Addendum No. 01

August 19, 2025

Memorial Stadium Modernization

Fieldhouse & Stadium

OWNER:	Madera Unified School District 1902 Howard Road Madera, CA 93637
PREPARED BY:	PBK Architects, Inc. 7790 N. Palm Avenue Fresno, California 93711
MADERA UNIFIED BID NO.:	073025
PBK PROJECT NO.:	20-51
DSA APPLICATION NO.:	02-121624 Fieldhouse 02-122784 Stadium

NOTICE TO BIDDERS

A. Receipt of this Addendum shall be acknowledged on the Proposal Form.
B. This Addendum forms part of the Contract Documents for the above-mentioned project and shall be incorporated integrally therewith.
C. Each proposer shall make necessary adjustments and submit their proposal with full knowledge of all modifications, clarifications, and supplemental data included therein. Where provisions of the following supplemental data differ from those of the original Contract Documents, this Addendum shall govern.
D. The description of changes to the documents included below is for the bidder's reference and should not be interpreted as an exhaustive list of every design change in the documents. The design team has put together a list to help bidders quickly assess and quantify the changes that have been incorporated. Design changes on the documents have been clouded, but it is the bidders' responsibility to fully examine the addendum documents and allow for all design changes included in them.

02-122784 STADIUM - ADDENDUM 01 ITEMS:

SPECIFICATION SECTIONS:

1-01 Remove and replace the following Specifications Sections with the attached revised versions:

a. 09 65 13.13 – RESILIENT BASE (3 pages)

1-02 Add the following Specifications Section to the Project Manual where indicated:

a. 07 55 00 – MODIFIED BITUMINOUS MEMBRANE ROOFING (13 pages)
b. 09 96 00 – HIGH PERFORMANCE COATINGS (4 pages)

CIVIL DRAWINGS:

1-03 Remove and replace the following sheets, revisions have been clouded: (6 Sheets)

a. C2.1 DEMOLITION PLAN
   - Revised two trees near Olive Ave to be protected.
   - Revised boundary of vegetation removal.
   - Included legend

Memorial Stadium Modernization

Fieldhouse & Stadium

b. C2.2 DEMOLITION PLAN
   - Revised boundary of vegetation removal.
   - Included legend keynote 'RQ'.
c. C2.3 DEMOLITION PLAN
   - Flagpole revised to be removed and returned to owner.
   - Legend keynote 'RQ' was added.
d. C3.3 SITE PLAN
   - Included flagpole with concrete base near scoreboard.
   - Included flagpole symbol in legend.
e. C4.3 HORIZONTAL CONTROL PLAN
   - Included flagpole concrete base control point and dimensions.
f. C4.5 HORIZONTAL CONTROL TABLE
   - Included control point 1292.

LANDSCAPE DRAWINGS:

1-04 Remove and replace the following sheets, revisions have been clouded: (6 Sheets)

a. IR1.0 OVERALL IRRIGATION PLAN
   - Relocated tree bubblers and revised pipes' location
b. IR1.2 IRRIGATION PLAN
   - Relocated tree bubblers and revised pipes' location
c. L1.0 OVERALL PLANTING PLAN
   - Added mulch to revised two trees near Olive Ave to be protected.
   - Increased new turf area at Northwest of the site.
   - Increased new turf area at Northeast of the site.
   - Relocated tree Ulmus parvifolia 'Dynasty' to south of the planter.
d. L1.1 PLANTING PLAN
   - Added mulch to revised two trees near Olive Ave to be protected.
   - Increased new turf area at Northwest of the site.
e. L1.2 PLANTING PLAN
   - Increased new turf area at Northeast of the site.
   - Relocated tree Ulmus parvifolia 'Dynasty' to south of the planter.
f. L1.5 PLANTING LEGEND
   - Updated Plant Legend – Increased turf area; Increased mulch area.

ARCHITECTURAL DRAWINGS:

1-05 Remove and replace the following sheets, revisions have been clouded: (21 Sheets)

a. AS.1 – OVERALL SITE PLAN
   - Updated Overall Site Plan to match with Civil.
b. AA1.1 – FLOOR PLAN - BUILDING A
   - Removed casework from A107 Uniform Storage.
c. AA1.2 – ENLARGED FLOOR PLAN & INT. ELEVS.
   - Corrected elevations and legend.
d. AA3.1 – ENLARGED RCP - BUILDING A
   - Revised lighting at Boys and Girls Restrooms.
   - Added note regarding Gyp Board.
   - Corrected keynotes.
e. AA7.1 – INTERIOR ELEVATIONS - BUILDING A
   - Removed casework from A107 Uniform Storage.

f. AB1.2 – ENLARGED FLOOR PLAN & INT. ELEV.
   - Corrected elevations and legend.
g. AB3.1 – ENLARGED RCP - BUILDING B
   - Revised lighting at Restrooms.
   - Added note regarding Gyp Board.
   - Corrected keynotes.
h. AC1.1 – FLOOR PLAN - BUILDING C
   - Added solid surface countertops at Press Box media rooms.
i. AC3.1 – ENLARGED RCP - BUILDING C
   - Revised lighting at Storage rooms.
j. AC6.1 – BUILDING SECTIONS - BUILDING C
   - Removed hard lid ceilings at Storage rooms.
k. AC7.2 – INTERIOR ELEVATIONS - BUILDING C
   - Corrected elevations and legend.
l. AD1.1 – FLOOR PLAN - BUILDING D
   - Added transaction windows.
m. AD5.1 – ELEVATIONS & SECTIONS - BUILDING D
   - Corrected elevations.
n. AD7.1 – INTERIOR ELEVATIONS - BUILDING D
   - Corrected elevations.
o. AD9.1 – SPECIALTY DETAILS
   - Revised plaster at details 08 and 09.
p. AX1.1 – WALL DETAILS
   - Revised wall details.
q. AX2.4 – TYPICAL EXTERIOR DETAILS
   - Removed detail 23.
r. AX3.2 – TYPICAL OPENINGS DETAILS – STOREFRONT
   - Revised storefront details.
s. AX4.1 – ROOF DETAILS
   - Revised roof details.
t. AX8.0 – FINISH/ COLOR SCHEDULE
   - Corrected table.
u. AX8.1 – DOOR & WINDOW SCHEDULE
   - Added door type.
   - Revised gate type.
   - Revised window schedules and window types.

ELECTRICAL DRAWINGS:

1-06 Remove and replace the following sheets, revisions have been clouded: (2 Sheets)

a. ES1.2 – ENLARGED ELECTRICAL SITE PLAN
   - Relocated fixture type ‘P6’ to be on bleachers between buildings ‘A’ and ‘B’.
b. EX1.1 – LIGHTING FIXTURE SCHEDULE
   - Changed fixture type ‘P6’ to a larger model.
   - Updated detail A10 for updated weight of larger fixture and changed name.

REPORTS:

1-07 Add the following reports to the Project Manual where indicated:

a. Asbestos Survey Report S93-23 (11 pages)

b. Asbestos Survey Report S99-24 (21 pages)
c. Stormwater Pollution Prevention Plan (614 pages)

RFI RESPONSES:

1-08 **PRE-BID RFI LOG**: Refer to attached log. (2 pages)

GENERAL:

1-09 **BID TIME HAS BEEN MOVED FROM 10:00AM TO 2:00PM.**

END OF ADDENDUM NO. 1

Michael Schöen, Architect

SECTION 09 65 13.13 RESILIENT BASE

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes requirements including but not limited to:
   1. Rubber base.
   2. Accessories necessary for a complete installation.

B. Related Sections:
   1. Section 09 21 16: Gypsum Board Assemblies.
   2. Section 09 65 23: Luxury Vinyl Tile Flooring.
   3. Section 09 68 00: Carpeting.

1.3 SUBMITTALS

A. Product Data: Technical data for each type of product including manufacturer's installation instructions.

B. Samples: Sample of Base Selected or Color Chart if none selected.

C. Maintenance Data: Submit for inclusion in maintenance manuals.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Entity having minimum 5 years documented experience who employs workers competent in techniques required by manufacturer for floor tile installation and seaming method indicated.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store base and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 degrees F (10 degrees C) or more than 85 degrees F (29 degrees C). Store floor tiles on flat surfaces.

PART 2 PRODUCTS

2.1 MATERIALS

A. Product by: **Roppe Corporation** or Architect approved equivalent.

B. Rubber Base - ASTM F1861:
   1. Material: Rubber, vulcanized, Type TS, Group I, Styles A and B.
   2. Manufacturing Method: Group I (solid, homogeneous).
   3. Style: Topset cove; minimum 100 foot coil, cut to length required.
   4. Minimum Thickness: 0.125 inch (3.2 mm).
   5. Color: Charcoal.

6. Height: 4 inches, unless otherwise indicated on drawings.
7. Outside Corners: Job formed.
8. Inside Corners: Job formed.
9. 4’ long lengths, not rolled goods.

C. Adhesives: Water resistant type recommended by floor tile and adhesive manufacturers to suit floor tile and substrate conditions indicated.

PART 3 EXECUTION

3.1 FIELD CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 degrees F (21 degrees C) or more than 85 degrees F (29 degrees C), in spaces to receive floor tile during the following time periods:
   1. 48 hours before installation.
   2. During installation.
   3. 48 hours after installation.

B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 degrees F (13 degrees C) or more than 95 degrees F (35 degrees C).

C. Close spaces to traffic for 48 hours after installation.

3.2 EXAMINATION

A. Examine substrates for compliance with requirements for maximum moisture content and other conditions affecting performance of the work:
   1. Verify that finishes of substrates comply with tolerances and other requirements specified for other work and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of floor tile.

B. Proceed with installation after correcting unsatisfactory conditions. Installation of resilient flooring and accessories indicates acceptance of surfaces and conditions.

3.3 PREPARATION

A. Immediately before installation, sweep clean substrates to be covered by resilient base.

3.4 INSTALLATION

A. Comply with manufacturer's written instructions for installing flooring. Scribe and cut flooring to butt neatly and tightly to vertical surfaces, permanent fixtures, and built in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Extend flooring into toe spaces, door reveals, closets, and similar openings.

B. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on flooring as marked on substrates. Use chalk or other nonpermanent marking device.

C. Resilient Base:
   1. Comply with manufacturer's written instructions for installing resilient base. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required:

I. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.

Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
Do not stretch resilient base during installation.
On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.
Preformed Corners: Install preformed corners before installing straight pieces.
Job Formed Corners:

1) Outside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches (76 mm) in length.
2) Form without producing discoloration (whitening) at bends.
3) Inside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches (76 mm) in length:
   a) Miter or cope corners to minimize open joints.

END OF SECTION 09 65 13.13

SECTION 07 55 00
MODIFIED BITUMINOUS MEMBRANE ROOFING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Provide labor, materials, services and equipment necessary to furnish and install work as indicated and as specified herein, which includes but is not limited to:
   1. Multi-ply modified bitumen roofing system over rigid insulation.
   2. System to be cold-applied

1.2 RELATED SECTIONS

A. Section 07 62 00 - Sheet Metal Flashing and Trim

B. Section 07 72 33 - Roof Hatches

C. Section 07 84 00 – Firestopping

D. Section 07 92 00 – Joint Sealants.

1.3 REFERENCES

A. 2022 California Building Code (CBC)

B. American Society of Civil Engineers - Reference Document ASCE 7-16, Minimum Design Loads for Buildings and Other Structures.

C. American National Standards Institute (ANSI):

D. American Standard of Testing Methods (ASTM):

E. California Title 24 Energy Efficiency Standards, Cool Roof Rating Council (CRRC) Rated Product Directory.

F. Factory Mutual (FM):

G. Sheet Metal and Air Conditioning Contractors National Association Inc. (SMACNA) Architectural Sheet Metal Manual.

H. Underwriters Laboratory (UL):

1.4 DEFINITIONS

A. Roofing Terminology: Definitions in NRCA's The NRCA Roofing and Waterproofing Manual apply to work of this Section

B. International Institute of Building Enclosure Consultants (IIBEC) Glossary of Building Envelope Terms.

1.5 SUBMITTALS

A. Assembly Letter: Submit project-specific letter authored by the technical department of the manufacturer of the roofing system addressed to the installer. The letter shall include

the following:

1. Components of the roofing assembly from the deck to the surface of the membrane corresponding to the project specifications.
2. If the project has multiple assemblies (such as multiple deck types), the letter must include each specified variation.
3. Attachment of each component of the roofing assembly to its respective substrate. Attachment details shall include:
   a) Component
   b) Method of attachment (fastened, self-adhered, etc.)
   c) Product(s) used (type of fastener, adhesive, etc.)
   d) Attachment density (fasteners per board, bead spacing, etc.) for the field, perimeter and corner.
4. Attachment of each component of the base flashing to its respective substrate. Attachment details shall include:
   a) Component
   b) Method of attachment (fastened, self-adhered, etc.)
   c) Product(s) used (type of fastener, adhesive product, etc.)
5. For each critical layer of the assembly, the required minimum fastener pull-out resistance expressed in pounds-per-square foot to meet specified wind uplift performance requirements for the critical layer(s) of the assembly.
6. For fire performance, the UL listing number along with the maximum incline for specified fire rating.
7. For wind performance, a tested assembly corresponding to roofing assembly that meets the wind performance requirements specified. For each assembly specified the tested assembly details shall include:
   a) Name of the independent third-party testing agency
   b) Reference number of the assembly.
   c) Design pressure and/or corresponding uplift resistance achieved.
8. Contractor eligibility to receive guarantee for project.
9. Guarantee duration and type
10. Overburden, if specified, along with details on whether the overburden is included or excluded from the guarantee coverage.
11. Eligibility of each specified assembly to qualify for any specified guarantee riders such as wind, hail, puncture, etc.

B. Guarantee Registration: Prior to roofing system installation, installer shall provide a copy of the guarantee application confirmation issued by the roofing system manufacturer. The guarantee registration shall include each roofing section and specified assembly as detailed in the assembly letter. Guarantee registration shall include any specified riders or overburden.

C. Guarantee: Provide manufacturer’s current guarantee specimen for the specified guarantee. If there are any specified riders (such as overburden, hail, etc) a specimen of the rider shall be submitted along with the guarantee specimen.

D. Certificates: Installer shall provide written documentation from the manufacturer of their authorization to install the roof system, and eligibility to obtain the warranty specified in the section and dated within 30 days of providing submittal.

E. Cool Roof Rating Council (CRRC): Submit membrane or coating product listing from the Cool Roof Rated Product Directory listing the minimum 3-year aged solar reflectance, minimum thermal emittance and minimum SRI of submitted membrane.

F. Product Data Sheets: Submit manufacturer’s product data sheets, installation instructions, and/or general requirements for each component.

G. Detail Drawings: Provide roofing system details and details of attachment to other work, including:
   1. Insulation fastening and/or adhesive patterns
   2. Base flashings and membrane terminations.
   3. For field-fabricated details that do not conform to manufacturer standard details, submit a shop drawing that has been reviewed, approved and stamped by the manufacturer.
   4. Tapered insulation shop drawings indicating slopes, crickets, sumps and saddles.

H. Safety Data Sheets: Provide a table summarizing each product data sheet in the submittal sorted alphabetically by its brand name and cross referencing the corresponding applicable Safety Data Sheet (SDS) with the exact name as it appears on the document. Note which products do not require a SDS in the summary table. Immediately after the summary table document, submit the SDS documents in alphabetical order by their name. Submit the SDS summary table and SDS documents as a separate file if submitting electronically.

I. Upon substantial completion of work, submit the following to the architect for submission to the owner:

J. Manufacturer's guarantee: Manufacturer's written guarantee as specified.

K. Contractor's warranty: Contractor's written warranty as specified.

L. Maintenance procedures: Three (3) copies of roof system manufacturer's printed instructions for Owner's use regarding care and maintenance of roof.

M. Letter from roofing manufacturer verifying that guarantee has been paid and is active.

N. Fastener and/or adhesive pull-out reports

O. Field quality-control reports from the manufacturer, including all in-progress reports, final inspection and resolution of any punch list items.

1.6 DESIGN / PERFORMANCE REQUIREMENTS

A. Basis-of-Design: The Garland Company, Inc.; 3800 E. 91st St., Cleveland, OH 44105. Local representative Rich Jones 559-647-1196 rjones@garlandco.com.

B. Wind Uplift Resistance: Roofing system stall meet the intent of systems that have been successfully tested by a qualified testing and inspecting agency to resist wind uplift pressures calculated in accordance with ASCE 7-2016 and having a safety factor of 2 or greater.

C. Fire Classification:
   1. Meets requirements of UL Class A up to ½" or greater

D. Roof Slope:
   1. Finished roof slope for membrane surfaces shall be 1/4 inch per foot, two percent (2%) minimum for roof drainage.

E. Cool Roof Rating Council (CRRC). Membrane or surface coating shall be listed on the CRRC rated product directory with published values meeting or exceeding the following values:

1. Minimum 3-Year Aged Solar Reflectance: 0.63
2. Minimum thermal Emittance: 0.75
3. Minimum Solar Reflectance: 75

1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications:
   1. Manufacturer shall be the primary manufacturer of the roofing membrane.
   2. Manufacturer shall supply every component of the roofing assembly included in the guarantee under their brand or have it co-branded.
   3. Manufacturer shall provide a technical representative to inspect the roof with the following qualifications to support this project:
      a. Not involved in product sales.
      b. Primarily responsible for evaluating installation of product and training contractors on proper installation techniques.
      c. Able to attend the pre-construction conference, in-progress meetings and all other site meetings in person.
      d. Able to provide a minimum of one in-progress visit for each 100 squares of roofing during construction.
      e. Able to complete the final inspection within 30 days of receiving notice from the installer.
      f. Able to validate, if necessary, the completion of any punch-list items within 30 days of receiving notice from the installer.
   4. Provide reports to contractor and architect within 5 days of completing the pre-construction conference, in-progress visits, final inspection and any post-final inspections.
   5. Provide specified warranty upon satisfactory project completion.

B. Contractor Qualifications:
   1. Contractor shall be authorized by the manufacturer to install specified materials prior to the bidding period through satisfactory project completion.
   2. Applicators shall have completed projects of similar scope using same materials as specified herein.
   3. Contractor shall provide full time, onsite superintendent or foreman experienced with the specified roof system through satisfactory project completion.
   4. Applicators shall be skilled in the application methods for all materials.
   5. Contractor shall maintain a daily record, onsite, documenting material installation and related Project conditions.
   6. Contractor shall maintain a copy of all submittal documents, onsite, available at all times for reference.
   7. Forward all manufacturer inspection reports to architect within 2 business days of receipt.

C. Test Reports
   1. Roof deck fastener pullout test
   2. Bonded pull test

D. Source Limitations: All products used in the system and pertaining to the manufacturer's guarantee shall be labeled by the single source roofing manufacturer issuing the guarantee

E. Weather Limitations: Proceed with installation only when current and forecasted weather conditions permit roofing system to be installed in accordance with manufacturer's written instructions and guarantee requirements.

1.8 WARRANTY

A. Manufacturer System Warranty
   1. Provide manufacturer's no-dollar limit (NDL) guarantee. Manufacturer agrees to repair or replace components in the roofing system which cause a leak due to a failure in materials or workmanship.
   2. Single-source guarantee includes roofing membrane, base flashings, roofing membrane accessories, roof insulation, fasteners, adhesives, cover board, vapor retarder, walkway products, manufacturer's expansion joints, manufacturer's edge metal products, and other approved single source components of roof system marketed by the manufacturer.
   3. Duration: Thirty (30) years from the date of Substantial Completion. Guarantees requiring period inspections and certification from the manufacturer are not acceptable.
   4. Fees: Contractor is required to include fees associated with manufacturer attendance at the pre-construction conference, one in-progress inspection per 100 squares of roofing during construction, final inspection and any subsequent inspections to resolve punch-list items. For projects with overburden, such as a photovoltaic system, fees associated with the manufacturer reviewing, inspecting and accepting the roofing system as part of the installation of the overburden are included at time of bid.
   5. Registration: Contractor is required to list PBK Architects as the architect of record, and BEAM Professionals as the specifier/consultant of record in the appropriate fields when applying for the manufacturer's warranty.

B. Installer Warranty
   1. Provide separate five (5) year workmanship warranty. In the event any work related to roofing, flashing, or metal is found to be within the installer warranty term defective or otherwise not in accordance with the Contract Documents, the installer shall repair that defect to the Owner and copy be sent to the manufacturer.

1.9 PRE-INSTALLATION CONFERENCE

A. Prior to scheduled commencement of the roofing installation and associated work, conduct a meeting in-person at the project site. The installer shall record conference discussions to include decisions and agreements reached (or disagreements), and furnish copies of recorded discussions to each attending party. The main purpose of this meeting is to review foreseeable methods and procedures related to roofing work.
   1. Meet in-person at the job site with the owner's representative, the architect, the consultant, the manufacturer's field technical representative, the deck installer if applicable, and installers whose work interfaces with or affects roofing, including installers of roof accessories, photovoltaic systems, and roof-mounted equipment.
   2. At least one of the manufacturer's representatives attending the pre-installation conference must be primarily employed as a field technical representative, not involved with product sales.
   3. Installer shall submit a copy of the approved roofing guarantee application prior to the meeting and distribute to the owner's representative and the architect.
   4. Review methods and procedures related to roofing installation, including manufacturer's written instructions and the project-specific assembly letter provided in the submittal.
   5. Review and finalize construction schedule, and verify availability of materials, installer's personnel, equipment, and facilities needed to make progress and avoid delays.
   6. Define access to the roof and working hours.
   7. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.

8. Review and finalize construction schedule, and verify availability of materials, installer's personnel, equipment, and facilities needed to make progress and avoid delays.
9. Review structural loading limitations of roof deck during and after roofing.
10. Review staging areas and loading plan.
11. Review temporary material protecting procedures during storage.
12. Review night seal procedures and requirements.
13. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that affects roofing system.
14. Review governing regulations and requirements for insurance and certificates if applicable.
15. Review temporary protection requirements for roofing system during and after installation. Discuss requirements of other related trades to immediately mark damaged material and report it.
16. Review roof observation and repair procedures after roofing installation

1.10 DELIVERY, STORAGE, AND HANDLING

A. Refer to each product data sheet or other published literature for specific requirements.

B. Delivery of materials in manufacturer’s original unopened packaging with all tags and labels intact and legible. Carton and can labels shall indicate appropriate warnings, storage conditions, lot numbers, and usage instructions. Handle and store materials and equipment in such a manner as to avoid damage. The proper storage of materials is the sole responsibility of the unit contractor. Materials damaged in shipping or storage shall not be used. Wet or damaged roofing materials shall be discarded, removed from plant and jobsite, and replaced with new materials prior to application.

C. Do not expose materials to moisture in any form before, during, or after delivery to the site. Reject delivery of materials that show evidence of contact with moisture.

D. Protect and store materials in a dry, well-vented, and weatherproof location. Only materials to be used the same day shall be removed from this location. During cold weather, store materials in a heated location, removed only as needed for immediate use.

E. When materials are to be stored outdoors, store away from standing water, stacked on raised pallets or dunnage, at least four inches (4”) or more above ground level. Carefully cover storage with “breathable” tarpaulins to protect materials from precipitation and to prevent exposure to condensation.

F. Materials shall be stored above 55°F a minimum of 24 hours prior to application.

G. Ensure that all materials used in the project have a sufficient shelf life to avoid any issues with expiration before the project's completion.

H. Properly dispose of all product wrappers, pallets, cardboard tubes, scrap, waste, and debris. All damaged materials shall be removed from jobsite and replaced with new, suitable materials.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Basis-of Design Manufacturer: Manufacturer and basis of design shall be the following;

however, products of other manufacturers will be considered for acceptance provided they equal or exceed the material requirements specified and acceptance is provided by the Architect in writing prior to bidding:

1. The Garland Company, Inc.; 3800 E. 91st St., Cleveland, OH 44105. Local Representative: Richard Jones Phone: (559) 647-1196. rjones@garlandind.com Web Site: www.garlandco.com.
2. Approved equal.

B. In making a request for substitution, the Bidder/Roofing Contractor represents that it has:
   1. Investigated the proposed product or method and determined that it is equal or superior in all respects to that specified.
   2. The ability to offer the same guarantee for substitution as for the product and method specified.
   3. Waived all claims for additional cost related to substitution, which consequently become apparent.

2.2 BASE PLY AND CAP SHEET MATERIALS

A. Roofing Membrane Sheet: SBS-modified asphalt sheet, smooth surfaced, suitable for application method specified.
   1. ASTM D6163, Type I or Type II, Grade S, glass-fiber reinforced.
   2. Basis-of-Design: Stressbase Plus 80 Base Sheet by The Garland Co.

B. Roofing Membrane Cap Sheet: SBS-modified asphalt sheet, granular surfaced, suitable for application method specified.
   1. ASTM D6162, Type II or Type III, Grade G, composite polyester and glass-fiber reinforced.
   2. Basis-of-Design: Stressply Plus FR Mineral Surfaced Cap Sheet by The Garland Co.

2.3 FLASHING MATERIALS

A. Backer Sheet: SBS-modified asphalt sheet; smooth surfaced; suitable for application method specified.
   1. Must comply with one of the following ASTM standards:
      a. ASTM D6163, Grade S, glass-fiber reinforced
      b. ASTM D6164, Grade G, polyester-reinforced
   2. Basis-of-Design: Stressbase Plus 80 Base Sheet by The Garland Co.

B. Flashing Sheet: SBS-modified asphalt sheet, smooth surfaced, suitable for application method specified.
   1. Must comply with one of the following ASTM standards:
      a. ASTM D6162, Grade G, composite polyester and glass-fiber reinforced.
      b. ASTM D6164, Grade G, polyester-reinforced
      c. ASTM D6221, Grade G, composite polyester and glass-fiber reinforced
   2. Basis-of-Design: Stressply Plus FR Mineral Surfaced Cap Sheet by The Garland Co.

C. Liquid Applied Flashing: A liquid and fabric-reinforced system appropriate suitable for application method specified supplied by the manufacturer of the roofing system and included as part of the roofing system guarantee.
   1. Basis-of-Design: Tuff Flash Plus Lo Liquid Flashing System by The Garland Co.

2.4 AUXILIARY ROOFING MATERIALS:

A. General: Auxiliary materials recommended by roofing system manufacturer for intended use.

B. Cold-Applied Adhesive: Cold-applied adhesive specially formulated for compatibility and use with membrane applications.

1. Basis-of-Design: WeatherKing Plus WC Cold Applied Interply Adhesive by The Garland Co.

C. Cold-Applied Flashing Adhesive: Cold-applied adhesive specially formulated for compatibility and use with flashing applications.

1. Basis-of-Design: WeatherKing Plus Cold Applied Flashing Adhesive by The Garland Co.

D. Miscellaneous Accessories: Provide miscellaneous accessories recommended by roofing system manufacturer.

E. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for intended use and provided by roofing manufacturer.

2.5 REFLECTIVE COATING

A. Base Coating: Coating or primer provided by roofing manufacturer and formulated to prevent bleed through asphalt substrates.
1. Basis-of-Design: Acrylic Base Coat Grey by The Garland Co.

B. Surface Coating: Acrylic or silicone coating furnished by roofing manufacturer.
1. Basis-of-Design: Pyramic Acrylic Top Coat White by The Garland Co.

2.6 WALKWAYS

A. Walkway Pads: As recommended and furnished by the membrane manufacturer set in approved adhesive to control foot traffic on roof top surface and provide a durable system compliant non-slip walkway

2.7 COVER BOARD

A. Gypsum Board: ASTM C 1177, Heavy duty coated glass-mat facer water-resistant gypsum substrate for adhered roof applications furnished by roofing system manufacturer.
1. Thickness: ½”
2. Basis-of-Design: DensDeck Prime Roof Board

2.8 ROOF INSULATION

A. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Class 1, Grade 2, glass-reinforced organic facer bonded to a core of polyisocyanurate foam with a compressive strength of 20 psi.
1. Provide insulation package with minimum R-Value of 30
2. Flat and tapered panels to provide slope as required

2.9 INSULATION ACCESSORIES

A. Provide saddles, crickets, tapered edge strips, and other insulations shapes where indicated for sloping to drain. Fabricate to slopes indicated.

B. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening roof insulation to substrate,

and furnished by roofing system manufacturer.

C. Urethane Adhesive: Manufacturer's two component polyurethane adhesive formulated to adhere insulation to substrate.
   1. Basis-of-Design: Insuloc HR Insulation Adhesive by The Garland Co.

D. Insulation Cant Strip:
   1. ASTM C 728, perlite insulation board
   2. ASTM C 208, cellulosic fiber board.

2.10 EDGE METAL COMPONENTS

A. Expansion Joints: Provide factory fabricated weatherproof, exterior covers for expansion joint openings consisting of flexible rubber membrane, supported by a closed cell foam to form flexible bellows, with two metal flanges, adhesively and mechanically combined to the bellows by a bifurcation process.

B. Coping System: Manufacturer's factory fabricated coping consisting of a base piece and a snap-on cap. Provide product from single-source roofing system supplier that is included in the No Dollar Limit guarantee.
   1. Basis-of-Design: R-Mer Edge Coping System by The Garland Co.

C. Shop-Fabricated Edge Metal: Custom-fabricated edge metal meeting the criterion of ANSI/SPRI ES-1. Must be approved by manufacturer for inclusion in their guarantee without exception.

D. Metal Flashing Sheet: Metal flashing sheet is specified in Division 07 Section "Sheet Metal Flashing and Trim."

PART 3 EXECUTION

3.1 EXAMINATION

A. Steel Decks:
   1. Verify that surface plane flatness and fastening of steel roof deck complies with requirements in Division 05 Section "Steel Decking."
   2. Verify that decking is visibly dry and free of moisture.
   3. Verify that the decking is smooth and free of large cracks, holes, or sharp changes in elevation of the surface.
   4. When applicable perform pull test with the specific fastener being used on the project to confirm the fastener resistance meets the requirements for that particular system.

B. Concrete Decks:
   1. Verify that concrete curing compounds that will impair adhesion of roofing components to roof deck have been removed.
   2. Verify that concrete substrate is visibly dry and free of moisture.

3.2 PREPARATION

A. General: Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Fill substrate surface voids that are greater than 1/4 inch wide with an acceptable fill material.

D. Roof surface to receive roofing system shall be smooth, clean, free from loose gravel, dirt and debris, dry and structurally sound.

E. Prime decks where required, in accordance with requirements and recommendations of the primer and deck manufacturer.

F. Proceed with each step of installation only after unsatisfactory conditions have been corrected.

3.3 INSTALLATION - GENERAL

A. Install modified bitumen membranes and flashings in accordance with manufacturer's instructions and with the recommendations provided by the National Roofing Contractors Association's Roofing & Waterproofing Manual, the Asphalt Roofing Manufacturers Association, and applicable codes.

B. Commence installation of the roofing system at the lowest point of the roof (or roof area), working up the slope toward the highest point. Lap sheets shingle fashion so as to constantly shed water.

3.4 INSULATION INSTALLATION

A. Coordinate installation of roof system components so insulation and cover board are not exposed to precipitation or left exposed a the end of the workday.

B. Comply with roofing system manufacturer’s written instructions for installation of roof insulation and cover board.

C. Install tapered insulation under area of roofing to conform to slopes indicated.

D. Install insulation boards with long joints in a continuous straight line. Joints should be staggered between rows, abutting edges and ends per manufacturer’s written instructions. Fill gaps exceeding 1/4 inch (6 mm) with like material.

E. Install 2 or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches (150 mm) in each direction.

F. Trim surface of insulation boards where necessary at roof drains so completed surface is flush and does not restrict flow of water.

G. Install tapered edge strips at perimeter edges of roof that do not terminate at vertical surfaces.

H. Installation over Concrete Decks
1. Install each layer in a two-part urethane adhesive according to roofing system manufacturer’s instruction.
2. Stagger each layer of insulation
3. Install each layer to resist uplift pressure at corners, perimeter, and field of roof.

I. Installation over Steel Decks
1. Secure first layer of insulation to deck using mechanical fasteners designed and sized for fastening specified board type to deck type.
2. Install subsequent layers in a two-part urethane adhesive according to roofing system manufacturer’s instructions.
3. Install each layer to resist uplift pressure at corners, perimeter and field of roof.

3.5 COVERBOARD INSTALLATION

A. Coordinate installing membrane roofing system components so cover board is not exposed to precipitation or left exposed at the end of the workday.

B. Comply with membrane roofing system manufacturer's written instructions for installing roof cover board.

C. Install cover board with long joints in a continuous straight line. Joints should be staggered between rows, abutting edges and ends per manufacturer's written instructions. Fill gaps exceeding 1/4 inch (6 mm) with cover board.
   1. Cut and fit cover board within 1/4 inch (6 mm) of nailers, projections, and penetrations.

D. Trim surface of cover board where necessary at roof drains so completed surface is flush and does not restrict flow of water.
   1. Install tapered edge strips at perimeter edges of roof that do not terminate at vertical surfaces

E. Adhered Cover Board: Adhere cover board to substrate as follows:
   1. Install in a two-part urethane adhesive according to roofing system manufacturer's instruction
   2. Install to resist uplift pressure at corners, perimeter, and field of roof.

3.6 ROOFING MEMBRANE INSTALLATION, GENERAL

A. Install roofing membrane in accordance with roofing system manufacturer's written instructions, applicable recommendations of the roofing manufacturer and requirements in this Section.

B. Cooperate with testing and inspecting agencies engaged or required to perform services for installing roofing system.

C. Where roof slope exceeds 1/2 inch per 12 inches (1:24), contact the membrane manufacturer for installation instructions regarding installation direction and backnailing

D. Coordinate installing roofing system so insulation and other components of the roofing membrane system not permanently exposed are not subjected to precipitation or left uncovered at the end of the workday or when rain is imminent.
   1. Provide tie-offs at end of each day's work to cover exposed roofing membrane sheets and insulation.
   2. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system.
   3. Remove and discard temporary seals before beginning work on adjoining roofing.

3.7 SBS-MODIFIED BITUMINOUS MEMBRANE INSTALLATION

A. Install modified bituminous roofing base sheet and cap sheet according to roofing manufacturer's written instructions, starting at low point of roofing system. Extend roofing membrane sheets over and terminate beyond cants, with the following installation method:

B. Unroll roofing membrane sheets and allow them to relax.

C. Install one lapped base sheet course and mechanically fasten to substrate according to roofing system manufacturer's written instructions.

D. Adhere modified bituminous roofing membrane base sheet and cap sheet to substrate in cold-applied adhesive according to roofing system manufacturer's instruction.

E. Laps: Accurately align roofing membrane sheets, without stretching, and maintain uniform side and end laps. Stagger end laps. Completely bond and seal laps, leaving no voids.
   1. Repair tears and voids in laps and lapped seams not completely sealed.

F. Install roofing membrane sheets so side and end laps shed water

3.8 FLASHING AND STRIPPING INSTALLATION

A. Install base flashing over cant strips and other sloping and vertical surfaces, at roof edges, and at penetrations through roof, and secure to substrates according to roofing system manufacturer's written instructions and as follows:

B. Prime substrates with asphalt primer if required by roofing system manufacturer.

C. Backer Sheet Application:
   1. Non-Concrete Substrate: Mechanically fasten backer sheet to walls or parapets.
   2. Concrete Substrate: Adhere backer sheet to substrate in approved adhesive applied at rate required by roofing system manufacturer

D. Flashing Sheet Application: Adhere flashing sheet to substrate in approved adhesive applied at rate required by roofing system manufacturer.

E. Mechanically fasten top of base flashing securely at terminations and perimeter of roofing.

F. Roof Drains: Set 30-by-30-inch 4 lb lead flashing sheet in a bed of flashing adhesive on completed roofing membrane. Cover metal flashing with roofing membrane cap-sheet stripping and extend a minimum of 4 inches beyond edge of metal flashing onto field of roofing membrane. Clamp roofing membrane, metal flashing, and stripping into roof-drain clamping ring.

G. Install stripping according to roofing system manufacturer's written instructions.

H. Flash tubular penetrations using 4lb lead jacks according to manufacturer's written instructions.

I. Flash all irregular (non-tubular) penetrations using liquid applied flashing system.

3.9 COATING INSTALLATION

A. A coating is only required if the cap sheet does not meet the aged minimum reflectance performance requirements as specified herein. Cap sheets with a factory-applied coating or specialty granule that meets specified reflective performance requirements do require a coating.

B. Ensure that all surfaces are clean, dry and free of any dirt, grease, oil or other debris that may interfere with proper adhesion.

C. Apply base coat or primer to roofing membrane and base flashings as recommended by the manufacturer.

D. Apply top coat to roofing membrane and base flashings as recommended by the manufacturer. Allow the base coat to completely dry before applying the second coat.

3.10 WALKWAY INSTALLATION

A. Walkway Pads: Install walkway pads using units of size indicated, or if not indicated, of

manufacturer's standard size according to walkway pad manufacturer's written instructions.

3.11 FIELD QUALITY CONTROL

A. In-Progress Inspections: Arrange for roofing system manufacturer's technical representative to inspect roofing installation and submit report to architect.
   1. Minimum one in-progress inspection
   2. Additional in-progress inspection for every 100 squares of roofing

B. Final Roof Inspection: Arrange for roofing system manufacturer's technical representative to inspect roofing installation on completion and submit report to Architect.

C. Repair or remove and replace components of roofing system where test results or inspections indicate that they do not comply with specified requirements.

D. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements

3.12 CLEANING

A. Clean-up and remove daily from the site all wrappings, empty containers, paper, loose particles and other debris resulting from these operations.

B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

3.13 PROTECTION

A. Provide traffic ways, erect barriers, fences, guards, rails, enclosures, chutes and the like to protect personnel, roofs and structures, vehicles and utilities.

B. Protect exposed surfaces of finished walls with tarps to prevent damage.

C. Plywood for traffic ways required for material movement over existing roofs shall be not less than 5/8 inch (16 mm) thick.

D. In addition to the plywood listed above, an underlayment of minimum 1/2 inch (13 mm) recover board is required on new roofing.

E. Special permission shall be obtained from the Manufacturer before any traffic shall be permitted over new roofing.

END OF SECTION 07 55 00

SECTION 09 96 00 HIGH PERFORMANCE COATINGS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Exterior Substrates:
1. Section 03 30 00 – Cast-In-Place Concrete
2. Section 04 22 00 – Concrete Masonry Unit
3. Section 07 91 00 – Exterior Wall Joint Sealants
4. Section 09 90 00 – Exterior Painting

B. Reference Standards:
1. ASTM D2247 - Standard Practice for Testing Water Resistance of Coatings in 100% Relative Humidity.
2. ASTM D4263 - Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method.
3. ICRI Guide No. 03732 - Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings and Polymer Overlays.
4. SSPC-SP 3 - Power Tool Cleaning.
5. SSPC-SP 13/NACE 6 - Surface Preparation of Concrete.

1.3 SUBMITTALS

A. Comply with Section 01 33 00 – Submittal Procedures.

B. Product Data - Manufacturer's data sheets on each product to be used, including:
1. Preparation instructions and recommendations.
2. Storage and handling requirements and recommendations.
3. Application instructions.
4. Manufacturer's Safety Data Sheets.

C. Shop Drawings - Submit a complete schedule of products proposed for use, including identifying product names and catalog numbers:
1. Arrange in same format as Finish Schedule.
2. Include applicable manufacturer's data and recommendations.

D. Selection Samples: For each finish product specified, two (2) complete sets of coating applied to sample wall types representing manufacturer's finish installation.

E. Quality Control Submittals:
1. Provide a protection plan of surrounding areas and non-work surfaces.

F. Manufacturer's Certificates: Certify products that meet or exceed specified requirements and are suitable for intended application.

G. Closeout Submittals: Provide manufacturer's maintenance instructions that include recommendations for periodic cleaning and maintenance of coatings specified.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications - Provide all products from a single manufacturer specializing in the manufacturing of finishes with a minimum of 10 years' experience:
   1. Materials shall be standard products of a single manufacturer.
   2. Secondary materials shall be specifically recommended by coating system manufacturer to ensure compatibility of systems.

B. Applicator Qualifications: A firm documented experienced applying coatings similar in material, design, and extent to those indicated for this project, whose work has resulted in applications with a record of successful in-service performance.

C. Regulatory Requirements: Conform to all applicable codes and ordinances for flame, fuel, smoke and volatile organic compounds (VOC) ratings requirements for finishes at time of application.

D. Mock-Up - Provide a mock-up for evaluation of surface preparation techniques and application workmanship:
   1. Located in areas designated by Architect.
   2. Prepare a surface preparation mock-up of each surface condition anticipated for the project.
   3. Provide mockup of at least 100 sf (9.3m2) to include surface preparation, sealant joint, and juncture details and allow for evaluation of repellent performance and finish.
   4. Conduct absorption test on cured field sample. Adjust application until required coating performance is achieved *(Reference Manuf. for absorption testing requirements)*.
   5. Do not proceed with remaining work until installation is approved by District and Architect for aesthetical review.
   6. Refinish mock-up area as required to produce acceptable work.
   7. Retain mock-ups to establish intended standards by which surface preparation and coating systems will be judged.

E. Pre-Construction Meeting:
   1. Convene a pre-application meeting two weeks before the start of application of wall coating system.
   2. Require attendance of parties directly affecting work of this section, including the Contractor, Architect, Owner's Representative, coating applicator, and a representative of coating material manufacturer.
   3. Items to be discussed at meeting shall include:
      a. Review of Contract Documents and accepted shop drawings and deviations or differences resolved.
      b. Establish areas on-site available for use as storage areas and working area.
      c. Review project schedule, and the work that should be completed before coating application.
      d. Review environmental conditions, surface conditions, surface preparation, application procedures, and protection after application.
      e. Review the surface preparation, application, cleaning, protection and coordination with other work.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to site in manufacturer's original, unopened containers and packaging, with manufacturer's labels clearly identifying product name and manufacturer and the following:
   1. Manufacturer and Coating or material name.
   2. Color name and number.

3. Batch or lot number.
4. Date of manufacture.
5. Mixing and thinning instructions.

B. Store materials in accordance with the manufacturer's instructions.
1. Store materials in dry, enclosed area with adequate protection from moisture.
2. Keep containers sealed until ready for use.
3. At all times, coatings shall be protected from freezing.

C. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

D. Protect materials during handling and application to prevent damage or contamination.

1.6 WARRANTIES

A. Manufacturer's warranty:
1. A standard 5-year labor and materials warranty to repair or replace any products that do not perform as warranted.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Approved Manufacturers shall be:
1. **Sika Corp**. https://usa.sika.com
2. Or approved equal

B. Manufacturer shall be certified under ISO 9001: All liquid materials, including primers, resins, curing agents, finish coats, and sealants are manufactured and tested under an ISO 9001 registered quality system.

2.2 MATERIALS

A. Basis of Design: Sika Sikagard 710 W Penetrating Sealant System

B. Or approved equal.

2.3 MATERIALS - GENERAL REQUIREMENTS

A. Sikagard 710 W is a solvent free concentrate of silane modified siloxane emulsion. It must be diluted, and the diluted liquid solution forms a water and chloride-ion repellent impregnation specifically formulated to seal absorbent cementitious surfaces and other masonry substrates.
1. Submit system to meet Basis of Design criteria or ensure approved equal demonstrates equivalent performance of Basis of Design system constraints.

PART 3 EXECUTION

3.1 EXAMINATION

A. Before starting work, ensure that environmental and site conditions are suitable for

application and curing.

B. Inspect surfaces for acceptability of levelness, moisture content and other critical factors at time of installation.

C. Report in writing to architect/engineer, with copy to manufacturer, of deficiencies that could impair work. Surfaces must be approved by the certified contractor prior to application of the system.

3.2 SURFACE PREPARATION

A. The substrate shall be prepared so as to be free of foreign materials such as oil, dust, dirt, water repellents, moisture and any other materials that inhibit adhesion.

B. Exposed aggregate: Power wash clean and allow to dry. Remove or grind down any aggregate that will not be sufficiently covered in the surface plane.

C. Protect plant life and surface to remain uncoated during application. Use drop-cloths or masking as required.

3.3 INSTALLATION

A. Apply the sealer in accordance with the manufacturer's instructions.

B. Stir material thoroughly before and during application.

C. Apply sealer with flooding action and eliminate ponding.

D. Apply evenly across the surface of maximum distribution of sealer.

3.4 FIELD QUALITY CONTROL

A. The contractor shall be responsible for the proper application of the sealer.

B. If required, the contractor shall certify in writing the quality of work performed relative to the substrate system, details, installation procedures, workmanship and as to the specific products used.

3.5 CLEANING

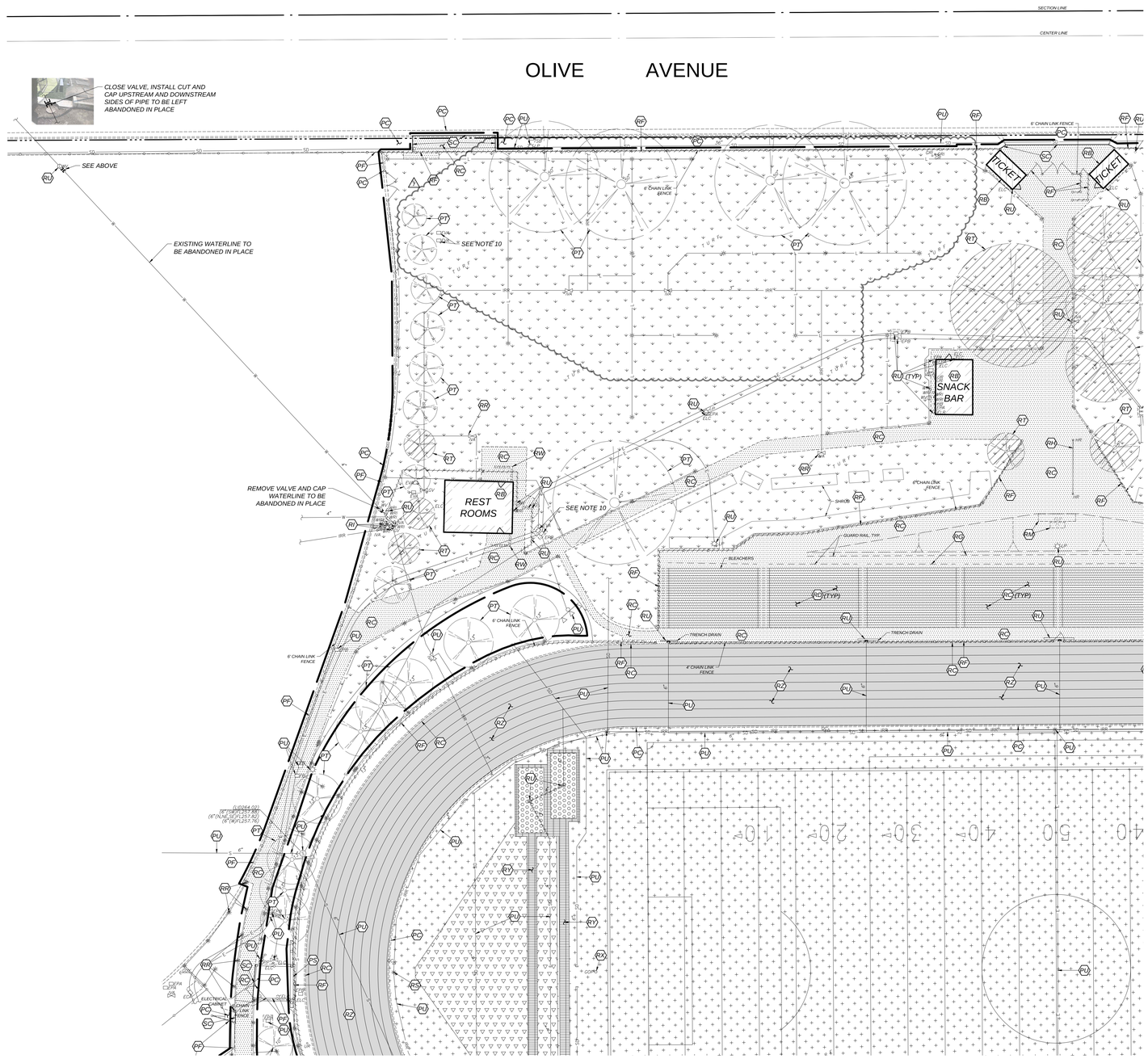
A. All excess materials shall be removed from the job site by the contractor and disposed of properly.

B. All surrounding areas shall be left free of debris and foreign substances resulting from the contractor's work.

3.6 PROTECTION

A. Protect sealer from damage during construction.

END OF SECTION 09 96 00



DEMOLITION LEGEND:

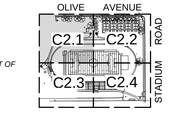
- APPROXIMATE LIMITS OF DEMOLITION. REMOVE EXISTING IMPROVEMENTS AS NECESSARY TO CONSTRUCT NEW IMPROVEMENTS SHOWN ON THESE PLANS UNLESS OTHERWISE NOTED ON THE PLAN. THE REMOVAL OF IMPROVEMENTS MUST BE COORDINATED WITH ALL PLAN SHEETS. CONTRACTOR MUST ALSO COORDINATE REMOVAL OF IMPROVEMENTS WITH UTILITY AGENCIES. PROTECT ALL IMPROVEMENTS NOT DESIGNATED FOR REMOVAL. SEE NOTE 1
- LIMITS OF VEGETATION REMOVAL. 4" MINIMUM DEPTH
- LIMITS OF REMOVAL OF SYNTHETIC TURF SURFACE MATERIAL BY OWNER; PROTECT EXISTING BASE AND SHOCK PAD
- LIMITS OF CONCRETE IMPROVEMENT REMOVAL
- LIMITS OF TRACK SURFACING REMOVAL BY OWNER
- LIMITS OF ASPHALTIC CONCRETE REMOVAL
- LIMITS OF SYNTHETIC TURF, SHOCK PAD AND BASE REMOVAL BY CONTRACTOR
- LIMITS OF SAND REMOVAL
- LIMITS OF TRACK SURFACING REMOVAL BY OWNER AND UNDERLYING CONCRETE REMOVAL BY CONTRACTOR
- LIMITS OF DEMOLITION PER DSA APPLICATION NO. 02-121624
- (PB) PROTECT BASKETBALL EQUIPMENT TO REMAIN
- (PC) PROTECT CONCRETE TO REMAIN
- (PF) PROTECT CHAIN LINK FENCE TO REMAIN
- (PP) REMOVE EXISTING STRIPING AND PROTECT EXISTING PLAYCOURT ASPHALT TO REMAIN
- (PS) PROTECT SCOREBOARD
- (PT) PROTECT TREE TO REMAIN
- (PU) PROTECT UTILITY TO REMAIN
- (PV) PROTECT VOLLEYBALL NET POST SLEEVE
- (RA) REMOVE AND LAWFULLY DISPOSE OF ASPHALT CONCRETE PAVEMENT STRUCTURAL SECTION
- (RB) REMOVE AND LAWFULLY DISPOSE OF BUILDING, FOUNDATION, UTILITIES, ETC.
- (RC) REMOVE AND LAWFULLY DISPOSE OF CONCRETE IMPROVEMENTS
- (RD) REMOVE AND LAWFULLY DISPOSE OF BLEACHERS
- (RE) REMOVE BASKETBALL EQUIPMENT AND RETURN TO OWNER
- (RF) REMOVE AND LAWFULLY DISPOSE OF CHAIN LINK FENCE FABRIC, POSTS AND FOOTINGS
- (RG) REMOVE AND RELOCATE BASKETBALL EQUIPMENT. SEE SITE PLAN SHEET C3.2 FOR NEW LOCATION
- (RH) REMOVE AND LAWFULLY DISPOSE OF HANDRAILS AND FOOTINGS
- (RI) DISCONNECT THE EXISTING BOOSTER PUMP FROM THE EXISTING IRRIGATION SERVICE LINE AND THE ELECTRICAL POWER. REMOVE PUMP, PIPE AND VALVES AS NEEDED FOR NEW BOOSTER PUMP PACKAGE. SEE SHEET IR1.1.
- (RJ) REMOVE AND SALVAGE IRON GATE, RETURN TO OWNER
- (RK) REMOVE AND LAWFULLY DISPOSE OF BLOCK WALK
- (RM) REMOVE AND RELOCATE MONUMENT SIGN. SEE ARCHITECTURAL SITE PLAN FOR NEW LOCATION
- (RN) REMOVE AND RETURN SHIPPING CONTAINER TO OWNER
- (RP) REMOVE AND RELOCATE FLAG POLE. SEE ARCHITECTURAL SITE PLAN FOR LOCATION
- (RQ) REMOVE AND RETURN FLAG POLE TO OWNER
- (RR) REMOVE AND RELOCATE (SEE IRRIGATION PLAN - IR1.1 TO IR1.5 FOR NEW LOCATION)
- (RS) REMOVE EXISTING SYN TURF ROTOR AND SWING JOINT. CAP TEE. REPLACE ALL VAULT BOX LIDS
- (RT) REMOVE AND LAWFULLY DISPOSE OF TREE AND ROOTS
- (RU) REMOVE AND LAWFULLY DISPOSE OF UTILITY
- (RV) REMOVE AND RELOCATE DEDICATION MONUMENT. SEE SITE PLAN FOR LOCATION
- (RW) REMOVE AND LAWFULLY DISPOSE OF WOOD BARRIER
- (RX) REMOVE GOAL POST AND FOOTINGS
- (RY) REMOVE AND LAWFULLY DISPOSE OF UNDERLYING CONCRETE IMPROVEMENTS
- (RZ) TRACK SURFACING REMOVAL BY OWNER
- (SB) SALVAGE BASKETBALL POLE AND BACKBOARD FOR REINSTALLATION
- (SC) SAWCUT
- C CAP END OF UTILITY LINE
- REMOVE TREE
- LIMIT OF CHAIN LINK FENCE REMOVAL
- LIMIT OF CONCRETE BLOCK WALL REMOVAL
- LIMIT OF SEWER MAIN LINE REMOVAL
- LIMIT OF STORM DRAIN LINE REMOVAL
- LIMIT OF STRIPING REMOVAL
- LIMIT OF IRRIGATION LINE REMOVAL

GENERAL DEMOLITION NOTES:

1. THE "LIMIT OF DEMOLITION" SHOWN IS APPROXIMATE AND IS GENERALLY CONSIDERED TO BE THE MINIMUM REMOVAL REQUIREMENTS. CONTRACTOR MUST COORDINATE AS NOTED IN THE LEGEND.
2. CONTRACTOR SHALL LEGALLY DISPOSE OF ALL DEMOLISHED MATERIALS OFF SITE.
3. CONTRACTOR SHALL PROTECT ALL EXISTING UTILITY IMPROVEMENTS NOT SPECIFICALLY DESIGNATED FOR REMOVAL.
4. THE ON-SITE UNDERGROUND UTILITIES SHOWN ON THIS SHEET ARE AT APPROXIMATE LOCATIONS. THE EXTENT, LOCATIONS AND SIZES ARE UNKNOWN. THE CONTRACTOR SHALL POTHOLE TO LOCATE AND VERIFY THE UNDERGROUND UTILITY LINES PRIOR TO REMOVAL.
5. CONTRACTOR TO PROTECT AND PRESERVE IN PLACE ANY FOUND SURVEY MONUMENTS. ANY MONUMENTS DISTURBED SHALL BE RESET BY A CALIFORNIA LICENSED SURVEYOR AND THE APPROPRIATE PAPERWORK FILED WITH THE CITY OR COUNTY, AT CONTRACTOR'S EXPENSE.
6. ALL HAZARDOUS MATERIALS ENCOUNTERED DURING SITE DEMOLITION SHALL BE REMEDIATED AND DISPOSED OF PER STATE AND EPA REQUIREMENTS.
7. CONTRACTOR SHALL CONTACT AND COORDINATE WITH ALL UTILITY AGENCIES PRIOR TO THE START OF ANY DEMOLITION OR CONSTRUCTION.
8. ANY EXISTING UTILITIES AND/OR IMPROVEMENTS WHICH ARE TO REMAIN, THAT BECOME DAMAGED DURING CONSTRUCTION SHALL BE COMPLETELY RESTORED TO THE SATISFACTION OF THE OWNER AND AGENCY HAVING AUTHORITY, AT THE CONTRACTOR'S SOLE EXPENSE.
9. REMOVE EXISTING IMPROVEMENTS AS NECESSARY TO CONSTRUCT NEW IMPROVEMENTS SHOWN ON THESE PLANS.
   a) FOR CONCRETE REMOVAL, REMOVE TO THE NEXT NEAREST TOOLED JOINT OR EXPANSION JOINT OF IMPROVEMENTS DESIGNATED TO REMAIN.
   b) FOR ASPHALTIC PAVEMENT REMOVAL. SAWCUT TO A STRAIGHT, CLEAN EDGE AT LOCATIONS INDICATED ON THE PLANS.
10. REFER TO MECHANICAL, ELECTRICAL, PLUMBING, IRRIGATION, AND ARCHITECTURAL PLANS FOR ADDITIONAL DEMOLITION AND COORDINATION.
11. COMPLIANCE WITH FIRE SAFETY DURING CONSTRUCTION WILL BE ENFORCED.
12. THE REMOVAL OF THE EXISTING TRACK SURFACING AND THE EXISTING SYNTHETIC TURF CARPET SHALL BE PERFORMED BY THE OWNER'S CMAS CONTRACTORS. THE GENERAL CONTRACTOR SHALL COORDINATE THEIR WORK WITH THE OWNER'S CMAS CONTRACTORS.
13. SOCCER GOAL ANCHORS EXACT LOCATION ARE UNKNOWN BUT SHALL BE PROTECTED IN PLACE. ANY DAMAGE DURING FIELD DEMOLITION SHALL BE REPAIRED TO PROVIDE A FULLY FUNCTIONAL ANCHOR SYSTEM.

SCALE: N 1"=20'

0 5 20 40
SCALE IN FEET



KEYMAP

811 Know what's below. Call before you dig.

PBK

ARCHITECT PBK Architects, Inc.
FRESNO
7790 North Palm Avenue
Fresno, CA 93711
559-448-8400 P
559-448-8467 F
PBK.com

Blair, Church & Flynn
CONSULTING ENGINEERS

MADERA HIGH SCHOOL STADIUM

200 SOUTH L STREET
MADERA, CA 93837

PHASE 2 CONSTRUCTION DOCUMENTS

PROFESSIONAL SEAL

REGISTERED PROFESSIONAL ENGINEER JEFFREY D. GRUNS No. 36,184 CIVIL CALIFORNIA
5/16/25
Date Signed:

PROJECT NUMBER	20-51
DATE	5/16/2025
DSA APPLICATION NO.	02-122784
FILE NO.	20-H3
PTN NO.	65243-154
DRAWN BY	DG

REVISIONS

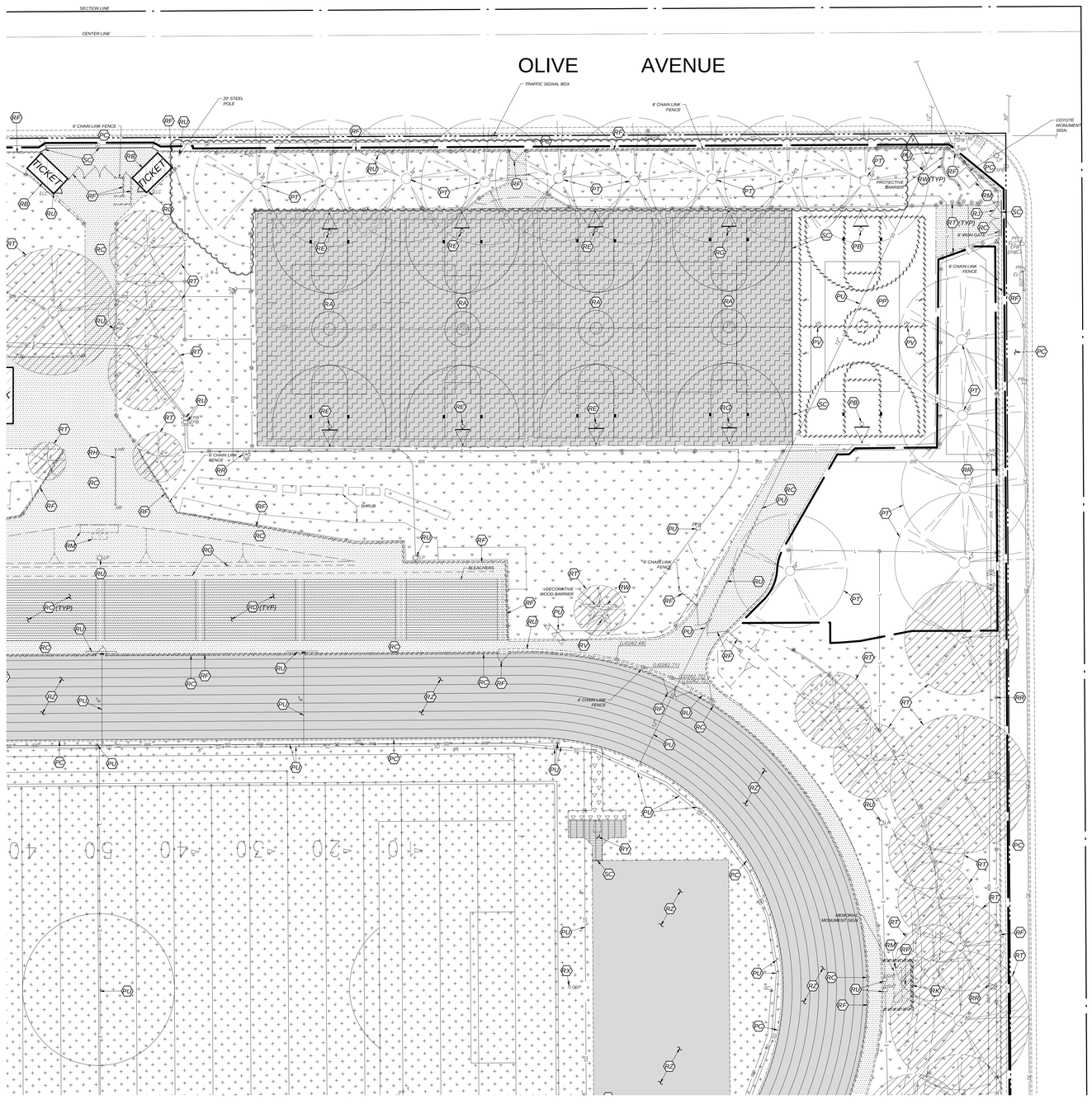
#	DESCRIPTION	DATE
1	ADDENDUM 1	8/12/25

CONSTRUCTION DOCUMENTS

DEMOLITION PLAN

C2.1

Drawing: P:\22\22-02\03\Bim\dwg\sheets\222352_D002.dwg C2.1 — Plotted: Aug 12, 2025 - 8:11am
Plot By: dgrunt



DEMOLITION LEGEND:

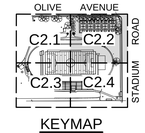
- *APPROXIMATE LIMITS OF DEMOLITION. REMOVE EXISTING IMPROVEMENTS AS NECESSARY TO CONSTRUCT NEW IMPROVEMENTS SHOWN ON THESE PLANS UNLESS OTHERWISE NOTED ON THE PLAN. THE REMOVAL OF IMPROVEMENTS MUST BE COORDINATED WITH ALL PLAN SHEETS. CONTRACTOR MUST ALSO COORDINATE REMOVAL OF IMPROVEMENTS WITH UTILITY AGENCIES. PROTECT ALL IMPROVEMENTS NOT DESIGNATED FOR REMOVAL. SEE NOTE 1*
- *LIMITS OF VEGETATION REMOVAL. 4" MINIMUM DEPTH*
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- *LIMITS OF CONCRETE IMPROVEMENT REMOVAL*
- *LIMITS OF TRACK SURFACING REMOVAL BY OWNER*
- *LIMITS OF ASPHALTIC CONCRETE REMOVAL*
- *LIMITS OF SYNTHETIC TURF, SHOCK PAD AND BASE REMOVAL BY CONTRACTOR*
- *LIMITS OF SAND REMOVAL*
- *LIMITS OF TRACK SURFACING REMOVAL BY OWNER AND UNDERLYING CONCRETE REMOVAL BY CONTRACTOR*
- *LIMITS OF DEMOLITION PER DSA APPLICATION NO. 02-121624*
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- (PC) *PROTECT CONCRETE TO REMAIN*
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- (PP) *REMOVE EXISTING STRIPING AND PROTECT EXISTING PLAYCOURT ASPHALT TO REMAIN*
- (PS) *PROTECT SCOREBOARD*
- (PT) *PROTECT TREE TO REMAIN*
- (PU) *PROTECT UTILITY TO REMAIN*
- (PV) *PROTECT VOLLEYBALL NET POST SLEEVE*
- (RA) *REMOVE AND LAWFULLY DISPOSE OF ASPHALT CONCRETE PAVEMENT STRUCTURAL SECTION*
- (RB) *REMOVE AND LAWFULLY DISPOSE OF BUILDING, FOUNDATION, UTILITIES, ETC.*
- (RC) *REMOVE AND LAWFULLY DISPOSE OF CONCRETE IMPROVEMENTS*
- (RD) *REMOVE AND LAWFULLY DISPOSE OF BLEACHERS*
- (RE) *REMOVE BASKETBALL EQUIPMENT AND RETURN TO OWNER*
- (RF) *REMOVE AND LAWFULLY DISPOSE OF CHAIN LINK FENCE FABRIC, POSTS AND FOOTINGS*
- (RG) *REMOVE AND RELOCATE BASKETBALL EQUIPMENT. SEE SITE PLAN SHEET C3.2 FOR NEW LOCATION*
- (RH) *REMOVE AND LAWFULLY DISPOSE OF HANDRAILS AND FOOTINGS*
- (RI) *DISCONNECT THE EXISTING BOOSTER PUMP FROM THE EXISTING IRRIGATION SERVICE LINE AND THE ELECTRICAL POWER. REMOVE PUMP, PIPE AND VALVES AS NEEDED FOR NEW BOOSTER PUMP PACKAGE. SEE SHEET IR1.1.*
- (RJ) *REMOVE AND SALVAGE IRON GATE, RETURN TO OWNER*
- (RK) *REMOVE AND LAWFULLY DISPOSE OF BLOCK WALK*
- (RM) *REMOVE AND RELOCATE MONUMENT SIGN. SEE ARCHITECTURAL SITE PLAN FOR NEW LOCATION*
- (RO) *REMOVE AND RETURN SHIPPING CONTAINER TO OWNER*
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GENERAL DEMOLITION NOTES:

1. *THE "LIMIT OF DEMOLITION" SHOWN IS APPROXIMATE AND IS GENERALLY CONSIDERED TO BE THE MINIMUM REMOVAL REQUIREMENTS. CONTRACTOR MUST COORDINATE AS NOTED IN THE LEGEND.*
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5. *CONTRACTOR TO PROTECT AND PRESERVE IN PLACE ANY FOUND SURVEY MONUMENTS. ANY MONUMENTS DISTURBED SHALL BE RESET BY A CALIFORNIA LICENSED SURVEYOR AND THE APPROPRIATE PAPERWORK FILED WITH THE CITY OR COUNTY, AT CONTRACTOR'S EXPENSE.*
6. *ALL HAZARDOUS MATERIALS ENCOUNTERED DURING SITE DEMOLITION SHALL BE REMEDIATED AND DISPOSED OF PER STATE AND EPA REQUIREMENTS.*
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SCALE: N 1"=20'

0 5 20 40
SCALE IN FEET



KEYMAP

811 Know what's below. Call before you dig.

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200 SOUTH L STREET
MADERA, CA 93637
PHASE 2 CONSTRUCTION DOCUMENTS

PROFESSIONAL SEAL

REGISTERED PROFESSIONAL ENGINEER — JEFFREY D. BRIANS — No. 36,189 — CIVIL — STATE OF CALIFORNIA

5/16/25
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DRAWN BY	DG

REVISIONS

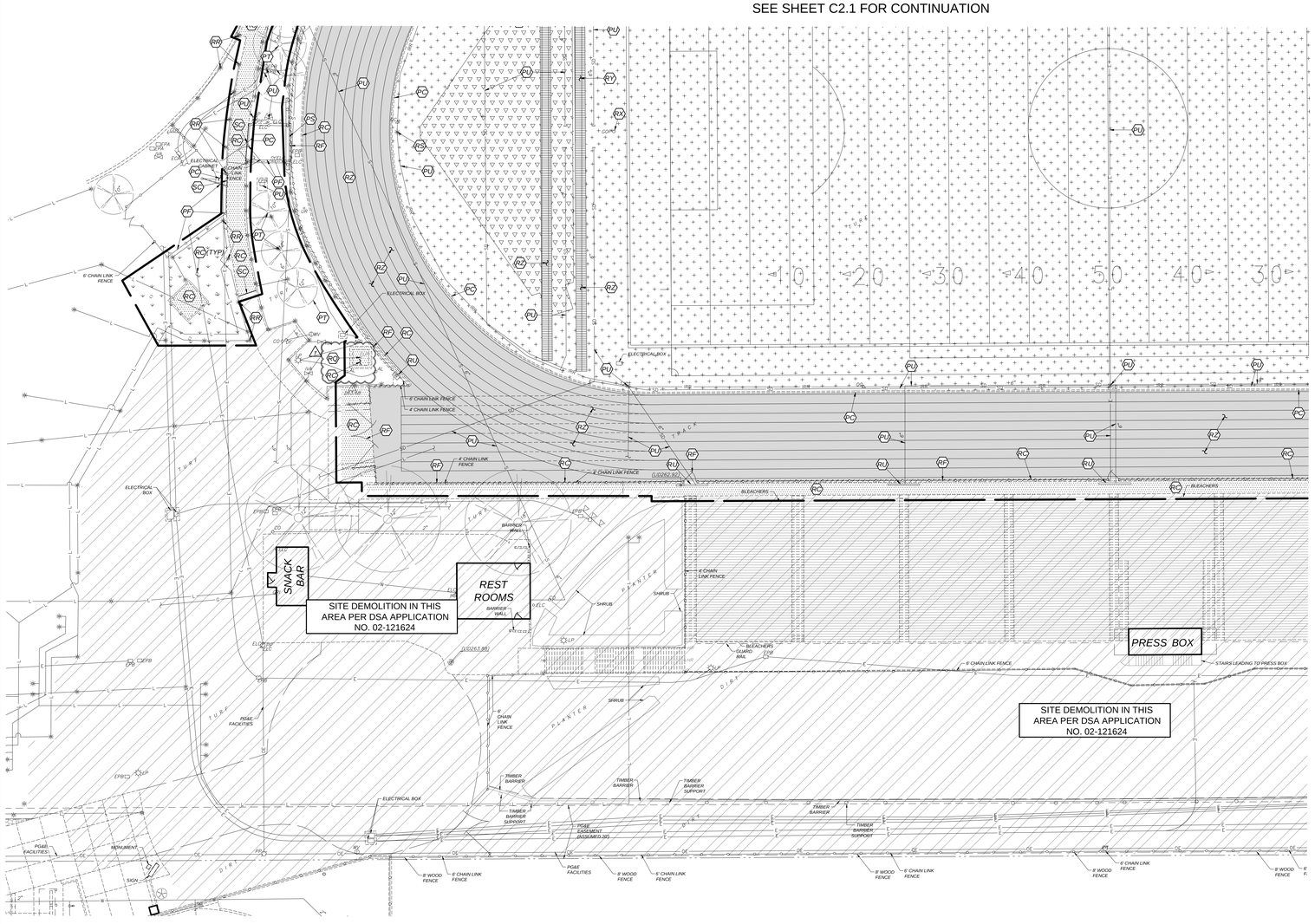
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1	ADDENDUM 1	8/12/25

CONSTRUCTION DOCUMENTS

DEMOLITION PLAN

C2.2

Drawing: P:\2020\20-51\05Plans\dwg\Drawings\222105_A010.dwg, C2.2 — Plot By: bgalvez Aug 12, 2025 8:31:31am

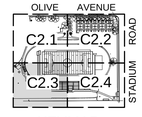


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REGISTERED PROFESSIONAL ENGINEER — JEFFREY D. BRYANS — No. 36,187 — CIVIL — STATE OF CALIFORNIA

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REVISIONS

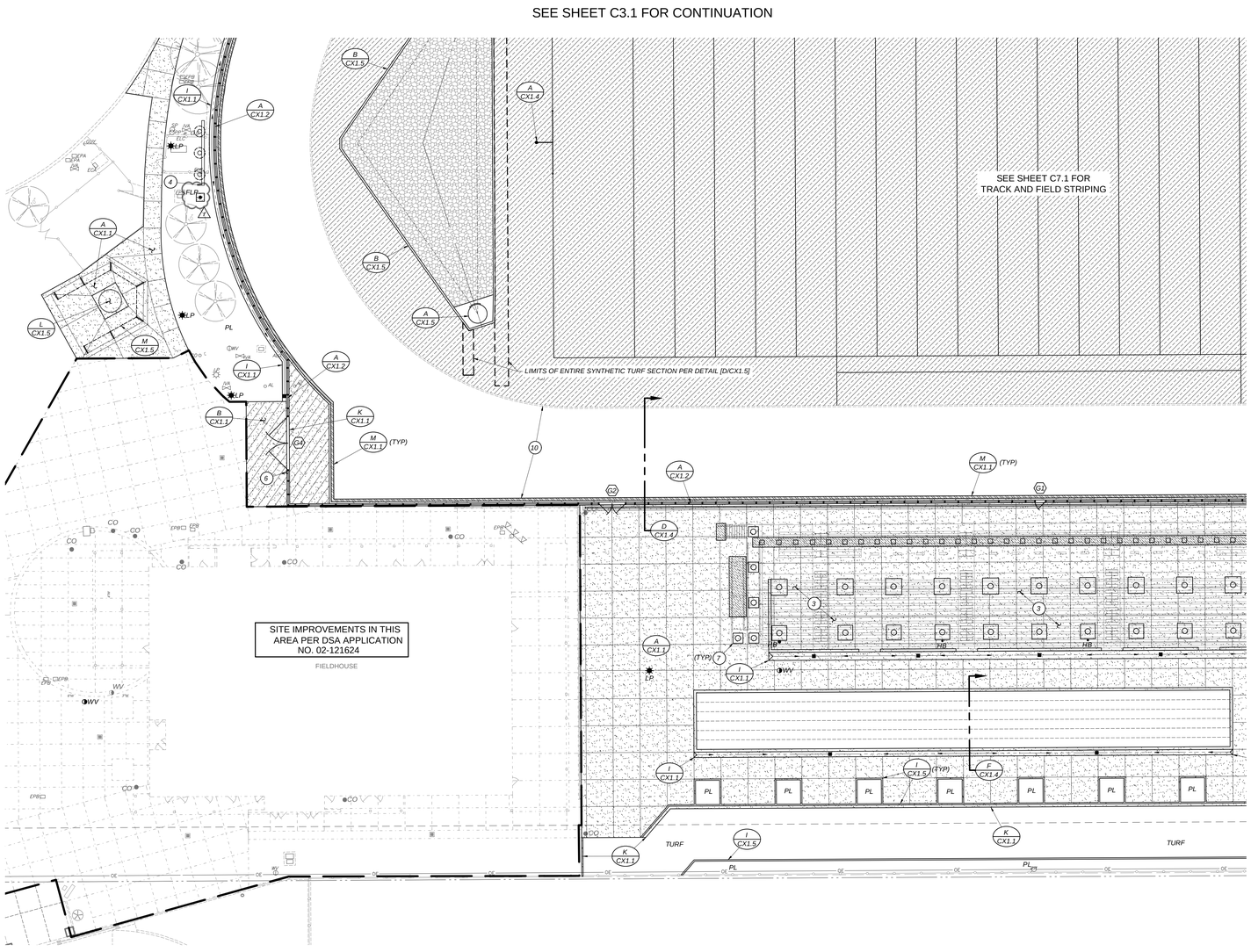
#	DESCRIPTION	DATE
1	ADDENDUM 1	8/12/25

CONSTRUCTION DOCUMENTS

DEMOLITION PLAN

C2.3

Drawing: P:\22\22514\00\Submissions\Working\22252_00.rvt, Aug 12, 2025 11:40:10am
Plot By: dgalvez Aug 12, 2025 11:40am



SITE LEGEND:

- LIMITS OF CONCRETE IMPROVEMENTS
- LIMITS OF HEAVY-DUTY CONCRETE IMPROVEMENTS
- CONCRETE PER BLEACHER PLANS
- LIMITS OF STANDARD DUTY ASPHALTIC CONCRETE PAVEMENT STRUCTURAL SECTION PER DETAIL [L/CX1.1]
- LIMITS OF TRACK PAVING ASPHALTIC CONCRETE PAVEMENT STRUCTURAL SECTION PER DETAIL [M/CX1.1]
- LIMITS OF CRACK FILL, SLURRY COAT AND RE STRIPING OF EXISTING ASPHALTIC CONCRETE PER SPECIFICATIONS
- SYNTHETIC TURF SURFACING TYPE A REPLACEMENT PER DETAIL [D/CX1.5] AND [E/CX1.5]
- SYNTHETIC TURF SURFACING TYPE B PER DETAIL [G/CX1.5] AND [H/CX1.5]
- DECOMPOSED GRANITE PER DETAIL [F/CX1.5]
- LIMITS OF FIRE LANE STRIPING
- STEEL POST FENCING PER DETAIL [A/CX1.2]
- PL — PLANTER
- LP — SITE LIGHTING, SEE ELECTRICAL PLANS
- FLP — FLAG POLE, SEE ARCHITECTURAL PLANS
- 1 — RELOCATED MEMORIAL SIGN, SEE ARCHITECTURAL PLANS
- 2 — RELOCATED FLAG POLE, SEE ARCHITECTURAL PLANS
- 3 — BLEACHERS, PER BLEACHER PLANS
- 4 — SCOREBOARD PER ARCHITECTURAL AND SCOREBOARD DRAWINGS
- 5 — DRIVE APPROACH PER CITY OF MADERA STANDARD DRAWING ST-13B, SEE DETAIL [D/CX1.7]
- 6 — INSTALL KNOX BOX PER DETAIL [H/CX1.7]
- 7 — PIER PER BLEACHER PLANS
- 8 — PILASTER AND FENCE ATTACHMENT PER ARCHITECTURAL PLANS
- 9 — PAINT RED STRIPE ON CONCRETE WITH WHITE LETTERING, "NO PARKING - FIRE LANE" AT 30' INTERVALS
- 10 — TRACK SURFACING BY OWNER
- 11 — REINSTALL SALVAGED BASKETBALL BACKBOARD PER DETAIL [G/CX1.7], SEE DETAIL [A/CX1.7] FOR LOCATION
- 12 — DECORATIVE IRON GATE, SEE ARCHITECTURAL PLANS

GENERAL SITE NOTES:

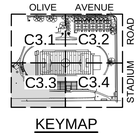
1. *ALL CONCRETE MOWSTRIPS, RAMPS AND SIDEWALKS SHALL HAVE WEAKENED PLANE JOINTS AT 10 FEET MAXIMUM ON CENTER AND EXPANSION JOINTS AT 30 FEET MAXIMUM ON CENTER PER DETAIL [A/CX1.1]*
2. *INSTALL DOWELED CONNECTION AT JOINT OF NEW CONCRETE TO EXISTING CONCRETE PER DETAIL [C/CX1.1]*
3. *NO CONCRETE MAY BE POURED UNTIL THE FORMS HAVE BEEN REVIEWED AND APPROVED BY THE PROJECT INSPECTOR.*
4. *ALL BURIED METALLIC OBJECTS SHALL HAVE A PROTECTIVE COATING OR BE WRAPPED WITH APPROVED PROTECTIVE WRAP.*
5. *ADJUST EXISTING SPRINKLER HEADS AND LATERAL LINES AS REQUIRED BY NEW IMPROVEMENTS, OR AS SHOWN ON THE IRRIGATION PLANS.*
6. *2 WORKING DAYS BEFORE COMMENCING EXCAVATION OPERATIONS WITHIN THE STREET RIGHT-OF-WAY AND/OR UTILITY EASEMENTS, ALL EXISTING UNDERGROUND FACILITIES SHALL HAVE BEEN LOCATED BY UNDERGROUND SERVICES ALERT (USA). CALL 1-800-642-2444*
7. *ANY SURVEY MONUMENTS WITHIN THE AREA OF CONSTRUCTION SHALL BE PRESERVED OR RESET BY A PERSON LICENSED TO PRACTICE LAND SURVEYING IN THE STATE OF CALIFORNIA. REPLACEMENT TO BE AT CONTRACTOR'S SOLE EXPENSE.*
8. *REPAIR ALL DAMAGED AND/OR OFF-GRADE CONCRETE STREET IMPROVEMENTS AS DETERMINED BY THE AGENCY HAVING JURISDICTION PRIOR TO OCCUPANCY*
9. *NO PAVEMENT STRIPING IS ALLOWED PRIOR TO SEAL COAT REVIEW BY ENGINEER, AND WRITTEN APPROVAL TO PROCEED BY ENGINEER.*
10. *OBTAIN ALL REQUIRED PERMITS AND APPROVALS FROM AGENCY HAVING JURISDICTION FOR WORK WITHIN THE PUBLIC RIGHT OF WAY*
11. *THE INSTALLATION OF THE NEW TRACK SURFACING AND THE NEW SYNTHETIC TURF SYSTEM SHALL BE PERFORMED BY THE OWNER'S CMAS CONTRACTOR. PRIOR TO STARTING ANY INSTALLATION WORK, THE CMAS CONTRACTORS SHALL ASSESS THEIR SUPPORTING SUBSTRATES FOR STRUCTURAL INTEGRITY, PLANARITY, DRAINAGE, AND CONFORMANCE TO THE DESIGN INTENT, AND SHALL NOTIFY THE OWNER OF ANY NON-CONFORMING CONDITIONS SUBJECT TO POTENTIAL REPAIR/REPLACEMENT. THE GENERAL CONTRACTOR SHALL COORDINATE ANY REPAIR WORK WITH THE OWNER'S CMAS CONTRACTORS. GENERAL CONTRACTOR SHALL INCLUDE AND ALLOWANCE IN ITS BID TOTALLING $10,0000 TO COVER ANY COSTS RELATED TO CORRECTIVE SUBSTRATE WORK REQUIRED TO MEET THE SPECIFICATIONS OF THE CMAS CONTRACTOR. ANY UNUSED ALLOWANCE SHALL BE RETURNED TO THE OWNER.*

PAVING NOTE:

SEE 'TRACK GENERAL NOTES' ON SHEET C7.1 FOR RESPONSIBILITIES OF BOTH THE SITE CONTRACTOR AND TRACK SURFACING CONTRACTOR RELATING TO THE PAVEMENT UNDER THE TRACK.

GATE SCHEDULE:

GATE ID	REFERENCE DETAIL	GATE FUNCTION	ACCESS	FIRE ACCESS
G1	[A/CX1.2]	SINGLE LEAF STEEL MAINTENANCE GATE	LOCKABLE FORK LATCH	N/A
G2	[J/CX1.5]	DOUBLE LEAF STEEL MAINTENANCE SWING GATE	LOCKABLE LATCH	N/A
G3	[K/CX1.5]	SINGLE LEAF STEEL ACCESSIBLE GATE	ADA/CBC ACCESSIBLE PANIC HARWARE, AND RHODES STYLE LEVER HANDLE	N/A
G4	[J/CX1.5]	DOUBLE LEAF STEEL FIRE ACCESS SWING GATE	LOCKABLE LATCH	KNOX BOX MOUNTED TO GATE POST
G5	[A/CX1.3]	DOUBLE LEAF CHAIN LINK MAINTENANCE GATE	LOCKABLE FORK LATCH	N/A
G6	[E/CX1.2]	DOUBLE LEAF DECORATIVE IRON FIRE ACCESS GATE	LOCKABLE LATCH	KNOX BOX MOUNTED TO GATE POST
G7	[E/CX1.2]	DOUBLE LEAF DECORATIVE IRON ACCESSIBLE GATE	ADA/CBC ACCESSIBLE PANIC HARWARE, AND RHODES STYLE LEVER HANDLE	N/A
G8	[E/CX1.2]	DOUBLE LEAF DECORATIVE IRON MAINTENANCE GATE	LOCKABLE FORK LATCH	N/A



KEYMAP

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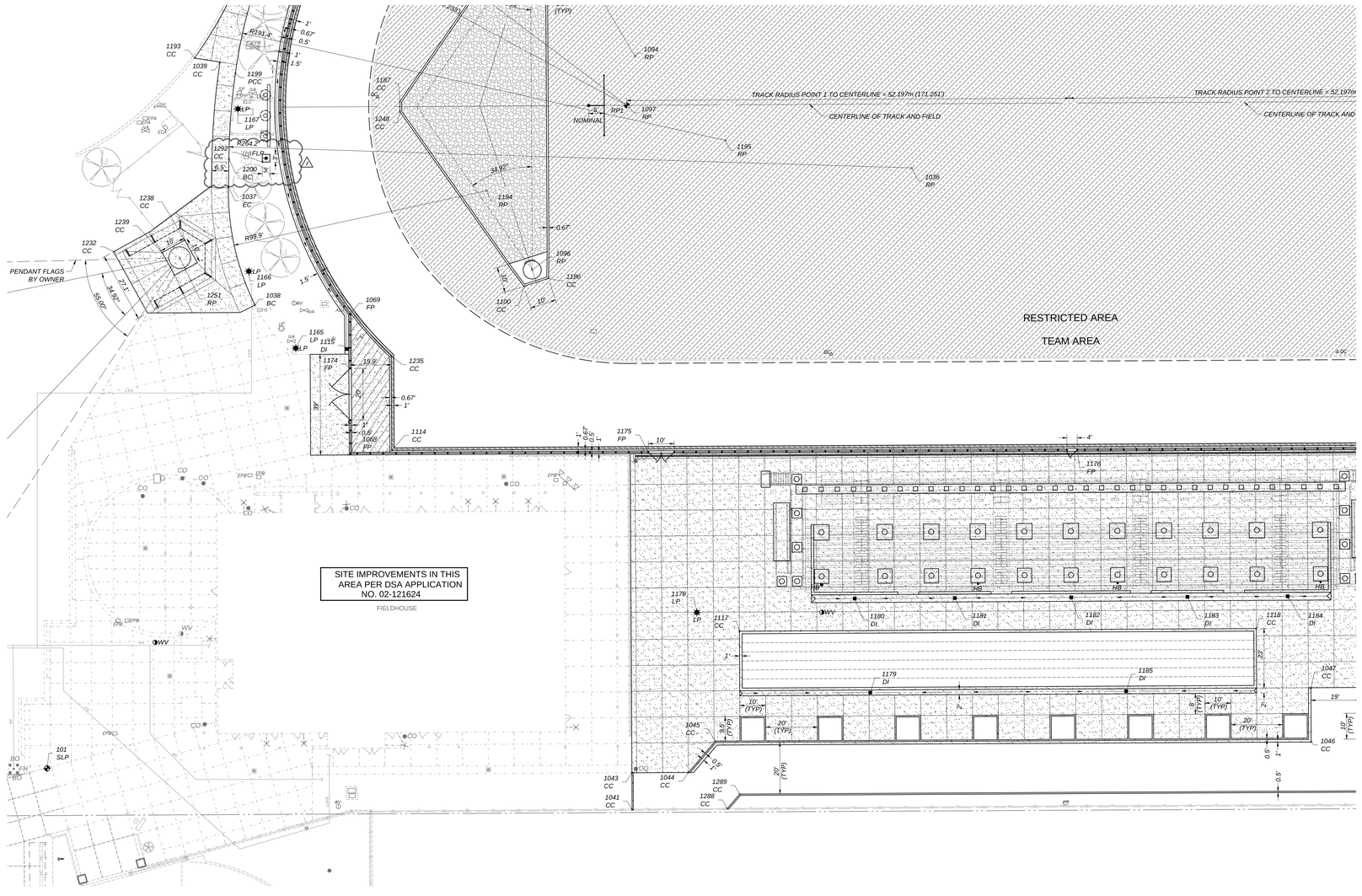
CONSTRUCTION DOCUMENTS

SITE PLAN

C3.3

Drawing: P:\22\22-20\SDgn\exhibits\drawings\22220_SDP_Map_C3.3 — Plot By: Dgalvez Aug 12, 2025 - 7:42am

SEE SHEET C4.1 FOR CONTINUATION



SEE SHEET C4.4 FOR CONTINUATION

HORIZONTAL CONTROL LEGEND:

1000 LCP	LAYOUT COORDINATE POINT
100 SLP	SITE LAYOUT POINT
200 BLP	BUILDING LAYOUT POINT
RP1	TRACK RADIUS POINT 1
RP2	TRACK RADIUS POINT 2
BC	BEGIN CURVE
CC	CORNER CONCRETE
DI	CENTER OF DRAIN INLET
EC	END CURVE
FG	FINISH GROUND
FP	FENCE POST
GP	FOOTBALL GOAL POST
LP	LIGHT POLE
MH	MANHOLE
PCC	POINT OF COMPOUND CURVE
PRC	POINT OF REVERSE CURVE
RP	RADIUS POINT

GENERAL HORIZONTAL CONTROL NOTES:

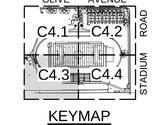
1. *THE SITE LAYOUT IS BASED ON AN ASSUMED COORDINATE SYSTEM. SITE LAYOUT POINT 100 IS A CHISELED 'X' ON TOP FACE OF CURB LOCATED APPROXIMATELY 25' SOUTH OF THE CURB RAMP AT THE OLIVE AVENUE AND STADIUM ROAD INTERSECTION.*

   SITE LAYOUT POINT 101 IS A CHISELED 'X' ON CONCRETE SIDEWALK LOCATED APPROXIMATELY 39' NORTHWEST OF THE MONUMENT NEAR THE SOFTBALL STADIUM ENTRANCE.

   SITE LAYOUT POINT 102 IS A CHISELED 'X' ON TOP OF CURB ON THE EAST SIDE OF STADIUM ROAD APPROXIMATELY 560' SOUTH OF OLIVE AVENUE.

2. *DIMENSIONS AND POINTS ARE TO CENTER OF FENCE POSTS, FACE OF BUILDINGS, TOP FACE OF CURB, OR EDGE OF CONCRETE, UNLESS SHOWN OTHERWISE.*

OLIVE AVENUE



KEYMAP

SCALE: 1"=20'

0 5 20 40
SCALE IN FEET

Know what's below. Call before you dig.

PBK
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PHASE 2 CONSTRUCTION DOCUMENTS

PROFESSIONAL SEAL

REGISTERED PROFESSIONAL ENGINEER
JEFFREY D. BRIANS
No. 36182
CIVIL
STATE OF CALIFORNIA

5/16/25
Date Signed:

PROJECT NUMBER	20-51
DATE	5/16/2025
DSA APPLICATION NO.	02-122784
FILE NO.	20-H3
PTN NO.	65243-154
DRAWN BY	DG

REVISIONS

#	DESCRIPTION	DATE
1	ADDENDUM 1	8/12/25

CONSTRUCTION DOCUMENTS

HORIZONTAL CONTROL PLAN

C4.3

Drawing: P:\2022\20-51\05\dwg\production\drawings\20-122202_ACDS.dwg, C4.3 — Plot By: Dgarcia Aug 12, 2025 - 8:13am

NORTHING EASTING TABLE

POINT	NORTHING	EASTING	ABV	DESCRIPTION
100	1805518.49	6688737.46	SLP	SITE LAYOUT POINT
101	1804951.07	6687975.82	SLP	SITE LAYOUT POINT
102	1804989.54	6688780.66	SLP	SITE LAYOUT POINT
200	1805386.02	6688230.42	BLP	BUILDING LAYOUT POINT
201	1805386.66	6688352.42	BLP	BUILDING LAYOUT POINT
202	1805386.84	6688388.42	BLP	BUILDING LAYOUT POINT
203	1805387.48	6688510.42	BLP	BUILDING LAYOUT POINT
204	1805505.66	6688349.80	BLP	BUILDING LAYOUT POINT
205	1805505.87	6688389.79	BLP	BUILDING LAYOUT POINT
1000	1805333.21	6688077.84	CC	CORNER CONCRETE
1001	1805521.94	6688118.04	EC	END CURVE
1002	1805533.76	6688110.75	FP	FENCE POST
1003	1805484.50	6688146.27	BC	BEGIN CURVE
1004	1805458.38	6688180.30	EC	END CURVE
1005	1805458.95	6688288.13	CC	CORNER CONCRETE
1006	1805480.51	6688305.99	CC	CORNER CONCRETE
1007	1805493.22	6688316.51	CC	CORNER CONCRETE
1008	1805513.14	6688333.01	CC	CORNER CONCRETE
1009	1805513.52	6688406.50	CC	CORNER CONCRETE
1010	1805493.78	6688423.21	CC	CORNER CONCRETE
1011	1805481.18	6688433.86	CC	CORNER CONCRETE
1012	1805459.81	6688451.94	CC	CORNER CONCRETE
1013	1805460.22	6688530.16	BC	BEGIN CURVE
1014	1805497.35	6688567.33	EC	END CURVE
1015	1805517.07	6688567.26	CC	CORNER CONCRETE
1016	1805517.20	6688592.26	CC	CORNER CONCRETE
1017	1805410.34	6688629.66	CC	CORNER CONCRETE
1018	1805410.15	6688592.82	CC	CORNER CONCRETE
1019	1805387.80	6688592.94	CC	CORNER CONCRETE
1020	1805387.68	6688569.96	CC	CORNER CONCRETE
1021	1805356.21	6688573.12	CC	CORNER CONCRETE
1022	1805356.35	6688598.91	CC	CORNER CONCRETE
1023	1805356.90	6688619.90	CC	CORNER CONCRETE
1024	1805351.72	6688622.93	CC	CORNER CONCRETE
1025	1805352.58	6688665.36	BC	BEGIN CURVE
1026	1805350.88	6688677.09	PRC	POINT OF REVERSE CURVE
1027	1805349.22	6688688.72	EC	END CURVE
1028	1805349.42	6688727.23	CC	CORNER CONCRETE
1031	1805362.11	6688128.88	CC	CORNER CONCRETE
1032	1805349.62	6688178.17	BC	BEGIN CURVE
1033	1805365.30	6688151.40	PCC	POINT OF COMPOUND CURVE
1034	1805289.42	6688069.11	BC	BEGIN CURVE
1035	1805270.87	6688062.48	EC	END CURVE
1036	1805183.36	6688310.39	RP	RADIUS POINT
1037	1805176.18	6688045.99	EC	END CURVE
1038	1805130.31	6688056.29	BC	BEGIN CURVE
1039	1805224.31	6688042.75	CC	CORNER CONCRETE
1040	1804954.23	6688726.77	FP	FENCE POST
1041	1804935.08	6688202.16	CC	CORNER CONCRETE
1043	1804949.37	6688202.09	CC	CORNER CONCRETE
1044	1804949.48	6688223.96	CC	CORNER CONCRETE
1045	1804961.58	6688234.33	CC	CORNER CONCRETE
1046	1804961.29	6688464.90	CC	CORNER CONCRETE
1047	1804982.29	6688464.79	CC	CORNER CONCRETE
1048	1804983.45	6688686.90	CC	CORNER CONCRETE
1049	1804974.18	6688696.27	CC	CORNER CONCRETE
1050	1804939.18	6688696.45	CC	CORNER CONCRETE
1051	1805003.67	6688729.37	CC	CORNER CONCRETE
1052	1805002.76	6688555.27	CC	CORNER CONCRETE
1053	1805014.28	6688543.62	CC	CORNER CONCRETE
1054	1805066.68	6688543.35	BC	BEGIN CURVE
1055	1805292.25	6688658.74	EC	END CURVE
1056	1805351.91	6688658.43	CC	CORNER CONCRETE
1057	1805110.95	6688646.84	CC	CORNER CONCRETE
1059	1805074.36	6688685.38	BC	BEGIN CURVE
1060	1805063.23	6688713.48	EC	END CURVE
1061	1805063.31	6688729.00	CC	CORNER CONCRETE
1062	1805066.68	6688728.98	BC	BEGIN CURVE
1063	1805123.02	6688719.41	PRC	POINT OF REVERSE CURVE
1064	1805176.82	6688718.60	PRC	POINT OF REVERSE CURVE
1065	1805243.42	6688718.56	PRC	POINT OF REVERSE CURVE
1066	1805307.89	6688717.50	PRC	POINT OF REVERSE CURVE
1067	1805341.65	6688727.28	EC	END CURVE
1068	1805072.82	6688093.24	FP	FENCE POST
1069	1805126.78	6688092.96	FP	FENCE POST
1070	1805344.11	6688649.97	FP	FENCE POST
1071	1805289.46	6688650.26	FP	FENCE POST
1072	1804977.39	6688730.47	FP	FENCE POST
1073	1804954.26	6688730.59	FP	FENCE POST
1076	1805537.75	6688108.42	FP	FENCE POST
1077	1805533.91	6688138.98	FP	FENCE POST
1078	1805533.94	6688144.95	FP	FENCE POST
1079	1805537.95	6688147.24	FP	FENCE POST
1080	1805539.30	6688405.84	FP	FENCE POST
1081	1805540.76	6688687.82	FP	FENCE POST
1082	1805527.15	6688687.90	FP	FENCE POST
1083	1805527.14	6688703.99	FP	FENCE POST
1085	1805504.14	6688710.88	FP	FENCE POST
1086	1805504.21	6688727.68	FP	FENCE POST
1089	1804938.39	6688730.67	FP	FENCE POST
1091	1804938.13	6688688.19	FP	FENCE POST
1092	1805493.38	6688180.12	RP	RADIUS POINT
1093	1805326.73	6688085.46	CC	CORNER CONCRETE
1094	1805226.49	6688203.27	RP	RADIUS POINT
1095	1805270.87	6688162.86	RP	RADIUS POINT
1096	1805143.88	6688163.52	RP	RADIUS POINT
1097	1805207.57	6688200.10	RP	RADIUS POINT
1098	1805274.18	6688169.11	CC	CORNER CONCRETE
1100	1805137.59	6688160.28	CC	CORNER CONCRETE
1101	1805277.13	6688159.55	CC	CORNER CONCRETE
1102	1805209.36	6688542.60	RP	RADIUS POINT
1103	1805497.22	6688530.33	RP	RADIUS POINT
1104	1805423.99	6688658.17	CC	CORNER CONCRETE
1105	1805342.86	6688634.08	CC	CORNER CONCRETE
1106	1805305.75	6688634.27	CC	CORNER CONCRETE
1107	1805311.58	6688665.39	RP	RADIUS POINT
1108	1805389.22	6688688.51	RP	RADIUS POINT
1109	1805315.71	6688753.66	RP	RADIUS POINT
1110	1805301.44	6688693.67	CC	CORNER CONCRETE
1111	1805271.41	6688708.29	CC	CORNER CONCRETE
1112	1805140.48	6688694.52	CC	CORNER CONCRETE
1113	1805110.41	6688709.13	CC	CORNER CONCRETE
1114	1805074.07	6688109.15	CC	CORNER CONCRETE
1115	1805113.31	6688091.78	DI	CENTER OF DRAIN INLET
1117	1805004.13	6688243.67	CC	CORNER CONCRETE
1118	1805005.18	6688443.67	CC	CORNER CONCRETE
1119	1805538.92	6688333.39	FP	FENCE POST
1122	1805395.52	6688108.52	FP	FENCE POST
1123	1805509.61	6688139.68	EC	END CURVE
1124	1805522.04	6688138.04	BC	BEGIN CURVE
1125	1805464.73	6688128.34	BC	BEGIN CURVE
1126	1805483.38	6688125.88	EC	END CURVE
1127	1805464.34	6688053.34	RP	RADIUS POINT
1128	1805522.30	6688188.04	RP	RADIUS POINT
1129	1805458.89	6688276.81	CC	CORNER CONCRETE
1130	1805480.30	6688276.70	BC	BEGIN CURVE
1131	1805497.19	6688311.64	EC	END CURVE
1132	1805459.87	6688463.21	CC	CORNER CONCRETE
1133	1805481.30	6688463.10	BC	BEGIN CURVE
1134	1805497.60	6688427.72	EC	END CURVE
1135	1805466.12	6688159.81	LP	LIGHT POLE
1136	1805459.58	6688217.62	LP	LIGHT POLE
1137	1805459.94	6688285.99	LP	LIGHT POLE
1138	1805498.26	6688319.39	LP	LIGHT POLE
1139	1805526.99	6688333.43	LP	LIGHT POLE
1140	1805527.36	6688405.93	LP	LIGHT POLE
1141	1805499.42	6688419.75	LP	LIGHT POLE
1142	1805460.81	6688452.45	LP	LIGHT POLE
1143	1805461.61	6688535.50	LP	LIGHT POLE
1144	1805494.31	6688566.22	LP	LIGHT POLE
1145	1805502.10	6688702.86	LP	LIGHT POLE
1146	1805423.03	6688665.50	LP	LIGHT POLE
1147	1805409.25	6688612.12	LP	LIGHT POLE
1148	1805386.15	6688614.71	LP	LIGHT POLE
1149	1805378.97	6688571.00	LP	LIGHT POLE
1150	1805343.69	6688660.04	LP	LIGHT POLE
1151	1805279.22	6688668.79	LP	LIGHT POLE
1152	1805323.04	6688725.19	LP	LIGHT POLE
1153	1805283.04	6688725.40	LP	LIGHT POLE
1154	1805243.04	6688725.61	LP	LIGHT POLE
1155	1805203.04	6688725.82	LP	LIGHT POLE
1156	1805163.04	6688726.03	LP	LIGHT POLE
1157	1805123.04	6688726.24	LP	LIGHT POLE
1158	1805136.18	6688666.97	LP	LIGHT POLE
1159	1805208.84	6688686.85	LP	LIGHT POLE
1160	1805087.25	6688618.33	LP	LIGHT POLE
1161	1805042.38	6688544.48	LP	LIGHT POLE
1162	1805003.84	6688571.38	LP	LIGHT POLE
1163	1805004.17	6688634.35	LP	LIGHT POLE
1164	1805004.50	6688697.33	LP	LIGHT POLE
1165	1805113.61	6688072.05	LP	LIGHT POLE
1166	1805143.36	6688053.89	LP	LIGHT POLE
1167	1805206.20	6688049.65	LP	LIGHT POLE
1168	1805267.60	6688062.84	LP	LIGHT POLE
1169	1805359.86	6688142.28	LP	LIGHT POLE
1170	1805340.26	6688180.12	FP	FENCE POST
1171	1805342.68	6688376.65	FP	FENCE POST
1172	1805343.70	6688571.58	FP	FENCE POST
1173	1805332.86	6688650.03	FP	FENCE POST
1174	1805105.82	6688093.07	FP	FENCE POST
1175	1805073.42	6688208.44	FP	FENCE POST
1176	1805074.29	6688374.37	FP	FENCE POST
1177	1805075.14	6688536.30	FP	FENCE POST
1178	1805011.39	6688227.23	LP	LIGHT POLE
1179	1804980.40	6688294.30	DI	CENTER OF DRAIN INLET
1180	1805016.76	6688288.29	DI	CENTER OF DRAIN INLET
1181	1805016.96	6688327.04	DI	CENTER OF DRAIN INLET
1182	1805017.20	6688372.02	DI	CENTER OF DRAIN INLET
1183	1805017.43	6688417.04	DI	CENTER OF DRAIN INLET
1184	1805017.64	6688455.79	DI	CENTER OF DRAIN INLET
1185	1804980.92	6688393.29	DI	CENTER OF DRAIN INLET
1186	1805140.64	6688169.81	CC	CORNER CONCRETE
1187	1805209.15	6688112.35	CC	CORNER CONCRETE
1188	1805354.06	6688611.81	MH	MANHOLE
1189	1805394.88	6688631.33	MH	MANHOLE
1190	1805454.15	6688516.66	MH	MANHOLE
1191	1805409.50	6688140.65	LP	LIGHT POLE
1192	1805325.67	6688095.57	LP	LIGHT POLE
1193	1805225.84	6688032.88	CC	CORNER CONCRETE
1194	1805174.53	6688145.84	RP	RADIUS POINT
1195	1805194.03	6688238.27	RP	RADIUS POINT
1196	1805346.57	6688158.40	RP	RADIUS POINT
1197	1805341.17	6688177.87	DI	CENTER OF DRAIN INLET
1198	1805257.24	6688057.66	PCC	POINT OF COMPOUND CURVE
1199	1805219.95	6688048.69	PCC	POINT OF COMPOUND CURVE
1200	1805186.88	6688046.16	BC	BEGIN CURVE
1201	1805483.86	6688301.95	CC	CORNER CONCRETE
1202	1805495.14	6688314.20	CC	CORNER CONCRETE
1203	1805461.56	6688293.21	CC	CORNER CONCRETE
1204	1805480.81	6688309.16	CC	CORNER CONCRETE
1205	1805483.68	6688305.69	CC	CORNER CONCRETE
1206	1805492.92	6688313.35	CC	CORNER CONCRETE
1207	1805490.05	6688316.81	CC	CORNER CONCRETE
1208	1805509.31	6688332.76	CC	CORNER CONCRETE
1209	1805536.63	6688334.88	FP	FENCE POST
1210	1805517.02	6688334.99	FP	FENCE POST
1211	1805515.24	6688349.35	FP	FENCE POST
1212	1805515.28	6688361.74	FP	FENCE POST
1213	1805517.38	6688404.49	FP	FENCE POST
1214	1805515.41	6688390.17	FP	FENCE POST
1217	1805493.52	6688426.38	CC	CORNER CONCRETE
1218	1805484.35	6688434.13	CC	CORNER CONCRETE
1221	1805484.57	6688437.87	CC	CORNER CONCRETE
1222	1805481.18	6688441.60	RP	RADIUS POINT
1223	1805480.41	6688298.20	RP	RADIUS POINT
1224	1805495.72	6688425.50	CC	CORNER CONCRETE
1225	1805537.07	6688404.38	FP	FENCE POST
1226	1805210.22	6688914.78	RP	RADIUS POINT
1227	1805272.78	6688545.03	RP	RADIUS POINT
1228	1805147.28	6688545.09	RP	RADIUS POINT
1229	1805109.97	6688813.24	RP	RADIUS POINT
1230	1805103.73	6688713.27	RP	RADIUS POINT
1231	1805533.79	6688116.95	FP	FENCE POST
1232	1805150.93	6688001.58	CC	CORNER CONCRETE
1235	1805110.69	6688108.96	CC	CORNER CONCRETE
1237	3610279.66	13376081.83	CC	CORNER CONCRETE
1238	1805155.43	6688029.09	CC	CORNER CONCRETE
1239	1805150.59	6688020.34	CC	CORNER CONCRETE
1246	1804962.26	6688730.55	FP	FENCE POST
1247	1805504.53	6688120.33	BC	BEGIN CURVE
1248	1805205.06	6688112.37	CC	CORNER CONCRETE
1249	1805342.28	6688299.65	FP	FENCE POST
1250	1805107.83	6688642.86	CC	CORNER CONCRETE
1251	1805148.64	6688027.14	RP	RADIUS POINT
1252	1805075.30	6688548.30	FP	FENCE POST
1253	1805052.49	6688503.42	CC	CORNER CONCRETE
1254	1805042.49	6688503.48	CC	CORNER CONCRETE
1255	1805032.55	6688513.53	CC	CORNER CONCRETE
1256	1805022.55	6688513.58	CC	CORNER CONCRETE
1257	1805012.52	6688493.63	CC	CORNER CONCRETE
1258	1805002.52	6688493.68	CC	CORNER CONCRETE
1259	1805012.48	6688483.63	CC	CORNER CONCRETE
1260	1805042.44	6688493.48	CC	CORNER CONCRETE
1261	1805022.49	6688503.58	CC	CORNER CONCRETE
1265	1805452.80	6688258.91	MH	MANHOLE
1266	1805093.90	6688664.80	BC	BEGIN CURVE
1267	1805003.28	6688653.71	EC	END CURVE
1268	1805025.99	6688713.23	BC	BEGIN CURVE
1269	1805003.42	6688681.35	EC	END CURVE
1270	1805021.23	6688729.73	CC	CORNER CONCRETE
1271	1805043.84	6688697.93	RP	RADIUS POINT
1272	1805001.97	6688706.31	RP	RADIUS POINT
1273	1804960.98	6688695.34	LP	LIGHT POLE
1274	1805361.20	6688570.10	CC	CORNER CONCRETE
1275	1805394.88	6688580.53	MH	MANHOLE
1276	1805423.65	6688592.75	CC	CORNER CONCRETE
1277	1805342.56	6688353.84	FP	FENCE POST
1278	1805342.76	6688391.46	FP	FENCE POST
1279	1805343.04	6688445.65	FP	FENCE POST
1280	1805509.70	6688406.79	CC	CORNER CONCRETE
1281	1805490.61	6688422.94	CC	CORNER CONCRETE
1282	1805481.45	6688430.69	CC	CORNER CONCRETE
1283	1805462.36	6688446.84	CC	CORNER CONCRETE
1284	1805517.75	6688686.94	CC	CORNER CONCRETE
1285	1805498.03	6688701.84	CC	CORNER CONCRETE
1286	1805503.12	6688706.88	CC	CORNER CONCRETE
1287	1805503.23	6688727.18	CC	CORNER CONCRETE
1288	1804935.55	6688239.02	CC	CORNER CONCRETE
1289	1804941.12	6688243.79	CC	CORNER CONCRETE
1290	1804943.50	6688696.43	CC	CORNER CONCRETE
1291	1805372.23	6688102.71	FP	FENCE POST
1292	1805185.61	6688059.08	CC	CORNER CONCRETE

PBK

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MADERA HIGH SCHOOL STADIUM

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PHASE 2 CONSTRUCTION DOCUMENTS

PROFESSIONAL SEAL

REGISTERED PROFESSIONAL ENGINEER
JEFFREY D. BURNS
No. 36,185
CIVIL
STATE OF CALIFORNIA

5/16/25
Date Signed:

PROJECT NUMBER
20-51

DATE
5/16/2025

DSA APPLICATION NO.
02-122784

FILE NO.
20-H3

PTN NO.
65243-154

DRAWN BY
DG

REVISIONS

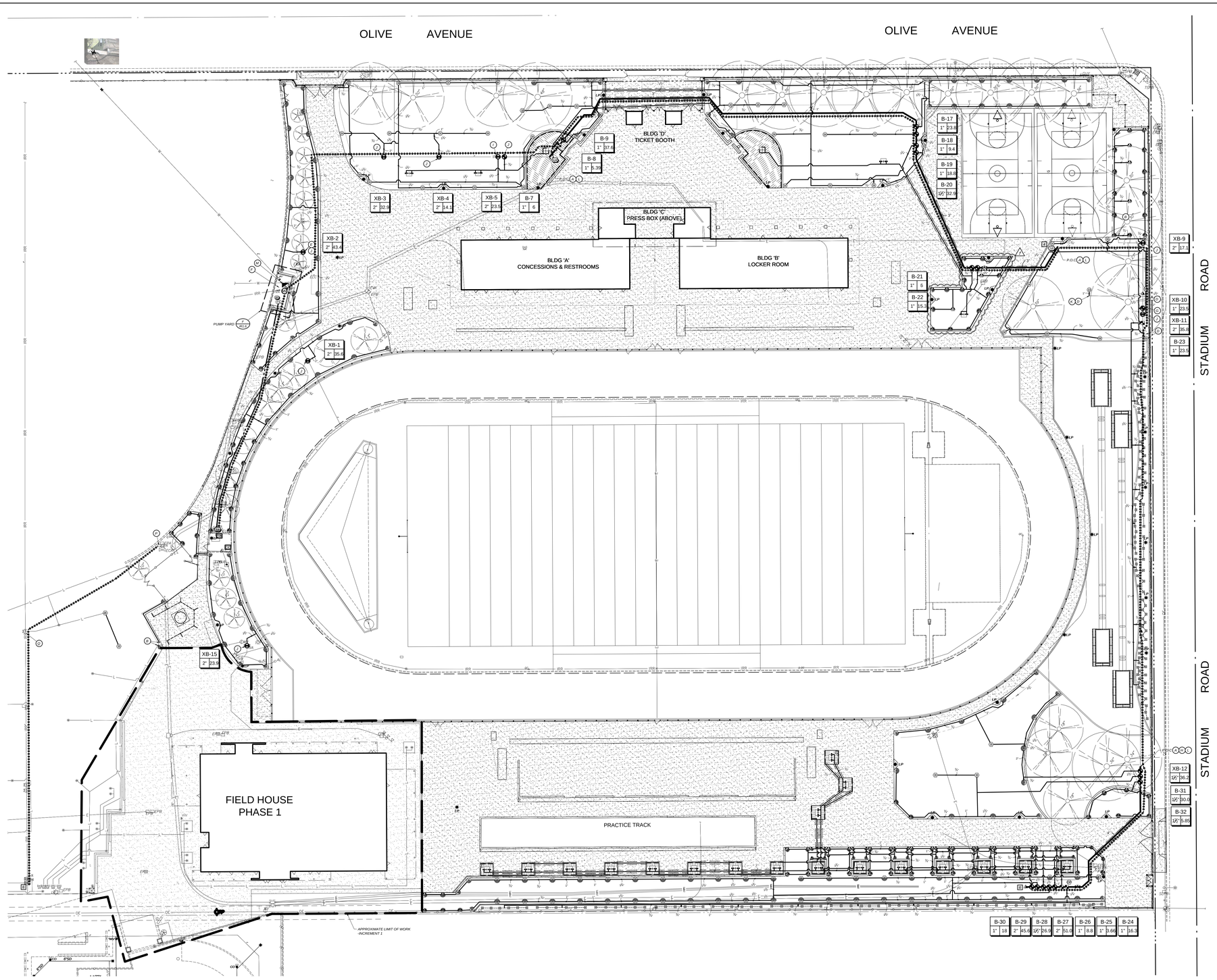
#	DESCRIPTION	DATE
1	ADDENDUM 1	6/12/25

CONSTRUCTION DOCUMENTS

HORIZONTAL CONTROL TABLE

C4.5

Drawing P:\2021\2021-025\25\plans\publish\drawings\C2025_x-HCS1.dwg, C4.5 — Plotted: Monday, Aug 11, 2025 at 8:13am By: Dgilbert



IRRIGATION SYSTEM OBSERVATION LOG:				
		REVIEWED & ACCEPTED BY OWNER'S REPRESENTATIVE		
ITEM NO.	WORK ITEM DESCRIPTION	PRINT NAME	SIGNATURE	DATE
IR-1	EXISTING SYSTEM OPERATION & PRESSURE CHECK			
IR-2	PIPING/WIRE SLEEVES UNDER PAVEMENT			
IR-3	MAIN LINE INSTALLATION & PRESSURE TEST			
IR-4	VALVE INSTALLATIONS			
IR-5	IRRIGATION COVERAGE PRIOR TO PLANTING			
IR-6	CONTROL EQUIPMENT INSTALLATION	N/A	N/A	
IR-7	BOOSTER PUMP INSTALLATION & START-UP (MANUF.)			
IR-8	FINAL SYSTEM OPERATION REVIEW			
NOTES:	THE ORIGINAL VERSION OF THIS LOG SHALL BE MAINTAINED ON THE AS-BUILT RECORD DRAWING SET.			
	WORK ITEMS MAY NOT BE REVIEWED IF PRIOR WORK ITEMS HAVE NOT BEEN ACCEPTED.			
	IT IS THE CONTRACTOR'S RESPONSIBILITY TO ENSURE THAT THE OWNER'S REPRESENTATIVE IS NOTIFIED OF THESE MILESTONE WITNESS POINTS.			

IRRIGATION SYSTEM BID ALLOWANCE:

CONTRACTOR SHALL INCLUDE A BID ALLOWANCE IN THE AMOUNT OF $ 8,000 FOR THE REPLACEMENT OF EXISTING OR THE INSTALLATION OF NEW SPRINKLER HEADS, VALVES, PIPING AND OTHER EQUIPMENT AND ACCESSORIES NECESSARY FOR THE PROPER OPERATION OF THE EXISTING SYSTEM WHERE NOT SPECIFICALLY SHOWN ON THE DRAWINGS FOR REPLACEMENT OR NEW INSTALLATION.

WATER CONSERVATION COMPLIANCE STATEMENT:

I HAVE COMPLIED WITH THE PERFORMANCE COMPLIANCE OPTION CRITERIA OF THE MODEL WATER EFFICIENT LANDSCAPE ORDINANCE (MWELO) AND APPLIED THEM ACCORDINGLY FOR THE EFFICIENT USE OF WATER IN THE IRRIGATION DESIGN PLAN.

DAVID W. BRILEY, PE 2787

SEE SHEETS IR1.5 AND IR1.6 FOR IRRIGATION NOTES AND DETAILS



KEYMAP

SCALE: N 1"=30'

0 10 20 30 60
SCALE IN FEET

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PHASE 2 CONSTRUCTION DOCUMENTS

PROFESSIONAL SEAL

DAVID W. BRILEY — No. 2787 — LANDSCAPE ARCHITECT — STATE OF CALIFORNIA

PROJECT NUMBER	20-51
DATE	5/16/2025
DSA APPLICATION NO.	02-122784
FILE NO.	20-H3
PTN NO.	65243-154
DRAWN BY	KC

REVISIONS

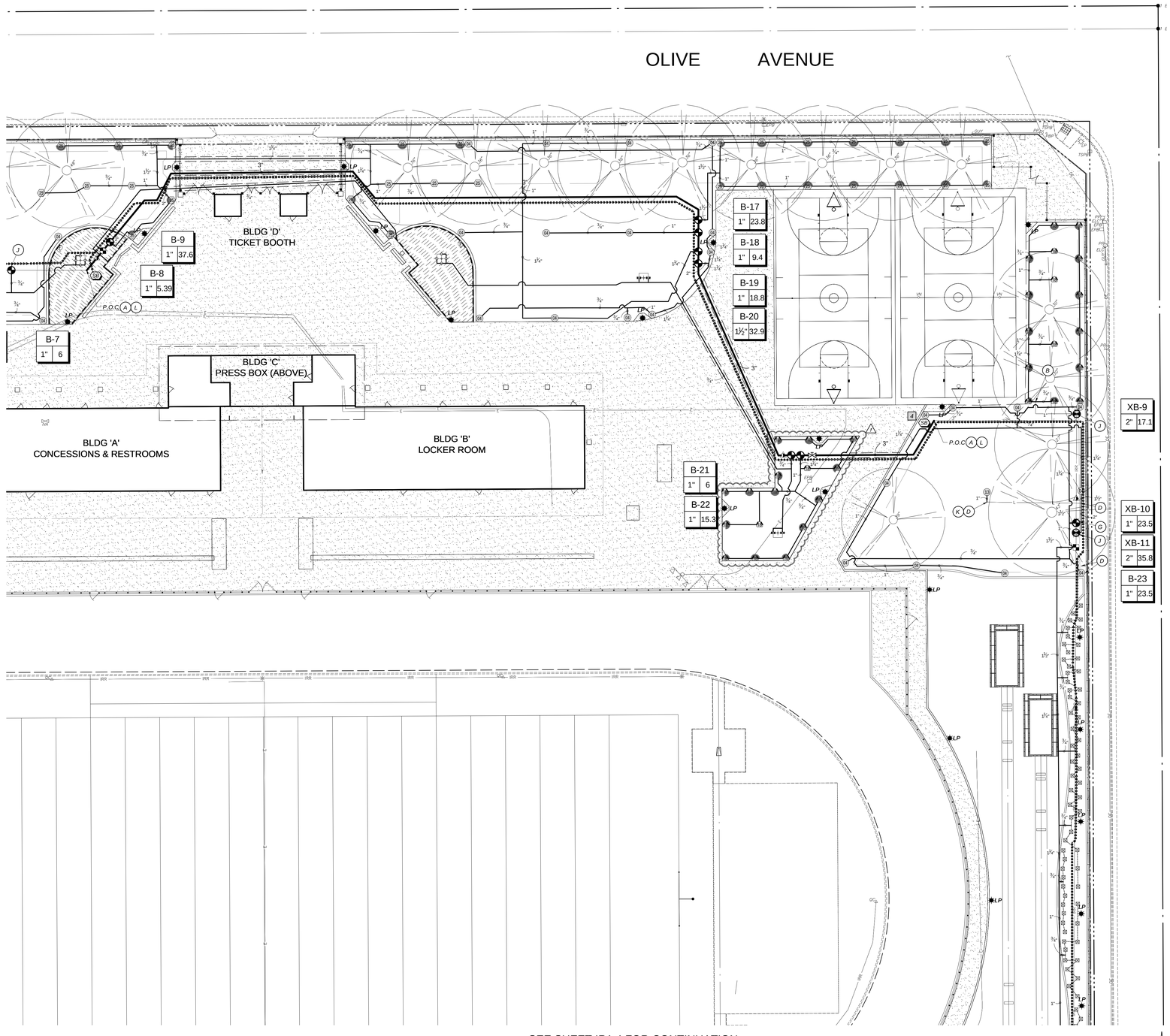
#	DESCRIPTION	DATE
1	ADDENDUM 1	8/12/25

CONSTRUCTION DOCUMENTS

OVERALL IRRIGATION PLAN

IR1.0

Drawing: P:\2025\20-51\Drawings\Irrigation\Drawings\20-51IR1_0.dwg, IR1.0 — Plotted by: Kaycee Aug 12, 2025 - 8:14am



SCALE: N 1"=20'

0 5 20 40
SCALE IN FEET

IRRIGATION LEGEND

FLOW RATES FOR ADJUSTABLE ARC NOZZLES ARE BASED ON 180 DEGREE ARCS, U.N.O.

SYMBOL	MANUFACTURER/MODEL/DESCRIPTION	ARC	PSI	GPM	RADIUS	DETAIL
	RAIN BIRD R-VAN14 RD-04-S-P45-F RV-14	ADJ	45	0.004	14'	G/IR1.5
	RAIN BIRD R-VAN18 RD-04-S-P45-F RV-18	ADJ	45	0.006	17'	G/IR1.5
	RAIN BIRD R-VAN18 RD-04-S-P45-F RV-18F	360	45	1.85	17'	G/IR1.5
	RAIN BIRD R-VAN24 RD-04-S-P45-F RV-24	ADJ	45	0.009	23'	G/IR1.5
	MULTI-STREAM SHURB BUBBLER 25Q HUNTER MSBN-25Q ON A RAIN BIRD RD-06-S-P30-F	90	30	0.25	1'	O/IR1.5
	TREE BUBBLER 1402 RAIN BIRD 1804-SAM-PRS-1402 FLOOD	360	30	0.5	6'	I/IR1.5
	TREE BUBBLER - SPECIMEN TREE 1404 RAIN BIRD 1804-SAM-PRS-1404 FLOOD	360	30	1	3'	I/IR1.5

SYMBOL	MANUFACTURER/MODEL/DESCRIPTION	PSI	GPM	RADIUS	DETAIL
25	HUNTER I-20-04-SS-PRB-MPR 25	45	1.98	25'	H/IR1.5
30	HUNTER I-20-04-SS-PRB-MPR 30	45	2.96	30'	H/IR1.5
35	HUNTER I-20-04-SS-PRB-MPR 35	45	3.81	35'	H/IR1.5
04	HUNTER I-25-04-SS 04	60	4.7	42'	H/IR1.5
13	HUNTER I-25-04-SS-HS 13	60	12.3	49'	H/IR1.5

SYMBOL	MANUFACTURER/MODEL/DESCRIPTION	DETAIL
	DRIP ZONE CONTROL KIT MF IRRITROL 700-1-MF	A/IR1.6
F	FLUSH VALVE	D/IR1.6
OP	HUNTER ECO-ID	E/IR1.6
	AREA TO RECEIVE DRIPLINE NETAFIM TLCV-04-18 TECHLINE PRESSURE COMPENSATING 17MM LANDSCAPE DRIPLINE WITH CHECK VALVE. 0.4 GPH EMITTERS AT 18" O.C. DRIPLINE LATERALS SPACED AT 18" APART, WITH EMITTERS OFFSET FOR TRIANGULAR PATTERN. MINIMUM 1" COVER	B/IR1.6

SYMBOL	MANUFACTURER/MODEL/DESCRIPTION	DETAIL
	EXISTING REMOTE CONTROL VALVE PROVIDE AN ADJUSTABLE UP TO 100 PSI PRESSURE REGULATOR IF NOT EXISTING	
	REMOTE CONTROL VALVE WITH PRESSURE REGULATOR IRRITROL 100P-G-OMR-100	J/IR1.5
	QUICK COUPLER VALVE HUNTER-44RC WITH HK44 KEY AND HS2 HOSE SWIVEL	N/IR1.5
	GATE VALVE LARGE LEEMCO LMV-BB WITH 2" NUT PUSH-ON BELL ENDS, OR EQUAL	K/IR1.5
MV	MASTER VALVE 3" SUPERIOR 3300, NORMALLY OPEN	
	EXISTING BACKFLOW PREVENTER ZURN WILKINS 4"	
CB	EXISTING CONTROLLER - B RAIN MASTER - SENTAR II (36 STATIONS TOTAL/16 USED). 6 SPARE WIRES.	
CC	EXISTING CONTROLLER - C (FIELD) RAIN MASTER - SENTAR II (36 STATIONS TOTAL/7 USED). NO INFORMATION REGARDING SPARE WIRES.	
FS	FLOW SENSOR	N/IR1.5
BP	NEW BOOSTER PUMP ASSEMBLY IN PUMP YARD	F/IR1.6
SB	SPLICE BOX	L/IR1.5
	IRRIGATION LATERAL LINE: PVC SCHEDULE 40, BELL END SOLVENT WELD, SIZE AS NOTED	C/IR1.5
	IRRIGATION LATERAL LINE: POLYETHYLENE 3/4" RAIN BIRD XBS 940 TUBING WITH TLF-0800 FITTINGS, AND 1/2" SPX-FLEX SWING PIPE WITH SB SERIES FITTINGS AT POP-UP HEADS	P/IR1.5
	IRRIGATION MAINLINE: PVC CLASS 200 SDR 21 RUBBER GASKETED, SIZE AS NOTED	A/IR1.5
	PIPE SLEEVE: PVC SCHEDULE 40 TWICE PIPE SIZE	E/IR1.5

- # — VALVE NUMBER
- #" — VALVE FLOW (GPM)
- # — VALVE SIZE

(E) VALVE-IN-HEAD ROTOR, LOCATIONS ARE CONFIRMED. HUNTER MODEL G995, PART-CIRCLE, #45 NOZZLE

EXISTING LATERAL LINE

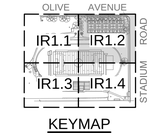
EXISTING MAIN LINE

PROPOSED TREE, SEE PLANTING PLAN ON SHEET L1.0 TO L1.4 FOR VARIETY AND SIZE

NUMBER OF SPARE CONTROL WIRE PLUS ONE (1) SPARE COMMON WIRE. PROVIDE A 10 FOOT LOOP IN VALVE BOX

	CONTROL WIRE SLEEVE	E/IR1.5
	CONTROL WIRE PLUS ONE (1) COMMON WIRE	D/IR1.5
	SENSOR CABLE IN PVC ELECTRICAL CONDUIT	E/IR1.5
	DRIPLINE MANIFOLD: PVC SCHEDULE 40	C/IR1.6

- (A) CONNECT NEW MAIN LINE TO EXISTING MAIN LINE
- (B) CONNECT NEW LATERAL LINE TO EXISTING LATERAL LINE
- (C) CONNECT EXISTING SPRINKLER HEAD TO NEW LATERAL LINE
- (D) RELOCATE EXISTING SPRINKLER HEADS. ADJUST HEADS/NOZZLES
- (E) EXISTING 2" ICV RELOCATED/ XB-2 (SEE DEMOLITION PLANS - C2.2 TO C2.5 FOR CURRENT LOCATION)
- (F) EXISTING BOOSTER PUMP ASSEMBLY. REPLACE WITH A NEW VFD BOOSTER PUMP IN A METAL ENCLOSURE.
- (G) REPLACE EXISTING 2" ICV WITH NEW 1" ICV
- (H) EXISTING 2" ICV RELOCATED/ XB-12 (SEE DEMOLITION PLANS - C2.2 TO C2.5 FOR CURRENT LOCATION)
- (I) NEW 1" ICV - USE WIRE AND CONTROLLER STATION B-7 (SEE DEMOLITION PLANS - C2.2 TO C2.5 FOR CURRENT LOCATION)
- (J) EXISTING 2" ICV WITH REVISED FLOW
- (K) CHANGE SPRINKLER HEAD ARC TO MINIMIZE OVERSPRAY ONTO HARDSCAPE
- (L) REROUTE EXISTING MAIN LINE AWAY FROM SITE IMPROVEMENTS(SEE DEMOLITION PLANS - C2.2 TO C2.5 FOR CURRENT LOCATION)
- (M) EXISTING 4" BACKFLOW PREVENTER TO REMAIN
- (N) EXISTING 2" ICV RELOCATED/ XB-13 (SEE DEMOLITION PLANS - C2.2 TO C2.5 FOR CURRENT LOCATION)
- (O) EXISTING 2" ICV RELOCATED/ XB-14 (SEE DEMOLITION PLANS - C2.2 TO C2.5 FOR CURRENT LOCATION)
- (P) SPLICE NEW CONTROL WIRES TO (E) SPARE CONTROL WIRES.
- (Q) CONNECT EXISTING CONTROL VALVE TO NEW CONTROL WIRE AND SPARE STATIONS ON CONTROLLER 'B'



KEYMAP

SEE SHEETS IR1.5 AND IR1.6 FOR IRRIGATION NOTES AND DETAILS

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PHASE 2 CONSTRUCTION DOCUMENTS

PROFESSIONAL SEAL

REGISTERED LANDSCAPE ARCHITECT
SHELLY [illegible]
12/31/26
RENEWAL DATE
STATE OF CALIFORNIA

PROJECT NUMBER	20-51
DATE	5/16/2025
DSA APPLICATION NO.	02-122784
FILE NO.	20-H3
PTN NO.	65243-154
DRAWN BY	KC

REVISIONS

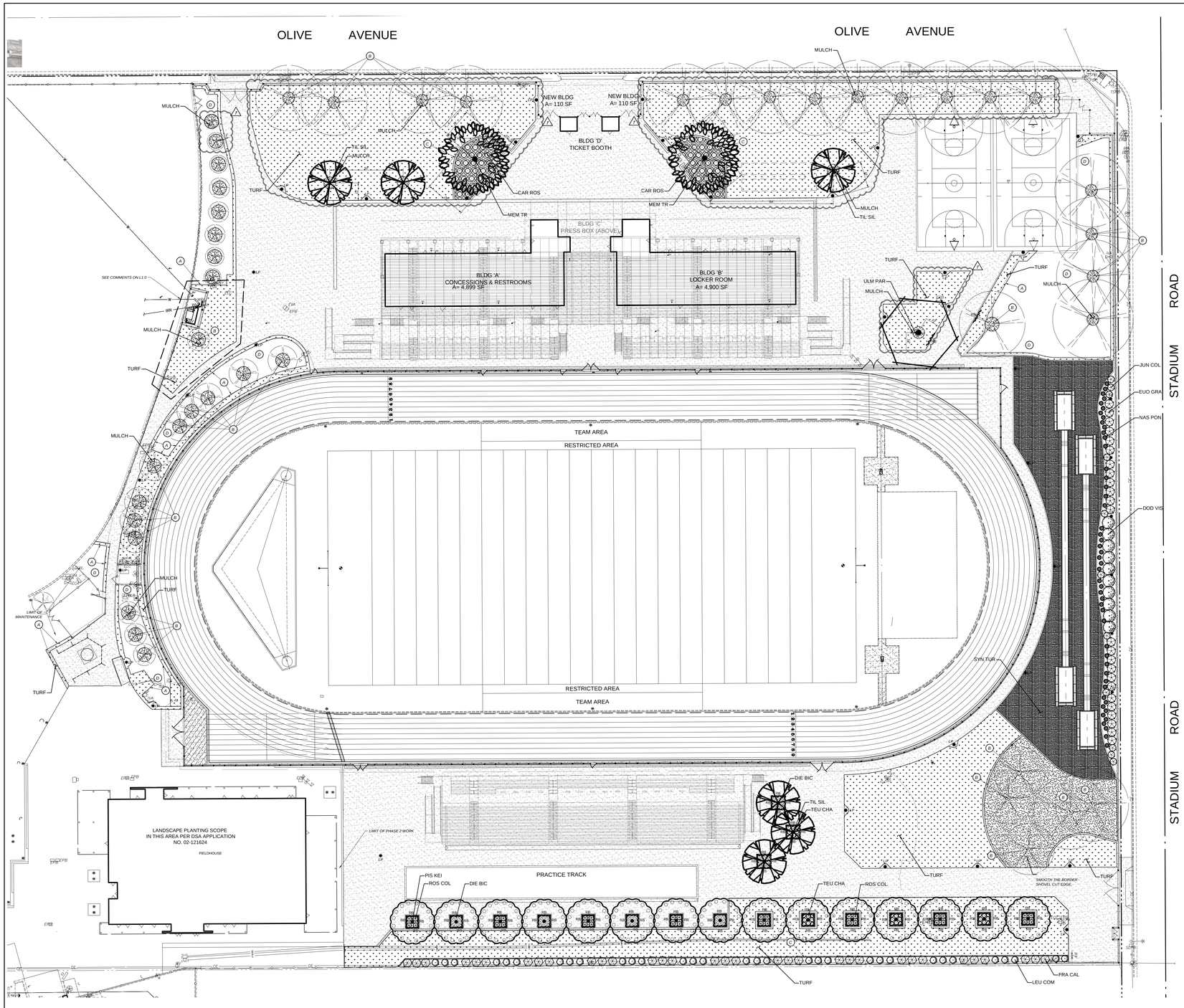
#	DESCRIPTION	DATE
1	ADDENDUM 1	8/12/25

CONSTRUCTION DOCUMENTS

IRRIGATION PLAN

IR1.2

Drawing: P:\22\22\22-0252\Drawings\Landscape\Irrigation\22252_IR002.dwg, IR1.2 —
Plot By: bgarcia Aug 12, 2025 8:14am



LANDSCAPE PLANTING OBSERVATION LOG				
		REVIEWED & ACCEPTED BY OWNER'S REP OR LAND ARCH		
ITEM NO.	WORK ITEM DESCRIPTION	PRINT NAME	SIGNATURE	DATE
PL-1	REPORT & PROTECTION OF EXISTING TREES			
PL-2	RIPPING OF PLANTING AREAS			
PL-3	SOIL CONDITIONING & TILLAGE DEPTH			
PL-4	IRRIGATION COVERAGE PRIOR TO PLANTING			
PL-5	FINISH GRADING PRIOR TO PLANTING			
PL-6	TREES - INITIAL QUALITY & LAYOUT			
PL-7	PLANTS - INITIAL QUALITY & LAYOUT			
PL-8	GRANULAR PRE-EMERGENT HERBICIDE IN MULCHED AREAS			
PL-9	WOOD MULCH DEPTH			
NOTES:	THE ORIGINAL VERSION OF THIS LOG SHALL BE MAINTAINED ON THE AS-BUILT RECORD DRAWING SET. WORK ITEMS MAY NOT BE REVIEWED IF PRIOR WORK ITEMS HAVE NOT BEEN ACCEPTED.			

LANDSCAPE PLANTING AREA REQUIREMENT (DSA 1-L)	AREA (SF)
NEW BUILDING FOOTPRINT:	10,019
REQUIRED MWELO COMPLIANT PLANTING:	7,514
EXISTING IRRIGATED AREA DESIGNATED FOR REMOVAL:	66,304
PROPOSED MWELO COMPLIANT PLANTING:	7,824
TOTAL CREDIT FOR MWELO COMPLIANT PLANTING:	74,128
EXCESS / (DEFICIT) OF PROPOSED COMPLIANT PLANTING:	66,614

LANDSCAPE SHADE CALCULATIONS	SHADING PER CALGREEN 5.106.12		
SITE SHADING - LANDSCAPE & HARDSCAPE	QUANTITY PROPOSED (SF)	PERCENT REQUIRED	SHADE AREA REQUIRED (SF)
LANDSCAPED AREA (EXCLUDING SPECIAL USE & PARKING LANDSCAPE AREAS)	7,824	20	1,565
UNCOVERED HARDSCAPE AREA (EXCLUDING PARKING HARDSCAPE AREAS)	75,288	20	15,058
TOTAL SITE SHADE REQUIRED			16,622
PROVIDED SHADE TREES	PROVIDED SHADE AREA	NO. TREES	
VERY LARGE (40' dia.= 1256 SF)	1,256	1	
LARGE (35' dia.= 962 SF)	12,506	13	(11 existing)
MEDIUM (30' dia.= 707 SF)	4,242	6	
SMALL (20' dia.= 314 SF)	9,734	31	(13 existing)
TOTALS	27,738	51	
OVER (UNDER) LANDSCAPE & HARDSCAPE SHADE REQUIREMENT			11,116

LANDSCAPE PLANTING BID ALLOWANCE:

CONTRACTOR SHALL INCLUDE A BID ALLOWANCE IN THE AMOUNT OF $5,000 FOR THE REMOVAL AND REPLACEMENT OF EXISTING PLANTS/TURFGRASS AND/OR THE INSTALLATION OF NEW PLANTS/TURFGRASS WHERE NOT SPECIFICALLY SHOWN ON THE DRAWINGS FOR REPLACEMENT OR INSTALLATION.
THE BID ALLOWANCE SHALL NOT BE USED FOR THE REPAIR OR REPLACEMENT OF EXISTING PLANTING NOTED TO REMAIN THAT IS DAMAGED OR DISTRESSED DUE TO CONSTRUCTION OPERATIONS.

SPECIMEN TREE ALLOWANCE:

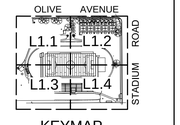
PROVIDE A BID ALLOWANCE OF $30,000 FOR ALL MATERIALS, LABOR AND EQUIPMENT NECESSARY FOR THE COMPLETE INSTALLATION OF THE TWO MEMORIAL TREES. SEE PLANTING LEGEND FOR ADDITIONAL INFORMATION.

WATER CONSERVATION COMPLIANCE STATEMENT:

I HAVE COMPLIED WITH THE CRITERIA OF THE LANDSCAPE WATER CONSERVATION ORDINANCE AND GUIDELINES, AND HAVE APPLIED THEM FOR THE EFFICIENT USE OF WATER IN THE PLANTING DESIGN PLAN.

DAVID W. BRILEY, RLA 2787

SEE SHEET L1.5 FOR PLANTING LEGEND AND NOTES, AND L1.6 FOR DETAILS



KEYMAP

SCALE: 1"=30'

0 10 20 30 60
SCALE IN FEET

811 Know what's below. Call before you dig.

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PHASE 2 CONSTRUCTION DOCUMENTS

PROFESSIONAL SEAL

REGISTERED LANDSCAPE ARCHITECT DAVID W. BRILEY 2787 12/31/26 RENEWAL DATE 5/16/25 STATE OF CALIFORNIA

PROJECT NUMBER	20-51
DATE	5/16/2025
DSA APPLICATION NO.	02-122784
FILE NO.	20-H3
PTN NO.	65243-154
DRAWN BY	KC

REVISIONS

#	DESCRIPTION	DATE
1	ADDENDUM 1	8/12/25

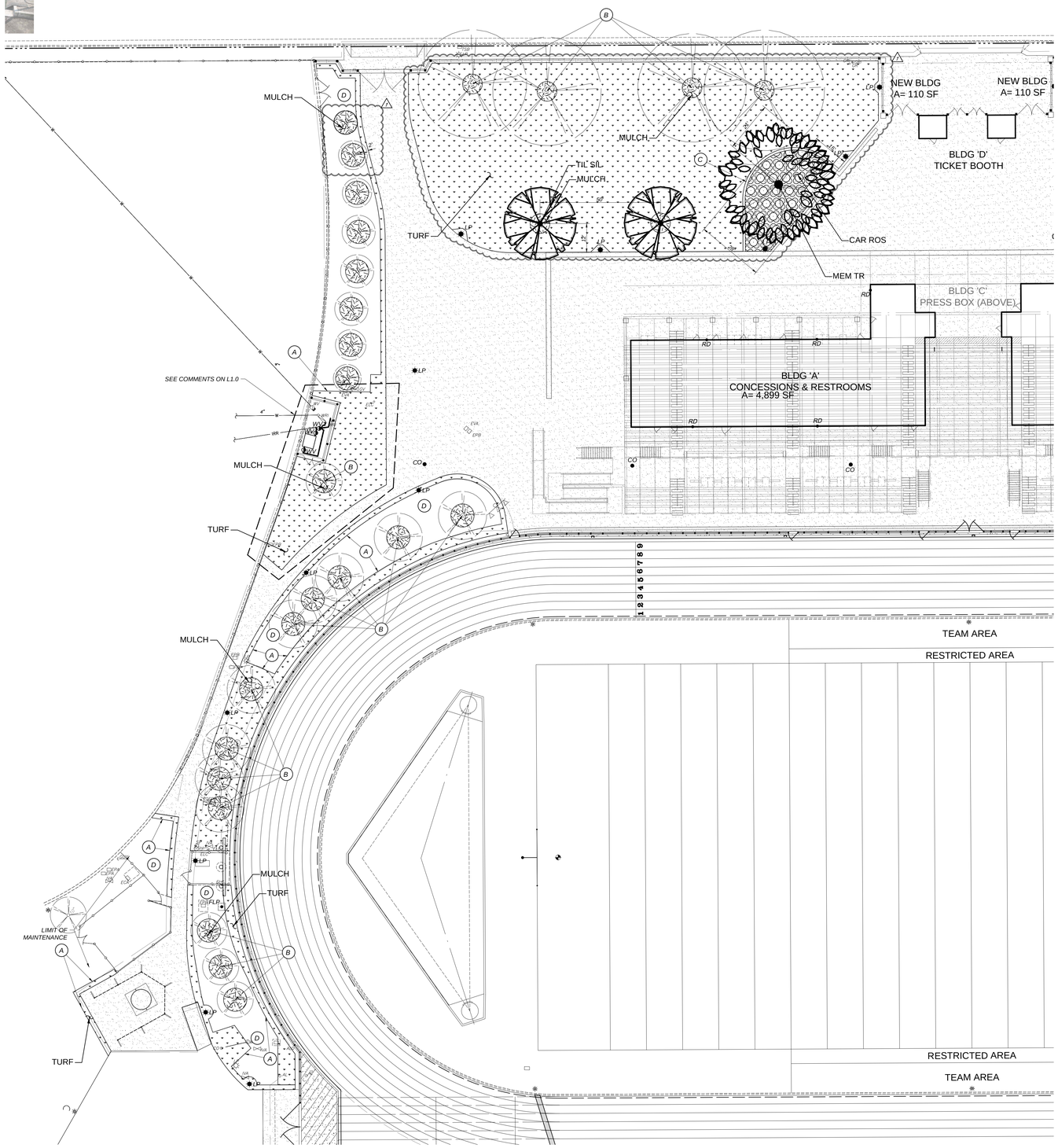
CONSTRUCTION DOCUMENTS

OVERALL PLANTING PLAN

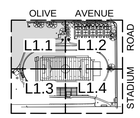
L1.0

Drawing: P:\2020\20-0051\Drawings\Arch\Working\20-0051_A02.dwg, L1.0 — Plot By: bjarvis Aug 12, 2025 - 8:14am

OLIVE AVENUE



SEE SHEET L1.5 FOR LEGEND



KEYMAP

SCALE: N 1"=20'

0 5 20 40
SCALE IN FEET

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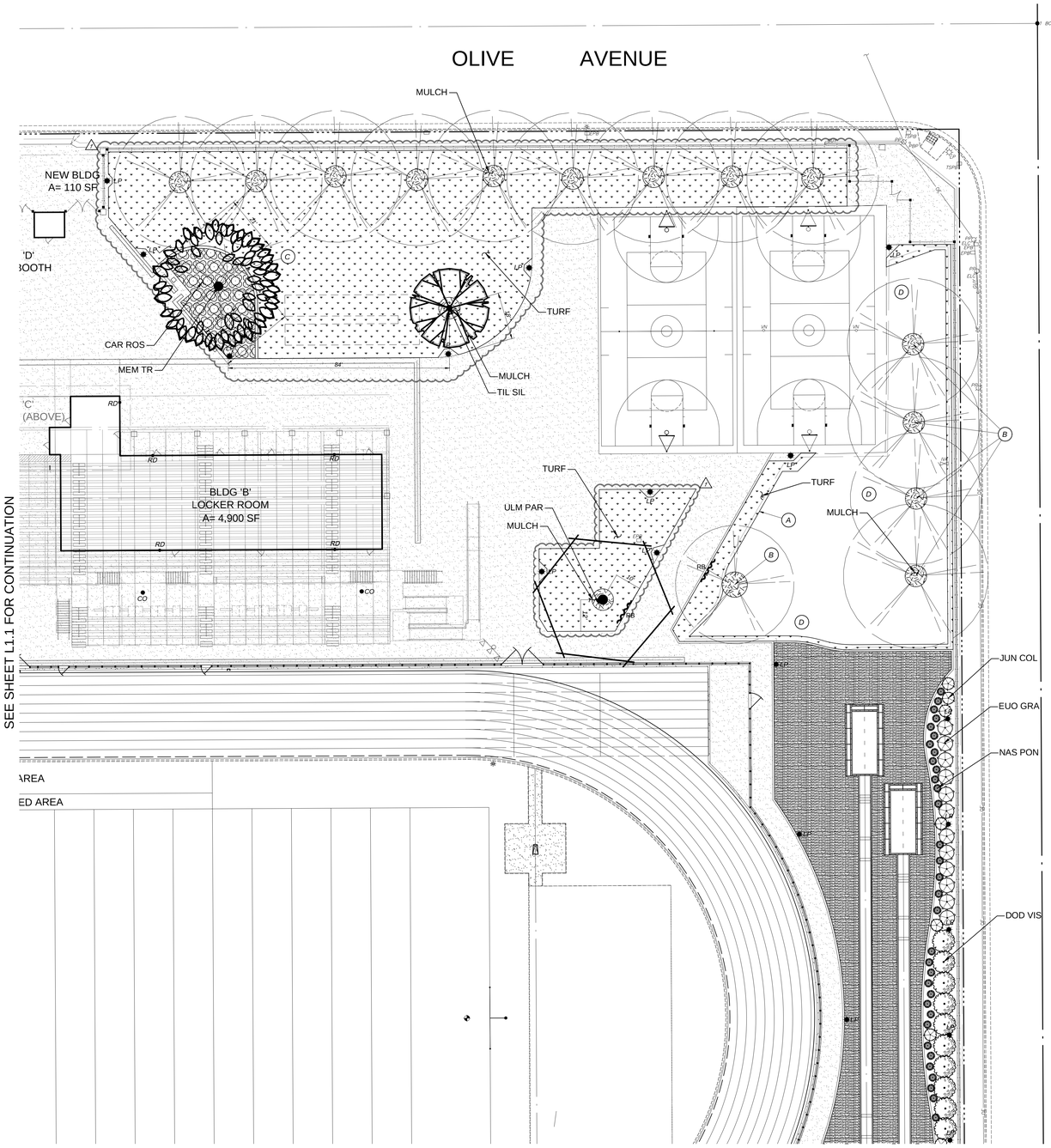
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1	ADDENDUM 1	8/12/25

CONSTRUCTION DOCUMENTS

PLANTING PLAN

L1.1

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Plot By: Kalpana Aug 12, 2025 - 8:14am



SEE SHEET L1.5 FOR LEGEND

KEYMAP

SCALE: N 1"=20'

0 5 20 40
SCALE IN FEET

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PROFESSIONAL SEAL

REGISTERED LANDSCAPE ARCHITECT
BRUCE
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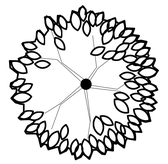
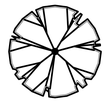
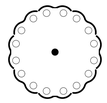
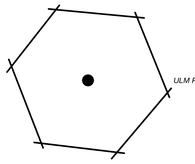
PLANTING PLAN

L1.2

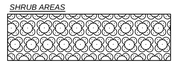
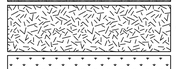
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PLANT LEGEND

TOTAL MIXED PLANTING AREA = 7,824 SF SUNSET ZONE: 9 MS = MATURE SIZE

SYMBOL	CODE	BOTANICAL / COMMON NAME	CONT	WATER USE	QTY	DETAIL	REMARKS
TREES							
	MEM TR	MEMORIAL TREE	72"BOX		2	G/L1.6	MEMORIAL TREE. SIZE AND SPECIES SHALL BE DETERMINED ONCE THE CONTRACT IS IN FORCE. TREES SHALL BE SELECTED BY THE OWNER AND LANDSCAPE ARCHITECT FROM ALM ENTERPRISES, INC. GROWING GROUNDS IN FRESNO COUNTY. PROVIDE A BID ALLOWANCE OF $30,000 FOR ALL MATERIALS, LABOR AND EQUIPMENT NECESSARY FOR THE COMPLETE INSTALLATION OF THE TWO MEMORIAL TREES.
MEDIUM TREES							
	TIL SIL	TILIA TOMENTOSA SILVER LINDEN	24"BOX	L	6	A/L1.6	DECIDUOUS. STANDARD FORM. YELLOW OR WHITE FLOWERS IN SUMMER. MS: 50' H X 20'-30' W
LARGE TREES							
	PIS KEI	PISTACIA CHINENSIS 'KEITH DAVEY' KEITH DAVEY CHINESE PISTACHE	24"BOX	L	15	A/L1.6	DECIDUOUS. STANDARD FORM. FULL SUN. ORANGE-CRIMSON FALL COLOR MS: 30-40' H X 25-35' W
VERY LARGE TREES							
	ULM PAR	ULMUS PARVIFOLIA 'DYNASTY' CHINESE ELM	24"BOX	M	1	A/L1.6	DECIDUOUS. STANDARD FORM. PARTIAL SHADE TO FULL SUN. MS: 50' H X 35'-50' W

SYMBOL	CODE	BOTANICAL / COMMON NAME	SIZE	WATER USE	QTY	DETAIL	REMARKS
SHRUBS							
	DIE BIC	DIETES BICOLOR FORTNIGHT LILY	1 GAL	L	48	B/L1.6	FULL SUN. LIGHT YELLOW IRIS-LIKE FLOWERS WITH VIVID MAROON BLOTCHES MS: 2'-3' H X 2'-3' W
	DOD VIS	DODONAEA VISCOSA HOPSEED BUSH	5 GAL	L	10	B/L1.6	EVERGREEN, INCONSPICUOUS BLOOM, SHOWY SEED PODS. MS: 10'-15' H X8'-10' W
	EUO GRA	EUONYMUS JAPONICUS 'GRANDIFOLIUS' JAPANESE EUNONYMUS	5 GAL	L	24	B/L1.6	EVERGREEN, INCONSPICUOUS BLOOM. MS: 6'-8' H X 4'-6' W
	FRA CAL	FRANGULA CALIFORNICA 'EVE CASE' EVE CASE COFFEEBERRY	5 GAL	L	33	B/L1.6	FULL SUN, PART SHADE, SHADE. MS: 3'-6' H X 4'-6' W
	JUN COL	JUNIPERUS CHINENSIS 'HETZII COLUMNARIS' HETZI COLUMN JUNIPER	5 GAL	L	11	B/L1.6	EVERGREEN, NO BLOOM. MS: 12'-15' H X 4'-6' W
	LEU COM	LEUCOPHYLLUM FRUTESCENS `COMPACTA` COMPACT TEXAS RANGER	5 GAL	L	32	B/L1.6	FULL SUN. PURPLE FLOWERS LATE SPRING OR EARLY SUMMER. LATE SUMMER OR EARLY FALL. MS: 5' X 5'
	TEU CHA	TEUCRIUM CHAMAEDRYS GERMANDER	5 GAL	L	32	B/L1.6	FULL SUN. DARK GREEN FOLIAGE TOPPED WITH LIGHT MAGENTA FLOWERS IN SPIKES. MS: 2'H X 3' W
PERENNIALS							
	ROS COL	ROSMARINUS OFFICINALIS `COLLINGWOOD INGRAM' COLLINGWOOD INGRAM ROSEMARY	5 GAL	L	32	B/L1.6	EVERGREEN. FULL SUN. DARK BLUE FLOWERS. MS: 2-3' H X 4' W
GRASSES							
	NAS PON	NASSELLA TENUISSIMA `PONY TAILS` MEXICAN FEATHERGRASS	1 GAL	L	49	B/L1.6	FULL SUN. PERENNIAL GRASS, THIN TAN BLOOM. MS: 2' H X 2'-3' W

SYMBOL	CODE	BOTANICAL / COMMON NAME	CONT	WATER USE	QTY	DETAIL	REMARKS
SHRUB AREAS							
	CAR ROS	ROSA X 'NOASCHNEE' FLOWER CARPET® WHITE GROUNDCOVER ROSE	1 GAL	L	1,823 SF	H/L1.6	EVERGREEN SPACE 3' O.C. MS: 2'-3' H X 3'-4' W
GROUND COVERS							
	SYN TUR	SYNTHETIC TURF	N/A	N/A			SEE CIVIL SITE PLAN.
	MULCH	WALK-ON WOOD MULCH	N/A	N/A	7,858 SF	D/L1.6	MIN. 3 INCH COMPRESSED DEPTH. SEE PLANTING NOTE #18. QUANTITY IS IN ADDITION TO THAT PROVIDED IN THE MIXED PLANTING AREA.
	TURF	`CELEBRATION` BERMUDAGRASS	SOD	M	55,069 SF	C/L1.6	
RB		ROOT BARRIER UB24-2				E/1.6	24 INCH DEEP ROOT BARRIER PANELS. INSTALL PER MANUFACTURE'S SPECIFICATIONS.

(A) TRANSITION GRADE, SEE GRADING AND DRAINAGE PLAN. PROVIDE SOD AT A MINIMUM 2' WIDTH WHERE DAMAGED OR DISTRESSED TO UNDISTURBED TURFGRASS.

(B) PROTECT EXISTING TREE IN PLACE. TPZ (TREE PROTECTION ZONE) PER SECTION 320190

(C) 6" WIDE CONCRETE CURB PER CIVIL DETAIL I/ CX1.5

(D) MAINTAIN THE EXISTING TURFGRASS THAT IS REMAINING IN PLACE THROUGHOUT THE CONSTRUCTION PERIOD UNTIL FINAL ACCEPTANCE OF THE PROJECT. APPLY FERTILIZER AT EQUAL FREQUENCY AND RATES AS NEWLY INSTALLED TURFGRASS. MOW AT THE SAME FREQUENCY AS NEWLY INSTALLED TURFGRASS.

PLANTING NOTES:

1. IMMEDIATELY NOTIFY THE OWNER'S REPRESENTATIVE IF IT IS OBVIOUS THAT OBSTRUCTIONS OR STRUCTURES, IRRIGATION SYSTEM MALFUNCTION, EXISTING TREES OR PLANTS, GRADE DIFFERENCES OR CHANGES IN THE SITE PLAN ARE PRESENT THAT WILL IMPACT THE PLANTING DESIGN. FAILURE TO GIVE SUCH NOTIFICATION SHALL PLACE THE RESPONSIBILITY ON THE CONTRACTOR FOR ANY REVISIONS OR REPLACEMENTS NECESSARY FOR CORRECTION.
2. ANY EXISTING PLANTING SHOWN ON THE PLAN IS FOR REFERENCE ONLY. THE CONTRACTOR SHALL VERIFY THE EXISTING PLANTING AT THE SITE PRIOR TO STARTING WORK. UNLESS NOTED OTHERWISE, THE CONTRACTOR SHALL PROTECT THE EXISTING PLANTING ADJACENT TO THE WORK FROM DAMAGE OR DISTRESS.
3. ALL TREES AND SHRUBS SHALL BE OF CLASS A QUALITY WITHOUT PESTS, DISEASE OR DAMAGE, SHALL BE WELL ESTABLISHED IN THEIR CONTAINERS WITHOUT GIRDLING ROOTS OR EXCESSIVE TOP GROWTH, AND SHALL COMPLY WITH THE REQUIREMENTS OF THE "AMERICAN STANDARDS FOR NURSERY STOCK" (ANSI Z60.1).
4. NOTIFY THE LANDSCAPE ARCHITECT PRIOR TO THE INSTALLATION OF IRRIGATION COMPONENTS AND TREE AND/OR SHRUB PLANTING FOR APPROVAL OF THE PLANT LAYOUT AND PLANT QUALITY. PLANT LOCATIONS SHALL AVOID CONFLICTS WITH EXISTING IMPROVEMENTS, PLANTINGS OR UTILITIES. LIGHT POLES WHILE MEETING THE DESIGN INTENT, DO NOT PLANT TREES WITHIN 15 FEET OF LIGHT POLES UNLESS SPECIFICALLY AUTHORIZED. FAILURE TO OBTAIN SUCH APPROVAL SHALL PLACE THE RESPONSIBILITY ON THE CONTRACTOR FOR ANY RELOCATION OR REPLACEMENT OF IRRIGATION COMPONENTS, PLANTED TREES AND/OR SHRUBS.
5. PLANT QUANTITIES ARE PROVIDED FOR BIDDING CONVENIENCE ONLY. THE CONTRACTOR SHALL PROVIDE SUFFICIENT QUANTITIES OF PLANTS EQUAL TO THE SYMBOL COUNT OR TO FILL THE AREA SHOWN ON THE PLAN AT THE SPECIFIED TRIANGULAR SPACING.
6. WHERE GROUND COVER PLANTS ARE SHOWN AT A SPECIFIED SPACING, THE GROUND COVER PLANTING CONTINUES UNDERNEATH THE TALLER SHRUBS AND TREES AS SHOWN IN THE PLANTING DETAILS. DO NOT PLANT GROUND COVER IN SHRUB OR TREE WATERING BASINS.
7. ALL NEW TREES LOCATED WITHIN 8 FEET OF PAVEMENT OR STRUCTURES SHALL HAVE A ROOT CONTROL BARRIER INSTALLED WHEN PLANTED. UNLESS OTHERWISE SPECIFIED, INSTALL A 12 FOOT LONG X 24 INCH DEEP LINEAR POLYETHYLENE BARRIER VESPRO OR EQUAL AT THE EDGE OF PAVEMENT/STRUCTURE, CENTERED ON THE TREE TRUNK AS SHOWN IN THE PLANTING DETAILS.
8. REMOVE NURSERY STAKES FROM TREES AFTER TREE STAKING OR GUYING AS SHOWN IN THE DETAILS.
9. INSTALL PERFORATED POLYETHYLENE TREE TRUNK PROTECTORS FOR ALL NEW TREES PLANTED IN TURF. UNLESS NOTED OTHERWISE, MAINTAIN A MINIMUM 6 FOOT DIAMETER MULCHED AREA AT THE BASE OF THE TREE INSIDE THE WATERING BASIN.
10. THE CONTRACTOR SHALL PRUNE NEW TREES ONLY WHEN SPECIFICALLY DIRECTED BY THE LANDSCAPE ARCHITECT. TREES HEADED BACK WITHOUT INTACT SCAFFOLDING BRANCH STRUCTURE OR IN ROOT-BOUND CONTAINERS SHALL BE REJECTED.
11. SUBMIT REPRESENTATIVE SOIL SAMPLES OF NATIVE AND PROPOSED IMPORT, IF NEEDED, PLANTING TOPSOIL TO A SOIL LAB FOR HORTICULTURAL ANALYSES AND FERTILITY RECOMMENDATIONS. AMEND SOIL ACCORDING TO THE RECOMMENDATIONS OF THE SOILS REPORT AND LANDSCAPE ARCHITECT'S DIRECTION. SEE THE LANDSCAPE PLANTING SPECIFICATIONS FOR ADDITIONAL INSTRUCTIONS.
12. PROVIDE SANDY LOAM TOPSOIL PER SPECIFICATION IN ALL RAISED PLANTERS AND WHERE IMPORT TOPSOIL IS REQUIRED. NATIVE SITE SOIL MAY BE USED IN RAISED PLANTERS ONLY WHEN THE NATIVE SITE SOIL MEETS THE CRITERIA FOR SANDY LOAM TOPSOIL AS DETERMINED BY A SOIL ANALYSIS.
13. PRIOR TO SOIL CONDITIONING, RIP IN TWO DIFFERENT DIRECTIONS WITH TINES AT 12 INCH SPACING, ALL TURFGRASS AREAS TO A 12 INCH DEPTH, AND SHRUB/GROUND COVER AREAS TO A 18 INCH DEPTH. ROUGH GRADE AND TILL THE APPROVED SOIL CONDITIONERS AND FERTILIZERS INTO THE TOP 6 INCHES PER THE LANDSCAPE PLANTING SPECIFICATIONS. COMPOST RATE SHALL BE A MINIMUM OF FOUR (4) CUBIC YARDS PER 1,000 SQUARE FEET.
14. UPON THE COMPLETION OF THE SOIL CONDITIONING, REMOVE ROCKS AND CLODS 1 INCH DIAMETER AND GREATER FROM THE TOP TWO INCHES OF TOPSOIL, AND ALL DEBRIS. FINISH GRADE THE AREA TO +/- 0.04 FOOT TOLERANCE. FINISH GRADE IN MULCHED AREAS SHALL BE STRAIGHT GRADES WITHOUT HUMPS OR DEPRESSIONS AND SHALL BE 2 INCHES BELOW ADJACENT HARDSCAPE, INLETS OR UTILITY BOX COLLARS. RELATIVE DENSITY OF THE TOPSOIL SHALL NOT EXCEED 85% COMPACTION.
15. OBTAIN THE APPROVAL OF THE OWNER'S REPRESENTATIVE TO BEGIN PLANTING OPERATIONS ONCE THE IRRIGATION SYSTEM IS OPERATIONAL AND THE SOIL CONDITIONING AND FINISH GRADING IS COMPLETED.
16. AFTER PLANTING IS COMPLETED AND JUST PRIOR TO MULCH INSTALLATION, APPLY A BROAD SPECTRUM PRE-EMERGENT HERBICIDE TO ALL NON-TURFGRASS PLANTING AREAS PER THE MANUFACTURER'S SPECIFICATIONS.
17. WHERE MULCH IS TO BE INSTALLED IN AN EXISTING PLANTING AREA, BREAKUP/TILL THE EXISTING SOIL TO A MINIMUM 6 INCH DEPTH PER SPECS, AND ADJUST FINISH GRADE ADJACENT TO HARDSCAPE AND DRAINAGE ELEMENTS TO PROVIDE A 2 INCH DEPTH THAT TRANSITIONS TO THE EXISTING GRADE OVER 1 TO 2 FEET.
18. INSTALL A MINIMUM 3 INCH DEPTH OF CHIPPED WALK-ON WOOD MULCH IN ALL PLANTING AREAS AND TREE WATERING BASINS EXCEPT FOR TURFGRASS AREAS, SLOPES 3H:1V OR GREATER, AREAS TO RECEIVE SEED PLANTING, OR AS NOTED ON THE PLAN. AREAS PLANTED WITH FLATS SHALL HAVE A MINIMUM MULCH DEPTH OF 2 INCHES. INSTALL A MINIMUM 3 FOOT RADIUS OF 3 INCH DEEP WOOD MULCH AT THE BASE OF ALL TREES IN NEW TURFGRASS AREAS.
19. ALL EXISTING PLANTS AND/OR TURFGRASS SHOWN TO REMAIN AND DAMAGED OR REMOVED BY CONSTRUCTION OPERATIONS AND/OR UTILITY/IRRIGATION/DRAINAGE LINES SHALL BE REPLACED WITH PLANTS THAT MATCH AS CLOSELY AS POSSIBLE TO THE EXISTING PLANT SPECIES, VARIETY AND SIZE. THE REPLACEMENT TURFGRASS SOD VARIETY SHALL BE THE SAME AS SHOWN IN THE PLANTING LEGEND AS IF FOR NEW WORK, OR SHALL MATCH THE EXISTING TURFGRASS VARIETY WHERE EXISTING. TILL SOIL CONDITIONING MATERIALS INTO THE TOP 6 INCHES OF THE SOIL OVER THE AREA OF REPAIR/REPLACEMENT AS IF FOR NEW WORK. ADJUST FINISH GRADE SO NEW TURFGRASS SOD ABUTS FLUSH TO EXISTING SOD GRADE. THE REPLACEMENT PLANTS AND/OR TURFGRASS SOD SHALL BE MAINTAINED AS PART OF THE ORIGINAL SCOPE OF WORK. THE REPAIR OR REPLACEMENT WORK SHALL BE AT THE CONTRACTOR'S SOLE EXPENSE.
20. CONTRACTOR SHALL MAINTAIN THE NEW PLANTING FOR HEALTHY AND VIGOROUS GROWTH, WHICH INCLUDES BUT IS NOT LIMITED TO WATERING, WEEDING, FERTILIZING, MOWING AND EDGING (AT LEAST ONCE A WEEK), REMOVING TRASH AND DEBRIS, AND OTHER RELATED ACTIVITIES THROUGHOUT THE DURATION OF THE MAINTENANCE PERIOD UNTIL FINAL ACCEPTANCE.

CONTRACTOR SPECIAL PLANTING NOTES:

1. AN ASSESSMENT AND VALUATION OF ONSITE EXISTING TREES SCHEDULED TO REMAIN IN THE AREA OF WORK SHALL BE PERFORMED BY THE CONTRACTOR'S ARBORIST PRIOR TO THE START OF CONSTRUCTION OPERATIONS PER THE 'EXISTING LANDSCAPE PROTECTION' SPECIFICATION.
2. THE CONTRACTOR SHALL RIP, CONDITION AND TILL THE ENTIRE EXTENT OF ALL PLANTING AREAS RECEIVING NEW PLANTS PER THE PLANTING NOTES AND 'LANDSCAPE PLANTING' SPECIFICATIONS.
3. ALL EXISTING MIXED PLANTING AREAS RECEIVING NEW WOOD MULCH SHALL BE MANUALLY TILLED TO A MINIMUM DEPTH OF 4 INCHES, CLODS BROKEN UP TO A MAXIMUM 1 INCH DIAMETER, FINISH GRADED TO 2 INCHES BELOW ADJACENT SURFACES AND UTILITY/IRRIGATION BOXES WITHIN 12 INCHES OF THE HARDSCAPE EDGE, AND A PRE-EMERGENT HERBICIDE APPLIED PRIOR TO WOOD MULCH INSTALLATION. PROTECT EXISTING PLANTING DURING WOOD MULCH PREPARATION AND INSTALLATION.
4. THE ORIGINAL PLANTING OBSERVATION LOG SHALL BE MAINTAINED ON THE AS-BUILT RECORD DRAWING SET.
5. THE AS-BUILT RECORD DRAWING SET AND MAINTENANCE MANUAL SHALL BE SUBMITTED AND ACCEPTED PRIOR TO THE SCHEDULING OF A FINAL ACCEPTANCE REVIEW.

TREE SIZE AND QUALITY STANDARDS

AMERICAN STANDARDS FOR NURSERY STOCK (ANSI Z60.1) AND GUIDELINE SPECIFICATIONS FOR NURSERY TREE QUALITY (URBAN TREE FOUNDATION) SHALL APPLY

	TYPES 1 & 2 SHADE TREES			TYPE 3 SMALL UPRIGHT TREES**			TYPE 4 SMALL SPREADING TREES***		
CONTAINER SIZE	MIN. CALIPER	MAX. CALIPER	TYPE 1 MIN./MAX. HEIGHT*	MIN. CALIPER	MAX. CALIPER	MIN./MAX. HEIGHT	MIN. CALIPER	MAX. CALIPER	MIN./MAX. HEIGHT
15 GALLON	0.75	2.0	7-10 FT	0.75	2.0	6-8 FT	0.75	2.0	4-8 FT
24" BOX	1.25	3.0	8-12 FT	1.25	3.0	8-10 FT	1.25	3.0	6-10 FT
36" BOX	1.75	3.5	10-16 FT	1.75	3.5	10-14 FT	1.75	3.5	7-12 FT
42" BOX	2.0	4.0	12-20 FT	2.0	4.0	12-18 FT	2.0	4.0	8-14 FT
48" BOX	2.5	5.0	14-26 FT	2.5	5.0	14-22 FT	2.5	5.0	9-16 FT

* TYPE 2 TREE HEIGHTS SHALL NOT BE LESS THAN TWO-THIRDS THE LISTED HEIGHT RANGE.

** TYPE 3 TREES SHALL HAVE A MINIMUM OF SEVEN BRANCHES

*** TYPE 4 TREES SHALL HAVE A MINIMUM OF EIGHT BRANCHES

CALIPER MEASUREMENT FOR CLUMP OR MULTI-STEM TREES IS ONE-HALF THE SUM OF THE THREE LARGEST TRUNK CALIPERS

CALIPER MEASUREMENT FOR <4" TRUNK IS +6" ABOVE ROOTBALL (NOT INCLUDING ROOTSTOCK). >4" TRUNK IS +12"

TREES SHALL HAVE A CENTRAL LEADER. NEW LEADERS LESS THAN HALF THE DIAMETER OF A HEADED LEADER, BROKEN OR CO-DOMINATE LEADERS ARE NOT ACCEPTABLE

SCAFFOLD BRANCHES SHALL BE LESS THAN 2/3 THE DIAMETER OF THE TRUNK, WITHOUT INCLUDED BARK AT ATTACHMENT. SCAFFOLD BRANCHES SHALL BE BALANCED, WELL SPACED VERTICALLY, AND WITH A RADIALLY BLANK SECTOR NO GREATER THAN 1/3 OF THE CANOPY CIRCUMFERENCE.

TEMPORARY BRANCHES ON THE LOWER TRUNK SHALL BE LESS THAN 3/8 INCH DIAMETER, AND THE CLEAR TRUNK HEIGHT SHALL BE NO MORE THAN 40% OF THE TOTAL TREE HEIGHT.

THE ROOT COLLAR AND ROOTBALL SHALL BE FREE OF DEFECTS INCLUDING CIRCLING, KINKED AND GIRDLING ROOTS. ROOTS THE EDGE AND BOTTOM OF THE CONTAINER SHALL BE LESS THAN 1/4 INCH DIAMETER, AND UNIFORM THROUGHOUT THE CONTAINER.

TREE CANOPY WIDTH SHALL BE A MINIMUM OF 25% OF THE STANDARD FORM TREE HEIGHT.

DO NOT HEAD BACK OR PRUNE TREES UNLESS APPROVED AND/OR DIRECTED TO BY THE LANDSCAPE ARCHITECT

SEE SHEET L1.6 FOR DETAILS

811 Know what's below. Call before you dig.

PBK

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7790 North Palm Avenue
Fresno, CA 93711
559-448-8400 P
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Blair, Church & Flynn CONSULTING ENGINEERS

MADERA HIGH SCHOOL STADIUM

200 SOUTH L STREET
MADERA, CA 93637
PHASE 2 CONSTRUCTION DOCUMENTS

PROFESSIONAL SEAL

REGISTERED LANDSCAPE ARCHITECT BRILEY MULLEN No. 6064 5/16/25 STATE OF CALIFORNIA

PROJECT NUMBER
20-51

DATE
5/16/2025

DSA APPLICATION NO.
02-122784

FILE NO.
20-H3

PTN NO.
65243-154

DRAWN BY
KC

REVISIONS

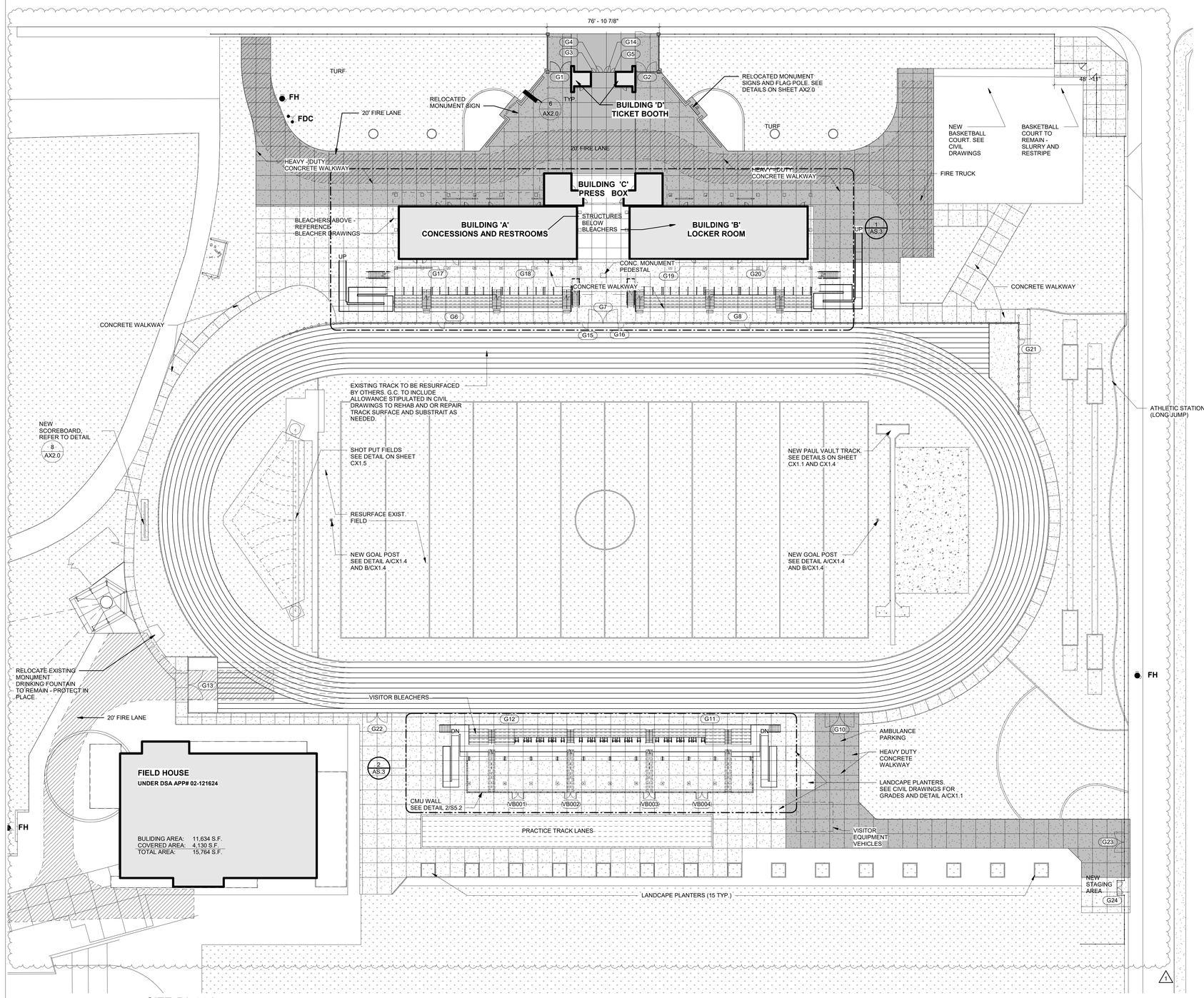
#	DESCRIPTION	DATE
1	ADDENDUM 1	8/12/25

CONSTRUCTION DOCUMENTS

PLANTING LEGEND

L1.5

Drawing: P:\22\22-20\DGN\publish\landscape\22202_LAND.dwg, L1.5, ---
Plotted: 8/12/2025 8:18:54 AM by Dionne Ang Ng



1 SITE PLAN
SCALE: 1" = 30'-0"

PATH OF TRAVEL NOTES

1. ALL BUILDINGS SHALL BE ACCESSIBLE FROM PARKING SPACES
2. ARCHITECT HAS SURVEYED/INSPECTED THE PATH OF TRAVEL (P.O.T.) AS INDICATED ON THE PLANS AND HAS FOUND IT TO BE, OR HAS INDICATED ON THE PLANS REMEDIAL WORK WHICH WOULD CAUSE IT TO BE, A BARRIER-FREE ACCESSIBLE ROUTE:
   - AT LEAST 48" IN WIDTH; OR AS APPROVED BY CODE
   - WITHOUT ABRUPT LEVEL CHANGES EXCEEDING 1/2" IF BEVELED AT 1:2 MAXIMUM SLOPE, OR VERTICAL LEVEL CHANGES EXCEEDING 1/4"
   - WITH A FIRM, STABLE, AND SLIP RESISTANT WALKING SURFACE
   - WITH A RUNNING SLOPE OF 1:20 OR LESS, UNLESS OTHERWISE INDICATED, AND A CROSS SLOPE OF 1:50 OR LESS
   - IS FREE FROM OVERHEAD OBSTRUCTIONS WITHIN 80" ABOVE WALKING SURFACE
   - AND IS FREE OF OBJECTS WHICH PROTRUDE MORE THAN 4" BETWEEN THE HEIGHTS OF 27" AND 80" ABOVE THE WALKING SURFACE.
3. ALL GATES IN PATH OF TRAVEL MUST COMPLY WITH EXIT DOOR REQUIREMENTS AS INDICATED ON A2.1 PROVIDE LEVER HARDWARE, KICK PLATES, 5 lbs PRESURE TO OPERATE, 24" MIN. STRIKE SIDE CLEARANCE, 48" MAX. WIDTH, AND PANIC HARDWARE IF REQUIRED BY FIRE LIFE SAFETY.
4. THERE IS NO DROP-OFF OVER 4" AT THE EDGE OF WALK OR LANDING. IN NEW CONSTRUCTION, ALL WALKS AND ROUTES ARE CONSIDERED PATH OF TRAVEL (P.O.T.) ARCHITECT AND CONTRACTOR SHALL VERIFY THAT THE ENTIRE PATH OF TRAVEL HAS BEEN CONSTRUCTED FREE OF BARRIERS.
5. ALL ACCESSIBLE PARKING SPACES ARE LOCATED SO THAT A PERSON WITH DISABILITY IS NOT COMPELLED TO WHEEL OR WALK BEHIND ANY OTHER CAR.
6. WALKS IN PATH OF TRAVEL SHALL BE FREE OF GRATINGS WHENEVER POSSIBLE. WHEN INSTALLED, OPENINGS SHALL BE 1/2" MAXIMUM IN DIRECTION OF TRAFFIC FLOW.

DSA PR-15-01
DESIGN PROFESSIONAL IN GENERAL RESPONSIBLE CHARGE STATEMENT:

THE POT IDENTIFIED IN THESE CONSTRUCTION DOCUMENTS IS COMPLIANT WITH CURRENT APPLICABLE CALIFORNIA BUILDING CODE ACCESSIBILITY PROVISIONS FOR PATH OF TRAVEL REQUIREMENTS FOR ALTERATIONS AND STRUCTURAL REPAIRS. AS PART OF THE DESIGN OF THIS PROJECT, THE POT WAS EXAMINED AND ANY ELEMENTS, COMPONENTS OR PORTION OF THE POT THAT WERE DETERMINED TO BE COMPLIANT 1) HAVE BEEN IDENTIFIED AND 2) THE CORRECTIVE WORK NECESSARY TO BRING THEM INTO COMPLIANCE HAS BEEN INCLUDED WIHTIN THE SCOPE OF THIS PROJECT'S WORK THROUGH DETAILS, DRAWINGS AND SPECIFICATIONS INCORPORATED INTO THESE CONSTRUCTION DOCUMENTS. ANY NONCOMPLIANT ELEMENTS, COMPONENTS OR PORTION OF THE POT THAT WILL NOT BE CORRECTED BY THIS PROJECT BASED ON VALUATION THRESHOLD LIMITATIONS OR A FINDING OF UNREASONABLE HARDSHIP ARE SO INDICATED IN THESE CONSTRUCTION DOCUMENTS.

DURING CONSTRUCTION, IF POT ITEMS WITHIN THE SCOPE OF THE PROJECT REPRESENTED AS CODE COMPLIANT ARE FOUND TO BE NONCONFORMING BEYOND REASONABLE CONSTUCTION TOLERANCES, THEY SHALL BE BROUGHT INTO COMPLIANCE WITH THE CBC AS A PART OF THIS PROJECT BY MEANS OF A "CONSTRUCTION CHANGE DOCUMENT" (FORM DSA 140).

COORDINATION NOTES

1. REFER TO CIVIL & LANDSCAPE PLANS FOR ANY ADDITIONAL SITE INFORMATION
2. ALL EGRESS ACCESS GATES THAT ARE EXISTING HAVE PANIC HARDWARE - SEE APP# 02-116013
3. CURBS ALONG FIRE LANE ARE PAINTED RED WITH 3" HIGH WHITE LETTERS STATING 'NO PARKING - FIRE LANE' AT 50' - 0" O.C.

SITE NOTE

UPON COMPLETION OF CONSTRUCTION, THE LOCAL FIRE DEPARTMENT AND/OR EMERGENCY COMMUNICATIONS AUTHORITY WILL BE CONTACTED TO OBTAIN DESIGN AND EQUIPMENT SPECIFICATIONS, AND TESTING AND ACCEPTANCE CRITERIA FOR **EMERGENCY RESPONDER RADIO COVERAGE (ERRC)** PER CFC 510. UPON COMPLETION, COPIES OF THE APPROVED PLANS, EQUIPMENT DATA SHEETS, AND PROOF OF TESTING AND ACCEPTANCE DOCUMENTATION SHALL BE PROVIDED TO THE SCHOOL DISTRICT.

DSA 810

FIRE & LIFE SAFETY SITE CONDITIONS SUBMITTAL

To facilitate the Division of the State Architect's (DSA) fire and life safety plan review of project site conditions, DSA requires the design professional to provide the following information at time of project submittal for projects consisting of construction of a new campus, construction of new building(s), additions to existing buildings, and for site alternate design means for fire department emergency vehicle access, and fire suppression water supply.

Information associated with compliance items 1–3 below is to be provided for all project types indicated above. Information associated with items 4–7 is to be completed when an alternate means is utilized. Acknowledgement by the school district and signature from the local fire authority (LFA) is only required when an alternate design means is being requested.

Page 1 of the completed form must be imaged onto the fire access site plan. When an alternate design/means is proposed, completed pages 1 *and* 2 are to be imaged on the fire access site plan.

For additional information refer to the instructions at the end of this form and DSA Policy 09-01.

PROJECT INFORMATION	
School District/Owner:	MADERA UNIFIED SCHOOL DISTRICT
Project Name/School:	MADERA HIGH SCHOOL - FIELD HOUSE
Project Address:	200 SOUTH "L" STREET, MADERA, CA 93637

FIRE & LIFE SAFETY INFOMATION					
1.	Has a fire hydrant flow test been performed within the past 12 months? *(If yes, provide a copy of the test data.)*	Yes ☒		No ☐	
2.	Was the fire hydrant water flow test performed as part of this LFA review?	Yes ☒		No ☐	
3.	Is the project located within a designated fire hazard severity zone as established by Cal-Fire? *(If yes, indicate fire hazard zone classification below)*	Yes ☐		No ☒	
	Refer to the following for fire hazard zone locations: www.fire.ca.gov/fire_prevention/fire_prevention_wildland_zones_maps	Moderate ☐	High ☐	Very High ☐	
	Wildland Interface Area (WIFA) *(If any designations are checked, project design must meet the requirements of CBC Chapter 7A.)*			WIFA ☐	

CONDITION MEANS AND METHODS RESOLUTION		ALTERNATE ACCEPTED			
		Yes	No	N/A	N/R
4.	Emergency vehicle access roadways do not meet CFC requirements.			✓	
4a.	**Acceptable Alternate:** Emergency vehicle and personnel access as proposed by the project architect is acceptable for providing fire suppression and protection of life and property.				
5.	**Fire Hydrants:** Number and spacing does not meet CFC requirements.				
5a.	**Acceptable Alternate:** Number of fire hydrants and spacing as proposed by the project architect is acceptable for fire suppression and protection of life and property.	✓			
6.	**Fire Hydrants:** Water flow and pressure are less than CFC minimum.			✓	
6a.	**Acceptable Alternate**: The available flow and pressure is acceptable for providing fire suppression and protection of life and property.				
7.	Location of fire department connection(s) serving fire sprinkler systems or standpipe systems does not meet CFC requirements.			✓	
7a.	**Acceptable Alternate:** The location of fire department connection serving the fire sprinkler system and/or standpipe system is acceptable for providing fire suppression and protection of life and property.				

DSA 810
FIRE & LIFE SAFETY SITE CONDITIONS SUBMITTAL

School District Acceptance of Acceptable Design Alternates

By signing this form, the school district acknowledges and accepts the proposed design as an alternative to California Building Code (CBC) and California Fire Code (CFC) minimum requirements, as indicated by one or more of the conditions indicated at items 4a, 5a, 6a or 7a, for providing fire and life safety protection of life and property.

Accepted by: _____ Title: _____

Signature: _____ Date: _____

LOCAL FIRE AUTHORITY (LFA) INFORMATION			
LFA Agency Name:	CITY OF MADERA		
LFA Review Official:	MATTHEW S. TARR		
Title:	FIRE MARSHAL	Work Phone:	559-661-5442
Work E-mail:	MTARR@CITY OF MADERA.COM or MTARR@MADERA.GOV		

LFA Reviewer's Signature: _____ Date: _____

SITE LEGEND

SITE HATCHES

- PROPERTY LINE
- 20' WIDE MIN.- FIRE LANE
- SCORED CONCRETE, SEE DETAILS 1, 2, 3, 5 / AX2.0
- HEAVY DUTY CONCRETE
- PAINTED CURBS RED w/ 3" HIGH WHITE LETTERS STATING "NO PARKING - FIRE LANE" AT 50' O.C.
- PLANTER AREA, REFER TO LANDSCAPE AND IRRIGATION PLANS
- K.B. (E) KNOX BOX @ CENTER 5'-0" ABV. GRADE.
- D.F. DRINKING FOUNTAIN:
  - SITE PLAN - EXISTING PER APP# 02-116013
  - BUILDING - SEE FLOOR PLANS
- FH FIRE HYDRANT, SPACED PER 2022 CFC, TABLE C102.1, 225'-0" FROM ANY POINT ON STREET TO HYDRANT.
- FDC FIRE DEPARTMENT CONNECTION.
- ACCESSIBLE EXIT ROUTE
- PATH OF TRAVEL
- CHAIN LINK FENCE
- SITE GATE, REFER TO SHEET A2.1 FOR SCHEDULE

FLOW TEST

LOCATION: 200 Coyote Lane

DATE: 15 June 2023

INFO

Static: 50 PSI
Residual: 45 PSI
Pitot: 20 PSI

Orifice Size: 2.5-inch

Flow: 750 GPM

Available Flow at 20 PSI residual pressure: 1973 GPM

Q= (.9)(29.84)(2.5**2)(20**1/2) = 750 GPM

At 20 PSI
Q2 = 750 x [(50-20) /(50-45)]**.54

Q2 = 750 x 6**.54 = 1973 GPM

Flow test performed, and calculations run by Matthew S. Tarr, FPE

PBK

ARCHITECT PBK Architects, Inc.

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Fresno, CA 93711
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559-448-8467 F
PBK.com

MADERA HIGH SCHOOL STADIUM
200 SOUTH "L" STREET
MADERA, CA 93637
CONSTRUCTION DOCUMENTS

PROFESSIONAL SEAL

LICENSED ARCHITECT — MICHAEL R. SCHOEN — No. C-32391 — RENEWAL DATE FEB 28, 2027 — STATE OF CALIFORNIA

PROJECT NUMBER	20-51
DATE	08/12/2024
DSA APPLICATION NO.	02-122784
FILE NO.	20-H3
PTN NO.	65243-154
DRAWN BY	XXX

REVISIONS

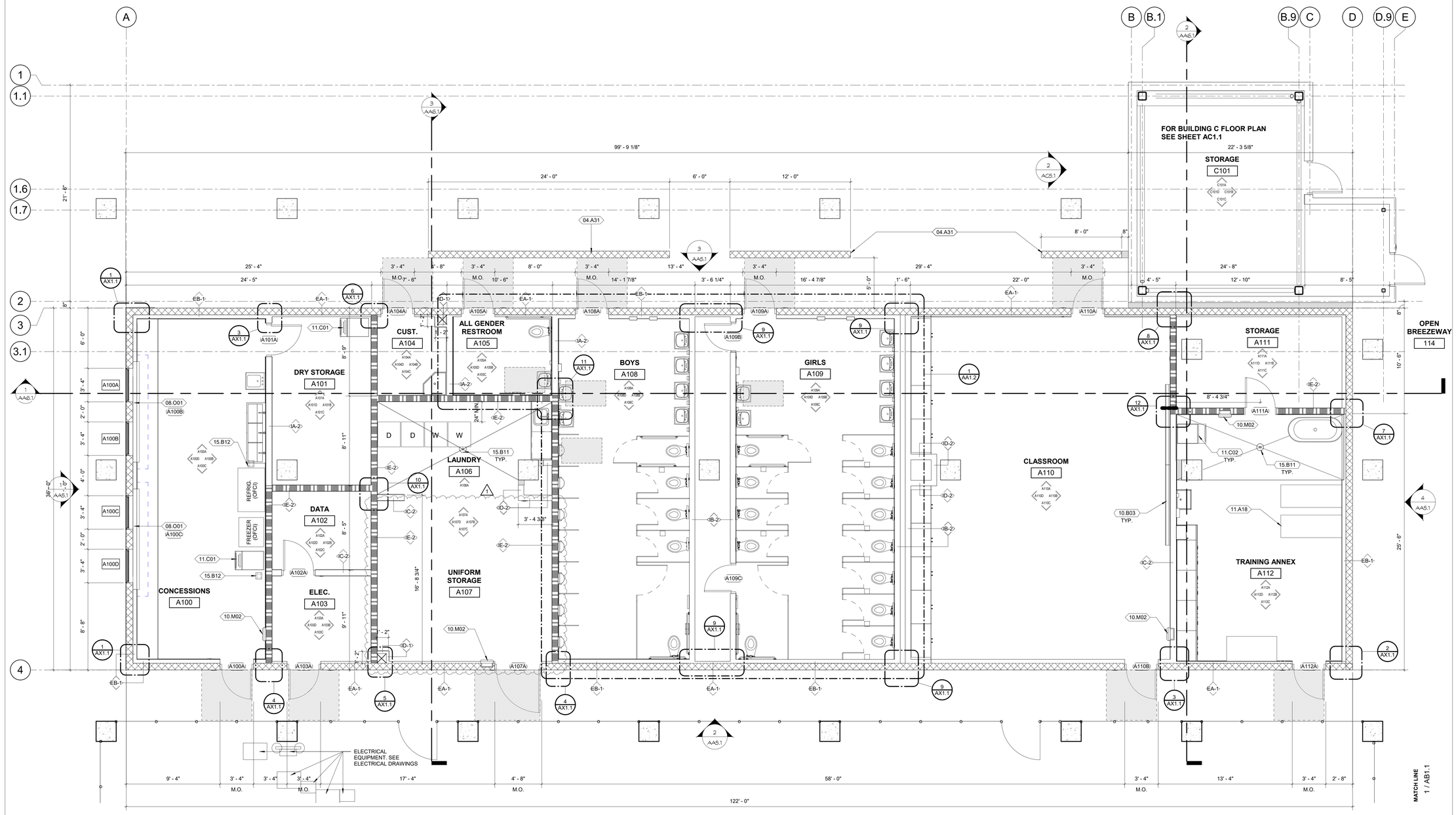
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1	ADDENDUM 01	08/18/2025

CONSTRUCTION DOCUMENTS

OVERALL SITE PLAN

AS.1

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1 FIRST FLOOR PLAN - BUILDING A

SCALE: 1/4" = 1'-0"

KEYNOTES

03.A24	CONCRETE PILASTER, REFERENCE BLEACHER DRAWINGS TYP.
04.A31	CMU SCREEN WALL. SEE DETAIL 2/S5.2
08.O01	OVERHEAD COILING SERVICE DOOR
10.B03	MARKERBOARD
10.M02	2A:10BC MIN RATED FIRE EXTINGUISHER W/ SEMI-RECESSED CABINET
11.A18	PHYSICAL TREATMENT GURNEY
11.C01	ICE-MACHINE, SEE PLUMBING PLANS
11.C02	REFRIGERATOR (N.I.C.)
15.B11	FLOOR DRAIN W/ SLOPED FLOOR (2% MAX), SEE PLUMBING AND STRUCTURAL PLANS
15.B12	FLOOR SINK, SEE PLUMBING PLANS

FLOOR PLAN NOTES

1. REFER TO SHEET G0.2 FOR ADDITIONAL SYMBOLS NOT SHOWN.
2. ALL DIMENSIONS ARE AS FOLLOWS UNLESS OTHERWISE NOTED:
   A. FACE OF STUD (OR CMU WHERE APPLICABLE) TO FACE OF STUD ;
   B. COLUMN LINE TO FACE OF STUD (OR CMU WHERE APPLICABLE) UNLESS OTHERWISE NOTED.
3. REFERENCE ENLARGED PLANS FOR DIMENSIONS OF ENLARGED PLAN AREAS.
4. DOORS ARE 4" CLR. FROM FROM THE FACE OF FINISH TO ROUGH OPENING OF JAMB UNLESS OTHERWISE NOTED.
5. SEE SHEETS AX1.0 FOR WALL ASSEMBLIES.
6. SEE STRUCT. FOR METAL STUD SIZES AND CONNECTIONS.
7. NON RATED INTERIOR WALLS TO EXTEND FROM FLOOR TO ROOF DECK. OTHER INTERIOR NON-RATED WALLS MAY EXTEND FROM FLOOR TO CEILING FRAMING OR 6" ABOVE ACOUSTICAL CEILING GRID.
8. ALL WALLS SHALL HAVE FRAMING, FINISHES, INSULATION, AND SUBSTRATES FROM FLOOR TO STRUCTURAL DECK. UNLESS OTHERWIS NOTED.
9. REFERENCE BLEACHER PLANS FOR DIMENSIONS OF BLEACHERS AND COLUMNS.
10. SEE SHEET AX8.0 FOR FOR FINISH AND COLOR SCHEDULE

WALL LEGEND

- NEW WALL, SEE WALL TYPES ON SHEET AX1.0
- NEW MASONRY WALL. SEE WALL TYPES ON SHEET AX1.0
- NEW 1HR FIRE RATED WALL ASSEMBLY. SEE WALL TYPES ON SHEET AX1.0
- CONCRETE COLUMN SEE STRUCTURAL DRAWINGS FOR SIZE AND LOCATION
- WALL TYPE — XX — DETAIL REFERENCE SEE SHEET AX1.0
- SYMBOL INDICATES ACCESSIBILITY ITEM. SEE DETAIL 15 / AX7.2 FOR TYPICAL ACCESSIBILITY STANDARDS, CLEARANCES AND MOUNTING HEIGHTS & LOCATIONS
- XX INTERIOR ELEVATION MARK, SEE INTERIOR ELEVATIONS SHEETS AA7.1, AA7.2, AB7.1, AB1.2 & AD7.1

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MADERA HIGH SCHOOL STADIUM

200 SOUTH "I" STREET
MADERA, CA 93637
CONSTRUCTION DOCUMENTS

PROFESSIONAL SEAL

LICENSED ARCHITECT — MICHAEL R. SCHOEN — No. C-35295 — RENEWAL DATE FEB 28, 2027 — STATE OF CALIFORNIA

PROJECT NUMBER 20-51

DATE 08/12/2024

DSA APPLICATION NO. 02-122784

FILE NO. 20-H3

PTN NO. 65243-154

DRAWN BY Author

REVISIONS

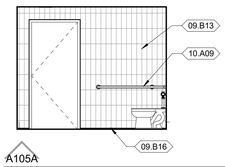
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CONSTRUCTION DOCUMENTS

FLOOR PLAN - BUILDING A

AA1.1

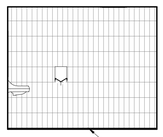
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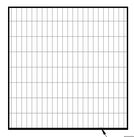
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A105B

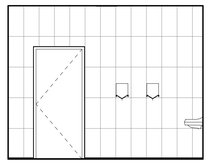


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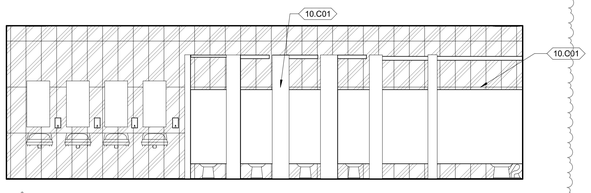


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ALL GENDER RESTROOM A105

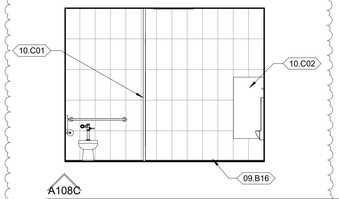


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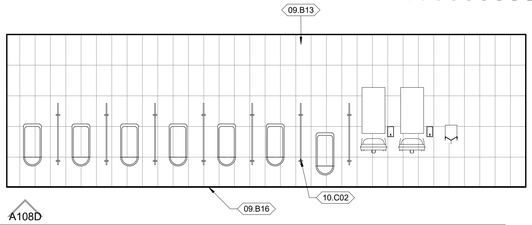


A108B

BOY'S RESTROOM A108

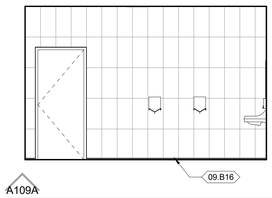


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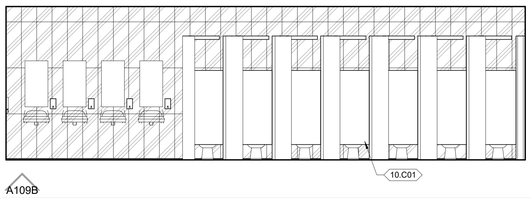


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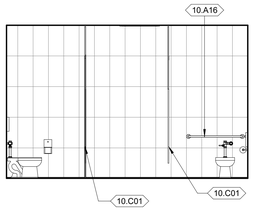


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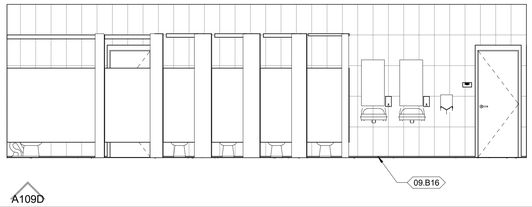


A109B

GIRL'S RESTROOM A109

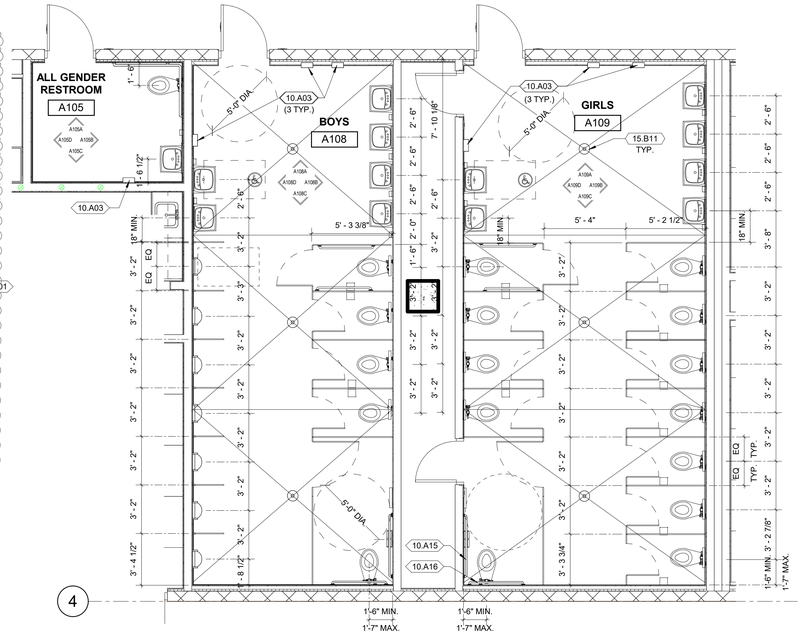


A109C



A109D

GIRL'S RESTROOM A109



4

1 ENLARGED RESTROOM PLANS - ROOMS A105, A108 & A109

SCALE: 1/4" = 1'-0"

KEYNOTES XX-XX

09.B13	WALL TILE
09.B16	FLOOR TO WALL TRANSITION STRIP
10.A03	ELECTRIC HAND DRYER, REFER TO ELECTRICAL DRAWINGS.
10.A09	GRAB BAR, REFER TO DETAIL 16/AX7.2 FOR ANCHORAGE.
10.A15	42" LONG GRAB BAR
10.A16	36" LONG GRAB BAR
10.C01	TOILET PARTITION
10.C02	URINAL SCREEN
15.B11	FLOOR DRAIN W/ SLOPED FLOOR (2% MAX), SEE PLUMBING AND STRUCTURAL PLANS

WALL LEGEND

- NEW WALL. SEE WALL TYPES ON SHEET AX1.0
- NEW MASONRY WALL. SEE WALL TYPES ON SHEET AX1.0
- NEW 1HR FIRE RATED WALL ASSEMBLY. SEE WALL TYPES ON SHEET AX1.0
- CONCRETE COLUMN SEE STRUCTURAL DRAWINGS FOR SIZE AND LOCATION
- WALL TYPE — DETAIL REFERENCE SEE SHEET AX1.0
- SYMBOL INDICATES ACCESSIBILITY ITEM. SEE DETAIL 15 / AX7.2 FOR TYPICAL ACCESSIBILITY STANDARDS, CLEARANCES AND MOUNTING HEIGHTS & LOCATIONS
- XX INTERIOR ELEVATION MARK, SEE INTERIOR ELEVATIONS SHEETS AA7.1 , AA7.2 , AB7.1 , AB1.2 & AD7.1

INTERIOR ELEVATION LEGEND

- HATCH INDICATES GYPSUM BOARD FINISH — P-1 U.O.N.
- HATCH INDICATES WALL TILE FINISH — TL-4
- HATCH INDICATES WALL TILE FINISH — TL-2
- HATCH INDICATES WALL TILE FINISH — TL-3

1

SYMBOLS LEGEND - RESTROOM

	ACCESSIBLE HI/LOW DRINKING FOUNTAIN, SEE PLUMBING PLANS
	LAVATORY, SEE PLUMBING PLANS
	WATER CLOSET, SEE PLUMBING PLANS
	URINAL, SEE PLUMBING PLANS
	MOP SINK, SEE PLUMBING PLANS
	MIRROR, SEE 08/AX5.2 FOR ANCHORAGE
	ELECTRIC HAND DRYER, REFER TO ELECTRICAL DRAWINGS.
	SOAP DISPENSER
	TOILET SEAT COVER DISPENSER
	SANITARY NAPKIN DISPOSAL
	TOILET TISSUE DISPENSER

GENERAL NOTES - RESTROOMS

1. SEE G0.20 FOR SYMBOLS NOT SHOWN ON THIS SHEET.
2. ALL DIMENSIONS ARE AS FOLLOWS UNLESS NOTED OTHERWISE: (a.) FACE OF STUD (OR CMU WHERE APPLICABLE) TO FACE OF STUD (OR CMU WHERE APPLICABLE) ; (b.) COLUMN LINE TO FACE OF STUD (OR CMU WHERE APPLICABLE) UNLESS NOTED OTHERWISE (c.) FACE OF FINISH TO FACE OF FINISH FOR REQUIRED RESTROOM CLEARANCES.
3. DOORS ARE 6" CLEAR FROM FROM FACE OF FINISH TO ROUGH OPENING OF JAMB UNLESS NOTED OTHERWISE.
4. SEE SHEET AX1.0 FOR WALL ASSEMBLIES AND FIRE RATED WALL ASSEMBLIES.
5. SEE STRUCTURAL FOUNDATION PLAN FOR METAL STUD SCHEDULE, CONNECTIONS AND STUD SIZES NOT SHOWN.
6. FLOOR DRAINS (FD) AND FLOOR SINKS (FS) SHALL BE SET -3/4" AND A MIN. OF 3'-0" FROM NEAREST WALL, UNLESS NOTED OTHERWISE.
7. DIMENSIONS NOTED AS "+/-" ARE NOMINAL.
8. FOR MINIMUM REQUIRED RESTROOM CLEARANCES, GRAB BAR SIZES, GRAB BAR AND ACCESSIBLE SHOWER BENCH ANCHORAGE AND STANDARDS SEE DETAILS 11, 15, 16/AX7.2 ACCESSIBILITY STANDARDS.
9. FOR MAXIMUM RESTROOM ACCESSORY HEIGHTS AND PROJECTIONS SEE DETAIL 15/AX7.2 TYPICAL ACCESSIBILITY STANDARDS (TOILET ROOM ACCESSORIES).
10. SEE DETAIL 20/AX7.2 FOR ALL TOILET ROOM PARTITION MOUNTING.
11. SEE G0.40 AND AX7.1 FOR SIGNAGE REQUIREMENTS AND IDENTIFICATION DETAILS.
12. SEE AX8.0 FOR FINISH SCHEDULE.

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CONSTRUCTION DOCUMENTS

PROFESSIONAL SEAL

LICENSED ARCHITECT — MICHAEL R. SCHOEN — No. C-28166 — RENEWAL DATE SEP. 28, 2027 — STATE OF CALIFORNIA

PROJECT NUMBER 20-51

DATE 08/12/2024

DSA APPLICATION NO. 02-122784

FILE NO. 20-H3

PTN NO. 65243-154

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REVISIONS

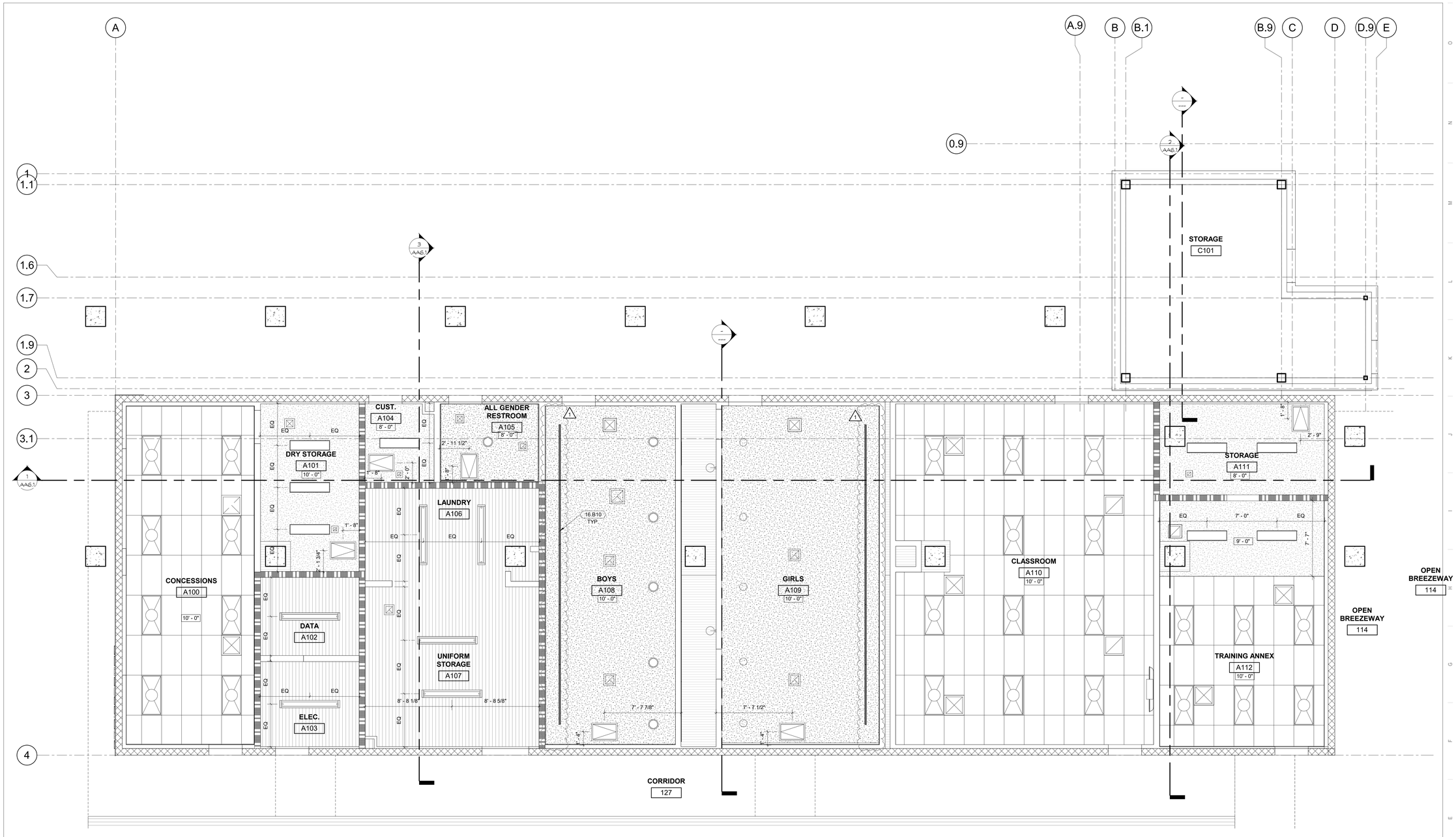
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1	ADDENDUM 01	08/18/2025

CONSTRUCTION DOCUMENTS

ENLARGED FLOOR PLAN & INT. ELEVS.

AA1.2

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1 REFLECTED CEILING PLAN - BUILDING A

2/ A5.1

SCALE: 1/4" = 1'-0"

KEYNOTES

XX-XX

1 16.B10 RECESSED LIGHTING, SEE ELECTRICAL PLANS FOR TYPE

GENERAL NOTES

1. REFER TO SHEET G0.20 FOR ADDITIONAL SYMBOLS NOT SHOWN.
2. ALL SOFFIT DIMENSIONS ARE OUTSIDE FACE OF FINISH TO OUTSIDE FACE OF FINISH UNLESS OTHERWISE NOTED.
3. NOT ALL ELECTRICAL, MECHANICAL AND TECHNOLOGY EQUIPMENT IS SHOWN ON REFLECTED CEILING PLAN. REFER TO ELECTRICAL, MECHANICAL AND TECHNOLOGY DRAWINGS FOR ELECTRICAL, MECHANICAL AND TECHNOLOGY CEILING EQUIPMENT.
4. ALL EXPOSED METAL DECK AND STRUCTURAL STEEL IS TO COMPLY WITH "ARCHITECTURALLY EXPOSED STRUCTURAL STEEL FRAMING", REFER TO SPECIFICATION.

CEILING NOTES - BLDG 'A'

USE MOISTURE AND MOLD RESISTANT TYPE GYPSUM BOARD AT THE FOLLOWING LOCATIONS:

A112 TRAINING ANNEX

1

CEILING LEGEND

- 24" x 48" SUSPENDED ACOUSTICAL CEILING SYSTEM SEE SHEET AX6.1 FOR TYPICAL DETAILS
- HARD LID GYPSUM BOARD CEILING 4 / AX6.2
- OPEN TO THE ROOF DECK ABOVE.
- METAL SOFFIT PANEL 7 / AX2.1
- CEMENT PLASTER SEE FINISH SCHEDULE AND DETAIL 23 / AX2.1
- OPEN TO BLEACHERS ABOVE
- LIGHT FIXTURE(S), REFER TO ELECTRICAL DRAWINGS
- MECHANICAL GRILLES, REFER TO MECHANICAL DRAWINGS
- ILLUMINATED EXIT SIGNS, REFER TO ELECTRICAL FOR FIXTURE TYPE AND LOCATION.
- 9' - 0" CEILING HEIGHT ABOVE FINISH FLOOR
- 20" X 30" MAX. CEILING ACCESS PANEL, SEE DETAIL

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MADERA, CA 93637
CONSTRUCTION DOCUMENTS

MADERA 19 66 UNIFIED SCHOOL DISTRICT

PROFESSIONAL SEAL

LICENSED ARCHITECT — MICHAEL R. SCHOEN — No. C-29295 — RENEWAL DATE FEB 28, 2027 — STATE OF CALIFORNIA

PROJECT NUMBER 20-51

DATE 08/12/2024

DSA APPLICATION NO. 02-122784

FILE NO. 20-H3

PTN NO. 65243-154

DRAWN BY Author

REVISIONS

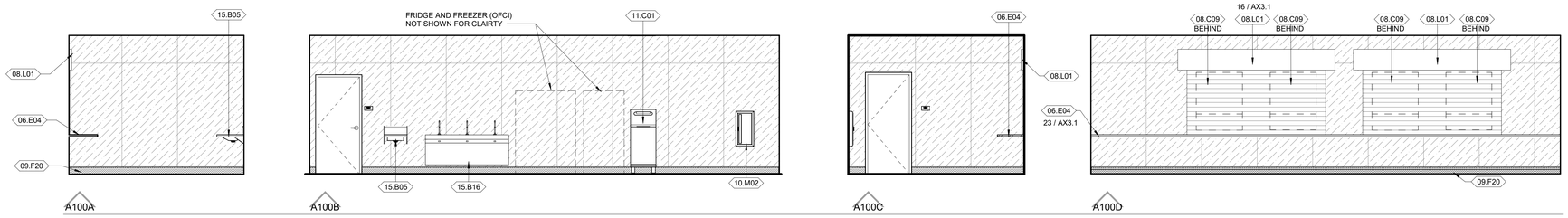
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1	ADDENDUM 01	08/18/2025

CONSTRUCTION DOCUMENTS

ENLARGED RCP - BUILDING A

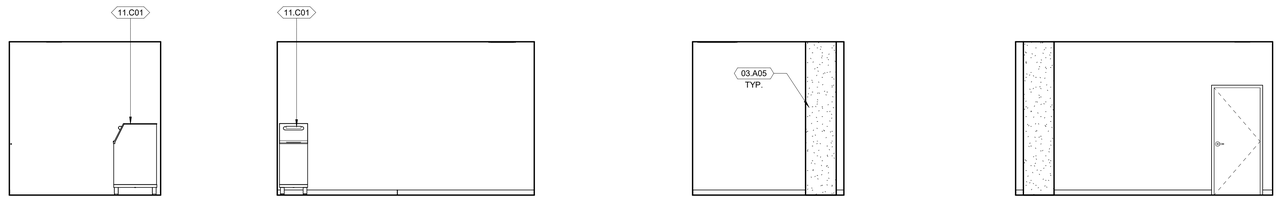
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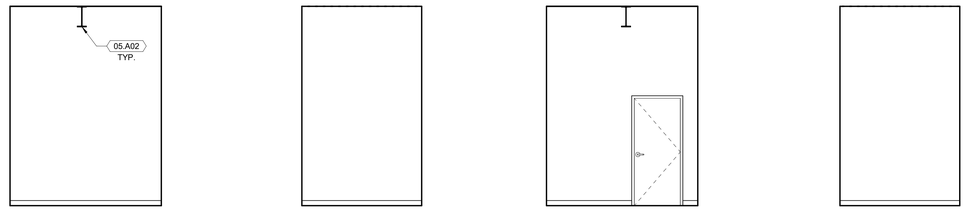
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CONCESSIONS A100



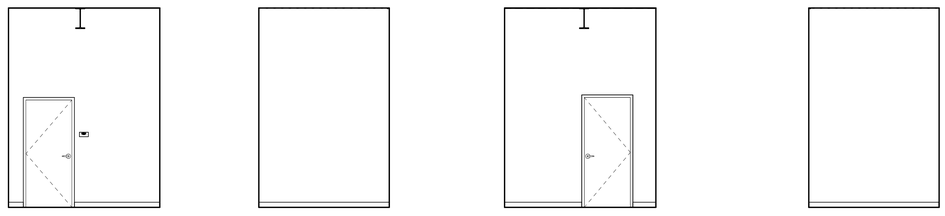
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DRY STORAGE A101A



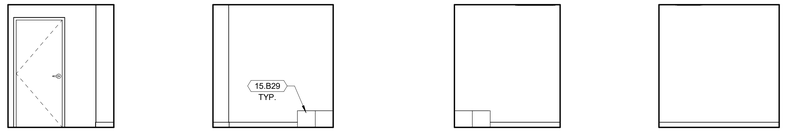
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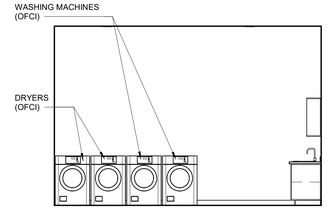
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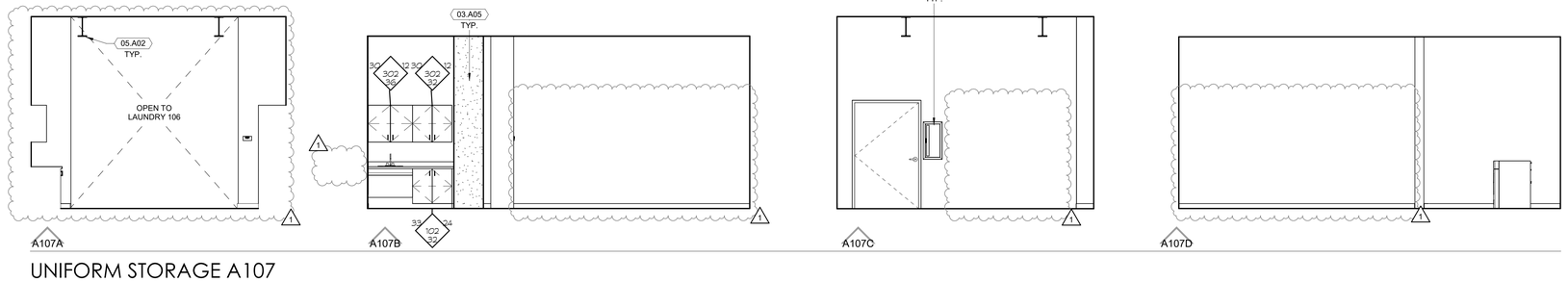
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CUSTODIAN A104A



A106A

LAUNDRY A106



A107A A107B A107C A107D

UNIFORM STORAGE A107

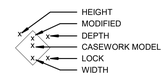
KEYNOTES XX-XX

03.A05	CONCRETE COLUMN, SEE STRUCTURAL PLANS
05.A02	EXPOSED STEEL BEAM, SEE STRUCTURAL PLANS
06.E04	COUNTERTOP
08.C09	TRANSACTION WINDOW
08.L01	OVERHEAD COILING DOOR, SEE DOOR SCHEDULE
09.F20	RUBBER TOPSET BASE,TYP., 4" U.O.N.
10.M02	2A:10BC MIN RATED FIRE EXTINGUISHER W/ SEMI-RECESSED CABINET
11.C01	ICE-MACHINE, SEE PLUMBING PLANS
15.B05	LAVATORY, SEE PLUMBING PLANS
15.B16	TRIPLE COMPARTMENT SINK, SEE PLUMBING PLANS
15.B29	MOP SINK

SYMBOL LEGEND - INT. ELEVATION

CASEWORK SYMBOL

CASEWORK SYMBOL



NOTE: SEE CASEWORK BACKING AND ATTACHMENT DETAILS ON SHEET AX5.2

NOTE: DIMENSIONS ARE TO THE NEAREST WHOLE NUMBER, CONTRACTOR TO FIELD VERIFY DIMENSIONS PRIOR TO FABRICATION

FINISH KEYNOTE SYMBOL

XX-XX = INDICATES FINISH, SEE COLOR SCHEDULE ON AX5.0

INTERIOR ELEVATION LEGEND

- HATCH INDICATES GYSPUM BOARD FINISH U.O.N. P-1
- HATCH INDICATES WALL TILE FINISH, TL-1 U.O.N.
- HATCH INDICATES FLOOR & BASE TILE FINISH, TL-3 ,U.O.N.
- HATCH INDICATES CONCRETE COLUMN
- HATCH INDICATES OMEGA AKROGOLD DEF SYSTEM - AKROFLEX MULTI-TEX FINISH
- HATCH INDICATES FIBERGLASS REINFORCED PANELING
- HATCH INDICATES FIRE RESISTANT PAINT o/ 5/8" FIRE RESISTANT PLYWOOD
- HATCH INDICATES GLAZING REFER TO WINDOW SCHEDULE
- HATCH INDICATES OPEN TO BEYOND

GENERAL NOTES

1. REFER TO REFLECTED CEILING PLAN FOR CEILING AND SOFFIT HEIGHTS.
2. REFER TO DETAIL 25 / AX5.2 FOR CASEWORK ANCHORAGE DETAILS.
3. FOR ELEVATIONS THAT ARE NOT ILLUSTRATED MATCH FINISHES OF TYPICAL ROOM ELEVATION AND REFER TO INTERIOR FINISH SCHEDULE.
4. SEE SHEET G0.2 FOR ADDITIONAL SYMBOLS NOT SHOWN.
5. REFER TO INTERIOR FINISH SCHEDULE TYPICAL PAINT COLORS.
6. ALL EXPOSED METAL DECK AND STRUCTURAL STEEL IS TO COMPLY WITH "ARCHITECTURALLY EXPOSED STRUCTURAL STEEL FRAMING", REFER TO SPECIFICATION.

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CONSTRUCTION DOCUMENTS

MADERA 19 66 UNIFIED SCHOOL DISTRICT

PROFESSIONAL SEAL

LICENSED ARCHITECT
MICHAEL R. SCHOEN
No. C-36295
RENEWAL DATE
FEB 29, 2027
STATE OF CALIFORNIA

PROJECT NUMBER
20-51

DATE
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DSA APPLICATION NO.
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FILE NO.
20-H3

PTN NO.
65243-154

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REVISIONS

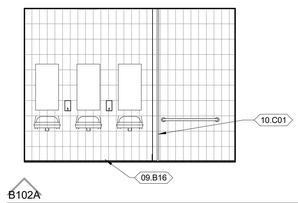
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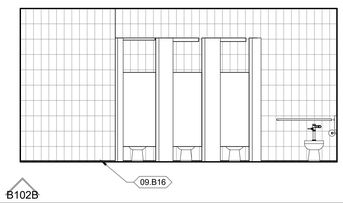
INTERIOR ELEVATIONS - BUILDING A

AA7.1

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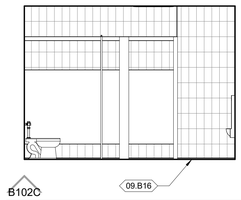


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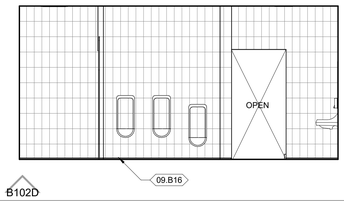


B102B

RESTROOM B102

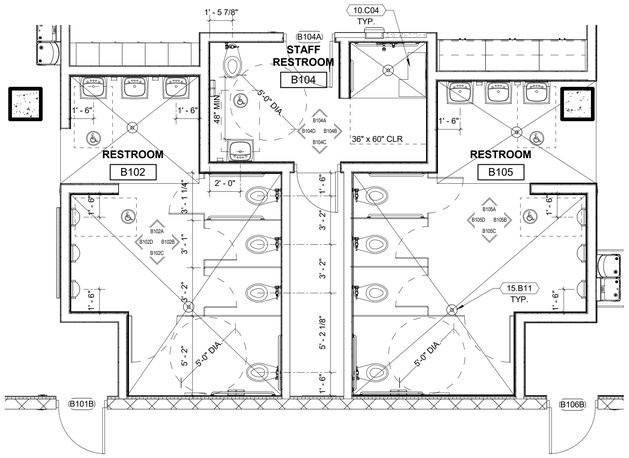


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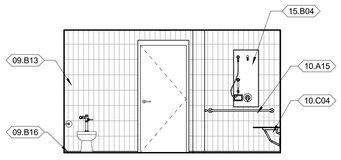
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RESTROOM B102

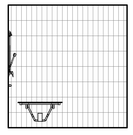


1 ENLARGED FLOOR PLANS

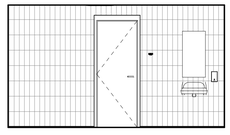
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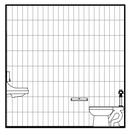
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B104B

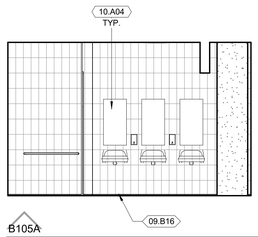


B104C

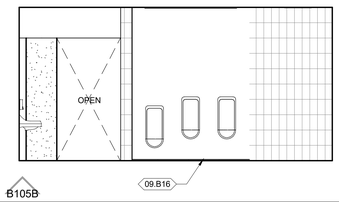


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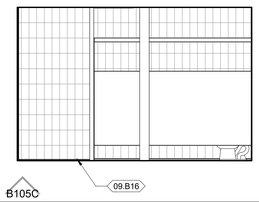
STAFF RESTROOM B104



B105A



B105B



B105C



B105D

RESTROOM B105

KEYNOTES XX-XX

09.B13	WALL TILE
09.B16	FLOOR TO WALL TRANSITION STRIP
10.A04	MIRROR
10.A15	42" LONG GRAB BAR
10.C01	TOILET PARTITION
10.C04	ACCESSIBLE SHOWER BENCH
15.B04	ACCESSIBLE SHOWER HEAD W/ HOSE SPRAYER AND CONTROLS, SEE PLUMBING PLANS
15.B11	FLOOR DRAIN W/ SLOPED FLOOR (2% MAX), SEE PLUMBING AND STRUCTURAL PLANS

WALL LEGEND

NEW WALL. SEE WALL TYPES ON SHEET AX1.0

NEW MASONRY WALL. SEE WALL TYPES ON SHEET AX1.0

NEW 1HR FIRE RATED WALL ASSEMBLY. SEE WALL TYPES ON SHEET AX1.0

CONCRETE COLUMN
SEE STRUCTURAL DRAWINGS FOR SIZE AND LOCATION

WALL TYPE — DETAIL REFERENCE SEE SHEET AX1.0

SYMBOL INDICATES ACCESSIBILITY ITEM. SEE DETAIL 15 / AX7.2 FOR TYPICAL ACCESSIBILITY STANDARDS, CLEARANCES AND MOUNTING HEIGHTS & LOCATIONS

XX INTERIOR ELEVATION MARK, SEE INTERIOR ELEVATIONS SHEETS AA7.1, AA7.2, AB7.1, AB1.2 & AD7.1

INTERIOR ELEVATION LEGEND

HATCH INDICATES GYPSUM BOARD FINISH P-1 U.O.N.

HATCH INDICATES WALL TILE FINISH TL-4

HATCH INDICATES WALL TILE FINISH TL-2

HATCH INDICATES WALL TILE FINISH TL-3

SYMBOLS LEGEND - RESTROOM

	ACCESSIBLE HI/LOW DRINKING FOUNTAIN, SEE PLUMBING PLANS
	LAVATORY, SEE PLUMBING PLANS
	WATER CLOSET, SEE PLUMBING PLANS
	URINAL, SEE PLUMBING PLANS
	MOP SINK, SEE PLUMBING PLANS
	MIRROR, SEE 08/AX5.2 FOR ANCHORAGE
	ELECTRIC HAND DRYER, REFER TO ELECTRICAL DRAWINGS.
	SOAP DISPENSER
	TOILET SEAT COVER DISPENSER
	SANITARY NAPKIN DISPOSAL
	TOILET TISSUE DISPENSER

GENERAL NOTES - RESTROOMS

1. SEE G0.20 FOR SYMBOLS NOT SHOWN ON THIS SHEET.
2. ALL DIMENSIONS ARE AS FOLLOWS UNLESS NOTED OTHERWISE: (a.) FACE OF STUD (OR CMU WHERE APPLICABLE) TO FACE OF STUD (OR CMU WHERE APPLICABLE) ; (b.) COLUMN LINE TO FACE OF STUD (OR CMU WHERE APPLICABLE) UNLESS NOTED OTHERWISE (c.) FACE OF FINISH TO FACE OF FINISH FOR REQUIRED RESTROOM CLEARANCES.
3. DOORS ARE 6" CLEAR FROM FROM FACE OF FINISH TO ROUGH OPENING OF JAMB UNLESS NOTED OTHERWISE.
4. SEE SHEET AX1.0 FOR WALL ASSEMBLIES AND FIRE RATED WALL ASSEMBLIES.
5. SEE STRUCTURAL FOUNDATION PLAN FOR METAL STUD SCHEDULE, CONNECTIONS AND STUD SIZES NOT SHOWN.
6. FLOOR DRAINS (FD) AND FLOOR SINKS (FS) SHALL BE SET -3/4" AND A MIN. OF 3'-0" FROM NEAREST WALL, UNLESS NOTED OTHERWISE.
7. DIMENSIONS NOTED AS "+/-" ARE NOMINAL.
8. FOR MINIMUM REQUIRED RESTROOM CLEARANCES, GRAB BAR SIZES, GRAB BAR AND ACCESSIBLE SHOWER BENCH ANCHORAGE AND STANDARDS SEE DETAILS 11, 15, 16/AX7.2 ACCESSIBILITY STANDARDS.
9. FOR MAXIMUM RESTROOM ACCESSORY HEIGHTS AND PROJECTIONS SEE DETAIL 15/AX7.2 TYPICAL ACCESSIBILITY STANDARDS (TOILET ROOM ACCESSORIES).
10. SEE DETAIL 20/AX7.2 FOR ALL TOILET ROOM PARTITION MOUNTING.
11. SEE AX7.1 FOR SIGNAGE REQUIREMENTS AND IDENTIFICATION DETAILS.
12. SEE AX8.0 FOR FINISH SCHEDULE.

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MADERA HIGH SCHOOL STADIUM

200 SOUTH "I" STREET
MADERA, CA 93637
CONSTRUCTION DOCUMENTS

MADERA 19 66 UNIFIED SCHOOL DISTRICT

PROFESSIONAL SEAL

LICENSED ARCHITECT — MICHAEL R. SCHOEN — No. C-26285 — RENEWAL DATE FEB 28, 2027 — STATE OF CALIFORNIA

PROJECT NUMBER 20-51

DATE 08/12/2024

DSA APPLICATION NO. 02-122784

FILE NO. 20-H3

PTN NO. 65243-154

DRAWN BY Author

REVISIONS

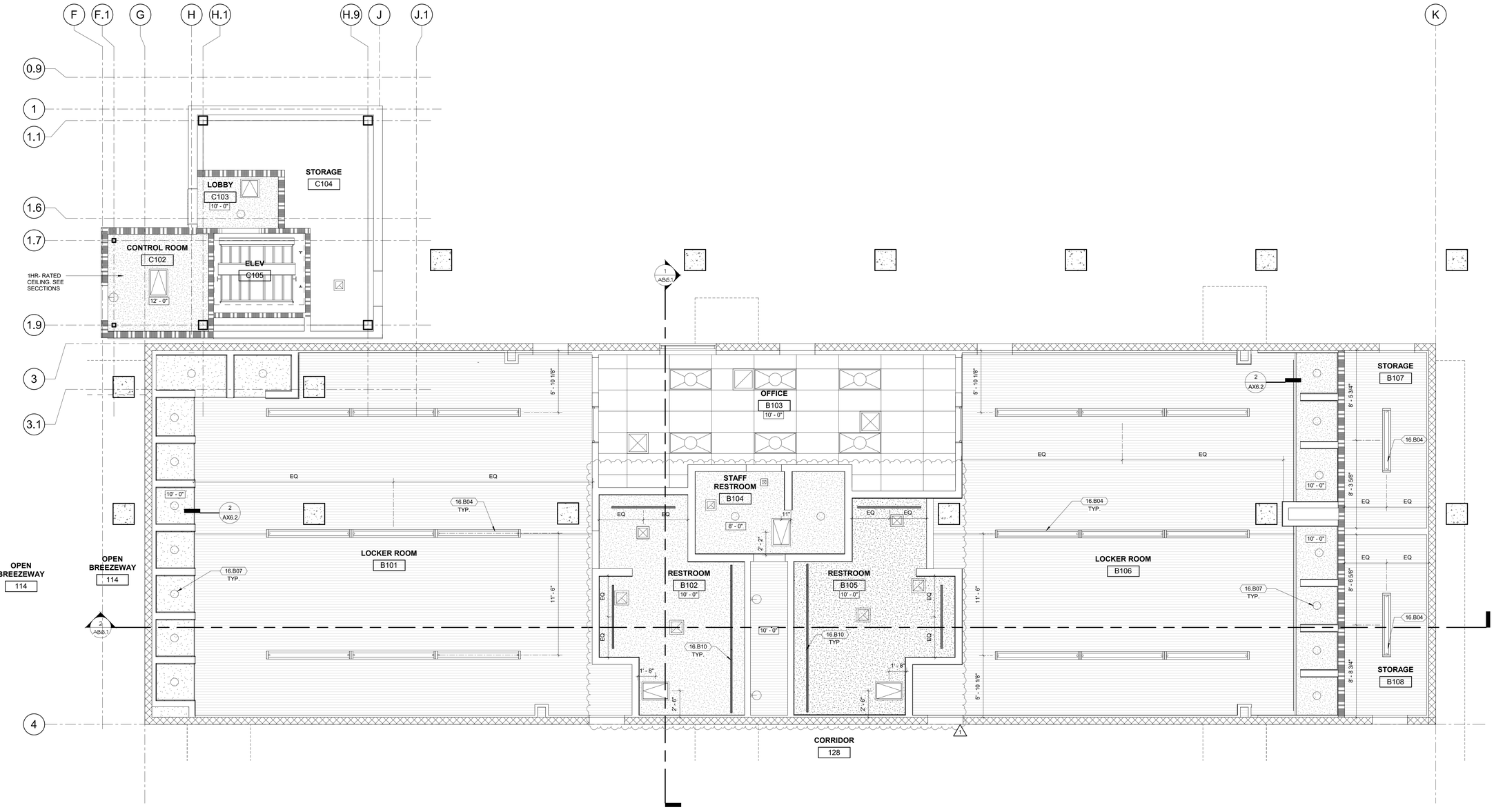
#	DESCRIPTION	DATE
1	ADDENDUM 01	08/18/2025

CONSTRUCTION DOCUMENTS

ENLARGED FLOOR PLAN & INT. ELEV.

AB1.2

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1 REFLECTED CEILING PLAN - BUILDING B

2/ A5.1

SCALE: 1/4" = 1'-0"

KEYNOTES XX-XX

16.B04 LIGHTING FIXTURE, SEE ELECTRICAL PLANS
16.B07 CEILING MOUNTED LIGHT FIXTURE, SEE ELECTRICAL PLAN
16.B10 RECESSED LIGHTING, SEE ELECTRICAL PLANS FOR TYPE

GENERAL NOTES

1. REFER TO SHEET G0.20 FOR ADDITIONAL SYMBOLS NOT SHOWN.
2. ALL SOFFIT DIMENSIONS ARE OUTSIDE FACE OF FINISH TO OUTSIDE FACE OF FINISH UNLESS OTHERWISE NOTED.
3. NOT ALL ELECTRICAL, MECHANICAL AND TECHNOLOGY EQUIPMENT IS SHOWN ON REFLECTED CEILING PLAN. REFER TO ELECTRICAL, MECHANICAL AND TECHNOLOGY DRAWINGS FOR ELECTRICAL, MECHANICAL AND TECHNOLOGY CEILING EQUIPMENT.
4. ALL EXPOSED METAL DECK AND STRUCTURAL STEEL IS TO COMPLY WITH "ARCHITECTURALLY EXPOSED STRUCTURAL STEEL FRAMING", REFER TO SPECIFICATION.

CEILING NOTES - BLDG 'B'

USE MOISTURE AND MOLD RESISTANT TYPE GYPSUM BOARD AT THE FOLLOWING LOCATIONS:

B101 LOCKER ROOM - OVER SHOWERS
B104 STAFF RESTROOM
B106 LOCKER ROOM - OVER SHOWERS

CEILING LEGEND

- 24" x 48" SUSPENDED ACOUSTICAL CEILING SYSTEM SEE SHEET AX6.1 FOR TYPICAL DETAILS
- HARD LID GYPSUM BOARD CEILING 4 / AX6.2
- OPEN TO THE ROOF DECK ABOVE.
- METAL SOFFIT PANEL 7 / AX2.1
- CEMENT PLASTER SEE FINISH SCHEDULE AND DETAIL 23 / AX2.1
- OPEN TO BLEACHERS ABOVE
- LIGHT FIXTURE(S), REFER TO ELECTRICAL DRAWINGS
- 9' - 0" CEILING HEIGHT ABOVE FINISH FLOOR
- MECHANICAL GRILLES, REFER TO MECHANICAL DRAWINGS
- 20" X 30" MAX. CEILING ACCESS PANEL, SEE DETAIL
- ILLUMINATED EXIT SIGNS, REFER TO ELECTRICAL FOR FIXTURE TYPE AND LOCATION.

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MADERA HIGH SCHOOL STADIUM

200 SOUTH "I" STREET
MADERA, CA 93637
CONSTRUCTION DOCUMENTS

MADERA 19 66 UNIFIED SCHOOL DISTRICT

PROFESSIONAL SEAL

LICENSED ARCHITECT — MICHAEL R. SCHOEN — No. C-32585 — RENEWAL DATE FEB 28, 2027 — STATE OF CALIFORNIA

PROJECT NUMBER 20-51

DATE 08/12/2024

DSA APPLICATION NO. 02-122784

FILE NO. 20-H3

PTN NO. 65243-154

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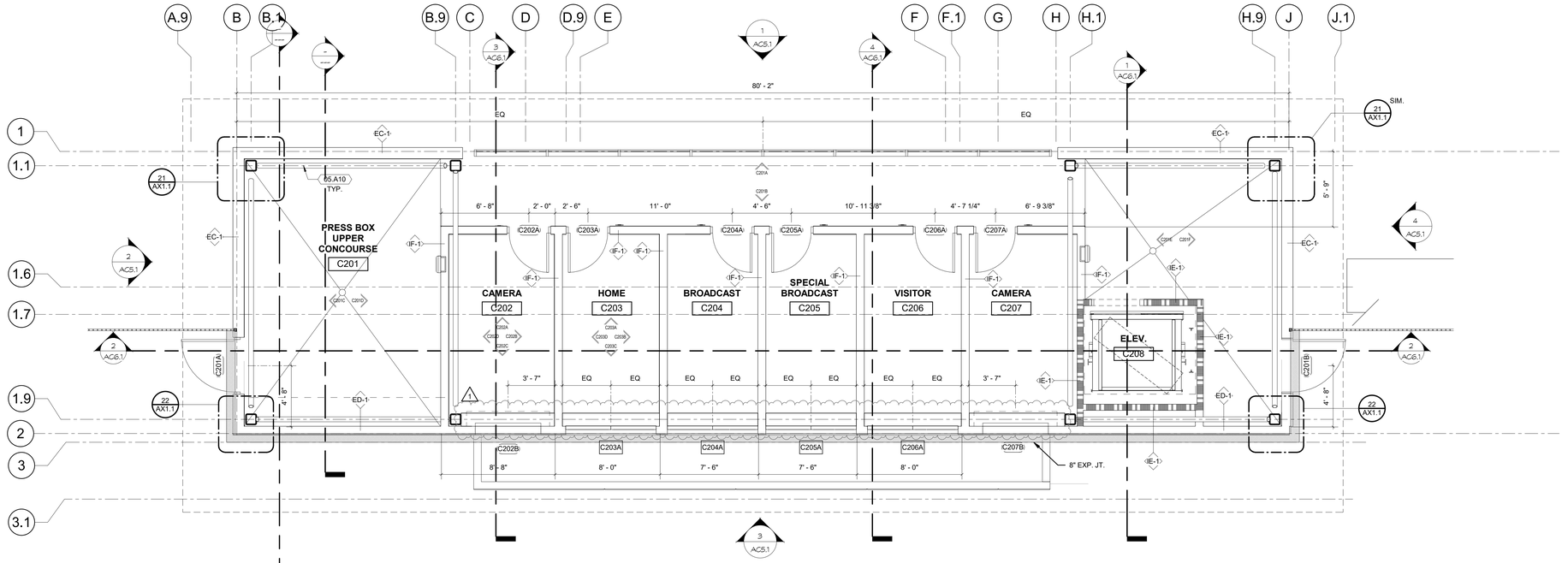
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CONSTRUCTION DOCUMENTS

ENLARGED RCP - BUILDING B

AB3.1

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1 SECOND FLOOR PLAN - BUILDING C
SCALE: 1/4" = 1'-0"

2 FIRST FLOOR PLAN - BUILDING C
SCALE: 1/4" = 1'-0"

EXTERIOR ELEVATION LEGEND

- CEMENT PLASTER, COLOR 1 — P-1
- CEMENT PLASTER, COLOR 2 — P-2
- CEMENT PLASTER, COLOR 3 — P-3
- MASONRY TILE PAVERS — MTP-1
- 11" - 4"
- 7" - 2"
- 4" - 8"
- 2" - 8"
- FINISHES TO BE SEPARATED WITH 1/4" REVEALS
- 2" TILE CAPS
- METAL COMPOSITE WALL PANELS, 4" SEE DTL. — MP-1
- CORRUGATED METAL WALL PANELS, 8" SEE DTL. — MP-2
- CORRUGATED METAL WALL PANELS, 8" SEE DTL. — MP-3
- CORRUGATED METAL WALL PANELS, 8" SEE DTL. — MP-4
- MESH PANELS

KEYNOTES <XX-XX>

04.A31 CMU SCREEN WALL. SEE DETAIL 2/S5.2
05.A10 STEEL BRACE FRAME, SEE STRUCTURAL PLANS

FLOOR PLAN NOTES

1. REFER TO SHEET G0.2C FOR ADDITIONAL SYMBOLS NOT SHOWN.
2. ALL DIMENSIONS ARE AS FOLLOWS UNLESS OTHERWISE NOTED:
   A. FACE OF STUD (OR CMU WHERE APPLICABLE) TO FACE OF STUD ;
   B. COLUMN LINE TO FACE OF STUD (OR CMU WHERE APPLICABLE) UNLESS OTHERWISE NOTED.
3. REFERENCE ENLARGED PLANS FOR DIMENSIONS OF ENLARGED PLAN AREAS.
4. DOORS ARE 4" CLR. FROM FROM THE FACE OF FINISH TO ROUGH OPENING OF JAMB UNLESS OTHERWISE NOTED.
5. SEE SHEETS AX1.0 FOR WALL ASSEMBLIES.
6. SEE STRUCT. FOR METAL STUD SIZES AND CONNECTIONS.
7. NON RATED INTERIOR WALLS TO EXTEND FROM FLOOR TO ROOF DECK. OTHER INTERIOR NON-RATED WALLS MAY EXTEND FROM FLOOR TO CEILING FRAMING OR 6" ABOVE ACOUSTICAL CEILING GRID.
8. ALL WALLS SHALL HAVE FRAMING, FINISHES, INSULATION, AND SUBSTRATES FROM FLOOR TO STRUCTURAL DECK. UNLESS OTHERWIS NOTED.
9. REFERENCE BLEACHER PLANS FOR DIMENSIONS OF BLEACHERS AND COLUMNS.
10. SEE SHEET AX8.0 FOR FOR FINISH AND COLOR SCHEDULE

WALL LEGEND

- NEW WALL. SEE WALL TYPES ON SHEET AX1.0
- NEW MASONRY WALL. SEE WALL TYPES ON SHEET AX1.0
- NEW 1HR FIRE RATED WALL ASSEMBLY. SEE WALL TYPES ON SHEET AX1.0
- CONCRETE COLUMN SEE STRUCTURAL DRAWINGS FOR SIZE AND LOCATION
- WALL TYPE — DETAIL REFERENCE SEE SHEET AX1.0
- SYMBOL INDICATES ACCESSIBILITY ITEM. SEE DETAIL 15 / AX7.2 FOR TYPICAL ACCESSIBILITY STANDARDS, CLEARANCES AND MOUNTING HEIGHTS & LOCATIONS
- XX INTERIOR ELEVATION MARK, SEE INTERIOR ELEVATIONS SHEETS AA7.1 , AA7.2 , AB7.1 , AB1.2 & AE7.1

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MADERA HIGH SCHOOL STADIUM
200 SOUTH "I" STREET
MADERA, CA 93637
CONSTRUCTION DOCUMENTS

MADERA 19 66 UNIFIED SCHOOL DISTRICT

PROFESSIONAL SEAL
LICENSED ARCHITECT — MICHAEL R. SCHOEN — No. C 28285 — RENEWAL DATE FEB 28, 2027 — STATE OF CALIFORNIA

PROJECT NUMBER 20-51
DATE 08/12/2024
DSA APPLICATION NO. 02-122784
FILE NO. 20-H3
PTN NO. 65243-154
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REVISIONS

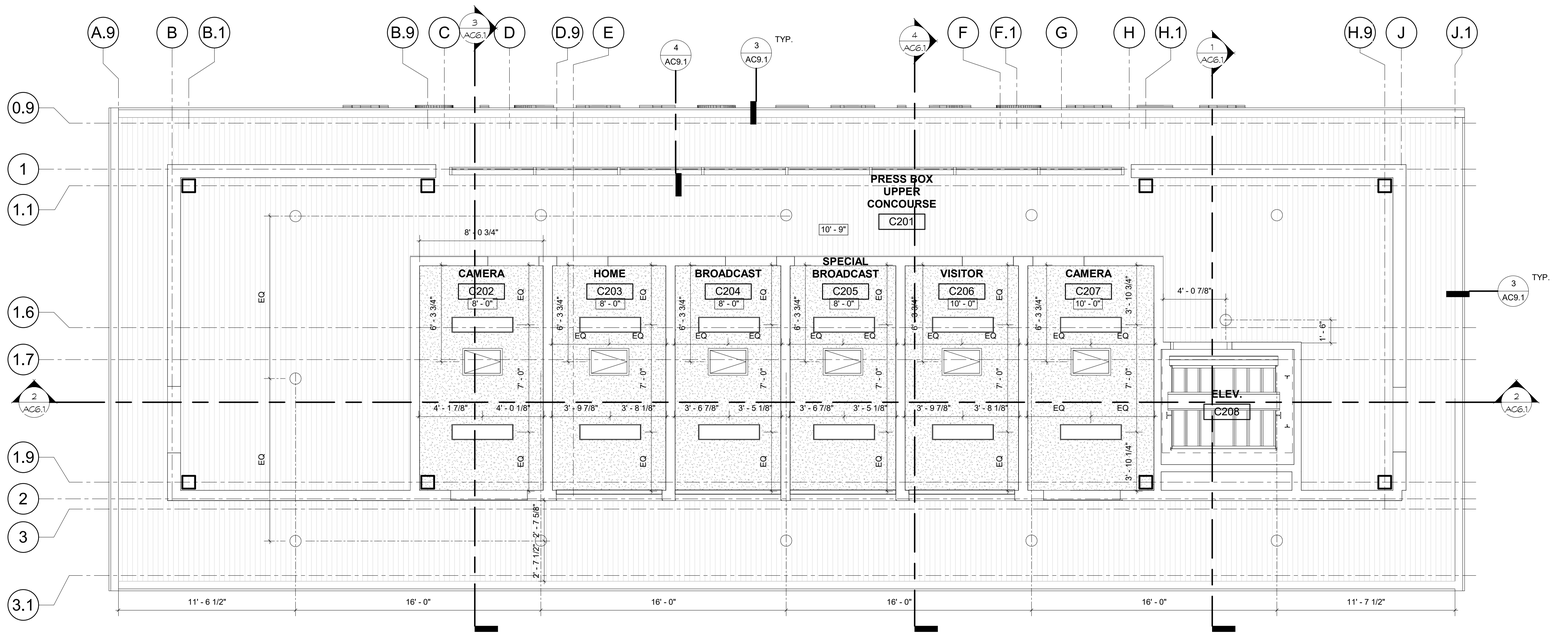
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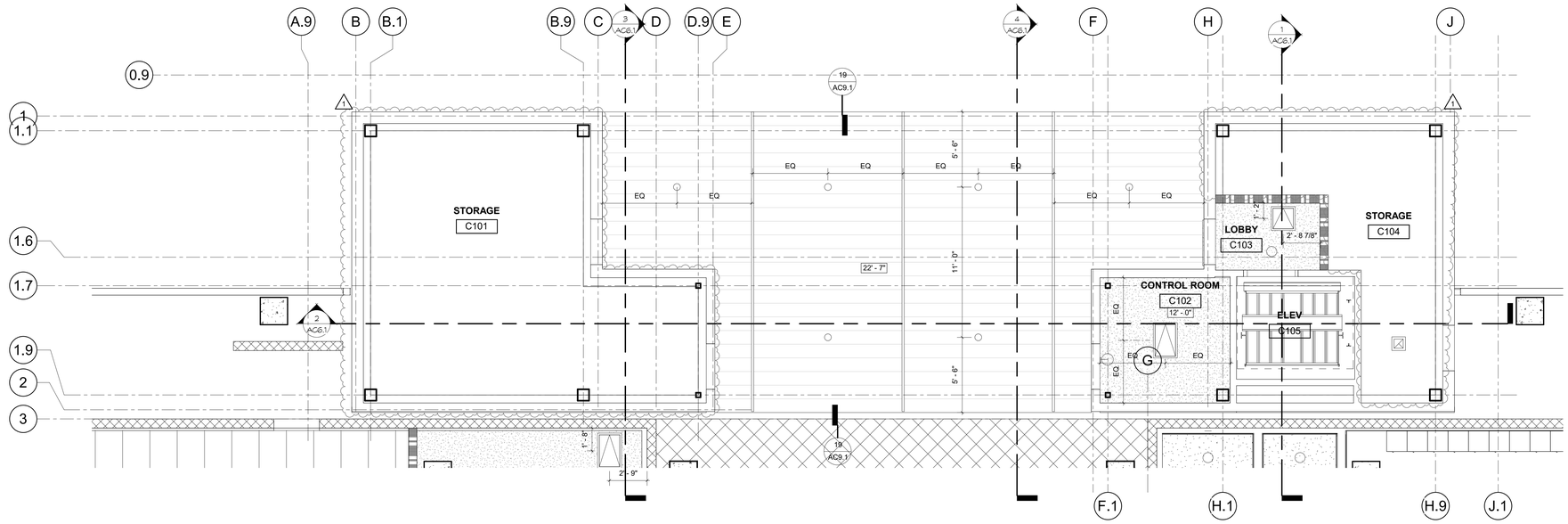
FLOOR PLAN - BUILDING C

AC1.1

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2 REFLECTED CEILING PLAN - BUIDLING C SECOND FLOOR
SCALE: 1/4" = 1'-0"



1 REFLECTED CEILING PLAN - BUILDING C FIRST FLOOR
SCALE: 1/4" = 1'-0"

KEYNOTES

XX-XX

GENERAL NOTES

1. REFER TO SHEET G0.20 FOR ADDITIONAL SYMBOLS NOT SHOWN.
2. ALL SOFFIT DIMENSIONS ARE OUTSIDE FACE OF FINISH TO OUTSIDE FACE OF FINISH UNLESS OTHERWISE NOTED.
3. NOT ALL ELECTRICAL, MECHANICAL AND TECHNOLOGY EQUIPMENT IS SHOWN ON REFLECTED CEILING PLAN. REFER TO ELECTRICAL, MECHANICAL AND TECHNOLOGY DRAWINGS FOR ELECTRICAL, MECHANICAL AND TECHNOLOGY CEILING EQUIPMENT.
4. ALL EXPOSED METAL DECK AND STRUCTURAL STEEL IS TO COMPLY WITH "ARCHITECTURALLY EXPOSED STRUCTURAL STEEL FRAMING", REFER TO SPECIFICATION.

CEILING LEGEND

- 24" x 48" SUSPENDED ACOUSTICAL CEILING SYSTEM SEE SHEET AX6.1 FOR TYPICAL DETAILS
- HARD LID GYPSUM BOARD CEILING 4 / AX6.2
- OPEN TO THE ROOF DECK ABOVE.
- METAL SOFFIT PANEL 7 / AX2.1
- CEMENT PLASTER SEE FINISH SCHEDULE AND DETAIL 23 / AX2.1
- OPEN TO BLEACHERS ABOVE
- LIGHT FIXTURE(S), REFER TO ELECTRICAL DRAWINGS
- 9' - 0" CEILING HEIGHT ABOVE FINISH FLOOR
- MECHANICAL GRILLES, REFER TO MECHANICAL DRAWINGS
- 20" X 30" MAX. CEILING ACCESS PANEL, SEE DETAIL
- ILLUMINATED EXIT SIGNS, REFER TO ELECTRICAL FOR FIXTURE TYPE AND LOCATION.

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CONSTRUCTION DOCUMENTS

MADERA 19 66 UNIFIED SCHOOL DISTRICT

PROFESSIONAL SEAL
LICENSED ARCHITECT MICHAEL R. SCHOEN No. C-36295 RENEWAL DATE FEB 29, 2027 STATE OF CALIFORNIA

PROJECT NUMBER 20-51
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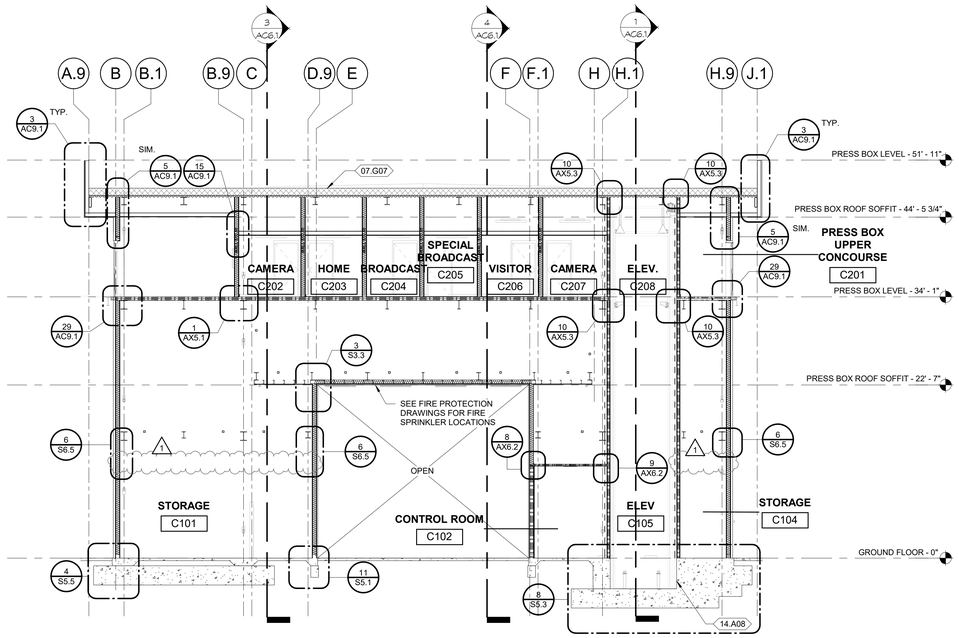
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CONSTRUCTION DOCUMENTS

ENLARGED RCP - BUILDING C

AC3.1

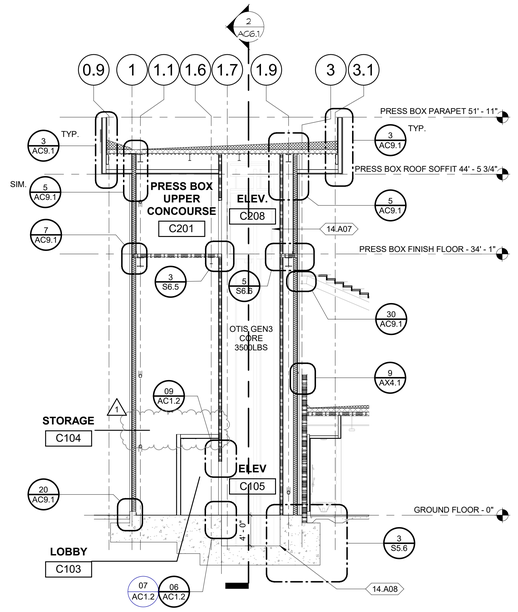
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2 PRESS BOX SECTION - LONGITUDINAL

2/ A1.0

SCALE: 1/8" = 1'-0"



1 ELEVATOR SECTION

1/ A1.0

SCALE: 1/8" = 1'-0"

4 PRESSBOX SECTION - AT BRIDGE

1/ A3.1

SCALE: 1/8" = 1'-0"

3 PRESS BOX SECTION - TRANSVERSE

2/ A1.0

SCALE: 1/8" = 1'-0"

GENERAL NOTES

1. SEE SHEET G0.2 FOR ADDITIONAL SYMBOLS NOT SHOWN.

SECTION LEGEND

1 HR ASSEBMLY

BATT INSULATION SCHEDULE

ROOF R- 30
WALL R-19

RIDGID INSULATION SCHEDULE

ROOF R-30 (6" EXTRUDED POLYSTYRENE)
WALL (NONE)

KEYNOTES XX-XX

03.A01 CONCRETE SLAB, SEE STRUCTURAL PLANS
04.A28 CMU WALL
07.G07 CLASS 'A' RATED BUILT-UP ROOFING SYSTEM WITH RIGID INSULATION AND COVERBOARD
09.A02 GYPSUM BOARD o/ CEILING JOISTS
14.A07 ELEVATOR
14.A08 ELEVATOR CONCRETE PIT

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PROFESSIONAL SEAL

LICENSED ARCHITECT
MICHAEL R. SCHOEN
No. C-28395
RENEWAL DATE
12-31-2025
STATE OF CALIFORNIA

PROJECT NUMBER	20-51
DATE	08/12/2024
DSA APPLICATION NO.	02-122784
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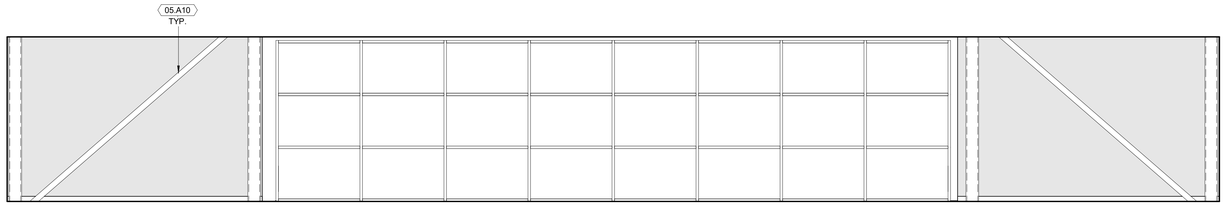
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CONSTRUCTION DOCUMENTS

BUILDING SECTIONS - BUILDING C

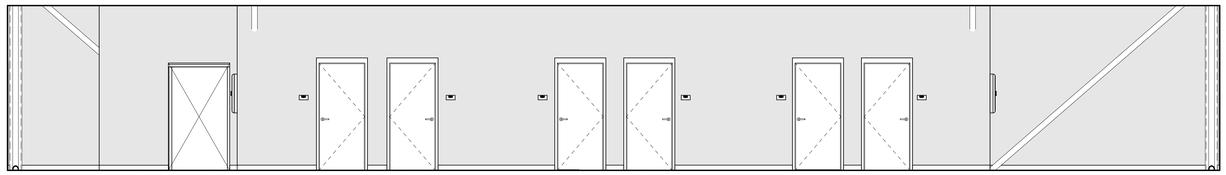
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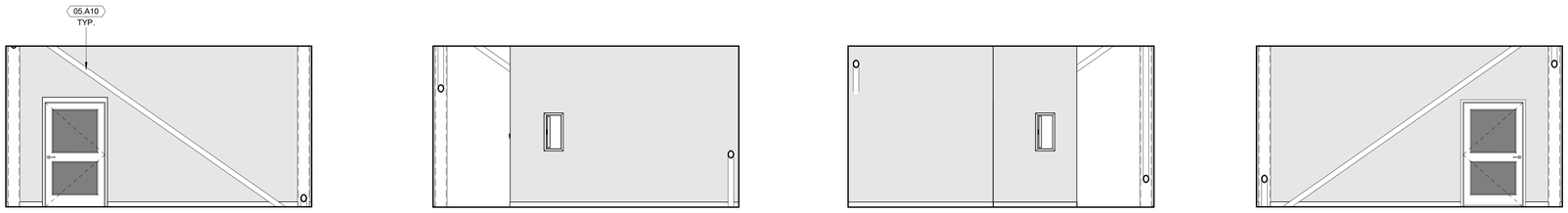
C201A

PB UPPER CONCOURSE C201



C201B

PB UPPER CONCOURSE C201



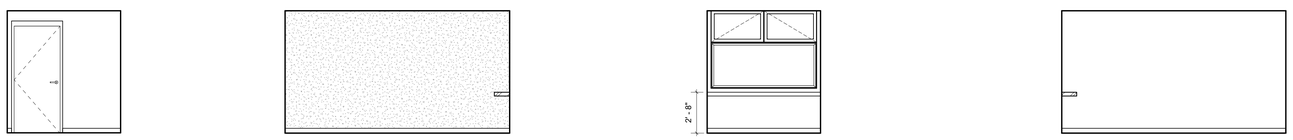
C201C C201D C201E C201F

PB UPPER CONCOURSE C201



C202A C202B C202C C202D

CAMERA RM C202 - OPP C207



C203A C203B C203C C203D

HOME C203 - SIM C205; OPP C204, C206

KEYNOTES

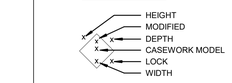
XX-XX

05.A10 STEEL BRACE FRAME, SEE STRUCTURAL PLANS
08.L01 OVERHEAD COILING DOOR, SEE DOOR SCHEDULE

SYMBOL LEGEND - INT. ELEVATION

CASEWORK SYMBOL

CASEWORK SYMBOL



NOTE: SEE CASEWORK BACKING AND ATTACHMENT DETAILS ON SHEET AX5.2

NOTE: DIMENSIONS ARE TO THE NEAREST WHOLE NUMBER, CONTRACTOR TO FIELD VERIFY DIMENSIONS PRIOR TO FABRICATION

FINISH KEYNOTE SYMBOL

XX-XX = INDICATES FINISH, SEE COLOR SCHEDULE ON AX5.0

INTERIOR ELEVATION LEGEND

HATCH INDICATES GYPSUM BOARD FINISH U.O.N. P-1

HATCH INDICATES FIBERGLASS REINFORCED PANELING

HATCH INDICATES WALL TILE FINISH, TL-1 U.O.N.

HATCH INDICATES FIRE RESISTANT PAINT o/ 5/8" FIRE RESISTANT PLYWOOD

HATCH INDICATES FLOOR & BASE TILE FINISH, TL-3 ,U.O.N.

HATCH INDICATES GLAZING REFER TO WINDOW SCHEDULE

HATCH INDICATES CONCRETE COLUMN

HATCH INDICATES OPEN TO BEYOND

HATCH INDICATES OMEGA AKROGOLD DEF SYSTEM - AKROFLEX MULTI-TEX FINISH 1

GENERAL NOTES

1. REFER TO REFLECTED CEILING PLAN FOR CEILING AND SOFFIT HEIGHTS.
2. REFER TO DETAIL 25 / AX5.2 FOR CASEWORK ANCHORAGE DETAILS.
3. FOR ELEVATIONS THAT ARE NOT ILLUSTRATED MATCH FINISHES OF TYPICAL ROOM ELEVATION AND REFER TO INTERIOR FINISH SCHEDULE.
4. SEE SHEET G0.20 FOR ADDITIONAL SYMBOLS NOT SHOWN.
5. REFER TO INTERIOR FINISH SCHEDULE TYPICAL PAINT COLORS.
6. ALL EXPOSED METAL DECK AND STRUCTURAL STEEL IS TO COMPLY WITH "ARCHITECTURALLY EXPOSED STRUCTURAL STEEL FRAMING", REFER TO SPECIFICATION.

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MADERA HIGH SCHOOL STADIUM

200 SOUTH "L" STREET
MADERA, CA 93637
CONSTRUCTION DOCUMENTS

PROFESSIONAL SEAL

LICENSED ARCHITECT
MICHAEL R. SCHOEN
No. C-28395
RENEWAL DATE
FEB 28, 2027
STATE OF CALIFORNIA

PROJECT NUMBER
20-51

DATE
08/12/2024

DSA APPLICATION NO.
02-122784

FILE NO.
20-H3

PTN NO.
65243-154

DRAWN BY
Author

REVISIONS

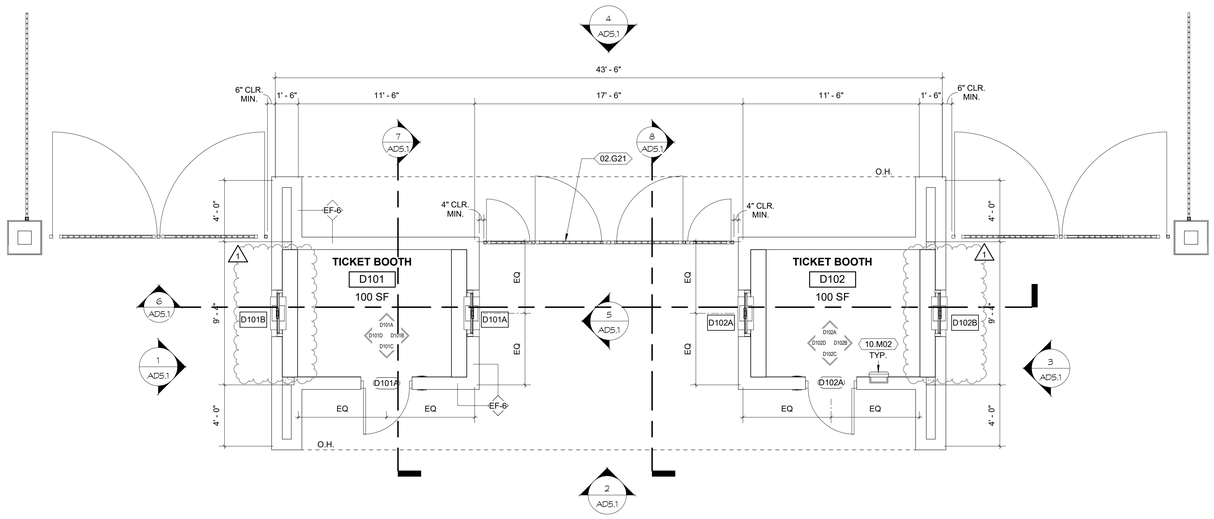
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CONSTRUCTION DOCUMENTS

INTERIOR ELEVATIONS - BUILDING C

AC7.2

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1 FLOOR PLAN - BUILDING D

SCALE: 1/4" = 1'-0"

KEYNOTES XX-XX

02.G21 WROUGHT IRON SWING GATE. SEE DETAILS ON SHEET AX2.3
10.M02 2A:10BC MIN RATED FIRE EXTINGUISHER W/ SEMI-RECESSED CABINET

FLOOR PLAN NOTES

1. REFER TO SHEET G0.20 FOR ADDITIONAL SYMBOLS NOT SHOWN.
2. ALL DIMENSIONS ARE AS FOLLOWS UNLESS OTHERWISE NOTED:
   A. FACE OF STUD (OR CMU WHERE APPLICABLE) TO FACE OF STUD ;
   B. COLUMN LINE TO FACE OF STUD (OR CMU WHERE APPLICABLE) UNLESS OTHERWISE NOTED.
3. REFERENCE ENLARGED PLANS FOR DIMENSIONS OF ENLARGED PLAN AREAS.
4. DOORS ARE 4" CLR. FROM FROM THE FACE OF FINISH TO ROUGH OPENING OF JAMB UNLESS OTHERWISE NOTED.
5. SEE SHEETS AX1.0 FOR WALL ASSEMBLIES.
6. SEE STRUCT. FOR METAL STUD SIZES AND CONNECTIONS.
7. NON RATED INTERIOR WALLS TO EXTEND FROM FLOOR TO ROOF DECK. OTHER INTERIOR NON-RATED WALLS MAY EXTEND FROM FLOOR TO CEILING FRAMING OR 6" ABOVE ACOUSTICAL CEILING GRID.
8. ALL WALLS SHALL HAVE FRAMING, FINISHES, INSULATION, AND SUBSTRATES FROM FLOOR TO STRUCTURAL DECK. UNLESS OTHERWIS NOTED.
9. REFERENCE BLEACHER PLANS FOR DIMENSIONS OF BLEACHERS AND COLUMNS.
10. SEE SHEET AX8.0 FOR FOR FINISH AND COLOR SCHEDULE

WALL LEGEND

- NEW WALL. SEE WALL TYPES ON SHEET AX1.0
- NEW MASONRY WALL. SEE WALL TYPES ON SHEET AX1.0
- NEW 1HR FIRE RATED WALL ASSEMBLY. SEE WALL TYPES ON SHEET AX1.0
- CONCRETE COLUMN SEE STRUCTURAL DRAWINGS FOR SIZE AND LOCATION
- WALL TYPE — DETAIL REFERENCE SEE SHEET AX1.0
- SYMBOL INDICATES ACCESSIBILITY ITEM. SEE DETAIL 15 / AX7.2 FOR TYPICAL ACCESSIBILITY STANDARDS, CLEARANCES AND MOUNTING HEIGHTS & LOCATIONS
- INTERIOR ELEVATION MARK, SEE INTERIOR ELEVATIONS SHEETS AA7.1, AA7.2, AB7.1, AB1.2 & AD7.1

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PROFESSIONAL SEAL

LICENSED ARCHITECT — MICHAEL P. SCHOEN — No. C-29295 — RENEWAL DATE 08.31.2027 — STATE OF CALIFORNIA

PROJECT NUMBER 20-51

DATE 08/12/2024

DSA APPLICATION NO. 02-122784

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PTN NO. 65243-154

DRAWN BY Author

REVISIONS

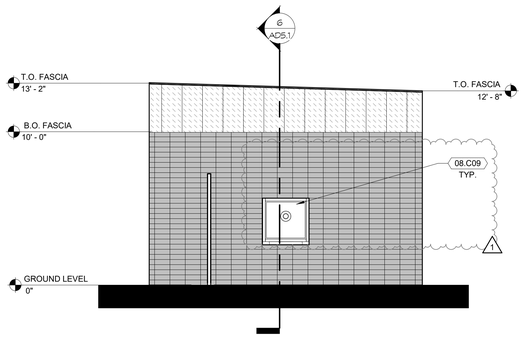
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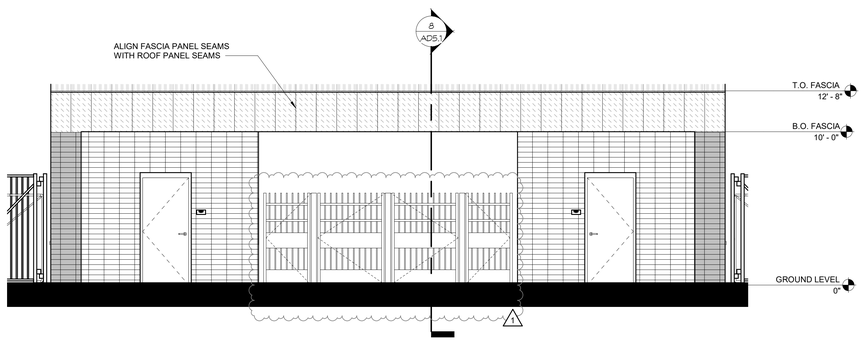
FLOOR PLAN - BUILDING D

AD1.1

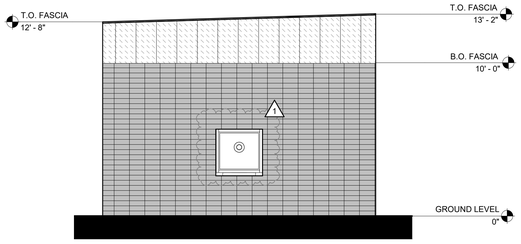
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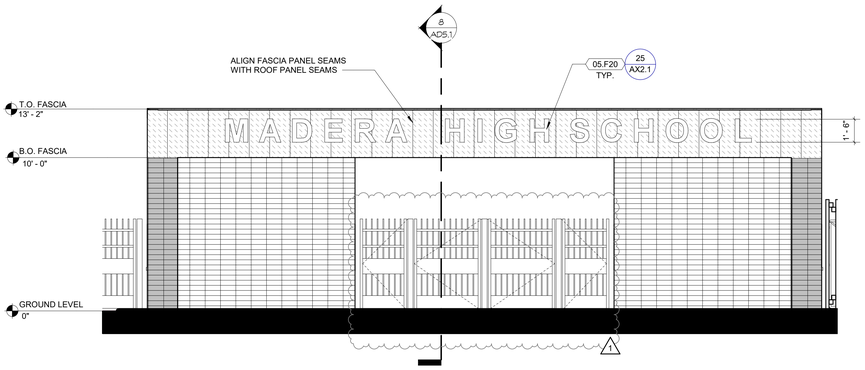
1 WEST ELEVATION - BUILDING D
SCALE: 1/4" = 1'-0"



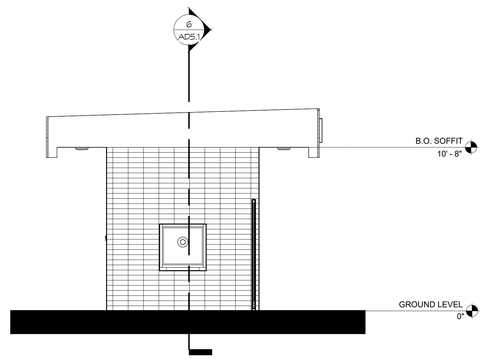
2 SOUTH ELEVATION - BUILDING D
SCALE: 1/4" = 1'-0"



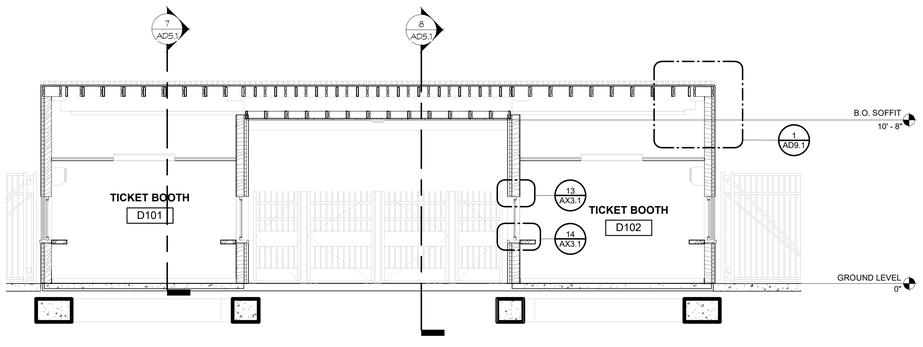
3 EAST ELEVATION - BUILDING D
SCALE: 1/4" = 1'-0"



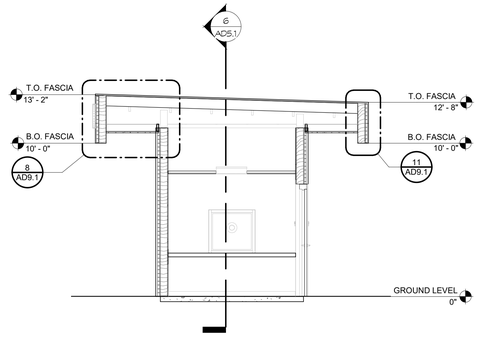
4 NORTH ELEVATION - BUILDING D
SCALE: 1/4" = 1'-0"



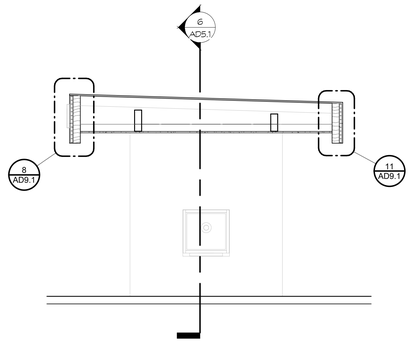
5 BREEZEWAY ELEVATION - BUILDING D
SCALE: 1/4" = 1'-0"



6 SECTION - BUILDING D
SCALE: 1/4" = 1'-0"



7 SECTION 2 - BUILDING D
SCALE: 1/4" = 1'-0"



8 BREEZEWAY SECTION - BLDG D
SCALE: 1/4" = 1'-0"

SECTION LEGEND

1 HR ASSEBMLY

BATT INSULATION SCHEDULE

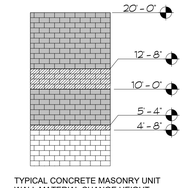
ROOF R- 30
WALL R-19

RIDGID INSULATION SCHEDULE

ROOF R-30 (6" EXTRUDED POLYSTYRENE)
WALL (NONE)

EXTERIOR ELEVATION LEGEND

- CONCRETE MASONRY UNIT, PRECISION COLOR 1 — CMU-1
- CONCRETE MASONRY UNIT, PRECISION COLOR 2 — CMU-2
- CONCRETE MASONRY UNIT, SPLIT FACE COLOR 2 — CMU-3
- THIN BRICK 20 / AX2.1 — TB-1
- THIN BRICK 20 / AX2.1 — TB-2
- HORIZONTALLY ORIENTED FLUSH METAL WALL AND SOFFIT PANELS, 7 / AX2.1 — MP-3
- VERTICALLY ORIENTED STANDING SEAM METAL ROOF AND FASCIA PANELS, 9 / AX2.1 — MP-4
- CEMENT PLASTER — CP-2



TYPICAL CONCRETE MASONRY UNIT WALL MATERIAL CHANGE HEIGHT (ALL CMU TO BE RUNNING BOND)

GENERAL NOTES EXT. ELEVATIONS

1. CONTRACTOR TO PROVIDE ALL ACCESSORIES REQ'D TO PROVIDE WEATHER TIGHT CONSTRUCTION, COORDINATE w/ MANUFACTURER.
2. ALL EXPOSED EXTERIOR STRUCTURAL STEEL, METAL DECK, CONDUITS, AND PIPING TO BE PAINTED. VERIFY COLOR WITH ARCHITECT.
3. SEE 23 / AX2.1 AND 24 / AX2.1 FOR PLASTER ACCESORIES AND REVEAL DETAILS.

KEYNOTES XX-XX

05.F20 FABRICATED ALUMINUM LETTERS
08.C09 TRANSACTION WINDOW

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MADERA HIGH SCHOOL STADIUM

200 SOUTH "I" STREET
MADERA, CA 93637
CONSTRUCTION DOCUMENTS

MADERA UNIFIED SCHOOL DISTRICT 19 66

PROFESSIONAL SEAL

LICENSED ARCHITECT — MICHAEL R. SCHOEN — No. C-22529 — RENEWAL DATE FEB 28, 2027 — STATE OF CALIFORNIA

PROJECT NUMBER 20-51
DATE 08/12/2024
DSA APPLICATION NO. 02-122784
FILE NO. 20-H3
PTN NO. 65243-154
DRAWN BY Author

REVISIONS

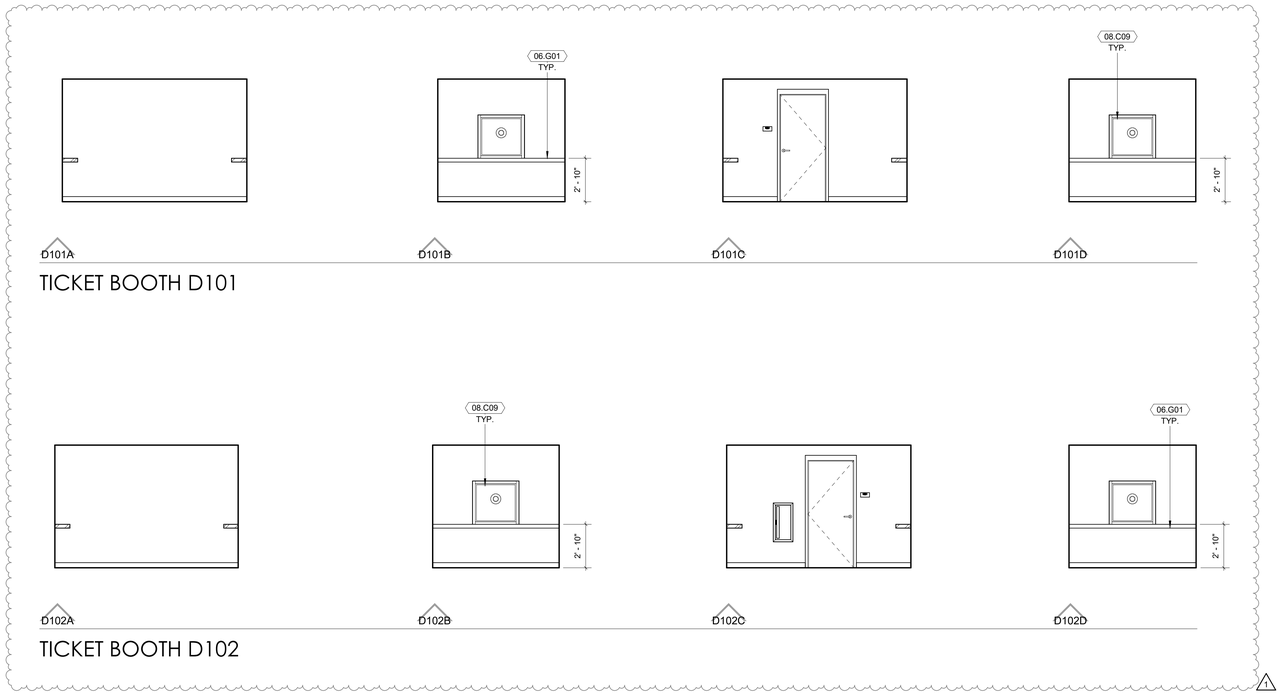
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1	ADDENDUM 01	08/18/2025

CONSTRUCTION DOCUMENTS

ELEVATIONS & SECTIONS - BUILDING D

AD5.1

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TICKET BOOTH D101

TICKET BOOTH D102

KEYNOTES

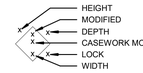
XX-XX

06.G01 SOLID SURFACE COUNTERTOP
08.C09 TRANSACTION WINDOW

SYMBOL LEGEND - INT. ELEVATION

CASEWORK SYMBOL

CASEWORK SYMBOL



NOTE: SEE CASEWORK BACKING AND ATTACHMENT DETAILS ON SHEET AX5.2

NOTE: DIMENSIONS ARE TO THE NEAREST WHOLE NUMBER, CONTRACTOR TO FIELD VERIFY DIMENSIONS PRIOR TO FABRICATION

FINISH KEYNOTE SYMBOL

XX-XX = INDICATES FINISH, SEE COLOR SCHEDULE ON AX5.0

INTERIOR ELEVATION LEGEND

HATCH INDICATES GYPSUM BOARD FINISH U.O.N. P-1

HATCH INDICATES WALL TILE FINISH, TL-1 U.O.N.

HATCH INDICATES FLOOR & BASE TILE FINISH, TL-3 U.O.N.

HATCH INDICATES CONCRETE COLUMN

HATCH INDICATES OMEGA AKROGOLD DEF SYSTEM - AKROFLEX MULTI-TEX FINISH

HATCH INDICATES FIBERGLASS REINFORCED PANELING

HATCH INDICATES FIRE RESISTANT PAINT o/ 5/8" FIRE RESISTANT PLYWOOD

HATCH INDICATES GLAZING REFER TO WINDOW SCHEDULE

HATCH INDICATES OPEN TO BEYOND

GENERAL NOTES

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4. SEE SHEET GO.2 FOR ADDITIONAL SYMBOLS NOT SHOWN.
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6. ALL EXPOSED METAL DECK AND STRUCTURAL STEEL IS TO COMPLY WITH "ARCHITECTURALLY EXPOSED STRUCTURAL STEEL FRAMING", REFER TO SPECIFICATION.

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CONSTRUCTION DOCUMENTS

PROFESSIONAL SEAL

LICENSED ARCHITECT
MICHAEL R. SCHOEN
No. C-36295
REGISTRATION DATE
FEB 29, 2027
STATE OF CALIFORNIA

PROJECT NUMBER
20-51

DATE
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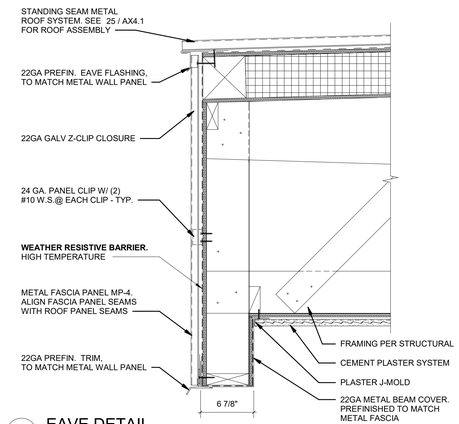
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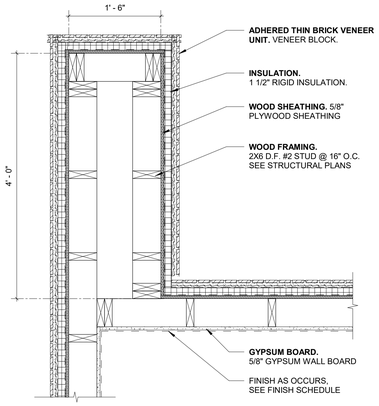
INTERIOR ELEVATIONS - BUILDING D

AD7.1

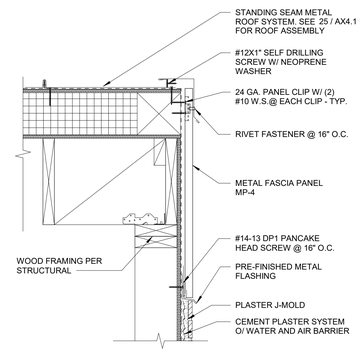
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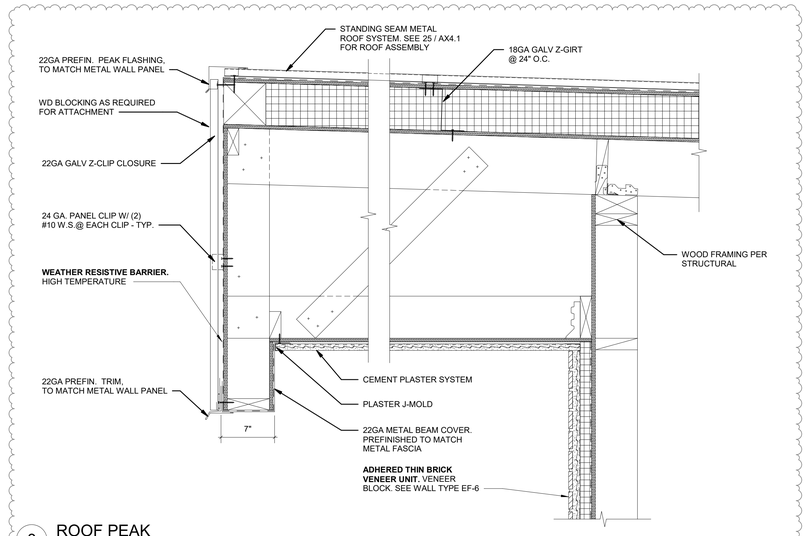
11 EAVE DETAIL
SCALE: 1 1/2" = 1'-0"



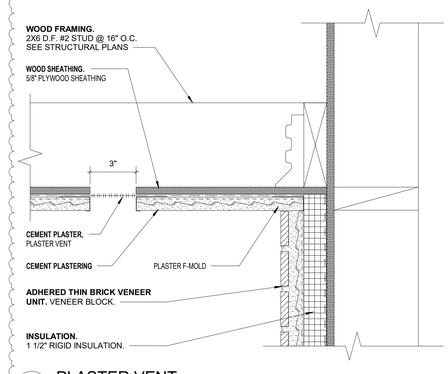
6 BUMP-OUT AT BLDG D - PLAN VIEW
SCALE: 1" = 1'-0"



1 RAKE DETAIL (TICKET BOOTH)
SCALE: 1 1/2" = 1'-0"

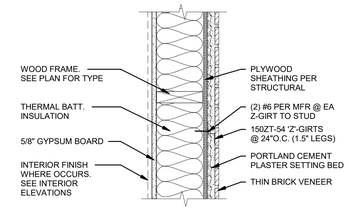


8 ROOF PEAK
SCALE: 1 1/2" = 1'-0"



9 PLASTER VENT
SCALE: 3" = 1'-0"

1



5 EXTERIOR WALL AT BRICK VENEER
SCALE: 1 1/2" = 1'-0"

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MADERA 19 66 UNIFIED SCHOOL DISTRICT

PROFESSIONAL SEAL

LICENSED ARCHITECT — MICHAEL R. SCHOEN — No. C-29505 — RENEWAL DATE 08/31/2027 — STATE OF CALIFORNIA

PROJECT NUMBER 20-51

DATE 08/12/2024

DSA APPLICATION NO. 02-122784

FILE NO. 20-H3

PTN NO. 65243-154

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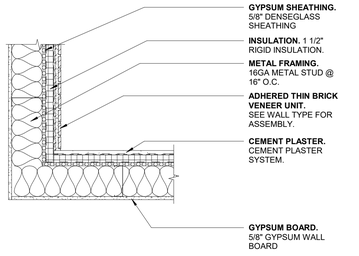
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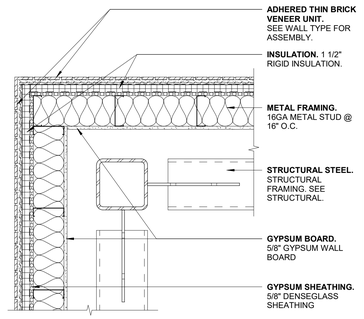
SPECIALTY DETAILS

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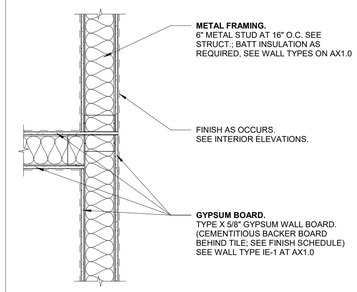
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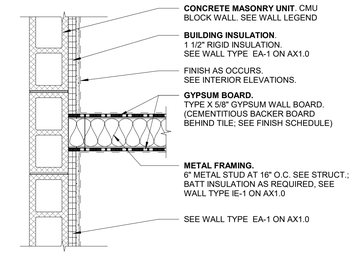
26 BUILDING C - CORNER
SCALE: 1" = 1'-0"



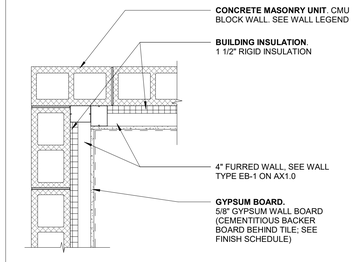
21 BUILDING C - CORNER
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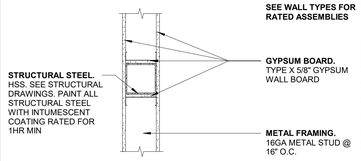
11 INT RATED WALLS
SCALE: 1" = 1'-0"



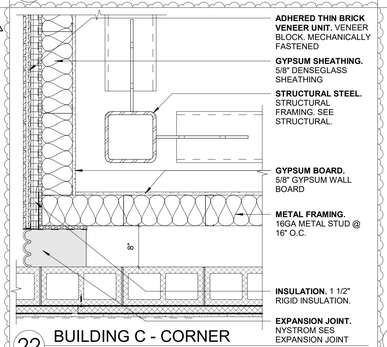
6 INT RATED WALL AT CMU WALL
SCALE: 1" = 1'-0"



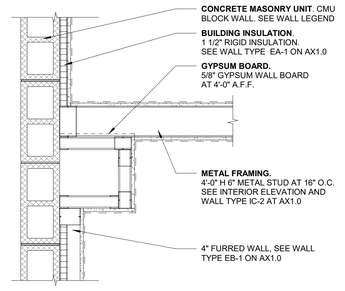
1 CORNER DETAIL AT FURRED CMU
SCALE: 1" = 1'-0"



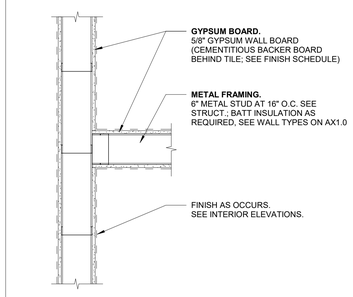
27 BUILDING C - INTERSECTION
SCALE: 1" = 1'-0"



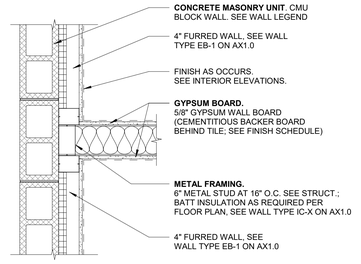
22 BUILDING C - CORNER
SCALE: 1" = 1'-0"



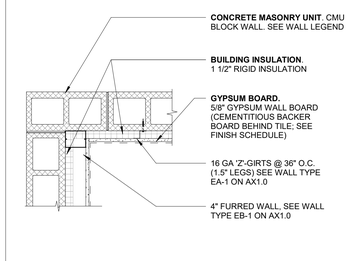
17 PARTIAL HEIGHT WALL AT CMU
SCALE: 1" = 1'-0"



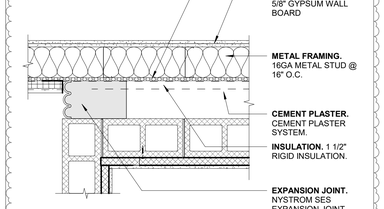
12 INT NON-RATED WALLS
SCALE: 1" = 1'-0"



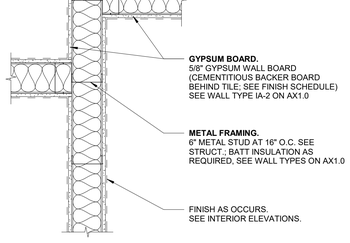
7 INT WALL AT CMU WALL
SCALE: 1" = 1'-0"



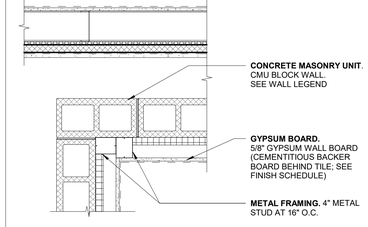
2 CORNER DETAIL AT CMU
SCALE: 1" = 1'-0"



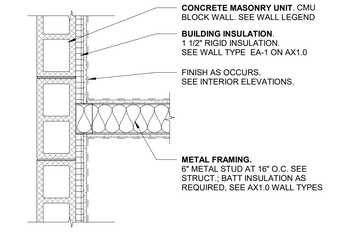
23 BUILDING C - CORNER
SCALE: 1" = 1'-0"



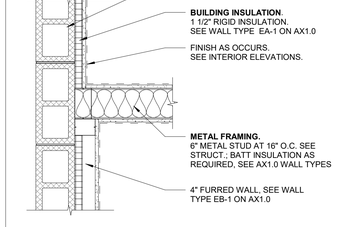
18 INT NON-RATED WALLS
SCALE: 1" = 1'-0"



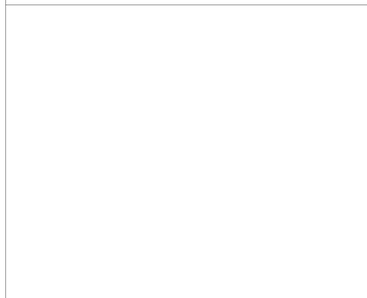
13 CORNER AT EXPANSION JOINT
SCALE: 1" = 1'-0"



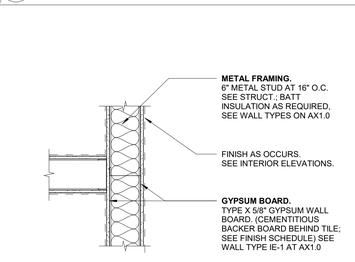
8 INT WALL AT FURRED CMU WALL
SCALE: 1" = 1'-0"



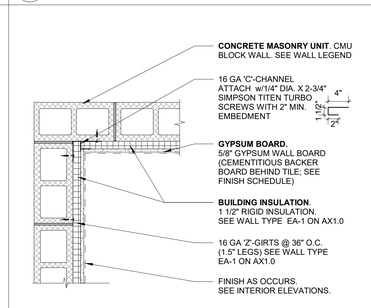
3 INT WALL AT FURRED CMU WALL
SCALE: 1" = 1'-0"



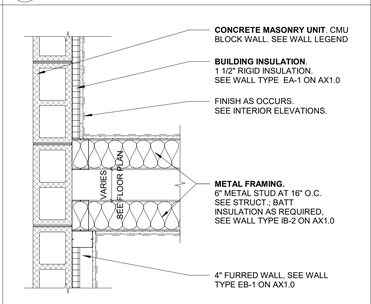
24 BUILDING C - CORNER
SCALE: 1" = 1'-0"



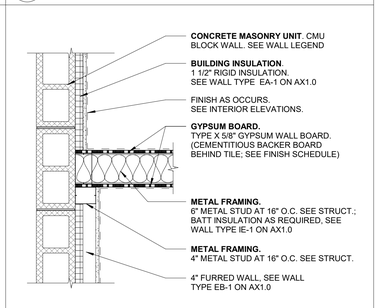
19 NON RATED WALL AT RATED WALL
SCALE: 1" = 1'-0"



14 CORNER DETAIL AT CMU
SCALE: 1" = 1'-0"

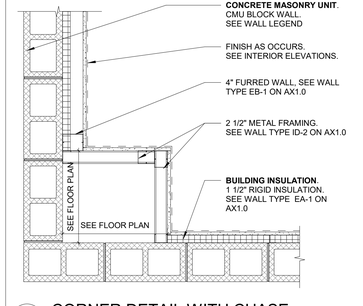


9 INT WALL AT FURRED CMU WALL
SCALE: 1" = 1'-0"

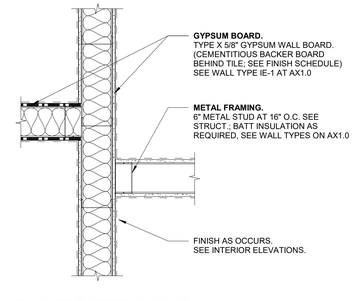


4 INT RATED WALL AT CMU WALL
SCALE: 1" = 1'-0"

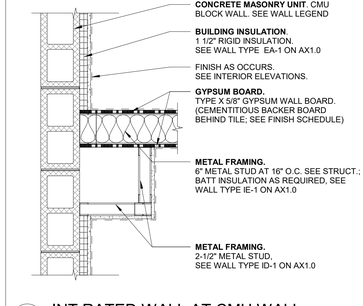
25 BUILDING C - INTERSECTION
SCALE: 1" = 1'-0"



15 CORNER DETAIL WITH CHASE
SCALE: 1" = 1'-0"



10 INT RATED WALLS
SCALE: 1" = 1'-0"



5 INT RATED WALL AT CMU WALL
SCALE: 1" = 1'-0"

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MADERA HIGH SCHOOL STADIUM
200 SOUTH "I" STREET
MADERA, CA 93637
CONSTRUCTION DOCUMENTS

MADERA 19 66 UNIFIED SCHOOL DISTRICT

PROFESSIONAL SEAL

LICENSED ARCHITECT — MICHAEL R. SCHOEN — No. C-36295 — RENEWAL DATE: FEB 29, 2027 — STATE OF CALIFORNIA

PROJECT NUMBER 20-51
DATE 08/12/2024
DSA APPLICATION NO. 02-122784
FILE NO. 20-H3
PTN NO. 65243-154
DRAWN BY Author

REVISIONS

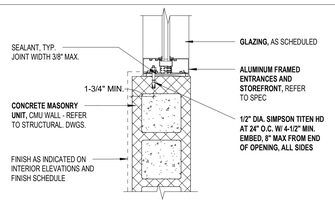
#	DESCRIPTION	DATE
1	ADDENDUM 01	08/18/2025

CONSTRUCTION DOCUMENTS

WALL DETAILS

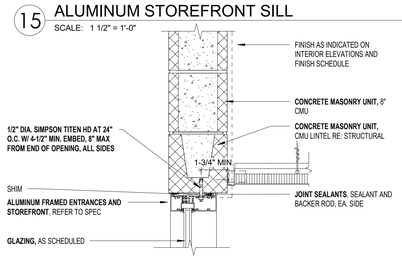
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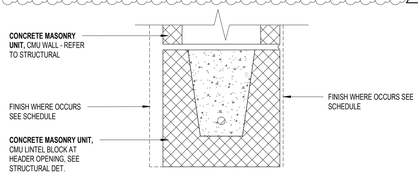
15 ALUMINUM STOREFRONT SILL

SCALE: 1 1/2" = 1'-0"



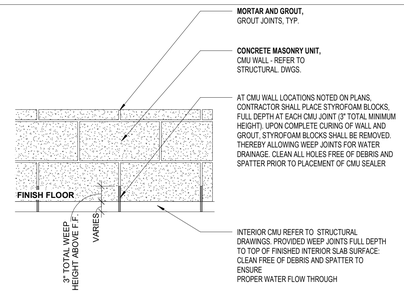
22 ALUMINUM STOREFRONT HEAD

SCALE: 1 1/2" = 1'-0"



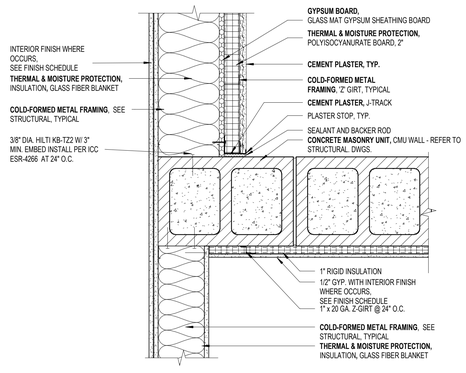
14 CMU HEADER

SCALE: 3" = 1'-0"



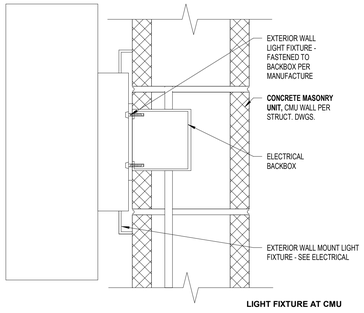
10 CMU WALL WEEP HOLE

SCALE: 1" = 1'-0"

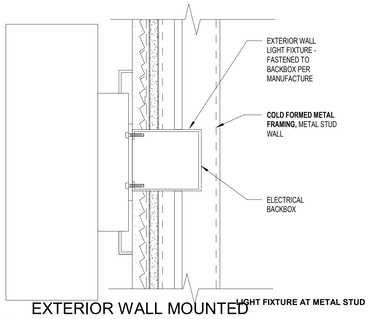


20 FURRED WALL AT CMU

SCALE: 1 1/2" = 1'-0"



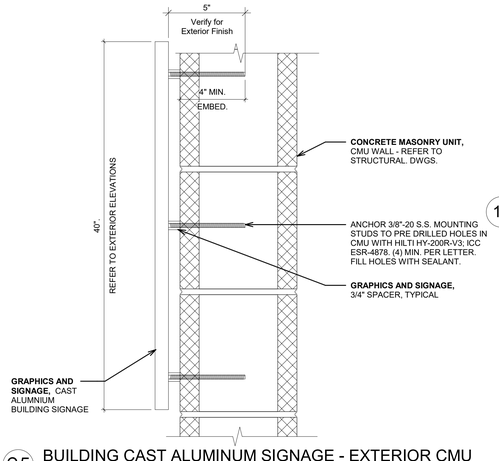
LIGHT FIXTURE AT CMU



LIGHT FIXTURE AT METAL STUD

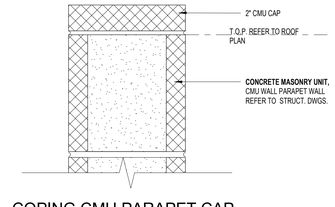
19 EXTERIOR WALL MOUNTED FIXTURE

SCALE: 3" = 1'-0"



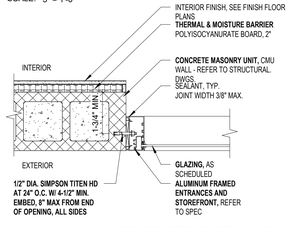
25 BUILDING CAST ALUMINUM SIGNAGE - EXTERIOR CMU

SCALE: 3" = 1'-0"



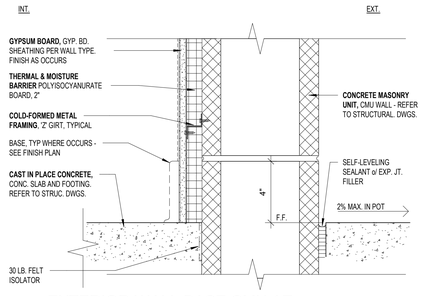
11 COPING CMU PARAPET CAP

SCALE: 3" = 1'-0"



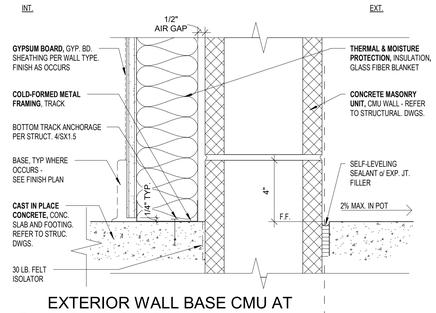
16 ALUMINUM STOREFRONT JAMB

SCALE: 1 1/2" = 1'-0"



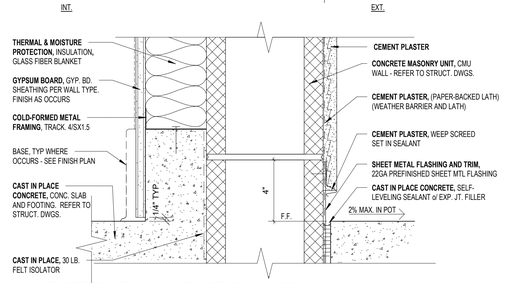
08 EXTERIOR WALL BASE CMU AT FURRED WALL

SCALE: 3" = 1'-0"



07 EXTERIOR WALL BASE CMU AT FURRED STUD WALL

SCALE: 3" = 1'-0"



06 EXTERIOR WALL BASE CMU AT RAISED CURB FURRED STUD WALL

SCALE: 3" = 1'-0"

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MADERA HIGH SCHOOL STADIUM

200 SOUTH "I" STREET
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CONSTRUCTION DOCUMENTS

MADERA 19 66 UNIFIED SCHOOL DISTRICT

PROFESSIONAL SEAL

LICENSED ARCHITECT — MICHAEL R. SCHOEN — No. C-26395 — RENEWAL DATE: SEPTEMBER 28, 2027 — STATE OF CALIFORNIA

PROJECT NUMBER	20-51
DATE	08/12/2024
DSA APPLICATION NO.	02-122784
FILE NO.	20-H3
PTN NO.	65243-154
DRAWN BY	Author

REVISIONS

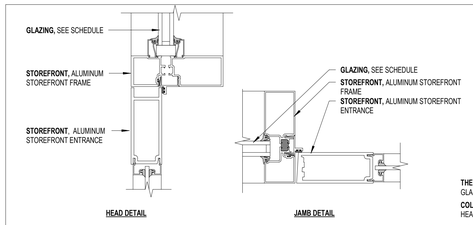
#	DESCRIPTION	DATE
1	ADDENDUM 01	08/18/2025

CONSTRUCTION DOCUMENTS

TYPICAL EXTERIOR DETAILS-CMU

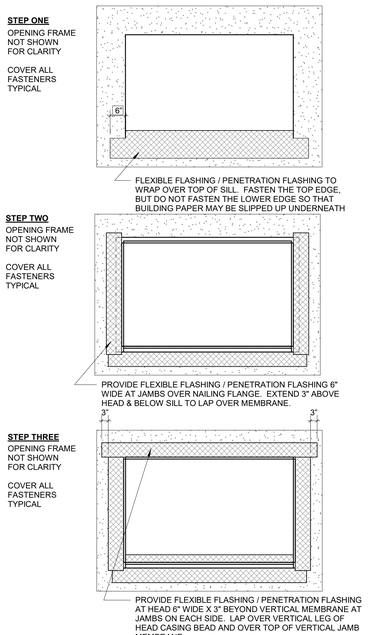
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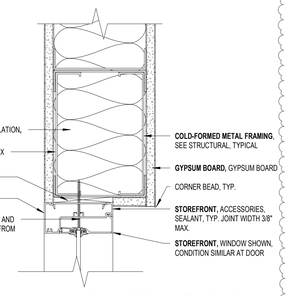
25 ALUMINUM STOREFRONT TRANSITION

SCALE: 3" = 1'-0"



24 TYPICAL OPENINGS FLEXIBLE FLASHING

SCALE: 1/2" = 1'-0"

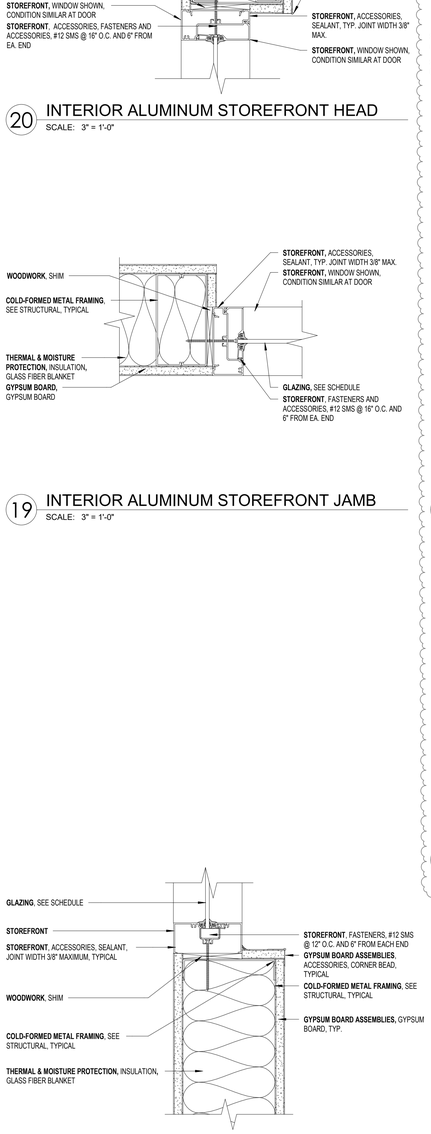


20 INTERIOR ALUMINUM STOREFRONT HEAD

SCALE: 3" = 1'-0"

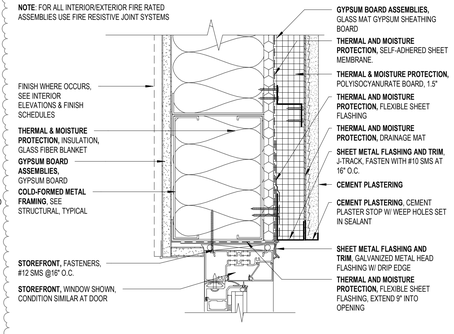
19 INTERIOR ALUMINUM STOREFRONT JAMB

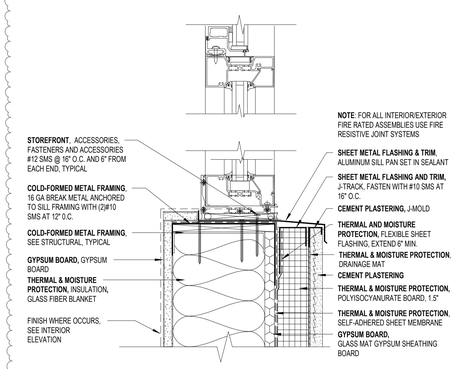
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17 INTERIOR ALUMINUM STOREFRONT SILL

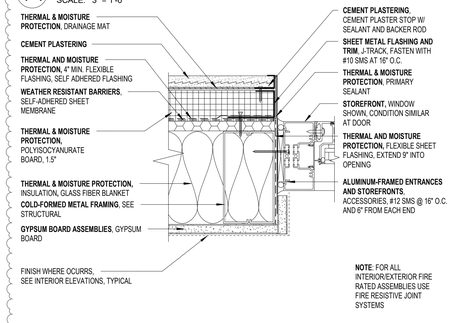
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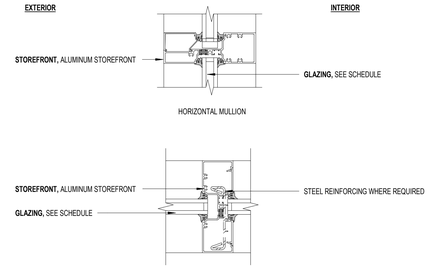
14 PRESSBOX WINDOW - HEAD/MULLION/SILL

SCALE: 3" = 1'-0"



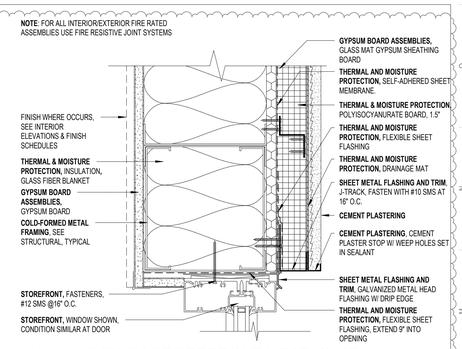
13 PRESSBOX WINDOW - JAMB

SCALE: 3" = 1'-0"



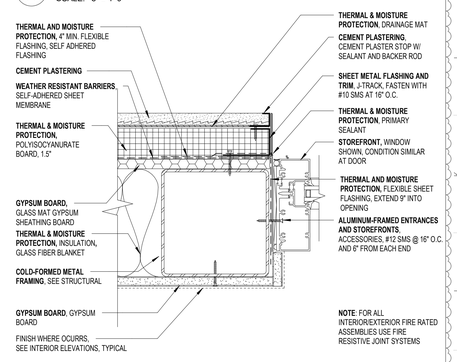
09 ALUMINUM STOREFRONT MULLION

SCALE: 3" = 1'-0"



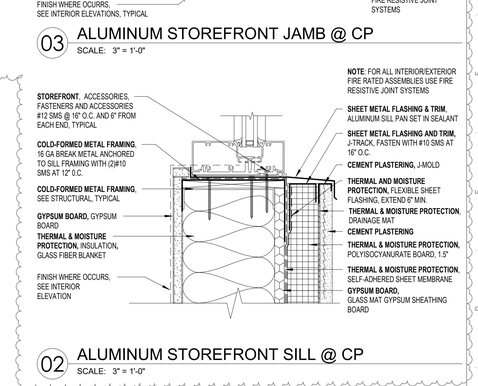
05 ALUMINUM STOREFRONT HEAD @ CP

SCALE: 3" = 1'-0"



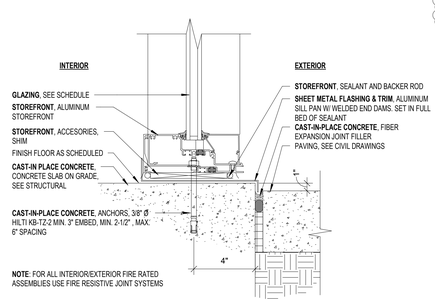
04 ALUMINUM STOREFRONT COLUMN CONDITION

SCALE: 3" = 1'-0"



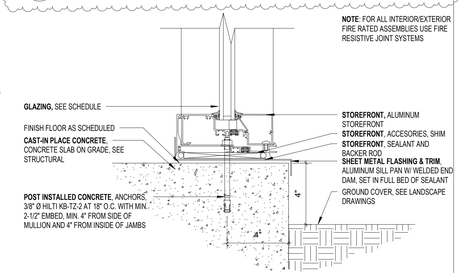
03 ALUMINUM STOREFRONT JAMB @ CP

SCALE: 3" = 1'-0"



06 ALUMINUM STOREFRONT SILL DETAIL

SCALE: 3" = 1'-0"



01 ALUMINUM STOREFRONT SILL DETAIL

SCALE: 3" = 1'-0"

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MADERA HIGH SCHOOL STADIUM

200 SOUTH "I" STREET
MADERA, CA 93637
CONSTRUCTION DOCUMENTS

PROFESSIONAL SEAL

LICENSED ARCHITECT — MICHAEL R. SCHOEN — No. C-36295 — REGISTRATION DATE FEB 29, 2027 — STATE OF CALIFORNIA

PROJECT NUMBER 20-51

DATE 08/12/2024

DSA APPLICATION NO. 02-122784

FILE NO. 20-H3

PTN NO. 65243-154

DRAWN BY PBK

REVISIONS

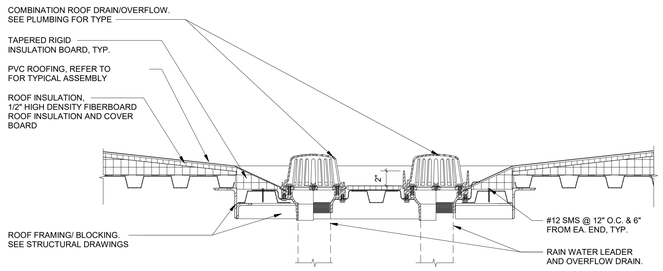
#	DESCRIPTION	DATE
1	ADDENDUM 01	08/16/2025

CONSTRUCTION DOCUMENTS

TYPICAL OPENING DETAILS - STOREFRONT

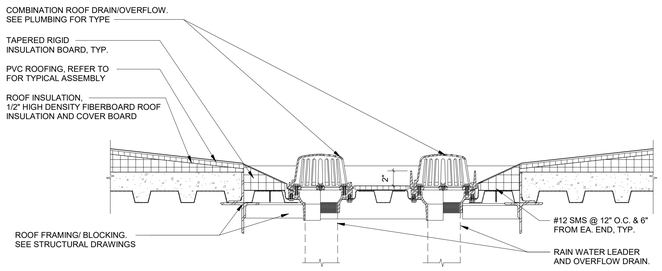
AX3.2

BIM 360://Madera USD_20-51_MHS Field House/20-51_MHS STADIUM_V21.rvt
8/18/2025 2:50:52 PM



26 ROOF AND OVERFLOW DRAINS

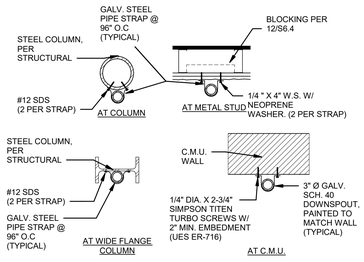
SCALE: 1 1/2" = 1'-0"



NOTE:
SEE 8/AX4.1 FOR ROOF ASSEMBLY

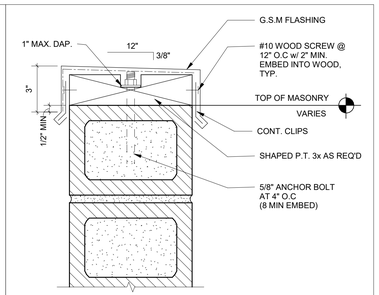
16 ROOF AND OVERFLOW DRAINS AT CONCRETE ROOF

SCALE: 1 1/2" = 1'-0"



6 DOWNSPOUT

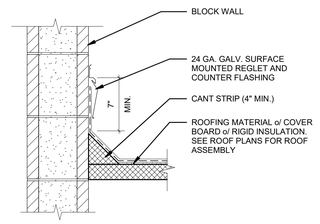
SCALE: 1" = 1'-0"



SECTION VIEW

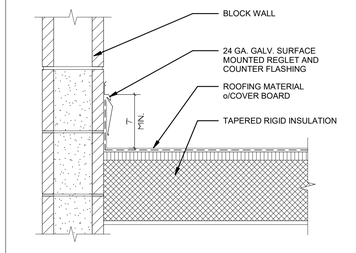
1 CMU @ PARAPET CAP

SCALE: 3" = 1'-0"



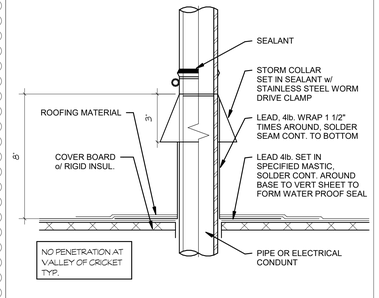
2 CANT STRIP AT MASONRY

SCALE: 1 1/2" = 1'-0"



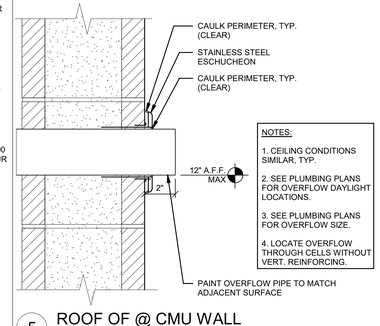
3 CRICKET

SCALE: 1 1/2" = 1'-0"



4 ROOF PENETRATION

SCALE: 3" = 1'-0"



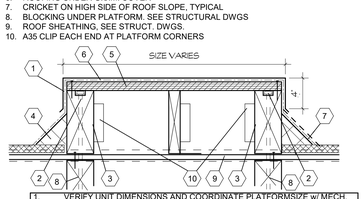
NOTES:

1. CEILING CONDITIONS SIMILAR, TYP.
2. SEE PLUMBING PLANS FOR OVERFLOW DAYLIGHT LOCATIONS.
3. SEE PLUMBING PLANS FOR OVERFLOW SIZE.
4. LOCATE OVERFLOW THROUGH CELLS WITHOUT VERT. REINFORCING.

5 ROOF OF @ CMU WALL

SCALE: 3" = 1'-0"

1. 24 GA. G.S.M. COVER, LAP, FOLD AND SOLDER ALL HORIZONTAL JOINTS
2. 5/8" DIA. THREADED ROD @ 24" O.C. REF. STRUCTURAL DRAWINGS
3. SHAPED 4x D.F. SUPPORT RAIL AT PERIMETER OF PLATFORM, RIP AS REQUIRED FOR ROOF SLOPE
4. CANT STRIP (3) LOW SIDES, TYP.
5. LEVEL 3/4" EXTERIOR GRADE PLYWD. PLATFORM w/ 10d @ 6" o.c. AT EDGES & 10d @ 12" o.c. FIELD
6. ROOFING UNDER G.S.M. COVER
7. CRICKET ON HIGH SIDE OF ROOF SLOPE, TYPICAL
8. BLOCKING UNDER PLATFORM. SEE STRUCTURAL DWGS
9. ROOF SHEATHING, SEE STRUCT. DWGS.
10. A35 CLIP EACH END AT PLATFORM CORNERS

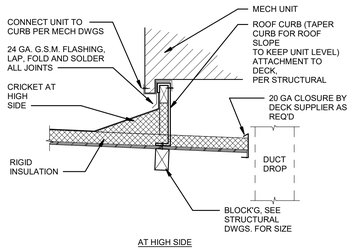


1. VERIFY UNIT DIMENSIONS AND COORDINATE PLATFORMSIZE w/ MECH. CONTRACTOR PRIOR TO CONSTRUCTION. SEE DETAIL 2/MX.2
2. ALL WOOD SHALL BE TREATED WITH FIRE RETARDANT MATERIAL

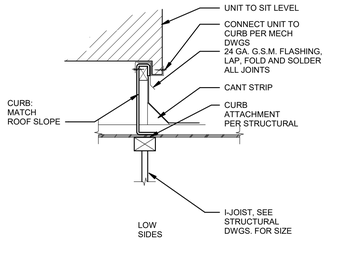
28 MECHANICAL PLATFORM

SCALE: 1 1/2" = 1'-0"

1. VERIFY UNIT DIMENSIONS AND COORDINATE CURB LOCATION &SIZE w/ MECH. CONTRACTOR PRIOR TO CONSTRUCTION.
2. SEE DTL. 13/S6.2 FOR ADDITIONAL INFO.
3. IF PLATFORM IS REQUIRED REFER TO DETAIL 12/AX4.1, SEE MECH. PLANS FOR LOCATIONS.

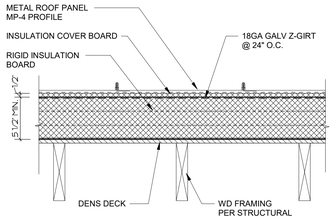


AT HIGH SIDE



30 CURB AT MECHANICAL UNIT

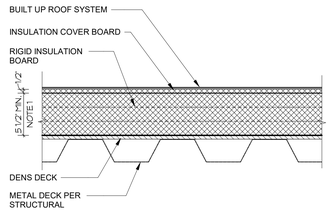
SCALE: 3/4" = 1'-0"



25 ROOF ASSEMBLY - BUILDING D

SCALE: 1 1/2" = 1'-0"

NOTE 1:
PROVIDE ADDITIONAL TAPERED INSULATION BOARD TO CREATE 1/4"/FT SLOPE AT CRICKETS AND WHERE METAL DECK IS FLAT

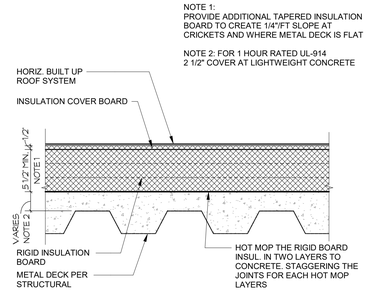


20 ROOF ASSEMBLY - BUILDING C

SCALE: 1 1/2" = 1'-0"

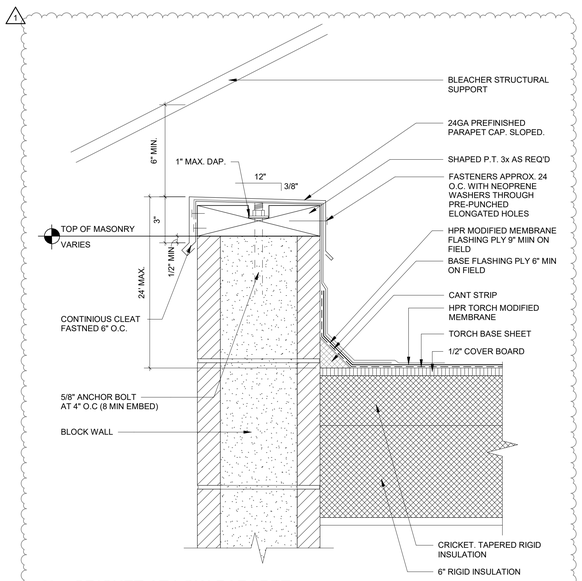
NOTE 1:
PROVIDE ADDITIONAL TAPERED INSULATION BOARD TO CREATE 1/4"/FT SLOPE AT CRICKETS AND WHERE METAL DECK IS FLAT

NOTE 2: FOR 1 HOUR RATED UL-914
2 1/2" COVER AT LIGHTWEIGHT CONCRETE



15 ROOF ASSEMBLY - BLDG A AND B

SCALE: 1 1/2" = 1'-0"

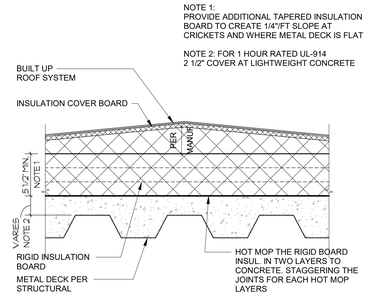


13 CRICKET AT LOW PARAPET

SCALE: 3" = 1'-0"

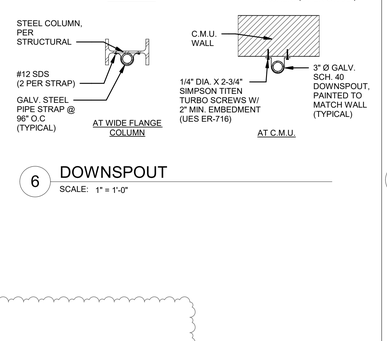
NOTE 1:
PROVIDE ADDITIONAL TAPERED INSULATION BOARD TO CREATE 1/4"/FT SLOPE AT CRICKETS AND WHERE METAL DECK IS FLAT

NOTE 2: FOR 1 HOUR RATED UL-914
2 1/2" COVER AT LIGHTWEIGHT CONCRETE



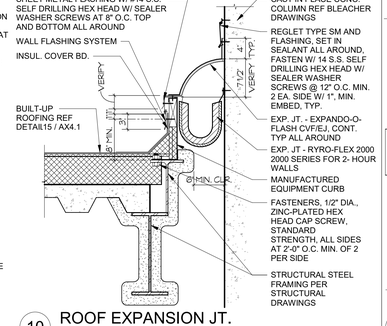
14 RIDGE - BLDG A AND B

SCALE: 1 1/2" = 1'-0"



9 EXPANSION JOINT @ MASONRY PARAPET

SCALE: 1 1/2" = 1'-0"



10 ROOF EXPANSION JT.

SCALE: 1" = 1'-0"

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PROFESSIONAL SEAL

LICENSED ARCHITECT
MICHAEL R. SCHOEN
No. C-18295
RENEWAL DATE
FEB 28, 2027
STATE OF CALIFORNIA

PROJECT NUMBER	20-51
DATE	08/12/2024
DSA APPLICATION NO.	02-122784
FILE NO.	20-H3
PTN NO.	65243-154
DRAWN BY	Author

REVISIONS

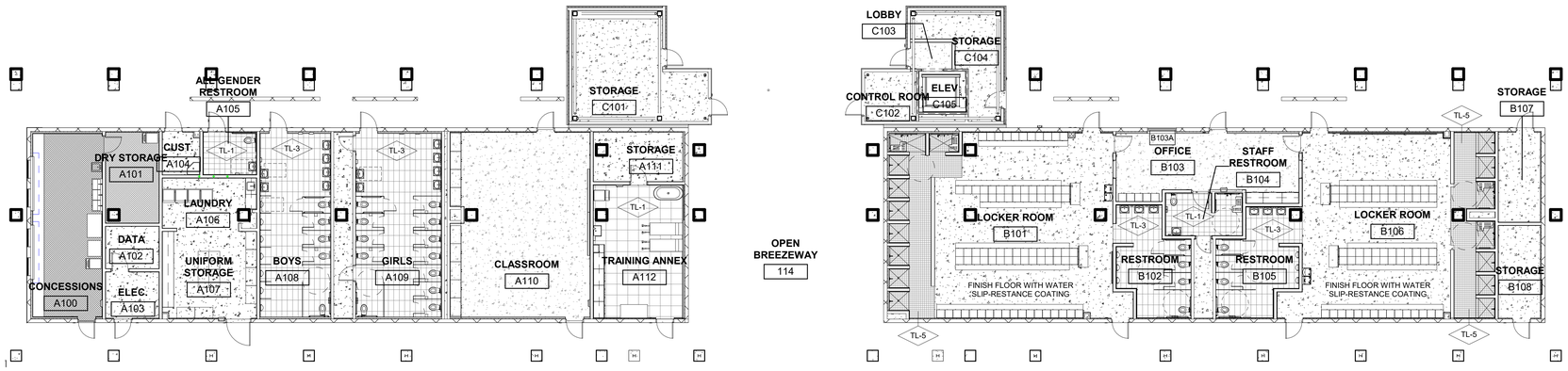
#	DESCRIPTION	DATE
1	ADDENDUM 01	08/18/2025

CONSTRUCTION DOCUMENTS

ROOF DETAILS

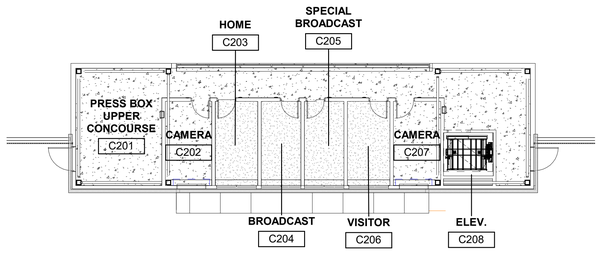
AX4.1

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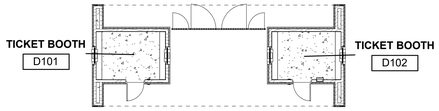


OPEN BREEZEWAY
114

1 BUILDING A, B, C - FIRST FLOOR FINISH PLAN
SCALE: 3/32" = 1'-0"



2 BUILDING C - SECOND FLOOR FINISH PLAN
SCALE: 3/32" = 1'-0"



3 BUILDING D - FIRST FLOOR FINISH PLAN
SCALE: 3/32" = 1'-0"

NUMBER	DESCRIPTION	FLOOR	BASE			WALLS								CEILING	REMARKS
						NORTH		EAST		SOUTH		WEST			
		MATERIAL	MATERIAL	FINISH	HEIGHT	MATERIAL	FINISH	MATERIAL	FINISH	MATERIAL	FINISH	MATERIAL	FINISH		
A100	CONCESSIONS	REFER TO SHEET AX8.0	EPF	FF	6"	FRP	FF	FRP	FF	FRP	FP	FRP	FF	REFER TO SHEET AA3.1	
A101	DRY STORAGE	REFER TO SHEET AX8.0	RTB	FF	4"	GB	ESP	GB	ESP	GB	ESP	GB	ESP	REFER TO SHEET AA3.1	
A102	DATA	REFER TO SHEET AX8.0	RTB	FF	4"	GB	ESP	GB	ESP	GB	ESP	GB	ESP	REFER TO SHEET AA3.1	
A103	ELEC.	REFER TO SHEET AX8.0	RTB	FF	4"	GB	ESP	GB	ESP	GB	ESP	GB	ESP	REFER TO SHEET AA3.1	
A104	CUST.	REFER TO SHEET AX8.0	RTB	FF	4"	GB	ESP	GB/FRP	ESP/FF	GB/FRP	ESP/FF	GB	ESP	REFER TO SHEET AA3.1	
A105	ALL GENDER RESTROOM	REFER TO SHEET AX8.0	TSP	FF	-	TL	FF	TL	FF	TL	FF	TL	FF	REFER TO SHEET AA3.1	SCHLUTER TRIM AT BASE PER 13/AX5.2
A106	LAUNDRY	REFER TO SHEET AX8.0	RTB	FF	4"	GB	GP	GB	GP	GB	GP	GB	GP	REFER TO SHEET AA3.1	
A107	UNIFORM STORAGE	REFER TO SHEET AX8.0	RTB	FF	4"	GB	ESP	GB	ESP	GB	ESP	GB	ESP	REFER TO SHEET AA3.1	
A108	BOYS	REFER TO SHEET AX8.0	TSP	FF	-	TL	FF	TL	FF	TL	FF	TL	FF	REFER TO SHEET AA3.1	SCHLUTER TRIM AT BASE AND WALL CORNER PER 12, 13/AX5.2
A109	GIRLS	REFER TO SHEET AX8.0	TSP	FF	-	TL	FF	TL	FF	TL	FF	TL	FF	REFER TO SHEET AA3.1	SCHLUTER TRIM AT BASE AND WALL CORNER PER 12, 13/AX5.2
A110	CLASSROOM	REFER TO SHEET AX8.0	RTB	FF	4"	GB	ESP	VTB-1	FF	GB	ESP	GB	ESP	REFER TO SHEET AA3.1	
A111	STORAGE	REFER TO SHEET AX8.0	RTB	FF	4"	GB	ESP	GB	ESP	GB	ESP	GB	ESP	REFER TO SHEET AA3.1	
A112	TRAINING ANNEX	REFER TO SHEET AX8.0	TL	FF	6"	GB	ESP	GB	ESP	GB	ESP	GB	ESP	REFER TO SHEET AA3.1	
B101	LOCKER ROOM	REFER TO SHEET AX8.0	RTB	FF	4"	GB	ESP	GB	ESP	GB	ESP	GB	ESP	REFER TO SHEET AB3.1	TL1 AT SHOWERS AND LOW WALL
B102	RESTROOM	REFER TO SHEET AX8.0	TSP	-	-	TL	FF	TL	FF	TL	FF	TL	FF	REFER TO SHEET AB3.1	SCHLUTER TRIM AT BASE AND WALL CORNER PER 12, 13/AX5.2
B103	OFFICE	REFER TO SHEET AX8.0	RTB	FF	4"	GB	ESP	GB	ESP	GB	ESP	GB	ESP	REFER TO SHEET AB3.1	
B104	STAFF RESTROOM	REFER TO SHEET AX8.0	TSP	FF	6"	TL	FF	TL	FF	TL	FF	TL	ESP	REFER TO SHEET AB3.1	SCHLUTER TRIM AT BASE AND WALL CORNER PER 12, 13/AX5.2
B105	RESTROOM	REFER TO SHEET AX8.0	TSP	-	-	TL	FF	TL	FF	TL	FF	TL	ESP	REFER TO SHEET AB3.1	SCHLUTER TRIM AT BASE AND WALL CORNER PER 12, 13/AX5.2
B106	LOCKER ROOM	REFER TO SHEET AX8.0	RTB	FF	4"	GB	ESP	GB	ESP	GB	ESP	GB	ESP	REFER TO SHEET AB3.1	TL1 AT SHOWERS AND LOW WALL
B107	STORAGE	REFER TO SHEET AX8.0	RTB	FF	4"	GB	ESP	GB	ESP	GB	ESP	GB	ESP	REFER TO SHEET AB3.1	
B108	STORAGE	REFER TO SHEET AX8.0	RTB	FF	4"	GB	ESP	GB	ESP	GB	ESP	GB	ESP	REFER TO SHEET AB3.1	
C101	STORAGE	REFER TO SHEET AX8.0	RTB	FF	4"	GB	ESP	GB	ESP	GB	ESP	GB	ESP	REFER TO SHEET AC3.1	
C102	CONTROL ROOM	REFER TO SHEET AX8.0	RTB	FF	4"	GB	ESP	GB	ESP	GB	ESP	GB	ESP	REFER TO SHEET AC3.1	
C103	LOBBY	REFER TO SHEET AX8.0	RTB	FF	4"	GB	ESP	GB	ESP	GB	ESP	GB	ESP	REFER TO SHEET AC3.1	
C104	STORAGE	REFER TO SHEET AX8.0	RTB	FF	4"	GB	ESP	GB	ESP	GB	ESP	GB	ESP	REFER TO SHEET AC3.1	
C105	ELEV	REFER TO SHEET AX8.0	RTB	FF	4"	PL	FF	PL	FF	PL	FF	PL	FF	REFER TO SHEET AC3.1	
C201	PRESS BOX UPPER CONCOURSE	REFER TO SHEET AX8.0	RTB	FF	6"	-	-	-	-	-	-	-	-	REFER TO SHEET AC3.1	
C202	CAMERA	REFER TO SHEET AX8.0	RTB	FF	6"	GB	ESP	GB	ESP	GB	ESP	GB	ESP	REFER TO SHEET AC3.1	
C203	HOME	REFER TO SHEET AX8.0	RTB	FF	6"	GB	ESP	GB	ESP	GB	ESP	GB	ESP	REFER TO SHEET AC3.1	
C204	BROADCAST	REFER TO SHEET AX8.0	RTB	FF	6"	GB	ESP	GB	ESP	GB	ESP	GB	ESP	REFER TO SHEET AC3.1	
C205	SPECIAL BROADCAST	REFER TO SHEET AX8.0	RTB	FF	6"	GB	ESP	GB	ESP	GB	ESP	GB	ESP	REFER TO SHEET AC3.1	
C206	VISITOR	REFER TO SHEET AX8.0	RTB	FF	6"	GB	ESP	GB	ESP	GB	ESP	GB	ESP	REFER TO SHEET AC3.1	
C207	CAMERA	REFER TO SHEET AX8.0	RTB	FF	6"	GB	ESP	GB	ESP	GB	ESP	GB	ESP	REFER TO SHEET AC3.1	
C208	ELEV	REFER TO SHEET AX8.0	RTB	FF	4"	PL	FF	PL	FF	PL	FF	PL	FF	REFER TO SHEET AC3.1	
D101	TICKET BOOTH	REFER TO SHEET AX8.0	RTB	FF	4"	GB	ESP	GB	ESP	GB	ESP	GB	ESP	REFER TO SHEET AD3.1	
D102	TICKET BOOTH	REFER TO SHEET AX8.0	RTB	FF	4"	GB	ESP	GB	ESP	GB	ESP	GB	ESP	REFER TO SHEET AD3.1	

COLOR SCHEDULE

MATERIAL	DESIGNATION	MANUFACTURER	SIZE	STYLE	COLOR	REMARKS
CONCRETE MASONRY UNIT	CMU-1	BASALITE		PRECISION	S-703	8
CONCRETE MASONRY UNIT	CMU-2	BASALITE		PRECISION	NATURAL	8
CONCRETE MASONRY UNIT	CMU-3	BASALITE		SPLIT FACE	NATURAL	8
EPOXY FLOOR	EPF-1	SHERWIN WILLIAMS		RESUFLOR DECO QUARTZ BC23	METEOR SHOWER	
FIBER REINFORCED PANEL	FRP-1	NUDO		FIBER-LITE LINER PANEL,SMOOTH	WHITE	
GROUT	GRT-1	CUSTOM			#644 SHADOW	
GROUT	GRT-2	CUSTOM			#543 DRIFTWOOD	
LVT (ELEVATOR)	LVT-1	SHAW CONTRACT	9"X48"	0927V, COVE	CASTER	
METAL PANEL	MP-3	AEP SPAN	12"	FLUSH PANEL	CUSTOM BLUE	
METAL PANEL	MP-4	AEP SPAN	16"	SELECT SEAM NARROW BATTEN	CUSTOM BLUE	
PAINT	P-1	BENJAMIN MOORE			OC-9 BALLET WHITE	
PAINT	P-2	SHERWIN WILLIAMS			SW 7017 DORIAN GRAY	
PAINT	P-3	BENJAMIN MOORE			HC-166 KENDALL CHARCOAL	
PARTITIONS	PRT-1	BOBRICK		SIERRA SERIES	SC04 - FOREST GREEN	
PLASTIC LAMINATE	PL-1	WILSONART		8208K-16	FAWN CYPRESS	2
PLASTIC LAMINATE	PL-2	WILSONART		5057K-18	PEARL ALLOY	2
RUBBER TOPSET BASE	RTB-1	ROPPE			123 CHARCOAL	
SEALED CONCRETE	SC-1					
THIN BRICK	TB-1	GLEN-GERY	7 5/8" X 2 1/4" X 1/2"	MODULAR THIN BRICK	STONE GREY KLAYCOAT	
THIN BRICK	TB-2	GLEN-GERY	7 5/8" X 2 1/4" X 1/2"	MODULAR THIN BRICK	BLUE SMOOTH IRONSPOT	
TILE	TL-1	CROSSVILLE	12"X12"	ARGENT	CLEAR SLATE	
TILE	TL-2	DALTILE	4"X12"	COLOR WHEEL LINEAR	MATTE BUISCUIT K775	
TILE	TL-3	CROSSVILLE	12"x24"	GOTHAM	CLOCK TOWER	
TILE	TL-4	CROSSVILLE	12"X36"	HIDE AND SLEEK	LAPIS	6
TILE	TL-5	CROSSVILLE	3"X3" MOSAIC	COLOR BLOX 2.0	LITTLE BOY BLUE	4
TILE	TL-6	CROSSVILLE	6"X12"	COLOR BLOX 2.0	LITTLE BOY BLUE	6
TILE	TL-7	CROSSVILLE	24"X24"	CIVILIZATION	CURRENCY	
TILE	TL-8	CROSSVILLE	6"X12"	CIVILIZATION	CURRENCY	
TILE	TL-9	CROSSVILLE	12"x24"	CIVILIZATION	CURRENCY	
TREX SIDING	TRX-1	TREX	.94" X 5.5"	TRANSCEND LINEAGE	ISLAND MIST	
VINYL TACKBOARD	VTB-1	WESTERN BUILDING CO. / DECOR MFG LLC			SNOWDRIFT	

FINISH SCHEDULE ABBREVIATIONS

AFF	ABOVE FINISH FLOOR
AL	ALUMINUM
ANOD	ANODIZED
CLN	CLEAN
CLR	CLEAR
CMU	CONCRETE MASONRY UNIT
CONC	CONCRETE
CPT	CARPET
CV	INTEGRAL COVE
DL	DUAL GLAZED
(E)	EXISTING
EPF	EPOXY FLOORING
ESP	EGGSHEEL PAINT
EXP	EXPOSED STRUCTURE
F	FIXED
FF	FACTORY FINISH
FRP	FIBER REINFORCED PANEL
GB	GYPSUM BOARD
GP	GLOSS PAINT
HM	HOLLOW METAL
LP	PLASTIC LAMINATE
OP	OPAQUE GLAZING (FILM)
P	PAINTED
PO	POLISHED
PL	PLASTIC LAMINATE
PLT	PLATE
PLY	PLYWOOD
PRT	TOILET PARTITION
RCP	REFLECTED CEILING PLAN
RTB	RUBBER TOPSET
S	SINGLE GLAZED
SC	SOLID CORE
SCF	STATIC CONTROL FLOORING
SGP	SEMI-GLOSS PAINT
SHGC	SOLAR HEAT GAIN COEFFICIENT
SL	SEALED
SO	SOLID SURFACE
STN	STAINED
T	TEMPERED
TL	TILE
TNT	TINTED
TSP	TRANSITION STRIP
U	U VALUE
VLT	VISUAL LIGHT TRANSMITTANCE
VT	VINYL TILE
VTB	VINYL TACK BOARD
VWC	VINYL WALL COVERING
WGB	WATER-RESISTANT GYPSUM BOARD

FINISH FLOOR PLAN LEGEND

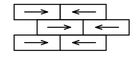
- HATCH INDICATES TILE — TL-1
- HATCH INDICATES TILE — TL-3
- HATCH INDICATES TILE — TL-5
- HATCH INDICATES CARPET — CPT-1
- HATCH INDICATES RUBBER FLOORING — EPF-1
- HATCH INDICATES EPOXY FLOORING
- HATCH INDICATES SEALED CONCRETE

GENERAL NOTES

1. FINISH SCHEDULES ARE TO BE COORDINATED WITH THE FINISH LEGEND.
2. REFER TO INTERIOR ELEVATIONS FOR LOCATIONS OF PAINTS, AND PLASTIC LAMINATES.
3. SEE REFLECTED CEILING PLANS FOR CEILING FINISHES
4. ALL HARD LID CEILINGS TO BE PAINTED WITH P-1, UNLESS OTHERWISE NOTED.
5. ALL EXPOSED STRUCTURE TO BE PAINTED WITH P-3, UNLESS OTHERWISE NOTED.
6. ALL GYPSUM BOARD WALLS TO BE PAINTED WITH P-1, UNLESS OTHERWISE NOTED.
7. ALL HOLLOW METAL DOORS TO BE PAINTED WITH P-4, UNLESS OTHERWISE NOTED.
8. ALL FLOORS IN PUBLIC AREA SHALL HAVE NON-SLIP SURFACE IN COMPLIANCE WITH DIVISION 18 OF HEALTH AND SAFETY CODES OF THE STATE OF CALIFORNIA.
9. INSTALL PROPER SCHLUTER STRIP AT FLOOR MATERIAL TRANSITIONS PER MANUFACTURER RECOMMENDATION.
10. ALL FINISHES SHALL COMPLY WITH MINIMUM FINISH CLASSIFICATION OF FLAME SPREAD AND SMOKE DEVELOPED REQUIREMENTS PER CBC 2022, 803.1.1 & 803.11
11. ALL EXPOSED/ SEALED/ POLISHED CONCRETE FLOORING SHALL BE PROTECTED FROM EQUIPMENT/ DAMAGE DURING CONSTRUCTION.
12. WALL FINISHES ARE TYPICAL AS INDICATED, INCLUDING BUT NOT LIMITED TO WING WALLS, ALCOVES, ETC. U.O.N.
13. ALL CASEWORK TO BE PLASTIC LAMINATE TYPE PL-1
    AND COUNTER TOPS TO BE PLASTIC LAMINATE TYPE PL-2

REMARKS

1. CARPET PATTERN SHALL BE: BRICK



2. RUN PLASTIC LAMINATE VERTICAL.
3. REFER TO RESTROOM ELEVATIONS FOR TILE ACCENT WALLS. SEE TILE PATTERN.
4. 3" X 3" MOSAIC TILE TO BE USED IN SHOWERS ONLY UNLESS OTHERWISE NOTED.
5. GROUT COLOR SHALL BE:
   CUSTOM BUILDING PRODUCTS
   COLOR GROUT
   #543 DRIFTWOOD
6. GROUT COLOR SHALL BE:
   CUSTOM BUILDING PRODUCTS
   PRISM SURE COLOR GROUT
   #19 PEWTER
7. GRAPHICS TO BE COORDINATED WITH ARCHITECT.
8. SEE EXTERIOR ELEVATIONS FOR PATTERN.

PBK

ARCHITECT PBK Architects, Inc.
FRESNO
7790 North Palm Avenue
Fresno, CA 93711
559-448-8400 P
559-448-8467 F
PBK.com

MADERA HIGH SCHOOL STADIUM

200 SOUTH "I" STREET
MADERA, CA 93637
CONSTRUCTION DOCUMENTS

MADERA UNIFIED SCHOOL DISTRICT

PROFESSIONAL SEAL

LICENSED ARCHITECT — MICHAEL R. SCHOEN — No. C-28295 — RENEWAL DATE 08.31.2027 — STATE OF CALIFORNIA

PROJECT NUMBER 20-51

DATE 08/12/2024

DSA APPLICATION NO. 02-122784

FILE NO. 20-H3

PTN NO. 65243-154

DRAWN BY Author

REVISIONS

#	DESCRIPTION	DATE
1	ADDENDUM 01	08/18/2025

CONSTRUCTION DOCUMENTS

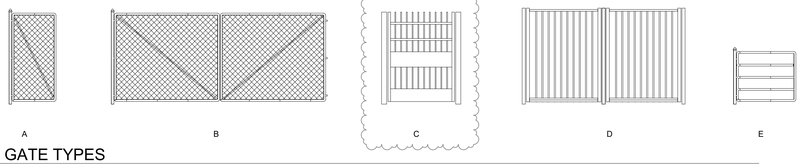
FINISH/COLOR SCHEDULE

AX8.0

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GATE SCHEDULE

GATE NO.	GATE TYPE	GATE SIZE WIDTH	GATE SIZE HEIGHT	GATE THICKNESS	GATE CONSTRUCTION	GATE FINISH	HARDWARE	REMARKS
G1	D	14' - 0"	6' - 0"	1 3/4"	WI	PT	G03	ORNAMENTAL
G2	D	14' - 0"	6' - 0"	1 3/4"	WI	PT	G03	ORNAMENTAL
G3	C	3' - 0"	6' - 0"	1 3/4"	WI	PT	G01	ORNAMENTAL
G4	C	4' - 6"	6' - 0"	1 3/4"	WI	PT	G01	ORNAMENTAL
G5	C	3' - 0"	6' - 0"	1 3/4"	WI	PT	G01	ORNAMENTAL
G6	E	4' - 0"	3' - 6"	1 3/4"	WI			
G7	I	20' - 0"	3' - 6"	0"	CL			
G8	E	4' - 0"	3' - 6"	1 3/4"	WI	GALV	G02	CHAIN LINK
G9	B	20' - 0"	6' - 0"		CL	GALV	G03	CHAIN LINK
G10	B	20' - 0"	6' - 0"		CL	GALV	G03	CHAIN LINK
G11	E	4' - 0"	3' - 6"	1 3/4"	WI	GALV	G02	CHAIN LINK
G12	E	4' - 0"	3' - 6"	1 3/4"	WI	GALV	G02	CHAIN LINK
G13	B	20' - 0"	6' - 0"		CL	GALV	G03	CHAIN LINK
G14	C	4' - 6"	6' - 0"	1 3/4"	WI	PT	G01	ORNAMENTAL
G15	E	4' - 0"	3' - 6"	1 3/4"	WI	GALV	G02	CHAIN LINK
G16	E	4' - 0"	3' - 6"	1 3/4"	WI	GALV	G02	CHAIN LINK
G17	A	4' - 0"	6' - 0"		CL	GALV	G03	CHAIN LINK
G18	A	4' - 0"	6' - 0"		CL	GALV	G03	CHAIN LINK
G19	A	4' - 0"	6' - 0"		CL	GALV	G03	CHAIN LINK
G20	A	4' - 0"	6' - 0"		CL	GALV	G03	CHAIN LINK
G21	E	4' - 0"	3' - 6"	1 3/4"	WI			
G22	J	14' - 0"	6' - 0"	1 3/4"	WI			
G23	J	14' - 0"	6' - 0"	1 3/4"	WI			
G24	U	8' - 0"	6' - 0"	1 3/4"	WI			



GATE TYPES

SCALE: 1/4" = 1'-0"

WINDOW SCHEDULE - BUILDING 'A'

WINDOW No.	Type	WINDOW DIMENSION WIDTH	WINDOW DIMENSION HEIGHT	GLAZING TYPE	GLAZING CLASS	GLAZING FINISH	FRAMES MATERIAL	FRAMES FINISH	FRAMES THICKNESS	FRAMES FIRE RATING	DETAILS HEAD	DETAILS JAMB	DETAILS SILL	REMARKS
A100A	A	3' - 4"	4' - 0"	DL	II	CLR	HM	SGP	2"	-	23 / AX3.1	24 & 25 / AX3.1	23 / AX3.1	
A100B	A	3' - 4"	4' - 0"	DL	II	CLR	HM	SGP	2"	-	23 / AX3.1	24 & 25 / AX3.1	23 / AX3.1	
A100C	A	3' - 4"	4' - 0"	DL	II	CLR	HM	SGP	2"	-	23 / AX3.1	24 & 25 / AX3.1	23 / AX3.1	
A100D	A	3' - 4"	4' - 0"	DL	II	CLR	HM	SGP	2"	-	23 / AX3.1	24 & 25 / AX3.1	23 / AX3.1	

WINDOW SCHEDULE - BUILDING 'B'

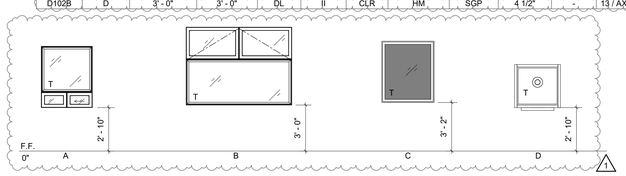
WINDOW No.	Type	WINDOW DIMENSION WIDTH	WINDOW DIMENSION HEIGHT	GLAZING TYPE	GLAZING CLASS	GLAZING FINISH	FRAMES MATERIAL	FRAMES FINISH	FRAMES THICKNESS	FRAMES FIRE RATING	DETAILS HEAD	DETAILS JAMB	DETAILS SILL	REMARKS
B103A	C	3' - 5"	4' - 0"	DL	II	CLR	HM	SGP	2"	-	23 / AX3.1	24 & 25 / AX3.1	23 / AX3.1	
B103B	C	3' - 5"	4' - 0"	S	II	CLR	HM	SGP	2"	-	20 / AX3.2	19 / AX3.2	17 / AX3.2	
B103C	C	3' - 5"	4' - 0"	S	II	CLR	HM	SGP	2"	-	20 / AX3.2	19 / AX3.2	17 / AX3.2	

WINDOW SCHEDULE - BUILDING 'C'

WINDOW No.	Type	WINDOW DIMENSION WIDTH	WINDOW DIMENSION HEIGHT	GLAZING TYPE	GLAZING CLASS	GLAZING FINISH	FRAMES MATERIAL	FRAMES FINISH	FRAMES THICKNESS	FRAMES FIRE RATING	DETAILS HEAD	DETAILS JAMB	DETAILS SILL	REMARKS
C203A	B	6' - 10 3/4"	5' - 1"	DL	II	CLR	AL	SGP	2"	-	14/AX3.2	13/AX3.2	14/AX3.2	
C204A	B	6' - 10 3/4"	5' - 1"	DL	II	CLR	AL	SGP	2"	-	14/AX3.2	13/AX3.2	14/AX3.2	
C205A	B	6' - 10 3/4"	5' - 1"	DL	II	CLR	AL	SGP	2"	-	14/AX3.2	13/AX3.2	14/AX3.2	
C206A	B	6' - 10 3/4"	5' - 1"	DL	II	CLR	AL	SGP	2"	-	14/AX3.2	13/AX3.2	14/AX3.2	

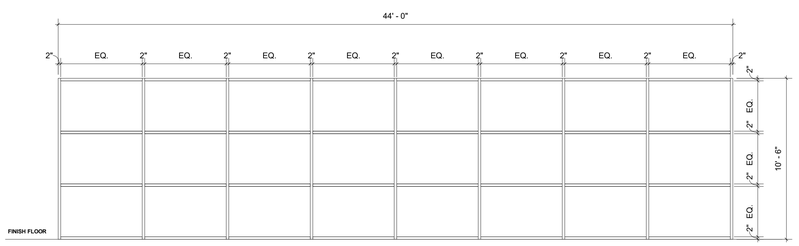
WINDOW SCHEDULE - BUILDING 'D'

WINDOW No.	Type	WINDOW DIMENSION WIDTH	WINDOW DIMENSION HEIGHT	GLAZING TYPE	GLAZING CLASS	GLAZING FINISH	FRAMES MATERIAL	FRAMES FINISH	FRAMES THICKNESS	FRAMES FIRE RATING	DETAILS HEAD	DETAILS JAMB	DETAILS SILL	REMARKS
D101A	D	3' - 0"	3' - 0"	DL	II	CLR	HM	SGP	4 1/2"	-	13 / AX3.1	13/ AX3.1 SIM	14 / AX3.1	
D101B	D	3' - 0"	3' - 0"	DL	II	CLR	HM	SGP	4 1/2"	-	13 / AX3.1	13/ AX3.1 SIM	14 / AX3.1	
D102A	D	3' - 0"	3' - 0"	DL	II	CLR	HM	SGP	4 1/2"	-	13 / AX3.1	13/ AX3.1 SIM	14 / AX3.1	
D102B	D	3' - 0"	3' - 0"	DL	II	CLR	HM	SGP	4 1/2"	-	13 / AX3.1	13/ AX3.1 SIM	14 / AX3.1	



WINDOW TYPES

SCALE: 1/4" = 1'-0"



STOREFRONT - BUILDING 'C'

SCALE: 1/4" = 1'-0"

DOOR SCHEDULE - BUILDING 'A'

DOOR NO.	DOOR TYPE	DOOR SIZE WIDTH	DOOR SIZE HEIGHT	DOOR THICKNESS	DOOR CONSTRUCTION	DOOR FINISH	FRAME CONSTRUCTION	FRAME FINISH	FIRE RATING	DETAILS (SEE SHEET AX3.1) HEAD	DETAILS (SEE SHEET AX3.1) JAMB	DETAILS (SEE SHEET AX3.1) THRESHOLD	HARDWARE	REMARKS
A100A	F	3' - 0"	7' - 2"	1 3/4"	HM	SGP	HM	SGP	-	6/AX3.1	7/AX3.1	8/AX3.1	02	
A100B	OH	10' - 0"	4' - 8"	3"	SS	SGP	HM	SGP		16/AX3.1	18/AX3.1		11	
A100C	OH	10' - 0"	4' - 8"	3"	SS	SGP	HM	SGP		16/AX3.1	18/AX3.1		11	
A101A	F	3' - 0"	7' - 0"	1 3/4"	SC	SGP	HM	SGP		4/AX3.1	4/AX3.1	8/AX3.1	10	
A102A	F	3' - 0"	7' - 0"	1 3/4"	SC	SGP	HM	SGP		4/AX3.1	4/AX3.1	8/AX3.1	10	
A103A	F	3' - 0"	7' - 2"	1 3/4"	SC	SGP	HM	SGP	45 MIN.	6/AX3.1	7/AX3.1	8/AX3.1	05	
A104A	F	3' - 0"	7' - 0"	1 3/4"	HM	SGP	HM	SGP	-	6/AX3.1	7/AX3.1	8/AX3.1	05	
A105A	F	3' - 0"	7' - 0"	1 3/4"	HM	SGP	HM	SGP	-	6/AX3.1	7/AX3.1	8/AX3.1	04	
A107A	F	4' - 4"	7' - 2"	1 3/4"	HM	SGP	HM	SGP	45 MIN.	6/AX3.1	7/AX3.1	8/AX3.1	06	
A108A	F	3' - 0"	7' - 2"	1 3/4"	HM	SGP	HM	SGP	-	6/AX3.1	7/AX3.1	8/AX3.1	03	
A109A	F	3' - 0"	7' - 2"	1 3/4"	HM	SGP	HM	SGP	-	6/AX3.1	7/AX3.1	8/AX3.1	03	
A109B	F	2' - 8"	7' - 0"	1 3/4"	SC	SGP	HM	SGP		4/AX3.1	4/AX3.1	8/AX3.1	10	
A109C	F	2' - 8"	7' - 0"	1 3/4"	SC	SGP	HM	SGP		4/AX3.1	4/AX3.1	8/AX3.1	10	
A110A	F	3' - 0"	7' - 2"	1 3/4"	HM	SGP	HM	SGP	-	6/AX3.1	7/AX3.1	8/AX3.1	01	
A110B	F	3' - 0"	7' - 0"	1 3/4"	HM	SGP	HM	SGP	-	6/AX3.1	7/AX3.1	8/AX3.1	01	
A111A	F	3' - 0"	7' - 0"	1 3/4"	SC	SGP	HM	SGP	-	4/AX3.1	4/AX3.1	8/AX3.1	10	
A112A	F	3' - 0"	7' - 0"	1 3/4"	HM	SGP	HM	SGP	-	6/AX3.1	7/AX3.1	8/AX3.1	02	

DOOR SCHEDULE - BUILDING 'B'

DOOR NO.	DOOR TYPE	DOOR SIZE WIDTH	DOOR SIZE HEIGHT	DOOR THICKNESS	DOOR CONSTRUCTION	DOOR FINISH	FRAME CONSTRUCTION	FRAME FINISH	FIRE RATING	DETAILS (SEE SHEET AX3.1) HEAD	DETAILS (SEE SHEET AX3.1) JAMB	DETAILS (SEE SHEET AX3.1) THRESHOLD	HARDWARE	REMARKS
B101A	F	3' - 0"	7' - 2"	1 3/4"	HM	SGP	HM	SGP	-	6/AX3.1	7/AX3.1	8/AX3.1	01	
B101B	F	3' - 0"	7' - 2"	1 3/4"	HM	SGP	HM	SGP	-	6/AX3.1	7/AX3.1	8/AX3.1	01	
B103A	F	3' - 0"	7' - 2"	1 3/4"	HM	SGP	HM	SGP	-	6/AX3.1	7/AX3.1	8/AX3.1	02	
B103B	F	3' - 0"	7' - 0"	1 3/4"	SC	SGP	HM	SGP		4/AX3.1	4/AX3.1	8/AX3.1	08	
B103C	F	3' - 0"	7' - 0"	1 3/4"	SC	SGP	HM	SGP		4/AX3.1	4/AX3.1	8/AX3.1	08	
B104A	F	3' - 0"	7' - 0"	1 3/4"	SC	SGP	HM	SGP		4/AX3.1	4/AX3.1	8/AX3.1	09	
B104B	F	2' - 8"	7' - 0"	1 3/4"	SC	SGP	HM	SGP		4/AX3.1	4/AX3.1	8/AX3.1	10	
B106A	F	3' - 0"	7' - 2"	1 3/4"	HM	SGP	HM	SGP	-	6/AX3.1	7/AX3.1	8/AX3.1	01	
B106B	F	3' - 0"	7' - 2"	1 3/4"	HM	SGP	HM	SGP	-	6/AX3.1	7/AX3.1	8/AX3.1	01	
B107A	F	3' - 0"	7' - 2"	1 3/4"	HM	SGP	HM	SGP	-	6/AX3.1	7/AX3.1	8/AX3.1	05	
B108A	F	3' - 0"	7' - 2"	1 3/4"	HM	SGP	HM	SGP	-	6/AX3.1	7/AX3.1	8/AX3.1	05	

DOOR SCHEDULE - BUILDING 'C'

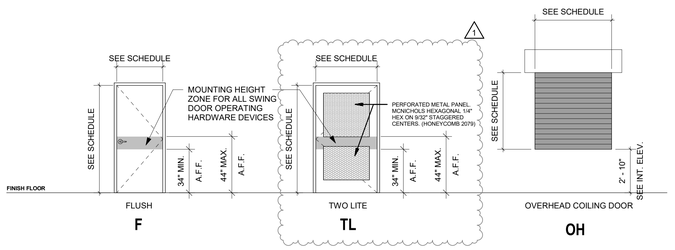
DOOR NO.	DOOR TYPE	DOOR SIZE WIDTH	DOOR SIZE HEIGHT	DOOR THICKNESS	DOOR CONSTRUCTION	DOOR FINISH	FRAME CONSTRUCTION	FRAME FINISH	FIRE RATING	DETAILS (SEE SHEET AX3.1) HEAD	DETAILS (SEE SHEET AX3.1) JAMB	DETAILS (SEE SHEET AX3.1) THRESHOLD	HARDWARE	REMARKS
C101A	F	3' - 0"	7' - 0"	1 3/4"	HM	SGP	HM	SGP		10/AX3.1	10/AX3.1	8/AX3.1	07	
C101B	F	3' - 0"	7' - 0"	1 3/4"	HM	SGP	HM	SGP		15/AX3.1	15/AX3.1	8/AX3.1	07	
C102A	F	3' - 0"	7' - 0"	1 3/4"	HM	SGP	HM	SGP	1 HR	10/AX3.1	10/AX3.1	8/AX3.1	05	
C103A	F	3' - 0"	7' - 0"	1 3/4"	HM	SGP	HM	SGP	1 HR	15/AX3.1	15/AX3.1	8/AX3.1	03	
C104A	F	3' - 0"	7' - 0"	1 3/4"	HM	SGP	HM	SGP		15/AX3.1	15/AX3.1	8/AX3.1	07	
C201A	TL	4' - 0"	7' - 0"	1 3/4"	HM	SGP	HM	SGP		15/AX3.1	15/AX3.1	8/AX3.1	07	PERFORATED METAL PANEL, PANIC HARDWARE
C201B	TL	4' - 0"	7' - 0"	1 3/4"	HM	SGP	HM	SGP		15/AX3.1	15/AX3.1	8/AX3.1	07	PERFORATED METAL PANEL, PANIC HARDWARE
C202A	F	3' - 0"	7' - 0"	1 3/4"	SC	SGP	HM	SGP		4/AX3.1	4/AX3.1	8/AX3.1	08	
C202B	OH	5' - 0"	5' - 0"	3"	SS	SGP	HM	SGP		20/AX3.1	19/AX3.1		11	
C203A	F	3' - 0"	7' - 0"	1 3/4"	SC	SGP	HM	SGP		4/AX3.1	4/AX3.1	8/AX3.1	08	
C204A	F	3' - 0"	7' - 0"	1 3/4"	SC	SGP	HM	SGP		4/AX3.1	4/AX3.1	8/AX3.1	08	
C205A	F	3' - 0"	7' - 0"	1 3/4"	SC	SGP	HM	SGP		4/AX3.1	4/AX3.1	8/AX3.1	08	
C206A	F	3' - 0"	7' - 0"	1 3/4"	SC	SGP	HM	SGP		4/AX3.1	4/AX3.1	8/AX3.1	08	
C207A	F	3' - 0"	7' - 0"	1 3/4"	SC	SGP	HM	SGP		4/AX3.1	4/AX3.1	8/AX3.1	08	
C207B	OH	5' - 0"	5' - 0"	3"	SS	SGP	HM	SGP		20/AX3.1	19/AX3.1		11	

DOOR SCHEDULE - BUILDING 'D'

DOOR NO.	DOOR TYPE	DOOR SIZE WIDTH	DOOR SIZE HEIGHT	DOOR THICKNESS	DOOR CONSTRUCTION	DOOR FINISH	FRAME CONSTRUCTION	FRAME FINISH	FIRE RATING	DETAILS (SEE SHEET AX3.1) HEAD	DETAILS (SEE SHEET AX3.1) JAMB	DETAILS (SEE SHEET AX3.1) THRESHOLD	HARDWARE	REMARKS
D101A	F	3' - 0"	7' - 0"	1 3/4"	HM	SGP	HM	SGP		11/AX3.1	12/AX3.1	8/AX3.1	05	
D102A	F	3' - 0"	7' - 0"	1 3/4"	HM	SGP	HM	SGP		11/AX3.1	12/AX3.1	8/AX3.1	05	

DOOR SCHEDULE - VISITOR BLEACHERS

DOOR NO.	DOOR TYPE	DOOR SIZE WIDTH	DOOR SIZE HEIGHT	DOOR THICKNESS	DOOR CONSTRUCTION	DOOR FINISH	FRAME CONSTRUCTION	FRAME FINISH	FIRE RATING	DETAILS (SEE SHEET AX3.1) HEAD	DETAILS (SEE SHEET AX3.1) JAMB	DETAILS (SEE SHEET AX3.1) THRESHOLD	HARDWARE	REMARKS
VB001	F	8' - 0"	7' - 0"	1 3/4"	HM	SGP	HM	SGP	-	6/AX3.1	7/AX3.1	8/AX3.1	05	
VB002	F	8' - 0"	7' - 0"	1 3/4"	HM	SGP	HM	SGP	-	6/AX3.1	7/AX3.1	8/AX3.1	05	
VB003	F	8' - 0"	7' - 0"	1 3/4"	HM	SGP	HM	SGP	-	6/AX3.1	7/AX3.1	8/AX3.1	05	
VB004	F	8' - 0"	7' - 0"	1 3/4"	HM	SGP	HM	SGP	-	6/AX3.1	7/AX3.1	8/AX3.1	05	



DOOR TYPES

SCALE: 1/4" = 1'-0"

DOOR SCHEDULE ABBREVIATIONS

AFF	ABOVE FINISH FLOOR
AL	ALUMINUM
ANOD	ANODIZED
CLN	CLEAN
CLR	CLEAR
CMU	CONCRETE MASONRY UNIT
CONC	CONCRETE
CPT	CARPET
CV	INTEGRAL COVE
DI	DUAL GLAZED
(E)	EXISTING
EPF	EPOXY FLOORING
ESP	EGGSHEEL PAINT
EXP	EXPOSED STRUCTURE
F	FIXED
FF	FACTORY FINISH
FRP	FIBER REINFORCED PANEL
GB	GYPSUM BOARD
GP	GLOSS PAINT
HM	HOLLOW METAL
LP	PLASTIC LAMINATE
OP	OPAQUE GLAZING (FILM)
P	PAINTED
PO	POLISHED
PL	PLASTIC LAMINATE
PLT	PLATE
PLY	PLYWOOD
PRT	TOILET PARTITION
RCP	REFLECTED CEILING PLAN
RTB	RUBBER TOPSET
S	SINGLE GLAZED
SC	SOLID CORE
SCF	STATIC CONTROL FLOORING
SGP	SEMI-GLOSS PAINT
SHGC	SOLAR HEAT GAIN COEFFICIENT
SL	SEALED
SO	SOLID SURFACE
STN	STAINED
T	TEMPERED
TL	TILE
TNT	TINTED
TSP	TRANSITION STRIP
U	U VALUE
VLT	VISUAL LIGHT TRANSMITTANCE
VT	VINYL TILE
VTB	VINYL TACK BOARD
VWC	VINYL WALL COVERING
WGB	WATER-RESISTANT GYPSUM BOARD

DOOR NOTES

DOOR NOTES

DOOR OPEWING FORCE:
THE FORCE FOR PUSHING OR PULLING OPEN A DOOR OR GATE OTHER THAN FIRE DOORS SHALL BE AS FOLLOWS:
1. INTERIOR HINGED DOORS AND GATES: 5 POUNDS MAXIMUM
2. SLIDING OR FOLDING DOORS: 5 POUNDS MAXIMUM
3. REQUIRED FIRE DOORS: THE MINIMUM OPENING FORCE ALLOWABLE BY THE APPROPRIATE ADMINISTRATIVE AUTHORITY, NOT TO EXCEED 15 POUNDS
4. EXTERIOR HINGED DOORS: 5 POUNDS MAXIMUM

FLOOR ELEVATION:
THERE SHALL BE A FLOOR OR LANDING ON EACH SIDE OF A DOOR. SUCH FLOOR OR LANDING SHALL BE AT THE SAME ELEVATION ON EACH SIDE OF THE DOOR. LANDINGS SHALL BE LEVEL EXCEPT FOR EXTERIOR LANDINGS, WHICH ARE PERMITTED TO HAVE A SLOPE NOT TO EXCEED 2 PERCENT MAX. IN ANY DIRECTION.

THRESHOLDS:
THRESHOLDS AT DOORWAYS SHALL NOT EXCEED 1/2" IN HEIGHT. RAISED THRESHOLDS AND FLOOR LEVEL CHANGES GREATER THAN 1/4" AT DOORWAYS SHALL BE BEVELED WITH A SLOPE NOT GREATER THAN ONE UNIT VERTICAL IN TWO UNITS HORIZONTAL.

DOOR OPERATIONS:
DOORS SHALL BE READILY OPENABLE FROM THE EGRESS SIDE WITHOUT THE USE OF A KEY OR SPECIAL KNOWLEDGE OR EFFORT.

HARDWARE:
DOOR HANDLES, PULLS, LATCHES, LOCKS AND OTHER OPERATING DEVICES ON DOORS REQUIRED TO BE ACCESSIBLE SHALL NOT REQUIRE TIGHT GRASPING, TIGHT PINCHING OR TWISTING OF THE WRIST TO OPERATE.

HARDWARE HEIGHT:
DOOR HANDLES, PULLS, LATCHES, LOCKS AND OTHER OPERATING DEVICES SHALL BE INSTALLED 34 INCHES MINIMUM/ 44 INCHES MAXIMUM ABOVE FINISHED FLOOR.

BOLT LOCKS:
MANUALLY OPERATED FLUSH BOLTS OR SURFACE BOLTS ARE NOT PERMITTED.

UNLATCHING:
THE UNLATCHING OF ANY DOOR OR LEAF SHALL NOT REQUIRE MORE THAN ONE OPERATION.

PANIC AND FIRE EXIT HARDWARE:
DOORS SERVING ROOMS OR SPACES WITH AN OCCUPANT LOAD OF 50 OR MORE IN A GROUP A OCCUPANCY, ASSEMBLY AREA NOT CLASSIFIED AS AN ASSEMBLY OCCUPANCY, OR E OCCUPANCIES SHALL NOT BE PROVIDED WITH A LATCH OR LOCK UNLESS IT IS PANIC HARDWARE OR FIRE EXIT HARDWARE.

INSTALLATION:
WHERE PANIC OR FIRE EXIT HARDWARE IS INSTALLED, IT SHALL COMPLY WITH THE FOLLOWING:
1. PANIC HARDWARE SHALL BE LISTED IN ACCORDANCE WITH UL 305;
2. FIRE EXIT HARDWARE SHALL BE LISTED IN ACCORDANCE WITH UL 10C AND UL 305;
3. THE ACTUATING PORTION OF THE RELEASING DEVICE SHALL EXTEND AT LEAST ONE-HALF OF THE DOOR LEAF WIDTH; AND THE MAXIMUM UNLATCHING FORCE SHALL NOT EXCEED 15 POUNDS.

ACCESSIBLE WATER CLOSET COMPARTMENT DOORS:
THE INSIDE AND OUTSIDE OF THE COMPARTMENT DOOR SHALL BE EQUIPPED WITH A LOOP OR U-SHAPED HANDLE IMMEDIATELY BELOW THE LATCH. THE LATCH SHALL BE FLIP-OVER STYLE, SLIDING OR OTHER HARDWARE NOT REQUIRING THE USER TO GRASP OR TWIST.

GENERAL DOOR SIGNAGE NOTES:
1. EXIT DOORS SHALL BE CLEARLY MARKED w/ "EXIT" MIN. 6" HIGH LETTERS.
2. POST A SIGN THAT READS "THIS DOOR TO REMAIN UNLOCKED DURING BUSINESS HOURS" USE LETTERS 1" HIGH ON CONTRASTING BACKGROUND ABOVE MAIN ENTRY DOOR.
3. INSTALL 6" MIN. SQUARE INTERNATIONAL SYMBOL OF ACCESSIBILITY (I.S.A.) LOGO NOTING WHEEL CHAIR ACCESS ON OR NEAR ALL ENTRANCE DOORS. SEE DET. 1/D2

GENERAL DOOR NOTES:
1. WEATHER STRIP ALL EXTERIOR DOORS AND OPENINGS.
2. THE BOTTOM 10" OF ALL DOORS (EXCEPT AUTOMATIC AND SLIDING) SHALL HAVE A SMOOTH UNINTERRUPTED SURFACE.
3. ALL DOORS & FRAMES (INCLUDING DOOR EDGING) ON EXTERIOR SIDE SHALL BE PAINTED.
4. EXIT DOORS USED AS PAIRS WITH APPROVED AUTOMATIC FLUSH BOLTS SHALL NOT HAVE DOOR KNOBS OR SURFACE MOUNTED HARDWARE ON THE INACTIVE LEAF.
5. ALL EXTERIOR DOOR LANDINGS GRADE HAVE A SMOOTH TRANSITION TO ADJACENT PAVED SURFACE.
6. ALL DOORS TO CLASSROOMS, AND ANY ROOM WITH AN OCCUPANT LOAD OF FIVE OR MORE PERSONS, SHALL BE EQUIPPED WITH AB211 COMPLIANT HARDWARE.8. LOCKABLE FROM THE INSIDE PER CBC 1010.2.2
7. PROVIDE LEVEL LANDINGS FOR EXTERIOR MAIN DOORS w/ NO MORE THAN 1/4" DROP AT THE THRESHOLD.
8. ALL EXTERIOR DOOR LANDINGS GRADE HAVE A SMOOTH TRANSITION TO ADJACENT PAVED SURFACE.
9. MAXIMUM MOUNTING HEIGHT OF DOOR OPERATORS 34" - 44" A.F.F.
10. DOOR AND GATE CLOSERS SHALL BE ADJUSTED SO THAT FROM AN OPEN POSITION OF 90 DEGREES, THE TIME REQUIRED TO MOVE THE DOOR TO A POSITION OF 12 DEGREES FROM THE LATCH IS 5 SECONDS MINIMUM.
11. DOOR AND GATE SPRING HINGES SHALL BE ADJUSTED SO THAT FROM THE OPEN POSITION OF 70 DEGREES, THE DOOR OR GATE SHALL MOVE TO THE CLOSED POSITION IN 1.5 SECONDS MINIMUM.

WINDOW NOTES

1. FIELD VERIFY ALL ROUGH OPENING DIM'S. PRIOR TO FABRICATIONG WINDOWS.
2. ALL INTERIOR GLAZING SHALL BE A SINGLE LAYER OF CLEAR, FULLY TEMPERED FLOAT GLASS.
3. DUAL GLAZING TO ACHIEVE THE FOLLOWING CRITERIA (REFER TO SPECIFICATION FOR ADDITIONAL INFORMATION):
   VLT: 54%
   U: .33
   SHGC: .28
4. ***PRIOR TO GLASS AND GLASS STOP INSTALATION, VERIFY WITH ARCHITECT ON WHICH SIDE THE GLASS WILL BE PLACED ON THE HOLLOW METAL FRAME.***
5. ANY WINDOW THAT MEETS ANY OF THE FOLLOWING CATAGORIES SHALL BE SAFETY GLAZING PER 2022 CBC 2406
   A. WITHIN 24" OF A DOOR
   B. 18" OR LESS ABOVE THE GROUND
6. SEE DETAIL 13 / AX3.1 FOR WINDOW FLASHING INSTALLATION
7. SEE DETAIL 2 / AX3.1 FOR HOLLOW METAL FRAME ANCHORAGE

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MADERA HIGH SCHOOL STADIUM
200 SOUTH "I" STREET
MADERA, CA 93637
CONSTRUCTION DOCUMENTS

MADERA UNIFIED SCHOOL DISTRICT

PROFESSIONAL SEAL

LICENSED ARCHITECT
MICHAEL R. SCHOEN
No. C-28295
RENEWAL DATE
FEB 28, 2007
STATE OF CALIFORNIA

PROJECT NUMBER 20-51
DATE 08/12/2024
DSA APPLICATION NO. 02-122784
FILE NO. 20-H3
PTN NO. 65243-154
DRAWN BY Author

REVISIONS

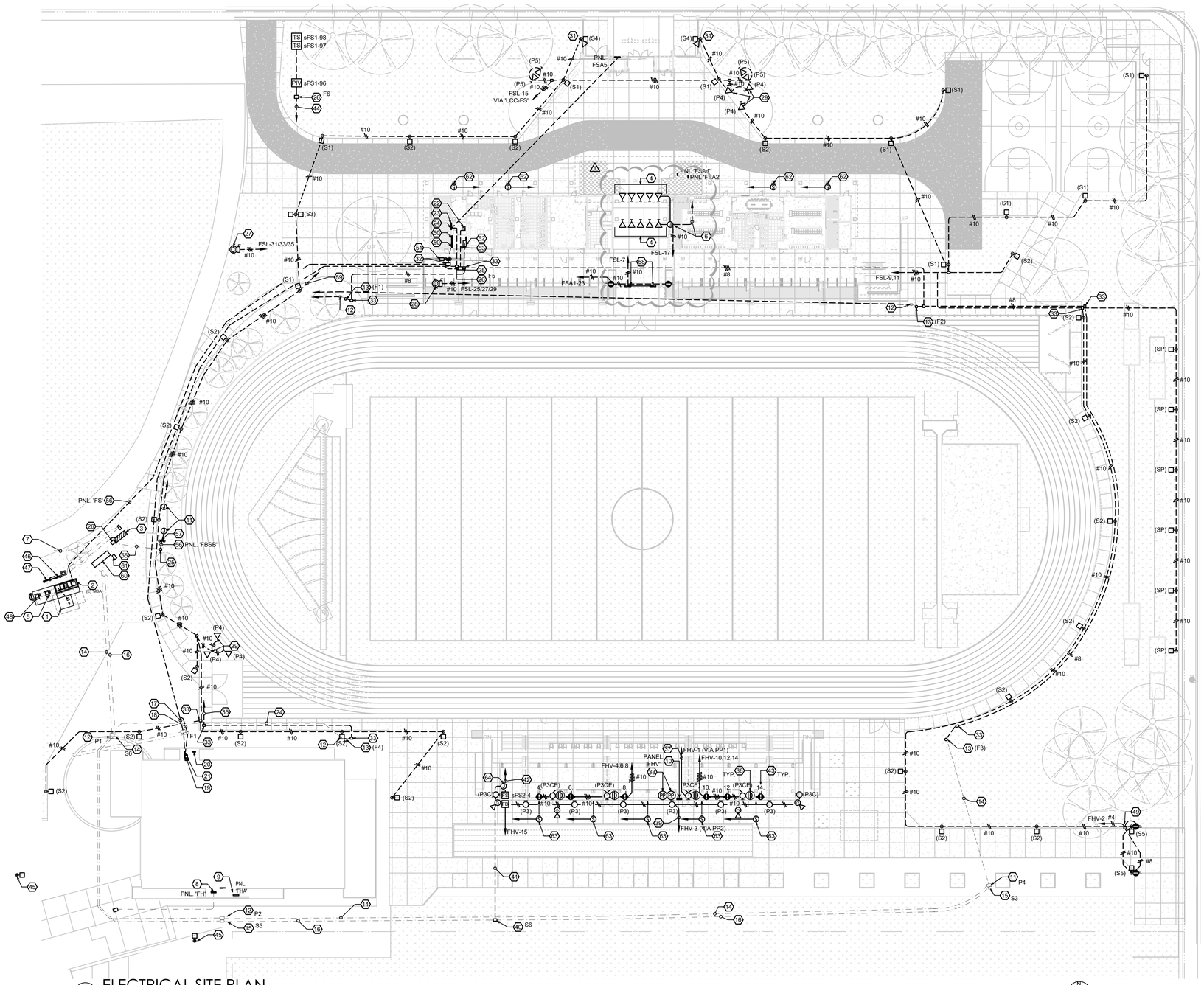
#	DESCRIPTION	DATE
1	ADDENDUM 01	08/18/2025

CONSTRUCTION DOCUMENTS

DOOR & WINDOW SCHEDULE

AX8.1

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KEYNOTES

1. (E) PAD MOUNTED P.G.&E. TRANSFORMER. DSA #02-121624.
2. (E) PAD MOUNTED MAIN SWITCHBOARD 'MSA'. 2000A BUS/1600A MAIN, 277/480V, 3Ø, 4W, 65kA SCCR FULLY RATED, NEMA 3R, SOLID NEUTRAL. DSA #02-121624.
3. (E) PAD MOUNTED MAIN SWITCHBOARD 'MSB'. DSA #02-108565.
4. (5) FIXTURE TYPE 'P6' MOUNTED TO BLEACHER BEAM OVER ENTRANCE. MOUNT PER DETAIL A10/EX1.1. ROUTE POWER CONDUIT U.G. TO PANEL 'FSL' AND DMX CONTROL CONDUIT TO BUILDING 'C'. SEE SHEET EC3.1 FOR ADDITIONAL INFORMATION.
5. (E) BATTERY ENERGY STORAGE SYSTEM, BESS01. DSA #02-121624.
6. PROVIDE DMX JUNCTION BOX TO COMBINE POWER AND DMX CONTROL WIRING INTO SINGLE FIXTURE CABLE. PROVIDE (3) JUNCTION BOXES TO WIRE EACH FIXTURE TO IT'S OWN CABLE ASSEMBLY. ACUITY #254PW3 DPI4W HYD. CONNECT JUNCTION BOX TO DMX CONTROLLER IS BROADCAST BOOTH IN BUILDING 'C', SECOND FLOOR.
7. APPROXIMATE LOCATION OF EXISTING UNDERGROUND PATHWAY FOR EXISTING SOLAR SYSTEM LOCATED AT PARKING LOT ON COYOTE LANE. EXERCISE CAUTION WHEN DIGGING IN THIS AREA AND LOCATE CONDUITS PRIOR TO EXCAVATING. OTHER UNDERGROUND PATHWAYS FOR SPORTS LIGHTING, LANDSCAPING, ETC. MAY BE PRESENT IN THIS AREA. DSA #02-119152.
8. (E) PANEL 'FH'. DSA #02-121624.
9. (E) PANEL 'FHA'. DSA #02-121624.
10. NEW MINI POWER ZONE 'FHV'. 10KVA, 120/240V, 1Ø, 3W, 10KA SCCR, NEMA 3R MOUNTED TO BLOCK WALL. SEE DETAIL D15/EX2.4.
11. CONNECT NEW SCOREBOARD. SEE DETAIL D5/EX2.4. PROVIDE 2"C TO PRESS BOX BROADCAST ROOM . SUPPLY NEW 8 CONDUCTOR 50 MICRON MULTIMODE FIBER OPTIC CABLE WITH TERMINATIONS PER SCOREBOARD MANUFACTURER'S SPECIFICATIONS FROM THE NEW SCOREBOARD TO PRESS BOX WITH SUFFICIENT LENGTH TO REACH TERMINATION POINT AT FIBER OPTIC CONVERTERS AT SCOREBOARD AND PRESS BOX PLUS 6' OF SERVICE LOOP AT EACH END. SERVICE LOOP MAY BE INSTALLED IN CLOSEST PULL BOX. COORDINATE POWER CONNECTIONS WITH SCOREBOARD SUPPLIER.
1.25"C. PANEL 'FBSB'
NEVCO MODEL #3685-IC, 120V, 8.6A, 2#10
(28) 10MM DISPLAY MODULES, 208V, 2.9A EA, 16#10
F/O CONVERTER, 120V, 0.1A, 2#10
1#10 GRD.
SEE DETAIL D5/EX2.4. PROVIDE AND INTALL J-BOX PER DETAIL L18/EX2.5.
12. (E) SPORTS LIGHTING PULL BOX TO REMAIN. DSA #02-108565.
13. (E) SPORTS LIGHTING POLE TO REMAIN. INSTALL NEW FIXTURES AND AIM PER MANUFACTURER'S INSTALLATION INSTRUCTIONS. FIXTURE POLE DESIGNATIONS COORDINATE TO MUSCO DRAWINGS. PROVIDE ALL NEW WIRING BACK TO SOURCE. RECONNECT CONDUIT AS REQUIRED AND PROVIDE NEW CONDUCTORS (1-1/2"C. 3#6. 1#6 CU GRD. FOR MAIN LIGHTS TO 'MSB' FOR COMPLETE AND OPERABLE SYSTEM. PROVIDE 1"C. 2#8, 1#8 CU GRD. TO 'INV-SL' IN NEW BUILDING FOR BLEACHER EGRESS FIXTURE. PROVIDE NEW 1" CONTROL CONDUIT TO BROADCAST ROOM IN PRESS BOX. PROVIDE #2/0 LIGHTNING PROTECTION GROUNDING CONDUCTOR DOWN POLE AND CONNECT TO 3/4" X 10' COPPER CLAD GROUND ROD ADJACENT TO BASE OF LIGHT POLE. BOND TO EGC AT POLE BASE PER MUSCO INSTALLATION INSTRUCTUION. DSA #02-108565.
14. (E) SPORTS LIGHTING CONDUITS TO REMAIN. SEE SINGLE LINE DIAGRAM FOR CONDUIT AND CONDUCTOR INFORMATION. DSA #02-108565.
15. (E) SOUND SYSTEM PULL BOX TO REMAIN. DSA #02-108565.
16. (E) SOUND SYSTEM CONDUIT TO REMAIN. RECONNECT AS REQUIRED. PROVIDE NEW SOUND SYSTEM CONDUCTORS AS SHOWN ON RISER. DSA #02-108565.
17. PROVIDE (2)3"C. PROVIDE (1) MAXCELL MXED64283 (3", 3-CELL, DETECTABLE) INNERDUCT IN EACH CONDUIT. INSTALL MAXCELL STRICTLY PER MANUFACTURER'S INSTALLATION INSTRUCTIONS. PROVIDE (1) 12-STR SM FIBER OPTIC CABLE, (1) 25-PAIR CAT3 OSP CABLE TO 'IDF-FS' VIA 'STC'FS'. SEE DETAIL L9/EX2.3.
18. PROVIDE 2"C (1)FA06W. FOR FIRE ALARM TO 'FACP-FS'. SEE DETAIL L9/EX2.3
19. (E) 'IDF-F'. DSA #02-121624.
20. (E) 'FACP-F'. DSA #02-121624.
21. (E) SIGNAL TERMINAL CABINET 'STC-F'. DSA #02-121624.
22. (N) 'IDF-FS'.
23. (N) 'FACP-FS'
24. (N) SIGNAL TERMINAL CABINET 'STC-FS'.
25. PROVIDE B1730BOX (BOX), B1730-12 (EXTENSION) AND B1730-51JH LID MARKED "COMMUNICATION" AND INTERCEPTION POINT. INSTALL BOX PER DETAIL L13/EX2.3. ORIENT PULL BOX WITH ANY ADJACENT CONCRETE, EDGES, JOINTS, ETC.
26. PROVIDE B1017BOX (BOX), B1017-12 (EXTENSION) & B1017-51JH (LID). MARK LID "FIRE ALARM". INSTALL PER DETAIL L13/EX2.3. ORIENT PULL BOX WITH ANY ADJACENT CONCRETE, EDGES, JOINTS, ETC.
27. CONNECT NEW IRRIGATION BOOSTER PUMP. 5HP, 480V, 3Ø. 1"C. 3#10, 1#10 GRD. COORDINATE WITH IRRIGATION PLANS FOR EXACT LOCATION AND IRRIGATION CONTRACTOR.
28. CONNECT NEW DOMESTIC DUPLEX BOOSTER PUMP. 2X2HP, 480V, 3Ø. 1"C. 3#10, 1#10 GRD. COORDINATE WITH PLUMBING CONTRACTOR.
29. PROVIDE NEW FLAGPOLE LIGHTS. COORDINATE WITH FLAGPOLE SUPPLIER.
30. PROVIDE NEW LANDSCAPE TREE UPLIGHTS. COORDINATE WITH LANDSCAPE.
31. AIM POLE TOP FLOOD LIGHT TO ILLUMINATE THE UPPER SIGN PORTION OF THE TICKET BOOTH BUILDING. THE FIXTURE SHALL BE AIMED SO AS TO AVOID GLARE AND BLINDING OF PEOPLE IN AND AROUND THE TICKET BOOTH BUILDING.
32. PROVIDE B2436BOX (BOX), B2436-12 (EXTENSION) & B2436-51JH (LID). MARK LID "ELECTRICAL". INSTALL PER DETAIL L13/EX2.3. ORIENT PULL BOX WITH ANY ADJACENT CONCRETE, EDGES, JOINTS, ETC.
33. PROVIDE B1017BOX (BOX), B1017-12 (EXTENSION) & B1017-51JH (LID). MARK LID "LIGHTING". INSTALL PER DETAIL L13/EX2.3. ORIENT PULL BOX WITH ANY ADJACENT CONCRETE, EDGES, JOINTS, ETC.
34. PROVIDE 1-1/4"C. 4#8, 1#8 GRD. FOR SPORTS POLE BLEACHER EGRESS LIGHTING. SEE DETAIL L9/EX2.3.
35. PROVIDE 1"C. 2#8, 1#8 GRD. FOR SPORTS POLE BLEACHER EGRESS LIGHTING. CONNECT TO DESIGNATED EGRESS LIGHTING FIXTURE AT POLE TOP PER MUSCO DRAWINGS. CONNECT TO CIRCUIT FSL-41, VIA EMERGENCY INVERTER 'INV-SL' AND MUSCO 'ALIC' PANEL IN ELECTRICAL ROOM. SEE DETAIL L9/EX2.3.
36. PROVIDE DIGITAL DIMMING SWITCH UNDER BLEACHERS AT ACCESS DOOR FOR CONTROL OF UNDER BLEACHER LIGHTING. SWITCH SHALL BE NLIGHT #nPODM DX WH LT. PROVIDE WEATHER PROOF BOX WITH CLEAR WEATHERPROOF WHILE-IN-USE COVER TAYMAC MM420C OR EQUAL. PROGRAM CONTROLS FOR MANUAL ON/OFF AND SWEEP OFF PER OWNER.
37. ROUTE CIRCUIT VIA POWERPACK #2. SEE KEYNOTE 36 ABOVE.
38. (2) DIMMING POWERPACK. nLIGHT #nPP16 D EFP LT. ONE POWERPACK SHALL BE FOR THE UNDERBLEACHER LIGHTS AND THE SECOND SHALL BE FOR THE LIGHTS ON THE 'EXTERIOR' OF THE UNDERBLEACHER SOUNDWALL. INSTALL POWERPACKS IN WEATHER PROOF ENCLOSURE. CONNECT POWERPACK TO LIGHTING CONTROL CABINET IN FIELDHOUSE. PROVIDE 1"C. (1) CAT5 OUTSIDE PLANT RATED.
39. ROUTE CIRCUIT VIA POWERPACK #1. PROGRAM FOR TIME CLOCK CONTROL TO OPERATE ON THE SAME SCHEDULE AS OTHER EXTERIOR LIGHTING.
40. PROVIDE B1017BOX (BOX), B1017-12 (EXTENSION) & B1017-51JH (LID). MARK LID "ELECTRICAL". INSTALL PER DETAIL L13/EX2.3. ORIENT PULL BOX WITH ANY ADJACENT CONCRETE, EDGES, JOINTS, ETC.
41. PROVIDE 1-1/2"C. FOR STADIUM AUDIO CONDUCTORS.
42. 1"C. (1)DW TO 'FATC-F' VIA F1 PULL BOX. CONNECT TO FLOW FOR UNDERBLEACHER SPRINKLERS.
43. INSTALL RECEPTACLES UNDER BLEACHERS AT +42" A.F.F., TYP.
44. 1"C. (3)DW TO 'FATC-FS' VIA F5 PULL BOX. CONNECT TO FLOW AND TAMPER SWITCHES FOR STADIUM FIRE SERVICE.
45. (E) SITE LIGHTING FIXTURE TO REMAIN. DSA #02-119114.
46. (E) PANEL 'ESSL'. SEE PANEL SCHEDULE, SHEET EX2.2. DSA #02-121624.
47. (E) PANEL 'ESS'. SEE PANEL SCHEDULE, SHEET EX2.2. DSA #02-121624.
48. (N) BATTERY ENERGY STORAGE SYSTEM, BESS-2. SEE SINGLE LINE DIAGRAM, G15/EX2.1 AND SHEET EX2.8. INSTALL ON EXISTING HOUSEKEEPING PAD INSTALLED UNDER APPLICATION #02-121624 PER DETAILS A18/EX2.8. MAINTAIN ALL REQUIRED CLEARANCES AROUND SYSTEM PER MANUFACTURER'S INSTALLATION INSTRUCTIONS. PROVIDE THE FOLLOWING RENEWABLES LABELS: 15, 16, 17, 18 & 19. SEE SHEETS EX2.9. SYSTEM CONSISTS OF ONE 60KW INVERTER WITH PCS AND ONE 60KWH BATTERY CABINET CONTAINING THE BATTERY STORAGE MODULES. PAD SHALL HAVE A MINIMUM OF 2'-0" SPACE FROM THE MOUNTING FASTENERS TO THE EDGE PER MANUFACTURER'S INSTALLATION INSTRUCTIONS. THE WORKING AREA OF THE EQUIPMENT PAD SHALL EXTEND TO PROVIDE AN UNOBSTRUCTED SPACE 42" DEEP.
49. PROVIDE B1017BOX (BOX), B1017-12 (EXTENSION) & B1017-51JH (LID). MARK LID "ELECTRICAL" NEAR BASE OF POLE FOR RECEPTACLE POWER INTO AND OUT OF POLE BASE. MAKE SPLICE IN POLE, OR PROVIDE WATERPROOF SPLICE IN PULL BOX. INSTALL PER DETAIL L13/EX2.3. ORIENT PULL BOX WITH ANY ADJACENT CONCRETE, EDGES, JOINTS, ETC.
50. (N) PANEL 'FS'. SEE SINGLE LINE DIAGRAM, SHEET EX2.1 & SCHEDULE , SHEET EX2.2.
51. (N) TRANSFORMER 'TFSA'. SEE SINGLE LINE DIAGRAM, SHEET EX2.1.
52. (N) INVERTER 'INV-SL'. MOUNT PER DETAIL F5/EX1.2.
53. (N) MUSCO 'ALIC' PANEL. MOUNT PER DETAIL K15/EX1.2.
54. (E) TRANSFORMER 'TE' TO REMAIN. 480-120/208V, 3PH, 4W, NEMA 3R. SQUARE D #112T3H. DSA #02-108565.
55. (E) (2)4" CONDUITS. PROVIDE NEW CONDUCTORS IN EXISTING CONDUIT PER SINGLE LINE DIAGRAM, SHEET EX2.1. DSA #02-108565.
56. (N) FEEDER PER SINGLE LINE DIAGRAM, SHEET EX2.1.
57. (N) PANEL 'FBSB' PER SCHEDULE. MOUNT PER DETAIL L8/EX2.5.
58. PROVIDE (2) TYPE 'P7E' FIXTURES UNDER BLEACHERS. SEE DETAIL L10/EX1.3.
59. 1"C. 4#10, 1#10 GRD. FSL-9 (SITE FIXTURES). FSL-15 (FLAG POLE, ROUTE VIA FSL-15 VIA 'LCC-FS').
60. REINSTALL EXISTING GENERATOR ON NEW CONCRETE PAD PER DETAIL H12/EX2.5.
61. REINSTALL EXISTING A.T.S. ON NEW CONCRETE PAD PER DETAIL H18/EX2.5.
62. PROVIDE SOUND SYSTEM SPEAKER ON BLEACHER COLUMN PER DETAIL G11/EX3.1. PROVIDE 3/4"C W/ WESTPENN AQ227 CABLE FROM SOUND SYSTEM SPEAKERS ON BLEACHER COLUMN TO AV RACK IN PRESS BOX.
63. PROVIDE SOUND SYSTEM SPEAKER ON BLEACHER HSS POLE PER DETAIL G11/EX3.1. PROVIDE 3/4"C W/ WESTPENN AQ227 CABLE FROM SOUND SYSTEM SPEAKERS ON BLEACHER POLE TO AV RACK IN PRESS BOX. VERIFY EXACT LOCATION IN FIELD
64. INSTALL JUNCTION BOX 12X10X6 NEMA 3R (EATON #12106 RTHC NK, 7.7LB) UNDER BLEACHERS FOR STADIUM AUDIO. TRANSITION FROM BLEACHER STRUCTURE TO BLOCK SIMILAR TO DETAIL D8/EX2.5.

REGISTERED PROFESSIONAL ENGINEER R. J. HARDIN No. 9125 ELECTRICAL STATE OF CALIFORNIA

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MADERA HIGH SCHOOL STADIUM
200 SOUTH "I" STREET
MADERA, CA 93637
CONSTRUCTION DOCUMENTS

MADERA 19 66 UNIFIED SCHOOL DISTRICT

PROFESSIONAL SEAL

LICENSED ARCHITECT MICHAEL R. SCHOEN No. C-34185 REGISTERED DATE 08.28.2027 STATE OF CALIFORNIA

PROJECT NUMBER 20-51
DATE 08/22/2023
DSA APPLICATION NO.
FILE NO. 20-H3
PTN NO. 65243-153
DRAWN BY XXX

REVISIONS

#	DESCRIPTION	DATE
1	ADDENDUM #1	08/18/2025

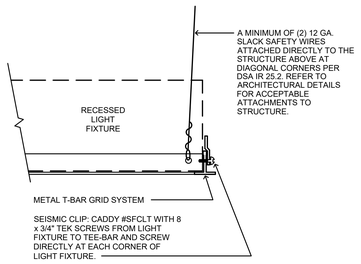
CONSTRUCTION DOCUMENTS

ENLARGED ELECTRICAL SITE PLAN

ES1.2

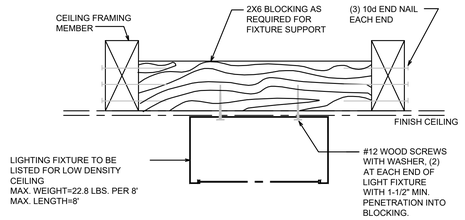
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HEAVY DUTY GRID SYSTEM			
LIGHT FIXTURE DIMENSION	WEIGHT	NO. OF HANGER WIRES	TYPE
<= 24" x 48"	<= 56 LBS	2	SLACK
> 24" x 48"	> 56 LBS	4	TAUT



L18 T-BAR LAY-IN LIGHT FIXTURE MOUNTING DETAIL

SCALE: NO SCALE



I18 TYPICAL SURFACE MOUNT LIGHT FIXTURE MOUNTING DETAIL

SCALE: NO SCALE

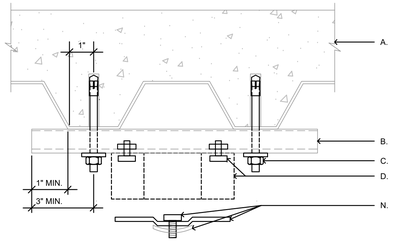
TYPE OF SPACE	MANUAL ON/OFF/OVERRIDE	DIMMING SWITCH	AUTOMATIC DAYLIGHT DIMMING WHEN AVAILABLE	OCCUPANCY SENSOR ON	OCCUPANCY SENSOR ON TO 70%	OCCUPANCY SENSOR REDUCE TO 50% AFTER 10 MIN.	OCCUPANCY SENSOR OFF AFTER 20 MIN	GATEWAY CLOSED & HOLIDAY HOURS SCHEDULE OFF	GATEWAY OPEN HOURS SCHEDULE ON	COLOR TOUCHSCREEN WITH AT LEAST 3 SCENES	REMOTE ON/OFF CONTROL OR KEY SWITCH	CONTROLLED POWER RECEPTACLES	DEMAND RESPONSE CAPABLE	ASTRONOMIC TIMECLOCK ON/OFF	ASTRONOMIC TIMECLOCK DIMMING	ASTRONOMIC TIMECLOCK X40 RELAYS
ENTRY / LOBBY	X	X	X	X		X		X	X	X	X		X			
CORRIDOR	X			X		X		X	X	X						
OFFICE	X	X	X		X		X						X			
CLASSROOM	X	X	X		X		X									
CONFERENCE ROOM	X	X	X		X		X						X			
MULTI-PURPOSE	X	X	X		X		X				X					
GYMNASIUM	X	X	X		X		X				X					
CAFETERIA	X	X	X		X		X				X					
KITCHEN	X	X	X		X		X									
KITCHENETTES IN OFFICES	X	X	X		X		X									
COPY ROOMS	X	X	X		X		X						X			
LARGE RESTROOM				X		X	X					X				
STAIRWELLS				X	X		X	X								
STORAGE <100 S.F.	X						X									
ELECTRICAL ROOM	X															
OTHER	X	X	X		X		X									
BUILDING >10,000 S.F.													X			
BUILDING EXTERIOR														X	X	
PEDESTRIAN WALKS														X		
PARKING LOT														X		X

I13 LIGHTING CONTROL MATRIX

SCALE: NO SCALE

LIGHTING FIXTURE SCHEDULE

TYPE	MFG'R	MODEL	LAMPS	WATTS	VOLTS	MOUNTING	WEIGHT (LB)	DETAIL	NOTES
A	LITHONIA	2BLT4 30L ADP EZ1 LP835 NLTAIR2 RIO	LED	22.5	UNV	TROFFER	18.2	L18/EX1.1	
AE	LITHONIA	2BLT4 30L ADP EZ1 LP835 NLTAIR2 RIO E10WLCP	LED	22.5	UNV	TROFFER	20.7	L18/EX1.1	W/ BATTERY BACKUP
AS	LITHONIA	2BLT4 30L ADP EZ1 LP835 NLTAIR2 RES7	LED	22.5	UNV	TROFFER	18.2	L18/EX1.1	W/ OCCUPANCY SENSOR
BB24E	PRUDENTIAL LTG	BPRO5-UN-FLSH-LED3S-MO-LO-R24'-XXX-8TW-SCW-ADC-SC-UNV-C496-X3-DM01-2EMHE	LED	225.6	UNV	SUSPENDED @11' A.F.F.	89	A18/EX1.1	W/ BATTERY BACKUP
CA7E	PRUDENTIAL LTG	BPRO5-PER-FLSH-LED3S-PROG375ULM-7'-XXX-PFL-WTW-NU-SC-UNV-SUR-X3-DM01-1EMHE	LED	20.0	UNV	RECESSED	25.9	A5/EX1.1	W/ BATTERY BACKUP
CA8E	PRUDENTIAL LTG	BPRO5-PER-FLSH-LED3S-PROG375ULM-8'-XXX-PFL-WTW-NU-SC-UNV-SUR-X3-DM01-1EMHE	LED	22.8	UNV	RECESSED	28	A5/EX1.1	W/ BATTERY BACKUP
CA9	PRUDENTIAL LTG	BPRO5-PER-FLSH-LED3S-PROG375ULM-R9'-XXX-PFL-WTW-NU-SC-UNV-SUR-X3-DM01	LED	25.7	UNV	RECESSED	31.5	A5/EX1.1	
CA14	PRUDENTIAL LTG	BPRO5-PER-FLSH-LED3S-PROG375ULM-R14'-XXX-PFL-WTW-NU-SC-UNV-SUR-X3-DM01	LED	39.9	UNV	RECESSED	44.5	A5/EX1.1	
CA33E	PRUDENTIAL LTG	BPRO5-PER-FLSH-LED3S-PROG375ULM-R33'-XXX-PFL-WTW-NU-SC-UNV-SUR-X3-DM01-2EMHE	LED	94.1	UNV	RECESSED	122.3	A5/EX1.1	W/ BATTERY BACKUP
D10	LUMINAIRE	VRDL6 MIN1 NLTAIR2 1000LM MD 35K 80CRI MVOLT CPL AMF	LED	12.0	UNV	RECESSED	14	C5/EX1.2	
D15	LUMINAIRE	VRDL6 MIN1 NLTAIR2 1500LM MD 40K 80CRI MVOLT CPL AMF	LED	18.8	UNV	RECESSED	14	C5/EX1.2	
D15E	LUMINAIRE	VRDL6 MIN1 NLTAIR2 1500LM MD 40K 80CRI MVOLT CPL AMF EMB310720	LED	18.8	UNV	RECESSED	16.5	C5/EX1.2	W/ BATTERY BACKUP
D15W	LUMINAIRE	VRDL6 MIN1 NLTAIR2 1500LM MD 40K 80CRI MVOLT CPL AMF	LED	18.8	UNV	RECESSED	14	E10/EX1.1	
D15WE	LUMINAIRE	VRDL6 MIN1 NLTAIR2 1500LM MD 40K 80CRI MVOLT CPL AMF EMB310720	LED	18.8	UNV	RECESSED	16.5	E10/EX1.1	W/ BATTERY BACKUP
D25	LUMINAIRE	VRDL6 MIN1 NLTAIR2 2500LM MD 40K 80CRI MVOLT CPL AMF	LED	31.0	UNV	RECESSED	14	C5/EX1.2	
D25E	LUMINAIRE	VRDL6 MIN1 NLTAIR2 2500LM MD 40K 80CRI MVOLT CPL AMF EMB310720	LED	31.0	UNV	RECESSED	16.5	C5/EX1.2	W/ BATTERY BACKUP
F4H	LITHONIA	CLX L48 3000LM SEF RDL MVOLT EZ1 35K 80CRI NLTAIR2 RIO WH	LED	18.5	UNV	SURFACE	7.5	H15/EX1.2	
F4HS	LITHONIA	CLX L48 3000LM SEF RDL MVOLT EZ1 35K 80CRI NLTAIR2 RES7 WH	LED	18.5	UNV	SURFACE	7.5	H15/EX1.2	
F4HE	LITHONIA	CLX L48 3000LM SEF RDL MVOLT EZ1 35K 80CRI E10WLCP NLTAIR2 RIO WH	LED	18.5	UNV	SURFACE	7.5	I18/EX1.1	W/ BATTERY BACKUP
F8	LITHONIA	CLX L96 6000LM SEF RDL MVOLT EZ1 35K 80CRI WH ZACVH M100	LED	37.0	UNV	SUSPENDED @11' A.F.F.	14	C15/EX1.2	SUSPEND 24" MAXIMUM
F8H	LITHONIA	CLX L96 6000LM SEF RDL MVOLT EZ1 35K 80CRI NLTAIR2 RIO WH	LED	37.0	UNV	SURFACE	14	H15/EX1.2	
F8HS	LITHONIA	CLX L96 6000LM SEF RDL MVOLT EZ1 35K 80CRI NLTAIR2 RES7 WH	LED	37.0	UNV	SURFACE	14	I18/EX1.1	W/ OCCUPANCY SENSOR
J	LITHONIA	OLVTWM	LED	15.0	UNV	WALL	5	F10/EX1.2	
K	LITHONIA	CPX 2X4 3000LM 80CRI 35K SWL MIN1 EZT MVOLT NLTAIR2	LED	24.6	UNV	TROFFER	17.25	L18/EX1.1	
KE	LITHONIA	CPX 2X4 3000LM 80CRI 35K SWL MIN1 EZT MVOLT E10WLCP NLTAIREM2 APIREM	LED	24.6	UNV	TROFFER	17.25	L18/EX1.1	W/ BATTERY BACKUP
KS	LITHONIA	CPX 2X4 3000LM 80CRI 35K SWL MIN1 EZT MVOLT NLTAIR2 APIR	LED	24.6	UNV	TROFFER	17.25	L18/EX1.1	W/ OCCUPLANY SENSOR
L	LITHONIA	CPANL 1X4 ALO1 SWW7 / DCMK14	LED	31.0	UNV	SURFACE	9.3	I18/EX1.1	
LE	LITHONIA	CPANL 1X4 ALO1 SWW7 / DCMK14 / ILBLP CP10 HE SD A	LED	31.0	UNV	SURFACE	9.3	I18/EX1.1	W/ BATTERY BACKUP
O	LITHONIA	CLX L48 5000LM SEF RDL MVOLT GZ10 35K 80CRI E10WLCP WH THCLXWH	LED	31.8	UNV	SURFACE	7.5	F10/EX1.2	W/ BATTERY BACKUP
P1	LITHONIA	WDGE2 LED P1 40K 80CRI T1S MVOLT SRM NLTAIR2 PIR XXXXXX	LED	11.0	UNV	WALL	13.5	F10/EX1.2	
P1E	LITHONIA	WDGE2 LED P1 40K 80CRI T1S MVOLT SRM E10WH NLTAIR2 PIR XXXXXX	LED	11.0	UNV	WALL	13.5	F10/EX1.2	W/ BATTERY BACKUP
P1C	LITHONIA	WDGE2 LED P1 40K 80CRI T1S MVOLT SRM NLTAIR2 PIR XXXXXX	LED	11.0	UNV	WALL	13.5	C10/EX1.2	
P1CE	LITHONIA	WDGE2 LED P1 40K 80CRI T1S MVOLT SRM E10WH NLTAIR2 PIR XXXXXX	LED	11.0	UNV	WALL	13.5	C10/EX1.2	W/ BATTERY BACKUP
P1W	LITHONIA	WDGE2 LED P1 40K 80CRI T1S MVOLT SRM NLTAIR2 PIR XXXXXX	LED	11.0	UNV	WALL	13.5	E5/EX1.1	
P3	LITHONIA	WDGE2 LED P3 40K 80CRI TFTM MVOLT SRM NLTAIR2 PIR XXXXXX	LED	32.0	UNV	WALL	13.5	F10/EX1.2	
P3E	LITHONIA	WDGE2 LED P3 40K 80CRI TFTM MVOLT SRM E10WH NLTAIR2 PIR XXXXXX	LED	32.0	UNV	WALL	15	F10/EX1.2	W/ BATTERY BACKUP
P3C	LITHONIA	WDGE2 LED P3 40K 80CRI TFTM MVOLT SRM NLTAIR2 PIR XXXXXX	LED	32.0	UNV	WALL	13.5	C10/EX1.2	
P3CE	LITHONIA	WDGE2 LED P3 40K 80CRI TFTM MVOLT SRM E10WH NLTAIR2 PIR XXXXXX	LED	32.0	UNV	WALL	15	C10/EX1.2	W/ BATTERY BACKUP
P3W	LITHONIA	WDGE2 LED P3 40K 80CRI TFTM MVOLT SRM NLTAIR2 PIR XXXXXX	LED	32.0	UNV	WALL	13.5	E5/EX1.1	
P4	HYDREL	M9720C SS LED P3 40K MVOLT NSP FLCSR 34B	LED	46.0	UNV	IN GROUND WELL	25	I5/EX1.3	FLAG POLE LIGHT
P5	TARGETTI	KPLH4-41-ZMP-32-40 / 26525 / 20U434410 / 20U2530	LED	64.0	UNV	IN GROUND WELL	25	I5/EX1.3	TREE UPLIGHT
P6	HYDREL	SAF14 LED P1 RGBW4 MVOLT 40DEG CWL YM CSLS0 DMX BL	LED	94.0	UNV	SURFACE	34	A10/EX1.1	RGBW FLOOD THEATRICAL
P7C	LITHONIA	WAP-S000LW-HST-MO 277 DALI 40K 80CRI E13WCP WUFEND2 NLTAIR2 RSDDR10	LED	49.0	277	SURFACE	13.5	C10/EX1.2	W/ BATTERY BACKUP
S1	LITHONIA	RAD1 LED P2 40K ASY MVOLT RPA NLTAIR2 HS DDBXD	LED	38.0	UNV	POLE	29	K5/EX1.2	
	LITHONIA	RSS 12 4B DM19RAD STLHHC DDBXD	--	--	--	12' POLE	85		
S2	LITHONIA	RAD1 LED P2 40K PATH MVOLT RPA NLTAIR2 HS DDBXD	LED	38.0	UNV	POLE	29	K5/EX1.2	
	LITHONIA	RSS 12 4B DM19RAD STLHHC DDBXD	--	--	--	12' POLE	85		
S3	LITHONIA	RAD1 LED P2 40K ASY MVOLT RPA NLTAIR2 HS DDBXD	LED	76.0	UNV	POLE	29	K5/EX1.2	
	LITHONIA	RSS 12 4B DM28RAD STLHHC DDBXD	--	--	--	12' POLE	85		
S4	LITHONIA	RAD1 LED P2 40K ASY MVOLT RPA NLTAIR2 HS DDBXD	LED	38.0	UNV	POLE	29	K10/EX1.2	
	HYDREL	SAF7 LED P3 80CRI 40K MVOLT 15DEG CWL KM CPMSA L3 CSL20 ZT FGS DDB	LED	57.4	UNV	POLE	15		POLE TOP FLOOD LIGHT
	LITHONIA	RSS 12 4B DM19RAD/T20 STLHHC DDBXD	--	--	--	12' POLE WITH TOP TENNON	85		
S5	LITHONIA	RAD1 LED P2 40K PATH MVOLT RPA NLTAIR2 HS DDBXD	LED	38.0	UNV	POLE	29	K5/EX1.2	
	LITHONIA	RSS 12 4B DM19RAD FDL1 STLHHC DDBXD	--	--	--	12' POLE	85		PROVIDE RECEPTACLE FESTOON NEAR POLE BOTTOM
SP	LITHONIA	DSX1 LED P9 40K 70CRI T1S MVOLT RPA NLTAIR2 PIRHN HS DDBXD	LED	279.0	UNV	POLE	34	K5/EX1.2	
	LITHONIA	RSS 12 4B [WB DRILLING] STLHHC DDBXD	--	--	--	12' POLE	85		
X	LITHONIA	LQC 1 R EL N	LED	0.6	UNV	WALL	4.5	F10/EX1.2	W/ BATTERY BACKUP
INV-SL	IOTA	IS 8000 277IN 277OUT ST SDC SZM FSREG1 PMA5REG1 SYR OB612P2720AMPON BOB611P2720AMPBON	--	8000.0	277	FLOOR	2120	F5/EX1.2	EMERGENCY INVERTER FOR STADIUM BLEACHERS
LCP-FS	ACUITY	ARP INTENCOB BFCR MVOLT 1VB HLK SM DTC	--	--	277	WALL	25	D10/EX2.4	MOUNT ABOVE PANEL 'FSL'



DETAIL KEY NOTES:

A. CONCRETE OVER METAL DECK

B. STRUT:
B-LINE B22 SOLID STRUT, LENGTH AS REQUIRED.

C. WEDGE ANCHOR:
'HILTI' KB-TZ2 CARBON STEEL 3/8" DIAMETER ANCHOR WITH MIN. 2-1/2" EMBEDMENT INTO CONCRETE DECK AND MIN. 8" EDGE DISTANCE, 1" MINIMUM EDGE OF FLUTE. (2) BOLTS PER STRUT. TORQUE TO 30 FT. LBS. ICC-ESR-4266 LISTED. WITH STRUT NUT, HEX NUT, 1/4"X1 5/8" SQ. WASHER.

D. J-BOX:
ATTACH BOX TO STRUT (2) 1/4-20X3/4" MACHINE SCREWS WITH LOCK WASHERS AND STRUT NUT.
(ELECTRICAL CIRCUIT AT POWER FEED END OF FIXTURE ONLY).

E. POWER FEED:
WHITE SO CORD, 18/3 OR 18/4, AS REQUIRED.

F. AIRCRAFT CABLE:
3/32" STAINLESS STEEL AIRCRAFT CABLE W/ BARREL TERMINAL AT ONE END. MAXIMUM 96" SPACING.

G. CANOPY:
PROVIDE WITH FIXTURE.

H. ZIP TIE:
NEATLY ZIP TIE POWER FEED TO AIRCRAFT CABLE AT 6" CENTERS W/ WHITE ZIP TIES.

I. GRIPPER:
UL LISTED AIRCRAFT CABLE GRIPPER W/ KNURLED LOCK NUT. 1/4-20" THREADED BODY & NUT ATTACHES TO FIXTURE.

J. STRAIN RELIEF:
STRAIN RELIEF BUSHING AT FIXTURE.

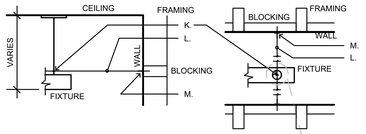
K. 2-CABLE CLAMP:
SECURE TO EACH HANGER CABLE WITHIN 4" OF FIXTURE ATTACHMENT POINT.

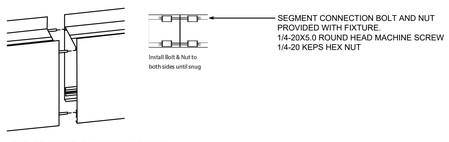
L. LATERAL BRACING CABLE:
3/32" STAINLESS STEEL AIRCRAFT CABLE INSTALLED LONGITUDINALLY ACROSS FIXTURE TO PREVENT SWAYING.

M. WALL CABLE ANCHOR:
GRIPLOCK #25Z-M13-1420-SL SECURED WITH #10 SMS TO WALL FRAMING/BLOCKING WITH 1-1/2" PENETRATION AT EACH END OF FIXTURE.

N. MOUNTING STRAP:
PROVIDED WITH FIXTURE. PRUDENTIAL #19031 WITH 1/4-20X5/8 PAD HEAD BOLT AND SPEED NUT.

P. 1/4-20 COUPLER WITH THREADED RING:
PROVIDED BY MANUFACTURER WITH FIXTURE. APPLY THREAD LOCKER PER MANUFACTURER INSTRUCTIONS.

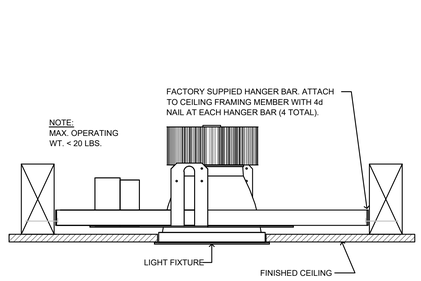




LINEAR FIXTURE LATERAL SEISMIC BRACING
REQUIRED WHEN FIXTURE CONTACTS OBSTRUCTION WHEN SWINGING 45° FROM VERTICAL.

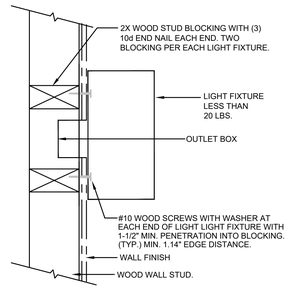
A18 SUSPENDED FIXTURE DETAIL (CONCRETE OVER METAL DECK)

SCALE: NO SCALE



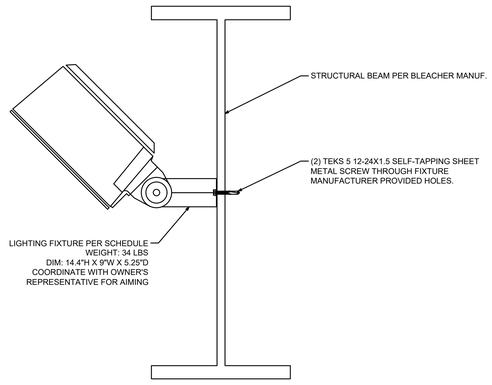
E10 TYPICAL RECESSED LIGHT MOUNTING DETAIL (WOOD FRAMING)

SCALE: NO SCALE



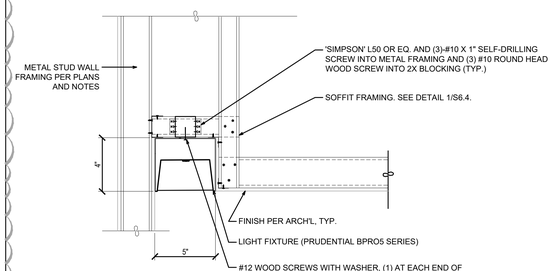
E5 TYPICAL SURFACE WALL LIGHT MOUNTING DETAIL (WOOD FRAMING)

SCALE: NO SCALE



A10 RGBW FLOOD

SCALE: NO SCALE



A5 PERIMETER LIGHT FIXT. MTG DETAIL

SCALE: NO SCALE

PBK
ARCHITECT PBK Architects, Inc.
FRESNO
7790 North Palm Avenue
Fresno, CA 93711
559-448-8400 P
559-448-8467 F
PBK.com

MADERA HIGH SCHOOL STADIUM

200 SOUTH "L" STREET
MADERA, CA 93637
CONSTRUCTION DOCUMENTS

MADERA 19 66 UNIFIED SCHOOL DISTRICT

PROFESSIONAL SEAL
LICENSED ARCHITECT — MICHAEL R. SCHOEN — No. C-30585 — REGISTERED DATE FEB 28, 2027 — STATE OF CALIFORNIA

PROJECT NUMBER 20-51
DATE 08/22/2023
DSA APPLICATION NO.
FILE NO. 20-H3
PTN NO. 65243-153
DRAWN BY XXX

REVISIONS

#	DESCRIPTION	DATE
1	ADDENDUM #1	08/18/2025

CONSTRUCTION DOCUMENTS

LIGHTING FIXTURE SCHEDULE

EX1.1

Hardin-Davidson Engineering
356 Pollasky Ave.
Suite 200
Clovis, CA 93612
559.323.4995 tel
559.323.4928 fax

REGISTERED PROFESSIONAL ENGINEER — R.J.HARDIN — No. 9125 — ELECTRICAL — STATE OF CALIFORNIA

20-51_MHS STADIUM_V21_detached.rvt
3/18/2024 10:14:46 AM

Leon Environmental Services

Richard "Danny" Leon CAC # 04-3708
Tommy Leon CAC # 05-3882

August 29, 2023

Domingo Mora
Maintenance Supervisor
Madera Unified School District
1902 Howard Rd, Madera, CA
Email: domingomora@maderausd.org

Re: Asbestos Survey Report
Madera High School Stadium
Visitor Side Snack Bar & Restrooms
820 W. Olive Ave, Madera, CA
LES Job No. S93-23

Dear Domingo,

Attached is the asbestos survey report for the above referenced site. The report includes inspection observations, a list of all samples taken, bulk sample analysis results, a sample location diagram and recommendations concerning asbestos containing materials identified at this site. If you have any questions or need additional information, please do not hesitate to call.

Thank you for using Leon Environmental Services. We look forward to working with you in the future.

Respectfully,

Richard Danny Leon

Digitally signed by Richard Danny Leon
Date: 2023.08.30 14:50:10 -07'00'

Richard "Danny" Leon
Certified Asbestos Consultant
Certification No. 04-3708

BUILDING DESCRIPTION

On Thursday, August 24, 2023, an asbestos survey was performed on the Madera High School stadium visitor snack bar & restroom building at **820 W. Olive Ave, Madera, CA** for Domingo Mora of Madera Unified School District.
The snack bar is approximately 250 square feet and 30 to 50 years old. It has CMU walls, an asphalt rolled roof and a concrete floor. On the west side of the snack bar is a small all wood hot water heater closet that has an asphalt shingle roof.

The restroom building is approximately 500 square feet and 50 to 75 years old. It has an asphalt shingle roof, bare concrete floors and plaster on the CMU exterior and interior walls. These two structures are scheduled for demolition.

ASBESTOS ANALYSIS RESULTS

All bulk samples of suspect ACM were taken in accordance with US EPA Guidelines and accepted industry standards by a state certified asbestos consultant. McCall and Spero Environmental, Inc. a NVLAP accredited laboratory performed a total of 24 analyses from 15 samples of suspect ACM collected from this site. The full list of all samples taken is on the following pages. Sample locations are indicated on the diagram included with this report.

COMMENTS AND RECOMMENDATIONS

All samples of suspect ACM collected from these structures were negative for asbestos.

CONCLUSIONS AND REGULATIONS

US EPA NESHAP 40 CFR Part 61

Based on our survey, sampling and subsequent laboratory analysis and regulatory guidelines affecting this site, **NO Asbestos Containing Materials were identified**. If the types of suspect ACM tested for this survey were positive for asbestos, they would need to be removed (in most cases) prior to demolition and/or renovation procedures to comply with local, state and federal agencies. The US EPA NESHAP (40 CFR Part 61 – November 20, 1990) requires materials containing greater than one percent asbestos be removed prior to renovation or demolition. If those materials are friable or likely to become friable due to the forces expected to act upon them during renovation or demolition, they become a regulated asbestos containing material (RACM) and require a 10-day notification to the local Air Pollution Control District prior to abatement.

CAL OSHA--------Construction Industry--------8CCR, 1529

The construction industry standard covers employees engaged in demolition and construction, and the following related activities likely to involve asbestos exposure: removal, encapsulation, alteration, repair, maintenance, insulation, spill emergency cleanup, transportation, disposal and storage of ACM. CAL OSHA worker health and safety regulations apply during any disturbance of ACM by a person while in the employ of another. This is true regardless of friability or quantity disturbed. If there is greater than 100 square feet of ACM, which will be affected by the demolition, a California Licensed Contractor who is registered with CAL OSHA for asbestos is required.

LIMITATIONS OF LIABILITY

The nature of demolition and asbestos abatement is such that materials can be uncovered which previously were unknown to exist. Therefore, Leon Environmental Services cannot be responsible for materials not previously detected due to lack of accessibility or concealment, although every effort was made during the inspection to detect all suspect materials. **If any materials other than those included herein are discovered during renovation or demolition, it must be assumed that the materials are asbestos containing and should be treated accordingly until further testing and analysis is performed.**

The data interpretations and recommendations are based solely on information available to Leon Environmental Services at the time of our inspection. The customer recognizes that site conditions or accessibility may vary from those encountered at the time of our inspection and sample collection. Varying conditions or access could result in additional information that would lead us to revise conclusions and recommendations. Leon Environmental Services will not be responsible for the interpretation or use by others of information contained within this report. Conclusions and recommendations presented in this report are qualitative judgments based on the prevailing regulations and accepted industry standards at the time of the report issuance. Leon Environmental Services provides no other guarantees, either expressed or implied.

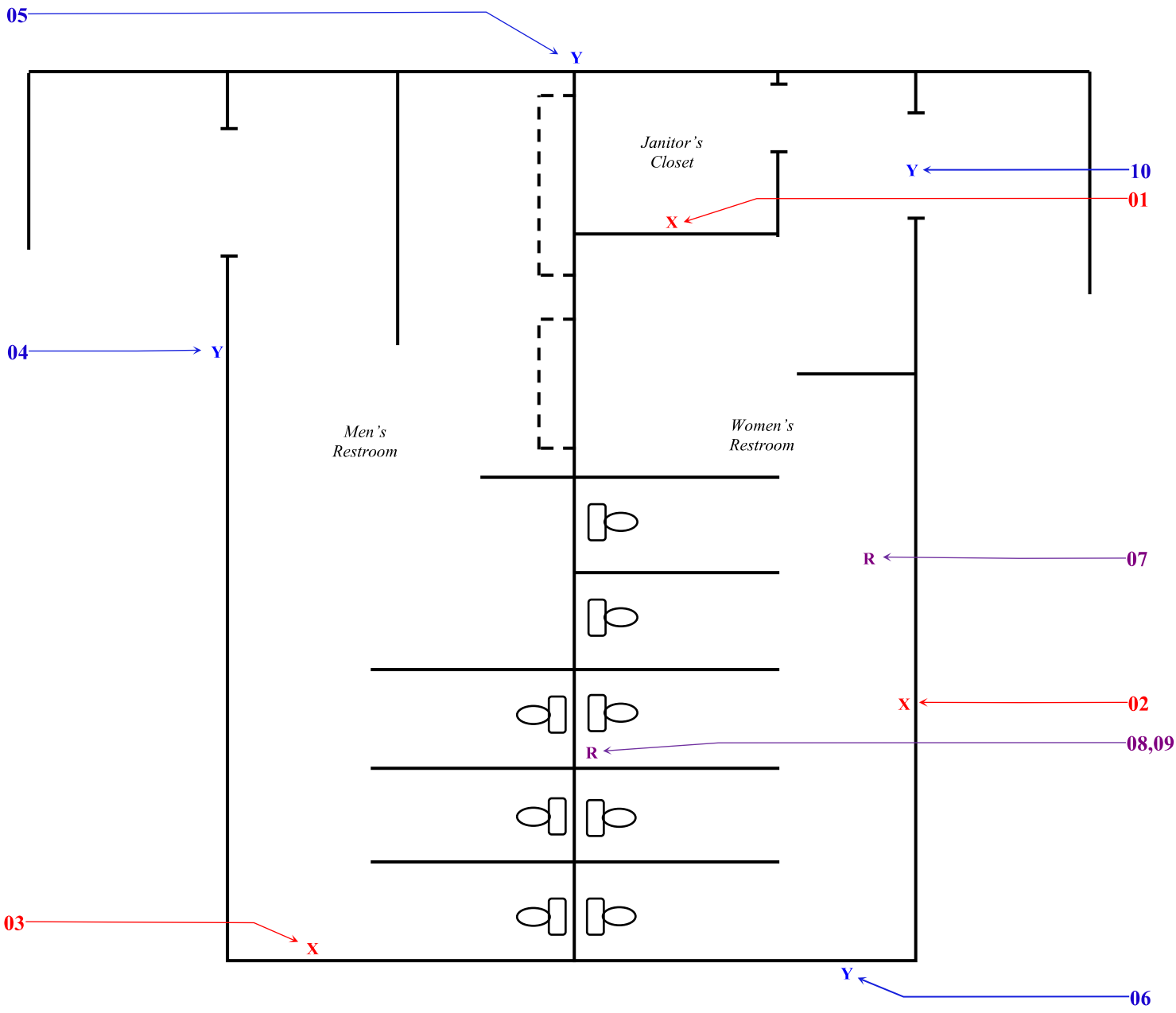
Richard Danny Leon Digitally signed by Richard Danny Leon
Date: 2023.08.30 14:50:36 -07'00'

Richard "Danny" Leon DATE
Certified Asbestos Consultant
Certification No. 04-3708

Leon Environmental Services

Richard "Danny" Leon CAC Certification No. 04-3708
Tommy Leon CAC Certification No. 05-3882

Job S93-23 / Sample Location Diagram
Madera High School – Stadium Snack Bar & Restrooms / 820 W. Olive Ave, Madera, CA
Domingo Mora / Madera Unified School District
Drawing not to Scale



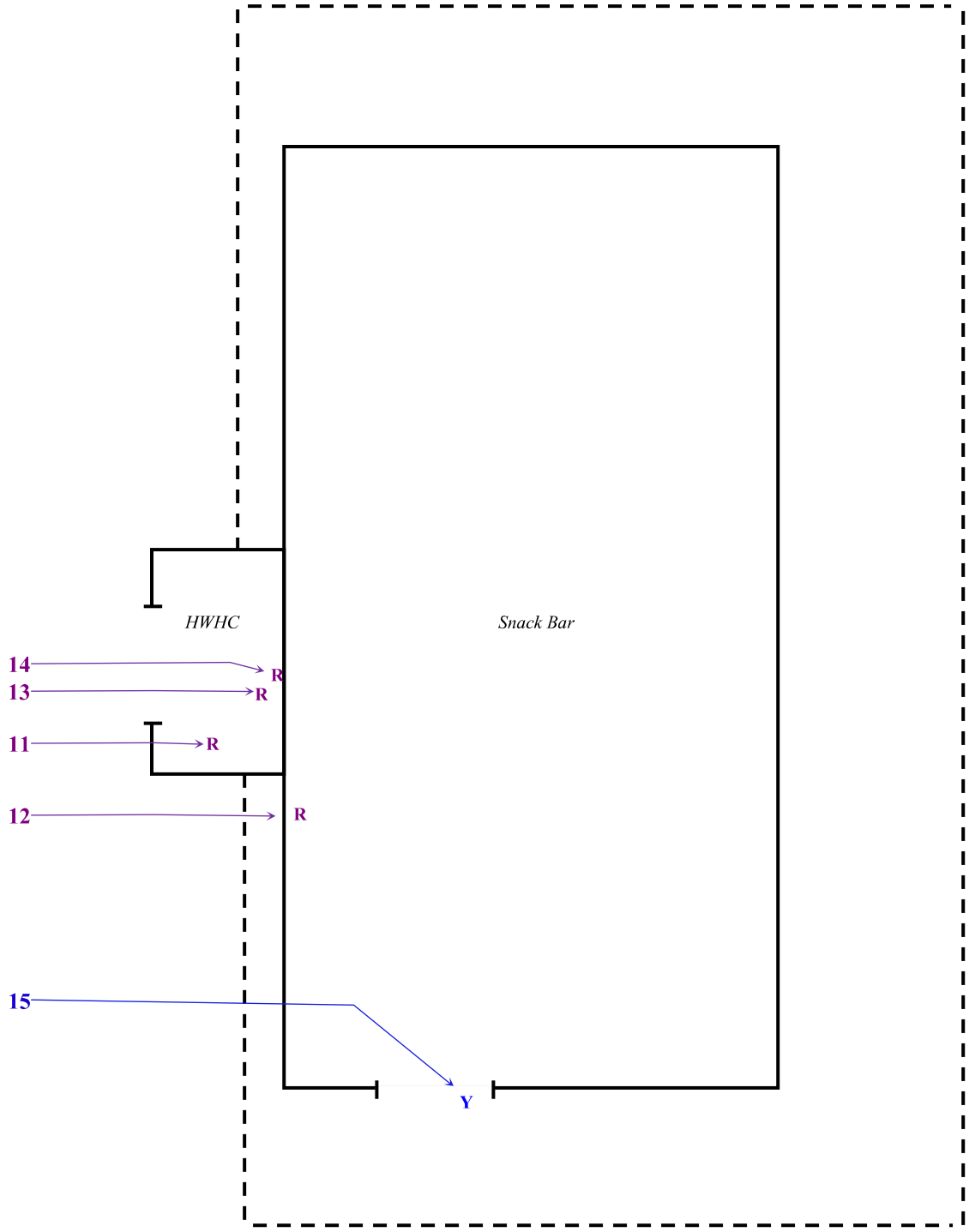
Y = Exterior Samples
X = Interior Samples
R = Roof Samples

4545 N. Brawley Ave., Suite 104, Fresno, CA 93722
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Leon Environmental Services

Richard "Danny" Leon CAC Certification No. 04-3708
Tommy Leon CAC Certification No. 05-3882

Job S93-23 / Sample Location Diagram
Madera High School – Stadium Snack Bar & Restrooms / 820 W. Olive Ave, Madera, CA
Domingo Mora / Madera Unified School District
Drawing not to Scale



Y = Exterior Samples
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N

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McCall and Spero Environmental, Inc.
Specialists in Microanalysis

1831 Williamson Court • Suite 100 • Louisville, KY 40223
Phone (502) 244-7135 • FAX (502) 244-7136
E-mail: customerservice@mselabs.com • Website: www.mselabs.com

Date: August 29, 2023

Attention: Tommy Leon
Leon Environmental Services

Subject: Analysis of bulk samples for asbestos mineral fibers by Polarized Light Microscopy (PLM) with Dispersion Staining (EPA/600/R-93/116)

RE: MSE-P8253LEO.1
Domingo Mora, Madera Unified School District - Madera High School, Stadium Snack Bar & Restrooms: 820 W. Olive Ave; Madera, CA Project LEO# S93-23

Dear Mr. Leon:

McCall & Spero Environmental, Inc. has completed the analysis of the bulk samples we received from your offices on August 25, 2023. These samples represent the bulk samples from the Domingo Mora, Madera Unified School District - Madera High School, Stadium Snack Bar & Restrooms: 820 W. Olive Ave; Madera, CA Project.

The PLM bulk analysis was performed according to the "Method of the Determination of Asbestos in Bulk Building Materials", R. L. Perkins and B. W. Harvey (EPA/600/R-93/116).

The results for the twenty-four (24) samples are summarized in the following report. Please note that for samples consisting of two or more distinct components, each component is analyzed and reported individually (EPA 40 CFR Part 61 [FRL-4821-71]).

Thank you for consulting McCall & Spero Environmental, Inc. Should you have any questions concerning these results, please contact our office.

Sincerely,

Kevin R. Bean, B.A.
PLM Laboratory Director

NVLAP®
TESTING
NVLAP LAB CODE 101895-0

SUMMARY OF PLM BULK ANALYSIS RESULTS

Project Name: Domingo Mora, Madera Unified School District - Madera High School, Stadium Snack Bar & Restrooms: 820 W. Olive Ave; Madera, CA Project
McCall & Spero Environmental Project No. MSE-P8253LEO.1

MSE # P8253LEO.1	SAMPLE # DESCRIPTION	ASBESTOS TYPE & %	OTHER FIBROUS MATERIAL & %	% NON-FIBROUS MATERIAL	COLOR
001 (A)	01 (A) Color Coat	ND	Cellulose / 2%	98%	White
001 (B)	01 (B) Plaster	ND	Cellulose / 2% Hair / 2%	96%	Gray
002 (A)	02 (A) Color Coat	ND	Cellulose / 2%	98%	White
002 (B)	02 (B) Plaster	ND	Cellulose / 2% Hair / 2%	96%	Gray
003 (A)	03 (A) Color Coat	ND	Cellulose / 2%	98%	White
003 (B)	03 (B) Plaster	ND	Cellulose / 2% Hair / 2%	96%	Gray
004 (A)	04 (A) Color Coat	ND	Cellulose / 2%	98%	White
004 (B)	04 (B) Plaster	ND	Cellulose / 2% Hair / 2%	96%	Gray
005 (A)	05 (A) Color Coat	ND	Cellulose / 2%	98%	Beige
005 (B)	05 (B) Plaster	ND	Cellulose / 2% Hair / 2%	96%	Gray
006 (A)	06 (A) Color Coat	ND	Cellulose / 2%	98%	White
006 (B)	06 (B) Plaster	ND	Cellulose / 2% Hair / 2%	96%	Gray
007 (A)	07 (A) Asphalt Shingle	ND	Glass / 15%	85%	Red/Black
007 (B)	07 (B) Underlayment	ND	Cellulose / 65%	35%	Black

SUMMARY OF PLM BULK ANALYSIS RESULTS

MSE # P8253LEO.1	SAMPLE # DESCRIPTION	ASBESTOS TYPE & %	OTHER FIBROUS MATERIAL & %	% NON-FIBROUS MATERIAL	COLOR
008	08 Sealant	ND	Cellulose / 2%	98%	Gray
009	09 Sealant	ND	Cellulose / 2%	98%	Tan
010	10 Concrete	ND	Cellulose / 2%	98%	Gray
011 (A)	11 (A) Asphalt Shingle	ND	Glass / 15%	85%	Gray
011 (B)	11 (B) Underlayment	ND	Cellulose / 65%	35%	Black
012 (A)	12 (A) Rolled Roofing Material	ND	Cellulose / 20%	80%	Black
012 (B)	12 (B) Underlayment	ND	Cellulose / 65%	35%	Black
013	13 Sealant	ND	Cellulose / 2%	98%	Tan
014	14 Sealant	ND	Cellulose / 2%	98%	Black
015	15 Concrete	ND	Cellulose / 2%	98%	Gray

SUMMARY OF PLM BULK ANALYSIS RESULTS

NOTES:

ND = None Detected	CH = Chrysotile	A = Amosite	AC = Actinolite
CR = Crocidolite	AN = Anthophyllite	TR = Tremolite	

For samples consisting of separate components, each component is analyzed and reported separately.

Results apply only to items tested. Quantification is accurate to within ± 10%. Results from this report must not be reproduced, except in full, with the approval of McCall & Spero Environmental, Inc. This report must not be used to claim product endorsement by NVLAP or any agency of the U.S. Government.

** EPA recommends that bulk materials found negative for asbestos or less than one percent asbestos by polarized light microscopy that fall into one of five dominantly nonfriable categories be reanalyzed by an additional method, such as transmission electron microscopy. (EPA Notice of Advisory, FR Vol. 59, No. 146 & Test Method EPA 600/ R-93/ 116).

Analyst: Kevin R. Bean, B.A. 

Leon Environmental Services

4545 N. Brawley Ave., Suite 104, Fresno, CA 93722 Phone: 559.274.9200 Fax: 559.274.9240 Email: LeonEnviro@comcast.net

Customer: Domingo Mora **Company** Madera Unified School District

Date: August 24, 2023 **Job No.** S93-23

Analysis (PLM) **Turn Around:** Rush Same Day Next Day (2-3 Day) 4-5 days

Inspection Site : Madera High School - Stadium Snack Bar & Restrooms, 820 W. Olive Ave, Madera, CA

Sample No	Location	Material			Quantity
		Color	Type	Friable	
	Restroom Building				
01	Janitor Closet - Wall		Color Coat		
	Janitor Closet - Wall		Plaster		
02	Women's Restroom - Wall		Color Coat		
	Women's Restroom - Wall		Plaster		
03	Men's Restroom - Wall		Color Coat		
	Men's Restroom - Wall		Plaster		
04	North Exterior - Wall		Color Coat		
	North Exterior - Wall		Plaster		
05	East Exterior - Wall		Color Coat		
	East Exterior - Wall		Plaster		
06	West Exterior - Wall		Color Coat		
	West Exterior - Wall		Plaster		
07	Roof	Red	Asphalt Shingle		
	Roof		Underlayment		
08	Roof Vent	Brown/ Grey	Sealant		
09	Roof Vent	Tan	Sealant		
10	Foundation		Concrete		

Relinquished By [signature] Date 8-24-23

Received By [signature] Date 8/25/23

Leon Environmental Services

4545 N. Brawley Ave., Suite 104, Fresno, CA 93722 Phone: 559.274.9200 Fax: 559.274.9240 Email: LeonEnviro@comcast.net

Customer: Domingo Mora **Company** Madera Unified School District

Date: August 24, 2023 **Job No.** S93-23

Analysis (PLM) **Turn Around:** Rush Same Day Next Day (2-3 Day) 4-5 days

Inspection Site : Madera High School - Stadium Snack Bar & Restrooms, 820 W. Olive Ave, Madera, CA

Sample No	Location	Material			Quantity
		Color	Type	Friable	
	Snack Bar				
11	Hot Water Heater Closet - Roof	Grey	Asphalt Shingle		
	Hot Water Heater Closet - Roof		Underlayment		
12	Snack Bar - Roof		Rolled Roofing Material		
	Snack Bar - Roof		Underlayment		
13	Roof Jack	Tan	Sealant		
14	Roof Jack	Black	Sealant		
15	Foundation		Concrete		

Relinquished By [signature] Date 8-24-23

Received By [signature] Date 8/25/23

Leon Environmental Services

Tommy Leon CAC # 05-3882

October 07, 2024

George Cummings
Madera Unified School District
1902 Howard Road
Madera, CA 93637

Re: Asbestos Survey
Madera H.S. Memorial Stadium
800-820 W. Olive Ave,
Madera, CA
Job No. S99-24

Dear George:

Attached is the asbestos survey report for the above referenced site. This report includes inspection observations, a list of all samples taken, bulk sample analysis results, a sample location drawing, and recommendations concerning asbestos containing materials.

If you have any questions or need additional information, please do not hesitate to call. Thank you for using Leon Environmental Services. We look forward to working with you in the future.

Respectfully,

Tommy Leon
Certified Asbestos Consultant
Certification No. 05-3882

4545 N. Brawley Ave., Suite 104, Fresno, CA 93722
Phone: 559.274.9200 Fax: 559.274.9240 Email: LeonEnviro@leonenviro.com

Asbestos Survey: Madera H.S. Memorial Stadium, 800-820 W. Olive Ave, Madera, CA S99-24

BUILDING DESCRIPTION

An asbestos survey was performed on **September 30, 2024,** at **800-820 W. Olive Ave, Madera, CA.** There are 06 buildings and a set of bleachers on this property. Please refer to the property map for building numbers.

Bathroom Building (Bldg 01) - This building is approximately 50-80 years old and approximately 500sqft. It has a wood frame, stucco exterior walls and an asphalt shingled roof. The interior walls and ceilings are plaster. The floors are concrete. The building was vacant at the time of the survey.

Concessions (Bldg 02) - This building is approximately 50-80 years old and approximately 350sqft. The building has a wood frame, stucco exterior walls and an asphalt shingled roof. The interior walls and ceilings are plaster. The floors are concrete. The building was vacant at the time of the survey.

Ticket Booth #1 (Bldg 03) - This building is approximately 50-80 years old and approximately 120sqft. The building has a wood frame, stucco exterior walls and a Spanish tile roof. The interior walls and ceiling are wood. The floors are concrete. The building was vacant at the time of the survey.

Ticket Booth #2 (Bldg 04) - This building is approximately 50-80 years old and approximately 120sqft. The building has a wood frame, stucco exterior walls and a Spanish tile roof. The interior walls and ceiling are wood. The floors are concrete. The building was vacant at the time of the survey.

Ticket Booth #3 (Bldg 05) - This building is approximately 50-80 years old and approximately 65sqft. The building has a wood frame, stucco exterior walls and an asphalt shingle roof. The interior walls and ceiling are wood. The floors are concrete. The building was vacant at the time of the survey.

Press Box (Bldg 06) - This building is approximately 50-80 years old and approximately 300sqft. It has a wood frame, wood exterior walls and a rolled roof. The interior walls and ceilings were wood and sheetrock with associated joint compound. The floors wood covered with carpet and concrete. The building was vacant at the time of the survey.

Bleachers - This Bleachers are approximately 70-80 years old. It has metal and wood structures. There are no walls. The foundation is concrete. The structure was vacant at the time of the survey.

Asbestos Survey: Madera H.S. Memorial Stadium, 800-820 W. Olive Ave, Madera, CA S99-24

ASBESTOS ANALYSIS RESULTS

All bulk samples of suspect asbestos containing materials were taken in accordance with US EPA Guidelines and accepted industry standards by a state certified asbestos consultant. McCall and Spero Environmental, Inc., a NVLAP accredited laboratory performed a total of **67** analyses from **46** samples collected from this structure at this site. The full list of all samples taken is on the following pages. Sample locations are indicated on the drawings included with this report. ***Quantities listed below are estimates, for sampling purposes only, and should be verified prior to asbestos abatement***.

Samples Negative for Asbestos

Sample	Location	Material	% Of ACM	Friable	Sq. Ft.
Bathroom Building (Bldg 01)					
01,02, 03	Women's & Men's Restroom - Walls	Texture/ Color Coat	ND		
		Plaster	ND		
04,05, 06	Exterior – West, North, South Walls	Color Coat	ND		
		Plaster	ND		
07	Roof	Asphalt Shingle	ND		
08	Roof	Underlayment	ND		
09	Roof - Jack	Sealant	ND		
10	Foundation	Concrete	ND		
Concessions (Bldg 02)					
11,12, 13	Interior – West, South, East Walls	Texture/ Color Coat	ND		
		Plaster	ND		
14,15, 16	Exterior – West, North, South Walls	Color Coat	ND		
		Plaster	ND		
17	Roof	Asphalt Shingle	ND		

18	Roof	Underlayment	ND		
19	Roof - Jack	Sealant	ND		
20	Foundation	Concrete	ND		
Ticket Booth #1 (Bldg 03)					
21,22, 23	Exterior – West, South, East Walls	Color Coat	ND		
		Plaster	ND		
24	Roof	Underlayment	ND		
25	Foundation	Concrete	ND		
Ticket Booth #2 (Bldg 04)					
26,27, 28	Exterior – East, South, West Walls	Color Coat	ND		
		Plaster	ND		
29	Roof	Underlayment	ND		
30	Foundation	Concrete	ND		
Ticket Booth #3 (Bldg 05)					
31	Roof	Asphalt Shingle	ND		
32	Roof	Underlayment	ND		
33	Roof - Jack	Grey/ Black Mastic	ND		
34	Foundation	Concrete	ND		
Press Box (Bldg 06)					
35	2nd Floor Press box - Wall	Base Cove Mastic	ND		
36,38, 40	2nd Floor Press box - Wall	Texture/ Paint	ND		
37,39, 41	2nd Floor Press box - Wall	Joint Compound	ND		
		Sheetrock	ND		
42	Roof	Rolled Roofing Material	ND		

43	Foundation	Concrete	ND		
Bleachers					
44,45, 46	Foundation – Northwest, Northeast, South Area	Concrete	ND		

* Determined after composite sampling with associated sheetrock
NS – Not Sampled

COMMENTS AND RECOMMENDATIONS

All samples of suspect materials from the selected areas of this site were negative for asbestos.

CONCLUSIONS AND REGULATIONS

US EPA NESHAP (40 CFR Part 61)

Based on our survey, sampling and subsequent laboratory analysis and regulatory guidelines affecting this site, the types of ACM identified on the previous page require removal (in most cases) prior to demolition and/or renovation procedures to comply with local, state and federal agencies. The US EPA NESHAP (40 CFR Part 61 – November 20, 1990) requires materials containing greater than one percent asbestos be removed prior to renovation or demolition. If those materials are friable or likely to become friable due to the forces expected to act upon them during renovation or demolition, they become a regulated asbestos containing material (RACM) and require a 10-day notification to the local Air Pollution Control District prior to abatement.

CAL OSHA--------Construction Industry--------8CCR, 1529

Cal/OSHA worker health and safety regulations apply during any disturbance of ACM by a person while in the employ of another. This is true regardless of friability or quantity disturbed. If there is greater than 100 square feet of ACM which will be affected by the demolition, a California Licensed Contractor who is registered with Cal/OSHA for asbestos is required. The regulations regarding asbestos are found in Title 8 CCR Section 1529, and include formal notification requirements to Cal/OSHA at least 24 hours prior to removal. It is required that removal be conducted with the material kept in a wetted state to contain dust and hazardous emissions.

The construction industry standard covers employees engaged in demolition and construction, and the following related activities likely to involve asbestos exposure: removal, encapsulation, alteration, repair, maintenance, insulation, spill emergency cleanup, transportation, disposal and storage of ACM.

Demolition contractors typically require that a building owner/operator accept responsibility for removal of all ACM found during the building inspection prior to start of demolition activities.

Non-friable and non-regulated ACM, in most cases, may be disposed of as construction debris in a landfill that accepts ordinary construction debris. All friable waste containing more than 1% asbestos (RACM) should be manifested as hazardous waste for disposal purposes.

LIMITATIONS OF LIABILITY

Conclusions and recommendations presented in this report are qualitative judgments based on the prevailing regulations and accepted industry standards at the time of the report issuance. Leon Environmental Services provides no other guarantees, either expressed or implied. All quantities of materials listed herein are estimates for sampling purposes only and should be verified by Owner representative or an abatement contractor prior to asbestos abatement.

The nature of demolition and asbestos abatement is such that materials can be uncovered which previously were unknown to exist. Therefore, Leon Environmental Services cannot be responsible for materials not previously detected due to lack of accessibility or concealment, although every effort was made during the inspection to detect all suspect materials. If any materials other than those included herein are discovered during renovation or demolition, it must be assumed that the materials are asbestos containing and should be treated accordingly until further testing and analysis is performed.

The data interpretations and recommendations are based solely on information available to Leon Environmental Services at the time of our inspection. The customer recognizes that site conditions or accessibility may vary from those encountered at the time of our inspection and sample collection. Varying conditions or access could result in additional information that would lead us to revise conclusions and recommendations. Leon Environmental Services will not be responsible for the interpretation or use by others of information contained within this report.

Thomas M. Leon Digitally signed by Thomas M. Leon
Date: 2024.10.08 14:24:18 -07'00'

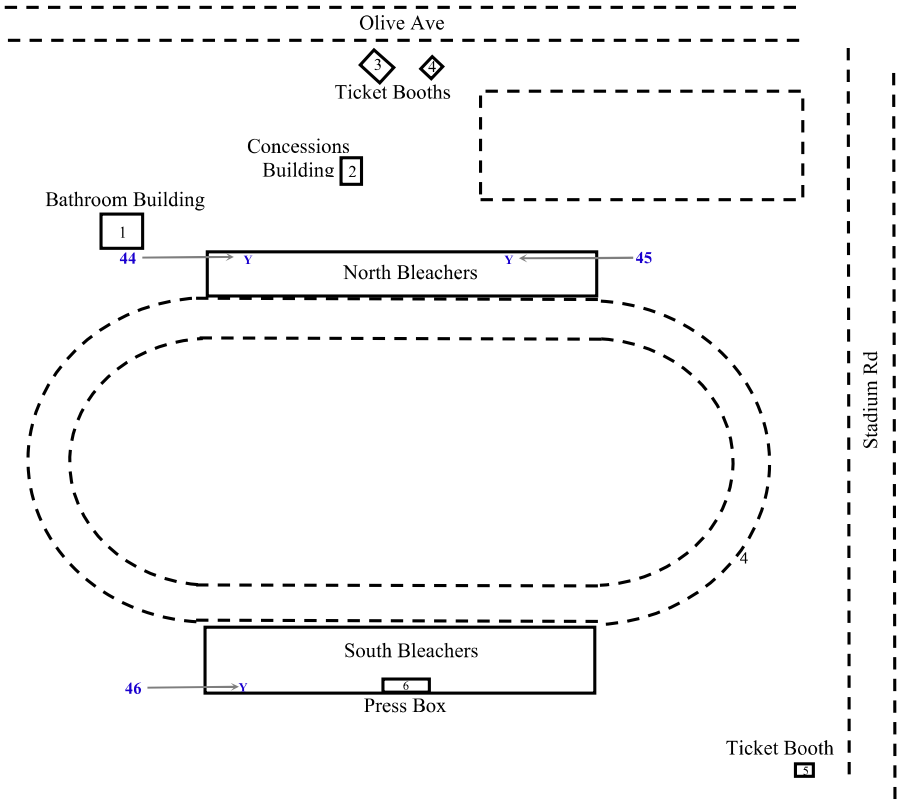
Thomas Leon DATE:
Certified Asbestos Consultant
Certification No. 05-3882

*Abbreviation Key:
Asbestos Containing Material — ACM (equal to or greater than 0.1% by weight)
Vinyl Asbestos Tile – VAT
No Asbestos Detected--N.A.D or N.D.
Homogeneous—H
Not Sampled--NS

Leon Environmental Services

Tommy Leon CAC Certification No. 05-3882

Job S99-24 / Sample Location Diagram
Madera H.S. Memorial Stadium / 800-820 W. Olive Ave., Madera
George Cummings / Madera Unified School District
Drawing not to Scale



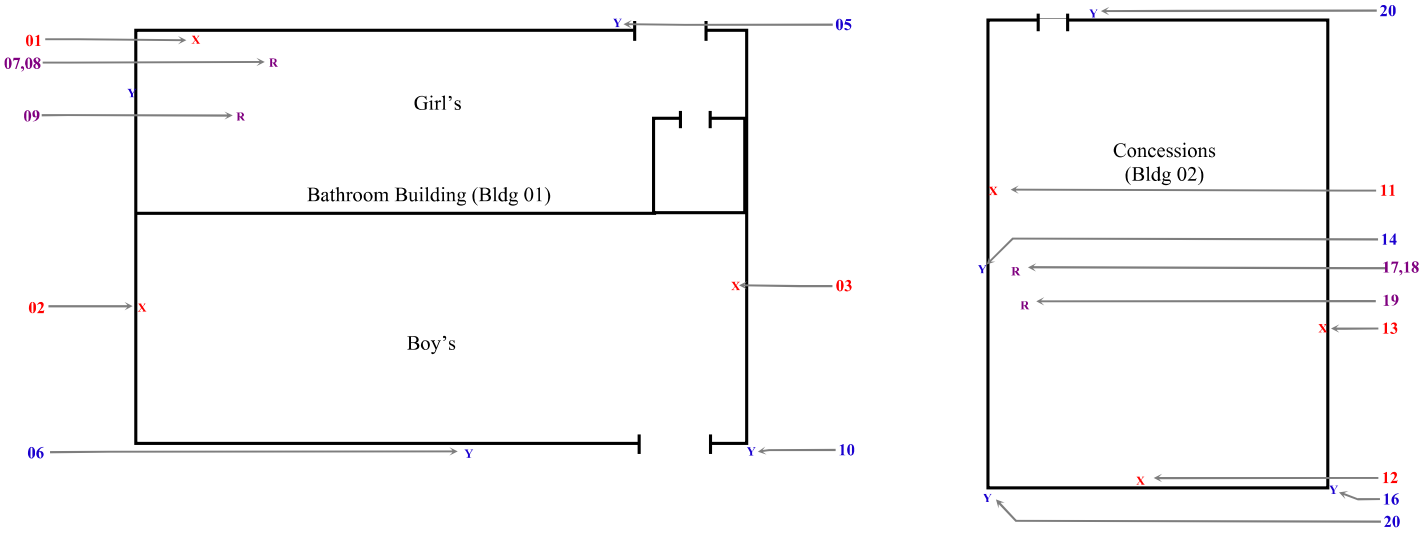
Y = Exterior Samples
X = Interior Samples
R = Roof Samples

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Leon Environmental Services

Tommy Leon CAC Certification No. 05-3882

Job S99-24 / Sample Location Diagram
Madera H.S. Memorial Stadium / 800-820 W. Olive Ave., Madera
George Cummings / Madera Unified School District
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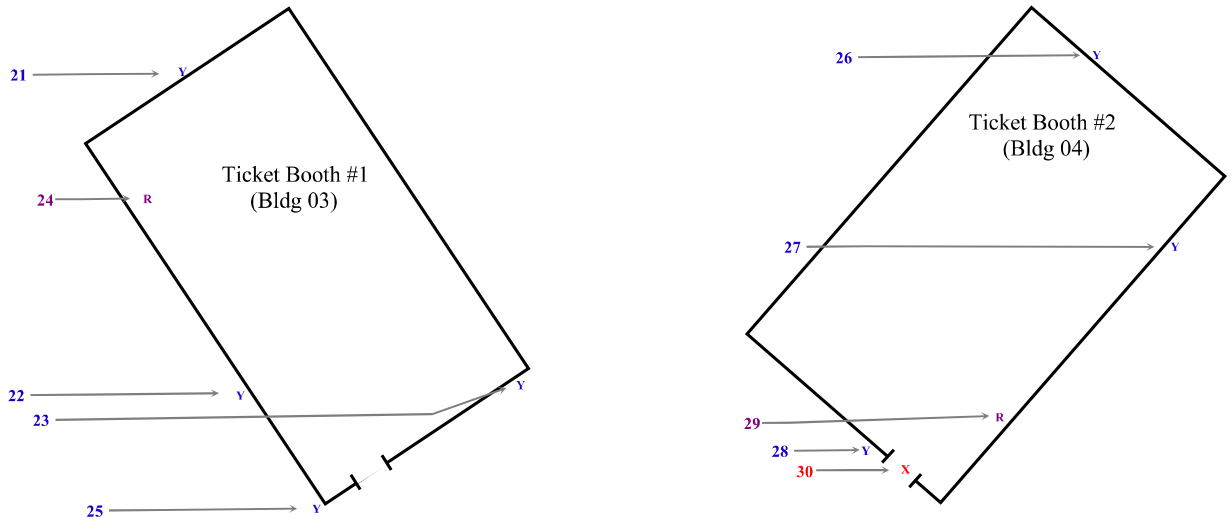
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Leon Environmental Services

Richard "Danny" Leon CAC Certification No. 04-3708
Tommy Leon CAC Certification No. 05-3882

Job S99-24 / Sample Location Diagram
Madera H.S. Memorial Stadium / 800-820 W. Olive Ave., Madera
George Cummings / Madera Unified School District
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Y = Exterior Samples
X = Interior Samples
R = Roof Samples

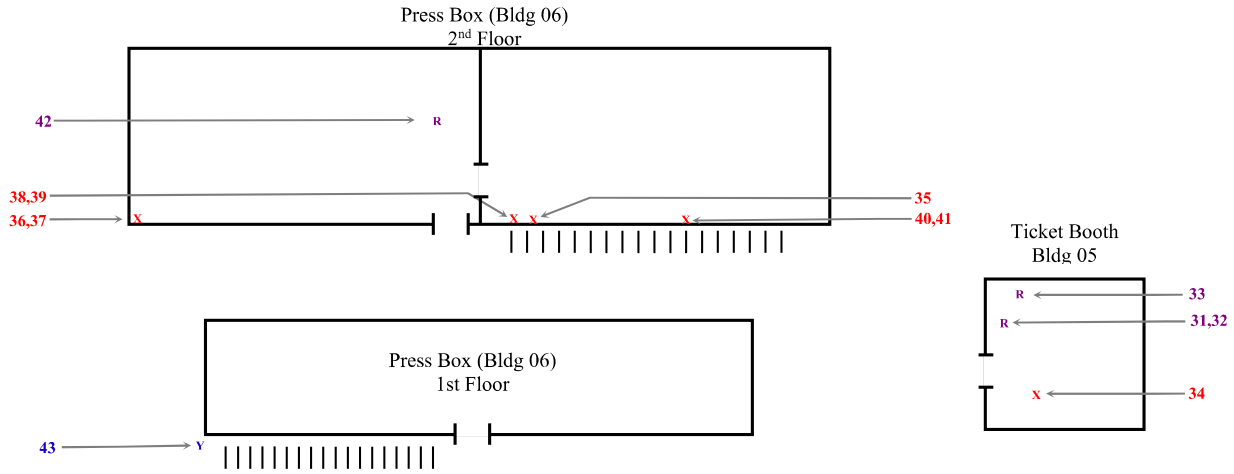
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Leon Environmental Services

Tommy Leon CAC Certification No. 05-3882

Job S99-24 / Sample Location Diagram
Madera H.S. Memorial Stadium / 800-820 W. Olive Ave., Madera
George Cummings / Madera Unified School District
Drawing not to Scale



Y = Exterior Samples
X = Interior Samples
R = Roof Samples

N

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McCall and Spero
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Specialists in Microanalysis

1831 Williamson Court • Suite 100 • Louisville, KY 40223
Phone (502) 244-7135 • FAX (502) 244-7136
E-mail: customerservice@mselabs.com • Website: www.mselabs.com

Date: October 4, 2024

Attention: Tommy Leon
Leon Environmental Services

Subject: Analysis of bulk samples for asbestos mineral fibers by Polarized Light Microscopy (PLM) with Dispersion Staining (EPA/600/R-93/116)

RE: MSE-PO24LEO.3
George Cummings, Madera Unified School District - Madera High School Memorial Stadium: 800-820 W. Olive Ave; Madera, CA Project
LEO# S99-24

Dear Mr. Leon:

McCall & Spero Environmental, Inc. has completed the analysis of the bulk samples we received from your offices on October 2, 2024. These samples represent the bulk samples from the George Cummings, Madera Unified School District - Madera High School Memorial Stadium: 800-820 W. Olive Ave; Madera, CA Project.

The PLM bulk analysis was performed according to the "Method of the Determination of Asbestos in Bulk Building Materials", R. L. Perkins and B. W. Harvey (EPA/600/R-93/116).

The results for the sixty-seven (67) samples are summarized in the following report. Please note that for samples consisting of two or more distinct components, each component is analyzed and reported individually (EPA 40 CFR Part 61 [FRL-4821-71]).

Thank you for consulting McCall & Spero Environmental, Inc. Should you have any questions concerning these results, please contact our office.

Sincerely,

Kevin R. Bean, B.A.
PLM Laboratory Director

NVLAP®
TESTING
NVLAP LAB CODE 101895-0

SUMMARY OF PLM BULK ANALYSIS RESULTS

Project Name: George Cummings, Madera Unified School District - Madera High School Memorial Stadium: 800-820 W. Olive Ave; Madera, CA Project
McCall & Spero Environmental Project No. MSE-PO24LEO.3

MSE # PO24LEO.3	SAMPLE # DESCRIPTION	ASBESTOS TYPE & %	OTHER FIBROUS MATERIAL & %	% NON-FIBROUS MATERIAL	COLOR
001 (A)	01 (A) Texture/Color Coat	ND	Cellulose / 2%	98%	White
001 (B)	01 (B) Plaster	ND	Cellulose / 2%	98%	Gray
002 (A)	02 (A) Texture/Color Coat	ND	Cellulose / 2%	98%	White
002 (B)	02 (B) Plaster	ND	Cellulose / 2%	98%	Gray
003 (A)	03 (A) Texture/Color Coat	ND	Cellulose / 2%	98%	White
003 (B)	03 (B) Plaster	ND	Cellulose / 2%	98%	Gray
004 (A)	04 (A) Color Coat	ND	Cellulose / 2%	98%	White
004 (B)	04 (B) Plaster	ND	Cellulose / 2%	98%	Gray
005 (A)	05 (A) Color Coat	ND	Cellulose / 2%	98%	White
005 (B)	05 (B) Plaster	ND	Cellulose / 2%	98%	Gray
006 (A)	06 (A) Color Coat	ND	Cellulose / 2%	98%	White
006 (B)	06 (B) Plaster	ND	Cellulose / 2%	98%	Gray
007	07 Asphalt Shingle	ND	Cellulose / 5% Glass / 15%	80%	Black
008	08 Underlayment	ND	Cellulose / 65%	35%	Black

SUMMARY OF PLM BULK ANALYSIS RESULTS

MSE # PO24LEO.3	SAMPLE # DESCRIPTION	ASBESTOS TYPE & %	OTHER FIBROUS MATERIAL & %	% NON-FIBROUS MATERIAL	COLOR
009	09 Sealant	ND	Cellulose / 2%	98%	Gray
010	10 Concrete	ND	Cellulose / 2%	98%	Gray
011 (A)	11 (A) Texture/Color Coat	ND	Cellulose / 2%	98%	White
011 (B)	11 (B) Plaster	ND	Cellulose / 2%	98%	Gray
012 (A)	12 (A) Texture/Color Coat	ND	Cellulose / 2%	98%	White
012 (B)	12 (B) Plaster	ND	Cellulose / 2%	98%	Gray
013 (A)	13 (A) Texture/Color Coat	ND	Cellulose / 2%	98%	White
013 (B)	13 (B) Plaster	ND	Cellulose / 2%	98%	Gray
014 (A)	14 (A) Color Coat	ND	Cellulose / 2%	98%	Beige
014 (B)	14 (B) Plaster	ND	Cellulose / 2%	98%	Gray
015 (A)	15 (A) Color Coat	ND	Cellulose / 2%	98%	White
015 (B)	15 (B) Plaster	ND	Cellulose / 2%	98%	Gray
016 (A)	16 (A) Color Coat	ND	Cellulose / 2%	98%	White
016 (B)	16 (B) Plaster	ND	Cellulose / 2%	98%	Gray
017	17 Asphalt Shingle	ND	Cellulose / 5% Glass / 15%	80%	Black

SUMMARY OF PLM BULK ANALYSIS RESULTS

MSE # PO24LEO.3	SAMPLE # DESCRIPTION	ASBESTOS TYPE & %	OTHER FIBROUS MATERIAL & %	% NON-FIBROUS MATERIAL	COLOR
018	18 Underlayment	ND	Cellulose / 65%	35%	Black
019	19 Sealant	ND	Cellulose / 2%	98%	Black
020	20 Concrete	ND	Cellulose / 2%	98%	Gray
021 (A)	21 (A) Color Coat	ND	Cellulose / 2%	98%	White
021 (B)	21 (B) Plaster	ND	Cellulose / 2%	98%	Gray
022 (A)	22 (A) Color Coat	ND	Cellulose / 2%	98%	White
022 (B)	22 (B) Plaster	ND	Cellulose / 2%	98%	Gray
023 (A)	23 (A) Color Coat	ND	Cellulose / 2%	98%	White
023 (B)	23 (B) Plaster	ND	Cellulose / 2%	98%	Gray
024	24 Underlayment	ND	Cellulose / 65%	35%	Black
025	25 Concrete	ND	Cellulose / 2%	98%	Gray
026 (A)	26 (A) Color Coat	ND	Cellulose / 2%	98%	White
026 (B)	26 (B) Plaster	ND	Cellulose / 2%	98%	Gray
027 (A)	27 (A) Color Coat	ND	Cellulose / 2%	98%	White
027 (B)	27 (B) Plaster	ND	Cellulose / 2%	98%	Gray

SUMMARY OF PLM BULK ANALYSIS RESULTS

MSE # PO24LEO.3	SAMPLE # DESCRIPTION	ASBESTOS TYPE & %	OTHER FIBROUS MATERIAL & %	% NON-FIBROUS MATERIAL	COLOR
028 (A)	28 (A) Color Coat	ND	Cellulose / 2%	98%	White
028 (B)	28 (B) Plaster	ND	Cellulose / 2%	98%	Gray
029	29 Underlayment	ND	Cellulose / 65%	35%	Black
030	30 Concrete	ND	Cellulose / 2%	98%	Gray
031	31 Asphalt Shingle	ND	Cellulose / 5% Glass / 15%	80%	Black
032	32 Underlayment	ND	Cellulose / 65%	35%	Black
033	33 Mastic	ND	Cellulose / 2%	98%	Gray/Black
034	34 Concrete	ND	Cellulose / 2%	98%	Gray
035	35 Base Cove Mastic	ND	Cellulose / 3%	97%	Tan
036	36 Texture/Paint	ND	Cellulose / 2%	98%	White
037 (A)	37 (A) Joint Compound	ND	Cellulose / 3%	97%	White
037 (B)	37 (B) Sheetrock	ND	Cellulose / 15%	85%	White
038	38 Texture/Paint	ND	Cellulose / 2%	98%	White
039 (A)	39 (A) Joint Compound	ND	Cellulose / 3%	97%	White
039 (B)	39 (B) Sheetrock	ND	Cellulose / 15%	85%	White

SUMMARY OF PLM BULK ANALYSIS RESULTS

MSE # PO24LEO.3	SAMPLE # DESCRIPTION	ASBESTOS TYPE & %	OTHER FIBROUS MATERIAL & %	% NON-FIBROUS MATERIAL	COLOR
040	40 Texture/Paint	ND	Cellulose / 2%	98%	White
041 (A)	41 (A) Joint Compound	ND	Cellulose / 3%	97%	White
041 (B)	41 (B) Sheetrock	ND	Cellulose / 15%	85%	White
042	42 Rolled Roofing Material	ND	Cellulose / 10% Glass / 10%	80%	Black
043	43 Concrete	ND	Cellulose / 2%	98%	Gray
044	44 Concrete	ND	Cellulose / 2%	98%	Gray
045	45 Concrete	ND	Cellulose / 2%	98%	Gray
046	46 Concrete	ND	Cellulose / 2%	98%	Gray

SUMMARY OF PLM BULK ANALYSIS RESULTS

NOTES:

ND = None Detected	CH = Chrysotile	A = Amosite	AC = Actinolite
CR = Crocidolite	AN = Anthophyllite	TR = Tremolite	

For samples consisting of separate components, each component is analyzed and reported separately.

Results apply only to items tested. Quantification is accurate to within ± 10%. Results from this report must not be reproduced, except in full, with the approval of McCall & Spero Environmental, Inc. This report must not be used to claim product endorsement by NVLAP or any agency of the U.S. Government.

** EPA recommends that bulk materials found negative for asbestos or less than one percent asbestos by polarized light microscopy that fall into one of five dominantly nonfriable categories be reanalyzed by an additional method, such as transmission electron microscopy. (EPA Notice of Advisory, FR Vol. 59, No. 146 & Test Method EPA 600/ R-93/ 116).

Analyst: Kevin R. Bean, B.A. 

Leon Environmental Services

4545 N. Brawley Ave., Suite 104, Fresno, CA 93722 Phone: 559.274.9200 Fax: 559.274.9240 Email: LeonEnviro@comcast.net

Customer: George Cummings **Company** Madera Unified School District

Date: September 30, 2024 **Job No.** S99-24

Analysis (PLM) **Turn Around:** Rush Same Day Next Day (2-3 Day) 4-5 days

Inspection Site : Madera High School Memorial Stadium, 800-820 W. Olive Ave, Madera, CA

Sample No	Location	Material			Quantity
		Color	Type	Friable	
	Building 01				
01	Women's Restroom - Wall		Texture/ Color Coat		
	Women's Restroom - Wall		Plaster		
02	Men's Restroom - West Wall		Texture/ Color Coat		
	Men's Restroom - West Wall		Plaster		
03	Men's Restroom - East Wall		Texture/ Color Coat		
	Men's Restroom - East Wall		Plaster		
04	Exterior - West Wall		Color Coat		
	Exterior - West Wall		Plaster		
05	Exterior - North Wall		Color Coat		
	Exterior - North Wall		Plaster		
06	Exterior - South Wall		Color Coat		
	Exterior - South Wall		Plaster		
07	Roof		Asphalt Shingle		
08	Roof		Underlayment		
09	Roof - Jack		Sealant		
10	Foundation		Concrete		
	Building 02				
11	Interior - West Wall		Texture/ Color Coat		

Relinquished By [signature] Date 09-30-24

Received By [signature] Date 10/2/24

Leon Environmental Services

4545 N. Brawley Ave., Suite 104, Fresno, CA 93722 Phone: 559.274.9200 Fax: 559.274.9240 Email: LeonEnviro@comcast.net

Customer: George Cummings **Company** Madera Unified School District

Date: September 30, 2024 **Job No.** S99-24

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Inspection Site : Madera High School Memorial Stadium, 800-820 W. Olive Ave, Madera, CA

Sample No	Location	Material			Quantity
		Color	Type	Friable	
	Interior - West Wall		Plaster		
12	Interior - South Wall		Texture/ Color Coat		
	Interior - South Wall		Plaster		
13	Interior - East Wall		Texture/ Color Coat		
	Interior - East Wall		Plaster		
14	Exterior - West Wall		Color Coat		
	Exterior - West Wall		Plaster		
15	Exterior - North Wall		Color Coat		
	Exterior - North Wall		Plaster		
16	Exterior - South Wall		Color Coat		
	Exterior - South Wall		Plaster		
17	Roof		Asphalt Shingle		
18	Roof		Underlayment		
19	Roof - Jack		Sealant		
20	Foundation		Concrete		
	Building 03				
21	Exterior - West Wall		Color Coat		
	Exterior - West Wall		Plaster		
22	Exterior - South Wall		Color Coat		

Relinquished By N. Ci Date 09-30-24

Received By Date 10/2/24

Leon Environmental Services

4545 N. Brawley Ave., Suite 104, Fresno, CA 93722 Phone: 559.274.9200 Fax: 559.274.9240 Email: LeonEnviro@comcast.net

Customer: George Cummings **Company** Madera Unified School District

Date: September 30, 2024 **Job No.** S99-24

Analysis (PLM) **Turn Around:** Rush Same Day Next Day (2-3 Day) 4-5 days

Inspection Site : Madera High School Memorial Stadium, 800-820 W. Olive Ave, Madera, CA

Sample No	Location	Material			Quantity
		Color	Type	Friable	
	Exterior - South Wall		Plaster		
23	Exterior - East Wall		Color Coat		
	Exterior - East Wall		Plaster		
24	Roof		Underlayment		
25	Foundation		Concrete		
	Building 04				
26	Exterior - East Wall		Color Coat		
	Exterior - East Wall		Plaster		
27	Exterior - South Wall		Color Coat		
	Exterior - South Wall		Plaster		
28	Exterior - West Wall		Color Coat		
	Exterior - West Wall		Plaster		
29	Roof		Underlayment		
30	Foundation		Concrete		
	Building 05				
31	Roof		Asphalt Shingle		
32	Roof		Underlayment		
33	Roof - Jack	Grey/ Black	Mastic		

Relinquished By N. Cin Date 09-30-24

Received By Date 10/2/24

Leon Environmental Services

4545 N. Brawley Ave., Suite 104, Fresno, CA 93722 Phone: 559.274.9200 Fax: 559.274.9240 Email: LeonEnviro@comcast.net

Customer: George Cummings **Company** Madera Unified School District

Date: September 30, 2024 **Job No.** S99-24

Analysis (PLM) **Turn Around:** Rush Same Day Next Day (2-3 Day) 4-5 days

Inspection Site : Madera High School Memorial Stadium, 800-820 W. Olive Ave, Madera, CA

Sample No	Location	Material			Quantity
		Color	Type	Friable	
34	Foundation		Concrete		
	Building 06				
35	2nd Floor Pressbox - Wall		Base Cove Mastic		
36	2nd Floor Pressbox - Wall		Texture/ Paint		
37	2nd Floor Pressbox - Wall		Joint Compound		
	2nd Floor Pressbox - Wall		Sheetrock		
38	2nd Floor Pressbox - Wall		Texture/ Paint		
39	2nd Floor Pressbox - Wall		Joint Compound		
	2nd Floor Pressbox - Wall		Sheetrock		
40	2nd Floor Pressbox - Wall		Texture/ Paint		
41	2nd Floor Pressbox - Wall		Joint Compound		
	2nd Floor Pressbox - Wall		Sheetrock		
42	Roof		Rolled Roofing Material		
43	Foundation		Concrete		
	Bleachers				
44	Foundation - Northwest Area		Concrete		
45	Foundation - Northeast Area		Concrete		
46	Foundation - South Area		Concrete		

Relinquished By [signature] **Date** 09-30-24

Received By [signature] **Date** 10/2/24

STORMWATER POLLUTION PREVENTION PLAN

for

Madera High School Stadium

Project Location:
Madera, CA

RISK LEVEL: 1

Legally Responsible Person (LRP):
Madera Unified School District
1205 S. Madera Ave.
Rosalind Cox
559-675-4548

Project Address:
Southwest Corner of W. Olive Ave. and Stadium Rd.

SWPPP Prepared by:

Blair, Church & Flynn
CONSULTING ENGINEERS
Gabriel Ledesma
451 Clovis Avenue #200, Clovis, CA 93612

SWPPP Preparation Date:
February 7, 2025

WDID #	5F20C408034
Application ID	584728

Estimate Construction Dates	Site Operation Hours
June 1, 2025 – December 31 2026	M-F, 7:00AM – 5:00PM

Contact	Name	Phone Number	License/Certification #
Qualified SWPPP Developer	Gabriel Ledesma	(559) 326-1400	#28909
Co-Qualified SWPPP Developer	Michael Gennaro	(559) 326-1400	#28547
Qualified SWPPP Practitioner	TBD		
QSP Trained Delegates	TBD		

Table of Contents

Table of Contents ..... **ii**
List of Acronyms **1**
Qualified SWPPP Developer (QSD) ..... **ii**
Qualified SWPPP Practitioner (QSP) ..... **iii**
Amendment Log ..... **iv**
Section 1 SWPPP Requirements **1-1**
1.1 Introduction 1-1
1.2 Permit Registration Documents 1-2
1.3 SWPPP Availability and Implementation 1-2
1.4 SWPPP Amendments 1-3
1.5 Retention of Records 1-4
1.6 Required Reporting 1-5
1.7 Changes to Permit Coverage 1-5
1.8 Notice of Termination 1-6
Section 2 Project Information **2-1**
2.1 Project and Site Description 2-1
2.1.1 Site Description 2-1
2.1.2 Existing Conditions 2-1
2.1.3 Existing Drainage 2-1
2.1.4 Geology and Groundwater 2-2
2.1.5 Project Description 2-2
2.1.6 Developed Condition 2-2
2.2 Permits and Governing Documents 2-3
2.3 Stormwater Run-On from Offsite Areas 2-3
2.4 Findings of the Construction Site Sediment and Receiving Water Risk Determination 2-4
2.5 Construction Schedule 2-5
2.6 Potential Construction Activity and Pollutant Sources 2-5
2.7 TMDL Requirements 2-6
2.8 Identification of Non-Stormwater Discharges 2-6
2.9 Required Site Map Information 2-7
Section 3 Best Management Practices **3-1**
3.1 Schedule for BMP Implementation 3-1
3.2.1 Erosion Control 3-6

3.2.2 Sediment Controls 3-16
3.3 Non-Stormwater Controls and Waste and Materials Management 3-22
3.3.1 Non-Stormwater Controls 3-22
3.3.2 Materials Management and Waste Management 3-32
3.4 TMDL-Related BMPs 3-47
3.5 Post Construction Stormwater Management Measures 3-47
Section 4 BMP Inspection and Maintenance 4-1
4.1 BMP Inspection and Maintenance 4-1
Section 5 Training 5-1
Section 6 Responsible Parties and Operators 6-1
6.1 Responsible Parties 6-1
6.2 Contractor List 6-3
Section 7 Construction Site Monitoring Program 7-1
7.1 Purpose 7-1
7.2 Applicability of Permit Requirements 7-1
7.3. Weather and Precipitation Event Tracking 7-1
7.4 Monitoring Locations 7-2
7.5 Safety and Monitoring Exemptions 7-2
7.6 Visual Monitoring 7-2
7.7 Sampling and Analysis Plan for Non-Visible Pollutants in Stormwater Runoff Discharges 7-10
7.7.9 Quality Assurance and Quality Control 7-23
7.8 Sampling and Analysis Plan for Dewatering Discharges 7-25
7.9 Sampling and Analysis Plan for Other Pollutants Required by the Regional Water Board 7-30
7.10 Training of Sampling Personnel 7-30
7.11 Records Retention 7-30
Section 8 References 8-1

List of Appendices

Appendix A: Site Maps and Drawings

Appendix B: Permit Registration Documents

Appendix C: SWPPP Amendment QSD Certifications

Appendix D: Submitted Changes of Information

Appendix E: Construction Schedule

Appendix F: Construction Activities, Materials Used, and Associated Pollutants

Appendix G: CASQA Stormwater BMP Handbook: Construction Fact Sheets

Appendix H: BMP Inspection Form

Appendix I: Training Forms

Appendix J: Responsible Parties

Appendix K: Contractors and Subcontractors

Appendix L: Post-Construction Calculations/ Demonstration

Appendix M: Weather Reports

Appendix N: Monitoring Records

Appendix O: Storm Event/Dewatering Monitoring Forms

Appendix P: Field Meter Instructions

Appendix Q: Supplemental Information

Appendix R: Construction General Permit

List of Acronyms

AS	Approved Signatory
ATS	Active Treatment System
BAT	Best Available Technology Economically Achievable
BCT	Best Conventional Pollutant Control Technology
BMP	Best Management Practices
CFR	Code of Federal Regulations
CGP	NPDES 2022 CGP for Storm Water Discharges Associated with Construction Activities
COC	Chain of Custody
CPESC	Certified Professional in Erosion and Sediment Control
CPSWQ	Certified Professional in Storm Water Quality
CSMP	Construction Site Monitoring Plan
CWA	Clean Water Act
DAR	Duly Authorized Representative
DWQ	Division of Water Quality
EPA	Environmental Protection Agency
LRP	Legally Responsible Person
MRR	Monitoring and Reporting Requirements
MS4	Municipal Separate Storm Sewer System
NAL	Numeric Action Level
NEL	Numeric Effluent Limitation
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NOT	Notice of Termination
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NTU	Nephelometric Turbidity Units
O&M	Operation and Maintenance
PRDs	Permit Registration Documents
QPE	Qualifying Precipitation Event
QSD	Qualified SWPPP Developer
QSP	Qualified SWPPP Practitioner
RUSLE2	Revised Universal Soil Loss Equation, Version 2
RW	Receiving Water
RWQCB	Central Valley Regional Water Quality Control Board (Fresno Office)
SMARTS -	Storm Water Multi Application Reporting and Tracking System
SSC	Suspended Sediment Concentration
SWMP	Storm Water Management Plan
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TMDL	Total Maximum Daily Load
WDID	Waste Discharge Identification Number
WQO	Water Quality Objective

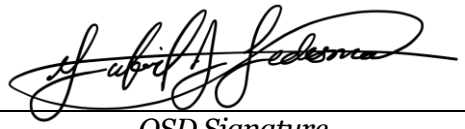
Qualified SWPPP Developer (QSD)

Approval and Certification of the Stormwater Pollution Prevention Plan

Project Name: Madera High School Stadium

Project Number/ID: **5F20C408034**

"This Stormwater Pollution Prevention Plan and its appendices were prepared under my direction to meet the requirements of the California Construction Stormwater General Permit (*Order No. 2022-0057-DWQ*). I certify that I am a Qualified SWPPP Developer in good standing as of the date signed below and will maintain up to date credentials for the duration of the project."



QSD Signature

February 7, 2025

Date

Gabriel Ledesma

QSD Name

28909

QSD Certificate Number

QSD, CPESC, Assistant Environmental Specialist at Blair, Church & Flynn Consulting Engineers

Title and Affiliation

(559) 326-1400

Telephone Number

gledesma@bcf-engr.com

Email

Qualified SWPPP Practitioner (QSP)

Project Name: Madera High School Stadium

Project Number/ID: **5F20C408034**

The QSP identified below shall complete and oversee the implementation and documentation of the construction site monitoring plan elements (CSMP) contained in this Stormwater Pollution Prevention Plan and the California Construction Stormwater General Permit (*Order No. 2022-0057-DWQ*). The QSP shall complete all documentation truthfully and shall not misrepresent their qualifications or active certificate status while acting as the QSP for the Project.

TBD

QSP Signature | *Date*

QSP Name | *QSP Certificate Number*

Title and Affiliation | *Telephone Number*

Email

Amendment Log

Project Name: Madera High School Stadium

Project Number/ID: **5F20C408034**

Amendment No.	Date	Brief Description of Amendment (include section and page number)	Prepared and Approved By
			Name: QSD#
			Name: QSD#
			Name: QSD#

The SWPPP will be revised when:

- There is a 2022 CGP violation (2022 CGP Section VI.Q.1);
- There is a reduction or increase in total disturbed acreage (2022 CGP Section III.F.2. and F.4);
- BMPs are not effective and are not resulting in a reduction or elimination of pollutants in stormwater discharges and authorized non-stormwater discharges (2022 CGP Section VI.Q.1 and Attachment E Section III.C.5);
- There is a change in the project duration that changes the project Risk Type (2022 CGP Section III.F.1);
- Dischargers with projects where all construction activities (including passive treatment, active treatment systems, and/or active equipment) will be suspended for 30 days or more (2022 CGP Section III.G).

Section 1 SWPPP Requirements

1.1 INTRODUCTION

This Stormwater Pollution Prevention Plan (SWPPP) is designed to comply with California's *General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities (2022 CGP),* State Water Resources Control Board (State Water Board) *Order No. 2022-0057-DWQ (NPDES No. CAS000002)* (Appendix R). This SWPPP has been prepared following the 2022 CGP SWPPP Template for Traditional Projects provided in the California Stormwater Quality Association (CASQA) Stormwater *Best Management Practice (BMP) Handbook: Construction* (CASQA 2023).

This project is considered a traditional construction project.

In accordance with the 2022 CGP, Section IV.O, this SWPPP is designed to address the following:

- Identification of all pollutants, their sources, and control mechanisms, including sources of sediment associated with all construction activities (e.g., sediment, paint, cement, stucco, cleaners, site erosion);
- Pollutant source assessments, including a list of potential pollutant sources and identification of site areas where additional BMPs are necessary to reduce or prevent pollutants in stormwater and authorized non-stormwater discharges, per the minimum requirements when developing the pollutant source assessment;
- Description of site-specific BMPs implemented to reduce or eliminate stormwater pollution;
- Where not otherwise required to be under a Regional Water Quality Control Board (Regional Water Board) permit, all non-stormwater discharges are identified and either eliminated, controlled, or treated;
- Site BMPs are effective and result in the reduction or elimination of pollutants in stormwater discharges and authorized non-stormwater discharges from construction activity to the Best Available Technology/Best Control Technology (BAT/BCT) standard; and;
- Stabilization BMPs are installed to reduce or eliminate pollutants after construction is completed are effective and maintained; and
- Calculations and design details, as well as BMP controls, are complete and correct.

The Madera High School Stadium project (Project, or Site) comprises approximately 9.97 acres, of which 9.55 acres will be disturbed. The Project is located at Southwest Corner of W. Olive Ave. and Stadium Rd. The property is owned and being developed by Madera Unified School District . The project's location is shown on the Site Maps in Appendix A.

The Project includes the demolition of existing improvements, and the construction of a new track surfacing, synthetic turf replacement for the football/soccer field, field house, bleachers, walkway improvements surrounding the track, a new press box, and bathrooms. Additionally, new landscaped areas will be constructed throughout the site and a new chainlink fence will be installed along the east and north perimeter. A underground stormwater storage system would also be installed to offset the additional stormwater runnoff that will result from the Project.

1.2 PERMIT REGISTRATION DOCUMENTS

Required Permit Registration Documents (PRDs) shall be submitted to the State Water Board via the Stormwater Multi Application and Report Tracking System (SMARTS) by the LRP or DAR. The project-specific PRDs include (2022 CGP Section III.A):

1. Notice of Intent (NOI);
2. Risk Level Determination (Construction Site Sediment and Receiving Water Risk Determination);
3. Site Drawings and Map;
4. SWPPP;
5. Applicable plans, calculations, and other supporting documentation for compliance with the Phase I or Phase II municipal separate storm sewer system (MS4) post construction requirements or the post-construction standards of the 2022 CGP:
    - Attachment or web-source containing the applicable Phase I or Phase II MS4 post construction requirements;
    - The post construction plans and calculations submitted to or approved by the applicable Phase I or Phase II MS4; and/or
    - Post-construction water balance calculation;
6. Dischargers proposing an alternate K-factor or LS-factor must submit documentation to support the site-specific factors, if applicable;
7. Active Treatment System (ATS) Plan, if applicable;
8. Passive Treatment Plan, if applicable;
9. Dewatering Plan, if applicable;
10. Annual Fee per the current 23 California Code of Regulations Chapter 9 fee schedule for National Pollutant Discharge Elimination System (NPDES) stormwater permits; and
11. Signed Certification Statement (LRP Certification is provided electronically with SMARTS PRD submittal).

Site Maps can be found in Appendix A. A copy of the submitted PRDs shall also be kept in Appendix B along with the Waste Discharge Identification (WDID) confirmation.

1.3 SWPPP AVAILABILITY AND IMPLEMENTATION

The SWPPP will be available at the construction site during working hours list on the title sheet and Section 7.5, while construction is occurring and shall be made available upon request by a federal, state, or municipal inspector. A current copy of the site-specific SWPPP and any site inspection reports required by the 2022 CGP may be kept in electronic format at the site so long as the information requested by a federal, state, or municipal inspector can be made available during an inspection. Legible maps in hard copy must be available at the site (2022 CGP Section IV.O.1.).

The SWPPP must be implemented at the appropriate level to protect water quality at all times throughout the life of the project. The SWPPP must remain on the site during construction activities, commencing with the initial mobilization and ending with the termination of coverage under the 2022 CGP.

1.4 SWPPP AMENDMENTS

The SWPPP will be revised when:

- If there is a 2022 CGP violation (2022 CGP Section VI.Q.1);
- There is a reduction or increase in total disturbed acreage (2022 CGP Section III.F.2 and F.4.);
- BMPs are not effective and are not resulting in a reduction or elimination of pollutants in stormwater discharges and authorized non-stormwater discharges (2022 CGP Section VI.Q.1 and Attachment D Section III.C.5);
- There is a change in the project duration that changes the project's risk level (2022 CGP Section III.F.1); or
- Dischargers with projects where all construction activities (including passive treatment, active treatment systems, and/or active equipment) will be suspended for 30 days or more (2022 CGP Section III.G.).

Additionally, the SWPPP will be amended when:

- There is a change in construction or operations that may affect the discharge of pollutants to surface waters, groundwater(s), or a municipal separate storm sewer system (MS4) (2022 CGP Sections IV.O. and VI.Q.1); or

When deemed necessary by the QSD. The QSD has determined that the changes listed in Table 1-1 can be field determined by the QSP. All other changes will be made by the QSD as formal amendments to the SWPPP. Note that the 2022 CGP requires that the QSD revise the SWPPP to address potential problems identified by visual inspections, sampling data, comments from a QSP, or their own site observations (2022 CGP Section V.C.2.).

The following items shall be included in each amendment:

- Who requested the amendment;
- The location of proposed change;
- The reason for change;
- The original BMP(s) proposed, if any;
- The new BMP(s) proposed; and
- QSD certification.

SWPPP amendments will be logged at the front of the SWPPP and SWPPP Amendment QSD certifications will be located in Appendix C. The SWPPP text will be revised, replaced and/or hand annotated as necessary to properly convey the amendment. SWPPP amendments must be made by a QSD. The following changes have been designated by the QSD as "to be field determined" and constitute minor changes that the QSP may implement based on field conditions.

Table 1-1 List of Changes to be Field Determined

Candidate changes for field location or determination by QSP (1)	Indicates changes that may be field located or field determined by QSP/Delegates
Increase quantity of Erosion or Sediment Control Measures	☒ Yes ☐ No
Relocate/Add stockpiles or stored materials	☒ Yes ☐ No
Relocate/Add toilets – Shall include a containment tray	☒ Yes ☐ No
Relocate vehicle storage and/or fueling locations	☒ Yes ☐ No
Relocate concrete waste management facilities	☒ Yes ☐ No
Relocate areas for waste storage	☒ Yes ☐ No
Relocate water storage and/or water transfer location	☒ Yes ☐ No
Changes to access points (entrance/exits)	☒ Yes ☐ No
Change type of Erosion or Sediment Control Measures – Changes may only include BMPs indicated within Section 3.1 of this SWPPP	☒ Yes ☐ No
Changes to location of Erosion or Sediment Control Measures	☒ Yes ☐ No
Minor changes to schedule or phases	☒ Yes ☐ No
Changes in construction materials	☒ Yes ☐ No
(1) Any field changes not identified for field location or field determination by the QSP must be made as an amendment by the QSD.	

1.5 RETENTION OF RECORDS

Paper or electronic records of documents required by this SWPPP will be retained for a minimum of three years from the date generated or date submitted, whichever is later, for the following items:

- SWPPP;
- Visual monitoring reports;
- Sampling equipment calibration records;
- pH and turbidity sampling field sheets;
- Analytical laboratory reports; and
- QSP training records of Contractor staff for BMP implementation, installation, and maintenance
- QSP delegate training records, if applicable

These records will be available at the Site until construction is complete. Records assisting in the determination of compliance with the 2022 CGP will be made available within a reasonable time to the Regional Water Board, State Water Board, or U.S. Environmental Protection Agency (EPA) upon request. Requests by the Regional Water Board for retention of records for a period longer than three years will be adhered to.

1.6 REQUIRED REPORTING

Completed inspection checklists are not required to be submitted to the Regional Water Board. However, completed inspection checklists will be kept with the SWPPP on-site or electronically and provided to the LRP upon termination of the SWPPP. The 2022 CGP requires that permittees prepare, certify, and electronically submit an Annual Report no later than September 1 of each year. Reporting requirements are identified in 2022 CGP Section VI.P. Annual reports will be filed in SMARTS and in accordance with information required by the online forms.

Planned changes in site construction activities that may result in non-compliance with the 2022 CGP are required to be provided in writing to the Regional Water Board and local stormwater agency in advance of the changes.

If a 2022 CGP discharge violation occurs, the QSP will immediately notify the LRP. The LRP will include information on the violation with the Annual Report. Corrective measures will be implemented immediately following identification of the discharge or written notice of non-compliance from the Regional Board. Discharges and corrective actions must be documented and include the following items:

- The date, time, location, nature of operation, and type of unauthorized discharge;
- The cause or nature of the notice or order;
- The BMPs deployed before the discharge event, or prior to receiving notice or order; and
- The date of deployment and type of BMPs deployed after the discharge event, or after receiving the notice or order, including additional measures installed or planned to reduce or prevent re-occurrence.

The Project is located in the Central Valley (Fresno) Regional Water Quality Control Board which has no water bodies with TMDL NALs and/or NELs, so there are no applicable TMDL NALs and/or NELs for the Project.

The Project will not use an Active Treatment System so there are no applicable NELs for the Project.

The Regional Water Board will be notified via email 24 hours prior to the beginning of a planned dewatering discharge.

In the event of an emergency dewatering, the Regional Water Board and applicable MS4 are to be notified within 24 hours of a discharge occurring. An emergency is defined as the need to protect human life and health or prevent severe property damage.

Results of (pH and turbidity, etc.) monitoring will be electronically submitted through SMARTS for all field sampling results within 30 days of the completion of the precipitation event or within 10 days if the field sampling results demonstrate the exceedance of the pH and/or turbidity NALs.

See Section 7.7.4.5 for additional discussion of the reporting requirements including contacts for Regional Water Board and MS4 notifications.

The Project will not utilize Passive Treatment so there is no Passive Treatment Plan for the Project.

1.7 CHANGES TO PERMIT COVERAGE

The 2022 CGP allows for the reduction or increase of the total acreage covered under the 2022 CGP when: a portion of the project is complete and/or conditions for termination of coverage

have been met; when ownership of a portion of the project is purchased by a different entity; or when new acreage is added to the project.

Modified PRDs will be filed electronically through a Change of Information (COI) within 30 days of a reduction or increase in total disturbed area if a change in permit-covered acreage is to be sought. The SWPPP will be modified appropriately and will be logged at the front of the SWPPP. SWPPP Amendments QSD Certifications will be located in Appendix C. COIs submitted electronically via SMARTS can be found in Appendix D.

1.8 NOTICE OF TERMINATION

A Notice of Termination (NOT) must be submitted electronically by the LRP or DAR via SMARTS to terminate coverage under the 2022 CGP.

According to the requirements of 2022 CGP Section III.H.4., the one or more of the following final stabilization method will be used to satisfy final stabilization condition requirements:

- 70 percent final cover method supported by pre- and post-project photographs demonstrating stabilization.
- RUSLE or RUSLE2 method with computation proof supported by pre- and post-project photographs demonstrating stabilization.
- Custom method for which Regional Water Board approval has been obtained, supported by documentation required by the Regional Water Board and pre- and post- project photographs demonstrating stabilization.

The Regional Water Board will consider a construction site complete when the conditions of the 2022 CGP Section III.H., have been met.

The discharger is required to submit the following in SMARTS:

- NOT SMARTS Form;
- QSP-prepared final NOT inspection which includes the QSP name and valid QSP certificate number;
- Final site map with photo orientation references;
- Photos demonstrating final stabilization and the applicable post-construction BMPs and/or low impact development; and
- A long-term maintenance plan for the post-construction stormwater runoff BMPs and/or low impact development features being implemented.

According to the 2022 CGP, the NOT will be automatically approved within 30 calendar days after the date the NOT was submitted, unless, within the 30 calendar days the Regional Water Board notifies the discharger through SMARTS that the Notice of Termination has been denied, returned, or accepted for review (2022 CGP Section III.H.7).

Note: If an Annual Report has not been filed in the current reporting year, an Annual Report will need to be submitted prior to the NOT.

Section 2 Project Information

2.1 PROJECT AND SITE DESCRIPTION

2.1.1 Site Description

The Madera High School Stadium project site is Risk Level 1, comprises approximately 9.97, and is located at Southwest Corner of W. Olive Ave. and Stadium Rd.. The project site is located approximately 0.5 miles west of Hwy 99 and Hwy 145. The project site is located approximately 0.15 miles north of the Main Canal, and 1.10 miles south of the Fresno River. The project is located at 36.952085, -120.066450 and is identified on the Site Map in Appendix A.

2.1.2 Existing Conditions

As of the initial date of this SWPPP, the project site is an existing athletic facility for the nearby high school. The facility includes impervious areas such as asphalt basketball courts, synthetic turf playing fields, rubberized tracks, concrete walkways, small buildings, and concrete bleachers. Pervious areas include grassy fields and landscaped areas. An underground storm drainage system exists on site and conveys flows to the City of Madera's stormwater system. The project site was previously developed with agricultural uses including row crop cultivation.

There are no known historical sources of potential contamination at the project site according to the Department of Toxic Substances Control (DTSC) *Envirostor* database (California Department of Toxic Substances Control, 2024).

There three (3) Leaky Underground Storage Tanks (LUST) cases associated with a Madera Unified School District (MUSD) Transportation parking lot approximately 500 ft. from the Project Site, according to the SWRCB's GeoTracker database (State Water Resources Control Board, 2024). All three cases have been closed and issues Case Closure letters from the Regional Water Quality Control Board stating that no further action is required for all three cases.

2.1.3 Existing Drainage

The project site is relatively level. The elevation of the project site ranges from 265 and 263 feet above mean sea level (msl), though berms constructed to support the stadium's bleachers rise up to 290 feet above msl. Surface drainage at the site currently flows as sheet flow and channelized flow to storm drains throughout the site. Surface drainage on the track and playing fields flow towards the edges of the field as sheet flow and percolate into an engineered, permeable base with perforated pipes. The existing campus underground stormwater conveyance system conveys flows to the northeast of the site where it connects to an underground section of the Colony Ditch, owned and operated by the Madera Irrigation District. Existing site topography, drainage patterns, and stormwater conveyance systems are shown on Site Maps Figures 2A and 2B in Appendix A.

The project discharges to the Stadium Basin. The water quality impairments (303 (d) list and TMDLs identified in the 2022 CGP Table H-1 for the receiving waters are identified in the Table 2-1.

Table 2-1 Applicable 303(d) List Impairments and TMDLs

Receiving Water	Water Quality Impairment	
	303(d) list[1]	TMDL (2022 CGP Table H-1)

Colony Ditch	N/A	None

[1] (State Water Resources Control Board (2), 2022)

Additional compliance actions applicable to the project are discussed in more detail in Section 7.7.

2.1.4 Geology and Groundwater

The site is underlain by sandy silt and silty sand to a depth of 21.5 feet below surface level (bsl) , according to a Geotechnical Report prepared for the Project (Gorham & Popenoe, 2023).

According to a groundwater monitoring well approximately 3.00 miles to the southeast (Site Code: 369149N1200385W001 with most recent measurements from October 19, 2023, groundwater occurs beneath the site at approximately 175.30 feet below ground surface. The groundwater gradient is toward the southwest (California Department of Water Resources, 2024).

2.1.5 Project Description

Project grading will occur on approximately 8.33 acres of the project, which comprises approximately 76.43% percent of the total area. The limits of grading are shown on Site Maps Figures 3A and 3B in Appendix A. Grading will include both cut and fill activities, with the total graded material estimated to be 6,300 cubic yards of cut material and 2,500 cubic yards of fill. Graded materials are expected to be balanced and any remaining material would be hauled away. Soil will be stockpiled in the staging area located in the west area of the site as shown on Site Maps Figures 3A and 3B in Appendix A. Construction activities will occur in different phases including demolition of existing structures, grading which will include the removal of a 25 foot berm, utility installation, vertical construction, installation of new synthetic turf and rubber track, and installation of new landscaping around the Project site.

Table 2-2 Construction Site Estimates

	Acres	Percent of Site
Total Construction site area	9.97	100%
Area of disturbance	9.55	95.79%
Area of grading	8.33	83.55%

2.1.6 Developed Condition

Post-construction surface drainage will be directed to the as sheet flow or channelized flow to storm drains throughout the Site.

Surface drainage north of the stadium will flow as sheet flow towards a trench drain that will service the stadium entrance. Surface drainage on the newly constructed bleachers will flow downslope as sheet flow towards trench drains at the base of each set of bleachers.

Surface drainage on the track and playing fields flow towards the edges of the field as sheet flow and percolate into an engineered, permeable base with perforated pipes. Additionally, surface

drainage will percolate into the sandy jump pits to the east where water will enter perforated pipes.

Surface drainage at the south side of the stadium and around the field house will flow towards storm drains as surface flow or as channelized flow in valley gutters.

All storm drains, perforated pipes, and trench drains will convey surface drainage to the campus underground stormwater conveyance system. The on-site drainage system conveys flows to the northeast to discharge to an underground section of the Colony Ditch. However, all stormwater collected from the Project site will first pass through a new underground stormwater storage system prior to discharging offsite. The underground storage system is designed to retain and infiltrate stormwater up to the volume produced during a 100-year, 10-day storm. Any excess stormwater will flow into the local Colony Ditch.

Post-construction drainage patterns and conveyance systems are presented on Site Maps Figures 4A.i and 4B.i in Appendix A.

The changes of impervious areas/drainage patterns resulting from the Project and demonstration of the Project complying with the post-construction requirements of the local MS4 are presented in Appendix L

2.2 PERMITS AND GOVERNING DOCUMENTS

In addition to the 2022 CGP, the following documents have been taken into account while preparing this SWPPP:

- Regional Water Board requirements
- Basin Plan requirements
- Contract Documents
- Air Quality regulations and permits
- State Water Board GeoTracker database (GeoTracker)
- Federal Endangered Species Act – Not applicable.
- National Historic Preservation Act/Requirements of the State Historic Preservation Office – Not applicable.
- State of California Endangered Species Act – Not applicable.
- Clean Water Act Section 401 Water Quality Certifications and 404 Permits – Not applicable.
- CA Department of Fish and Game 1600 Streambed Alteration Agreement – Not applicable.
- California Ocean Plan – Not applicable.

2.3 STORMWATER RUN-ON FROM OFFSITE AREAS

There is no anticipated offsite run-on to this construction site because there are no upgradient drainage areas.

2.4 FINDINGS OF THE CONSTRUCTION SITE SEDIMENT AND RECEIVING WATER RISK DETERMINATION

A construction site risk assessment has been performed for the project and the resultant risk level is Risk Level 1. The factors used to calculate risk level were determined by the use of the standard methods in the CGP.

- The R-value was determined from EPA's *Rainfall Erosivity Factor Calculator for Small Construction S*ites at: https://lew.epa.gov/ in accordance with the State Water Board Guidance for multi-year projects at: https://www.waterboards.ca.gov/water_issues/programs/stormwater/smarts/construction/docs/rfactor_guide.pdf,
- K and LS factors used were provided by SMARTS for the Project region.

The risk level is based on project duration, location, proximity to impaired receiving waters, and soil conditions. A copy of the Risk Level determination submitted on SMARTS with the PRDs is included in Appendix B.

Table 2-3 and Table 2-4 summarize the sediment and receiving water risk factors and document the sources of information used to derive the factors.

Table 2-3 Summary of Sediment Risk

RUSLE Factor	Value	Method for Establishing Value
R	34.24	EPA's *Rainfall Erosivity Factor Calculator for Small Construction Sites*
K	0.32	SWRCB K-Factor Map, Generated by SMARTS
LS	0.2	SWRCB LS-Factor Map, Generated by SMARTS
Total Predicted Sediment Loss (tons/acre)		**2.14**
Overall Sediment Risk Low Sediment Risk < 15 tons/ acre Medium Sediment Risk >= 15 and < 75 tons/acre High Sediment Risk >= 75 tons/acre		☒ **Low** ☐ **Medium** ☐ **High**

The project site discharges into the City of Madera MS4 that discharge into a City of Madera stormwater basin, Stadium Basin.

Table 2-4 Summary of Receiving Water Risk

Receiving Water Name	303(d) Listed for Sediment Related Pollutant (1)	TMDL for Sediment Related Pollutant (1)	Beneficial Uses of COLD, SPAWN, and MIGRATORY (1)
Colony Ditch	☐ Yes ☒ No	☐ Yes ☒ No	☐ Yes ☒ No
Overall Receiving Water Risk			☒ **Low** ☐ **High**
(1) If yes is selected for any option the Receiving Water Risk is High			

Risk Level 1 sites are subject to the narrative effluent limitations specified in the 2022 CGP, and may be subject to numeric effluent limits for applicable TMDLs, dewatering activities, active treatment systems and passive treatment systems used on site. The narrative effluent limitations require stormwater discharges associated with construction activity to minimize or prevent pollutants in stormwater and authorized non-stormwater through the use of controls, structures, and best management practices (BMPs). This SWPPP has been prepared to address Risk Level 1 requirements (2022 CGP Attachment D).Projects that discharge to a water body and or watershed listed in Table H-2 are subject to both the narrative and numeric effluent limitations imposed by the TMDL requirements in Attachment H. There are no water bodies with TMDLs in the Central Valley Regional Water Quality Control Board region (the region of the Project), therefore the Project is not subject to any TMDL requirements.

Table 2-7 TMDL Numeric Action Levels, Numeric Effluent Limits

TMDL	Parameter	Unit	Numeric Action Level	Numeric Effluent Limit
None	NA	NA	NA	NA

2.5 CONSTRUCTION SCHEDULE

The site sediment risk was determined based on construction taking place between:

Estimate Project Start Date: June 1, 2025

Estimate Project End Date: December 31 2026

Modification or extension of the schedule (start and end dates) may affect risk determination and permit requirements. The LRP shall contact the QSD if the schedule changes during construction to address potential impact to the SWPPP. The estimated schedule for planned work can be found in Appendix E.

2.6 POTENTIAL CONSTRUCTION ACTIVITY AND POLLUTANT SOURCES

Appendix F includes a list of construction activities and associated materials that are anticipated to be used onsite as well as the pollutant source assessment form that was completed for the project. These activities and associated materials will or could potentially contribute pollutants, other than sediment, to stormwater runoff.

The anticipated activities and associated pollutants were used in Section 3 to select the BMPs for the project. Locations of anticipated pollutants and associated BMPs are shown on the Site Map in Appendix A.

Additionally, proper measures will be taken to ensure that trench spoils or any other soils disturbed during construction activities that are contaminated are not discharged with stormwater or non-stormwater discharges into storm drains or water bodies (except pursuant to a separate NPDES Permit). If contaminated soils are found on site, and the responsible party cannot be identified or fails to take action, soils will be sampled to determine proper handling and protect public safety. The appropriate local, State, and federal agencies along with the appropriate Regional Water Board will be notified when contaminated soils are observed.

For sampling requirements for non-visible pollutants associated with construction activity, please refer to Section 7.7.1. For a full and complete list of onsite pollutants, refer to the Safety Data Sheets (SDS), which are retained onsite at the construction trailer or are available electronically at the site.

2.7 TMDL REQUIREMENTS

Based on the project's receiving water and the pollutant source assessment, there are no applicable TMDLs for the Project.

Table 2-8 Project TMDLs

TMDL	Applicable Water Body/ Watershed	Pollutants	Additional TMDL-Related NAL or NEL	Compliance Actions
None	NA	NA	NA	NA

2.8 IDENTIFICATION OF NON-STORMWATER DISCHARGES

Non-stormwater discharges into storm drainage systems or waterways, which are not authorized under the 2022 CGP and listed in the SWPPP, or authorized under a separate NPDES permit, are prohibited.

Non-stormwater discharges that are authorized from this project site include the following:

- De-chlorinated potable water sources and non-potable water sources such as:
  - fire-fighting activity,
  - fire hydrant system flushing,
  - irrigation of vegetative erosion control measures,
  - uncontaminated water line flushing,
  - pipe flushing and testing,
  - air conditioning and compressor condensate,
  - water to control dust, uncontaminated groundwater or spring water from construction dewatering activities in compliance with Attachment J of the 2022 CGP
- Non-stormwater discharges that meet the following conditions:
  - The discharge is not routed through site areas with exposed soil, except for water used for dust control or to vegetation irrigation to stabilize areas;
  - The discharge does not cause or contribute to an exceedance of water quality standards in the receiving water;
  - The discharge complies with other applicable requirements of the 2022 CGP including applicable action levels, effluent limitations, and monitoring and reporting requirements;
  - The discharge is not prohibited by an applicable regional or statewide water quality control plan;
  - The discharge is in accordance with other applicable State and Regional Water Board permits; and

These authorized non-stormwater discharges will be managed with the stormwater and non-stormwater BMPs described in Section 3 of this SWPPP and will be minimized under the

direction of the QSP. Additionally, the non-stormwater discharges not applicable to this project are still allowable granted they do not contact potential pollutant sources.

Activities at this site that may result in unauthorized non-stormwater discharges include:

- Debris and trash
    - In accordance with State Water Board Resolution 2015-0019, the Trash Provisions of the Water Quality Control Plan for Ocean Waters of California and the Water Quality Control Plan for Inland Surface Waters, Enclosed Bays, and Estuaries of California, as applicable to construction stormwater discharges;
- Wastewater from washout or cleanout of areas, structures or equipment with concrete, grout, stucco, paint, or other construction materials;
- Form-release oils and curing compounds;
- Fuels, oils, fluids, or other materials used in vehicle and equipment operation and maintenance;
- Soaps, solvents, or detergents (e.g., used in vehicle equipment washing or external building wash down); and
- Toxic or hazardous substances (e.g., asbestos, lead, mercury, or PCBs).

Steps will be taken, including the implementation of appropriate BMPs, to ensure that unauthorized discharges are eliminated, controlled, disposed, or treated on-site.

Discharges of construction materials and wastes, such as fuel or paint, resulting from dumping, spills, or direct contact with rainwater or stormwater runoff, are also prohibited.

2.9 REQUIRED SITE MAP INFORMATION

The construction project's Site Map(s) showing the project location, surface water boundaries, geographic features, construction site perimeter and general topography, locations of storm drain inlets that receive runoff from the project, and other requirements identified in 2022 CGP Sections IV.O.2. k. and l are located in Appendix A. Table 2-9 identifies Maps or Sheet Nos. where required elements are illustrated.

Table 2-9 Required Map Information

Included on Map/Plan Sheet No. (1)	Required Element
Pre-Earthwork Drawings	
All Figures	Site and project boundaries
Figure 2A and 2B	Areas disturbed during geotechnical or other preconstruction investigation work
Figure 2A and 2B	Existing roads and trails
Figure 2A and 2B	Drainage areas
Figure 2A and 2B	Discharge locations
Figure 2A and 2B	Existing storm drain system if applicable
Figure 2A and 2B	Proposed locations of storage areas for waste

Table 2-9 Required Map Information

Included on Map/Plan Sheet No. [1]	Required Element
Figure 2A and 2B	Proposed locations of construction materials
Figure 2A and 2B	Proposed locations of project staging areas
Figure 2A and 2B	Proposed locations of stockpiles
Figure 2A and 2B	Proposed locations of vehicles, equipment staging and vehicle maintenance
Figure 2A and 2B	Proposed locations of loading/unloading materials
Figure 2A and 2B	Proposed locations of site access (entrance/exits)
Figure 2A and 2B	Proposed locations of fueling, water storage, water transfer for dust control
Figure 3A and 3B	Proposed locations of demolition
Figure 2A and 2B	Proposed locations of other construction support activities
Construction and Earthwork Drawing(s)	
Figures 3A, 3B, 4A and 4B	Site layout (grading plans) including roads
Figures 3A, 3B, 4A and 4B	Site and project boundaries
Figures 3A, 3B, 4A and 4B	Drainage areas
Figures 3A, 3B, 4A and 4B	Discharge locations
Figures 3A, 3B, 4A and 4B	Sampling locations
Figures 3A, 3B, 4A and 4B	Areas of soil disturbance (temporary or permanent)
Figures 3A, 3B, 4A and 4B	Proposed active areas of soil disturbance (cut or fill)
Figures 3A, 3B, 4A and 4B	Proposed locations of erosion control BMPs
Figures 3A, 3B, 4A and 4B	Proposed locations of sediment control BMPs
Figures 3A, 3B, 4A and 4B	Proposed locations of run-off BMPs
✓/NA	Temporary and/or permanent run-on conveyance (if applicable)
NA	Proposed locations of active treatment systems(s) (if applicable)
Figures 3A, 3B, 4A and 4B	Proposed locations of storage areas for waste

Table 2-9 Required Map Information

Included on Map/Plan Sheet No. (1)	Required Element
Figures 3A, 3B, 4A and 4B	Proposed locations of construction materials
Figures 3A, 3B, 4A and 4B	Proposed locations of project staging areas
Figures 3A, 3B, 4A and 4B	Proposed locations of stockpiles
Figures 3A, 3B, 4A and 4B	Proposed locations of vehicles, equipment and vehicle maintenance
Figures 3A, 3B, 4A and 4B	Proposed locations of loading/unloading materials
Figures 3A, 3B, 4A and 4B	Proposed locations of site access (entrance/exits)
Figures 3A, 3B, 4A and 4B	Proposed locations of fueling, water storage, water transfer for dust control
Figures 3A and 3B	Proposed locations of demolition
Figures 3A, 3B, 4A and 4B	Proposed locations of other construction support activities
Figures 3A, 3B, 4A and 4B	Site-specific procedures to implement final stabilization BMPs as soon as reasonably practicable

Notes: (1) Indicate maps or drawings that information is included on (e.g., Vicinity Map, Site Map, Drainage Plans, Grading Plans, Progress Maps.)

Section 3 Best Management Practices

3.1 SCHEDULE FOR BMP IMPLEMENTATION

BMPs will be implemented as per the schedule indicated in Table 3-1.

Table 3-1 BMP Implementation Schedule

	BMP	Location	Implementation	Duration
Erosion Control BMPs	EC-1, Scheduling	Entire Site	From pre-construction until final stabilization.	Entirety of Project
	EC-2, Preservation of Existing Vegetation	Areas not planned for disturbance, or that can be planned to be disturbed later to minimize disturbed soil areas.	Start of Construction of Project and prior to each disturbance of a new area.	Entirety of Project
	EC-3, Hydraulic Mulch	Areas not planned for disturbance for the next 14 days.	After ceasing land disturbance for an area not planned for disturbance for the next 14 days.	1-3 days of initial spraying and re-applied as needed.
	EC-4, Hydroseed	Areas not planned for disturbance for the next 14 days, areas for final stabilization.	After ceasing land disturbance for an area not planned for disturbance for the next 14 days; Final stabilization.	1-3 days of initial spraying and re-applied as needed.
	EC-5, Soil Binders	Areas not planned for disturbance for the next 14 days, inactive high dust generating areas.	After ceasing land disturbance for an area not planned for disturbance for the next 14 days.	1-3 days of initial spraying and re-applied as needed.
	EC-6, Straw Mulch	Areas not planned for disturbance for the next 14 days.	After ceasing land disturbance for an area not planned for disturbance for the next 14 days.	1-3 days of initial installation and re-applied as needed.
	EC-7, Geotextiles and Mats	Steep disturbed slopes, under trackout rocks, in disturbed stormwater conveyance channels.	Pre-earthwork (trackout installation), after completing grading of an area, pre-storm events, final stabilization.	As needed during on-going construction activities.
	EC-8, Wood Mulching	Areas planned for landscaping.	Final stabilization phase.	1-2 weeks.
	EC-9, Earth Dikes and Drainage Swales	At border of run-on areas or for anticipated disturbed flow concentration channels.	Prior to or early in grading phase to divert run-on. Ongoing based on QSPs during- and post-storm observations.	1-2 weeks of installation and ongoing maintenance.
	EC-10, Velocity Dissipation Devices	Designed stormwater outfalls/conveyance channels and observed temporary concentrated flow areas.	After completing construction of a new stormwater outfall. After disturbance of an existing concentrated flow channel or creation of a new channel.	1 week to install. Ongoing maintenance to remove accumulated sediment, trash, litter, etc.

Table 3-1 BMP Implementation Schedule

	BMP	Location	Implementation	Duration
	~~EC-11, Slope Drains~~	~~Designed slope drains.~~	~~After completing construction of a new drain and outfall.~~	~~1-3 weeks.~~
	~~EC-12, Streambank Stabilization~~	~~Stream banks, with applicable permits from USACE, SWRCB, and CDFW.~~	~~Prior to disturbing large upland areas that will increase stormwater discharge volume to stream.~~	~~1-2 weeks. Ongoing maintenance.~~
	EC-14, Compost Blanket	Areas not planned for disturbance for the next 14 days, final stabilization areas.	After ceasing land disturbance for an area not planned for disturbance for the next 14 days; Final stabilization.	1-3 weeks.
	EC-15, Soil Preparation-Roughening	Areas not planned for disturbance for the next 14 days, final stabilization areas.	After ceasing land disturbance for an area not planned for disturbance for the next 14 days; Final stabilization.	1-5 days for roughening. 1-2 weeks for soil amendments.
	EC-16, Non-Vegetative Stabilization	Areas requiring immediate stabilization, areas expected to be constantly disturbed (e.g. staging area, access routes), planned landscaping areas.	When disturbed soil areas require immediate stabilization (e.g. eroding slopes), when setting up staging area, final stabilization phase.	1 week. Ongoing maintenance.
Sediment Control BMPs	SE-1, Silt Fence	Flat areas below disturbed slopes. Site perimeter.	Prior to disturbing slopes. Prior to commencing grading (perimeter control).	1-2 weeks. Ongoing maintenance.
	~~SE-2, Sediment Basin~~	~~At designed sediment basin location for Project.~~	~~Prior to mass grading.~~	~~1-3 months. Ongoing maintenance.~~
	SE-3, Sediment Trap	Flat low areas receiving concentrated stormwater, especially prior to outfalls.	At start of grading.	1-5 days. Ongoing maintenance.
	SE-4, Check Dams	Concentrated flow channels.	Prior to upgrade land disturbance that discharges to flow channel. Immediately after disturbing flow channel.	1-2 days. Ongoing maintenance.
	SE-5, Fiber Rolls	Site/disturbed area perimeters, disturbed slope contours, around soil stockpiles.	Prior to grading of an area. Immediately after disturbing slopes. As needed around stockpiles.	1-2 weeks. Ongoing maintenance.
	SE-6, Gravel Bag Berm	Site/disturbed area perimeters, flat areas below disturbed slopes.	During Construction	1-2 days. Ongoing maintenance.
	SE-7, Street Sweeping	Internal paved site areas, off-site paved areas (site exists)	During Construction	Up-to twice per day, as needed.
	SE-8, Sandbag Barrier	Flat areas below disturbed slopes, along disturbed slope contours, stormwater diversion areas.	During Construction	1-2 days. Ongoing maintenance.

Table 3-1 BMP Implementation Schedule

	BMP	Location	Implementation	Duration
	~~SE-9, Straw Bale Barrier~~	~~Flat areas below disturbed slopes. Site perimeter.~~	~~Prior to disturbing slopes. Prior to commencing grading (perimeter control).~~	~~1-2 weeks. Ongoing maintenance.~~
	SE-10, Storm Drain Inlet Protection	Existing and new drain inlets	Prior to grading, immediately after installation of new drain inlets.	1-2 days. Frequent ongoing maintenance.
	~~SE-11, Active Treatment Systems~~	~~Per ATS plan.~~	~~Per ATS plan.~~	~~Per ATS plan.~~
	SE-12, Manufactured Linear Sediment Controls	Paved site perimeters, disturbed site perimeters, in flow channels as check structure, at flat areas below disturbed slopes.	Prior to grading and ongoing as needed.	1-2 weeks. Ongoing maintenance.
	SE-13, Compost Sock and Berm	Site/disturbed area perimeters, disturbed slope contours, drain inlets.	Prior to grading of an area. Immediately after disturbing slopes.	1-2 weeks. Ongoing maintenance.
	~~SE-14, Biofilter Bags~~	~~Areas needing immediate sediment control BMPs, including: perimeter controls, DI protections, and as a check dam.~~	~~During Construction~~	~~1 day. Ongoing maintenance and replacement.~~
Wind Erosion Control BMPs	WE-1, Wind Erosion Control	Disturbed site areas.	Every non-wet day of active construction.	2-4 times per day.
	EC-3, Hydraulic Mulch	Areas not planned for disturbance for the next 14 days.	After ceasing land disturbance for an area not planned for disturbance for the next 14 days.	1-3 days of initial spraying and re-applied as needed.
	EC-4, Hydroseed	Areas not planned for disturbance for the next 14 days, areas for final stabilization.	After ceasing land disturbance for an area not planned for disturbance for the next 14 days; Final stabilization.	1-3 days of initial spraying and re-applied as needed.
	EC-5, Soil Binders	Areas not planned for disturbance for the next 14 days, inactive high dust generating areas.	After ceasing land disturbance for an area not planned for disturbance for the next 14 days.	1-3 days of initial spraying and re-applied as needed.
	EC-6, Straw Mulch	Areas not planned for disturbance for the next 14 days.	After ceasing land disturbance for an area not planned for disturbance for the next 14 days.	1-3 days of initial installation and re-applied as needed.
	EC-15, Soil Preparation-Roughening (roughening only)	Areas not planned for disturbance for the next 14 days, final stabilization areas.	After ceasing land disturbance for an area not planned for disturbance for the next 14 days; Final stabilization.	1-5 days for roughening.

Table 3-1 BMP Implementation Schedule

	BMP	Location	Implementation	Duration
	EC-16, Non-Vegetative Stabilization	Areas requiring immediate stabilization, areas expected to be constantly disturbed (e.g. staging area, access routes), planned landscaping areas.	When frequently disturbed soil areas (e.g. staging area) is contributing to significant dust generation.	1 week. Ongoing maintenance.
Tracking Control BMPs	TC-1, Stabilized Construction Entrance and Exit	Site exits/entrances approved by landowner and relevant city, county, or Caltrans.	Start of Construction, prior to grading.	1 week. Ongoing maintenance. May be relocated for new phases.
	TC-2, Stabilized Construction Roadway	Site exits/entrances approved by QSD, landowner, and relevant city, county, or Caltrans.	Start of Construction, prior to grading.	2-3 weeks. Ongoing sweeping.
	~~TC-3, Entrance/Outlet Tire Wash~~	~~Inside site adjacent to exits/entrances.~~	~~Start of Construction, prior to grading. As needed to supplement TC-1.~~	~~2-3 weeks. Ongoing maintenance.~~
Non-Stormwater Control BMPs	NS-1, Water Conservation Practices	All potable/non-potable water sources, and water holding equipment, valves, and hoses.	During Construction	Ongoing.
	NS-2, Dewatering Operation	Site locations impacted by pooled stormwater and non-stormwater.	After rain events or other non-stormwater accumulation.	1 day of de-watering per de-watering event.
	NS-3, Paving and Grinding Operation	Areas designated or paving/grinding and paving/grinding equipment, material, and waste storage locations.	During paving/grinding operations.	From start of paving equipment arriving on-site until paving equipment has left site. During grinding operations and waste management.
	~~NS-4, Temporary Stream Crossing~~	~~Designated crossing locations, with applicable permits from USACE, SWRCB, and CDFW.~~	~~Prior to stream crossing~~	~~1-3 weeks.~~
	~~NS-5, Clear Water Diversion~~	~~Work areas in water bodies.~~	~~Prior to construction in water bodies~~	~~1-4 weeks. Ongoing maintenance.~~
	NS-6, Illicit Connection-Illegal Discharge Connection	Entire site.	During Construction	Ongoing.

Table 3-1 BMP Implementation Schedule

	BMP	Location	Implementation	Duration
	NS-7, Potable Water Irrigation Discharge Detection	All potable/non-potable water sources and equipment.	During Construction	Immediately after installing irrigation system. Ongoing.
	NS-8, Vehicle and Equipment Cleaning	Designated and designed vehicle/equipment washing location.	Prior to any on-site vehicle and equipment washing.	1-2 weeks to construct. Ongoing when washing.
	NS-9, Vehicle and Equipment Fueling	Designated fueling location.	Prior to any on-site fuel tank arriving on-site.	1 day to install. Ongoing when fueling.
	NS-10, Vehicle and Equipment Maintenance	Designated vehicle and equipment maintenance location.	Prior to any on-site vehicle and equipment maintenance.	1 day to install. Ongoing when fueling.
	~~NS-11, Pile Driving Operations~~	~~Pile driving and equipment storage locations~~	~~Prior to pile driving equipment arriving on-site~~	~~1 day to install. Ongoing.~~
	NS-12, Concrete Curing	Concrete curing compound use and storage location.	Prior to concrete curing compound arriving on-site, during use, and ongoing while storing compound on-site.	1 day to install. Ongoing.
	NS-13, Concrete Finishing	Planned concrete finishing locations.	Prior to starting concrete finishing, during use, and while material is stored on-site	1 day to install. Ongoing.
	~~NS-14, Material Over Water~~	~~Planned work areas over water, with applicable permits from USACE, SWRCB, and CDFW.~~	~~Prior to work over water and during.~~	~~Ongoing.~~
	~~NS-15, Demolition Adjacent to Water~~	~~Planned demolition areas adjacent to water~~	~~Prior to start of demolition and during.~~	~~1-5 days to install. Ongoing~~
	~~NS-16, Temporary Batch Plants~~	~~Designated temporary batch plant location.~~	~~At start of construction of temporary batch plant and ongoing during operation and storage.~~	~~Planning prior to batch plant construction and ongoing until all materials are removed from site.~~
Constructi on Material	WM-1, Material Delivery and Storage	Designated delivery and storage location.	Prior to material delivery, during delivery, and ongoing for storage.	Entirety of project
	WM-2, Material Use	Planned locations for each unique material use.	Prior to and during material use.	Entirety of project

Table 3-1 BMP Implementation Schedule

	BMP	Location	Implementation	Duration
	WM-3, Stockpile Management	Designated stockpile location and on-site soil source location.	Immediately after stockpiling materials. Prior to rain and wind events.	Entirety of project
	WM-4, Spill Prevention and Control	Entire site.	Initial spill training and ongoing.	Entirety of project
Waste Management Control BMPs	WM-5, Solid Waste Management	Designated solid waste storage locations and solid waste generating areas/activities.	Prior to generation of solid waste and during all of construction	Entirety of project
	WM-6, Hazardous Waste Management	Designated hazardous waste storage locations and hazardous waste generating areas/activities.	Prior to construction activities and during all of construction	Entirety of project
	~~WM-7, Contaminated Soil Management~~	~~Identified contaminated soil locations.~~	~~Prior to disturbance of contaminated soil areas and ongoing until disposal of hazard soil and final stabilization of hazard soil location.~~	~~Ongoing until all hazard soil is removed from site or stabilized.~~
	WM-8, Concrete Waste Management	Planned concrete, stucco, cement, and mortar use and storage locations, including wastes.	Prior to concrete, stucco, cement, and mortar use. Ongoing while storing dry materials and wastes.	Ongoing when concrete, stucco, cement, mortar, and resulting wastes are on-site.
	WM-9, Sanitary-Septic Waste Management	Designated portable outhouse storage locations.	All of construction with weekly maintenance.	Entirety of project
	WM-10, Liquid Waste Management	Designated liquid waste storage locations and liquid waste generating areas/activities.	Prior to generation of liquid waste and while liquid waste is stored/being generated on-site.	Ongoing with liquid waste stored on-site.

Erosion and sediment controls are required by the 2022 CGP to provide effective reduction or elimination of sediment related pollutants in stormwater discharges and authorized non-stormwater discharges from the Site. Applicable BMPs are identified in this section for erosion control, sediment control, tracking control, and wind erosion control.

3.2.1 Erosion Control

Erosion control, also referred to as soil stabilization, consists of source control measures that are designed to prevent soil particles from detaching and becoming transported in stormwater runoff. Erosion control BMPs protect the soil surface by covering and/or binding soil particles.

This construction project will implement the following practices to provide effective temporary and final erosion control during construction:

1. Preserve existing vegetation where required and when feasible.

2. The area of soil disturbing operations shall be controlled such that the Contractor is able to implement erosion control BMPs quickly and effectively.
3. Stabilize non-active areas within 14 days of cessation of construction activities or sooner if stipulated by local requirements.
4. Control erosion in concentrated flow paths by applying erosion control blankets, check dams, erosion control seeding, or alternate methods.
5. Prior to the completion of construction, apply permanent erosion control to remaining disturbed soil areas.

Sufficient erosion control materials shall be maintained onsite to allow implementation in conformance with this SWPPP.

The following erosion control BMP selection table, Table 3-2 indicates the BMPs that will be implemented to control erosion on the construction site. Fact Sheets for temporary erosion control BMPs are provided in Appendix G.

These temporary erosion control BMPs shall be implemented in conformance with the following guidelines and as outlined in the BMP Factsheets provided in Appendix G. If there is a conflict between documents, the Site Map will prevail over narrative in the body of the SWPPP or guidance in the BMP Fact Sheets. Site specific details in the Site Map prevail over standard details included in the Site Map. The narrative in the body of the SWPPP prevails over guidance in the BMP Fact Sheets.

Table 3-2 Erosion Control BMPs

CASQA Fact Sheet	BMP Name	Considered for the Project [1]	BMP Used		If not used, state reason and alternate BMP, if applicable
			YES	NO	
EC-1	Scheduling	✓	✓		
EC-2	Preservation of Existing Vegetation	✓	✓		
EC-3	Hydraulic Mulch	✓[2]	✓		
EC-4	Hydroseed	✓[2]	✓		
EC-5	Soil Binders	✓[2]	✓		
EC-6	Straw Mulch	✓[2]	✓		
EC-7	Geotextiles and Mats	✓[2]	✓		
EC-8	Wood Mulching	✓[2]	✓		
EC-9	Earth Dike and Drainage Swales	✓[3]	✓		
EC-10	Velocity Dissipation Devices	✓[3]	✓		
EC-11	Slope Drains	✓[3]		✓	There are no outfalls to slopes that require BMP.
EC-12	Stream Bank Stabilization	✓		✓	Project does not drain to stream.
EC-14	Compost Blankets	✓[2]		✓	Not necessary for Project with mild slopes.
EC-15	Soil Preparation-Roughening	✓	✓		
EC-16	Non-Vegetated Stabilization	✓[2]	✓		
WE-1	Wind Erosion Control	✓	✓		

[1] The 2022 CGP Fact Sheet Section I.R.1.d.through I.R.1.i.describes various BMPs that should be considered for use on the construction site.
[2] The QSD shall ensure implementation of one of the minimum measures listed or a combination thereof to achieve and maintain the Risk Level requirements.
[3] All run-on and runoff from the construction site shall be managed for Risk Level 2 and 3 and Risk Level 1 if the evaluation of quantity and quality of run-on and runoff deems them necessary or visual inspections show that the site requires these controls. Run-on from offsite shall be directed away from all disturbed areas, diversion of offsite flows may require design/analysis by a licensed civil engineer and/or additional environmental permitting.

EC-1 Scheduling

Scheduling is a critical BMP for every Project. The contractor shall continually reevaluate and adjust the Project construction schedule by considering current and expected site conditions, the upcoming forecast, and reasonably predictable long-term weather events.

- On a macro-level, scheduling to start a Project or mass grading in months with less rainfall amounts takes no products or labor to significantly reduce would-be periods of high erosion on a Project site. The contractor shall consider the average monthly rainfall of the Project location to decide when to start mass grading for the Project. If the Contractor decides to have large areas of disturbed soil during high-rain fall periods, the Contractor shall utilize effective erosion and sediment controls to offset the higher erosion risk at the site.
- On a micro-level, scheduling additional land disturbance or use of polluting materials (asphalt concrete, concrete, stucco, painting, herbicide, fertilizer, etc.) when there is a forecast of no rain for a long period allows the contractor has time to complete the work of the Project and have time to install necessary BMPs and for polluting materials to cure, dry, stabilize, etc.. The contractor shall check the local NOAA forecast prior to disturbance of new soil areas and use of stormwater polluting materials that require time cure, dry, stabilize, etc.
- The contractor shall suspend non-emergency construction work during periods of extreme wind events over 40 MPH.
- The contractor shall minimize construction work at the job site during forecasted qualifying precipitation events as defined in the CGP and Section 7.3 of this SWPPP.

EC-2 Preservation of Existing Vegetation

The Contractor shall reduce the discharge of pollutants from the site by conserving as much of the existing vegetation as possible. If possible, vegetative buffer strips will be left adjacent to watercourses, impervious areas, drain inlets, and along the site perimeter. The purpose of minimizing the removal or injury of existing trees, vines, shrubs and grasses is that they naturally protect soil from erosion.

EC-3 Hydraulic Mulch

- The Contractor shall consider the application of hydraulic mulch to provide sediment control and temporary soil stabilization, or use an equivalently effective erosion control BMP as needed throughout the Project, and as shown in Appendix A: Site Maps, Figure 4A and 4B. Hydraulic mulch may be used in the following locations:
    - On disturbed soils within the construction project limits that are not planned for disturbance for the next 14 days (CGP Appendix D Section II.D.f.).
    - On soil stockpiles

Suitable Applications

- Hydraulic Mulch is a medium-durability erosion control BMP intended for temporarily stabilizing disturbed soil areas. This BMP typically includes a soil binder similar to EC-5, but also includes mulch material (typically wood fiber) to provide soil cover in addition to binding soil particles.
- Hydraulic mulch shall be considered to be installed to flat to mild slopes of disturbed soil areas not expected to receive vehicle traffic.
- Hydraulic mulch can typically be expected to be re-installed once over a rainy season.
- Hydraulic mulch be more effective (especially on slopes) when paired with EC-15 Soil Roughening and preparation (specifically track walking or soil scarification) or SE-4 Fiber rolls on slopes.
- Hydraulic mulch is one possible erosion control BMP. Other erosion control BMP options to consider include: EC-4 Hydroseeding (temporary or permanent), EC-5 Soil Binders, EC-6 Straw Mulch, EC-7 Geotextile mats, EC-8 Wood Mulching, EC-14 Compost Blankets, EC-15 Soil Preperation and Roughening, and/or EC-16 Non-vegetative Stabilization. The contractor shall consult with the Project QSP, QSD, and/or CASQA Construction BMP Handbook to determine the

most effective erosion control BMPs for each new completed disturbed soil area that requires temporary or permanent stabilization per Section IV.O.2.d of the CGP.

Implementation

- Apply according to manufacturer recommendation.
- Prior to application, roughen embankment and fill areas by rolling with a crimping or punching type roller or by track walking up and down the slopes.
- To be effective, hydraulic matrices require 24 hours to dry before rainfall occurs.
- May require a second application in order to remain effective for an entire rainy season.
- Avoid mulch over spray onto roads, sidewalks, drainage channels, existing vegetation, etc.
- Paper based hydraulic mulches alone shall not be used for erosion control.

EC-4 Hydroseed

Hydroseeding is an erosion control that typically consists of applying a mixture of wood fiber, seed, fertilizer, and stabilizing emulsion with hydro-mulch equipment, to temporarily or permanently protect exposed soils from erosion by water and wind.

Apply to areas requiring temporary protection until permanent stabilization is established, and disturbed areas that will be re-disturbed following an extended period of inactivity.

- The Contractor shall consider the application of hydroseed to provide sediment control and temporary (or permanent) soil stabilization, or use an equivalently effective erosion control BMP as needed throughout the Project, and as shown in Appendix A: Site Maps, Figure 4A and 4B. Hydroseed may be used in the following locations:
    - On disturbed soils within the construction project limits that are not planned for disturbance for the next 14 days (CGP Appendix D Section II.D.f.).
    - On soil stockpiles

To select the appropriate matrix, an evaluation of site conditions shall be performed with respect to:

- Soil conditions; maintenance requirements; site topography; sensitive adjacent areas; season and climate; water availability; seed mix; and plans for permanent vegetation.
- The Contractor shall consider the use of hydroseed for temporary or permanent stabilization of areas of soil disturbed by the Project that do not have any improvements in the landscaping plans.
    - When using hydroseed, the Contractor and QSP shall consider the need to implement the additional BMPs of EC-7 Geotextile Mats, EC-Soil Preperation and roughening (for roughening and nutrient soil amendments), and SC-4 Fiber Rolls for steep slopes.
- If hydroseeding is not selected, disturbed soil areas shall achieve final stabilization by other methods including:
    - hand or drill seeding in conjunction with temporary soil cover of EC-6 Straw Mulch or EC-3 Hydraulic Mulch as needed to promote moisture needed for germination.
- Hydroseeding is one possible temporary erosion control BMP. Other temporary erosion control BMP options to consider include: EC-3 Hydro Mulch, EC-5 Soil Binders, EC-6 Straw Mulch, EC-7 Geotextile mats, EC-8 Wood Mulching, EC-14 Compost Blankets, EC-15 Soil Preperation and Roughening, and/or EC-16 Non-vegetative Stabilization. The contractor shall consult with the Project QSP, QSD, and/or CASQA Construction BMP Handbook to determine the most effective erosion control BMPs for each new completed disturbed soil area that requires temporary or permanent stabilization per CGP Appendix D Section II.D.f.

Implementation

- Avoid use of hydro-seeding in areas that would be incompatible with future earthwork activities and would have to be removed.

- Hydro-seeding may be used alone only when there is sufficient time in the season to ensure adequate vegetation establishment and coverage to provide adequate erosion control. Otherwise, hydro-seeding must be used in conjunction with mulching and sediment controls on disturbed slopes.
- Hydro-seeding can be accomplished using a multiple step or one step process. The multiple step process ensures maximum direct contact of the seeds to soil. When the one step process is used to apply the mixture of fiber, seed, etc., the seed rate should be increased to compensate for all seeds not having direct contact with the soil.
- Prior to application, roughen the area to be seeded with the furrows trending along the contours.
- Apply straw mulch to keep seeds in place and to moderate soil moisture and temperature until the seeds germinate and grow.
- All seeds shall be in conformance with the California State Seed Law of the Department of Agriculture. Each seed bag shall be delivered to the site sealed and clearly marked as to species, purity, percent germination, dealer's guarantee, and dates of test. The container shall be labeled to clearly reflect the amount of Pure Live Seed (PLS) contained.
- Commercial fertilizer shall conform to the requirements of the California Food and Agricultural Code. Fertilizer may be liquid, pellet or granular form.
- Follow up applications should be made as needed to cover weak spots and to maintain adequate soil protection.
- Avoid over spray onto roads, sidewalks, drainage channels, existing vegetation, etc.

EC-5 Soil Binders

- The Contractor shall consider the application of soil binders to provide sediment control and temporary (or permanent) soil stabilization, or use an equivalently effective erosion control BMP as needed throughout the Project, and as shown in Appendix A: Site Maps, Figure 4A and 4B. Soil binders may be used in the following locations:
    - On disturbed soils within the construction project limits that are not planned for disturbance for the next 14 days (CGP Appendix D Section II.D.f.).
- Soil binder is a relatively cheap and effective BMP for erosion control that can be installed quickly by the Contractor with minimal specialty equipment. Soil binder is appropriate for disturbed soil areas that will not experience vehicle traffic.
- Different soil binders should be considered for use of water erosion control and wind erosion control.
- Soil binder is necessary when implementing EC-6 Straw mulch for sandy soil conditions. The Site is underlain by silty sand and sandy silt, so this BMP may be appropriate for these soil conditions.
- Soil binder shall not be applied when there is any forecasted rain for the next 24-hours to prevent the discharge of pollutants from the soil binder product.
- Soil binder shall be applied according to the manufacturer's specifications.
- The Contractor and QSP shall consult with CASQA EC-5 and Appendix B of the CASQA Handbook to select an appropriate soil binder for the specific use situation of the Project and submit the proposed product to the QSD prior to use. The QSD shall respond to the Contractor within three working days (not including the day of submittal) for approval of the proposed soil binder product.
- Soil Binders is one possible erosion control BMP. Other erosion control BMP options to consider include: EC-3 Hydro Mulch, EC-4 Hydroseeding (temporary or permanent), EC-6 Straw Mulch, EC-7 Geotextile mats, EC-8 Wood Mulching, EC-14 Compost Blankets, EC-15 Soil Preperation and Roughening, and/or EC-16 Non-vegetative Stabilization. The contractor shall consult with the Project QSP, QSD, and/or CASQA Construction BMP Handbook to determine the most effective erosion control BMPs for each new completed disturbed soil area that requires temporary or permanent stabilization per Section IV.O.2.d of the CGP.

EC-6 Straw Mulch

- The Contractor shall consider the application of straw mulch to provide sediment control and temporary (or permanent) soil stabilization, or use an equivalently effective erosion control BMP as needed throughout the Project, and as shown in Appendix A: Site Maps, Figure 4A and 4B. Straw mulch may be used in the following locations:
    - On disturbed soils within the construction project limits that are not planned for disturbance for the next 14 days (CGP Appendix D Section II.D.f.).
- Straw mulch shall be considered to be installed to flat to mild slopes of disturbed soil areas not expected to receive vehicle traffic.
- The Contractor shall consider the use of straw mulch in conjunction for areas of seeding or hydroseeding to promote the growth of vegetation by improving soil moisture after seeding.
- The contractor shall only use a weed-free agricultural straw product.
- When applying straw mulch on sandy soil, the contractor shall pair straw mulch application with a soil binder. The Contractor and QSP shall consult with CASQA EC-5 and Appendix B of the CASQA Handbook to select an appropriate soil binder for the specific use situation of the Project and submit the proposed product to the QSD prior to use. The QSD shall respond to the Contractor within three working days (not including the day of submittal) for approval of the proposed soil binder product.
- If straw mulch is applied alone with no tackifier/binder, the Contractor shall at a minimum track walk over applied straw to into the soil, or use a crimper or punch roller to fully work straw into the soil. The Contractor shall plan for reapplication of straw as needed and consider the cost-benefits of working applied straw mulch into soil.
- Straw Mulch is one possible erosion control BMP. Other erosion control BMP options to consider include: EC-3 Hydro Mulch, EC-4 Hydroseeding (temporary or permanent), EC-5 Soil Binders, EC-7 Geotextile mats, EC-8 Wood Mulching, EC-14 Compost Blankets, EC-15 Soil Preperation and Roughening, and/or EC-16 Non-vegetative Stabilization. The contractor shall consult with the Project QSP, QSD, and/or CASQA Construction BMP Handbook to determine the most effective erosion control BMPs for each new completed disturbed soil area that requires temporary or permanent stabilization per Section IV.O.2.d of the CGP.

EC-7 Geotextiles and Mats

Geotextiles and mats come in a variety of materials and thicknesses for different use cases. The contractor shall different types of geotextiles for the following circumstances:

Polypropylene fabric

- Material should be a woven polypropylene fabric with minimum thickness of 0.06 in., minimum width of 12 ft and should have minimum tensile strength of 150 lbs (warp); 80 lbs (fill) in conformance with the requirements in ASTM Designation: D 4632. The permittivity of the fabric should be approximately 0.07 sec–1 in conformance with the requirements in ASTM Designation: D4491. The fabric should have an ultraviolet (UV) stability of 70 percent in conformance with the requirements in ASTM designation: D4355.
- Traditional black polypropylene fabric shall be used for:
    - Lining of disturbed concentrated flow channels.
        - Soil areas shall be prepared by clearing of trash, plant material, and rocks for a smooth surface. Fabric shall be dug into the soil at top of slope, and installed with full contact to the soil to prevent stormwater from flowing under an installed mat.
        - Consider the addition of check dams per SE-4 to concentrated flow channels.
    - A reusable stockpile cover (or achieved by use of plastic tarps).
    - Underlining of trackout control rocks per TC-1.

- Underlining of landscaping mulch materials (woodchips, gravel, decomposed granite, rip rap, etc.) temporarily installed for soil stabilization as a tool for removal or re-use of landscaped materials for the final landscaping design.
- Immediate stabilization of disturbed slopes steeper than 3:1 (H:V) prior to rain events.
    - Disturbed slopes shall be prepared as a smooth surface by removing trash, plant material, and rocks.
    - Blanket shall be installed with overlap and staple spacing and type according to CASQA EC-7.

EC- 8 Wood Mulching

- The Contractor shall consider the use of wood mulching as an erosion control BMP to provide effective soil cover of disturbed areas that are not planned for disturbance for the next 14 days. If Wood Mulching is not selected, the Contractor shall implement an equivalent erosion control BMP for these areas throughout the Project.
- The Contractor shall consider the procuring wood chips that are a part of the landscaping design early for use as a recyclable temporary erosion control BMP throughout the Project. Disturbed soil areas needing immediate stabilization can be covered with polypropylene geotextile mats to facilitate collection of woodchips from temporary areas for re-use for the final landscaping design.
- Wood Mulching shall be used for final stabilization areas, as specified in the Project landscaping plan.
- Wood mulching shall not be used for slopes steeper than 5:1 (H:V).
- Wood mulching is one possible erosion control BMP. Other erosion control BMP options to consider include: EC-3 Hydro Mulch, EC-4 Hydroseeding (temporary or permanent), EC-5 Soil Binders, EC-6 Straw Mulch, EC-7 Geotextile mats, EC-14 Compost Blankets, EC-15 Soil Preperation and Roughening, and/or EC-16 Non-vegetative Stabilization. The contractor shall consult with the Project QSP, QSD, and/or CASQA Construction BMP Handbook to determine the most effective erosion control BMPs for each new completed disturbed soil area that requires temporary or permanent stabilization per CGP Appendix D Section II.D.f..

EC-9 Earth Dike and Drainage Swales

Earth dikes and drainage swales are erosion controls that consists of a temporary berm or ridge of compacted soil used to divert runoff or channel water to a desired location. A drainage swale is a shaped and sloped depression in the soil surface used to convey runoff to a desired location. Earth dikes and drainage swales are used to divert off site runoff around the construction site and to divert runoff from stabilized areas and disturbed areas, and direct runoff into sediment basins or traps.

Earth dikes and drainage swales are suitable for use, individually or together, where runoff needs to be diverted from one area and conveyed to another. Earth dikes and drainage swales may be used:

- To convey surface runoff down sloping land.
- To intercept and divert runoff to avoid sheet flow over sloped surfaces.
- To divert and direct runoff towards a stabilized watercourse, drainage pipe or channel.
- To intercept runoff from paved surfaces.
- To prevent run-on to material and waste storage areas.
- Below steep grades where runoff begins to concentrate.
- Along roadways and facility improvements subject to flood drainage.
- At the top of slopes to divert run on from adjacent or undisturbed slopes.
- At bottom and mid slope locations to intercept sheet flow and convey concentrated flows.
- Divert sediment laden runoff into sediment basins or traps.

When earthen dikes and/or drainage swales are used at the Project site, the Contractor shall:

- Newly graded slopes should be protected from erosion by runoff.

- Carefully size and locate earth dikes, drainage swales.
- Excessively steep, unlined dikes and swales are subject to erosion and gully formation.
- Use a lined ditch for high flow velocities.
- Compact any fills to prevent unequal settlement.
- Do not divert runoff onto other property without securing written authorization from the property owner.
- When possible, install and utilize permanent dikes, swales, and ditches early in the construction process.
- Provide stabilized outlets.

Earthen Dikes

The Contractor shall Review civil drawings for specifications and construct earth dikes according to the specifications in the approved plan. Generally temporary diversion dikes should be installed in the following manner:

- All dikes should be compacted by earth moving equipment.
- All dikes should have positive drainage to an outlet.
- All dikes should have 2:1 or flatter side slopes, 18 in. minimum height, and a minimum top width of 24 in. Wide top widths and flat slopes are usually needed at crossings for construction traffic.
- The outlet from the earth dike must function with a minimum of erosion. Runoff should be conveyed to a sediment trapping device such as a Sediment Trap (SE-3) or Sediment Basin (SE-2) when either the dike channel or the drainage area above the dike are not adequately stabilized.

Temporary stabilization may be achieved using seed and mulching for slopes less than 5% and either rip-rap or sod for slopes in excess of 5%. Plastic sheeting may be used to line the dike however it has a short useful life and may need to be replaced more frequently. In either case, stabilization of the earth dike should be completed immediately after construction or prior to the first rain. If riprap is used to stabilize the channel formed along the toe of the dike, the following typical specifications apply:

Channel Grade	Riprap Stabilization
0.5%-1.0%	4 in Rock
1.1-2.0%	6 in Rock
2.1-4.0%	8 in Rock
4.1-5.0%	8 in – 12 in Riprap

- The stone riprap, recycled concrete, etc. used for stabilization should be pressed into the soil with construction equipment.
- Filter cloth or plastic sheeting may be used to cover dikes in use for long periods.
- Construction activity on the earth dike should be kept to a minimum.

Drainage Swales

Drainage swales are only effective if they are properly installed. Swales are more effective than dikes because they tend to be more stable. The combination of a swale with a dike on the downhill side is the most cost effective diversion.

Standard engineering design criteria for small open channel and closed conveyance systems should be used (see the local drainage design manual or approved civil drawings). Unless approved civil drawings or local drainage design criteria state otherwise, drainage swales should be designed as follows:

- Permanent drainage facilities must be designed by a professional engineer (see the local drainage design criteria for proper design).
- No more than 5 acres may drain to a temporary drainage swale.
- Place drainage swales above or below, not on, a cut or fill slope.

- Swale bottom width should be at least 2 ft.
- Depth of the swale should be at least 18 in.
- Side slopes should be 2:1 or flatter.
- Drainage or swales should be laid at a grade of at least 1 percent, but not more than 15 percent.
- The swale must not be overtopped by the peak discharge from a 10-year storm, irrespective of the design criteria stated above.
- Remove all trees, stumps, obstructions, and other objectionable material from the swale when it is built.
- Compact any fill material along the path of the swale.
- Stabilize all swales immediately. Seed and mulch swales at a slope of less than 5 percent and use riprap or sod for swales with a slope between 5 and 15 percent. For temporary swales, geotextiles and mats (EC-7) may provide immediate stabilization.
- Irrigation may be required to establish sufficient vegetation to prevent erosion.
- Do not operate construction vehicles across a swale unless a stabilized crossing.
- At a minimum, the drainage swale should conform to predevelopment drainage patterns and capacities.
- Construct the drainage swale with a positive grade to a stabilized outlet.
- Provide erosion protection or energy dissipation measures if the flow out of the drainage swale can reach an erosive velocity.

EC-10 Velocity Dissipation Devices

The Contractor shall reduce the discharge of pollutants from the site by construction and maintenance of velocity dissipation devices in disturbed concentrated stormwater conveyance channels and/or channels expected to convey turbid stormwater from disturbed areas. The purpose of velocity dissipations to prevent scour of the soil caused by concentrated, height velocity flows. This project will use rip rap, gravel bags, etc. to construct the velocity dissipation devices along concentrated stormwater flow paths with expected turbid runnoff.

EC-16 Non-Vegetated Stabilization

- The Contractor shall consider the application of non-vegetative stabilization to provide sediment control and temporary (or permanent) soil stabilization, or use an equivalently effective erosion control BMP as needed throughout the Project, and as shown in Appendix A: Site Maps, Figure 4A and 4B. Non-vegetative stabilization may be used in the following locations:
    - On disturbed soils within the construction project limits that are not planned for disturbance for the next 14 days (CGP Appendix D Section II.D.f.).
    - As specified in the Project plans.
- The purpose of non-vegetative stabilization methods is to provide exposed soils temporary or permanent stabilization from wind and water erosion.
- This project will use gravel, decomposed granite, rip-rap, etc. applied at 3”-4” in depth to areas identified in the Project landscaping plans and shown in Appendix A: Site Maps, Figures 4A and 4B.
- Non-vegetative Stabilization is possible erosion control BMP, with other options including: EC-3 Hydro Mulch, EC-4 Hydroseeding (temporary or permanent), EC-5 Soil Binders, EC-6 Straw Mulch, EC-7 Geotextile mats, EC-8 Wood Mulching, EC-14 Compost Blankets, and/or EC-15 Soil Preperation and Roughening. The contractor shall consult with the Project QSP, QSD, and/or CASQA Construction BMP Handbook to determine the most effective erosion control BMPs for each new completed disturbed soil area that requires temporary or permanent stabilization per Section IV.O.2.d of the CGP.

WE-1 Wind Erosion Control

- The Contractor shall prevent dust nuisance generated from construction activities on the site by applying water and/or soil binder on exposed soil surfaces.
    - When selecting soil binder for wind erosion control, the contractor will refer to the BMP narrative for EC-5 Soil Binder above and the CASQA BMP Fact Sheet in Appendix G.

- The contractor will prevent the discharge of sediment by wind erosion in accordance with the San Joaquin Valley Air Pollution Control District (SJVAPCD) Regulation VIII for fugitive dust control.
- Wind erosion control will be implemented in accordance to water conservation practices (see NS-1 found in Appendix G) as directed by the QSP.

3.2.2 Sediment Controls

Sediment controls are temporary or permanent structural measures that are intended to complement the selected erosion control measures and reduce sediment discharges from active construction areas. Sediment controls are designed to intercept and settle out soil particles that have been detached and transported by the force of water.

The following sediment control BMP selection table indicates the BMPs that will be implemented to control sediment on the construction site. Fact Sheets for temporary sediment control BMPs are provided in Appendix G.

These temporary sediment control BMPs will be implemented in conformance with the following guidelines and in accordance with the BMP Fact Sheets provided in Appendix G. If there is a conflict between documents, the Site Map will prevail over narrative in the body of the SWPPP or guidance in the BMP Fact Sheets. Site specific details in the Site Map prevail over standard details included in the Site Map. The narrative in the body of the SWPPP prevails over guidance in the BMP Fact Sheets.

Table 3-3 Temporary Sediment Control BMPs

CASQA Fact Sheet	BMP Name	Considered for the Project [1]	BMP used		If not used, state reason and alternate BMP, if applicable
			YES	NO	
SE-1	Silt Fence	✓[2] [3]	✓		
SE-2	Sediment Basin	✓		✓	Using sediment basin for Project excessively expensive. Cheaper sediment controls will be effective.
SE-3	Sediment Trap	✓	✓		
SE-4	Check Dams	✓		✓	No pervious flow channels to use BMP.
SE-5	Fiber Rolls	✓[2][3]	✓		
SE-6	Gravel Bag Berm	✓[3]	✓		
SE-7	Street Sweeping	✓	✓		
SE-8	Sandbag Barrier	✓	✓		
SE-9	Straw Bale Barrier	✓		✓	Excessive costs. Other linear sediment controls will be just as effective.
SE-10	Storm Drain Inlet Protection	✓ RL2&3	✓		
SE-11	ATS	✓		✓	Excessively expensive and challenging to implement.
SE-12	Manufactured Linear Sediment Controls	✓	✓		
SE-13	Compost Sock and Berm	✓[3]	✓		
SE-14	Biofilter Bags	✓[3]		✓	Not as durable or effective as Gravel Bags.
NA	Passive Treatment System	✓		✓	Excessively expensive and challenging to implement.
TC-1	Stabilized Construction Entrance and Exit	✓	✓		
TC-2	Stabilized Construction Roadway	✓	✓		
TC-3	Entrance Outlet Tire Wash	✓		✓	Excessively expensive and challenging to implement.

[1] The 2022 CGPs Fact Sheet Section I.R.1.d through I.R.1.i describes various BMPs that should be considered for use on the construction site.
[2] The QSD shall ensure implementation of one of the minimum measures listed or a combination thereof to achieve and maintain the Risk Level requirements.
[3] All run-on and runoff from the construction site shall be managed. Risk Level 2 and 3 shall provide linear sediment control along toe of slope, face of slope, and at the grade breaks of exposed slope.

EC-1 Silt Fence

- The QSP and Contractor shall consider the use of silt fence as a perimeter sediment control to comply with Section II.E.1.a of the CGP. If selected, the Contractor shall:
    - Install the silt fence in accordance with guidance shown in the CASQA Handbook Appendix G, and this BMP narrative section.
- If silt fence is not selected as a perimeter sediment control, the Contractor shall select and implement one of the following alternate BMPs: EC-5 Fiber Rolls, EC-6 Gravel Bag Berm, EC-12 Manufactured Linear Sediment Controls, and/or EC-13 Compost Socks.
- The Contractor shall maintain silt fence by repairing sagging, leaning, and holes. The Contractor shall maintain silt fence by removing accumulated sediment after rain events.

Materials

- Silt fence fabric should be woven polypropylene with a minimum width of 36 in. and a minimum tensile strength of 100 lb force. The fabric should conform to the requirements in ASTM designation D4632 and should have an integral reinforcement layer. The reinforcement layer should be a polypropylene, or equivalent, net provided by the manufacturer. The permittivity of the fabric should be between 0.1 sec-1 and 0.15 sec-I in conformance with the requirements in ASTM designation D4491.
- 2" X 2" wood stakes should be commercial quality lumber of the size and shape shown on the plans. Each stake should be free from decay, splits or cracks longer than the thickness of the stake or other defects that would weaken the stakes and cause the stakes to be structurally unsuitable.
- Staples used to fasten the fence fabric to the stakes should be not less than 1.75 in. long and should be fabricated from 15 gauge or heavier wire. The wire used to fasten the tops of the stakes together when joining two sections of fence should be 9 gauge or heavier wire. Galvanizing of the fastening wire will not be required.
- There are new products that may use prefabricated plastic holders for the silt fence and use bar reinforcement instead of wood stakes. If bar reinforcement is used in lieu of wood stakes, use number four or greater bar. Provide end protection for any exposed bar reinforcement.

Implementation

- Trench and key in the bottom of the silt fence at a minimum of 12 in folded towards the direction of anticipated flow. Firmly compact backfilled material.
- Construct silt fences with a setback of at least 3 ft from the toe of a slope. Where a silt fence is determined to be not practicable due to specific site conditions, the silt fence may be constructed at the toe of the slope but should be constructed as far from the toe of the slope as practicable. Silt fences close to the toe of the slope will be less effective and difficult to maintain.
- Posts should be spaced a maximum of 6 ft apart and driven securely into the ground a minimum of 18 in. or 12 in. below the bottom of the trench.
- Do not install silt fence as a perimeter control along slopes.
- Do not install silt fence at locations of anticipated concentrated flow.
- Always install silt fence along a level contour. Not doing so will divert and concentrate stormwater and create erosion.
- Turn the ends of the filter fence uphill to prevent stormwater from flowing around the fence

EC-3 Sediment Trap

- The QSP and Contractor shall consider the use of sediment trap(s) for the Project at low site locations near stormwater discharge locations (site perimeters or drain inlets) to provide effective sediment control. If selected, the Contractor shall:

- Install an appropriately sized sediment trap to temporarily contain stormwater from the anticipated run-on area,
- Not use sediment traps for run-on areas larger than five acres.
- Be used in conjunction with polypropylene fabrics per EC-7 and rip-rap per EC-16 to stabilize the designed outfall structure from scouring caused by concentrated discharge flow.

- The Contractor shall install sediment trap(s) as a form of drain inlet protection for drain inlets in disturbed drainage areas greater than one acre, where feasible based on site layout. Sediment traps are the most effective sediment control to remove sediment from high flows while preventing regional flooding.
- If the Contractor chooses not to implement sediment trap(s), the Contractor shall install and maintain effective sediment controls including: EC-1 Silt Fence, EC-5 Fiber Rolls, EC-6 Gravel Bag Berm, EC-12 Manufactured Linear Sediment Controls, and/or EC-13 Compost Socks.

EC-5 Fiber Rolls

- The QSP and Contractor shall consider the use of fiber rolls as a perimeter sediment control to comply with Section II.E.1.a of the CGP. If selected:
  - The Contractor shall install fiber rolls shown in Appendix A: Site Map, Figures 2A through 4B to site perimeters prior to commencing grading.
  - Fiber rolls are not appropriate as the only BMP at a site and shall be used in conjunction with other erosion and sediment control measures to reduce pollutant discharges.
  - Fiber rolls shall be installed with "j-hooks" upgrade to prevent stormwater from flowing around the fiber roll.
  - Fiber rolls shall be maintained by the contractor to ensure effective sediment control. The exact location of fiber rolls will be determined in the field by the QSP.
  - Fiber rolls must be secured (staked) to the ground in a trench that is ¼ to 1/3 of the thickness of the roll, with a width the same diameter as the as the roll.
  - Fiber rolls used on this project will be eight to twelve inches in diameter unless the QSP specifies otherwise.
  - The Contractor shall repair or replace fiber rolls that are split, torn, unraveling or slumping.
- If fiber rolls are not selected as a perimeter sediment control, the Contractor shall select and implement one of the following alternate BMPs: EC-1 Silt Fence, EC-6 Gravel Bag Berm, EC-12 Manufactured Linear Sediment Controls, and/or EC-13 Compost Socks.
- The Contractor shall not use fiber rolls as drain inlet protection.

EC-6 Gravel Bag Berm

- Gravel bag berms are typically more expensive and labor intensive than alternate linear sediment controls like fiber rolls and compost socks. Gravel bag berms (as well as compost socks) provide a more porous linear control that filters sediment and other pollutants out of stormwater where fiber rolls do not.
- The QSP and Contractor shall consider the use of gravel bag berms as a perimeter sediment control to comply with Section II.E.1.a of the CGP. If selected:
  - The Contractor shall gravel bag berms shown in Appendix A: Site Map, Figures 2A through 4B to site perimeters prior to commencing grading.
  - Gravel bag berms are not appropriate as the only BMP at a site and shall be used in conjunction with other erosion and sediment control measures to reduce pollutant discharges.
  - Gravel bag berms shall be installed with "j-hooks" upgrade to prevent stormwater from flowing around the fiber roll.
  - Gravel bag berms shall be maintained by the contractor to ensure effective sediment control. The exact location of fiber rolls will be determined in the field by the QSP.

- Fiber rolls must be secured (staked) to the ground in a trench that is ¼ to 1/3 of the thickness of the roll, with a width the same diameter as the as the roll.
- The Contractor shall size each gravel bag berm (height, width, shape) in accordance with EC-6 in the CASQA BMP Handbook found in Appendix G.
- The Contractor shall repair or replace gravel bags that are split, torn, or unraveling and remove any spilled gravel.

EC-7 Street Sweeping and Vacuuming

- The Contractor shall reduce the discharge of pollutants from the Project site by:
  - Sweeping and /or vacuuming the streets and roadways adjacent to the Project site. The Project site and off-site exits shall be inspected daily for track out.
  - Sweeping sediment observed on internal site pavement that drains to drain inlets or off-site areas prior to rain events.
  - Sweeping and/or vacuum the streets and roadways adjacent to the Project site in accordance with SJVAPCD's Regulation VIII on fugitive dust control.
- The Contractor shall limit speed of vehicles to control dust.

EC-8 Sandbag Barrier

- The Contractor shall use sandbag barriers as a BMP to:
  - Divert stormwater away from disturbed soil areas,
  - Divert stormwater away from steeper disturbed slopes,
  - Divert stormwater in a way that reduces drainage areas and resulting downgrade stormwater flow concentration,
  - As an optional material for use of constructing a sediment trap.
- The Contractor shall not install a linear sandbag barrier on a slope except along the slope contour.
- The Contractor shall replace damaged sandbags and remove any lost material.
- The Contractor shall use a pyramid approach when stacking sand bags, and follow the berm sizing (height, width, shape) listed in Appendix G: CASQA BMP Handbook.

EC-10 Storm Drain Inlet Protection

- Storm drain inlet protection will be used at all operational internal inlets to the storm drain system as shown on Appendix A: Site Map, Figures 2A through 4B, and in accordance with the BMP Manual. Additional locations may be required based on actual field conditions/observations and such locations will be determined by the QSP.
- Inlets will be protected from stormwater discharge with the use of gravel bag berms, gravel bag j-weirs in gutters, sediment traps, silt fence, and/or pre-manufactured storm drain inlet inserts for drain inlet protections.
  - Silt fence shall be the primary choice of drain inlet protection **where/when feasible**. Silt fence as a drain inlet protection shall be installed according to EC-10 in the CASQA BMP Handbook, found in Appendix G. Conditions that will require the use of silt fence for the Project include:
    - When storm drain inlets are located in a pervious surrounding that provides an area that will allow stormwater to pool without resulting in flooding that will cause a public hazard or property damage.
  - Gravel bag berms and pre-manufactured storm drain inlet inserts shall be the secondary choice of drain inlet protections.

        - Gravel bag berms shall be sized to be up to 24" tall in a pyramid shape, but shorter if too high of a gravel bag berm would cause undesirable diversion of stormwater.
    - Gravel bag j-weirs shall be placed in **all** gutters expected to convey turbid stormwater from disturbed site areas. The Contractor shall install two to three sets of gravel bag j-weirs along gutters where the j-weir spans the width of the concrete gutter and the length is at least three times as long as the width. The QSP shall determine the exact location and arrangement of j-weirs.
    - Sediment traps shall be installed adjacent to drain inlets anticipated to receive stormwater from an area greater than approximately 1 acre, when feasible based on site layout.
- All storm drain inlet protections shall be inspected after rain events and maintained by removing accumulated sediment, re-arranging of materials, replacement of materials, etc.. Sediment traps shall be maintained after rain events to remove accumulated sediment to ensure deposited sediment is not resuspended into stormwater.
- Filter fabric shall not be used as a drain inlet protection.

EC-12 Manufactured Linear Sediment Controls

- The QSP and Contractor shall consider the use of manufactured linear sediment controls (MLSCs) as a substitute to EC-1 Silt Fence, EC-5 Fiber Rolls, EC-8 Gravel Bag Barrier, and EC-9 Sandbag Barrier. MCLSs come in a variety of products and should be considered for the following reasons:
    - Providing perimeter controls on pavement.
    - As a more re-usable perimeter control than fiber rolls and silt fence.
- The Contractor shall install any MLCSs according to the manufacturer's specification.

EC-13 Compost Sock and Berm

- The QSP and Contractor shall consider the use of compost socks and/or berms as a perimeter sediment control to comply with Section II.E.1.a of the CGP. If selected:
    - The Contractor shall install compost socks and/or berms as shown in Appendix A: Site Map, Figures 2A through 4B to site perimeters prior to commencing grading.
    - Compost socks and/or berms are not appropriate as the only BMP at a site and shall be used in conjunction with other erosion and sediment control measures to reduce pollutant discharges.
    - Compost socks and/or berms shall be installed with "j-hooks" upgrade to prevent stormwater from flowing around the compost socks and/or berms.
    - Compost socks and/or berms shall be maintained by the contractor to ensure effective sediment control. The exact location of compost socks and/or berms will be determined in the field by the QSP.
    - Compost socks shall not be punctured with stakes. Compost socks typically do not need to be secured with stakes or placed in trenches due to their weight.
    - The Contractor shall repair or replace compost socks and/or berms that are split, torn, unraveling or slumping.
- If compost socks and/or berms are not selected as a perimeter sediment control, the Contractor shall select and implement one of the following alternate BMPs: EC-1 Silt Fence, EC-5 Fiber Rolls, EC-6 Gravel Bag Berm, and/or EC-12 Manufactured Linear Sediment Controls.
- The QSP and Contractor shall consider the use of compost socks and/or berms for areas of slopes with expected high sheet flow amounts due to their filtering properties.
- The QSP and Contractor shall consider the use of compost socks and/or berms for slopes that are planned for vegetation establishment for final stabilization due to their ability to provide nutrients to soil.

- The Contractor shall not use compost socks as drain inlet protection due to their risk of discharging nutrients.
- The Contactor shall source compost and other materials in accordance with the guidance in Appendix G: CASQA BMP Factsheet.

TC-1 Stabilized Construction Entrance and Exit

- The Contractor shall ensure that construction activity traffic to and from the project is limited to entrances and exits that employ effective controls to prevent off-site tracking of sediment. A stabilized construction entrance is a pad of rip-rap underlain with polypropylene fabric. Stabilized Construction Entrance/Exits shall be implemented where existing pavement meets exposed disturbed soil areas of the project, as shown in Exhibit A: Site Maps, Figures 2A through 4B, or in an equivalent location approved by the QSP, landowner, and any relevant City, County, or other right-of-way owners.
- The Contractor shall limit speed of vehicles to control dust. Inspect local roads adjacent to the site daily. Sweep or vacuum to remove visible accumulated sediment. Remove aggregate, separate and dispose of sediment when construction entrance becomes clogged with sediment.

TC- 2 Stabilized Construction Roadway

The Contractor may utilize the existing 100+ ft of pavement within the Project site as a stabilized construction exit for removing sediment from construction vehicles from the site, as shown in Appendix A: Site Maps, Figures 2A through 4B. The Contractor shall monitor this exit throughout the day and sweep the pavement of sediment immediately if sediment has accumulated on the pavement and is contributing to airborne dust.

3.3 NON-STORMWATER CONTROLS AND WASTE AND MATERIALS MANAGEMENT

3.3.1 Non-Stormwater Controls

Non-stormwater discharges into storm drainage systems or waterways which are not authorized under the 2022 CGP are prohibited. Non-stormwater discharges for which a separate NPDES permit is required by the local Regional Water Board are prohibited unless coverage under the separate NPDES permit has been obtained for the discharge. The selection of non-stormwater BMPs is based on the list of construction activities with a potential for non-stormwater discharges identified in Section 2.7 of this SWPPP.

The following non-stormwater control BMP selection table indicates the BMPs that will be implemented to control sediment on the construction site. Fact Sheets for temporary non-stormwater control BMPs are provided in Appendix G.

Non-stormwater BMPs will be implemented in conformance with the following guidelines and in accordance with the BMP Fact Sheets provided in Appendix G. If there is a conflict between documents, the Site Map will prevail over narrative in the body of the SWPPP or guidance in the BMP Fact Sheets. Site specific details in the Site Map prevail over standard details included in the Site Map. The narrative in the body of the SWPPP prevails over guidance in the BMP Fact Sheets.

Table 3-4 Temporary Non-Stormwater BMPs

CASQA Fact Sheet	BMP Name	Considered for the Project [1]	BMP used		If not used, state reason and alternate BMP, if applicable
			YES	NO	
NS-1	Water Conservation Practices	✓	✓		
NS-2	Dewatering Operation	✓	✓		
NS-3	Paving and Grinding Operation	✓	✓		
NS-4	Temporary Stream Crossing	✓		✓	No stream crossings.
NS-5	Clear Water Diversion	✓		✓	No water diversions.
NS-6	Illicit Connection/Discharge	✓	✓		
NS-7	Potable Water/Irrigation	✓	✓		
NS-8	Vehicle and Equipment Cleaning	✓	✓		
NS-9	Vehicle and Equipment Fueling	✓	✓		
NS-10	Vehicle and Equipment Maintenance	✓	✓		
NS-11	Pile Driving Operation	✓		✓	No pile driving.
NS-12	Concrete Curing	✓	✓		
NS-13	Concrete Finishing	✓	✓		
NS-14	Material and Equipment Use Over Water	✓		✓	No equipment over water.
NS-15	Demolition Removal Adjacent to Water	✓		✓	No demolition adjacent to water.
NS-16	Temporary Batch Plants	✓		✓	No temporary batch plant.

[1] The 2022 CGP Fact Sheet Section I.R.1.d through I.R.1.i describes various BMPs that should be considered for use on the construction site.

NS-1 Water Conservation Practices

Water conservation practices are a non-stormwater discharge management measure that consists of activities that use water during the construction of a project in a manner that avoids causing erosion and the transport of pollutants offsite. These practices can reduce or eliminate non-stormwater discharges.

Water conservation practices are suitable for all construction sites where water is used, including piped water, metered water, trucked water, and water from a reservoir.

Generally, the Contractor shall:

- Keep water equipment in good working condition.
- Stabilize water truck filling area.
- Repair water leaks promptly.
- Use nozzles on hoses that shut off when not in use.
- Washing of vehicles and equipment on the construction site is prohibited unless an emergency.
- Avoid using water to clean construction areas. If water must be used for cleaning or surface preparation, surface should be swept and vacuumed first to remove dirt. This will minimize amount of water required.
- Direct construction water runoff to areas where it can soak into the ground or be collected and reused.
- Authorized non-stormwater discharges to the storm drain system, channels, or receiving waters are acceptable with the implementation of appropriate BMPs.
- Lock water tank valves to prevent unauthorized use.
- Install sediment and erosion control measures to non-stormwater use areas as needed if there is the potential to cause erosion or scour.
- Repair water equipment as needed to prevent unintended discharges, including but not limited to:
    - Water trucks
    - Water reservoirs (water buffalos)
    - Irrigation systems
    - Hydrant/water source connections

NS-2 Dewatering Operation

Dewatering operations are practices that manage the discharge of pollutants when non-stormwater and accumulated precipitation must be removed from a work location so that construction work may be accomplished. Non-stormwater includes, but is not limited to, groundwater, water from cofferdams, water diversions, and waters used during construction activities that must be removed from a work area.

These practices are implemented for discharges of non-stormwater from construction sites. Practices identified in this section are also appropriate for implementation when managing the removal of accumulated precipitation (stormwater) from depressed areas at a construction site. Stormwater mixed with non-stormwater should be managed as non-stormwater.

- Dewatering non stormwater cannot be discharged without prior notice to and approval from the RWQCB and local stormwater management agency. This includes stormwater that is co-mingled

with groundwater or other non-stormwater sources. Once the discharge is allowed, appropriate BMPs must be implemented to ensure the discharge complies with all permit requirements and regional and watershed specific requirements.

- RWQCB may require a separate NPDES permit prior to the dewatering discharge of non-stormwater. These permits will have specific testing, monitoring, and discharge requirements and can take significant time to obtain.
- The QSP will coordinate monitoring and permit compliance.
- Additional permits or permissions from other agencies may be required for dewatering cofferdams or diversions.
- Dewatering discharges must not cause erosion at the discharge point.
- The QSP and Contractor shall review the CASQA BMP Factsheet in Appendix G to determine the appropriate equipment needed to conduct off-site dewatering operations in a manor that prevents the violation of water quality standards. One or more of the following equipment shall considered for use:
    - Weir tanks, dewatering tanks, gravity bag filter, sand media particulate filter, and pressurized bag filter.

NS-3 Paving and Grinding Operation

The Contractor shall prevent or reduce the discharge of pollutants from paving operations, using measures to prevent run-on and runoff pollution, properly disposing of wastes, and training employees and subcontractors.

These procedures shall be implemented where paving, surfacing, resurfacing, or saw cutting, may pollute stormwater runoff or discharge to the storm drain system or watercourses.

- **Avoid paving during the wet season when feasible.**
- **Reschedule paving and grinding activities if rain is in the forecast.**
- Store materials away from drainage courses to prevent stormwater run-on (see WM-1, Material Delivery and Storage).
- Protect drainage courses, particularly in areas with a grade, by employing BMPs to divert runoff or to trap and filter sediment.
- Stockpile material removed from roadways away from drain inlets, drainage ditches, and watercourses. Materials should be stored consistent with WM-3, Stockpile Management.
- Disposal of PCC and AC waste should be in conformance with WM-8, Concrete Waste Management.

Saw cutting, grinding, and pavement removal

- The Contractor shall shovel or vacuum saw-cut slurry and remove from site. Cover or barricade storm drains during saw cutting to prevent any discharge of slurry.
- When paving involves AC, the Contractor shall follow the following steps prevent the discharge of grinding residue, un-compacted or loose AC, tack coats, equipment cleaners, or unrelated paving materials:
    - AC grindings, pieces, or chunks used in embankments or shoulder backing must not be allowed to enter any storm drains or watercourses. This shall be accomplished by the use of effective sediment control BMPs.

    - Collect and remove all broken asphalt and recycle when practical. Old or spilled asphalt must be recycled or disposed.

- Do not allow saw-cut slurry to enter storm drains or watercourses. Residue from grinding operations shall be picked up by means of a vacuum attachment to the grinding machine, shall not be allowed to flow across the pavement, and shall not be left on the surface of the pavement. See also WM-8, Concrete Waste Management, and WM-10, Liquid Waste Management.
- Dig out activities should not be conducted in the rain.
- Collect dig out material by mechanical or manual methods. This material may be recycled for use as shoulder backing or base material.
- If dig out material cannot be recycled, transport the material back to an approved storage site.

Asphaltic Concrete Paving

- Do not allow sand or gravel placed over new asphalt to wash into storm drains, streets, or creeks. Vacuum or sweep loose sand and gravel and properly dispose of this waste by referring to WM-5, Solid Waste Management.
- Old asphalt must be disposed of properly. Collect and remove all broken asphalt from the site and recycle whenever possible.

Portland Cement Concrete Paving

- Do not wash sweepings from exposed aggregate concrete into a storm drain system. Collect and return to aggregate base stockpile or dispose of properly.
- Allow aggregate rinse to settle. Then, either allow rinse water to dry in a temporary pit as described in WM-8, Concrete Waste Management, or pump the water to the sanitary sewer if allowed by the local wastewater authority.

Sealing Operations

- During chip seal application and sweeping operations, petroleum or petroleum covered aggregate must not be allowed to enter any storm drain or water courses. Apply temporary perimeter controls until structure is stabilized.
- Drainage inlet structures and manholes shall be covered with filter fabric during application of seal coat, tack coat, slurry seal, and fog seal.
- Seal coat, tack coat, slurry seal, or fog seal shall not be applied if rainfall is predicted to occur during the application or manufacturer's specified curing period.

Paving Equipment

- Leaks and spills from paving equipment can contain toxic levels of heavy metals and oil and grease. Place drip pans or absorbent materials under paving equipment when not in use.
- Clean up spills with absorbent materials rather than burying. See NS-10, Vehicle and Equipment Maintenance, WM-4, Spill Prevention and Control, and WM-10, Liquid Waste Management.
- Substances used to coat asphalt transport trucks, and asphalt spreading equipment should not contain soap and should be non-foaming and non-toxic.
- Use only non-toxic substances to coat asphalt transport trucks and asphalt spreading equipment.
- Paving equipment parked onsite should be parked over plastic to prevent soil contamination.

NS- 6 Illicit Connection/Discharge

This is a non-stormwater management control that includes procedures and practices designed for construction contractors to recognize illicit connections or illegally dumped or discharged materials on a construction site and report incidents.

This BMP applies to all construction projects. Illicit connection/discharge and reporting is applicable anytime an illicit connection or discharge is discovered, or illegally dumped material is found on the construction site.

- The QSP and Contractor shall review the SWPPP. Pre-existing areas of contamination should be identified and documented in the SWPPP.
- The QSP shall inspect the site before beginning the job for evidence of illicit connections, illegal dumping or discharges. Document any pre-existing conditions.
- Unlabeled and unidentifiable material should be treated as hazardous.
- **Solids -** Look for debris, or rubbish piles. Solid waste dumping often occurs on roadways with light traffic loads or in areas not easily visible from the traveled way.
- **Liquids -** signs of illegal liquid dumping or discharge can include:
    - Visible signs of staining or unusual colors to the pavement or surrounding adjacent soils,
    - Pungent odors coming from the drainage systems,
    - Discoloration or oily substances in the water or stains and residues detained within ditches, channels or drain boxes,
    - Abnormal water flow during the dry weather season.
- **Urban Areas -** Evidence of illicit connections or illegal discharges is typically detected at storm drain outfall locations or at manholes. Signs of an illicit connection or illegal discharge can include:
    - Abnormal water flow during the dry weather season,
    - Unusual flows in sub drain systems used for dewatering,
    - Pungent odors coming from the drainage systems,
    - Discoloration or oily substances in the water or stains and residues detained within ditches, channels or drain boxes,
    - Excessive sediment deposits, particularly adjacent to or near active offsite construction projects.
- **Cleanup and Removal -** The responsibility for cleanup and removal of illicit or illegal dumping or discharges will vary by location. Contact the Project proponent and local stormwater management agency for further information.

NS-7 Potable Water/Irrigation

This is a non-stormwater management control for potable water/irrigation that consists of practices and procedures to manage the discharge of potential pollutants generated during discharges from irrigation water lines, landscape irrigation, lawn or garden watering, planned and unplanned discharges from potable water sources, water line flushing, and hydrant flushing.

Implement this BMP whenever potable water or irrigation water discharges occur to or from a construction site.

- Direct water from offsite sources around or through a construction site, where feasible, in a way that minimizes contact with the construction site.
- Discharges from water line flushing should be reused for landscaping purposes where feasible.
- Shut off the water source to broken lines, sprinklers, or valves as soon as possible to prevent excess water flow
- Protect downstream stormwater drainage systems and watercourses from water pumped or bailed from trenches excavated to repair water lines.
- Inspect irrigated areas within the construction limits for excess watering. Adjust watering times and schedules to ensure that the appropriate amount of water is being used and to minimize runoff. Consider factors such as soil structure, grade, time of year, and type of plant material in determining the proper amounts of water for a specific area.

NS-8 Vehicle and Equipment Cleaning

- The Contractor shall not clean vehicles or equipment with water and/or soaps on-site. The Contractor shall wash all equipment off-site (with the exception of concrete truck washout).
- The Contractor shall use dry cleaning methods (rags) for cleaning equipment of grease and residues. Used rags shall be stored in watertight containers for re-use or disposed of as hazardous waste.
- If equipment must be washed with water on-site, the Contractor shall follow the proceedures outlined in Appendix G: CASQA BMP Handbook.

NS-9 Vehicle and Equipment Fueling

Vehicle and equipment fueling procedures and practices are designed to prevent fuel spills and leaks and reduce or eliminate contamination of stormwater. This can be accomplished by using offsite facilities, fueling in designated areas only, enclosing or covering stored fuel and implementing spill controls.

These procedures are suitable on all construction sites where vehicle and equipment fueling takes place.

- Onsite vehicle and equipment fueling shall only be used where it is impractical to send vehicles and equipment offsite for fueling.
- Use offsite fueling stations as much as possible. These businesses are better equipped to handle fuel and spills properly. Performing this work offsite can also be economical by eliminating the need for a separate fueling area at a site.
- Discourage “topping-off” of fuel tanks.
- Absorbent spill cleanup materials and spill kits shall be available in fueling areas and on fueling trucks, and shall be disposed of properly after use.
- Drip pans or absorbent pads shall be used during vehicle and equipment fueling, unless the fueling is performed over an impermeable surface in a dedicated fueling area.
- Use absorbent materials on small spills. Do not hose down or bury the spill. Remove the adsorbent materials promptly and dispose of properly.
- Avoid mobile fueling of mobile construction equipment around the site; rather, transport the equipment to designated fueling areas. With the exception of tracked equipment such as bulldozers and large excavators, most vehicles should be able to travel to a designated area with little lost time.
- When fueling must take place onsite, designate an area away from drainage courses to be used.

- Dedicated fueling areas shall be protected from stormwater run-on and run-off, and should be located at least 50 ft away from downstream drainage facilities and watercourses. Fueling must be performed on level-grade areas.
- Protect fueling areas with berms and dikes to prevent run-on, run-off, and to contain spills.
- Nozzles used in vehicle and equipment fueling should be equipped with an automatic shutoff to control drips. Fueling operations should not be left unattended.
- Use vapor recovery nozzles to help control drips as well as air pollution where required by the SJVAPCD.
- Federal, state, and local requirements should be observed for any stationary above ground storage tanks

NS-10 Vehicle and Equipment Maintenance

This is a non-stormwater management measure used to prevent or reduce the contamination of stormwater resulting from vehicle and equipment maintenance by running a "dry and clean site". The best option would be to perform maintenance activities at an offsite facility. If this option is not available then work should be performed in designated areas only, while providing cover for materials stored outside, checking for leaks and spills, and containing and cleaning up spills immediately. These procedures are suitable on all construction projects where an onsite yard area is necessary for storage and maintenance of heavy equipment and vehicles.

Onsite vehicle and equipment maintenance should only be used where it is impractical to send vehicles and equipment offsite for maintenance and repair.

- Use offsite repair shops as much as possible. These businesses are better equipped to handle vehicle fluids and spills properly. Performing this work offsite can also be economical by eliminating the need for a separate maintenance area.
- If maintenance must be done onsite, use designated areas, located away from drainage courses.
- Dedicated maintenance areas should be protected from storm water run-on and run-off and should be located at least 50 ft from downstream drainage facilities and watercourses.
- Drip pans or absorbent pads should be used during vehicle and equipment maintenance work that involves fluids, unless the maintenance work is performed over an impermeable surface in a dedicated maintenance area.
- Place a stockpile of spill cleanup materials where it will be readily accessible.
- All fueling trucks and fueling areas are required to have spill kits and/or use other spill protection devices.
- Use adsorbent materials on small spills. Remove the absorbent materials promptly and dispose of properly.
- Look for leaks of fluids or oil from vehicles and equipment, at start up and repair immediately or place out of service with drip pans of buckets to contain the leaked material. Properly dispose of leaked material
- Keep vehicles and equipment clean; do not allow excessive build-up of oil and grease.
- Segregate and recycle wastes, such as greases, used oil or oil filters, antifreeze, cleaning solutions, automotive batteries, hydraulic and transmission fluids. Provide secondary containment and covers for these materials if stored onsite.

- Drip pans or plastic sheeting should be placed under all vehicles and equipment placed on docks, barges, or other structures over water bodies when the vehicle or equipment is planned to be idle for more than 1 hour.
- For long-term projects, consider using portable tents or covers over maintenance areas if maintenance cannot be performed offsite.
- Properly dispose of used oils, fluids, lubricants, and spill cleanup materials.
- Do not place used oil in a dumpster or pour into a storm drain or watercourse.
- Properly dispose of or recycle used batteries.

NS-12 Concrete Curing

Concrete curing is used in the construction of structures such as bridges, retaining walls, pump houses, large slabs, and structured foundations. Concrete curing includes the use of both chemical and water methods. Discharges of stormwater and non-stormwater exposed to concrete during curing may have a high pH and may contain chemicals, metals, and fines. Proper procedures reduce or eliminate the contamination of stormwater runoff during concrete curing.

Suitable applications include all projects where Portland Cement Concrete (PCC) and concrete curing chemicals are placed where they can be exposed to rainfall, runoff from other areas, or where runoff from the PCC will leave the site.

- For chemical concrete curing:
    - Avoid over spray of curing compounds.
    - Minimize the drift of chemical cure as much as possible by applying the curing compound close to the concrete surface.
    - Apply an amount of compound that covers the surface, but does not allow any runoff of the compound.
    - Use proper storage and handling techniques for concrete curing compounds. Refer to WM- 1, Material Delivery and Storage.
    - Protect drain inlets prior to the application of curing compounds.
    - Refer to WM-4, Spill Prevention and Control.
- For water concrete curing:
    - Direct cure water away from inlets and watercourses to collection areas for infiltration or other means of removal in accordance with all applicable permits.
    - Collect cure water at the top of slopes and transport or dispose of water in a non-erodible manner.
    - Utilize wet blankets or a similar method that maintains moisture while minimizing the use and possible discharge of water.

NS-13 Concrete Finishing

Concrete finishing methods are used for bridge deck rehabilitation, paint removal, curing compound removal, and final surface finish appearances. Methods include sand blasting, shot blasting, grinding, or high pressure water blasting. Stormwater and non-stormwater exposed to concrete finishing by-products may have a high pH and may contain chemicals, metals, and fines. Proper procedures and

implementation of appropriate non stormwater management measures can minimize the impact that concrete finishing methods may have on stormwater and non-stormwater discharges.

These procedures apply to all construction locations where concrete finishing operations are performed.

- Divert blasting water to a collection/containment area.
- Collect and properly dispose of water from high-pressure water blasting operations.
- Collect contaminated water from blasting operations at the top of slopes. Transport or dispose of contaminated water while using BMPs such as those for erosion control.
- Direct water from blasting operations away from inlets and watercourses to collection areas for infiltration or other means of removal (dewatering).
- Protect inlets during sandblasting operations.
- Minimize the drift of dust and blast material as much as possible by keeping the blasting nozzle close to the surface.
- When blast residue contains a potentially hazardous waste, refer to WM-6, Hazardous Waste Management.

3.3.2 Materials Management and Waste Management

Materials management control practices consist of implementing procedural and structural BMPs for handling, storing, and using construction materials to prevent the release of those materials into stormwater discharges. The amount and type of construction materials to be utilized at the Site will depend upon the type of construction and the length of the construction period. The materials may be used continuously, such as fuel for vehicles and equipment, or the materials may be used for a discrete period, such as soil binders for temporary stabilization.

Waste management consist of implementing procedural and structural BMPs for handling, storing, and ensuring proper disposal of wastes to prevent the release of those wastes into stormwater discharges.

Materials and waste management pollution control BMPs will be implemented to minimize stormwater contact with construction materials, wastes, and service areas; and to prevent materials and wastes from being discharged off-site. The primary mechanisms for stormwater contact that shall be addressed include:

- Direct contact with precipitation
- Contact with stormwater run-on and runoff
- Wind dispersion of loose materials
- Direct discharge to the storm drain system through spills or dumping
- Extended contact with some materials and wastes, such as asphalt cold mix and treated wood products, which can leach pollutants into stormwater.

A list of construction activities is provided in Section 2.6. The following Materials and Waste Management BMP selection table, Table 3-5, indicates the BMPs that shall be implemented to handle materials and control construction site wastes associated with these construction activities. Fact Sheets for Materials and Waste Management BMPs are provided in Appendix G.

Material management BMPs will be implemented in conformance with the following guidelines and in accordance with the BMP Fact Sheets provided in Appendix G. If there is a conflict between documents, the Site Map will prevail over narrative in the body of the SWPPP or guidance in the BMP Fact Sheets. Site specific details in the Site Map prevail over standard details included in the Site Map. The narrative in the body of the SWPPP prevails over guidance in the BMP Fact Sheets.

Table 3-5 Temporary Materials Management BMPs

CASQA Fact Sheet	BMP Name	Considered for Project [1]	BMP used		If not used, state reason and alternate BMP, if applicable
			YES	NO	
WM-01	Material Delivery and Storage	✓	✓		
WM-02	Material Use	✓	✓		
WM-03	Stockpile Management	✓	✓		
WM-04	Spill Prevention and Control	✓	✓		
WM-05	Solid Waste Management	✓	✓		
WM-06	Hazardous Waste Management	✓	✓		
WM-07	Contaminated Soil Management			✓	There is no identified contaminated soil at the Project site.
WM-08	Concrete Waste Management	✓	✓		
WM-09	Sanitary-Septic Waste Management	✓	✓		
WM-10	Liquid Waste Management	✓	✓		

[1] The 2022 CGP Fact Sheet Section I.R.1.d through I.R.1.i describes various BMPs that should be considered for use on the construction site.

WM-1 Material Delivery and Storage

This waste management and pollution control measure is used to prevent, reduce, or eliminate the discharge of pollutants by minimizing the storage of hazardous materials on site, storing materials in a designated area, installing secondary containment, and conducting regular inspections.

Material delivery and storage control measures apply to soil stabilizers and binders; Pesticides and herbicides; Fertilizers; Detergents; Plaster, Petroleum products such as fuel, oil, and grease; Asphalt and concrete components; Hazardous chemicals such as acids, lime, glues, adhesives, paints, solvents, and curing compounds; Concrete compounds; and other materials that may be detrimental if released to the environment.

Delivery & Storage

- Generally, construction materials should be stored off the ground, under cover, and, in temporary containment areas in certain cases.
- Material Safety Data Sheets (MSDS) shall be available for all materials stored on-site in the on-site job trailer.
- Designate areas on site for material delivery and storage areas.
- Material delivery and storage areas shall be located near the construction entrances, away from drainage areas, watercourses, and heavy traffic areas if possible.
- Place containment areas in an area which will be paved if possible.
- Install a stabilized entrance at the entrance to the storage area if vehicles or equipment will enter from a paved surface to an unpaved storage area.
- Stockpiles shall be protected in accordance with WM-3, Stockpile Management.
- Materials shall be stored in their original containers and the original product labels should be maintained in place in a legible condition. Damaged or otherwise illegible labels shall be replaced as soon as possible.
- Materials should be stored indoors within existing structures or sheds when available. If this is not feasible, materials shall be covered by a fully secured impervious tarp.
- If stored outside, cover and store liquids, chemicals, boxed materials, drums, and materials with the potential to migrate during a storm on pallets, away from water courses and in secondary containment such as earthen dikes, horse troughs, or even a children's wading pool or "bus boy trays" for non-reactive materials such as detergents, oil, grease, and paints.
- Liquids, petroleum products, and substances listed in 40 CFR Parts 110, 117, or 302 shall be stored in approved containers and drums and shall not be overfilled. Containers and drums shall be placed in temporary secondary containment facilities for storage.

Containment Facility

- A temporary containment facility shall provide for a spill containment volume able to contain precipitation from a 25-year storm event, plus the greater of 10% of the aggregate volume of all containers or 100% of the capacity of the largest container within its boundary, whichever is greater.
- A temporary containment facility shall be impervious to the materials stored for a minimum contact time of 72 hours.
- A temporary containment facility should be maintained free of accumulated rainwater and spills. In the event of spills or leaks, accumulated rainwater and spills shall be collected and placed into drums. These liquids shall be handled as a hazardous waste unless testing determines them to be non-hazardous. All collected liquids or non-hazardous liquids shall be sent to an approved disposal site.

- Sufficient separation shall be provided between stored containers to allow for spill cleanup and emergency response access.
- Incompatible materials, such as chlorine and ammonia, shall not be stored in the same temporary containment facility.
- Throughout the rainy season, each temporary containment facility shall be covered during nonworking days, prior to, and during rain events.

Hazardous or Regulated Materials

- Hazardous materials storage onsite should be minimized.
- Hazardous materials should be handled as infrequently as possible.
- Chemicals should be kept in their original labeled containers.
- An ample supply of appropriate spill clean-up material should be kept near storage areas.
- Also see WM-6, Hazardous Waste Management, for storing of hazardous materials.
- If significant residual materials remain on the ground after construction is complete, properly remove materials and any contaminated soil. See WM-7, Contaminated Soil Management in Appendix G: CASQA BMP Handbook. If the area is to be paved, pave as soon as materials are removed to stabilize the soil.
- Storage of reactive, ignitable, or flammable liquids must comply with the fire codes of your area. Contact the local Fire Marshal to review site materials, quantities, and proposed storage area to determine specific requirements. See the Flammable and Combustible Liquid Code, NFPA30.

Spills

- Contain and clean up any spill immediately.
- Properly remove and dispose of any hazardous materials or contaminated soil if significant residual materials remain on the ground after construction is complete. See WM-7,
- Contaminated Soil Management.
- See WM-4, Spill Prevention and Control, for spills of chemicals and/or hazardous materials.

WM-2 Material Use

This waste management and materials pollution control is implemented to prevent or reduce the discharge of pollutants to the storm drain system or watercourses from material use by using alternative products if available, and minimizing hazardous material uses onsite.

This BMP is suitable for use at all construction projects. These procedures apply when the following materials are used or prepared onsite:

- Pesticides and herbicides,
- Fertilizers,
- Detergents,
- Petroleum products such as fuel, oil, and grease,
- Asphalt and other concrete components,
- Other hazardous chemicals such as acids, lime, glues, adhesives, paints, solvents, and curing compounds,
- Other materials that may be detrimental if released to the environment.

The following steps should be taken to minimize risk of stormwater pollution from material use:

- Reduce and minimize use of hazardous materials onsite when practical.
- Follow manufacturer instructions regarding uses, protective equipment, ventilation, flammability, and mixing of chemicals. Train personnel who use pesticides. The California Department of Pesticide Regulation and county agricultural commissioner's license pesticide dealers, certify pesticide applicators, and conduct onsite inspections.
- Do not over-apply fertilizers, herbicides, and pesticides. Prepare only the amount needed.
- Follow the recommended usage instructions. Over-application is expensive and environmentally harmful. Unless on steep slopes, till fertilizers into the soil rather than hydro seeding. Apply surface dressings in several smaller applications, as opposed to one large application, to allow time for infiltration and to avoid excess material being carried offsite by runoff. Do not apply these chemicals just before it rains.
- Keep Material Safety Data Sheets (MSDS) for all materials on site.
- Dispose of latex paint and paint cans, used brushes, rags, absorbent materials, and drop cloths, when thoroughly dry and are no longer hazardous, with other construction debris.
- Do not remove the original product label; it contains important safety and disposal information. Use the entire product before disposing of the container.
- Mix paint in a containment area. Never clean paintbrushes or rinse pain containers into a street, gutter, storm drain, or watercourse. Dispose of any paint thinners, residue, and sludge(s) that cannot be recycled, as hazardous waste.
- For water-based paint, clean brushes to the extent practicable, and rinse to a drain leading to a sanitary sewer where permitted, or into a concrete washout pit or other lined liquid waste container.
- For oil-based paints, clean brushes to the extent practicable, and filter and reuse thinners and solvents.
- Use recycled and less hazardous products when practical. Recycle residual paints, solvents, nontreated lumber, and other materials.
- Use materials only where and when needed to complete the construction activity. Use safer alternative materials as much as possible.
- Keep an ample supply of spill clean-up material near use areas.
- Avoid exposing applied materials to rainfall and runoff unless sufficient time has been allowed for them to dry.

WM-3 Stockpile Management

Stockpile management procedures and practices is a waste management and materials pollution control Stockpile Management procedures and practices are designed to reduce or eliminate air and stormwater pollution from stockpiles of soil, paving materials such as Portland cement concrete (PCC) rubble, asphalt concrete (AC), asphalt concrete rubble, aggregate base, aggregate sub base or pre-mixed aggregate, asphalt minder (so called "cold mix" asphalt), and pressure treated wood.

Implement in all stockpiles of soil and other loose materials.

- Locate stockpiles a minimum of 50 ft away from concentrated flows of stormwater, drainage courses, and inlets.
- Protect all stockpiles from stormwater run on using a temporary perimeter sediment barrier such as berms, dikes, fiber rolls, silt fences, sandbag, or gravel bags.
- Implement wind erosion control practices as appropriate on all stockpiled material. For specific information, see WE-1, Wind Erosion Control.

- All stockpiles are required to be protected immediately if they are not scheduled to be used within 14 days.
- Manage stockpiles of contaminated soil in accordance with WM-7, Contaminated Soil Management.
- Place bagged materials on pallets and under cover.
- Ensure that stockpile coverings are installed securely to protect from wind and rain.
- Some plastic covers withstand weather and sunlight better than others. Select cover materials or methods based on anticipated duration of use.
- Temporary vegetation should be considered for topsoil piles that will be stockpiled for extended periods.
- Stockpiles of concrete rubble, asphalt concrete, asphalt concrete rubble, aggregate base, and aggregate sub base shall be covered and protected with a temporary perimeter sediment barrier at all times.

Stockpiles of polluting materials

- Asphalt cold mix, fly ash, stucco, and hydrated lime stockpiles should be placed on and covered with plastic sheeting or comparable material at all times and surrounded by a berm.
- Treated wood should be covered with plastic sheeting or comparable material at all times and surrounded by a berm.

Protection of Active Stockpiles

- All stockpiles should be covered and protected with a temporary linear sediment barrier prior to the onset of precipitation.
- Stockpiles of "cold mix" and treated wood, and basic materials should be placed on and covered with plastic sheeting or comparable material and surrounded by a berm prior to the onset of precipitation.
- The downstream perimeter of an active stockpile should be protected with a linear sediment barrier or berm and runoff

WM-4 Spill Prevention and Control

Prevent or reduce the discharge of pollutants to drainage systems or watercourses from leaks and spills by reducing the chance for spills, stopping the source of spills, containing and cleaning up spills, properly disposing of spill materials, and training employees. This best management practice covers only spill prevention and control. However, WM-1, Materials Delivery and Storage, and WM-2, Material Use, also contain useful information, particularly on spill prevention. For information on wastes, see WM-5 Liquid Waste Management and WM-10 solid Waste Management.

This BMP is suitable for all construction projects. Spill control procedures are implemented anytime chemicals or hazardous substances are stored on the construction site, including the following materials:

- Soil stabilizers/binders
- Dust palliatives
- Herbicides
- Growth inhibitors
- Fertilizers
- Deicing/anti-icing chemicals
- Fuels
- Lubricants
- Other petroleum distillates

Implementation

- To the extent that the work can be accomplished safely, spills of oil, petroleum products, and substances listed under 40 CFR parts 110,117, and 302, and sanitary and septic wastes should be contained and cleaned up immediately.
- Store hazardous materials and wastes in covered containers and protect from vandalism.
- Place a stockpile of spill cleanup materials where it will be readily accessible.
- Train employees in spill prevention and cleanup.
- Designate responsible individuals to oversee and enforce control measures.
- Spills should be covered and protected from stormwater run-on during rainfall to the extent that it doesn't compromise clean-up activities.
- Do not bury or wash spills with water.
- Store and dispose of used clean up materials, contaminated materials, and recovered spill material that is no longer suitable for the intended purpose in conformance with the provisions in applicable BMPs.
- Do not allow water used for cleaning and decontamination to enter storm drains or watercourses. Collect and dispose of contaminated water in accordance with WM-10, Liquid Waste Management.
- Contain water overflow or minor water spillage and do not allow it to discharge into drainage facilities or watercourses.
- Place proper storage, cleanup, and spill reporting instructions for hazardous materials stored or used on the project site in an open, conspicuous, and accessible location.
- Keep waste storage areas clean, well-organized, and equipped with ample clean supplies as appropriate for the materials being stored. Perimeter controls, containment structures, covers, and liners should be repaired or replaced as needed to maintain proper function.

Cleanup

- Clean up leaks and spills immediately.
- Use a rag for small spills on paved surfaces, a damp mop for general cleanup, and absorbent material for larger spills. If the spilled material is hazardous, then the used cleanup materials are also hazardous and must be sent to either a certified laundry (rags) or disposed of as hazardous waste.
- Never hose down or bury dry material spills. Clean up as much of the material as possible and dispose of properly. See WM-5 Waste Management and WM-7 contaminated soils in this section for specific information.
- Report all spills to the Project QSP immediately. A spill may trigger stormwater sampling for non-visible pollutants.

Minor Spills

- Minor spills typically involve small quantities of oil, gasoline, paint, etc. which can be controlled at the discovery of the spill.
- Contain the spread of the spill.
- Use absorbent materials on small spills rather than hosing down or burying the spill.
- Notify the project foreman immediately.
- Recover spilled materials.
- Clean the contaminated area and properly dispose of contaminated materials.

- If the spill occurs on paved or impermeable surfaces, clean up using "dry" methods (absorbent materials, cat litter and/or rags). Contain the spill by encircling with absorbent materials and do not let the spill spread widely.
- If the spill occurs in dirt areas, immediately contain the spill by constructing an earthen dike. Dig up and properly dispose of contaminated soil.
- If the spill occurs during rain, cover spill with tarps or other material to prevent contaminating runoff.

Semi-Significant Spills

- Semi-significant spills still can be controlled by the first responder along with the aid of other personnel such as laborers and the foreman, etc. This response may require the cessation of all other activities. Spills should be cleaned up immediately.

Significant/Hazardous Spills

- For significant or hazardous spills that cannot be controlled by personnel in the immediate vicinity, the following steps should be taken:
    - Notify the local emergency response by dialing 911. In addition to 911, the contractor will notify the proper City or County officials. All emergency phone numbers will be posted at the construction site.
    - Contact the site superintendent. For spills of federal reportable quantities, (examples are listed below) in conformance with the requirements in 40 CFR parts 110,119, and 302, the site superintendent will notify the National Response Center at (800) 424-8802. The superintendent will notify the Regional Water Quality Control Board and any other applicable agencies.
- The services of a spill contractor or a Haz-Mat team should be obtained immediately. Construction personnel should not attempt to clean up until the appropriate and qualified staffs have arrived at the job site.
- Notification should first be made by telephone and followed up with a written report.
- Other agencies which may need to be consulted include, but are not limited to, the Public Works Department, the Coast Guard, the Highway Patrol, the City/County Police Department, Department of Toxic Substances, California Division of Oil and Gas, Cal/OSHA, etc.
- Federal regulations require that any significant oil spill into a water body or onto an adjoining shoreline be reported to the National Response Center (NRC) at 800-424-8802 (24 hours).

Sampling

- If there is evidence that the spilled material was discharged offsite, follow the appropriate sampling protocol (stormwater, non-stormwater or non-visible discharges) located in the CSMP.

Vehicle and Equipment Maintenance

- If maintenance must be performed onsite, use a designated area and secondary containment, located away from drainage courses, to prevent the run on of stormwater and the runoff of spills.
- Regularly inspect onsite vehicles and equipment for leaks and repair immediately.
- Check incoming vehicles and equipment (including delivery trucks, and employee and subcontractor vehicles) for leaking oil and fluids. Do not allow leaking vehicles or equipment onsite.
- Always use secondary containment, such as a drain pan or drop cloth, to catch spills or leaks when removing or changing fluids.
- Place drip pans or absorbent materials under paving equipment when not in use.

- Use absorbent materials on small spills rather than hosing down or burying the spill.
- Remove the absorbent materials promptly and dispose of properly.
- Promptly transfer used fluids to the proper waste or recycling drums. Don't leave full drip pans or other open containers lying around.
- Oil filters disposed of in trashcans or dumpsters can leak oil and pollute stormwater. Place the oil filter in a funnel over a waste oil-recycling drum to drain excess oil before disposal. Oil filters can also be recycled. Ask the oil supplier or recycler about recycling oil filters.
- Store cracked batteries in a non-leaking secondary container. Do this with all cracked batteries even if you think all the acid has drained out. If you drop a battery, treat it as if it is cracked. Put it into the containment area until you are sure it is not leaking.

Vehicle and Equipment Fueling

- If fueling must be performed onsite, designate areas located away from drainage courses to prevent the run on of stormwater and the runoff of spills.
- Discourage "topping off" of fuel tanks.
- Always use secondary containment, such as a drain pan, when fueling to catch spills/ leaks.

Typical Reportable Quantities for Construction Sites

Material	**Released to**	**Quantity**
Engine Oil, Fuel Hydraulic & Brake Fluid	Land	25 Gallons
Engine Oil, Fuel Hydraulic & Brake Fluid	Water	Visible Sheen
Gasoline	Land or Water	32 Gallons
Anti-Freeze	Land or Water	5000 lbs (539 Gallons)
Engine Degreaser	Land or Water	100 lbs (10 Gallons)

WM-5 Solid Waste Management

Solid waste management procedures and practices are a waste management and pollution control designed to prevent or reduce the discharge of pollutants to stormwater from solid or construction waste by providing designated waste collection areas and containers, arranging for regular disposal, and training employees and subcontractors.

Temporary stockpiling of certain construction wastes may not necessitate stringent drainage related controls during the non-rainy season or in desert areas with low rainfall.

- Inform trash-hauling contractors that you will accept only watertight dumpsters for onsite use. Inspect dumpsters for leaks and repair any dumpster that is not watertight.
- Provide an adequate number of containers for the amount of trash that will be generated from the site with lids or covers that can be placed over the container to keep rain out or to prevent loss of wastes when it is windy.
- Trash receptacles with lids shall be provided in the contractor's yard, field trailer areas, and at locations where workers congregate for lunch and break periods.
- Solid waste storage areas should be located away from drainage facilities and watercourses and should not be located in areas prone to flooding or ponding.
- Stormwater run-on shall be prevented from contacting stored solid waste through the use of berms, dikes, or other temporary diversion structures or through the use of measures to elevate waste from site surfaces.
- Collect site trash daily, especially during rainy and windy conditions and cover receptacles at the end of each business day or while not in use.

- Collected litter and debris should not be stored next to inlets, drainage systems, or watercourses.
- Waste containers, dumpsters, & trash receptacles must be covered at the end of the work day and in the event of rain or significant wind.
- Arrange for regular waste collection before containers overflow.
- To prevent clogging of the storm drainage system, litter and debris removal from drainage grates, trash racks, and ditch lines shall be a priority.
- Segregate potentially hazardous waste from non-hazardous construction site waste.
- Make sure that toxic liquid wastes (used oils, solvents, and paints) and chemicals (acids, pesticides, additives, curing compounds) are not disposed of in dumpsters designated for construction debris.
- Do not hose out dumpsters on the construction site. Leave dumpster cleaning to the trash hauling contractor.
- Clean up immediately if a waste container does spill.
- Make sure that construction waste is collected, removed, and disposed of only at authorized disposal facilities.
- Littering on the project site is prohibited.

WM-6 Hazardous Waste Management

This hazardous waste management measure is a waster management and pollution control measure that applies to all construction projects to prevent or reduce the discharge of pollutants to stormwater from hazardous waste through proper material use, waste disposal, and training of associates and subcontractors.

Hazardous waste management practices are implemented on construction projects that generate waste from the use of:

- Petroleum Products, Asphalt Products, Concrete Curing Compounds, Pesticides, Palliatives, Acids, Septic Wastes, Paints, Stains, Solvents, Wood Preservatives, Roofing Tar and any materials deemed a hazardous waste in California, Title 22 Division 4.5, or listed in 40 CFR Parts 110, 117, 261, or 302.

In addition, sites with existing structures may contain wastes, which must be disposed of in accordance with federal, state, and local regulations. These wastes include:

- Sandblasting grit mixed with lead-, cadmium-, or chromium-based paints
- Asbestos
- PCBs (particularly in older transformers)

Implementation

- Wastes should be stored in sealed containers constructed of a suitable material and should be labeled as required by Title 22 CCR, Division 4.5 and 49 CFR Parts 172, 173, 178, and 179.
- All hazardous waste should be stored, transported, and disposed as required in Title 22 CCR, Division 4.5 and 49 CFR 261-263.
- Waste containers shall be stored in temporary containment facilities that comply with the following requirements:
    - Designate hazardous waste storage areas onsite away from storm drains or watercourses and away from moving vehicles and equipment to prevent accidental spills.
    - Minimize production or generation of hazardous materials and hazardous waste on the job site.

    - Use containment berms in fueling and maintenance areas and where the potential for spills is high.
    - Segregate potentially hazardous waste from non-hazardous construction site debris.
    - Keep liquid or semi-liquid hazardous waste in appropriate containers (closed drums or similar) and under cover.
    - Temporary containment facility should provide for a spill containment volume equal to 1.5 times the volume of all containers able to contain precipitation from a 25-year storm event, plus the greater of 10% of the aggregate volume of all containers or 100% of the capacity of the largest tank within its boundary, whichever is greater.
    - Temporary containment facility should be impervious to the materials stored there for a minimum contact time of 72 hours.
    - Temporary containment facilities should be maintained free of accumulated rainwater and spills. In the event of spills or leaks, accumulated rainwater and spills should be placed into drums after each rainfall. These liquids should be handled as a hazardous waste unless testing determines them to be non-hazardous. Non-hazardous liquids should be sent to an approved disposal site.
    - Sufficient separation should be provided between stored containers to allow for spill cleanup and emergency response access.
    - Incompatible materials, such as chlorine and ammonia, should not be stored in the same temporary containment facility.
    - Throughout the rainy season, temporary containment facilities should be covered during non-working days, and prior to rain events. Covered facilities may include use of plastic tarps for small facilities or constructed roofs with overhangs.
    - Drums should not be overfilled, and wastes should not be mixed.
    - Unless watertight, containers of dry waste should be stored on pallets.
- Do not over-apply herbicides and pesticides. Prepare only the amount needed. Follow the recommended usage instructions. Over application is expensive and environmentally harmful. Apply surface dressings in several smaller applications, as opposed to one large application. Allow time for infiltration and avoid excess material being carried offsite by runoff. Do not apply these chemicals just before it rains. People applying pesticides must be certified in accordance with federal and state regulations.
- Paint brushes and equipment for water and oil-based paints should be cleaned within a contained area and should not be allowed to contaminate site soils, watercourses, or drainage systems. Waste paints, thinners, solvents, residues, and sludges that cannot be recycled or reused should be disposed of as hazardous waste. When thoroughly dry, latex paint and paint cans, used brushes, rags, absorbent materials, and drop cloths should be disposed of as solid waste.
- Do not clean out brushes or rinse paint containers into the dirt, street, gutter, storm drain, or stream. “Paint out” brushes as much as possible. Rinse water-based paints to the sanitary sewer. Filter and reuse thinners and solvents. Dispose of excess oil-based paints and sludge as hazardous waste.
- Clearly label all hazardous waste containers with the waste being stored and the date of accumulation.
    - Place hazardous waste containers in secondary containment.
    - Do not allow potentially hazardous waste materials to accumulate on the ground.
    - Do not mix wastes.
    - Use the entire product before disposing of the container.

- Do not remove the original product label; it contains important safety and disposal information.

Waste Recycling Disposal

- Select designated hazardous waste collection areas onsite.
- Hazardous materials and wastes should be stored in covered containers and protected from vandalism.
- Place hazardous waste containers in secondary containment.
- Do not mix wastes, this can cause chemical reactions, making recycling impossible and complicating disposal.
- Recycle any useful materials such as used oil or water-based paint.
- Make sure that toxic liquid wastes (used oils, solvents, and paints) and chemicals (acids, pesticides, additives, curing compounds) are not disposed of in dumpsters designated for construction debris.
- Arrange for regular waste collection before containers overflow.
- Make sure that hazardous waste (e.g., excess oil-based paint and sludge) is collected, removed, and disposed of only at authorized disposal areas.

Disposal Procedures

- Waste should be disposed of by a licensed hazardous waste transporter at an authorized and licensed disposal facility or recycling facility utilizing properly completed Uniform Hazardous Waste Manifest forms.
- A Department of Health Services certified laboratory should sample waste to determine the appropriate disposal facility.
- Properly dispose of rainwater in secondary containment that may have mixed with hazardous waste.
- Attention is directed to "Hazardous Material", "Contaminated Material", and "Aerially Deposited Lead" of the contract documents regarding the handling and disposal of hazardous materials.
- Place a stockpile of spill cleanup materials where it will be readily accessible.
- If a container does spill, clean up immediately.

WM-8 Concrete Waste Management

The use of concrete waste managing measures including, concrete washouts, are wase management and pollution controls that prevent or reduce the discharge of pollutants to stormwater from concrete waste products conducting washout offsite or onsite in a designated area.

Suitable Applications

Concrete waste management proceedures and practices shall be implemented on the Project where:

- Concrete is used as a construction material or where concrete dust and debris results from demolition activities.
- Slurries containing Portland cement concrete or asphalt concrete are generated, such as from saw cutting, coring, grinding, grinding, and hydro-concrete demolition.
- Concrete trucks and other concrete coated equipment area washed on site.
- Mortar-mixing stations and equipment.

Implementation

- Concrete washout containers shall consist of water tight plastic tubs over a bermed liner for secondary containment that accommodates access by concrete trucks.
- Arrange for pumping or accumulated slurry/water capacity is 75%.
- Place downstream as far as possible from storm drains, open ditches, and waterbodies.
- Place in a location that allows convenient access for concrete trucks, preferably near the area where concrete is being poured.
- Place far from construction traffic to reduce the likelihood of damage.
- The size and number of concrete washout facilities shall be appropriate for the anticipated amount of concrete waste.
- To prevent leaks, use prefabricated concrete washout containers that are watertight.
- Store dry and wet materials under cover and away from drainage areas.
- Avoid mixing of excess amounts of fresh concrete.
- Perform washout of concrete trucks offsite or in designated washout areas.
- Do not wash out concrete trucks into the soils, into storm drains, open ditches, streets, or water bodies.
- Do not dump excess concrete on non-designated concrete waste areas.

Concrete Slurry Wastes

- Residue from grinding operations should be picked up by means of vacuum attachment.
- Saw cutting residue shall not be allowed to flow across pavement and should not be left on the surface of pavement. See NS-3 Paving and Grinding Operations.
- Slurry residue should be vacuumed and disposed in a temporary put. Dispose of dry slurry residue in accordance with solid waste management WM-5.

WM-9 Sanitary-Septic Waste Management

Proper sanitary and septic waste management are waste management and material pollution controls that prevent the discharge of pollutants to stormwater from sanitary and septic waste by providing convenient, well-maintained facilities, an arranging for regular service and disposal.

Sanitary septic waste management practices are suitable for use at all construction sites that use temporary or portable sanitary and septic waste systems.

Implementation

- Shall be located away from drainage facilities, watercourses, and from traffic circulation.
- Provide a sufficient quantity of facilities to accommodate the workforce.
- Ensure containment of sanitation facilities to prevent discharge of pollutants to the stormwater drainage system or the receiving water.
- When subjected to high winds or risk of high winds, temporary sanitary facilities shall be secured to prevent overturning.
- Sanitary facilities should be located in a convenient location.
- Sanitary or septic wastes shall be treated or disposed of in accordance with state and local requirements.
- Sanitary facilities shall be maintained in good working order by a licensed service.
- Regular waste collection by a licensed hauler should be arranged before facilities overflow.

- Do not discharge or bury sanitary waste within the project site.
- Sanitary and septic systems that discharge directly into sanitary sewer systems, where permissible, shall comply with the local health agency, city, county, and sewer district requirements.
- Sanitary and septic facilities should be maintained in good working order by a licensed service.

WM-10 Liquid Waste Management

Liquid waste management is a waste management and materials pollution control that includes procedures and practices to prevent discharge of pollutants to the storm drain system or to watercourses as a result of the creation, collection, and disposal of non-hazardous liquid wastes

Liquid waste management is applicable to construction projects that generate any of the following nonhazardous by-products, residuals, or wastes:

- Drilling slurries and drilling fluids.
- Grease-free and oil-free wastewater and rinse water.
- Dredgings.
- Other non-stormwater liquid discharges not permitted by separate permits.

Limitations

- Disposal of some liquid wastes may be subject to specific laws and regulations or to requirements of other permits secured for the construction project (e.g., NPDES permits, Army Corps permits, Coastal Commission permits, etc.).
- Liquid waste management does not apply to dewatering operations (NS-2 Dewatering Operations), solid waste management (WM-5, Solid Waste Management), hazardous wastes (WM-6, Hazardous Waste Management), or concrete slurry residue (WM-8, Concrete Waste Management).
- Typical permitted non-stormwater discharges can include: water line flushing; landscape irrigation; diverted stream flows; rising ground waters; uncontaminated pumped ground water; discharges from potable water sources; foundation drains; irrigation water; springs; water from crawl space pumps; footing drains; lawn watering; flows from riparian habitats and wetlands; and discharges or flows from emergency fire-fighting activities.

Implementation

Containing Liquid Wastes

- Drilling residue and drilling fluids should not be allowed to enter storm drains and watercourses and should be disposed of.
- If an appropriate location is available, drilling residue and drilling fluids that are exempt under Title 23, CCR § 2511(g) may be dried by infiltration and evaporation in a containment facility constructed in conformance with the provisions concerning the Temporary Concrete Washout Facilities detailed in WM-8, Concrete Waste Management.
- Liquid wastes generated as part of an operational procedure, such as water-laden dredge material and drilling mud, should be contained and not allowed to flow into drainage channels or receiving waters prior to treatment.
- Liquid wastes should be contained in a controlled area such as a holding pit, sediment basin roll-off bin, or portable tank.
- Containment devices must be structurally sound and leak free.
- Containment devices must be of sufficient quantity or volume to completely contain the liquid wastes generated.

Capturing Liquid Wastes

- Capture all liquid wastes that have the potential to affect the storm drainage system (such as wash water and rinse water from cleaning walls or pavement), before they run off a surface.
- Do not allow liquid wastes to flow or discharge uncontrolled. Use temporary dikes or berms to intercept flows and direct them to a containment area or device for capture.
- Use a sediment trap (SE-3, Sediment Trap) for capturing and treating sediment laden liquid waste or capture in a containment device and allow sediment to settle.

Disposing of Liquid Wastes

- A typical method to handle liquid waste is to dewater the contained liquid waste, using procedures such as described in NS-2, Dewatering Operations, and SE-2, Sediment Basin, and dispose of resulting solids per WM-5, Solid Waste Management.
- Methods of disposal for some liquid wastes may be prescribed in Water Quality Reports, NPDES permits, Environmental Impact Reports, 401 or 404 permits, and local agency discharge permits, etc. Review the SWPPP to see if disposal methods are identified.
- Liquid wastes, such as from dredged material, may require testing and certification whether it is hazardous or not before a disposal method can be determined.
- For disposal of hazardous waste, see WM-6, Hazardous Waste Management.
- If necessary, further treat liquid wastes prior to disposal. Treatment may include, though is not limited to, sedimentation, filtration, and chemical neutralization.

3.4 TMDL-RELATED BMPS

There are no required TMDL-related BMPs for the Project since the Project does not discharge to a water body with TMDLs.

3.5 POST CONSTRUCTION STORMWATER MANAGEMENT MEASURES

Post construction BMPs are permanent measures installed during construction, designed to reduce or eliminate pollutant discharges from the site after construction is completed.

This site is subject to the post-construction requirements of an existing NPDES Phase I or Phase II MS4. ☒ Yes ☐ No

The post construction runoff reduction requirements have been satisfied through the City of Madera MS4 program, this project is exempt from 2022 CGP Provision IV.N.3. The MS4's post construction requirements and the post-construction plans and calculations approved by the MS4 were uploaded as part of the PRDs as required by 2022 CGP Provision IV.N.2.

Section 4 BMP Inspection and Maintenance

4.1 BMP INSPECTION AND MAINTENANCE

The 2022 CGP requires routine weekly inspections of BMPs, along with inspections before, during, and after qualifying precipitation events. A BMP inspection checklist must be filled out for inspections and maintained on-site with the SWPPP. The inspection checklist must include the necessary information covered in Section 7.6. A blank BMP Inspection Form can be found in Appendix H. Completed forms will be kept in Appendix N.

Maintenance, repair, or design and implementation of new BMPs alternatives will be begin withing 72 hours of the identification of failures or other shortcomings. Corrections will be completed as soon as possible, prior to the next forecasted precipitation event (2022 CGP Appendix D Section II.J).

The QSP will verify that all BMP maintenance and repairs were appropriately implemented during the next visual inspection following completion.

The QSP may delegate BMP maintenance and repair verification to an appropriately trained QSP Delegate.

Specific details for maintenance, inspection, and repair of Construction Site BMPs can be found in the BMP Factsheets in Appendix G.

Section 5 Training

Appendix J identifies the QSPs and QSP Delegates for the project. To promote stormwater management awareness specific for this project, periodic training of job-site personnel will be included as part of routine project meetings (e.g., daily/weekly tailgate safety meetings), or task specific training as needed. Refresher training will be provided as necessary.

The QSP will be responsible for providing this information at the meetings, and subsequently completing the Training Reporting Form shown in Appendix I, which identify the site-specific stormwater topics covered as well as the names of site personnel who attended the meeting.

The QSP may delegate specific tasks to trained QSP Delegates who have received the following training based on the guidelines developed by the Construction General Permit Training Team.

1. **Foundational training** for all QSP Delegate(s) regarding stormwater compliance roles and responsibilities, forecast information, and documentation and reporting procedures; and
2. **Site-specific training** regarding visual inspections, sampling procedures, and/or SWPPP and BMP implementation activities relevant to the responsibilities assigned to the QSP Delegate(s).

The delegate cannot perform the QSD and QSP inspections required in Section V.C.4 or Section V.D.2, respectively.

Documentation of training activities will be retained in Appendix I.

Section 6 Responsible Parties and Operators

6.1 RESPONSIBLE PARTIES

DAR(s) who are responsible for SWPPP implementation and have authority to sign permit-related documents are listed below. The DAR(s) assigned to this project are:

Name	Title	Phone Number
Rosalind Cox	Signatory of the LRP, Director of Facilities Planning and Construction Management	559-675-4548

QSD(s) identified for the project are identified in Appendix J. The QSD will have primary responsibility for assessing how construction activities will affect sediment transport, erosion, and other discharges of pollutants in stormwater runoff throughout the project. The QSD is required to revise the SWPPP to address potential problems identified by visual inspections, sampling data, comments from a QSP, or their own site observations. The QSD is required to perform the following on-site visual inspections:

- Within 30 days of construction activities commencing on site;
- Within 30 days when a new QSD is assigned to the project;
- Twice annually, once August through October and once January through March;
- Within 14 calendar days after a numeric action level exceedance; and
- Within the time period requested in writing from Regional Water Board staff.

QSPs and QSP Delegates identified for the project are identified in Appendix J. The QSP will have primary responsibility and significant authority for the implementation, maintenance, and inspection/monitoring of SWPPP requirements. The QSP will be available at all times throughout the duration of the project.

Duties of the QSP include but are not limited to:

- Implementing all elements of the 2022 CGP and SWPPP, including, but not limited to:
    - Performing the following on-site visual inspections:
        - One inspection per calendar month; other weekly inspections in the month can be delegated to a trained QSP Delegate under the specific direction of the QSP.
        - Within 72 hours prior to a forecasted qualifying precipitation event, to inspect any areas of concern and to verify the status of any deficient BMPs, or other identified issues at the site. If extended forecast precipitation data (greater than 72 hours) is available from the *National Weather Service*, then the Pre-Precipitation Event inspection may be done up to 120 hours in advance.
        - Within 14 days after a NAL exceedance, the QSP shall visually inspect the drainage area for exceedance and document any areas of concern.

        - Prior to the submittal for the NOT or COI (for acreage changes) for all or part of the site.
    - Ensuring that all BMPs are implemented, inspected, and properly maintained;
    - Ensure that the SMARTS generated WDID Number Notification form is posted on-site, in a location viewable by the public or readily available upon request, and the dates are correct and match the dates listed in SMARTS.
- Implementing non-stormwater management, and materials and waste management activities such as: monitoring discharges; general Site clean-up; vehicle and equipment cleaning, fueling and maintenance; spill control; ensuring that no materials other than stormwater are discharged in quantities which will have an adverse effect on receiving waters or storm drain systems, etc.;
- Ensuring elimination of unauthorized discharges.
- The QSPs shall be assigned authority by the LRP to mobilize crews in order to make immediate repairs to the control measures.
- Coordinate with the Contractor(s) to assure the necessary corrections/repairs are made immediately and that the project complies with the SWPPP, the 2022 CGP, and approved plans at all times.
- Notifying the LRP or Duly Authorized Representative immediately of off-site discharges or other non-compliance events.
- Providing foundation and site-specific training to QSP Delegates and overseeing QSP Delegate work. Tasks that may be delegated to appropriately trained QSP-delegates include:
    - Performing non-stormwater and stormwater visual observations and inspections;
    - Performing stormwater sampling and analysis, as required; and
    - Performing routine inspections and observations.

Table 6-1. QSP and QSP Delegate Authorized Inspections

	Weekly BMP and NSW	Pre-QPE	Daily-QPE Visual Inspections	Post-QPE Visual Inspections	Post NAL Exceedances	Monthly BMP and NSW	NOT
QSP	X	X	X	X	X	X	X
QSP Delegate	X		X	X			

6.2 CONTRACTOR LIST

Contractor Name:	TBD, Contractor information will be added via COI once known.
Title:	
Contractor Company:	
Address	
Phone Number:	
Phone Number (24/7)	

Section 7 Construction Site Monitoring Program

7.1 Purpose

This Construction Site Monitoring Program was developed to address the following objectives:

1. To demonstrate that the site is in compliance with the Discharge Prohibitions.
2. To determine whether non-visible pollutants discharged from the construction site and are causing or contributing to exceedances of water quality objectives;
3. To determine whether immediate corrective actions, additional BMP implementation, or SWPPP revisions are necessary to reduce pollutants in stormwater discharges and authorized non-stormwater discharges;
4. To determine whether BMPs included in the SWPPP are effective in preventing or reducing pollutants in stormwater discharges and authorized non-stormwater discharges.

7.2 Applicability of Permit Requirements

This project has been determined to be a Risk Level 1 project. The 2022 CGP identifies the following types of monitoring as being applicable for a Risk Level 1 project.

Risk Level 1

- Visual inspections of BMPs;
- Visual monitoring of the site related to qualifying precipitation events;
- Visual monitoring of the site for non-stormwater discharges;
- Sampling and analysis of construction site runoff for non-visible pollutants identified during the pollutant source assessments when applicable; and
- Sampling and analysis of construction site runoff as required by the Regional Water Board when applicable.

7.3. Weather and Precipitation Event Tracking

Visual monitoring and inspections requirements of the 2022 CGP are triggered by a Qualifying Precipitation Event. The 2022 CGP defines a Qualifying Precipitation Event as any weather pattern that is forecast to have a 50 percent or greater Probability of Precipitation (PoP) and a Quantitative Precipitation Forecast (QPF) of 0.5 inches or more within a 24-hour period. The event begins with the 24-hour period when 0.5 inches has been forecast and continues on subsequent 24-hour periods when 0.25 inches of precipitation or more is forecast.

7.3.1 Weather Tracking

The QSP should daily consult the National Oceanographic and Atmospheric Administration (NOAA) for the Forecast Weather Table Interface. These forecasts can be obtained at http://forecast.weather.gov. Weather reports should be printed and maintained with the SWPPP in Appendix M. Record the date and time the forecast was printed.

7.3.2 Rain Gauges

The QSP shall install a rain gauge on the project site. Locate the gauge in an open area away from obstructions such as trees or overhangs. Mount the gauge on a post at a height of 3 to 5 feet with the gauge extending several inches beyond the post. Make sure that the top of the

gauge is level. Make sure the post is not in an area where rainwater can indirectly splash from sheds, equipment, trailers, etc.

The rain gauge(s) shall be read daily during normal site scheduled hours by the Contractor. The rain gauge should be read at approximately the same time every day and the date and time of each reading recorded. An example rain gauge log sheet is provided in Appendix O. Retain rain gauge readings in Appendix N. Follow the rain gauge instructions to obtain accurate measurements.

Once the rain gauge reading has been recorded, accumulated rain shall be emptied, and the gauge reset.

For comparison with the site rain gauge, the nearest appropriate governmental rain gauge(s) is located at the staging area shown in Appendix A: Site Maps, Figures 2A-4B.

7.4 Monitoring Locations

Monitoring locations are shown on the Site Maps in Appendix A. Monitoring locations are described in the Sections 7.6 and 7.7.

Whenever changes in the construction site might affect the appropriateness of sampling locations, the sampling locations shall be revised accordingly. All such revisions shall be implemented as soon as feasible and the SWPPP amended. Temporary changes that result in a one-time additional sampling location do not require a SWPPP amendment.

7.5 Safety and Monitoring Exemptions

Safety practices for sample collection will be in accordance with the Contractor's Project health and safety plan. A summary of the safety requirements that apply to sampling personnel is provided below.

- Wear all required PPE at all times.
- Be careful of slips, trips, and falls during wet site conditions.

This project is not required to collect samples or conduct visual observations (inspections) under the following conditions (see Section III.B of the 2022 CGP):

- During dangerous weather conditions such as electrical storms, flooding, and high winds above 40 miles per hour;
- Outside of scheduled site operating hours; or

When the site is not accessible to personnel. Scheduled site business hours are: M-F, 7:00AM – 5:00PM

If monitoring (visual monitoring or sample collection) of the site is unsafe because of the dangerous conditions noted above, then the QSP shall document the conditions for why an exception to performing the monitoring was necessary. The exemption documentation will be filed in Appendix N and must be included in the Annual Report.

7.6 Visual Monitoring

Visual monitoring includes observations and inspections. Inspections of BMPs are required to identify and record BMPs that need maintenance to operate effectively, that have failed, or that could fail to operate as intended. Visual observations of the site are required to observe storm water drainage areas to identify any spills, leaks, or uncontrolled pollutant sources.

Table 7-1 identifies the required frequency of visual observations and inspections. Inspections and observations will be conducted at the locations identified in Section 7.6.3.

Table 7-1 Summary of Visual Monitoring and Inspections

Type of Inspection	Frequency
Routine Inspections[1]	
Site Entrances/Exits	Daily
Hazardous Material/Waste storage areas	Daily
BMP Inspections	Weekly[2]
Qualifying Precipitation Event Triggered Inspections	
Site Inspections Prior to a Qualifying Precipitation Event	Within 72 hours of a qualifying precipitation event or up to 120 hours prior if supported with forecast [2]
BMP Inspections During an Extended Qualifying Precipitation Event	Once every 24-hour period of a qualifying precipitation event[3]
Site Inspections Following a Qualifying Precipitation Event	Within 96 hours of a qualifying precipitation event[2]

[1] Inspections are required during scheduled site operating hours.

[2] Most BMPs must be inspected weekly; those identified below must be inspected more frequently.

[3] Inspections are required during scheduled site operating hours on days that the forecast predicts at least 0.25 inches of precipitation once the qualifying precipitation event commences.

7.6.1 Routine Observations and Inspections

Routine site inspections and visual monitoring are necessary to confirm that the project is in compliance with the requirements of the 2022 CGP.

7.6.1.1 Routine BMP Inspections

Inspections of BMPs are conducted to identify and record:

- BMPs that are properly installed;
- BMPs that need maintenance to operate effectively;
- BMPs that have failed; or
- BMPs that could fail to operate as intended.

7.6.1.2 Non-Stormwater Discharge Observations

Each drainage area will be inspected for the presence of or indications of prior unauthorized and authorized non-stormwater discharges. Inspections will record:

- Presence or evidence of any non-stormwater discharge (authorized or unauthorized);
- Identification and elimination of unauthorized non-stormwater discharges
- Pollutant characteristics (floating and suspended material, sheen, discoloration, turbidity, odor, etc.); and
- Source of discharge.

7.6.2 Qualifying Precipitation Event Triggered Observations and Inspections

Visual observations of the site and inspections of BMPs are required prior to a qualifying precipitation event; following a qualifying precipitation event, and every 24-hour period during a qualifying precipitation event. Pre-Qualifying Precipitation Event inspections will be conducted after consulting NOAA and determining that a precipitation event with a 50 percent or greater PoP and a QPF of 0.5 inches or more precipitation within a 24-hour period has been predicted by the National Weather Service Forecast Office.

7.6.2.1 Visual Observations Prior to a Forecasted Qualifying Precipitation Event

Within 72 hours prior to a qualifying precipitation event or up to 120 hours prior if extended forecast precipitation data is available, a stormwater visual monitoring site inspection will include observations of the following locations:

- All stormwater drainage areas to identify leaks, spills, or uncontrolled pollutant sources and when necessary, implement appropriate corrective actions.
- All BMPs to identify whether they have been properly implemented per the SWPPP and implement appropriate corrective actions, as necessary.
- All stormwater storage and containment areas to detect leaks and check for available capacity to prevent overflow.

The QSP must conduct the inspection prior to the qualifying precipitation event. Consistent with the requirements for a qualifying precipitation event, pre-rain BMP inspections and visual monitoring will be triggered by a NOAA forecast that indicates a 50 percent or greater probability of 0.5 inches of precipitation or more in a 24-hour period in the project area.

7.6.2.2 BMP Inspections During a Qualifying Precipitation Event

During an extended qualifying precipitation event BMP inspections will be conducted at least once every 24 hours. Qualifying precipitation events are extended for each subsequent 24-hour period forecast to have at least 0.25 inches of precipitation. The BMP inspections are to identify and record:

- If BMPs were adequately designed, implemented and effective.
- BMPs that require repair or replacement due to damage.
- Additional BMPs that need to be implemented and revise the SWPPP accordingly.

If the construction site is not accessible during the rain event, the visual inspections shall be performed at all relevant outfalls, discharge points, downstream locations. The inspections should record any projected maintenance activities.

7.6.2.3 Visual Observations Following a Qualifying Precipitation Event

Within 96 hours following the end of a qualifying precipitation event a stormwater visual monitoring site inspection is required to observe:

- If BMPs were adequately designed, implemented and effective.
- BMPs that require repair or replacement due to damage.
- Additional BMPs that need to be implemented and revise the SWPPP accordingly.

7.6.3 Visual Monitoring Procedures

Visual monitoring shall be conducted by the QSP or QSP Delegates.

The name(s) and contact number(s) of the QSPs or QSP Delegates assigned to conduct visual observations are listed below and their training qualifications are provided in Appendix J.

Assigned QSP:	Gabriel Ledesma	Phone #:	559-326-1400
Assigned QSP:	Michelle Reynaud	Phone #:	559-326-1400
Assigned QSP:	Michael Gennaro	Phone #:	559-326-1400
Assigned QSP Delegate:		Phone #:	

Stormwater observations shall be documented on the *Visual Inspection Field Log Sheet* (see Appendix O). BMP inspections shall be documented on the site-specific BMP inspection checklist and include photographs of areas of concern along with the QSP's description of the problem.

The QSP shall within 24 hours of the inspection submit copies of the completed inspection report to the Contractor.

The QSP shall be responsible for keeping a digital record of visual monitoring inspections, and shall provide their records to the QSD or Landowner upon request.

The completed reports will be kept in Appendix N. Results of visual monitoring must be summarized and reported in the Annual Report.

7.6.4 Visual Monitoring Follow-Up and Reporting

Maintenance, repairs, and correction of deficiencies, including design changes to BMPs, identified by the observations or inspections, including required repairs or maintenance of BMPs, shall be initiated within 72 hours of identification and completed as soon as possible, prior to the next forecasted precipitation event.

When design changes to BMPs are required, the SWPPP shall be amended to reflect the changes.

Deficiencies identified in site inspection reports and correction of deficiencies will be tracked on the *Inspection Field Log Sheet* or *BMP Inspection Report* shall be kept in Appendix N. QSP Delegates shall report issues identified during inspections that require corrective action to the QSP within 24 hours of the observation.

The QSP shall within 24 hours of the inspection submit copies of the completed *Inspection Field Log Sheet* or *BMP Inspection Report* with the corrective actions to the Contractor.

The QSP shall be responsible for keeping a digital record of visual monitoring inspections, and shall provide their records to the QSD or Landowner upon request.

Results of visual monitoring must be summarized and reported in the Annual Report.

7.6.5 Visual Monitoring Locations

The inspections and observations identified in Sections 7.6.1 and 7.6.2 will be conducted at the locations identified in this section.

BMP locations are shown on the Site Maps in Appendix A.

Due to grading activities and the installation of new surface or underground stormwater conveyance systems, the drainage areas of the Project site will change throughout construction. The SWPPP identifies two main conditions for pre-grading/pre-stromwater conveyance system construction and post-grading/stormwater conveyance system construction for the purposes of

identifying the main discharge locations of the Project for monitoring. These two main drainage conditions are presented in Site Maps in Appendix A.

The QSP and trained Delegates shall use the drainage conditions presented in Site Maps in Appendix A as a guide for understanding site drainage and then field verify the accurate drainage areas and discharge locations/sampling locations during the event of a release of a non-visible pollutant based on their observations of the current drainage conditions at the site.

For the pre-grading site condition, there are 19 drainage area(s) on the project site and the contractor's yard, staging areas, and storage areas. Drainage area(s) are shown on the Site Maps in Appendix A and Table 7-2 identifies each drainage area by location.

For the active earthwork site condition, there are ten (10) drainage area(s) on the project site and the contractor's yard, staging areas, and storage areas. Drainage area(s) are shown on the Site Maps in Appendix A and Table 7-2 identifies each drainage area by location.

For the post-grading/post-stormwater system construction site condition, there are 29 drainage area(s) on the project site and the contractor's yard, staging areas, and storage areas. Drainage area(s) are shown on the Site Maps in Appendix A and Table 7-2 identifies each drainage area by location.

Table 7-2 Site Drainage Areas

Pre-Grading Condition	
Location No.	**Location**
DA 1	Northwest Landscaped Area
DA 2	Northeast Basketball Courts
DA 3	Stadium – Northwest Section
DA 4	Stadium – Section 1
DA 5	Stadium – Section 2
DA 6	Stadium – Section 3
DA 7	Stadium – Section 4
DA 8	Stadium – North Section
DA 9	Stadium – South Section
DA 10	Stadium – East Landscaped Area
DA 11	Stadium – Southwest Section
DA 12	Field House and South Road Area
DA 13	Stadium – Section 5
DA 14	Stadium – Section 6
DA 15	Stadium – Section 7
DA 16	Stadium – Section 8

DA 17	Stadium – Section 9
DA 18	Southwest Sidewalk Improvements
DA 19	Southwest Planter
Earthwork Condition	
DA 1	Entrance – West
DA 2	Entrance – East
DA 3	Stadium – Northwest Section
DA 4	Stadium Playfield
DA 5	East Landscaped Area
DA 6	Fieldhouse Grassy Area
DA 7	Fieldhouse Area
DA 8	South Road
DA 9	Southwest Sidewalk Improvements
DA 10	Southwest Planter
Post-Grading/Post-Stormwater System Construction Condition	
DA 1	West Entrance Landscaping
DA 2	North Entrance
DA 3	East Basketball Courts
DA 4	Stadium – Northwest Section
DA 5	North Bleachers
DA 6	Stadium Playfield – North
DA 7	East Jump Pits
DA 8	Track – Southwest Section
DA 9	Stadium Playfield – South
DA 10	Southwest Track Entryway
DA 11	Fieldhouse – Section 1
DA 12	Fieldhouse – Section 2
DA 13	Fieldhouse – Section 3
DA 14	Fieldhouse – Section 4
DA 15	Fieldhouse – Section 5
DA 16	Fieldhouse – Section 6
DA 17	Fieldhouse – Section 7
DA 18	South Bleachers
DA 19	South Bleachers – Section 1

DA 20	South Bleachers – Section 2
DA 21	South Bleachers – Section 3
DA 22	South Bleachers – Section 4
DA 23	South Bleachers – Section 5
DA 24	Warm up Area – West
DA 25	Warm up Area – East
DA 26	Southeast Entrance
DA 27	Southwest Sidewalk Improvements
DA 28	Southwest Staging Area
DA 29	Southwest Planter

There are two (2) stormwater storage or containment area(s) are on the project site from which stormwater will be dewatered. Stormwater storage or containment area(s) are shown on the Site Maps in Appendix A and Table 7-3 identifies each stormwater storage or containment area by location.

Table 7-3 Stormwater Storage and Containment Areas (Dewatering Locations)

Location No.	Location
CA08a	South Bleachers Cut Area 1
CA08b	South Bleachers Cut Area 2

For the pre-grading/pre-stormwater system construction site condition, there are eighteen (19) discharge location(s) on the project site. Site stormwater discharge location(s) are shown on the Site Maps in Appendix A and Table 7-4 identifies each stormwater discharge location.

For the Earthwork and post-earthwork condition, there are eight (9) discharge location(s) on the project site. Site stormwater discharge location(s) are shown on the Site Maps in Appendix A and Table 7-4 identifies each stormwater discharge location.

For the post-grading/post-stormwater system construction site condition, there are twenty-seven (29) discharge location(s) on the project site. Site stormwater discharge location(s) are shown on the Site Maps in Appendix A and Table 7-4 identifies each stormwater discharge location.

Table 7-4 Site Stormwater Discharge Locations

Pre-Grading Construction Condition	
Location No.	**Location**
SL 1	Northwest Landscaped Area perimeter

SL 2	Northeast Basketball Courts perimeter
SL 3	Stadium – Northwest Section west perimeter
SL 4	Stadium – Section 1 storm drain
SL 5	Stadium – Section 2 storm drain
SL 6	Stadium – Section 3 storm drain
SL 7	Stadium – Section 4 storm drain
SL 8	Stadium – North Section low points over perforated pipe
SL 9	Stadium – South Section low points over perforated pipe
SL 10	Stadium – East Landscaped Area east perimeter
SL 11	Stadium – Southwest Section storm drain
SL 12	Field House and South Road southwest perimeter
SL 13	Stadium – Section 5 storm drain
SL 14	Stadium – Section 6 storm drain
SL 15	Stadium – Section 7 storm drain
SL 16	Stadium – Section 8 storm drain
SL 17	Stadium – Section 9 storm drain
SL 18	Southwest Sidewalk Improvements downstream curb and gutter
SL 19	Southwest Planter south perimeter
Earthwork Condition	
SL 1	Entrance – West perimeter
SL 2	Entrance – East perimeter
SL 3	Stadium – Northwest Section west perimeter
SL 4	Stadium Playfield low points over perforated pipes
SL 5	East Landscaped Area east perimeter
SL 6	Fieldhouse Grassy Area storm drain
SL 7	Fieldhouse southwest perimeter
SL 9	Southwest Sidewalk Improvements downstream curb and gutter
SL 10	Southwest Planter south perimeter
Post-Grading/Post-Stormwater System Construction Condition	
SL 1	West Entrance Landscaping perimeter
SL 2	North Entrance trench drain
SL 3	East Basketball Courts perimeter
SL 4	Stadium – Northwest Section west perimeter
SL 5	North Bleachers trench drain

SL 6	Stadium Playfield – North low points over perforated pipe
SL 7	East Jump Pits pits over perforated pipe
SL 8	Track – Southwest Section storm drain
SL 9	Stadium Playfield – South low points over perforated pipe
SL 10	Southwest Track Entryway storm drain
SL 11	Fieldhouse – Section 1 storm drain
SL 12	Fieldhouse – Section 2 storm drain
SL 13	Fieldhouse – Section 3 storm drain
SL 14	Fieldhouse – Section 4 storm drain
SL 15	Fieldhouse – Section 5 storm drain
SL 16	Fieldhouse – Section 6 storm drain
SL 17	Fieldhouse – Section 7 storm drain
SL 18	South Bleachers trench drain
SL 19	South Bleachers – Section 1 storm drain
SL 20	South Bleachers – Section 2 storm drain
SL 21	South Bleachers – Section 3 storm drain
SL 22	South Bleachers – Section 4 storm drain
SL 23	South Bleachers – Section 5 storm drain
SL 24	Warm up Area – West storm drain
SL 25	Warm up Area – East storm drain
SL 26	Southeast Entrance east perimeter
SL 27	Southwest Sidewalk Improvements downstream curb and gutter
SL 28	Southwest Staging Area south perimeter
SL 29	Southwest Planter south perimeter

7.7 Sampling and Analysis Plan for Non-Visible Pollutants in Stormwater Runoff Discharges

This Sampling and Analysis Plan for Non-Visible Pollutants describes the sampling and analysis strategy and schedule for monitoring non-visible pollutants in stormwater runoff discharges from the project site.

Sampling for non-visible pollutants, including those associated with TMDLs, will be conducted when (1) a breach, leakage, malfunction, or spill is observed; and (2) the leak or spill has not been cleaned up prior to the rain event; and (3) there is the potential for discharge of non-visible pollutants to surface waters or drainage system.

The QSP and trained Delegates are responsible for completing the following non-visible pollutant monitoring requirements:

- The QSP and trained Delegates shall collect one or more samples during any breach, malfunction, leakage, or spill observed during a visual inspection which could result in the discharge of pollutants to surface waters that would be visually detectable in storm water;
- The QSP and trained Delegates is not required to sample if one of the conditions described above (e.g., breach or spill) occurs and the site is cleaned of material and pollutants and/or BMPs are implemented prior to the next storm event;
- The QSP and trained Delegates shall ensure that water samples are large enough to characterize the site conditions;
- The QSP and trained Delegates shall collect samples at all discharge locations that can be safely accessed;
- The QSP and trained Delegates shall collect samples during the first two hours of discharge from rain events that occur during business hours which generate runoff;
- The QSP and trained Delegates shall analyze samples for the non-visible pollutant parameters, if applicable (see the list of parameters identified in Table 7-5 – Potential Non-Visible Pollutants and Water Quality Indicator Constituents Based on the Pollutant Source Assessment);
- The QSP and trained Delegates shall collect a sample of storm water that has not come in contact with the disturbed soil or materials stored or used onsite (uncontaminated sample) for comparison with the discharge sample;
- The QSP and trained Delegates shall compare the uncontaminated sample to the samples of discharge using field analysis or through laboratory analysis;
- For laboratory analyses, all sampling sample preservation, and other analyses must be conducted according to test procedures pursuant to 40 C.F.R. Part 136. SCE shall ensure that field samples are collected and analyzed according to manufacturer specifications of the sampling devices employed. Portable meters shall be calibrated according to manufacturer's specifications; and
- The QSP and trained Delegates shall keep all field/or analytical data with the SWPPP document.

Table 7-5 summarizes the potential non-visible pollutants identified in the pollutant source assessment Sections 2.6 and 2.7 and the water quality constituent or indicator for that pollutant. Drainage areas for the pre-grading/pre-stormwater system construction and post-grading/post-stormwater system construction site conditions where the source is present are identified in Table 7-6 and shown in the Site Maps in Appendix A.

Table 7-5 Potential Non-Visible Pollutants and Water Quality Indicator Constituents Based on the Pollutant Source Assessment

Pollutant	Water Quality Indicator or Constituent	Source/Reason from Pollutant Source Assessment	TMDL Pollutant	Pre-Grading Site Drainage Area	Earth-work Site Drainage Area	Post-Grading Site Drainage Area
PCBs (from demolished	PCBs	Building Demolition	No	None.	None.	None.

Table 7-5 Potential Non-Visible Pollutants and Water Quality Indicator Constituents Based on the Pollutant Source Assessment

Pollutant	Water Quality Indicator or Constituent	Source/Reason from Pollutant Source Assessment	TMDL Pollutant	Pre-Grading Site Drainage Area	Earth-work Site Drainage Area	Post-Grading Site Drainage Area
structures from 1950-1980)						
Lead Paint	Pb	Building Demolition	No	None	None	None
Gypsum / Lime amendments	pH	Grading / Earthwork	No	None	All	None
Contaminated soil	Constituents specific to known contaminants, check with Laboratory	Grading / Earthwork	No	None	None	None
Sealant (Methyl methacrylate)	SVOC	Concrete Masonry Work	No	None	None	All
Curing compounds	VOCs, SVOCs, pH	Concrete Masonry Work	No	None	None	All
Ash, slag, sand	pH, Al, Ca, Va, Zn	Concrete Masonry Work	No	None	None	All
Treated Wood	Cu, CR, As, Zn	Carpentry Work	No	None	None	2, 5, 11-17
Particle Board	Formaldehyde	Carpentry Work	No	None	None	2, 5, 11-17
Untreated Wood	BOD	Carpentry Work	No	None	None	2, 5, 11-17
Drywall	Cu, Al, CA, VA, Zn	Building Construction	No	None	None	2, 5, 11-17
Solder, flux, pipe fitting	Cu, Pb, Sn, Sn	Plumbing	No	None	None	2, 5, 11-17
Roofing Compound	Cu, Pb, VOC	Roofing	No	None	None	2, 5, 11-17
Insulation	Al, Zn	Insulation	No	None	None	2, 5, 11-17
Resins, Thinners, Paint Strippers, Lacquers, varnishes, enamels, Sealants, Adhesives	COD, SVOCs, VOCs, Metals, Phenols	Painting	No	None	None	2, 5, 11-17
Chlorinated water	Residual Chlorine, Chloramines	Utility Line Testing and Flushing	No	None	None	2, 5, 11-17
Pesticides/ Herbicides	Product dependent, see label and check with Laboratory	Vegetation Management	No	None	All	1- 8, 10, 17, 18, 23-28
Vegetation Stockpiles	BOD	Vegetation Management	No	None	All	1- 8, 10, 17, 18, 23-28
Fertilizers	TKN, NO_3, BOD, COD, DOC, Sulfate, NH_3, Phosphate	Landscaping	No	None	None	1- 8, 10, 17, 18, 23-28

Table 7-5 Potential Non-Visible Pollutants and Water Quality Indicator Constituents Based on the Pollutant Source Assessment

Pollutant	Water Quality Indicator or Constituent	Source/Reason from Pollutant Source Assessment	TMDL Pollutant	Pre-Grading Site Drainage Area	Earth-work Site Drainage Area	Post-Grading Site Drainage Area
	Potassium					
Aluminum Sulfate	AL, TDS, Sulfate	Landscaping/soil amendments	No	None	None	1- 8, 10, 17, 18, 23-28
Liquid Waste	Constituents specific to materials, check with Laboratory	Liquid Waste	No	All	All	All
Sewer line breaks and Portable Toilets	BOD, Total/Fecal coliform	Sanitary Waste	No	None	1, 2, 3, 4, 6, 7	2, 5, 11-17
Polymer/Co-polymers	TKN, NO_3, BOD, COD, DOC, Sulfate, Ni	Soil Preparation / Amendments / Dust Control	No	None	All	None
Lignin sulfate	TDS, Alkalinity	Soil Amendments/ Dust Control	No	None	All	1- 8, 10, 17, 18, 23-28
Psyllium	COD, TOC	Soil Amendments/ Dust Control	No	None	All	1- 8, 10, 17, 18, 23-28
Guar/Plant Gums	COD, TOC, Ni	Soil Amendments/ Dust Control	No	None	All	1- 8, 10, 17, 18, 23-28
Batteries	Sulfuric Acid, Pb, pH	Vehicle and Equipment Use	No	All	All	All
Freon	Freon	Heating, Ventilation, Air Conditions	No	All	All	All

7.7.1 Sampling Schedule

Samples for the potential non-visible pollutant(s) and a sufficiently large unaffected background sample shall be collected during the first eight hours of discharge from rain events that result in a sufficient discharge for sample collection. Samples shall be collected during the site's scheduled hours and shall be collected regardless of the time of year and phase of the construction.

Collection of discharge samples for non-visible pollutant monitoring will be triggered only when any of the following conditions are observed during site inspections conducted prior to or during a rain event.

- Materials or wastes containing potential non-visible pollutants are not stored under watertight conditions. Watertight conditions are defined as (1) storage in a watertight container, (2) storage under a watertight roof or within a building, or (3) protected by temporary cover and containment that prevents stormwater contact and runoff from the storage area.

- Materials or wastes containing potential non-visible pollutants are stored under watertight conditions, but (1) a breach, malfunction, leakage, or spill is observed, (2) the leak or spill is not cleaned up prior to the rain event, and (3) there is the potential for discharge of non-visible pollutants to surface waters or a storm drain system.
- A construction activity, including but not limited to those in Section 2.6, with the potential to contribute non-visible pollutants (1) was occurring during or within 24 hours prior to the rain event, (2) BMPs were observed to be breached, malfunctioning, or improperly implemented, and (3) there is the potential for discharge of non-visible pollutants to surface waters or a storm drain system.
- Soil amendments that have the potential to change the chemical properties, engineering properties, or erosion resistance of the soil have been applied, and there is the potential for discharge of non-visible pollutants to surface waters or a storm drain system.
- Stormwater runoff from an area contaminated by historical usage of the site has been observed to combine with stormwater runoff from the site, and there is the potential for discharge of non-visible pollutants to surface waters or a storm drain system.

7.7.2 Sampling Locations

Sampling locations are based on proximity to planned non-visible pollutant storage, occurrence or use, accessibility for sampling, and personnel safety. Planned non-visible pollutant sampling locations are shown on the Site Maps in Appendix A and include the locations identified in Table 7-6.

Pre-grading site condition:

19 sampling location(s) on the project site and the contractor's yard have been identified for the collection of samples of runoff from planned material and waste storage areas and areas where non-visible pollutant producing construction activities are planned.

Zero (0) sampling locations have been identified for the collection of samples of runoff from drainage areas where soil amendments will be applied that have the potential to affect water quality.

Zero (0) sampling locations have been identified for the collection of samples of runoff from drainage areas contaminated by historical usage of the site.

Zero (0) sampling location has been identified for the collection of an uncontaminated sample of runoff as a background sample for comparison with the samples being analyzed for non-visible pollutants. These locations will be selected in the field by the QSP such that the sample will not have come in contact with the operations, activities, or areas identified in Section 7.7.1 or with disturbed soils areas.

Zero (0) sampling locations have been identified for the collection of samples of run-on to the project site. There is no run-on identified at this Site.

Earthwork construction site condition:

Ten (10) sampling location(s) on the project site and the contractor's yard have been identified for the collection of samples of runoff from planned material and waste storage areas and areas where non-visible pollutant producing construction activities are planned.

Ten (10) sampling locations have been identified for the collection of samples of runoff from drainage areas where soil amendments will be applied that have the potential to affect water quality.

Zero (0) sampling locations have been identified for the collection of samples of runoff from drainage areas contaminated by historical usage of the site.

Zero (0) sampling location has been identified for the collection of an uncontaminated sample of runoff as a background sample for comparison with the samples being analyzed for non-visible pollutants. These locations will be selected in the field by the QSP such that the sample will not have come in contact with the operations, activities, or areas identified in Section 7.7.1 or with disturbed soils areas.

Zero (0) sampling locations have been identified for the collection of samples of run-on to the project site. There is no run-on identified at this Site.

Post-grading/Post-stormwater system construction site condition:

29 sampling location(s) on the project site and the contractor's yard have been identified for the collection of samples of runoff from planned material and waste storage areas and areas where non-visible pollutant producing construction activities are planned.

16 sampling locations have been identified for the collection of samples of runoff from drainage areas where soil amendments will be applied that have the potential to affect water quality.

Zero (0) sampling locations have been identified for the collection of samples of runoff from drainage areas contaminated by historical usage of the site.

Zero (0) sampling location has been identified for the collection of an uncontaminated sample of runoff as a background sample for comparison with the samples being analyzed for non-visible pollutants. These locations will be selected in the field by the QSP such that the sample will not have come in contact with the operations, activities, or areas identified in Section 7.7.1 or with disturbed soils areas.

Zero (0) sampling locations have been identified for the collection of samples of run-on to the project site. There is no run-on identified at this Site.

Table 7-6 Non-Visible Pollutant Sample Locations

Pre-Grading Construction Condition			
Sample Location Identifier	**Sample Location Description**	**Sample Location Latitude and Longitude** (Decimal Degrees)	**Runoff or Run-on**
SL 1	Northwest Landscaped Area perimeter	36.952738, -120.066952	Runoff
SL 2	Northeast Basketball Courts perimeter	36.952727, -120.065761	Runoff
SL 3	Stadium – Northwest Section west perimeter	36.952110, -120.067457	Runoff
SL 4	Stadium – Section 1 storm drain	36.952143, -120.066930	Runoff

SL 5	Stadium – Section 2 storm drain	36.952139, -120.066695	Runoff
SL 6	Stadium – Section 3 storm drain	36.952136, -120.066433	Runoff
SL 7	Stadium – Section 4 storm drain	36.952143, -120.066154	Runoff
SL 8	Stadium – North Section low points over perforated pipe	36.952006, -120.066343	Runoff
SL 9	Stadium – South Section low points over perforated pipe	36.951544, -120.066470	Runoff
SL 10	Stadium – East Landscaped Area east perimeter	36.951858, -120.065166	Runoff
SL 11	Stadium – Southwest Section storm drain	36.951371, -120.067331	Runoff
SL 12	Field House and South Road southwest perimeter	36.951065, -120.067615	Runoff
SL 13	Stadium – Section 5 storm drain	36.951411, -120.066970	Runoff
SL 14	Stadium – Section 6 storm drain	36.951400, -120.066686	Runoff
SL 15	Stadium – Section 7 storm drain	36.951400, -120.066406	Runoff
SL 16	Stadium – Section 8 storm drain	36.951407, -120.066131	Runoff
SL 17	Stadium – Section 9 storm drain	36.951436, -120.065676	Runoff
SL 18	Southwest Sidewalk Improvements downstream curb and gutter	36.951094, -120.068793	Runoff
SL 19	Southwest Planter south perimeter	36.951016, -120.068565	Runoff
Earthwork Construction Condition			
Sample Location Identifier	**Sample Location Description**	**Sample Location Latitude and Longitude** (Decimal Degrees)	**Runoff or Run-on**
SL 1	Entrance – West perimeter	36.952738, -120.066952	Runoff
SL 2	Entrance – East perimeter	36.952727, -120.065761	Runoff
SL 3	Stadium – Northwest Section west perimeter	36.952110, -120.067457	Runoff
SL 4	Stadium Playfield low points over perforated pipes	36.952017, -120.066267	Runoff
SL 5	East Landscaped Area east perimeter	36.951721, -120.065143	Runoff
SL 6	Fieldhouse Grassy Area storm drain	36.951379, -120.067318	Runoff
SL 7	Fieldhouse southwest perimeter	36.950997, -120.067525	Runoff
SL 9	Southwest Sidewalk Improvements downstream curb and gutter	36.951115, -120.068797	Runoff
SL 10	Southwest Planter south perimeter	36.951016, -120.068565	Runoff

Post-Grading/Post-Stormwater System Construction Condition			
Sample Location Identifier	**Sample Location Description**	**Sample Location Latitude and Longitude** (Decimal Degrees)	**Runoff or Run-on**
SL 1	West Entrance Landscaping perimeter	36.952709, -120.066979	Runoff
SL 2	North Entrance trench drain	36.952460, -120.066424	Runoff
SL 3	East Basketball Courts perimeter	36.952738, -120.065694	Runoff
SL 4	Stadium – Northwest Section west perimeter	36.952107, -120.067455	Runoff
SL 5	North Bleachers trench drain	36.952163, -120.066438	Runoff
SL 6	Stadium Playfield – North low points over perforated pipe	36.952030, -120.066245	Runoff
SL 7	East Jump Pits pits over perforated pipe	36.952012, -120.065338	Runoff
SL 8	Track – Southwest Section storm drain	36.951524, -120.067417	Runoff
SL 9	Stadium Playfield – South low points over perforated pipe	36.951539, -120.066294	Runoff
SL 10	Southwest Track Entryway storm drain	36.951445, -120.067413	Runoff
SL 11	Fieldhouse – Section 1 storm drain	36.951245, -120.067496	Runoff
SL 12	Fieldhouse – Section 2 storm drain	36.951293, -120.067383	Runoff
SL 13	Fieldhouse – Section 3 storm drain	36.951278, -120.067314	Runoff
SL 14	Fieldhouse – Section 4 storm drain	36.951272, -120.067204	Runoff
SL 15	Fieldhouse – Section 5 storm drain	36.951102, -120.067216	Runoff
SL 16	Fieldhouse – Section 6 storm drain	36.951099, -120.067371	Runoff
SL 17	Fieldhouse – Section 7 storm drain	36.951142, -120.067447	Runoff
SL 18	South Bleachers trench drain	36.951402, -120.066882	Runoff
SL 19	South Bleachers – Section 1 storm drain	36.951169, -120.066852	Runoff
SL 20	South Bleachers – Section 2 storm drain	36.951124, -120.066714	Runoff
SL 21	South Bleachers – Section 3 storm drain	36.951118, -120.066382	Runoff
SL 22	South Bleachers – Section 4 storm drain	36.951111, -120.066187	Runoff
SL 23	South Bleachers – Section 5 storm drain	36.951121, -120.065939	Runoff
SL 24	Warm up Area – West storm drain	36.951093, -120.066685	Runoff
SL 25	Warm up Area – East storm drain	36.951088, -120.066232	Runoff
SL 26	Southeast Entrance east perimeter	36.951126, -120.065176	Runoff
SL 27	Southwest Sidewalk Improvements downstream curb and gutter	36.951129, -120.068808	Runoff

SL 28	Southwest Staging Area south perimeter	36.951016, -120.068565	Runoff
SL 29	Southwest Planter south perimeter	36.951016, -120.068565	Runoff

If a stormwater visual monitoring site inspection conducted prior to or during a storm event identifies the presence of a material storage, waste storage, operations area with spills, or the potential for the discharge of non-visible pollutants to surface waters or a storm drain system that is at a location not listed above and has not been identified on the Site Maps, sampling locations will be selected by the QSP using the same rationale as that used to identify planned locations. Non-visible pollutant sampling locations shall be documented by the QSP on the pre-rain event inspection form prior to a forecasted qualifying precipitation event and the *Effluent Sampling Field Log Sheet*, which are provided in Appendix O.

7.7.3 Monitoring Preparation

Non-visible pollutant samples will be collected by:

QSP ☒ Yes ☐ No

QSP Delegate ☒ Yes ☐ No

An adequate stock of monitoring supplies and equipment for monitoring non-visible pollutants will be available on the project site prior to a sampling event. Monitoring supplies and equipment will be stored in a cool temperature environment that will not come into contact with rain or direct sunlight. The QSP or QSP Delegates responsible for sampling will be available to collect samples in accordance with the sampling schedule. Supplies maintained at the project site will include, but are not limited to, clean powder-free nitrile gloves, sample collection equipment, coolers, appropriate number and volume of sample bottles, identification labels, re-sealable storage bags, paper towels, personal rain gear, ice, and *Effluent Sampling Field Log Sheets* and Chain of Custody (CoC) forms, which are provided in Appendix O.

7.7.3.1 Analytical Constituents

Table 7-7 lists the specific sources and types of potential non-visible pollutants based on the project pollutant source assessment and the water quality indicator constituent(s) for that pollutant. Table 7-7 provides the specific analytical methods and reporting limits for the potential non-visible pollutants. Analytical methods were selected in compliance with U.S. EPA sufficiently sensitive method requirements in 40 Code of Federal Regulations Part 136, as evidenced by the method detection limit and minimum level.

7.7.4 Sample Collection

Samples of discharge shall be collected at the designated non-visible pollutant sampling locations identified in Table 7-6 and shown on the Site Maps in Appendix A or in the locations determined by observed breaches, malfunctions, leakages, spills, operational areas, soil amendment application areas, and historical site usage areas that triggered the sampling event.

Only the QSP, or QSP Delegates trained on sample collection identified in Section 7.7.1.3 shall collect samples. Grab samples will be collected and preserved in accordance with the methods identified in Table 7-7. Samples will be collected by following the steps outlined below:

1. Place a laboratory provided sampling container directly into a stream of water down-gradient and within close proximity to the potential non-visible pollutant discharge location;

2. Transfer the collected sample into the sample bottles (supplied by the lab for the appropriate parameters being monitored) filling the bottles completely (or as instructed by the laboratory);
3. The up-gradient (uncontaminated) background samples will be collected first, prior to collecting the down-gradient sample, in order to minimize cross-contamination; and
4. Sampling personnel will collect the water up-gradient of where they are standing.

To maintain sample integrity and prevent cross-contamination, sampling collection personnel will:

- Wear a clean pair of powder-free nitrile gloves prior to the collection and handling of each sample at each location;
- Not contaminate the inside of the sample bottle by allowing it to come into contact with any material other than the water sample;
- Discard sample bottles or sample lids that have been dropped onto the ground prior to sample collection;
- Not leave the cooler lid open for an extended period of time once samples are placed inside;
- Not sample near a running vehicle where exhaust fumes may impact the sample;
- Not touch the exposed end of a sampling tube, if applicable;
- Avoid allowing rainwater to drip from rain gear or other surfaces into sample bottles;
- Not eat, smoke, or drink during sample collection nor sneeze or cough in the direction of an open sample bottle;
- Minimize the exposure of the samples to direct sunlight, as sunlight may cause biochemical transformation of the sample;
- Decontaminate sampling equipment prior to sample collection using a tri-sodium phosphate (TSP) solution water wash and triple rinse with distilled or de-ionized water; and
- Dispose of decontamination water/soaps appropriately (i.e., do not discharge to the storm drain system or receiving water).

Note, that depending upon the specific analytical test, some containers may contain preservatives. These containers should **never** be dipped into the stream but filled indirectly from the collection container.

7.7.4.1 Clean Sampling Techniques

Clean sampling techniques involve the use of certified clean containers for sample collection and clean powder-free nitrile gloves during sample collection and handling. As discussed in Section 7.7.7, adoption of a clean sampling approach will minimize the chance of field contamination and questionable data results.

Table 7-7 Sample Collection, Preservation and Analysis for Monitoring Non-Visible Pollutants

Constituent	Analytical Method	Minimum Sample Volume	Sample Containers	Sample Preservation	Reporting Limit	Maximum Holding Time
SVOCs	EPA 625	1 x 1 L	Glass-amber	Store at 4°C	10 ug/L	7 days
VOCs	EPA 601/602	3 X 40 mL	VOA - Glass	Store at 4°C, HCL to pH<2	1 ug/L	14 days
BOD	EPA 405.1	1 x 500 mL	Polypropylene	Store at 4°C	1 mg/L	48 hours
COD	EPA 410.4	1 X 250mL	Glass - Amber	Store at 4°C, H_2SO_4 to pH<2	5 mg/L	28 days
DO	SM 4500-OG	1 x 250 mL	Glass-Amber	Store at 4°C	Check Lab	8 hours
NO_3	EPA 353.2	1 x 250 mL	Glass-Amber	Store at 4°C, H_2SO_4	0.05 mg/L	28 days
NH_3	EPA 350.1	1 x 250 mL	Glass-Amber	Store at 4°C, H_2SO_4	0.01 mg/L	
TKN	EPA 351.1	1 x 250 mL	Glass-Amber	Store at 4°C, H_2SO_4 to pH<2	0.1 mg/L	28 days
Coliform, Fecal	FDA BAM CH 4	1 x 100 mL	Glass/Polypropylene	Store at or below 10°C	0.1 mg/L	8 hours
Coliform, Total	SM 9221B	1 x 100 mL	Glass/Polypropylene	Store at or below 10°C	0.1 mg/L	8 hours
Metals (Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, Se, Na, Th, Va, Zn)	EPA 200.8/1631	1 x 250 mL	Polypropylene	Store at 4°C, HNO_3 to pH<2	0.1 mg/L	6 months
Chromium VI	EPA 7196	1 x 500 mL	Polypropylene	Store at 4°C	1 g/L	24 hours
Ortho Phenyl Phenol	HPLC FLUORESCENCE	1 x 1L	Tenax GC Tube	Store at 4°C	1 mg/L	8 hours
pH	SM 4500B	1 x 100 mL	Polypropylene	None	Unit less	15 minutes
Formaldehyde	EPA 1667A	1 x 20 mL	Glass-Amber	Store at 4°C	50 ug/L	5 days
PCBs	EPA 608	1 x 1 L	Glass-Amber	Store at 4°C, H_2SO_4 to pH 5-9	0.25 ug/L	40 days

7.7.5 Sample Analysis

Samples shall be analyzed using the analytical methods identified in the Table 7-7.

Samples will be analyzed by:

Laboratory Name:	BSK Associates – Fresno
Street Address:	1414 Stanislaus St,
City, State Zip:	Fresno, CA 93706
Telephone Number:	(559) 497-2880
Point of Contact:	TBD
ELAP Certification Number:	01180CA

Samples will be delivered to the laboratory by:

Driven by QSP/QSP Delegate/Contractor	☒	Yes	☐	No
Picked up by Laboratory Courier	☐	Yes	☒	No
Shipped	☐	Yes	☒	No

7.7.6 Sample Handling

All samples for laboratory analysis must be maintained between 0-6 degrees Celsius during delivery to the laboratory. Samples must be kept on ice, or refrigerated, from sample collection through delivery to the laboratory. Place samples to be shipped inside coolers with ice. Make sure the sample bottles are well packaged to prevent breakage and secure cooler lids with packaging tape.

Ship samples that will be laboratory analyzed to the analytical laboratory right away. Hold times are measured from the time the sample is collected to the time the sample is analyzed. The 2022 CGP requires that samples be received by the analytical laboratory within 48 hours of the physical sampling (unless required sooner by the analytical laboratory to meet all hold times).

7.7.7 Sample Documentation Procedures

All original data documented on sample container identification labels, *Effluent Sampling Field Log Sheet* (Appendix O), and CoCs shall be recorded using waterproof ink. These shall be considered accountable documents. If an error is made on an accountable document, the individual shall make corrections by lining through the error and entering the correct information. The erroneous information shall not be obliterated. All corrections shall be initialed and dated.

Duplicate samples shall be identified consistent with the numbering system for other samples to prevent the laboratory from identifying duplicate samples. Duplicate samples shall be identified in the Effluent Sampling Field Log Sheet.

Sample documentation procedures include the following:

Sample Bottle Identification Labels: Sampling personnel shall attach an identification label to each sample bottle. Sample identification shall uniquely identify each sample location. (These location identifiers should be listed in the tables in the SWPPP.)

Field Log Sheets: Sampling personnel shall complete the *Effluent Sampling Field Log Sheet* and *Receiving Water Sampling Field Log Sheet* (Appendix O) for each sampling event, as appropriate.

Chain of Custody: Sampling personnel shall complete the CoC for each sampling event for which samples are collected for laboratory analysis. The sampler will sign the CoC (Appendix O) when the sample(s) is turned over to the testing laboratory or courier.

7.7.8 QA/QC Samples

QA/QC samples provide an indication of the accuracy and precision of the sample collection; sample handling; field measurements; and analytical laboratory methods. The following types of QA/QC will be conducted for this project:

☒ Field Duplicates at a frequency of 5 percent or 1 duplicate minimum per sampling event (Required for all sampling plans with field measurements or laboratory analysis)

☐ Equipment Blanks
(Only needed if the equipment used to collect samples could add the pollutants to sample)

☒ Field Blanks
(Only required if sampling method calls for field blanks)

☒ Travel Blanks
(Required for sampling plans that include VOC laboratory analysis)

7.7.8.1 Field Duplicates

Field duplicates provide verification of laboratory or field analysis and sample collection. Duplicate samples shall be collected, handled, and analyzed using the same protocols as primary samples. The sample location where field duplicates are collected shall be randomly selected from the discharge locations. Duplicate samples shall be collected immediately after the primary sample has been collected. Duplicate samples must be collected in the same manner and as close in time as possible to the original sample. Duplicate samples shall not influence any evaluations or conclusion.

7.7.8.2 Equipment Blanks

Equipment blanks provide verification that equipment has not introduced a pollutant into the sample. Equipment blanks are typically collected when:

- New equipment is used;
- Equipment that has been cleaned after use at a contaminated site;
- Equipment that is not dedicated for surface water sampling is used; or
- Whenever a new lot of filters is used when sampling metals.

7.7.8.3 Field Blanks

Field blanks assess potential sample contamination levels that occur during field sampling activities. De-ionized water field blanks are taken to the field, transferred to the appropriate container, and treated the same as the corresponding sample type during the course of a sampling event.

7.7.8.4 Travel Blanks

Travel blanks assess the potential for cross-contamination of volatile constituents between sample containers during shipment from the field to the laboratory. De-ionized water blanks are taken along for the trip and held unopened in the same cooler with the VOC samples.

7.7.9 Quality Assurance and Quality Control

An effective Quality Assurance and Quality Control (QA/QC) plan shall be implemented as part of the CSMP to ensure that analytical data can be used with confidence. QA/QC procedures to be initiated include the following:

- Field logs;
- Clean sampling techniques;
- CoCs;
- QA/QC Samples; and
- Data verification.

Each of these procedures is discussed in more detail in the following sections.

7.7.10 Chain of Custody

The sample CoC is an important documentation step that tracks samples from collection through analysis to ensure the validity of the sample. Sample CoC procedures include the following:

- Proper labeling of samples;
- Use of CoC forms for all samples; and
- Prompt sample delivery to the analytical laboratory.

Analytical laboratories usually provide CoC forms to be filled out for sample containers. An example CoC is included in Appendix O.

7.7.11 Data Verification

After results are received from the analytical laboratory, the QSP or QSP Delegates shall verify the data to ensure that it is complete, accurate, and the appropriate QA/QC requirements were met. Data must be verified as soon as the data reports are received. Data verification shall include:

- Check the CoC and laboratory reports.
  Make sure all requested analyses were performed and all samples are accounted for in the reports.
- Check laboratory reports to make sure hold times were met and that the reporting levels meet or are lower than the reporting levels agreed to in the contract.
- Check data for outlier values and follow up with the laboratory.
  Occasionally typographical errors, unit reporting errors, or incomplete results are reported and should be easily detected. These errors need to be identified, clarified, and corrected quickly by the laboratory. The QSP or QSP Delegates should especially note data that is an order of magnitude or more different than similar locations or is inconsistent with previous data from the same location.
- Check laboratory QA/QC results.
  EPA establishes QA/QC checks and acceptable criteria for laboratory analyses. These data are typically reported along with the sample results. The QSP or QSP Delegates shall evaluate the reported QA/QC data to check for contamination (method, field, and

equipment blanks), precision (laboratory matrix spike duplicates), and accuracy (matrix spikes and laboratory control samples). When QA/QC checks are outside acceptable ranges, the laboratory must flag the data, and usually provides an explanation of the potential impact to the sample results.

- Check the data set for outlier values and, accordingly, confirm results and re-analyze samples where appropriate.
  Sample re-analysis should only be undertaken when it appears that some part of the QA/QC resulted in a value out of the accepted range. Sample results may not be discounted unless the analytical laboratory identifies the required QA/QC criteria were not met and confirms this in writing.

Field data including inspections and observations must be verified as soon as the field logs are received, typically at the end of the sampling event. Field data verification shall include:

- Check field logs to make sure all required measurements were completed and appropriately documented;
- Check reported values that appear out of the typical range or inconsistent; Follow-up immediately to identify potential reporting or equipment problems, if appropriate, recalibrate equipment after sampling;
- Verify equipment calibrations;
- Review observations noted on the field logs; and
- Review notations of any errors and actions taken to correct the equipment or recording errors.

7.7.12 Data Evaluation and Reporting

The QSP shall complete an evaluation of the water quality sample analytical results based on a comparison of the results to the unaffected sample.

Runoff/downgradient results shall be compared with the associated upgradient/unaffected results and any associated run-on results. Should the runoff/downgradient sample show an increased level of the tested analyte relative to the unaffected background sample, which cannot be explained by run-on results, the BMPs, site conditions, and surrounding influences shall be assessed to determine the probable cause for the increase.

As determined by the site and data evaluation, appropriate BMPs shall be repaired or modified to mitigate discharges of non-visible pollutant concentrations. Any revisions to the BMPs shall be recorded as an amendment to the SWPPP.

The QSP is responsible for reporting:

- Analytical results of non-visible pollutant monitoring shall be submitted to the QSD within 5 days of obtaining the analytical results.

The QSD is responsible for reporting:

- Analytical results of non-visible pollutant monitoring shall be submitted to SMARTS by the QSD within 10 days of obtaining the analytical results.

The 2022 CGP prohibits the storm water discharges that contain hazardous substances equal to or in excess of reportable quantities established in 40 C.F.R. §§ 117.3 and 302.4. The results of any non-stormwater discharge results that indicate the presence of a hazardous substance in excess of established reportable quantities shall be immediately reported to the Regional Water Board and other agencies as required by 40 C.F.R. §§ 117.3 and 302.4.

7.8 Sampling and Analysis Plan for Dewatering Discharges

Dewatering activities associated with this project *are not* subject to a separate NPDES permit and will be discharged under this WDID. Dewatering discharges authorized include mechanical pumping or syphoning of non-potable water from sources including, but not limited to: groundwater removal specifically related to the construction activities from excavations, trenches, foundations, vaults, **and/or** stormwater collected in impoundments (e.g., trenches, ponds, puddles, low points on the active site, or other similar accumulation points).

Dewatering Activities for the Project Site:

☐ No dewatering activities are planned for this project.

☐ Dewatering activities planned for this project will be conducted and monitored according to the requirements of the following NPDES Permit: [insert name and order number of the permit.]

☒ Dewatering activities may occur for this project and will be conducted and monitored according to the requirements of the 2022 CGP Attachment J.

This Sampling and Analysis Plan for dewatering discharges describes the sampling and analysis strategy and schedule for monitoring dewatering discharges in accordance with the requirements of the 2022 CGP.

Dewatering of non-stormwater or non-groundwater sources (other than de-chlorinated potable water) is prohibited. Dewatering of stormwater with presence of an oily sheen, odor, or discoloration is prohibited. Dewatering of stormwater that is suspected to have contacted non-visible pollutants due to a spill, breach, or malfunction shall also be sampled for non-visible pollutants according to Section 7.7 of this SWPPP.

7.8.1 Dewatering Reporting Requirements

At least 24 hours prior to the beginning of a dewatering discharge, the QSP or trained Delegates shall notify the applicable Regional Water Board stormwater and local MS4 staff via email of the anticipated dewatering discharge, and copy the LRP and QSD.

The Project QSP will update the field SWPPP at least 24 hours prior to the beginning of a dewatering discharge. The Project QSD will upload a formal COI with the amended SWPPP, to SMARTS within 14 days. The SWPPP will be amendment to include all requirements established in Attachment J, Section D.4 of the 2022 CGP.

7.8.2 Dewatering Numeric Action Levels (NALs)

Dewatering activities covered by the CGP are subject to the pH and turbidity NALs in Table 7-8 below. A NAL exceedance occurs when a single sample exceeds the turbidity NAL or is outside of the pH range shown in Table 7-8. Dewatering sampling is to be performed within the first hour of commencement of discharge and daily each day that the discharge continues.

Table 7-8: Dewatering Numeric Action Levels (NALs)

Parameter	Unit	Numeric Action Levels
pH	pH units	Lower NAL < 6.5, Upper NAL > 8.5
Turbidity	NTU	>250 NTU

If a pH or Turbidity exceedance occurs, dewatering activities will **cease immediately** until either: (1) enough time and dry weather has allowed sediment in stored water to settle or pH to neutralize, as advised by the QSP (2) additional BMPs have been implemented to prevent the NAL exceedance.

If a pH or Turbidity exceedance occurs, within five (5) calendar days, the project QSP will investigate the cause of the exceedance and identify corrective actions and notify the QSD and LRP. Within ten (10) days, the QSD will enter field measurements demonstrating the exceedance into SMARTS. If necessary, the QSD will revise the SWPPP to incorporate immediate corrective actions to prevent further exceedances of the numeric action levels for pH and turbidity.

7.8.3 Dewatering Schedule

As of the initial draft if this SWPPP there are no planned dewatering activities for the Project. The need for dewatering from the Project site may arise based on impoundment of low points in the Project site and a desire by the Contractor to continue construction activities in impounded areas.

If dewatering activities that result in discharge off-site are planned to commence, dewatering activities and sample analysis shall comply with this Section 7.8.

7.8.4 Dewatering Locations and Discharge Locations, and Sampling Locations

If the Contractor desires to pump or siphon impounded stormwater at the Project site, the QSP and trained Delegates shall first consider if on-site pervious areas could be utilized for on-site stormwater storage and percolation (without resulting in discharging off-site) rather than discharging impounded stormwater off-site. This moving of stormwater throughout the site is not considered dewatering and therefore does not require the reporting or sampling requirments outlined in this Section 7.8.

Since the need for dewatering operations are dependent on minor changes to the construction schedule and future precipitation events, the dewatering locations, discharge locations, and sampling locations are unknown as of the initial authoring of this SWPPP. If the Contractor/QSP identifies planned dewatering activities, the field copy of Site Maps in Appendix A and Table 7-9 will be updated by the QSP or Trained Delegates with dewatering locations, discharge locations, and sampling locations prior to starting dewatering operations.

Dewatering discharge locations shall be selected to prevent dewatering discharge from contacting construction materials and equipment. Outlet locations are prohibited from using waters of the United States as part of the treatment area for all areas or points where dewatering is discharged. Velocity reduction BMPs/devices shall be implemented to prevent scour down-gradient from the outlet location. Sampling locations will represent the water quality of dewatering water as it leaves the Project site.

The QSP shall notify the QSD and the LRP of these operations and locations prior to starting dewatering operations (as well as the regional Water Board as discussed in Section 7.8.1).

The QSD will submit a COI to SMARTS with these new operations and locations. This will include selecting dewatering outlet locations to prevent the dewatering discharge from coming in contacting with construction materials or equipment

7.8.5 Dewatering Sampling Schedule

Sampling of dewatering discharges will be conducted within the first hour of the commencement of discharge and daily each day that the discharge continues. Dewatering operations shall not

commence without the knowledge of the QSP, and shall not commence without the presence of the QSP of QSP trained delegates who are prepared to conduct dewatering discharge sampling for turbidity and pH.

7.8.6. Sample Locations

Sampling locations are based on the planned dewatering locations. Planned dewatering sampling locations are listed in Table 7-16 and shown on the Site Maps in Appendix A.

The number of dewatering sampling location(s) on the project site and the contractor's yard are unknown as of the date of drafting this SWPPP. If the Contractor decides to conduct dewatering operations at the site, the QSP shall identify the dewatering discharge locations and the QSP or QSP delegates shall conduct sampling dewatering discharge for turbidity and pH.

Table 7-8 Turbidity and pH Dewatering Sample Locations

Sample Location Identifier	Sample Location Description	Sample Location Latitude and Longitude (Decimal Degrees)
Unknown, TBD	Unknown, TBD	Unknown, TBD

In the event that dewatering is required at a location not listed in Table 7-15, and has not been identified on the Site Maps, sampling locations will be selected by the QSP using the same rationale as that used to identify planned locations. Dewatering sampling locations shall be documented by the QSP or QSP delegates on the *Effluent Sampling Field Log Sheet*, which are provided in Appendix O.

7.8.7 Monitoring Preparation

Dewatering samples will be collected by:

QSP	TBD	☒	Yes	☐	No
QSD Delegate	TBD	☒	Yes	☐	No

An adequate stock of monitoring supplies and equipment for monitoring turbidity and will be available on the project site prior to a sampling event. Monitoring supplies and equipment will be stored in a cool temperature environment that will not come into contact with rain or direct sunlight. The QSP or QSP Delegates will be available to collect samples in accordance with the sampling schedule. Supplies maintained at the project site will include, but are not limited to, field meters, extra batteries, clean powder-free nitrile gloves, sample collection equipment, appropriate sample containers, paper towels, personal rain gear, and *Effluent Sampling Field Log Sheets* and CoC forms provided in Appendix O.

The QSP or QSP Delegates will obtain and maintain the field-testing instruments, as identified in Section 7.7.2.6, for analyzing samples in the field.

7.8.8 Dewatering Sample Collection

Dewatering samples shall be collected at the designated sampling locations determined by the QSP or identified in Table 7-15 and shown on the Site Maps in Appendix A.

Grab samples for turbidity and pH will be collected by following the steps outlined below:

1. Place the pH meter or secondary sample container directly into the stream of flow;
2. Sampling personnel will collect the water up-gradient of where they are standing.

To maintain sample integrity and prevent cross-contamination, sampling collection personnel will:

- Pre-rinse the meter probe or secondary sample container with deionized water or within the flow of runoff;
- Not sample near a running vehicle where exhaust fumes may impact the sample;
- Not touch the exposed end of the meter's probe;
- Not touching inside secondary sampling containers;
- Avoid allowing rainwater to drip from rain gear or other surfaces into secondary sampling containers; and
- Not eat, smoke, or drink during sample collection nor sneeze or cough in the direction of the meter probe or secondary sampling container.

For pH and turbidity samples collected for field analysis, the collection shall be in accordance with SWAMP QAPrP[1] protocols and analysis, and equipment calibration shall be in accordance with field instrument manufacturer's specifications. Table 6-3 below lists the type of instruments used in the field for these parameters.

Table 7-9: Field Analysis Instrumentation

Field Instrument	EPA Analytical Method	Parameter	MDL
pH Meter	150.1	pH	0.2
Turbidity Meter	180.1	Turbidity	1

- The instruments will be maintained in accordance with manufacturer's instructions.
- The instrument(s) will be calibrated before each sampling event.
- Maintenance and calibration records will be maintained with the SWPPP.

Immediately following collection, samples for field analysis shall be tested in accordance with the field instrument manufacturer's instructions and results recorded on the Effluent Sampling Field Log Sheet located in Appendix D.

7.8.9 Dewatering Sampling Field Analyses

Discharges from the site are subject to Numeric Action Level (NALs) for pH and turbidity as shown in Table 7-10 below.

[1] Sampling personnel shall be trained to collect, maintain, and ship samples in accordance with the Surface Water Ambient Monitoring program (SWAMP) 2017 Quality Assurance Program Plan (QAPrP)

Table 7-10: Numeric Action Levels

Parameter	Unit	Numeric Action Levels
pH	pH units	Lower NAL < 6.5 Upper NAL > 8.5
Turbidity	NTU	>250 NTU

Compliance with the NAL for pH and turbidity is based on a single sample evaluation. An NAL exceedance occurs when any sample exceeds the turbidity NAL or is outside of the pH range shown in Table 7-10.

Turbidity and pH measurements must be conducted immediately. Do not store turbidity or pH samples for later measurement.

The QSP or Delegates shall complete the *Effluent Sampling Field Log Sheets* found in Appendix O while conducting dewatering sample analysis.

7.8.10 Data Evaluation and Reporting

At least 24 hours prior to the beginning of a dewatering discharge, the QSP or QSP Delegate shall notify the Regional Water Board via email of the anticipated dewatering discharge. The QSP or QSP Delegate shall copy the LRP and QSD on these notification emails.

The QSP shall within five calendar days of the sample collection submit copies of the completed *Effluent Sampling Field Log Sheets* to the LRP and QSD.

Compliance with the NALs for pH and turbidity in dewatering discharges is based on a single sample evaluation. A NAL exceedance occurs when any sample exceeds the turbidity NAL or is outside of the pH range shown in Table 7-13.

If the dewatering sampling results show that an NAL was exceeded, the QSP or QSP Delegate shall instruct the Contractor to immediately cease dewatering discharges. If the discharge is necessary to protect human life and health or prevent severe property damage and cannot be ceased, the QSP or QSP Delegates shall notify the Regional Water Board and the Local Stormwater Agency within 24 hours.

Table 7-17 Dewatering Notification Contacts

Agency	Name	Email
Regional Water Board	Fresno Branch Office	R5f_stormwater@waterboards.ca.gov
City of Madera	Jaime Hickman, Streets and Storm Drainage Manager	jhickman@madera.gov

If an NAL for pH or turbidity was exceeded during dewatering operations, the QSP or trained delegates shall inform the QSD and LRP within 5 days and send a copy of the completed *Effluent Sampling Field Log Sheets*.

Exceedances of NALs shall be electronically reported to the State Water Board by the LRP or DAR through SMARTS within 10 days of the NAL exceedance measurement.

7.8.11 Dewatering NAL Corrective Actions

Upon receiving notice that dewatering operations caused a NAL exceedance, the QSD shall investigate the cause of the exceedance and identify corrective actions for dewatering operations.

Following a NAL exceedance, the QSD shall revise the SWPPP to incorporate corrective actions to prevent further exceedances within 10 days of the NAL exceedance measurement.

7.9 Sampling and Analysis Plan for Other Pollutants Required by the Regional Water Board

The Regional Water Board has not specified monitoring for additional pollutants.

7.10 Training of Sampling Personnel

QSP Delegates assigned to conduct sampling shall be trained by the QSP to collect, maintain, and ship samples in accordance with the 2022 CGP Sample Collection and Handling Instructions and supplemental information as needed. Training records of QSP Delegates assigned to sample are provided in Appendix I.

The QSP and QSP Delegates have received the following stormwater sampling training:

Name	Training
Gabriel Ledesma	QSD/QSP Training, CPESC Training.
Michael Gennaro	QSD/QSP Training, CPESC Training.
Michelle Reynaud	QSP Training.

The QSP and QSP Delegates have the following stormwater sampling experience:

Name	Experience
Gabriel Ledesma	4 years of Aquatic Pesticide Sampling, including turbidity, pH, water quality, and pollutant sampling as MS4 inspector.
Michael Gennaro	2 years of Risk Level 2 Sampling for other Projects
Michelle Reynaud	401 Permit Sampling for other Projects.

7.11 Records Retention

All records of stormwater monitoring information and copies of reports (including Annual Reports) must be retained for a period of at least three years from date of submittal or longer if required by the Regional Water Board.

Results of visual monitoring, field measurements, and laboratory analyses must be kept in the SWPPP along with CoCs, and other documentation related to the monitoring.

Records are to be kept onsite while construction is ongoing. Records to be retained include:

- The date, place, and time of inspections, sampling, visual observations, and/or measurements, including precipitation;
- The individual(s) who performed the inspections, sampling, visual observation, and/or field measurements;
- The date and approximate time of field measurements and laboratory analyses;
- The individual(s) who performed the laboratory analyses;

- A summary of all analytical results, the method detection limits and reporting limits, and the analytical techniques or methods used;
- Rain gauge readings from site inspections;
- QA/QC records and results;
- Calibration records;
- Visual observation and sample collection exception records;
- The records of any corrective actions and follow-up activities that resulted from analytical results, visual observations, or inspections;
- Dewatering notifications to the Regional Water Board;
- Dewatering exception notifications to the Regional Water Board and local stormwater agency;

Section 8 References

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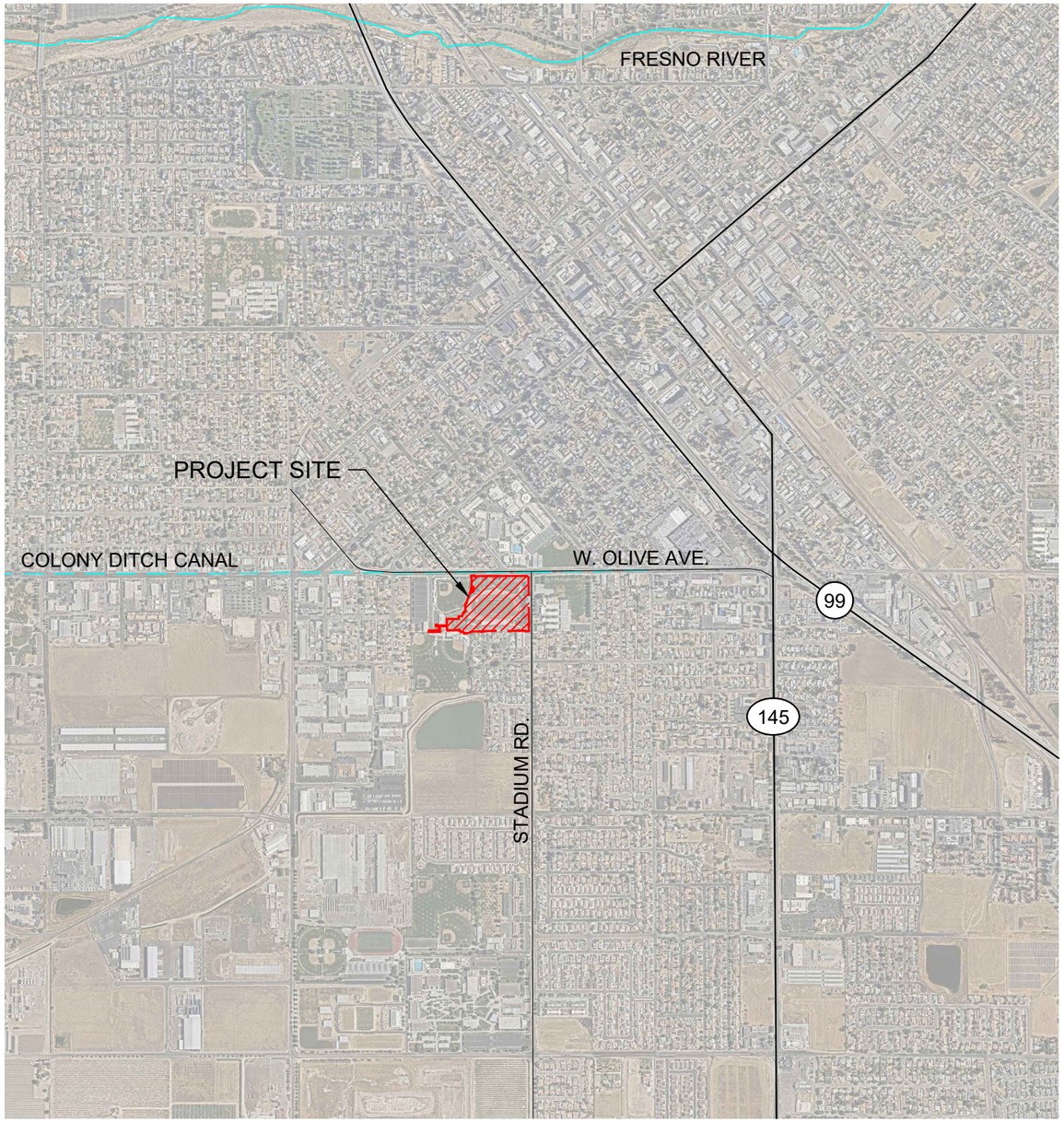
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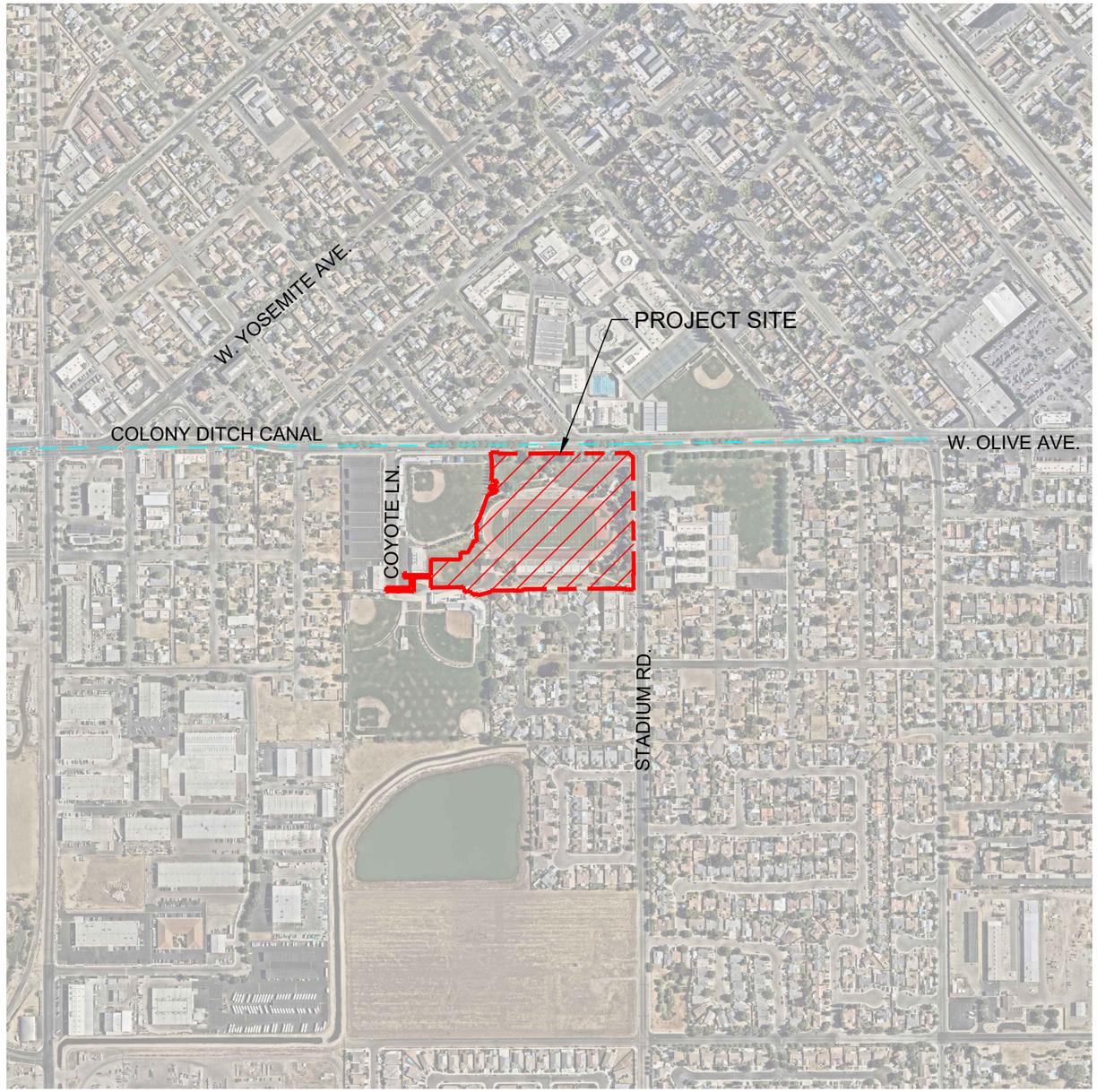
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Appendix A: Site Maps and Drawings



LOCATION MAP
NOT TO SCALE



PROJECT SITE
SCALE: 1"=600'

SITE LOCATION: 800 - 820 W. OLIVE AVE. | MADERA, CA 93637 | 36.952085, -120.066450

FIGURE: 1A

Blair, Church & Flynn CONSULTING ENGINEERS

CONSULTANT
Blair, Church & Flynn Consulting Engineers
4hXt Clovis Avenue, Suite 200
Clovis, California 93612
Tel (559) 326-1400
Fax (559) 326-1500

MADERA UNIFIED SCHOOL DISTRICT

STORM WATER POLLUTION PREVENTION PLAN
MADERA HIGH SCHOOL STADIUM
LOCATION AND VICINITY MAPS

DR. BY GL
CH. BY MG
DATE 02-06-25
SCALE: AS NOTED

SHEET NO. 1
OF 11 SHEETS

Drawing: C:_data\backup\222352_Madera HS Stadium and Field House SWPPP Figures.dwg; Figure 1A Plot by: gledesma Feb 07, 2025 - 10:31am

CONSTRUCTION SYMBOL LEGEND:

- PROTECT PROPOSED DRAIN INLET PER CASQA SE-10
- PROTECT EXISTING DRAIN INLET PER CASQA SE-10
- SURFACE FLOW DIRECTION
- PROJECT BOUNDARY
- LOCATION OF LINEAR SEDIMENT CONTROL BMPS. REFER TO NOTE 1 AND 2. EXACT LOCATIONS OF THE SEDIMENT CONTROL BMP'S SHALL BE COORDINATED WITH THE QSP PRIOR TO INSTALLATION OR REMOVAL.
- EXISTING STORM DRAIN PIPELINE
- PROPOSED STORM DRAIN PIPELINE
- PROPOSED GAS PIPELINE/WATER PIPELINE
- PROPOSED TRENCH STORM DRAIN
- PROPOSED PERFORATED STORM DRAIN PIPELINE
- PROPOSED ASPHALT CONCRETE (NON-ROOF IMPERVIOUS AREAS)
- PROPOSED CONCRETE (NON-ROOF IMPERVIOUS AREAS)
- PROPOSED BUILDING (ROOF IMPERVIOUS AREA)
- PROPOSED BUILDING OVERHANG (IMPERVIOUS AREAS)
- PROPOSED LANDSCAPING (PERVIOUS AREAS)
- AREAS OF SYNTHETIC TURF (NON-ROOF IMPERVIOUS AREAS)
- PROPOSED SAND PIT (NON-ROOF IMPERVIOUS AREAS)
- PROPOSED GRAVEL (PERVIOUS AREA)
- PROPOSED RUBBER TRACK SURFACE (NON-ROOF IMPERVIOUS AREAS)
- LOCATION OF STABILIZED CONSTRUCTION ENTRANCE/EXIT PER CASQA TC-1
- AREAS OF NON-BUILT LAND DISTURBANCE FOR FINAL STABILIZATION. DISTURBED SOIL AREAS NOT PLANNED FOR CONSTRUCTION ACTIVITIES OVER THE NEXT 14 DAYS SHALL BE STABILIZED BY USE OF EROSION CONTROL BMPS. SEE NOTE 3 ON FIGURE 1B.

EARTHWORK SYMBOL LEGEND:

- PROTECT EXISTING DRAIN INLET PER CASQA SE-10
- SURFACE FLOW DIRECTION
- PROJECT BOUNDARY
- LOCATION OF LINEAR SEDIMENT CONTROL BMPS. REFER TO NOTE 1 AND 2. EXACT LOCATIONS OF THE SEDIMENT CONTROL BMP'S SHALL BE COORDINATED WITH THE QSP PRIOR TO INSTALLATION OR REMOVAL.
- EXISTING STORM DRAIN PIPELINE
- EXISTING SWALE/DRAINAGE DITCH/FLOWLINE/GUTTER
- PROPOSED STORM DRAIN PIPELINE
- PROPOSED SWALE/DRAINAGE DITCH/FLOWLINE/GUTTER
- AREAS OF DEMOLITION. DISTURBED SOIL AREAS NOT PLANNED FOR CONSTRUCTION ACTIVITIES OVER THE NEXT 14 DAYS SHALL BE STABILIZED BY USE OF EROSION CONTROL BMPS. SEE NOTE 3 ON FIGURE 1B.
- AREAS OF NON-BUILT LAND DISTURBANCE. DISTURBED SOIL AREAS NOT PLANNED FOR CONSTRUCTION ACTIVITIES OVER THE NEXT 14 DAYS SHALL BE STABILIZED BY USE OF EROSION CONTROL BMPS. SEE NOTE 3 ON FIGURE 1B.
- AREAS OF PROPOSED CUT. DISTURBED SOIL AREAS NOT PLANNED FOR CONSTRUCTION ACTIVITIES OVER THE NEXT 14 DAYS SHALL BE STABILIZED BY USE OF EROSION CONTROL BMPS. SEE NOTE 3 ON FIGURE 1B.
- AREAS OF PROPOSED MINOR GRADING. DISTURBED SOIL AREAS NOT PLANNED FOR CONSTRUCTION ACTIVITIES OVER THE NEXT 14 DAYS SHALL BE STABILIZED BY USE OF EROSION CONTROL BMPS. SEE NOTE 3 ON FIGURE 1B.
- LOCATION OF STABILIZED CONSTRUCTION ENTRANCE/EXIT PER CASQA TC-1

DRAINAGE AREA/NON-VISIBLE SAMPLING SYMBOL LEGEND:

- DRAINAGE AREA "X" BOUNDARY
- ## DRAINAGE AREA NUMBER
- CA## STORMWATER CONTAINMENT AREA
- CS## STORMWATER RUN-ON CONTROL SAMPLE LOCATION
- SL## QSD IDENTIFIED DISCHARGE AND SAMPLING LOCATION. THE QSP SHALL FIELD VERIFY THE EXACT LOCATION OF DISCHARGE FOR A REPRESENTATIVE STORMWATER SAMPLE FOR NON-VISIBLE POLLUTANT SAMPLING.

STAGING AREA ITEMS:

- 1 CONCRETE WASHOUT LOCATION PER CASQA WM-08
- 2 LOCATION OF JOB TRAILER CONTAINING SPILL KIT AND ONSITE SWPPP
- 3 LOCATION OF RAIN GAUGE
- 4 MATERIAL STORAGE LOCATION PER CASQA WM-01
- 5 OVERNIGHT EQUIPMENT/VEHICLE STORAGE AND MAINTENANCE PER CASQA NS-8, NS-9 AND NS-10
- 6 RESTROOMS AND SANITARY FACILITIES PER CASQA WM-09
- 7 SOLID WASTE STORAGE LOCATION PER CASQA WM-05
- 8 STOCKPILE STORAGE LOCATION PER CASQW WM-03
- WS WATER SUPPLY LOCATION PER CASQA NS-1

PRE-EARTHWORK SYMBOL LEGEND:

- PROTECT EXISTING DRAIN INLET PER CASQA SE-10
- EXISTING DRAIN INLET TO BE REMOVED. PROTECT DRAIN INLET PER CASQA SE-10
- SURFACE FLOW DIRECTION
- PROJECT BOUNDARY
- LOCATION OF LINEAR SEDIMENT CONTROL BMPS. REFER TO NOTE 1 AND 2. EXACT LOCATIONS OF THE SEDIMENT CONTROL BMP'S SHALL BE COORDINATED WITH THE QSP PRIOR TO INSTALLATION OR REMOVAL.
- EXISTING STORM DRAIN PIPELINE
- EXISTING STORMWATER GUTTER
- EXISTING ASPHALT (NON-ROOF IMPERVIOUS AREAS)
- EXISTING CONCRETE (NON-ROOFTOP IMPERVIOUS AREAS)
- EXISTING ROOFTOP IMPERVIOUS AREAS
- EXISTING PERVIOUS AREAS
- LOCATION OF STABILIZED CONSTRUCTION ENTRANCE/EXIT PER CASQA TC-1
- PRE-CONSTRUCTION GEOTECHNICAL INVESTIGATION BORING LOCATION

NOTES TO CONTRACTOR:

1. REFER TO SECTION 3 OF THE PROJECT SWPPP FOR THE BMP IMPLEMENTATION SCHEDULE AND A COMPLETE NARRATIVE ON APPLICABLE BMPS FOR THE PROJECT. REFER TO THE CASQA CONSTRUCTION BMP HANDBOOK IN APPENDIX G TECHNICAL DETAILS ON ALL BMPS.
2. IN ADDITION TO THE BMPS DEPICTED HEREON, THE QSP AND CONTRACTOR SHALL STUDY SECTION 3 OF THE PROJECT SWPPP AND APPENDIX G TO SELECT, IMPLEMENT AND MAINTAIN EFFECTIVE BMPS FOR ALL CONSTRUCTION POLLUTANTS ORIGINATING FROM THE SITE THROUGHOUT THE LIFE OF THE PROJECT, IN ACCORDANCE WITH THE CGP.
3. THE CONTRACTOR AND QSP SHALL IDENTIFY DISTURBED AREAS THAT ARE NOT PLANNED FOR DISTURBANCE WITHIN THE NEXT 14 DAYS AND IMMEDIATELY TEMPORARILY (OR PERMANENTLY) STABILIZE THESE AREAS USING EFFECTIVE EROSION CONTROL BMPS AS DISCUSSED IN SECTION 3.2 OF THE SWPPP.
4. SUFFICIENT QUANTITIES OF TEMPORARY SEDIMENT CONTROL MATERIALS SHALL BE MAINTAINED ON-SITE THROUGHOUT THE DURATION OF THE PROJECT. ALLOWING FOR IMPLEMENTATION OF TEMPORARY SEDIMENT CONTROLS IN THE EVENT OF PREDICTED RAIN AND FOR RAPID RESPONSE DUE TO FAILURES OR EMERGENCY, IN CONFORMANCE WITH OTHER CGP REQUIREMENTS AS DESCRIBED IN THE PROJECT SWPPP.
5. STREET SURFACES SHALL BE SWEPT BY THE CONTRACTOR PER CASQA SE-7. VISIBLE SEDIMENT TRACKING SHALL BE SWEPT OR VACUUMED ON A DAILY BASIS.
6. DUST CONTROL PRACTICES SHALL CONFORM WITH THE LOCAL AIR DISTRICT AND CASQA WE-1.
7. IF CONSTRUCTION IS PHASED, BMPS MAY BE INSTALLED ONLY WITHIN ACTIVE AREAS OF CONSTRUCTION. ONCE EACH PHASE OF CONSTRUCTION IS COMPLETE AND PROJECT AREA IS STABILIZED, BMPS MAY BE REMOVED WITHIN THE STABILIZED AREA.
8. THE QSP SHALL CONTINUALLY UPDATE FIGURE 2-4 WITH THE ACTUAL LOCATIONS OF ALL BMPS, AND MAINTAIN A CURRENT COPY IN THE SITE SWPPP BINDER OR ACTIVE DIGITAL VERSION ACCESSIBLE ON-SITE. IF THE IMPLEMENTED BMPS ARE SIGNIFICANTLY DIFFERENT FROM THOSE INDICATED IN THE SWPPP, THE QSP SHALL CONTACT THE QSD TO REQUEST A SWPPP AMENDMENT BE PREPARED AND SUBMITTED TO THE WATER BOARD.
9. THE INDICATED STAGING AREAS ARE ASSUMED FOR SCHEMATIC PURPOSES ONLY, AND SHOULD BE COORDINATED WITH THE OWNER. DEPICTION OF STAGING AREAS SHALL NOT GUARANTEE USE OF THOSE AREAS WITHOUT PRIOR PERMISSION. THE QSP SHALL CONTINUALLY UPDATE THESE FIGURES WITH THE ACTUAL LOCATIONS OF ALL STAGING, AND MAINTAIN A CURRENT COPY IN THE SITE SWPPP BINDER. ALL STAGING AREAS SHALL BE FULLY STABILIZED BEFORE CLOSEOUT.
10. THE CONTRACTOR SHALL PLAN AND ACHIEVE FINAL STABILIZATION FOR ALL AREAS DISTURBED BY PROJECT ACTIVITIES WITHIN 90 DAYS OF COMPLETING CONSTRUCTION ACTIVITIES. FOR THE PURPOSES OF THIS PROJECT ACCEPTABLE FINAL STABILIZATION CONDITIONS INCLUDES 70% OR GREATER UNIFORM VEGETATIVE COVER OR NON-VEGETATIVE STABILIZATION PER CASQA EC-15.
11. REFER TO THE CONSTRUCTION DRAWINGS FOR MORE DETAIL.

SITE LOCATION: 800 - 820 W. OLIVE AVE. | MADERA, CA 93637 | 36.952085, -120.066450 — FIGURE: 1B

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MADERA UNIFIED SCHOOL DISTRICT

STORM WATER POLLUTION PREVENTION PLAN
MADERA HIGH SCHOOL STADIUM
LEGENDS AND NOTES

DR. BY GL
CH. BY MG
DATE 02-06-25
SCALE: AS NOTED

SHEET NO. 2
OF 11 SHEETS

Drawing: C:_data\backup\222352_Madera HS Stadium and Field House SWPPP Figures.dwg; Figure 1B Plot by: gledesma Feb 07, 2025 - 10:31am

EROSION AND SEDIMENT CONTROL BMPS

CASQA BMP#	BMP REQUIREMENT SUMMARY
EC-1	SCHEDULE CLEARING AND GRUBBING DURING DRY WEATHER, WHEN FEASIBLE.
EC-3, EC-4, EC-5, EC-6, EC-7, EC-8, EC-14, EC-15, EC-16	IMPLEMENT EROSION CONTROL BMPS TO DISTURBED SOIL AREAS NOT PLANNED FOR CONSTRUCTION ACTIVITIES OVER THE NEXT 14 DAYS.
WE-1	WATER DISTURBED SOIL DAILY TO MITIGATE DUST PER SJVAPCD DUST CONTROL REQUIREMENTS. ESTABLISH CRUST AT END OF WEEK BY WATERING DISTURBED AREAS AND RESTRICTING VEHICLE ACCESS.
SE-10	PROTECT STORM DRAIN INLETS, TRENCH DRAINS, GUTTERS, DITCHES, AND DRAINAGE COURSES WITH APPROPRIATE BMPS, SUCH AS GRAVEL BAGS, INLET FILTER, BERMS, ETC. (SEE DETAILS SE-10a & SE-10b)
SE-1, SE-2, SE-3, SE-4, SE-5, SE-6, SE-8, SE-12, SE-13	PREVENT SEDIMENT FROM MIGRATING OFFSITE BY INSTALLING AND MAINTAINING SEDIMENT CONTROLS, SUCH AS FIBER ROLLS, SILT FENCES, OR SEDIMENT BASINS.
WM-7	IF ANY OF THE FOLLOWING CONDITIONS ARE OBSERVED, TEST FOR CONTAMINATION AND CONTACT LOCAL COUNTY ENVIRONMENTAL HEALTH DEPARTMENT, REGIONAL WATER QUALITY CONTROL BOARD, AND LOCAL MUNICIPAL INSPECTOR: UNUSUAL SOIL CONDITIONS, DISCOLORATION, OR ODOR, ABANDONED UNDERGROUND TANKS ABANDONED WELLS, BURIED BARRELS, DEBRIS, OR TRASH.
TC-1, TC-2	ESTABLISH AND MAINTAIN EFFECTIVE STABILIZED CONSTRUCTION EXIT AT ALL CONSTRUCTION EXITS TO SUFFICIENTLY CONTROL TRACKING OFF SITE (SEE DETAIL TC-1).
SE-7	SWEEP OR VACUUM ANY STREET TRACKING IMMEDIATELY UPON OBSERVATION. NEVER HOSE DOWN STREETS TO CLEAN UP TRACKING.

SPILL PREVENTION AND CONTROL BMPS

CASQA BMP#	BMP REQUIREMENT SUMMARY
WM-4, WM-6	KEEP SPILL KIT AVAILABLE AT SITE AT ALL TIMES (ABSORBENT, SPILL BOOMS, DISPOSAL BAGS, PPE). TRAIN STAFF ON SPILL CLEANUP RESPONSIBILITY AND PROCEDURES.
WM-4, WM-6, NS-10	INSPECT VEHICLES AND EQUIPMENT FREQUENTLY FOR AND REPAIR LEAKS PROMPTLY. USE DRIP PANS TO CATCH LEAKS UNTIL REPAIRS ARE MADE.
WM-4, WM-6	CLEAN UP SPILLS OR LEAKS IMMEDIATELY AND DISPOSE OF CLEANUP MATERIALS PROPERLY.
WM-4, WM-6	DO NOT HOSE DOWN SURFACES WHERE FLUIDS HAVE SPILLED. USE DRY CLEANUP METHODS (ABSORBENT MATERIALS).
WM-4, WM-6	SWEEP UP SPILLED DRY MATERIALS IMMEDIATELY (CONCRETE, MORTAR, DRYWALL PLASTER ETC.). DO NOT WASH THEM AWAY WITH WATER, OR BURY THEM.
WM-4, WM-6, WM-7	CLEAN UP SPILLS ON DIRT AREAS BY DIGGING UP AND PROPERLY DISPOSING OF CONTAMINATED SOIL.
WM-4, WM-6	REPORT SIGNIFICANT SPILLS IMMEDIATELY. YOU ARE REQUIRED BY LAW TO REPORT ALL SIGNIFICANT RELEASES OF HAZARDOUS MATERIALS, INCLUDING OIL. TO REPORT A SPILL: DIAL 911.

PAINTING AND PAINT REMOVAL BMPS

CASQA BMP#	BMP REQUIREMENT SUMMARY
WM-6, WM-10	NEVER CLEAN BRUSHES OR RINSE PAINT CONTAINERS INTO STREET, GUTTER, STORM DRAIN, SOIL, OR SURFACE WATERS.
WM-6, WM-10	FOR WATER-BASED PAINTS, PAINT OUT BRUSHES TO THE EXTENT POSSIBLE. RINSE TO THE SANITARY SEWER ONCE YOU HAVE GAINED PERMISSION FROM THE LOCAL WASTEWATER TREATMENT AUTHORITY. NEVER POUR PAINT DOWN A DRAIN OR ONTO SOIL.
WM-6, WM-10	FOR OIL-BASED PAINTS, PAINT OUT BRUSHES TO THE EXTENT POSSIBLE AND CLEAN WITH THINNER OR SOLVENT IN A PROPER CONTAINER. FILTER AND REUSE THINNERS AND SOLVENTS. DISPOSE OF RESIDUE AND UNUSABLE THINNER/SOLVENTS AS HAZARDOUS WASTE.
WM-5, WM-6,	CHEMICAL PAINT STRIPPING RESIDUE AND CHIPS AND DUST FROM PAINTS CONTAINING LEAD OR TRIBUTYLTIN MUST BE DISPOSED OF AS HAZARDOUS WASTE.
WM-5, WM-6,	PAINT CHIPS AND DUST FROM NON-HAZARDOUS DRY STRIPPING AND SAND BLASTING MAY BE SWEPT UP OR COLLECTED IN PLASTIC DROP CLOTHS AND DISPOSED OF AS TRASH.

ASPHALT, CONCRETE, MORTAR, STUCCO BMPS

CASQA BMP#	BMP REQUIREMENT SUMMARY
NS-3, NS-12, NS-13	DO NOT PAVE, SEAL COAT, OR POUR CONCRETE IN WET WEATHER, OR WHEN RAIN IS FORECAST BEFORE FRESH PAVEMENT/CONCRETE WILL HAVE TIME TO CURE.
NS-3, NS-12, NS-13	COVER STORM DRAIN INLETS AND MANHOLES WHEN APPLYING SEAL COAT, TACK COAT, SLURRY SEAL, FOG SEAL, ETC.
WM-5	COLLECT AND RECYCLE OR APPROPRIATELY DISPOSE OF EXCESS ABRASIVE GRAVEL OR SAND. DO NOT SWEEP OR WASH IT INTO GUTTERS.
NS-3, NS-12, NS-13, WM-8	DO NOT USE WATER TO WASH DOWN FRESH ASPHALT OR CONCRETE PAVEMENT.
NS-3, WM-8	COMPLETELY COVER OR BARRICADE STORM DRAIN INLETS WHEN SAW CUTTING. USE DRAIN INLET PLUG OR SAND BAGS TO KEEP SLURRY OUT OF THE STORM DRAIN SYSTEM.
NS-3, WM-8	ABOSORB, OR VACUUM SAW-CUT SLURRY AND DISPOSE OF ALL WASTE AS SOON AS YOU ARE FINISHED IN ONE LOCATION OR AT THE END OF EACH WORK DAY (WHICHEVER IS SOONER).
NS-3, WM-8	IF SAWCUT SLURRY ENTERS A CATCH BASIN, CLEAN IT UP IMMEDIATELY.
WM-1	STORE CONCRETE, GROUT, MORTAR, STUCCO, ETC. UNDER COVER AND RAISED OFF GROUND, AND AWAY FROM DRAINAGE COURSES. THESE MATERIALS MUST NEVER REACH A STORM DRAIN.
WM-4, WM-8	CONCRETE WASHOUT AND OTHER LIQUID WASTE FROM MORTAR, GROUT, STUCCO, PLASTER, DRYWALL, ETC. MUST BE STORED IN CONTAINMENT BIN/BUCKET. THESE LIQUID WASTES MAY NOT BE DISPOSED ON SOIL OR DRAINAGE COURSES. SELECT A CONTAINER LARGE ENOUGH FOR THE JOB AND LEAVE FREEBOARD TO PREVENT SPILLS OF CONTAINER. COVER CONTAINERS FOR ALL RAIN EVENTS.
WM-4, WM-8	COLLECT THE WASH WATER FROM WASHING EXPOSED AGGREGATE CONCRETE AND REMOVE IT FOR APPROPRIATE DISPOSAL OFFSITE.
WM-2, WM-5, WM-8	PLACE TARP UNDER SOIL OF MORTAR, STUCCO, PLASTER, ETC. MIXING STATIONS AND UNDER APPLICATION AREAS. CONTAIN THESE MATERIALS ON TARP FROM SCRAPING FROM OVER-APPLICATION. COLLECT AND DISPOSE MATERIALS ACCUMULATED ON TARP IMMEDIATELY AFTER CURING.

RUN-ON AND DEWATERING BMPS

CASQA BMP#	BMP REQUIREMENT SUMMARY
SE-8, EC-9	EFFECTIVELY DIVERT RUN-ON TO DISTURBED AREAS BY USE OF SANDBAG BERMS OR DIVERSION PIPE/HOSE. WHEN DIVERSION IS INFEASIBLE, SCHEDULE WORK DISTURBANCE TO RUN-ON AREAS DURING DRY WEATHER IF FEASIBLE. IF RUN-ON TO DISTURBED AREAS IS UNAVOIDABLE, IMPLEMENT A COMBINATION OF EFFECTIVE EROSION AND SEDIMENT CONTROLS TO MINIMIZE POLLUTANT TRANSPORT FROM RUN-ON.
NS-2	WHEN DEWATERING OFF-SITE, NOTIFY AND OBTAIN APPROVAL FROM THE LOCAL MUNICIPALITY AND REGIONAL WATER QUALITY CONTROL BOARD BEFORE DISCHARGING IMPOUNDED WATER OFF-SITE. SEE SECTION 7 OF THE PROJECT SWPPP FOR SITE-SPECIFIC DEWATERING PERMIT/SAMPLING REQUIREMENTS.
EC-10	UTILIZE VELOCITY DISSIPATION DEVICES WHEN DEWATERING TO PERVIOUS AREAS.
NS-2, WM-7	IN AREAS OF KNOWN CONTAMINATION, TESTING IS REQUIRED PRIOR TO REUSE OR DISCHARGE OF GROUNDWATER OR IMPOUNDED STORMWATER. CONSULT WITH THE ENGINEER AND MUNICIPAL STAFF TO DETERMINE WHETHER TESTING IS REQUIRED AND HOW TO INTERPRET RESULTS. CONTAMINATED GROUNDWATER OR IMPOUNDED WATER MUST BE TREATED OR HAULED OFFSITE FOR PROPER DISPOSAL.

EQUIPMENT MAINTENANCE AND PARKING BMPS

CASQA BMP#	BMP REQUIREMENT SUMMARY
NS-8, NS-9, NS-10	DESIGNATE AN AREA, FITTED WITH APPROPRIATE BMPS, FOR VEHICLE AND EQUIPMENT PARKING AND STORAGE.
NS-8, NS-9, NS-10	PERFORM MAJOR MAINTENANCE, REPAIR JOBS, AND VEHICLE AND EQUIPMENT WASHING OFF-SITE.
NS-9, NS-10	IF REFUELING OR VEHICLE MAINTENANCE MUST BE DONE ONSITE, WORK IN A BERMED AREA AWAY FROM STORM DRAINS AND OVER A DRIP PAN BIG ENOUGH TO COLLECT FLUIDS. RECYCLE OR DISPOSE OF FLUIDS AS HAZARDOUS WASTE.
NS-8	IF VEHICLE OR EQUIPMENT CLEANING MUST BE DONE ONSITE, CLEAN WITH WATER ONLY IN A BERMED AREA THAT WILL NOT ALLOW RINSE WATER TO RUN INTO GUTTERS, STREETS, STORM DRAINS, OR SURFACE WATERS
NS-8	DO NOT CLEAN VEHICLES OR EQUIPMENT ON-SITE USING SOAPS, SOLVENTS, DEGREASERS, STEAM CLEANING EQUIPMENT, ETC.

MATERIAL & WASTE MANAGEMENT BMPS

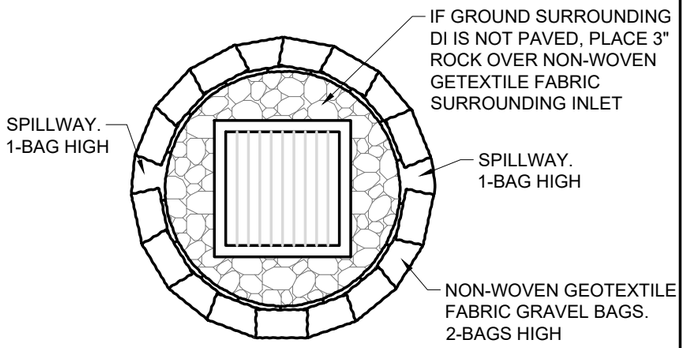
CASQA BMP#	BMP REQUIREMENT SUMMARY
WM-1, WM-3	BERM AND SECURELY COVER STOCKPILES OF SAND, DIRT, OR OTHER CONSTRUCTION MATERIALS WITH TARPS WHEN RAIN IS FORECAST OR IF STOCKPILES ARE NOT ACTIVELY BEING USED. FOR BEST RESULTS, THIS SHOULD BE DONE AT THE END OF THE WORK DAY THROUGHOUT CONSTRUCTION WHEN FEASIBLE.
WM-5, WM-6	BERM AND SECURELY COVER STOCKPILES OF ALL DEMOLISHED BUILDING RUBBLE.
WM-4, WM-6, WM-10	LABEL ALL HAZARDOUS MATERIALS AND HAZARDOUS WASTES (SUCH AS PESTICIDES, PAINTS, THINNERS, SOLVENTS, FUEL, OIL, AND ANTIFREEZE) IN ACCORDANCE WITH CITY, COUNTY, STATE AND FEDERAL REGULATIONS.
WM-4, WM-6, WM-10	STORE HAZARDOUS MATERIALS AND WASTES IN WATER TIGHT CONTAINERS, STORE IN APPROPRIATE SECONDARY CONTAINMENT, AND COVER THEM AT THE END OF EVERY WORK DAY OR DURING WET WEATHER OR WHEN RAIN IS FORECAST.
WM-2,WM-4, WM-6, WM-10, NS-12, NS-13	FOLLOW MANUFACTURER'S APPLICATION INSTRUCTIONS FOR HAZARDOUS MATERIALS AND BE CAREFUL NOT TO USE MORE THAN NECESSARY. DO NOT APPLY CHEMICALS OUTDOORS WHEN RAIN IS FORECAST WITHIN 24 HOURS.
WM-6	ARRANGE APPROPRIATE DISPOSAL OF ALL HAZARDOUS WASTES.
WM-5	COVER WASTE DISPOSAL CONTAINERS SECURELY WITH TARPS AT THE END OF EVERY WORK DAY AND DURING WET WEATHER.
WM-9	CLEAN OR REPLACE PORTABLE TOILETS, AND INSPECT THEM FREQUENTLY FOR LEAKS AND SPILLS. ADD SECONDARY CONTAINMENT AND LOCATE THEM AWAY FROM STORM DRAIN INLETS. ENSURE TOILETS ARE PROTECTED FROM TIPPING FROM HIGH WIND.
WM-5	WHEN CUTTING OR GRINDING METAL OR PLASTIC MATERIALS (PVC PIPE, SIDING, ETC.) PLACE DROPCLOTH OR TARP TO CONTAIN INORGANIC (TRASH) SHARDS/SHAVINGS/DUST. DISPOSE COLLECTED MATERIALS AFTER COMPLETING CUTTING/GRINDING ACTIVITY.

LANDSCAPING BMPS

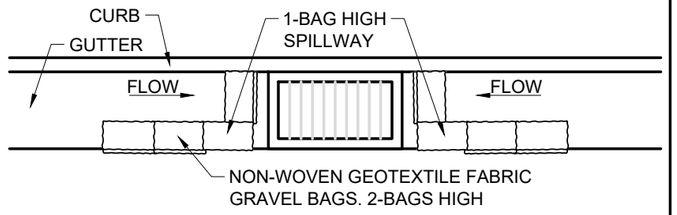
CASQA BMP#	BMP REQUIREMENT SUMMARY
WM-1, WM-3	CONTAIN STOCKPILED LANDSCAPING MATERIALS BY STORING THEM UNDER TARPS AND BERMED FROM RUN-ON WHEN THEY ARE NOT ACTIVELY BEING USED.
WM-1, WM-3	STORE ERODIBLE LANDSCAPE MATERIAL ON PALLETS. COVER OR STORE THESE MATERIALS WHEN THEY ARE NOT ACTIVELY BEING USED OR APPLIED.
WM-1, WM-3	DISCONTINUE APPLICATION OF ANY ERODIBLE LANDSCAPE MATERIAL WITHIN 2 DAYS BEFORE A FORECAST RAIN EVENT OR DURING WET WEATHER.
NS-7	COORDINATE WITH OWNER TO MODIFY EXISTING IRRIGATION SYSTEMS IN/AROUND PROJECT SITE TO ENSURE IRRIGATION WATER IS NOT A SOURCE OF NON-STORMWATER INTO DISTURBED AREAS.

ADDITIONAL BMP GUIDANCE DETAILS

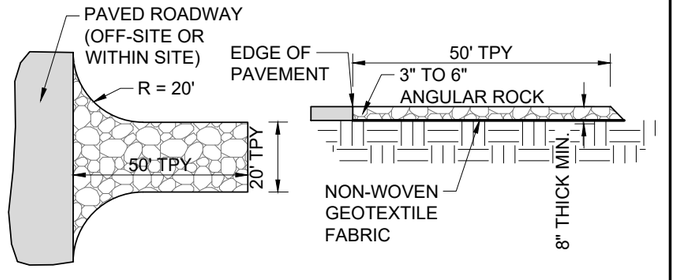
BMP DETAILS SHOWN BELOW PROVIDE ADDITIONAL BMP GUIDANCE NOT INCLUDED IN THE CASQA BMP FACTSHEET. ALL OTHER BMPS SHALL FOLLOW GUIDANCE IN THE FACTHEET IN APPENDIX G OF THE PROJECT SWPPP.



SE 10a *LEVEL GRADE DRAIN INLET PROTECTION*
NOT TO SCALE



SE 10b *CURB & GUTTER DRAIN INLET PROTECTION*
NOT TO SCALE



NOTES:
1. CONSTRUCTION EXIT SHALL BE KEPT IN GOOD CONDITION BY OCCASIONAL TOP DRESSING AND/OR ROUGHENING.
2. "RUMBLE PLATES" MAY BE ADDED AND COUNT TOWARDS 50' FT REQUIREMENT.
3. CONTRACTOR SHALL INSPECT EXIT WEEKLY AND DURING RAIN EVENTS.
4. CONTRACTOR SHALL SWEEP TRACKOUT WEEKLY AND PRIOR TO RAIN EVENTS PER CASQA SE-7 AND PER SJVAPCD DUST CONTROL REQUIREMENTS

TC 1 *STABILIZED CONSTRUCTION EXIT*
NOT TO SCALE

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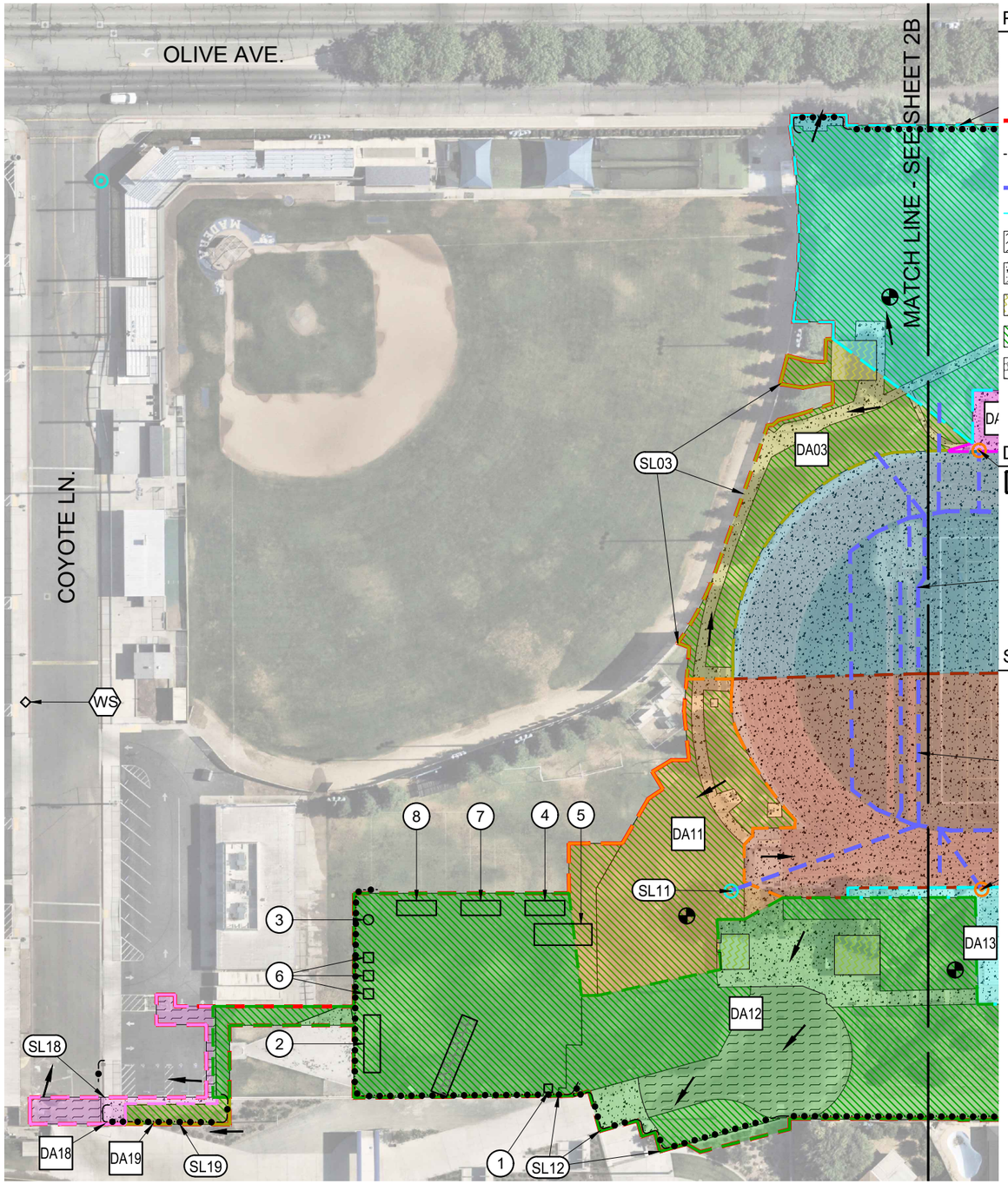
MADERA UNIFIED SCHOOL DISTRICT

STORM WATER POLLUTION PREVENTION PLAN
MADERA HIGH SCHOOL STADIUM
BMP SUMMARY AND DETAILS

DR. BY GL
CH. BY MG
DATE 02-06-25
SCALE: AS NOTED

SHEET NO. 3
OF 11 SHEETS

Drawing: C:_data\backup\222352_Madera HS Stadium and Field House SWPPP Figures.dwg; Figure 1C Plot by: gledesma Feb 07, 2025 - 10:31am



PRE-EARTHWORK SYMBOL LEGEND:

- PROTECT EXISTING DRAIN INLET PER CASQA SE-10
- EXISTING DRAIN INLET TO BE REMOVED. PROTECT DRAIN INLET PER CASQA SE-10
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- PROJECT BOUNDARY
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- EXISTING STORM DRAIN PIPELINE
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- EXISTING ASPHALT (NON-ROOF IMPERVIOUS AREAS)
- EXISTING CONCRETE (NON-ROOFTOP IMPERVIOUS AREAS)
- EXISTING ROOFTOP IMPERVIOUS AREAS
- EXISTING PERVIOUS AREAS
- LOCATION OF STABILIZED CONSTRUCTION ENTRANCE/EXIT PER CASQA TC-1
- PRE-CONSTRUCTION GEOTECHNICAL INVESTIGATION BORING LOCATION

DRAINAGE AREA/NON-VISIBLE SAMPLING SYMBOL LEGEND:

- DRAINAGE AREA "X" BOUNDARY
- ## DRAINAGE AREA NUMBER
- CS## STORMWATER RUN-ON CONTROL SAMPLE LOCATION
- SL## QSD IDENTIFIED DISCHARGE AND SAMPLING LOCATION. THE QSP SHALL FIELD VERIFY THE EXACT LOCATION OF DISCHARGE FOR A REPRESENTATIVE STORMWATER SAMPLE FOR NON-VISIBLE POLLUTANT SAMPLING.

STAGING AREA ITEMS:

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2. LOCATION OF JOB TRAILER CONTAINING SPILL KIT AND ONSITE SWPPP
3. LOCATION OF RAIN GAUGE
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7. SOLID WASTE STORAGE LOCATION PER CASQA WM-05
8. STOCKPILE STORAGE LOCATION PER CASQW WM-03

WS WATER SUPPLY LOCATION PER CASQA NS-1

N

0 20 40 80 120 160
SCALE IN FEET

SITE LOCATION: 800 - 820 W. OLIVE AVE. | MADERA, CA 93637 | 36.952085, -120.066450

FIGURE: 2A

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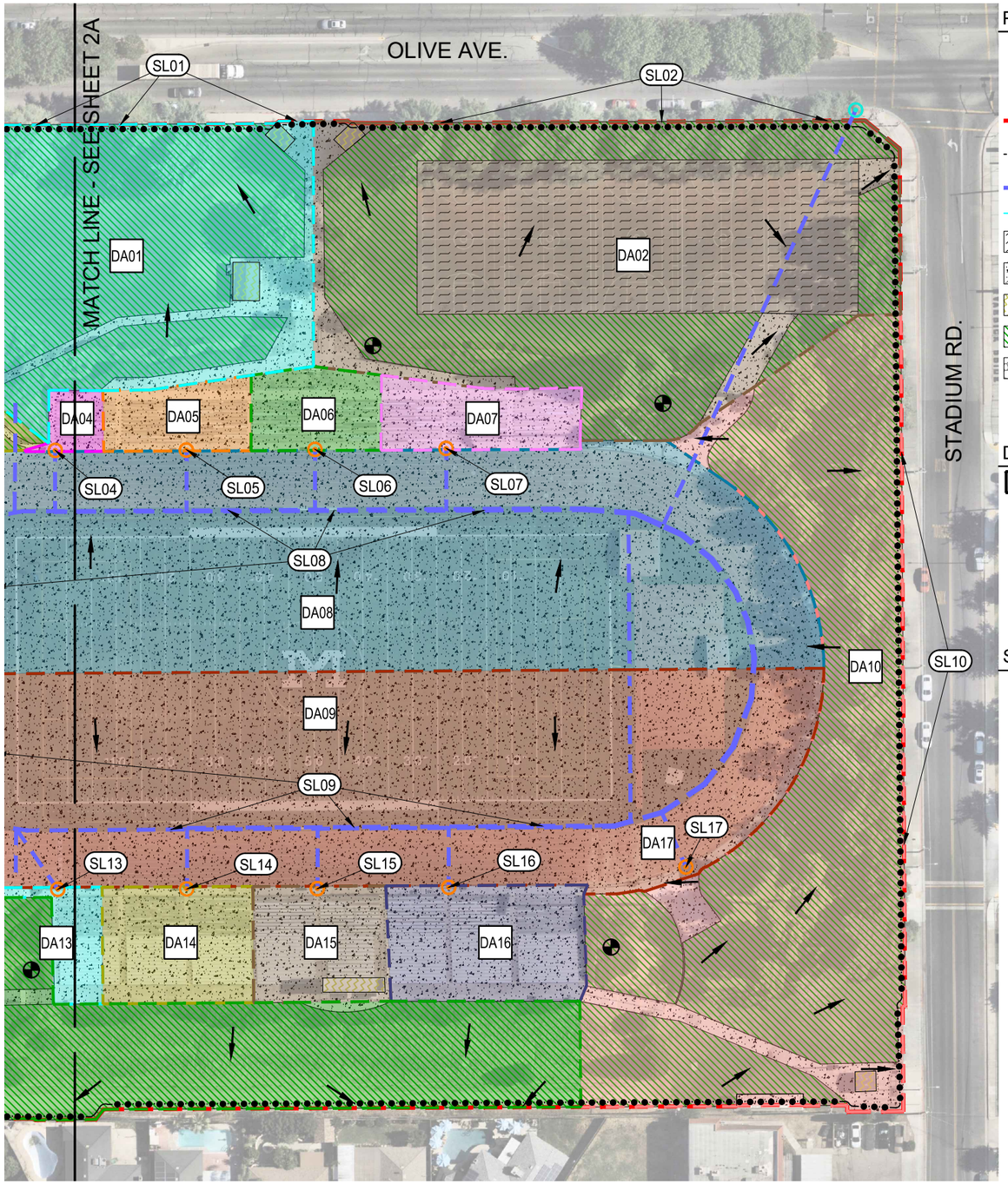
MADERA UNIFIED SCHOOL DISTRICT

STORM WATER POLLUTION PREVENTION PLAN
MADERA HIGH SCHOOL STADIUM
PRE-EARTHWORK SITE MAP

DR. BY GL
CH. BY MG
DATE 02-06-25
SCALE: AS NOTED

SHEET NO. 4
OF 11 SHEETS

Drawing: C:_data\backup\222352_Madera HS Stadium and Field House SWPPP Figures.dwg; Figure 2A Plot by: gledesma Feb 07, 2025 - 10:31am



PRE-EARTHWORK SYMBOL LEGEND:

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- EXISTING DRAIN INLET TO BE REMOVED. PROTECT DRAIN INLET PER CASQA SE-10
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- ## — DRAINAGE AREA NUMBER
- CS## — STORMWATER RUN-ON CONTROL SAMPLE LOCATION
- SL## — QSD IDENTIFIED DISCHARGE AND SAMPLING LOCATION. THE QSP SHALL FIELD VERIFY THE EXACT LOCATION OF DISCHARGE FOR A REPRESENTATIVE STORMWATER SAMPLE FOR NON-VISIBLE POLLUTANT SAMPLING.

STAGING AREA ITEMS:

1. CONCRETE WASHOUT LOCATION PER CASQA WM-08
2. LOCATION OF JOB TRAILER CONTAINING SPILL KIT AND ONSITE SWPPP
3. LOCATION OF RAIN GAUGE
4. MATERIAL STORAGE LOCATION PER CASQA WM-01
5. OVERNIGHT EQUIPMENT/VEHICLE STORAGE AND MAINTENANCE PER CASQA NS-8, NS-9 AND NS-10
6. RESTROOMS AND SANITARY FACILITIES PER CASQA WM-09
7. SOLID WASTE STORAGE LOCATION PER CASQA WM-05
8. STOCKPILE STORAGE LOCATION PER CASQW WM-03
- WS — WATER SUPPLY LOCATION PER CASQA NS-1

N

0 20 40 80 120 160
SCALE IN FEET

SITE LOCATION: 800 - 820 W. OLIVE AVE. | MADERA, CA 93637 | 36.952085, -120.066450

FIGURE: 2B

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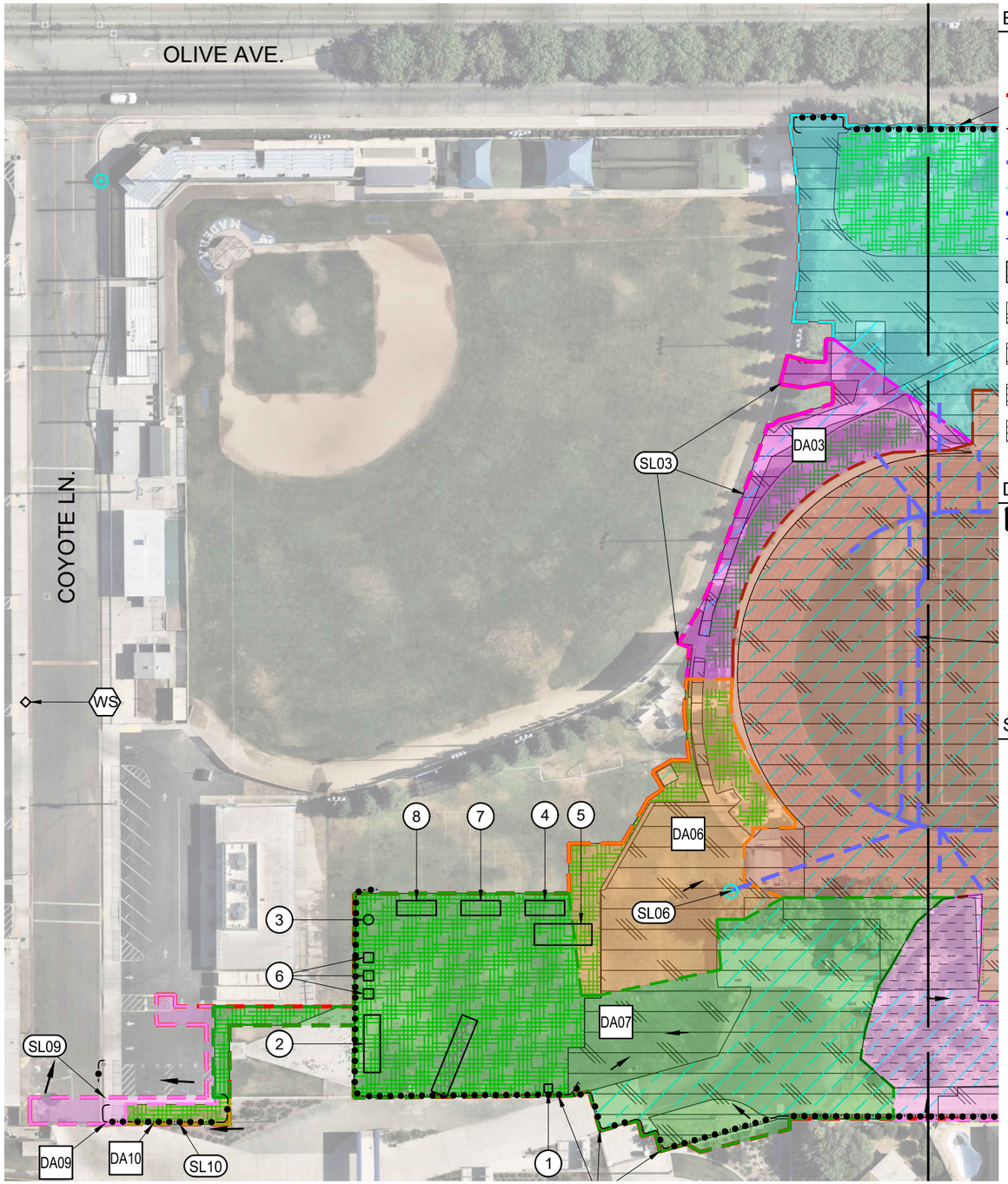
MADERA UNIFIED SCHOOL DISTRICT

STORM WATER POLLUTION PREVENTION PLAN
MADERA HIGH SCHOOL STADIUM
PRE-EARTHWORK SITE MAP

DR. BY GL
CH. BY MG
DATE 02-06-25
SCALE: AS NOTED

SHEET NO. 5
OF 11 SHEETS

Drawing: C:_data\backup\222352_Madera HS Stadium and Field House SWPPP Figures.dwg; Figure 2B Plot by: gledesma Feb 07, 2025 - 10:31am



EARTHWORK SYMBOL LEGEND:

- PROTECT EXISTING DRAIN INLET PER CASQA SE-10
- SURFACE FLOW DIRECTION
- PROJECT BOUNDARY
- LOCATION OF LINEAR SEDIMENT CONTROL BMPS. REFER TO NOTE 1 AND 2. EXACT LOCATIONS OF THE SEDIMENT CONTROL BMP'S SHALL BE COORDINATED WITH THE QSP PRIOR TO INSTALLATION OR REMOVAL.
- EXISTING STORM DRAIN PIPELINE
- EXISTING SWALE/DRAINAGE DITCH/FLOWLINE/GUTTER
- PROPOSED STORM DRAIN PIPELINE
- PROPOSED SWALE/DRAINAGE DITCH/FLOWLINE/GUTTER
- AREAS OF DEMOLITION. DISTURBED SOIL AREAS NOT PLANNED FOR CONSTRUCTION ACTIVITIES OVER THE NEXT 14 DAYS SHALL BE STABILIZED BY USE OF EROSION CONTROL BMPS. SEE NOTE 3 ON FIGURE 1B.
- AREAS OF NON-BUILT LAND DISTURBANCE. DISTURBED SOIL AREAS NOT PLANNED FOR CONSTRUCTION ACTIVITIES OVER THE NEXT 14 DAYS SHALL BE STABILIZED BY USE OF EROSION CONTROL BMPS. SEE NOTE 3 ON FIGURE 1B.
- AREAS OF PROPOSED CUT. DISTURBED SOIL AREAS NOT PLANNED FOR CONSTRUCTION ACTIVITIES OVER THE NEXT 14 DAYS SHALL BE STABILIZED BY USE OF EROSION CONTROL BMPS. SEE NOTE 3 ON FIGURE 1B.
- AREAS OF PROPOSED MINOR GRADING. DISTURBED SOIL AREAS NOT PLANNED FOR CONSTRUCTION ACTIVITIES OVER THE NEXT 14 DAYS SHALL BE STABILIZED BY USE OF EROSION CONTROL BMPS. SEE NOTE 3 ON FIGURE 1B.
- LOCATION OF STABILIZED CONSTRUCTION ENTRANCE/EXIT PER CASQA TC-1

DRAINAGE AREA/NON-VISIBLE SAMPLING SYMBOL LEGEND:

- DRAINAGE AREA "X" BOUNDARY
- ## — DRAINAGE AREA NUMBER
- CA## — STORMWATER CONTAINMENT AREA
- CS## — STORMWATER RUN-ON CONTROL SAMPLE LOCATION
- SL## — QSD IDENTIFIED DISCHARGE AND SAMPLING LOCATION. THE QSP SHALL FIELD VERIFY THE EXACT LOCATION OF DISCHARGE FOR A REPRESENTATIVE STORMWATER SAMPLE FOR NON-VISIBLE POLLUTANT SAMPLING.

STAGING AREA ITEMS:

1. CONCRETE WASHOUT LOCATION PER CASQA WM-08
2. LOCATION OF JOB TRAILER CONTAINING SPILL KIT AND ONSITE SWPPP
3. LOCATION OF RAIN GAUGE
4. MATERIAL STORAGE LOCATION PER CASQA WM-01
5. OVERNIGHT EQUIPMENT/VEHICLE STORAGE AND MAINTENANCE PER CASQA NS-8, NS-9 AND NS-10
6. RESTROOMS AND SANITARY FACILITIES PER CASQA WM-09
7. SOLID WASTE STORAGE LOCATION PER CASQA WM-05
8. STOCKPILE STORAGE LOCATION PER CASQW WM-03
- WS — WATER SUPPLY LOCATION PER CASQA NS-1

N

0 20 40 80 120 160
SCALE IN FEET

SITE LOCATION: 800 - 820 W. OLIVE AVE. | MADERA, CA 93637 | 36.952085, -120.066450 — FIGURE: 3A

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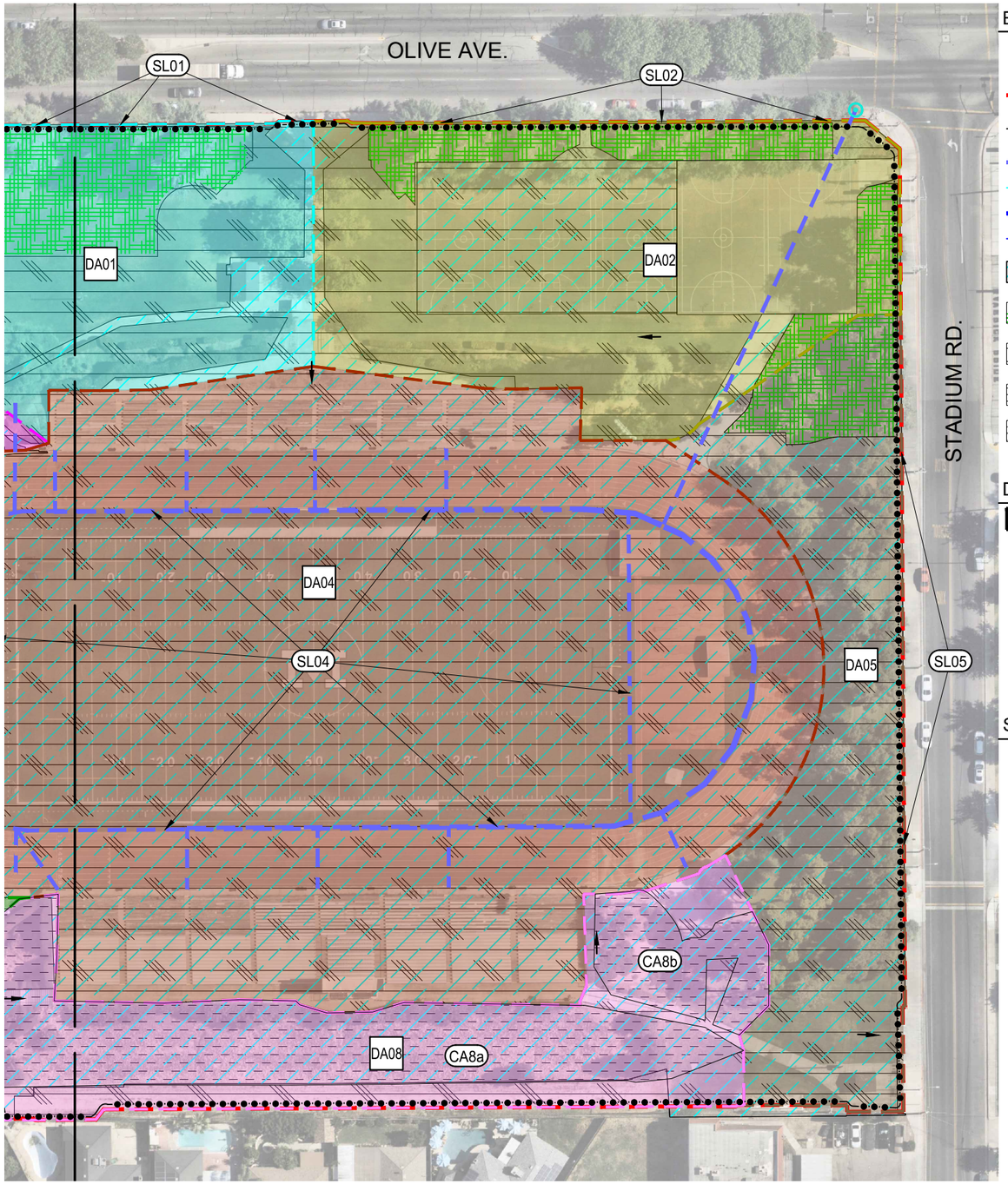
MADERA UNIFIED SCHOOL DISTRICT

STORM WATER POLLUTION PREVENTION PLAN
MADERA HIGH SCHOOL STADIUM
EARTHWORK SITE MAP

DR. BY GL
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SHEET NO. 6
OF 11 SHEETS

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EARTHWORK SYMBOL LEGEND:

- PROTECT EXISTING DRAIN INLET PER CASQA SE-10
- SURFACE FLOW DIRECTION
- PROJECT BOUNDARY
- LOCATION OF LINEAR SEDIMENT CONTROL BMPS. REFER TO NOTE 1 AND 2. EXACT LOCATIONS OF THE SEDIMENT CONTROL BMP'S SHALL BE COORDINATED WITH THE QSP PRIOR TO INSTALLATION OR REMOVAL.
- EXISTING STORM DRAIN PIPELINE
- EXISTING SWALE/DRAINAGE DITCH/FLOWLINE/GUTTER
- PROPOSED STORM DRAIN PIPELINE
- PROPOSED SWALE/DRAINAGE DITCH/FLOWLINE/GUTTER
- AREAS OF DEMOLITION. DISTURBED SOIL AREAS NOT PLANNED FOR CONSTRUCTION ACTIVITIES OVER THE NEXT 14 DAYS SHALL BE STABILIZED BY USE OF EROSION CONTROL BMPS. SEE NOTE 3 ON FIGURE 1B.
- AREAS OF NON-BUILT LAND DISTURBANCE. DISTURBED SOIL AREAS NOT PLANNED FOR CONSTRUCTION ACTIVITIES OVER THE NEXT 14 DAYS SHALL BE STABILIZED BY USE OF EROSION CONTROL BMPS. SEE NOTE 3 ON FIGURE 1B.
- AREAS OF PROPOSED CUT. DISTURBED SOIL AREAS NOT PLANNED FOR CONSTRUCTION ACTIVITIES OVER THE NEXT 14 DAYS SHALL BE STABILIZED BY USE OF EROSION CONTROL BMPS. SEE NOTE 3 ON FIGURE 1B.
- AREAS OF PROPOSED MINOR GRADING. DISTURBED SOIL AREAS NOT PLANNED FOR CONSTRUCTION ACTIVITIES OVER THE NEXT 14 DAYS SHALL BE STABILIZED BY USE OF EROSION CONTROL BMPS. SEE NOTE 3 ON FIGURE 1B.
- LOCATION OF STABILIZED CONSTRUCTION ENTRANCE/EXIT PER CASQA TC-1

DRAINAGE AREA/NON-VISIBLE SAMPLING SYMBOL LEGEND:

- DRAINAGE AREA "X" BOUNDARY
- ## — DRAINAGE AREA NUMBER
- CA## — STORMWATER CONTAINMENT AREA
- CS## — STORMWATER RUN-ON CONTROL SAMPLE LOCATION
- SL## — QSD IDENTIFIED DISCHARGE AND SAMPLING LOCATION. THE QSP SHALL FIELD VERIFY THE EXACT LOCATION OF DISCHARGE FOR A REPRESENTATIVE STORMWATER SAMPLE FOR NON-VISIBLE POLLUTANT SAMPLING.

STAGING AREA ITEMS:

1. CONCRETE WASHOUT LOCATION PER CASQA WM-08
2. LOCATION OF JOB TRAILER CONTAINING SPILL KIT AND ONSITE SWPPP
3. LOCATION OF RAIN GAUGE
4. MATERIAL STORAGE LOCATION PER CASQA WM-01
5. OVERNIGHT EQUIPMENT/VEHICLE STORAGE AND MAINTENANCE PER CASQA NS-8, NS-9 AND NS-10
6. RESTROOMS AND SANITARY FACILITIES PER CASQA WM-09
7. SOLID WASTE STORAGE LOCATION PER CASQA WM-05
8. STOCKPILE STORAGE LOCATION PER CASQW WM-03
- WS — WATER SUPPLY LOCATION PER CASQA NS-1

N

0 20 40 80 120 160
SCALE IN FEET

SITE LOCATION: 800 - 820 W. OLIVE AVE. | MADERA, CA 93637 | 36.952085, -120.066450 — FIGURE: 3B

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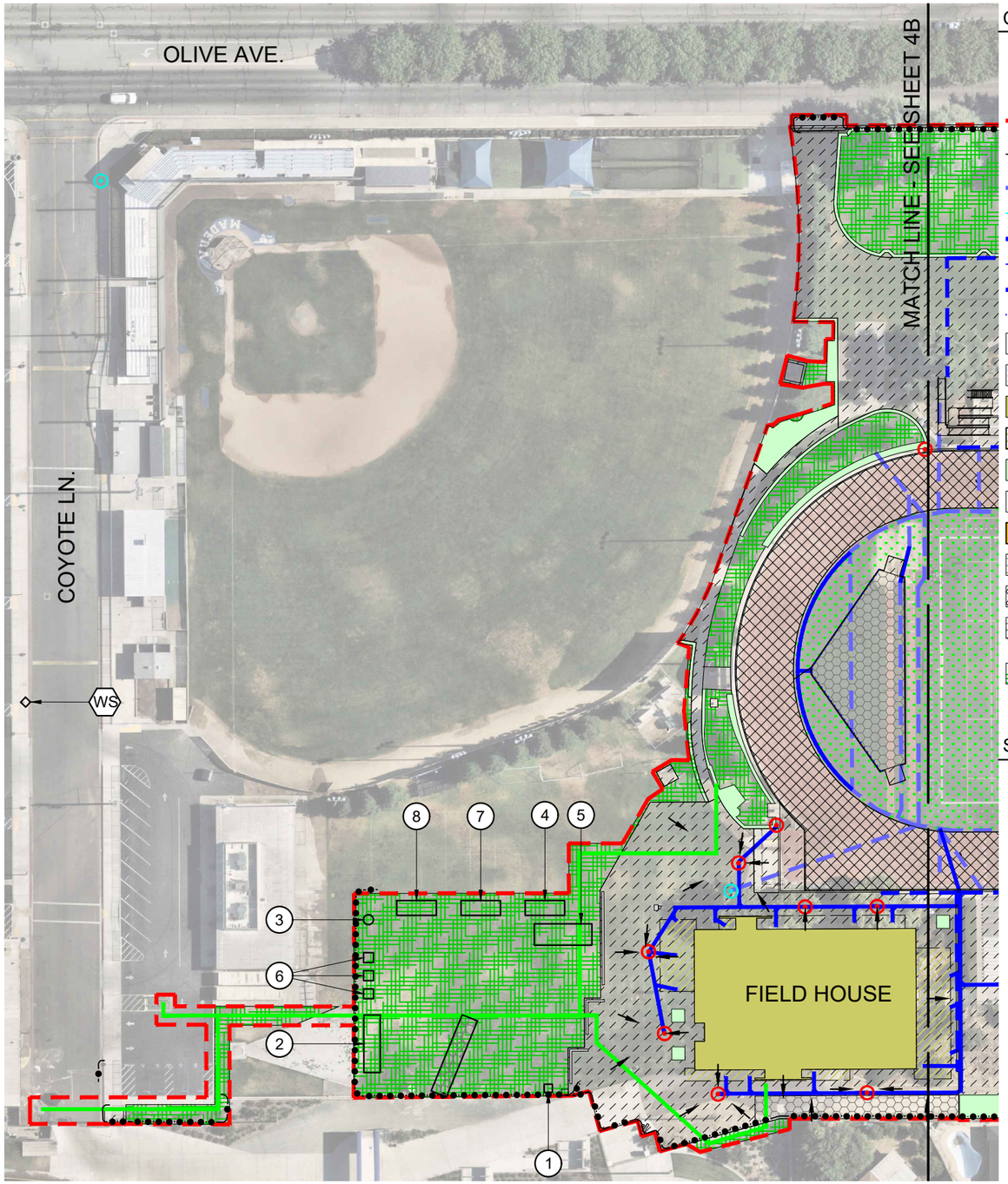
MADERA UNIFIED SCHOOL DISTRICT

STORM WATER POLLUTION PREVENTION PLAN
MADERA HIGH SCHOOL STADIUM
EARTHWORK SITE MAP

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CONSTRUCTION SYMBOL LEGEND:

- PROTECT PROPOSED DRAIN INLET PER CASQA SE-10
- PROTECT EXISTING DRAIN INLET PER CASQA SE-10
- SURFACE FLOW DIRECTION
- PROJECT BOUNDARY
- LOCATION OF LINEAR SEDIMENT CONTROL BMPS. REFER TO NOTE 1 AND 2. EXACT LOCATIONS OF THE SEDIMENT CONTROL BMP'S SHALL BE COORDINATED WITH THE QSP PRIOR TO INSTALLATION OR REMOVAL.
- EXISTING STORM DRAIN PIPELINE
- EXISTING SWALE/DRAINAGE DITCH/FLOWLINE/GUTTER
- PROPOSED STORM DRAIN PIPELINE
- SWALE/DRAINAGE/DITCH/CULVERT/FLOWLINE/VALLEY GUTTER
- PROPOSED TRENCH STORM DRAIN
- PROPOSED PERFORATED STORM DRAIN PIPELINE
- PROPOSED ASPHALT CONCRETE RESURFACING (NON-ROOF IMPERVIOUS AREAS)
- PROPOSED CONCRETE (NON-ROOF IMPERVIOUS AREAS)
- PROPOSED BUILDING (ROOF IMPERVIOUS AREA)
- PROPOSED BUILDING OVERHANG (IMPERVIOUS AREAS)
- PROPOSED LANDSCAPING (PERVIOUS AREAS)
- AREAS OF SYNTHETIC TURF (NON-ROOF IMPERVIOUS AREAS)
- PROPOSED SAND PIT (NON-ROOF IMPERVIOUS AREAS)
- PROPOSED GRAVEL (PERVIOUS AREA)
- PROPOSED RUBBER TRACK SURFACE (NON-ROOF IMPERVIOUS AREAS)
- LOCATION OF STABILIZED CONSTRUCTION ENTRANCE/EXIT PER CASQA TC-1
- AREAS OF NON-BUILT LAND DISTURBANCE FOR FINAL STABILIZATION. DISTURBED SOIL AREAS NOT PLANNED FOR CONSTRUCTION ACTIVITIES OVER THE NEXT 14 DAYS SHALL BE STABILIZED BY USE OF EROSION CONTROL BMPS. SEE NOTE 3 ON FIGURE 1B.

STAGING AREA ITEMS:

1. CONCRETE WASHOUT LOCATION PER CASQA WM-08
2. LOCATION OF JOB TRAILER CONTAINING SPILL KIT AND ONSITE SWPPP
3. LOCATION OF RAIN GAUGE
4. MATERIAL STORAGE LOCATION PER CASQA WM-01
5. OVERNIGHT EQUIPMENT/VEHICLE STORAGE AND MAINTENANCE PER CASQA NS-8, NS-9 AND NS-10
6. RESTROOMS AND SANITARY FACILITIES PER CASQA WM-09
7. SOLID WASTE STORAGE LOCATION PER CASQA WM-05
8. STOCKPILE STORAGE LOCATION PER CASQW WM-03
- WS. WATER SUPPLY LOCATION PER CASQA NS-1

N

0 20 40 80 120 160
SCALE IN FEET

SITE LOCATION: 800 - 820 W. OLIVE AVE. | MADERA, CA 93637 | 36.952085, -120.066450 — FIGURE: 4A

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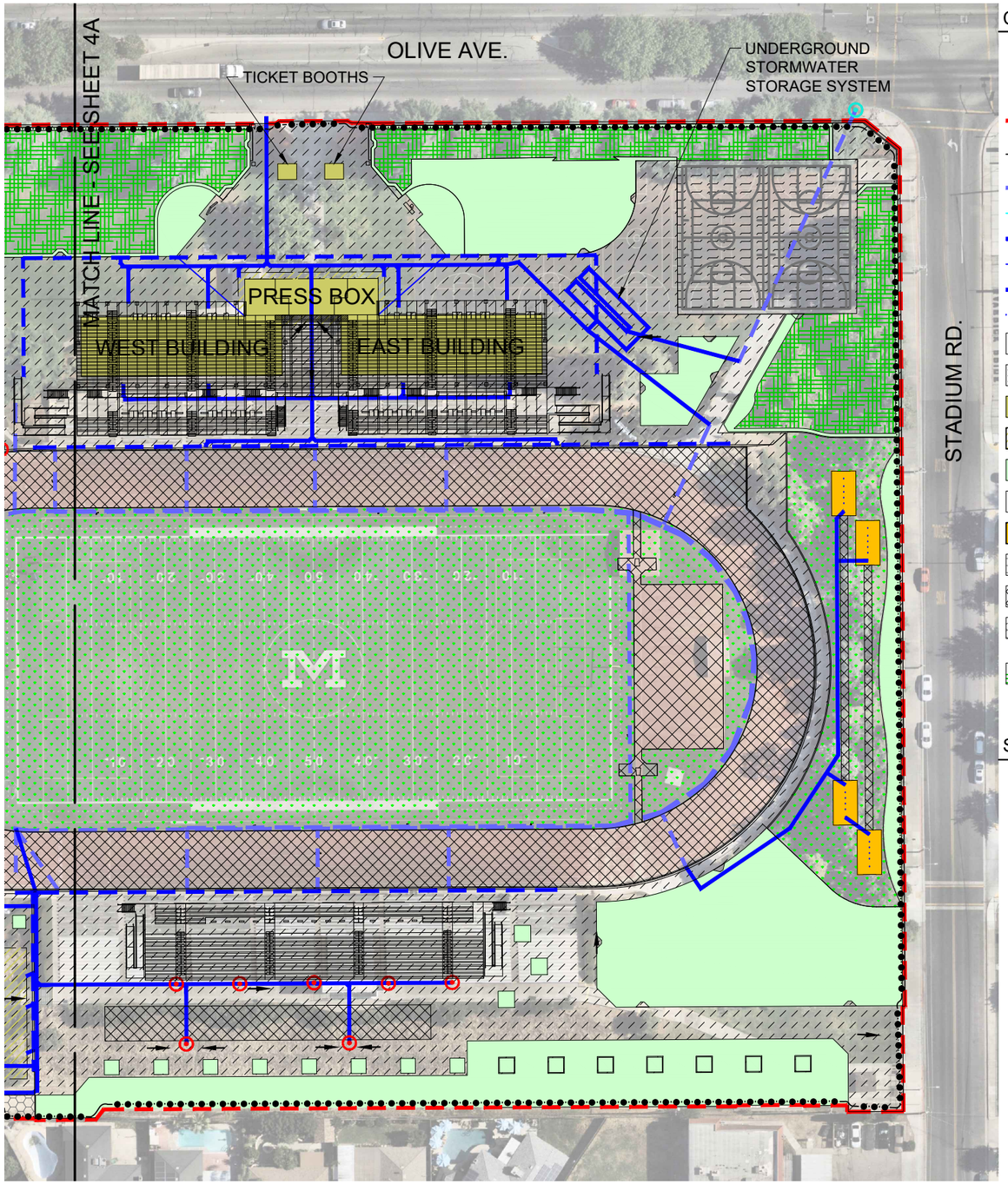
MADERA UNIFIED SCHOOL DISTRICT

STORM WATER POLLUTION PREVENTION PLAN
MADERA HIGH SCHOOL STADIUM
CONSTRUCTION SITE MAP

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CONSTRUCTION SYMBOL LEGEND:

- PROTECT PROPOSED DRAIN INLET PER CASQA SE-10
- PROTECT EXISTING DRAIN INLET PER CASQA SE-10
- SURFACE FLOW DIRECTION
- PROJECT BOUNDARY
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- EXISTING STORM DRAIN PIPELINE
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- PROPOSED STORM DRAIN PIPELINE
- SWALE/DRAINAGE/DITCH/CULVERT/FLOWLINE/VALLEY GUTTER
- PROPOSED TRENCH STORM DRAIN
- PROPOSED PERFORATED STORM DRAIN PIPELINE
- PROPOSED ASPHALT CONCRETE RESURFACING (NON-ROOF IMPERVIOUS AREAS)
- PROPOSED CONCRETE (NON-ROOF IMPERVIOUS AREAS)
- PROPOSED BUILDING (ROOF IMPERVIOUS AREA)
- PROPOSED BUILDING OVERHANG (IMPERVIOUS AREAS)
- PROPOSED LANDSCAPING (PERVIOUS AREAS)
- AREAS OF SYNTHETIC TURF (NON-ROOF IMPERVIOUS AREAS)
- PROPOSED SAND PIT (NON-ROOF IMPERVIOUS AREAS)
- PROPOSED GRAVEL (PERVIOUS AREA)
- PROPOSED RUBBER TRACK SURFACE (NON-ROOF IMPERVIOUS AREAS)
- LOCATION OF STABILIZED CONSTRUCTION ENTRANCE/EXIT PER CASQA TC-1
- AREAS OF NON-BUILT LAND DISTURBANCE FOR FINAL STABILIZATION. DISTURBED SOIL AREAS NOT PLANNED FOR CONSTRUCTION ACTIVITIES OVER THE NEXT 14 DAYS SHALL BE STABILIZED BY USE OF EROSION CONTROL BMPS. SEE NOTE 3 ON FIGURE 1B.

STAGING AREA ITEMS:

1. CONCRETE WASHOUT LOCATION PER CASQA WM-08
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3. LOCATION OF RAIN GAUGE
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5. OVERNIGHT EQUIPMENT/VEHICLE STORAGE AND MAINTENANCE PER CASQA NS-8, NS-9 AND NS-10
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7. SOLID WASTE STORAGE LOCATION PER CASQA WM-05
8. STOCKPILE STORAGE LOCATION PER CASQW WM-03
- WS WATER SUPPLY LOCATION PER CASQA NS-1

N

0 20 40 80 120 160
SCALE IN FEET

SITE LOCATION: 800 - 820 W. OLIVE AVE. | MADERA, CA 93637 | 36.952085, -120.066450 — FIGURE: 4B

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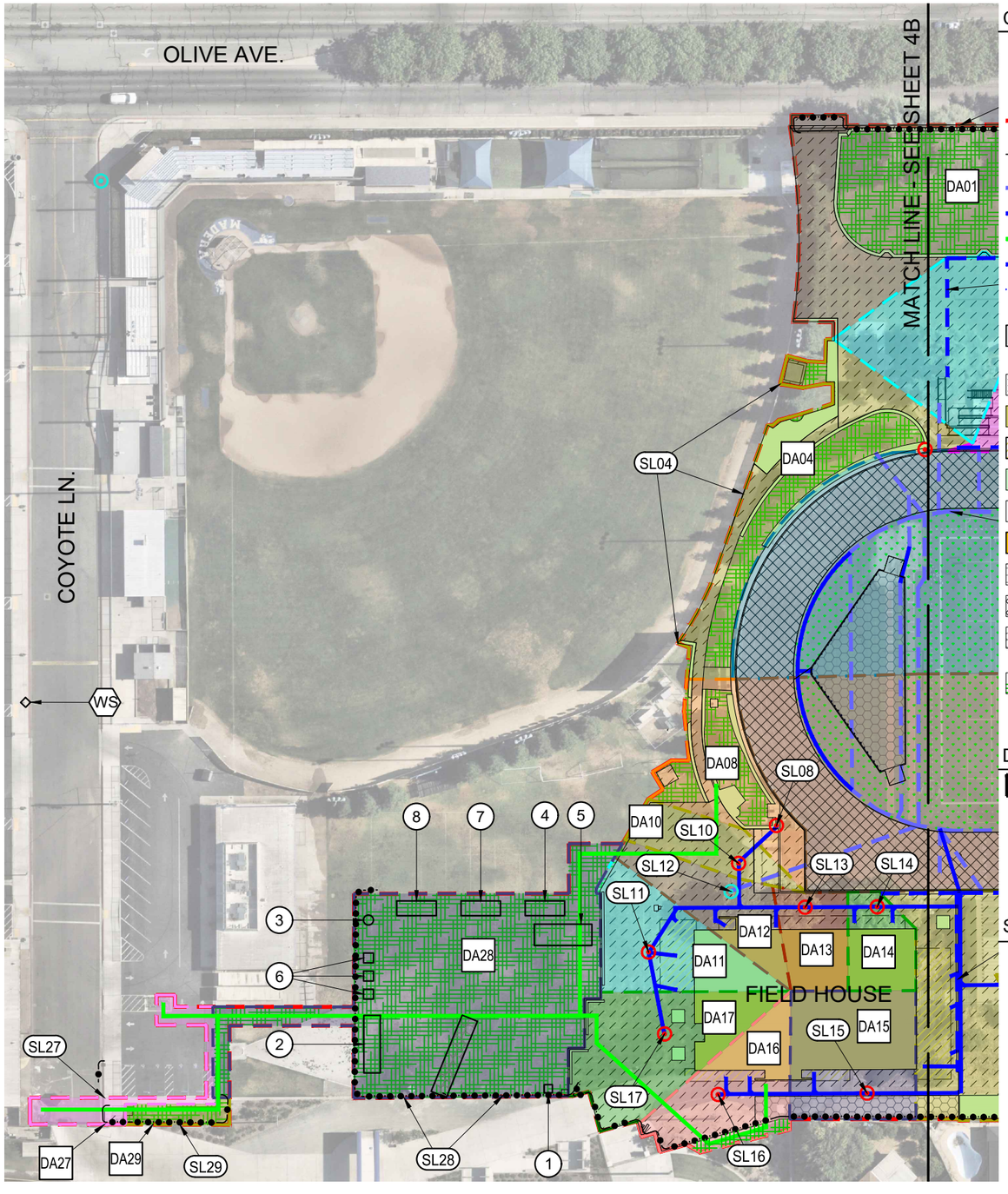
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STORM WATER POLLUTION PREVENTION PLAN
MADERA HIGH SCHOOL STADIUM
CONSTRUCTION SITE MAP

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SHEET NO. 9
OF 11 SHEETS

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CONSTRUCTION SYMBOL LEGEND:

- PROTECT PROPOSED DRAIN INLET PER CASQA SE-10
- PROTECT EXISTING DRAIN INLET PER CASQA SE-10
- SURFACE FLOW DIRECTION
- PROJECT BOUNDARY
- LOCATION OF LINEAR SEDIMENT CONTROL BMPS. REFER TO NOTE 1 AND 2. EXACT LOCATIONS OF THE SEDIMENT CONTROL BMP'S SHALL BE COORDINATED WITH THE QSP PRIOR TO INSTALLATION OR REMOVAL.
- EXISTING STORM DRAIN PIPELINE
- PROPOSED STORM DRAIN PIPELINE
- PROPOSED GAS PIPELINE/WATER PIPELINE
- PROPOSED TRENCH STORM DRAIN
- PROPOSED PERFORATED STORM DRAIN PIPELINE
- PROPOSED ASPHALT CONCRETE (NON-ROOF IMPERVIOUS AREAS)
- PROPOSED CONCRETE (NON-ROOF IMPERVIOUS AREAS)
- PROPOSED BUILDING (ROOF IMPERVIOUS AREA)
- PROPOSED BUILDING OVERHANG (IMPERVIOUS AREAS)
- PROPOSED LANDSCAPING (PERVIOUS AREAS)
- AREAS OF SYNTHETIC TURF (NON-ROOF IMPERVIOUS AREAS)
- PROPOSED SAND PIT (NON-ROOF IMPERVIOUS AREAS)
- PROPOSED GRAVEL (PERVIOUS AREA)
- PROPOSED RUBBER TRACK SURFACE (NON-ROOF IMPERVIOUS AREAS)
- LOCATION OF STABILIZED CONSTRUCTION ENTRANCE/EXIT PER CASQA TC-1
- AREAS OF NON-BUILT LAND DISTURBANCE FOR FINAL STABILIZATION. DISTURBED SOIL AREAS NOT PLANNED FOR CONSTRUCTION ACTIVITIES OVER THE NEXT 14 DAYS SHALL BE STABILIZED BY USE OF EROSION CONTROL BMPS. SEE NOTE 3 ON FIGURE 1B.

DRAINAGE AREA/NON-VISIBLE SAMPLING SYMBOL LEGEND:

- DRAINAGE AREA "X" BOUNDARY
- ## — DRAINAGE AREA NUMBER
- SL## — QSD IDENTIFIED DISCHARGE AND SAMPLING LOCATION. THE QSP SHALL FIELD VERIFY THE EXACT LOCATION OF DISCHARGE FOR A REPRESENTATIVE STORMWATER SAMPLE FOR NON-VISIBLE POLLUTANT SAMPLING.

STAGING AREA ITEMS (REFER TO FIGURE 4A AND 4B)

N

0 20 40 80 120 160
SCALE IN FEET

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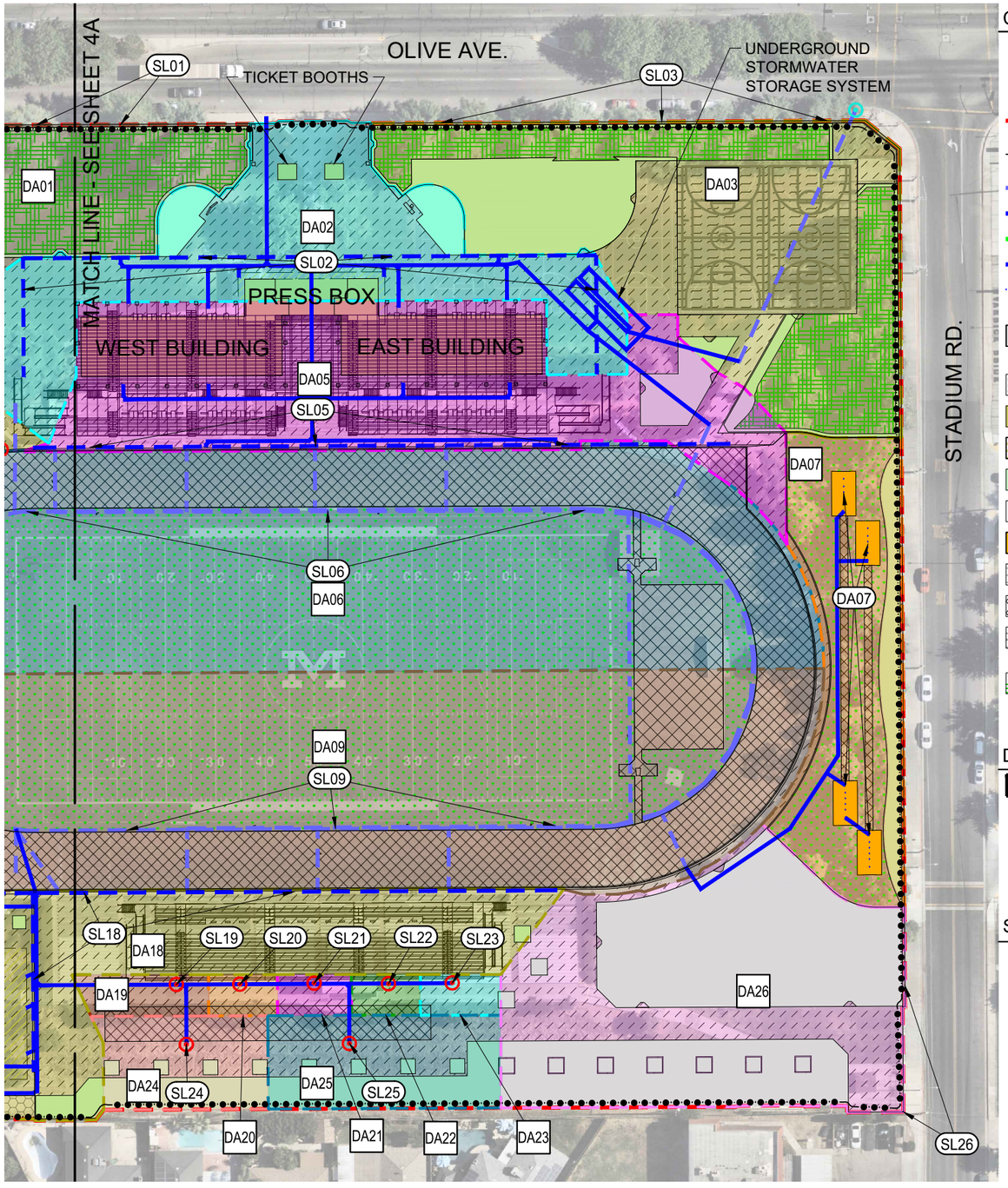
MADERA UNIFIED SCHOOL DISTRICT

STORM WATER POLLUTION PREVENTION PLAN
MADERA HIGH SCHOOL STADIUM
DRAINAGE AREA AND SAMPLING SITE MAP - CONSTRUCTION

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DATE 02-06-25
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SHEET NO. 10
OF 11 SHEETS

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CONSTRUCTION SYMBOL LEGEND:

- PROTECT PROPOSED DRAIN INLET PER CASQA SE-10
- PROTECT EXISTING DRAIN INLET PER CASQA SE-10
- SURFACE FLOW DIRECTION
- PROJECT BOUNDARY
- LOCATION OF LINEAR SEDIMENT CONTROL BMPS. REFER TO NOTE 1 AND 2. EXACT LOCATIONS OF THE SEDIMENT CONTROL BMP'S SHALL BE COORDINATED WITH THE QSP PRIOR TO INSTALLATION OR REMOVAL.
- EXISTING STORM DRAIN PIPELINE
- PROPOSED STORM DRAIN PIPELINE
- PROPOSED GAS PIPELINE/WATER PIPELINE
- PROPOSED TRENCH STORM DRAIN
- PROPOSED PERFORATED STORM DRAIN PIPELINE
- PROPOSED ASPHALT CONCRETE (NON-ROOF IMPERVIOUS AREAS)
- PROPOSED CONCRETE (NON-ROOF IMPERVIOUS AREAS)
- PROPOSED BUILDING (ROOF IMPERVIOUS AREA)
- PROPOSED BUILDING OVERHANG (IMPERVIOUS AREAS)
- PROPOSED LANDSCAPING (PERVIOUS AREAS)
- AREAS OF SYNTHETIC TURF (NON-ROOF IMPERVIOUS AREAS)
- PROPOSED SAND PIT (NON-ROOF IMPERVIOUS AREAS)
- PROPOSED GRAVEL (PERVIOUS AREA)
- PROPOSED RUBBER TRACK SURFACE (NON-ROOF IMPERVIOUS AREAS)
- LOCATION OF STABILIZED CONSTRUCTION ENTRANCE/EXIT PER CASQA TC-1
- AREAS OF NON-BUILT LAND DISTURBANCE FOR FINAL STABILIZATION. DISTURBED SOIL AREAS NOT PLANNED FOR CONSTRUCTION ACTIVITIES OVER THE NEXT 14 DAYS SHALL BE STABILIZED BY USE OF EROSION CONTROL BMPS. SEE NOTE 3 ON FIGURE 1B.

DRAINAGE AREA/NON-VISIBLE SAMPLING SYMBOL LEGEND:

- DRAINAGE AREA "X" BOUNDARY
- ## — DRAINAGE AREA NUMBER
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STAGING AREA ITEMS (REFER TO FIGURE 4A AND 4B)

N

0 20 40 80 120 160
SCALE IN FEET

SITE LOCATION: 800 - 820 W. OLIVE AVE. | MADERA, CA 93637 | 36.952085, -120.066450 | FIGURE: 4B.i

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CONSULTANT
Blair, Church & Flynn Consulting Engineers
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MADERA UNIFIED SCHOOL DISTRICT

STORM WATER POLLUTION PREVENTION PLAN
MADERA HIGH SCHOOL STADIUM
DRAINAGE AREA AND SAMPLING SITE MAP - CONSTRUCTION

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OF 11 SHEETS

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Appendix B: Permit Registration Documents

Permit Registration Documents included in this Appendix:

Location in SWPPP	**Permit Registration Document** (in addition to a copy of the SWPPP)
Appendix A	Site Maps and Drawings
Appendix B	Notice of Intent
Appendix B	Risk Level Determination
N/A	Certification (LRP Certification is provided electronically with SMARTS PRD submittal)
Appendix Q	Post-Construction Requirements, if applicable
Appendix L	Post-Construction Compliance Demonstration
Appendix B	Copy of Annual Fee Receipt
N/A	ATS Design Documents, if applicable
N/A	Passive Treatment Design Documents, if applicable

GENERAL PERMIT TO DISCHARGE STORM WATER
ASSOCIATED WITH CONSTRUCTION ACTIVITY
(WQ ORDER NO. 2022-0057-DWQ)

WDID: 5F20C408034
Risk Level: Level1

Initial Application Questions

Type: Traditional
Sub-type:
Is the applicant an eligible Discharger as defined in Attachment B (Glossary) for this project? Y
Is the site a part of larger common plan of development? N
Name of the Common Plan of Development:
What is the Total Site Size of the Common Plan of Development?
Is the Construction project separated into phases? N

Owner Information

Owner Name: Madera Unified School District
Street Address: 1205 S Madera Avenue
Address Line 2:
City, State, Zip: Madera, CA, 93637
Title: Director of Facilities Planning and Construction Management
Contact Name: Rosalind Cox
Phone Number: 559-675-4548
Email Address: rosalindcox@maderausd.org

On-Site Contact Information

Company Name: Madera Unified School District
Street Address: 1205 S. Madera Ave.
Address Line 2:
City, State, Zip: Madera, CA, 93637
Contact Name: Rosalind Cox
Title: Director of Facilities Planning and Construction Management
Phone Number: 559-675-4548
Email Address: rosalindcox@maderausd.org

Site Information

Site Name: Madera High School Stadium
Street Address: SWC of W Olive Ave and Stadium Rd
Address Line 2:
City, State, Zip: Madera, CA, 93637
Latitude: 36.952085
Longitude: -120.06645
Total Site Size: 9.97
Total Planned Disturbed Acreage: 9.55
Disturbed Area Remaining: 9.55
Construction Start Date: 2025-06-01
Complete Grading Date:
Final Stabilization Date: 2026-12-31
Is the site a part of a larger common plan of development? No
Name of Common Plan of Development:
Total Site Size of Common Plan of Development:
Type of Construction: Traditional

Additional Site Information

County: Madera
Regional Board: Region 5F - Fresno
Regional Water Board Email: r5f_stormwater@waterboards.ca.gov
Receiving Water: Colony Ditch
401/404: N
Dewatering: Y
Active Treatment System: N

Passive Treatment Technologies: N
Areas of Special Biological Significance: N

Risk

R-Factor: 34.24
K-Factor: 0.32
LS-Factor: 0.2
Receiving Water Risk: Low
Combined Risk: Level1

TMDL Requirements

There are no TMDL parameters indicated at this time.

Post Construction

Is the project located within a permitted Phase I or Phase II Municipal Separate Storm Sewer System (MS4) area?
Yes
Will the project be subdivided into smaller sub-areas or drainage management areas?

QSD Information

Primary QSD: Gabriel Ledesma
Other QSD(s): Michael Gennaro

Attachments

Attachment ID	File Name	File Hash	File Size	Date Attached	Attachment Type
3930464	NOI_COR.zip	6ff8475bdf3189e603087fbede562876fc6178d85a8d120429a3f30ebaf26b5	77155877		Application COR Zip
3930408	Madera HS Stadium - SWPPP_Preliminary	4751f1fe413a5f686cc59dc45f6f54896adf68a39b04fdf43b87d2ee8dd1021	47770380		SWPPP
3856256	City of Madera - Post-Construction Requirements	e7340c242e952adbc9e6c2c2587fa4d26f3315ebec9bfef23b80b88d4f71a	141653		MS4 Post Construction Reqts
3856255	Madera HS Stadium - SWPPP Figures	5b62905bf147df28f814d3bc6a1a118cb310f92545abc24d4c5d407468b653e0	11894620		Facility/Site Map
3856254	Madera HS Stadium - Drainage Mitigation Study and City Approval	8db55cb32e15bfd26b2b6be7bc8ee077bbf729f99817177ee0f388870	19890030		Post Construction

Certification

Name: Rosalind Cox
Title: Director of Facilities Planning and Construction Management
Date: 2025-08-05 11:36:03.675

ction - NOI **Application ID:** 581523

Sediment Risk | Receiving Water Risk | Combined Risk

1. SEDIMENT RISK FACTOR CALCULATION

Instructions: Enter R, K, and LS factor values. System will calculate watershed erosion estimates and segment se

A) R Factor Value: ***(What's this?)** 34.24 Erc

Populate K and LS using GIS layer data

B) K Factor Value: (weighted average, by area, for all site soils) ***(What's this?)** 0.43

C) LS Factor: (weighted average, by area, for all slopes) ***(What's this?)** 0.52876914

Watershed Erosion Estimate (=R*K*LS) in tons/acre 7.785173802048

Project Sediment Risk Factor: **(What's this?)** **Low**

ction - NOI **Application ID:** 581523 **Status:** Not Submitte

Sediment Risk | Receiving Water Risk | Combined Risk

2. RECEIVING WATER RISK FACTOR CALCULATION

Statewide Map of High Receiving Water Risk Watersheds

A. Watershed Characteristics

A.1.(a) Does the disturbed area discharge directly or indirectly to a 303(d) listed waterbody impaired by sediment?

OR

A.1.(b) Is the disturbed area located within a sub-watershed draining to a 303(d) listed waterbody impaired by sediment?

OR

A.2. Is the disturbed area located within a planning watershed draining to a waterbody with designated beneficial uses of COLD, SPAWN AND MIGRATORY?

Receiving Water Risk (answer to above questions): No Populate Receiving Water Risk

Project Receiving Water Risk Factor: **Low**

tion - NOI **Application ID:** 581523 **Status:** Not Submi

Sediment Risk | Receiving Water Risk | Combined Risk

3. COMBINED RISK LEVEL MATRIX

		Sediment Risk: Low	Sediment Risk: Medium	Sediment Risk: High
Receiving Water Risk	Low	Level1	Level2	
	High	Level2		Level3

Project Sediment Risk: Low

Project Receiving Water Risk: Low

Project Combined Risk: **Level1**

An official website of the United States government

Rainfall Erosivity Factor Calculator for Small Construction

Introduction

EPA's stormwater regulations allow NPDES permitting authorities to waive NPDES permitting requirements for stormwater discharges from small construction sites if:

- the construction site disturbs less than five acres, and
- the rainfall erosivity factor ("R" in the revised universal soil loss equation, or RUSLE) value is less than five during the period of construction activity.

If your small construction project is located in an area where EPA is the permitting authority and your R factor is less than five, you qualify for a low erosivity waiver (LEW) from NPDES stormwater permitting. If your small construction project does not qualify for a waiver, then NPDES stormwater permit coverage is required. Follow the steps below to calculate your R-Factor.

LEW certifications are submitted through the NPDES eReporting Tool or "CGP-NeT". Several states that are authorized to implement the NPDES permitting program also accept LEWs. Check with your state NPDES permitting authority for more information.

- Submit your LEW through EPA's eReporting Tool <https://www.epa.gov/npdes/submitting-notice-intent-noi-notice-termination-not-or-low-erosivity-waiver-lew-under>

- List of states, Indian country, and territories where EPA is the permitting authority (pdf) <https://www.epa.gov/system/files/documents/2022-01/2022-cgp-final-appendix-b-areas-of-permit-cover.pdf>
- Construction Rainfall Erosivity Waiver Fact Sheet <https://www.epa.gov/npdes/construction-rainfall-erosivity-waiver-fact-sheet>
- Small Construction Waivers and Instructions (pdf) <https://www.epa.gov/system/files/documents/2022-01/2022-cgp-final-appendix-c-waivers.pdf>

The R-factor calculation can also be integrated directly into custom applications using the R-Factor web service <https://epa.gov/api-docs/>.

Steps to Calculate an R Factor for your Small Construction Project

1 Select the estimated start and end dates of construction by clicking the calendar icons below and using the dropdown calendar. The period of construction activity begins at initial earth disturbance and ends with final stabilization.

Start Date:

06/01/2025

End Date:

05/31/2026

2 Locate your small construction project by entering the address in the search box or by clicking on the map.

Location:

36.952085, -120.066450

Search

+

—



3 Click the "Calculate R Factor" button below.

Calculate R Factor

Facility Information

Start Date: 06/01/2025	**Latitude:** 36.9521
End Date: 05/31/2026	**Longitude:** -120.0665

Calculation Results

Rainfall erosivity factor (R Factor) = **24.93**

A rainfall erosivity factor of 5.0 or greater has been calculated for your site's period of construction.

You do NOT qualify for a waiver from NPDES permitting requirements and must seek Construction General Permit (CGP) coverage. If you are located in an area where EPA is the permitting authority (pdf)
<https://www.epa.gov/system/files/documents/2022-01/2022-cgp-final-appendix-b-areas-of-permit-

An official website of the United States government

Rainfall Erosivity Factor Calculator for Small Construction

Introduction

EPA's stormwater regulations allow NPDES permitting authorities to waive NPDES permitting requirements for stormwater discharges from small construction sites if:

- the construction site disturbs less than five acres, and
- the rainfall erosivity factor ("R" in the revised universal soil loss equation, or RUSLE) value is less than five during the period of construction activity.

If your small construction project is located in an area where EPA is the permitting authority and your R factor is less than five, you qualify for a low erosivity waiver (LEW) from NPDES stormwater permitting. If your small construction project does not qualify for a waiver, then NPDES stormwater permit coverage is required. Follow the steps below to calculate your R-Factor.

LEW certifications are submitted through the NPDES eReporting Tool or "CGP-NeT". Several states that are authorized to implement the NPDES permitting program also accept LEWs. Check with your state NPDES permitting authority for more information.

- Submit your LEW through EPA's eReporting Tool <https://www.epa.gov/npdes/submitting-notice-intent-noi-notice-termination-not-or-low-erosivity-waiver-lew-under>

- List of states, Indian country, and territories where EPA is the permitting authority (pdf) <https://www.epa.gov/system/files/documents/2022-01/2022-cgp-final-appendix-b-areas-of-permit-cover.pdf>
- Construction Rainfall Erosivity Waiver Fact Sheet <https://www.epa.gov/npdes/construction-rainfall-erosivity-waiver-fact-sheet>
- Small Construction Waivers and Instructions (pdf) <https://www.epa.gov/system/files/documents/2022-01/2022-cgp-final-appendix-c-waivers.pdf>

The R-factor calculation can also be integrated directly into custom applications using the R-Factor web service <https://epa.gov/api-docs/>.

Steps to Calculate an R Factor for your Small Construction Project

1 Select the estimated start and end dates of construction by clicking the calendar icons below and using the dropdown calendar. The period of construction activity begins at initial earth disturbance and ends with final stabilization.

Start Date:

05/31/2026

End Date:

12/31/2026

2 Locate your small construction project by entering the address in the search box or by clicking on the map.

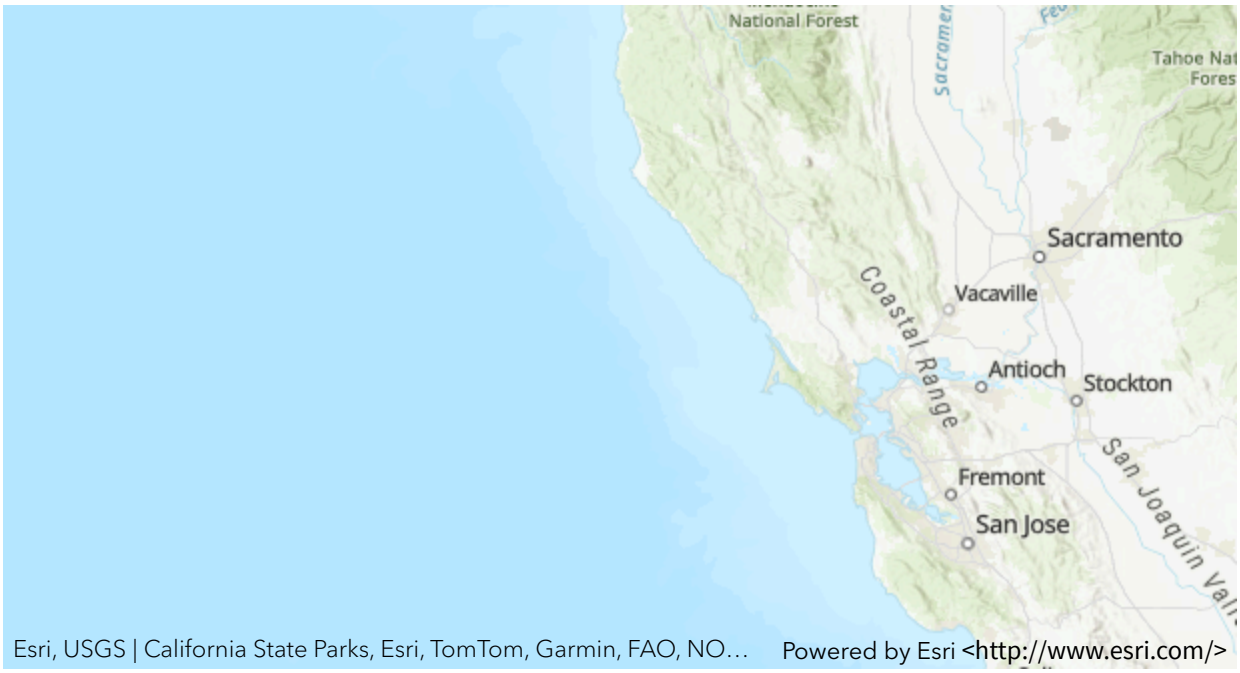
Location:

36.952085, -120.066450

Search

+

—



3 Click the "Calculate R Factor" button below.

Calculate R Factor

Facility Information

Start Date: 05/31/2026	**Latitude:** 36.9521
End Date: 12/31/2026	**Longitude:** -120.0665

Calculation Results

Rainfall erosivity factor (R Factor) = **9.31**

A rainfall erosivity factor of 5.0 or greater has been calculated for your site's period of construction.

You do NOT qualify for a waiver from NPDES permitting requirements and must seek Construction General Permit (CGP) coverage. If you are located in an area where EPA is the permitting authority (pdf)
<https://www.epa.gov/system/files/documents/2022-01/2022-cgp-final-appendix-b-areas-of-permit-

Appendix C: SWPPP Amendment QSD Certifications

SWPPP Amendment No. _____

Project Name: Madera High School Stadium

Project Number: **5F20C408034**

Qualified SWPPP Developer's Certification of the Stormwater Pollution Prevention Plan Amendment

"This Stormwater Pollution Prevention Plan and its appendices were prepared under my direction to meet the requirements of the 2022 CGP (SWRCB Order No. 2022-0057-DWQ). I certify that I am a Qualified SWPPP Developer in good standing as of the date signed below."

QSD's Signature	Date
QSD Name	QSD Certificate Number
Title and Affiliation	Telephone
Address	Email

Appendix D: Submitted Changes of Information

Log of Updated PRDs

The 2022 CGP allows for the reduction or increase of the total acreage when a portion of the project is complete and/or conditions for termination of coverage have been met; when ownership of a portion of the project is purchased by a different entity; or when new acreage is added to the project.

A Change of Information (COI) shall be filed electronically within the timeframe shown in the table below. The SWPPP shall be modified appropriately, with revisions and amendments recorded in the SWPPP Amendment Log at the front of the SWPPP. COIs submitted electronically via SMARTS can be found in this Appendix.

Reason for Filing COI	**Timeline for Filing COI**
Reduction or increase in total disturbed area	Within 30 days of the reduction or increase
Updating site specific BMPs	Within 14 days of design change
Change construction start or end date	At least 14 days prior to the date to be changed
Post-construction plans updated or approved by the municipal stormwater permittee	Within 14 days of approval

---

This appendix includes all of the following updated PRDs (check all that apply):

☐ Change of Information;

☐ Revised Site Map;

☐ Revised Risk Assessment;

☐ New landowner's information (name, address, phone number, email address); and

☐ New signed certification statement.

Signature of [Authorized Representative of] Legally Responsible Person or Duly Authorized Representative	Date
Name of [Authorized Representative of] Legally Responsible Person or Duly Authorized Representative	Telephone Number

Appendix E: Construction Schedule

Appendix F: Construction Activities, Materials Used, and Associated Pollutants

Table F.a POLLUTANTS ASSOCIATED WITH CONSTRUCTION ACTIVITIES

General Work Activity/ Products With Potential Stormwater Pollutants	Specific Work Activity/Products With Potential Stormwater Pollutants	Pollutant Categories
Adhesives	• Adhesives, glues, resins, epoxy synthetics, PVC cement • Caulks, sealers, putty, sealing agents and • Coal tars (naphtha, pitch)	Oil and Grease, Synthetic Organics
Asphalt paving/curbs	• Hot and cold mix asphalt	Oil and Grease
Cleaners	• Polishes (metal, ceramic, tile) • Etching agents • Cleaners, ammonia, lye, caustic sodas, bleaching agents and chromate salts	Metals, Synthetic Organics
Concrete / Masonry	• Cement and brick dust • Colored chalks • Concrete curing compounds • Glazing compounds • Surfaces cleaners • Saw cut slurries • Tile cutting	Metals, Synthetic Organics
Drywall	• Saw-cutting drywall	Metals
Framing/Carpentry	• Sawdust, particle board dust, and treated woods • Saw cut slurries	Metals, Synthetic Organics
Heating, Ventilation, Air Conditioning	• Demolition or construction of air condition and heating systems	Metals, Synthetic Organics
Insulation	• Demolition or construction involving insulation, venting systems	Metals, Synthetic Organics
Liquid waste	• Wash waters • Irrigation line testing/flushing	Metals, Synthetic Organics
Painting	• Paint thinners, acetone, methyl ethyl ketone, stripper paints, lacquers, varnish, enamels, turpentine, gum spirit, solvents, dyes, stripping pigments and sanding	Metals, Synthetic Organics
Planting / Vegetation Management	• Vegetation control (pesticides/herbicides) • Planting • Plant maintenance • Vegetation removal	Nutrients, Metals, Synthetic Organics
Plumbing	• Solder (lead, tin), flux (zinc chloride), pipe fitting • Galvanized metal in nails, fences, and electric wiring	Metals, Synthetic Organics

Table F.a POLLUTANTS ASSOCIATED WITH CONSTRUCTION ACTIVITIES

General Work Activity/ Products With Potential Stormwater Pollutants	Specific Work Activity/Products With Potential Stormwater Pollutants	Pollutant Categories
Removal of existing structures	• Demolition of asphalt, concrete, masonry, framing, roofing, metal structures.	Metals, Oil and Grease, Synthetic Organics
Roofing	• Flashing • Saw cut slurries (tile cutting) • Shingle scrap and debris	Metals, Oil and Grease, Synthetic Organics
Sanitary waste	• Portable toilets • Disturbance of existing sewer lines.	Nutrients
Soil preparation/amendments	• Use of soil additives/amendments	Nutrients
Solid waste	• Litter, trash and debris • Vegetation	Gross Pollutants
Utility line testing and flushing	• Hydrostatic test water • Pipe flushing	Synthetic Organics
Vehicle and equipment use	• Equipment operation • Equipment maintenance • Equipment washing • Equipment fueling	Oil and Grease
Building Demolition	• Demolition debris built between 1950-1980 • Demolition debris from buildings with lead paint	Lead PCBs
1 Synthetic Organics are defined in Table 1.2 of the CASQA Stormwater BMP Handbook: Construction as adhesives, cleaners, sealants, solvents, etc. These are generally categorized as VOCs or SVOCs.		

Table F.1 Pollutant Source Assessment Form

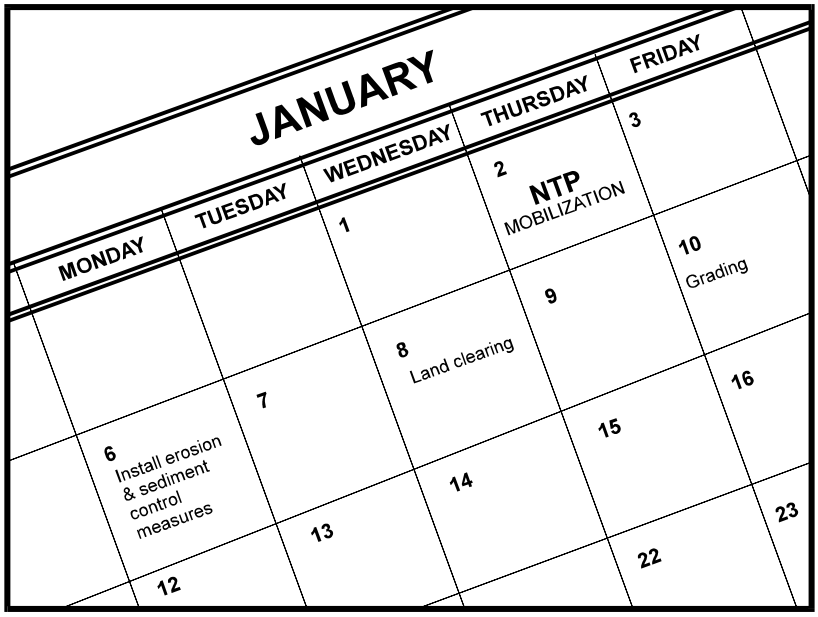
Phase	Activity	Associated Materials or Pollutants	Pollutant Category (1)
Demolition and Pre-Development Site Preparation Phase	Geotechnical investigations	Sediment	TSS
	Building Demolition	Sediment, trash	Sediment, gross pollutant
	Vehicle Equipment Operation and Storage	Fuel, Oil, Grease	Oil & grease
	Vehicle Equipment Operation and Storage	Freon, battery acid	Synthetic organics, metals
	Concrete cutting/grinding	sediment, concrete dust and slurry	Sediment, pH, metals
	Vegetation clearing and storage	Stockpiled vegetation	Nutrients
	General Operations	Trash, Sanitary waste	Gross pollutants, nutrients, bacteria, viruses
Grading and Land Development	Grading	Sediment	Sediment
	Vegetation clearing and storage	Stockpiled vegetation	Nutrients
	Vehicle Equipment Operation and Storage	Fuel, oil, Grease	Oil & grease
	Vehicle Equipment Operation and Storage	Freon, battery acid	Synthetic organics, metals
	Vegetation clearing and storage	Stockpiled vegetation	Nutrients
	General Operations	Trash, Sanitary waste	Gross pollutants, nutrients, bacteria, viruses
Streets and Utilities Phase	Material Delivery	Varies based on materials	Varies based on materials
	Trenching and Soil Management	Sediment	Sediment
	Install pipelines, laterals, conduits	Joint and form lubricants, PVC shards/dust	Synthetic organics, gross Pollutants
	Adhesives	Adhesives, flues, resins, epoxy synthetic, PVC cement Caulks, sealers, putty, sealing agents.	Oil & grease, synthetic organics
	Asphalt Concrete Paving Operations	Sediment, bituminous chemicals	Sediment, oil & grease
	Concrete Paving and Operations	Curing Concrete, Concrete washout waste	Sediment, metals, pH
	Install emulsion sealer	Hydrocarbons	Oil & grease
	Paint pavement striping and markings	Paint	Synthetic organics, nutrients
	Vegetation clearing and storage	Stockpiled vegetation	Nutrients
	Vehicle Equipment Operation and Storage	Fuel, oil, Grease	Oil & grease
	Vehicle Equipment Operation and Storage	Freon, battery acid	Synthetic organics, metals

	General Operations	Trash, Sanitary waste	Gross pollutants, nutrients, bacteria, viruses
	Utility line flushing	Chlorinated water	Synthetic organics
Vertical Construction Phase	Welding	Solder (lead, tin), flux (zinc chloride), pipe fitting	Metals, synthetic organics
	Framing/Carpentry	Sawdust, particle board dust, and treated woods	Metals, synthetic organics
	Drywall	Saw-cutting drywall	Metals
	Heating, ventilation, Air conditioning	Construction of HVAC systems	Metals, synthetic organics, oil and grease
	Insulation Installation	Insulation materials	Metals, synthetic organics
	Painting	Paint thinners, acetone, methyl ethyl ketone, stripper paints, lacquers, varnish, enamels, turpentine, gum spirit, solvents, dyes, stripping pigments and sanding	Metals, Synthetic Organics
	Pools/fountains	Chlorinated water	Synthetic organics
	Roofing	Flashing, saw cut slurries (tiles), Shingle scrap and debris, roof sealants	Metals, oil and grease, synthetic organics
	Plumbing	Solder (lead, tin), flux (zinc chloride),	Metals
	Vehicle Equipment Operation and Storage	Fuel, oil, Grease	Oil & grease
	Vehicle Equipment Operation and Storage	Freon, battery acid	Synthetic organics, metals
	General Operations	Trash, Sanitary waste	Gross pollutants, nutrients, bacteria, viruses
	Utility line flushing	Chlorinated water	Synthetic organics
Final Landscaping and Site Stabilization Phase	Planting / Vegetation Management	Vegetation control (pesticides/herbicides), planting, plant maintenance, vegetation removal	Nutrients, Metals, Synthetic Organics
	Soil preparation/amendments	Use of compost, chemical fertilizer, pH soil amendments	Nutrients, pH
	Vehicle Equipment Operation and Storage	Fuel, oil, Grease	Oil & grease
	Vehicle Equipment Operation and Storage	Freon, battery acid	Synthetic organics, metals
	General Operations	Trash, Sanitary waste	Gross pollutants, nutrients, bacteria, viruses

(1) Categories per CASQA BMP Handbook (i.e., Sediment, Nutrients, Bacteria and Viruses, Oil and Grease, Metals, Synthetic Organics, Pesticides, Gross Pollutants, and Vector Production).

Appendix G: CASQA Stormwater BMP Handbook: Construction Fact Sheets

Scheduling EC-1



Description and Purpose

Scheduling is the development of a written plan that includes sequencing of construction activities and the implementation of BMPs such as erosion control and sediment control while taking local climate (rainfall, wind, etc.) into consideration. The purpose is to reduce the amount and duration of soil exposed to erosion by wind, rain, runoff, and vehicle tracking, and to perform the construction activities and control practices in accordance with the planned schedule.

Suitable Applications

Proper sequencing of construction activities to reduce erosion potential should be incorporated into the schedule of every construction project especially during rainy season. Use of other, more costly yet less effective, erosion and sediment control BMPs may often be reduced through proper construction sequencing.

Limitations

- Environmental constraints such as nesting season prohibitions reduce the full capabilities of this BMP.

Implementation

- Avoid rainy periods. Schedule major grading operations during dry months when practical. Allow enough time before rainfall begins to stabilize the soil with vegetation or physical means or to install sediment trapping devices.
- Plan the project and develop a schedule showing each phase of construction. Clearly show how the rainy season relates

Categories

EC	Erosion Control	☑
SE	Sediment Control	☒
TC	Tracking Control	☒
WE	Wind Erosion Control	☒
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

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CALIFORNIA STORMWATER QUALITY ASSOCIATION®

to soil disturbing and re-stabilization activities. Incorporate the construction schedule into the SWPPP.

- Include on the schedule, details on the rainy season implementation and deployment of:
  - Erosion control BMPs
  - Sediment control BMPs
  - Tracking control BMPs
  - Wind erosion control BMPs
  - Non-stormwater BMPs
  - Waste management and materials pollution control BMPs
- Include dates for activities that may require non-stormwater discharges such as dewatering, sawcutting, grinding, drilling, boring, crushing, blasting, painting, hydro-demolition, mortar mixing, pavement cleaning, etc.
- Work out the sequencing and timetable for the start and completion of each item such as site clearing and grubbing, grading, excavation, paving, foundation pouring utilities installation, etc., to minimize the active construction area during the rainy season.
  - Sequence trenching activities so that most open portions are closed before new trenching begins.
  - Incorporate staged seeding and re-vegetation of graded slopes as work progresses.
  - Schedule establishment of permanent vegetation during appropriate planting time for specified vegetation.
- Non-active areas should be stabilized as soon as practical after the cessation of soil disturbing activities or one day prior to the onset of precipitation.
- Monitor the weather forecast for rainfall.
- When rainfall is predicted, adjust the construction schedule to allow the implementation of soil stabilization and sediment treatment controls on all disturbed areas prior to the onset of rain.
- Be prepared year-round to deploy erosion control and sediment control BMPs. Erosion may be caused during dry seasons by un-seasonal rainfall, wind, and vehicle tracking. Keep the site stabilized year-round and retain and maintain rainy season sediment trapping devices in operational condition.
- Apply permanent erosion control to areas deemed substantially complete during the project's defined seeding window.
- Avoid soil disturbance during periods with high wind velocities.

Costs

Construction scheduling to reduce erosion may increase other construction costs due to reduced economies of scale in performing site grading. The cost effectiveness of scheduling techniques

should be compared with the other less effective erosion and sedimentation controls to achieve a cost-effective balance.

Inspection and Maintenance

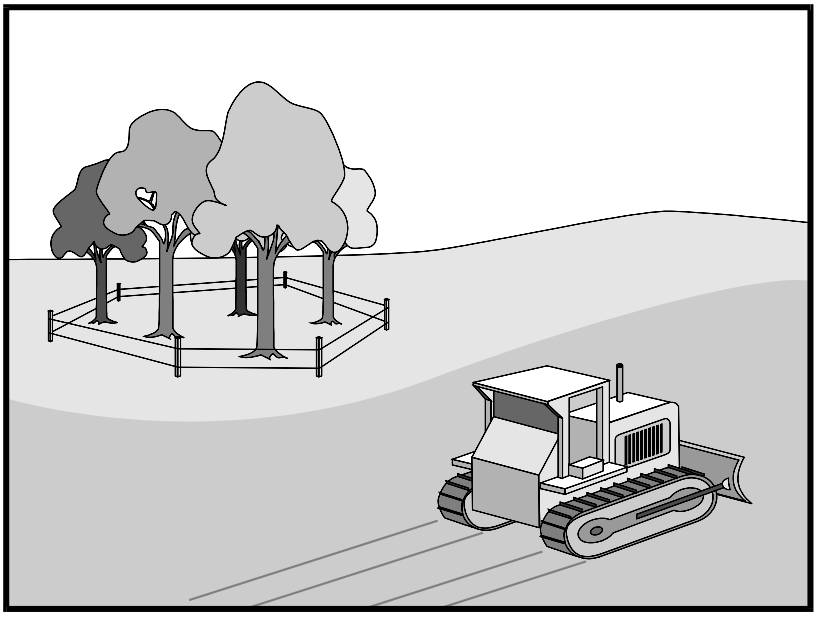
- Verify that work is progressing in accordance with the schedule. If progress deviates, take corrective actions.
- Amend the schedule when changes are warranted.
- Amend the schedule prior to the rainy season to show updated information on the deployment and implementation of construction site BMPs.

References

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities Developing Pollution Prevention Plans and Best Management Practices (EPA 832-R-92-005), U.S. Environmental Protection Agency, Office of Water, September 1992.

Preservation of Existing Vegetation EC-2



Categories

EC	Erosion Control	☑
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

Description and Purpose

Carefully planned preservation of existing vegetation minimizes the potential of removing or injuring existing trees, vines, shrubs, and grasses that protect soil from erosion.

Suitable Applications

Preservation of existing vegetation is suitable for use on most projects. Large project sites often provide the greatest opportunity for use of this BMP. Suitable applications include the following:

- Areas within the site where no construction activity occurs or occurs at a later date. This BMP is especially suitable to multi year projects where grading can be phased.
- Areas where natural vegetation exists and is designated for preservation. Such areas often include steep slopes, watercourse, and building sites in wooded areas.
- Areas where local, state, and federal government require preservation, such as vernal pools, wetlands, marshes, certain oak trees, etc. These areas are usually designated on the plans, or in the specifications, permits, or environmental documents.
- Where vegetation designated for ultimate removal can be temporarily preserved and be utilized for erosion control and sediment control.
- Protecting existing vegetation buffers and swales.

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Preservation of Existing Vegetation EC-2

Limitations

- Requires forward planning by the owner/developer, contractor, and design staff.
- Limited opportunities for use when project plans do not incorporate existing vegetation into the site design.
- For sites with diverse topography, it is often difficult and expensive to save existing trees while grading the site satisfactory for the planned development.

Implementation

The best way to prevent erosion is to not disturb the land. In order to reduce the impacts of new development and redevelopment, projects may be designed to avoid disturbing land in sensitive areas of the site (e.g., natural watercourses, steep slopes), and to incorporate unique or desirable existing vegetation into the site's landscaping plan. Clearly marking and leaving a buffer area around these unique areas during construction will help to preserve these areas as well as take advantage of natural erosion prevention and sediment trapping.

Existing vegetation to be preserved on the site must be protected from mechanical and other injury while the land is being developed. The purpose of protecting existing vegetation is to ensure the survival of desirable vegetation for shade, beautification, and erosion control. Mature vegetation has extensive root systems that help to hold soil in place, thus reducing erosion. In addition, vegetation helps keep soil from drying rapidly and becoming susceptible to erosion. To effectively save existing vegetation, no disturbances of any kind should be allowed within a defined area around the vegetation. For trees, no construction activity should occur within the drip line of the tree.

Timing

- Provide for preservation of existing vegetation prior to the commencement of clearing and grubbing operations or other soil disturbing activities in areas where no construction activity is planned or will occur at a later date.

Design and Layout

- Mark areas to be preserved with temporary fencing. Include sufficient setback to protect roots.
  - Orange colored plastic mesh fencing works well.
  - Use appropriate fence posts and adequate post spacing and depth to completely support the fence in an upright position.
- Locate temporary roadways, stockpiles, and layout areas to avoid stands of trees, shrubs, and grass.
- Consider the impact of grade changes to existing vegetation and the root zone.
- Maintain existing irrigation systems where feasible. Temporary irrigation may be required.
- Instruct employees and subcontractors to honor protective devices. Prohibit heavy equipment, vehicular traffic, or storage of construction materials within the protected area.

- Consider pruning or mowing vegetation instead of removing it to allow for regrowth.
- If possible, retain vegetation buffer around the site and adjacent waterways.

Costs

There is little cost associated with preserving existing vegetation if properly planned during the project design, and these costs may be offset by aesthetic benefits that enhance property values. During construction, the cost for preserving existing vegetation will likely be less than the cost of applying erosion and sediment controls to the disturbed area. Replacing vegetation inadvertently destroyed during construction can be extremely expensive, sometimes in excess of $10,000 per tree.

Inspection and Maintenance

During construction, the limits of disturbance should remain clearly marked at all times. Irrigation or maintenance of existing vegetation should be described in the landscaping plan. If damage to protected trees still occurs, maintenance guidelines described below should be followed:

- Verify that protective measures remain in place. Restore damaged protection measures immediately.
- Serious tree injuries shall be attended to by an arborist.
- Damage to the crown, trunk, or root system of a retained tree shall be repaired immediately.
- Trench as far from tree trunks as possible, usually outside of the tree drip line or canopy. Curve trenches around trees to avoid large roots or root concentrations. If roots are encountered, consider tunneling under them. When trenching or tunneling near or under trees to be retained, place tunnels at least 18 in. below the ground surface, and not below the tree center to minimize impact on the roots.
- Do not leave tree roots exposed to air. Cover exposed roots with soil as soon as possible. If soil covering is not practical, protect exposed roots with wet burlap or peat moss until the tunnel or trench is ready for backfill.
- Cleanly remove the ends of damaged roots with a smooth cut.
- Fill trenches and tunnels as soon as possible. Careful filling and tamping will eliminate air spaces in the soil, which can damage roots.
- If bark damage occurs, cut back all loosened bark into the undamaged area, with the cut tapered at the top and bottom and drainage provided at the base of the wood. Limit cutting the undamaged area as much as possible.
- Aerate soil that has been compacted over a trees root zone by punching holes 12 in. deep with an iron bar and moving the bar back and forth until the soil is loosened. Place holes 18 in. apart throughout the area of compacted soil under the tree crown.
- Fertilization:

- Fertilize trees in the late fall or early spring. Although to note, many native species do not require fertilization.

- Apply fertilizer to the soil over the feeder roots and in accordance with label instructions, but never closer than 3 ft to the trunk. Increase the fertilized area by one-fourth of the crown area for conifers that have extended root systems.

- Retain protective measures until all other construction activity is complete to avoid damage during site cleanup and stabilization.

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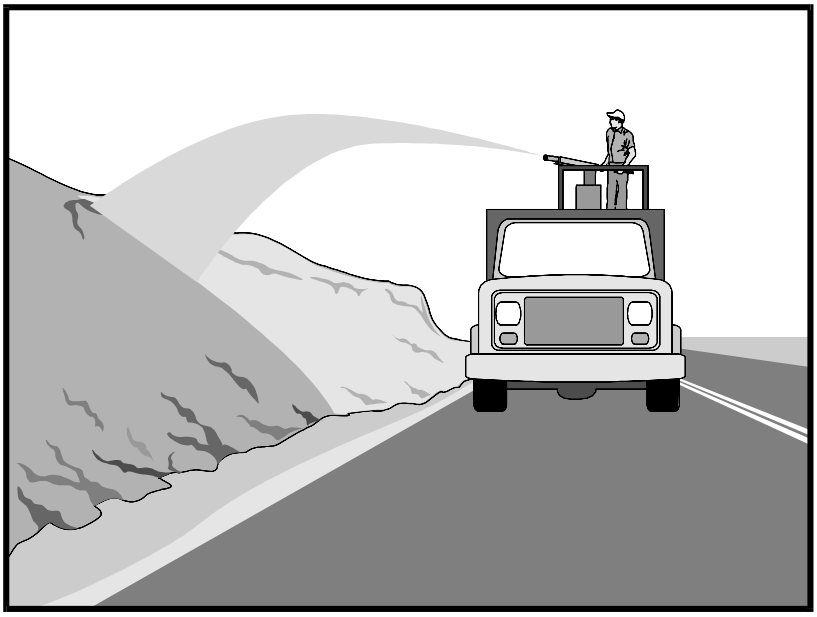
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Water Quality Management Plan for The Lake Tahoe Region, Volume II, Handbook of Management Practices, Tahoe Regional Planning Agency, November 1988.

Hydraulic Mulch EC-3



Categories

EC	Erosion Control	☑
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	☒
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

EC-4 Hydroseeding
EC-5 Soil Binders
EC-6 Straw Mulch
EC-7 Geotextiles and Mats
EC-8 Wood Mulching
EC-14 Compost Blanket
EC-16 Non-Vegetative Stabilization

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Description and Purpose

Hydraulic Mulch consists of various types of fibrous materials mixed with water and sprayed onto the soil surface in slurry form to provide a layer of temporary protection from wind and water erosion.

Suitable Applications

Hydraulic mulch as a temporary, stand alone, erosion control BMP is suitable for disturbed areas that require temporary protection from wind and water erosion until permanent soil stabilization activities commence. Examples include:

- Rough-graded areas that will remain inactive for longer than permit-required thresholds (e.g., 14 days) or otherwise require stabilization to minimize erosion or prevent sediment discharges.
- Soil stockpiles.
- Slopes with exposed soil between existing vegetation such as trees or shrubs.
- Slopes planted with live, container-grown vegetation or plugs.
- Slopes burned by wildfire.
- To stabilize earthen berms
- Areas seeded by broadcasting or drilling

- Temporary stabilization during high wind conditions

Hydraulic mulch can also be applied to augment other erosion control BMPs such as:

- In conjunction with straw mulch (see EC-6 Straw Mulch) where the rate of hydraulic mulch is reduced to 100-500 lbs per acre and the slurry is applied over the straw as a tackifying agent to hold the straw in place.
- Supplemental application of soil amendments, such as fertilizer, lime, gypsum, soil bio-stimulants or compost.

Limitations

In general, hydraulic mulch is not limited by slope length, gradient or soil type. However, the following limitations typically apply:

- Most hydraulic mulch applications, particularly bonded fiber matrices (BFMs), require at least 24 hours to dry before rainfall occurs.
- Temporary applications (i.e., without a vegetative component) may require a second application in order to remain effective for an entire rainy season.
- Treatment areas must be accessible to hydraulic mulching equipment.
- Availability of water sources in remote areas for mixing and application.
- As a stand-alone temporary BMP, hydraulic mulches may need to be re-applied to maintain their erosion control effectiveness, typically after 6-12 months depending on the type of mulch used.
- Availability of hydraulic mulching equipment may be limited just prior to the rainy season and prior to storms due to high demand.
- Cellulose fiber mulches alone may not perform well on steep slopes or in course soils.
- This BMP consists of a mixture of several constituents (e.g., fibers/mulches, compost, tackifiers, and other chemical constituents), some of which may be proprietary and may come pre-mixed by the manufacturer. The water quality impacts of these constituents are relatively unknown, and some may have water quality impacts due to their chemical makeup. Refer to specific chemical properties identified in the product Safety Data Sheet (may not include ecological information); products should be evaluated for project-specific implementation by the SWPPP Preparer. Refer to factsheet EC-05 for further guidance on selecting soil binders.
- A water supply is needed to refill hydro mulch equipment tank.
- Cannot be disturbed by walking or driving on the surface after application.
- Recommend using in conjunction with other BMPs (i.e., fiber rolls, etc.).

Implementation

- Where feasible, it is preferable to prepare soil surfaces prior to application by roughening embankments and fill areas with a crimping or punching type roller or by track walking.
- The majority of hydraulic mulch applications do not necessarily require surface/soil preparation (See EC-15 Soil Preparation) although in almost every case where re-vegetation is included as part of the practice, soil preparation can be beneficial. One of the advantages of hydraulic mulch over other erosion control methods is that it can be applied in areas where soil preparation is precluded by site conditions, such as steep slopes, rocky soils, or inaccessibility.
- Avoid mulch over spray onto roads, sidewalks, drainage channels, existing vegetation, etc.
- Hydraulic mulching is generally performed utilizing specialized machines that have a large water-holding/mixing tank and some form of mechanical agitation or other recirculation method to keep water, mulch and soil amendments in suspension. The mixed hydraulic slurry can be applied from a tower sprayer on top of the machine or by extending a hose to areas remote from the machine.
- Where possible apply hydraulic mulch from multiple directions to adequately cover the soil. Application from a single direction can result in shadowing, uneven coverage and failure of the BMP.
- Hydraulic mulch can also include a vegetative component, such as seed, rhizomes, or stolons (see EC-4 Hydraulic Seed).
- Typical hydraulic mulch application rates range from 2,000 pounds per acre for standard mulches (SMs) to 3,500 lbs. per acre for BFMs. However, the required amount of hydraulic mulch to provide adequate coverage of exposed topsoil may appear to exceed the standard rates when the roughness of the soil surface is changed due to soil preparation methods (see EC-15 Soil Preparation) or by slope gradient.
- Other factors such as existing soil moisture and soil texture can have a profound effect on the amount of hydraulic mulch required (i.e. application rate) applied to achieve an erosion-resistant covering.
- Avoid use of mulch without a tackifier component, especially on slopes.
- Mulches used in the hydraulic mulch slurry can include:
  - Cellulose fiber (paper- or corn-based)
  - Wood fibers
  - Cotton
  - Synthetics
  - Compost (see EC-14, Compost Blanket)
  - Straw

- Additional guidance on the comparison and selection of temporary slope stabilization methods is provided in Appendix F of the Handbook.

Categories of Hydraulic Mulches

Standard Hydraulic Mulch (SM)

Standard hydraulic mulches are generally applied at a rate of 2,000 lbs. per acre and are manufactured containing around 5% tackifier (i.e. soil binder), usually a plant-derived guar or psyllium type. Most standard mulches are green in color derived from food-color based dyes.

Hydraulic Matrices (HM) and Stabilized Fiber Matrices (SFM)

Hydraulic matrices and stabilized fiber matrices are slurries which contain increased levels of tackifiers/soil binders; usually 10% or more by weight. HMs and SFMs have improved performance compared to a standard hydraulic mulch (SM) because of the additional percentage of tackifier and because of their higher application rates, typically 2,500 – 4,000 lbs. per acre. Hydraulic matrices can include a mixture of fibers, for example, a 50/50 blend of paper and wood fiber. In the case of an SFM, the tackifier/soil binder is specified as a polyacrylamide (PAM).

Bonded Fiber Matrix (BFM)

Bonded fiber matrices (BFMs) are hydraulically-applied systems of fibers, adhesives (typically guar- or polymer-based) and chemical cross-links. Upon drying, the slurry forms an erosion-resistant blanket that prevents soil erosion and promotes vegetation establishment. The cross-linked adhesive in the BFM should be biodegradable and should not dissolve or disperse upon re-wetting. BFMs are typically applied at rates from 3,000 to 4,000 lbs. per acre based on the manufacturer's recommendation. BFMs should not be applied immediately before, during or immediately after rainfall or if the soil is saturated. Depending on the product, BFMs typically require 12 to 24 hours to dry and become effective.

Hydraulic Compost Matrix (HCM)

Hydraulic compost matrix (HCM) is a field-derived practice whereby finely graded or sifted compost is introduced into the hydraulic mulch slurry. A guar-type tackifier can be added for steeper slope applications as well as any specified seed mixtures. An HCM can help to accelerate seed germination and growth. HCMs are particularly useful as an in-fill for three-dimensional re-vegetation geocomposites, such as turf reinforcement mats (TRM) (see EC-7 Geotextiles and Mats).

Costs

Average installed costs for hydraulic mulch categories are is provided in Table 1, below.

Table
HYDRAULIC MULCH BMPs
INSTALLED COSTS

BMP	Installed Cost/Acre
Standard Hydraulic Mulching (SM)	$2,100 - $4,700 per acre
Hydraulic Matrices (HM) and Stabilized Fiber Matrices	
Guar-based	$2,600 - $5,200 per acre
PAM-based	$3,200 - $7,200 per acre
Bonded Fiber Matrix (BFM)	$5,000 - $8,800 per acre
Hydraulic Compost Matrix (HCM)	$3,800 - $4,500 per acre

Source: Cost information received from individual product manufacturers solicited by Geosyntec Consultants (2004). Adjusted for inflation (2016 dollars) by Tetra Tech, Inc.

Inspection and Maintenance

- Maintain an unbroken, temporary mulched ground cover throughout the period of construction when the soils are not being reworked.
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Areas where erosion is evident should be repaired and BMPs re-applied as soon as possible. Care should be exercised to minimize the damage to protected areas while making repairs, as any area damaged will require re-application of BMPs.
- Compare the number of bags or weight of applied mulch to the area treated to determine actual application rates and compliance with specifications.

References

Soil Stabilization BMP Research for Erosion and Sediment Controls: Cost Survey Technical Memorandum, State of California Department of Transportation (Caltrans), July 2007.

Controlling Erosion of Construction Sites, Agricultural Information #347, U.S. Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS) (formerly Soil Conservation Service – SCS).

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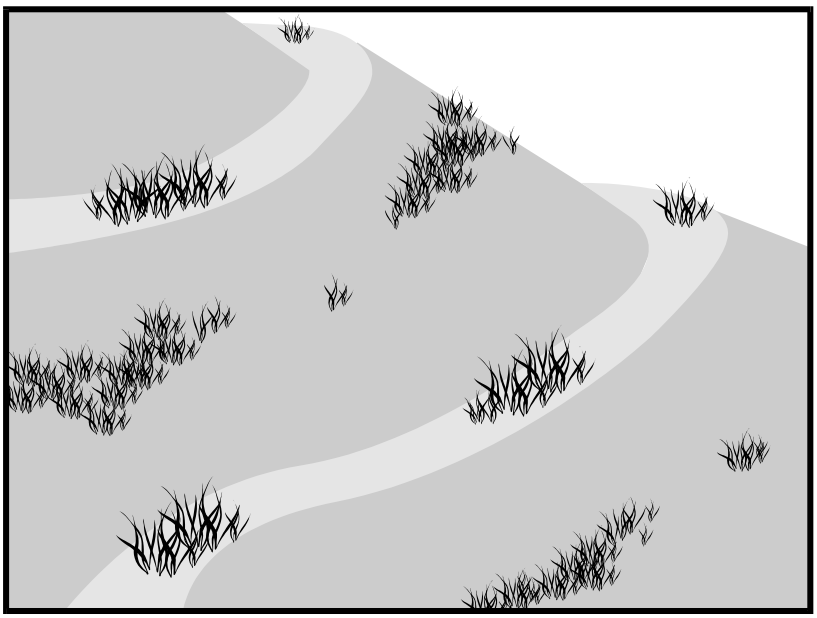
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Water Quality Management Plan for the Lake Tahoe Region, Volume II, Handbook of Management Practices, Tahoe Regional Planning Agency, November 1988.

Hydroseeding EC-4



Description and Purpose

Hydroseeding typically consists of applying a mixture of a hydraulic mulch, seed, and water with the possible addition of tackifier, compost, mycorrhizae inoculant, fertilizer, and/or soil conditioner, to temporarily protect exposed soils from erosion by water and wind. Hydraulic seeding, or hydroseeding, is simply the method by which temporary or permanent seed is applied to the soil surface and temporary erosion control is established by means of the mulch component.

Suitable Applications

Hydroseeding is suitable for disturbed areas requiring temporary protection until permanent stabilization is established, for disturbed areas that will be re-disturbed following an extended period of inactivity, or to apply permanent stabilization measures. Hydroseeding without mulch or other cover (e.g., EC-7, Geotextiles and Mats) is not a stand-alone erosion control BMP and should be combined with additional measures until vegetation establishment.

Typical applications for hydroseeding include:

- Disturbed soil/graded areas where permanent stabilization or continued earthwork is not anticipated prior to seed germination.
- Cleared and graded areas exposed to seasonal rains or temporary irrigation.
- To vegetate swales and earthen berms.

Categories

EC	Erosion Control	☑
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	☒
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

EC-3 Hydraulic Mulch
EC-5 Soil Binders
EC-6 Straw Mulch
EC-7 Geotextiles and Mats
EC-8 Wood Mulching
EC-14 Compost Blanket
EC-16 Non-Vegetative Stabilization

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- Areas not subject to heavy wear by construction equipment or high traffic.

Limitations

- Availability of hydroseeding equipment may be limited just prior to the rainy season and prior to storms due to high demand.
- Hydraulic seed should be applied with hydraulic mulch or a stand-alone hydroseed application should be followed by one of the following:
    - Straw mulch (see Straw Mulch EC-6)
    - Rolled erosion control products (see Geotextiles and Mats EC-7)
    - Application of Compost Blanket (see Compost Blanket EC-14)

  Hydraulic seed may be used alone only on small flat surfaces when there is sufficient time in the season to ensure adequate vegetation establishment and coverage to provide adequate erosion control.
- Hydraulic seed without mulch does not provide immediate erosion control.
- Temporary seeding may not be appropriate for steep slopes (i.e., slopes readily prone to rill erosion or without sufficient topsoil).
- Temporary seeding may not be appropriate in dry periods without supplemental irrigation.
- Temporary vegetation may have to be removed before permanent vegetation is applied.
- Temporary vegetation may not be appropriate for short term inactivity (i.e., less than 3-6 months).
- Vegetation may not establish when hydroseed is applied to very compact soils.
- Mulch may inhibit germination when applied at high rates.
- This BMP consists of a mixture of several constituents (e.g., fibers/mulches, tackifiers, and other chemical constituents), some of which may be proprietary and may come pre-mixed by the manufacturer. The water quality impacts of these constituents are relatively unknown, and some may have water quality impacts due to their chemical makeup. Additionally, these constituents may require non-visible pollutant monitoring. Refer to specific chemical properties identified in the product's Safety Data Sheet (SDS), although, note that not all SDS's provide ecological information; products should be evaluated for project-specific implementation by the QSD. Refer to fact sheet EC-05, Soil Binders, for further guidance on selecting soil binders.

Implementation

In order to select appropriate hydraulic seed mixtures, an evaluation of site conditions should be performed with respect to:

- Soil conditions
- Site topography and exposure (sun/wind)
- Season and climate
- Vegetation types
- Maintenance requirements
- Sensitive adjacent areas
- Water availability
- Plans for permanent vegetation

The local office of the U.S.D.A. Natural Resources Conservation Service (NRCS), Resource Conservation Districts and Agricultural Extension Service can provide information on appropriate seed mixes.

The following steps should be followed for implementation:

- Where appropriate or feasible, soil should be prepared to receive the seed by disking or otherwise scarifying (See EC-15, Soil Preparation) the surface to eliminate crust, improve air and water infiltration and create a more favorable environment for germination and growth.
- Avoid use of hydraulic seed in areas where the BMP would be incompatible with future earthwork activities.
- Hydraulic seed can be applied using a multiple step or one step process.
  - In a multiple step process, hydraulic seed is applied first, followed by mulch or a Rolled Erosion Control Product (RECP).
  - In the one step process, hydraulic seed is applied with hydraulic mulch in a hydraulic matrix. When the one step process is used to apply the mixture of fiber, seed, etc., the seed rate should be increased to compensate for all seeds not having direct contact with the soil.
- All hydraulically seeded areas should have mulch, or alternate erosion control cover to keep seeds in place and to moderate soil moisture and temperature until the seeds germinate and grow.
- All seeds should be in conformance with the California State Seed Law of the Department of Agriculture. Each seed bag should be delivered to the site sealed and clearly marked as to species, purity, percent germination, dealer's guarantee, and dates of test. The container should be labeled to clearly reflect the amount of Pure Live Seed (PLS) contained. All legume seed should be pellet inoculated. Inoculant sources should be species specific and should be applied at a rate of 2 lb of inoculant per 100 lb seed.
- Commercial fertilizer should conform to the requirements of the California Food and Agricultural Code, which can be found at: http://www.leginfo.ca.gov/.html/fac_table_of_contents.html. Fertilizer should be pelleted or granular form.
- Follow up applications should be made as needed to cover areas of poor coverage or germination/vegetation establishment and to maintain adequate soil protection.
- Avoid over spray onto roads, sidewalks, drainage channels, existing vegetation, etc.

- Additional guidance on the comparison and selection of temporary slope stabilization methods is provided in Appendix F of the Handbook.

Costs

Average cost for installation and maintenance may vary from as low as $2,400 per acre for flat slopes and stable soils, to $5,200 per acre for moderate to steep slopes and/or erosive soils. Cost of seed mixtures vary based on types of required vegetation.

BMP	Installed Cost per Acre
Hydraulic Seed	$2,400-$5,200

Source: Cost information received from individual product manufacturers solicited by Geosyntec Consultants (2004). Adjusted for inflation (2016 dollars) by Tetra Tech, Inc.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Areas where erosion is evident should be repaired and BMPs re-applied as soon as possible. Care should be exercised to minimize the damage to protected areas while making repairs, as any area damaged will require re-application of BMPs.
- Where seeds fail to germinate, or they germinate and die, the area must be re-seeded, fertilized, and mulched within the planting season, using not less than half the original application rates.
- Irrigation systems, if applicable, should be inspected daily while in use to identify system malfunctions and line breaks. When line breaks are detected, the system must be shut down immediately and breaks repaired before the system is put back into operation.
- Irrigation systems should be inspected for complete coverage and adjusted as needed to maintain complete coverage.

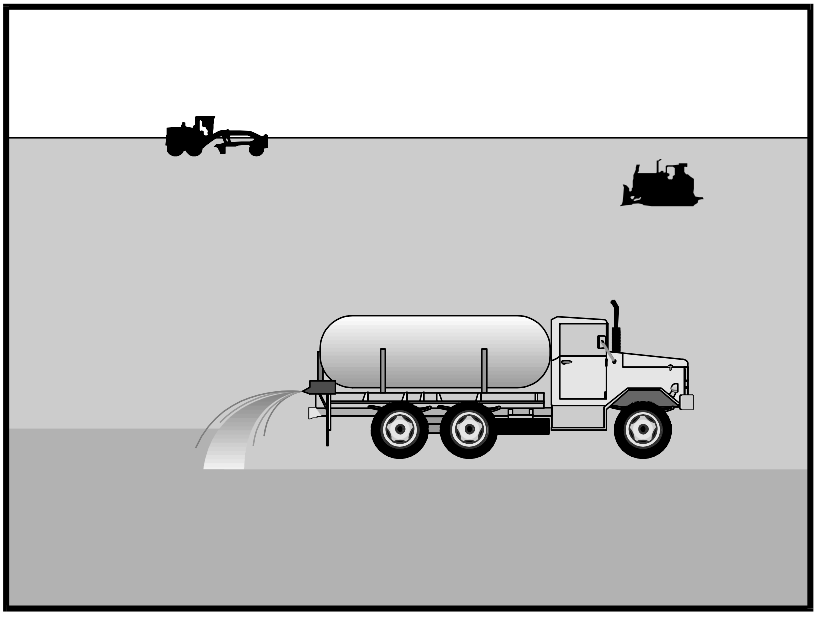
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Soil Binders EC-5



Categories

EC	Erosion Control	☑
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	☒
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

EC-3 Hydraulic Mulch

EC-4 Hydroseeding

EC-6 Straw Mulch

EC-7 Geotextiles and Mats

EC-8 Wood Mulching

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Description and Purpose

Soil binding consists of application and maintenance of a soil stabilizer to exposed soil surfaces. Soil binders are materials applied to the soil surface to temporarily prevent water and wind induced erosion of exposed soils on construction sites.

Suitable Applications

Soil binders are typically applied to disturbed areas requiring temporary protection. Because soil binders, when used as a stand-alone practice, can often be incorporated into the soil, they are a good alternative to mulches in areas where grading activities will soon resume. Soil binders are commonly used in the following areas:

- Rough graded soils that will be inactive for a short period of time.
- Soil stockpiles.
- Temporary haul roads prior to placement of crushed rock.
- Compacted soil road base.
- Construction staging, materials storage, and layout areas.
- Slopes and areas requiring stabilization prior to rain.
- Disturbed areas subject to high winds.

Limitations

- Soil binders are temporary in nature and may need reapplication.
- Soil binders require a minimum curing time until fully effective, as prescribed by the manufacturer. Curing time may be 24 hours or longer. Soil binders may need reapplication after a storm event.
- Soil binders will generally experience spot failures during heavy rainfall events. If runoff penetrates the soil at the top of a slope treated with a soil binder, it is likely that the runoff will undercut the stabilized soil layer and discharge at a point further down slope.
- Plant-material-based soil binders do not generally hold up to pedestrian or vehicular traffic across treated areas as well as polymeric emulsion blends or cementitious-based binders.
- Soil binders may not sufficiently penetrate compacted soils.
- Some soil binders are soil texture specific in terms of their effectiveness. For example, polyacrylamides (PAMs) work very well on silt and clayey soils but their performance decreases dramatically in sandy soils.
- Some soil binders may not perform well with low relative humidity. Under rainy conditions, some agents may become slippery or leach out of the soil.
- Soil binders may not cure if low temperatures occur within 24 hours of application.
- The water quality impacts of some chemical soil binders are relatively unknown, and some may have water quality impacts due to their chemical makeup. Additionally, these chemicals may require non-visible pollutant monitoring. Products should be evaluated for project-specific implementation by the SWPPP Preparer. Refer to the product Material Safety Data Sheet for chemical properties.

Implementation

General Considerations

- Soil binders should conform to local municipality specifications and requirements.
- Site soil types will dictate appropriate soil binders to be used.
- A soil binder must be environmentally benign (non-toxic to plant and animal life), easy to apply, easy to maintain, economical, and should not stain paved or painted surfaces. Soil binders should not pollute stormwater when cured. Obtain a Safety Data Sheet (SDS) from the manufacturer to ensure non-toxicity (note however, the SDS may not include ecological information).
- Stormwater runoff from PAM treated soils should pass through one of the following sediment control BMP prior to discharging to surface waters.
    - When the total drainage area is greater than or equal to 5 acres, PAM treated areas should drain to a sediment basin.

- Areas less than 5 acres should drain to sediment control BMPs, such as a sediment trap, or a series of check dams. The total number of check dams used should be maximized to achieve the greatest amount of settlement of sediment prior to discharging from the site. Each check dam should be spaced evenly in the drainage channel through which stormwater flows are discharged off site.

- Performance of soil binders depends on temperature, humidity, and traffic across treated areas.
- Avoid over spray onto roads, sidewalks, drainage channels, existing vegetation, etc.
- Some soil binders are designed for application to roads.
- Additional guidance on the comparison and selection of temporary slope stabilization methods is provided in Appendix F of the Handbook.

Selecting a Soil Binder

Properties of common soil binders used for erosion control are provided on Table 1 at the end of this Fact Sheet. Use Table 1 to select an appropriate soil binder. Refer to WE-1, Wind Erosion Control, for dust control soil binders.

Factors to consider when selecting a soil binder include the following:

- Suitability to situation - Consider where the soil binder will be applied, if it needs a high resistance to leaching or abrasion, and whether it needs to be compatible with any existing vegetation. Determine the length of time soil stabilization will be needed, and if the soil binder will be placed in an area where it will degrade rapidly. In general, slope steepness is not a discriminating factor for the listed soil binders.
- Soil types and surface materials - Fines and moisture content are key properties of surface materials. Consider a soil binder's ability to penetrate, likelihood of leaching, and ability to form a surface crust on the surface materials.
- Frequency of application - The frequency of application is related to the functional longevity of the binder, which can be affected by subgrade conditions, surface type, climate, and maintenance schedule.
- Frequent applications could lead to high costs. Application frequency may be minimized if the soil binder has good penetration, low evaporation, and good longevity. Consider also that frequent application will require frequent equipment clean up.

Plant-Material-Based (Short Lived, <6 months) Binders

Guar: Guar is a non-toxic, biodegradable, natural galactomannan-based hydrocolloid treated with dispersant agents for easy field mixing. It should be mixed with water at the rate of 11 to 15 lb per 1,000 gallons. Recommended minimum application rates are as follows:

Application Rates for Guar Soil Stabilizer

Slope (H:V):	Flat	4:1	3:1	2:1	1:1
lb/acre:	40	45	50	60	70

Psyllium: Psyllium is composed of the finely ground muciloid coating of plantago seeds that is applied as a dry powder or in a wet slurry to the surface of the soil. It dries to form a firm but rewettable membrane that binds soil particles together but permits germination and growth of seed. Psyllium requires 12 to 18 hours drying time. Application rates should be from 80 to 200 lb/acre, with enough water in solution to allow for a uniform slurry flow.

Starch: Starch is non-ionic, cold water soluble (pre-gelatinized) granular cornstarch. The material is mixed with water and applied at the rate of 150 lb/acre. Approximate drying time is 9 to 12 hours.

Plant-Material-Based (Long Lived, 6-12 months) Binders

Pitch and Rosin Emulsion: Generally, a non-ionic pitch and rosin emulsion has a minimum solids content of 48%. The rosin should be a minimum of 26% of the total solids content. The soil stabilizer should be non-corrosive, water dilutable emulsion that upon application cures to a water insoluble binding and cementing agent. For soil erosion control applications, the emulsion is diluted and should be applied as follows:

- For clayey soil: 5 parts water to 1-part emulsion
- For sandy soil: 10 parts water to 1-part emulsion

Application can be by water truck or hydraulic seeder with the emulsion and product mixture applied at the rate specified by the manufacturer.

Polymeric Emulsion Blend Binders

Acrylic Copolymers and Polymers: Polymeric soil stabilizers should consist of a liquid or solid polymer or copolymer with an acrylic base that contains a minimum of 55% solids. The polymeric compound should be handled and mixed in a manner that will not cause foaming or should contain an anti-foaming agent. The polymeric emulsion should not exceed its shelf life or expiration date; manufacturers should provide the expiration date. Polymeric soil stabilizer should be readily miscible in water, non-injurious to seed or animal life, non-flammable, should provide surface soil stabilization for various soil types without totally inhibiting water infiltration, and should not re-emulsify when cured. The applied compound typically requires 12 to 24 hours drying time. Liquid copolymer should be diluted at a rate of 10 parts water to 1-part polymer and the mixture applied to soil at a rate of 1,175 gallons/acre.

Liquid Polymers of Methacrylates and Acrylates: This material consists of a tackifier/sealer that is a liquid polymer of methacrylates and acrylates. It is an aqueous 100% acrylic emulsion blend of 40% solids by volume that is free from styrene, acetate, vinyl, ethoxylated surfactants or silicates. For soil stabilization applications, it is diluted with water in accordance with the manufacturer's recommendations and applied with a hydraulic seeder at the rate of 20 gallons/acre. Drying time is 12 to 18 hours after application.

Copolymers of Sodium Acrylates and Acrylamides: These materials are non-toxic, dry powders that are copolymers of sodium acrylate and acrylamide. They are mixed with water and applied to the soil surface for erosion control at rates that are determined by slope gradient:

Slope Gradient (H:V)	lb/acre
Flat to 5:1	3.0 – 5.0
5:1 to 3:1	5.0 – 10.0
2:1 to 1:1	10.0 – 20.0

Poly-Acrylamide (PAM) and Copolymer of Acrylamide**:** Linear copolymer polyacrylamide for use as a soil binder is packaged as a dry flowable solid, as a liquid. Refer to the manufacturer's recommendation for dilution and application rates as they vary based on liquid or dry form, site conditions and climate.

- Limitations specific to PAM are as follows:
  - Do not use PAM on a slope that flows into a water body without passing through a sediment trap or sediment basin.
  - The specific PAM copolymer formulation must be anionic. Cationic PAM should not be used in any application because of known aquatic toxicity problems. Only the highest drinking water grade PAM, certified for compliance with ANSI/NSF Standard 60 for drinking water treatment, should be used for soil applications.
  - PAM designated for erosion and sediment control should be "water soluble" or "linear" or "non-cross linked".
  - PAM should not be used as a stand-alone BMP to protect against water-based erosion. When combined with mulch, its effectiveness increases dramatically.

Hydro-Colloid Polymers: Hydro-Colloid Polymers are various combinations of dry flowable poly-acrylamides, copolymers and hydro-colloid polymers that are mixed with water and applied to the soil surface at rates of 55 to 60 lb/acre. Drying times are 0 to 4 hours.

Cementitious-Based Binders

Gypsum: This is a formulated gypsum-based product that readily mixes with water and mulch to form a thin protective crust on the soil surface. It is composed of high purity gypsum that is ground, calcined and processed into calcium sulfate hemihydrate with a minimum purity of 86%. It is mixed in a hydraulic seeder and applied at rates 4,000 to 12,000 lb/acre. Drying time is 4 to 8 hours.

Applying Soil Binders

After selecting an appropriate soil binder, the untreated soil surface must be prepared before applying the soil binder. The untreated soil surface must contain sufficient moisture to assist the agent in achieving uniform distribution. In general, the following steps should be followed:

- Follow manufacturer's written recommendations for application rates, pre-wetting of application area, and cleaning of equipment after use.
- Prior to application, roughen embankment and fill areas.
- Consider the drying time for the selected soil binder and apply with sufficient time before anticipated rainfall. Soil binders should not be applied during or immediately before rainfall.
- Avoid over spray onto roads, sidewalks, drainage channels, sound walls, existing vegetation, etc.

- Soil binders should not be applied to frozen soil, areas with standing water, under freezing or rainy conditions, or when the temperature is below 40°F during the curing period.
- More than one treatment is often necessary, although the second treatment may be diluted or have a lower application rate.
- Generally, soil binders require a minimum curing time of 24 hours before they are fully effective. Refer to manufacturer's instructions for specific cure time.
- For liquid agents:
  - Crown or slope ground to avoid ponding.
  - Uniformly pre-wet ground at 0.03 to 0.3 gal/yd^2 or according to manufacturer's recommendations.
  - Apply solution under pressure. Overlap solution 6 to 12 in.
  - Allow treated area to cure for the time recommended by the manufacturer; typically, at least 24 hours.
  - Apply second treatment before first treatment becomes ineffective, using 50% application rate.
  - In low humidities, reactivate chemicals by re-wetting with water at 0.1 to 0.2 gal/yd^2.

Costs

Costs vary according to the soil stabilizer selected for implementation. The following are approximate installed costs:

Soil Binder	Cost per Acre
Plant-Material-Based (Short Lived) Binders	$900-$1,200
Plant-Material-Based (Long Lived) Binders	$1,500-$1,900
Polymeric Emulsion Blend Binders	$900-$1,900
Cementitious-Based Binders	$1,000-$1,500

Source: Cost information received from individual product manufacturers solicited by Geosyntec Consultants (2004). Adjusted for inflation (2016 dollars) by Tetra Tech Inc.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Areas where erosion is evident should be repaired and BMPs re-applied as soon as possible. Care should be exercised to minimize the damage to protected areas while making repairs, as any area damaged will require re-application of BMPs.

- Reapply the selected soil binder as needed to maintain effectiveness.

Table 1 Properties of Soil Binders for Erosion Control

Evaluation Criteria	Binder Type			
	Plant Material Based (Short Lived)	**Plant Material Based (Long Lived)**	**Polymeric Emulsion Blends**	**Cementitious-Based Binders**
Relative Cost	Low	Moderate to High	Low to High	Low to Moderate
Resistance to Leaching	High	High	Low to Moderate	Moderate
Resistance to Abrasion	Moderate	Low	Moderate to High	Moderate to High
Longevity	Short to Medium	Medium	Medium to Long	Medium
Minimum Curing Time before Rain	9 to 18 hours	19 to 24 hours	0 to 24 hours	4 to 8 hours
Compatibility with Existing Vegetation	Good	Poor	Poor	Poor
Mode of Degradation	Biodegradable	Biodegradable	Photodegradable/ Chemically Degradable	Photodegradable/ Chemically Degradable
Labor Intensive	No	No	No	No
Specialized Application Equipment	Water Truck or Hydraulic Mulcher	Water Truck or Hydraulic Mulcher	Water Truck or Hydraulic Mulcher	Water Truck or Hydraulic Mulcher
Liquid/Powder	Powder	Liquid	Liquid/Powder	Powder
Surface Crusting	Yes, but dissolves on rewetting	Yes	Yes, but dissolves on rewetting	Yes
Clean Up	Water	Water	Water	Water
Erosion Control Application Rate	Varies (1)	Varies (1)	Varies (1)	4,000 to 12,000 lbs/acre

(1) See Implementation for specific rates.

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Erosion Control Pilot Study Report, State of California Department of Transportation (Caltrans), June 2000.

Manual of Standards of Erosion and Sediment Control Measures, Association of Bay Area Governments, May 1995.

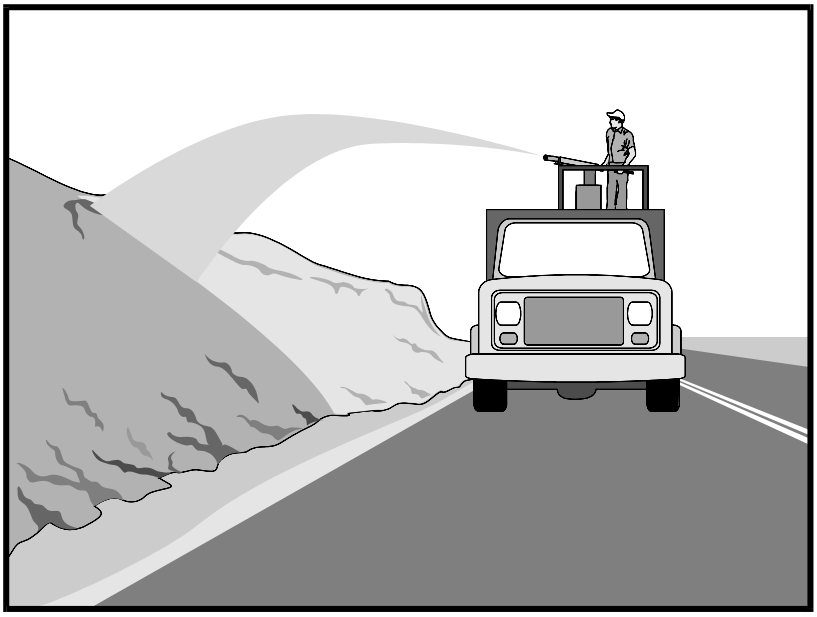
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Straw Mulch EC-6



Categories

EC	Erosion Control	☑
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	☒
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

EC-3 Hydraulic Mulch
EC-4 Hydroseeding
EC-5 Soil Binders
EC-7 Geotextiles and Mats
EC-8 Wood Mulching
EC-14 Compost Blanket

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Description and Purpose

Straw mulch consists of placing a uniform layer of straw and incorporating it into the soil with a studded roller or crimper or anchoring it with a tackifier or stabilizing emulsion. Straw mulch protects the soil surface from the impact of rain drops, preventing soil particles from becoming dislodged.

Suitable Applications

Straw mulch is suitable for disturbed areas requiring temporary protection until permanent stabilization is established. Straw mulch can be specified for the following applications:

- As a stand-alone BMP on disturbed areas until soils can be prepared for permanent vegetation. The longevity of straw mulch is typically less than six months.
- Applied in combination with temporary seeding strategies
- Applied in combination with permanent seeding strategies to enhance plant establishment and final soil stabilization
- Applied around containerized plantings to control erosion until the plants become established to provide permanent stabilization

Limitations

Availability of straw and straw blowing equipment may be limited just prior to the rainy season and prior to storms due to high demand.

- There is a potential for introduction of weed seed and unwanted plant material if weed-free agricultural straw is not specified.
- Straw mulch applied by hand is more time intensive and potentially costly.
- Wind may limit application of straw and blow straw into undesired locations.
- May have to be removed prior to permanent seeding or prior to further earthwork.
- "Punching" of straw does not work in sandy soils, necessitating the use of tackifiers.
- Potential fugitive dust control issues associated with straw applications can occur. Application of a stabilizing emulsion or a water stream at the same time straw is being blown can reduce this problem.
- Use of plastic netting should be avoided in areas where wildlife may be entrapped and may be prohibited for projects in certain areas with sensitive wildlife species, especially reptiles and amphibians.

Implementation

- Straw should be derived from weed-free wheat, rice, or barley. Where required by the plans, specifications, permits, or environmental documents, native grass straw should be used.
- Use tackifier to anchor straw mulch to the soil on slopes.
- Crimping, punch roller-type rollers, or track walking may also be used to incorporate straw mulch into the soil on slopes. Track walking can be used where other methods are impractical.
- Avoid placing straw onto roads, sidewalks, drainage channels, sound walls, existing vegetation, etc.
- Straw mulch with tackifier should not be applied during or immediately before rainfall.
- Additional guidance on the comparison and selection of temporary slope stabilization methods is provided in Appendix F of the Handbook.

Application Procedures

- When using a tackifier to anchor the straw mulch, roughen embankment or fill areas by rolling with a crimping or punching-type roller or by track walking before placing the straw mulch. Track walking should only be used where rolling is impractical.
- Apply straw at a rate of between 3,000 and 4,000 lb./acre, either by machine or by hand distribution and provide 100% ground cover. A lighter application is used for flat surfaces and a heavier application is used for slopes.
- Evenly distribute straw mulch on the soil surface.
- Anchoring straw mulch to the soil surface by "punching" it into the soil mechanically (incorporating) can be used in lieu of a tackifier.

- Methods for holding the straw mulch in place depend upon the slope steepness, accessibility, soil conditions, and longevity.

  - A tackifier acts to glue the straw fibers together and to the soil surface. The tackifier should be selected based on longevity and ability to hold the fibers in place. A tackifier is typically applied at a rate of 125 lb./acre. In windy conditions, the rates are typically 180 lb./acre.

  - On very small areas, a spade or shovel can be used to punch in straw mulch.

  - On slopes with soils that are stable enough and of sufficient gradient to safely support construction equipment without contributing to compaction and instability problems, straw can be "punched" into the ground using a knife blade roller or a straight bladed coulter, known commercially as a "crimper."

Costs

Average annual cost for installation and maintenance is included in the table below. Application by hand is more time intensive and potentially more costly.

BMP	Unit Cost per Acre
Straw mulch, crimped or punched	$3,150-$6,900
Straw mulch with tackifier	$2,300-$6,200

Source: Cost information received from individual product suppliers solicited by Geosyntec Consultants (2004). Adjusted for inflation (2016 dollars) by Tetra Tech, Inc.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.

- Areas where erosion is evident should be repaired and BMPs re-applied as soon as possible. Care should be exercised to minimize the damage to protected areas while making repairs, as any area damaged will require re-application of BMPs.

- The key consideration in inspection and maintenance is that the straw needs to last long enough to achieve erosion control objectives. Straw mulch as a stand-alone BMP is temporary and is not suited for long-term erosion control.

- Maintain an unbroken, temporary mulched ground cover while disturbed soil areas are inactive. Repair any damaged ground cover and re-mulch exposed areas.

- Reapplication of straw mulch and tackifier may be required to maintain effective soil stabilization over disturbed areas and slopes.

References

Soil Stabilization BMP Research for Erosion and Sediment Controls: Cost Survey Technical Memorandum, State of California Department of Transportation (Caltrans), July 2007.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.

Controlling Erosion of Construction Sites, Agricultural Information Bulletin #347, U.S. Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS) (formerly Soil Conservation Service – SCS).

Guides for Erosion and Sediment Control in California, USDA Soils Conservation Service, January 1991.

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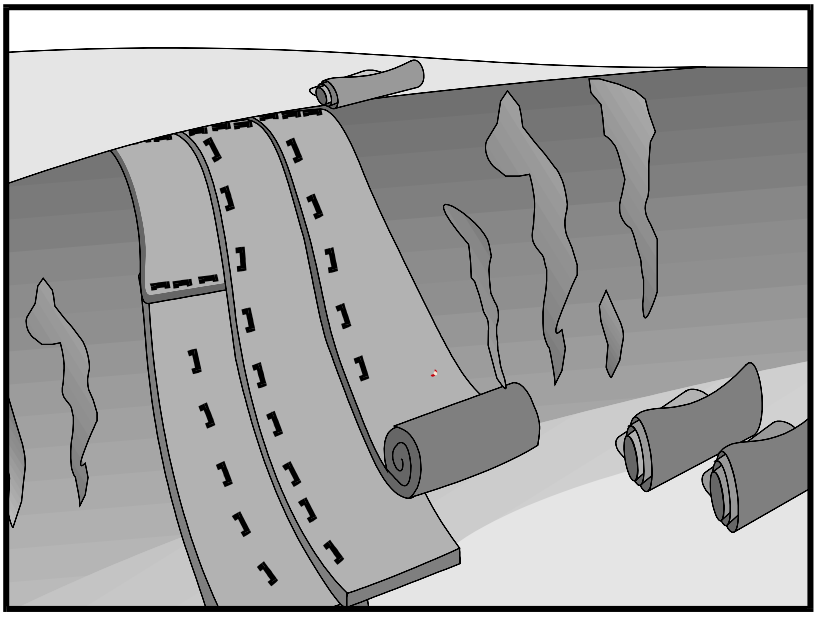
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Stormwater Management of the Puget Sound Basin, Technical Manual, Publication #91-75, Washington State Department of Ecology, February 1992.

Water Quality Management Plan for the Lake Tahoe Region, Volume II, Handbook of Management Practices, Tahoe Regional Planning Agency, November 1988.

Geotextiles and Mats EC-7



Categories		
EC	Erosion Control	☑
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	☒
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Targeted Constituents	
Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

EC-3 Hydraulic Mulch

EC-4 Hydroseeding

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Description and Purpose

Rolled Erosion Control Products (RECPs), also known as erosion control matting or blankets, can be made of natural or synthetic materials or a combination of the two. RECPs are used to cover the soil surface to reduce erosion from rainfall impact, hold soil in place, and absorb and hold moisture near the soil surface. Additionally, RECPs may be used to stabilize soils until vegetation is established or to reinforce non-woody surface vegetation.

Suitable Applications

RECPs are typically applied on slopes where erosion hazard is high, and vegetation will be slow to establish. Mattings are also used on stream banks, swales and other drainage channels where moving water at velocities between 3 ft/s and 6 ft/s are likely to cause scour and wash out new vegetation and in areas where the soil surface is disturbed and where existing vegetation has been removed. RECPs may also be used when seeding cannot occur (e.g., late season construction and/or the arrival of an early rain season). RECPs should be considered when the soils are fine grained and potentially erosive. RECPs should be considered in the following situations:

- Steep slopes, generally steeper than 3:1 (H:V).
- Long slopes.
- Slopes where the erosion potential is high.
- Slopes and disturbed soils where mulch must be anchored.

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- Disturbed areas where temporary cover is needed, or plants are slow to establish or will not establish.
- Channels with flows exceeding 3.3 ft/s.
- Channels to be vegetated.
- Stockpiles.
- Slopes adjacent to water bodies.

Limitations

- RECP installed costs are generally higher than other erosion control BMPs, limiting their use to areas where other BMPs are ineffective (e.g., channels, steep slopes).
- RECPs may delay seed germination, due to reduction in soil temperature and/or sunlight.
- RECPs are generally not suitable for excessively rocky sites or areas where the final vegetation will be mowed (since staples and netting can catch in mowers). If a staple or pin cannot be driven into the soil because the underlying soil is too hard or rocky, then an alternative BMP should be selected.
- If used for temporary erosion control, RECPs should be removed and disposed of prior to application of permanent soil stabilization measures.
- The use of plastic sheeting should be limited to covering stockpiles or very small graded areas for short periods of time (such as through one imminent storm event) until other measures, such as seeding and mulching, may be installed.
    - Plastic sheeting is easily vandalized, easily torn, photodegradable, and must be disposed of at a landfill.
    - Plastic sheeting results in 100% runoff, which may cause serious erosion problems in the areas receiving the increased flow.
- According to the State Water Board's *CGP Review, Issue #2*, only RECPs that either do not contain plastic netting or contain netting manufactured from 100% biodegradable non-plastic materials, such as jute, sisal, or coir fiber should be used due to plastic pollution and wildlife concerns. If a plastic-netted product is used for temporary stabilization, it must be promptly removed when no longer needed and removed or replaced with non-plastic netted RECPs for final stabilization.
- RECPs may have limitations based on soil type, slope gradient, or channel flow rate; consult the manufacturer for proper selection.
- Not suitable for areas that have foot traffic (tripping hazard) – e.g., pad areas around buildings under construction.
- RECPs that incorporate a plastic netting (e.g. straw blanket typically uses a plastic netting to hold the straw in place) may not be suitable near known wildlife habitat. Wildlife can become trapped in the plastic netting. As per State Water Board guidance, RECPs that

contain plastic netting are discouraged for temporary controls and are not acceptable alternatives for permanent controls. RECPs that do not contain plastic netting or contain netting manufactured from 100% biodegradable non-plastic materials such as jute, sisal, or coir fiber should be used.

- RECPs may have limitations in extremely windy climates; they are susceptible to wind damage and displacement. However, when RECPs are properly trenched at the top and bottom and stapled in accordance with the manufacturer's recommendations, problems with wind can be minimized.

Implementation

Material Selection

- Natural RECPs have been found to be effective where re-vegetation will be provided by re-seeding. The choice of material should be based on the size of area, side slopes, surface conditions such as hardness, moisture, weed growth, and availability of materials.

- Additional guidance on the comparison and selection of temporary slope stabilization methods is provided in Appendix F of the Handbook.

- The following natural and synthetic RECPs are commonly used:

Geotextiles

- Material can be a woven or a non-woven polypropylene fabric with minimum thickness of 0.06 in., minimum width of 12 ft and should have minimum tensile strength of 150 lbs (warp), 80 lbs (fill) in conformance with the requirements in ASTM Designation: D 4632. The permittivity of the fabric should be approximately 0.07 sec^{-1} in conformance with the requirements in ASTM Designation: D4491. The fabric should have an ultraviolet (UV) stability of 70 percent in conformance with the requirements in ASTM designation: D4355. Geotextile blankets must be secured in place with wire staples or sandbags and by keying into tops of slopes to prevent infiltration of surface waters under geotextile. Staples should be made of minimum 11-gauge steel wire and should be U-shaped with 8 in. legs and 2 in. crown.

- Geotextiles may be reused if they are suitable for the use intended.

Plastic Covers

- Generally plastic sheeting should only be used as stockpile covering or for very small graded areas for short periods of time (such as through one imminent storm event). If plastic sheeting must be used, choose a plastic that will withstand photo degradation.

- Plastic sheeting should have a minimum thickness of 6 mils and must be keyed in at the top of slope (when used as a temporary slope protection) and firmly held in place with sandbags or other weights placed no more than 10 ft apart. Seams are typically taped or weighted down their entire length, and there should be at least a 12 in. to 24 in. overlap of all seams. Edges should be embedded a minimum of 6 in. in soil (when used as a temporary slope protection).

- All sheeting must be inspected periodically after installation and after significant rainstorms to check for erosion, undermining, and anchorage failure. Any failures must be repaired

immediately. If washout or breakages occur, the material should be re-installed after repairing the damage to the slope.

Erosion Control Blankets/Mats

- Biodegradable RECPs are typically composed of jute fibers, curled wood fibers, straw, coconut fiber, or a combination of these materials. In order for an RECP to be considered 100% biodegradable, the netting, sewing or adhesive system that holds the biodegradable mulch fibers together must also be biodegradable. See typical installation details at the end of this fact sheet.

  - **Jute** is a natural fiber that is made into a yarn that is loosely woven into a biodegradable mesh. The performance of jute as a stand-alone RECP is low. Most other RECPs outperform jute as a temporary erosion control product and therefore jute is not commonly used. It is designed to be used in conjunction with vegetation. The material is supplied in rolled strips, which should be secured to the soil with U-shaped staples or stakes in accordance with manufacturers' recommendations.

  - **Excelsior** (curled wood fiber) blanket material should consist of machine produced mats of curled wood excelsior with 80 percent of the fiber 6 in. or longer. The excelsior blanket should be of consistent thickness. The wood fiber must be evenly distributed over the entire area of the blanket. The top surface of the blanket should be covered with a photodegradable extruded plastic mesh. The blanket should be smolder resistant without the use of chemical additives and should be non-toxic and non-injurious to plant and animal life. Excelsior blankets should be furnished in rolled strips, a minimum of 48 in. wide, and should have an average weight of 0.8 lb/yd^2, ±10 percent, at the time of manufacture. Excelsior blankets must be secured in place with wire staples. Staples should be made of minimum 11-gauge steel wire and should be U-shaped with 8 in. legs and 2 in. crown.

  - **Straw blanket** should be machine produced mats of straw with a lightweight biodegradable netting top layer. The straw should be attached to the netting with biodegradable thread or glue strips. The straw blanket should be of consistent thickness. The straw should be evenly distributed over the entire area of the blanket. Straw blanket should be furnished in rolled strips a minimum of 6.5 ft wide, a minimum of 80 ft long and a minimum of 0.5 lb/yd^2. Straw blankets must be secured in place with wire staples. Staples should be made of minimum 11-gauge steel wire and should be U-shaped with 8 in. legs and 2 in. crown.

  - **Wood fiber blanket** is composed of biodegradable fiber mulch with extruded plastic netting held together with adhesives. The material is designed to enhance re-vegetation. The material is furnished in rolled strips, which must be secured to the ground with U-shaped staples or stakes in accordance with manufacturers' recommendations.

  - **Coconut fiber blanket** should be a machine produced mat of 100 percent coconut fiber with biodegradable netting on the top and bottom. The coconut fiber should be attached to the netting with biodegradable thread or glue strips. The coconut fiber blanket should be of consistent thickness. The coconut fiber should be evenly distributed over the entire area of the blanket. Coconut fiber blanket should be furnished in rolled strips with a minimum of 6.5 ft wide, a minimum of 80 ft. long and a minimum of 0.5

lb/yd^2. Coconut fiber blankets must be secured in place with wire staples. Staples should be made of minimum 11-gauge steel wire and should be U-shaped with 8 in. legs and 2 in. crown.

- **Coconut fiber mesh** is a thin permeable membrane made from coconut or corn fiber that is spun into a yarn and woven into a biodegradable mat. It is designed to be used in conjunction with vegetation and typically has longevity of several years. The material is supplied in rolled strips, which must be secured to the soil with U-shaped staples or stakes in accordance with manufacturers' recommendations.

- **Straw coconut fiber blanket** should be machine produced mats of 70 percent straw and 30 percent coconut fiber with a biodegradable netting top layer and a biodegradable bottom net. The straw and coconut fiber should be attached to the netting with biodegradable thread or glue strips. The straw coconut fiber blanket should be of consistent thickness. The straw and coconut fiber should be evenly distributed over the entire area of the blanket. Straw coconut fiber blanket should be furnished in rolled strips a minimum of 6.5 ft wide, a minimum of 80 ft long and a minimum of 0.5 lb/yd^2. Straw coconut fiber blankets must be secured in place with wire staples. Staples should be made of minimum 11-gauge steel wire and should be U-shaped with 8 in. legs and 2 in. crown.

- Non-biodegradable RECPs are typically composed of polypropylene, polyethylene, nylon or other synthetic fibers. In some cases, a combination of biodegradable and synthetic fibers is used to construct the RECP. Netting used to hold these fibers together is typically non-biodegradable as well. Only biodegradable RECPs can remain on a site applying for a Notice of Termination due to plastic pollution and wild life concerns (State Waterboard, 2016). RECPs containing plastic that are used on a site must be disposed of for final stabilization.

  - **Plastic netting** is a lightweight biaxially oriented netting designed for securing loose mulches like straw or paper to soil surfaces to establish vegetation. The netting is photodegradable. The netting is supplied in rolled strips, which must be secured with U-shaped staples or stakes in accordance with manufacturers' recommendations.

  - **Plastic mesh** is an open weave geotextile that is composed of an extruded synthetic fiber woven into a mesh with an opening size of less than ¼ in. It is used with re-vegetation or may be used to secure loose fiber such as straw to the ground. The material is supplied in rolled strips, which must be secured to the soil with U-shaped staples or stakes in accordance with manufacturers' recommendations.

  - **Synthetic fiber with netting** is a mat that is composed of durable synthetic fibers treated to resist chemicals and ultraviolet light. The mat is a dense, three-dimensional mesh of synthetic (typically polyolefin) fibers stitched between two polypropylene nets. The mats are designed to be re-vegetated and provide a permanent composite system of soil, roots, and geomatrix. The material is furnished in rolled strips, which must be secured with U-shaped staples or stakes in accordance with manufacturers' recommendations.

  - **Bonded synthetic fibers** consist of a three-dimensional geometric nylon (or other synthetic) matting. Typically, it has more than 90 percent open area, which facilitates

root growth. It's tough root reinforcing system anchors vegetation and protects against hydraulic lift and shear forces created by high volume discharges. It can be installed over prepared soil, followed by seeding into the mat. Once vegetated, it becomes an invisible composite system of soil, roots, and geomatrix. The material is furnished in rolled strips that must be secured with U-shaped staples or stakes in accordance with manufacturers' recommendations.

- **Combination synthetic and biodegradable RECPs** consist of biodegradable fibers, such as wood fiber or coconut fiber, with a heavy polypropylene net stitched to the top and a high strength continuous filament geomatrix or net stitched to the bottom. The material is designed to enhance re-vegetation. The material is furnished in rolled strips, which must be secured with U-shaped staples or stakes in accordance with manufacturers' recommendations.

Site Preparation

- Proper soil preparation is essential to ensure complete contact of the RECP with the soil. Soil Roughening is not recommended in areas where RECPs will be installed.
- Grade and shape the area of installation.
- Remove all rocks, clods, vegetation or other obstructions so that the installed blankets or mats will have complete, direct contact with the soil.
- Prepare seedbed by loosening 2 to 3 in. of topsoil.

Seeding/Planting

Seed the area before blanket installation for erosion control and re-vegetation. Seeding after mat installation is often specified for turf reinforcement application. When seeding prior to blanket installation, all areas disturbed during blanket installation must be re-seeded. Where soil filling is specified for turf reinforcement mats (TRMs), seed the matting and the entire disturbed area after installation and prior to filling the mat with soil.

Fertilize and seed in accordance with seeding specifications or other types of landscaping plans. The protective matting can be laid over areas where grass has been planted and the seedlings have emerged. Where vines or other ground covers are to be planted, lay the protective matting first and then plant through matting according to design of planting.

Check Slots

Check slots shall be installed as required by the manufacturer.

Laying and Securing Matting

- Before laying the matting, all check slots should be installed and the seedbed should be friable, made free from clods, rocks, and roots. The surface should be compacted and finished according to the requirements of the manufacturer's recommendations.
- Mechanical or manual lay down equipment should be capable of handling full rolls of fabric and laying the fabric smoothly without wrinkles or folds. The equipment should meet the fabric manufacturer's recommendations or equivalent standards.

Anchoring

- U-shaped wire staples, metal geotextile stake pins, or triangular wooden stakes can be used to anchor mats and blankets to the ground surface.
- Wire staples should be made of minimum 11-gauge steel wire and should be U-shaped with 8 in. legs and 2 in. crown.
- Metal stake pins should be 0.188 in. diameter steel with a 1.5 in. steel washer at the head of the pin, and 8 in. in length.
- Wire staples and metal stakes should be driven flush to the soil surface.

Installation on Slopes

Installation should be in accordance with the manufacturer's recommendations. In general, these will be as follows:

- Begin at the top of the slope and anchor the blanket in a 6 in. deep by 6 in. wide trench. Backfill trench and tamp earth firmly.
- Unroll blanket down slope in the direction of water flow.
- Overlap the edges of adjacent parallel rolls 2 to 3 in. and staple every 3 ft (or greater, per manufacturer's specifications).
- When blankets must be spliced, place blankets end over end (shingle style) with 6 in. overlap. Staple through overlapped area, approximately 12 in. apart.
- Lay blankets loosely and maintain direct contact with the soil. Do not stretch.
- Staple blankets sufficiently to anchor blanket and maintain contact with the soil. Staples should be placed down the center and staggered with the staples placed along the edges. Steep slopes, 1:1 (H:V) to 2:1 (H:V), require a minimum of 2 staples/yd^2. Moderate slopes, 2:1 (H:V) to 3:1 (H:V), require a minimum of 1 ½ staples/yd^2. Check manufacturer's specifications to determine if a higher density staple pattern is required.

Installation in Channels

Installation should be in accordance with the manufacturer's recommendations. In general, these will be as follows:

- Dig initial anchor trench 12 in. deep and 6 in. wide across the channel at the lower end of the project area.
- Excavate intermittent check slots, 6 in. deep and 6 in. wide across the channel at 25 to 30 ft intervals along the channels.
- Cut longitudinal channel anchor trenches 4 in. deep and 4 in. wide along each side of the installation to bury edges of matting, whenever possible extend matting 2 to 3 in. above the crest of the channel side slopes.

- Beginning at the downstream end and in the center of the channel, place the initial end of the first roll in the anchor trench and secure with fastening devices at 12 in. intervals. Note: matting will initially be upside down in anchor trench.
- In the same manner, position adjacent rolls in anchor trench, overlapping the preceding roll a minimum of 3 in.
- Secure these initial ends of mats with anchors at 12 in. intervals, backfill and compact soil.
- Unroll center strip of matting upstream. Stop at next check slot or terminal anchor trench. Unroll adjacent mats upstream in similar fashion, maintaining a 3 in. overlap.
- Fold and secure all rolls of matting snugly into all transverse check slots. Lay mat in the bottom of the slot then fold back against itself. Anchor through both layers of mat at 12 in. intervals, then backfill and compact soil. Continue rolling all mat widths upstream to the next check slot or terminal anchor trench.
- Alternate method for non-critical installations: Place two rows of anchors on 6 in. centers at 25 to 30 ft. intervals in lieu of excavated check slots.
- Staple shingled lap spliced ends a minimum of 12 in. apart on 12 in. intervals.
- Place edges of outside mats in previously excavated longitudinal slots; anchor using prescribed staple pattern, backfill, and compact soil.
- Anchor, fill, and compact upstream end of mat in a 12 in. by 6 in. terminal trench.
- Secure mat to ground surface using U-shaped wire staples, geotextile pins, or wooden stakes.
- Seed and fill turf reinforcement matting with soil, if specified.

Soil Filling (if specified for turf reinforcement mat (TRM))

Installation should be in accordance with the manufacturer's recommendations. Typical installation guidelines are as follows:

- After seeding, spread and lightly rake ½-3/4 inches of fine topsoil into the TRM apertures to completely fill TRM thickness. Use backside of rake or other flat implement.
- Alternatively, if allowed by product specifications, spread topsoil using lightweight loader, backhoe, or other power equipment. Avoid sharp turns with equipment.
- Always consult the manufacturer's recommendations for installation.
- Do not drive tracked or heavy equipment over mat.
- Avoid any traffic over matting if loose or wet soil conditions exist.
- Use shovels, rakes, or brooms for fine grading and touch up.
- Smooth out soil filling just exposing top netting of mat.

Temporary Soil Stabilization Removal

- Temporary soil stabilization removed from the site of the work must be disposed of if necessary.

Costs

Installed costs can be relatively high compared to other BMPs. Approximate costs for installed materials are shown below:

Rolled Erosion Control Products		Installed Cost per Acre
Biodegradable	Jute Mesh	$7,700-$9,000
	Curled Wood Fiber	$10,200-$13,400
	Straw	$10,200-$13,400
	Wood Fiber	$10,200-$13,400
	Coconut Fiber	$16,600-$18,000
	Coconut Fiber Mesh	$38,400-$42,200
	Straw Coconut Fiber	$12,800-$15,400
Non-Biodegradable	Plastic Netting	$2,600-$2,800
	Plastic Mesh	$3,800-$4,500
	Synthetic Fiber with Netting	$43,500-$51,200
	Bonded Synthetic Fibers	$57,600-$70,400
	Combination with Biodegradable	$38,400-$46,100

Source: Cost information received from individual product manufacturers solicited by Geosyntec Consultants (2004). Adjusted for inflation (2016 dollars) by Tetra Tech, Inc.

Inspection and Maintenance

- RECPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Areas where erosion is evident shall be repaired and BMPs reapplied as soon as possible. Care should be exercised to minimize the damage to protected areas while making repairs, as any area damaged will require reapplication of BMPs.
- If washout or breakage occurs, re-install the material after repairing the damage to the slope or channel.
- Make sure matting is uniformly in contact with the soil.
- Check that all the lap joints are secure.
- Check that staples are flush with the ground.

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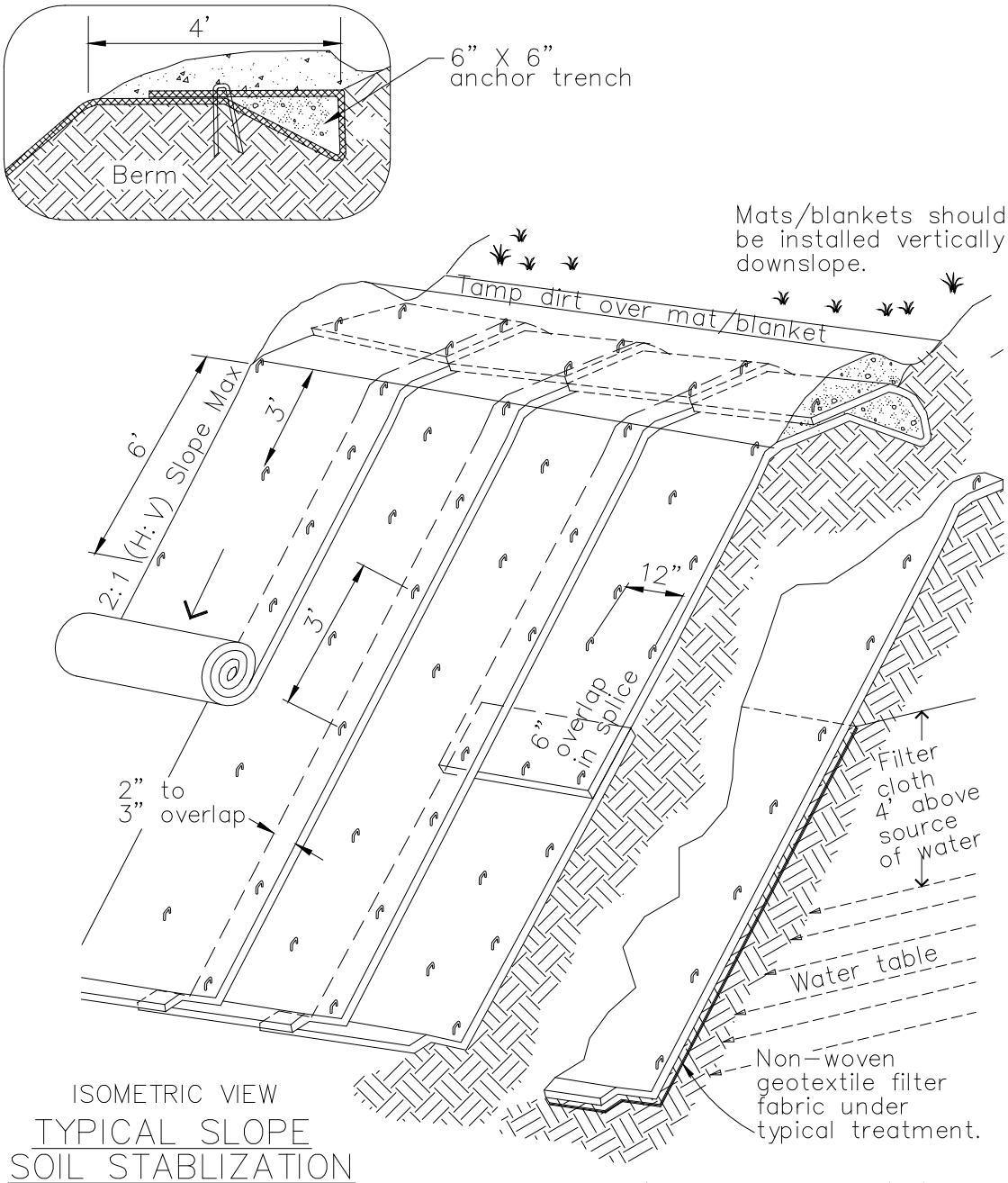
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ISOMETRIC VIEW

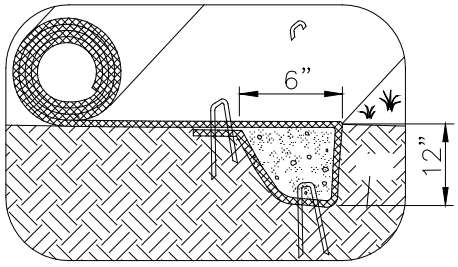
TYPICAL SLOPE
SOIL STABLIZATION
NTS

WET SLOPE LINING
NTS

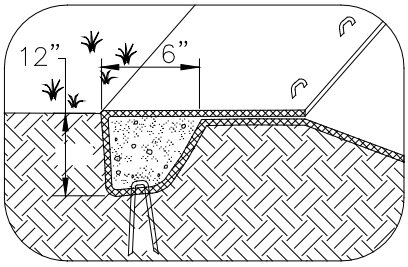
NOTES:

1. Slope surface shall be free of rocks, clods, sticks and grass. Mats/blankets shall have good soil contact.
2. Lay blankets loosely and stake or staple to maintain direct contact with the soil. Do not stretch.
3. Install per manufacturer's recommendations

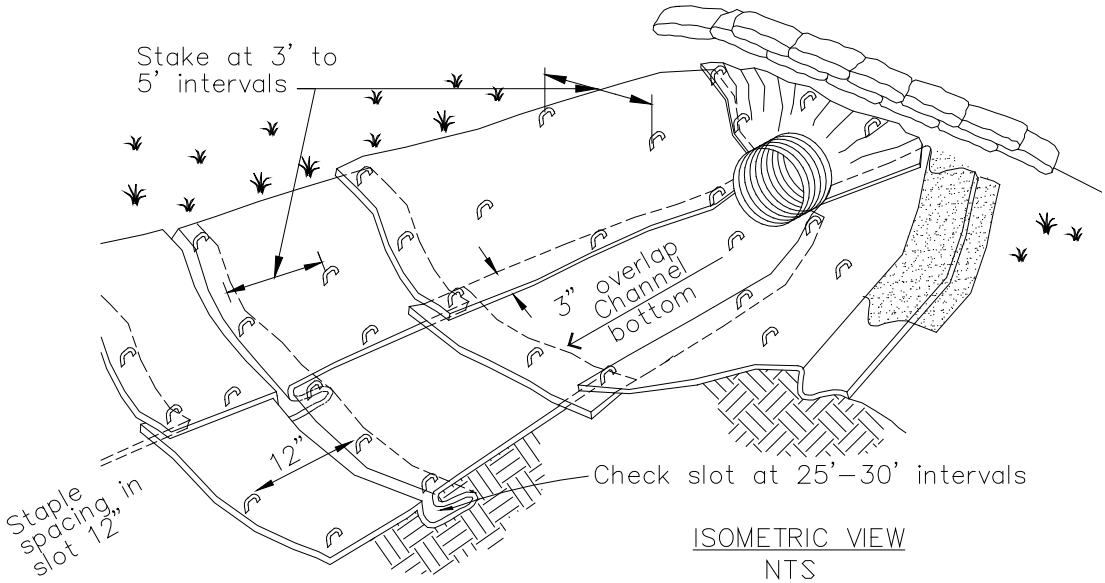
TYPICAL INSTALLATION DETAIL



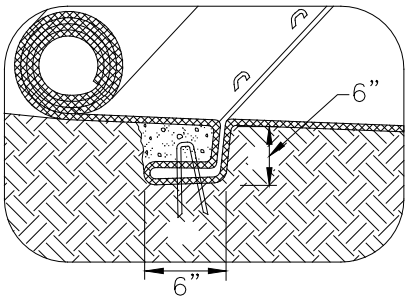
INITIAL CHANNEL ANCHOR TRENCH
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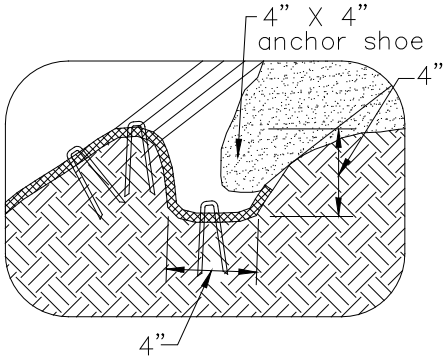
TERMINAL SLOPE AND CHANNEL ANCHOR TRENCH
NTS



ISOMETRIC VIEW
NTS



INTERMITTENT CHECK SLOT
NTS



LONGITUDINAL ANCHOR TRENCH
NTS

NOTES:
1. Check slots to be constructed per manufacturers specifications.
2. Staking or stapling layout per manufacturers specifications.
3. Install per manufacturer's recommendations

TYPICAL INSTALLATION DETAIL

Wood Mulching EC-8



Description and Purpose

Wood mulching consists of applying a mixture of shredded wood mulch or bark to disturbed soils. The primary function of wood mulching is to reduce erosion by protecting bare soil from rainfall impact, increasing infiltration, and reducing runoff.

Suitable Applications

Wood mulching is suitable for disturbed soil areas requiring temporary protection until permanent stabilization is established. Wood mulch may also be used for final stabilization; generally, used in a landscape setting or areas that will have pedestrian traffic.

Limitations

- Best suited to flat areas or gentle slopes or 5:1 (H:V) or flatter. Not suitable for use on slopes steeper than 3:1 (H:V). For slopes steeper than 3:1, consider the use of Compost Blankets (EC-14).
- Wood mulch may introduce unwanted species if it contains seed, although it may also be used to prevent weed growth if it is seed-free.
- Not suitable for areas exposed to concentrated flows.
- If used for temporary stabilization, wood mulch may need to be removed prior to further earthwork.

Categories

EC	Erosion Control	☑
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	☒
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

EC-3 Hydraulic Mulch

EC-4 Hydroseeding

EC-5 Soil Binders

EC-6 Straw Mulch

EC-7 Geotextiles and Mats

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Implementation

Mulch Selection

There are many types of mulches. Selection of the appropriate type of mulch should be based on the type of application, site conditions, and compatibility with planned or future uses.

Application Procedures

Prior to application, after existing vegetation has been removed, roughen embankment and fill areas by rolling with a device such as a punching type roller or by track walking. The construction application procedures for mulches vary significantly depending upon the type of mulching method specified. Two methods are highlighted here:

- Green Material: This type of mulch is produced by the recycling of vegetation trimmings such as grass, shredded shrubs, and trees. Chipped brush from on-site vegetation clearing activities may be used (this may require stockpiling and reapplying after earthwork is complete). Methods of application are generally by hand although pneumatic methods are available.
  - Green material can be used as a temporary ground cover with or without seeding.
  - The green material should be evenly distributed on site to a depth of not more than 2 in.
- Shredded Wood: Suitable for ground cover in ornamental or revegetated plantings.
  - Shredded wood/bark is conditionally suitable. See note under limitations.
  - Distribute by hand or use pneumatic methods.
  - Evenly distribute the mulch across the soil surface to a depth of 2 to 3 in.
- Avoid mulch placement onto roads, sidewalks, drainage channels, existing vegetation, etc.

Costs

Assuming a 2-in. layer of wholesale landscaping-grade wood mulch, the average one-time cost for installation may range from $15,000 – $23,000 per acre[1]. Costs can increase if the source is not close to the project site.

Inspection and Maintenance

- Inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Areas where erosion is evident shall be repaired and BMPs reapplied as soon as possible. Care should be exercised to minimize the damage to protected areas while making repairs, as any area damaged will require reapplication of BMPs.

[1] Costs based on estimates provided by the California Department of Transportation's *Soil Stabilization BMP Research for Erosion and Sediment Controls Cost Survey Technical Memorandum*, CTSW-TM-07-172.35.1, July 2007 (available at: http://www.dot.ca.gov/hq/LandArch/16_la_design/guidance/estimating/Soil_Stabilization_Pricing.pdf) and adjusted for inflation from 1997 to 2016.

- Regardless of the mulching technique selected, the key consideration in inspection and maintenance is that the mulch needs to last long enough to achieve erosion control objectives. If the mulch is applied as a stand-alone erosion control method over disturbed areas (without seed), it should last the length of time the site will remain barren or until final re-grading and revegetation.
- Where vegetation is not the ultimate cover, such as ornamental and landscape applications of bark or wood chips, inspection and maintenance should focus on longevity and integrity of the mulch.
- Reapply mulch when bare earth becomes visible.

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Controlling Erosion of Construction Sites Agriculture Information Bulletin #347, U.S. Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS) (formerly Soil Conservation Service – SCS).

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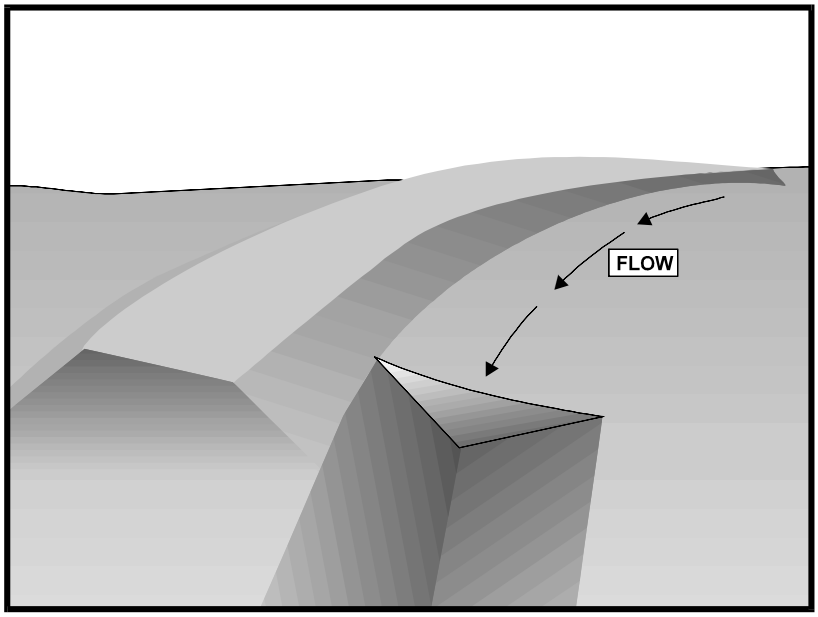
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Earth Dikes and Drainage Swales EC-9



Categories

EC	Erosion Control	☑
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

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Description and Purpose

An earth dike is a temporary berm or ridge of compacted soil used to divert runoff or channel water to a desired location. A drainage swale is a shaped and sloped depression in the soil surface used to convey runoff to a desired location. Earth dikes and drainage swales are used to divert off site runoff around the construction site, divert runoff from stabilized areas and disturbed areas, and direct runoff into sediment basins or traps.

Suitable Applications

Earth dikes and drainage swales are suitable for use, individually or together, where runoff needs to be diverted from one area and conveyed to another.

- Earth dikes and drainage swales may be used:
  - To convey surface runoff down sloping land
  - To intercept and divert runoff to avoid sheet flow over sloped surfaces
  - To divert and direct runoff towards a stabilized watercourse, drainage pipe or channel
  - To intercept runoff from paved surfaces
  - To intercept and divert run-on
  - Below steep grades where runoff begins to concentrate

- Along roadways and facility improvements subject to flood drainage
- At the top of slopes to divert runon from adjacent or undisturbed slopes
- At bottom and mid slope locations to intercept sheet flow and convey concentrated flows
- Divert sediment laden runoff into sediment basins or traps

Limitations

Dikes should not be used for drainage areas greater than 10 acres or along slopes greater than 10 percent. For larger areas more permanent drainage structures should be built. All drainage structures should be built in compliance with local municipal requirements.

- Earth dikes may create more disturbed area on site and become barriers to construction equipment.
- Earth dikes must be stabilized immediately, which adds cost and maintenance concerns.
- Diverted stormwater may cause downstream flood damage.
- Dikes should not be constructed of soils that may be easily eroded.
- Regrading the site to remove the dike may add additional cost.
- Temporary drains and swales or any other diversion of runoff should not adversely impact upstream or downstream properties.
- Temporary drains and swales must conform to local floodplain management requirements.
- Earth dikes/drainage swales are not suitable as sediment trapping devices.
- It may be necessary to use other soil stabilization and sediment controls such as check dams, plastics, and blankets, to prevent scour and erosion in newly graded dikes, swales, and ditches.
- Sediment accumulation, scour depressions, and/or persistent non-stormwater discharges can result in areas of standing water suitable for mosquito production in drainage swales.

Implementation

The temporary earth dike is a berm or ridge of compacted soil, located in such a manner as to divert stormwater to a sediment trapping device or a stabilized outlet, thereby reducing the potential for erosion and offsite sedimentation. Earth dikes can also be used to divert runoff from off site and from undisturbed areas away from disturbed areas and to divert sheet flows away from unprotected slopes.

An earth dike does not itself control erosion or remove sediment from runoff. A dike prevents erosion by directing runoff to an erosion control device such as a sediment trap or directing runoff away from an erodible area. Temporary diversion dikes should not adversely impact adjacent properties and must conform to local floodplain management regulations and should not be used in areas with slopes steeper than 10%.

Earth Dikes and Drainage Swales EC-9

Slopes that are formed during cut and fill operations should be protected from erosion by runoff. A combination of a temporary drainage swale and an earth dike at the top of a slope can divert runoff to a location where it can be brought to the bottom of the slope (see EC-11, Slope Drains). A combination dike and swale is easily constructed by a single pass of a bulldozer or grader and compacted by a second pass of the tracks or wheels over the ridge. Diversion structures should be installed when the site is initially graded and remain in place until post construction BMPs are installed and the slopes are stabilized.

Diversion practices concentrate surface runoff, increasing its velocity and erosive force. Thus, the flow out of the drain or swale must be directed onto a stabilized area or into a grade stabilization structure. If significant erosion will occur, a swale should be stabilized using vegetation, chemical treatment, rock rip-rap, matting, or other physical means of stabilization. Any drain or swale that conveys sediment laden runoff must be diverted into a sediment basin or trap before it is discharged from the site.

General

- Care must be applied to correctly size and locate earth dikes, drainage swales. Excessively steep, unlined dikes, and swales are subject to erosion and gully formation.
- Conveyances should be stabilized.
- Use a lined ditch for high flow velocities.
- Select flow velocity based on careful evaluation of the risks due to erosion of the measure, soil types, overtopping, flow backups, washout, and drainage flow patterns for each project site.
- Compact any fills to prevent unequal settlement.
- Do not divert runoff onto other property without securing written authorization from the property owner.
- When possible, install and utilize permanent dikes, swales, and ditches early in the construction process.
- Provide stabilized outlets.

Earth Dikes

Temporary earth dikes are a practical, inexpensive BMP used to divert stormwater runoff. Temporary diversion dikes should be installed in the following manner:

- All dikes should be compacted by earth moving equipment.
- All dikes should have positive drainage to an outlet.
- All dikes should have 2:1 or flatter side slopes, 18 in. minimum height, and a minimum top width of 24 in. Wide top widths and flat slopes are usually needed at crossings for construction traffic.

- May be covered with hydro mulch, hydroseed, wood mulch, compost blanket, or RECP for stabilization.
- The outlet from the earth dike must function with a minimum of erosion. Runoff should be conveyed to a sediment trapping device such as a Sediment Trap (SE-3) or Sediment Basin (SE-2) when either the dike channel or the drainage area above the dike are not adequately stabilized.
- Temporary stabilization may be achieved using seed and mulching for slopes less than 5% and either rip-rap or sod for slopes in excess of 5%. In either case, stabilization of the earth dike should be completed immediately after construction or prior to the first rain.
- If riprap is used to stabilize the channel formed along the toe of the dike, the following typical specifications apply:

Channel Grade	Riprap Stabilization
0.5-1.0%	4 in. Rock
1.1-2.0%	6 in. Rock
2.1-4.0%	8 in. Rock
4.1-5.0%	8 in. -12 in. Riprap

- The stone riprap, recycled concrete, etc. used for stabilization should be pressed into the soil with construction equipment.
- Filter cloth may be used to cover dikes in use for long periods.
- Construction activity on the earth dike should be kept to a minimum.

Drainage Swales

Drainage swales are only effective if they are properly installed. Swales are more effective than dikes because they tend to be more stable. The combination of a swale with a dike on the downhill side is the most cost-effective diversion.

Standard engineering design criteria for small open channel and closed conveyance systems should be used (see the local drainage design manual). Unless local drainage design criteria state otherwise, drainage swales should be designed as follows:

- No more than 5 acres may drain to a temporary drainage swale.
- Place drainage swales above or below, not on, a cut or fill slope.
- Swale bottom width should be at least 2 ft.
- Depth of the swale should be at least 18 in.
- Side slopes should be 2:1 or flatter.
- Drainage or swales should be laid at a grade of at least 1 %, but not more than 15 %.

- The swale must not be overtopped by the peak discharge from a 10-year storm, irrespective of the design criteria stated above.
- Remove all trees, stumps, obstructions, and other objectionable material from the swale when it is built.
- Compact any fill material along the path of the swale.
- Stabilize all swales immediately. Seed and mulch swales at a slope of less than 5 % and use rip-rap or sod for swales with a slope between 5 and 15 %. For temporary swales, geotextiles and mats (EC-7) may provide immediate stabilization.
- Irrigation may be required to establish sufficient vegetation to prevent erosion.
- Do not operate construction vehicles across a swale unless a stabilized crossing is provided.
- Permanent drainage facilities must be designed by a professional engineer (see the local drainage design criteria for proper design).
- At a minimum, the drainage swale should conform to predevelopment drainage patterns and capacities.
- Construct the drainage swale with a positive grade to a stabilized outlet.
- Provide erosion protection or energy dissipation measures if the flow out of the drainage swale can reach an erosive velocity.

Costs

- Cost ranges from $19 to $70 per ft. for both earthwork and stabilization and depends on availability of material, site location, and access (Adjusted for inflation (2016 dollars) by Tetra Tech, Inc.).
- Small dikes: $3 - $8/linear ft.; Large dikes: $3/yd^3 (Adjusted for inflation (2016 dollars) by Tetra Tech, Inc.).
- The cost of a drainage swale increases with drainage area and slope. Typical swales for controlling internal erosion are inexpensive, as they are quickly formed during routine earthwork.

Inspection and Maintenance

- Inspect BMPs prior to forecast rain, daily during extended rain events, after rain events, weekly during the rainy season, and at two-week intervals during the non-rainy season.
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.
- Inspect ditches and berms for washouts. Replace lost riprap, damaged linings or soil stabilizers as needed.

- Inspect channel linings, embankments, and beds of ditches and berms for erosion and accumulation of debris and sediment. Remove debris and sediment and repair linings and embankments as needed.

- Temporary conveyances should be completely removed as soon as the surrounding drainage area has been stabilized or at the completion of construction

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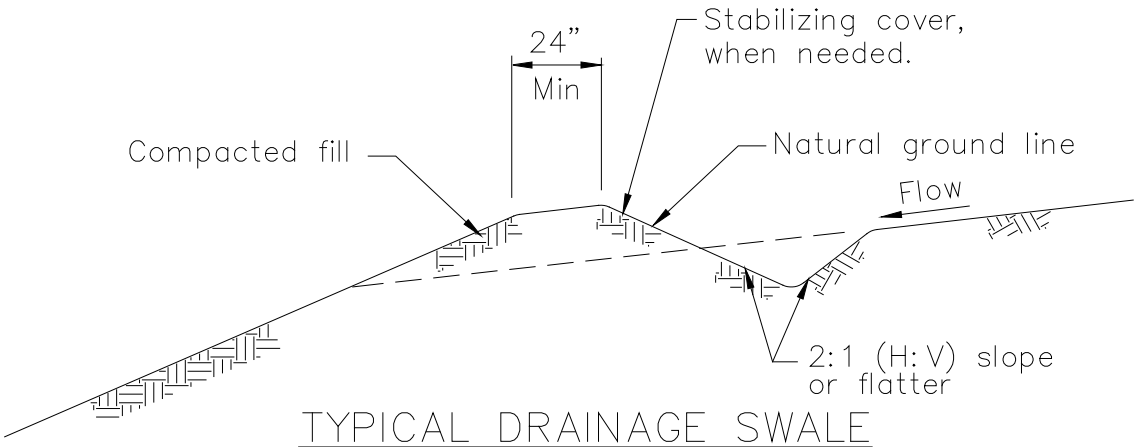
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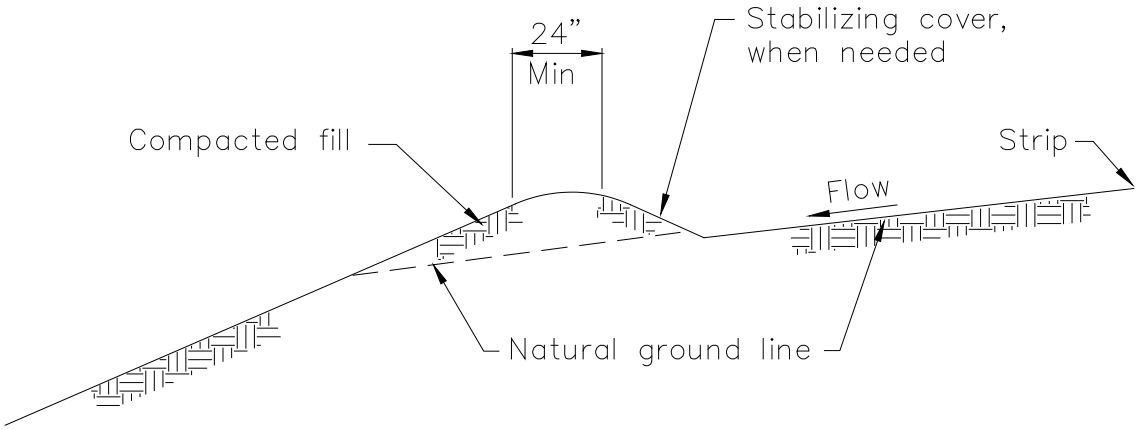
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TYPICAL DRAINAGE SWALE
NOT TO SCALE

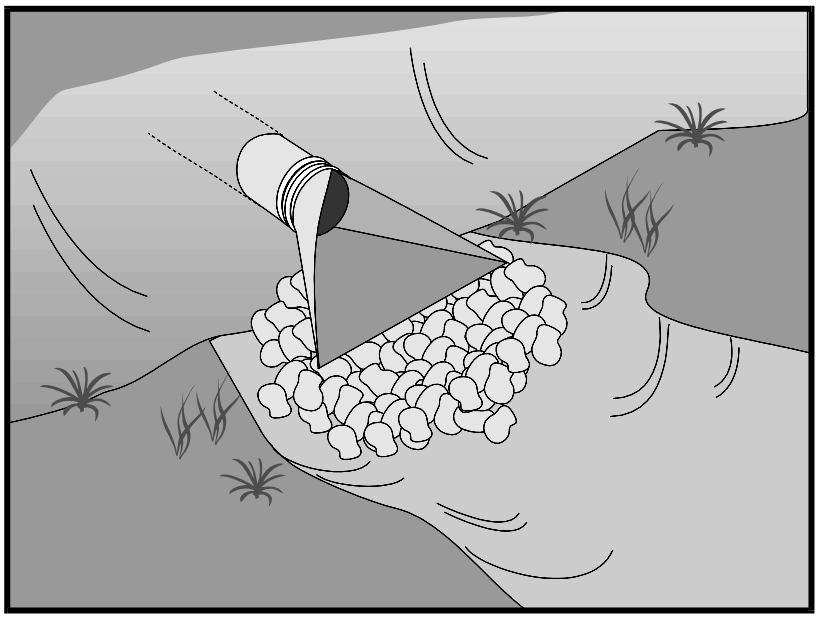
NOTES:

1. Stabilize inlet, outlets and slopes.
2. Properly compact the subgrade.



TYPICAL EARTH DIKE
NOT TO SCALE

Velocity Dissipation Devices EC-10



Categories

EC	Erosion Control	☑
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

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Description and Purpose

Outlet protection is a physical device composed of rock, grouted riprap, or concrete rubble, which is placed at the outlet of a pipe or channel to prevent scour of the soil caused by concentrated, high velocity flows.

Suitable Applications

Whenever discharge velocities and energies at the outlets of culverts, conduits, or channels are sufficient to erode the next downstream reach. This includes temporary diversion structures to divert runon during construction.

- These devices may be used at the following locations:
  - Outlets of pipes, drains, culverts, slope drains, diversion ditches, swales, conduits, or channels.
  - Outlets located at the bottom of mild to steep slopes.
  - Discharge outlets that carry continuous flows of water.
  - Outlets subject to short, intense flows of water, such as flash floods.
  - Points where lined conveyances discharge to unlined conveyances

Limitations

- Large storms or high flows can wash away the rock outlet protection and leave the area susceptible to erosion.

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- Sediment captured by the rock outlet protection may be difficult to remove without removing the rock.
- Outlet protection may negatively impact the channel habitat.
- Grouted riprap may break up in areas of freeze and thaw.
- If there is not adequate drainage, and water builds up behind grouted riprap, it may cause the grouted riprap to break up due to the resulting hydrostatic pressure.
- Sediment accumulation, scour depressions, and/or persistent non-stormwater discharges can result in areas of standing water suitable for mosquito production in velocity dissipation devices.

Implementation

General

Outlet protection is needed where discharge velocities and energies at the outlets of culverts, conduits or channels are sufficient to erode the immediate downstream reach. This practice protects the outlet from developing small eroded pools (plange pools) and protects against gully erosion resulting from scouring at a culvert mouth.

Design and Layout

As with most channel design projects, depth of flow, roughness, gradient, side slopes, discharge rate, and velocity should be considered in the outlet design. Compliance to local and state regulations should also be considered while working in environmentally sensitive streambeds. General recommendations for rock size and length of outlet protection mat are shown in the rock outlet protection figure in this BMP and should be considered minimums. The apron length and rock size gradation are determined using a combination of the discharge pipe diameter and estimate discharge rate: Select the longest apron length and largest rock size suggested by the pipe size and discharge rate. Where flows are conveyed in open channels such as ditches and swales, use the estimated discharge rate for selecting the apron length and rock size. Flows should be same as the culvert or channel design flow but never the less than the peak 5-year flow for temporary structures planned for one rainy season, or the 10-year peak flow for temporary structures planned for two or three rainy seasons.

- There are many types of energy dissipaters, with rock being the one that is represented in the attached figure.
- Best results are obtained when sound, durable, and angular rock is used.
- Install riprap, grouted riprap, or concrete apron at selected outlet. Riprap aprons are best suited for temporary use during construction. Grouted or wired tied rock riprap can minimize maintenance requirements.
- Rock outlet protection is usually less expensive and easier to install than concrete aprons or energy dissipaters. It also serves to trap sediment and reduce flow velocities.
- Carefully place riprap to avoid damaging the filter fabric.

- Stone 4 in. to 6 in. may be carefully dumped onto filter fabric from a height not to exceed 12 in.

- Stone 8 in. to 12 in. must be hand placed onto filter fabric, or the filter fabric may be covered with 4 in. of gravel and the 8 in. to 12 in. rock may be dumped from a height not to exceed 16 in.

- Stone greater than 12 in. shall only be dumped onto filter fabric protected with a layer of gravel with a thickness equal to one half the D_{50} rock size, and the dump height limited to twice the depth of the gravel protection layer thickness.

- For proper operation of apron: Align apron with receiving stream and keep straight throughout its length. If a curve is needed to fit site conditions, place it in upper section of apron.

- Outlets on slopes steeper than 10 percent should have additional protection.

Costs

Costs are low if material is readily available. If material is imported, costs will be higher. Average installed cost is $250 per device.

Inspection and Maintenance

- Inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.

- Inspect BMPs subjected to non-stormwater discharges daily while non-stormwater discharges occur. Minimize areas of standing water by removing sediment blockages and filling scour depressions.

- Inspect apron for displacement of the riprap and damage to the underlying fabric. Repair fabric and replace riprap that has washed away. If riprap continues to wash away, consider using larger material.

- Inspect for scour beneath the riprap and around the outlet. Repair damage to slopes or underlying filter fabric immediately.

- Temporary devices should be completely removed as soon as the surrounding drainage area has been stabilized or at the completion of construction.

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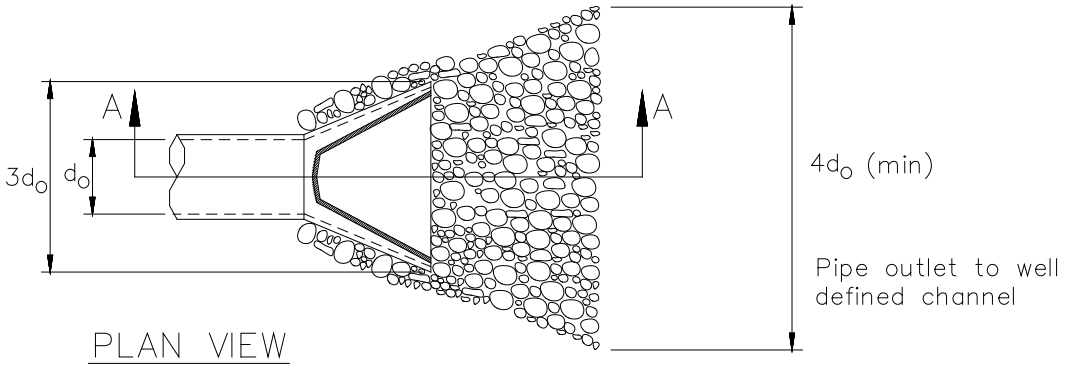
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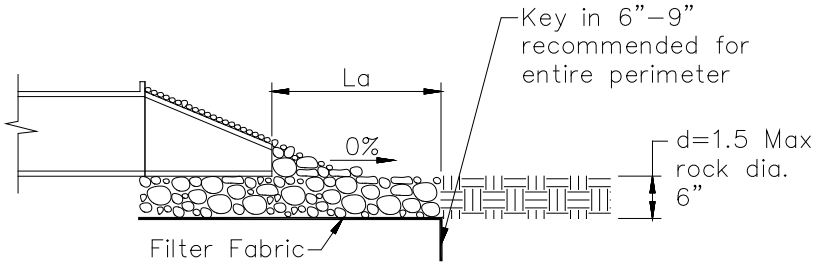
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PLAN VIEW

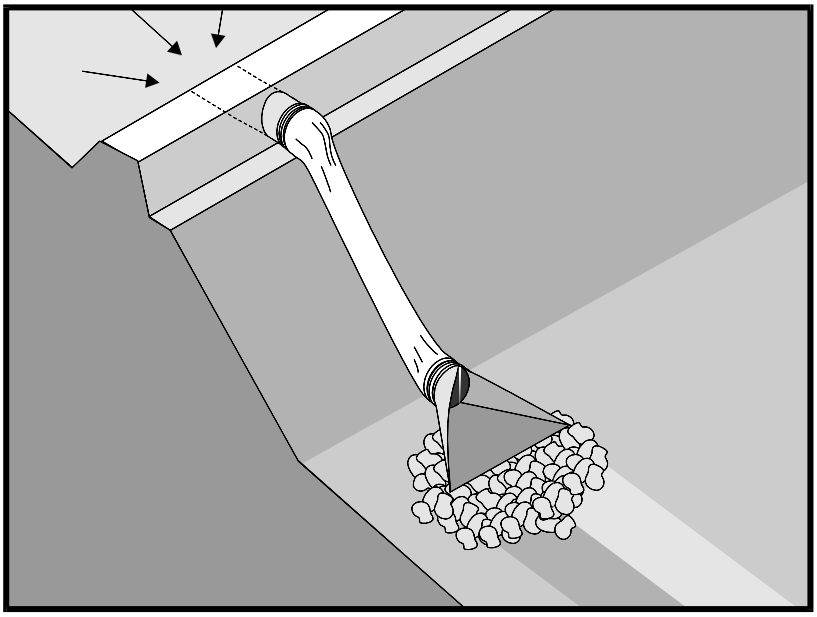


SECTION A–A

Pipe Diameter inches	Discharge ft³/s	Apron Length, La ft	Rip Rap D_{50} Diameter Min inches
12	5	10	4
	10	13	6
18	10	10	6
	20	16	8
	30	23	12
	40	26	16
24	30	16	8
	40	26	8
	50	26	12
	60	30	16

For larger or higher flows consult a Registered Civil Engineer
Source: USDA - SCS

Slope Drains EC-11



Description and Purpose

A slope drain is a pipe used to intercept and direct surface runoff or groundwater into a stabilized watercourse, trapping device, or stabilized area. Slope drains are used with earth dikes and drainage ditches to intercept and direct surface flow away from slope areas to protect cut or fill slopes.

Suitable Applications

- Where concentrated flow of surface runoff must be conveyed down a slope in order to prevent erosion.
- Drainage for top of slope diversion dikes or swales.
- Drainage for top of cut and fill slopes where water can accumulate.
- Emergency spillway for a sediment basin.

Limitations

Installation is critical for effective use of the pipe slope drain to minimize potential gully erosion.

- Maximum drainage area per slope drain is 10 acres. (For large areas use a paved chute, rock lined channel, or additional pipes.)
- Severe erosion may result when slope drains fail by overtopping, piping, or pipe separation.

Categories

EC	Erosion Control	☑
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

EC-9 Earth Dike, Drainage Swales

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- During large storms, pipe slope drains may become clogged or over charged, forcing water around the pipe and causing extreme slope erosion.
- If the sectional downdrain is not sized correctly, the runoff can spill over the drain sides causing gully erosion and potential failure of the structure.

- Dissipation of high flow velocities at the pipe outlet is required to avoid downstream erosion.
- Sediment accumulation, scour depressions, and/or persistent non-stormwater discharges can result in areas of standing water suitable for mosquito production in energy dissipaters associated with slope drain outlets.

Implementation

General

The slope drain is applicable for any construction site where concentrated surface runoff can accumulate and must be conveyed down the slope in order to prevent erosion. The slope drain is effective because it prevents the stormwater from flowing directly down the slope by confining all the runoff into an enclosed pipe or channel. Due to the time lag between grading slopes and installation of permanent stormwater collection systems and slope stabilization measures, temporary provisions to intercept runoff are sometimes necessary. Particularly in steep terrain, slope drains can protect unstabilized areas from erosion.

Installation

The slope drain may be a rigid pipe, such as corrugated metal, a flexible conduit, or a lined terrace drain with the inlet placed on the top of a slope and the outlet at the bottom of the slope. This BMP typically is used in combination with a diversion control, such as an earth dike or drainage swale at the top of the slope.

The following criteria must be considered when siting slope drains.

- Permanent structures included in the project plans can often serve as construction BMPs if implemented early. However, the permanent structure must meet or exceed the criteria for the temporary structure.
- Inlet structures must be securely entrenched and compacted to avoid severe gully erosion.
- Slope drains must be securely anchored to the slope and must be adequately sized to carry the capacity of the design storm and associated forces.
- Outlets must be stabilized with riprap, concrete or other type of energy dissipator, or directed into a stable sediment trap or basin. See EC-10, Velocity Dissipation Devices.
- Debris racks are recommended at the inlet. Debris racks located several feet upstream of the inlet can usually be larger than racks at the inlet, and thus provide enhanced debris protection and less plugging.
- Safety racks are also recommended at the inlet and outlet of pipes where children or animals could become entrapped.
- Secure inlet and surround with dikes to prevent gully erosion and anchor pipe to slope.

- When using slope drains, limit drainage area to 10 acres per pipe. For larger areas, use a rock lined channel or a series of pipes.
- Size to convey at least the peak flow of a 10-year storm. The design storm is conservative due to the potential impact of system failures.
- Maximum slope generally limited to 2:1 (H:V) as energy dissipation below steeper slopes is difficult.
- Direct surface runoff to slope drains with interceptor dikes. See BMP EC-9, Earth Dikes and Drainage Swales. Top of interceptor dikes should be 12 in. higher than the top of the slope drain.
- Slope drains can be placed on or buried underneath the slope surface.
- Recommended materials include both metal and plastic pipe, either corrugated or smooth wall. Concrete pipe can also be used.
- When installing slope drains:
  - Install slope drains perpendicular to slope contours.
  - Compact soil around and under entrance, outlet, and along length of pipe.
  - Securely anchor and stabilize pipe and appurtenances into soil.
  - Check to ensure that pipe connections are watertight.
  - Protect area around inlet with filter cloth. Protect outlet with riprap or other energy dissipation device. For high energy discharges, reinforce riprap with concrete or use reinforced concrete device.
  - Protect outlet of slope drains using a flared end section when outlet discharges to a flexible energy dissipation device.
  - A flared end section installed at the inlet will improve flow into the slope drain and prevent erosion at the pipe entrance. Use a flared end section with a 6 in. minimum toe plate to help prevent undercutting. The flared section should slope towards the pipe inlet.

Design and Layout

The capacity for temporary drains should be sufficient to convey at least the peak runoff from a 10-year rainfall event. The pipe size may be computed using the Rational Method or a method established by the local municipality. Higher flows must be safely stored or routed to prevent any offsite concentration of flow and any erosion of the slope. The design storm is purposely conservative due to the potential impacts associated with system failures.

As a guide, temporary pipe slope drains should not be sized smaller than shown in the following table:

Minimum Pipe Diameter (Inches)	Maximum Drainage Area (Acres)
12	1.0
18	3.0
21	5.0
24	7.0
30	10.0

Larger drainage areas can be treated if the area can be subdivided into areas of 10 acres or less and each area is treated as a separate drainage. Drainage areas exceeding 10 acres must be designed by a Registered Civil Engineer and approved by the agency that issued the grading permit.

Materials:

Soil type, rainfall patterns, construction schedule, local requirements, and available supply are some of the factors to be considered when selecting materials. The following types of slope drains are commonly used:

- **Rigid Pipe:** This type of slope drain is also known as a pipe drop. The pipe usually consists of corrugated metal pipe or rigid plastic pipe. The pipe is placed on undisturbed or compacted soil and secured onto the slope surface or buried in a trench. Concrete thrust blocks must be used when warranted by the calculated thrust forces. Collars should be properly installed and secured with metal strappings or watertight collars.

- **Flexible Pipe**: The flexible pipe slope drain consists of a flexible tube of heavy-duty plastic, rubber, or composite material. The tube material is securely anchored onto the slope surface. The tube should be securely fastened to the metal inlet and outlet conduit sections with metal strappings or watertight collars.

- **Section Downdrains**: The section downdrain consists of pre-fabricated, section conduit of half round or third round material. The sectional downdrain performs similar to a flume or chute. The pipe must be placed on undisturbed or compacted soil and secured into the slope.

- **Concrete-lined Terrace Drain:** This is a concrete channel for draining water from a terrace on a slope to the next level. These drains are typically specified as permanent structures and if installed early, can serve as slope drains during construction, which should be designed according to local drainage design criteria.

Costs

- Cost varies based on pipe selection and selected outlet protection.

Corrugated Steel Pipes, Per Foot	
Size	Supplied and Installed Cost (No Trenching Included)
12”	$25 per LF
15”	$28.00
18”	$33.00
24”	$41.00
30”	$64.00
PVC Pipes, Per Foot	
Size	Supplied and Installed Cost (No Trenching Included)
12”	$31.00
14”	$63.00
16”	$65.00
18”	$69.00
20”	$84.00
24”	$119.00
30”	$166.00

Adjusted for inflation (2016 dollars) by Tetra Tech, Inc.

Inspection and Maintenance

- Inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect BMPs subjected to non-stormwater discharges daily while non-stormwater discharges occur. Minimize areas of standing water by removing sediment blockages and filling scour depressions.
- Inspect outlet for erosion and downstream scour. If eroded, repair damage and install additional energy dissipation measures. If downstream scour is occurring, it may be necessary to reduce flows being discharged into the channel unless other preventative measures are implemented.
- Insert inlet for clogging or undercutting. Remove debris from inlet to maintain flows. Repair undercutting at inlet and if needed, install flared section or rip rap around the inlet to prevent further undercutting.
- Inspect pipes for leakage. Repair leaks and restore damaged slopes.

- Inspect slope drainage for accumulations of debris and sediment.
- Remove built up sediment from entrances and outlets as required. Flush drains if necessary; capture and settle out sediment from discharge.
- Make sure water is not ponding onto inappropriate areas (e.g., active traffic lanes, material storage areas, etc.).
- Pipe anchors must be checked to ensure that the pipe remains anchored to the slope. Install additional anchors if pipe movement is detected.

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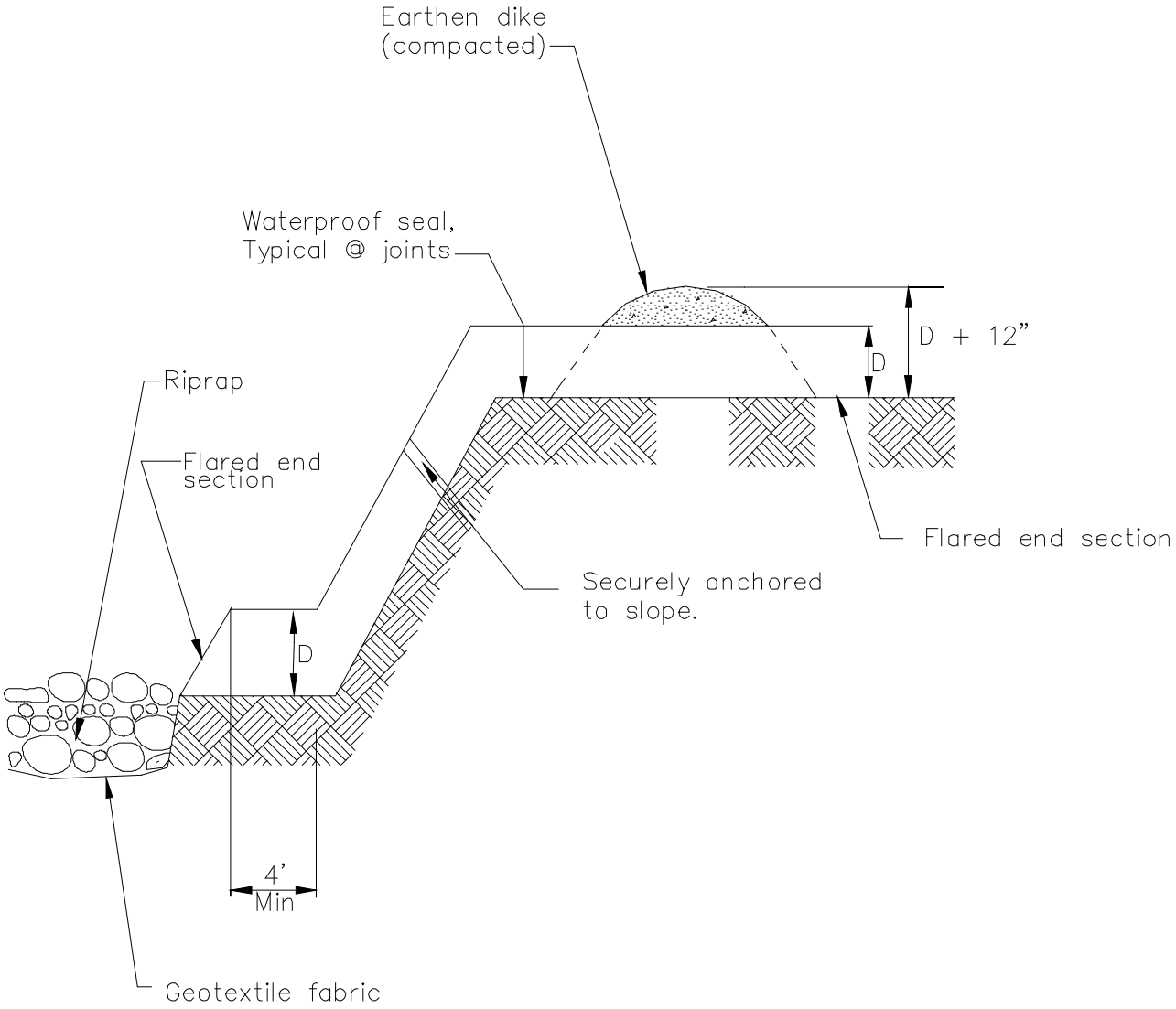
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TYPICAL SLOPE DRAIN
NOT TO SCALE

Streambank Stabilization EC-12



Categories

EC	Erosion Control	☑
SE	Sediment Control	☒
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☒
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

Combination of erosion and sediment controls.

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Description and Purpose

Stream channels, streambanks, and associated riparian areas are dynamic and sensitive ecosystems that respond to changes in land use activity. Streambank and channel disturbance resulting from construction activities can increase the stream's sediment load, which can cause channel erosion or sedimentation and have adverse affects on the biotic system. BMPs can reduce the discharge of sediment and other pollutants to minimize the impact of construction activities on watercourses. Streams on the 303(d) list and listed for sediment may require numerous measures to prevent any increases in sediment load to the stream.

Suitable Applications

These procedures typically apply to all construction projects that disturb or occur within stream channels and their associated riparian areas.

Limitations

Specific permit requirements or mitigation measures such as Regional Water Quality Control Board (RWQCB) 401 Certification, U.S. Army Corps of Engineers 404 permit and approval by California Department of Fish and Game supercede the guidance in this BMP.

- If numerical based water quality standards are mentioned in any of these and other related permits, testing and sampling may be required. Streams listed as 303(d) impaired for sediment, silt, or turbidity, are required to

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conduct sampling to verify that there is no net increase in sediment load due to construction activities.

Implementation

Planning

- Proper planning, design, and construction techniques can minimize impacts normally associated with in stream construction activities. Poor planning can adversely affect soil, fish, wildlife resources, land uses, or land users. Planning should take into account: scheduling; avoidance of in-stream construction; minimizing disturbance area and construction time period; using pre-disturbed areas; selecting crossing location; and selecting equipment.

Scheduling

- Construction activities should be scheduled according to the relative sensitivity of the environmental concerns and in accordance with EC-1, Scheduling. Scheduling considerations will be different when working near perennial streams vs. ephemeral streams and are as follows.

- When in-stream construction is conducted in a perennial stream, work should optimally be performed during the rainy season. This is because in the summer, any sediment-containing water that is discharged into the watercourse will cause a large change in both water clarity and water chemistry. During the rainy season, there is typically more and faster flowing water in the stream, so discharges are diluted faster. However, should in-stream work be scheduled for summer, establishing an isolation area, or diverting the stream, will significantly decrease the amount of sediment stirred up by construction work. Construction work near perennial streams should optimally be performed during the dry season (see below).

- When working in or near ephemeral streams, work should be performed during the dry season. By their very nature, ephemeral streams are usually dry in the summer, and therefore, in-stream construction activities will not cause significant water quality problems. However, when tying up the site at the end of the project, wash any fines (see Washing Fines) that accumulated in the channel back into the bed material, to decrease pollution from the first rainstorm of the season.

- When working near ephemeral or perennial streams, erosion and sediment controls (see silt fences, straw bale barriers, etc.) should be implemented to keep sediment out of stream channel.

Minimize Disturbance

- Minimize disturbance through: selection of the narrowest crossing location; limiting the number of equipment trips across a stream during construction; and, minimizing the number and size of work areas (equipment staging areas and spoil storage areas). Place work areas at least 50 ft from stream channel. Field reconnaissance should be conducted during the planning stage to identify work areas.

Use of Pre-Disturbed Areas

- Locate project sites and work areas in areas disturbed by prior construction or other activity when possible.

Selection of Project Site

- Avoid steep and unstable banks, highly erodible or saturated soils, or highly fractured rock.
- Select project site that minimizes disturbance to aquatic species or habitat.

Equipment Selection

- Select equipment that reduces the amount of pressure exerted on the ground surface, and therefore, reduces erosion potential and/or use overhead or aerial access for transporting equipment across drainage channels. Use equipment that exerts ground pressures of less than 5 or 6 lb/in^2, where possible. Low ground pressure equipment includes: wide or high flotation tires (34 to 72 in. wide); dual tires; bogie axle systems; tracked machines; lightweight equipment; and, central tire inflation systems.

Streambank Stabilization

Preservation of Existing Vegetation

- Preserve existing vegetation in accordance with EC-2, Preservation of Existing Vegetation. In a streambank environment, preservation of existing vegetation provides the following benefits.

Water Quality Protection

- Vegetated buffers on slopes trap sediment and promote groundwater recharge. The buffer width needed to maintain water quality ranges from 15 to 100 ft. On gradual slopes, most of the filtering occurs within the first 30 ft. Steeper slopes require a greater width of vegetative buffer to provide water quality benefits.

Streambank Stabilization

- The root system of riparian vegetation stabilizes streambanks by increasing tensile strength in the soil. The presence of vegetation modifies the moisture condition of slopes (infiltration, evapo transpiration, interception) and increases bank stability.

Riparian Habitat

- Buffers of diverse riparian vegetation provide food and shelter for riparian and aquatic organisms. Minimizing impacts to fisheries habitat is a major concern when working near streams and rivers. Riparian vegetation provides shade, shelter, organic matter (leaf detritus and large woody debris), and other nutrients that are necessary for fish and other aquatic organisms. Buffer widths for habitat concerns are typically wider than those recommended for water quality concerns (100 to 1500 ft).
- When working near watercourses, it is important to understand the work site's placement in the watershed. Riparian vegetation in headwater streams has a greater impact on overall water quality than vegetation in downstream reaches. Preserving existing vegetation upstream is necessary to maintain water quality, minimize bank failure, and maximize riparian habitat, downstream of the work site.

Limitations

- Local county and municipal ordinances regarding width, extent and type of vegetative buffer required may exceed the specifications provided here; these ordinances should be investigated prior to construction.

Streambank Stabilization Specific Installation

- As a general rule, the width of a buffer strip between a road and the stream is recommended to be 50 ft plus four times the percent slope of the land, measured between the road and the top of stream bank.

Hydraulic Mulch

- Apply hydraulic mulch on disturbed streambanks above mean high water level in accordance with EC-3, Hydraulic Mulch to provide temporary soil stabilization.

Limitations

- Do not place hydraulic mulch or tackifiers below the mean high-water level, as these materials could wash into the channel and impact water quality or possibly cause eutrophication (eutrophication is an algal bloom caused by excessively high nutrient levels in the water).

Hydroseeding

- Hydroseed disturbed streambanks in accordance with EC-4, Hydroseeding.

Limitations

- Do not place tackifiers or fertilizers below the mean high-water level, as these materials could wash into the channel and impact water quality or possibly cause eutrophication.

Soil Binders

- Apply soil binders to disturbed streambanks in accordance with EC-5, Soil Binders.

Limitations

- Do not place soil binders below the mean high-water level. Soil binder must be environmentally benign and non-toxic to aquatic organisms.

Straw Mulch

- Apply straw mulch to disturbed streambanks in accordance with EC-6, Straw Mulch.

Limitations

- Do not place straw mulch below the mean high-water level, as this material could wash into the channel and impact water quality or possibly cause eutrophication.

Geotextiles and Mats

- Install geotextiles and mats as described in EC-7, Geotextiles and Mats, to stabilize disturbed channels and streambanks. Not all applications should be in the channel, for example, certain geotextile netting may snag fish gills and are not appropriate in fish bearing streams. Geotextile fabrics that are not biodegradable are not appropriate for in stream use. Additionally, geotextile fabric or blankets placed in channels must be adequate to sustain anticipated hydraulic forces.

Earth Dikes, Drainage Swales, and Lined Ditches

- Convey, intercept, or divert runoff from disturbed streambanks using EC-9, Earth Dikes and Drainage Swales.

Limitations

- Do not place earth dikes in watercourses, as these structures are only suited for intercepting sheet flow and should not be used to intercept concentrated flow.

- Appropriately sized velocity dissipation devices (EC-10) must be placed at outlets to minimize erosion and scour.

Velocity Dissipation Devices

- Place velocity dissipation devices at outlets of pipes, drains, culverts, slope drains, diversion ditches, swales, conduits or channels in accordance with EC-10, Velocity Dissipation Devices.

Slope Drains

- Use slope drains to intercept and direct surface runoff or groundwater into a stabilized watercourse, trapping device or stabilized area in accordance with EC-11, Slope Drains.

Limitations

- Appropriately sized outlet protection and velocity dissipation devices (EC-10) must be placed at outlets to minimize erosion and scour.

Streambank Sediment Control

Silt Fences

- Install silt fences in accordance with SE-1, Silt Fence, to control sediment. Silt fences should only be installed where sediment laden water can pond, thus allowing the sediment to settle out.

Fiber Rolls

- Install fiber rolls in accordance with SE-5, Fiber Rolls, along contour of slopes above the high-water level to intercept runoff, reduce flow velocity, release the runoff as sheet flow and provide removal of sediment from the runoff. In a stream environment, fiber rolls should be used in conjunction with other sediment control methods such as SE-1, Silt Fence or SE-9 Straw Bale Barrier. Install silt fence, straw bale barrier, or other erosion control method along toe of slope above the high-water level.

Gravel Bag Berm

- A gravel bag berm or barrier can be utilized to intercept and slow the flow of sediment laden sheet flow runoff in accordance with SE-6, Gravel Bag Berm. In a stream environment gravel bag barrier can allow sediment to settle from runoff before water leaves the construction site and can be used to isolate the work area from the live stream.

Limitations

- Gravel bag barriers are not recommended as a perimeter sediment control practice around streams.

Straw Bale Barrier

- Install straw bale barriers in accordance with SE-9, Straw Bale Barrier, to control sediment. Straw bale barriers should only be installed where sediment laden water can pond, thus allowing the sediment to settle out. Install a silt fence in accordance with SE-1, Silt Fence,

on down slope side of straw bale barrier closest to stream channel to provide added sediment control.

Rock Filter

Description and Purpose

Rock filters are temporary erosion control barriers composed of rock that is anchored in place. Rock filters detain the sediment laden runoff, retain the sediment, and release the water as sheet flow at a reduced velocity. Typical rock filter installations are illustrated at the end of this BMP.

Applications

- Near the toe of slopes that may be subject to flow and rill erosion.

Limitations

- Inappropriate for contributing drainage areas greater than 5 acres.
- Requires sufficient space for ponded water.
- Ineffective for diverting runoff because filters allow water to slowly seep through.
- Rock filter berms are difficult to remove when construction is complete.
- Unsuitable in developed areas or locations where aesthetics is a concern.

Specifications

- Rock: open graded rock, 0.75 to 5 in. for concentrated flow applications.
- Woven wire sheathing: 1 in. diameter, hexagonal mesh, galvanized 20gauge (used with rock filters in areas of concentrated flow).
- In construction traffic areas, maximum rock berm heights should be 12 in. Berms should be constructed every 300 ft on slopes less than 5%, every 200 ft on slopes between 5% and 10%, and every 100 ft on slopes greater than 10%.

Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect weekly during the rainy season and at two-week intervals in the non-rainy season to verify continued BMP implementation.
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.
- Reshape berms as needed and replace lost or dislodged rock, and filter fabric.
- Sediment that accumulates in the BMP must be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when the sediment accumulation reaches one third of the barrier height. Sediment removed during maintenance may be incorporated into earthwork on the site or disposed at an appropriate location.

K-rail

Description and Purpose

This is temporary sediment control that uses K-rails to form the sediment deposition area, or to isolate the near bank construction area. Install K-rails at toe of slope in accordance with procedures described in NS-5, Clear Water Diversion.

Barriers are placed end to end in a pre-designed configuration and gravel filled bags are used at the toe of the barrier and at their abutting ends to seal and prevent movement of sediment beneath or through the barrier walls.

Appropriate Applications

- This technique is useful at the toe of embankments, cuts or fills slopes.

Limitations

- The K-rail method should not be used to dewater a project site, as the barrier is not watertight.

Implementation

- Refer to NS-5, Clear Water Diversion, for implementation requirements.

Instream Construction Sediment Control

There are three different options currently available for reducing turbidity while working in a stream or river. The stream can be isolated from the area in which work is occurring by means of a water barrier, the stream can be diverted around the work site through a pipe or temporary channel, or one can employ construction practices that minimize sediment suspension.

Whatever technique is implemented, an important thing to remember is that dilution can sometimes be the solution. A probable "worst time" to release high TSS into a stream system might be when the stream is very low; summer low flow, for example. During these times, the flow may be low while the biological activity in the stream is very high. Conversely, the addition of high TSS or sediment during a big storm discharge might have a relatively low impact, because the stream is already turbid, and the stream energy is capable of transporting both suspended solids, and large quantities of bedload through the system. The optimum time to "pull" in-stream structures may be during the rising limb of a storm hydrograph.

Techniques to minimize Total Suspended Solids (TSS)

- **Padding** - Padding laid in the stream below the work site may trap some solids that are deposited in the stream during construction. After work is done, the padding is removed from the stream, and placed on the bank to assist in re-vegetation.

- **Clean, washed gravel** - Using clean, washed gravel decreases solid suspension, as there are fewer small particles deposited in the stream.

- **Excavation using a large bucket** - Each time a bucket of soil is placed in the stream, a portion is suspended. Approximately the same amount is suspended whether a small amount of soil is placed in the stream, or a large amount. Therefore, using a large excavator bucket instead of a small one, will reduce the total amount of soil that washes downstream.

- **Use of dozer for backfilling** - Using a dozer for backfilling instead of a backhoe follows the same principles – the fewer times soil is deposited in the stream, the less soil will be suspended.

- **Partial dewatering with a pump** - Partially dewatering a stream with a pump reduces the amount of water, and thus the amount of water that can suspend sediment.

Washing Fines

Definition and Purpose

- Washing fines is an "in-channel" sediment control method, which uses water, either from a water truck or hydrant, to wash stream fines that were brought to the surface of the channel bed during restoration, back into the interstitial spaces of the gravel and cobbles.

- The purpose of this technique is to reduce or eliminate the discharge of sediment from the channel bottom during the first seasonal flow. Sediment should not be allowed into stream channels; however, occasionally in-channel restoration work will involve moving or otherwise disturbing fines (sand and silt sized particles) that are already in the stream, usually below bankfull discharge elevation. Subsequent re-watering of the channel can result in a plume of turbidity and sedimentation.

- This technique washes the fines back into the channel bed. Bedload materials, including gravel cobbles, boulders and those fines, are naturally mobilized during higher storm flows. This technique is intended to delay the discharge until the fines would naturally be mobilized.

Appropriate Applications

- This technique should be used when construction work is required in channels. It is especially useful in intermittent or ephemeral streams in which work is performed "in the dry", and which subsequently become re-watered.

Limitations

- The stream must have sufficient gravel and cobble substrate composition.

- The use of this technique requires consideration of time of year and timing of expected stream flows.

- The optimum time for the use of this technique is in the fall, prior to winter flows.

- Consultation with, and approval from the Department of Fish and Game and the Regional Water Quality Control Board may be required.

Implementation

- Apply sufficient water to wash fines, but not cause further erosion or runoff.

- Apply water slowly and evenly to prevent runoff and erosion.

- Consult with Department of Fish and Game and the Regional Water Quality Control Board for specific water quality requirements of applied water (e.g. chlorine).

Inspection and Maintenance

- None necessary

Costs

Cost may vary according to the combination of practices implemented.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events until final stabilization is achieved.

- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.

- Inspect and repair equipment (for damaged hoses, fittings, and gaskets).

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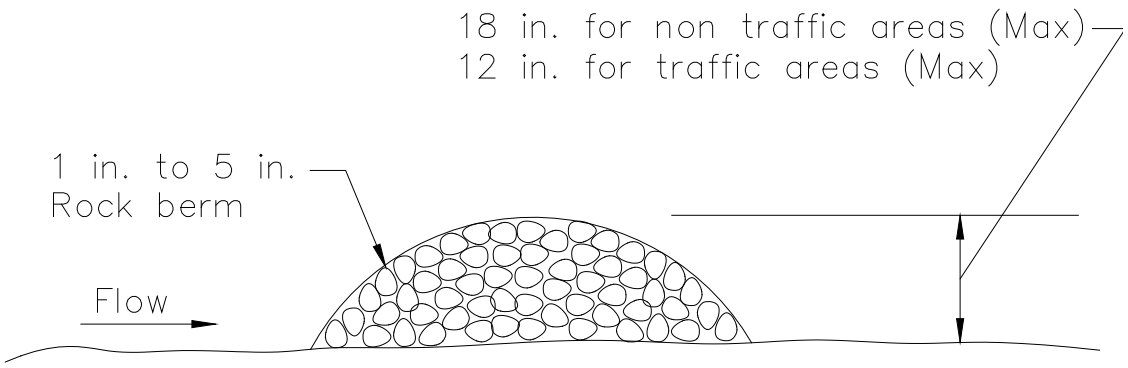
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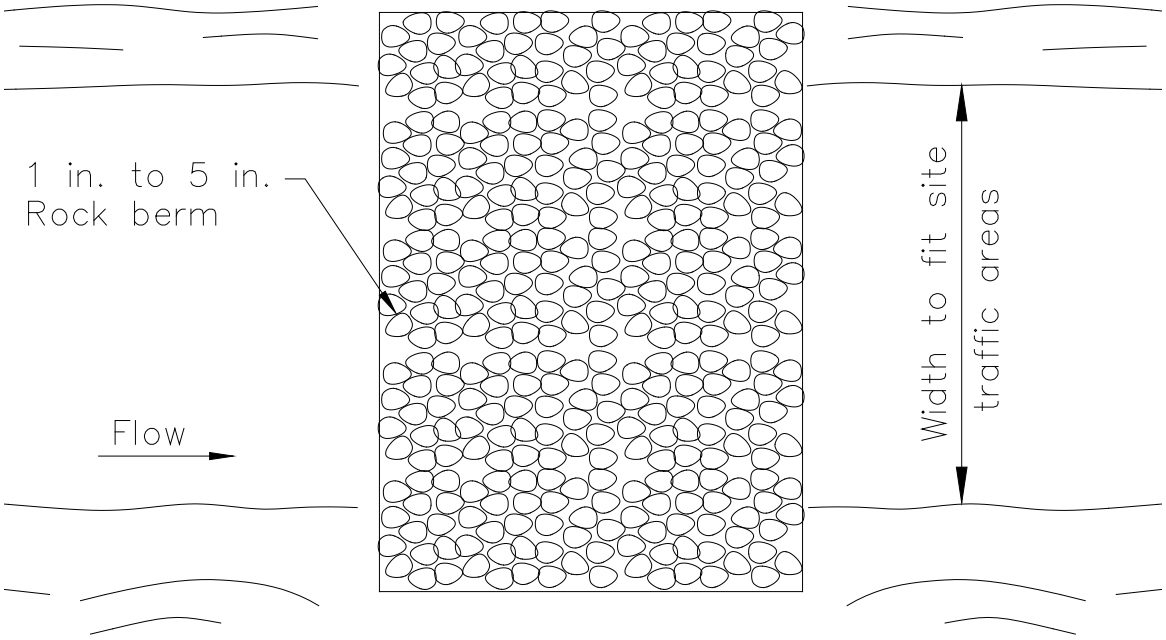
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SECTION



PLAN

TYPICAL ROCK FILTER
NOT TO SCALE

Compost Blanket EC-14



Categories

EC	Erosion Control	☑
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

EC-3 Hydraulic Mulch

EC-4 Hydroseeding

EC-5 Soil Binders

EC-7 Geotextiles and Mats

EC-8 Wood Mulching

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Description and Purpose

A compost blanket is applied to slopes and earth disturbed areas to prevent erosion, and in some cases, increase infiltration and/or establish vegetation. The compost blanket can be applied by hand, conveyor system, compost spreader, or pneumatic delivery (blower) system. The blanket thickness is determined from the slope steepness and anticipated precipitation. A compost blanket protects the soil surface from raindrop erosion, particularly rills and gullies that may form under other methods of erosion control.

A compost blanket, if properly installed, can be very successful at vegetation establishment, weed suppression and erosion control. The compost blanket comes into direct contact with the underlying soil, reducing rill formation. Furthermore, compost provides organic matter and nutrients important for vegetation growth. The compost blanket provides soil structure that allows water to infiltrate the soil surface and retain moisture, which also promotes seed germination and vegetation growth, in addition to reducing runoff.

Compost is typically derived from combinations of feedstocks, biosolids, leaf and yard trimmings, manure, wood, or mixed solid waste. Many types of compost are products of municipal recycle or "Green waste" programs. Compost is organic and biodegradable and can be left onsite. There are many types of compost with a variety of properties with specific functions, and accordingly, compost selection is an important design consideration in the application of this type of erosion control.

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Suitable Applications

A compost blanket is appropriate for slopes and earth disturbed areas requiring protection until permanent stabilization is established. A compost blanket can also used in combination with temporary and/or permanent seeding strategies to enhance plant establishment. Examples include:

- Rough-graded areas that will remain inactive for longer than 14 days
- Soil stockpiles
- Slopes with exposed soil between existing vegetation such as trees or shrubs
- Slopes planted with live, container-grown vegetation
- Disturbed areas where plants are slow to develop

A compost blanket is typically used on slopes of 2:1 (H:V) or gentler. However, a compost blanket can be effective when applied to slopes as steep as 1:1 (H:V) with appropriate design considerations including slope length, blanket thickness, adding components such as a tackifier, or using compost blankets in conjunction with other techniques, such as compost socks and berms or fiber rolls.

Compost can be pre-seeded prior to application to the soil (recommended by the EPA for construction site stormwater runoff control) or seeded after the blanket has been installed. The compost medium can also remove pollutants in stormwater including heavy metals; oil and grease; and hydrocarbons (USEPA, 1998).

Limitations

- Compost can potentially leach nutrients (dissolved phosphorus and nitrogen) into runoff and potentially impact water quality. Compost should not be used directly upstream from nutrient impaired waterbodies (Adams et. al, 2008).
- Compost may also contain other undesirable constituents that are detrimental to water quality. Carefully consider the qualifications and experience of any compost producer/supplier.
- A compost blanket applied by hand is more time intensive and potentially costly. Using a pneumatic blower truck is the recommended cost-effective method of application.
- When blowers are used, the treatment areas should be within 300 ft of a road or surface capable of supporting trucks.
- Wind may limit application of compost and result in application to undesired locations.
- Compost blankets should not be applied in areas of concentrated flows.
- Steeper slopes may require additional blanket thickness and other stability measures such as using tackifiers or slope interruption devices (compost socks and berms, or fiber rolls). The same applies for sites with high precipitation totals or during the rainy season.

Implementation

- Additional guidance on the comparison and selection of temporary slope stabilization methods is provided in Appendix F of the Handbook.

Compost Materials

- California Compost Regulations (Title 14, California Code of Regulations, Division 7, Chapter 3.1, Article 7, Section 17868.3) define and require a quality of compost for application. Compost should comply with all physical and chemical requirements. Specific requirements are provided in Table 1 below, taken from Caltrans Standard Special Provision 10-1 (SSP 10-1), Erosion Control (Compost Blanket).

- The compost producer should be fully permitted as specified under the California Integrated Waste Management Board, Local Enforcement Agencies and any other State and Local Agencies that regulate Solid Waste Facilities. If exempt from State permitting requirements, the composting facility should certify that it follows guidelines and procedures for production of compost meeting the environmental health standards of Title 14, California Code of Regulations, Division 7, Chapter 3.1, Article 7.

- The compost producer should be a participant in United States Composting Council's Seal of Testing Assurance program.

- Compost moisture should be considered for composition quality and application purposes. A range of 30-50% is typical. Compost that is too dry is hard to apply and compost that is too wet is more difficult (and more expensive) to transport. For arid or semi-arid areas, or for application during the dry season, use compost with greater moisture content than areas with wetter climates. For wetter or more humid climates or for application during the wet season, drier composts can be used as the compost will absorb moisture from the ambient air.

- Organic content of the compost is also important and should range from 30 to 65% depending on site conditions.

- Compost should be high-quality mature compost. Immature compost can potentially leach nutrients.

- Compost should not be derived from mixed municipal solid waste and should be free of visible contaminants.

- Compost should not contain paint, petroleum products, pesticides or any other chemical residues harmful to animal life or plant growth. Metal concentrations in compost should not exceed the maximum metal concentrations listed under Title 14, California Code of Regulations, Division 7, Chapter 3.1, Section 17868.2.

- Compost should not possess objectionable odors.

- Compost should be weed free.

Table 1. Physical/Chemical Requirements of Compost
Reference - Caltrans SSP-10 Erosion Control Blanket (Compost)

Property	Test Method	Requirement
pH	*TMECC 04.11-A Elastomeric pH 1:5 Slurry Method pH Units	6.0–8.0
Soluble Salts	TMECC 04.10-A Electrical Conductivity 1:5 Slurry Method dS/m (mmhos/cm)	0-10.0
Moisture Content	TMECC 03.09-A Total Solids & Moisture at 70+/- 5 deg C % Wet Weight Basis	30-60
Organic Matter Content	TMECC 05.07-A Loss-On-Ignition Organic Matter Method (LOI) % Dry Weight Basis	30–65
Maturity	TMECC 05.05-A Germination and Vigor Seed Emergence Seedling Vigor % Relative to Positive Control	 80 or Above 80 or Above
Stability	TMECC 05.08-B Carbon Dioxide Evolution Rate mg CO_2-C/g OM per day	8 or below
Particle Size	TMECC 02.02-B Sample Sieving for Aggregate Size Classification % Dry Weight Basis	100% Passing, 3 inches 90-100% Passing, 1 inch 65-100% Passing, 3/4 inch 0 - 75% Passing, 1/4 inch Maximum length 6 inches
Pathogen	TMECC 07.01-B Fecal Coliform Bacteria < 1000 MPN/gram dry wt.	Pass
Pathogen	TMECC 07.01-B Salmonella < 3 MPN/4 grams dry wt.	Pass
Physical Contaminants	TMECC 02.02-C Man Made Inert Removal and Classification: Plastic, Glass and Metal % > 4mm fraction	Combined Total: < 1.0
Physical Contaminants	TMECC 02.02-C Man Made Inert Removal and Classification: Sharps (Sewing needles, straight pins and hypodermic needles) % > 4mm fraction	None Detected

*TMECC refers to "Test Methods for the Examination of Composting and Compost," published by the United States Department of Agriculture and the United States Compost Council (USCC).

Installation

- Prior to compost application, prepare the slope by removing loose rocks, roots, stumps, and other debris greater than 2" in diameter. Prepare the slope area surface by scarifying or track walking/roughening if necessary.
- Select method to apply the compost blanket. A pneumatic blower is most cost effective and most adaptive in applying compost to steep, rough terrain, and hard to reach locations.
- A compost blanket thickness of 1" to 4" should be applied to slopes of 2:1 (H:V) or gentler, based on site-specific conditions. Increase blanket thickness with increased slope steepness and/or during installation during the rainy season (for example, 2" to 3" should be used for a

3:1 slope, while 1" to 2" can be used for a 4:1 slope). Erosion control using a compost blanket is not recommended for slopes greater than 1:1 (H:V).

- For steeper slopes, tackifiers should be utilized and/or other stabilization techniques employed. For example, compost socks or berms can be installed at intervals over the compost blanket (in a similar manner as Fiber Rolls, SE-5).
- Compost socks or berms (or equivalent linear sediment control BMP) should be placed at the top and/or bottom of the slope for additional erosion control performance.
- For optimum vegetation establishment, a blanket thickness of 1" to 2" is recommended. If vegetation establishment is not the primary function of the compost blanket, a thicker blanket may be recommended based on slope or rainfall conditions.
- Evenly distribute compost on the soil surface to the desired blanket thickness (1/2" to 4" as calculated prior based on-site conditions and objectives). Even distribution is an important factor in preventing future rill and gully erosion.
- The compost blanket should extend 3 to 6 feet over the top of the shoulder of the slope. A compost sock or compost berm can be used at the top of the slope as an auxiliary technique to prevent runoff from flowing underneath the compost blanket.
- Use additional anchoring and erosion control BMPs in conjunction of the compost blanket as needed.

Costs

The cost associated with a compost blanket is similar to that of a straw mat and generally less expensive than a geotextile blanket (USEPA, 2009). Caltrans has provided a recent estimate for $5,600 to $9,000 per acre for application of an unseeded 1-inch compost blanket (Caltrans Compost Specifications, 2009. Adjusted for inflation (2016 dollars) by Tetra Tech, Inc.). Vendor costs indicate that proprietary blends of compost that are seeded and contain a nutrient rich "tackifier" can cost approximately $0.45 per square foot, or approximately $19,200 per acre for a 2-inch blanket (Adjusted for inflation (2016 dollars) by Tetra Tech, Inc.). Application by hand is more time intensive and likely more costly.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Areas where erosion is evident, another layer of compost should be reapplied as soon as possible. It may be necessary to install an additional type of stormwater BMP at the top of slope or as a slope interrupter to control flow, such as a fiber roll (SE-5) or compost sock (SE-11).
- Care should be exercised to minimize the damage to protected areas while making repairs, as any area damaged will require reapplication of BMPs.

- Limit or prohibit foot traffic to minimize damage to BMP or impede vegetation establishment.

References

An Analysis of Composting as an Environmental Remediation Technology, U.S. Environmental Protection Agency (USEPA), Solid Waste and Emergency Response (5305W), EPA530-R-8-008, 1998.

Characteristics of Compost: Moisture Holding and Water Quality Improvement, Center for Research in Water Resources, Kirchoff, C., Malina, J., and Barrett, M., 2003.

Compost Utilization for Erosion Control, The University of Georgia College of Agricultural and Environmental Sciences, pubs.caes.uga.edu/caespubs/pubcd/B1200.htm, Faucette, B. and Risse, M., 2009.

Demonstration Project Using Yard Debris Compost for Erosion Control, Final Report, presented to Metropolitan Service District, W&H Pacific, 1993.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, 2005.

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Standard Specifications for Transportation Materials and Methods of Sampling and Testing Designation M10-03, Compost for Erosion/Sediment Control (Compost Blankets), Provisional, American Association of State Highway Transportation Officials (AASHTO), 2003.

Stormwater Best Management Practices (BMPs) Field Trials of Erosion Control Compost in Reclamation of Rock Quarry Operations, Nonpoint Source Protection Program CWA §319(h), Texas Commission on Environmental Quality, Adams, T., McFarland, A., Hauck, L., Barrett, M., and Eck, B., 2008.

Soil Preparation/Roughening EC-15



Description and Purpose

Soil Preparation/Roughening involves assessment and preparation of surface soils for BMP installation. This can include soil testing (for seed base, soil characteristics, or nutrients), as well as roughening surface soils by mechanical methods (including sheepsfoot rolling, track walking, scarifying, stair stepping, and imprinting) to prepare soil for additional BMPs, or to break up sheet flow. Soil Preparation can also involve tilling topsoil to prepare a seed bed and/or incorporation of soil amendments, to enhance vegetative establishment.

Suitable Applications

Soil preparation: Soil preparation is essential to proper vegetative establishment. In particular, soil preparation (i.e. tilling, raking, and amendment) is suitable for use in combination with any soil stabilization method, including Rolled Erosion Control Products (RECPs) or sod. Soil preparation should not be confused with roughening.

Roughening: Soil roughening is generally referred to as track walking (sometimes called imprinting) a slope, where treads from heavy equipment run parallel to the contours of the slope and act as mini terraces. Soil preparation is most effective when used in combination with erosion controls. Soil Roughening is suitable for use as a complementary process for controlling erosion on a site. Roughening is not intended to be used as a stand-alone BMP, and should be used with perimeter controls, additional erosion control measures, grade breaks, and vegetative establishment for maximum effectiveness. Roughening is intended to only affect surface soils and should not compromise slope stability or overall compaction. Suitable applications for soil roughening include:

Categories

EC	Erosion Control	☑
SE	Sediment Control	☒
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

EC-3 Hydraulic Mulch

EC-5 Soil Binders

EC-7 Geotextiles and Mats

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- Along any disturbed slopes, including temporary stockpiles, sediment basins, or compacted soil diversion berms and swales.

- Roughening should be used in combination with hydraulically applied stabilization methods, compost blanket, or straw mulch; but should not be used in combination with RECPs or sod because roughening is intended to leave terraces on the slope.

Limitations

- Preparation and roughening must take place prior to installing other erosion controls (such as hydraulically applied stabilizers) or sediment controls (such as fiber rolls) on the faces of slopes.

- In such cases where slope preparation is minimal, erosion control/revegetation BMPs that do not require extensive soil preparation - such as hydraulic mulching and seeding applications - should be employed.

- Consideration should be given to the type of erosion control BMP that follows surface preparation, as some BMPs are not designed to be installed over various types of tillage/roughening, i.e., RECPs should not be used with soil roughening due to a "bridging" effect, which suspends the blanket above the seed bed.

- Surface roughness has an effect on the amount of mulch material that needs to be applied, which shows up as a general increase in mulch material due to an increase in surface area (Topographic Index -see EC-3 Hydraulic Mulch).

Implementation

- Additional guidance on the comparison and selection of temporary slope stabilization methods is provided in Appendix F of the Handbook.

General

A roughened surface can significantly reduce erosion. Based on tests done at the San Diego State Erosion Research Laboratory, various roughening techniques on slopes can result in a 12 - 76% reduction in the erosion rate versus smooth slopes.

Materials

Minimal materials are required unless amendments and/or seed are added to the soil. The majority of soil roughening/preparation can be done with equipment that is on hand at a normal construction site, such as bull dozers and compaction equipment.

Installation Guidelines

Soil Preparation

- Where appropriate or feasible, soil should be prepared to receive the seed by disking or otherwise scarifying the surface to eliminate crust, improve air and water infiltration and create a more favorable environment for germination and growth.

- Based upon soil testing conducted, apply additional soil amendments (e.g., fertilizers, additional seed) to the soil to help with germination. Follow EC-4, Hydroseeding, when selecting and applying seed and fertilizers.

Cut Slope Roughening:

- Stair-step grade or groove the cut slopes that are steeper than 3:1.
- Use stair-step grading on any erodible material soft enough to be ripped with a bulldozer. Slopes consisting of soft rock with some subsoil are particularly suited to stair-step grading.
- Make the vertical cut distance less than the horizontal distance, and slightly slope the horizontal position of the "step" in toward the vertical wall.
- Do not make individual vertical cuts more than 2 ft. (0.6 m) high in soft materials or more than 3 ft. (0.9 m) high in rocky materials.
- Groove the slope using machinery to create a series of ridges and depressions that run across the slope, on the contour.

Fill Slope Roughening:

- Place on fill slopes with a gradient steeper than 3:1 in lifts not to exceed 8 in. (0.2 m), and make sure each lift is properly compacted.
- Ensure that the face of the slope consists of loose, uncompacted fill 4-6 in. (0.1-0.2 m) deep.
- Use grooving or tracking to roughen the face of the slopes, if necessary.
- Do not blade or scrape the final slope face.

Roughening for Slopes to be Mowed:

- Slopes that require mowing activities should not be steeper than 3:1.
- Roughen these areas to shallow grooves by track walking, scarifying, sheepsfoot rolling, or imprinting.
- Make grooves close together (less than 10 in.), and not less than 1 in. deep, and perpendicular to the direction of runoff (i.e., parallel to the slope contours).
- Excessive roughness is undesirable where mowing is planned.

Roughening with Tracked Machinery:

- Limit roughening with tracked machinery to soils with a sandy textural component to avoid undue compaction of the soil surface.
- Operate tracked machinery up and down the slope to leave horizontal depressions in the soil. Do not back-blade during the final grading operation.
- Seed and mulch roughened areas as soon as possible to obtain optimum seed germination and growth.

Costs

Costs are based on the additional labor of tracking or preparation of the slope plus the cost of any required soil amendment materials.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Check the seeded slopes for signs of erosion such as rills and gullies. Fill these areas slightly above the original grade, then reseed and mulch as soon as possible.
- Inspect BMPs weekly during normal operations, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.

References

Soil Stabilization BMP Research for Erosion and Sediment Controls: Cost Survey Technical Memorandum, State of California Department of Transportation (Caltrans), July 2007.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.

Non-Vegetative Stabilization EC-16



Categories

EC	Erosion Control	☑
SE	Sediment Control	☒
TR	Tracking Control	
WE	Wind Erosion Control	☒
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

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Description and Purpose

Non-vegetative stabilization methods are used for temporary or permanent stabilization of areas prone to erosion and should be used only where vegetative options are not feasible; examples include:

- Areas of vehicular or pedestrian traffic such as roads or paths;
- Arid environments where vegetation would not provide timely ground coverage, or would require excessive irrigation;
- Rocky substrate, infertile or droughty soils where vegetation would be difficult to establish; and
- Areas where vegetation will not grow adequately within the construction time frame.

There are several non-vegetative stabilization methods and selection should be based on site-specific conditions.

Decomposed Granite (DG) is a permanent erosion protection method that consists of a layer of stabilized decomposed granite placed over an erodible surface.

Degradable Mulches of various types (see EC-3, EC-6, EC-8) can be used for temporary non-vegetative stabilization; examples include straw mulch, compost, wood chips or hydraulic mulch.

Geotextiles and Mats can be used for temporary non-vegetative stabilization (see EC-7). These BMPs are typically manufactured from degradable or synthetic materials and are

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designed and specified based on their functional longevity, i.e., how long they will persist and provide erosion protection. All geotextiles and mats should be replaced when they exceed their functional longevity or when permanent stabilization methods are instituted.

Gravel Mulch is a non-degradable erosion control product that is composed of washed and screened coarse to very coarse gravel, 16 mm to 64 mm (0.6" - 2.5"), similar to an AASHTO No. 3 coarse aggregate.

Rock Slope Protection consists of utilizing large rock or rip-rap (4"- 24") to stabilize slopes with a high erosion potential and those subject to scour along waterways.

Soil Binders can be used for temporary non-vegetative stabilization (see EC-5). The key to their use is functional longevity. In most cases, the soil binder will need to be routinely monitored and re-applied to maintain an erosion-resistant coverage.

Suitable Applications

Non-vegetated stabilization methods are suitable for use on disturbed soil areas and on material stockpiles that need to be temporarily or permanently protected from erosion by water and wind. Non-vegetated stabilization should only be utilized when vegetation cannot be established in the required timeframe, due to soil or climactic conditions, or where vegetation may be a potential fire hazard.

Decomposed Granite (DG) and Gravel Mulch are suitable for use in areas where vegetation establishment is difficult, on flat surfaces, trails and pathways, and when used in conjunction with a stabilizer or tackifier, on shallow slopes (i.e., 10:1 [H:V]). DG and gravel can also be used on shallow rocky slopes where vegetation cannot be established for permanent erosion control.

Degradable Mulches can be used to cover and protect soil surfaces from erosion both in temporary and permanent applications. In many cases, the use of mulches by themselves requires routine inspection and re-application. See EC-3 Hydraulic Mulch, EC-6 Straw Mulch, EC-8 Wood Mulch, or EC-14 Compost Blankets for more information.

Geotextiles and Mats can be used as a temporary stand-alone soil stabilization method. Depending on material selection, geotextiles and mats can be a short-term (3 mos – 1 year) or long-term (1-2 years) temporary stabilization method. For more information on geotextiles and mats see EC-7 Geotextiles and Mats.

Rock Slope Protection can be used when the slopes are subject to scour or have a high erosion potential, such as slopes adjacent to flowing waterways or slopes subject to overflow from detention facilities (spillways).

Soil Binders can be used for temporary stabilization of stockpiles and disturbed areas not subject to heavy traffic. See EC-5 Soil Binders for more information.

Limitations

General

- Refer to EC-3, EC-6, EC-8, and EC-14 for limitations on use of mulches. Refer to EC-7 for limitations on use of geotextiles and mats. Refer to EC-5 for limitations on use of Soil Binders.

Decomposed Granite

- Not available in some geographic regions.
- If not tackified, material may be susceptible to erosion even on slight slopes (e.g., 30:1 [H:V]).
- Installed costs may be more expensive than vegetative stabilization methods.

Gravel Mulch

- Availability is limited in some geographic regions.
- If not properly screened and washed, can contain fine material that can erode and/or create dust problems.
- If inadequately sized, material may be susceptible to erosion on sloped areas.
- Pore spaces fill with dirt and debris over time; may provide a growing medium for weeds.

Rock Slope Protection

- Installation is labor intensive.
- Installed costs can be significantly higher than vegetative stabilization methods.
- Rounded stones may not be used on slopes greater than 2:1 [H:V].

Implementation

General

Non-vegetated stabilization should be used in accordance with the following general guidance:

- Should be used in conjunction with other BMPs, including drainage, erosion controls and sediment controls.
- Refer to EC-3, EC-6, EC-8, and EC-14 for implementation details for mulches. Refer to EC-7 for implementation details for geotextiles and mats. Refer to EC-5 for implementation details for soil binders.
- Non-vegetated stabilization measures should be implemented as soon as the disturbance in the areas they are intended to protect has ceased.
- Additional guidance on the comparison and selection of temporary slope stabilization methods is provided in Appendix F of the Handbook.

Decomposed Granite Stabilization

- If used for a road or path should be installed on a prepared base.
- Should be mixed with a stabilizer if used for roads or pathways, or on slope applications.
- Though porous it is recommended to prevent standing water on or next to a decomposed granite road or pathway.

Gravel Mulch

- Should be sized based on slope, rainfall, and upgradient run-on conditions. Stone size should be increased as potential for erosion increases (steeper slopes, high intensity rainfall).
- If permanent, a weed control fabric should be placed prior to installation.
- Should be installed at a minimum 2" depth.
- Should completely cover all exposed surfaces.

Rock Slope Protection

- Rock slope protection installation should follow Caltrans Standard Specification 72-2: Rock Slope Protection. Refer to the specification for rock conformity requirements and installation methods.
- When using rock slope protection, rock size and installation method should be specified by an Engineer.
- A geotextile fabric should be placed prior to installation.

Costs

- Costs are highly variable depending not only on technique chosen, but also on materials chosen within specific techniques. In addition, availability of certain materials will vary by region/location, which will also affect the cost. Costs of mulches, geotextiles and mats, and soil binders are presented in their respective fact sheets. Costs for decomposed granite, gravel mulch stabilization and rock slope protection may be higher depending on location and availability of materials. Caltrans has provided an estimate for gravel mulch of \$13 - \$20/yd^2 in flat areas and \$14 - \$30/yd^2 on side slopes (adjusted for inflation, 2016 dollars).

Inspection and Maintenance

General

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- For permanent installation, require inspection periodically and after major storm events to look for signs of erosion or damage to the stabilization.
- All damage should be repaired immediately.
- Refer to EC-3, EC-6, EC-8, and EC-14 for inspection and maintenance requirements for mulches. Refer to EC-7 for inspection and maintenance requirements for geotextiles and mats. Refer to EC-5 for inspection and maintenance requirements for soil binders.

Decomposed Granite and Gravel Mulch Stabilization

- Rake out and add decomposed granite or gravel as needed to areas subject to rill erosion. Inspect upgradient drainage controls and repair/modify as necessary.

- Should remain stable under loose surface material. Any significant problem areas should be repaired to restore uniformity to the installation.

References

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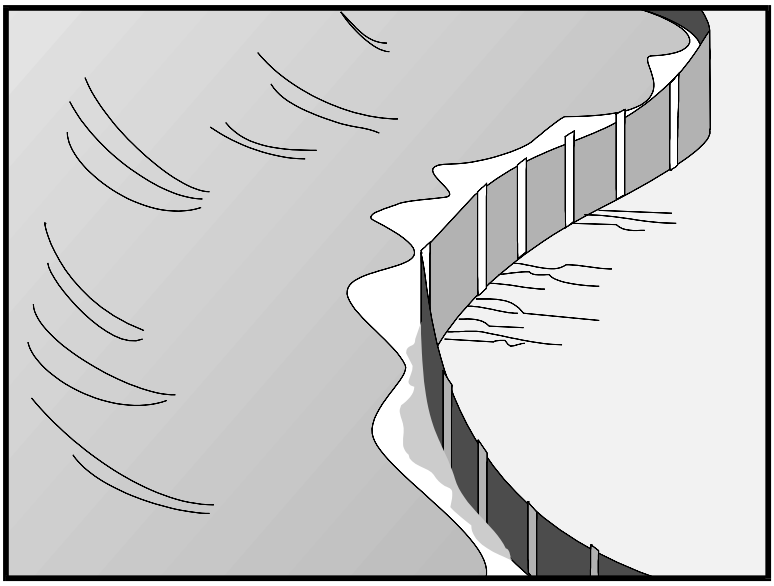
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Silt Fence SE-1



Categories

EC	Erosion Control	
SE	Sediment Control	☑
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Description and Purpose

A silt fence is made of a woven geotextile that has been entrenched, attached to supporting poles, and sometimes backed by a plastic or wire mesh for support. The silt fence detains water, promoting sedimentation of coarse sediment behind the fence. Silt fence does not retain soil fine particles like clays or silts.

Suitable Applications

Silt fences are suitable for perimeter control, placed below areas where sheet flows discharge from the site. They could also be used as interior controls below disturbed areas where runoff may occur in the form of sheet and rill erosion and around inlets within disturbed areas (Storm Drain Inlet Protection, SE-10). Silt fences should not be used in locations where the flow is concentrated. Silt fences should always be used in combination with erosion controls. Suitable applications include:

- At perimeter of a project (although they should not be installed up and down slopes).
- Below the toe or down slope of exposed and erodible slopes.
- Along streams and channels.
- Around temporary spoil areas and stockpiles.
- Around inlets.
- Below other small cleared areas.

Targeted Constituents

Sediment (coarse sediment)	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

SE-5 Fiber Rolls

SE-6 Gravel Bag Berm SE-12 Manufactured Linear Sediment Controls

SE-13 Compost Socks and Berms

SE-14 Biofilter Bags

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Limitations

- Do not use in streams, channels, drain inlets, or anywhere flow is concentrated.
- Do not use in locations where ponded water may cause a flooding hazard.
- Do not use silt fence to divert water flows or place across any contour line.
- Improperly installed fences are subject to failure from undercutting, overtopping, or collapsing.
- Must be trenched and keyed in.
- According to the State Water Board's *CGP Review, Issue #2* (2014), silt fences reinforced with metal or plastic mesh should be avoided due to plastic pollution and wildlife concerns.
- Not intended for use as a substitute for Fiber Rolls (SE-5), when fiber rolls are being used as a slope interruption device.
- Do not use on slopes subject to creeping, slumping, or landslides.

Implementation

General

A silt fence is a temporary sediment barrier consisting of woven geotextile stretched across and attached to supporting posts, trenched-in, and, depending upon the strength of fabric used, supported with plastic or wire mesh fence. Silt fences trap coarse sediment by intercepting and detaining sediment-laden runoff from disturbed areas in order to promote sedimentation behind the fence.

The following layout and installation guidance can improve performance and should be followed:

- Silt fence should be used in combination with erosion controls up-slope in order to provide the most effective sediment control.
- Silt fence alone is not effective at reducing turbidity. (Barrett and Malina, 2004)
- Designers should consider diverting sediment laden water to a temporary sediment basin or trap. (EPA, 2012)
- Use principally in areas where sheet flow occurs.
- Install along a level contour, so water does not pond more than 1.5 ft. at any point along the silt fence.
- Provide sufficient room for runoff to pond behind the fence and to allow sediment removal equipment to pass between the silt fence and toes of slopes or other obstructions. About 1200 ft.^{2} of ponding area should be provided for every acre draining to the fence.
- Efficiency of silt fences is primarily dependent on the detention time of the runoff behind the control. (Barrett and Malina, 2004)

- The drainage area above any fence should not exceed a quarter of an acre. (Rule of Thumb-100-feet of silt fence per 10,000 ft.^{2} of disturbed area.) (EPA, 2012)
- The maximum length of slope draining to any point along the silt fence should be 100 ft. per ft of silt fence.
- Turn the ends of the filter fence uphill to prevent stormwater from flowing around the fence.
- Leave an undisturbed or stabilized area immediately down slope from the fence where feasible.
- Silt fences should remain in place until the disturbed area draining to the silt fence is permanently stabilized, after which, the silt fence fabric and posts should be removed and properly disposed.
- J-hooks, which have ends turning up the slope to break up long runs of fence and provide multiple storage areas that work like mini-retention areas, may be used to increase the effectiveness of silt fence.
- Be aware of local regulations regarding the type and installation requirements of silt fence, which may differ from those presented in this fact sheet.

Design and Layout

In areas where high winds are anticipated the fence should be supported by a plastic or wire mesh. The geotextile fabric of the silt fence should contain ultraviolet inhibitors and stabilizers to provide longevity equivalent to the project life or replacement schedule.

- Layout in accordance with the attached figures.
- For slopes that contain a high number of rocks or large dirt clods that tend to dislodge, it may be necessary to protect silt fence from rocks (e.g., rockfall netting) ensure the integrity of the silt fence installation.

Standard vs. Heavy Duty Silt Fence

Standard Silt Fence

- Generally applicable in cases where the area draining to fence produces moderate sediment loads.

Heavy Duty Silt Fence

- Heavy duty silt fence usually has 1 or more of the following characteristics, not possessed by standard silt fence.
  - Fabric is reinforced with wire backing or additional support.
  - Posts are spaced closer than pre-manufactured, standard silt fence products.
- Use is generally limited to areas affected by high winds.
- Area draining to fence produces moderate sediment loads.

Materials

Standard Silt Fence

- Silt fence material should be woven geotextile with a minimum width of 36 in. The fabric should conform to the requirements in ASTM designation D6461.

- Wooden stakes should be commercial quality lumber of the size and shape shown on the plans. Each stake should be free from decay, splits or cracks longer than the thickness of the stake or other defects that would weaken the stakes and cause the stakes to be structurally unsuitable.

- Staples used to fasten the fence fabric to the stakes should be not less than 1.75 in. long and should be fabricated from 15-gauge or heavier wire. The wire used to fasten the tops of the stakes together when joining two sections of fence should be 9 gauge or heavier wire. Galvanizing of the fastening wire will not be required.

Heavy-Duty Silt Fence

- Some silt fence has a wire backing to provide additional support, and there are products that may use prefabricated plastic holders for the silt fence and use metal posts instead of wood stakes.

Installation Guidelines – Traditional Method

Silt fences are to be constructed on a level contour. Sufficient area should exist behind the fence for ponding to occur without flooding or overtopping the fence.

- A trench should be excavated approximately 6 in. wide and 6 in. deep along the line of the proposed silt fence (trenches should not be excavated wider or deeper than necessary for proper silt fence installation).

- Bottom of the silt fence should be keyed-in a minimum of 12 in.

- Posts should be spaced a maximum of 6 ft. apart and driven securely into the ground a minimum of 18 in. or 12 in. below the bottom of the trench.

- When standard strength geotextile is used, a plastic or wire mesh support fence should be fastened securely to the upslope side of posts using heavy–duty wire staples at least 1 in. long. The mesh should extend into the trench.

- When extra-strength geotextile and closer post spacing are used, the mesh support fence may be eliminated.

- Woven geotextile should be purchased in a long roll, then cut to the length of the barrier. When joints are necessary, geotextile should be spliced together only at a support post, with a minimum 6 in. overlap and both ends securely fastened to the post.

- The trench should be backfilled with native material and compacted.

- Construct the length of each reach so that the change in base elevation along the reach does not exceed 1/3 the height of the barrier; in no case should the reach exceed 500 ft.

- Cross barriers should be a minimum of 1/3 and a maximum of ½ the height of the linear barrier.

- See typical installation details at the end of this fact sheet.

Installation Guidelines - Static Slicing Method

- Static Slicing is defined as insertion of a narrow blade pulled behind a tractor, similar to a plow blade, at least 10 in. into the soil while at the same time pulling silt geotextile fabric into the ground through the opening created by the blade to the depth of the blade. Once the geotextile is installed, the soil is compacted using tractor tires.
- This method will not work with pre-fabricated, wire backed silt fence.
- Benefits:
    - Ease of installation (most often done with a 2-person crew).
    - Minimal soil disturbance.
    - Better level of compaction along fence, less susceptible to undercutting
    - Uniform installation.
- Limitations:
    - Does not work in shallow or rocky soils.
    - Complete removal of geotextile material after use is difficult.
    - Be cautious when digging near potential underground utilities.

Costs

- It should be noted that costs vary greatly across regions due to available supplies and labor costs.
- Average annual cost for installation using the traditional silt fence installation method (assumes 6 month useful life) is $7 per linear foot based on vendor research. Range of cost is $3.50 - $9.10 per linear foot.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Repair undercut silt fences.
- Repair or replace split, torn, slumping, or weathered fabric. The lifespan of silt fence fabric is generally 5 to 8 months.
- Silt fences that are damaged and become unsuitable for the intended purpose should be removed from the site of work, disposed, and replaced with new silt fence barriers.
- Sediment that accumulates in the BMP should be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when the sediment accumulation reaches 1/3 of the barrier height.

- Silt fences should be left in place until the upgradient area is permanently stabilized. Until then, the silt fence should be inspected and maintained regularly.
- Remove silt fence when upgradient areas are stabilized. Fill and compact post holes and anchor trench, remove sediment accumulation, grade fence alignment to blend with adjacent ground, and stabilize disturbed area.

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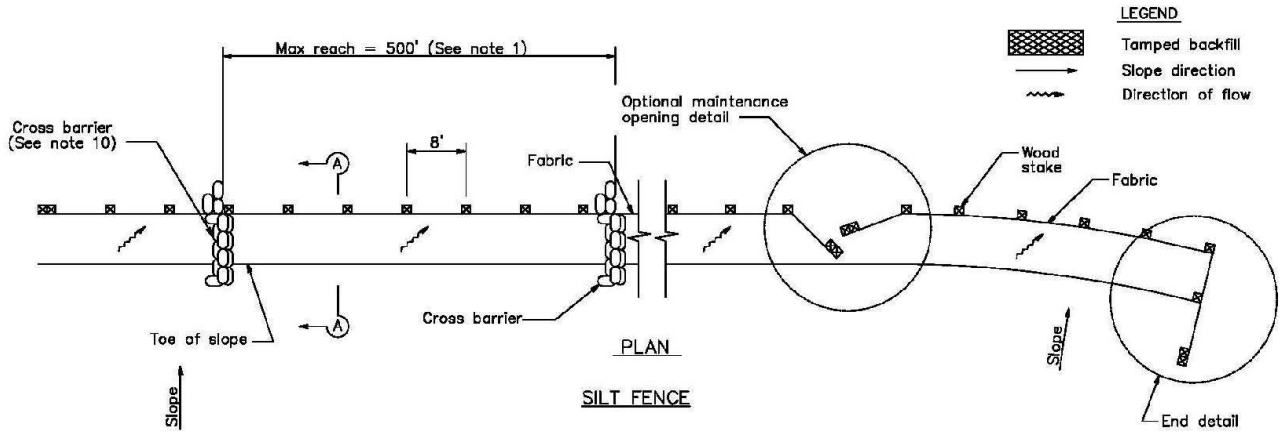
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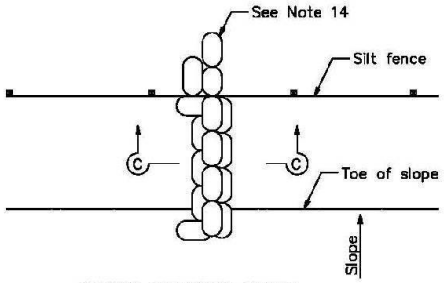
Silt Fence SE-1



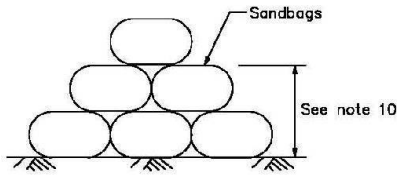
SILT FENCE

NOTES

1. Construct the length of each reach so that the change in base elevation along the reach does not exceed 1/3 the height of the linear barrier, in no case shall the reach length exceed 500'.
2. The last 8'–0" of fence shall be turned up slope.
3. Stake dimensions are nominal.
4. Dimension may vary to fit field condition.
5. Stakes shall be spaced at 8'–0" maximum and shall be positioned on downstream side of fence.
6. Stakes to overlap and fence fabric to fold around each stake one full turn. Secure fabric to stake with 4 staples.
7. Stakes shall be driven tightly together to prevent potential flow–through of sediment at joint. The tops of the stakes shall be secured with wire.
8. For end stake, fence fabric shall be folded around two stakes one full turn and secured with 4 staples.
9. Minimum 4 staples per stake. Dimensions shown are typical.
10. Cross barriers shall be a minimum of 1/3 and a maximum of 1/2 the height of the linear barrier.
11. Maintenance openings shall be constructed in a manner to ensure sediment remains behind silt fence.
12. Joining sections shall not be placed at sump locations.
13. Sandbag rows and layers shall be offset to eliminate gaps.
14. Add 3–4 bags to cross barrier on downgradient side of silt fence as needed to prevent bypass or undermining and as allowable based on site limits of disturbance.

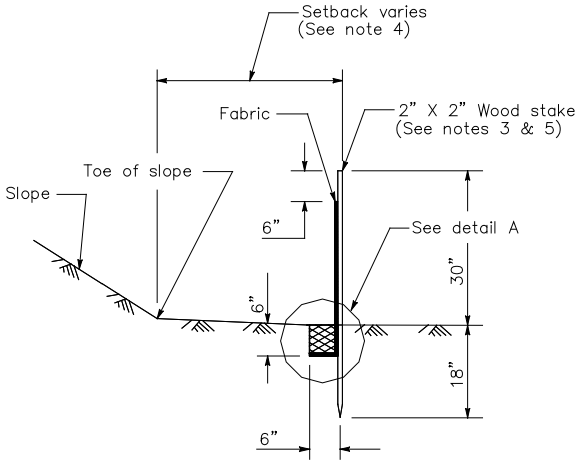


CROSS BARRIER DETAIL

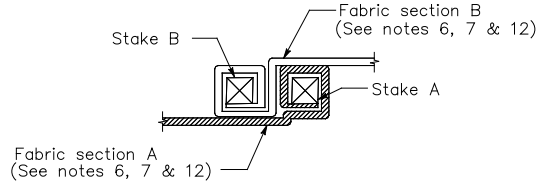


SECTION C–C

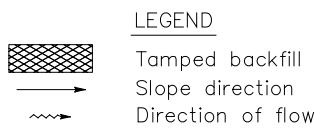
Silt Fence SE-1

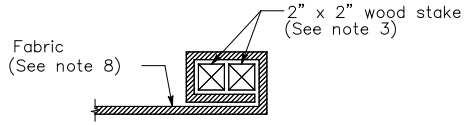


SECTION A–A

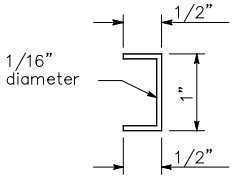


JOINING SECTION DETAIL (TOP VIEW)

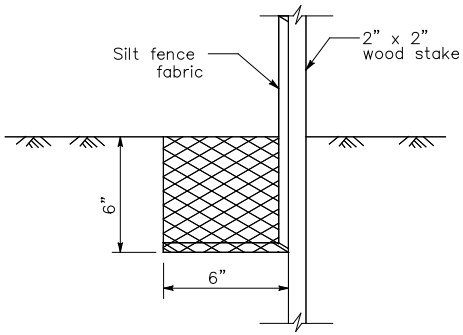




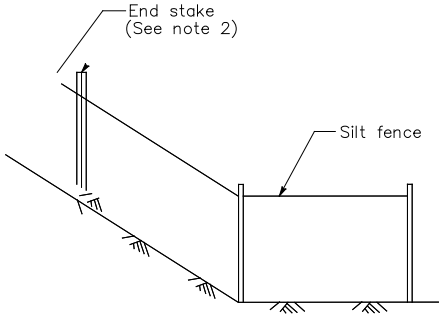
END STAKE DETAIL (TOP VIEW)



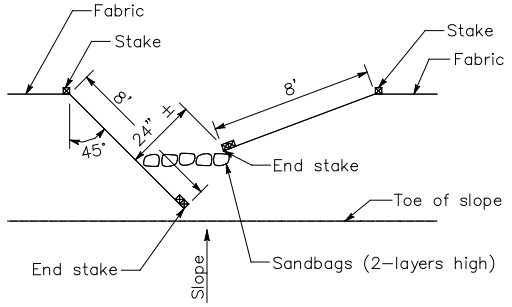
STAPLE DETAIL
(SEE NOTE 9)



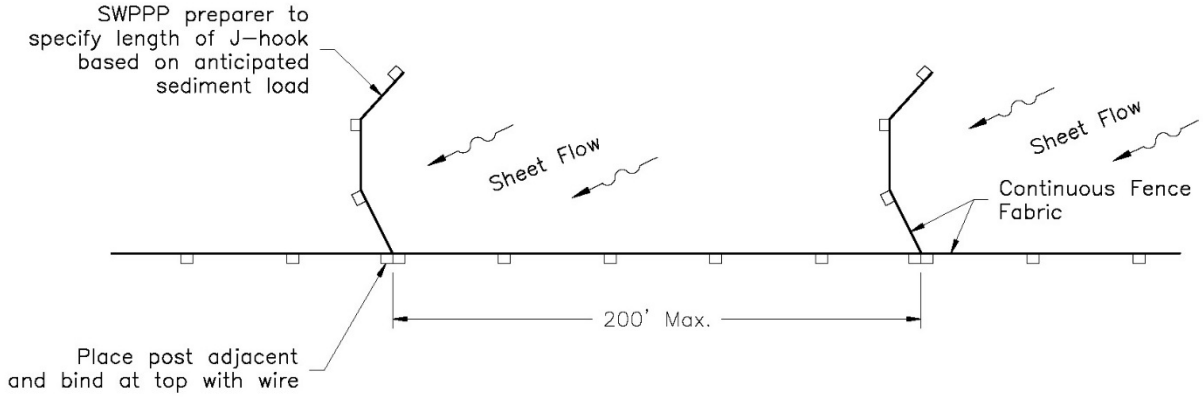
DETAIL A



END DETAIL

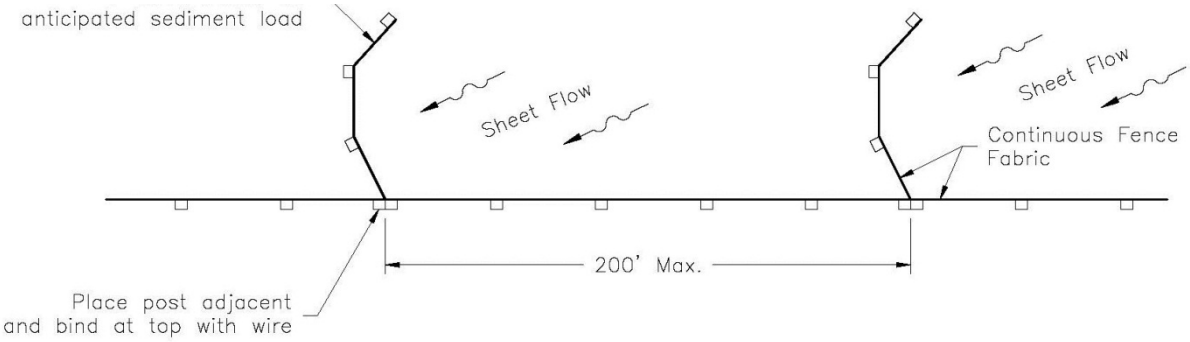


OPTIONAL MAINTENANCE OPENING DETAIL
(SEE NOTE 11)



Plan

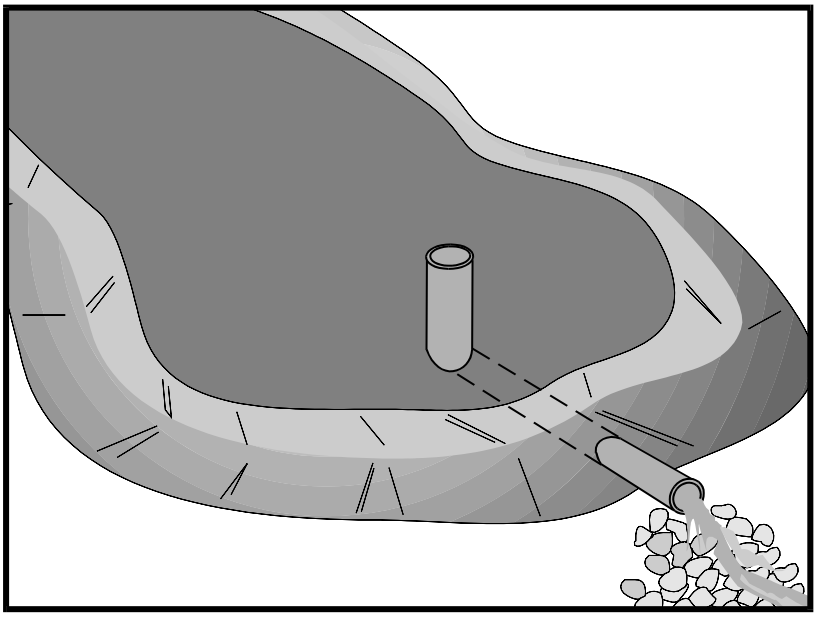
J–HOOK



Plan

J–HOOK

Sediment Basin SE-2



Description and Purpose

A sediment basin is a temporary basin formed by excavation or by constructing an embankment so that sediment-laden runoff is temporarily detained under quiescent conditions, allowing sediment to settle out before the runoff is released.

Sediment basin design guidance presented in this fact sheet is intended to provide options, methods, and techniques to optimize temporary sediment basin performance and basin sediment removal. Basin design guidance provided in this fact sheet is not intended to guarantee basin effluent compliance with numeric discharge limits (numeric action levels or numeric effluent limits for turbidity). Compliance with discharge limits requires a thoughtful approach to comprehensive BMP planning, implementation, and maintenance. Therefore, optimally designed and maintained sediment basins should be used in conjunction with a comprehensive system of BMPs that includes:

- Diverting runoff from undisturbed areas away from the basin
- Erosion control practices to minimize disturbed areas on-site and to provide temporary stabilization and interim sediment controls (e.g., stockpile perimeter control, check dams, perimeter controls around individual lots) to reduce the basin's influent sediment concentration.

At some sites, sediment basin design enhancements may be required to adequately remove sediment. Traditional

Categories

EC	Erosion Control	
SE	Sediment Control	☑
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	☑
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

SE-3 Sediment Trap (for smaller areas)

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(a.k.a. “physical”) enhancements such as alternative outlet configurations or flow deflection baffles increase detention time and other techniques such as outlet skimmers preferentially drain flows with lower sediment concentrations. These “physical” enhancement techniques are described in this fact sheet. To further enhance sediment removal particularly at sites with fine soils or turbidity sensitive receiving waters, some projects may need to consider implementing Active Treatment Systems (ATS) whereby coagulants and flocculants are used to enhance settling and removal of suspended sediments. Guidance on implementing ATS is provided in SE-11.

Suitable Applications

Sediment basins may be suitable for use on larger projects with sufficient space for constructing the basin. Sediment basins should be considered for use:

- Where sediment-laden water may enter the drainage system or watercourses
- On construction projects with disturbed areas during the rainy season
- At the outlet of disturbed watersheds between 5 acres and 75 acres and evaluated on a site by site basis
- Where post construction detention basins are required
- In association with dikes, temporary channels, and pipes used to convey runoff from disturbed areas

Limitations

Sediment basins must be installed only within the property limits and where failure of the structure will not result in loss of life, damage to homes or buildings, or interruption of use or service of public roads or utilities. In addition, sediment basins are attractive to children and can be very dangerous. Local ordinances regarding health and safety must be adhered to. If fencing of the basin is required, the type of fence and its location should be shown in the SWPPP and in the construction specifications.

- As a general guideline, sediment basins are suitable for drainage areas of 5 acres or more, but not appropriate for drainage areas greater than 75 acres. However, the tributary area should be evaluated on a site by site basis.
- Sediment basins may become an “attractive nuisance” and care must be taken to adhere to all safety practices. If safety is a concern, basin may require protective fencing.
- Sediment basins designed according to this fact sheet are only effective in removing sediment down to about the silt size fraction. Sediment-laden runoff with smaller size fractions (fine silt and clay) may not be adequately treated unless chemical (or other appropriate method) treatment is used in addition to the sediment basin.
- Basins with a height of 25 ft or more or an impounding capacity of 50 ac-ft or more must obtain approval from California Department of Water Resources Division of Safety of Dams (http://www.water.ca.gov/damsafety/).

- Water that stands in sediment basins longer than 96 hours may become a source of mosquitoes (and midges), particularly along perimeter edges, in shallow zones, in scour or below-grade pools, around inlet pipes, along low-flow channels, and among protected habitats created by emergent or floating vegetation (e.g. cattails, water hyacinth), algal mats, riprap, etc.
- Basins require large surface areas to permit settling of sediment. Size may be limited by the available area.

Implementation

General

A sediment basin is a controlled stormwater release structure formed by excavation or by construction of an embankment of compacted soil across a drainage way, or other suitable location. It is intended to trap sediment before it leaves the construction site. The basin is a temporary measure expected to be used during active construction in most cases and is to be maintained until the site area is permanently protected against erosion or a permanent detention basin is constructed.

Sediment basins are suitable for nearly all types of construction projects. Whenever possible, construct the sediment basins before clearing and grading work begins. Basins should be located at the stormwater outlet from the site but not in any natural or undisturbed stream. A typical application would include temporary dikes, pipes, and/or channels to convey runoff to the basin inlet.

Many development projects in California are required by local ordinances to provide a stormwater detention basin for post-construction flood control, desilting, or stormwater pollution control. A temporary sediment basin may be constructed by rough grading the post-construction control basins early in the project.

Sediment basins if properly designed and maintained can trap a significant amount of the sediment that flows into them. However, traditional basins do not remove all inflowing sediment. Therefore, they should be used in conjunction with erosion control practices such as temporary seeding, mulching, diversion dikes, etc., to reduce the amount of sediment flowing into the basin.

Planning

To improve the effectiveness of the basin, it should be located to intercept runoff from the largest possible amount of disturbed area. Locations best suited for a sediment basin are generally in lower elevation areas of the site (or basin tributary area) where site drainage would not require significant diversion or other means to direct water to the basin but outside jurisdictional waterways. However, as necessary, drainage into the basin can be improved by the use of earth dikes and drainage swales (see BMP EC-9). . The basin should not be located where its failure would result in the loss of life or interruption of the use or service of public utilities or roads.

Construct before clearing and grading work begins when feasible.

- Do not locate the basin in a jurisdictional stream.

- Basin sites should be located where failure of the structure will not cause loss of life, damage to homes or buildings, or interruption of use or service of public roads or utilities.
- Basins with a height of 25 ft or more or an impounding capacity of 50 ac-ft must obtain approval from the Division of Dam Safety. Local dam safety requirements may be more stringent.
- Limit the contributing area to the sediment basin to only the runoff from the disturbed soil areas. Use temporary concentrated flow conveyance controls to divert runoff from undisturbed areas away from the sediment basin.
- The basin should be located: (1) by excavating a suitable area or where a low embankment can be constructed across a swale, (2) where post-construction (permanent) detention basins will be constructed, and (3) where the basins can be maintained on a year-round basis to provide access for maintenance, including sediment removal and sediment stockpiling in a protected area, and to maintain the basin to provide the required capacity.

Design

When designing a sediment basin, designers should evaluate the site constraints that could affect the efficiency of the BMP. Some of these constraints include: the relationship between basin capacity, anticipated sediment load, and freeboard, available footprint for the basin, maintenance frequency and access, and hydraulic capacity and efficiency of the temporary outlet infrastructure. Sediment basins should be designed to maximize sediment removal and to consider sediment load retained by the basin as it affects basin performance.

Three Basin Design Options (Part A) are presented below along with a Typical Sediment/Detention Basin Design Methodology (Part B). Regardless of the design option that is selected, designers also need to evaluate the sediment basin capacity with respect to sediment accumulation (See "*Step 3. Evaluate the Capacity of the Sediment Basin") and* should incorporate approaches identified in "*Step 4. Other Design Considerations*" to enhance basin performance.

A) Basin Design Options:

Option 1:

Design sediment basin(s) using the standard equation:

$$A_s = \frac{1.2Q}{V_s} \qquad \text{(Eq. 1)}$$

Where:

A_s = Minimum surface area for trapping soil particles of a certain size

V_s = Settling velocity of the design particle size chosen (V_s = 0.00028 ft/s for a design particle size of 0.01 mm at 68°F)

1.2 = Factor of safety recommended by USEPA to account for the reduction in basin efficiency caused due to turbulence and other non ideal conditions.

$Q = CIA$ (Eq.2)

Where

Q = Peak basin influent flow rate measured in cubic feet per second (ft^3/s)

C = Runoff coefficient (unitless)

I = Peak rainfall intensity for the 10-year, 6-hour rain event (in/hr)

A = Area draining into the sediment basin in acres

The design particle size should be the smallest soil grain size determined by wet sieve analysis, or the fine silt sized (0.01 mm [or 0.0004 in.]) particle, and the Vs used should be 100 percent of the calculated settling velocity.

This sizing basin method is dependent on the outlet structure design or the total basin length with an appropriate outlet. If the designer chooses to utilize the outlet structure to control the flow duration in the basin, the basin length (distance between the inlet and the outlet) should be a minimum of twice the basin width; the depth should not be less than 3 ft nor greater than 5 ft for safety reasons and for maximum efficiency (2 ft of sediment storage, 2 ft of capacity). If the designer chooses to utilize the basin length (with appropriate basin outlet) to control the flow duration in the basin, the basin length (distance between the inlet and the outlet) should be a specifically designed to capture 100% of the design particle size; the depth should not be less than 3 ft nor greater than 5 ft for safety reasons and for maximum efficiency (2 ft of sediment storage, 2 ft of capacity).

Basin design guidance provided herein assumes standard water properties (e.g., estimated average water temperature, kinematic viscosity, etc.) as a basis of the design. Designers can use an alternative design (Option 3) with site specific water properties as long as the design is as protective as Option 1.

The design guidance uses the peak influent flow rate to size sediment basins. Designers can use an alternative design (Option 3) with site specific average flow rates as long as the design is as protective as Option 1.

The basin should be located on the site where it can be maintained on a year-round basis and should be maintained on a schedule to retain the 2 ft of capacity.

Option 2:

Design pursuant to local ordinance for sediment basin design and maintenance, provided that the design efficiency is as protective or more protective of water quality than Option 1.

Option 3:

The use of an equivalent surface area design or equation provided that the design efficiency is as protective or more protective of water quality than Option 1.

B) Typical Sediment/Detention Basin Design Methodology:

Design of a sediment basin requires the designer to have an understanding of the site constraints, knowledge of the local soil (e.g., particle size distribution of potentially contributing soils), drainage area of the basin, and local hydrology. Designers should not assume that a sediment basin for location A is applicable to location B. Therefore, designers can use this factsheet as guidance but will need to apply professional judgment and knowledge of the site to design an effective and efficient sediment basin. The following provides a general overview of typical design methodologies:

Step 1. Hydrologic Design

- Evaluate the site constraints and assess the drainage area for the sediment basin. Designers should consider on- and off-site flows as well as changes in the drainage area associated with site construction/disturbance. To minimize additional construction during the course of the project, the designer should consider identifying the maximum drainage area when calculating the basin dimensions.

- If a local hydrology manual is not available, it is recommended to follow standard rational method procedures to estimate the flow rate. The references section of this factsheet provides a reference to standard hydrology textbooks that can provide standard methodologies. If local rainfall depths are not available, values can be obtained from standard precipitation frequency maps from NOAA (downloaded from http://www.wrcc.dri.edu/pcpnfreq.html).

Step 2. Hydraulic Design

- Calculate the surface area required for the sediment basin using Equation 1. In which the flow rate is estimated for a 10-yr 6-hr event using rational method procedure listed in local hydrology manual and Vs is estimated using Stokes Law presented in Equation 3.

$$V_s = 2.81d^2 \qquad \text{(Eq.3)}$$

Where

V_s = Settling velocity in feet per second at 68˚F

d = diameter of sediment particle in millimeters (smallest soil grain size determined by wet sieve analysis or fine silt (0.01 mm [or 0.0004 in.])

- In general, the basin outlet design requires an iterative trial and error approach that considered the maximum water surface elevation, the elevation versus volume (stage-storage) relationship, the elevation verses basin outflow (a.k.a.-discharge) relationship, and the estimated inflow hydrograph. To adequately design the basins to settle sediment, the outlet configuration and associated outflow rates can be estimated by numerous methodologies. The following provides some guidance for design the basin outlet:

  - An outlet should have more than one orifice.

  - An outlet design typically utilizes multiple horizontal rows of orifices (approximately 3 or more) with at least 2 orifices per row (see Figures 1 and 2 at the end of this fact sheet).

- Orifices can vary in shape.
- Select the appropriate orifice diameter and number of perforations per row with the objective of minimizing the number of rows while maximizing the detention time.
- The diameter of each orifice is typically a maximum of 3-4 inches and a minimum of 0.25-0.5 inches.
- If a rectangular orifice is used, it is recommended to have minimum height of 0.5 inches and a maximum height of 6 inches.
- Rows are typically spaced at three times the diameter center to center vertically with a minimum distance of approximately 4 inches on center and a maximum distance of 1 foot on center.
- To estimate the outflow rate, each row is calculated separately based on the flow through a single orifice then multiplied by the number of orifices in the row. This step is repeated for each of the rows. Once all of the orifices are estimated, the total outflow rate versus elevation (stage-discharge curve) is developed to evaluate the detention time within the basin.
- Flow through a single orifice can be estimated using an Equation 4:

$$Q = BC' A(2gH)^{0.5} \qquad \text{(Eq.4)}$$

Where
Q = Outflow rate in ft^3/s
C′ = Orifice coefficient (unitless)
A = Area of the orifice (ft^2)
g = acceleration due to gravity (ft^3/s)
H = Head above the orifice (ft)
B = Anticipated Blockage or clogging factor (unitless), It is dependent on anticipated sediment and debris load, trash rack configuration etc, so the value is dependent on design engineer's professional judgment and/or local requirements (B is never greater than 1 and a value of 0.5 is generally used)

- Care must be taken in the selection of orifice coefficient ("C′"); 0.60 is most often recommended and used. However, based on actual tests, Young and Graziano (1989), "Outlet Hydraulics of Extended Detention Facilities for Northern Virginia Planning District Commission", recommends the following:
  - C′ = 0.66 for thin materials; where the thickness is equal to or less than the orifice diameter, or
  - C′ = 0.80 when the material is thicker than the orifice diameter
- If different sizes of orifices are used along the riser then they have to be sized such that not more than 50 percent of the design storm event drains in one-third of the drawdown time (to provide adequate settling time for events smaller than the design storm event)

and the entire volume drains within 96 hours or as regulated by the local vector control agency. If a basin fails to drain within 96 hours, the basin must be pumped dry.

- Because basins are not maintained for infiltration, water loss by infiltration should be disregarded when designing the hydraulic capacity of the outlet structure.

- Floating Outlet Skimmer: The floating skimmer (see Figure 3 at the end of this fact sheet is an alternative outlet configuration (patented) that drains water from upper portion of the water column. This configuration has been used for temporary and permanent basins and can improve basin performance by eliminating bottom orifices which have the potential of discharging solids. Some design considerations for this alternative outlet device includes the addition of a sand filter or perforated under drain at the low point in the basin and near the floating skimmer. These secondary drains allow the basin to fully drain. More detailed guidelines for sizing the skimmer can be downloaded from http://www.fairclothskimmer.com/.

- Hold and Release Valve: An ideal sediment/detention basin would hold all flows to the design storm level for sufficient time to settle solids, and then slowly release the storm water. Implementing a reliable valve system for releasing detention basins is critical to eliminate the potential for flooding in such a system. Some variations of hold and release valves include manual valves, bladder devices or electrically operated valves. When a precipitation event is forecast, the valve would be close for the duration of the storm and appropriate settling time. When the settling duration is met (approximately 24 or 48 hours), the valve would be opened and allow the stormwater to be released at a rate that does not resuspend settled solids and in a non-erosive manner. If this type of system is used the valve should be designed to empty the entire basin within 96 hours or as stipulated by local vector control regulations.

Step 3. Evaluate the Capacity of the Sediment Basin

- Typically, sediment basins do not perform as designed when they are not properly maintained or the sediment yield to the basin is larger than expected. As part of a good sediment basin design, designers should consider maintenance cycles, estimated soil loss and/or sediment yield, and basin sediment storage volume. The two equations below can be used to quantify the amount of soil entering the basin.

- The Revised Universal Soil Loss Equation (RUSLE, Eq.5) can be used to estimate annual soil loss and the Modified Universal Soil Equation (MUSLE, Eq.6) can be used to estimate sediment yield from a single storm event.

$$A = R \times K \times LS \times C \times P \qquad \text{(Eq.5)}$$

$$Y = 95\left(Q \times q_p\right)^{0.56} \times K \times LS \times C \times P \qquad \text{(Eq.6)}$$

Where:

A = annual soil loss, tons/acre-year

R = rainfall erosion index, in 100 ft. Tons/acre.in/hr.

K = soil erodibility factor, tons/acre per unit of R

LS = slope length and steepness factor (unitless)

C = vegetative cover factor (unitless)

P = erosion control practice factor (unitless)

Y = single storm sediment yield in tons

Q = runoff volume in acre-feet

q_p = peak flow in cfs

- Detailed descriptions and methodologies for estimating the soil loss can be obtained from standard hydrology text books (See References section).
- Determination of the appropriate equation should consider construction duration and local environmental factors (soils, hydrology, etc.). For example, if a basin is planned for a project duration of 1 year and the designer specifies one maintenance cycle, RUSLE could be used to estimate the soil loss and thereby the designer could indicate that the sediment storage volume would be half of the soil loss value estimated. As an example, for use of MUSLE, a project may have a short construction duration thereby requiring fewer maintenance cycles and a reduced sediment storage volume. MUSLE would be used to estimate the anticipated soil loss based on a specific storm event to evaluate the sediment storage volume and appropriate maintenance frequency.
- The soil loss estimates are an essential step in the design, and it is essential that the designer provide construction contractors with enough information to understand maintenance frequency and/or depths within the basin that would trigger maintenance. Providing maintenance methods, frequency and specification should be included in design bid documents such as the SWPPP Site Map.
- Once the designer has quantified the amount of soil entering the basin, the depth required for sediment storage can be determined by dividing the estimated sediment loss by the surface area of the basin.

Step 4. Other Design Considerations

- Consider designing the volume of the settling zone for the total storm volume associated with the 2-year event or other appropriate design storms specified by the local agency. This volume can be used as a guide for sizing the basin without iterative routing calculations. The depth of the settling zone can be estimated by dividing the estimated 2-yr storm volume by the surface area of the basin.
- The basin volume consists of two zones:
  - A sediment storage zone at least 1 ft deep.
  - A settling zone at least 2 ft deep.

- The basin depth must be no less than 3 ft (not including freeboard).

- Proper hydraulic design of the outlet is critical to achieving the desired performance of the basin. The outlet should be designed to drain the basin within 24 to 96 hours (also referred to as "drawdown time"). The 24-hour limit is specified to provide adequate settling time; the 96-hour limit is specified to mitigate vector control concerns.

- Confirmation of the basin performance can be evaluated by routing the design storm (10-yr 6-hr, or as directed by local regulations) through the basin based on the basin volume (stage-storage curve) and the outlet design (stage-discharge curve based on the orifice configuration or equivalent outlet design).

- Sediment basins, regardless of size and storage volume, should include features to accommodate overflow or bypass flows that exceed the design storm event.

  - Include an emergency spillway to accommodate flows not carried by the principal spillway. The spillway should consist of an open channel (earthen or vegetated) over undisturbed material (not fill) or constructed of a non-erodible riprap (or equivalent protection) on fill slopes.

  - The spillway control section, which is a level portion of the spillway channel at the highest elevation in the channel, should be a minimum of 20 ft in length.

- Rock, vegetation or appropriate erosion control should be used to protect the basin inlet, outlet, and slopes against erosion.

- The total depth of the sediment basin should include the depth required for sediment storage, depth required for settling zone and freeboard of at least 1 foot or as regulated by local flood control agency for a flood event specified by the local agency.

- The basin alignment should be designed such that the length of the basin is more than twice the width of the basin; the length should be determined by measuring the distance between the inlet and the outlet. If the site topography does not allow for this configuration baffles should be installed so that the ratio is satisfied. If a basin has more than one inflow point, any inflow point that conveys more than 30 percent of the total peak inflow rate has to meet the required length to width ratio.

- An alternative basin sizing method proposed by Fifield (2004) can be consulted to estimate an alternative length to width ratio and basin configuration. These methods can be considered as part of Option 3 which allows for alternative designs that are protective or more protective of water quality.

- Baffles (see Figure 4 at the end of this fact sheet) can be considered at project sites where the existing topography or site constraints limit the length to width ratio. Baffles should be constructed of earthen berms or other structural material within the basin to divert flow in the basin, thus increasing the effective flow length from the basin inlet to the outlet riser. Baffles also reduce the change of short circuiting and allows for settling throughout the basin.

- Baffles are typically constructed from the invert of the basin to the crest of the emergency spillway (i.e., design event flows are meant to flow around the baffles and flows greater than the design event would flow over the baffles to the emergency spillway).
- Use of other materials for construction of basin baffles (such as silt fence) may not be appropriate based on the material specifications and will require frequent maintenance (maintain after every storm event). Maintenance may not be feasible when required due to flooded conditions resulting from frequent (i.e., back to back) storm events. Use of alternative baffle materials should not deviate from the intended purpose of the material, as described by the manufacturer.
- Sediment basins are best used in conjunction with erosion controls.
- Basins with an impounding levee greater than 4.5 ft tall, measured from the lowest point to the impounding area to the highest point of the levee, and basins capable of impounding more than 35,000 ft^3, should be designed by a Registered Civil Engineer. The design should include maintenance requirements, including sediment and vegetation removal, to ensure continuous function of the basin outlet and bypass structures.
- A forebay, constructed upstream of the basin, may be provided to remove debris and larger particles.
- The outflow from the sediment basin should be provided with velocity dissipation devices (see BMP EC-10) to prevent erosion and scouring of the embankment and channel.
- The principal outlet should consist of a corrugated metal, high density polyethylene (HDPE), or reinforced concrete riser pipe with dewatering holes and an anti-vortex device and trash rack attached to the top of the riser, to prevent floating debris from flowing out of the basin or obstructing the system. This principal structure should be designed to accommodate the inflow design storm.
- A rock pile or rock-filled gabions can serve as alternatives to the debris screen, although the designer should be aware of the potential for extra maintenance involved should the pore spaces in the rock pile clog.
- The outlet structure should be placed on a firm, smooth foundation with the base securely anchored with concrete or other means to prevent floatation.
- Attach riser pipe (watertight connection) to a horizontal pipe (barrel). Provide anti-seep collars on the barrel.
- Cleanout level should be clearly marked on the riser pipe.

Installation

- Securely anchor and install an anti-seep collar on the outlet pipe/riser and provide an emergency spillway for passing major floods (see local flood control agency).
- Areas under embankments must be cleared and stripped of vegetation.

- Chain link fencing should be provided around each sediment basin to prevent unauthorized entry to the basin or if safety is a concern.

Costs

The cost of a sediment basin is highly variable and is dependent of the site configuration. To decrease basin construction costs, designers should consider using existing site features such as berms or depressed area to site the sediment basin. Designers should also consider potential savings associated with designing the basin to minimize the number of maintenance cycles and siting the basin in a location where a permanent BMP (e.g., extended detention basin) is required for the project site.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level and as required by local requirements. It is recommended that at a minimum, basins be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Examine basin banks for seepage and structural soundness.
- Check inlet and outlet structures and spillway for any damage or obstructions. Repair damage and remove obstructions as needed.
- Check inlet and outlet area for erosion and stabilize if required.
- Check fencing for damage and repair as needed.
- Sediment that accumulates in the basin must be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when sediment accumulation reaches one-half the designated sediment storage volume. Sediment removed during maintenance should be managed properly. The sediment should be appropriately evaluated and used or disposed of accordingly. Options include: incorporating sediment into earthwork on the site (only if there is no risk that sediment is contaminated); or off-site export/disposal at an appropriate location (e.g., sediment characterization and disposal to an appropriate landfill).
- Remove standing water from basin within 96 hours after accumulation.
- If the basin does not drain adequately (e.g., due to storms that are more frequent or larger than the design storm or other unforeseen site conditions), dewatering should be conducted in accordance with appropriate dewatering BMPs (see NS-2) and in accordance with local permits as applicable.
- To minimize vector production:
  - Remove accumulation of live and dead floating vegetation in basins during every inspection.
  - Remove excessive emergent and perimeter vegetation as needed or as advised by local or state vector control agencies.

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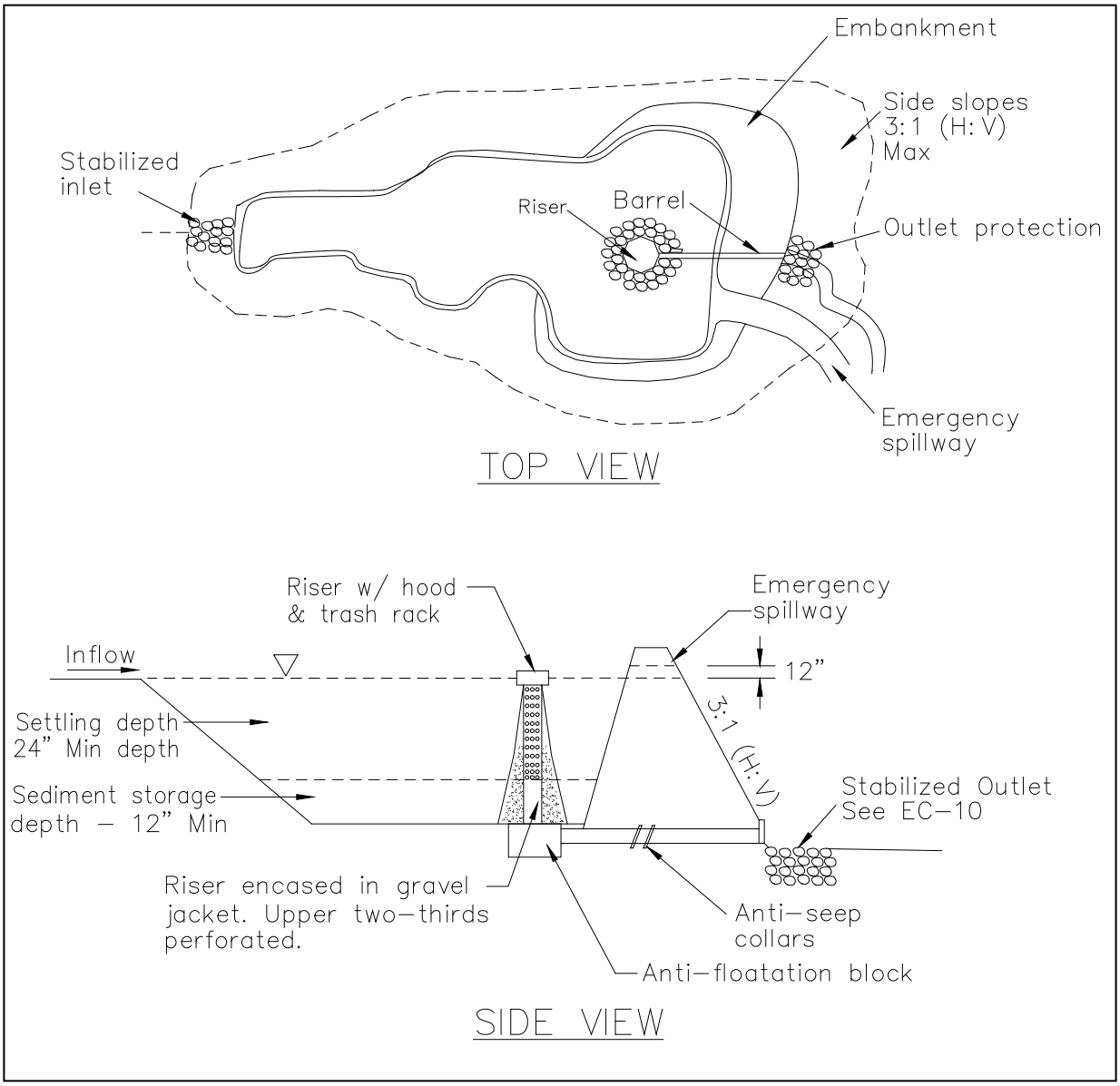


FIGURE 1: TYPICAL TEMPORARY SEDIMENT BASIN
MULTIPLE ORIFICE DESIGN
NOT TO SCALE

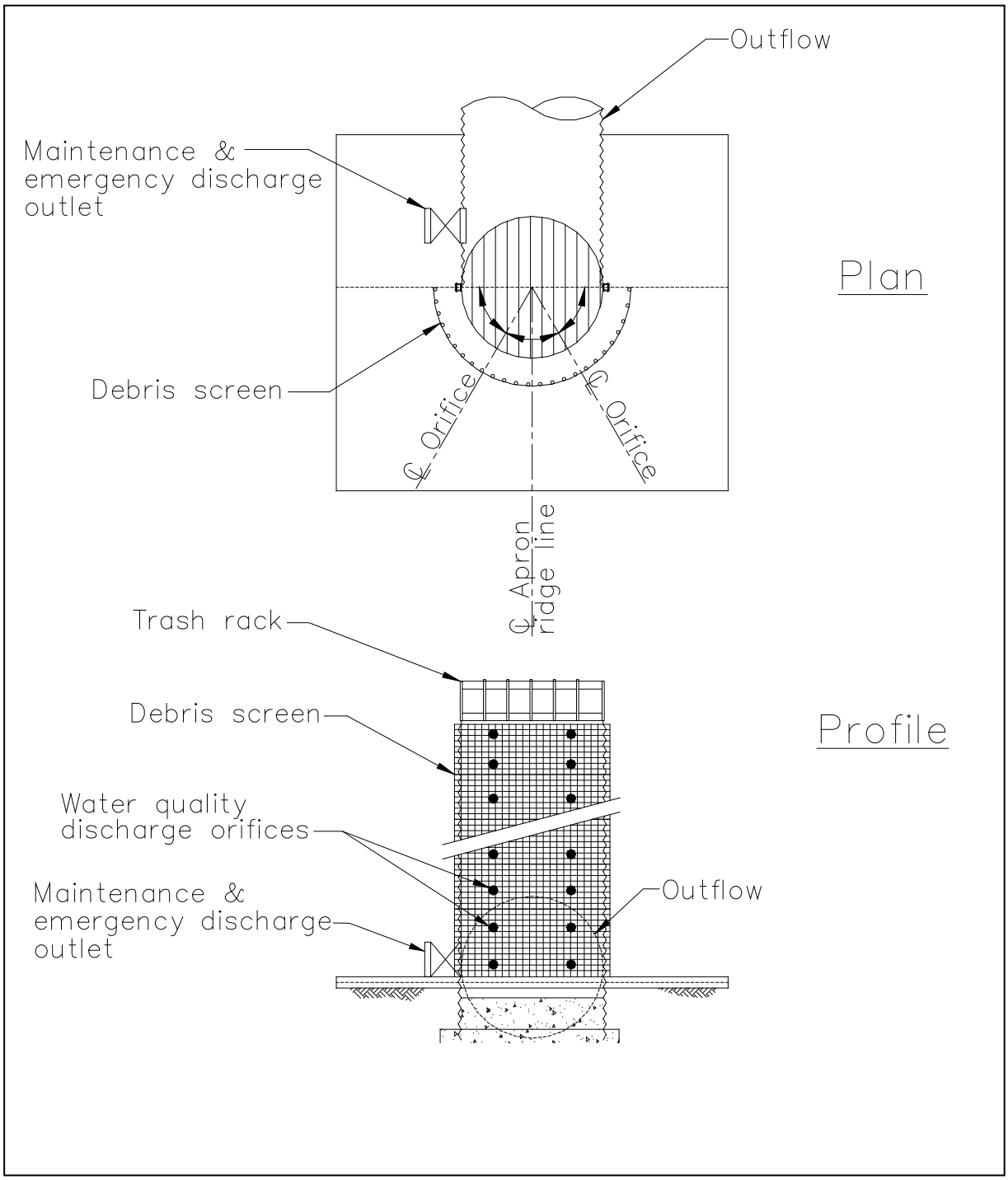


FIGURE 2: MULTIPLE ORIFICE OUTLET RISER

NOT TO SCALE

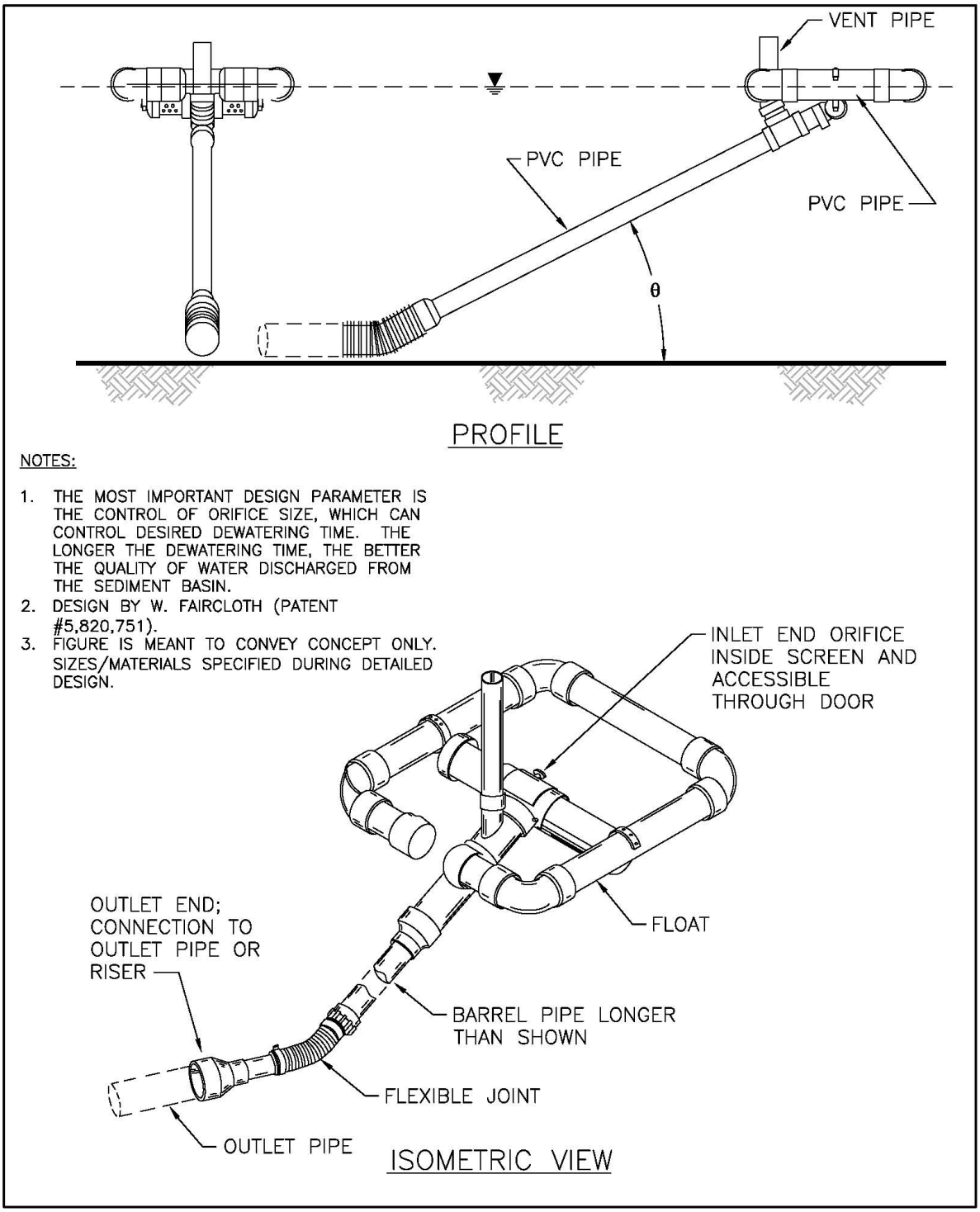


FIGURE 3: TYPICAL SKIMMER

NOT TO SCALE

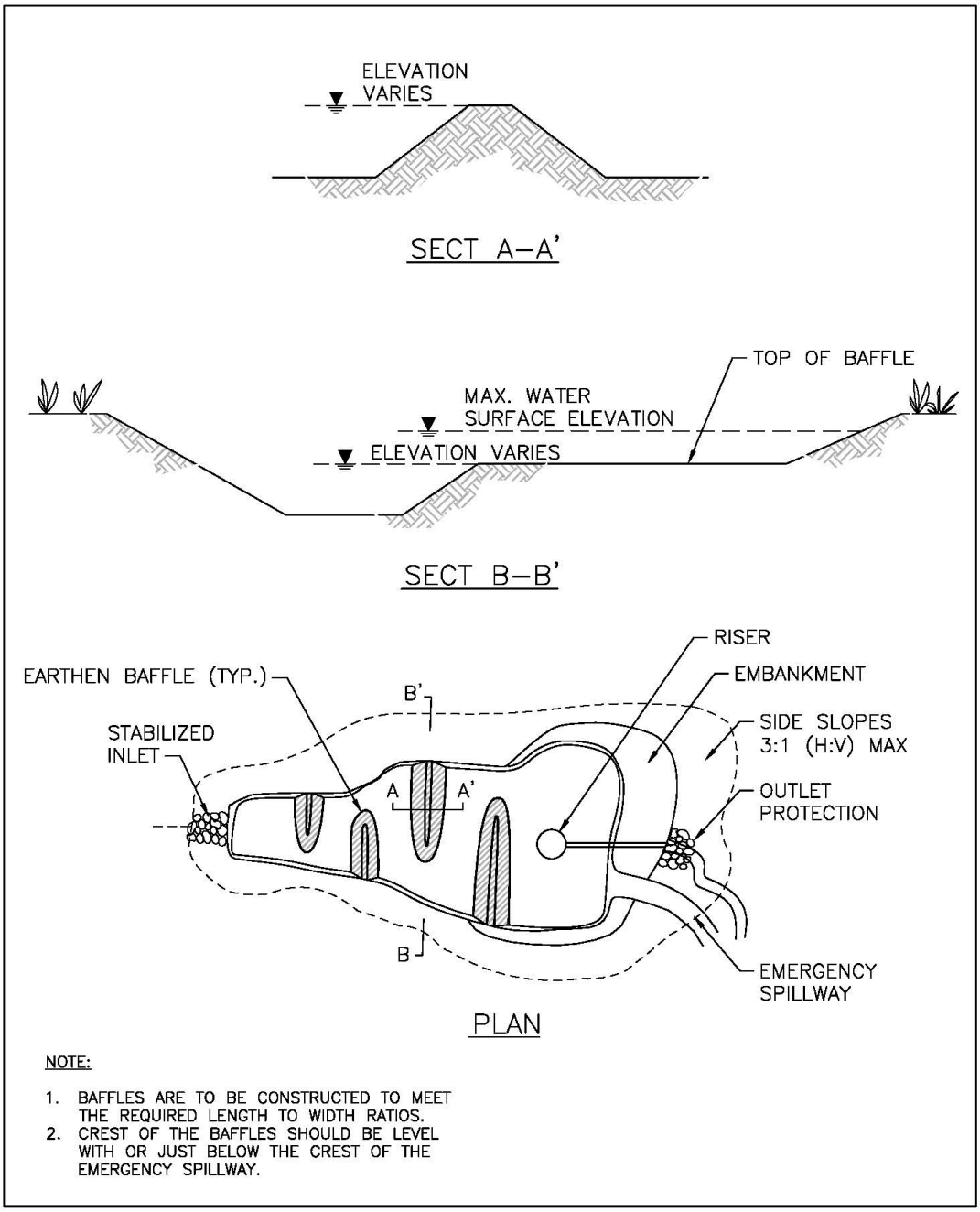
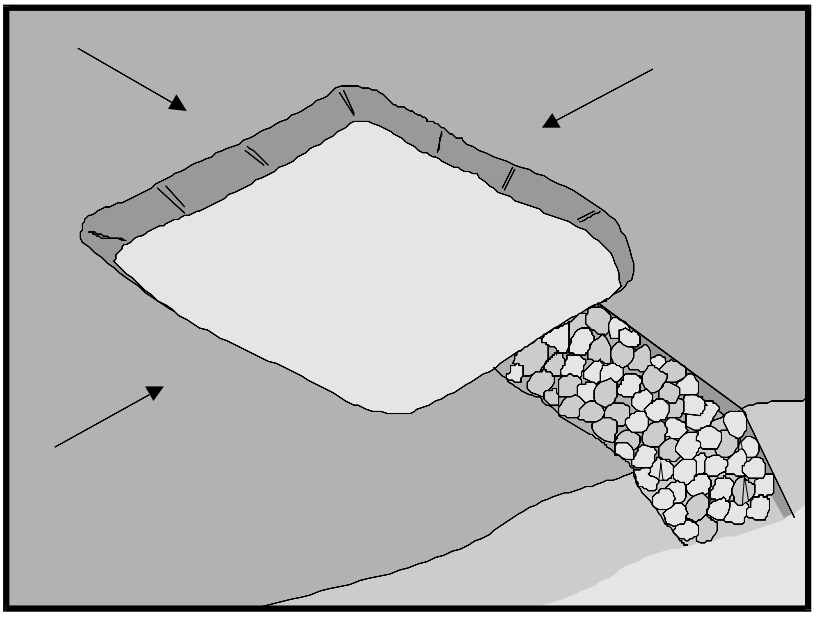


FIGURE 4: TYPICAL TEMPORARY SEDIMENT BASIN WITH BAFFLES

NOT TO SCALE

Sediment Trap SE-3



Categories

EC	Erosion Control	
SE	Sediment Control	☑
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	☑
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

SE-2 Sediment Basin (for larger areas)

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Description and Purpose

A sediment trap is a containment area where sediment-laden runoff is temporarily detained under quiescent conditions, allowing sediment to settle out or before the runoff is discharged by gravity flow. Sediment traps are formed by excavating or constructing an earthen embankment across a waterway or low drainage area.

Trap design guidance provided in this fact sheet is not intended to guarantee compliance with numeric discharge limits (numeric action levels or numeric effluent limits for turbidity). Compliance with discharge limits requires a thoughtful approach to comprehensive BMP planning, implementation, and maintenance. Therefore, optimally designed and maintained sediment traps should be used in conjunction with a comprehensive system of BMPs.

Suitable Applications

Sediment traps should be considered for use:

- At the perimeter of the site at locations where sediment-laden runoff is discharged offsite.
- At multiple locations within the project site where sediment control is needed.
- Around or upslope from storm drain inlet protection measures.
- Sediment traps may be used on construction projects where the drainage area is less than 5 acres. Traps would be

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placed where sediment-laden stormwater may enter a storm drain or watercourse. SE-2, Sediment Basins, must be used for drainage areas greater than 5 acres.

- As a supplemental control, sediment traps provide additional protection for a water body or for reducing sediment before it enters a drainage system.

Limitations

- Requires large surface areas to permit infiltration and settling of sediment.
- Not appropriate for drainage areas greater than 5 acres.
- Only removes large and medium sized particles and requires upstream erosion control.
- Attractive and dangerous to children, requiring protective fencing.
- Conducive to vector production.
- Should not be located in live streams.

Implementation

Design

A sediment trap is a small temporary ponding area, usually with a gravel outlet, formed by excavation or by construction of an earthen embankment. Its purpose is to collect and store sediment from sites cleared or graded during construction. It is intended for use on small drainage areas with no unusual drainage features and projected for a quick build-out time. It should help in removing coarse sediment from runoff. The trap is a temporary measure with a design life of approximately six months to one year and is to be maintained until the site area is permanently protected against erosion by vegetation and/or structures.

Sediment traps should be used only for small drainage areas. If the contributing drainage area is greater than 5 acres, refer to SE-2, Sediment Basins, or subdivide the catchment area into smaller drainage basins.

Sediment usually must be removed from the trap after each rainfall event. The SWPPP should detail how this sediment is to be disposed, such as in fill areas onsite, or removal to an approved offsite dump. Sediment traps used as perimeter controls should be installed before any land disturbance takes place in the drainage area.

Sediment traps are usually small enough that a failure of the structure would not result in a loss of life, damage to home or buildings, or interruption in the use of public roads or utilities. However, sediment traps are attractive to children and can be dangerous. The following recommendations should be implemented to reduce risks:

- Install continuous fencing around the sediment trap or pond. Consult local ordinances regarding requirements for maintaining health and safety.
- Restrict basin side slopes to 3:1 or flatter.

Sediment trap size depends on the type of soil, size of the drainage area, and desired sediment removal efficiency (see SE-2, Sediment Basin). As a rule of thumb, the larger the basin volume

the greater the sediment removal efficiency. Sizing criteria are typically established under the local grading ordinance or equivalent. The runoff volume from a 2-year storm is a common design criterion for a sediment trap. The sizing criteria below assume that this runoff volume is 0.042 acre-ft/acre (0.5 in. of runoff). While the climatic, topographic, and soil type extremes make it difficult to establish a statewide standard, the following criteria should trap moderate to high amounts of sediment in most areas of California:

- Locate sediment traps as near as practical to areas producing the sediment.
- Trap should be situated according to the following criteria: (1) by excavating a suitable area or where a low embankment can be constructed across a swale, (2) where failure would not cause loss of life or property damage, and (3) to provide access for maintenance, including sediment removal and sediment stockpiling in a protected area.
- Trap should be sized to accommodate a settling zone and sediment storage zone with recommended minimum volumes of 67 yd^3/acre and 33 yd^3/acre of contributing drainage area, respectively, based on 0.5 in. of runoff volume over a 24-hour period. In many cases, the size of an individual trap is limited by available space. Multiple traps or additional volume may be required to accommodate specific rainfall, soil, and site conditions.
- Traps with an impounding levee greater than 4.5 ft tall, measured from the lowest point to the impounding area to the highest point of the levee, and traps capable of impounding more than 35,000 ft^3, should be designed by a Registered Civil Engineer. The design should include maintenance requirements, including sediment and vegetation removal, to ensure continuous function of the trap outlet and bypass structures.
- The outlet pipe or open spillway must be designed to convey anticipated peak flows.
- Use rock or vegetation to protect the trap outlets against erosion.
- Fencing should be provided to prevent unauthorized entry.

Installation

Sediment traps can be constructed by excavating a depression in the ground or creating an impoundment with a small embankment. Sediment traps should be installed outside the area being graded and should be built prior to the start of the grading activities or removal of vegetation. To minimize the area disturbed by them, sediment traps should be installed in natural depressions or in small swales or drainage ways. The following steps must be followed during installation:

- The area under the embankment must be cleared, grubbed, and stripped of any vegetation and root mat. The pool area should be cleared.
- The fill material for the embankment must be free of roots or other woody vegetation as well as oversized stones, rocks, organic material, or other objectionable material. The embankment may be compacted by traversing with equipment while it is being constructed.
- All cut-and-fill slopes should be 3:1 or flatter.
- When a riser is used, all pipe joints must be watertight.

- When a riser is used, at least the top two-thirds of the riser should be perforated with 0.5 in. diameter holes spaced 8 in. vertically and 10 to 12 in. horizontally. See SE-2, Sediment Basin.
- When an earth or stone outlet is used, the outlet crest elevation should be at least 1 ft below the top of the embankment.
- When crushed stone outlet is used, the crushed stone used in the outlet should meet AASHTO M43, size No. 2 or 24, or its equivalent such as MSHA No. 2. Gravel meeting the above gradation may be used if crushed stone is not available.

Costs

Average annual cost per installation is $15 ft ^{2} and plus additional costs for the design and maintenance.

Inspection and Maintenance

- Inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect outlet area for erosion and stabilize if required.
- Inspect trap banks for seepage and structural soundness, repair as needed.
- Inspect outlet structure and spillway for any damage or obstructions. Repair damage and remove obstructions as needed.
- Inspect fencing for damage and repair as needed.
- Inspect the sediment trap for area of standing water during every visit. Corrective measures should be taken if the BMP does not dewater completely in 96 hours or less to prevent vector production.
- Sediment that accumulates in the BMP must be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when the sediment accumulation reaches one-third of the trap capacity. Sediment removed during maintenance may be incorporated into earthwork on the site or disposed of at an appropriate location.
- Remove vegetation from the sediment trap when first detected to prevent pools of standing water and subsequent vector production.
- BMPs that require dewatering shall be continuously attended while dewatering takes place. Dewatering BMPs per NS-2 shall be implemented at all times during dewatering activities.

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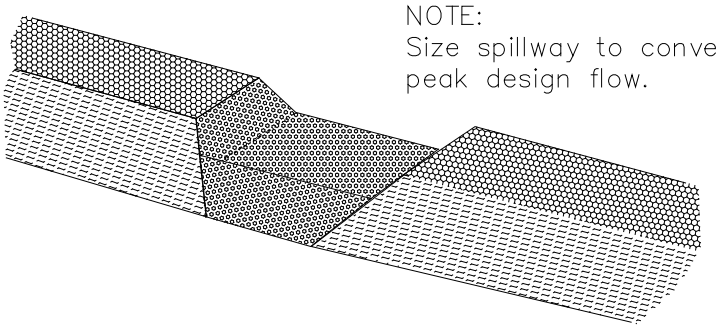
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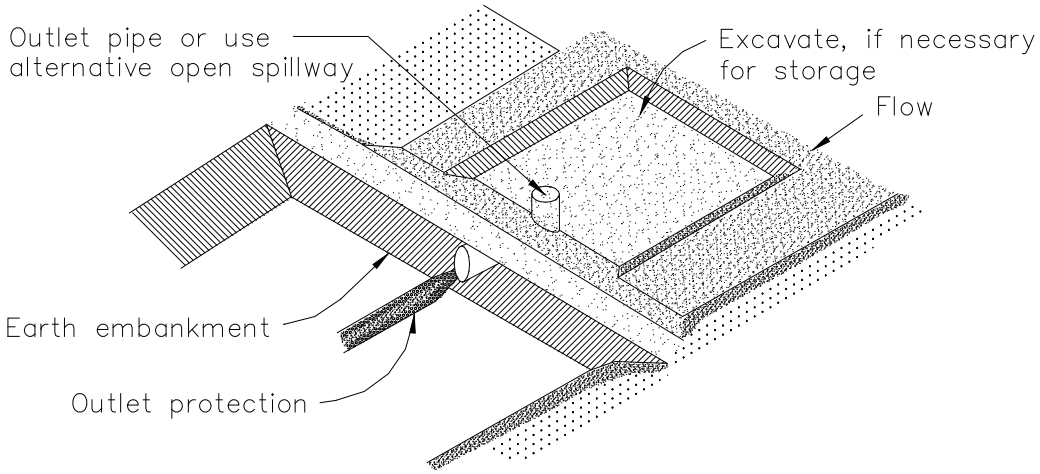
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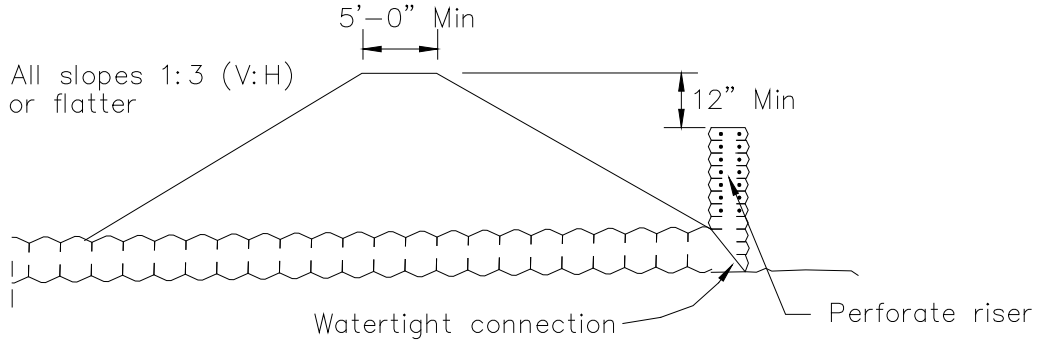
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TYPICAL OPEN SPILLWAY

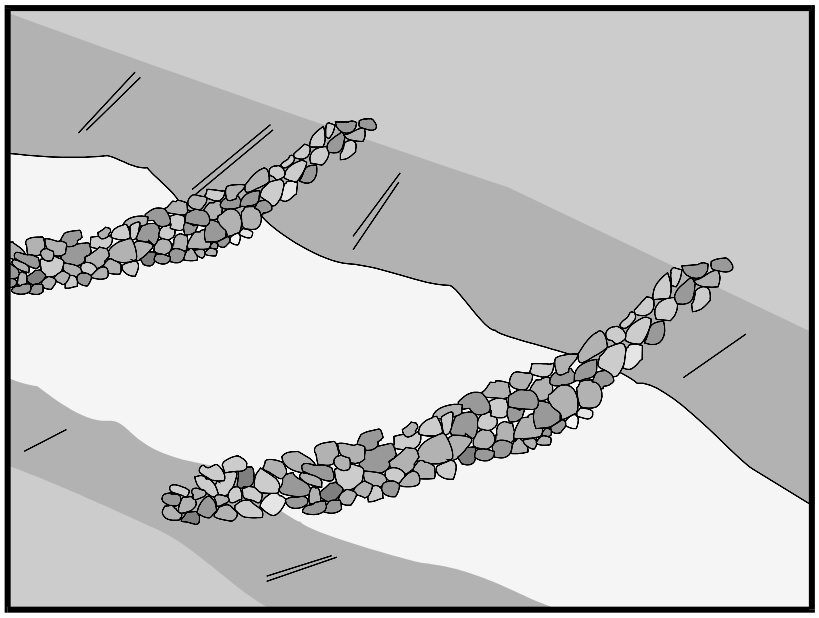




EMBANKMENT SECTION THRU RISER

TYPICAL SEDIMENT TRAP
NOT TO SCALE

Check Dams SE-4



Description and Purpose

A check dam is a small barrier constructed of rock, gravel bags, sandbags, fiber rolls, or other proprietary products, placed across a constructed swale or drainage ditch. Check dams reduce the effective slope of the channel, thereby reducing scour and channel erosion by reducing flow velocity and increasing residence time within the channel, allowing sediment to settle.

Suitable Applications

Check dams may be appropriate in the following situations:

- To promote sedimentation behind the dam.
- To prevent erosion by reducing the velocity of channel flow in small intermittent channels and temporary swales.
- In small open channels that drain 10 acres or less.
- In steep channels where stormwater runoff velocities exceed 5 ft/s.
- During the establishment of grass linings in drainage ditches or channels.
- In temporary ditches where the short length of service does not warrant establishment of erosion-resistant linings.
- To act as a grade control structure.

Categories

EC	Erosion Control	☒
SE	Sediment Control	☑
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

SE-5 Fiber Rolls

SE-6 Gravel Bag Berm

SE-8 Sandbag Barrier

SE-12 Manufactured Linear Sediment Controls

SE-14 Biofilter Bags

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Limitations

- Not to be used in live streams or in channels with extended base flows.
- Not appropriate in channels that drain areas greater than 10 acres.
- Not appropriate in channels that are already grass-lined unless erosion potential or sediment-laden flow is expected, as installation may damage vegetation.
- Require extensive maintenance following high velocity flows.
- Promotes sediment trapping which can be re-suspended during subsequent storms or removal of the check dam.
- Do not construct check dams with straw bales or silt fence.
- Water suitable for mosquito production may stand behind check dams, particularly if subjected to daily non-stormwater discharges.

Implementation

General

Check dams reduce the effective slope and create small pools in swales and ditches that drain 10 acres or less. Using check dams to reduce channel slope reduces the velocity of stormwater flows, thus reducing erosion of the swale or ditch and promoting sedimentation. Thus, check dams are dual-purpose and serve an important role as erosion controls as well as sediment controls. Note that use of 1-2 isolated check dams for sedimentation will likely result in little net removal of sediment because of the small detention time and probable scour during longer storms. Using a series of check dams will generally increase their effectiveness. A sediment trap (SE-3) may be placed immediately upstream of the check dam to increase sediment removal efficiency.

Design and Layout

Check dams work by decreasing the effective slope in ditches and swales. An important consequence of the reduced slope is a reduction in capacity of the ditch or swale. This reduction in capacity should be considered when using this BMP, as reduced capacity can result in overtopping of the ditch or swale and resultant consequences. In some cases, such as a "permanent" ditch or swale being constructed early and used as a "temporary" conveyance for construction flows, the ditch or swale may have sufficient capacity such that the temporary reduction in capacity due to check dams is acceptable. When check dams reduce capacities beyond acceptable limits, either:

- Don't use check dams. Consider alternative BMPs, or.
- Increase the size of the ditch or swale to restore capacity.

Maximum slope and velocity reduction is achieved when the toe of the upstream dam is at the same elevation as the top of the downstream dam (see "Spacing Between Check Dams" detail at the end of this fact sheet). The center section of the dam should be lower than the edge sections (at least 6 inches), acting as a spillway, so that the check dam will direct flows to the center of

the ditch or swale (see "Typical Rock Check Dam" detail at the end of this fact sheet). Bypass or side-cutting can occur if a sufficient spillway is not provided in the center of the dam.

Check dams are usually constructed of rock, gravel bags, sandbags, and fiber rolls. A number of products can also be used as check dams (e.g. HDPE check dams, temporary silt dikes (SE-12)), and some of these products can be removed and reused. Check dams can also be constructed of logs or lumber and have the advantage of a longer lifespan when compared to gravel bags, sandbags, and fiber rolls. Check dams should not be constructed from straw bales or silt fences, since concentrated flows quickly wash out these materials.

Rock check dams are usually constructed of 8 to 12 in. rock. The rock is placed either by hand or mechanically, but never just dumped into the channel. The dam should completely span the ditch or swale to prevent washout. The rock used should be large enough to stay in place given the expected design flow through the channel. It is recommended that abutments be extended 18 in. into the channel bank. Rock can be graded such that smaller diameter rock (e.g. 2-4 in) is located on the upstream side of larger rock (holding the smaller rock in place); increasing residence time.

Log check dams are usually constructed of 4 to 6 in. diameter logs, installed vertically. The logs should be embedded into the soil at least 18 in. Logs can be bolted or wired to vertical support logs that have been driven or buried into the soil.

See fiber rolls, SE-5, for installation of fiber roll check dams.

Gravel bag and sand bag check dams are constructed by stacking bags across the ditch or swale, shaped as shown in the drawings at the end of this fact sheet (see "Gravel Bag Check Dam" detail at the end of this fact sheet).

Manufactured products, such as temporary silt dikes (SE-12), should be installed in accordance with the manufacturer's instructions. Installation typically requires anchoring or trenching of products, as well as regular maintenance to remove accumulated sediment and debris.

If grass is planted to stabilize the ditch or swale, the check dam should be removed when the grass has matured (unless the slope of the swales is greater than 4%).

The following guidance should be followed for the design and layout of check dams:

- Install the first check dam approximately 16 ft from the outfall device and at regular intervals based on slope gradient and soil type.
- Check dams should be placed at a distance and height to allow small pools to form between each check dam.
- For multiple check dam installation, backwater from a downstream check dam should reach the toes of the upstream check dam.
- A sediment trap provided immediately upstream of the check dam will help capture sediment. Due to the potential for this sediment to be resuspended in subsequent storms, the sediment trap should be cleaned following each storm event.

- High flows (typically a 2-year storm or larger) should safely flow over the check dam without an increase in upstream flooding or damage to the check dam.
- Where grass is used to line ditches, check dams should be removed when grass has matured sufficiently to protect the ditch or swale.

Materials

- Rock used for check dams should typically be 8-12 in rock and be sufficiently sized to stay in place given expected design flows in the channel. Smaller diameter rock (e.g. 2 to 4 in) can be placed on the upstream side of larger rock to increase residence time.
- Gravel bags used for check dams should conform to the requirements of SE-6, Gravel Bag Berms.
- Sandbags used for check dams should conform to SE-8, Sandbag Barrier.
- Fiber rolls used for check dams should conform to SE-5, Fiber Rolls.
- Temporary silt dikes used for check dams should conform to SE-12, Temporary Silt Dikes.

Installation

- Rock should be placed individually by hand or by mechanical methods (no dumping of rock) to achieve complete ditch or swale coverage.
- Tightly abut bags and stack according to detail shown in the figure at the end of this section (pyramid approach). Gravel bags and sandbags should not be stacked any higher than 3 ft.
- Upper rows or gravel and sand bags shall overlap joints in lower rows.
- Fiber rolls should be trenched in, backfilled, and firmly staked in place.
- Install along a level contour.
- HDPE check dams, temporary silt dikes, and other manufactured products should be used and installed per manufacturer specifications.

Costs

Cost consists of labor costs if materials are readily available (such as gravel on-site). If material must be imported, costs will increase. For other material and installation costs, see SE-5, SE-6, SE-8, SE-12, and SE-14.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Replace missing rock, bags, rolls, etc. Replace bags or rolls that have degraded or have become damaged.

- If the check dam is used as a sediment capture device, sediment that accumulates behind the BMP should be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when the sediment accumulation reaches one-third of the barrier height.
- If the check dam is used as a grade control structure, sediment removal is not required as long as the system continues to control the grade.
- Inspect areas behind check dams for pools of standing water, especially if subjected to daily non-stormwater discharges.
- Remove accumulated sediment prior to permanent seeding or soil stabilization.
- Remove check dam and accumulated sediment when check dams are no longer needed.

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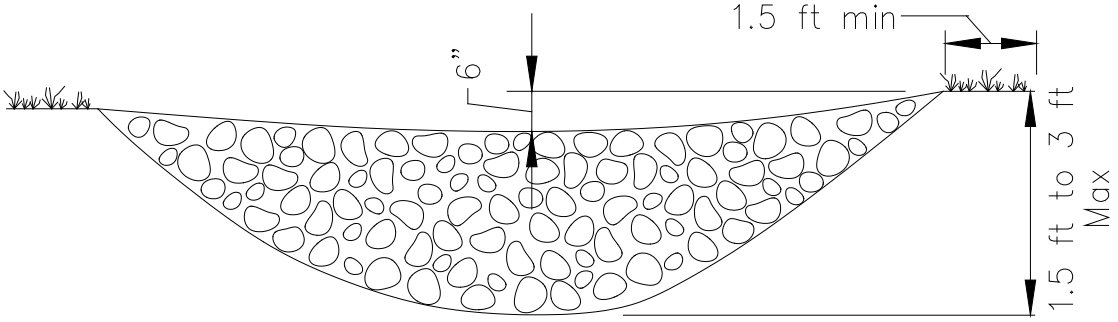
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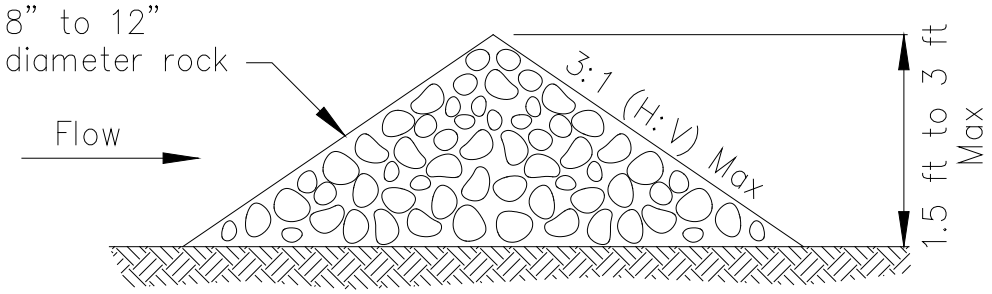
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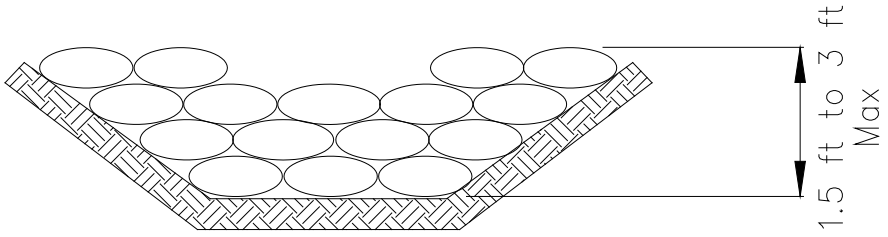


ELEVATION

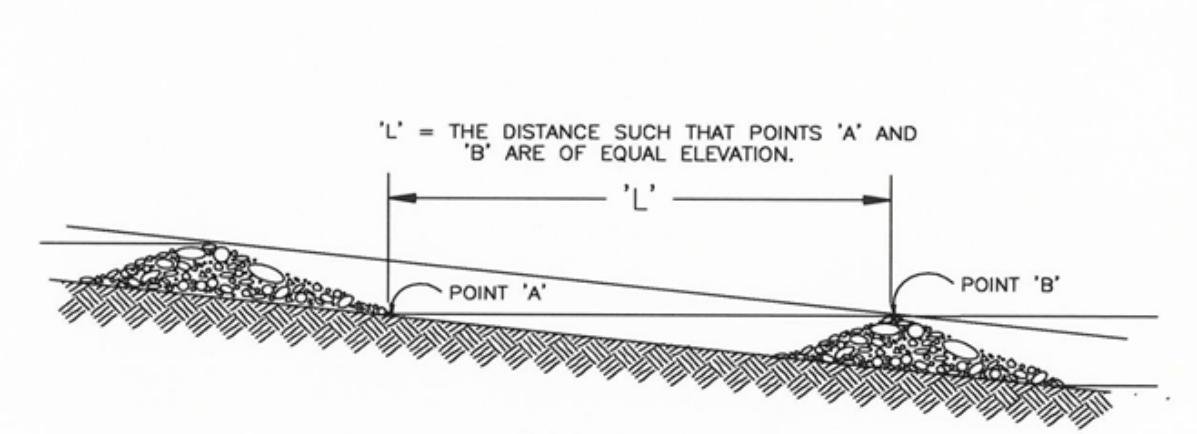


TYPICAL ROCK CHECK DAM SECTION

ROCK CHECK DAM
NOT TO SCALE

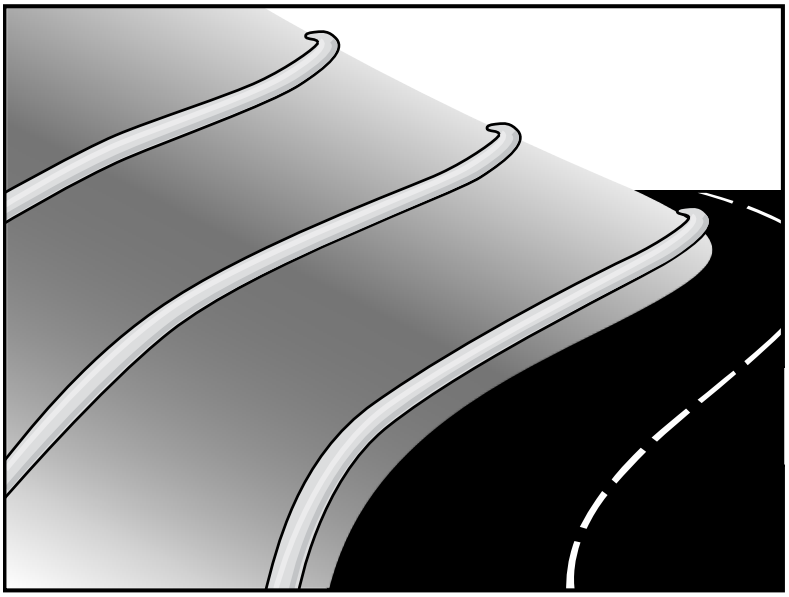


GRAVEL BAG CHECK DAM ELEVATION
NOT TO SCALE



SPACING BETWEEN CHECK DAMS

Fiber Rolls SE-5



Categories

EC	Erosion Control	☒
SE	Sediment Control	☑
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Description and Purpose

A fiber roll (also known as wattles or logs) consists of straw, coir, curled wood fiber, or other biodegradable materials bound into a tight tubular roll wrapped by plastic netting, which can be photodegradable, or natural fiber, such as jute, cotton, or sisal. Additionally, gravel core fiber rolls are available, which contain an imbedded ballast material such as gravel or sand for additional weight when staking the rolls are not feasible (such as use as inlet protection). When fiber rolls are placed at the toe and on the face of slopes along the contours, they intercept runoff, reduce its flow velocity, release the runoff as sheet flow, and provide removal of sediment from the runoff (through sedimentation). By interrupting the length of a slope, fiber rolls can also reduce sheet and rill erosion until vegetation is established.

Suitable Applications

Fiber rolls may be suitable:

- Along the toe, top, face, and at grade breaks of exposed and erodible slopes to shorten slope length and spread runoff as sheet flow.
- At the end of a downward slope where it transitions to a steeper slope.
- Along the perimeter of a project.
- As check dams in unlined ditches with minimal grade.
- Down-slope of exposed soil areas.

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

SE-1 Silt Fence

SE-6 Gravel Bag Berm

SE-8 Sandbag Barrier

SE-12 Manufactured Linear Sediment Controls

SE-14 Biofilter Bags

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- At operational storm drains as a form of inlet protection.
- Around temporary stockpiles.

Limitations

- Fiber rolls should be used in conjunction with erosion control, such as hydroseed, RECPs, etc.
- Only biodegradable fiber rolls containing no plastic can remain on a site applying for a Notice of Termination due to plastic pollution and wildlife concerns (State Water Board, 2016). Fiber rolls containing plastic that are used on a site must be disposed of for final stabilization.
- Fiber rolls are not effective unless trenched in and staked. If not properly staked and trenched in, fiber rolls will not work as intended and could be transported by high flows.
- Not intended for use in high flow situations (i.e., for concentrated flows).
- Difficult to move once saturated.
- Fiber rolls have a limited sediment capture zone.
- Fiber rolls should not be used on slopes subject to creep, slumping, or landslide.
- Rolls typically function for 12-24 months, depending upon local conditions and roll material.

Implementation

Fiber Roll Materials

- Fiber rolls should be prefabricated.
- Fiber rolls may come manufactured containing polyacrylamide (PAM), a flocculating agent within the roll. Fiber rolls impregnated with PAM provide additional sediment removal capabilities and should be used in areas with fine, clayey or silty soils to provide additional sediment removal capabilities. Monitoring may be required for these installations.
- Fiber rolls are made from weed-free rice straw, flax, curled wood fiber, or coir bound into a tight tubular roll by netting or natural fiber (see *Limitations* above regarding plastic netting).
- Typical fiber rolls vary in diameter from 6 in. to 20 in. Larger diameter rolls are available as well. The larger the roll, the higher the sediment retention capacity.
- Typical fiber rolls lengths are 4, 10, 20 and 25 ft., although other lengths are likely available.

Installation

- Locate fiber rolls on level contours spaced as follows:
  - Slope inclination of 4:1 (H:V) or flatter: Fiber rolls should be placed at a maximum interval of 20 ft.

  - Slope inclination between 4:1 and 2:1 (H:V): Fiber Rolls should be placed at a maximum interval of 15 ft. (a closer spacing is more effective).

  - Slope inclination 2:1 (H:V) or greater: Fiber Rolls should be placed at a maximum interval of 10 ft. (a closer spacing is more effective).

- Prepare the slope before beginning installation.
- Dig small trenches across the slope on the contour. The trench depth should be ¼ to 1/3 of the thickness of the roll, and the width should equal the roll diameter, in order to provide area to backfill the trench.
- It is critical that rolls are installed perpendicular to water movement, and parallel to the slope contour.
- Start building trenches and installing rolls from the bottom of the slope and work up.
- It is recommended that pilot holes be driven through the fiber roll. Use a straight bar to drive holes through the roll and into the soil for the wooden stakes.
- Turn the ends of the fiber roll up slope to prevent runoff from going around the roll.
- Stake fiber rolls into the trench.

  - Drive stakes at the end of each fiber roll and spaced 4 ft maximum on center.

  - Use wood stakes with a nominal classification of 0.75 by 0.75 in. and minimum length of 24 in.

- If more than one fiber roll is placed in a row, the rolls should be overlapped, not abutted.
- See typical fiber roll installation details at the end of this fact sheet.

Removal

- Fiber rolls can be left in place or removed depending on the type of fiber roll and application (temporary vs. permanent installation). Fiber rolls encased with plastic netting or containing any plastic material will need to be removed from the site for final stabilization. Fiber rolls used in a permanent application are to be encased with a non-plastic material and are left in place. Removal of a fiber roll used in a permanent application can result in greater disturbance; therefore, during the BMP planning phase, the areas where fiber rolls will be used on final slopes, only fiber rolls wrapped in non-plastic material should be selected.
- Temporary installations should only be removed when up gradient areas are stabilized per General Permit requirements, and/or pollutant sources no longer present a hazard. But they should also be removed before vegetation becomes too mature so that the removal process does not disturb more soil and vegetation than is necessary.

Costs

Material costs for straw fiber rolls range from $26 - $38 per 25-ft. roll[1] and curled wood fiber rolls range from $30 - $40 per roll[2].

Material costs for PAM impregnated fiber rolls range between $9.00-$12.00 per linear foot, based upon vendor research[1] .

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Repair or replace split, torn, unraveling, or slumping fiber rolls.
- If the fiber roll is used as a sediment capture device, or as an erosion control device to maintain sheet flows, sediment that accumulates in the BMP should be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when sediment accumulation reaches one-third the designated sediment storage depth.
- If fiber rolls are used for erosion control, such as in a check dam, sediment removal should not be required as long as the system continues to control the grade. Sediment control BMPs will likely be required in conjunction with this type of application.
- Repair any rills or gullies promptly.

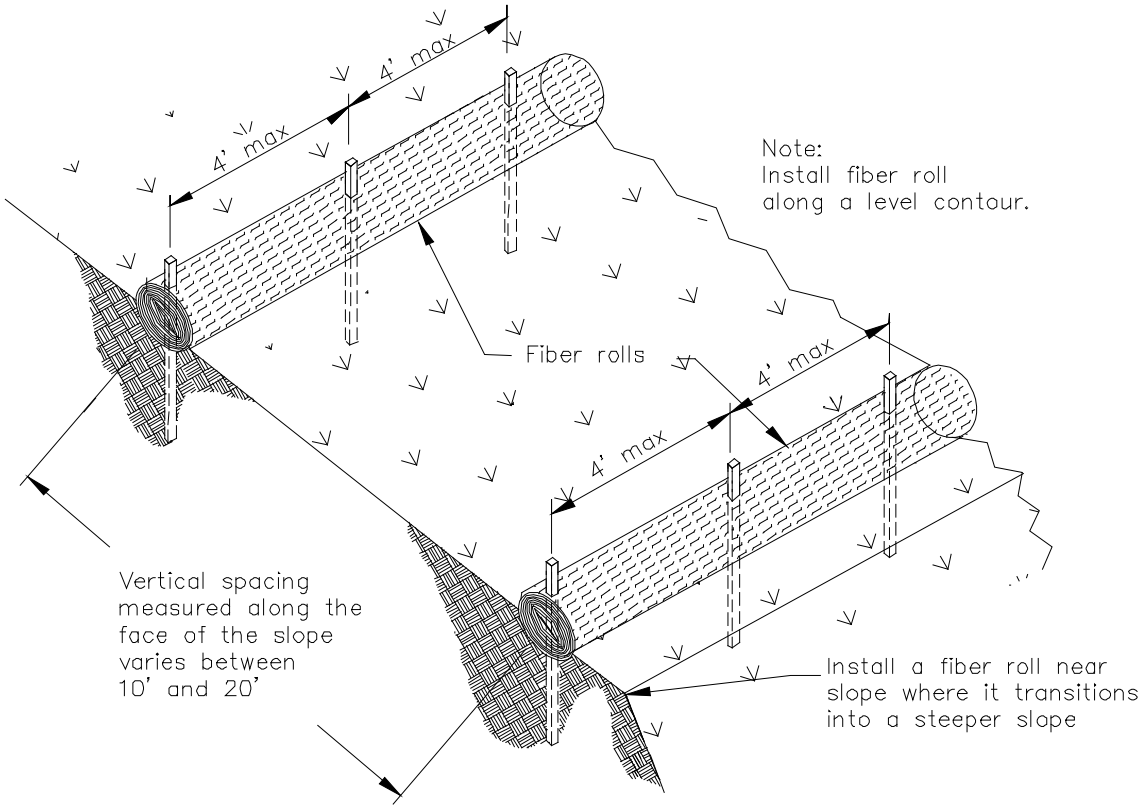
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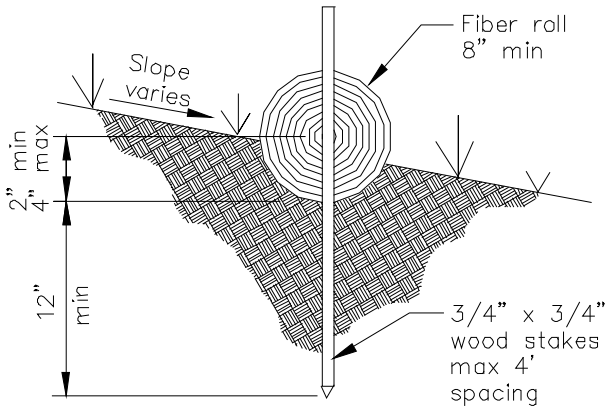
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[1] Adjusted for inflation (2016 dollars) by Tetra Tech, Inc.
[2] Costs estimated based on vendor query by Tetra Tech, Inc. 2016.

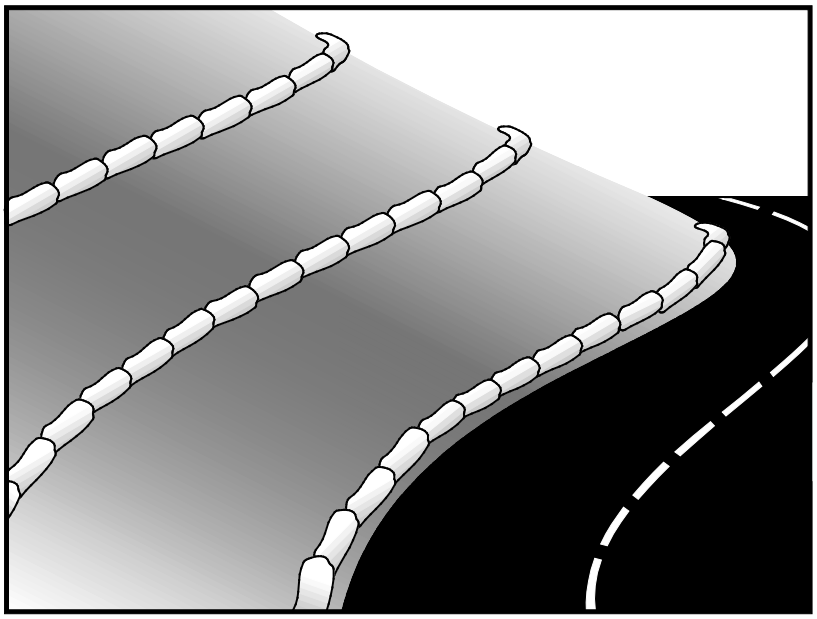


TYPICAL FIBER ROLL INSTALLATION
N.T.S.



ENTRENCHMENT DETAIL
N.T.S.

Gravel Bag Berm SE-6



Description and Purpose

A gravel bag berm is a series of gravel-filled bags placed on a level contour to intercept sheet flows. Gravel bags pond sheet flow runoff, allowing sediment to settle out, and release runoff slowly as sheet flow, preventing erosion.

Suitable Applications

Gravel bag berms may be suitable:

- As a linear sediment control measure:
  - Below the toe of slopes and erodible slopes
  - As sediment traps at culvert/pipe outlets
  - Below other small cleared areas
  - Along the perimeter of a site
  - Down slope of exposed soil areas
  - Around temporary stockpiles and spoil areas
  - Parallel to a roadway to keep sediment off paved areas
  - Along streams and channels
- As a linear erosion control measure:
  - Along the face and at grade breaks of exposed and erodible slopes to shorten slope length and spread runoff as sheet flow.

Categories

EC	Erosion Control	☒
SE	Sediment Control	☑
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

SE-1 Silt Fence
SE-5 Fiber Roll
SE-8 Sandbag Barrier
SE-12 Temporary Silt Dike
SE-14 Biofilter Bags

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- At the top of slopes to divert runoff away from disturbed slopes.
- As chevrons (small check dams) across mildly sloped construction roads. For use check dam use in channels, see SE-4, Check Dams.

Limitations

- Gravel berms may be difficult to remove.
- Removal problems limit their usefulness in landscaped areas.
- Gravel bag berm may not be appropriate for drainage areas greater than 5 acres.
- Runoff will pond upstream of the berm, possibly causing flooding if sufficient space does not exist.
- Degraded gravel bags may rupture when removed, spilling contents.
- Installation can be labor intensive.
- Durability of gravel bags is somewhat limited, and bags may need to be replaced when installation is required for longer than 6 months.
- Easily damaged by construction equipment.
- When used to detain concentrated flows, maintenance requirements increase.

Implementation

General

A gravel bag berm consists of a row of open graded gravel-filled bags placed on a level contour. When appropriately placed, a gravel bag berm intercepts and slows sheet flow runoff, causing temporary ponding. The temporary ponding allows sediment to settle. The open graded gravel in the bags is porous, which allows the ponded runoff to flow slowly through the bags, releasing the runoff as sheet flows. Gravel bag berms also interrupt the slope length and thereby reduce erosion by reducing the tendency of sheet flows to concentrate into rivulets, which erode rills, and ultimately gullies, into disturbed, sloped soils. Gravel bag berms are similar to sand bag barriers but are more porous. Generally, gravel bag berms should be used in conjunction with temporary soil stabilization controls up slope to provide effective erosion and sediment control.

Design and Layout

- Locate gravel bag berms on level contours.
- When used for slope interruption, the following slope/sheet flow length combinations apply:
  - Slope inclination of 4:1 (H:V) or flatter: Gravel bags should be placed at a maximum interval of 20 ft, with the first row near the slope toe.
  - Slope inclination between 4:1 and 2:1 (H:V): Gravel bags should be placed at a maximum interval of 15 ft. (a closer spacing is more effective), with the first row near the slope toe.

Slope inclination 2:1 (H:V) or greater: Gravel bags should be placed at a maximum interval of 10 ft. (a closer spacing is more effective), with the first row near the slope toe.

- Turn the ends of the gravel bag barriers up slope to prevent runoff from going around the berm.
- Allow sufficient space up slope from the gravel bag berm to allow ponding, and to provide room for sediment storage.
- For installation near the toe of the slope, gravel bag barriers should be set back from the slope toe to facilitate cleaning. Where specific site conditions do not allow for a set-back, the gravel bag barrier may be constructed on the toe of the slope. To prevent flows behind the barrier, bags can be placed perpendicular to a berm to serve as cross barriers.
- Drainage area should not exceed 5 acres.
- In Non-Traffic Areas:
  - Height = 18 in. maximum
  - Top width = 24 in. minimum for three or more-layer construction
  - Top width = 12 in. minimum for one- or two-layer construction
  - Side slopes = 2:1 (H:V) or flatter
- In Construction Traffic Areas:
  - Height = 12 in. maximum
  - Top width = 24 in. minimum for three or more-layer construction.
  - Top width = 12 in. minimum for one- or two-layer construction.
  - Side slopes = 2:1 (H:V) or flatter.
- Butt ends of bags tightly.
- On multiple row, or multiple layer construction, overlap butt joints of adjacent row and row beneath.
- Use a pyramid approach when stacking bags.

Materials

- ***Bag Material:*** Bags should be woven polypropylene, polyethylene or polyamide fabric or burlap, minimum unit weight of 4 ounces/yd^2, Mullen burst strength exceeding 300 lb/in^2 in conformance with the requirements in ASTM designation D3786, and ultraviolet stability exceeding 70% in conformance with the requirements in ASTM designation D4355.

- ***Bag Size:*** Each gravel-filled bag should have a length of 18 in., width of 12 in., thickness of 3 in., and mass of approximately 33 lbs. Bag dimensions are nominal and may vary based on locally available materials.

- ***Fill Material:*** Fill material should be 0.5 to 1 in. Crushed rock, clean and free from clay, organic matter, and other deleterious material, or other suitable open graded, non-cohesive, porous gravel.

Costs

Material costs for gravel bags are average and are dependent upon material availability. $3.20-$3.80 per filled gravel bag is standard based upon vendor research (Adjusted for inflation, 2016 dollars, by Tetra Tech, Inc.).

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.

- Gravel bags exposed to sunlight will need to be replaced every two to three months due to degrading of the bags.

- Reshape or replace gravel bags as needed.

- Repair washouts or other damage as needed.

- Sediment that accumulates in the BMP should be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when the sediment accumulation reaches one-third of the barrier height.

- Remove gravel bag berms when no longer needed and recycle gravel fill whenever possible and properly dispose of bag material. Remove sediment accumulation and clean, re-grade, and stabilize the area.

References

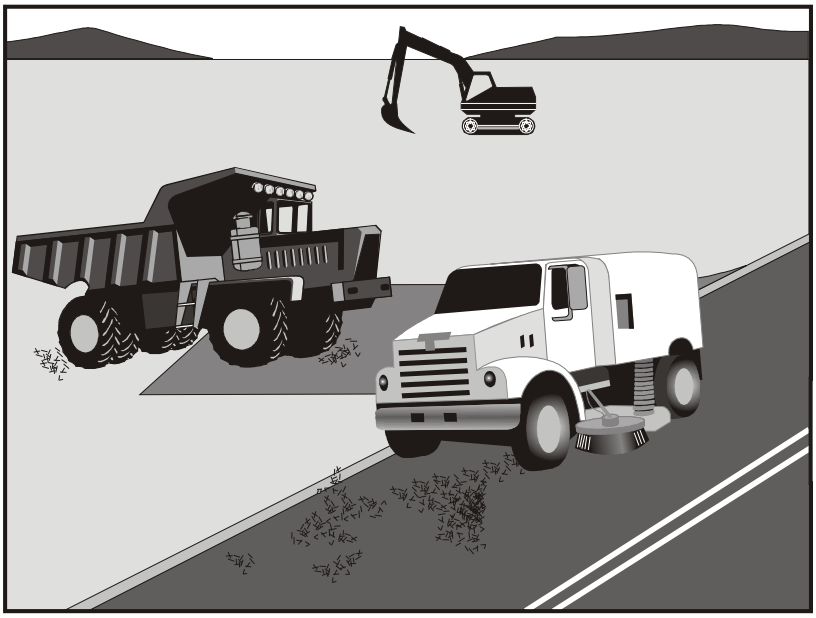
Handbook of Steel Drainage and Highway Construction, American Iron and Steel Institute, 1983.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Pollution Plan Handbook, First Edition, State of California, Department of Transportation Division of New Technology, Materials and Research, October 1992.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.

Street Sweeping and Vacuuming SE-7



Categories

EC	Erosion Control	
SE	Sediment Control	☒
TC	Tracking Control	☑
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	☑
Metals	
Bacteria	
Oil and Grease	☑
Organics	

Potential Alternatives

None

Description and Purpose

Street sweeping and vacuuming includes use of self-propelled and walk-behind equipment to remove sediment from streets and roadways and to clean paved surfaces in preparation for final paving. Sweeping and vacuuming prevents sediment from the project site from entering storm drains or receiving waters.

Suitable Applications

Sweeping and vacuuming are suitable anywhere sediment is tracked from the project site onto public or private paved streets and roads, typically at points of egress. Sweeping and vacuuming are also applicable during preparation of paved surfaces for final paving.

Limitations

- Sweeping and vacuuming may not be effective when sediment is wet or when tracked soil is caked (caked soil may need to be scraped loose).
- Sweeping may be less effective for fine particle soils (i.e., clay).

Implementation

- Controlling the number of points where vehicles can leave the site will allow sweeping and vacuuming efforts to be focused and perhaps save money.
- Inspect potential sediment tracking locations daily.

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- Visible sediment tracking should be swept or vacuumed on a daily basis.
- Do not use kick brooms or sweeper attachments. These tend to spread the dirt rather than remove it.
- If not mixed with debris or trash, consider incorporating the removed sediment back into the project

Costs

Rental rates for self-propelled sweepers vary depending on hopper size and duration of rental. Expect rental rates from $ 650/day to $2,500/day[1], plus operator costs. Hourly production rates vary with the amount of area to be swept and amount of sediment. Match the hopper size to the area and expect sediment load to minimize time spent dumping.

Inspection and Maintenance

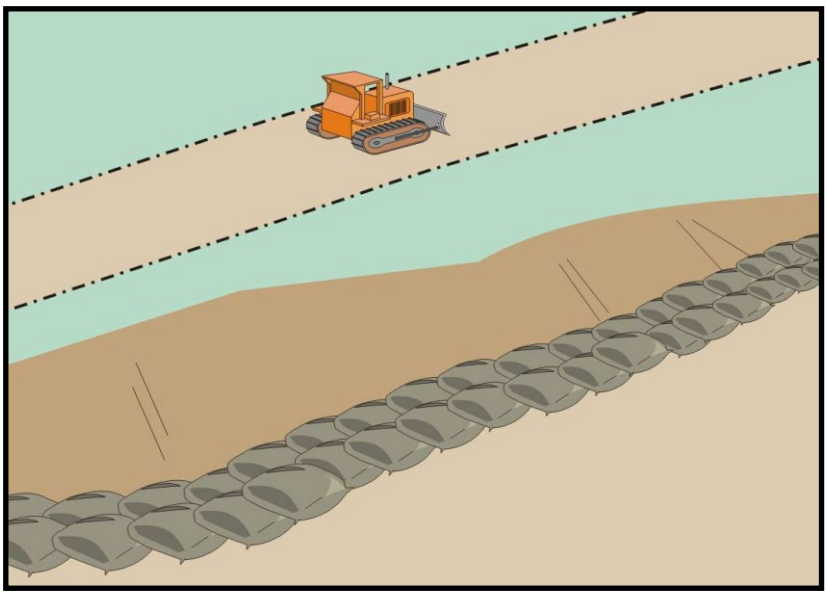
- Inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- When actively in use, points of ingress and egress must be inspected daily.
- When tracked or spilled sediment is observed outside the construction limits, it must be removed at least daily. More frequent removal, even continuous removal, may be required in some jurisdictions.
- Be careful not to sweep up any unknown substance or any object that may be potentially hazardous.
- Adjust brooms frequently; maximize efficiency of sweeping operations.
- After sweeping is finished, properly dispose of sweeper wastes at an approved dumpsite.

References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

[1] Based on contractor query conducted by Tetra Tech, Inc. November 2016.

Sandbag Barrier SE-8



Categories		
EC	Erosion Control	☒
SE	Sediment Control	☑
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Description and Purpose

A sandbag barrier is a series of sand-filled bags placed on a level contour to intercept or to divert sheet flows. Sandbag barriers placed on a level contour pond sheet flow runoff, allowing sediment to settle out.

Suitable Applications

Sandbag barriers may be a suitable control measure for the applications described below. It is important to consider that sand bags are less porous than gravel bags and ponding or flooding can occur behind the barrier. Also, sand is easily transported by runoff if bags are damaged or ruptured. The SWPPP Preparer should select the location of a sandbag barrier with respect to the potential for flooding, damage, and the ability to maintain the BMP.

- As a linear sediment control measure:
  - Below the toe of slopes and erodible slopes.
  - As sediment traps at culvert/pipe outlets.
  - Below other small cleared areas.
  - Along the perimeter of a site.
  - Down slope of exposed soil areas.
  - Around temporary stockpiles and spoil areas.
  - Parallel to a roadway to keep sediment off paved areas.
  - Along streams and channels.

Targeted Constituents	
Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

SE-1 Silt Fence

SE-5 Fiber Rolls

SE-6 Gravel Bag Berm

SE-12 Manufactured Linear Sediment Controls

SE-14 Biofilter Bags

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- As linear erosion control measure:
  - Along the face and at grade breaks of exposed and erodible slopes to shorten slope length and spread runoff as sheet flow.
  - At the top of slopes to divert runoff away from disturbed slopes.
  - As check dams across mildly sloped construction roads.

Limitations

- It is necessary to limit the drainage area upstream of the barrier to 5 acres.
- Sandbags are not intended to be used as filtration devices.
- Easily damaged by construction equipment.
- Degraded sandbags may rupture when removed, spilling sand.
- Installation can be labor intensive.
- Durability of sandbags is somewhat limited, and bags will need to be replaced when there are signs of damage or wear.
- Burlap should not be used for sandbags.

Implementation

General

A sandbag barrier consists of a row of sand-filled bags placed on a level contour. When appropriately placed, a sandbag barrier intercepts and slows sheet flow runoff, causing temporary ponding. The temporary ponding allows sediment to settle. Sand-filled bags have limited porosity, which is further limited as the fine sand tends to quickly plug with sediment, limiting or completely blocking the rate of flow through the barrier. If a porous barrier is desired, consider SE-1, Silt Fence, SE-5, Fiber Rolls, SE-6, Gravel Bag Berms or SE-14, Biofilter Bags. Sandbag barriers also interrupt the slope length and thereby reduce erosion by reducing the tendency of sheet flows to concentrate into rivulets which erode rills, and ultimately gullies, into disturbed, sloped soils. Sandbag barriers are similar to gravel bag berms, but less porous. Generally, sandbag barriers should be used in conjunction with temporary soil stabilization controls up slope to provide effective erosion and sediment control.

Design and Layout

- Locate sandbag barriers on a level contour.
- When used for slope interruption, the following slope/sheet flow length combinations apply:
  - Slope inclination of 4:1 (H:V) or flatter: Sandbags should be placed at a maximum interval of 20 ft, with the first row near the slope toe.
  - Slope inclination between 4:1 and 2:1 (H:V): Sandbags should be placed at a maximum interval of 15 ft. (a closer spacing is more effective), with the first row near the slope toe.

- Slope inclination 2:1 (H:V) or greater: Sandbags should be placed at a maximum interval of 10 ft. (a closer spacing is more effective), with the first row near the slope toe.

- Turn the ends of the sandbag barrier up slope to prevent runoff from going around the barrier.
- Allow sufficient space up slope from the barrier to allow ponding, and to provide room for sediment storage.
- For installation near the toe of the slope, sand bag barriers should be set back from the slope toe to facilitate cleaning. Where specific site conditions do not allow for a set-back, the sand bag barrier may be constructed on the toe of the slope. To prevent flows behind the barrier, bags can be placed perpendicular to a berm to serve as cross barriers.
- Drainage area should not exceed 5 acres.
- Butt ends of bags tightly.
- Overlap butt joints of row beneath with each successive row.
- Use a pyramid approach when stacking bags.
- In non-traffic areas
  - Height = 18 in. maximum
  - Top width = 24 in. minimum for three or more-layer construction
  - Side slope = 2:1 (H:V) or flatter
- In construction traffic areas
  - Height = 12 in. maximum
  - Top width = 24 in. minimum for three or more-layer construction.
  - Side slopes = 2:1 (H:V) or flatter.
- See typical sandbag barrier installation details at the end of this fact sheet.

Materials

- ***Sandbag Material:*** Sandbag should be woven polypropylene, polyethylene or polyamide fabric, minimum unit weight of 4 ounces/yd^2, Mullen burst strength exceeding 300 lb/in^2 in conformance with the requirements in ASTM designation D3786, and ultraviolet stability exceeding 70% in conformance with the requirements in ASTM designation D4355. Use of burlap is not an acceptable substitute, as sand can more easily mobilize out of burlap.
- ***Sandbag Size:*** Each sand-filled bag should have a length of 18 in., width of 12 in., thickness of 3 in., and mass of approximately 33 lbs. Bag dimensions are nominal and may vary based on locally available materials.

- ***Fill Material:*** All sandbag fill material should be non-cohesive, Class 3 (Caltrans Standard Specification, Section 25) or similar permeable material free from clay and deleterious material, such as recycled concrete or asphalt.

Costs

Empty sandbags cost $0.25 - $0.75. Average cost of fill material is $8 per yd^3. Additional labor is required to fill the bags. Pre-filled sandbags are more expensive at $1.50 - $2.00 per bag. These costs are based upon vendor research.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Sandbags exposed to sunlight will need to be replaced every two to three months due to degradation of the bags.
- Reshape or replace sandbags as needed.
- Repair washouts or other damage as needed.
- Sediment that accumulates behind the BMP should be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when the sediment accumulation reaches one-third of the barrier height.
- Remove sandbags when no longer needed and recycle sand fill whenever possible and properly dispose of bag material. Remove sediment accumulation, and clean, re-grade, and stabilize the area.

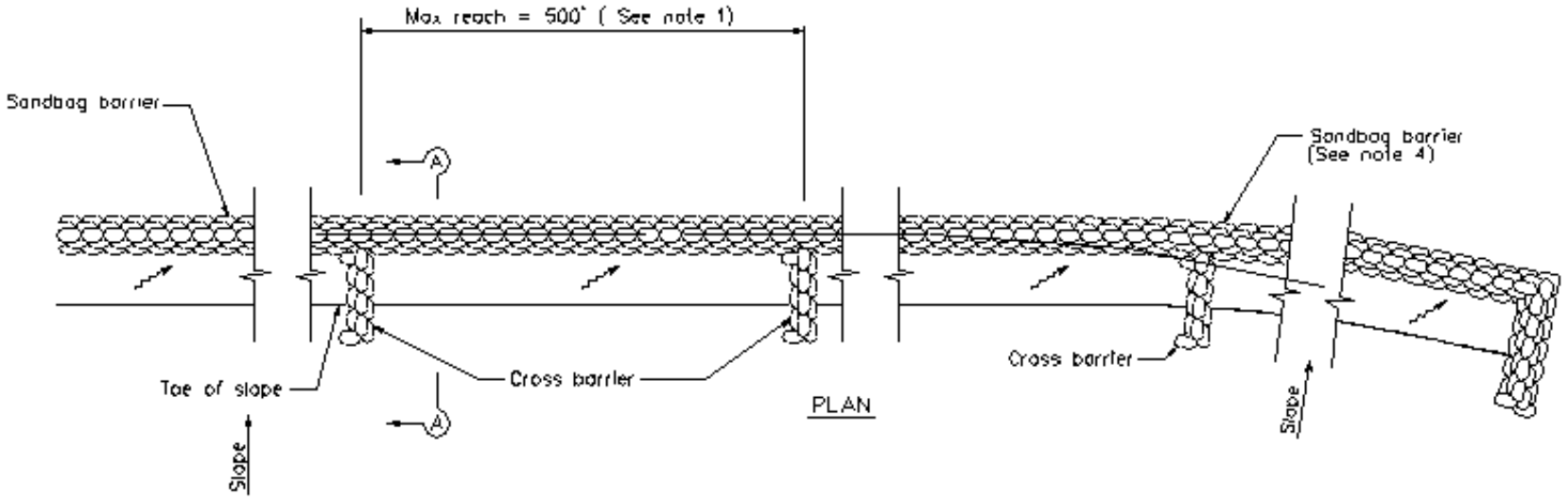
References

Standard Specifications for Construction of Local Streets and Roads, California Department of Transportation (Caltrans), July 2002.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.

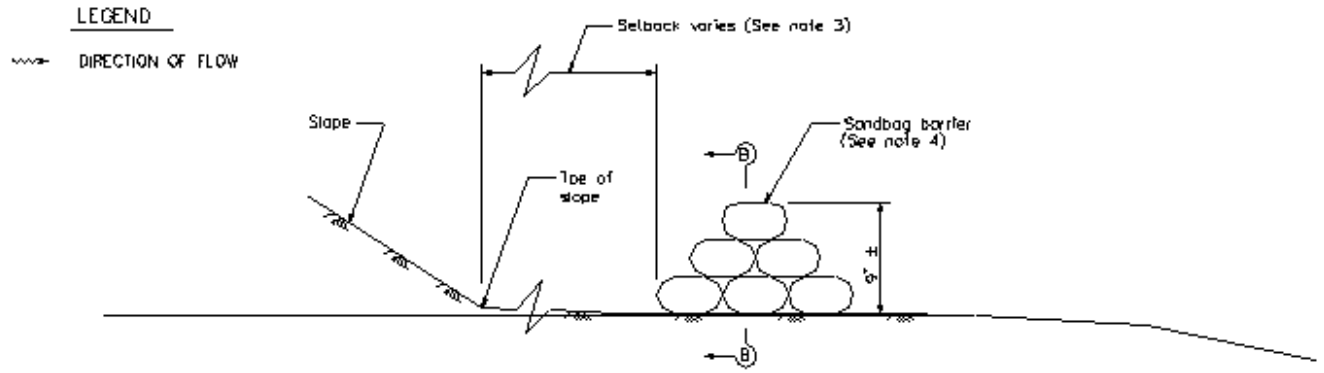
Sandbag Barrier SE-8



SANDBAG BARRIER

NOTES

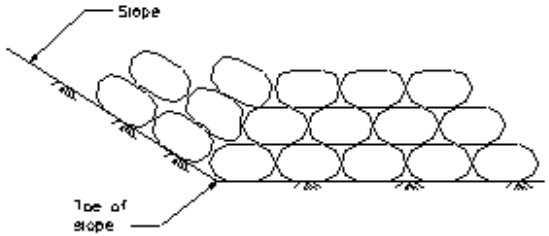
1. Construct the length of each reach so that the change in base elevation along the reach does not exceed 1/2 the height of the linear barrier, in no case shall the reach length exceed 500'.
2. Place sandbags tightly
3. Dimension may vary to fit field condition.
4. Sandbag barrier shall be a minimum of 3 bags high.
5. The end of the barrier shall be turned up slope.
6. Cross barriers shall be a min of 1/2 and a max of 2/3 the height of the linear barrier.
7. Sandbag rows and layers shall be staggered to eliminate gaps.



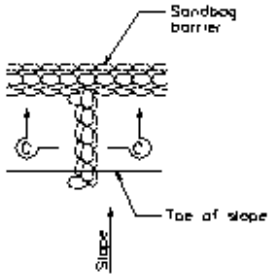
SECTION A–A



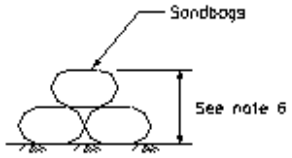
SECTION B–B



END DETAIL

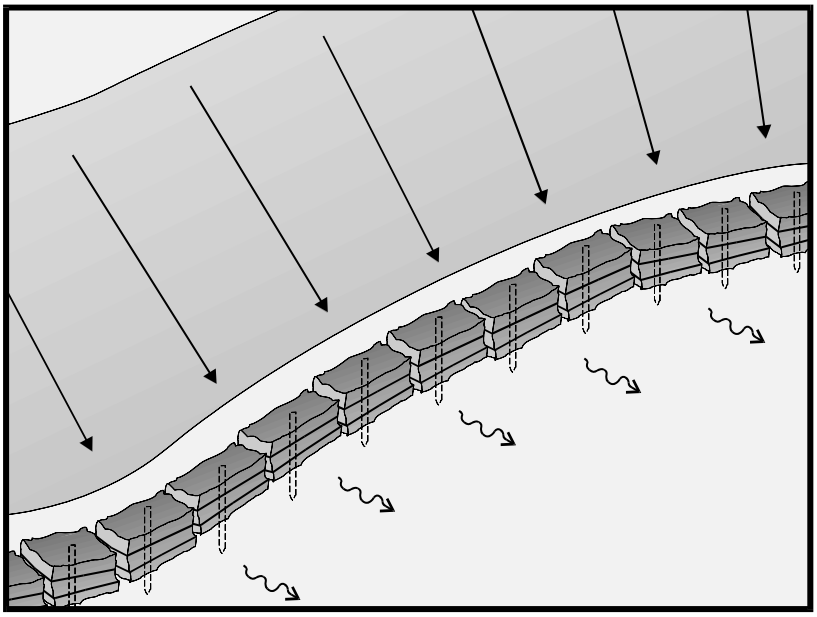


CROSS BARRIER DETAIL



SECTION C–C

Straw Bale Barrier SE-9



Description and Purpose

A straw bale barrier is a series of straw bales placed on a level contour to intercept sheet flows. Straw bale barriers pond sheet-flow runoff, allowing sediment to settle out.

Suitable Applications

Straw bale barriers may be suitable:

- As a linear sediment control measure:
  - Below the toe of slopes and erodible slopes
  - As sediment traps at culvert/pipe outlets
  - Below other small cleared areas
  - Along the perimeter of a site
  - Down slope of exposed soil areas
  - Around temporary stockpiles and spoil areas
  - Parallel to a roadway to keep sediment off paved areas
  - Along streams and channels
- As linear erosion control measure:
  - Along the face and at grade breaks of exposed and erodible slopes to shorten slope length and spread runoff as sheet flow

Categories

EC	Erosion Control	☒
SE	Sediment Control	☑
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

SE-1 Silt Fence

SE-5 Fiber Rolls

SE-6 Gravel Bag Berm

SE-8 Sandbag Barrier

SE-12 Temporary Silt Dike

SE-14 Biofilter Bags

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- At the top of slopes to divert runoff away from disturbed slopes
- As check dams across mildly sloped construction roads

Limitations

Straw bale barriers:

- Are not to be used for extended periods of time because they tend to rot and fall apart
- Are suitable only for sheet flow on slopes of 10 % or flatter
- Are not appropriate for large drainage areas, limit to one acre or less
- May require constant maintenance due to rotting
- Are not recommended for concentrated flow, inlet protection, channel flow, and live streams
- Cannot be made of bale bindings of jute or cotton
- Require labor-intensive installation and maintenance
- Cannot be used on paved surfaces
- Should not to be used for drain inlet protection
- Should not be used on lined ditches
- May introduce undesirable non-native plants to the area

Implementation

General

A straw bale barrier consists of a row of straw bales placed on a level contour. When appropriately placed, a straw bale barrier intercepts and slows sheet flow runoff, causing temporary ponding. The temporary ponding provides quiescent conditions allowing sediment to settle. Straw bale barriers also interrupt the slope length and thereby reduce erosion by reducing the tendency of sheet flows to concentrate into rivulets, which erode rills, and ultimately gullies, into disturbed, sloped soils.

Straw bale barriers have not been as effective as expected due to improper use. These barriers have been placed in streams and drainage ways where runoff volumes and velocities have caused the barriers to wash out. In addition, failure to stake and entrench the straw bale has allowed undercutting and end flow. Use of straw bale barriers in accordance with this BMP should produce acceptable results.

Design and Layout

- Locate straw bale barriers on a level contour.
  - Slopes up to 10:1 (H:V): Straw bales should be placed at a maximum interval of 50 ft (a closer spacing is more effective), with the first row near the toe of slope.
  - Slopes greater than 10:1 (H:V): Not recommended.

- Turn the ends of the straw bale barrier up slope to prevent runoff from going around the barrier.
- Allow sufficient space up slope from the barrier to allow ponding, and to provide room for sediment storage.
- For installation near the toe of the slope, consider moving the barrier away from the slope toe to facilitate cleaning. To prevent flow behind the barrier, sand bags can be placed perpendicular to the barrier to serve as cross barriers.
- Drainage area should not exceed 1 acre, or 0.25 acre per 100 ft of barrier.
- Maximum flow path to the barrier should be limited to 100 ft.
- Straw bale barriers should consist of two parallel rows.
    - Butt ends of bales tightly
    - Stagger butt joints between front and back row
    - Each row of bales must be trenched in and firmly staked
- Straw bale barriers are limited in height to one bale laid on its side.
- Anchor bales with either two wood stakes or four bars driven through the bale and into the soil. Drive the first stake towards the butt joint with the adjacent bale to force the bales together.
- See attached figure for installation details.

Materials

- ***Straw Bale Size:*** Each straw bale should be a minimum of 14 in. wide, 18 in. in height, 36 in. in length and should have a minimum mass of 50 lbs. The straw bale should be composed entirely of vegetative matter, except for the binding material.
- ***Bale Bindings:*** Bales should be bound by steel wire, nylon or polypropylene string placed horizontally. Jute and cotton binding should not be used. Baling wire should be a minimum diameter of 14 gauge. Nylon or polypropylene string should be approximately 12 gauge in diameter with a breaking strength of 80 lbs force.
- ***Stakes:*** Wood stakes should be commercial quality lumber of the size and shape shown on the plans. Each stake should be free from decay, splits or cracks longer than the thickness of the stake, or other defects that would weaken the stakes and cause the stakes to be structurally unsuitable. Steel bar reinforcement should be equal to a #4 designation or greater. End protection should be provided for any exposed bar reinforcement.

Costs

Straw bales cost $5 - $7 each. Adequate labor should be budgeted for installation and maintenance.

Inspection and Maintenance

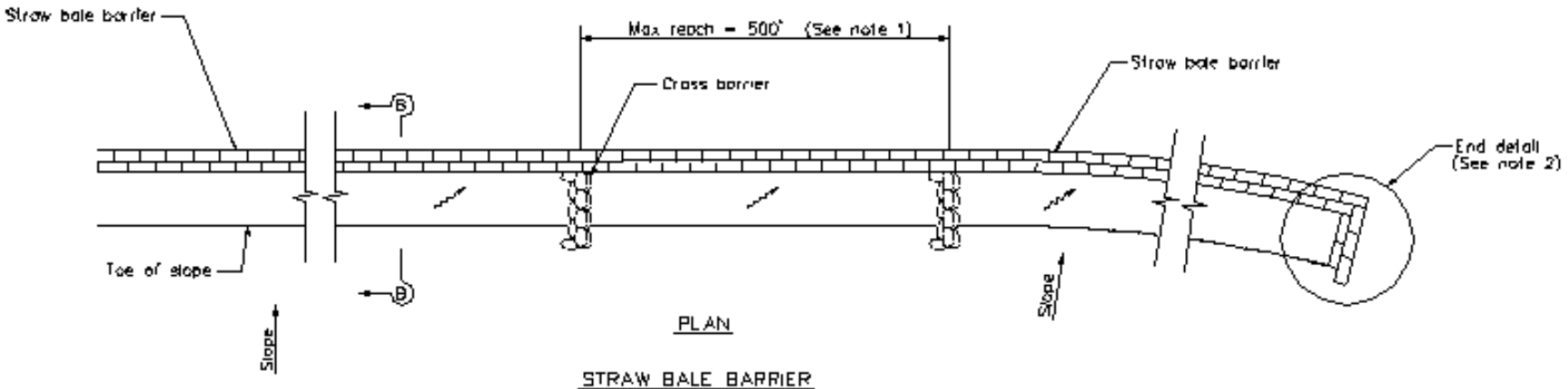
Maintenance

- Inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Straw bales degrade, especially when exposed to moisture. Rotting bales will need to be replaced on a regular basis.
- Replace or repair damaged bales as needed.
- Repair washouts or other damages as needed.
- Sediment that accumulates in the BMP must be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when the sediment accumulation reaches one-third of the barrier height. Sediment removed during maintenance may be incorporated into earthwork on the site or disposed at an appropriate location.
- Remove straw bales when no longer needed. Remove sediment accumulation, and clean, re-grade, and stabilize the area. Removed sediment should be incorporated in the project or disposed of.

References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Straw Bale Barrier SE-9



PLAN

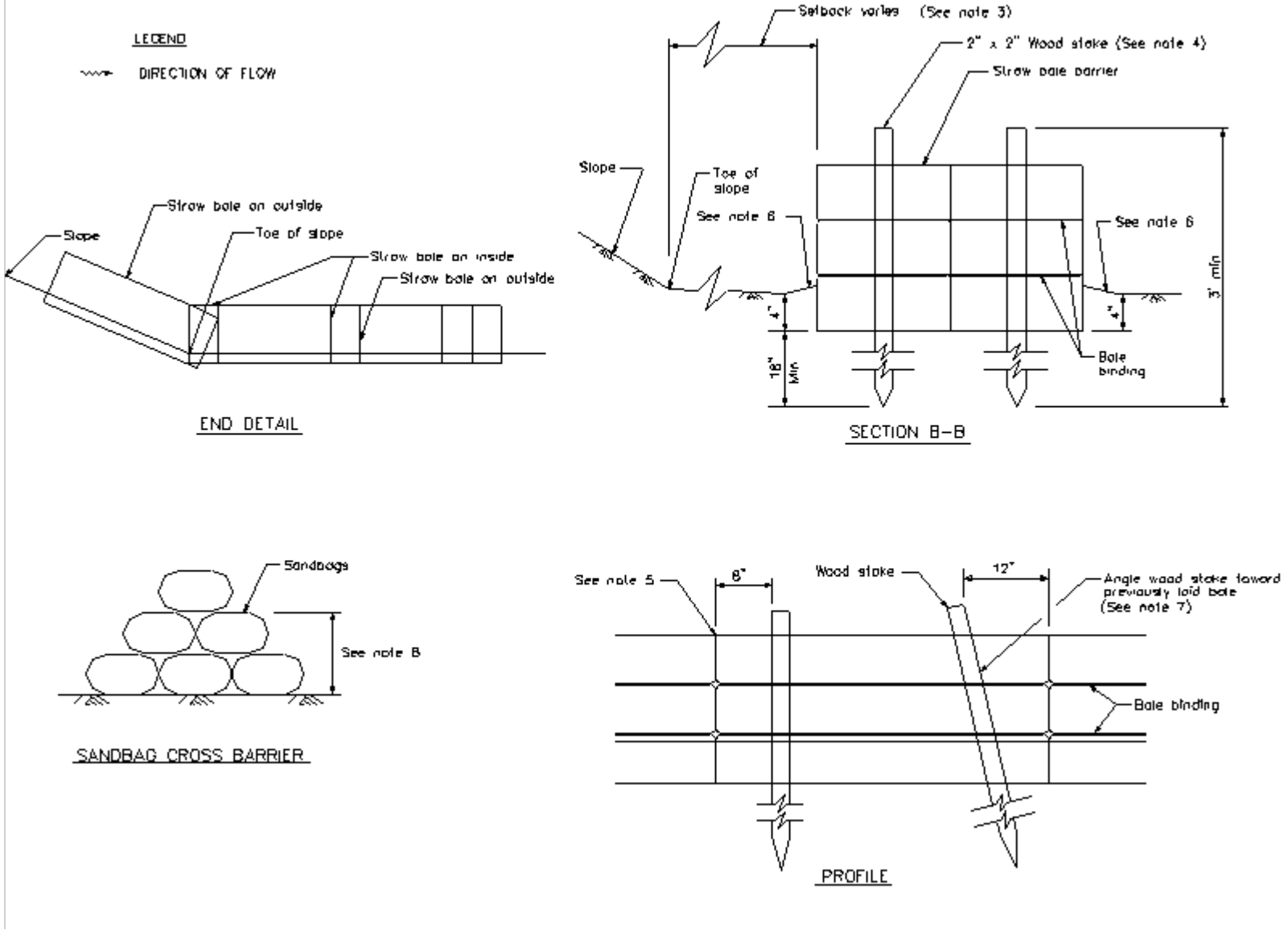
STRAW BALE BARRIER

NOTES

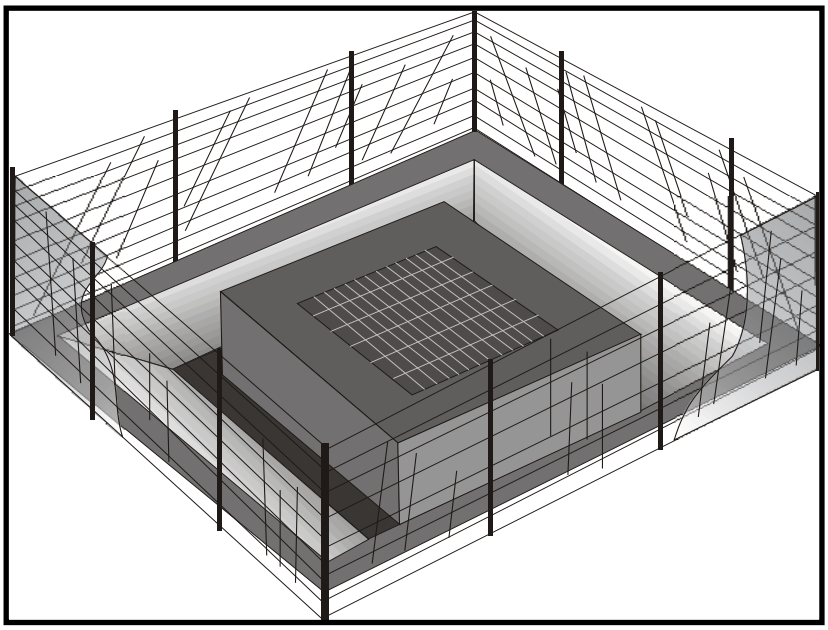
1. Construct the length of each reach so that the change in base elevation along the reach does not exceed 1/2 the height of the linear barrier. In no case shall the reach length exceed 500'.
2. The end of barrier shall be turned up slope.
3. Dimension may vary to fit field condition.
4. Stake dimensions are nominal.
5. Place straw bales tightly together.
6. Tamp embedment spoils against sides of installed bales
7. Drive angled wood stake before vertical stake to ensure tight abutment to adjacent bale.
8. Sandbag cross barriers should be a min of 1/2 and a max of 2/3 the height of the linear barrier.
9. Sandbag rows and layers should be offset to eliminate gaps.

LEGEND

DIRECTION OF FLOW


LEGEND
DIRECTION OF FLOW
Straw bale on outside
Slope
Toe of slope
Straw bale on inside
Straw bale on outside
END DETAIL
Setback varies (See note 3)
2" x 2" Wood stake (See note 4)
Straw bale barrier
Slope
Toe of slope
See note 6
See note 6
4"
4"
18" Min
3' min
Bale binding
SECTION B-B
Sandbags
See note 8
SANDBAG CROSS BARRIER
See note 5
8"
Wood stake
12"
Angle wood stake toward previously laid bale (See note 7)
Bale binding
PROFILE

Storm Drain Inlet Protection SE-10



Categories

EC	Erosion Control	
SE	Sediment Control	☑
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	☒
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

SE-1 Silt Fence

SE-5 Fiber Rolls

SE-6 Gravel Bag Berm

SE-8 Sandbag Barrier

SE-14 Biofilter Bags

SE-13 Compost Socks and Berms

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Description and Purpose

Storm drain inlet protection consists of a sediment filter or an impounding area in, around or upstream of a storm drain, drop inlet, or curb inlet. Storm drain inlet protection measures temporarily pond runoff before it enters the storm drain, allowing sediment to settle. Some filter configurations also remove sediment by filtering, but usually the ponding action results in the greatest sediment reduction. Temporary geotextile storm drain inserts attach underneath storm drain grates to capture and filter storm water.

Suitable Applications

- Every storm drain inlet receiving runoff from unstabilized or otherwise active work areas should be protected. Inlet protection should be used in conjunction with other erosion and sediment controls to prevent sediment-laden stormwater and non-stormwater discharges from entering the storm drain system.

Limitations

- Drainage area should not exceed 1 acre.
- In general straw bales should not be used as inlet protection.
- Requires an adequate area for water to pond without encroaching into portions of the roadway subject to traffic.
- Sediment removal may be inadequate to prevent sediment discharges in high flow conditions or if runoff is heavily sediment laden. If high flow conditions are expected, use

other onsite sediment trapping techniques in conjunction with inlet protection.

- Frequent maintenance is required.
- Limit drainage area to 1 acre maximum. For drainage areas larger than 1 acre, runoff should be routed to a sediment-trapping device designed for larger flows. See BMPs SE-2, Sediment Basin, and SE-3, Sediment Traps.
- Excavated drop inlet sediment traps are appropriate where relatively heavy flows are expected, and overflow capability is needed.

Implementation

General

Inlet control measures presented in this handbook should not be used for inlets draining more than one acre. Runoff from larger disturbed areas should be first routed through SE-2, Sediment Basin or SE-3, Sediment Trap and/or used in conjunction with other drainage control, erosion control, and sediment control BMPs to protect the site. Different types of inlet protection are appropriate for different applications depending on site conditions and the type of inlet. Alternative methods are available in addition to the methods described/shown herein such as prefabricated inlet insert devices, or gutter protection devices.

Design and Layout

Identify existing and planned storm drain inlets that have the potential to receive sediment-laden surface runoff. Determine if storm drain inlet protection is needed and which method to use.

- The key to successful and safe use of storm drain inlet protection devices is to know where runoff that is directed toward the inlet to be protected will pond or be diverted as a result of installing the protection device.
  - Determine the acceptable location and extent of ponding in the vicinity of the drain inlet. The acceptable location and extent of ponding will influence the type and design of the storm drain inlet protection device.
  - Determine the extent of potential runoff diversion caused by the storm drain inlet protection device. Runoff ponded by inlet protection devices may flow around the device and towards the next downstream inlet. In some cases, this is acceptable; in other cases, serious erosion or downstream property damage can be caused by these diversions. The possibility of runoff diversions will influence whether or not storm drain inlet protection is suitable; and, if suitable, the type and design of the device.
- The location and extent of ponding, and the extent of diversion, can usually be controlled through appropriate placement of the inlet protection device. In some cases, moving the inlet protection device a short distance upstream of the actual inlet can provide more efficient sediment control, limit ponding to desired areas, and prevent or control diversions.
- Seven types of inlet protection are presented below. However, it is recognized that other effective methods and proprietary devices exist and may be selected.

- Silt Fence: Appropriate for drainage basins with less than a 5% slope, sheet flows, and flows under 0.5 cfs.

- Excavated Drop Inlet Sediment Trap: An excavated area around the inlet to trap sediment (SE-3).

- Gravel bag barrier: Used to create a small sediment trap upstream of inlets on sloped, paved streets. Appropriate for sheet flow or when concentrated flow may exceed 0.5 cfs, and where overtopping is required to prevent flooding.

- Block and Gravel Filter: Appropriate for flows greater than 0.5 cfs.

- Temporary Geotextile Storm drain Inserts: Different products provide different features. Refer to manufacturer details for targeted pollutants and additional features.

- Biofilter Bag Barrier: Used to create a small retention area upstream of inlets and can be located on pavement or soil. Biofilter bags slowly filter runoff allowing sediment to settle out. Appropriate for flows under 0.5 cfs.

- Compost Socks: Allow filtered run-off to pass through the compost while retaining sediment and potentially other pollutants (SE-13). Appropriate for flows under 1.0 cfs.

- Select the appropriate type of inlet protection and design as referred to or as described in this fact sheet.

- Provide area around the inlet for water to pond without flooding structures and property.

- Grates and spaces around all inlets should be sealed to prevent seepage of sediment-laden water.

- Excavate sediment sumps (where needed) 1 to 2 ft with 2:1 side slopes around the inlet.

Installation

- ***DI Protection Type 1 - Silt Fence -*** Similar to constructing a silt fence; see BMP SE-1, Silt Fence. Do not place fabric underneath the inlet grate since the collected sediment may fall into the drain inlet when the fabric is removed or replaced and water flow through the grate will be blocked resulting in flooding. See typical Type 1 installation details at the end of this fact sheet.

  1. Excavate a trench approximately 6 in. wide and 6 in. deep along the line of the silt fence inlet protection device.

  2. Place 2 in. by 2 in. wooden stakes around the perimeter of the inlet a maximum of 3 ft apart and drive them at least 18 in. into the ground or 12 in. below the bottom of the trench. The stakes should be at least 48 in.

  3. Lay fabric along bottom of trench, up side of trench, and then up stakes. See SE-1, Silt Fence, for details. The maximum silt fence height around the inlet is 24 in.

  4. Staple the filter fabric (for materials and specifications, see SE-1, Silt Fence) to wooden stakes. Use heavy-duty wire staples at least 1 in. in length.

5. Backfill the trench with gravel or compacted earth all the way around.

- ***DI Protection Type 2 - Excavated Drop Inlet Sediment Trap -*** Install filter fabric fence in accordance with DI Protection Type 1. Size excavated trap to provide a minimum storage capacity calculated at the rate 67 yd^3/acre of drainage area. See typical Type 2 installation details at the end of this fact sheet.

- ***DI Protection Type 3 - Gravel bag -*** Flow from a severe storm should not overtop the curb. In areas of high clay and silts, use filter fabric and gravel as additional filter media. Construct gravel bags in accordance with SE-6, Gravel Bag Berm. Gravel bags should be used due to their high permeability. See typical Type 3 installation details at the end of this fact sheet.

  1. Construct on gently sloping street.

  2. Leave room upstream of barrier for water to pond and sediment to settle.

  3. Place several layers of gravel bags – overlapping the bags and packing them tightly together.

  4. Leave gap of one bag on the top row to serve as a spillway. Flow from a severe storm (e.g., 10-year storm) should not overtop the curb.

- ***DI Protection Type 4 – Block and Gravel Filter -*** Block and gravel filters are suitable for curb inlets commonly used in residential, commercial, and industrial construction. See typical Type 4 installation details at the end of this fact sheet.

  1. Place hardware cloth or comparable wire mesh with 0.5 in. openings over the drop inlet so that the wire extends a minimum of 1 ft beyond each side of the inlet structure. If more than one strip is necessary, overlap the strips. Place woven geotextile over the wire mesh.

  2. Place concrete blocks lengthwise on their sides in a single row around the perimeter of the inlet, so that the open ends face outward, not upward. The ends of adjacent blocks should abut. The height of the barrier can be varied, depending on design needs, by stacking combinations of blocks that are 4 in., 8 in., and 12 in. wide. The row of blocks should be at least 12 in. but no greater than 24 in. high.

  3. Place wire mesh over the outside vertical face (open end) of the concrete blocks to prevent stone from being washed through the blocks. Use hardware cloth or comparable wire mesh with 0.5 in. opening.

  4. Pile washed stone against the wire mesh to the top of the blocks. Use 0.75 to 3 in.

- ***DI Protection Type 5 – Temporary Geotextile Insert (proprietary) –*** Many types of temporary inserts are available. Most inserts fit underneath the grate of a drop inlet or inside of a curb inlet and are fastened to the outside of the grate or curb. These inserts are removable, and many can be cleaned and reused. Installation of these inserts differs between manufacturers. Please refer to manufacturer instruction for installation of proprietary devices.

- ***DI Protection Type 6 - Biofilter bags*** – Biofilter bags may be used as a substitute for gravel bags in low-flow situations. Biofilter bags should conform to specifications detailed in SE-14, Biofilter bags.

    1. Construct in a gently sloping area.
    2. Biofilter bags should be placed around inlets to intercept runoff flows.
    3. All bag joints should overlap by 6 in.
    4. Leave room upstream for water to pond and for sediment to settle out.
    5. Stake bags to the ground as described in the following detail. Stakes may be omitted if bags are placed on a paved surface.

- ***DI Protection Type 7 – Compost Socks*** – A compost sock can be assembled on site by filling a mesh sock (e.g., with a pneumatic blower). Compost socks do not require special trenching compared to other sediment control methods (e.g., silt fence). Compost socks should conform to specification detailed in SE-13, Compost Socks and Berms.

Costs

- Average annual cost for installation and maintenance of DI Type 1-4 and 6 (one-year useful life) is $200 per inlet.
- Temporary geotextile inserts are proprietary, and cost varies by region. These inserts can often be reused and may have greater than 1 year of use if maintained and kept undamaged. Average cost per insert ranges from $50-75 plus installation, but costs can exceed $100. This cost does not include maintenance.
- See SE-13 for Compost Sock cost information.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Silt Fences. If the fabric becomes clogged, torn, or degrades, it should be replaced. Make sure the stakes are securely driven in the ground and are in good shape (i.e., not bent, cracked, or splintered, and are reasonably perpendicular to the ground). Replace damaged stakes. At a minimum, remove the sediment behind the fabric fence when accumulation reaches one-third the height of the fence or barrier height.
- Gravel Filters. If the gravel becomes clogged with sediment, it should be carefully removed from the inlet and either cleaned or replaced. Since cleaning gravel at a construction site may be difficult, consider using the sediment-laden stone as fill material and put fresh stone around the inlet. Inspect bags for holes, gashes, and snags, and replace bags as needed. Check gravel bags for proper arrangement and displacement.

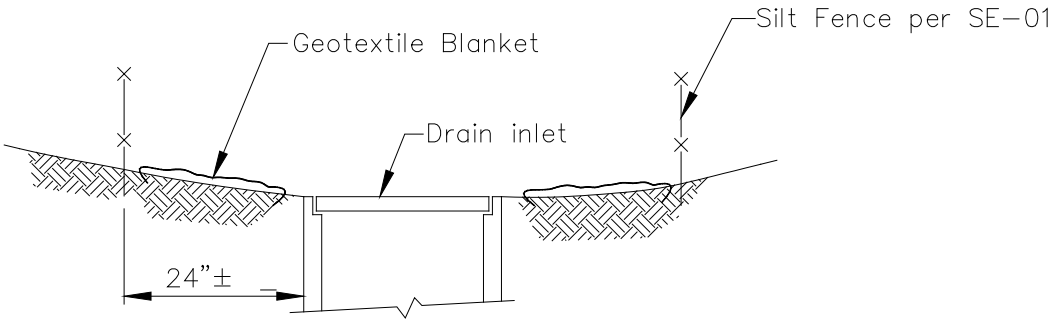
- Sediment that accumulates in the BMP should be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when the sediment accumulation reaches one-third of the barrier height.
- Inspect and maintain temporary geotextile insert devices according to manufacturer's specifications.
- Remove storm drain inlet protection once the drainage area is stabilized.
    - Clean and regrade area around the inlet and clean the inside of the storm drain inlet, as it should be free of sediment and debris at the time of final inspection.

References

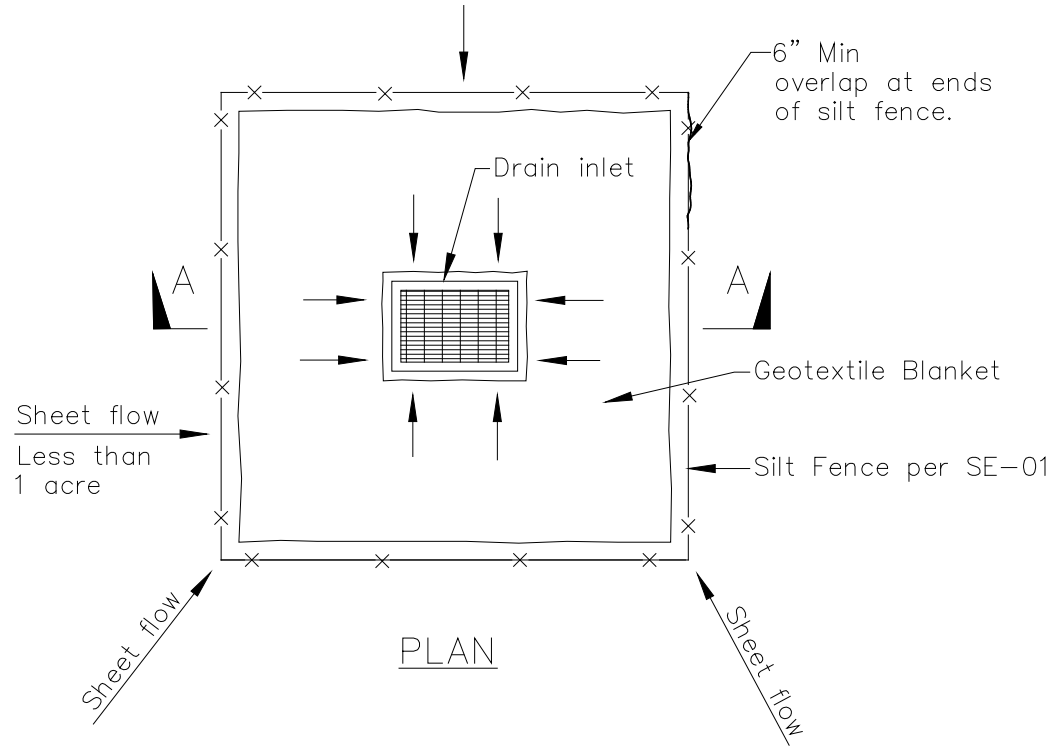
Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management Manual for The Puget Sound Basin, Washington State Department of Ecology, Public Review Draft, 1991.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.



SECTION A–A

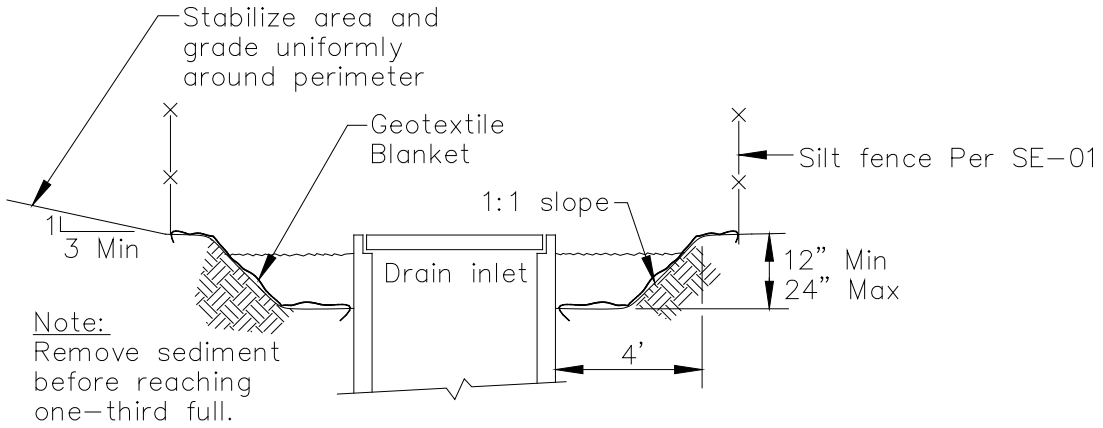


PLAN

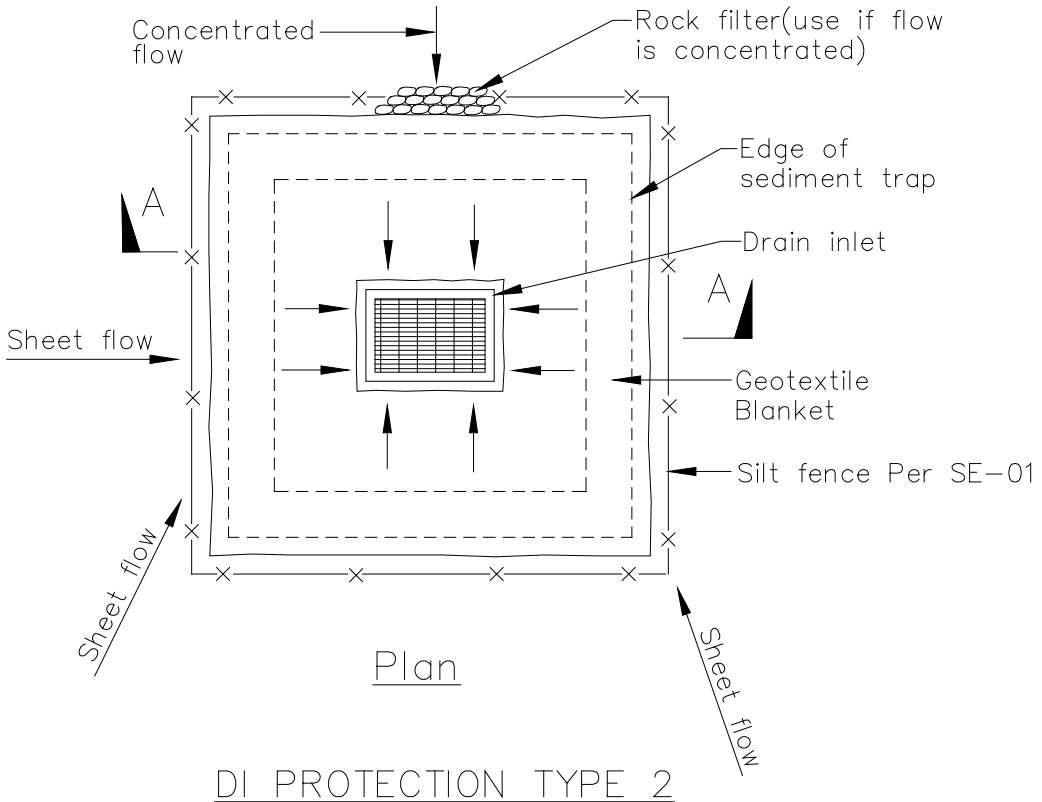
DI PROTECTION TYPE 1
NOT TO SCALE

NOTES:

1. For use in areas where grading has been completed and final soil stabilization and seeding are pending.
2. Not applicable in paved areas.
3. Not applicable with concentrated flows.



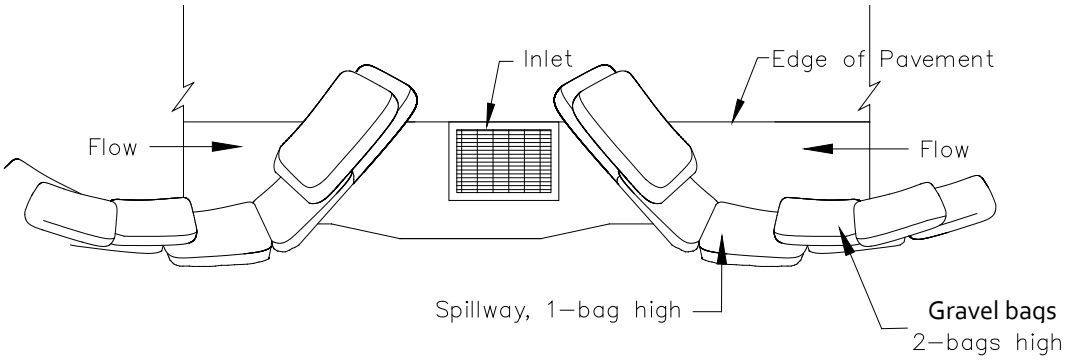
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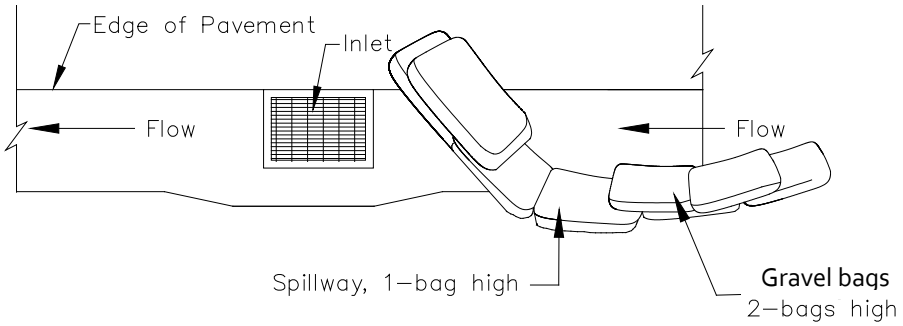
Plan

DI PROTECTION TYPE 2
NOT TO SCALE

Notes
1. For use in cleared and grubbed and in graded areas.
2. Shape basin so that longest inflow area faces longest length of trap.
3. For concentrated flows, shape basin in 2:1 ratio with length oriented towards direction of flow.



TYPICAL PROTECTION FOR INLET ON SUMP

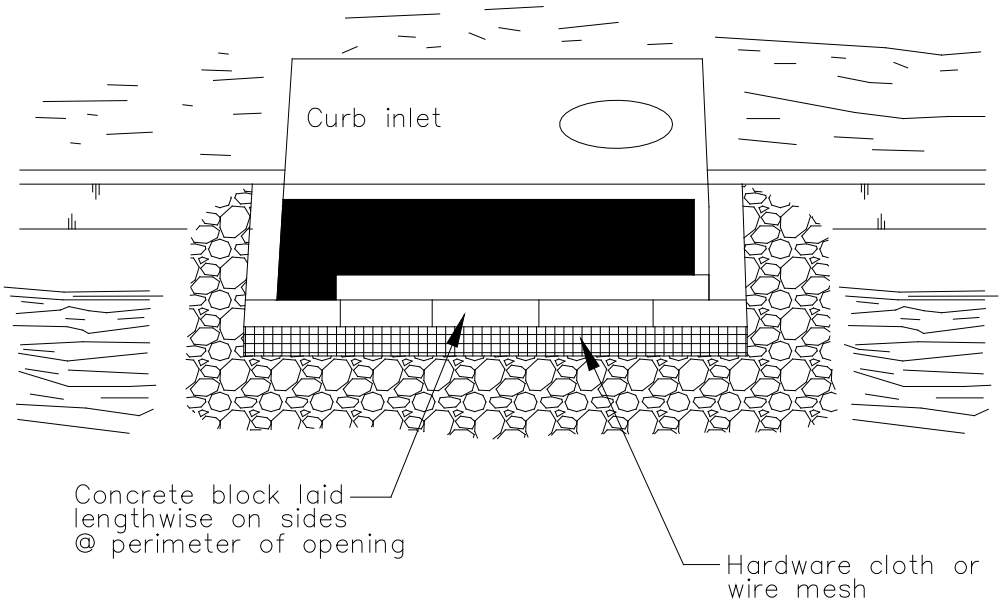


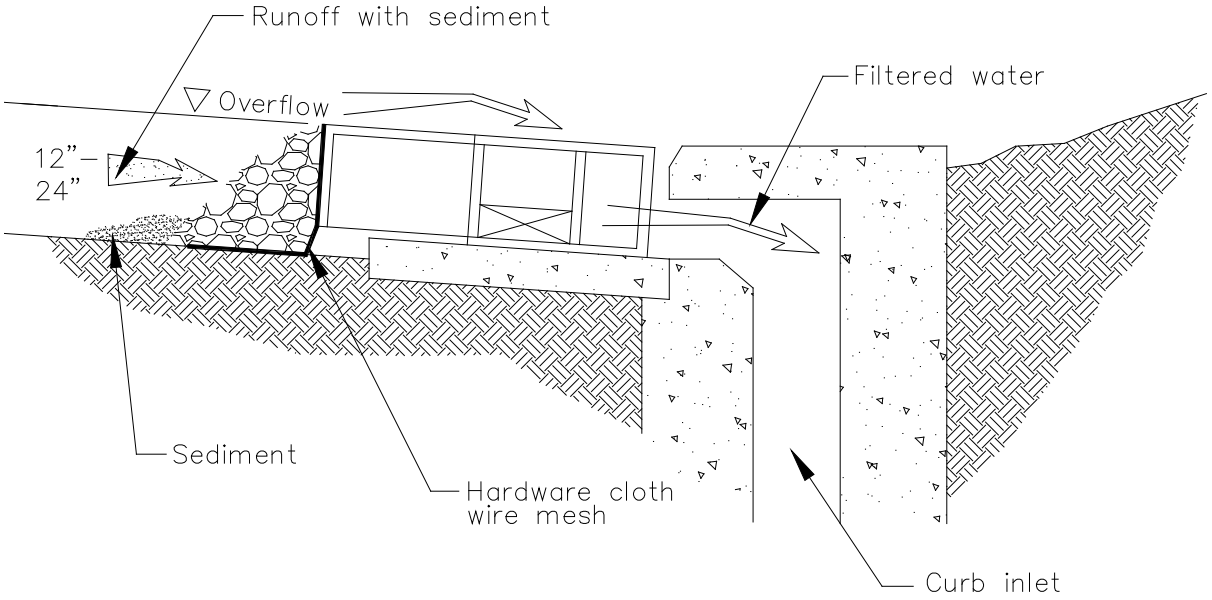
TYPICAL PROTECTION FOR INLET ON GRADE

NOTES:

1. Intended for short–term use.
2. Use to inhibit non–storm water flow.
3. Allow for proper maintenance and cleanup.
4. Bags must be removed after adjacent operation is completed
5. Not applicable in areas with high silts and clays without filter fabric.
6. Protection can be effective even if it is not immediately adjacent to the inlet provided that the inlet is protected from potential sources of pollution.

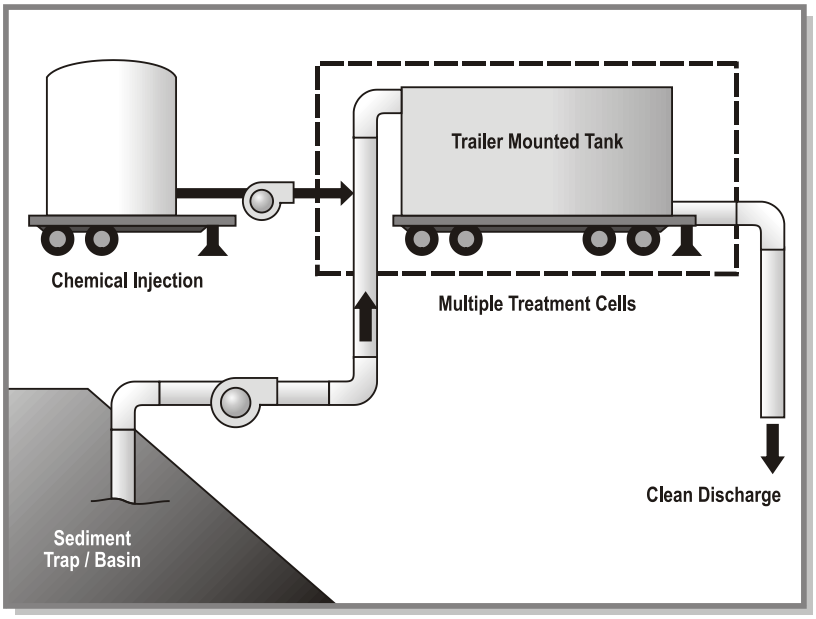
DI PROTECTION TYPE 3
NOT TO SCALE





DI PROTECTION – TYPE 4
NOT TO SCALE

Active Treatment Systems SE-11



Categories

EC	Erosion Control	☑
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

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Description and Purpose

Active Treatment Systems (ATS) reduce turbidity of construction site runoff by introducing chemicals to stormwater through direct dosing or an electrical current to enhance flocculation, coagulation, and settling of the suspended sediment. Coagulants and flocculants are used to enhance settling and removal of suspended sediments and generally include inorganic salts and polymers (USACE, 2001). The increased flocculation aids in sedimentation and ability to remove fine suspended sediments, thus reducing stormwater runoff turbidity and improving water quality.

Suitable Applications

ATS can reliably provide exceptional reductions of turbidity and associated pollutants and should be considered where turbid discharges to sediment and turbidity sensitive waters cannot be avoided using traditional BMPs. Additionally, it may be appropriate to use an ATS when site constraints inhibit the ability to construct a correctly sized sediment basin, when clay and/or highly erosive soils are present, or when the site has very steep or long slope lengths.

Limitations

Dischargers choosing to utilize chemical treatment in an ATS must follow all guidelines of the Construction General Permit Attachment F – Active Treatment System Requirements. General limitations are as follows:

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- Numeric Effluent Limit (NEL) for all discharges (10 NTU daily flow-weighted average)
- Limited availability of chemical residual testing procedures that meet permit requirements for flow-through treatment
- Specific field and classroom ATS training required to operate equipment
- Batch treatment requires extensive toxicity testing of effluent
- Batch treatment requires large footprint to accommodate treatment cells
- Requires additional filtration to remove residual floc and treatment chemicals prior to discharge
- Petroleum based polymers should not be used
- Requires site-specific design and equipment
- Limited discharge rates depending on receiving water body
- Labor intensive operation and maintenance
- ATS costs are higher on a unit basis for smaller sites that would be expected to have a lower volume of treated runoff
- ATS costs are seasonably variable due to increases or decreases in rainfall volumes

Implementation

Turbidity is difficult to control once fine particles are suspended in stormwater runoff from a construction site. Sedimentation ponds are effective at removing larger particulate matter by gravity settling but are ineffective at removing smaller particulates such as clay and fine silt. Sediment ponds are typically designed to remove sediment no smaller than medium silt (0.02 mm). ATS may be used to reduce the turbidity of stormwater runoff. With an ATS, very high turbidities can be reduced to levels comparable to what is found in streams during dry weather.

Criteria for ATS Product Use

Chemically treated stormwater discharged from construction sites must be non-toxic to aquatic organisms. The following protocol should be used to evaluate chemicals proposed for stormwater treatment at construction sites. Authorization to use a chemical in the field based on this protocol does not relieve the applicant from responsibility for meeting all discharge and receiving water criteria applicable to a site.

- An ATS Plan, which includes an Operation and Maintenance component, a Monitoring, Sampling and Reporting component, a Health and Safety component, and a Spill Prevention component must be prepared and submitted to the Regional Water Quality Control Board (RWQCB).

- Treatment chemicals should be approved by EPA for potable water use or otherwise be demonstrated to be protective of human health and the environment. Chemical residual or whole effluent toxicity testing is required.

- Prior to field use of chemical treatment, jar tests are to be conducted to demonstrate that turbidity reduction necessary to meet the NELs and receiving water criteria can be achieved. Test conditions, including but not limited to raw water quality and jar test procedures, should be indicative of field conditions. Although these small-scale tests cannot be expected to reproduce performance under field conditions, they are indicative of treatment capability. A minimum of six site-specific jar tests must be conducted per chemical.

- The proposed maximum dosage should be at least a factor of five lower than the no observed effects concentration (NOEC).

- Effluent discharge from an ATS to a receiving water is conditional upon the favorable results of full-scale whole effluent bioassay/toxicity testing for batch treatment systems and upon chemical residuals testing for flow-through systems.

- Contact the RWQCB for a list of treatment chemicals that may be pre-approved for use.

Active Treatment System Design Considerations

The design and operation of an ATS should take into consideration the factors that determine optimum, cost-effective performance. While site characteristics will influence system design, it is important to recognize the following overriding considerations:

- The right chemical must be used at the right dosage. A dosage that is either too low or too high will not produce the lowest turbidity. There is an optimum dosage rate. This is a situation where the adage “adding more is always better” is not the case.

- The coagulant must be mixed rapidly into the water to insure proper dispersion.

- The mixing system for batch treatment must be sized to provide adequate mixing for the design storage volume. Lack of adequate mixing during the flocculation phase results in flocs that are too small and/or insufficiently dense. Too much mixing can rapidly destroy floc as it is formed.

- Care must be taken in the design of the withdrawal system to minimize outflow velocities and to prevent floc discharge. The discharge should be directed through a filtration system such as sand, bag, or cartridge filter that would catch any unintended floc discharge.

- ATS is also regulated for pH of the discharge. A pH-adjusting chemical should be added into the treated water to control pH if the selected coagulant requires alteration of the pH of the discharge outside of the acceptable range.

Active Treatment System Design

ATS can be designed as batch treatment systems using either ponds or portable trailer-mounted tanks, or as flow-through systems using any number of proprietary designed systems.

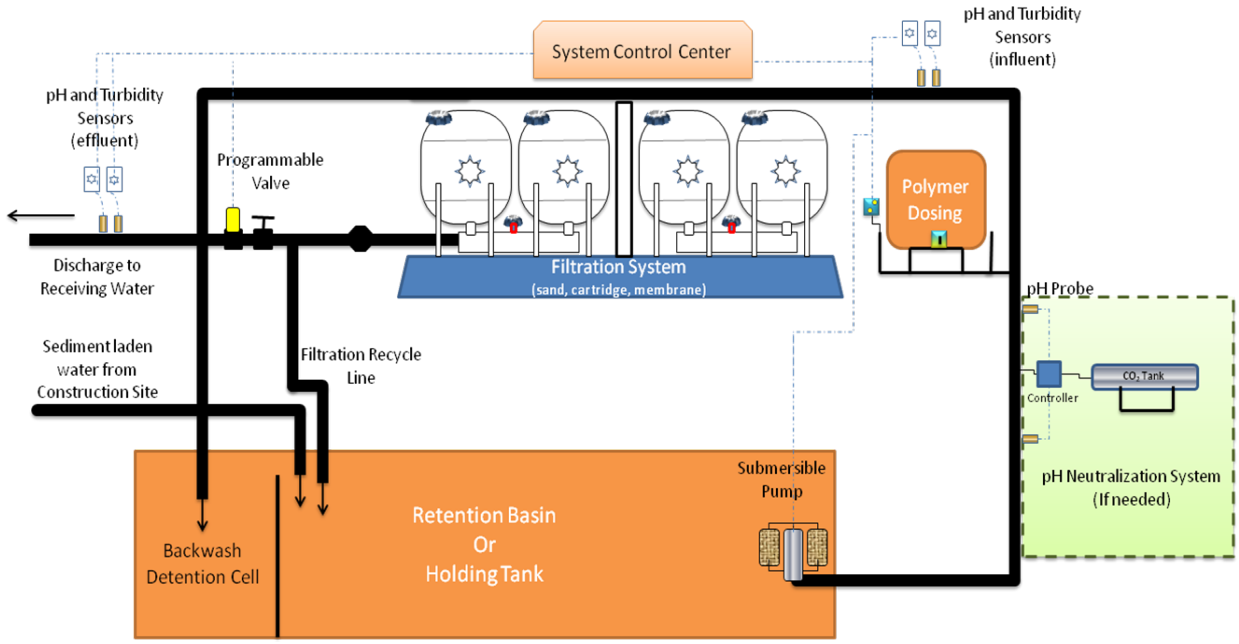


Figure has been adapted from Port of Seattle response to Washington Dept. of Ecology Action Order 2948

Batch Treatment

Batch Treatment systems consist of the stormwater collection system (either temporary diversion or the permanent site drainage system); a sediment basin, trap or holding tanks; pumps; a chemical feed system; treatment cells; and, interconnecting piping.

Batch treatment systems should use a minimum of two lined treatment cells. Multiple treatment cells allow for clarification of treated water while other cells are being filled or emptied. Treatment cells may be basins, traps, or tanks. Portable tanks may also be suitable for some sites.

The following equipment should be located in a secured, covered location:

- The chemical injector
- Secondary contaminant for acid, caustic, buffering compound, and treatment chemical
- Emergency shower and eyewash
- Monitoring equipment which consists of a pH meter and a turbidimeter (if not already within the instrumentation panel of the chemical injector)

Flow-through Treatment

At a minimum, a flow-through ATS system consists of the stormwater collection system (either temporary diversion or the permanent site drainage system), an untreated stormwater storage pond or holding tank, and a chemically enhanced filtration system.

Stormwater is collected at interception point(s) on the site and is diverted by gravity or by pumping to an untreated stormwater storage pond or other untreated stormwater holding area.

The stormwater is stored until treatment occurs. It is important that the holding pond be large enough to provide adequate storage.

Stormwater is then pumped from the untreated stormwater storage pond to the chemically enhanced filtration system where polymer is added. Adjustments to pH may be necessary before chemical addition. The filtration system continually monitors the stormwater for turbidity and pH. If the discharge water is out of the acceptable turbidity or pH range, the water is recycled to the untreated stormwater pond (or holding tank) where it can be retreated. Flow through systems must ensure that:

- Cumulative flow volume shall be recorded daily. The data recording system shall have the capacity to record a minimum of seven days of continuous data.
- Instrumentation systems are interfaced with system control to provide auto shutoff or recirculation in the event that effluent measurements exceed turbidity or pH.
- Upon system upset, power failure, or other catastrophic event, the ATS will default to a recirculation mode or safe shut down.
- The instrumentation system provides a method for controlling coagulant dose, to prevent potential overdosing.

Sizing Criteria

An ATS shall be designed and approved by a Certified Professional in Erosion and Sediment Control (CPESC), a Certified Professional in Storm Water Quality (CPSWQ); a California registered civil engineer; or any other California registered engineer.

ATS must be designed to capture and treat (within 72 hours) runoff from the 10-year 24-hour storm event. The runoff volume of the watershed area to be treated from this size storm event is required to be calculated using the Rational Method with a runoff coefficient of 1.

If sediment basins are used to capture flow-through or batch treatment, see SE-2, Sediment Basin, for design criteria. Bypass should be provided around the ATS to accommodate extreme storm events. Primary settling should be encouraged in the sediment basin/storage pond. A forebay with access for maintenance may be beneficial.

The permissible discharge rate governed by potential downstream effect should be used to calculate the recommended size of the treatment cells. Local requirements related to Phase I or Phase II NPDES permit thresholds should be considered in developing maximum discharge rates the ATS Plan.

Costs

Costs for ATS may be significant due to equipment rental requirements and cost of chemicals. ATS cost is lower on a treated unit-basis for large construction sites with large volumes of runoff.

Inspection and Maintenance

ATS must be operated and maintained by individuals with experience in their use and trained in accordance with training requirements below. ATS should be monitored continuously while in

use. A designated responsible person shall be on site daily at all times during treatment operations. Daily on-site visual monitoring of the system for proper performance shall be conducted and recorded in the project data log. The name, phone number, and training documentation of the person responsible for system operation and monitoring shall be included in the project data log.

The following monitoring requirements and results should be recorded in the data log:

Operational and Compliance Monitoring

- Effluent flow rate and volume shall be continuously monitored and recorded at 15- minute or less intervals.
- Influent and effluent pH must be continuously monitored and recorded at 15-minute or less intervals.
- Influent and effluent turbidity (expressed in NTU) must be continuously monitored and recorded at 15-minute or less intervals.
- The type and amount of chemical used for pH adjustment, if any, shall be monitored and recorded.
- Dose rate of chemical used in the ATS system (expressed in mg/L) shall be monitored and reported 15-minutes after startup and every 8 hours of operation.
- Laboratory duplicates – monthly laboratory duplicates for residual coagulant analysis must be performed and records shall be maintained onsite.
- Effluent shall be monitored and recorded for residual chemical/additive levels.
- If a residual chemical/additive test does not exist and the ATS is operating in a batch treatment mode of operation refer to the toxicity monitoring requirements below.

Toxicity Monitoring

Batch Treatment

Toxicity testing for systems operated in batch treatment mode should be made in accordance with the following:

- Acute toxicity testing on effluent samples representing effluent from each batch prior to discharge shall be undertaken. All bioassays shall be sent to a laboratory certified by the Department of Health Services (DHS) Environmental Laboratory Accreditation Program (ELAP). The required field of testing number for Whole Effluent Toxicity (WET) testing is E113.
- Acute toxicity tests shall be conducted with the following species and protocols. The methods to be used in the acute toxicity testing shall be those outlined for a 96-hour acute test in "Methods for Measuring the Acute Toxicity of Effluents and Receiving Water to Freshwater and Marine Organisms, USEPA-841-R-02-012" for Fathead minnow, *Pimephales promelas*. Rainbow trout, *Oncorhynchus mykiss,* may be used as a substitute for fathead minnow.

All toxicity tests shall meet quality assurance criteria and test acceptability criteria in the most recent versions of the EPA test method for WET testing.

Flow-through Treatment

Toxicity testing for systems operated in flow-through treatment mode should be made in accordance with the following:

- A residual chemical test method shall be used that has a method detection limit (MDL) of 10% or less than the maximum allowable threshold concentration (MATC) for the specific coagulant in use and for the most sensitive species of the chemical used. The MATC is equal to the geometric mean of the No Observed Effect Concentration (NOEC) and Lowest Observed Effect Concentration (LOEC) Acute and Chronic toxicity results for most sensitive species determined for the specific coagulant.
- The residual chemical test method shall produce a result within one hour of sampling.
- A California State certified laboratory shall validate the selected residual chemical test. Specifically, the lab will review the test protocol, test parameters, and the detection limit of the coagulant. The discharger shall electronically submit this documentation as part of the ATS Plan.

Numeric Effluent Limit (NEL) Compliance:

All chemically treated stormwater must be sampled and tested for compliance with pH and turbidity limits. These limits have been established by the Construction General Permit. Sampling and testing for other pollutants may also be necessary at some sites. Turbidity limits have been set as 10 NTU as a daily flow-weighted average or 20 NTU from a single sample. pH must be within the range of 6.0 to 9.0 standard units. It is often possible to discharge treated stormwater that has a lower turbidity than the receiving water and that matches the pH.

Treated stormwater samples and measurements should be taken from the discharge pipe or another location representative of the nature of the treated stormwater discharge. Samples used for determining compliance with the water quality standards in the receiving water should not be taken from the treatment pond prior to decanting. Compliance with the water quality standards is determined in the receiving water.

Operator Training:

Operators shall have training specific to using an ATS and liquid coagulants for stormwater discharges in California. The training shall be in the form of a formal class with a certificate and requirements for testing and certificate renewal. Training shall include a minimum of eight hours classroom and 32 hours field training.

Standard BMPs:

Erosion and sediment control BMPs should be implemented throughout the site to prevent erosion and discharge of sediment to the ATS. Some types of chemical coagulation and flocculation are only achievable in water below a certain turbidity; therefore, minimizing the amount of sediment reaching the system will increase the likelihood of meeting effluent limits and will potentially lower costs of chemical dosing.

Sediment Removal and Disposal

- Sediment shall be removed from the storage or treatment cells as necessary to ensure that the cells maintain their required water storage (i.e., volume) capability.
- Handling and disposal of all solids generated during ATS operations shall be done in accordance with all local, state, and federal laws and regulations.
- If sediment is determined to be non-toxic, it may be incorporated into the site away from drainages.

References

Engineering and Design – Precipitation/Coagulation/Flocculation. United States Army Corps of Engineers, EM 1110-1-4012, 2001.

Evaluation of Active Treatment Systems (ATS) for Construction Site Runoff. California Building and Industry Association (prepared by Geosyntec Consultants), 2008.

Stormwater Management Manual for Western Washington, Volume II – Construction Stormwater Pollution Prevention, Washington State Department of Ecology, August 2001.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Manufactured Linear Sediment Controls (MLSC) SE-12






Description and Purpose

Manufactured linear sediment controls (MLSC) are pre-manufactured devices that are typically specified and installed for drainage and sediment control on the perimeter of disturbed sites or stockpiles and as check dams within channels. Typically, MLSCs can be reused.

This fact sheet is intended to provide guidance on BMP selection and implementation of proprietary or vendor-supplied products, for sediment control. Products should be evaluated for project-specific implementation and used if determined to be appropriate by the SWPPP Preparer.

Suitable Applications

MLSCs are generally used in areas as a substitute for fiber rolls and silt fences in sediment control applications to slow down runoff water, divert drainage or contain fines and sediment. MLSCs are a linear control and application suitability varies based on the specific product type. They may be suitable:

- On paved surfaces for perimeter protection.
- As check structures in channels.
- Along the perimeter of disturbed sites in lieu of silt fence.

Categories

EC	Erosion Control	☒
SE	Sediment Control	☑
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	☒
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

SE-1 Silt Fence

SE-5 Fiber Roll

SE-6 Gravel Bag Berm

SE-8 Sandbag Barrier

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- At operational storm drains as a form of inlet protection.
- Around temporary stockpiles or material/equipment storage areas.
- At the interface between graveled driveways and pavement.
- Along the toe of exposed and erodible slopes.

Limitations

- Limitations vary by product. Product manufacturer's printed product use instructions should be reviewed by the SWPPP Preparer to determine the project-specific applicability of MLSCs.

Implementation

General

When appropriately placed, MLSCs intercept and slow sheet flow runoff, causing temporary ponding. The temporary ponding provides quiescent conditions allowing sediment to settle. The device is porous, which allows the ponded runoff to flow slowly through the device, releasing the runoff as sheet flows. Generally, MLSCs should be used in conjunction with temporary soil stabilization controls up-slope to provide an effective combination of erosion and sediment control.

Design and Layout

- MLSCs used on soil should be trenched or attached to the ground per manufacturer specifications in a manner that precludes runoff or ponded water from flowing around or under the device.
- MLSCs designed for use on asphalt or concrete may be attached using a variety of methods, including nailing the device to the pavement, or using a high strength adhesive.
- Follow manufacturer written specifications when installing MLSCs.
- Allow sufficient space up-slope from the silt dike to allow ponding, and to provide room for sediment storage.
- For installation near the toe of the slope, MLSCs should be set back 3 feet from the slope toe to facilitate cleaning. Where site conditions do not allow set back, the sediment control may be constructed on the toe of the slope. To prevent flows behind the barrier, sand or gravel bags can be placed perpendicular and between the sediment control and slope to serve as a barrier to parallel flow.
- Drainage area should not exceed 5 acres.

Materials

- Several manufactured products are available. The following search terms or combination of terms can be used with an internet search engine to find manufactured linear sediment controls:

- "silt barrier"
- "reusable silt fence"
- "silt fence alternative" or
- "perimeter sediment control"

Costs

Manufacturers should be contacted directly for current pricing.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Reshape or replace sections of damaged MLSCs as needed.
- Repair washouts or other damage as needed.
- Sediment that accumulates behind the BMP should be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when the sediment accumulation reaches one-third of the barrier height.
- Remove MLSCs when no longer needed. Remove sediment accumulation and clean, re-grade, and stabilize the area. Removed sediment should be incorporated in the project or disposed of properly.

References

City of Elko Construction Site Best Management Practices Handbook, December 2005.

Construction Site Best Management Practices Handbook, June 2008 Update, Truckee Meadows Regional Stormwater Quality Management Program, June 2008.

Complying with the Edwards Aquifer Rules Technical Guidance on Best Management Practices, Texas Commission on Environmental Quality, Revised July 2005, Addendum Sheet, January26, 2011.

Stormwater Management Manual for Western Washington Volume II, Construction Stormwater Pollution Prevention, Washington State Department of Ecology, February 2005.

Compost Socks and Berms SE-13



Categories

EC	Erosion Control	☒
SE	Sediment Control	☑
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	☒
Bacteria	☒
Oil and Grease	☒
Organics	

Potential Alternatives

SE-1 Silt Fence

SE-5 Fiber Roll

SE-6 Gravel Bag Berm

SE-8 Sandbag Barrier

SE-14 Biofilter Bags

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Description and Purpose

Compost socks and berms act as three-dimensional biodegradable filtering structures to intercept runoff where sheet flow occurs and are generally placed at the site perimeter or at intervals on sloped areas. Compost socks are generally a mesh sock containing compost and a compost berm is a dike of compost, trapezoidal in cross section. When employed to intercept sheet flow, both BMPs are placed perpendicular to the flow of runoff, allowing filtered runoff to pass through the compost and retaining sediment (and potentially other pollutants). A compost sock can be assembled on site by filling a mesh sock (e.g. with a pneumatic blower). The compost berm should be constructed using a backhoe or equivalent and/or a pneumatic delivery (blower) system and should be properly compacted. Compost socks and berms act as filters, reduce runoff velocities, and in some cases, aid in establishing vegetation.

Compost is organic, biodegradable, and renewable. Compost provides soil structure that allows water to infiltrate the compost medium which helps prevent rill erosion and the retained moisture promotes seed germination and vegetation growth, in addition to providing organic matter and nutrients important for fostering vegetation. Compost improves soil quality and productivity, as well as erosion and sediment control.

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The compost of the compost sock or berm can be selected that targets site specific objectives in capturing sediment and other pollutants, supporting vegetation, or additional erosion control.

Compost is typically derived from combinations of feedstocks, biosolids, leaf and yard trimmings, manure, wood, or mixed solid waste. Many types of compost are products of municipal recycle or "Green waste" programs. Compost is organic and biodegradable and can be left onsite. There are many types of compost with a variety of properties with specific functions, and accordingly compost selection is an important design consideration in the application of this type of erosion and sediment control.

Suitable Applications

- Along the toe, top, face, and at grade breaks of exposed and erodible slopes to shorten slope length and spread runoff as sheet flow (compost berms should only be used at the top of slopes or on slopes 4:1 (H:V) or flatter, all other slope applications should use compost socks)
- Along the perimeter of a project
- As check dams in unlined ditches (compost socks only)
- Down-slope of exposed soil areas
- At operational storm drains as a form of inlet protection (compost socks only)
- Around temporary stockpiles

Compost socks and berms do not require special trenching or BMP removal compared to other sediment control methods (e.g. silt fence or fiber rolls). Compost socks and berms can remain in place after earth disturbing activities are completed or the compost components can be spread over the site providing nutrients for plant growth and augmenting soil structure. BMPs that remain in place are particularly advantageous below embankments, especially adjacent streams, by limiting re-entry and the disturbance to sensitive areas.

Compost can be pre-seeded prior to application (recommended by the EPA for construction site stormwater runoff control and required for compost socks) or seeded after installation (for compost berms only). The compost medium can also remove pollutants in stormwater including heavy metals; oil and grease; and hydrocarbons.

Limitations

- Compost can potentially leach nutrients (dissolved phosphorus and nitrogen) into runoff and potentially impact water quality. Compost should not be used directly upstream from nutrient impaired waterbodies (Adams et. al, 2008).
- Compost may also contain other undesirable constituents that are detrimental to water quality. Compost should be obtained from a supplier certified by the California Integrated Waste Management Board or compost should otherwise meet the environmental health standards of Title 14, California Code of Regulations, Division 7, Chapter 3.1, Article 7. Carefully consider the qualifications and experience of any compost producer/supplier.

- Application by hand is more time intensive and potentially costly. Using a pneumatic blower truck is the recommended cost-effective method of assembly.
- Compost socks and berms should not be employed at the base of slopes greater than 2:1 (H:V). They can be employed with other erosion control methods for steeper slopes.
- Difficult to move once saturated.
- Compost berms should not be applied in areas of concentrated flows.
- Compost socks and berms are easy to fix; however, they are susceptible to damage by frequent traffic. Compost socks can be used around heavy machinery, but regular disturbance decreases sock performance.

Implementation

Compost Materials

- California Compost Regulations (Title 14, California Code of Regulations, Division 7, Chapter 3.1, Article 7, Section 17868.3) define and require a quality of compost for application. Compost should comply with all physical and chemical requirements. Specific requirements are provided in **Table 1**, taken from Caltrans *Standard Specifications* (2015).
- The Caltrans SSP, Section 21-2.02Q, *Compost Socks*, states that the sock used to retain the compost must be composed of natural, biodegradable products, such as cotton, jute, sisal, burlap or coir.
- The compost producer should be fully permitted as specified under the California Integrated Waste Management Board, Local Enforcement Agencies and any other State and Local Agencies that regulate Solid Waste Facilities. If exempt from State permitting requirements, the composting facility should certify that it follows guidelines and procedures for production of compost meeting the environmental health standards of Title 14, California Code of Regulations, Division 7, Chapter 3.1, Article 7.
- The compost producer should be a participant in United States Composting Council's Seal of Testing Assurance program.
- Compost medium parameter specifications for compost socks and berms have been developed to assist in compost selection, such as those provided by the American Association of State Highway Transportation Officials (AASHTO).
- Particle size is important parameter for selecting compost. Well consolidated, coarser grades of compost (e.g., small and large pieces) perform better for filtration objectives, while finer grades better support vegetation. Particle size of the compost should be selected based on site conditions, such as expected precipitation, and filtration goals and / or long-term plant nutrients.
- Compost moisture should be considered for composition quality and application purposes. A range of 30-50% is typical. Compost that is too dry is hard to apply and compost that is too wet is more difficult (and more expensive) to transport. For arid or semi-arid areas, or for application during the dry season, use compost with greater moisture content than areas with wetter climates. For wetter or more humid climates or for application during the wet

season, drier composts can be used as the compost will absorb moisture from the ambient air.

- If vegetation establishment is a desired function of the compost, a compost sample should be inspected by a qualified individual. Vegetation has different nutrient and moisture needs.
- Organic content of the compost is also important and should range from 30 to 65% depending on site conditions.
- Compost should not be derived from mixed municipal solid waste and should be reasonably free of visible contaminates.
- Compost should not contain paint, petroleum products, pesticides or any other chemical residues harmful to animal life or plant growth. Metal concentrations in compost should not exceed the maximum metal concentrations listed under Title 14, California Code of Regulations, Division 7, Chapter 3.1, Section 17868.2.
- Compost should not possess objectionable odors.
- Compost should be weed free.

Table 1. Physical/Chemical Requirements of Compost
Reference - Caltrans SSP-10 Erosion Control Blanket (Compost)

Property	Test Method	Requirement
pH	TMECC 04.11-A	6.0–8.5
Soluble Salts	TMECC 04.10-A	0-10.0
Moisture Content	TMECC 03.09-A	30-60
Organic Matter Content	TMECC 05.07-A	30–100
Maturity	TMECC 05.05-A	80 or Above 80 or Above
Stability	TMECC 05.08-B	8 or below
Particle size for fine compost: dry weight Pass 5/8-inch sieve (min, %) Pass 3/8-inch sieve (min, %)	TMECC 02.02-B	 95 70
Particle size for medium compost: dry weight Pass 2-inch sieve (min, %) Pass 1-inch sieve (max, %)	TMECC 02.02-B	 95 30
Particle size for coarse compost: dry weight Pass 2-1/2-inch sieve (min, %) Pass 3/8-inch sieve (max, %)	TMECC 02.02-B	 99 40
Pathogen Fecal Coliform Bacteria MPN/1-gram dry wt.	TMECC 07.01-B	< 1,000
Pathogen Salmonella MPN/4 grams dry wt.	TMECC 07.01-B	< 3
Physical Contaminants (% dry weight) Plastics, glass, and metal	TMECC 02.02-C	Combined Total: < 1.0
Physical Contaminants (% dry weight) Sharps	TMECC 02.02-C	None Detected

*TMECC refers to "Test Methods for the Examination of Composting and Compost," published by the United States Department of Agriculture and the United States Compost Council (USCC).

Installation

- Prior to application, prepare locations for socks and berms by removing brush and thick vegetation. The compost of the sock and/or berm should be allowed to come in full contact with the ground surface.

- Select method to apply the compost sock or berm. A pneumatic blower is most cost effective and most adaptive in applying compost to steep, rough terrain, and hard to reach locations.

- The compost of the berm should be distributed evenly to the surface, compacted, and shaped trapezoidal in cross section. Berm design is generally consisting of a base two times the height. AASHTO specification MP 9-03 provides compost berm dimensions based on anticipated site precipitation (AASHTO, 2003 and USEPA, 2009). State agencies, such as Oregon Department of Environmental Quality (ODEQ) have developed berm dimension based on slope steepness and length (ODEQ, 2004).

- Compost socks can be assembled on site by filling mesh socks with the selected compost. Mesh socks can be tied at one end, filled, and then tied at the other end. The ends of socks can be interlocked until the desired length is achieved. The sock diameter is a function of slope steepness and length. Again, ASSHTO provides specifications for various parameters. Compost socks range from 8" to 18" but are typically 12" to 18" in diameter.

- Compost socks are typically placed in contours perpendicular to sheet flow. They can also be placed in V formation on a slope. Compost socks need to be anchored, typically stakes, through the center of the sock. To prevent water flowing around them, the ends of compost socks should be placed upslope.

- Locate compost socks and berms on level contours spaced as follows:

  - Slope inclination of 4:1 (H:V) or flatter: Socks and/or berms should be placed at a maximum interval of 20 ft.

  - Slope inclination between 4:1 and 2:1 (H:V): Socks should be placed at a maximum interval of 15 ft. (a closer spacing is more effective).

  - Slope inclination 2:1 (H:V) or greater: Socks should be placed at a maximum interval of 10 ft. (a closer spacing is more effective).

- Place perimeter socks and berms using a j-hook installation. Use of vegetation will also provide additional anchoring.

- Compost socks and berms can be placed around the perimeter of an affected area, like a silt fence, if the area is flat or on a contour. Do not place these socks and berms where ponded water could become an issue.

- If used at the toe of slopes, the compost sock or berm should at a minimum of 5 to 10 feet away.

- Use additional anchoring and erosion control BMPs in conjunction of the compost socks and berms as needed.

- Consider using compost berms or socks as necessary at the top and/or bottom of the slope for additional erosion control performance.

- Compost socks and berms can also be effective over rocky and frozen ground if installed properly.

- It is recommended that the drainage areas of these compost BMPs do not exceed 0.25 acre per 100 feet placement interval and runoff does not exceed 1 cubic foot per second.

Costs

Recently obtained vendor costs indicated $4.50 per linear foot for compost berm application and $2.50 per linear foot for 8" socks and $3.20 per linear foot for 12"socks (Adjusted for inflation ,2016 dollars, by Tetra Tech, Inc.). Costs do not include final compost sock or berm functions at the end of construction activities, including spreading or removal, if required. ODEQ estimates that compost berms cost 30 percent less than silt fences to install.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.

- Once damage is identified, mend or reapply the sock or berm as needed. Washed out areas should be replaced. If the sock or berm height is breached during a storm, an additional sock can be stacked to increase the sock height and similarly the berm dimensions can be increased, as applicable. An additional sock or berm may be installed upslope, as needed. It may be necessary to apply an additional type of stormwater BMP, such as a compost blanket.

- Sediment contained by the sock or berm should be removed prior reaching 1/3 of the exposed height of the BMP. The sediment can be stabilized with the compost sock or berm with vegetation at the end of construction activities.

- Care should be exercised to minimize the damage to protected areas while making repairs, as any area damaged will require reapplication of BMPs.

- Limit traffic to minimize damage to BMPs or impede vegetation establishment.

References

An analysis of Composting as an Environmental Remediation Technology, U.S. Environmental Protection Agency (USEPA), Solid Waste and Emergency Response (5305W), EPA530-R-8-008, 1998.

Characteristics of Compost: Moisture Holding and Water Quality Improvement, Center for Research in Water Resources, Kirchoff, C., Malina, J., and Barrett, M., 2003.

Compost Utilization for Erosion Control, The University of Georgia College of Agricultural and Environmental Sciences, pubs.caes.uga.edu/caespubs/pubcd/B1200.htm, Faucette, B. and Risse, M., 2001.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.

Standard Specifications, State of California, California State Transportation Agency, Department of Transportation (Caltrans), 2015. Available online at: http://www.dot.ca.gov/hq/esc/oe/construction_contract_standards/std_specs/2015_StdSpecs/2015_StdSpecs.pdf.

Evaluation of Environmental Benefits and Impacts of Compost and Industry Standard Erosion and Sediment Controls Measures Used in Construction Activities, Dissertation, Institute of Ecology, University of Georgia, Faucette, B., 2004.

National Pollutant Discharge Elimination System (NPDES), Compost Blankets, U.S. Environmental Protection Agency (USEPA). http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=factsheet_results&view=specific&bmp=118, 2009.

Standard Specifications for Transportation Materials and Methods of Sampling and Testing, Designation MP-9, Compost for Erosion/Sediment Control (Filter Berms), Provisional, American Association of State Highway Transportation Officials (AASHTO), 2003.

Stormwater Best Management Practices (BMPs) Field Trials of Erosion Control Compost in Reclamation of Rock Quarry Operations, Nonpoint Source Protection Program CWA §319(h), Texas Commission on Environmental Quality, Adams, T., McFarland, A., Hauck, L., Barrett, M., and Eck, B., 2008.

Biofilter Bags SE-14



Categories

EC	Erosion Control	
SE	Sediment Control	☑
TR	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

SE-1 Silt Fence

SE-4 Check Dams

SE-5 Fiber Roll

SE-6 Gravel Bag Berm

SE-8 Sandbag Barrier

SE-10 Storm Drain Inlet Protection

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Description and Purpose

Biofilter bags, or bio-bags, are a multi-purpose sediment control BMP consisting of a plastic mesh bag filled with 100% recycled wood product waste. Biofilter bags come in a variety of sizes (30" x 18" and 30" x 9" being common) and generally have between 1-2 cubic yards of recycled wood waste (or wood chips). Biofilter bags work by detaining flow and allowing a slow rate of discharge through the wood media. This action removes suspended sediment through gravity settling of the detained water and filtration within the bag.

Suitable Applications

Biofilter bags are a short-term BMP that can be rapidly deployed, maintained, and replaced. Biofilter bags can be an effective short-term solution to place in developed rills to prevent further erosion until permanent measures can be established. Suitable short-term applications include:

- As a linear sediment control measure:
  - Below the toe of slopes and erodible slopes
  - Below other small cleared areas
  - Along the perimeter of a site (with low-expected flow)
  - Down slope of exposed soil areas
  - Around temporary stockpiles and spoil areas
  - Parallel to a roadway to keep sediment off paved areas

  - Along streams and channels

- As linear erosion control measure:
  - Along the face and at grade breaks of exposed and erodible slopes to shorten slope length and spread runoff as sheet flow
  - At the top of slopes to divert runoff away from disturbed slopes
  - As check dams across mildly sloped construction roads
- Inlet Protection (See SE-10)
- Supplement to silt fences or other sediment control devices

Limitations

- Short life-span (maximum usefulness of 2-3 months and should be replaced more frequently if needed); regular maintenance and replacement required to ensure effectiveness. Bags will rapidly fill with sediment and reduce permeability.
- Easily damaged by construction vehicles.
- If not properly staked, will fail on slope applications.
- If improperly installed can allow undercutting or side-cutting flow.
- Not effective where water velocities or volumes are high.
- Potentially buoyant and easily displaced if not properly installed.

Implementation

General

Biofilter bags are a relatively low cost temporary BMP that are easily deployed and have a simple installation that can be performed by hand. Without proper installation, however, biofilter bags can fail due to their light weight, potential displacement, and multiple joint locations. One of the benefits of utilizing biofilter bags is that the media (wood-product) can be recycled or used onsite when no longer needed (where acceptable).

Design and Layout – Linear control

- Locate biofilter bags on level contours.
  - Slopes between 20:1 and 4:1 (H:V): Biofilter bags should be placed at a maximum interval of 20 ft, with the first row near the slope toe.
  - Slopes between 4:1 and 2:1 (H:V): Biofilter bags should be placed at a maximum interval of 15 ft, with the first row near the slope toe.
  - Slopes 2:1 (H:V) or steeper: Biofilter bags should be placed at a maximum interval of 10 ft., with the first row placed the slope toe.

- Turn the ends of the biofilter bag barriers up slope to prevent runoff from going around the berm.
- Allow sufficient space up slope from the biofilter bag berm to allow ponding, and to provide room for sediment storage.
- Stake biofilter bags into a 1 to 2 in. deep trench with a width equal to the bag.
  - Drive one stake at each end of the bag.
  - Use wood stakes with a nominal classification of 0.75 by 0.75 in. and minimum length of 24 in.
- Biofilter bags should be overlapped (6 in.), not abutted.

Costs

Pre-filled biofilter bags cost approximately $3.20-$4.50 per bag, dependent upon size (Adjusted for inflation, 2016 dollars, by Tetra Tech, Inc.).

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Biofilter bags exposed to sunlight will need to be replaced every two to three months due to degrading of the bags.
- Reshape or replace biofilter bags as needed.
- Repair washouts or other damage as needed.
- Sediment that is retained by the BMP should be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when the sediment accumulation reaches one-third of the barrier height.
- Remove biofilter bag berms when no longer needed. Remove sediment accumulation and clean, re-grade, and stabilize the area. Biofilter media may be used on-site, if allowed.

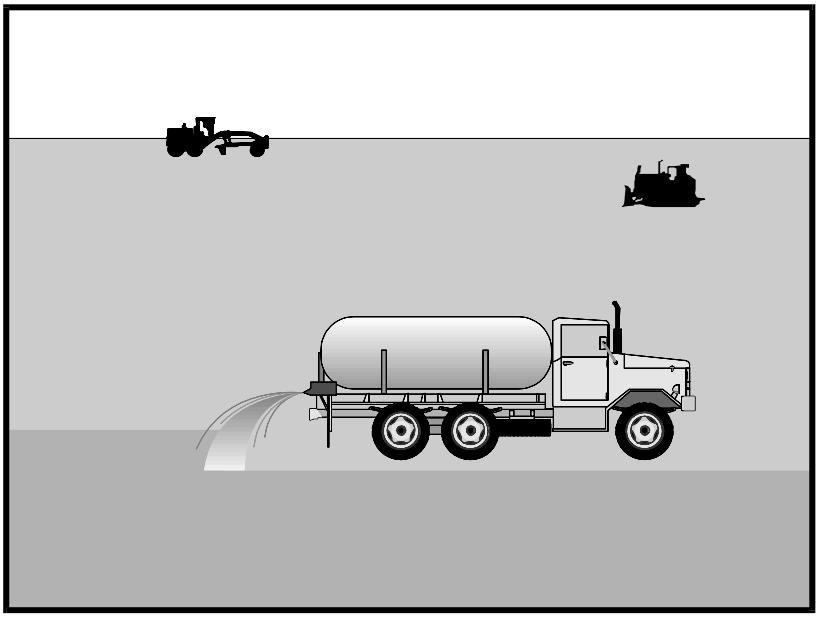
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Catalog of Stormwater Best Management Practices for Idaho Cities and Counties. Volume 2, Section 7, BMP 34 – Biofilter Bags, Idaho Department of Environmental Quality, 2005.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Wind Erosion Control WE-1



Categories

EC	Erosion Control	
SE	Sediment Control	☒
TC	Tracking Control	
WE	Wind Erosion Control	☑
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

EC-5 Soil Binders

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Description and Purpose

Wind erosion or dust control consists of applying water or other chemical dust suppressants as necessary to prevent or alleviate dust nuisance generated by construction activities. Covering small stockpiles or areas is an alternative to applying water or other dust palliatives.

California's Mediterranean climate, with a short "wet" season and a typically long, hot "dry" season, allows the soils to thoroughly dry out. During the dry season, construction activities are at their peak, and disturbed and exposed areas are increasingly subject to wind erosion, sediment tracking, and dust generated by construction equipment. Site conditions and climate can make dust control more of an erosion problem than water-based erosion. Additionally, many local agencies, including Air Quality Management Districts, require dust control and/or dust control permits in order to comply with local nuisance laws, opacity laws (visibility impairment) and the requirements of the Clean Air Act. Wind erosion control is required to be implemented at all construction sites greater than 1 acre by the General Permit.

Suitable Applications

Most BMPs that provide protection against water-based erosion will also protect against wind-based erosion and dust control requirements required by other agencies will generally meet wind erosion control requirements for water quality protection. Wind erosion control BMPs are suitable during the following construction activities:

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- Construction vehicle traffic on unpaved roads
- Drilling and blasting activities
- Soils and debris storage piles
- Batch drop from front-end loaders
- Areas with unstabilized soil
- Final grading/site stabilization

Limitations

- Watering prevents dust only for a short period (generally less than a few hours) and should be applied daily (or more often) to be effective.
- Over watering may cause erosion and track-out.
- Oil or oil-treated subgrade should not be used for dust control because the oil may migrate into drainageways and/or seep into the soil.
- Chemical dust suppression agents may have potential environmental impacts. Selected chemical dust control agents should be environmentally benign.
- Effectiveness of controls depends on soil, temperature, humidity, wind velocity and traffic.
- Chemical dust suppression agents should not be used within 100 feet of wetlands or water bodies.
- Chemically treated subgrades may make the soil water repellant, interfering with long-term infiltration and the vegetation/re-vegetation of the site. Some chemical dust suppressants may be subject to freezing and may contain solvents and should be handled properly.
- In compacted areas, watering and other liquid dust control measures may wash sediment or other constituents into the drainage system.
- If the soil surface has minimal natural moisture, the affected area may need to be pre-wetted so that chemical dust control agents can uniformly penetrate the soil surface.

Implementation

Dust Control Practices

Dust control BMPs generally stabilize exposed surfaces and minimize activities that suspend or track dust particles. The following table presents dust control practices that can be applied to varying site conditions that could potentially cause dust. For heavily traveled and disturbed areas, wet suppression (watering), chemical dust suppression, gravel asphalt surfacing, temporary gravel construction entrances, equipment wash-out areas, and haul truck covers can be employed as dust control applications. Permanent or temporary vegetation and mulching can be employed for areas of occasional or no construction traffic. Preventive measures include minimizing surface areas to be disturbed, limiting onsite vehicle traffic to 15 mph or less, and controlling the number and activity of vehicles on a site at any given time.

Chemical dust suppressants include: mulch and fiber based dust palliatives (e.g. paper mulch with gypsum binder), salts and brines (e.g. calcium chloride, magnesium chloride), non-petroleum based organics (e.g. vegetable oil, lignosulfonate), petroleum based organics (e.g. asphalt emulsion, dust oils, petroleum resins), synthetic polymers (e.g. polyvinyl acetate, vinyl, acrylic), clay additives (e.g. bentonite, montmorillonite) and electrochemical products (e.g. enzymes, ionic products).

Site Condition	Dust Control Practices							
	Permanent Vegetation	Mulching	Wet Suppression (Watering)	Chemical Dust Suppression	Gravel or Asphalt	Temporary Gravel Construction Entrances/Equipment Wash Down	Synthetic Covers	Minimize Extent of Disturbed Area
Disturbed Areas not Subject to Traffic	x	x	x	x	x			x
Disturbed Areas Subject to Traffic			x	x	x	x		x
Material Stockpiles		x	x	x			x	x
Demolition			x			x	x	
Clearing/ Excavation			x	x				x
Truck Traffic on Unpaved Roads			x	x	x	x	x	
Tracking					x	x		

Additional preventive measures include:

- Schedule construction activities to minimize exposed area (see EC-1, Scheduling).
- Quickly treat exposed soils using water, mulching, chemical dust suppressants, or stone/gravel layering.
- Identify and stabilize key access points prior to commencement of construction.
- Minimize the impact of dust by anticipating the direction of prevailing winds.
- Restrict construction traffic to stabilized roadways within the project site, as practicable.
- Water should be applied by means of pressure-type distributors or pipelines equipped with a spray system or hoses and nozzles that will ensure even distribution.
- All distribution equipment should be equipped with a positive means of shutoff.
- Unless water is applied by means of pipelines, at least one mobile unit should be available at all times to apply water or dust palliative to the project.
- If reclaimed waste water is used, the sources and discharge must meet California Department of Health Services water reclamation criteria and the Regional Water Quality

Control Board (RWQCB) requirements. Non-potable water should not be conveyed in tanks or drain pipes that will be used to convey potable water and there should be no connection between potable and non-potable supplies. Non-potable tanks, pipes, and other conveyances should be marked, "NON-POTABLE WATER - DO NOT DRINK."

- Pave or chemically stabilize access points where unpaved traffic surfaces adjoin paved roads.
- Provide covers for haul trucks transporting materials that contribute to dust.
- Provide for rapid clean up of sediments deposited on paved roads. Furnish stabilized construction road entrances and wheel wash areas.
- Stabilize inactive areas of construction sites using temporary vegetation or chemical stabilization methods.

For chemical stabilization, there are many products available for chemically stabilizing gravel roadways and stockpiles. If chemical stabilization is used, the chemicals should not create any adverse effects on stormwater, plant life, or groundwater and should meet all applicable regulatory requirements.

Costs

Installation costs for water and chemical dust suppression vary based on the method used and the length of effectiveness. Annual costs may be high since some of these measures are effective for only a few hours to a few days.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities.
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Check areas protected to ensure coverage.
- Most water-based dust control measures require frequent application, often daily or even multiple times per day. Obtain vendor or independent information on longevity of chemical dust suppressants.

References

Best Management Practices and Erosion Control Manual for Construction Sites, Flood Control District of Maricopa County, Arizona, September 1992.

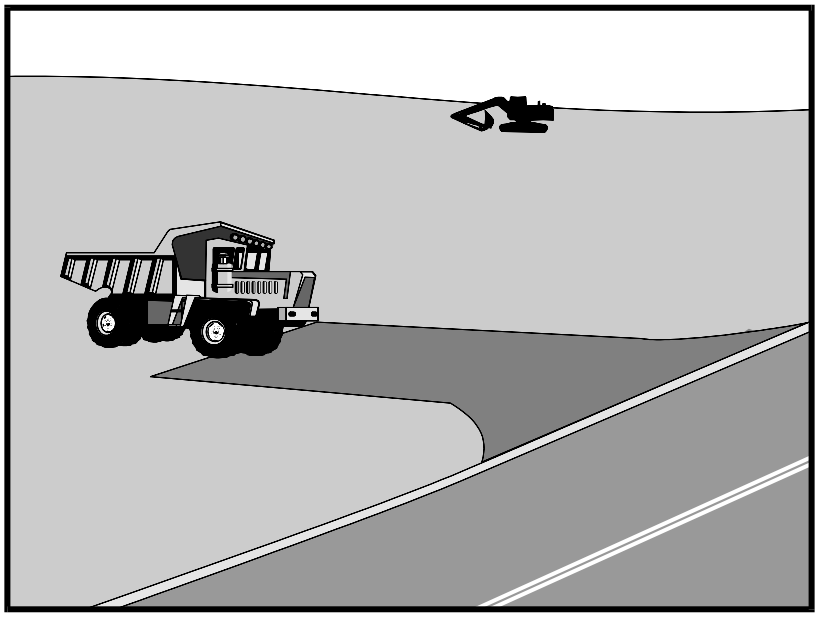
California Air Pollution Control Laws, California Air Resources Board, updated annually.

Construction Manual, Chapter 4, Section 10, "Dust Control"; Section 17, "Watering"; and Section 18, "Dust Palliative", California Department of Transportation (Caltrans), July 2001.

Prospects for Attaining the State Ambient Air Quality Standards for Suspended Particulate Matter (PM10), Visibility Reducing Particles, Sulfates, Lead, and Hydrogen Sulfide, California Air Resources Board, April 1991.

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stabilized Construction Entrance/Exit TC-1



Categories

EC	Erosion Control	☒
SE	Sediment Control	☒
TC	Tracking Control	☑
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

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Description and Purpose

A stabilized construction access is defined by a point of entrance/exit to a construction site that is stabilized to reduce the tracking of mud and dirt onto public roads by construction vehicles.

Suitable Applications

Use at construction sites:

- Where dirt or mud can be tracked onto public roads.
- Adjacent to water bodies.
- Where poor soils are encountered.
- Where dust is a problem during dry weather conditions.

Limitations

- Entrances and exits require periodic top dressing with additional stones.
- This BMP should be used in conjunction with street sweeping on adjacent public right of way.
- Entrances and exits should be constructed on level ground only.
- Stabilized construction entrances are rather expensive to construct and when a wash rack is included, a sediment trap of some kind must also be provided to collect wash water runoff.

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Stabilized Construction Entrance/Exit TC-1

Implementation

General

A stabilized construction entrance is a pad of aggregate underlain with filter cloth located at any point where traffic will be entering or leaving a construction site to or from a public right of way, street, alley, sidewalk, or parking area. The purpose of a stabilized construction entrance is to reduce or eliminate the tracking of sediment onto public rights of way or streets. Reducing tracking of sediments and other pollutants onto paved roads helps prevent deposition of sediments into local storm drains and production of airborne dust.

Where traffic will be entering or leaving the construction site, a stabilized construction entrance should be used. NPDES permits require that appropriate measures be implemented to prevent tracking of sediments onto paved roadways, where a significant source of sediments is derived from mud and dirt carried out from unpaved roads and construction sites.

Stabilized construction entrances are moderately effective in removing sediment from equipment leaving a construction site. The entrance should be built on level ground. Advantages of the Stabilized Construction Entrance/Exit is that it does remove some sediment from equipment and serves to channel construction traffic in and out of the site at specified locations. Efficiency is greatly increased when a washing rack is included as part of a stabilized construction entrance/exit.

Design and Layout

- Construct on level ground where possible.
- Select 3 to 6 in. diameter stones.
- Use minimum depth of stones of 12 in. or as recommended by soils engineer.
- Construct length of 50 ft or maximum site will allow, and 10 ft minimum width or to accommodate traffic.
- Rumble racks constructed of steel panels with ridges and installed in the stabilized entrance/exit will help remove additional sediment and to keep adjacent streets clean.
- Provide ample turning radii as part of the entrance.
- Limit the points of entrance/exit to the construction site.
- Limit speed of vehicles to control dust.
- Properly grade each construction entrance/exit to prevent runoff from leaving the construction site.
- Route runoff from stabilized entrances/exits through a sediment trapping device before discharge.
- Design stabilized entrance/exit to support heaviest vehicles and equipment that will use it.

Stabilized Construction Entrance/Exit TC-1

- Select construction access stabilization (aggregate, asphaltic concrete, concrete) based on longevity, required performance, and site conditions. Do not use asphalt concrete (AC) grindings for stabilized construction access/roadway.
- If aggregate is selected, place crushed aggregate over geotextile fabric to at least 12 in. depth, or place aggregate to a depth recommended by a geotechnical engineer. A crushed aggregate greater than 3 in. but smaller than 6 in. should be used.
- Designate combination or single purpose entrances and exits to the construction site.
- Require that all employees, subcontractors, and suppliers utilize the stabilized construction access.
- Implement SE-7, Street Sweeping and Vacuuming, as needed.
- All exit locations intended to be used for more than a two-week period should have stabilized construction entrance/exit BMPs.

Inspection and Maintenance

- Inspect and verify that activity–based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMPs are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect local roads adjacent to the site daily. Sweep or vacuum to remove visible accumulated sediment.
- Remove aggregate, separate and dispose of sediment if construction entrance/exit is clogged with sediment.
- Keep all temporary roadway ditches clear.
- Check for damage and repair as needed.
- Replace gravel material when surface voids are visible.
- Remove all sediment deposited on paved roadways within 24 hours.
- Remove gravel and filter fabric at completion of construction

Costs

Average annual cost for installation and maintenance may vary from $1,500 to $6,100 each, averaging $3,100 per entrance. Costs will increase with addition of washing rack and sediment trap. With wash rack, costs range from $1,500 - $7,700 each, averaging $4,600 per entrance (All costs adjusted for inflation, 2016 dollars, by Tetra Tech Inc.

References

Manual of Standards of Erosion and Sediment Control Measures, Association of Bay Area Governments, May 1995.

National Management Measures to Control Nonpoint Source Pollution from Urban Areas, USEPA Agency, 2002.

Proposed Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters, Work Group Working Paper, USEPA, April 1992.

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

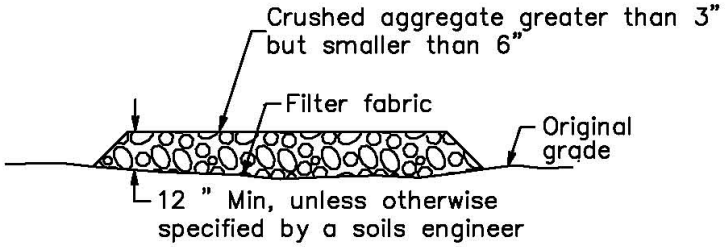
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Virginia Erosion and Sedimentation Control Handbook, Virginia Department of Conservation and Recreation, Division of Soil and Water Conservation, 1991.

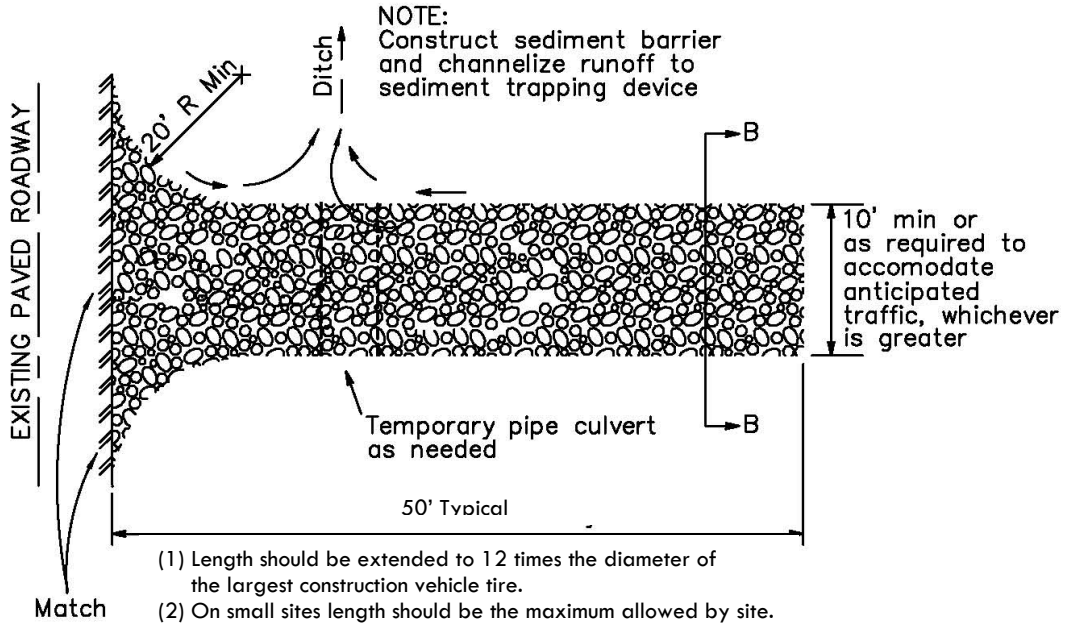
Guidance Specifying Management Measures for Nonpoint Pollution in Coastal Waters, EPA 840-B-9-002, USEPA, Office of Water, Washington, DC, 1993.

Water Quality Management Plan for the Lake Tahoe Region, Volume II, Handbook of Management Practices, Tahoe Regional Planning Agency, November 1988.

Stabilized Construction Entrance/Exit TC-1



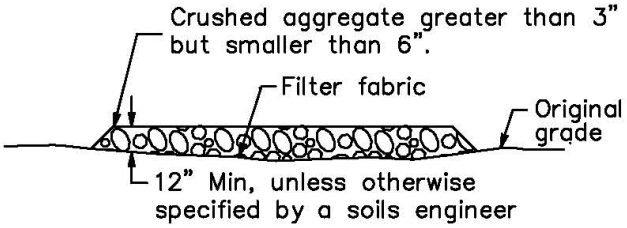
SECTION B–B
NTS



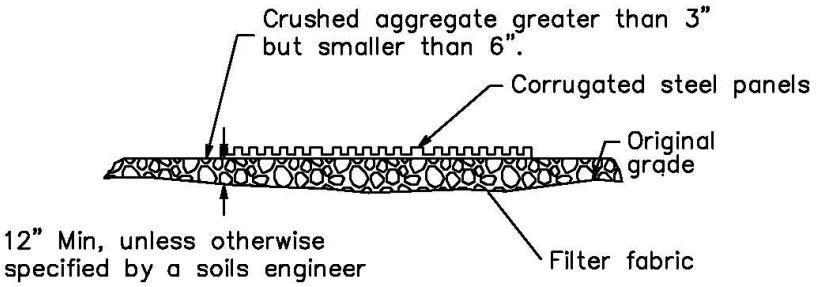
(1) Length should be extended to 12 times the diameter of the largest construction vehicle tire.
(2) On small sites length should be the maximum allowed by site.

PLAN
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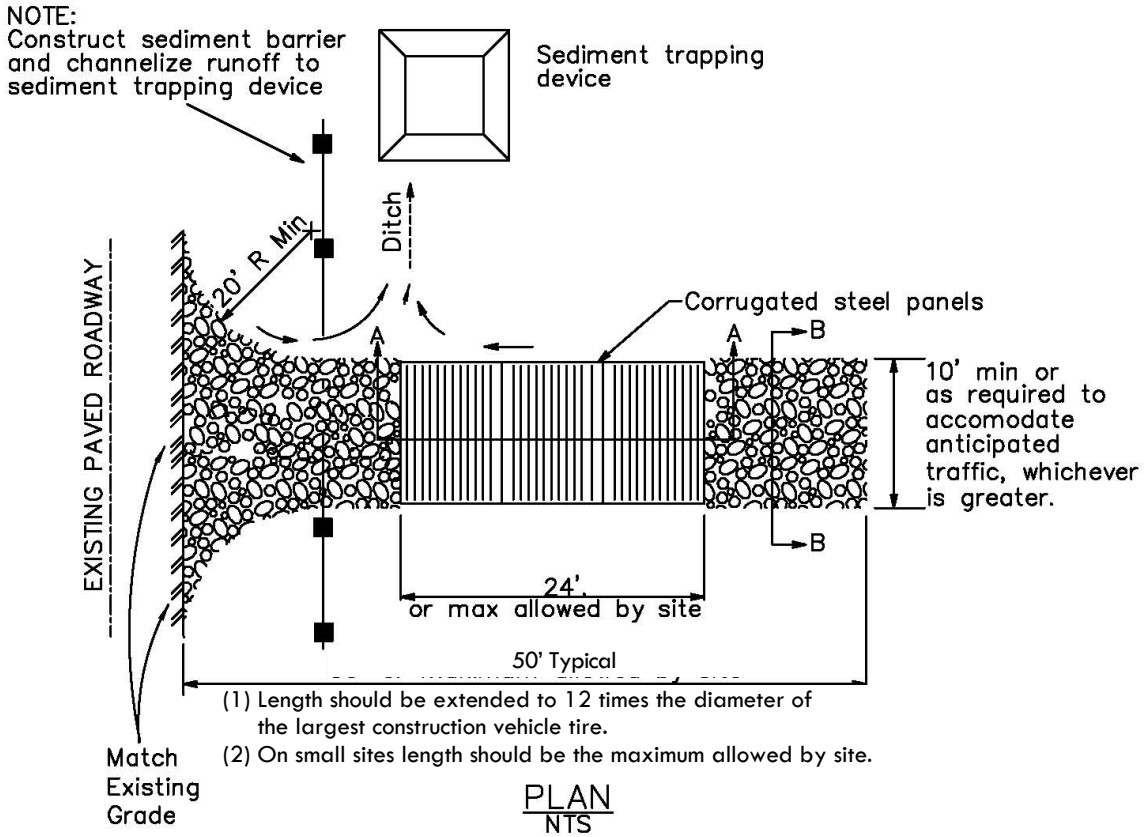
Stabilized Construction Entrance/Exit TC-1



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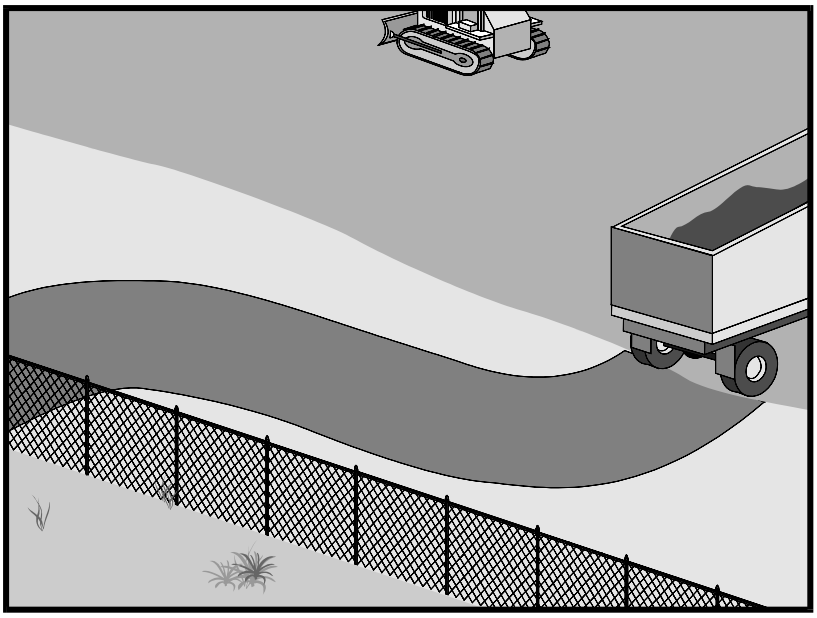


SECTION A–A
NOT TO SCALE



PLAN
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Stabilized Construction Roadway TC-2



Categories

EC	Erosion Control	☒
SE	Sediment Control	☒
TC	Tracking Control	☑
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

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Description and Purpose

Access roads, subdivision roads, parking areas, and other onsite vehicle transportation routes should be stabilized immediately after grading, and frequently maintained to prevent erosion and control dust.

Suitable Applications

This BMP should be applied for the following conditions:

- Temporary Construction Traffic:
  - Phased construction projects and offsite road access
  - Construction during wet weather
- Construction roadways and detour roads:
  - Where mud tracking is a problem during wet weather
  - Where dust is a problem during dry weather
  - Adjacent to water bodies
  - Where poor soils are encountered

Limitations

- The roadway must be removed or paved when construction is complete.

- Certain chemical stabilization methods may cause stormwater or soil pollution and should not be used. See WE-1, Wind Erosion Control.
- Management of construction traffic is subject to air quality control measures. Contact the local air quality management agency.
- Materials will likely need to be removed prior to final project grading and stabilization.
- Use of this BMP may not be applicable to very short duration projects.

Implementation

General

Areas that are graded for construction vehicle transport and parking purposes are especially susceptible to erosion and dust. The exposed soil surface is continually disturbed, leaving no opportunity for vegetative stabilization. Such areas also tend to collect and transport runoff waters along their surfaces. During wet weather, they often become muddy quagmires that generate significant quantities of sediment that may pollute nearby streams or be transported offsite on the wheels of construction vehicles. Dirt roads can become so unstable during wet weather that they are virtually unusable.

Efficient construction road stabilization not only reduces onsite erosion but also can significantly speed onsite work, avoid instances of immobilized machinery and delivery vehicles, and generally improve site efficiency and working conditions during adverse weather

Installation/Application Criteria

Permanent roads and parking areas should be paved as soon as possible after grading. As an alternative where construction will be phased, the early application of gravel or chemical stabilization may solve potential erosion and stability problems. Temporary gravel roadway should be considered during the rainy season and on slopes greater than 5%.

Temporary roads should follow the contour of the natural terrain to the maximum extent possible. Slope should not exceed 15%. Roadways should be carefully graded to drain transversely. Provide drainage swales on each side of the roadway in the case of a crowned section or one side in the case of a super elevated section. Simple gravel berms without a trench can also be used.

Installed inlets should be protected to prevent sediment laden water from entering the storm sewer system (SE-10, Storm Drain Inlet Protection). In addition, the following criteria should be considered.

- Road should follow topographic contours to reduce erosion of the roadway.
- The roadway slope should not exceed 15%.
- Chemical stabilizers or water are usually required on gravel or dirt roads to prevent dust (WE-1, Wind Erosion Control).
- Properly grade roadway to prevent runoff from leaving the construction site.
- Design stabilized access to support heaviest vehicles and equipment that will use it.

- Stabilize roadway using aggregate, asphalt concrete, or concrete based on longevity, required performance, and site conditions. The use of cold mix asphalt or asphalt concrete (AC) grindings for stabilized construction roadway is not allowed.
- Coordinate materials with those used for stabilized construction entrance/exit points.
- If aggregate is selected, place crushed aggregate over geotextile fabric to at least 12 in. depth. A crushed aggregate greater than 3 in. but smaller than 6 in. should be used.

Inspection and Maintenance

- Inspect and verify that activity–based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Keep all temporary roadway ditches clear.
- When no longer required, remove stabilized construction roadway and re-grade and repair slopes.
- Periodically apply additional aggregate on gravel roads.
- Active dirt construction roads are commonly watered three or more times per day during the dry season.

Costs

Gravel construction roads are moderately expensive, but cost is often balanced by reductions in construction delay. No additional costs for dust control on construction roads should be required above that needed to meet local air quality requirements.

References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Coastal Nonpoint Pollution Control Program; Program Development and Approval Guidance, Working Group, Working Paper; USEPA, April 1992.

Manual of Standards of Erosion and Sediment Control Measures, Association of Bay Area Governments, May 1995.

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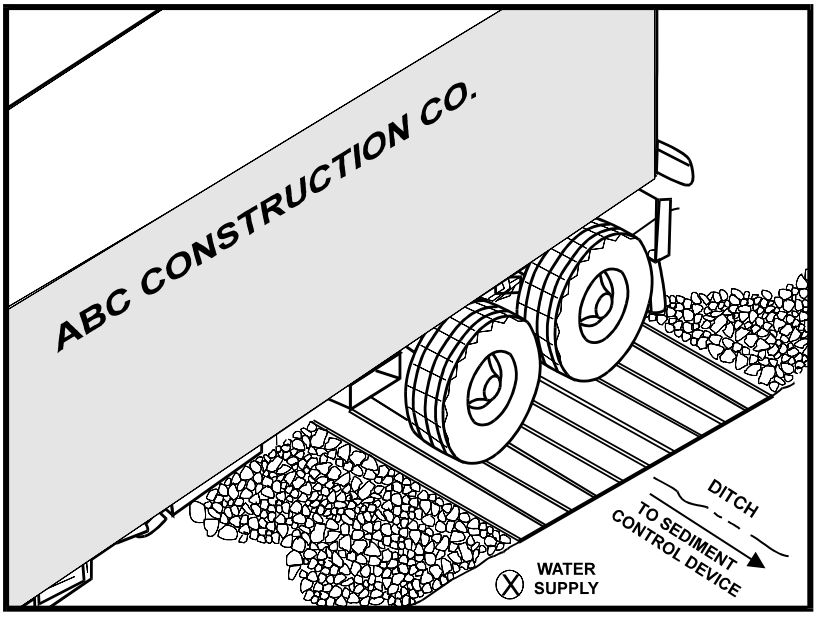
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Virginia Erosion and Sedimentation Control Handbook, Virginia Department of Conservation and Recreation, Division of Soil and Water Conservation, 1991.

Water Quality Management Plan for the Lake Tahoe Region, Volume II, Handbook of Management Practices, Tahoe Regional Planning Agency, November 1988.

Entrance/Outlet Tire Wash TC-3



Categories

EC	Erosion Control	
SE	Sediment Control	☒
TC	Tracking Control	☑
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

TC-1 Stabilized Construction Entrance/Exit

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Description and Purpose

A tire wash is an area located at stabilized construction access points to remove sediment from tires and under carriages and to prevent sediment from being transported onto public roadways.

Suitable Applications

Tire washes may be used on construction sites where dirt and mud tracking onto public roads by construction vehicles may occur.

Limitations

- The tire wash requires a supply of wash water.
- A turnout or doublewide exit is required to avoid having entering vehicles drive through the wash area.
- Do not use where wet tire trucks leaving the site leave the road dangerously slick.

Implementation

- Incorporate with a stabilized construction entrance/exit. See TC-1, Stabilized Construction Entrance/Exit.
- Construct on level ground when possible, on a pad of coarse aggregate greater than 3 in. but smaller than 6 in. A geotextile fabric should be placed below the aggregate.
- Wash rack should be designed and constructed/manufactured for anticipated traffic loads.

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- Provide a drainage ditch that will convey the runoff from the wash area to a sediment trapping device. The drainage ditch should be of sufficient grade, width, and depth to carry the wash runoff.
- Use hoses with automatic shutoff nozzles to prevent hoses from being left on.
- Require that all employees, subcontractors, and others that leave the site with mud caked tires and undercarriages to use the wash facility.
- Implement SC-7, Street Sweeping and Vacuuming, as needed.

Costs

Costs are low for installation of wash rack.

Inspection and Maintenance

- Inspect and verify that activity–based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect BMPs subject to non-stormwater discharge daily while non-stormwater discharges occur.
- Remove accumulated sediment in wash rack and/or sediment trap to maintain system performance.
- Inspect routinely for damage and repair as needed.

References

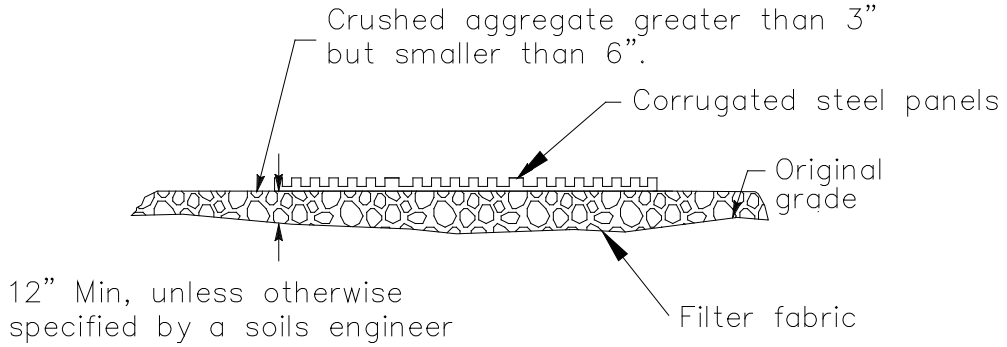
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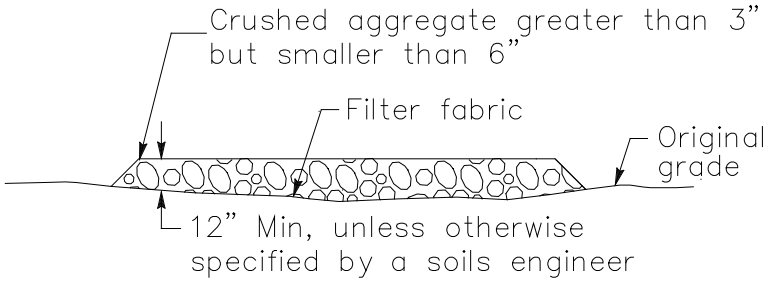
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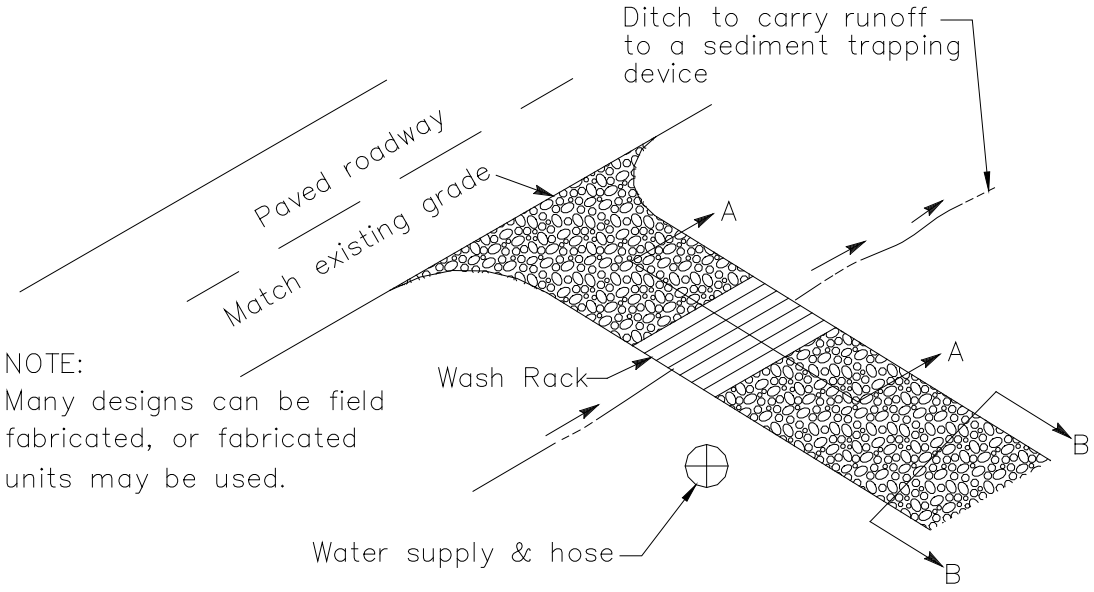
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SECTION A–A
NOT TO SCALE



SECTION B–B
NTS



TYPICAL TIRE WASH
NOT TO SCALE

Section 4
Non-Stormwater Management and Material Management BMPs

4.1 Non-Stormwater Management BMPs

The discharge of materials other than stormwater and authorized non-stormwater discharges is prohibited by NPDES regulations as well as other local codes and ordinances. It is recognized that certain authorized non-stormwater discharges may be necessary for the completion of construction projects. Such discharges include, but are not limited to, irrigation of vegetative erosion control measures, and pipe flushing and testing.

Non-stormwater management BMPs are source control BMPs that prevent pollution by limiting or reducing potential pollutants at their source or eliminating off-site discharge. These practices involve day-to-day operations of the construction site and are usually under the control of the contractor. These BMPs are also referred to as "good housekeeping practices," which involve keeping a clean, orderly construction site.

Non-stormwater management BMPs also include procedures and practices designed to minimize or eliminate the discharge of pollutants from vehicle and equipment cleaning, fueling, and maintenance operations to stormwater drainage systems or to watercourses.

Table 4-1 of this handbook lists the non-stormwater management BMPs. All these BMPs must be implemented depending on the conditions and applicability of deployment described as part of the BMP. The key to implementing these BMPs is to maintain a clean site and keep water, runoff, and run-on away from potential pollutants, including bare soil. In general, conduct construction activities so that: potential pollutants are not discharged directly to drainage systems; generation of potential pollutants is limited; and pollutants that are generated are contained and cleaned up immediately and are therefore not available for later discharge. These BMPs are fundamental to water quality protection and all sites must implement non-stormwater BMPs appropriate for the construction activities being performed.

Table 4-1 Non-Stormwater Management BMPs

BMP#	BMP Name
NS-1	Water Conservation Practices[2]
NS-2	Dewatering Operations[1, 3]
NS-3	Paving and Grinding Operations[1, 3]
NS-4	Temporary Stream Crossing[1, 2]
NS-5	Clear Water Diversion[2]
NS-6	Illicit Connection/Discharge[1, 2]
NS-7	Potable Water/Irrigation[1, 2]
NS-8	Vehicle and Equipment Cleaning[1, 2]
NS-9	Vehicle and Equipment Fueling[1, 2]
NS-10	Vehicle and Equipment Maintenance[1, 2]
NS-11	Pile Driving Operations[1, 2]
NS-12	Concrete Curing[1, 3]
NS-13	Concrete Finishing[1, 3]
NS-14	Material Over Water[1, 2]
NS-15	Demolition Adjacent to Water[1, 2]
NS-16	Temporary Batch Plants[1, 3]

1) BMP fact sheet updated in 2009
2) BMP fact sheet updated in 2011
3) BMP fact sheet updated in 2012

It is recommended that owners and contractors be vigilant regarding implementation of these BMPs, including making their implementation a condition of continued employment, and part of all prime and subcontract agreements. By doing so, the chance of inadvertent violation by an uncaring individual can be prevented, potentially saving thousands of dollars in fines and project delays. Also, if procedures are not properly implemented and/or if BMPs are compromised then the discharge may be subject to additional sampling and analysis requirements for non-visible pollutants contained in the General Permit. (See Section 2.5.4.2. of this handbook)

4.2 Waste Management and Materials Pollution Control BMPs

Waste management and materials pollution control BMPs, like non-stormwater management BMPs, are source control BMPs that prevent pollution by limiting or reducing potential pollutants at their source before they come in contact with stormwater. These BMPs also involve day-to-day operations of the construction site, and are under the control of the contractor, and are additional "good housekeeping practices," which involve keeping a clean, orderly construction site. These BMPs are fundamental to water quality protection and all sites must implement waste management and/or materials pollution control non-stormwater BMPs appropriate for the construction activities being performed.

Table 4-2 Waste Management and Materials Pollution Control BMPs

BMP#	BMP Name
WM-1	Material Delivery and Storage[1]
WM-2	Material Use[1]
WM-3	Stockpile Management[1, 2, 3]
WM-4	Spill Prevention and Control[1, 2]
WM-5	Solid Waste Management[1, 2]
WM-6	Hazardous Waste Management[1, 2]
WM-7	Contaminated Soil Management[1, 2]
WM-8	Concrete Waste Management[1, 3]
WM-9	Sanitary/ Septic Waste Management[1]
WM-10	Liquid Waste Management[1]

1) BMP fact sheet updated in 2009
2) BMP fact sheet updated in 2011
3) BMP fact sheet updated in 2012

Waste management consists of implementing procedural and structural BMPs for handling, storing, and disposing of wastes generated by a construction project to prevent the release of waste materials into stormwater runoff or discharges through proper management of the following types of wastes:

- Solid
- Sanitary
- Concrete
- Hazardous
- Equipment-related wastes

Materials pollution control (also called materials handling) consists of implementing procedural and structural BMPs in the handling of, storing, and the using of construction materials. The BMPs are intended to prevent the release of pollutants during stormwater and non-stormwater

discharges. The objective is to prevent or reduce the opportunity for contamination of stormwater runoff from construction materials by covering and/or providing secondary containment of storage areas and/or by taking adequate precautions when handling materials. These controls must be implemented for all applicable activities, material usage, and site conditions. The discharge of construction materials or wastes from a site is prohibited.

Table 4-2 of this handbook lists the waste management and materials pollution control BMPs. It is important to note that these BMPs should be implemented depending on the conditions/applicability of deployment described as part of the BMP.

4.3 Fact Sheet Format

A BMP fact sheet is a short document that presents detailed information about a particular BMP. Typically, each fact sheet contains the information outlined in Figure 4-1 of this handbook. Completed fact sheets for each of the above activities are provided in Section 4.4 of this handbook.

The fact sheets also contain side bar presentations with information on BMP categories, targeted constituents, removal effectiveness, and potential alternatives.

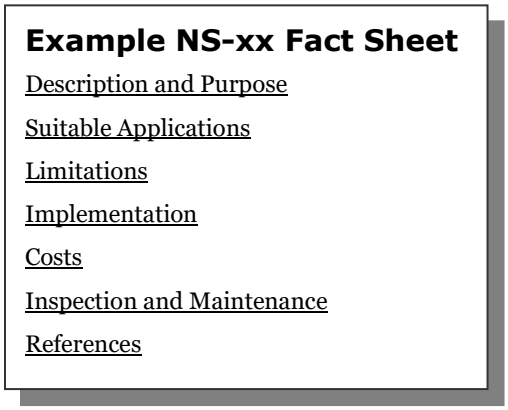


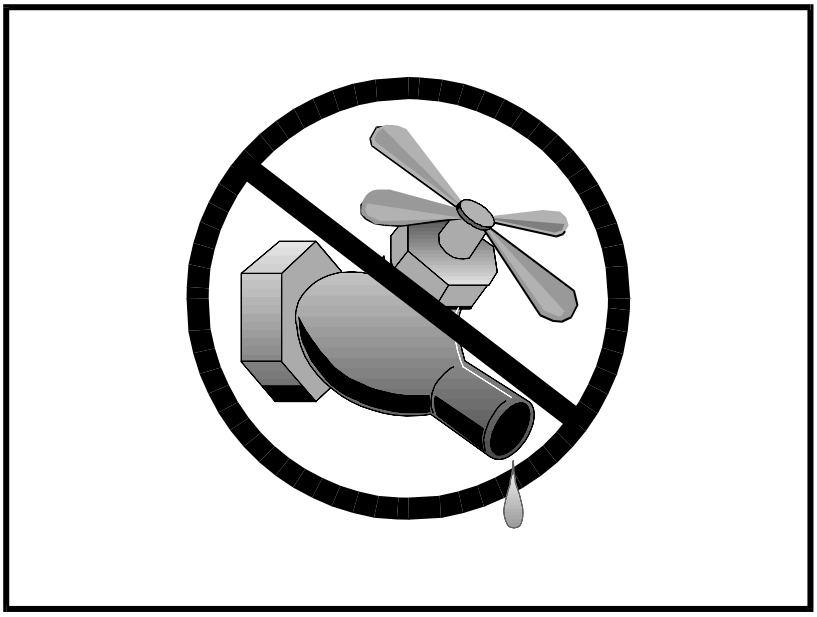
Figure 4-1
Example Fact Sheet

4.4 BMP Fact Sheets

BMP fact sheets for non-stormwater management and waste management and materials pollution control follow. The BMP fact sheets are individually page numbered and are suitable for inclusions in SWPPPs. Copies of the fact sheets can be individually downloaded from the CASQA Online BMP Handbook at http://www.casqa.org.

BMP fact sheets are guidance and intended to provide a range of information about the BMPs. The BMP fact sheets should not be interpreted as General Permit requirements. CASQA recognizes that there may be alternative public domain and/or proprietary practices performing similar function. Alternative products should be evaluated for project-specific implementation and used if determined to be appropriate by the QSD. Fact sheets do not address site-specific implementation application needs and modifications. The QSD should provide site specific implementation requirements in the SWPPP.

Water Conservation Practices NS-1



Categories

EC	Erosion Control	☒
SE	Sediment Control	☒
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

Description and Purpose

Water conservation practices are activities that use water during the construction of a project in a manner that avoids causing erosion and the transport of pollutants offsite. These practices can reduce or eliminate non-stormwater discharges.

Suitable Applications

Water conservation practices are suitable for all construction sites where water is used, including piped water, metered water, trucked water, and water from a reservoir.

Limitations

- None identified.

Implementation

- Keep water equipment in good working condition.
- Stabilize water truck filling area.
- Repair water leaks promptly.
- Washing of vehicles and equipment on the construction site is discouraged.
- Avoid using water to clean construction areas. If water must be used for cleaning or surface preparation, surface should be swept and vacuumed first to remove dirt. This will minimize amount of water required.

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- Direct construction water runoff to areas where it can soak into the ground or be collected and used.
- Authorized non-stormwater discharges to the storm drain system, channels, or receiving waters are acceptable with the implementation of appropriate BMPs.
- Lock water tank valves to prevent unauthorized use.

Costs

The cost is small to none compared to the benefits of conserving water.

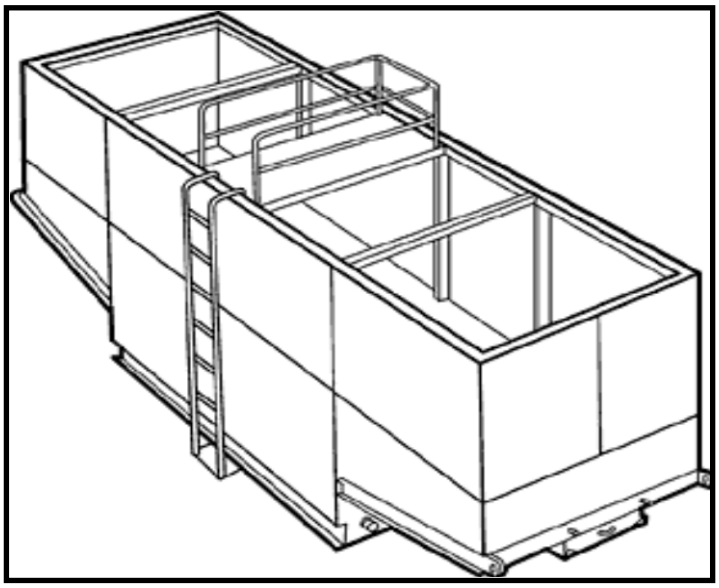
Inspection and Maintenance

- Inspect and verify that activity based BMPs are in place prior to the commencement of authorized non-stormwater discharges.
- Inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges are occuring.
- Repair water equipment as needed to prevent unintended discharges.
    - Water trucks
    - Water reservoirs (water buffalos)
    - Irrigation systems
    - Hydrant connections

References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Dewatering Operations NS-2



Categories		
EC	Erosion Control	
SE	Sediment Control	☒
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Targeted Constituents	
Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	☑
Organics	

Potential Alternatives

SE-5: Fiber Roll

SE-6: Gravel Bag Berm

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Description and Purpose

Dewatering operations are practices that manage the discharge of pollutants when non-stormwater and accumulated precipitation (stormwater) must be removed from a work location to proceed with construction work or to provide vector control.

The General Permit incorporates Numeric Action Levels (NAL) for turbidity (see Section 2 of this handbook to determine your project's risk level and if you are subject to these requirements).

Discharges from dewatering operations can contain high levels of fine sediment that, if not properly treated, could lead to exceedances of the General Permit requirements or Basin Plan standards.

The dewatering operations described in this fact sheet are not Active Treatment Systems (ATS) and do not include the use of chemical coagulations, chemical flocculation or electrocoagulation.

Suitable Applications

These practices are implemented for discharges of non-stormwater from construction sites. Non-stormwaters include, but are not limited to, groundwater, water from cofferdams, water diversions, and waters used during construction activities that must be removed from a work area to facilitate construction.

Practices identified in this section are also appropriate for implementation when managing the removal of accumulated

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precipitation (stormwater) from depressed areas at a construction site.

Stormwater mixed with non-stormwater should be managed as non-stormwater.

Limitations

- Dewatering operations will require and should comply with applicable local and project-specific permits and regulations. In some areas, all dewatering activities, regardless of the discharge volume, require a dewatering permit.
- Site conditions will dictate design and use of dewatering operations.
- The controls discussed in this fact sheet primarily address sediment. Other secondary pollutant removal benefits are discussed where applicable.
- The controls detailed in this fact sheet only allow for minimal settling time for sediment particles. Use only when site conditions restrict the use of the other control methods.
- Avoid dewatering discharges where possible by using the water for dust control.

Implementation

- A Construction Site Monitoring Plan (CSMP) should be included in the project Stormwater Pollution Prevention Plan (SWPPP).
- Regional Water Quality Control Board (RWQCB) Regions may require notification and approval prior to any discharge of water from construction sites.
- The destination of discharge from dewatering activities will typically determine the type of permit required for the discharge. For example, when discharging to a water of the U.S., a dewatering permit may be required through the site's governing RWQCB. When discharging to a sanitary sewer or Municipal Separate Storm Sewer System (MS4), a permit may need to be obtained from the owner of the sanitary sewer or MS4 in addition to obtaining an RWQCB dewatering permit. Additional permits or permissions from other agencies may be required for dewatering cofferdams or diversions.
- Dewatering discharges should not cause erosion at the discharge point. Appropriate BMPs should be implemented to maintain compliance with all applicable permits.
- Maintain dewatering records in accordance with all local and project-specific permits and regulations.

Sediment Treatment

A variety of methods can be used to treat water during dewatering operations. Several devices are presented below and provide options to achieve sediment removal. The sediment particle size and permit or receiving water limitations on sediment or turbidity are key considerations for selecting sediment treatment option(s); in some cases, the use of multiple devices may be appropriate. Use of other enhanced treatment methods (i.e., introduction of chemicals or electric current to enhance flocculation and removal of sediment) must comply with: 1) for storm drain or surface water discharges, the requirements for Active Treatment Systems (see SE-11); or 2) for sanitary sewer discharges, the requirements of applicable sanitary sewer discharge permits.

Sediment Basin (see also SE-2)

Description:

- A sediment basin is a temporary basin with a controlled release structure that is formed by excavation or construction of an embankment to detain sediment-laden runoff and allow sediment to settle out before discharging. Sediment basins are generally larger than Sediment Traps (SE-3) and have a designed outlet structure.

Appropriate Applications:

- Effective for the removal of trash, gravel, sand, silt, some metals that settle out with the sediment.

Implementation:

- Excavation and construction of related facilities is required.
- Temporary sediment basins should be fenced if safety is a concern.
- Outlet protection is required to prevent erosion at the outfall location.

Maintenance:

- Maintenance is required for safety fencing, vegetation, embankment, inlet and outlet, as well as other features.
- Removal of sediment is required when the storage volume is reduced by one-third.

Sediment Trap (See also SE-3)

Description:

- A sediment trap is a temporary basin formed by excavation and/or construction of an earthen embankment across a waterway or low drainage area to detain sediment-laden runoff and allow sediment to settle out before discharging. Sediment traps are generally smaller than Sediment Basins (SE-2) and do not have a designed outlet (but do have a spillway or overflow).

Appropriate Applications:

Effective for the removal of large and medium sized particles (sand and gravel) and some metals that settle out with the sediment.

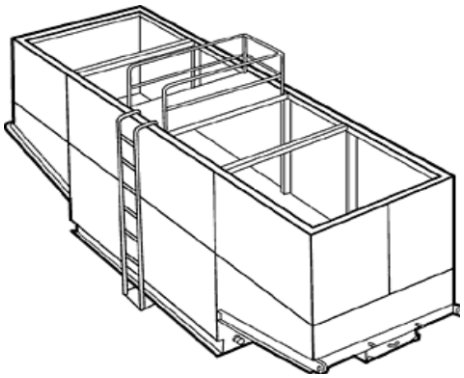
Implementation:

- Excavation and construction of related facilities is required.
- Trap inlets should be located to maximize the travel distance to the trap outlet.
- Use rock or vegetation to protect the trap outlets against erosion.

Maintenance:

- Maintenance is required for vegetation, embankment, inlet and outfall structures, as well as other features.
- Removal of sediment is required when the storage volume is reduced by one-third.

Weir Tanks



Description:

- A weir tank separates water and waste by using weirs. The configuration of the weirs (over and under weirs) maximizes the residence time in the tank and determines the waste to be removed from the water, such as oil, grease, and sediments.

Appropriate Applications:

- The tank removes trash, some settleable solids (gravel, sand, and silt), some visible oil and grease, and some metals (removed with sediment). To achieve high levels of flow, multiple tanks can be used in parallel. If additional treatment is desired, the tanks can be placed in series or as pre-treatment for other methods.

Implementation:

- Tanks are delivered to the site by the vendor, who can provide assistance with set-up and operation.
- Tank size will depend on flow volume, constituents of concern, and residency period required. Vendors should be consulted to appropriately size tank.
- Treatment capacity (i.e., volume and number of tanks) should provide at a minimum the required volume for discrete particle settling for treatment design flows.

Maintenance:

- Periodic cleaning is required based on visual inspection or reduced flow.
- Oil and grease disposal should be conducted by a licensed waste disposal company.

Dewatering Tanks



Description:

- A dewatering tank removes debris and sediment. Flow enters the tank through the top, passes through a fabric filter, and is discharged through the bottom of the tank. The filter separates the solids from the liquids.

Appropriate Applications:

- The tank removes trash, gravel, sand, and silt, some visible oil and grease, and some metals (removed with sediment). To achieve high levels of flow, multiple tanks can be used in parallel. If additional treatment is desired, the tanks can be placed in series or as pre-treatment for other methods.

Implementation:

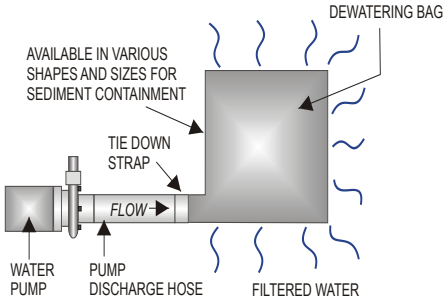
- Tanks are delivered to the site by the vendor, who can provide assistance with set-up and operation.
- Tank size will depend on flow volume, constituents of concern, and residency period required. Vendors should be consulted to appropriately size tank.

Maintenance:

- Periodic cleaning is required based on visual inspection or reduced flow.
- Oil and grease disposal should be conducted by licensed waste disposal company.

Gravity Bag Filter





Description:

- A gravity bag filter, also referred to as a dewatering bag, is a square or rectangular bag made of non-woven geotextile fabric that collects gravel, sand, silt, and fines.

Appropriate Applications:

- Effective for the removal of sediments (gravel, sand, silt, and fines). Some metals are removed with the sediment.

Implementation:

- Water is pumped into one side of the bag and seeps through the top, bottom, and sides of the bag.
- Place filter bag on pavement or a gravel bed or paved surface. Avoid placing a dewatering bag on unprotected bare soil. If placing the bag on bare soil is unavoidable, a secondary barrier should be used, such as a rock filter bed placed beneath and beyond the edges of the bag to, prevent erosion and capture sediments that escape the bag.
- Perimeter control around the downstream end of the bag should be implemented. Secondary sediment controls are important especially in the initial stages of discharge, which tend to allow fines to pass through the bag.

Maintenance:

- Inspection of the flow conditions, bag condition, bag capacity, and the secondary barrier (as applicable) is required.
- Replace the bag when it no longer filters sediment or passes water at a reasonable rate.
- Caution should be taken when removing and disposing of the bag, to prevent the release of captured sediment
- Properly dispose of the bag offsite. If sediment is removed from the bag prior to disposal (bags can potentially be reused depending upon their condition), dispose of sediment in accordance with the general maintenance procedures described at the end of this BMP Fact Sheet.

Sand Media Particulate Filter





Description:

- Water is treated by passing it through canisters filled with sand media. Generally, sand filters provide a final level of treatment. They are often used as a secondary or higher level of treatment after a significant amount of sediment and other pollutants have been removed using other methods.

Appropriate Applications:

- Effective for the removal of trash, gravel, sand, and silt and some metals, as well as the reduction of biochemical oxygen demand (BOD) and turbidity.
- Sand filters can be used for stand-alone treatment or in conjunction with bag and cartridge filtration if further treatment is required.
- Sand filters can also be used to provide additional treatment to water treated via settling or basic filtration.

Implementation:

- The filters require delivery to the site and initial set up. The vendor can provide assistance with installation and operation.

Maintenance:

- The filters require regular service to monitor and maintain the level of the sand media. If subjected to high loading rates, filters can plug quickly.
- Venders generally provide data on maximum head loss through the filter. The filter should be monitored daily while in use and cleaned when head loss reaches target levels.
- If cleaned by backwashing, the backwash water may need to be hauled away for disposal or returned to the upper end of the treatment train for another pass through the series of dewatering BMPs.

Pressurized Bag Filter





Description:

- A pressurized bag filter is a unit composed of single filter bags made from polyester felt material. The water filters through the unit and is discharged through a header. Vendors provide bag filters in a variety of configurations. Some units include a combination of bag filters and cartridge filters for enhanced contaminant removal.

Appropriate Applications:

- Effective for the removal of sediment (sand and silt) and some metals, as well as the reduction of BOD, turbidity, and hydrocarbons. Oil absorbent bags are available for hydrocarbon removal.

- Filters can be used to provide secondary treatment to water treated via settling or basic filtration.

Implementation:

- The filters require delivery to the site and initial set up. The vendor can provide assistance with installation and operation.

Maintenance:

- The filter bags require replacement when the pressure differential equals or exceeds the manufacturer's recommendation.

Cartridge Filter



Description:

- Cartridge filters provide a high degree of pollutant removal by utilizing a number of individual cartridges as part of a larger filtering unit. They are often used as a secondary or higher (polishing) level of treatment after a significant amount of sediment and other pollutants are removed. Units come with various cartridge configurations (for use in series with bag filters) or with a larger single cartridge filtration unit (with multiple filters within).

Appropriate Applications:

- Effective for the removal of sediment (sand, silt, and some clays) and metals, as well as the reduction of BOD, turbidity, and hydrocarbons. Hydrocarbons can effectively be removed with special resin cartridges.

- Filters can be used to provide secondary treatment to water treated via settling or basic filtration.

Implementation:

- The filters require delivery to the site and initial set up. The vendor can provide assistance.

Maintenance:

- The cartridges require replacement when the pressure differential equals or exceeds the manufacturer's recommendation.

Costs

- Sediment control costs vary considerably depending on the dewatering and sediment treatment system that is selected. Pressurized filters tend to be more expensive than gravity settling but are often more effective. Simple tanks are generally rented on a long-term basis (one or more months) and can range from $460 per month for a 1,000-gallon tank to $3,400 per month for a 10,000-gallon tank (adjusted for inflation, 2016 dollars, by Tetra Tech Inc.). Mobilization and demobilization costs vary considerably.

Inspection and Maintenance

- Inspect and verify that dewatering BMPs are in place and functioning prior to the commencement of activities requiring dewatering.

- Inspect dewatering BMPs daily while dewatering activities are being conducted.

- Inspect all equipment before use. Monitor dewatering operations to ensure they do not cause offsite discharge or erosion.
- Sample dewatering discharges as required by the General Permit.
- Unit-specific maintenance requirements are included with the description of each unit.
- Sediment removed during the maintenance of a dewatering device may be either spread onsite and stabilized or disposed of at a disposal site as approved by the owner.
- Sediment that is commingled with other pollutants should be disposed of in accordance with all applicable laws and regulations and as approved by the owner.

References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

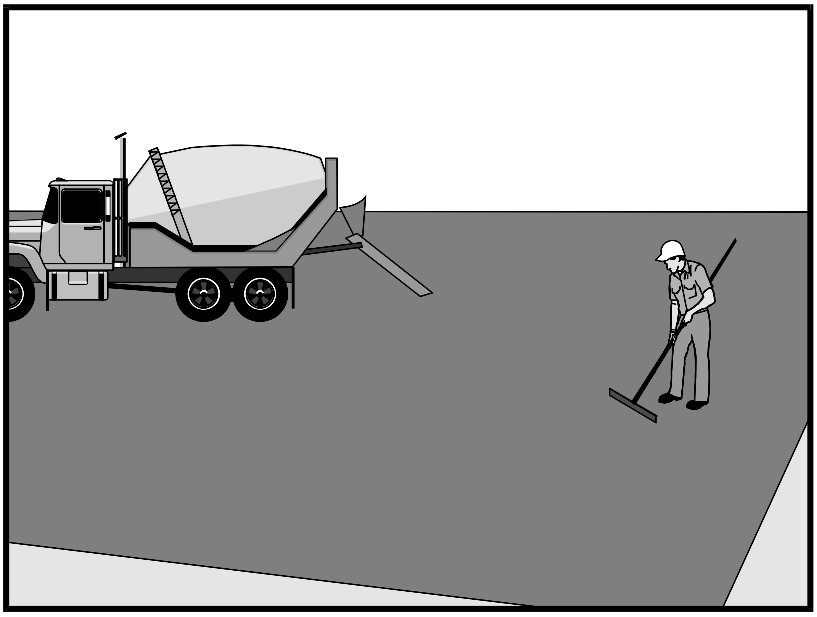
Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003; Updated March 2004.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

Labor Surcharge & Equipment Rental Rates, April 1, 2002 through March 31, 2003, California Department of Transportation (Caltrans).

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.

Paving and Grinding Operations NS-3



Categories		
EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	☒

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Targeted Constituents	
Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	☑
Organics	

Potential Alternatives

None

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Description and Purpose

Prevent or reduce the discharge of pollutants from paving operations, using measures to prevent runon and runoff pollution, properly disposing of wastes, and training employees and subcontractors.

The General Permit incorporates Numeric Action Levels (NAL) for pH and turbidity (see Section 2 of this handbook to determine your project's risk level and if you are subject to these requirements).

Many types of construction materials associated with paving and grinding operations, including mortar, concrete, and cement and their associated wastes have basic chemical properties that can raise pH levels outside of the permitted range. Additional care should be taken when managing these materials to prevent them from coming into contact with stormwater flows, which could lead to exceedances of the General Permit requirements.

Suitable Applications

These procedures are implemented where paving, surfacing, resurfacing, or sawcutting, may pollute stormwater runoff or discharge to the storm drain system or watercourses.

Limitations

- Paving opportunities may be limited during wet weather.

  Discharges of freshly paved surfaces may raise pH to environmentally harmful levels and trigger permit violations.

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Implementation

General

- Avoid paving during the wet season when feasible.
- Reschedule paving and grinding activities if rain is forecasted.
- Train employees and sub-contractors in pollution prevention and reduction.
- Store materials away from drainage courses to prevent stormwater runon (see WM-1, Material Delivery and Storage).
- Protect drainage courses, particularly in areas with a grade, by employing BMPs to divert runoff or to trap and filter sediment.
- Stockpile material removed from roadways away from drain inlets, drainage ditches, and watercourses. These materials should be stored consistent with WM-3, Stockpile Management.
- Disposal of PCC (Portland cement concrete) and AC (asphalt concrete) waste should be in conformance with WM-8, Concrete Waste Management.

Saw Cutting, Grinding, and Pavement Removal

- Shovel or vacuum saw-cut slurry and remove from site. Cover or barricade storm drains during saw cutting to contain slurry.
- When paving involves AC, the following steps should be implemented to prevent the discharge of grinding residue, uncompacted or loose AC, tack coats, equipment cleaners, or unrelated paving materials:
  - AC grindings, pieces, or chunks used in embankments or shoulder backing should not be allowed to enter any storm drains or watercourses. Install inlet protection and perimeter controls until area is stabilized (i.e. cutting, grinding or other removal activities are complete and loose material has been properly removed and disposed of)or permanent controls are in place. Examples of temporary perimeter controls can be found in EC-9, Earth Dikes and Drainage Swales; SE-1, Silt Fence; SE-5, Fiber Rolls, or SE-13 Compost Socks and Berms
  - Collect and remove all broken asphalt and recycle when practical. Old or spilled asphalt should be recycled or disposed of properly.
- Do not allow saw-cut slurry to enter storm drains or watercourses. Residue from grinding operations should be picked up by a vacuum attachment to the grinding machine, or by sweeping, should not be allowed to flow across the pavement, and should not be left on the surface of the pavement. See also WM-8, Concrete Waste Management, and WM-10, Liquid Waste Management.
- Pavement removal activities should not be conducted in the rain.
- Collect removed pavement material by mechanical or manual methods. This material may be recycled for use as shoulder backing or base material.

- If removed pavement material cannot be recycled, transport the material back to an approved storage site.

Asphaltic Concrete Paving

- If paving involves asphaltic cement concrete, follow these steps:

  - Do not allow sand or gravel placed over new asphalt to wash into storm drains, streets, or creeks. Vacuum or sweep loose sand and gravel and properly dispose of this waste by referring to WM-5, Solid Waste Management.

  - Old asphalt should be disposed of properly. Collect and remove all broken asphalt from the site and recycle whenever possible.

Portland Cement Concrete Paving

- Do not wash sweepings from exposed aggregate concrete into a storm drain system. Collect waste materials by dry methods, such as sweeping or shoveling, and return to aggregate base stockpile or dispose of properly. Allow aggregate rinse to settle. Then, either allow rinse water to dry in a temporary pit as described in WM-8, Concrete Waste Management, or pump the water to the sanitary sewer if authorized by the local wastewater authority.

Sealing Operations

- During chip seal application and sweeping operations, petroleum or petroleum covered aggregate should not be allowed to enter any storm drain or water courses. Apply temporary perimeter controls until structure is stabilized (i.e. all sealing operations are complete and cured and loose materials have been properly removed and disposed).

- Inlet protection (SE-10, Storm Drain Inlet Protection) should be used during application of seal coat, tack coat, slurry seal, and fog seal.

- Seal coat, tack coat, slurry seal, or fog seal should not be applied if rainfall is predicted to occur during the application or curing period.

Paving Equipment

- Leaks and spills from paving equipment can contain toxic levels of heavy metals and oil and grease. Place drip pans or absorbent materials under paving equipment when not in use. Clean up spills with absorbent materials and dispose of in accordance with the applicable regulations. See NS-10, Vehicle and Equipment Maintenance, WM-4, Spill Prevention and Control, and WM-10, Liquid Waste Management.

- Substances used to coat asphalt transport trucks and asphalt spreading equipment should not contain soap and should be non-foaming and non-toxic.

- Paving equipment parked onsite should be parked over plastic to prevent soil contamination.

- Clean asphalt coated equipment offsite whenever possible. When cleaning dry, hardened asphalt from equipment, manage hardened asphalt debris as described in WM-5, Solid Waste Management. Any cleaning onsite should follow NS-8, Vehicle and Equipment Cleaning.

Thermoplastic Striping

- Thermoplastic striper and pre-heater equipment shutoff valves should be inspected to ensure that they are working properly to prevent leaking thermoplastic from entering drain inlets, the stormwater drainage system, or watercourses.
- Pre-heaters should be filled carefully to prevent splashing or spilling of hot thermoplastic. Leave six inches of space at the top of the pre-heater container when filling thermoplastic to allow room for material to move.
- Do not pre-heat, transfer, or load thermoplastic near drain inlets or watercourses.
- Clean truck beds daily of loose debris and melted thermoplastic. When possible, recycle thermoplastic material.

Raised/Recessed Pavement Marker Application and Removal

- Do not transfer or load bituminous material near drain inlets, the stormwater drainage system, or watercourses.
- Melting tanks should be loaded with care and not filled to beyond six inches from the top to leave room for splashing.
- When servicing or filling melting tanks, ensure all pressure is released before removing lids to avoid spills.
- On large-scale projects, use mechanical or manual methods to collect excess bituminous material from the roadway after removal of markers.

Costs

- All of the above are low cost measures.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of paving and grinding operations.
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Sample stormwater runoff required by the General Permit.
- Keep ample supplies of drip pans or absorbent materials onsite.
- Inspect and maintain machinery regularly to minimize leaks and drips.

References

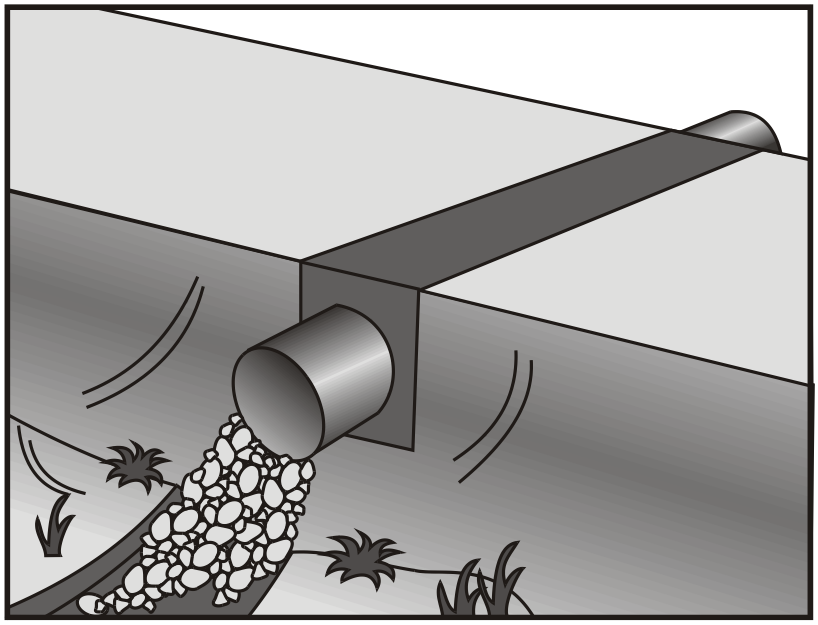
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Temporary Stream Crossing NS-4



Categories

EC	Erosion Control	☒
SE	Sediment Control	☒
TC	Tracking Control	☒
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

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Description and Purpose

A temporary stream crossing is a temporary culvert, ford or bridge placed across a waterway to provide access for construction purposes for a period of less than one year. Temporary access crossings are not intended to maintain traffic for the public. The temporary access will eliminate erosion and downstream sedimentation caused by vehicles.

Suitable Applications

Temporary stream crossings should be installed at all designated crossings of perennial and intermittent streams on the construction site, as well as for dry channels that may be significantly eroded by construction traffic.

Temporary streams crossings are installed at sites:

- Where appropriate permits have been secured (404 Permits, and 401 Certifications)
- Where construction equipment or vehicles need to frequently cross a waterway
- When alternate access routes impose significant constraints
- When crossing perennial streams or waterways causes significant erosion
- Where construction activities will not last longer than one year

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- Where appropriate permits have been obtained for the stream crossing

Limitations

The following limitations may apply:

- Installation and removal will usually disturb the waterway.
- Installation may require Regional Water Quality Control Board (RWQCB) 401 Certification, U.S. Army Corps of Engineers 404 permit and approval by California Department of Fish and Game. If numerical-based water quality standards are mentioned in any of these and other related permits, testing and sampling may be required.
- Installation may require dewatering or temporary diversion of the stream. See NS-2, Dewatering Operations and NS-5, Clear Water Diversion.
- Installation may cause a constriction in the waterway, which can obstruct flood flow and cause flow backups or washouts. If improperly designed, flow backups can increase the pollutant load through washouts and scouring.
- Use of natural or other gravel in the stream for construction of Cellular Confinement System (CCS) ford crossing will be contingent upon approval by fisheries agencies.
- Ford crossings may degrade water quality due to contact with vehicles and equipment.
- May be expensive for a temporary improvement.
- Requires other BMPs to minimize soil disturbance during installation and removal.
- Fords should only be used in dry weather.

Implementation

General

The purpose of this BMP is to provide a safe, erosion-free access across a stream for construction equipment. Minimum standards and specifications for the design, construction, maintenance, and removal of the structure should be established by an engineer registered in California. Temporary stream crossings may be necessary to prevent construction equipment from causing erosion of the stream and tracking sediment and other pollutants into the stream.

Temporary stream crossings are used as access points to construction sites when other detour routes may be too long or burdensome for the construction equipment. Often heavy construction equipment must cross streams or creeks, and detour routes may impose too many constraints such as being too narrow or poor soil strength for the equipment loadings. Additionally, the contractor may find a temporary stream crossing more economical for light–duty vehicles to use for frequent crossings and may have less environmental impact than construction of a temporary access road.

Location of the temporary stream crossing should address:

- Site selection where erosion potential is low.

- Areas where the side slopes from site runoff will not spill into the side slopes of the crossing.

The following types of temporary stream crossings should be considered:

- **Culverts** – A temporary culvert is effective in controlling erosion but will cause erosion during installation and removal. A temporary culvert can be easily constructed and allows for heavy equipment loads.

- **Fords** - Appropriate during the dry season in arid areas. Used on dry washes and ephemeral streams, and low-flow perennial streams. CCS, a type of ford crossing, is also appropriate for use in streams that would benefit from an influx of gravels. A temporary ford provides little sediment and erosion control and is ineffective in controlling erosion in the stream channel. A temporary ford is the least expensive stream crossing and allows for maximum load limits. It also offers very low maintenance. Fords are more appropriate during the dry ice season and in arid areas of California.

- **Bridges** - Appropriate for streams with high flow velocities, steep gradients and where temporary restrictions in the channel are not allowed.

Design

During the long summer construction season in much of California, rainfall is infrequent, and many streams are dry. Under these conditions, a temporary ford may be sufficient. A ford is not appropriate if construction will continue through the winter rainy season, if summer thunderstorms are likely, or if the stream flows during most of the year. Temporary culverts and bridges should then be considered and, if used, should be sized to pass a significant design storm (i.e., at least a 10-year storm). The temporary stream crossing should be protected against erosion, both to prevent excessive sedimentation in the stream and to prevent washout of the crossing.

Design and installation requires knowledge of stream flows and soil strength. Designs should be prepared under direction of, and approved by, a registered civil engineer and for bridges, a registered structural engineer. Both hydraulic and construction loading requirements should be considered with the following:

- Comply with any special requirements for culvert and bridge crossings, particularly if the temporary stream crossing will remain through the rainy season.

- Provide stability in the crossing and adjacent areas to withstand the design flow. The design flow and safety factor should be selected based on careful evaluation of the risks due to over topping, flow backups, or washout.

- Install sediment traps immediately downstream of crossings to capture sediments. See SE-3, Sediment Trap.

- Avoid oil or other potentially hazardous materials for surface treatment.

- Culverts are relatively easy to construct and able to support heavy equipment loads.

- Fords are the least expensive of the crossings, with maximum load limits.

- CCS crossing structures consist of clean, washed gravel and cellular confinement system blocks. CCS are appropriate for streams that would benefit from an influx of gravel; for example, salmonid streams, streams or rivers below reservoirs, and urban, channelized streams. Many urban stream systems are gravel-deprived due to human influences, such as dams, gravel mines, and concrete channels.
- CCS allow designers to use either angular or naturally occurring rounded gravel, because the cells provide the necessary structure and stability. In fact, natural gravel is optimal for this technique, because of the habitat improvement it will provide after removal of the CCS.
- A gravel depth of 6 to 12 in. for a CCS structure is sufficient to support most construction equipment.
- An advantage of a CCS crossing structure is that relatively little rock or gravel is needed, because the CCS provides the stability.
- Bridges are generally more expensive to design and construct but provide the least disturbance of the streambed and constriction of the waterway flows.

Construction and Use

- Stabilize construction roadways, adjacent work area, and stream bottom against erosion.
- Construct during dry periods to minimize stream disturbance and reduce costs.
- Construct at or near the natural elevation of the streambed to prevent potential flooding upstream of the crossing.
- Install temporary erosion control BMPs in accordance with erosion control BMP fact sheets to minimize erosion of embankment into flow lines.
- Any temporary artificial obstruction placed within flowing water should only be built from material, such as clean gravel or sandbags, that will not introduce sediment or silt into the watercourse.
- Temporary water body crossings and encroachments should be constructed to minimize scour. Cobbles used for temporary water body crossings or encroachments should be clean, rounded river cobble.
- Vehicles and equipment should not be driven, operated, fueled, cleaned, maintained, or stored in the wet or dry portions of a water body where wetland vegetation, riparian vegetation, or aquatic organisms may be destroyed.
- The exterior of vehicles and equipment that will encroach on the water body within the project should be maintained free of grease, oil, fuel, and residues.
- Drip pans should be placed under all vehicles and equipment placed on docks, barges, or other structures over water bodies when the vehicle or equipment is planned to be idle for more than one hour.

- Disturbance or removal of vegetation should not exceed the minimum necessary to complete operations. Precautions should be taken to avoid damage to vegetation by people or equipment. Disturbed vegetation should be replaced with the appropriate soil stabilization measures.

- Riparian vegetation, when removed pursuant to the provisions of the work, should be cut off no lower than ground level to promote rapid re-growth. Access roads and work areas built over riparian vegetation should be covered by a sufficient layer of clean river run cobble to prevent damage to the underlying soil and root structure. The cobble must be removed upon completion of project activities.

- Conceptual temporary stream crossings are shown in the attached figures.

Costs

Caltrans Construction Cost index for temporary bridge crossings is $58-$122/ft^2 (costs adjusted for inflation, 2016 dollars, by Tetra Tech Inc.).

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.

- Check for blockage in the channel, sediment buildup or trapped debris in culverts, blockage behind fords or under bridges.

- Check for erosion of abutments, channel scour, riprap displacement, or piping in the soil.

- Check for structural weakening of the temporary crossings, such as cracks, and undermining of foundations and abutments.

- Remove sediment that collects behind fords, in culverts, and under bridges periodically.

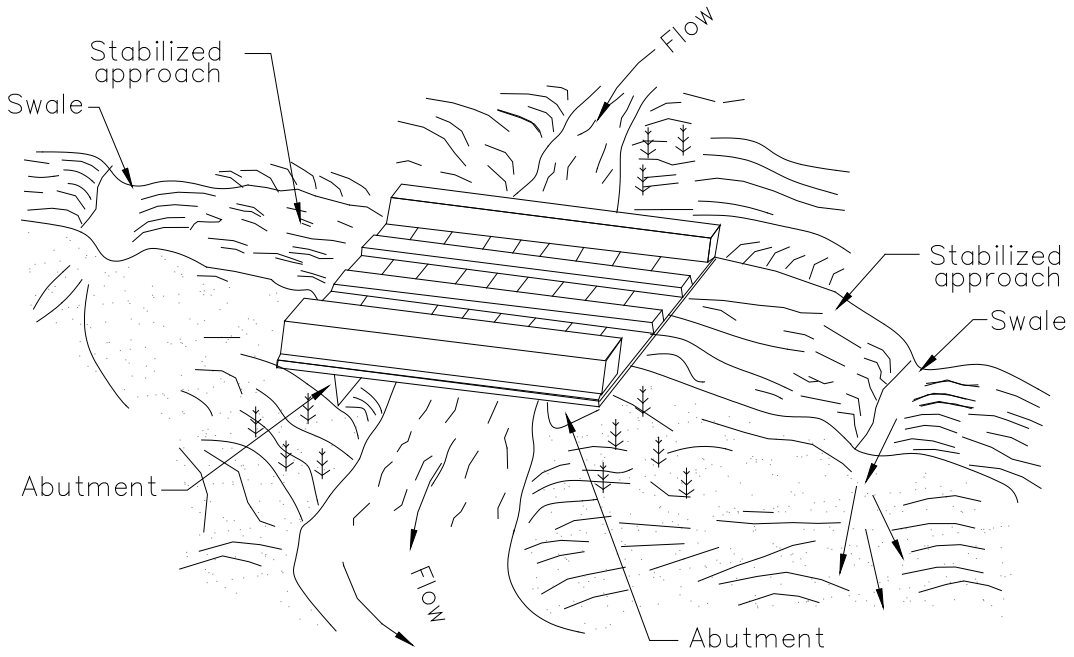
- Replace lost or displaced aggregate from inlets and outlets of culverts and cellular confinement systems.

- Remove temporary crossing promptly when it is no longer needed.

References

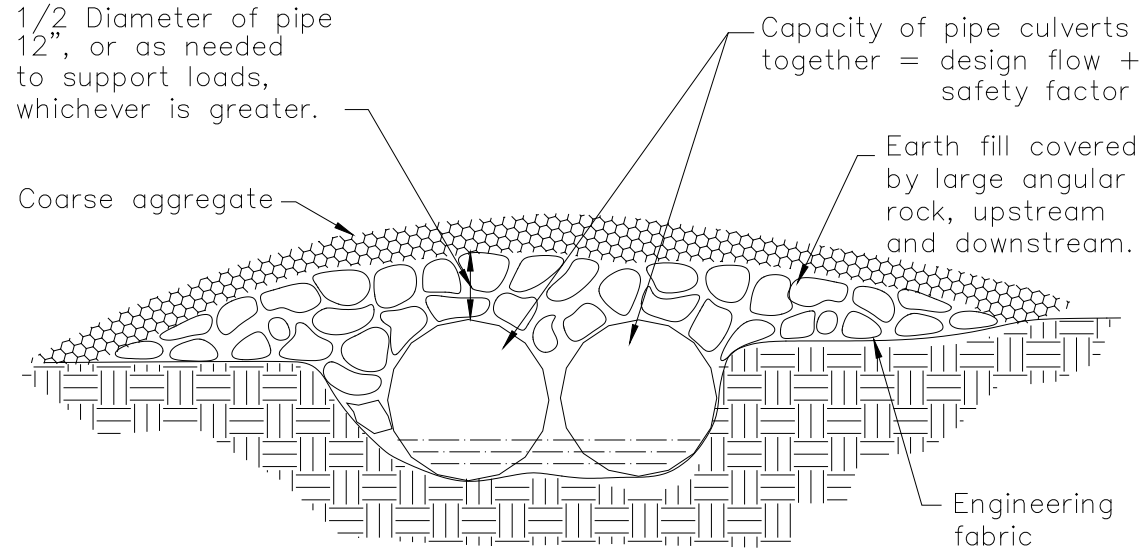
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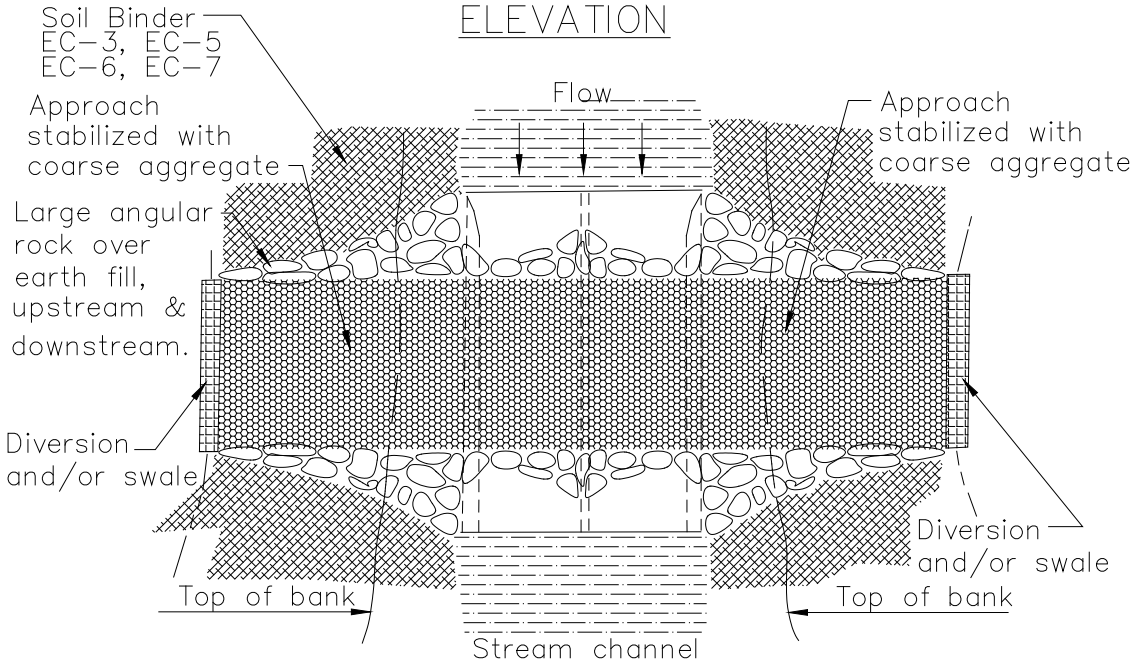


NOTE:
Surface flow of road diverted by swale and/or dike.

TYPICAL BRIDGE CROSSING
NOT TO SCALE

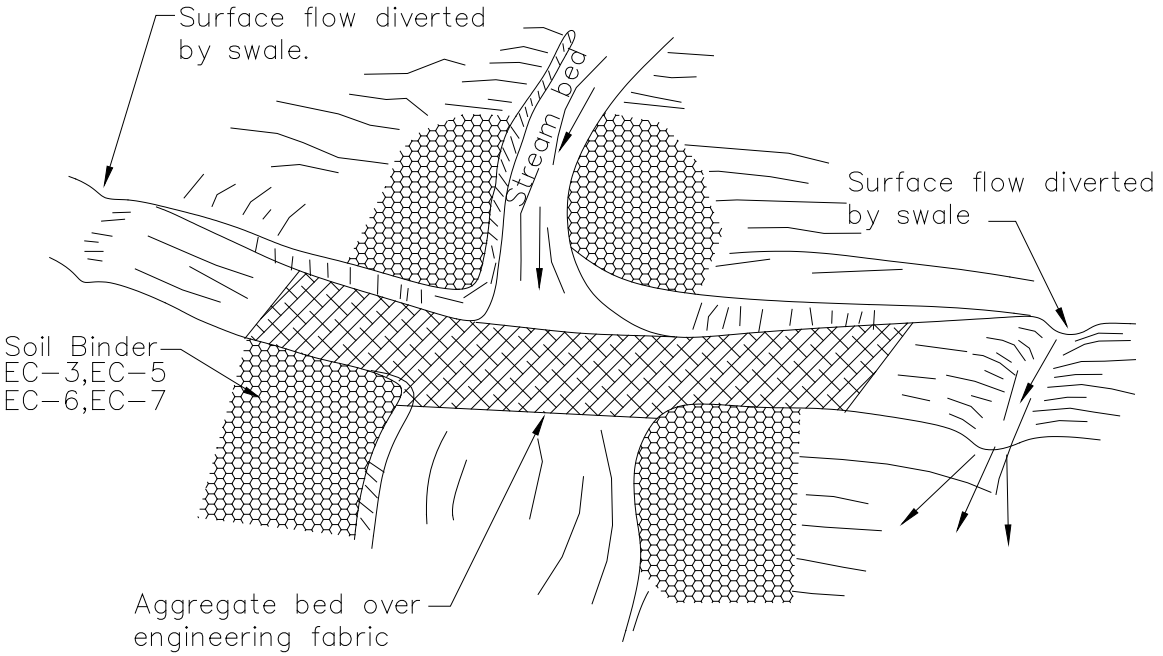


ELEVATION

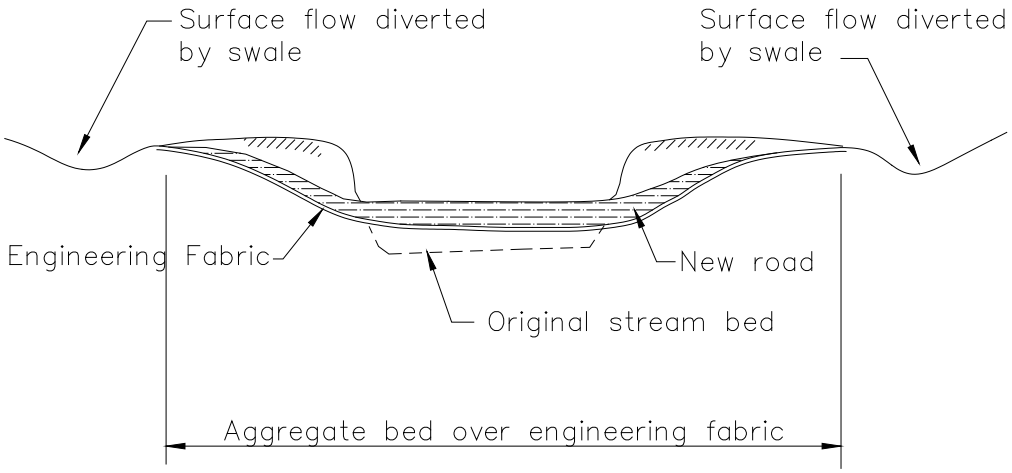


PLAN VIEW

TYPICAL CULVERT CROSSING
NOT TO SCALE

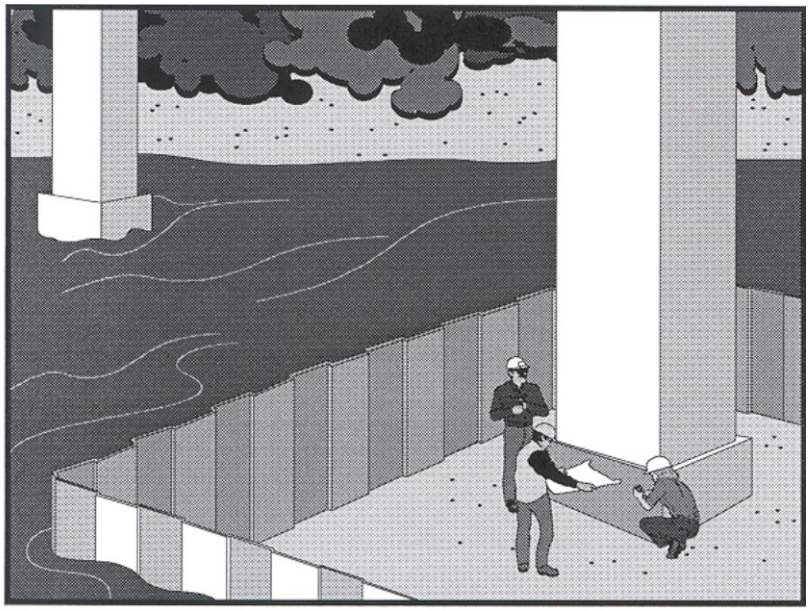


Aggregate approch
1:5 (V:H) Maximum slope on road



TYPICAL FORD CROSSING
NOT TO SCALE

Clear Water Diversion NS-5



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

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Description and Purpose

Clear water diversion consists of a system of structures and measures that intercept clear surface water runoff upstream of a project, transport it around the work area, and discharge it downstream with minimal water quality degradation from either the project construction operations or the construction of the diversion. Clear water diversions are used in a waterway to enclose a construction area and reduce sediment pollution from construction work occurring in or adjacent to water. Structures commonly used as part of this system include diversion ditches, berms, dikes, slope drains, rock, gravel bags, wood, aqua barriers, cofferdams, filter fabric or turbidity curtains, drainage and interceptor swales, pipes, or flumes.

Suitable Applications

A clear water diversion is typically implemented where appropriate permits (1601 Agreement) have been secured and work must be performed in a flowing stream or water body.

- Clear water diversions are appropriate for isolating construction activities occurring within or near a water body such as streambank stabilization, or culvert, bridge, pier or abutment installation. They may also be used in combination with other methods, such as clear water bypasses and/or pumps.
- Pumped diversions are suitable for intermittent and low flow streams.
- Excavation of a temporary bypass channel or passing the flow through a heavy pipe (called a “flume”) with a trench

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excavated under it, is appropriate for the diversion of streams less than 20 ft wide, with flow rates less than 100 cfs.

- Clear water diversions incorporating clean washed gravel may be appropriate for use in salmonid spawning streams.

Limitations

- Diversion and encroachment activities will usually disturb the waterway during installation and removal of diversion structures.
- Installation may require Regional Water Quality Control Board (RWQCB) 401 Certification, U.S. Army Corps of Engineers 404 permit and approval by California Department of Fish and Game. If numerical-based water quality standards are mentioned in any of these and other related permits, testing and sampling may be required.
- Diversion and encroachment activities may constrict the waterway, which can obstruct flood flows and cause flooding or washouts. Diversion structures should not be installed without identifying potential impacts to the stream channel.
- Diversion or isolation activities are not appropriate in channels where there is insufficient stream flow to support aquatic species in the area dewatered as a result of the diversion.
- Diversion or isolation activities are inappropriate in deep water unless designed or reviewed by an engineer registered in California.
- Diversion or isolation activities should not completely dam stream flow.
- Dewatering and removal may require additional sediment control or water treatment. See NS-2, Dewatering Operations.
- Not appropriate if installation, maintenance, and removal of the structures will disturb sensitive aquatic species of concern.

Implementation

General

- Implement guidelines presented in EC-12, Streambank Stabilization to minimize impacts to streambanks.
- Where working areas encroach on flowing streams, barriers adequate to prevent the flow of muddy water into streams should be constructed and maintained between working areas and streams. During construction of the barriers, muddying of streams should be held to a minimum.
- Diversion structures must be adequately designed to accommodate fluctuations in water depth or flow volume due to tides, storms, flash floods, etc.
- Heavy equipment driven in wet portions of a water body to accomplish work should be completely clean of petroleum residue, and water levels should be below the fuel tanks, gearboxes, and axles of the equipment unless lubricants and fuels are sealed such that inundation by water will not result in discharges of fuels, oils, greases, or hydraulic fluids.

- Excavation equipment buckets may reach out into the water for the purpose of removing or placing fill materials. Only the bucket of the crane/ excavator/backhoe may operate in a water body. The main body of the crane/excavator/backhoe should not enter the water body except as necessary to cross the stream to access the work site.
- Stationary equipment such as motors and pumps located within or adjacent to a water body, should be positioned over drip pans.
- When any artificial obstruction is being constructed, maintained, or placed in operation, sufficient water should, at all times, be allowed to pass downstream to maintain aquatic life.
- Equipment should not be parked below the high-water mark unless allowed by a permit.
- Disturbance or removal of vegetation should not exceed the minimum necessary to complete operations. Precautions should be taken to avoid damage to vegetation by people or equipment. Disturbed vegetation should be replaced with the appropriate erosion control measures.
- Riparian vegetation approved for trimming as part of the project should be cut off no lower than ground level to promote rapid re-growth. Access roads and work areas built over riparian vegetation should be covered by a sufficient layer of clean river run cobble to prevent damage to the underlying soil and root structure. The cobble should be removed upon completion of project activities.
- Drip pans should be placed under all vehicles and equipment placed on docks, barges, or other structures over water bodies when the vehicle or equipment is planned to be idle for more than 1 hour.
- Where possible, avoid or minimize diversion and encroachment impacts by scheduling construction during periods of low flow or when the stream is dry. Scheduling should also consider seasonal releases of water from dams, fish migration and spawning seasons, and water demands due to crop irrigation.
- Construct diversion structures with materials free of potential pollutants such as soil, silt, sand, clay, grease, or oil.

Temporary Diversions and Encroachments

- Construct diversion channels in accordance with EC-9, Earth Dikes and Drainage Swales.
- In high flow velocity areas, stabilize slopes of embankments and diversion ditches using an appropriate liner, in accordance with EC-7, Geotextiles and Mats, or use rock slope protection.
- Where appropriate, use natural streambed materials such as large cobbles and boulders for temporary embankment and slope protection, or other temporary soil stabilization methods.
- Provide for velocity dissipation at transitions in the diversion, such as the point where the stream is diverted to the channel and the point where the diverted stream is returned to its natural channel. See also EC-10, Velocity Dissipation Devices.

Temporary Dry Construction Areas

- When dewatering behind temporary structures to create a temporary dry construction area, such as cofferdams, pass pumped water through a sediment-settling device, such as a portable tank or settling basin, before returning water to the water body. See also NS-2, Dewatering Operations.

- Any substance used to assemble or maintain diversion structures, such as form oil, should be non-toxic and non-hazardous.

- Any material used to minimize seepage underneath diversion structures, such as grout, should be non-toxic, non-hazardous, and as close to a neutral pH as possible.

Comparison of Diversion and Isolation Techniques:

- Gravel bags are relatively inexpensive, but installation and removal can be labor intensive. It is also difficult to dewater the isolated area. Sandbags should not be used for this technique in rivers or streams, as sand should never be put into or adjacent to a stream, even if encapsulated in geotextile.

- Gravel Bag Berms (SE-6) used in conjunction with an impermeable membrane are cost effective and can be dewatered relatively easily. If spawning gravel is used, the impermeable membrane can be removed from the stream, and the gravel can be spread out and left as salmonid spawning habitat if approved in the permit. Only clean, washed gravel should be used for both the gravel bag and gravel berm techniques.

- Cofferdams are relatively expensive, but frequently allow full dewatering. Also, many options now available are relatively easy to install.

- Sheet pile enclosures are a much more expensive solution but do allow full dewatering. This technique is not well suited to small streams, but can be effective on large rivers or lakes, and where staging and heavy equipment access areas are available.

- K-rails are an isolation method that does not allow full dewatering, but can be used in small to large watercourses, and in fast-water situations.

- A relatively inexpensive isolation method is filter fabric isolation. This method involves placement of gravel bags or continuous berms to ‘key-in’ the fabric, and subsequently staking the fabric in place. This method should be used in relatively calm water and can be used in smaller streams. Note that this is not a dewatering method, but rather a sediment isolation method.

- Turbidity curtains should be used where sediment discharge to a stream is unavoidable. They can also be used for in-stream construction, when dewatering an area is not required.

- When used in watercourses or streams, cofferdams must be used in accordance with permit requirements.

- Manufactured diversion structures should be installed following manufacturer’s specifications.

- Filter fabric and turbidity curtain isolation installation methods can be found in the specific technique descriptions that follow.

Filter Fabric Isolation Technique

Definition and Purpose

A filter fabric isolation structure is a temporary structure built into a waterway to enclose a construction area and reduce sediment pollution from construction work in or adjacent to water. This structure is composed of filter fabric, gravel bags, and steel t-posts.

Appropriate Applications

- Filter fabric may be used for construction activities such as streambank stabilization, or culvert, bridge, pier or abutment installation. It may also be used in combination with other methods, such as clean water bypasses and/or pumps.
- Filter fabric isolation is relatively inexpensive. This method involves placement of gravel bags or continuous berms to 'key-in' the fabric, and subsequently staking the fabric in place.
- If spawning gravel is used, all other components of the isolation can be removed from the stream, and the gravel may be spread out and left as salmonid spawning habitat if approved in the permit. Whether spawning gravel or other types of gravel are used, only clean washed gravel should be used as infill for the gravel bags or continuous berm.
- This method should be used in relatively calm water and can be used in smaller streams. This is not a dewatering method, but rather a sediment isolation method.
- Water levels inside and outside the fabric curtain must be about the same, as differential heads will cause the curtain to collapse.

Limitations

- Do not use if the installation, maintenance and removal of the structures will disturb sensitive aquatic species of concern.
- Filter fabrics are not appropriate for projects where dewatering is necessary.
- Filter fabrics are not appropriate to completely dam stream flow.

Design and Installation

- For the filter fabric isolation method, a non-woven or heavy-duty fabric is recommended over standard silt fence. Using rolled geotextiles allows non-standard widths to be used.
- Anchor filter fabric with gravel bags filled with clean, washed gravel. Do not use sand. If a bag should split open, the gravel can be left in the stream, where it can provide aquatic habitat benefits. If a sandbag splits open in a watercourse, the sand could cause a decrease in water quality, and could bury sensitive aquatic habitat.
- Another anchor alternative is a continuous berm, made with the Continuous Berm Machine. This is a gravel-filled bag that can be made in very long segments. The length of the berms is usually limited to 18 ft for ease of handling (otherwise, it gets too heavy to move).

- Place the fabric on the bottom of the stream, and place either a bag of clean, washed gravel or a continuous berm over the bottom of the silt fence fabric, such that a bag-width of fabric lies on the stream bottom. The bag should be placed on what will be the outside of the isolation area.
- Pull the fabric up and place a metal t-post immediately behind the fabric, on the inside of the isolation area; attach the silt fence to the post with three diagonal nylon ties.
- Continue placing fabric as described above until the entire work area has been isolated, staking the fabric at least every 6 ft.

Inspection and Maintenance

- Immediately repair any gaps, holes or scour.
- Remove and properly dispose of sediment buildup.
- Remove BMP upon completion of construction activity. Recycle or reuse if applicable.
- Revegetate areas disturbed by BMP removal if needed.

Turbidity Curtain Isolation Technique

Definition and Purpose

A turbidity curtain is a fabric barrier used to isolate the near shore work area. The barriers are intended to confine the suspended sediment. The curtain is a floating barrier, and thus does not prevent water from entering the isolated area; rather, it prevents suspended sediment from getting out.

Appropriate Applications

Turbidity curtains should be used where sediment discharge to a stream is unavoidable. They are used when construction activities adjoin quiescent waters, such as lakes, ponds, and slow flowing rivers. The curtains are designed to deflect and contain sediment within a limited area and provide sufficient retention time so that the sediment particles will fall out of suspension.

Limitations

- Turbidity curtains should not be used in flowing water; they are best suited for use in ponds, lakes, and very slow-moving rivers.
- Turbidity curtains should not be placed across the width of a channel.
- Removing sediment that has been deflected and settled out by the curtain may create a discharge problem through the resuspension of particles and by accidental dumping by the removal equipment.

Design and Installation

- Turbidity curtains should be oriented parallel to the direction of flow.
- The curtain should extend the entire depth of the watercourse in calm-water situations.
- In wave conditions, the curtain should extend to within 1 ft of the bottom of the watercourse, such that the curtain does not stir up sediment by hitting the bottom repeatedly. If it is

desirable for the curtain to reach the bottom in an active-water situation, a pervious filter fabric may be used for the bottom 1 ft.

- The top of the curtain should consist of flexible flotation buoys, and the bottom should be held down by a load line incorporated into the curtain fabric. The fabric should be a brightly colored impervious mesh.
- The curtain should be held in place by anchors placed at least every 100 ft.
- First, place the anchors, then tow the fabric out in a furled condition, and connect to the anchors. The anchors should be connected to the flotation devices, and not to the bottom of the curtain. Once in place, cut the furling lines, and allow the bottom of the curtain to sink.
- Consideration must be given to the probable outcome of the removal procedure. It must be determined if it will create more of a sediment problem through re-suspension of the particles or by accidental dumping of material during removal. It is recommended that the soil particles trapped by the turbidity curtain only be removed if there has been a significant change in the original contours of the affected area in the watercourse.
- Particles should always be allowed to settle for a minimum of 6 to 12 hours prior to their removal or prior to removal of the turbidity curtain.

Maintenance and Inspection:

- The curtain should be inspected for holes or other problems, and any repairs needed should be made promptly.
- Allow sediment to settle for 6 to 12 hours prior to removal of sediment or curtain. This means that after removing sediment, wait an additional 6 to 12 hours before removing the curtain.
- To remove, install furling lines along the curtain, detach from anchors, and tow out of the water.

K-rail River Isolation

Definition and Purpose

This temporary sediment control or stream isolation method uses K-rails to form the sediment deposition area, or to isolate the in-stream or near-bank construction area.

Barriers are placed end-to-end in a pre-designed configuration and gravel-filled bags are used at the toe of the barrier and at their abutting ends to seal and prevent movement of sediment beneath or through the barrier walls.

Appropriate Applications

The K-rail isolation can be used in streams with higher water velocities than many other isolation techniques.

- This technique is also useful at the toe of embankments and cut or fill slopes.

Limitations

- The K-rail method should not be used to dewater a project site, as the barrier is not watertight.

Design and Installation

- To create a floor for the K-rail, move large rocks and obstructions. Place washed gravel and gravel-filled bags to create a level surface for K-rails to sit. Washed gravel should always be used.
- Place the bottom two K-rails adjacent to each other, and parallel to the direction of flow; fill the center portion with gravel bags. Then place the third K-rail on top of the bottom two. There should be sufficient gravel bags between the bottom K-rails such that the top rail is supported by the gravel. Place plastic sheeting around the K-rails, and secure at the bottom with gravel bags.
- Further support can be added by pinning and cabling the K-rails together. Also, large riprap and boulders can be used to support either side of the K-rail, especially where there is strong current.

Inspection and Maintenance:

- The barrier should be inspected, and any leaks, holes, or other problems should be addressed immediately.
- Sediment should be allowed to settle for at least 6 to 12 hours prior to removal of sediment, and for 6 to 12 hours prior to removal of the barrier.

Stream Diversions

The selection of which stream diversion technique to use will depend upon the type of work involved, physical characteristics of the site, and the volume of water flowing through the project.

Advantages of a Pumped Diversion

- Downstream sediment transport can be nearly eliminated.
- Dewatering of the work area is possible.
- Pipes can be moved around to allow construction operations.
- The dams can serve as temporary access to the site.
- Increased flows can be managed by adding more pumping capacity.

Disadvantages of a Pumped Diversion

- Flow volume is limited by pump capacity.
- A pumped diversion requires 24-hour monitoring of pumps.
- Sudden rain could overtop dams.
- Erosion at the outlet.

- Minor in-stream disturbance is required to install and remove dams.

Advantages of Excavated Channels and Flumes

- Excavated channels isolate work from water flow and allow dewatering.
- Excavated channels can handle larger flows than pumps.

Disadvantages of Excavated Channels and Flumes

- Bypass channel or flume must be sized to handle flows, including possible floods.
- Channels must be protected from erosion.
- Flow diversion and re-direction with small dams involves in-stream disturbance and mobilization of sediment.

Design and Installation

- Installation guidelines will vary based on existing site conditions and type of diversion used.
- Pump capacity must be sufficient for design flow.
- A standby pump is required in case a primary pump fails.
- Dam materials used to create dams upstream and downstream of diversion should be erosion resistant; materials such as steel plate, sheet pile, sandbags, continuous berms, inflatable water bladders, etc., would be acceptable.

When constructing a diversion channel, begin excavation of the channel at the proposed downstream end, and work upstream. Once the watercourse to be diverted is reached and the excavated channel is stable, breach the upstream end and allow water to flow down the new channel. Once flow has been established in the diversion channel, install the diversion weir in the main channel; this will force all water to be diverted from the main channel.

Inspection and Maintenance

- Pumped diversions require 24-hour monitoring of pumps.
- Inspect embankments and diversion channels for damage to the linings, accumulating debris, sediment buildup, and adequacy of the slope protection. Remove debris and repair linings and slope protection as required. Remove holes, gaps, or scour.
- Upon completion of work, the diversion or isolation structure should be removed, and flow should be redirected through the new culvert or back into the original stream channel. Recycle or reuse if applicable.
- Revegetate areas disturbed by BMP removal if needed.

Costs

Costs of clear water diversion vary considerably and can be very high.

Inspection and Maintenance

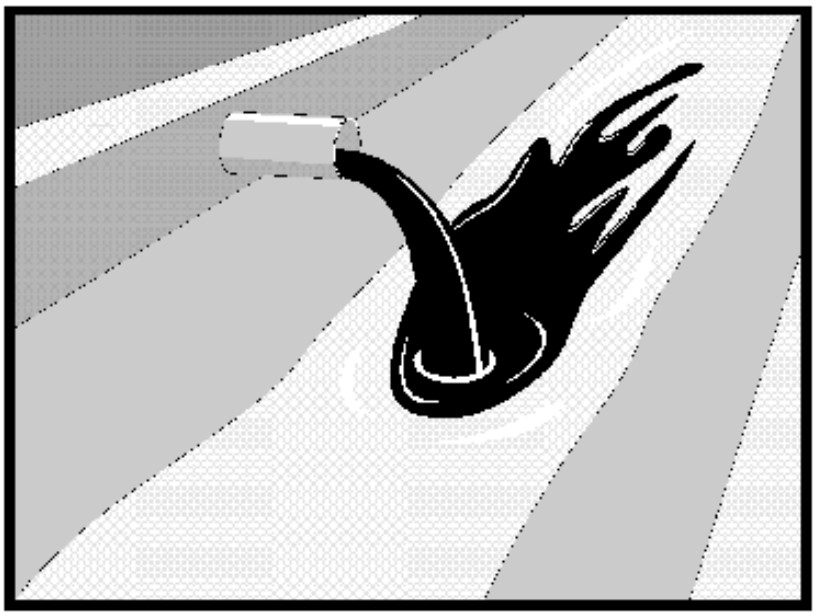
- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.
- Refer to BMP-specific inspection and maintenance requirements.

References

California Bank and Shore Rock Slope Protection Design – Practitioners Guide and Field Evaluations of Riprap Methods, Caltrans Study No. F90TL03, October 2000.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Illicit Connection/Discharge NS-6



Categories		
EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Objective**
☒ **Secondary Objective**

Targeted Constituents	
Sediment	
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	☑
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

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Description and Purpose

Procedures and practices designed for construction contractors to recognize illicit connections or illegally dumped or discharged materials on a construction site and report incidents.

Suitable Applications

This best management practice (BMP) applies to all construction projects. Illicit connection/discharge and reporting is applicable anytime an illicit connection or discharge is discovered, or illegally dumped material is found on the construction site.

Limitations

Illicit connections and illegal discharges or dumping, for the purposes of this BMP, refer to discharges and dumping caused by parties other than the contractor. If pre-existing hazardous materials or wastes are known to exist onsite, they should be identified in the SWPPP and handled as set forth in the SWPPP.

Implementation

Planning

- Review the SWPPP. Pre-existing areas of contamination should be identified and documented in the SWPPP.
- Inspect site before beginning the job for evidence of illicit connections, illegal dumping or discharges. Document any pre-existing conditions and notify the owner.

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- Inspect site regularly during project execution for evidence of illicit connections, illegal dumping or discharges.
- Observe site perimeter for evidence for potential of illicitly discharged or illegally dumped material, which may enter the job site.

Identification of Illicit Connections and Illegal Dumping or Discharges

- **General –** unlabeled and unidentifiable material should be treated as hazardous.
- **Solids** - Look for debris, or rubbish piles. Solid waste dumping often occurs on roadways with light traffic loads or in areas not easily visible from the traveled way.
- **Liquids** - signs of illegal liquid dumping or discharge can include:
  - Visible signs of staining or unusual colors to the pavement or surrounding adjacent soils
  - Pungent odors coming from the drainage systems
  - Discoloration or oily substances in the water or stains and residues detained within ditches, channels or drain boxes
  - Abnormal water flow during the dry weather season
- **Urban Areas** - Evidence of illicit connections or illegal discharges is typically detected at storm drain outfall locations or at manholes. Signs of an illicit connection or illegal discharge can include:
  - Abnormal water flow during the dry weather season
  - Unusual flows in sub drain systems used for dewatering
  - Pungent odors coming from the drainage systems
  - Discoloration or oily substances in the water or stains and residues detained within ditches, channels or drain boxes
  - Excessive sediment deposits, particularly adjacent to or near active offsite construction projects
- **Rural Areas** - Illicit connections or illegal discharges involving irrigation drainage ditches are detected by visual inspections. Signs of an illicit discharge can include:
  - Abnormal water flow during the non-irrigation season
  - Non-standard junction structures
  - Broken concrete or other disturbances at or near junction structures

Reporting

Notify the owner of any illicit connections and illegal dumping or discharge incidents at the time of discovery. For illicit connections or discharges to the storm drain system, notify the local stormwater management agency. For illegal dumping, notify the local law enforcement agency.

Cleanup and Removal

The responsibility for cleanup and removal of illicit or illegal dumping or discharges will vary by location. Contact the local stormwater management agency for further information.

Costs

Costs to look for and report illicit connections and illegal discharges and dumping are low. The best way to avoid costs associated with illicit connections and illegal discharges and dumping is to keep the project perimeters secure to prevent access to the site, to observe the site for vehicles that should not be there, and to document any waste or hazardous materials that exist onsite before taking possession of the site.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect the site regularly to check for any illegal dumping or discharge.
- Prohibit employees and subcontractors from disposing of non-job-related debris or materials at the construction site.
- Notify the owner of any illicit connections and illegal dumping or discharge incidents at the time of discovery.

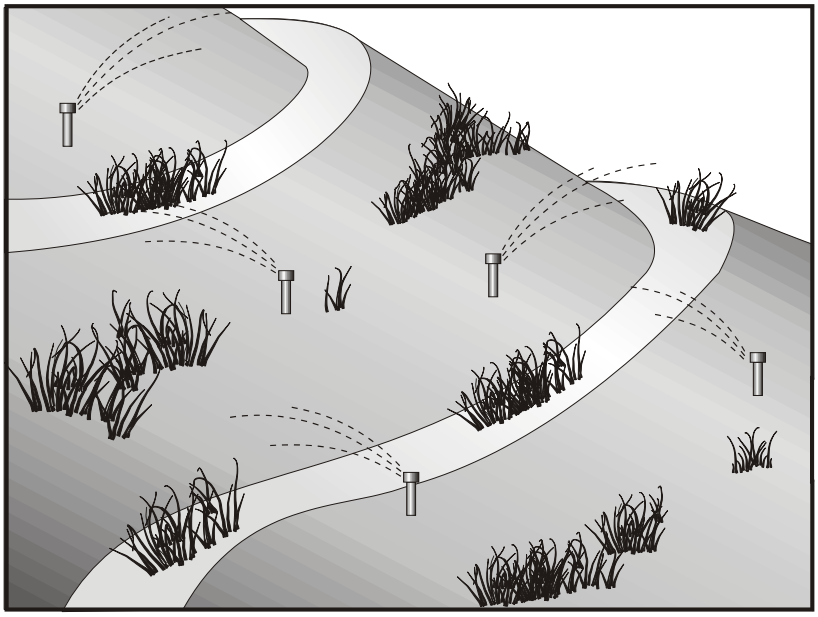
References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

Potable Water/Irrigation NS-7



Description and Purpose

Potable Water/Irrigation consists of practices and procedures to manage the discharge of potential pollutants generated during discharges from irrigation water lines, landscape irrigation, lawn or garden watering, planned and unplanned discharges from potable water sources, water line flushing, and hydrant flushing.

Suitable Applications

Implement this BMP whenever potable water or irrigation water discharges occur at or enter a construction site.

Limitations

None identified.

Implementation

- Direct water from offsite sources around or through a construction site, where feasible, in a way that minimizes contact with the construction site.
- Discharges from water line flushing should be reused for landscaping purposes where feasible.
- Shut off the water source to broken lines, sprinklers, or valves as soon as possible to prevent excess water flow.
- Protect downstream stormwater drainage systems and watercourses from water pumped or bailed from trenches excavated to repair water lines.

Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	
Metals	☑
Bacteria	
Oil and Grease	
Organics	☑

Potential Alternatives

None

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- Inspect irrigated areas within the construction limits for excess watering. Adjust watering times and schedules to ensure that the appropriate amount of water is being used and to minimize runoff. Consider factors such as soil structure, grade, time of year, and type of plant material in determining the proper amounts of water for a specific area.

Costs

Cost to manage potable water and irrigation are low and generally considered to be a normal part of related activities.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.

- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.

- Repair broken water lines as soon as possible.

- Inspect irrigated areas regularly for signs of erosion and/or discharge.

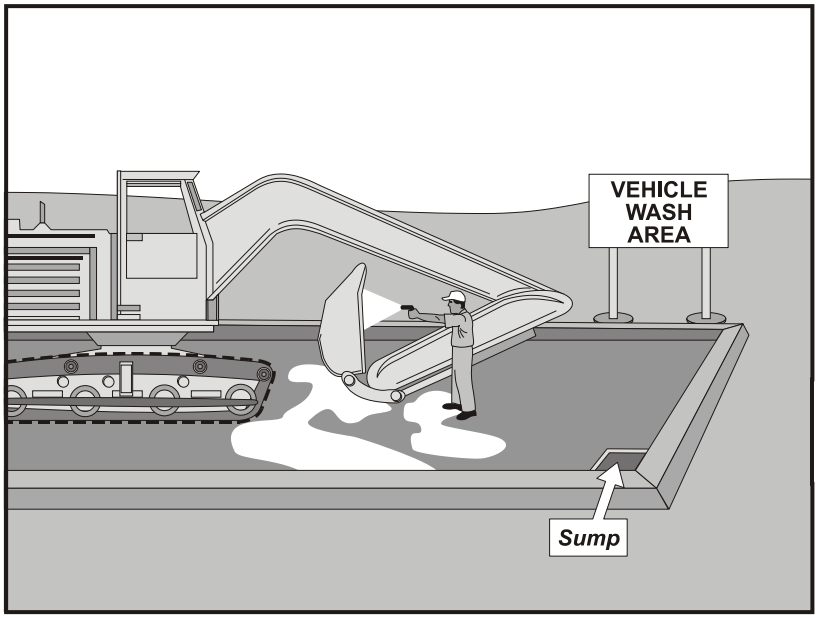
References

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Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

Vehicle and Equipment Cleaning NS-8



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	
Metals	
Bacteria	
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

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Description and Purpose

Vehicle and equipment cleaning procedures and practices eliminate or reduce the discharge of pollutants to stormwater from vehicle and equipment cleaning operations. Procedures and practices include but are not limited to: using offsite facilities; washing in designated, contained areas only; eliminating discharges to the storm drain by infiltrating the wash water; and training employees and subcontractors in proper cleaning procedures.

Suitable Applications

These procedures are suitable on all construction sites where vehicle and equipment cleaning is performed.

Limitations

Even phosphate-free, biodegradable soaps have been shown to be toxic to fish before the soap degrades. Sending vehicles/equipment offsite should be done in conjunction with TC-1, Stabilized Construction Entrance/Exit.

Implementation

Other options to washing equipment onsite include contracting with either an offsite or mobile commercial washing business. These businesses may be better equipped to handle and dispose of the wash waters properly. Performing this work offsite can also be economical by eliminating the need for a separate washing operation onsite.

If washing operations are to take place onsite, then:

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- Use phosphate-free, biodegradable soaps.
- Educate employees and subcontractors on pollution prevention measures.
- Do not permit steam cleaning onsite. Steam cleaning can generate significant pollutant concentrates.
- Cleaning of vehicles and equipment with soap, solvents or steam should not occur on the project site unless resulting wastes are fully contained and disposed of. Resulting wastes should not be discharged or buried and must be captured and recycled or disposed according to the requirements of WM-10, Liquid Waste Management or WM-6, Hazardous Waste Management, depending on the waste characteristics. Minimize use of solvents. Use of diesel for vehicle and equipment cleaning is prohibited.
- All vehicles and equipment that regularly enter and leave the construction site must be cleaned offsite.
- When vehicle and equipment washing and cleaning must occur onsite, and the operation cannot be located within a structure or building equipped with appropriate disposal facilities, the outside cleaning area should have the following characteristics:
  - Located away from storm drain inlets, drainage facilities, or watercourses
  - Paved with concrete or asphalt and bermed to contain wash waters and to prevent runon and runoff
  - Configured with a sump to allow collection and disposal of wash water
  - No discharge of wash waters to storm drains or watercourses
  - Used only when necessary
- When cleaning vehicles and equipment with water:
  - Use as little water as possible. High-pressure sprayers may use less water than a hose and should be considered
  - Use positive shutoff valve to minimize water usage
  - Facility wash racks should discharge to a sanitary sewer, recycle system or other approved discharge system and must not discharge to the storm drainage system, watercourses, or to groundwater

Costs

Cleaning vehicles and equipment at an offsite facility may reduce overall costs for vehicle and equipment cleaning by eliminating the need to provide similar services onsite. When onsite cleaning is needed, the cost to establish appropriate facilities is relatively low on larger, long-duration projects, and moderate to high on small, short-duration projects.

Inspection and Maintenance

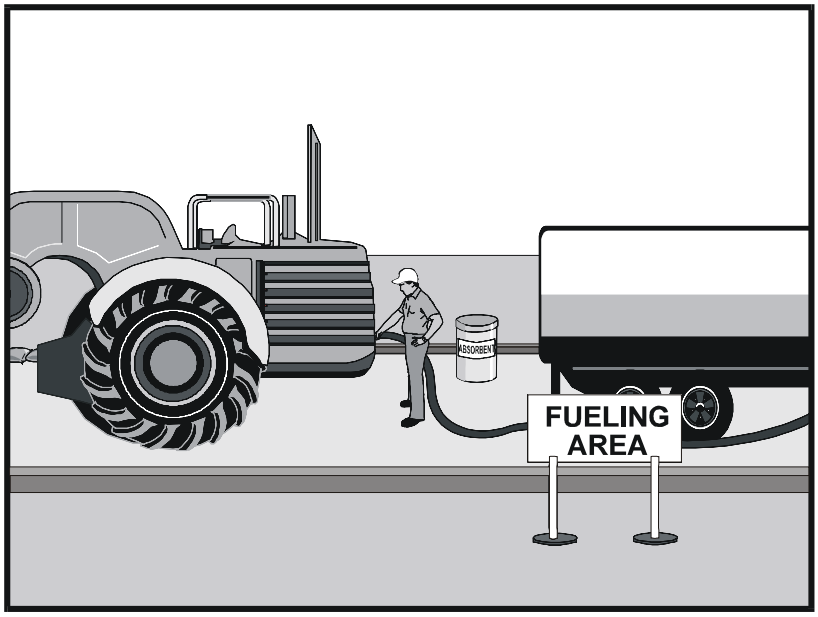
- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.
- Inspection and maintenance is minimal, although some berm repair may be necessary.
- Monitor employees and subcontractors throughout the duration of the construction project to ensure appropriate practices are being implemented.
- Inspect sump regularly and remove liquids and sediment as needed.
- Prohibit employees and subcontractors from washing personal vehicles and equipment on the construction site.

References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Swisher, R.D. Surfactant Biodegradation, Marcel Decker Corporation, 1987.

Vehicle and Equipment Fueling NS-9



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	☑
Organics	

Potential Alternatives

None

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Description and Purpose

Vehicle equipment fueling procedures and practices are designed to prevent fuel spills and leaks and reduce or eliminate contamination of stormwater. This can be accomplished by using offsite facilities, fueling in designated areas only, enclosing or covering stored fuel, implementing spill controls, and training employees and subcontractors in proper fueling procedures.

Suitable Applications

These procedures are suitable on all construction sites where vehicle and equipment fueling takes place.

Limitations

Onsite vehicle and equipment fueling should only be used where it is impractical to send vehicles and equipment offsite for fueling. Sending vehicles and equipment offsite should be done in conjunction with TC-1, Stabilized Construction Entrance/ Exit.

Implementation

- Use offsite fueling stations as much as possible. These businesses are better equipped to handle fuel and spills properly. Performing this work offsite can also be economical by eliminating the need for a separate fueling area at a site.
- Discourage “topping-off” of fuel tanks.

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- Absorbent spill cleanup materials and spill kits should be available in fueling areas and on fueling trucks and should be disposed of properly after use.
- Drip pans or absorbent pads should be used during vehicle and equipment fueling, unless the fueling is performed over an impermeable surface in a dedicated fueling area.
- Use absorbent materials on small spills. Do not hose down or bury the spill. Remove the adsorbent materials promptly and dispose of properly.
- Avoid mobile fueling of mobile construction equipment around the site; rather, transport the equipment to designated fueling areas. With the exception of tracked equipment such as bulldozers and large excavators, most vehicles should be able to travel to a designated area with little lost time.
- Train employees and subcontractors in proper fueling and cleanup procedures.
- When fueling must take place onsite, designate an area away from drainage courses to be used. Fueling areas should be identified in the SWPPP.
- Dedicated fueling areas should be protected from stormwater runon and runoff and should be located at least 50 ft away from downstream drainage facilities and watercourses. Fueling must be performed on level-grade areas.
- Protect fueling areas with berms and dikes to prevent runon, runoff, and to contain spills.
- Nozzles used in vehicle and equipment fueling should be equipped with an automatic shutoff to control drips. Fueling operations should not be left unattended.
- Use vapor recovery nozzles to help control drips as well as air pollution where required by Air Quality Management Districts (AQMD).
- Federal, state, and local requirements should be observed for any stationary above ground storage tanks.

Costs

- All of the above measures are low cost except for the capital costs of above ground tanks that meet all local environmental, zoning, and fire codes.

Inspection and Maintenance

- Inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Vehicles and equipment should be inspected each day of use for leaks. Leaks should be repaired immediately, or problem vehicles or equipment should be removed from the project site.
- Keep ample supplies of spill cleanup materials onsite.

- Immediately clean up spills and properly dispose of contaminated soil and cleanup materials.

References

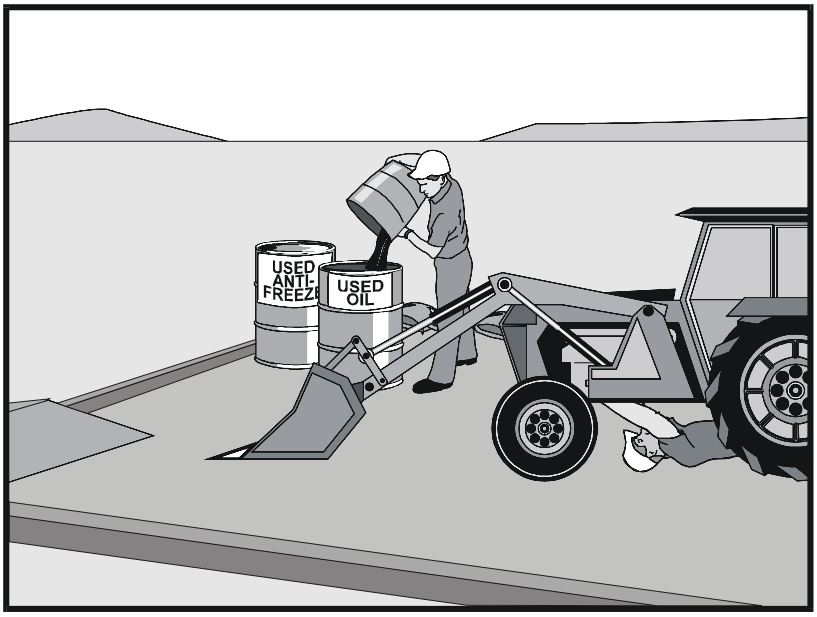
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Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance, Working Group Working Paper; USEPA, April 1992.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

Vehicle & Equipment Maintenance NS-10



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	
Nutrients	☑
Trash	☑
Metals	
Bacteria	
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

Description and Purpose

Prevent or reduce the contamination of stormwater resulting from vehicle and equipment maintenance by running a "dry and clean site". The best option would be to perform maintenance activities at an offsite facility. If this option is not available then work should be performed in designated areas only, while providing cover for materials stored outside, checking for leaks and spills, and containing and cleaning up spills immediately. Employees and subcontractors must be trained in proper procedures.

Suitable Applications

These procedures are suitable on all construction projects where an onsite yard area is necessary for storage and maintenance of heavy equipment and vehicles.

Limitations

Onsite vehicle and equipment maintenance should only be used where it is impractical to send vehicles and equipment offsite for maintenance and repair. Sending vehicles/equipment offsite should be done in conjunction with TC-1, Stabilized Construction Entrance/Exit.

Outdoor vehicle or equipment maintenance is a potentially significant source of stormwater pollution. Activities that can contaminate stormwater include engine repair and service, changing or replacement of fluids, and outdoor equipment storage and parking (engine fluid leaks). For further information on vehicle or equipment servicing, see NS-8,

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Vehicle and Equipment Cleaning, and NS-9, Vehicle and Equipment Fueling.

Implementation

- Use offsite repair shops as much as possible. These businesses are better equipped to handle vehicle fluids and spills properly. Performing this work offsite can also be economical by eliminating the need for a separate maintenance area.
- If maintenance must occur onsite, use designated areas, located away from drainage courses. Dedicated maintenance areas should be protected from stormwater runon and runoff and should be located at least 50 ft from downstream drainage facilities and watercourses.
- Drip pans or absorbent pads should be used during vehicle and equipment maintenance work that involves fluids, unless the maintenance work is performed over an impermeable surface in a dedicated maintenance area.
- Place a stockpile of spill cleanup materials where it will be readily accessible.
- All fueling trucks and fueling areas are required to have spill kits and/or use other spill protection devices.
- Use adsorbent materials on small spills. Remove the absorbent materials promptly and dispose of properly.
- Inspect onsite vehicles and equipment daily at startup for leaks, and repair immediately.
- Keep vehicles and equipment clean; do not allow excessive build-up of oil and grease.
- Segregate and recycle wastes, such as greases, used oil or oil filters, antifreeze, cleaning solutions, automotive batteries, hydraulic and transmission fluids. Provide secondary containment and covers for these materials if stored onsite.
- Train employees and subcontractors in proper maintenance and spill cleanup procedures.
- Drip pans or plastic sheeting should be placed under all vehicles and equipment placed on docks, barges, or other structures over water bodies when the vehicle or equipment is planned to be idle for more than 1 hour.
- For long-term projects, consider using portable tents or covers over maintenance areas if maintenance cannot be performed offsite.
- Consider use of new, alternative greases and lubricants, such as adhesive greases, for chassis lubrication and fifth-wheel lubrication.
- Properly dispose of used oils, fluids, lubricants, and spill cleanup materials.
- Do not place used oil in a dumpster or pour into a storm drain or watercourse.
- Properly dispose of or recycle used batteries.
- Do not bury used tires.

- Repair leaks of fluids and oil immediately.

Listed below is further information if you must perform vehicle or equipment maintenance onsite.

Safer Alternative Products

- Consider products that are less toxic or hazardous than regular products. These products are often sold under an "environmentally friendly" label.
- Consider use of grease substitutes for lubrication of truck fifth-wheels. Follow manufacturers label for details on specific uses.
- Consider use of plastic friction plates on truck fifth-wheels in lieu of grease. Follow manufacturers label for details on specific uses.

Waste Reduction

Parts are often cleaned using solvents such as trichloroethylene, trichloroethane, or methylene chloride. Many of these cleaners are listed in California Toxic Rule as priority pollutants. These materials are harmful and must not contaminate stormwater. They must be disposed of as a hazardous waste. Reducing the number of solvents makes recycling easier and reduces hazardous waste management costs. Often, one solvent can perform a job as well as two different solvents. Also, if possible, eliminate or reduce the amount of hazardous materials and waste by substituting non-hazardous or less hazardous materials. For example, replace chlorinated organic solvents with non-chlorinated solvents. Non-chlorinated solvents like kerosene or mineral spirits are less toxic and less expensive to dispose of properly. Check the list of active ingredients to see whether it contains chlorinated solvents. The "chlor" term indicates that the solvent is chlorinated. Also, try substituting a wire brush for solvents to clean parts.

Recycling and Disposal

Separating wastes allows for easier recycling and may reduce disposal costs. Keep hazardous wastes separate, do not mix used oil solvents, and keep chlorinated solvents (like,-trichloroethane) separate from non-chlorinated solvents (like kerosene and mineral spirits). Promptly transfer used fluids to the proper waste or recycling drums. Don't leave full drip pans or other open containers lying around. Provide cover and secondary containment until these materials can be removed from the site.

Oil filters can be recycled. Ask your oil supplier or recycler about recycling oil filters.

Do not dispose of extra paints and coatings by dumping liquid onto the ground or throwing it into dumpsters. Allow coatings to dry or harden before disposal into covered dumpsters.

Store cracked batteries in a non-leaking secondary container. Do this with all cracked batteries, even if you think all the acid has drained out. If you drop a battery, treat it as if it is cracked. Put it into the containment area until you are sure it is not leaking.

Costs

All of the above are low cost measures. Higher costs are incurred to setup and maintain onsite maintenance areas.

Vehicle & Equipment Maintenance NS-10

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.
- Keep ample supplies of spill cleanup materials onsite.
- Maintain waste fluid containers in leak proof condition.
- Vehicles and equipment should be inspected on each day of use. Leaks should be repaired immediately, or the problem vehicle(s) or equipment should be removed from the project site.
- Inspect equipment for damaged hoses and leaky gaskets routinely. Repair or replace as needed.

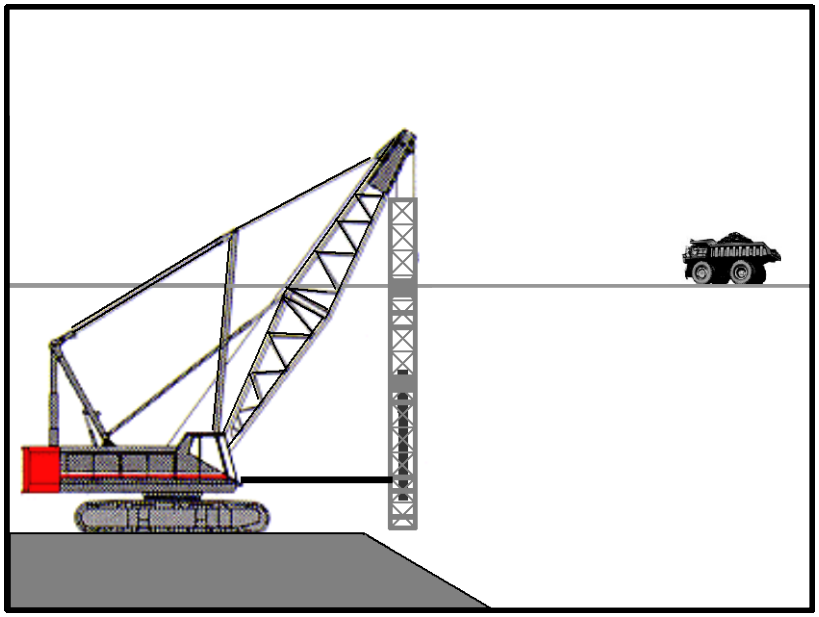
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Coastal Nonpoint Pollution Control Program; Program Development and Approval Guidance, Working Group, Working Paper; USEPA, April 1992.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Pile Driving Operations NS-11



Categories		
EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Objective**
☒ **Secondary Objective**

Targeted Constituents	
Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	☑
Organics	

Potential Alternatives

None

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Description and Purpose

The construction and retrofit of bridges and retaining walls often include driving piles for foundation support and shoring operations. Driven piles are typically constructed of precast concrete, steel, or timber. Driven sheet piles are also used for shoring and cofferdam construction. Proper control and use of equipment, materials, and waste products from pile driving operations will reduce or eliminate the discharge of potential pollutants to the storm drain system, watercourses, and waters of the United States.

Suitable Applications

These procedures apply to all construction sites near or adjacent to a watercourse or groundwater where permanent and temporary pile driving (impact and vibratory) takes place, including operations using pile shells as well as construction of cast-in-steel-shell and cast-in-drilled-hole piles.

Limitations

None identified.

Implementation

- Use drip pans or absorbent pads during vehicle and equipment operation, maintenance, cleaning, fueling, and storage. Refer to NS-8, Vehicle and Equipment Cleaning, NS-9, Vehicle and Equipment Fueling, and NS-10, Vehicle and Equipment Maintenance.

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- Have spill kits and cleanup materials available at all locations of pile driving. Refer to WM-4, Spill Prevention and Control.
- Equipment that is stored or in use in streambeds, or on docks, barges, or other structures over water bodies should be kept leak free.
- Park equipment over plastic sheeting or equivalent where possible. Plastic is not a substitute for drip pans or absorbent pads. The storage or use of equipment in streambeds or other bodies of water must comply with all applicable permits.
- Implement other BMPs as applicable, such as NS-2, Dewatering Operations, WM-5, Solid Waste Management, WM-6, Hazardous Waste Management, and WM-10, Liquid Waste Management.
- When not in use, store pile-driving equipment away from concentrated flows of stormwater, drainage courses, and inlets. Protect hammers and other hydraulic attachments from runon and runoff by placing them on plywood and covering them with plastic or a comparable material prior to the onset of rain.
- Use less hazardous products, e.g., vegetable oil, when practicable.

Costs

All of the above measures can be low cost.

Inspection and Maintenance

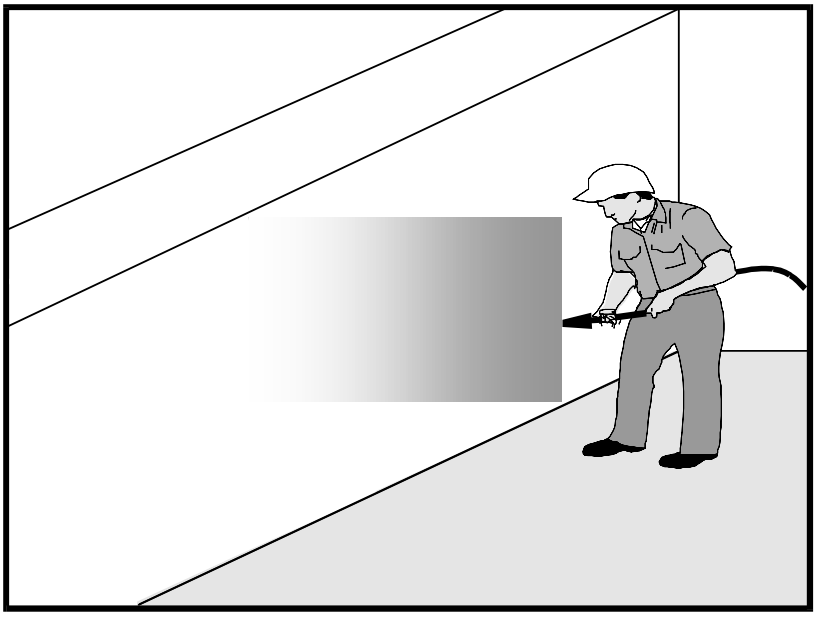
- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.
- Inspect equipment every day at startup and repair equipment as needed (i.e., worn or damaged hoses, fittings, and gaskets). Recheck equipment at shift changes or at the end of the day and scheduled repairs as needed.

References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

Concrete Curing NS-12



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	☑

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	

Potential Alternatives

None

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Description and Purpose

Concrete curing is used in the construction of structures such as bridges, retaining walls, pump houses, large slabs, and structured foundations. Concrete curing includes the use of both chemical and water methods.

Concrete and its associated curing materials have basic chemical properties that can raise the pH of water to levels outside of the permitted range. Discharges of stormwater and non-stormwater exposed to concrete during curing may have a high pH and may contain chemicals, metals, and fines. The General Permit incorporates Numeric Action Levels (NAL) for pH (see Section 2 of this handbook to determine your project's risk level and if you are subject to these requirements).

Proper procedures and care should be taken when managing concrete curing materials to prevent them from coming into contact with stormwater flows, which could result in a high pH discharge.

Suitable Applications

Suitable applications include all projects where Portland Cement Concrete (PCC) and concrete curing chemicals are placed where they can be exposed to rainfall, runoff from other areas, or where runoff from the PCC will leave the site.

Limitations

- Runoff contact with concrete waste can raise pH levels in the water to environmentally harmful levels and trigger permit violations.

Implementation

Chemical Curing

- Avoid over spray of curing compounds.
- Minimize the drift by applying the curing compound close to the concrete surface. Apply an amount of compound that covers the surface but does not allow any runoff of the compound.
- Use proper storage and handling techniques for concrete curing compounds. Refer to WM-1, Material Delivery and Storage.
- Protect drain inlets prior to the application of curing compounds.
- Refer to WM-4, Spill Prevention and Control.

Water Curing for Bridge Decks, Retaining Walls, and other Structures

- Direct cure water away from inlets and watercourses to collection areas for evaporation or other means of removal in accordance with all applicable permits. See WM-8 Concrete Waste Management.
- Collect cure water at the top of slopes and transport to a concrete waste management area in a non-erosive manner. See EC-9 Earth Dikes and Drainage Swales, EC-10, Velocity Dissipation Devices, and EC-11, Slope Drains.
- Utilize wet blankets or a similar method that maintains moisture while minimizing the use and possible discharge of water.

Education

- Educate employees, subcontractors, and suppliers on proper concrete curing techniques to prevent contact with discharge as described herein.
- Arrange for the QSP or the appropriately trained contractor's superintendent or representative to oversee and enforce concrete curing procedures.

Costs

All of the above measures are generally low cost.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities.
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.
- Sample non-stormwater discharges and stormwater runoff that contacts uncured and partially cured concrete as required by the General Permit.

- Ensure that employees and subcontractors implement appropriate measures for storage, handling, and use of curing compounds.
- Inspect cure containers and spraying equipment for leaks.

References

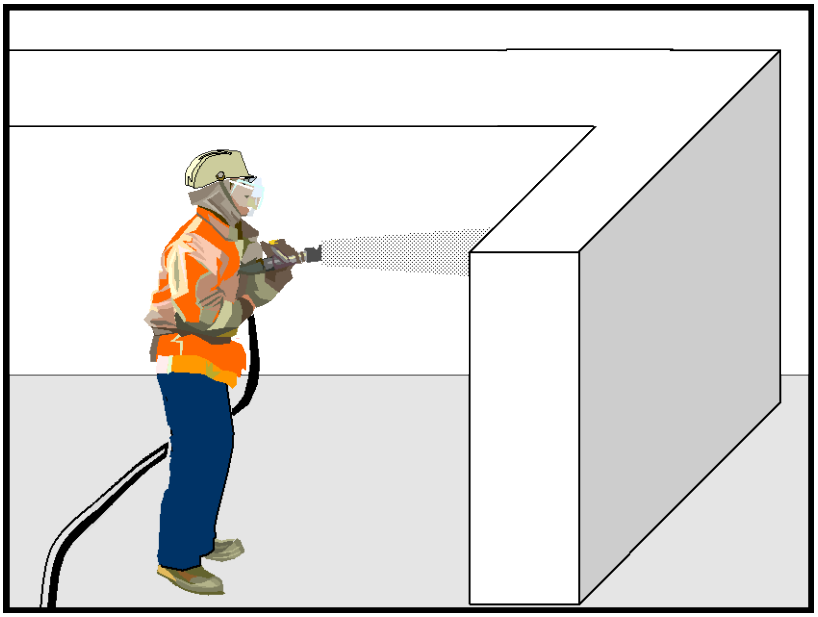
Blue Print for a Clean Bay-Construction-Related Industries: Best Management Practices for Stormwater Pollution Prevention; Santa Clara Valley Non-Point Source Pollution Control Program, 1992.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.

Concrete Finishing NS-13



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	☑

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	☑
Bacteria	
Oil and Grease	
Organics	☑

Potential Alternatives

None

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Description and Purpose

Concrete finishing methods are used for bridge deck rehabilitation, paint removal, curing compound removal, and final surface finish appearances. Methods include sand blasting, shot blasting, grinding, or high-pressure water blasting. Stormwater and non-stormwater exposed to concrete finishing by-products may have a high pH and may contain chemicals, metals, and fines. Proper procedures and implementation of appropriate BMPs can minimize the impact that concrete-finishing methods may have on stormwater and non-stormwater discharges.

The General Permit incorporates Numeric Action Levels (NAL) for pH (see Section 2 of this handbook to determine your project's risk level and if you are subject to these requirements).

Concrete and its associated curing materials have basic chemical properties that can raise pH levels outside of the permitted range. Additional care should be taken when managing these materials to prevent them from coming into contact with stormwater flows, which could lead to exceedances of the General Permit requirements.

Suitable Applications

These procedures apply to all construction locations where concrete finishing operations are performed.

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Limitations

- Runoff contact with concrete waste can raise pH levels in the water to environmentally harmful levels and trigger permit violations.

Implementation

- Collect and properly dispose of water from high-pressure water blasting operations.
- Collect contaminated water from blasting operations at the top of slopes. Transport or dispose of contaminated water while using BMPs such as those for erosion control. Refer to EC-9, Earth Dikes and Drainage Swales, EC-10, Velocity Dissipation Devices, and EC-11, Slope Drains.
- Direct water from blasting operations away from inlets and watercourses to collection areas for infiltration or other means of removal (dewatering). Refer to NS-2 Dewatering Operations.
- Protect inlets during sandblasting operations. Refer to SE-10, Storm Drain Inlet Protection.
- Refer to WM-8, Concrete Waste Management for disposal of concrete debris.
- Minimize the drift of dust and blast material as much as possible by keeping the blasting nozzle close to the surface.
- When blast residue contains a potentially hazardous waste, refer to WM-6, Hazardous Waste Management.

Education

- Educate employees, subcontractors, and suppliers on proper concrete finishing techniques to prevent contact with discharge as described herein.
- Arrange for the QSP or the appropriately trained contractor's superintendent or representative to oversee and enforce concrete finishing procedures.

Costs

These measures are generally of low cost.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities.
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.
- Sample non-stormwater discharges and stormwater runoff that contacts concrete dust and debris as required by the General Permit.

- Sweep or vacuum up debris from sandblasting at the end of each shift.
- At the end of each work shift, remove and contain liquid and solid waste from containment structures, if any, and from the general work area.
- Inspect containment structures for damage prior to use and prior to onset of forecasted rain.

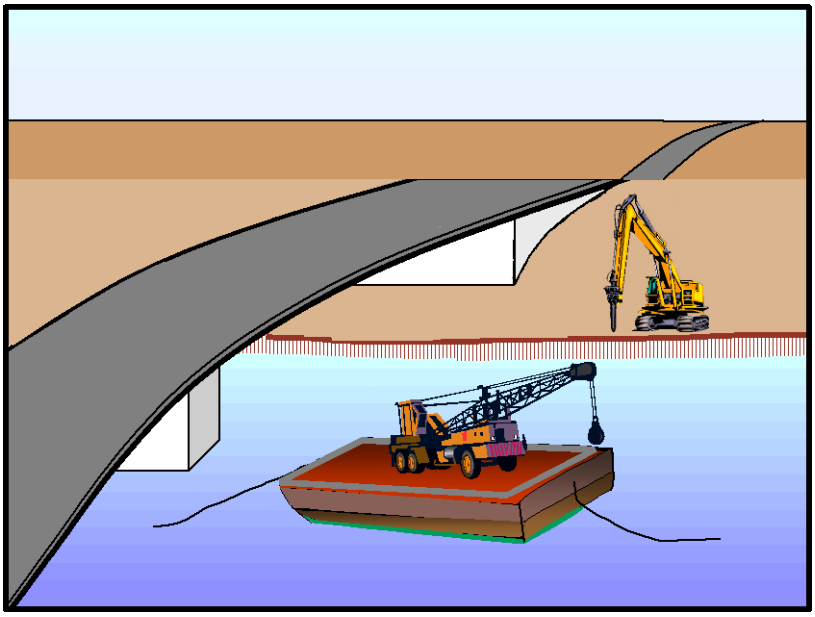
References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

Material Over Water NS-14



Categories		
EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	☑

Legend:
☑ **Primary Objective**
☒ **Secondary Objective**

Description and Purpose
Procedures for the proper use, storage, and disposal of materials and equipment on barges, boats, temporary construction pads, or similar locations that minimize or eliminate the discharge of potential pollutants to a watercourse.

Suitable Applications
Applies where materials and equipment are used on barges, boats, docks, and other platforms over or adjacent to a watercourse including waters of the United States. These procedures should be implemented for construction materials and wastes (solid and liquid), soil or dredging materials, or any other materials that may cause or contribute to exceedances of water quality standards.

Limitations
Dredge and fill activities are regulated by the US Army Corps of Engineers and Regional Boards under Section 404/401 of the Clean Water Act.

Implementation
- Refer to WM-1, Material Delivery and Storage and WM-4, Spill Prevention and Control.
- Use drip pans and absorbent materials for equipment and vehicles and ensure that an adequate supply of spill clean up materials is available.
- Drip pans should be placed under all vehicles and equipment placed on docks, barges, or other structures over

Targeted Constituents	
Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	☑
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

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water bodies when the vehicle or equipment is expected to be idle for more than 1 hour.

- Maintain equipment in accordance with NS-10, Vehicle and Equipment Maintenance. If a leaking line cannot be repaired, remove equipment from over the water.
- Provide watertight curbs or toe boards to contain spills and prevent materials, tools, and debris from leaving the barge, platform, dock, etc.
- Secure all materials to prevent discharges to receiving waters via wind.
- Identify types of spill control measures to be employed, including the storage of such materials and equipment. Ensure that staff is trained regarding the use of the materials, deployment and access of control measures, and reporting measures.
- In case of spills, contact the local Regional Board as soon as possible but within 48 hours.
- Refer to WM-5, Solid Waste Management (non-hazardous) and WM-6, Hazardous Waste Management. Ensure the timely and proper removal of accumulated wastes
- Comply with all necessary permits required for construction within or near the watercourse, such as Regional Water Quality Control Board, U.S. Army Corps of Engineers, Department of Fish and Game or and other local permitting.
- Discharges to waterways should be reported to the Regional Water Quality Control Board immediately upon discovery. A written discharge notification must follow within 7 days. Follow the spill reporting procedures contained in SWPPP.

Costs

These measures are generally of low to moderate cost. Exceptions are areas for temporary storage of materials, engine fluids, or wastewater pump out.

Inspection and Maintenance

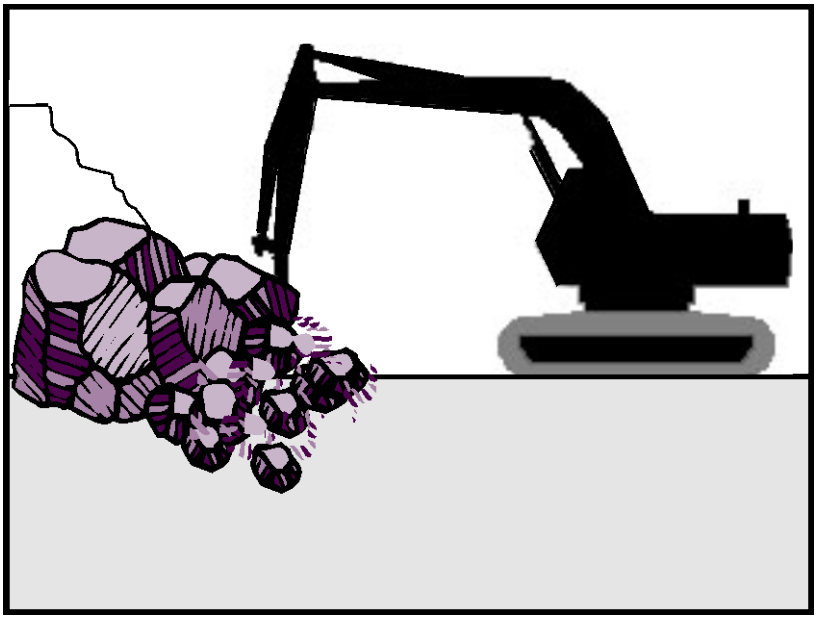
- Inspect and verify that activity–based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect BMPs subject to non-stormwater discharge daily while non-stormwater discharges occur.
- Ensure that employees and subcontractors implement the appropriate measures for storage and use of materials and equipment.
- Inspect and maintain all associated BMPs and perimeter controls to ensure continuous protection of the water courses, including waters of the United States.

References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

Demolition Adjacent to Water NS-15



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	☑
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

Description and Purpose

Procedures to protect water bodies from debris and wastes associated with structure demolition or removal over or adjacent to watercourses.

Suitable Applications

Full bridge demolition and removal, partial bridge removal (barrier rail, edge of deck) associated with bridge widening projects, concrete channel removal, or any other structure removal that could potentially affect water quality.

Limitations

None identified.

Implementation

- Refer to NS-5, Clear Water Diversion, to direct water away from work areas.
- Use attachments on construction equipment such as backhoes to catch debris from small demolition operations.
- Use covers or platforms to collect debris.
- Platforms and covers are to be approved by the owner.
- Stockpile accumulated debris and waste generated during demolition away from watercourses and in accordance with WM-3, Stockpile Management.
- Ensure safe passage of wildlife, as necessary.

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- Discharges to waterways shall be reported to the Regional Water Quality Control Board immediately upon discovery. A written discharge notification must follow within 7 days. Follow the spill reporting procedures in the SWPPP.

- For structures containing hazardous materials, i.e., lead paint or asbestos, refer to BMP WM-6, Hazardous Waste Management. For demolition work involving soil excavation around lead-painted structures, refer to WM-7, Contaminated Soil Management.

Costs

Cost may vary according to the combination of practices implemented.

Inspection and Maintenance

- Inspect and verify that activity–based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.

- Inspect BMPs subject to non-stormwater discharge daily while non-stormwater discharges occur.

- Any debris-catching devices shall be emptied regularly. Collected debris shall be removed and stored away from the watercourse and protected from runon and runoff.

References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

Temporary Batch Plants NS-16



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☑
WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	☑
Metals	☑
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

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Description and Purpose

The construction of roads, bridges, retaining walls, and other large structures in remote areas, often requires temporary batch plant facilities to manufacture Portland Cement Concrete (PCC) or asphalt cement (AC). Temporary batch plant facilities typically consist of silos containing fly ash, lime, and cement; heated tanks of liquid asphalt; sand and gravel material storage areas; mixing equipment; above ground storage tanks containing concrete additives and water; and designated areas for sand and gravel truck unloading, concrete truck loading, and concrete truck washout. Proper control and use of equipment, materials, and waste products from temporary batch plant facilities will reduce the discharge of potential pollutants to the storm drain system or watercourses, reduce air emissions, and mitigate noise impacts.

The General Permit draft incorporates Numeric Action Levels (NAL) for pH (see Section 2 of this handbook to determine your project's risk level and if you are subject to these requirements). Many types of batch plant materials, including mortar, concrete, cement and block and their associated wastes have basic chemical properties that can raise pH levels outside of the permitted range. Additional care should be taken when managing these materials to prevent them from coming into contact with stormwater flows which may cause an exceedance of the General Permit requirements.

Suitable Applications

These procedures typically apply to construction sites where temporary batch plant facilities are used; however, some of the

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practices described are applicable to construction sites with general concrete use.

Limitations

The General Permit for discharges of stormwater associated with industrial activities (General Industrial Permit) may be applicable to temporary batch plants.

Specific permit requirements or mitigation measures such as Air Resources Board (ARB), Air Quality Management District (AQMD), Air Pollution Control District (APCD, Regional Water Quality Control Board (RWQCB), county ordinances and city ordinances may require alternative mitigation measures for temporary batch plants. Contact the local regulatory agencies to determine if a permit is required.

Implementation

Planning

- Temporary batch plants may be subject to the General Industrial Permit. To obtain a copy of this permit and the application forms, visit http://www.waterboards.ca.gov or contact the State Water Resources Control Board.
- Proper planning, design, and construction of temporary batch plants should be implemented to minimize potential water quality, air pollution, and noise impacts associated with temporary batch plants.
- BMPs and a Construction Site Monitoring Plan (CSMP) should be included in the project Stormwater Pollution Prevention Plan (SWPPP). BMPs should be implemented, inspected, and maintained in accordance with these plans.
- Temporary batch plants should be managed to comply with AQMD Statewide Registration Program and/or local AQMD Portable Equipment Registration requirements.
- Construct temporary batch plants downwind of existing developments whenever possible.
- Placement of access roads should be planned to mitigate water and air quality impacts.

Layout and Design

- Temporary batch plants should be properly located and designed to mitigate water quality impacts to receiving water bodies. Batch plants should be located away from watercourses, drainage courses, and drain inlets. Batch plants should be located to minimize the potential for stormwater runon onto the site.
- Temporary batch plant facilities (including associated stationary equipment and stockpiles) should be located at least 300 ft from any recreational area, school, residence, or other structure not associated with the construction project.
- Construct continuous interior AC or PCC berms around batch plant equipment (mixing equipment, silos, concrete drop points, conveyor belts, admixture tanks, etc.) to facilitate proper containment and cleanup of releases. Rollover or flip top curbs or dikes should be placed at ingress and egress points (SE-12, Temporary Silt Dike).
- Direct runoff from the paved or unpaved portion of the batch plant into a sump and pipe to a lined washout area or dewatering tank.

- Direct stormwater and non-stormwater runoff from unpaved portions of batch plant facility to catchment ponds or tanks.
- Construct and remove concrete washout facilities in accordance with WM-8, Concrete Waste Management.
- Layout of a typical batch plant and associated BMP is located at the end of this BMP fact sheet.

Operational Procedures

- Washout of concrete trucks should be conducted in a designated area in accordance with WM-8, Concrete Waste Management.
- Do not dispose of concrete into drain inlets, the stormwater drainage system, or watercourses.
- Washing of concrete mixing and transport equipment (including concrete truck washout) should occur in a designated area in accordance with WM-8, Concrete Waste Management.
- Washing equipment, tools, or vehicles to remove PCC should be conducted in accordance with NS-7, Potable Water/Irrigation, NS-8, Vehicle and Equipment Cleaning, and WM-8, Concrete Waste Management.
- All dry material transfer points should be ducted through a fabric or cartridge type filter unless there are no visible emissions from the transfer point.
- Equip all bulk storage silos, including auxiliary bulk storage trailers, with fabric or cartridge type filter(s).
- Maintain silo vent filters in proper operating condition.
- Equip silos and auxiliary bulk storage trailers with dust-tight service hatches.
- Fabric dust collection system should be capable of controlling particulate matter in accordance with the California Air Resources Control Board and local Air Pollution Control District Regulations.
- Fabric dust collectors (except for vent filters) should be equipped with an operational pressure differential gauge to measure the pressure drop across the filters.
- All transfer points should be equipped with a wet suppression system to control fugitive particulate emissions unless there are no visible emissions.
- All conveyors should be covered, unless the material being transferred results in no visible emissions.
- There should be no visible emissions beyond the property line, while the equipment is being operated.
- Collect dust emissions from the loading of open-bodied trucks, at the drip point of dry batch plants, or dust emissions from the drum feed for central mix plants.

- Equip silos and auxiliary bulk storage trailers with a visible and/or audible warning mechanism to warn operators that the silo or trailer is full.

- All open-bodied vehicles transporting material should be loaded with a final layer of wet sand and the truck should be covered with a tarp to reduce emissions.

Tracking Control

- Plant roads (batch truck and material delivery truck roads) and areas between stockpiles and conveyor hoppers should be stabilized (TC-2, Stabilized Construction Roadway), watered, treated with dust-suppressant chemicals (WE-1, Wind Erosion Control), or paved with a cohesive hard surface that can be repeatedly swept, maintained intact, and cleaned as necessary to control dust emissions.

- Trucks should not track PCC from plants onto public roads. Use appropriate practices from TC-1, Stabilized Construction Entrance/Exit, to prevent tracking.

Materials Storage

- WM-1, Material Delivery and Storage, should be implemented at all batch plants using concrete components or compounds. An effective strategy is to cover and contain materials.

- WM-2, Material Use should be conducted in a way to minimize or eliminate the discharge of materials to storm drain system or watercourse.

- Ensure that finer materials are not dispersed into the air during operations, such as unloading of cement delivery trucks.

- Stockpiles should be covered and enclosed with perimeter sediment barriers per WM-3, Stockpile Management. Uncovered stockpiles should be sprayed with water and/or dust-suppressant chemicals as necessary to control dust emissions, unless the stockpiled material results in no visible emissions. An operable stockpile watering system should be onsite at all times.

- Store bagged and boxed materials on pallets and cover or store in a completely enclosed storage area on non-working days and prior to rain.

- Minimize stockpiles of demolished PCC by recycling them in a timely manner.

- Provide secondary containment for liquid materials (WM-1, Material Delivery and Storage, WM-10, Liquid Waste Management). Containment should provide sufficient volume to contain precipitation from a 25-year storm plus 10% of the aggregate volume of all containers or plus 100% of the largest container, whichever is greater.

- Handle solid and liquid waste in accordance with WM-5, Solid Waste Management, WM-10, Liquid Waste Management, and WM-8, Concrete Waste Management.

- Maintain adequate supplies of spill cleanup materials and train staff to respond to spills per WM-4, Spill Prevention and Control.

- Immediately contain and clean up spilled cement and fly ash and contain.

Equipment Maintenance

- Equipment should be maintained to prevent fluid leaks and spills per NS-9, Vehicle and Equipment Fueling, and NS-10, Vehicle and Equipment Maintenance.
- Maintain adequate supplies of spill cleanup materials and train staff to respond to spills per WM-4, Spill Prevention and Control.
- Incorporate other BMPs such as WM-5, Solid Waste Management, WM-6, Hazardous Waste Management, and WM-10, Liquid Waste Management.

Costs

Costs will vary depending on the size of the facility and combination of BMPs implemented.

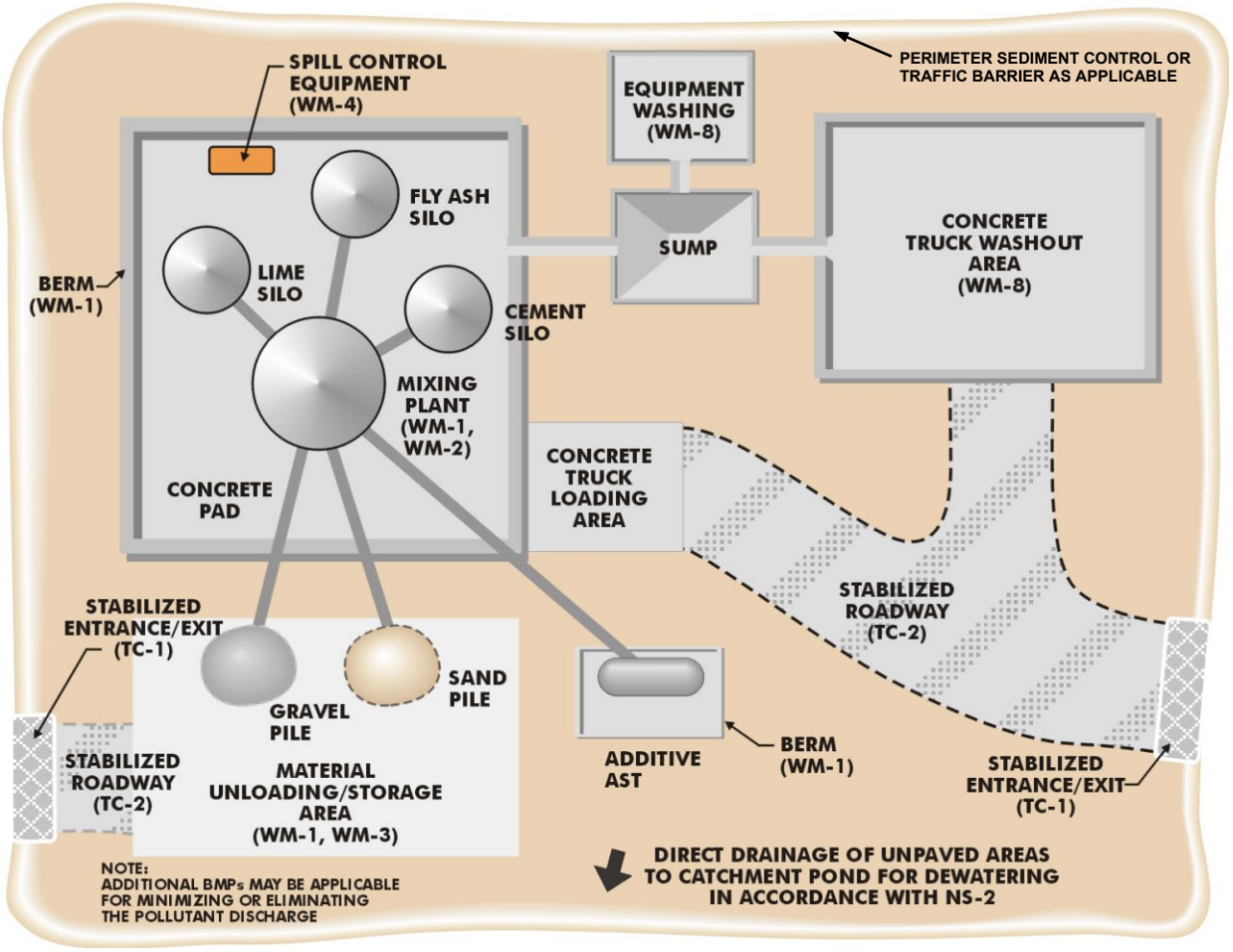
Inspection and Maintenance

- Inspect and verify that activity–based BMPs are in place prior to the commencement of associated activities.
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect BMPs subject to non-stormwater discharge daily while non-stormwater discharges occur.
- Sample non-stormwater discharges and stormwater runoff that contacts cementitious materials or fly ash as required by the General Permit.
- Inspect and repair equipment (for damaged hoses, fittings, and gaskets).
- Inspect and maintain a Stabilized Construction Entrance/Exit (TC-1) as needed.
- Inspect and maintain stabilized haul roads as needed (TC-2, Stabilized Construction Roadway).
- Inspect and maintain materials and waste storage areas as needed.

References

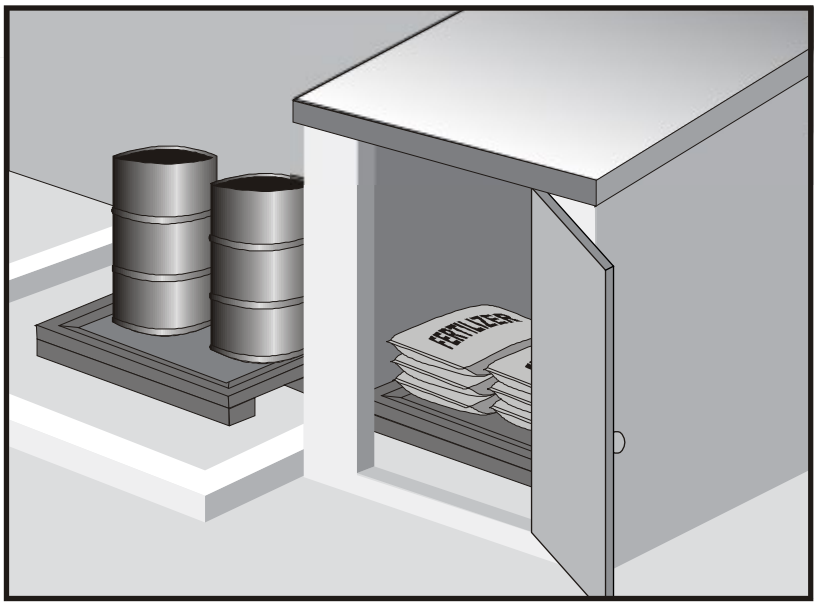
Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.



Typical Temporary Batch

Material Delivery and Storage WM-1



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

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Description and Purpose

Prevent, reduce, or eliminate the discharge of pollutants from material delivery and storage to the stormwater system or watercourses by minimizing the storage of hazardous materials onsite, storing materials in watertight containers and/or a completely enclosed designated area, installing secondary containment, conducting regular inspections, and training employees and subcontractors.

This best management practice covers only material delivery and storage. For other information on materials, see WM-2, Material Use, or WM-4, Spill Prevention and Control. For information on wastes, see the waste management BMPs in this section.

Suitable Applications

These procedures are suitable for use at all construction sites with delivery and storage of the following materials:

- Soil stabilizers and binders
- Pesticides and herbicides
- Fertilizers
- Detergents
- Plaster
- Petroleum products such as fuel, oil, and grease

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- Asphalt and concrete components
- Hazardous chemicals such as acids, lime, glues, adhesives, paints, solvents, and curing compounds
- Concrete compounds
- Other materials that may be detrimental if released to the environment

Limitations

- Space limitation may preclude indoor storage.
- Storage sheds often must meet building and fire code requirements.

Implementation

The following steps should be taken to minimize risk:

- Chemicals must be stored in water tight containers with appropriate secondary containment or in a storage shed.
- When a material storage area is located on bare soil, the area should be lined and bermed.
- Use containment pallets or other practical and available solutions, such as storing materials within newly constructed buildings or garages, to meet material storage requirements.
- Stack erodible landscape material on pallets and cover when not in use.
- Contain all fertilizers and other landscape materials when not in use.
- Temporary storage areas should be located away from vehicular traffic.
- Material Safety Data Sheets (MSDS) should be available on-site for all materials stored that have the potential to effect water quality.
- Construction site areas should be designated for material delivery and storage.
- Material delivery and storage areas should be located away from waterways, if possible.
    - Avoid transport near drainage paths or waterways.
    - Surround with earth berms or other appropriate containment BMP. See EC-9, Earth Dikes and Drainage Swales.
    - Place in an area that will be paved.
- Storage of reactive, ignitable, or flammable liquids must comply with the fire codes of your area. Contact the local Fire Marshal to review site materials, quantities, and proposed storage area to determine specific requirements. See the Flammable and Combustible Liquid Code, NFPA30.
- An up to date inventory of materials delivered and stored onsite should be kept.

- Hazardous materials storage onsite should be minimized.
- Hazardous materials should be handled as infrequently as possible.
- Keep ample spill cleanup supplies appropriate for the materials being stored. Ensure that cleanup supplies are in a conspicuous, labeled area.
- Employees and subcontractors should be trained on the proper material delivery and storage practices.
- Employees trained in emergency spill cleanup procedures must be present when dangerous materials or liquid chemicals are unloaded.
- If significant residual materials remain on the ground after construction is complete, properly remove and dispose of materials and any contaminated soil. See WM-7, Contaminated Soil Management. If the area is to be paved, pave as soon as materials are removed to stabilize the soil.

Material Storage Areas and Practices

- Liquids, petroleum products, and substances listed in 40 CFR Parts 110, 117, or 302 should be stored in approved containers and drums and should not be overfilled. Containers and drums should be placed in temporary containment facilities for storage.
- A temporary containment facility should provide for a spill containment volume able to contain precipitation from a 25-year storm event, plus the greater of 10% of the aggregate volume of all containers or 100% of the capacity of the largest container within its boundary, whichever is greater.
- A temporary containment facility should be impervious to the materials stored therein for a minimum contact time of 72 hours.
- A temporary containment facility should be maintained free of accumulated rainwater and spills. In the event of spills or leaks, accumulated rainwater and spills should be collected and placed into drums. These liquids should be handled as a hazardous waste unless testing determines them to be non-hazardous. All collected liquids or non-hazardous liquids should be sent to an approved disposal site.
- Sufficient separation should be provided between stored containers to allow for spill cleanup and emergency response access.
- Incompatible materials, such as chlorine and ammonia, should not be stored in the same temporary containment facility.
- Materials should be covered prior to, and during rain events.
- Materials should be stored in their original containers and the original product labels should be maintained in place in a legible condition. Damaged or otherwise illegible labels should be replaced immediately.

- Bagged and boxed materials should be stored on pallets and should not be allowed to accumulate on the ground. To provide protection from wind and rain throughout the rainy season, bagged and boxed materials should be covered during non-working days and prior to and during rain events.
- Stockpiles should be protected in accordance with WM-3, Stockpile Management.
- Materials should be stored indoors within existing structures or completely enclosed storage sheds when available.
- Proper storage instructions should be posted at all times in an open and conspicuous location.
- An ample supply of appropriate spill clean up material should be kept near storage areas.
- Also see WM-6, Hazardous Waste Management, for storing of hazardous wastes.

Material Delivery Practices

- Keep an accurate, up-to-date inventory of material delivered and stored onsite.
- Arrange for employees trained in emergency spill cleanup procedures to be present when dangerous materials or liquid chemicals are unloaded.

Spill Cleanup

- Contain and clean up any spill immediately.
- Properly remove and dispose of any hazardous materials or contaminated soil if significant residual materials remain on the ground after construction is complete. See WM-7, Contaminated Soil Management.
- See WM-4, Spill Prevention and Control, for spills of chemicals and/or hazardous materials.
- If spills or leaks of materials occur that are not contained and could discharge to surface waters, non-visible sampling of site discharge may be required. Refer to the General Permit or to your project specific Construction Site Monitoring Plan to determine if and where sampling is required.

Cost

- The largest cost of implementation may be in the construction of a materials storage area that is covered and provides secondary containment.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Keep storage areas clean and well organized, including a current list of all materials onsite.
- Inspect labels on containers for legibility and accuracy.

- Repair or replace perimeter controls, containment structures, covers, and liners as needed to maintain proper function.

References

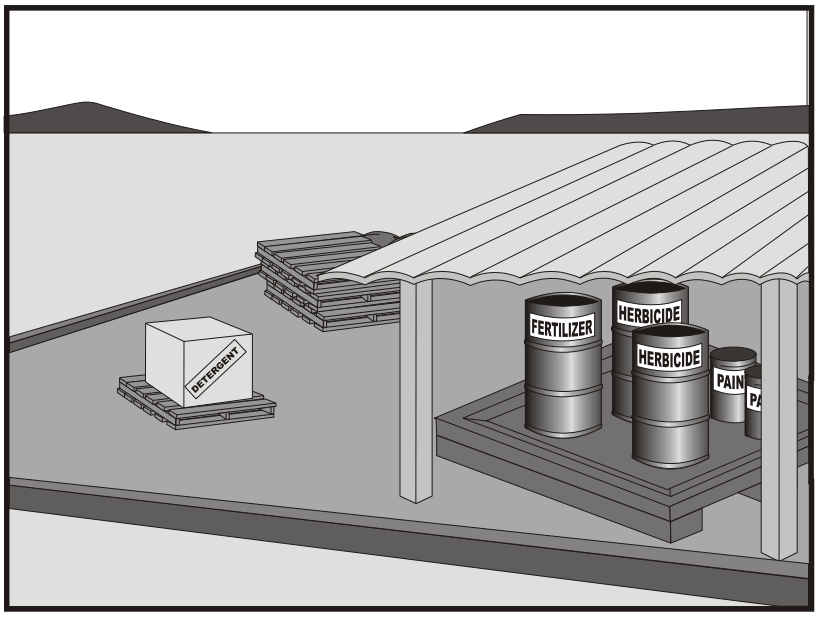
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Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance, Working Group Working Paper; USEPA, April 1992.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

Material Use WM-2



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

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Description and Purpose

Prevent or reduce the discharge of pollutants to the storm drain system or watercourses from material use by using alternative products, minimizing hazardous material use onsite, and training employees and subcontractors.

Suitable Applications

This BMP is suitable for use at all construction projects. These procedures apply when the following materials are used or prepared onsite:

- Pesticides and herbicides
- Fertilizers
- Detergents
- Petroleum products such as fuel, oil, and grease
- Asphalt and other concrete components
- Other hazardous chemicals such as acids, lime, glues, adhesives, paints, solvents, and curing compounds
- Other materials that may be detrimental if released to the environment

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Limitations

Safer alternative building and construction products may not be available or suitable in every instance.

Implementation

The following steps should be taken to minimize risk:

- Minimize use of hazardous materials onsite.
- Follow manufacturer instructions regarding uses, protective equipment, ventilation, flammability, and mixing of chemicals.
- Train personnel who use pesticides. The California Department of Pesticide Regulation and county agricultural commissioners license pesticide dealers, certify pesticide applicators, and conduct onsite inspections.
- The preferred method of termiticide application is soil injection near the existing or proposed structure foundation/slab; however, if not feasible, soil drench application of termiticides should follow EPA label guidelines and the following recommendations (most of which are applicable to most pesticide applications):
  - Do not treat soil that is water-saturated or frozen.
  - Application shall not commence within 24-hours of a predicted precipitation event with a 40% or greater probability. Weather tracking must be performed on a daily basis prior to termiticide application and during the period of termiticide application.
  - Do not allow treatment chemicals to runoff from the target area. Apply proper quantity to prevent excess runoff. Provide containment for and divert stormwater from application areas using berms or diversion ditches during application.
  - Dry season: Do not apply within 10 feet of storm drains. Do not apply within 25 feet of aquatic habitats (such as, but not limited to, lakes; reservoirs; rivers; permanent streams; marshes or ponds; estuaries; and commercial fish farm ponds).
  - Wet season: Do not apply within 50 feet of storm drains or aquatic habitats (such as, but not limited to, lakes; reservoirs; rivers; permanent streams; marshes or ponds; estuaries; and commercial fish farm ponds) unless a vegetative buffer is present (if so, refer to dry season requirements).
  - Do not make on-grade applications when sustained wind speeds are above 10 mph (at application site) at nozzle end height.
  - Cover treatment site prior to a rain event in order to prevent run-off of the pesticide into non-target areas. The treated area should be limited to a size that can be backfilled and/or covered by the end of the work shift. Backfilling or covering of the treated area shall be done by the end of the same work shift in which the application is made.
  - The applicator must either cover the soil him/herself or provide written notification of the above requirement to the contractor on site and to the person commissioning the

application (if different than the contractor). If notice is provided to the contractor or the person commissioning the application, then they are responsible under the Federal Insecticide Fungicide, and Rodenticide Act (FIFRA) to ensure that: 1) if the concrete slab cannot be poured over the treated soil within 24 hours of application, the treated soil is covered with a waterproof covering (such as polyethylene sheeting), and 2) the treated soil is covered if precipitation is predicted to occur before the concrete slab is scheduled to be poured.

- Do not over-apply fertilizers, herbicides, and pesticides. Prepare only the amount needed. Follow the recommended usage instructions. Over-application is expensive and environmentally harmful. Unless on steep slopes, till fertilizers into the soil rather than hydraulic application. Apply surface dressings in several smaller applications, as opposed to one large application, to allow time for infiltration and to avoid excess material being carried offsite by runoff. Do not apply these chemicals before predicted rainfall.
- Train employees and subcontractors in proper material use.
- Supply Material Safety Data Sheets (MSDS) for all materials.
- Dispose of latex paint and paint cans, used brushes, rags, absorbent materials, and drop cloths, when thoroughly dry and are no longer hazardous, with other construction debris.
- Do not remove the original product label; it contains important safety and disposal information. Use the entire product before disposing of the container.
- Mix paint indoors or in a containment area. Never clean paintbrushes or rinse paint containers into a street, gutter, storm drain, or watercourse. Dispose of any paint thinners, residue, and sludge(s) that cannot be recycled, as hazardous waste.
- For water-based paint, clean brushes to the extent practicable, and rinse to a drain leading to a sanitary sewer where permitted or contain for proper disposal off site. For oil-based paints, clean brushes to the extent practicable, and filter and reuse thinners and solvents.
- Use recycled and less hazardous products when practical. Recycle residual paints, solvents, non-treated lumber, and other materials.
- Use materials only where and when needed to complete the construction activity. Use safer alternative materials as much as possible. Reduce or eliminate use of hazardous materials onsite when practical.
- Document the location, time, chemicals applied, and applicator's name and qualifications.
- Keep an ample supply of spill clean up material near use areas. Train employees in spill clean up procedures.
- Avoid exposing applied materials to rainfall and runoff unless sufficient time has been allowed for them to dry.
- Discontinue use of erodible landscape material within 2 days prior to a forecasted rain event and materials should be covered and/or bermed.

- Provide containment for material use areas such as masons' areas or paint mixing/preparation areas to prevent materials/pollutants from entering stormwater.

Costs

All of the above are low cost measures.

Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities.
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Ensure employees and subcontractors throughout the job are using appropriate practices.

References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

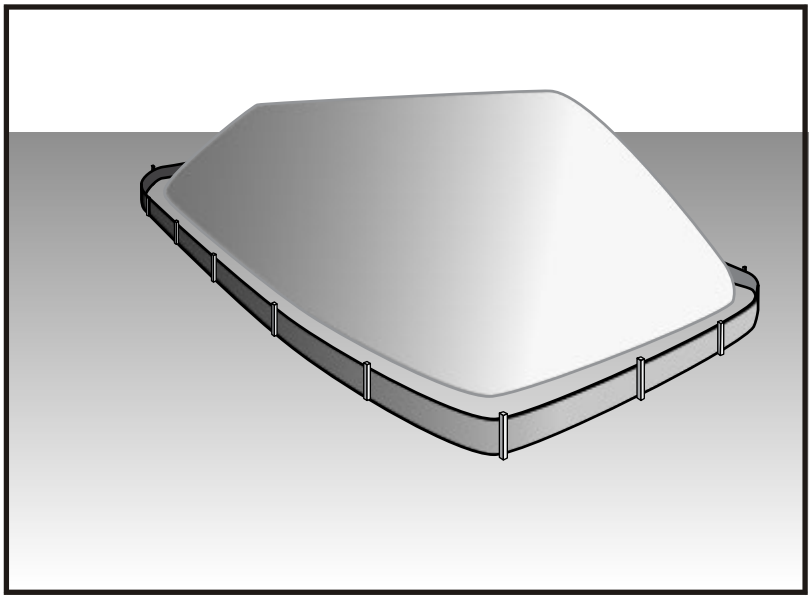
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Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

Stockpile Management WM-3



Treat Categories		
EC	Erosion Control	
SE	Sediment Control	☒
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☒
WM	Waste Management and Materials Pollution Control	☑

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Description and Purpose

Stockpile management procedures and practices are designed to reduce or eliminate air and stormwater pollution from stockpiles of soil, soil amendments, sand, paving materials such as Portland cement concrete (PCC) rubble, asphalt concrete (AC), asphalt concrete rubble, aggregate base, aggregate sub base or pre-mixed aggregate, asphalt minder (so called "cold mix" asphalt), and pressure treated wood.

Suitable Applications

Implement in all projects that stockpile soil and other loose materials.

Limitations

- Plastic sheeting as a stockpile protection is temporary and hard to manage in windy conditions. Where plastic is used, consider use of plastic tarps with nylon reinforcement which may be more durable than standard sheeting.
- Plastic sheeting can increase runoff volume due to lack of infiltration and potentially cause perimeter control failure.
- Plastic sheeting breaks down faster in sunlight.
- The use of Plastic materials and photodegradable plastics should be avoided.

Implementation

Protection of stockpiles is a year-round requirement. To properly manage stockpiles:

Targeted Constituents	
Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	☑

Potential Alternatives
None

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- On larger sites, a minimum of 50 ft separation from concentrated flows of stormwater, drainage courses, and inlets is recommended.
- After 14 days of inactivity, a stockpile is non-active and requires further protection described below. All stockpiles are required to be protected as non-active stockpiles immediately if they are not scheduled to be used within 14 days.
- Protect all stockpiles from stormwater run-on using temporary perimeter sediment barriers such as compost berms (SE-13), temporary silt dikes (SE-12), fiber rolls (SE-5), silt fences (SE-1), sandbags (SE-8), gravel bags (SE-6), or biofilter bags (SE-14). Refer to the individual fact sheet for each of these controls for installation information.
- Implement wind erosion control practices as appropriate on all stockpiled material. For specific information, see WE-1, Wind Erosion Control.
- Manage stockpiles of contaminated soil in accordance with WM-7, Contaminated Soil Management.
- Place bagged materials on pallets and under cover.
- Ensure that stockpile coverings are installed securely to protect from wind and rain.
- Some plastic covers withstand weather and sunlight better than others. Select cover materials or methods based on anticipated duration of use.

Protection of Non-Active Stockpiles

A stockpile is considered non-active if it either is not used for 14 days or if it is scheduled not to be used for 14 days or more. Stockpiles need to be protected immediately if they are not scheduled to be used within 14 days. Non-active stockpiles of the identified materials should be protected as follows:

Soil stockpiles

- Soil stockpiles should be covered or protected with soil stabilization measures and a temporary perimeter sediment barrier at all times.
- Temporary vegetation should be considered for topsoil piles that will be stockpiled for extended periods.

Stockpiles of Portland cement concrete rubble, asphalt concrete, asphalt concrete rubble, aggregate base, or aggregate sub base

- Stockpiles should be covered and protected with a temporary perimeter sediment barrier at all times.

Stockpiles of "cold mix"

- Cold mix stockpiles should be placed on and covered with plastic sheeting or comparable material at all times and surrounded by a berm.

Stockpiles of fly ash, stucco, hydrated lime

- Stockpiles of materials that may raise the pH of runoff (i.e., basic materials) should be covered with plastic and surrounded by a berm.

Stockpiles/Storage of treated wood

- Treated wood should be covered with plastic sheeting or comparable material at all times and surrounded by a berm.

Protection of Active Stockpiles

A stockpile is active when it is being used or is scheduled to be used within 14 days of the previous use. Active stockpiles of the identified materials should be protected as follows:

- All stockpiles should be covered and protected with a temporary linear sediment barrier prior to the onset of precipitation.
- Stockpiles of "cold mix" and treated wood, and basic materials should be placed on and covered with plastic sheeting or comparable material and surrounded by a berm prior to the onset of precipitation.
- The downstream perimeter of an active stockpile should be protected with a linear sediment barrier or berm and runoff should be diverted around or away from the stockpile on the upstream perimeter.

Costs

For cost information associated with stockpile protection refer to the individual erosion or sediment control BMP fact sheet considered for implementation (For example, refer to SE-1 Silt Fence for installation of silt fence around the perimeter of a stockpile.)

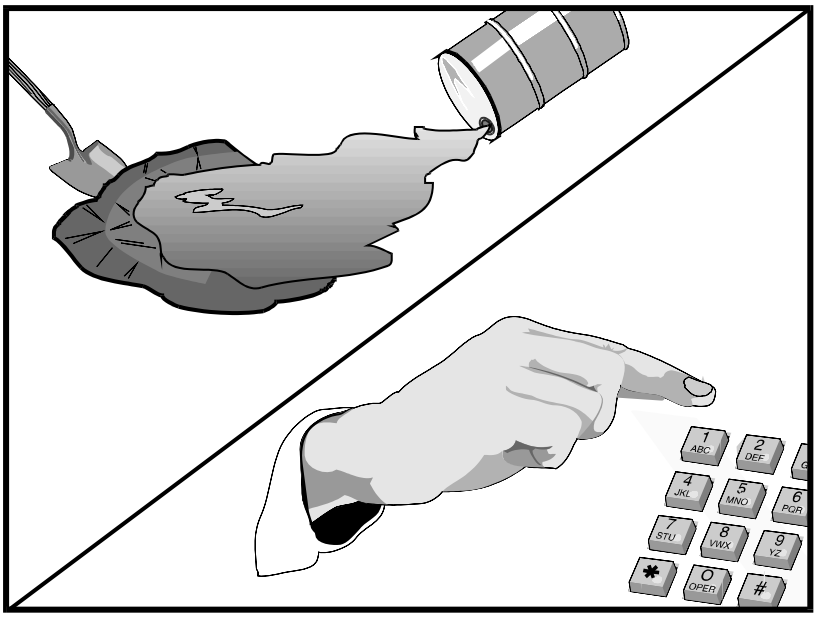
Inspection and Maintenance

- Stockpiles must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- It may be necessary to inspect stockpiles covered with plastic sheeting more frequently during certain conditions (for example, high winds or extreme heat).
- Repair and/or replace perimeter controls and covers as needed to keep them functioning properly.
- Sediment shall be removed when it reaches one-third of the barrier height.

References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Spill Prevention and Control WM-4



Description and Purpose

Prevent or reduce the discharge of pollutants to drainage systems or watercourses from leaks and spills by reducing the chance for spills, stopping the source of spills, containing and cleaning up spills, properly disposing of spill materials, and training employees.

This best management practice covers only spill prevention and control. However, WM-1, Materials Delivery and Storage, and WM-2, Material Use, also contain useful information, particularly on spill prevention. For information on wastes, see the waste management BMPs in this section.

Suitable Applications

This BMP is suitable for all construction projects. Spill control procedures are implemented anytime chemicals or hazardous substances are stored on the construction site, including the following materials:

- Soil stabilizers/binders
- Dust palliatives
- Herbicides
- Growth inhibitors
- Fertilizers
- Deicing/anti-icing chemicals

Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

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- Fuels
- Lubricants
- Other petroleum distillates

Limitations

- In some cases, it may be necessary to use a private spill cleanup company.
- This BMP applies to spills caused by the contractor and subcontractors.
- Procedures and practices presented in this BMP are general. Contractor should identify appropriate practices for the specific materials used or stored onsite

Implementation

The following steps will help reduce the stormwater impacts of leaks and spills:

Education

- Be aware that different materials pollute in different amounts. Make sure that each employee knows what a "significant spill" is for each material they use, and what is the appropriate response for "significant" and "insignificant" spills.
- Educate employees and subcontractors on potential dangers to humans and the environment from spills and leaks.
- Hold regular meetings to discuss and reinforce appropriate disposal procedures (incorporate into regular safety meetings).
- Establish a continuing education program to indoctrinate new employees.
- Have contractor's superintendent or representative oversee and enforce proper spill prevention and control measures.

General Measures

- To the extent that the work can be accomplished safely, spills of oil, petroleum products, substances listed under 40 CFR parts 110,117, and 302, and sanitary and septic wastes should be contained and cleaned up immediately.
- Store hazardous materials and wastes in covered containers and protect from vandalism.
- Place a stockpile of spill cleanup materials where it will be readily accessible.
- Train employees in spill prevention and cleanup.
- Designate responsible individuals to oversee and enforce control measures.
- Spills should be covered and protected from stormwater runon during rainfall to the extent that it doesn't compromise clean up activities.
- Do not bury or wash spills with water.

- Store and dispose of used clean up materials, contaminated materials, and recovered spill material that is no longer suitable for the intended purpose in conformance with the provisions in applicable BMPs.
- Do not allow water used for cleaning and decontamination to enter storm drains or watercourses. Collect and dispose of contaminated water in accordance with WM-10, Liquid Waste Management.
- Contain water overflow or minor water spillage and do not allow it to discharge into drainage facilities or watercourses.
- Place proper storage, cleanup, and spill reporting instructions for hazardous materials stored or used on the project site in an open, conspicuous, and accessible location.
- Keep waste storage areas clean, well organized, and equipped with ample cleanup supplies as appropriate for the materials being stored. Perimeter controls, containment structures, covers, and liners should be repaired or replaced as needed to maintain proper function.

Cleanup

- Clean up leaks and spills immediately.
- Use a rag for small spills on paved surfaces, a damp mop for general cleanup, and absorbent material for larger spills. If the spilled material is hazardous, then the used cleanup materials are also hazardous and must be sent to either a certified laundry (rags) or disposed of as hazardous waste.
- Never hose down or bury dry material spills. Clean up as much of the material as possible and dispose of properly. See the waste management BMPs in this section for specific information.

Minor Spills

- Minor spills typically involve small quantities of oil, gasoline, paint, etc. which can be controlled by the first responder at the discovery of the spill.
- Use absorbent materials on small spills rather than hosing down or burying the spill.
- Absorbent materials should be promptly removed and disposed of properly.
- Follow the practice below for a minor spill:
  - Contain the spread of the spill.
  - Recover spilled materials.
  - Clean the contaminated area and properly dispose of contaminated materials.

Semi-Significant Spills

- Semi-significant spills still can be controlled by the first responder along with the aid of other personnel such as laborers and the foreman, etc. This response may require the cessation of all other activities.

- Spills should be cleaned up immediately:
  - Contain spread of the spill.
  - Notify the project foreman immediately.
  - If the spill occurs on paved or impermeable surfaces, clean up using "dry" methods (absorbent materials, cat litter and/or rags). Contain the spill by encircling with absorbent materials and do not let the spill spread widely.
  - If the spill occurs in dirt areas, immediately contain the spill by constructing an earthen dike. Dig up and properly dispose of contaminated soil.
  - If the spill occurs during rain, cover spill with tarps or other material to prevent contaminating runoff.

Significant/Hazardous Spills

- For significant or hazardous spills that cannot be controlled by personnel in the immediate vicinity, the following steps should be taken:
  - Notify the local emergency response by dialing 911. In addition to 911, the contractor will notify the proper county officials. It is the contractor's responsibility to have all emergency phone numbers at the construction site.
  - Notify the Governor's Office of Emergency Services Warning Center, (916) 845-8911.
  - For spills of federal reportable quantities, in conformance with the requirements in 40 CFR parts 110,119, and 302, the contractor should notify the National Response Center at (800) 424-8802.
  - Notification should first be made by telephone and followed up with a written report.
  - The services of a spill's contractor or a Haz-Mat team should be obtained immediately. Construction personnel should not attempt to clean up until the appropriate and qualified staffs have arrived at the job site.
  - Other agencies which may need to be consulted include, but are not limited to, the Fire Department, the Public Works Department, the Coast Guard, the Highway Patrol, the City/County Police Department, Department of Toxic Substances, California Division of Oil and Gas, Cal/OSHA, etc.

Reporting

- Report significant spills to local agencies, such as the Fire Department; they can assist in cleanup.
- Federal regulations require that any significant oil spill into a water body or onto an adjoining shoreline be reported to the National Response Center (NRC) at 800-424-8802 (24 hours).

Use the following measures related to specific activities:

Vehicle and Equipment Maintenance

- If maintenance must occur onsite, use a designated area and a secondary containment, located away from drainage courses, to prevent the runon of stormwater and the runoff of spills.
- Regularly inspect onsite vehicles and equipment for leaks and repair immediately
- Check incoming vehicles and equipment (including delivery trucks, and employee and subcontractor vehicles) for leaking oil and fluids. Do not allow leaking vehicles or equipment onsite.
- Always use secondary containment, such as a drain pan or drop cloth, to catch spills or leaks when removing or changing fluids.
- Place drip pans or absorbent materials under paving equipment when not in use.
- Use absorbent materials on small spills rather than hosing down or burying the spill. Remove the absorbent materials promptly and dispose of properly.
- Promptly transfer used fluids to the proper waste or recycling drums. Don't leave full drip pans or other open containers lying around
- Oil filters disposed of in trashcans or dumpsters can leak oil and pollute stormwater. Place the oil filter in a funnel over a waste oil-recycling drum to drain excess oil before disposal. Oil filters can also be recycled. Ask the oil supplier or recycler about recycling oil filters.
- Store cracked batteries in a non-leaking secondary container. Do this with all cracked batteries even if you think all the acid has drained out. If you drop a battery, treat it as if it is cracked. Put it into the containment area until you are sure it is not leaking.

Vehicle and Equipment Fueling

- If fueling must occur onsite, use designate areas, located away from drainage courses, to prevent the runon of stormwater and the runoff of spills.
- Discourage "topping off" of fuel tanks.
- Always use secondary containment, such as a drain pan, when fueling to catch spills/ leaks.

Costs

Prevention of leaks and spills is inexpensive. Treatment and/ or disposal of contaminated soil or water can be quite expensive.

Inspection and Maintenance

- Inspect and verify that activity–based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.

- Inspect BMPs subject to non-stormwater discharge daily while non-stormwater discharges occur.
- Keep ample supplies of spill control and cleanup materials onsite, near storage, unloading, and maintenance areas.
- Update your spill prevention and control plan and stock cleanup materials as changes occur in the types of chemicals onsite.

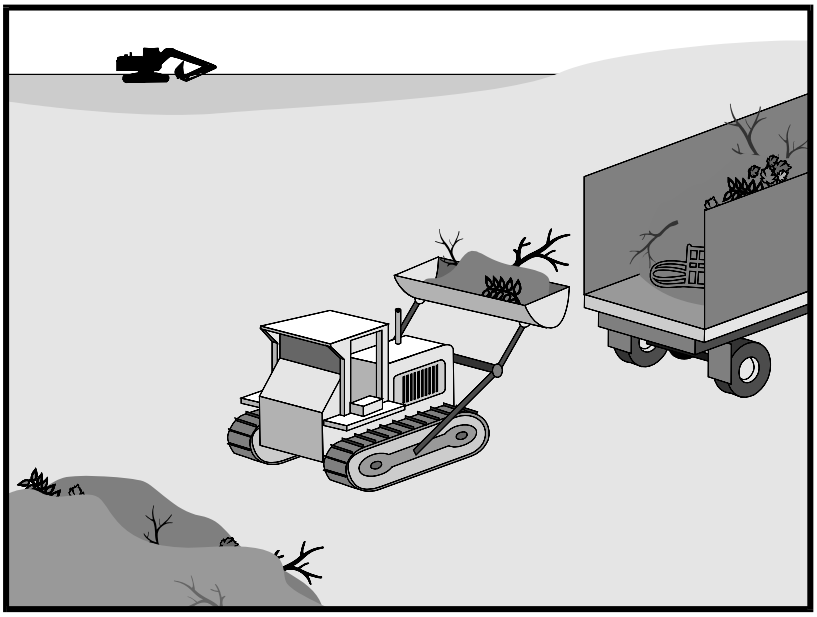
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Solid Waste Management WM-5



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

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Description and Purpose

Solid waste management procedures and practices are designed to prevent or reduce the discharge of pollutants to stormwater from solid or construction waste by providing designated waste collection areas and containers, arranging for regular disposal, and training employees and subcontractors.

Suitable Applications

This BMP is suitable for construction sites where the following wastes are generated or stored:

- Solid waste generated from trees and shrubs removed during land clearing, demolition of existing structures (rubble), and building construction
- Packaging materials including wood, paper, and plastic
- Scrap or surplus building materials including scrap metals, rubber, plastic, glass pieces, and masonry products
- Domestic wastes including food containers such as beverage cans, coffee cups, paper bags, plastic wrappers, and cigarettes
- Construction wastes including brick, mortar, timber, steel and metal scraps, pipe and electrical cuttings, non-hazardous equipment parts, styrofoam and other materials used to transport and package construction materials

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- Highway planting wastes, including vegetative material, plant containers, and packaging materials

Limitations

Temporary stockpiling of certain construction wastes may not necessitate stringent drainage related controls during the non-rainy season or in desert areas with low rainfall.

Implementation

The following steps will help keep a clean site and reduce stormwater pollution:

- Select designated waste collection areas onsite.
- Inform trash-hauling contractors that you will accept only watertight dumpsters for onsite use. Inspect dumpsters for leaks and repair any dumpster that is not watertight.
- Locate containers in a covered area or in a secondary containment.
- Provide an adequate number of containers with lids or covers that can be placed over the container to keep rain out or to prevent loss of wastes when it is windy.
- Cover waste containers at the end of each work day and when it is raining.
- Plan for additional containers and more frequent pickup during the demolition phase of construction.
- Collect site trash daily, especially during rainy and windy conditions.
- Remove this solid waste promptly since erosion and sediment control devices tend to collect litter.
- Make sure that toxic liquid wastes (used oils, solvents, and paints) and chemicals (acids, pesticides, additives, curing compounds) are not disposed of in dumpsters designated for construction debris.
- Do not hose out dumpsters on the construction site. Leave dumpster cleaning to the trash hauling contractor.
- Arrange for regular waste collection before containers overflow.
- Clean up immediately if a container does spill.
- Make sure that construction waste is collected, removed, and disposed of only at authorized disposal areas.

Education

- Have the contractor's superintendent or representative oversee and enforce proper solid waste management procedures and practices.
- Instruct employees and subcontractors on identification of solid waste and hazardous waste.
- Educate employees and subcontractors on solid waste storage and disposal procedures.

- Hold regular meetings to discuss and reinforce disposal procedures (incorporate into regular safety meetings).
- Require that employees and subcontractors follow solid waste handling and storage procedures.
- Prohibit littering by employees, subcontractors, and visitors.
- Minimize production of solid waste materials wherever possible.

Collection, Storage, and Disposal

- Littering on the project site should be prohibited.
- To prevent clogging of the storm drainage system, litter and debris removal from drainage grates, trash racks, and ditch lines should be a priority.
- Trash receptacles should be provided in the contractor's yard, field trailer areas, and at locations where workers congregate for lunch and break periods.
- Litter from work areas within the construction limits of the project site should be collected and placed in watertight dumpsters at least weekly, regardless of whether the litter was generated by the contractor, the public, or others. Collected litter and debris should not be placed in or next to drain inlets, stormwater drainage systems, or watercourses.
- Dumpsters of sufficient size and number should be provided to contain the solid waste generated by the project.
- Full dumpsters should be removed from the project site and the contents should be disposed of by the trash hauling contractor.
- Construction debris and waste should be removed from the site biweekly or more frequently as needed.
- Construction material visible to the public should be stored or stacked in an orderly manner.
- Stormwater runon should be prevented from contacting stored solid waste through the use of berms, dikes, or other temporary diversion structures or through the use of measures to elevate waste from site surfaces.
- Solid waste storage areas should be located at least 50 ft from drainage facilities and watercourses and should not be located in areas prone to flooding or ponding.
- Except during fair weather, construction and highway planting waste not stored in watertight dumpsters should be securely covered from wind and rain by covering the waste with tarps or plastic.
- Segregate potentially hazardous waste from non-hazardous construction site waste.
- Make sure that toxic liquid wastes (used oils, solvents, and paints) and chemicals (acids, pesticides, additives, curing compounds) are not disposed of in dumpsters designated for construction debris.

- For disposal of hazardous waste, see WM-6, Hazardous Waste Management. Have hazardous waste hauled to an appropriate disposal and/or recycling facility.
- Salvage or recycle useful vegetation debris, packaging and surplus building materials when practical. For example, trees and shrubs from land clearing can be used as a brush barrier, or converted into wood chips, then used as mulch on graded areas. Wood pallets, cardboard boxes, and construction scraps can also be recycled.

Costs

All of the above are low cost measures.

Inspection and Maintenance

- Inspect and verify that activity–based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect BMPs subject to non-stormwater discharge daily while non-stormwater discharges occur
- Inspect construction waste area regularly.
- Arrange for regular waste collection.

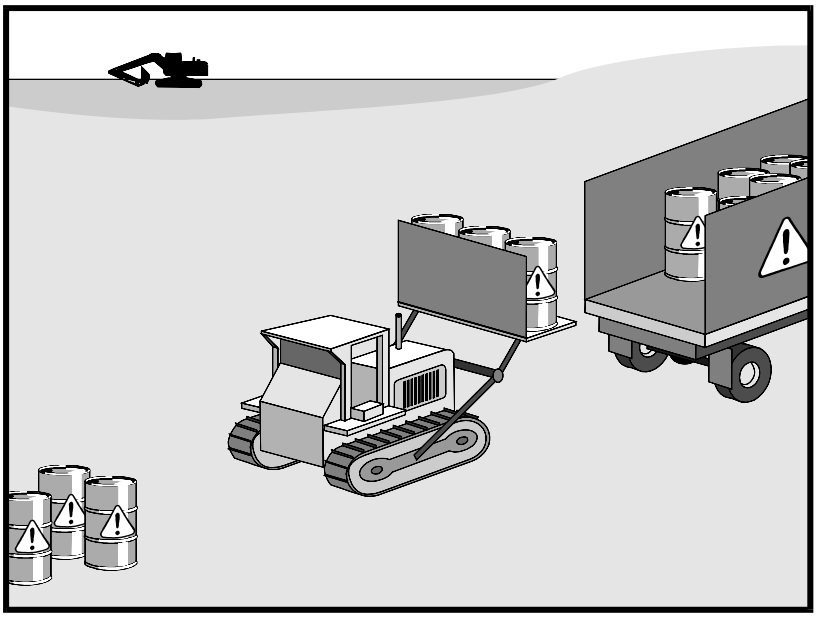
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Hazardous Waste Management WM-6



Description and Purpose

Prevent or reduce the discharge of pollutants to stormwater from hazardous waste through proper material use, waste disposal, and training of employees and subcontractors.

Suitable Applications

This best management practice (BMP) applies to all construction projects. Hazardous waste management practices are implemented on construction projects that generate waste from the use of:

- Petroleum Products
- Asphalt Products
- Concrete Curing Compounds
- Pesticides
- Palliatives
- Acids
- Septic Wastes
- Paints
- Stains
- Solvents
- Wood Preservatives
- Roofing Tar
- Any materials deemed a hazardous waste in California, Title 22 Division 4.5, or listed in 40 CFR Parts 110, 117, 261, or 302

Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	☑
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

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In addition, sites with existing structures may contain wastes, which must be disposed of in accordance with federal, state, and local regulations. These wastes include:

- Sandblasting grit mixed with lead-, cadmium-, or chromium-based paints
- Asbestos
- PCBs (particularly in older transformers)

Limitations

- Hazardous waste that cannot be reused or recycled must be disposed of by a licensed hazardous waste hauler.
- Nothing in this BMP relieves the contractor from responsibility for compliance with federal, state, and local laws regarding storage, handling, transportation, and disposal of hazardous wastes.
- This BMP does not cover aerially deposited lead (ADL) soils. For ADL soils refer to WM-7, Contaminated Soil Management.

Implementation

The following steps will help reduce stormwater pollution from hazardous wastes:

Material Use

- Wastes should be stored in sealed containers constructed of a suitable material and should be labeled as required by Title 22 CCR, Division 4.5 and 49 CFR Parts 172, 173, 178, and 179.
- All hazardous waste should be stored, transported, and disposed as required in Title 22 CCR, Division 4.5 and 49 CFR 261-263.
- Waste containers should be stored in temporary containment facilities that should comply with the following requirements:
  - Temporary containment facility should provide for a spill containment volume equal to 1.5 times the volume of all containers able to contain precipitation from a 25-year storm event, plus the greater of 10% of the aggregate volume of all containers or 100% of the capacity of the largest tank within its boundary, whichever is greater.
  - Temporary containment facility should be impervious to the materials stored there for a minimum contact time of 72 hours.
  - Temporary containment facilities should be maintained free of accumulated rainwater and spills. In the event of spills or leaks, accumulated rainwater and spills should be placed into drums after each rainfall. These liquids should be handled as a hazardous waste unless testing determines them to be non-hazardous. Non-hazardous liquids should be sent to an approved disposal site.
  - Sufficient separation should be provided between stored containers to allow for spill cleanup and emergency response access.

  - Incompatible materials, such as chlorine and ammonia, should not be stored in the same temporary containment facility.

  - Throughout the rainy season, temporary containment facilities should be covered during non-working days, and prior to rain events. Covered facilities may include use of plastic tarps for small facilities or constructed roofs with overhangs.

- Drums should not be overfilled, and wastes should not be mixed.

- Unless watertight, containers of dry waste should be stored on pallets.

- Do not over-apply herbicides and pesticides. Prepare only the amount needed. Follow the recommended usage instructions. Over application is expensive and environmentally harmful. Apply surface dressings in several smaller applications, as opposed to one large application. Allow time for infiltration and avoid excess material being carried offsite by runoff. Do not apply these chemicals just before it rains. People applying pesticides must be certified in accordance with federal and state regulations.

- Paint brushes and equipment for water and oil-based paints should be cleaned within a contained area and should not be allowed to contaminate site soils, watercourses, or drainage systems. Waste paints, thinners, solvents, residues, and sludges that cannot be recycled or reused should be disposed of as hazardous waste. When thoroughly dry, latex paint and paint cans, used brushes, rags, absorbent materials, and drop cloths should be disposed of as solid waste.

- Do not clean out brushes or rinse paint containers into the dirt, street, gutter, storm drain, or stream. “Paint out” brushes as much as possible. Rinse water-based paints to the sanitary sewer. Filter and reuse thinners and solvents. Dispose of excess oil-based paints and sludge as hazardous waste.

- The following actions should be taken with respect to temporary contaminant:

  - Ensure that adequate hazardous waste storage volume is available.

  - Ensure that hazardous waste collection containers are conveniently located.

  - Designate hazardous waste storage areas onsite away from storm drains or watercourses and away from moving vehicles and equipment to prevent accidental spills.

  - Minimize production or generation of hazardous materials and hazardous waste on the job site.

  - Use containment berms in fueling and maintenance areas and where the potential for spills is high.

  - Segregate potentially hazardous waste from non-hazardous construction site debris.

  - Keep liquid or semi-liquid hazardous waste in appropriate containers (closed drums or similar) and under cover.

- Clearly label all hazardous waste containers with the waste being stored and the date of accumulation.
- Place hazardous waste containers in secondary containment.
- Do not allow potentially hazardous waste materials to accumulate on the ground.
- Do not mix wastes.
- Use all of the product before disposing of the container.
- Do not remove the original product label; it contains important safety and disposal information.

Waste Recycling Disposal

- Select designated hazardous waste collection areas onsite.
- Hazardous materials and wastes should be stored in covered containers and protected from vandalism.
- Place hazardous waste containers in secondary containment.
- Do not mix wastes, this can cause chemical reactions, making recycling impossible and complicating disposal.
- Recycle any useful materials such as used oil or water-based paint.
- Make sure that toxic liquid wastes (used oils, solvents, and paints) and chemicals (acids, pesticides, additives, curing compounds) are not disposed of in dumpsters designated for construction debris.
- Arrange for regular waste collection before containers overflow.
- Make sure that hazardous waste (e.g., excess oil-based paint and sludge) is collected, removed, and disposed of only at authorized disposal areas.

Disposal Procedures

- Waste should be disposed of by a licensed hazardous waste transporter at an authorized and licensed disposal facility or recycling facility utilizing properly completed Uniform Hazardous Waste Manifest forms.
- A Department of Health Services certified laboratory should sample waste to determine the appropriate disposal facility.
- Properly dispose of rainwater in secondary containment that may have mixed with hazardous waste.
- Attention is directed to "Hazardous Material", "Contaminated Material", and "Aerially Deposited Lead" of the contract documents regarding the handling and disposal of hazardous materials.

Education

- Educate employees and subcontractors on hazardous waste storage and disposal procedures.
- Educate employees and subcontractors on potential dangers to humans and the environment from hazardous wastes.
- Instruct employees and subcontractors on safety procedures for common construction site hazardous wastes.
- Instruct employees and subcontractors in identification of hazardous and solid waste.
- Hold regular meetings to discuss and reinforce hazardous waste management procedures (incorporate into regular safety meetings).
- The contractor's superintendent or representative should oversee and enforce proper hazardous waste management procedures and practices.
- Make sure that hazardous waste is collected, removed, and disposed of only at authorized disposal areas.
- Warning signs should be placed in areas recently treated with chemicals.
- Place a stockpile of spill cleanup materials where it will be readily accessible.
- If a container does spill, clean up immediately.

Costs

All of the above are low cost measures.

Inspection and Maintenance

- Inspect and verify that activity–based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect BMPs subject to non-stormwater discharge daily while non-stormwater discharges occur
- Hazardous waste should be regularly collected.
- A foreman or construction supervisor should monitor onsite hazardous waste storage and disposal procedures.
- Waste storage areas should be kept clean, well organized, and equipped with ample cleanup supplies as appropriate for the materials being stored.
- Perimeter controls, containment structures, covers, and liners should be repaired or replaced as needed to maintain proper function.

- Hazardous spills should be cleaned up and reported in conformance with the applicable Material Safety Data Sheet (MSDS) and the instructions posted at the project site.
- The National Response Center, at (800) 424-8802, should be notified of spills of federal reportable quantities in conformance with the requirements in 40 CFR parts 110, 117, and 302. Also notify the Governors Office of Emergency Services Warning Center at (916) 845-8911.
- A copy of the hazardous waste manifests should be provided.

References

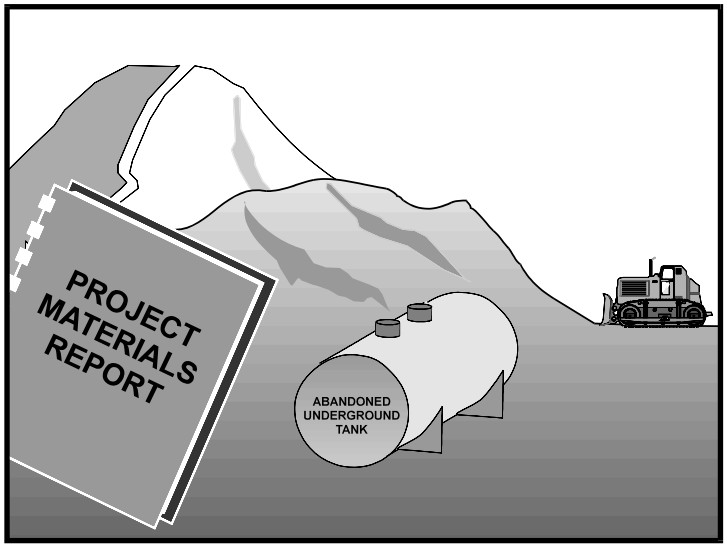
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Contaminated Soil Management WM-7



Categories		
EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:
☑ **Primary Objective**
☒ **Secondary Objective**

Description and Purpose

Prevent or reduce the discharge of pollutants to stormwater from contaminated soil and highly acidic or alkaline soils by conducting pre-construction surveys, inspecting excavations regularly, and remediating contaminated soil promptly.

Suitable Applications

Contaminated soil management is implemented on construction projects in highly urbanized or industrial areas where soil contamination may have occurred due to spills, illicit discharges, aerial deposition, past use and leaks from underground storage tanks.

Limitations

Contaminated soils that cannot be treated onsite must be disposed of offsite by a licensed hazardous waste hauler. The presence of contaminated soil may indicate contaminated water as well. See NS-2, Dewatering Operations, for more information.

The procedures and practices presented in this BMP are general. The contractor should identify appropriate practices and procedures for the specific contaminants known to exist or discovered onsite.

Implementation

Most owners and developers conduct pre-construction environmental assessments as a matter of routine. Contaminated soils are often identified during project planning and development with known locations identified in the plans, specifications and in the SWPPP. The contractor should review applicable reports and investigate appropriate call-outs in the

Targeted Constituents	
Sediment	
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	☑
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

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plans, specifications, and SWPPP. Recent court rulings holding contractors liable for cleanup costs when they unknowingly move contaminated soil highlight the need for contractors to confirm a site assessment is completed before earth moving begins.

The following steps will help reduce stormwater pollution from contaminated soil:

- Conduct thorough, pre-construction inspections of the site and review documents related to the site. If inspection or reviews indicated presence of contaminated soils, develop a plan before starting work.
- Look for contaminated soil as evidenced by discoloration, odors, differences in soil properties, abandoned underground tanks or pipes, or buried debris.
- Prevent leaks and spills. Contaminated soil can be expensive to treat and dispose of properly. However, addressing the problem before construction is much less expensive than after the structures are in place.
- The contractor may further identify contaminated soils by investigating:
  - Past site uses and activities
  - Detected or undetected spills and leaks
  - Acid or alkaline solutions from exposed soil or rock formations high in acid or alkaline forming elements
  - Contaminated soil as evidenced by discoloration, odors, differences in soil properties, abandoned underground tanks or pipes, or buried debris.
  - Suspected soils should be tested at a certified laboratory.

Education

- Have employees and subcontractors complete a safety training program which meets 29 CFR 1910.120 and 8 CCR 5192 covering the potential hazards as identified, prior to performing any excavation work at the locations containing material classified as hazardous.
- Educate employees and subcontractors in identification of contaminated soil and on contaminated soil handling and disposal procedures.
- Hold regular meetings to discuss and reinforce disposal procedures (incorporate into regular safety meetings).

Handling Procedures for Material with Aerially Deposited Lead (ADL)

- Materials from areas designated as containing (ADL) may, if allowed by the contract special provisions, be excavated, transported, and used in the construction of embankments and/or backfill.
- Excavation, transportation, and placement operations should result in no visible dust.
- Caution should be exercised to prevent spillage of lead containing material during transport.

- Quality should be monitored during excavation of soils contaminated with lead.

Handling Procedures for Contaminated Soils

- Minimize onsite storage. Contaminated soil should be disposed of properly in accordance with all applicable regulations. All hazardous waste storage will comply with the requirements in Title 22, CCR, Sections 66265.250 to 66265.260.
- Test suspected soils at an approved certified laboratory.
- Work with the local regulatory agencies to develop options for treatment or disposal if the soil is contaminated.
- Avoid temporary stockpiling of contaminated soils or hazardous material.
- Take the following precautions if temporary stockpiling is necessary:
  - Cover the stockpile with plastic sheeting or tarps.
  - Install a berm around the stockpile to prevent runoff from leaving the area.
  - Do not stockpile in or near storm drains or watercourses.
- Remove contaminated material and hazardous material on exteriors of transport vehicles and place either into the current transport vehicle or into the excavation prior to the vehicle leaving the exclusion zone.
- Monitor the air quality continuously during excavation operations at all locations containing hazardous material.
- Procure all permits and licenses, pay all charges and fees, and give all notices necessary and incident to the due and lawful prosecution of the work, including registration for transporting vehicles carrying the contaminated material and the hazardous material.
- Collect water from decontamination procedures and treat or dispose of it at an appropriate disposal site.
- Collect non-reusable protective equipment, once used by any personnel, and dispose of at an appropriate disposal site.
- Install temporary security fence to surround and secure the exclusion zone. Remove fencing when no longer needed.
- Excavate, transport, and dispose of contaminated material and hazardous material in accordance with the rules and regulations of the following agencies (the specifications of these agencies supersede the procedures outlined in this BMP):
  - United States Department of Transportation (USDOT)
  - United States Environmental Protection Agency (USEPA)
  - California Environmental Protection Agency (CAL-EPA)

- California Division of Occupation Safety and Health Administration (CAL-OSHA)
- Local regulatory agencies

Procedures for Underground Storage Tank Removals

- Prior to commencing tank removal operations, obtain the required underground storage tank removal permits and approval from the federal, state, and local agencies that have jurisdiction over such work.
- To determine if it contains hazardous substances, arrange to have tested, any liquid or sludge found in the underground tank prior to its removal.
- Following the tank removal, take soil samples beneath the excavated tank and perform analysis as required by the local agency representative(s).
- The underground storage tank, any liquid or sludge found within the tank, and all contaminated substances and hazardous substances removed during the tank removal and transported to disposal facilities permitted to accept such waste.

Water Control

- All necessary precautions and preventive measures should be taken to prevent the flow of water, including ground water, from mixing with hazardous substances or underground storage tank excavations. Such preventative measures may consist of, but are not limited to, berms, cofferdams, grout curtains, freeze walls, and seal course concrete or any combination thereof.
- If water does enter an excavation and becomes contaminated, such water, when necessary to proceed with the work, should be discharged to clean, closed top, watertight transportable holding tanks, treated, and disposed of in accordance with federal, state, and local laws.

Costs

Prevention of leaks and spills is inexpensive. Treatment or disposal of contaminated soil can be quite expensive.

Inspection and Maintenance

- Inspect and verify that activity–based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Arrange for contractor's Water Pollution Control Manager, foreman, and/or construction supervisor to monitor onsite contaminated soil storage and disposal procedures.
- Monitor air quality continuously during excavation operations at all locations containing hazardous material.
- Coordinate contaminated soils and hazardous substances/waste management with the appropriate federal, state, and local agencies.

- Implement WM-4, Spill Prevention and Control, to prevent leaks and spills as much as possible.

References

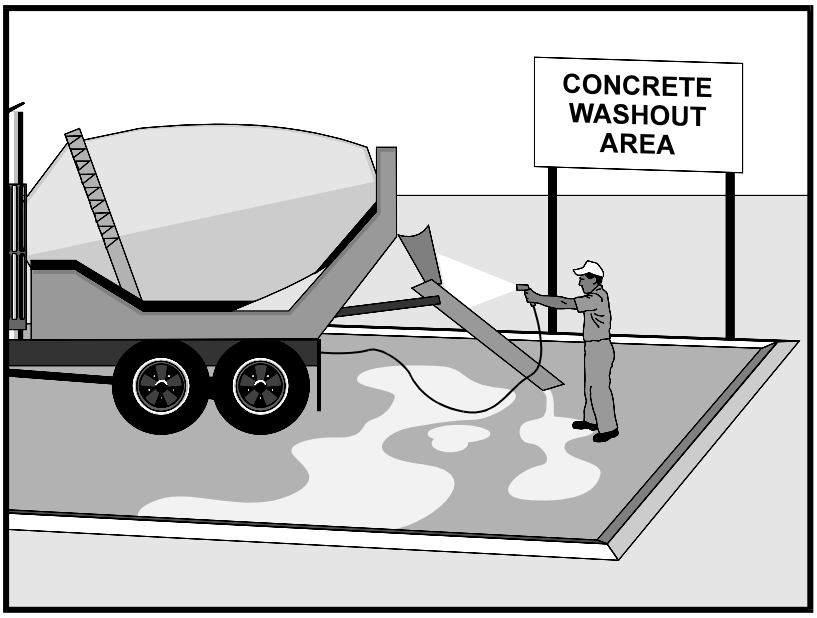
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Concrete Waste Management WM-8



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	☒
WM	Waste Management and Materials Pollution Control	☑

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	☑
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

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Description and Purpose

Prevent the discharge of pollutants to stormwater from concrete waste by conducting washout onsite or offsite in a designated area, and by employee and subcontractor training.

The General Permit incorporates Numeric Action Levels (NAL) for pH (see Section 2 of this handbook to determine your project's risk level and if you are subject to these requirements).

Many types of construction materials, including mortar, concrete, stucco, cement and block and their associated wastes have basic chemical properties that can raise pH levels outside of the permitted range. Additional care should be taken when managing these materials to prevent them from coming into contact with stormwater flows and raising pH to levels outside the accepted range.

Suitable Applications

Concrete waste management procedures and practices are implemented on construction projects where:

- Concrete is used as a construction material or where concrete dust and debris result from demolition activities.
- Slurries containing Portland cement concrete (PCC) are generated, such as from saw cutting, coring, grinding, grooving, and hydro-concrete demolition.
- Concrete trucks and other concrete-coated equipment are washed onsite.

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- Mortar-mixing stations exist.
- Stucco mixing and spraying.
- See also NS-8, Vehicle and Equipment Cleaning.

Limitations

- Offsite washout of concrete wastes may not always be possible.
- Multiple washouts may be needed to assure adequate capacity and to allow for evaporation.

Implementation

The following steps will help reduce stormwater pollution from concrete wastes:

- Incorporate requirements for concrete waste management into material supplier and subcontractor agreements.
- Store dry and wet materials under cover, away from drainage areas. Refer to WM-1, Material Delivery and Storage for more information.
- Avoid mixing excess amounts of concrete.
- Perform washout of concrete trucks in designated areas only, where washout will not reach stormwater.
- Do not wash out concrete trucks into storm drains, open ditches, streets, streams or onto the ground. Trucks should always be washed out into designated facilities.
- Do not allow excess concrete to be dumped onsite, except in designated areas.
- For onsite washout:
    - On larger sites, it is recommended to locate washout areas at least 50 feet from storm drains, open ditches, or water bodies. Do not allow runoff from this area by constructing a temporary pit or bermed area large enough for liquid and solid waste.
    - Washout wastes into the temporary washout where the concrete can set, be broken up, and then disposed properly.
    - Washouts shall be implemented in a manner that prevents leaching to underlying soils. Washout containers must be water tight and washouts on or in the ground must be lined with a suitable impervious liner, typically a plastic type material.
- Do not wash sweepings from exposed aggregate concrete into the street or storm drain. Collect and return sweepings to aggregate base stockpile or dispose in the trash.
- See typical concrete washout installation details at the end of this fact sheet.

Education

- Educate employees, subcontractors, and suppliers on the concrete waste management techniques described herein.

- Arrange for contractor's superintendent or representative to oversee and enforce concrete waste management procedures.
- Discuss the concrete management techniques described in this BMP (such as handling of concrete waste and washout) with the ready-mix concrete supplier before any deliveries are made.

Concrete Demolition Wastes

- Stockpile concrete demolition waste in accordance with BMP WM-3, Stockpile Management.
- Dispose of or recycle hardened concrete waste in accordance with applicable federal, state or local regulations.

Concrete Slurry Wastes

- PCC and AC waste should not be allowed to enter storm drains or watercourses.
- PCC and AC waste should be collected and disposed of or placed in a temporary concrete washout facility (as described in Onsite Temporary Concrete Washout Facility, Concrete Transit Truck Washout Procedures, below).
- A foreman or construction supervisor should monitor onsite concrete working tasks, such as saw cutting, coring, grinding and grooving to ensure proper methods are implemented.
- Saw-cut concrete slurry should not be allowed to enter storm drains or watercourses. Residue from grinding operations should be picked up by means of a vacuum attachment to the grinding machine or by sweeping. Saw cutting residue should not be allowed to flow across the pavement and should not be left on the surface of the pavement. See also NS-3, Paving and Grinding Operations; and WM-10, Liquid Waste Management.
- Concrete slurry residue should be disposed in a temporary washout facility (as described in Onsite Temporary Concrete Washout Facility, Concrete Transit Truck Washout Procedures, below) and allowed to dry. Dispose of dry slurry residue in accordance with WM-5, Solid Waste Management.

Onsite Temporary Concrete Washout Facility, Transit Truck Washout Procedures

- Temporary concrete washout facilities should be located a minimum of 50 ft from storm drain inlets, open drainage facilities, and watercourses. Each facility should be located away from construction traffic or access areas to prevent disturbance or tracking.
- A sign should be installed adjacent to each washout facility to inform concrete equipment operators to utilize the proper facilities.
- Temporary concrete washout facilities should be constructed above grade or below grade at the option of the contractor. Temporary concrete washout facilities should be constructed and maintained in sufficient quantity and size to contain all liquid and concrete waste generated by washout operations.

- Temporary washout facilities should have a temporary pit or bermed areas of sufficient volume to completely contain all liquid and waste concrete materials generated during washout procedures.
- Temporary washout facilities should be lined to prevent discharge to the underlying ground or surrounding area.
- Washout of concrete trucks should be performed in designated areas only.
- Only concrete from mixer truck chutes should be washed into concrete wash out.
- Concrete washout from concrete pumper bins can be washed into concrete pumper trucks and discharged into designated washout area or properly disposed of or recycled offsite.
- Once concrete wastes are washed into the designated area and allowed to harden, the concrete should be broken up, removed, and disposed of per WM-5, Solid Waste Management. Dispose of or recycle hardened concrete on a regular basis.
- Temporary Concrete Washout Facility (Type Above Grade)
    - Temporary concrete washout facility (type above grade) should be constructed as shown on the details at the end of this BMP, with a recommended minimum length and minimum width of 10 ft; however, smaller sites or jobs may only need a smaller washout facility. With any washout, always maintain a sufficient quantity and volume to contain all liquid and concrete waste generated by washout operations.
    - Materials used to construct the washout area should conform to the provisions detailed in their respective BMPs (e.g., SE-8 Sandbag Barrier).
    - Plastic lining material should be a minimum of 10 mil in polyethylene sheeting and should be free of holes, tears, or other defects that compromise the impermeability of the material.
    - Alternatively, portable removable containers can be used as above grade concrete washouts. Also called a “roll-off”; this concrete washout facility should be properly sealed to prevent leakage and should be removed from the site and replaced when the container reaches 75% capacity.
- Temporary Concrete Washout Facility (Type Below Grade)
    - Temporary concrete washout facilities (type below grade) should be constructed as shown on the details at the end of this BMP, with a recommended minimum length and minimum width of 10 ft. The quantity and volume should be sufficient to contain all liquid and concrete waste generated by washout operations.
    - Lath and flagging should be commercial type.
    - Plastic lining material should be a minimum of 10 mil polyethylene sheeting and should be free of holes, tears, or other defects that compromise the impermeability of the material.

- The base of a washout facility should be free of rock or debris that may damage a plastic liner.

Removal of Temporary Concrete Washout Facilities

- When temporary concrete washout facilities are no longer required for the work, the hardened concrete should be removed and properly disposed or recycled in accordance with federal, state or local regulations. Materials used to construct temporary concrete washout facilities should be removed from the site of the work and properly disposed or recycled in accordance with federal, state or local regulations.

- Holes, depressions or other ground disturbance caused by the removal of the temporary concrete washout facilities should be backfilled and repaired.

Costs

All of the above are low cost measures. Roll-off concrete washout facilities can be more costly than other measures due to removal and replacement; however, provide a cleaner alternative to traditional washouts. The type of washout facility, size, and availability of materials will determine the cost of the washout.

Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.

- Temporary concrete washout facilities should be maintained to provide adequate holding capacity with a minimum freeboard of 4 in. for above grade facilities and 12 in. for below grade facilities. Maintaining temporary concrete washout facilities should include removing and disposing of hardened concrete and returning the facilities to a functional condition. Hardened concrete materials should be removed and properly disposed or recycled in accordance with federal, state or local regulations.

- Washout facilities must be cleaned, or new facilities must be constructed and ready for use once the washout is 75% full.

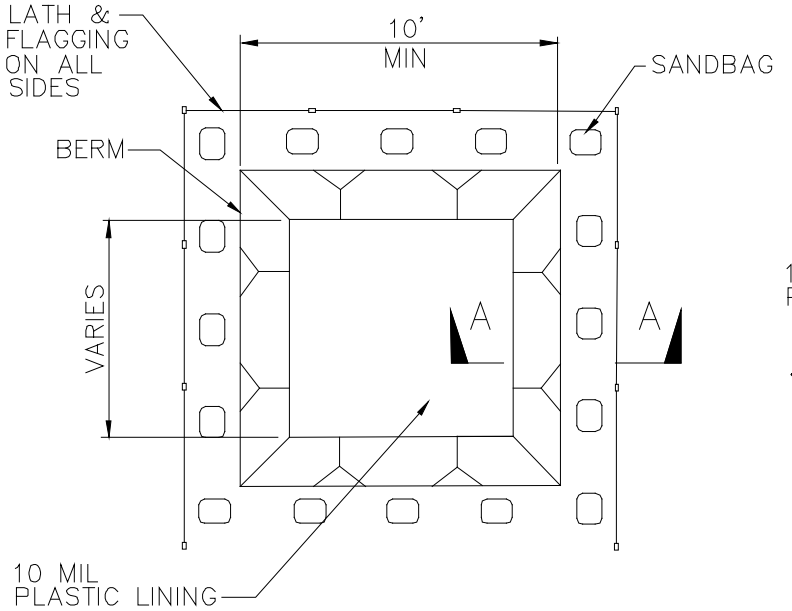
- Inspect washout facilities for damage (e.g. torn liner, evidence of leaks, signage, etc.). Repair all identified damage.

References

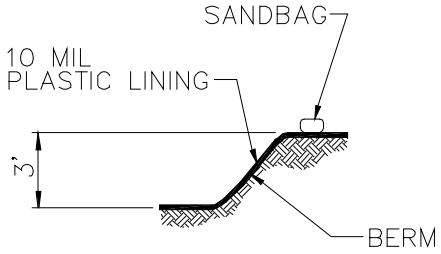
Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000, Updated March 2003.

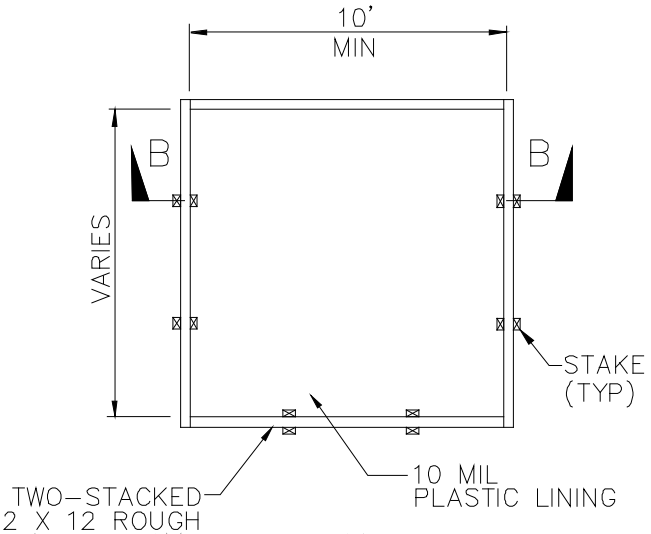
Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.



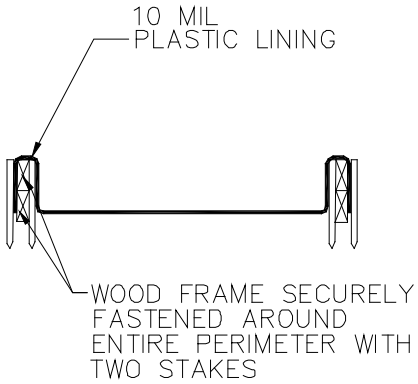
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SECTION A–A
NOT TO SCALE



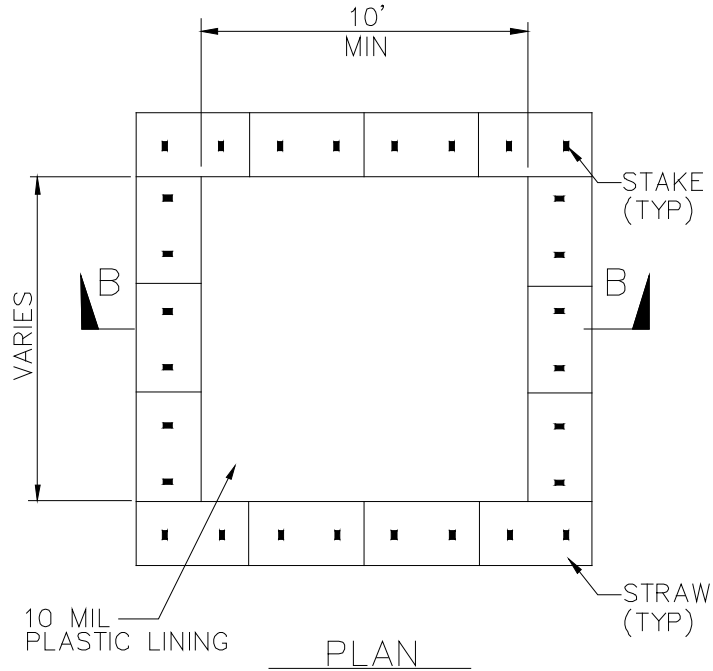
PLAN
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TYPE "ABOVE GRADE"



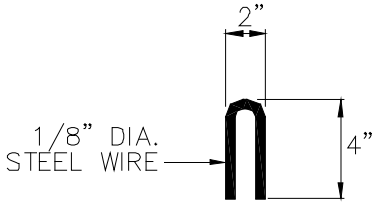
SECTION B–B
NOT TO SCALE

NOTES

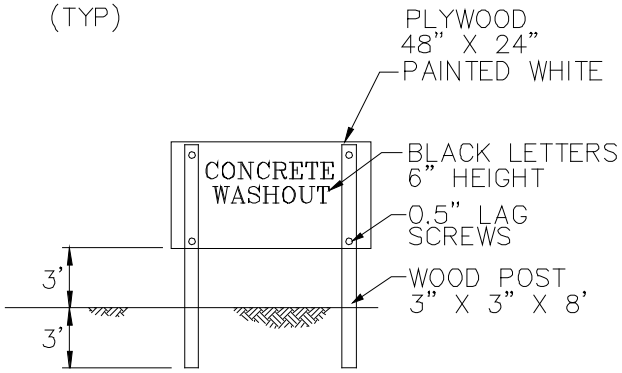
1. ACTUAL LAYOUT DETERMINED IN FIELD.
2. THE CONCRETE WASHOUT SIGN SHALL BE INSTALLED WITHIN 30 FT. OF THE TEMPORARY CONCRETE WASHOUT FACILITY.



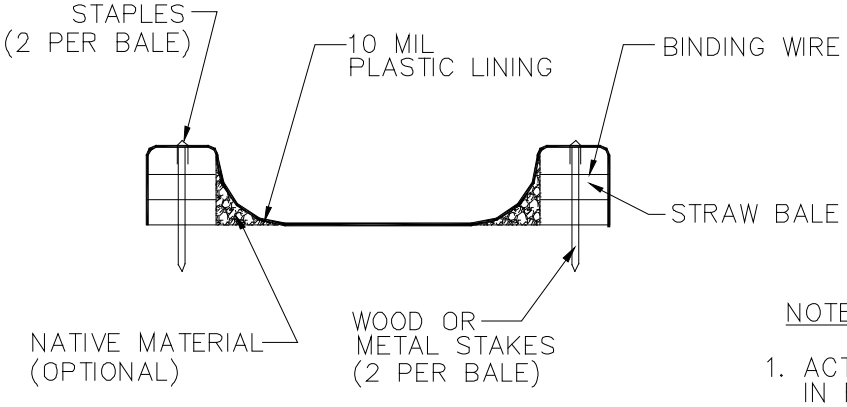
PLAN
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WITH STRAW BALES



STAPLE DETAIL



CONCRETE WASHOUT
SIGN DETAIL
(OR EQUIVALENT)

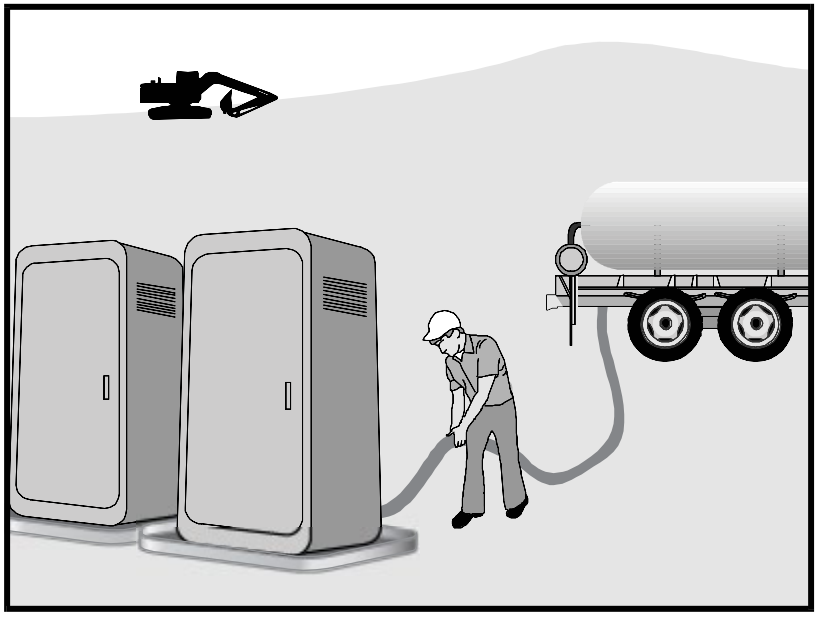


SECTION B–B
NOT TO SCALE

NOTES

1. ACTUAL LAYOUT DETERMINED IN FIELD.
2. THE CONCRETE WASHOUT SIGN SHALL BE INSTALLED WITHIN 30 FT. OF THE TEMPORARY CONCRETE WASHOUT FACILITY.

Sanitary/Septic Waste Management WM-9



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	
Nutrients	☑
Trash	☑
Metals	
Bacteria	☑
Oil and Grease	
Organics	☑

Potential Alternatives

None

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Description and Purpose

Proper sanitary and septic waste management prevent the discharge of pollutants to stormwater from sanitary and septic waste by providing convenient, well-maintained facilities, and arranging for regular service and disposal.

Suitable Applications

Sanitary septic waste management practices are suitable for use at all construction sites that use temporary or portable sanitary and septic waste systems.

Limitations

None identified.

Implementation

Sanitary or septic wastes should be treated or disposed of in accordance with state and local requirements. In many cases, one contract with a local facility supplier will be all that it takes to make sure sanitary wastes are properly disposed.

Storage and Disposal Procedures

- Temporary sanitary facilities should be located away from drainage facilities, watercourses, and from traffic circulation. If site conditions allow, place portable facilities a minimum of 50 feet from drainage conveyances and traffic areas. When subjected to high winds or risk of high winds, temporary sanitary facilities should be secured to prevent overturning.

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- Temporary sanitary facilities must be equipped with containment to prevent discharge of pollutants to the stormwater drainage system of the receiving water.
- Consider safety as well as environmental implications before placing temporary sanitary facilities.
- Wastewater should not be discharged or buried within the project site.
- Sanitary and septic systems that discharge directly into sanitary sewer systems, where permissible, should comply with the local health agency, city, county, and sewer district requirements.
- Only reputable, licensed sanitary and septic waste haulers should be used.
- Sanitary facilities should be located in a convenient location.
- Temporary septic systems should treat wastes to appropriate levels before discharging.
- If using an onsite disposal system (OSDS), such as a septic system, local health agency requirements must be followed.
- Temporary sanitary facilities that discharge to the sanitary sewer system should be properly connected to avoid illicit discharges.
- Sanitary and septic facilities should be maintained in good working order by a licensed service.
- Regular waste collection by a licensed hauler should be arranged before facilities overflow.
- If a spill does occur from a temporary sanitary facility, follow federal, state and local regulations for containment and clean-up.

Education

- Educate employees, subcontractors, and suppliers on sanitary and septic waste storage and disposal procedures.
- Educate employees, subcontractors, and suppliers of potential dangers to humans and the environment from sanitary and septic wastes.
- Instruct employees, subcontractors, and suppliers in identification of sanitary and septic waste.
- Hold regular meetings to discuss and reinforce the use of sanitary facilities (incorporate into regular safety meetings).
- Establish a continuing education program to indoctrinate new employees.

Costs

All of the above are low cost measures.

Inspection and Maintenance

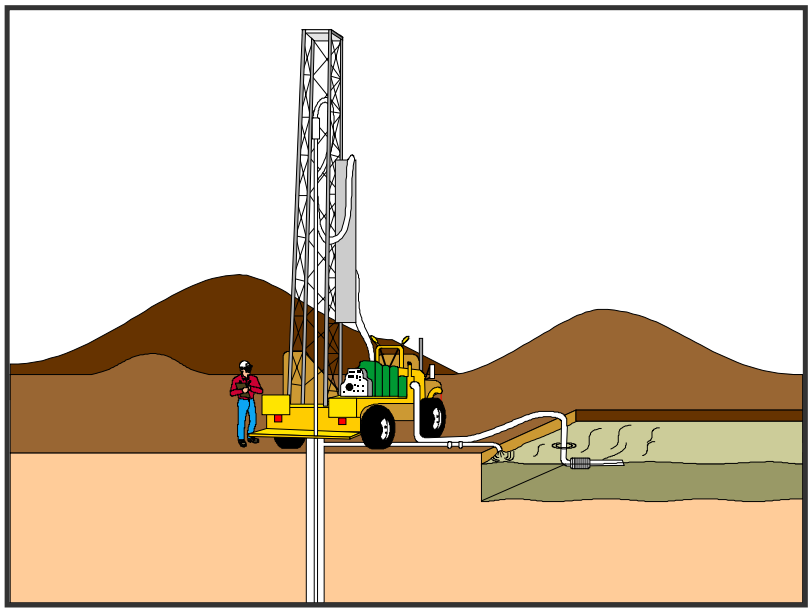
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Arrange for regular waste collection.
- If high winds are expected, portable sanitary facilities must be secured with spikes or weighed down to prevent over turning.
- If spills or leaks from sanitary or septic facilities occur that are not contained and discharge from the site, non-visible sampling of site discharge may be required. Refer to the General Permit or to your project specific Construction Site Monitoring Plan to determine if and where sampling is required.

References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

Liquid Waste Management WM-10



Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	☑

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	

Potential Alternatives

None

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Description and Purpose

Liquid waste management includes procedures and practices to prevent discharge of pollutants to the storm drain system or to watercourses as a result of the creation, collection, and disposal of non-hazardous liquid wastes.

Suitable Applications

Liquid waste management is applicable to construction projects that generate any of the following non-hazardous by-products, residuals, or wastes:

- Drilling slurries and drilling fluids
- Grease-free and oil-free wastewater and rinse water
- Dredgings
- Other non-stormwater liquid discharges not permitted by separate permits

Limitations

- Disposal of some liquid wastes may be subject to specific laws and regulations or to requirements of other permits secured for the construction project (e.g., NPDES permits, Army Corps permits, Coastal Commission permits, etc.).
- Liquid waste management does not apply to dewatering operations (NS-2 Dewatering Operations), solid waste management (WM-5, Solid Waste Management), hazardous wastes (WM-6, Hazardous Waste Management), or

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concrete slurry residue (WM-8, Concrete Waste Management).

- Typical permitted non-stormwater discharges can include: water line flushing; landscape irrigation; diverted stream flows; rising ground waters; uncontaminated pumped ground water; discharges from potable water sources; foundation drains; irrigation water; springs; water from crawl space pumps; footing drains; lawn watering; flows from riparian habitats and wetlands; and discharges or flows from emergency fire fighting activities.

Implementation

General Practices

- Instruct employees and subcontractors how to safely differentiate between non-hazardous liquid waste and potential or known hazardous liquid waste.
- Instruct employees, subcontractors, and suppliers that it is unacceptable for any liquid waste to enter any storm drainage device, waterway, or receiving water.
- Educate employees and subcontractors on liquid waste generating activities and liquid waste storage and disposal procedures.
- Hold regular meetings to discuss and reinforce disposal procedures (incorporate into regular safety meetings).
- Verify which non-stormwater discharges are permitted by the statewide NPDES permit; different regions might have different requirements not outlined in this permit.
- Apply NS-8, Vehicle and Equipment Cleaning for managing wash water and rinse water from vehicle and equipment cleaning operations.

Containing Liquid Wastes

- Drilling residue and drilling fluids should not be allowed to enter storm drains and watercourses and should be disposed of.
- If an appropriate location is available, drilling residue and drilling fluids that are exempt under Title 23, CCR § 2511(g) may be dried by infiltration and evaporation in a containment facility constructed in conformance with the provisions concerning the Temporary Concrete Washout Facilities detailed in WM-8, Concrete Waste Management.
- Liquid wastes generated as part of an operational procedure, such as water-laden dredged material and drilling mud, should be contained and not allowed to flow into drainage channels or receiving waters prior to treatment.
- Liquid wastes should be contained in a controlled area such as a holding pit, sediment basin, roll-off bin, or portable tank.
- Containment devices must be structurally sound and leak free.
- Containment devices must be of sufficient quantity or volume to completely contain the liquid wastes generated.

- Precautions should be taken to avoid spills or accidental releases of contained liquid wastes. Apply the education measures and spill response procedures outlined in WM-4, Spill Prevention and Control.

- Containment areas or devices should not be located where accidental release of the contained liquid can threaten health or safety or discharge to water bodies, channels, or storm drains.

Capturing Liquid Wastes

- Capture all liquid wastes that have the potential to affect the storm drainage system (such as wash water and rinse water from cleaning walls or pavement), before they run off a surface.

- Do not allow liquid wastes to flow or discharge uncontrolled. Use temporary dikes or berms to intercept flows and direct them to a containment area or device for capture.

- Use a sediment trap (SE-3, Sediment Trap) for capturing and treating sediment laden liquid waste or capture in a containment device and allow sediment to settle.

Disposing of Liquid Wastes

- A typical method to handle liquid waste is to dewater the contained liquid waste, using procedures such as described in NS-2, Dewatering Operations, and SE-2, Sediment Basin, and dispose of resulting solids per WM-5, Solid Waste Management.

- Methods of disposal for some liquid wastes may be prescribed in Water Quality Reports, NPDES permits, Environmental Impact Reports, 401 or 404 permits, and local agency discharge permits, etc. Review the SWPPP to see if disposal methods are identified.

- Liquid wastes, such as from dredged material, may require testing and certification whether it is hazardous or not before a disposal method can be determined.

- For disposal of hazardous waste, see WM-6, Hazardous Waste Management.

- If necessary, further treat liquid wastes prior to disposal. Treatment may include, though is not limited to, sedimentation, filtration, and chemical neutralization.

Costs

Prevention costs for liquid waste management are minimal. Costs increase if cleanup or fines are involved.

Inspection and Maintenance

- Inspect and verify that activity–based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect weekly during the rainy season and of two-week intervals in the non-rainy season to verify continued BMP implementation.

- Inspect BMPs subject to non-stormwater discharge daily while non-stormwater discharges occur.

- Remove deposited solids in containment areas and capturing devices as needed and at the completion of the task. Dispose of any solids as described in WM-5, Solid Waste Management.
- Inspect containment areas and capturing devices and repair as needed.

References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Section 5
Glossary and List of Acronyms

5.1 Glossary

303(d) Listed: Water bodies listed as impaired as per Section 303(d) of the 1972 CWA.

Active Areas of Construction: All areas subject to land surface disturbance activities related to the project including, but not limited to, project staging areas, immediate access areas and storage areas. All previously active areas of construction are considered active areas (unless temporarily defined as inactive areas) until final stabilization is complete.

Active Treatment System (ATS): A treatment technology that employs chemical coagulation, chemical flocculation, or electrocoagulation to reduce turbidity caused by fine suspended sediment, and/or to control pH levels. An active treatment system relies on enclosed computerized systems with pumps, filters, and real-time controls.

Acute Toxicity: Acute toxicity in water is caused by chemical stimuli that rapidly induce a negative effect on aquatic life; in aquatic toxicity tests, acute toxicity is demonstrated by an effect observed within 96 hours or less.

Acute Toxicity Test: Laboratory test in which an organism of interest (e.g., fathead minnow or rainbow trout) is placed in a water sample. By tracking the organism's survival, the lab can determine whether the sample water is toxic.

Aquatic: The water environment. Plants and animals that live in the water are referred to as being aquatic.

Bacteria: See pathogens.

Beneficial Uses: As defined in the California Water Code, beneficial uses of the waters of the State that may be protected against quality degradation include, but are not limited to, domestic, municipal, agricultural and industrial supply; power generation; recreation; aesthetic enjoyment; navigation; and preservation and enhancement of fish, wildlife, and other aquatic resources or preserves. See also COLD, MIGR, and SPWN.

Best Management Practices (BMPs): Includes schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent, eliminate, or reduce the pollution of waters of the receiving waters. BMPs also include treatment requirements, operating procedures, and practices to control plant site runoff spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

Biofilter Bags: Plastic mesh bag filled with 100% recycled wood product waste. They come in a variety of sizes and are used to detain flow and allowing a slow rate of discharge through the wood media.

Cartridge Filter: Cartridge filters provide a high degree of pollutant removal by utilizing a number of individual cartridges as part of a larger filtering unit. They are often used as a secondary or higher (polishing) level of treatment after a significant amount of sediment and other pollutants are removed.

Catch Basin (Also known as Inlet): Box-like underground concrete structure with openings in curbs and gutters designed to collect runoff from streets and pavement.

Check Dam: A small barrier constructed of rock, gravel bags, sandbags, fiber rolls, or other proprietary products, placed across a constructed swale or drainage ditch. Check dams are used to reduce the effective slope of the channel and flow velocity, which allows sediment to settle out of suspension.

Clay A particle size class consisting of sediment particles less than 0.002 mm in diameter.

Clean Water Act (CWA): (33 U.S.C. 1251 et seq.) requirements of the NPDES program are defined under Sections 307, 402, 318 and 405 of the CWA.

COLD: Abbreviation for the Cold Freshwater Habitat Beneficial Use, which designates uses of water that support cold water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.

Compost: Compost is typically derived from combinations of feedstocks, biosolids, leaf and yard trimmings, manure, wood, or mixed solid waste; it is organic and biodegradable and can be left on-site.

Compost Berm: A dike of compost with a trapezoidal cross-section used to intercept sheet flow when placed perpendicular to runoff flow.

Compost Blanket: A layer of compost applied at the appropriate thickness onto slopes and earth disturbed areas to prevent erosion, and in some cases, increase infiltration and/or establish vegetation. Provides organic matter and nutrients important for plant growth.

Compost Sock: Mesh sock containing compost used as a three-dimensional biodegradable filtering structure to intercept runoff where sheet flow occurs.

Concrete Curing: Concrete curing is used in the construction of structures such as bridges, retaining walls, pump houses, large slabs, and structured foundations. Concrete curing includes the use of both chemical and water methods.

Concrete Finishing: General term for methods used for bridge deck rehabilitation, paint removal, curing compound removal, and final surface finish appearances. Applications include sand blasting, shot blasting, grinding, or high-pressure water blasting.

Construction Activity: Includes clearing, grading, excavation, and contractor activities that result in soil disturbance.

Denuded: Land stripped of vegetation or land that has had its vegetation worn down due to the impacts from the elements or humans.

Detention: The temporary storage of stormwater to improve quality or reduce the volumetric flow rate of discharge or both.

Dewatering: The process of removing excess water in an excavation or impoundment by pumping or other mechanical means.

Dewatering Bag: See gravity bag filter.

Dewatering Operations: Practices that manage the discharge of pollutants when non-stormwater and/or stormwater must be removed from a work location to proceed with construction work or to provide vector control.

Dewatering Tank: A dewatering tank removes debris and sediment. Flow enters the tank through the top, passes through a fabric filter, and is discharged through the bottom of the tank. The filter separates the solids from the liquids.

Discharge: A release or flow of stormwater or other substance from a conveyance system or storage container. Broader – includes release to storm drains, etc.

Discharge Location: A common outlet from a construction site drainage area where stormwater, authorized non-stormwater, or dewatering discharge leaves the site or project boundary, or enters any on-site waters of the United States (e.g., a creek running through a site).

Disking: A mechanical method of roughening the upper layer of soil to reduce competing vegetation, improve water infiltration, and prepare for planting.

Effluent Limitations: Any numeric or narrative restriction imposed on quantities, discharge rates, and concentrations of pollutants which are discharged from point sources into waters of the United States, the waters of the contiguous zone, or the ocean.

Erosion: The process, by which soil particles are detached and transported by the actions of wind, water, or gravity.

Erosion Control BMPs: Are vegetation, such as grasses and wildflowers, and other materials, such as straw, fiber, stabilizing emulsion, protective blankets, rolled erosion control product, etc., placed to stabilize areas of disturbed soils, reduce loss of soil due to the action of water or wind, and prevent water pollution.

Fiber Rolls: A tight tubular roll made of straw, coir, or other biodegradable materials wrapped in netting which can be photodegradable or natural. Used along the contour or at the toe of a slope to intercept runoff, reduce flow velocity, and release the runoff as sheet flow, and provide some removal of sediment from the runoff.

Fines: Refers to soil particles (sediment) that fall within the clay or silt size fractions.

Forecasted Precipitation Event: Forecasted precipitation event is any weather pattern that is forecasted to have a 50 percent or greater chance of producing 0.5 inches of precipitation in a 24-hour period in the project area. The discharger shall obtain precipitation forecast information from the National Weather Service Forecast Office (e.g., by entering the zip code of the project's location at https://forecast.weather.gov). Precipitation events end when there are two sequential 24-hour periods with less than 0.25 inches of precipitation forecast for each period.

(Construction) General Permit: A National Pollutant Discharge Elimination System (NPDES) permit issued by the State Water Resources Control Board for the discharge of stormwater associated with construction activity from soil disturbance of one acre or more.

Grading: The cutting or filling of the land surface to a desired slope or elevation.

Gravel Bag Berm: Series of gravel-filled bags placed on a level contour to intercept sheet flow.

Gravity Bag Filter: A gravity bag filter, also referred to as a dewatering bag, is a square or rectangular bag made of non-woven geotextile fabric that collects gravel, sand, silt, and fines.

Gross Pollutants: Typically refers to visible pollutants such as trash, debris, and floatables, which may create an aesthetic "eye sore" in waterways, but may also include heavy metals, pesticides, and bacteria in stormwater. Gross pollutants also include plant debris (such as leaves and lawn-clippings), animal excrement, street litter, and other organic matter.

Gully Erosion: Erosion that occurs where the volume of runoff is concentrated, flowing water cuts deep into the soil bringing together separate rills into larger channels called gullies. Gully erosion acts like rill erosion on a larger scale.

Hazardous Waste: A waste or combination of wastes that, because of its quantity, concentration, or physical, chemical or infectious characteristics, may either cause or significantly contribute to an increase in mortality or an increase in serious irreversible illness; or pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of or otherwise managed. Possesses at least one of four characteristics (ignitability, corrosivity, reactivity, or toxicity) or appears on special U.S. EPA or State lists. Regulated under the federal Resource Conservation and Recovery Act and the California Health and Safety Code.

Hydraulic Mulch: Hydraulic mulch consists of various types of fibrous materials mixed with water and sprayed onto the soil surface in slurry form to provide a layer of temporary protection from wind and water erosion.

Hydroseeding: Typically consists of applying a mixture of a hydraulic mulch, seed, fertilizer, and stabilizing emulsion with a hydraulic mulcher, to temporarily protect exposed soils from erosion by water and wind.

Illicit Discharges: Any discharge to an MS4 or receiving water that is not in compliance with applicable laws and regulations, e.g., is not discharged pursuant to an NPDES permit or applicable exemption or waiver.

Impervious Surface: Ground cover that prevents the infiltration of water into the soil, such as pavement and buildings.

Inactive Areas of Construction: Areas of construction activity that have been disturbed but which are not currently being worked and are not scheduled to be re-disturbed for at least 14 days.

Inactive Project: A project where all construction activities (including passive treatment technology, active treatment systems, and/or active equipment), are fully stabilized and will be suspended for 30 days or more.

Industrial General Permit: The NPDES General Permit (No. CAS000001) issued by the State Water Resources Control Board for discharge of stormwater associated with industrial activity. Available online at http://www.waterboards.ca.gov/water_issues/programs/stormwater/industrial.shtml.

Inlet: An entrance into a ditch, storm drain, or other waterway.

Integrated Pest Management (IPM): An ecosystem-based strategy that focuses on long-term prevention of pests or their damage through a combination of techniques such as biological control, habitat manipulation, modification of cultural practices, and use of resistant varieties. Pesticides are used only after monitoring indicates they are needed according to established guidelines, and treatments are made with the goal of removing only the target organism.

Leaching: Infiltration or percolation below the soil surface, which is perceived as a loss. Typically refers to fertilizers or salts being pushed below the plant rooting zone by rain or irrigation water.

Legally Responsible Person (LRP): The Legally Responsible Person is a representative of a permittee and signatory that is legally designated to sign, certify, and electronically submit any documents required by the General Permit, the State or Regional Water Board, or U.S. EPA.

Linear Underground/Overhead Project (LUP): Linear Underground/Overhead Projects (LUPs) include, but are not limited to, any conveyance, pipe, or pipeline for the transportation of any gaseous, liquid (including water and wastewater for domestic municipal services), liquescent, or slurry substance; any cable line or wire for the transmission of electrical energy; any cable line or wire for communications (e.g., telephone, telegraph, radio, or television messages); and associated ancillary facilities.

MIGR: Abbreviation for the Migration of Aquatic Organisms Beneficial Use, which designates uses of water that support habitats necessary for migration or other temporary activities by aquatic organisms, such as anadromous fish.

Municipal Separate Storm Sewer System (MS4): A conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains): (i) designed or used for collecting or conveying stormwater; (ii) which is not a combined sewer; and (iii) which is not part of a Publicly Owned Treatment Works (POTW) as defined at Title 40 of the Code of Federal Regulations (CFR) 122.2. A "Small MS4" is defined as an MS4 that is not a permitted MS4under the Phase I regulations. This definition of a Small MS4 applies to MS4 operated within cities and counties as well as other public storm drain operators that have a system of storm sewers.

Non-Point Source Pollution: Pollution that originates from diffuse contamination that does not originate from a single discrete source and specifically does not come from a point source as defined by the CWA. Non-point source pollution can originate from aerial diffuse sources, agriculture, forests, and runoff that does not flow through an MS4, industrial, or construction operation subject to an NPDES permit.

Non-stormwater Discharge: Non-stormwater discharges are discharges that do not originate from precipitation events. They can include, but are not limited to, discharges of process water, air conditioner condensate, non-contact cooling water, vehicle wash water, sanitary wastes, concrete washout water, paint wash water, irrigation water, dust control over-wetting, or pipe testing water.

Notice of Intent (NOI): Part of the required Permit Registration Documents, which provides information on the owner, location, type of project, and certifies that the owner will comply with the conditions of the General Permit.

Notice of Termination (NOT): Formal notice to SWRCB submitted by owner/developer that a construction project is complete and the project has met the conditions to terminate the permit.

NPDES Permit: NPDES is an acronym for National Pollutant Discharge Elimination System. NPDES is the national program for administering and regulating Sections 307, 318, 402, and 405 of the CWA. In California, the State Water Resources Control Board (SWRCB) has issued a General Permit for stormwater discharges associated with construction activities (see Appendix A).

Numeric Action Level (NAL): A numeric action level (e.g., a pH range, turbidity value, or concentration) is a level that triggers a required evaluation of the effectiveness of best management practices implemented on the subject construction site, and the required implementation of additional corrective actions necessary to reduce the subject pollutant below the numeric action level. The numeric action level compliance location applies to each sample location and/or corresponding discharge location.

Numeric Effluent Limitation (NEL): A technology-based or water quality-based limit (e.g., pH range, turbidity value, or concentration) established for discharges covered under the General Permit. The numeric effluent limitation compliance location(s) applies to each sample and/or discharge location at the point of discharge from an active treatment system or construction site with TMDL requirements, as applicable.

Nutrients: Compounds necessary for plant and animal growth. In regards to water quality, the term usually refers to nitrogen and phosphorus compounds. These nutrients can result in excessive or accelerated growth of vegetation, such as algae, resulting in impaired use of water in lakes and other sources of water supply or recreational opportunities. For example, nutrients have led to a loss of water clarity in Lake Tahoe. In addition, excessive algae growth leads to oxygen depletion which can be fatal to fish and aquatic life. Also, un-ionized ammonia (one of the forms of nitrogen) can be toxic to fish.

Oil and Grease: Oil and grease includes a wide array of hydrocarbon compounds, some of which are toxic to aquatic organisms at low concentrations. Sources of oil and grease include leakage, spills, cleaning and sloughing associated with vehicle and equipment engines and suspensions, leaking and breaks in hydraulic systems, restaurants and waste oil disposal.

Organics: Compounds that are carbon based. Often synthetic organic compounds (adhesives, cleaners, sealants, solvents, etc.) are widely applied and may be improperly stored and disposed.

Outfall: The end point where storm drains discharge water into a waterway.

Passive Treatment: Passive treatment is the application of natural or synthetic chemicals and products to reduce turbidity in discharges through coagulation and flocculation. Passive treatment does not rely on computerized, enclosed systems with pumps, filters, and real-time controls. Passive treatment may include pumps where they are necessary to move water around the construction site. Passive treatment products are available in a variety of forms and may be land-applied for soil stabilization (e.g., bonded fiber matrixes, hydromulches) or water-applied for sediment removal (e.g., liquid treatment chemicals, powders, slow-releasing solid blocks/socks). General Permit Attachment G applies to the use of water-applied passive

treatment products that remove suspended solids such as sediment from stormwater without using an active treatment system.

Pathogens: Refers to bacteria and viruses that cause disease. For separate storm drain systems, sources of these contaminants include animal excrement and sanitary sewer leaks and overflow. High levels of indicator bacteria in stormwater have led to the closure of beaches, lakes, and rivers to contact recreation such as swimming.

Permit Registration Documents (PRDs): A formal notice to SWRCB submitted by the owner of a construction site that said owner seeks coverage under the General Permit for discharges associated with construction activities.

Pesticide: Any substance used to eliminate pests. Pesticides include herbicides, fungicides, rodenticides, and insecticides.

pH: A measure of the acidic or basic nature of a solution. The typical pH scale ranges from 0 to 14, with pure water being neutral and having a pH of 7. Values above 7 are considered basic and pH values less than 7 are acidic, relative to how far they deviate from neutral (pH=7).

(Construction) Phases: The General Permit recognizes five distinct phases of construction activities: (1) Demolition and Pre-development Site Preparation Phase, (2) Grading and Land Development Phase, (3) Streets and Utilities Phase, (4) Vertical Construction Phase, and (5) Final Landscaping and Site Stabilization Phase. Each phase has activities that can result in different water quality effects from different water quality pollutants and some General Permit requirements are tailored to the construction phase.

Photodegradable: A material that breaks down or degrades in sunlight.

Planning Watershed: Planning watershed was defined by the Calwater watershed classification system as a watershed ranging in size from approximately 3,000 to 10,000 acres. The Calwater watershed classification system has since been merged with the national Watershed Boundary Dataset (WBD). For the purposes of this permit, Calwater planning watersheds are assumed to be roughly equivalent to the WBD's Hydrologic Unit Code, 12 digit subwatersheds (HUC-12). See: http://www.waterboards.ca.gov/water_issues/programs/stormwater/docs/constpermits/guidance/receivingwaterrisk.pdf.

Point Source: Any discernible, confined, and discrete conveyance from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture or agricultural stormwater runoff.

Pollutant: Generally, any substance introduced into the environment that adversely affects the usefulness of a resource.

Pollution Prevention (P2): Practices and actions that reduce or eliminate the generation of pollutants.

Polyacrylamide (PAM): Substance available in a variety of forms used to aggregate soil particles allowing them to settle out of suspension.

Precipitation: Any form of rain or snow.

Pressurized Bag Filter: A pressurized bag filter is a unit composed of single filter bags made from polyester felt material. The water filters through the unit and is discharged through a header. Some units include a combination of bag filters and cartridge filters for enhanced contaminant removal.

Pretreatment: Treatment of waste stream before it is discharged to a collection system.

Qualified SWPPP Developer (QSD): Individual who is a qualified stormwater professional authorized by the discharger to develop and revise SWPPPs. Effective September 1, 2023, a QSD shall have one of the following credentials:

a. A California registered professional civil engineer; or
b. A California registered professional geologist or engineering geologist; or
c. A California registered landscape architect; or
d. A professional hydrologist registered through the American Institute of Hydrology; or
e. A Certified Professional in Erosion and Sediment Control (CPESC) registered through EnviroCert International, Inc.; or
f. A Certified Professional in Storm Water Quality (CPSWQ) registered through EnviroCert International, Inc.; or
g. Any prerequisite course approved by the State Water Board's Division of Water Quality Deputy Director in accordance with General Permit Section V.G.

Effective September 2, 2011, a QSD shall have attended an SWRCB-sponsored or approved QSD training course.

Qualified SWPPP Practitioner (QSP): Individual who is a qualified stormwater professional authorized by the discharger to conduct non-stormwater and stormwater visual observations, sampling, and implementation of all elements of the SWPPP. Effective September 1, 2023, a QSP shall have attended an SWRCB-sponsored or approved QSP training course and shall be either a QSD or have one of the following credentials:

a. A Certified Erosion, Sediment and Storm Water Inspector (CESSWI) registered through EnviroCert International, Inc.; or
b. A Certified Inspector of Sediment and Erosion Control (CISEC) registered through Certified Inspector of Sediment and Erosion Control, Inc.; or
c. A Construction Management degree from an accredited 4-year institution that includes coursework that covers the underlying principles of erosion and sediment control and practices of reducing pollution in stormwater; or
d. Any prerequisite course approved by the State Water Board's Division of Water Quality Deputy Director in accordance with General Permit Section V.H.

Qualified SWPPP Practitioner Delegate (QSP Delegate): An individual assigned responsibility by the QSP for the implementation of specific elements of the SWPPP who has completed the required foundational and site-specific training provided by the QSP.

Qualifying Precipitation Event (QPE): Qualifying precipitation event is any weather pattern that is forecast to have a 50 percent or greater Probability of Precipitation (PoP) and a

Quantitative Precipitation Forecast (QPF) of 0.5 inches or more within a 24-hour period. The event begins with the 24-hour period when 0.5 inches has been forecast and continues on subsequent 24-hour periods when 0.25 inches of precipitation or more is forecast.

Quantitative Precipitation Forecast (QPF): Quantitative Precipitation Forecast is the forecast that includes precipitation and snow accumulation measurements. This information can be obtained from the NOAA Forecast.

Receiving Water: A river, lake, stream, estuary, bay, or ocean into which runoff is discharged.

Receiving Water Monitoring Trigger: Thresholds for particular effluent water quality measurements that trigger receiving water monitoring for a subset of construction projects. The General Permit includes receiving water triggers for pH and turbidity.

Responsible Discharger: Responsible dischargers are dischargers who:

a. Discharge stormwater and authorized non-stormwater directly, or through a municipal separate sewer system (MS4) or other conveyance, to impaired water bodies or watersheds identified in a U.S. EPA-approved TMDL with a waste load allocation assigned to construction stormwater sources; and
b. Have identified, through the site-specific pollutant source assessment, that one or more pollutants specific to the TMDL are present on-site with the potential to enter construction stormwater discharges.

Retention: The storage of stormwater to prevent it from leaving the development site.

Revised Universal Soil Loss Equation (RUSLE): A formula for determining soil loss in tons per acre according to different site specific variables. The equation is written as follows:

$$A=(R)(K)(LS)(C)(P)$$

Where:
R = rainfall-runoff erosivity factor
K = soil erodibility factor
LS = length-slope factor
C = cover factor
P = management operations and support practices

Rill Erosion: Rills are channels small enough to be smoothed over by normal tillage. Rill erosion takes place when water concentrates in these small channels and carries sediment in the water flow.

Riparian: Refers to the habitat located adjacent to rivers or streams.

Rolled Erosion Control Products (RECPs): These products, also known as geotextiles and mats, can be made of natural or synthetic materials or a combination of the two. RECPs are used to cover the soil surface to reduce erosion from rainfall impact, hold soil in place, and absorb and hold moisture near the soil surface.

Roughening: Soil roughening is generally referred to as track walking (sometimes called imprinting) a slope, where treads from heavy equipment run parallel to the contours of the slope and act as mini terraces.

Runoff: Water originating from rainfall, melted snow, and other sources (e.g., sprinkler irrigation) that flows over the land surface to drainage facilities, rivers, streams, springs, seeps, ponds, lakes, and wetlands.

Run-on: Discharges that originate offsite and flow onto the property of a separate project site.

Sand: A soil particle between 0.05 and 2.0 mm in diameter.

Sandbag Barrier: Series of sand-filled bags placed on a level contour to intercept or divert sheet flows of water.

Sand Media Particulate Filter: Water is treated by passing it through canisters filled with sand media. Generally, sand filters provide a final level of treatment. They are often used as a secondary or higher level of treatment after a significant amount of sediment and other pollutants have been removed using other methods.

Scour: The erosive and digging action in a watercourse caused by flowing water.

Secondary Containment: A device or control measure in addition to the primary containment that is used to stop a discharge of pollutants or hazardous material from leaving a specified area.

Sedimentation: The process of depositing soil particles, clays, sands, or other sediments that were picked up by runoff.

Sediment: Sediment is solid particulate matter, both mineral and organic, that is in suspension, is being transported, or has been moved from its site of origin by air, water, gravity, or ice and has come to rest on the earth's surface either above or below sea level.

Sediment Basin: A sediment basin is a temporary basin with a controlled release structure that is formed by excavation or construction of an embankment to detain sediment-laden runoff and allow sediment to settle out before discharging.

Sediment Control: Sediment controls are treatment control practices that trap soil particles after erosion by rain, flowing water, or wind. They include those practices that intercept and slow or detain the flow of stormwater to allow sediment to settle and be trapped (e.g., silt fence, sediment basin, fiber rolls, etc.). Sediment control measures are usually passive systems that rely on filtering or settling the particles out of the water or wind that is transporting them.

Sediment Transport Capacity: The capability of a channel to move sediment, this varies under different flow conditions.

Sediment Trap: A temporary basin formed by excavation and/or construction of an earthen embankment across a waterway or low drainage area to detain sediment-laden runoff and allow sediment to settle out before discharging.

Sheet Erosion: Sheet erosion is relatively uniform erosion from the entire soil surface.

Significant Materials: Includes, but not limited to, raw materials; fuels; materials such as solvents, detergents, and plastic pellets; finished materials such as metallic products; raw

materials used in food processing or production; hazardous substances designed under Section 101(14) of CERLCA; any chemical the facility is required to report pursuant to Section 313 of Title III of SARA; fertilizers; pesticides; and waste products such as ashes, slag, and sludge that have the potential to be released with stormwater discharges.

Significant Quantities: The volume, concentrations, or mass of a pollutant in stormwater discharge that can cause or threaten to cause pollution, contamination, or nuisance that adversely impact human health or the environment and cause or contribute to a violation of any applicable water quality standards for receiving water.

Silt: A soil particle size class consisting of particles between 0.05 and 0.002 mm in diameter. These particles are smaller than sand and larger than clay.

Silt Fence: A silt fence is used to detain sediment-laden water, promoting sedimentation behind the fence. Silt fences are made of a woven geotextile that has been entrenched, attached to supporting poles, and sometimes backed by a plastic or wire mesh for support.

Soil Binder: Material applied to the soil surface to temporarily prevent water and wind induced erosion of exposed soils on construction sites. Soil binders are typically applied to disturbed areas requiring short term temporary protection.

Soil Preparation: Steps taken to prepare soil for planting or the installation of a BMP. Soil preparation may include tilling, raking, or the addition of a soil amendment.

Source Control BMPs: Operational practices that reduce potential pollutants at the source.

Source Reduction (also source control): The technique of stopping and/or reducing pollutants at their point of generation so that they do not come into contact with stormwater.

SPWN: Abbreviation for the Spawning, Reproduction, and/or Early Development Beneficial Use, which designates uses of water that support high quality aquatic habitats suitable for reproduction and early development of fish.

Stockpile Management: Procedures and practices that are designed to reduce or eliminate air and stormwater pollution from stockpiles of soil, soil amendments, sand, paving materials such as Portland cement concrete (PCC) rubble, asphalt concrete (AC), asphalt concrete rubble, aggregate base, aggregate subbase or pre-mixed aggregate, asphalt minder (so called “cold mix” asphalt), and pressure treated wood.

Storm Drains: Above- and below-ground structures for transporting stormwater to streams or outfalls for flood control purposes.

Stormwater: Stormwater is rain, snowmelt, or any other liquid or solid precipitation that may result in runoff, and drainage from a site. Stormwater is that portion of precipitation that flows across a surface to the storm drain system or receiving waters.

Stormwater Discharge Associated with Industrial Activity: Discharge from any conveyance which is used for collecting and conveying stormwater from an area that is directly related to manufacturing, processing, or raw materials storage activities at an industrial plant.

Stormwater Pollution Prevention Plan (SWPPP): A written plan that documents the series of phases and activities that, first, characterizes your site, and then prompts you to select and carry out actions which prevent the pollution of stormwater discharges.

Straw Mulch: Straw mulch consists of placing a uniform layer of straw and incorporating it into the soil with a studded roller or crimper, or anchoring it with a tackifier or stabilizing emulsion. Straw mulch protects the soil surface from the impact of rain drops, preventing soil particles from becoming dislodged.

Temporary Batch Plant: During the construction of large structures or in remote locations, a temporary batch plant may be necessary to manufacture Portland Cement Concrete (PCC) or AC. Temporary batch plant facilities typically consist of silos containing fly ash, lime, and cement; heated tanks of liquid asphalt; sand and gravel material storage areas; mixing equipment; above ground storage tanks containing concrete additives and water; and designated areas for sand and gravel truck unloading, concrete truck loading, and concrete truck washout.

Temporary Silt Dike: Pre-manufactured device that is installed for semi-permanent drainage and sediment control on the perimeter of disturbed sites or stockpiles of materials or as check dams within channels.

Total Maximum Daily Load (TMDL): A TMDL is the sum of the maximum amount of a pollutant that a waterbody can receive per day and still meet state water quality standards. It is the sum of the individual Waste Load Allocations (WLAs) for point sources, the load allocations for nonpoint and natural background sources, and the margin of safety.

Toxicity: Adverse responses of organisms to chemicals or physical agents ranging from mortality to physiological responses such as impaired reproduction or growth anomalies.

Tracking Control: Tracking control refers to methods of preventing or reducing the tracking of sediment off-site by vehicles leaving the construction area.

Traditional Construction Project: Most construction projects, including but not limited to commercial, residential, industrial, institutional, and highway construction project. Does not include those projects defined as LUPs.

Trash: All improperly discarded solid material from any production, manufacturing, or processing operation including, but not limited to, products, product packaging, or containers constructed of plastic, steel, aluminum, glass, paper, or other synthetic or natural materials.

Treatment Control BMPs: Treatment methods to remove pollutants from stormwater.

Turbidity: The optical condition and cloudiness of water caused by suspended or dissolved particles or colloids. Turbidity is quantified by the degree to which light traveling through a water column is scattered by the suspended organic and inorganic particles it contains. The turbidity test is reported in Nephelometric Turbidity Units (NTU) or Jackson Turbidity Units (JTU) with a calibrated turbidity meter.

Urban Runoff: Stormwater from city streets and adjacent domestic or commercial properties that carries pollutants of various kinds into the sewer systems and receiving waters.

Vector: Organism that spreads disease (e.g., mosquitos and rodents).

Vegetation: Living plant matter.

Virus: See pathogens.

Wadable Stream: Streams that can be sampled by field crews wearing chest waders (generally less than 0.5 m-1.0 meters deep)

Waste Management: Source control management practices that prevent pollution by limiting or reducing potential pollutants at their source, before they come into contact with stormwater. Practices under this category can be thought of as "good housekeeping" and include procedural and structural BMPs for handing, storing, and disposing of wastes generated by a construction project.

Weir Tank: A weir tank separates water and waste by using weirs. The configuration of the weirs (over and under weirs) maximizes the residence time in the tank and determines the waste to be removed from the water, such as oil, grease, and sediments.

Wetland: An area of land that has water-saturated soils for long periods of time and water loving vegetation. Wetlands are typically flooded for part of the year, forming a transitional area between aquatic and terrestrial environments.

Wind Erosion Control: Methods used to minimize wind erosion. Controls consist of applying water or other dust palliatives to prevent or alleviate dust nuisance.

5.2 List of Acronyms

AASHTO	American Association of State Highway and Transportation Officials
AC	Asphalt Concrete
ADL	Aerially Deposited Lead
AIMP	Impervious Area
AINF	Infiltration Area
ANSI	American National Standards Institute
APCD	Air Pollution Control District
APHA	American Public Health Association
APWA	American Public Works Association
AQMD	Air Quality Management District
ARB	Air Resources Board
ARS	Agricultural Research Service
ASTM	American Society for Testing Materials
ATS	Active Treatment System
AWWA	American Water Works Association
BAT	Best Available Technology (economically available)
BCT	Best Conventional Technology (pollution control)
BFM	Bonded Fiber Matrix
BMPs	Best Management Practices
BOD	Biochemical Oxygen Demand
CA	Contractor Activities
CAL-OSHA	California Division of Occupational Safety and Health Administration
CASQA	California Stormwater Quality Association
CCR	California Code of Regulations
CCS	Cellular Confinement System
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
CESSWI	Certified Erosion, Sediment, and Storm Water Inspector
CFR	Code of Federal Regulations
CISEC	Certified Inspector of Erosion and Sediment Control
COC	Chain of Custody

COE	United States Army Corps of Engineers, also known as, USACE
CPESC	Certified Professional in Erosion and Sediment Control
CPI	Coalescing Plate Interceptor
CPSWQ	Certified Professional in Storm Water Quality
CSMP	Construction Site Monitoring Program
CWA	Clean Water Act (Federal Water Pollution Control Act of 1972 as amended in 1987)
DCIA	Directly Connected Impervious Area
DFG	(California) Department of Fish and Game
DG	Decomposed Granite
DHS	Department of Health Services
DTSC	California Department of Toxic Substances Control
EC	Erosion Control
EEC	Effect Effluent Concentration
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
ELG	Effluent Limitation Guideline
ELAP	Environmental Laboratory Accreditation Program
EMC	Event Mean Concentration
EOS	Equivalent Opening Size
EPA	Environmental Protection Agency
ESA	Environmentally Sensitive Area
ESC	Erosion and Sediment Control
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
GIS	Geographical Information System
Hazmat	Hazardous Material
HCM	Hydraulic Compost Matrix
HDPE	High-Density Polyethylene
HM	Hydraulic Matrix
HSG	Hydrologic Soil Groups
IPM	Integrated Pest Management

LOEC	Lowest Observed Effect Concentration
LOI	Loss-On-Ignition
LUP	Linear Underground/Overhead Project
LRP	Legally Responsible Person
MATC	Maximum Allowable Threshold Concentration
MBAS	Methylene Blue Activated Substances
MBFM	Mechanically-Bonded Fiber Matrix
MEP	Maximum Extent Practicable
MDL	Method Detection Limit
MLSC	Manufactured Linear Sediment Control
MS4	Municipal Separate Storm Sewer System
MSDS	Material Safety Data Sheet
MSHA	Mine Safety and Health Administration
MSRP	Monitoring, Sampling & Reporting Plan
NAL	Numeric Action Level
NEL	Numeric Effluent Limitation
NELAP	National Environmental Laboratory Accreditation Program
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanographic and Atmospheric Administration
NOEC	No Observed Effect Concentration
NOI	Notice of Intent
NOT	Notice of Termination
NPDES	National Pollutant Discharge Elimination System
NPS	Nonpoint Source
NRC	National Response Center
NRCS	Natural Resources Conservation Service
NS	Non-stormwater Management
NSF	National Science Foundation
NTU	Nephelometric Turbidity Unit
NURP	National Urban Runoff Program
O&G	Oil and Grease

O&M	Operations and Maintenance
OSDS	On-site Disposal System
OSHA	Occupational Safety and Health Administration
P2	Pollution Prevention
PAHs	Poly-Aromatic Hydrocarbons
PAM	Polyacrylamide
PCBs	Polychlorinated Biphenyls
PCC	Portland Cement Concrete
PH	Professional Hydrologist
PLS	Pure Live Seed
PPT	Pollution Prevention Team
PoP	Probability of Precipitation
POTW	Publicly Owned Treatment Works
PRD	Permit Registration Document
PSD	Particle Size Distribution
PTS	Passive Treatment System
QA	Quality Assurance
QC	Quality Control
QSD	Qualified SWPPP Developer
QSP	Qualified SWPPP Practitioner
QPE	Qualifying Precipitation Event
QPF	Quantitative Precipitation Forecast
RCRA	Resource Conservation and Recovery Act
RECP	Rolled Erosion Control Product
RUSLE	Revised Universal Soil Loss Equation
RWQCB	Regional Water Quality Control Board
SAP	Sampling and Analysis Plan
SARA	Superfund Amendments and Reauthorization Act
SCP	Scientific Collecting Permit
SE	Sediment Control
SIC	Standard Industrial Classification
SFM	Stabilized Fiber Matrix

SM	Standard Mulch
SMARTS	Storm Water Multiple Application and Report Tracking System
SPCC	Spill Prevention Control and Countermeasure
SSC	Suspended Sediment Concentration
SUSMP	Standard Urban Stormwater Mitigation Plan
SVOC	Semi-Volatile Organic Compound
SWAMP	Surface Water Ambient Monitoring Program
SWMP	Stormwater Management Program
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TC	Tracking Control
TDS	Total Dissolved Solids
TMDL	Total Maximum Daily Load
TMECC	Test Methods for the Examination of Composting and Compost
TOC	Total Organic Carbon
TRM	Turf Reinforcement Mat
TSP	Trisodium phosphate
TSS	Total Suspended Solids
UFC	Uniform Fire Code
USACE	United States Army Corps of Engineers, also known as, COE
USC	United States Code
USCC	United States Compost Council
USDA	United States Department of Agriculture
USDOT	United States Department of Transportation
UV	Ultraviolet
VOCs	Volatile Organic Compounds
WDID	Waste Discharge Identification (Number)
WDR	Water Discharge Requirement
WE	Wind Erosion Control
WEF	Water Environment Federation
WET	Whole Effluent Toxicity
WM	Waste Management

Appendix H: BMP Inspection Form

BMP INSPECTION REPORT

Date and Time of Inspection:	Date Report Written:

Inspection Type: (Circle one)	Weekly *Complete Parts I,II,III and VII*	Pre-Qualifying Precipitation Event (QPE) *Complete Parts I,II,III,IV and VII*	During QPE *Complete Parts I, II, III, V, and VII*	Post-QPE *Complete Parts I,II,III,VI and VII*	*Inactive Project Complete Parts I,II,III and VII*

Part I. General Information

Site Information

Construction Site Name: Madera High School Stadium	
Construction stage and completed activities:	Approximate area of site that is exposed:

Photos Taken: (Circle one)	Yes	No	Photo Reference IDs:

Weather

Estimate storm beginning: (date and time)	Estimate storm duration: (hours)
Estimate time since last storm: (days or hours)	Rain gauge reading and location: (in)

Is a "Qualifying Precipitation Event" predicted or did one occur (i.e., any weather pattern with a 50% chance of 0.5" or more within a 24-hr period when 0.5" has been forecast and continues on subsequent 24-hour periods when 0.25" of precipitation or more is forecast)? (Y/N)
If yes, summarize forecast:

Exception Documentation (explanation required if inspection could not be conducted). Visual inspections are not required outside of business hours or during dangerous weather conditions such as electrical storms, flooding, and high winds above 40 miles per hour.

Inspector Information

Inspector Name:	Inspector Title:

Inspector Certification:	Date:

Part II. BMP Observations. Describe deficiencies in Part III.

Minimum BMPs for Risk Level _____ Sites	Adequately designed, implemented and effective (yes, no, N/A)	Action Required (yes/no)	Action Implemented (Date)
Good Housekeeping for Construction Materials			
Inventory of products (excluding materials designed to be outdoors)			
Stockpiled construction materials not actively in use are covered and bermed			
All chemicals are stored in watertight containers with appropriate secondary containment, or in a completely enclosed storage shed			
Construction materials are minimally exposed to precipitation			
BMPs preventing the off-site tracking of materials are implemented and properly effective			
Good Housekeeping for Waste Management			
Wash/rinse water and materials are prevented from being disposed into the storm drain system			
Portable toilets are contained to prevent discharges of waste			
Sanitation facilities are clean and with no apparent for leaks and spills			
Equipment is in place to cover waste disposal containers at the end of business day and during rain events			
Discharges from waste disposal containers are prevented from discharging to the storm drain system / receiving water			
Stockpiled waste material is securely protected from wind and rain if not actively in use			
Procedures are in place for addressing hazardous and non-hazardous spills			
Appropriate spill response personnel are assigned and trained			
Equipment and materials for cleanup of spills is available onsite			
Washout areas (e.g., concrete) are contained appropriately to prevent discharge or infiltration into the underlying soil			
Good Housekeeping for Vehicle Storage and Maintenance			
Measures are in place to prevent oil, grease, or fuel from leaking into the ground, storm drains, or surface waters			
All equipment or vehicles are fueled, maintained, and stored in a designated area with appropriate BMPs			
Vehicle and equipment leaks are cleaned immediately and disposed of properly			

Part II. BMP Observations Continued. Describe deficiencies in Part III.			
Minimum BMPs for Risk Level _____ Sites	Adequately designed,	Action Required (yes/no)	Action Implemented (Date)

	implemented and effective (yes, no, N/A)		
Good Housekeeping for Landscape Materials			
Stockpiled landscape materials such as mulches and topsoil are contained and covered when not actively in use			
Erodible landscape material has not been applied 2 days before a forecasted rain event or during an event			
Erodible landscape materials are applied at quantities and rates in accordance with manufacturer recommendations			
Bagged erodible landscape materials are stored on pallets and covered			
Good Housekeeping for Air Deposition of Site Materials			
Good housekeeping measures are implemented onsite to control the air deposition of site materials and from site operations			
Non-Stormwater Management			
Non-Stormwater discharges are properly controlled			
Vehicles are washed in a manner to prevent non-stormwater discharges to surface waters or drainage systems			
Streets are cleaned in a manner to prevent unauthorized non-stormwater discharges to surface waters or drainage systems.			
Erosion Controls			
Wind erosion controls are effectively implemented			
Effective soil cover is provided for disturbed areas inactive (i.e., not scheduled to be disturbed for 14 days) as well as finished slopes, open space, utility backfill, and completed lots			
The use of plastic materials is limited in cases when a more sustainable, environmentally friendly alternative exists.			
Sediment Controls			
Perimeter controls are established and effective at controlling erosion and sediment discharges from the site			
Entrances and exits are stabilized to control erosion and sediment discharges from the site			
Sediment basins are properly maintained			
Inspect immediate access roads prior to forecasted precipitation			
Linear sediment control along toe of slope, face of slope an at grade breaks (Risk Level 2 & 3 Only)			
Limit construction activity to and from site to entrances and exits that employ effective controls to prevent offsite tracking (Risk Level 2 & 3 Only)			
Ensure all storm, drain inlets and perimeter controls, runoff control BMPs and pollutants controls at entrances and exits are maintained and protected from activities the reduce their effectiveness (Risk Level 2 & 3 Only)			
Run-On and Run-Off Controls			

Run-on to the site is effectively managed and directed away from all disturbed areas.			
Other			
Are the project SWPPP and BMP plan up to date, available onsite and being properly implemented?			
Is the posting of the project's unique WDID number, waiver identification number, and site and project contact information publicly accessible?			

Part III. Descriptions of BMP Deficiencies		
Deficiency	**Repairs Implemented: Note - Repairs must begin within 72 hours of identification and, complete repairs as soon as possible.**	
	Start Date	**Action**
1.		
2.		
3.		
4.		

Part IV. Additional Pre-QPE Observations. Note the presence or absence of floating and suspended materials, sheen, discoloration, turbidity, odors, and source(s) of pollutants(s).	
	Yes, No, N/A
Do stormwater storage and containment areas have adequate freeboard? If no, complete Part III.	
Are drainage areas free of spills, leaks, or uncontrolled pollutant sources? If no, complete Part VII and describe below.	
Notes:	
Are stormwater storage and containment areas free of leaks? If no, complete Parts III and/or VII and describe below.	
Notes:	

Part V. Additional During-QPE Observations. If BMPs cannot be inspected during inclement weather, list the results of visual inspections at all relevant outfalls, discharge points, and downstream locations. Note odors or visible sheen on the surface of discharges. Complete Part VII (Corrective Actions) as needed.
Outfall, Discharge Point, or Other Downstream Location

Location	Description
Location	Description
Location	Description
Location	Description

Part VI. Additional Post-QPE Observations. Visually observe (inspect) stormwater discharges at all discharge locations within 96 hours after each qualifying precipitation event, and observe (inspect) the discharge of stored or contained stormwater that is derived from and discharged subsequent to a qualifying precipitation event producing precipitation of ½ inch or more at the time of discharge. Complete Part VII (Corrective Actions) as needed.	
Discharge Location, Storage or Containment Area	**Visual Observation**

Part VII. Additional Corrective Actions Required. Identify additional corrective actions not included with BMP Deficiencies (Part III) above. Note if SWPPP change is required.	
Required Actions	**Implementation Date**

Appendix I: Training Forms

Contractor Personnel Training Log

Stormwater Management Training Log and Documentation

Project Name: Madera High School Stadium

WDID#: **5F20C408034**

Stormwater Management Topic: (check as appropriate)

☐ Good Housekeeping BMPs ☐ Erosion Control BMPs

☐ Sediment Control BMPs ☐ Tracking Control

☐ Non-Stormwater Management BMPs ☐ Waste Management & Pollution Control BMPs

☐ BMP Implementation Activities ☐ Advanced BMPs

☐ Identification of QSPs and QSP Delegates

Training Objective: _____

Date: _____ Instructor: _____

Training Length (hours): _____

Attendee Roster (Attach additional forms if necessary)

Name	Company	Phone

QSP Delegate Training Log

Stormwater Management Training Log and Documentation

Project Name: Madera High School Stadium

WDID#: **5F20C408034**

QSP Delegate Name: _____

Delegated Responsibilities:

☐ Stormwater Visual Inspections

☐ Sampling

☐ BMP Inspections

☐ BMP Maintenance and Repair

Foundational Training

Topic	Date Completed	QSP Trainer
☐ Roles and Responsibilities		
☐ Forecast Information		
☐ Documentation and Reporting Procedures		

Site-Specific Training

Topic	Date Completed	QSP Trainer
☐ Visual Inspections		
☐ Sample Collection Procedures		
☐ Sample Reporting Procedures		
☐ BMP Implementation		

As needed, attach proof of external training (e.g., course completion certificates, credentials for the QSP Delegate).

Appendix J: Responsible Parties

CERTIFICATE OF TRAINING

CALIFORNIA CONSTRUCTION GENERAL PERMIT

Qualified SWPPP Developer (QSD)

AND

Qualified SWPPP Practitioner (QSP)

Michael Gennaro

July 1, 2025 - August 28, 2027

Certificate #28547

CASQA

CALIFORNIA STORMWATER QUALITY ASSOCIATION®

California Stormwater Quality Association and
California Construction General Permit Training Team

CERTIFICATE OF TRAINING

CALIFORNIA CONSTRUCTION GENERAL PERMIT

QUALIFIED SWPPP DEVELOPER (QSD)
AND
QUALIFIED SWPPP PRACTITIONER (QSP)

Gabriel Ledesma

Aug 15, 2024 - Aug 15, 2026

Certificate # 28909

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION®

California Stormwater Quality Association and
California Construction General Permit Training Team

Identification of QSP and QSP Delegates

Project Name: Madera High School Stadium

WDID#: **5F20C408034**

The following are QSPs and QSP Delegates associated with this project

Name of Personnel(1)	QSP Number, or state "Delegate"	Company	Date

(1) If additional QSPs or QSP Delegates are required on the job site add additional lines

Appendix K: Contractors and Subcontractors

Prime Contractor/Construction Management Firm:

Contractor Name:	
Title:	
Contractor Company:	
Address	
Phone Number:	
Phone Number (24/7)	

Sub-Contractors:

Sub-Contractor Name:	
Scope of Work:	
Title:	
Contractor Company:	
Address	
Phone Number:	
Phone Number (24/7)	

Sub-Contractor Name:	
Scope of Work:	
Title:	
Contractor Company:	
Address	
Phone Number:	
Phone Number (24/7)	

Sub-Contractor Name:	

Scope of Work:	
Title:	
Contractor Company:	
Address	
Phone Number:	
Phone Number (24/7)	

Sub-Contractor Name:	
Scope of Work:	
Title:	
Contractor Company:	
Address	
Phone Number:	
Phone Number (24/7)	

Sub-Contractor Name:	
Scope of Work:	
Title:	
Contractor Company:	
Address	
Phone Number:	
Phone Number (24/7)	

Appendix L: Post-Construction Calculations/ Demonstration

Jeff Brians

From: Raquel Rios Cardenas <rrios@madera.gov>
Sent: Tuesday, January 28, 2025 1:59 PM
To: Zachary Weibert; Keith Helmuth
Cc: Zachary Hockett; Eric Portnoff; Jeff Brians
Subject: RE: Madera High School Stadium Drainage Mitigation Study
Attachments: Madera H.S. Stadium_Drainage Mitigation Study 01.24.25.pdf; RE: Madera High School Stadium Drainage Mitigation Study

***** CAUTION -- EXTERNAL EMAIL *****

Good afternoon Zachary,

With MID's approval of the connection and minor changes to the study, you have City approval to use the existing connection.
I didn't spot any off-site work being proposed but if work is required in the public right-of-way be sure to have the contractor obtain an encroachment permit.

Let us know if you need anything else from the City for this item. Thank you.

Best,

The City of MADERA

Raquel Rios | Assistant Engineer
City of Madera | Engineering Department
428 East Yosemite Avenue, Madera, CA 93638
p. (559) 661.5188
rrios@madera.gov

From: Zachary Weibert <zweibert@bcf-engr.com>
Sent: Friday, January 24, 2025 4:03 PM
To: Keith Helmuth <khelmuth@madera.gov>
Cc: Zachary Hockett <zhockett@bcf-engr.com>; Eric Portnoff <eportnoff@madera.gov>; Raquel Rios Cardenas <rrios@madera.gov>; Jeff Brians <JBrians@bcf-engr.com>
Subject: RE: Madera High School Stadium Drainage Mitigation Study

Good afternoon Keith,

Please see attached for revised Drainage Mitigation Study. We have added verbiage to explain the increased runoff as well as noted MID's approval is required for the connection.

I have also attached our correspondence with MID where they have approved the connection to the existing inlet. Please review and if there are no concerns a response noting the City's approval would be greatly appreciated.

Thanks,

Zachary Weibert, PE | Civil Engineer
zweibert@bcf-engr.com | T 559.326.1400

A Native American Owned MBE - Connect With Us On Social Media @bcfengr

From: Keith Helmuth <khelmuth@madera.gov>
Sent: Tuesday, January 21, 2025 4:23 PM
To: Zachary Weibert <zweibert@bcf-engr.com>
Cc: Zachary Hockett <zhockett@bcf-engr.com>; Eric Portnoff <eportnoff@madera.gov>; Raquel Rios Cardenas <rrios@madera.gov>
Subject: RE: Madera High School Stadium Drainage Mitigation Study

***** CAUTION -- EXTERNAL EMAIL *****

Good afternoon Zachary,

I really do not have much to say about the report. I do have a couple comments that are included in the attached document.

My biggest question comes back to whether MID has approved the connection as I mentioned in an email from October 23, 2024 to Michael Gennaro.

We will need to have that tied down before we allow any encroachment permits for that construction within the road right-of-way. The only question I need answered is MID approval and you will have City approval.

Keith Helmuth, P.E. | City Engineer
City of Madera | Engineering Department
428 East Yosemite Avenue, Madera, CA 93638
p. (559) 661.5418
khelmuth@madera.gov

From: Zachary Weibert <zweibert@bcf-engr.com>
Sent: Tuesday, January 21, 2025 1:05 PM
To: Keith Helmuth <khelmuth@madera.gov>; Raquel Rios Cardenas <rrios@madera.gov>
Cc: Zachary Hockett <zhockett@bcf-engr.com>
Subject: RE: Madera High School Stadium Drainage Mitigation Study

Good morning Keith,

Following-up on the below. Please confirm if you were able to receive the Drainage Mitigation Study for Madera High School. Would you also be able to provide a review timeline for us to adhere to?

Thanks,

Zachary Weibert, **PE** | Civil Engineer
zweibert@bcf-engr.com | T 559.326.1400

A Native American Owned MBE - Connect With Us On Social Media @bcfengr

From: Zachary Weibert
Sent: Friday, January 17, 2025 11:02 AM
To: Keith Helmuth <khelmuth@madera.gov>; Raquel Rios Cardenas <rrios@madera.gov>
Cc: Zachary Hockett <zhockett@bcf-engr.com>
Subject: Madera High School Stadium Drainage Mitigation Study

Good morning Keith,

Please see attached for our Drainage Mitigation Study for the Madera High School Stadium project that we have been corresponding on the past month.

Knowing this is a DSA project and we will not be getting any permits through the City for the proposed work how would you like to handle review of this report? Would you like to review the report and provide feedback/approval via email or is there another process that we should follow? Please let us know how to proceed so we can close out the communication on this project.

We will have a few more projects in the area going down a similar route with DSA review so establishing a plan for review with the City would be greatly appreciated.

Thanks,

Zachary Weibert, **PE** | Civil Engineer
zweibert@bcf-engr.com | T 559.326.1400

A Native American Owned MBE - Connect With Us On Social Media @bcfengr

MADERA UNIFIED SCHOOL DISTRICT
MADERA HIGH SCHOOL STADIUM
DRAINAGE MITIGATION STUDY

Prepared for:

Madera Unified School District
1902 Howard Road,
Madera, CA 93637

Prepared by:

Blair, Church & Flynn Consulting Engineers
451 Clovis Avenue, Suite 200
Clovis, CA 93612
www.bcf-engr.com

Project References:

Blair, Church, & Flynn Project Ref/No: 222-0352

Prepared on: January 14, 2025

Engineer of Record: Jeffrey Brians, PE



Table of Contents

Project Overview 1
Project Description 1
Summary of Project Drainage Impacts 1
Existing Site Drainage 2
Pre-Construction Site Description 2
Pre-Construction Drainage Overview and Run-off Conditions 2
Proposed Site Drainage 3
Proposed Project Description 3
Post-Construction Drainage Overview and Run-off Conditions 3
Pre-construction v. Post-construction Run-off Comparison 4
Site Hydromodification Mitigation Measures 4
Determine BMP Size & Capacity 4
Proposed Maintenance and Inspection Guide for Contech System 5
Appendix 6
A – Pre-Construction DMA Map 6
B – Post-Construction DMA Map 8
C – H&H Calculations 10
D – Topographic Survey Sheets 16
E – Grading and Drainage Sheets 22
F – Contech CDS Unit Detail 27
G – Geotechnical Report 29
H – Inspection and Maintenance Guide 70

Figures

Figure 1. Vicinity Map 1
Figure 2. Pre-construction Site Drainage Patterns 2
Figure 3. Post-construction Site Drainage Patterns 4

Project Overview

Project Description

The proposed Madera High School Stadium project is located at 800-820 W Olive Avenue in Madera, California 93637.

The project location is bordered by W Olive Avenue to the north, Stadium Road to the east, an existing baseball field to the west and existing residential housing to the south.

Madera Unified School District is making various modernization improvements to the existing Madera High School Stadium, track and field.



Figure 1. Vicinity Map

Summary of Project Drainage Impacts

This report documents a comparison of pre-construction and post-construction run-off conditions, run-off mitigation requirements, and proposed detention design.

For this project, post-construction run-off flowrates and volumes are higher than pre-construction run-off flowrates and volumes due to an increase of hardscape at the project site. The increase in run-off flowrate is to be managed by a subsurface detention and infiltration system. Stormwater will be routed to this subsurface system to store and infiltrate the increase in stormwater run-off. During large storm events where the detention/infiltration system receives more water than it can infiltrate, an overflow pipe will be installed and connected to the MID line in W Olive Avenue with MID's approval.

Existing Site Drainage

Pre-Construction Site Description

The existing site where construction is proposed to take place is located at 800-820 W Olive Avenue in Madera, California 93637. The existing site consists of a rubber surfaced track, synthetic turf field, home and away bleachers, asphalt basketball courts, concrete sidewalks, rest room buildings, and a snack bar building. The remaining site area is made up of grassy fields and existing trees.

Pre-Construction Drainage Overview and Run-off Conditions

Drainage for this site is managed by both a storm drainage system as well as sheet flow onto the adjacent streets. Runoff within the track and field is directed to the inside of the track where trench drains pick up the runoff around the field perimeter. Runoff from the bleachers is directed into trench drains as well, which tie into the trench drains around the track and field. These trench drains direct runoff to the northeast portion of the track where an outlet pipe directs the runoff off to an existing drain inlet at the corner of W Olive Avenue and Stadium Road.

Drainage outside of the track and field along the north and east boundaries of the site sheet flow onto their respective streets. The run-off that enters these streets also enters the existing MID line through the curb and gutter flow in W Olive Avenue and Stadium Road. Run-off on the south and west portions of the site drain into existing pervious areas where the stormwater can infiltrate.



Figure 2. Pre-construction Site Drainage Patterns

Proposed Site Drainage

Proposed Project Description

The proposed improvements in the project include the following:

1. New northern entrance gates and ticket booths
2. New track surfacing
3. Relocation of shot-put facilities
4. Relocation of jump pits
5. New practice track behind visitor bleachers
6. Replacement of synthetic turf and organic infill for the soccer/football field
7. Removal of on-grade grandstands, walks, ramps, and stairs
8. Removal of the earthen berms around the north, east and south track perimeters
9. New bleachers for home and visitor sides
10. New fieldhouse building adjacent to the visitor side bleachers.

Post-Construction Drainage Overview and Run-off Conditions

Post-construction drainage patterns for the site will generally match the pre-construction drainage patterns. The new track and field will continue to drain into trench drains surrounding the perimeter of the field. The visitor bleachers and new practice track behind them will direct runoff into valley gutters and trench drains which will tie into the track and field trench drain system. Run-off from the proposed fieldhouse west of the visitor bleachers will be collected via new storm drain inlets and directed into the track and field trench drain system. The run-off collected in these areas will be routed through a Contech pretreatment device and into a subsurface infiltration system to detain stormwater onsite.

Run-off from the home bleachers and the new stadium entrance area will be collected in new trench drains. The run-off collected in this area will be routed to the same Contech pretreatment device and subsurface infiltration system to detain the stormwater onsite. Stormwater collected in the subsurface infiltration system will be retained and infiltrated, up to a designed high-water level. At the high-water level, an overflow pipe from this system will be connected to the existing 12” outlet pipe to the MID line in W Olive Avenue for large storm events where the influx of stormwater is greater than the capacity of the subsurface infiltration system. This overflow pipe is sized to restrict outflow to match the pre-construction flowrate for a 100yr-30min storm.

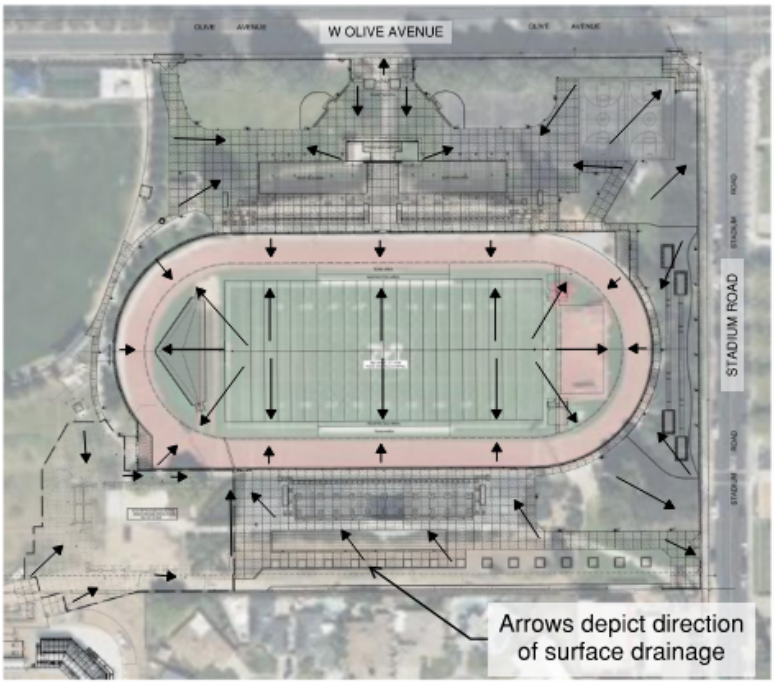


Figure 3. Post-construction Site Drainage Patterns

Pre-construction v. Post-construction Run-off Comparison

Based on a quantitative assessment of the site run-off patterns prior to and after construction, the project team has determined there will be a slight increase in run-off flowrate post-construction due to an increase of hardscape at the project site. The increase in run-off will be managed by the subsurface infiltration system. All post-construction project run-off is routed to the new subsurface infiltration system which manages the outflow rate entering the existing MID line.

Site Hydromodification Mitigation Measures

The proposed subsurface infiltration system will also serve as hydromodification mitigation BMP for the site. While the system will primarily deal with the stormwater through infiltration, there will be an overflow pipe installed that will connect to the existing site outlet to the MID line in W Olive Avenue. This overflow pipe will be utilized during large storm events when the stormwater volume exceeds the design capacity. The pipe will manage the rate that water leaves the system as to not increase the total stormwater run-off leaving the site as calculated in the pre-construction conditions.

Determine BMP Size & Capacity

A modified version of the Rational Method was utilized to determine the difference in stormwater volume from pre-construction to post-construction based on a 100yr-10day storm as directed by the City of Madera. The calculations can be seen in Appendix C – H&H Calculations. For the subsurface infiltration system proposed, it was determined that a design volume of 6,639 cubic feet is required. To satisfy this

requirement, 135 linear feet of 8 foot diameter Contech Perforated CMP Infiltration Sytem is proposed which has a volume capacity of 6,786 cubic feet. The capacity of the proposed Contech infiltration system exceeds the required volume calculated per Appendix C.

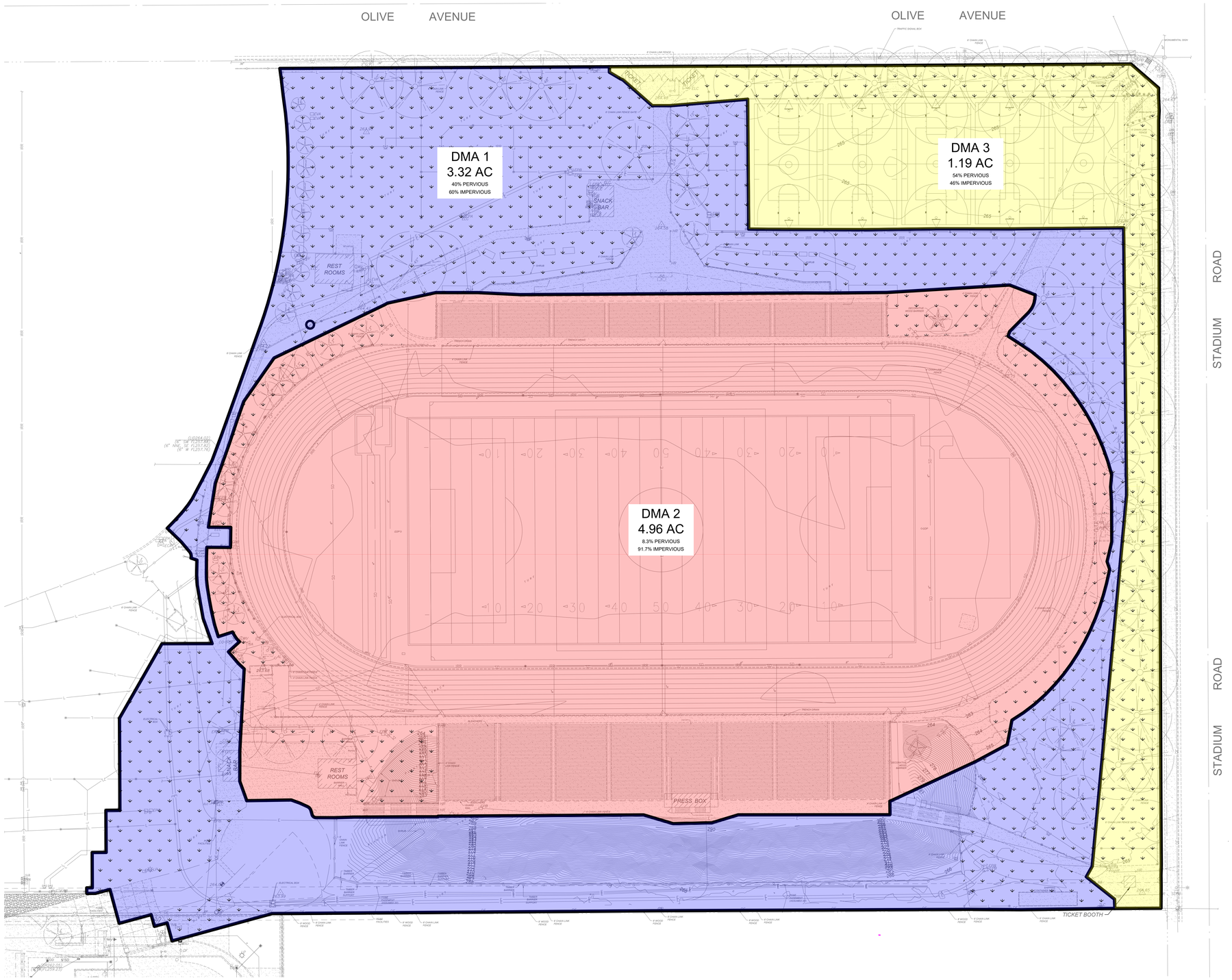
Proposed Maintenance and Inspection Guide for Contech System

The long term effectiveness of proposed BMPs is directly tied to the ongoing effort allocated to implementing and maintaining those BMPs. As such, it is important to document the proposed inspection and maintenance plan for the listed BMPs.

A maintenance and inspection guide published by Contech for the Perforated CMP Infiltration System has been provided as Appendix H.

Appendix

A – Pre-Construction DMA Map



LEGEND:

		PERVIOUS AREA, SF	IMPERVIOUS AREA, SF	TOTAL AREA, SF	TOTAL AREA, AC
DMA 1		58,466	86,134	144,600	3.32
DMA 2		17,912	198,181	216,093	4.96
DMA 3		28,131	23,919	52,050	1.19
	TOTAL:	104,509	308,234	412,743	9.47

SCALE: N 1"=30'

0 10 20 30 60
SCALE IN FEET

Blair, Church & Flynn
CONSULTING ENGINEERS

CONSULTANT
Blair, Church & Flynn Consulting Engineers
455 Clovis Avenue, Suite 200
Clovis, California 93612
Tel (559) 326-1400
Fax (559) 326-1500

REF. & REV.

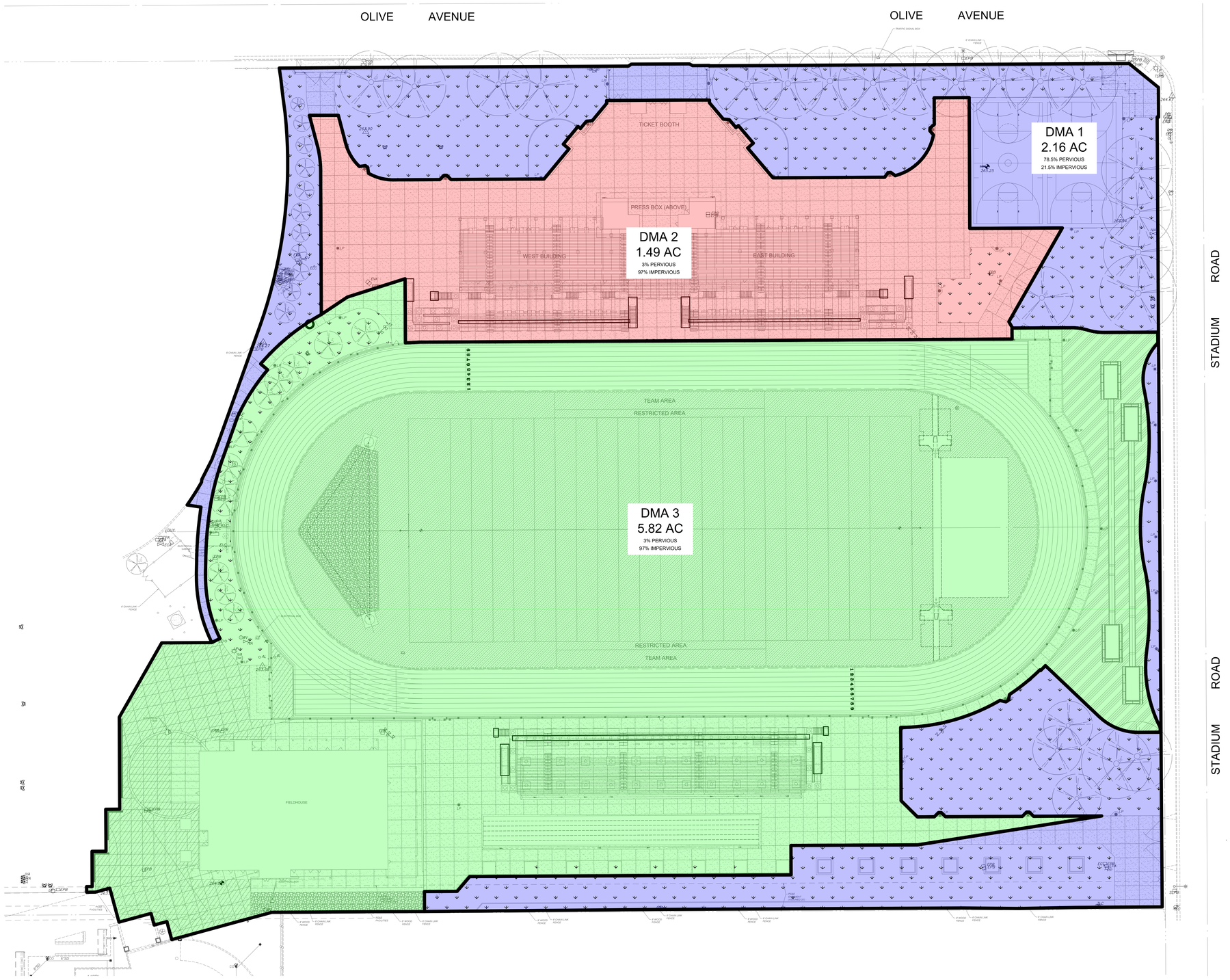
MADERA HIGH SCHOOL STADIUM

PRE-CONSTRUCTION DMA MAP
200 SOUTH L STREET
MADERA, CA 93637

DR. BY: ZW
CH. BY: JB
DATE: 12/31/2024
SCALE AS NOTED

SHEET NO. 1
OF 2 SHEETS

B – Post-Construction DMA Map



LEGEND:

		PERVIOUS AREA, SF	IMPERVIOUS AREA, SF	TOTAL AREA, SF	TOTAL AREA, AC
DMA 1		74,025	20,247	94,272	2.16
DMA 2		1,840	63,199	65,039	1.49
DMA 3		7,054	246,378	253,432	5.82
	TOTAL:	82,919	329,824	412,743	9.47

SCALE: N 1"=30'

0 10 20 30 60
SCALE IN FEET

Blair, Church & Flynn
CONSULTING ENGINEERS

CONSULTANT
Blair, Church & Flynn
Consulting Engineers
451 Clovis Avenue,
Suite 200
Clovis, California 93612
Tel (559) 326-1400
Fax (559) 326-1500

REF. & REV.

MADERA HIGH SCHOOL STADIUM

POST-CONSTRUCTION DMA MAP
200 SOUTH L STREET
MADERA, CA 93637

DR. BY: ZW
CH. BY: JB
DATE: 12/31/2024
SCALE AS NOTED

SHEET NO. 2
OF 2 SHEETS

C – H&H Calculations

Blair, Church & Flynn CONSULTING ENGINEERS					
	Project:	Madera High School Stadium	By:	ZW	Sheet No.
	Location:	800-820 W Olive Avenue, Madera, CA 93637	Date:	1/8	1 of 2
	Client:	PBK	Job No.	222-0352	
	Description:	**Site Run-off Calculations (Flow)**			

Description:

Using the Rational Method, a rough estimate of site run-off was calculated for the various DMAs on the Madera High School Stadium site. A weighted C factor is used due to the DMA's being made up of materials with different C factors. The calculations were run using a 100-year 30-minute storm intensity obtained from NOAA.

$$Q = C_w i A \qquad C_w = \sum(CA)/\sum A$$

Q = DMA run-off (cfs)
C = Unitless run-off coefficient
C_w = Weighted run-off coefficient
i = Rainfall intensity (in/hr)
A = DMA Area (acres)

C = 0.9 Impervious Area
C = 0.3 Pervious Area

$i_{100yr\text{-}30min}$ 1.27 in/hr Source: NOAA Atlas 14 Volume 6, Version 2

Calculations:

Weighted C-Factor (Pre-Construction)

DMA	$Area_P$ (SF)	C_P	$Area_{IMP}$ (SF)	C_{IMP}	**C_w**
1	58466	0.3	86134	0.9	**0.66**
2	17912	0.3	198181	0.9	**0.85**
3	28131	0.3	23919	0.9	**0.58**

Pre-Construction

DMA	C_w	Area (SF)	Area (ac)	$Q_{100yr\text{-}30min}$	**Units**
1	0.66	144600	3.32	2.77	CFS
2	0.85	216093	4.96	5.36	CFS
3	0.58	52050	1.19	0.87	CFS
	Total:	412743	9.47	9.00	CFS

Weighted C-Factor (Post-Construction)

DMA	$Area_P$ (SF)	C_P	$Area_{IMP}$ (SF)	C_{IMP}	**C_w**
1	74025	0.3	20247	0.9	**0.43**
2	1840	0.3	63199	0.9	**0.88**
3	7054	0.3	246378	0.9	**0.88**

Post-Construction

DMA	C_w	Area (SF)	Area (ac)	$Q_{100yr\text{-}30min}$	**Units**
1	0.43	94272	2.16	1.18	CFS
2	0.88	65039	1.49	1.67	CFS
3	0.88	253432	5.82	6.53	CFS
	Total:	412743	9.47	9.38	CFS

Blair, Church & Flynn CONSULTING ENGINEERS	Project:	Madera High School Stadium	By:	ZW	Sheet No.
	Location:	800-820 W Olive Avenue, Madera, CA 93637	Date:	1/8	2 of 2
	Client:	PBK	Job No.	222-0352	
	Description:	**Site Run-off Calculations (Volume)**			

Pre v. Post Comparison

The DMA's that will be evaluated below represent those that contribute stormwater to the MID stormwater line in W Olive Avenue. The difference between pre-development and post-development runoff volume for these DMA's is calculated below based on a 100-year, 10-day storm.

$$V = C_w dA$$

V = DMA Run-off Volume (CF)
C_w = Weighted run-off coefficient
d = Rainfall depth (ft)
A = DMA Area (SF)

$d_{100yr\text{-}10day}$ 6.15 in
0.51 ft

Source: NOAA Atlas 14 Volume 6, Version 2

Pre-Construction

DMA	C_w	Area (SF)	$V_{100yr\text{-}10day}$	**Units**
1	0.66	144600	48718	CF
2	0.85	216093	94165	CF
3	0.58	52050	15358	CF
	Total:	412743	158241	CF

Post-Construction

DMA	C_w	Area (SF)	$V_{100yr\text{-}10day}$	**Units**
1	0.43	94272	20720	CF
2	0.88	65039	29433	CF
3	0.88	253432	114726	CF
	Total:	412743	164880	CF

Difference:	6639	CF

Storage Volume = 6,639 ft^3

NOAA Atlas 14, Volume 6, Version 2
Location name: Madera, California, USA*
Latitude: 36.952°, Longitude: -120.0667°
Elevation: 263 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches/hour)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.900** (0.804-1.02)	**1.10** (0.984-1.25)	**1.43** (1.27-1.62)	**1.73** (1.51-1.98)	**2.21** (1.85-2.66)	**2.65** (2.15-3.29)	**3.17** (2.48-4.08)	**3.78** (2.84-5.06)	**4.76** (3.38-6.77)	**5.66** (3.84-8.45)
10-min	**0.648** (0.582-0.732)	**0.792** (0.708-0.894)	**1.02** (0.906-1.16)	**1.24** (1.09-1.42)	**1.58** (1.33-1.91)	**1.90** (1.54-2.36)	**2.27** (1.78-2.92)	**2.71** (2.04-3.63)	**3.41** (2.43-4.85)	**4.06** (2.75-6.05)
15-min	**0.520** (0.468-0.588)	**0.640** (0.572-0.724)	**0.824** (0.732-0.932)	**0.996** (0.876-1.14)	**1.28** (1.07-1.54)	**1.53** (1.24-1.90)	**1.83** (1.44-2.36)	**2.18** (1.64-2.93)	**2.75** (1.96-3.91)	**3.28** (2.22-4.88)
30-min	**0.362** (0.324-0.408)	**0.444** (0.396-0.500)	**0.570** (0.508-0.646)	**0.690** (0.608-0.792)	**0.884** (0.740-1.07)	**1.06** (0.862-1.32)	**1.27** (0.994-1.63)	**1.51** (1.14-2.03)	**1.91** (1.36-2.71)	**2.27** (1.54-3.38)
60-min	**0.249** (0.223-0.281)	**0.305** (0.273-0.345)	**0.393** (0.350-0.445)	**0.475** (0.418-0.546)	**0.609** (0.510-0.734)	**0.730** (0.593-0.908)	**0.873** (0.685-1.12)	**1.04** (0.786-1.40)	**1.31** (0.934-1.87)	**1.56** (1.06-2.33)
2-hr	**0.177** (0.159-0.200)	**0.216** (0.194-0.244)	**0.277** (0.246-0.314)	**0.333** (0.293-0.383)	**0.423** (0.354-0.510)	**0.503** (0.409-0.626)	**0.596** (0.468-0.768)	**0.705** (0.532-0.945)	**0.878** (0.624-1.25)	**1.03** (0.700-1.54)
3-hr	**0.144** (0.129-0.162)	**0.176** (0.157-0.198)	**0.224** (0.199-0.254)	**0.269** (0.236-0.309)	**0.339** (0.284-0.409)	**0.402** (0.327-0.500)	**0.474** (0.372-0.611)	**0.559** (0.421-0.749)	**0.690** (0.491-0.981)	**0.808** (0.548-1.20)
6-hr	**0.099** (0.088-0.111)	**0.120** (0.107-0.135)	**0.152** (0.135-0.172)	**0.182** (0.160-0.209)	**0.228** (0.191-0.275)	**0.268** (0.218-0.334)	**0.315** (0.247-0.405)	**0.368** (0.277-0.493)	**0.451** (0.320-0.641)	**0.524** (0.355-0.782)
12-hr	**0.066** (0.059-0.075)	**0.080** (0.072-0.091)	**0.101** (0.090-0.115)	**0.120** (0.106-0.138)	**0.150** (0.126-0.181)	**0.177** (0.143-0.220)	**0.207** (0.162-0.266)	**0.241** (0.182-0.323)	**0.295** (0.209-0.419)	**0.342** (0.232-0.510)
24-hr	**0.045** (0.040-0.050)	**0.054** (0.049-0.061)	**0.068** (0.061-0.077)	**0.080** (0.072-0.091)	**0.100** (0.087-0.117)	**0.117** (0.099-0.140)	**0.136** (0.113-0.166)	**0.158** (0.128-0.198)	**0.191** (0.150-0.249)	**0.221** (0.167-0.297)
2-day	**0.027** (0.024-0.030)	**0.033** (0.029-0.037)	**0.041** (0.037-0.047)	**0.049** (0.044-0.056)	**0.060** (0.052-0.070)	**0.069** (0.059-0.083)	**0.080** (0.066-0.097)	**0.091** (0.074-0.114)	**0.108** (0.084-0.140)	**0.122** (0.092-0.164)
3-day	**0.020** (0.018-0.022)	**0.024** (0.022-0.028)	**0.031** (0.028-0.035)	**0.037** (0.033-0.042)	**0.045** (0.039-0.053)	**0.051** (0.044-0.062)	**0.059** (0.049-0.072)	**0.066** (0.054-0.083)	**0.077** (0.061-0.101)	**0.087** (0.066-0.117)
4-day	**0.016** (0.015-0.018)	**0.020** (0.018-0.023)	**0.026** (0.023-0.029)	**0.030** (0.027-0.034)	**0.037** (0.032-0.043)	**0.042** (0.036-0.051)	**0.048** (0.040-0.059)	**0.054** (0.044-0.068)	**0.063** (0.049-0.082)	**0.070** (0.053-0.094)
7-day	**0.011** (0.010-0.012)	**0.014** (0.012-0.016)	**0.018** (0.016-0.020)	**0.021** (0.018-0.024)	**0.025** (0.022-0.030)	**0.029** (0.024-0.035)	**0.033** (0.027-0.040)	**0.037** (0.030-0.046)	**0.042** (0.033-0.055)	**0.047** (0.035-0.063)
10-day	**0.008** (0.008-0.010)	**0.011** (0.010-0.012)	**0.014** (0.012-0.015)	**0.016** (0.014-0.018)	**0.020** (0.017-0.023)	**0.022** (0.019-0.027)	**0.025** (0.021-0.031)	**0.028** (0.023-0.035)	**0.032** (0.025-0.042)	**0.036** (0.027-0.048)
20-day	**0.005** (0.005-0.006)	**0.007** (0.006-0.008)	**0.009** (0.008-0.010)	**0.010** (0.009-0.012)	**0.013** (0.011-0.015)	**0.014** (0.012-0.017)	**0.016** (0.013-0.020)	**0.018** (0.014-0.023)	**0.020** (0.016-0.027)	**0.022** (0.017-0.030)
30-day	**0.004** (0.004-0.005)	**0.005** (0.005-0.006)	**0.007** (0.006-0.008)	**0.008** (0.007-0.010)	**0.010** (0.009-0.012)	**0.011** (0.010-0.014)	**0.013** (0.011-0.016)	**0.014** (0.012-0.018)	**0.016** (0.013-0.021)	**0.018** (0.013-0.024)
45-day	**0.003** (0.003-0.004)	**0.004** (0.004-0.005)	**0.006** (0.005-0.007)	**0.007** (0.006-0.008)	**0.008** (0.007-0.010)	**0.009** (0.008-0.011)	**0.011** (0.009-0.013)	**0.012** (0.009-0.015)	**0.013** (0.010-0.017)	**0.014** (0.011-0.020)
60-day	**0.003** (0.003-0.003)	**0.004** (0.003-0.004)	**0.005** (0.005-0.006)	**0.006** (0.005-0.007)	**0.007** (0.006-0.009)	**0.008** (0.007-0.010)	**0.009** (0.008-0.012)	**0.010** (0.008-0.013)	**0.012** (0.009-0.015)	**0.013** (0.010-0.017)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

Back to Top

PF graphical

NOAA Atlas 14, Volume 6, Version 2
Location name: Madera, California, USA*
Latitude: 36.952°, Longitude: -120.0667°
Elevation: 263 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.075 (0.067-0.085)	0.092 (0.082-0.104)	0.119 (0.106-0.135)	0.144 (0.126-0.165)	0.184 (0.154-0.222)	0.221 (0.179-0.274)	0.264 (0.207-0.340)	0.315 (0.237-0.422)	0.397 (0.282-0.564)	0.472 (0.320-0.704)
10-min	0.108 (0.097-0.122)	0.132 (0.118-0.149)	0.170 (0.151-0.193)	0.206 (0.181-0.236)	0.264 (0.221-0.318)	0.316 (0.257-0.393)	0.378 (0.296-0.487)	0.451 (0.340-0.605)	0.569 (0.405-0.808)	0.677 (0.459-1.01)
15-min	0.130 (0.117-0.147)	0.160 (0.143-0.181)	0.206 (0.183-0.233)	0.249 (0.219-0.286)	0.319 (0.267-0.385)	0.383 (0.311-0.476)	0.457 (0.359-0.589)	0.546 (0.411-0.732)	0.688 (0.489-0.978)	0.819 (0.555-1.22)
30-min	0.181 (0.162-0.204)	0.222 (0.198-0.250)	0.285 (0.254-0.323)	0.345 (0.304-0.396)	0.442 (0.370-0.533)	0.530 (0.431-0.659)	0.634 (0.497-0.816)	0.757 (0.571-1.01)	0.954 (0.679-1.36)	1.14 (0.770-1.69)
60-min	0.249 (0.223-0.281)	0.305 (0.273-0.345)	0.393 (0.350-0.445)	0.475 (0.418-0.546)	0.609 (0.510-0.734)	0.730 (0.593-0.908)	0.873 (0.685-1.12)	1.04 (0.786-1.40)	1.31 (0.934-1.87)	1.56 (1.06-2.33)
2-hr	0.355 (0.318-0.400)	0.433 (0.388-0.489)	0.554 (0.493-0.628)	0.667 (0.587-0.766)	0.846 (0.709-1.02)	1.01 (0.818-1.25)	1.19 (0.936-1.54)	1.41 (1.06-1.89)	1.76 (1.25-2.49)	2.07 (1.40-3.08)
3-hr	0.433 (0.388-0.488)	0.529 (0.473-0.597)	0.673 (0.600-0.764)	0.808 (0.711-0.928)	1.02 (0.855-1.23)	1.21 (0.982-1.50)	1.43 (1.12-1.84)	1.68 (1.26-2.25)	2.08 (1.48-2.95)	2.43 (1.65-3.62)
6-hr	0.593 (0.531-0.669)	0.721 (0.645-0.814)	0.913 (0.813-1.04)	1.09 (0.959-1.25)	1.37 (1.14-1.65)	1.61 (1.31-2.00)	1.89 (1.48-2.43)	2.21 (1.66-2.96)	2.70 (1.92-3.84)	3.14 (2.13-4.68)
12-hr	0.806 (0.722-0.908)	0.973 (0.870-1.10)	1.22 (1.09-1.39)	1.46 (1.28-1.67)	1.82 (1.52-2.19)	2.13 (1.73-2.65)	2.50 (1.96-3.21)	2.91 (2.20-3.90)	3.56 (2.53-5.05)	4.13 (2.80-6.15)
24-hr	1.08 (0.979-1.22)	1.30 (1.18-1.47)	1.64 (1.48-1.85)	1.94 (1.74-2.21)	2.40 (2.09-2.82)	2.81 (2.40-3.36)	3.27 (2.72-4.00)	3.79 (3.08-4.76)	4.60 (3.60-5.99)	5.31 (4.02-7.14)
2-day	1.30 (1.18-1.47)	1.59 (1.44-1.79)	2.00 (1.81-2.26)	2.36 (2.12-2.69)	2.90 (2.52-3.40)	3.35 (2.86-4.01)	3.84 (3.20-4.70)	4.39 (3.57-5.51)	5.19 (4.07-6.77)	5.88 (4.46-7.90)
3-day	1.46 (1.32-1.64)	1.79 (1.62-2.02)	2.26 (2.04-2.56)	2.67 (2.39-3.04)	3.26 (2.83-3.82)	3.74 (3.19-4.47)	4.25 (3.54-5.20)	4.81 (3.91-6.04)	5.62 (4.40-7.32)	6.28 (4.76-8.45)
4-day	1.60 (1.45-1.80)	1.98 (1.79-2.23)	2.50 (2.26-2.83)	2.95 (2.64-3.36)	3.58 (3.12-4.21)	4.10 (3.49-4.90)	4.64 (3.87-5.68)	5.23 (4.25-6.56)	6.06 (4.74-7.90)	6.74 (5.11-9.06)
7-day	1.92 (1.74-2.17)	2.39 (2.16-2.70)	3.03 (2.73-3.42)	3.56 (3.19-4.06)	4.32 (3.75-5.07)	4.92 (4.20-5.89)	5.55 (4.63-6.79)	6.22 (5.06-7.81)	7.16 (5.61-9.34)	7.92 (6.01-10.7)
10-day	2.13 (1.93-2.40)	2.66 (2.40-3.00)	3.37 (3.04-3.81)	3.97 (3.55-4.52)	4.80 (4.17-5.64)	5.46 (4.66-6.54)	6.15 (5.13-7.53)	6.88 (5.59-8.63)	7.89 (6.18-10.3)	8.70 (6.60-11.7)
20-day	2.76 (2.50-3.11)	3.47 (3.14-3.91)	4.41 (3.98-4.98)	5.18 (4.64-5.91)	6.26 (5.44-7.34)	7.09 (6.05-8.48)	7.95 (6.63-9.72)	8.84 (7.19-11.1)	10.1 (7.88-13.1)	11.0 (8.36-14.8)
30-day	3.35 (3.04-3.78)	4.23 (3.83-4.78)	5.39 (4.87-6.10)	6.34 (5.68-7.23)	7.64 (6.64-8.97)	8.64 (7.37-10.3)	9.66 (8.06-11.8)	10.7 (8.71-13.4)	12.1 (9.50-15.8)	13.2 (10.0-17.8)
45-day	4.13 (3.74-4.65)	5.24 (4.74-5.91)	6.69 (6.04-7.57)	7.87 (7.05-8.96)	9.46 (8.22-11.1)	10.7 (9.10-12.8)	11.9 (9.92-14.6)	13.1 (10.7-16.5)	14.8 (11.6-19.3)	16.1 (12.2-21.7)
60-day	4.91 (4.45-5.53)	6.26 (5.66-7.06)	8.00 (7.22-9.04)	9.40 (8.42-10.7)	11.3 (9.81-13.2)	12.7 (10.8-15.2)	14.1 (11.8-17.3)	15.6 (12.7-19.6)	17.5 (13.7-22.8)	19.0 (14.4-25.5)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

Back to Top

PF graphical

Blair, Church & Flynn CONSULTING ENGINEERS	Project:	Madera High School Stadium	By: ZW	Sheet No.
	Location:	800-820 W Olive Avenue, Madera, CA 93637	Date: 1/13	1 of 1
	Client:	PBK	Job No. 222-0352	
	Description:	**Orifice Calculations**		

Orifice Freely Discharging Formula

An orifice controls stormwater flow by restricting the discharge rate during large storm events, ensuring that post-construction flow rates match pre-construction conditions. The below calculation sizes an orifice for the proposed subsurface infiltration to match pre-construction flowrates for a 100year-10day storm.

$$Q = C_d A\sqrt{2gh}$$

Lindeburg, Michael R. PE *Civil Engineering Reference Manual* , 15th ed. (CERM)

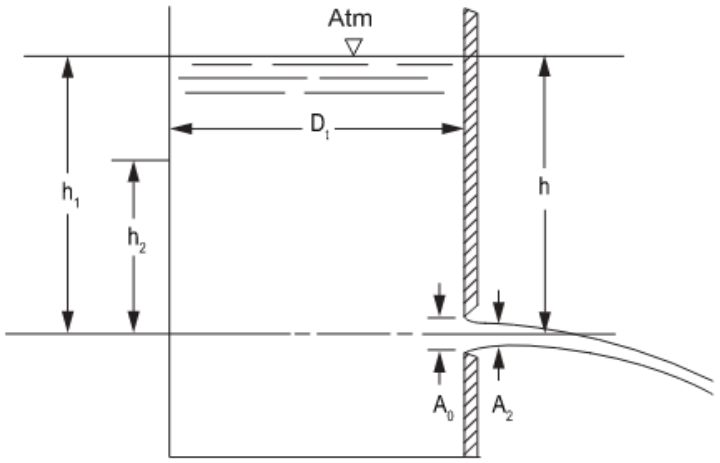
Q = Volumetric Flow (ft^3/s)
C_d = Coefficeint of Discharge
A = Cross-Sectional Area of Flow (ft^2)
g = Acceleration due to Gravity (ft/s^2)
h = Height of water above orifice (ft)

Area of Orifice

A=	πr^2	
D=	12.000	**in**
R=	6.000	**in**
R=	0.500	**ft**
A=	0.785	**ft^2**

Orifice

Q=	6.670	**cfs**
C=	0.800	
A=	0.785	**ft^2**
g=	32.200	**ft/s^2**
h=	1.750	**ft**



Vennard, J.K., *Elementary Fluid Mechanics*, 6th ed., J.K. Vennard, 1954.

D – Topographic Survey Sheets

GENERAL TOPOGRAPHIC SURVEY LEGEND:

(NOT ALL SYMBOLS SHOWN APPEAR ON THE PLANS)

AB	ABUTMENT
AC	ASPHALTIC CONCRETE
ACE	ASPHALTIC CONCRETE EDGE
AD	ASPHALTIC CONCRETE DIKE
AWT	ALL-WEATHER TRACK
BD	BRIDGE DECK
BFC	BOTTOM FACE OF CURB
BGST	STEPS
BGTR	TOP OF ROOF
BGV	BUILDING VENTS
BOD	BOTTOM OF DITCH
BR	BARRICADE
BRK	BRICK
BW	BARRIER WALL
CB	CATCH BASIN
CDA	CONCRETE DRIVE APPROACH
CE	CONCRETE EDGE
CMP	CORRUGATED METAL PIPE
CON	CONCRETE
COTH	COMMUNICATION TRENCH
CR	CROWN OF ROAD
CRQ	QUARTER CROWN
CS	CONCRETE SLAB
CULV	CULVERT
CW	CONCRETE WALL
DD	DOWN DRAIN
DFL	DITCH FLOWLINE
DWY	DRIVEWAY
ECTH	ELECTRICAL TRENCH
EDR	EDGE OF DIRT ROAD
EGR	EDGE OF GRAVEL ROAD
EOD	EDGE OF OILED DIRT
EP	EDGE OF PAVEMENT
ES	EDGE OF SHOULDER
ET	EDGE OF TRAVELED WAY
FF	FINISH FLOOR
FOTH	FIBER OPTIC TRENCH
GB	GRADE BREAK
GFL	GUTTER FLOWLINE
GR	GRATE
GRA	GRAVEL SPOT SHOT
GRAE	EDGE OF GRAVEL
GSTH	GAS TRENCH
HDR	WOOD HEADER
HW	HEAD WALL
KR	K-RAIL
LIP	LIP OF GUTTER
LSDE	DECOMPOSED GRANITE EDGE
LSDG	DECOMPOSED GRANITE
LSGC	GROUND COVER
LSGF	GOLF COURSE FAIRWAY
LSGG	GOLF COURSE GREEN
LSGT	GOLF COURSE TEE
LSSA	SAND
LSSP	SLOPE PROTECTION
LSST	GOLF COURSE SAND TRAP
NPTH	NON-POTABLE TRENCH
PA	PATIO
PGTH	PROPANE GAS TRENCH
POS	POINT ON SLOPE
RCP	REINFORCED CONCRETE
RIEL	RIPARIAN EDGE OF LAKE
RIEP	RIPARIAN EDGE OF POND
RIES	RIPARIAN EDGE OF STREAM
RIEW	RIPARIAN EDGE OF WETLAND
RIFL	RIPARIAN FLOWLINE
RIMC	RIPARIAN MISC.
RIP	RIP-RAP SLOPE PROTECTION
RK	ROCK
RW	RETAINING WALL
SB	SPEED BUMP
SDCD	STORM DRAIN CROSS DRAIN
SDFL	STORM DRAIN FLOWLINE
SDGR	STORM DRAIN GRATE
SDMG	STORM DRAIN MANHOLE W/ GRATE
SSFL	SEWER FLOWLINE
SDTH	STORM DRAIN TRENCH
SSGT	STORM DRAIN GREASE TRAP
SSST	SEWER TANK (SEPTIC)
SSTH	SEWER TRENCH
SWK	SIDEWALK
SWL	SWALE
T	TURF
TBC	TOP BACK OF CURB
TBW	TOP BACK OF WALK
TF	TOP OF FOOTING
TFC	TOP FACE OF CURB
TFW	TOP FACE OF WALK
TLTH	TELEPHONE TRENCH
TOB	TOP OF BANK
TOE	TOE OF SLOPE
TOP	TOP OF SLOPE
TRDO	TRUNCATED DOMES
TVTH	TV TRENCH
TW	TOP OF WALL
UTH	UNIDENTIFIED TRENCH/SCAR LINE
VGFL	VALLEY GUTTER FLOWLINE
VGR	VALLEY GUTTER
WALBA	BARRIER WALL
WALBW	BLOCK WALL
WALCW	CONCRETE WALL
WALHW	HEAD WALL
WALRW	RETAINING WALL
WALWW	WING WALL
WCR	WHEELCHAIR RAMP
WLPD	WELL PAD
WTTH	WATER TRENCH
WW	WING WALL
(335.21)	EXISTING ELEVATION
AL	ACCENT LIGHT
AV	ALFALFA VALVE
	BACKFLOW ASSEMBLY
	BASKETBALL GOAL
BOV	BLOW-OFF VALVE
	BM=BENCHMARK; OR SBM=SITE BENCHMARK
BO	BOLLARD
CO	CLEANOUT
COPB	COMMUNICATION PULLBOX
COVA	COMMUNICATION VAULT
212.55	SURVEY CONTROL MONUMENT
DF	DRINKING FOUNTAIN
DS	DOORSTOP
DW	DRYWELL
EG	ELECTRICAL GROUND
ELC	ELECTRICAL CONDUIT
	ELECTRICAL METER
EPB	ELECTRICAL PULLBOX
	ELECTRICAL VAULT LID
ETS	GAS ELECTRONIC TESTING STATION
FDC	FIRE DEPARTMENT CONNECTION
	FIRE HYDRANT
FP	FENCE POST
FLP	FLAG POLE
GAS	GAS LINE; DIAMETER AS SHOWN
GR	GAS REGULATOR
GAV	IRRIGATION GATE VALVE
	GAS METER
GOP	GOAL POST
GP	GUY POLE
GS	GATE STOP
GSR	GAS RISER
GV	GAS VALVE
GRD	GROUNDING ROD
GUY	GUY WIRE
HB	HOSE BIBB
HR	HANDRAIL
ICB	IRRIGATION CONTROLLER
	IRRIGATION DISTRICT MANHOLE
IVA	IRRIGATION REMOTE CONTROL VALVE
ISB	IRRIGATION SPLICE BOX
IHB	IN-GROUND HOSE BIBB
IP	IRON PIPE
JP	JOINT UTILITY POLE
LP	LIGHT POLE
MB	MAIL BOX
	MANHOLE
MV	MANUAL IRRIGATION VALVE
PB	PULLBOX
PIV	POST INDICATOR VALVE
	UTILITY STUB
	PARKING METER
POST	POST; DIAMETER AS SHOWN
PP	POWER POLE
PVC	PVC PIPE; DIAMETER AS SHOWN
QC	QUICK COUPLER VALVE
RD	ROOF DRAIN
RDU	ROOF DRAIN UNDERGROUND
RS	ROOF SUPPORT
	STADIUM LIGHT POLE
	STORM DRAIN MANHOLE
	SIGN
PPB	SIGNAL LIGHT PUSH BUTTON
	STREET LIGHT
SLE	PIPE SLEEVE; DIAMETER AS SHOWN
	SLOPE
SLPB	STREET LIGHT PULLBOX
SLV	PIPE SLEEVE; DIAMETER AS SHOWN
	SEWER MANHOLE
SP	SERVICE POLE
SPB	SIGNAL PULLBOX
	SPRINKLER
SPO	STEEL POST; DIAMETER AS SHOWN
	SAND SEPARATOR; SIZE AS NOTED
STP	STAND PIPE; DIAMETER AS NOTED
STUMP	TREE STUMP; DIAMETER AS SHOWN
MW	SURVEY MONUMENT WELL
TEL	TELEPHONE; DIAMETER AS SHOWN
	TELEPHONE MANHOLE
TN	TENNIS NET POLE
TP	TELEPHONE POLE
TPB	TELEPHONE PULLBOX
TVPB	TELEVISION PULLBOX
	TREE; SPREAD SHOWN GRAPHICALLY AND TRUNK DIAMETER AS SHOWN
	PALM TREE; SPREAD SHOWN GRAPHICALLY
TSB	TELEPHONE SPLICE BOX
	TRAFFIC SIGNAL POLE
TSPB	TRAFFIC SIGNAL PULLBOX
UP	UTILITY POLE
VB	VACUUM BREAKER
VN	VOLLEYBALL NET POST
VP	VENT PIPE; DIAMETER AS SHOWN
WELL	WELL
W	WATER METER
WP	WELL PUMP
WPO	CIRCULAR WOOD POST; DIAMETER AS SHOWN
WPO	SQUARE WOOD POST; SIZE AS SHOWN
W	WATER LINE; DIAMETER AS SHOWN
WV	WATER VALVE
	ASPHALT PAVEMENT
	CONCRETE BLOCK WALL
	BUILDING
	CONCRETE
	DETECTABLE WARNINGS
	DG OR GRAVEL
	CHAIN LINK FENCE
	CHAIN LINK ROLL GATE
	EDGE OF ASPHALT PAVEMENT
	WOOD FENCE
	DIRECTION OF FLOW
E	UNDERGROUND ELECTRIC
G	GAS LINE; SIZE AS NOTED
OT	OVERHEAD TELEPHONE
SD	STORM DRAIN LINE; SIZE AS NOTED
S	SEWER LINE; SIZE AS NOTED
T	UNDERGROUND TELEPHONE
W	WATER LINE; SIZE AS NOTED
AG	AGRICULTURAL IRRIGATION LINE; SIZE AS NOTED
A	AIR LINE; SIZE AS NOTED
C	COMMUNICATION LINE
350	MAJOR GRADE CONTOUR LINE
345	MINOR GRADE CONTOUR LINE
CW	CHILLED WATER LINE; SIZE AS NOTED
CWR	CHILLED WATER RETURN LINE; SIZE AS NOTED
CWS	CHILLED WATER SUPPLY LINE; SIZE AS NOTED
	LIMIT OF DIRT
	LIMIT OF TURF
DL	DRAIN LINE; SIZE AS NOTED
EMS	EMERGENCY MANAGEMENT SYSTEM
FA	FIRE ALARM LINE
F	FIRE LINE; SIZE AS NOTED
FO	FIBER OPTIC LINE
	DRAIN TUBE
HW	HOT WATER LINE; SIZE AS NOTED
HWR	HOT WATER RETURN LINE; SIZE AS NOTED
HWS	HOT WATER SUPPLY LINE; SIZE AS NOTED
HYD	HYDRAULIC LINE
ID	IRRIGATION DISTRICT; SIZE AS NOTED
	IRON FENCE
IRR	IRRIGATION MAIN LINE; SIZE AS NOTED
L	IRRIGATION LATERAL LINE; SIZE AS NOTED
ITS	INTELLIGENT TRAFFIC SYSTEM
JT	JOINTLY TRENCHED UTILITIES
OC	OVERHEAD COMMUNICATIONS LINE
OE	OVERHEAD ELECTRIC LINE
OEC	OVERHEAD ELECTRIC AND COMMUNICATION LINE
OET	OVERHEAD ELECTRIC AND TELEPHONE LINE
OETV	OVERHEAD ELECTRIC AND TELEVISION LINE
OETVT	OVERHEAD ELECTRIC, TELEVISION AND TELEPHONE LINE
OTS	OVERHEAD TRAFFIC SIGNAL LINE
OTV	OVERHEAD TELEVISION LINE
OU	OVERHEAD UTILITY LINE
P	PETROLEUM LINE; SIZE AS NOTED
RW	RECYCLED WATER IRRIGATION LINE; SIZE AS NOTED
SAS	SEWER AND STORM DRAIN LINE; SIZE AS NOTED
SFM	SEWER FORCE MAIN; SIZE AS NOTED
ST	STEAM LINE; SIZE AS NOTED
TFO	TRAFFIC FIBER OPTIC LINE
TS	TRAFFIC SIGNAL LINE
TV	TELEVISION LINE
UNK	UNKNOWN UTILITY LINE
	WIRE FENCE
	PROPERTY LINE
	CITY LIMIT
	EASEMENT 1
	EASEMENT 2
	RIGHT-OF-WAY LINE
	RIGHT-OF-WAY CENTER LINE
	SETBACK LINE

SURVEY NOTES:

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BENCHMARK:

1" BRASS CAP MONUMENT ON TOP OF CURB, SOUTH SIDE OF OLIVE AVENUE, 280' EAST OF THE CENTERLINE OF "P" STREET.

ELEV.= 263.43 U.S.G.S. DATUM

SITE BENCHMARK:

CHISELED "X" ON CONCRETE DRIVE NORTH OF THE SOFTBALL FIELDS APPROXIMATELY 113.50' SOUTHWEST OF THE SOUTHWESTERN CORNER OF THE SNACK BAR BUILDING.

ELEV.= 263.71 U.S.G.S. DATUM

NAIL AND TIN ON ASPHALT ON THE WEST SIDE OF THE SECOND BASKETBALL COURT FROM THE EAST APPROXIMATELY 9.7 FEET EAST OF THE WEST SIDE AND 2.5 FEET SOUTH OF THE CENTERLINE.

ELEV.= 265.25 U.S.G.S. DATUM

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PROFESSIONAL SEAL

REGISTERED PROFESSIONAL ENGINEER
JEFFREY D. BRYANT
No. 36182
CIVIL
STATE OF CALIFORNIA

9/11/2024
Date Signed:

PROJECT NUMBER	20-51
DATE	09/11/2024
DSA APPLICATION NO.	02-122784
FILE NO.	20-H3
PTN NO.	65243-154
DRAWN BY	DG

REVISIONS

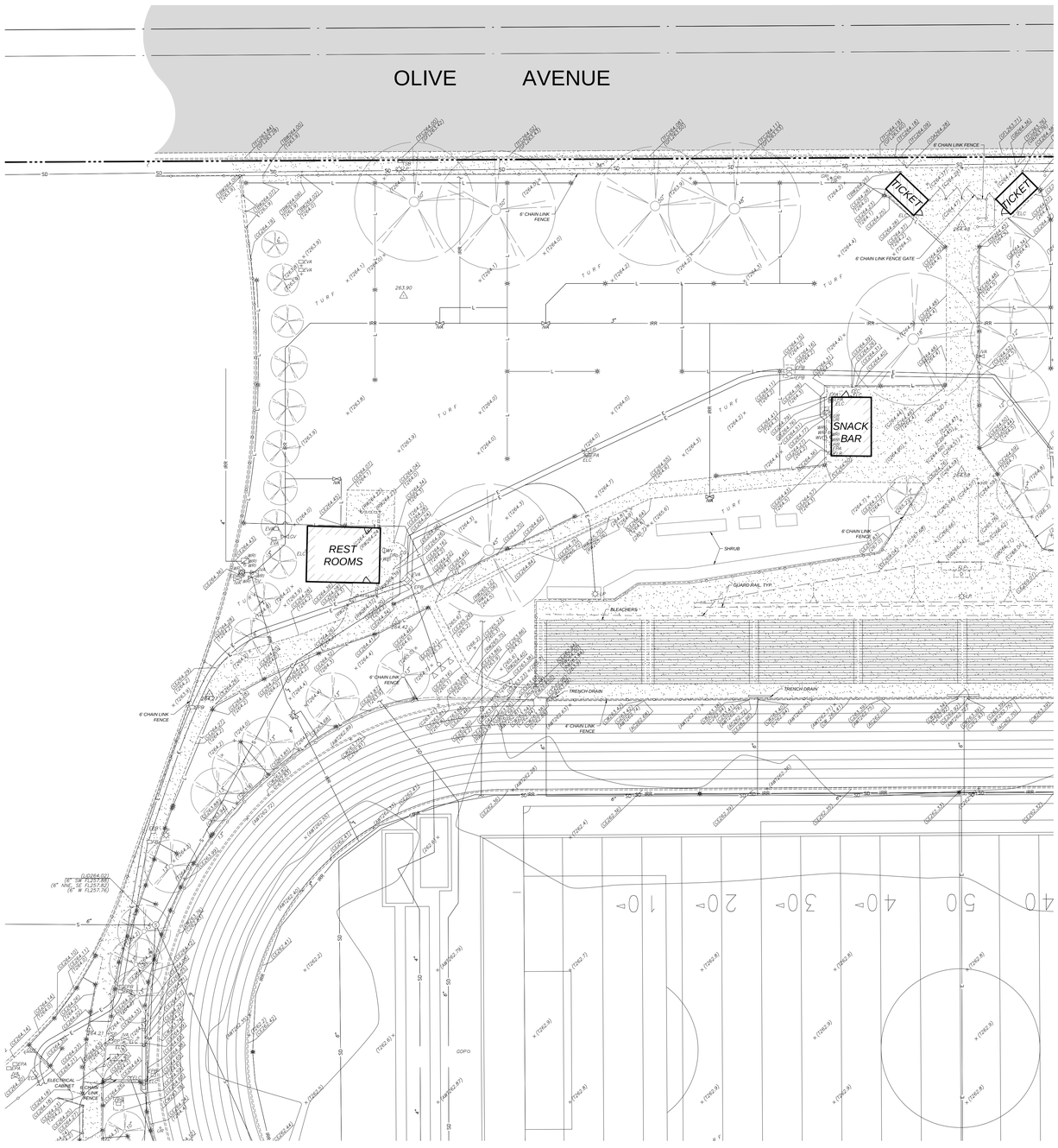
#	DESCRIPTION	DATE

CONSTRUCTION DOCUMENTS

TOPOGRAPHIC SURVEY NOTES AND LEGEND

C1.0

Drawing: P:\22-0252\Site\production\drawings\222252_TOPO.dwg, C1.0 — Plot by: zwalker — Jan 14, 2025 - 10:19am



SURVEY NOTES:

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ELEV.= 263.43 U.S.G.S. DATUM

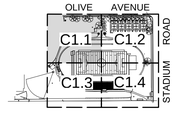
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ELEV.= 265.25 U.S.G.S. DATUM



KEYMAP

SCALE: 1"=20'

0 5 20 40

SCALE IN FEET

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PROFESSIONAL SEAL

REGISTERED PROFESSIONAL ENGINEER
JEFFREY D. DRAKE
No. 36,181
CIVIL
CALIFORNIA

9/11/2024
Date Signed:

PROJECT NUMBER	20-51
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REVISIONS

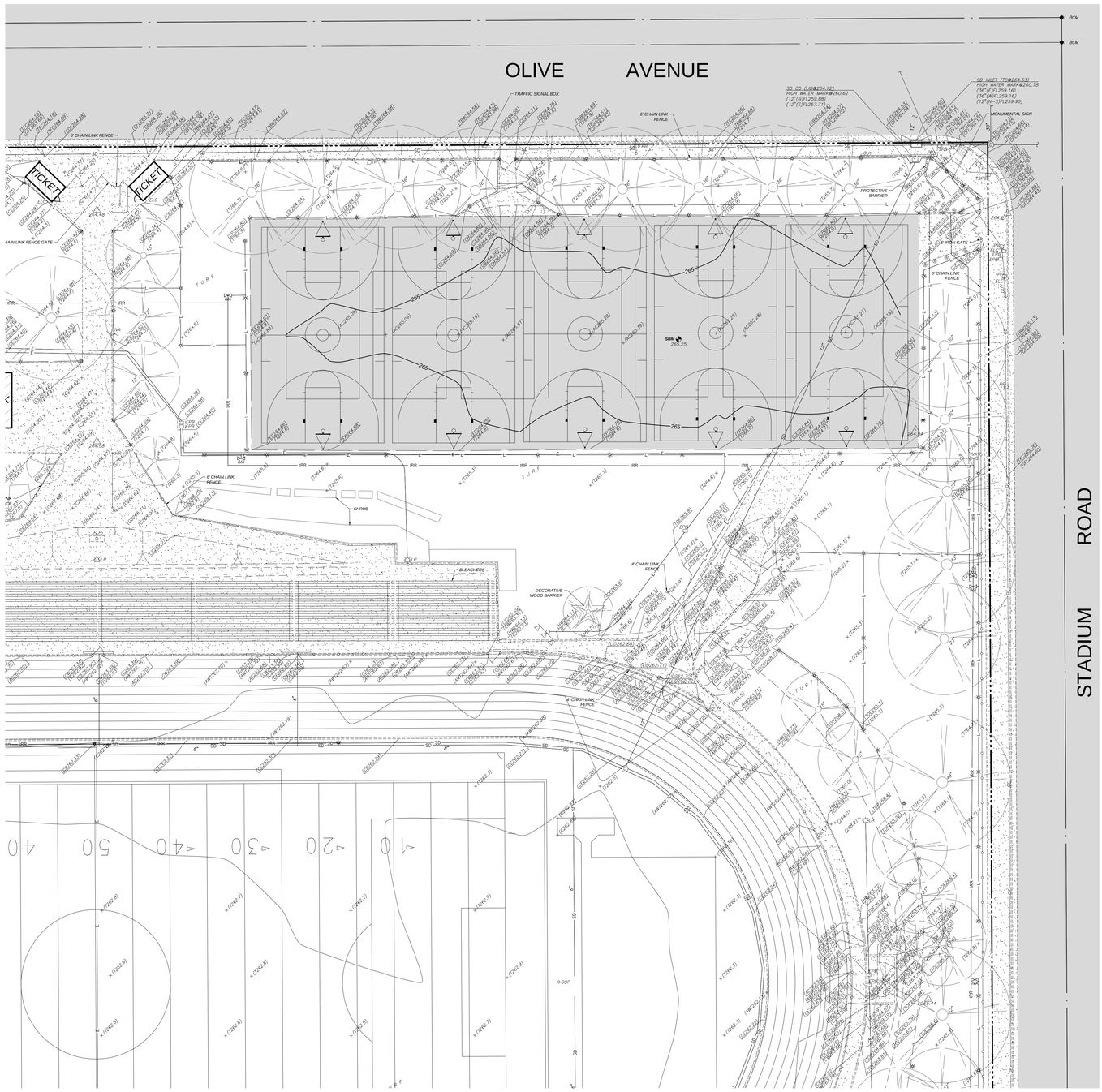
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CONSTRUCTION DOCUMENTS

TOPOGRAPHIC SURVEY

C1.1

Drawing: P:\20-20\20Design\Architectural\Drawings\220252_TOGO.dwg, C1.1 — Plotted by: Jason Jan 14, 2025 - 11:13:33am



SURVEY NOTES:

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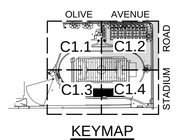
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KEYMAP

SCALE: 1"=20'

0 5 20 40
SCALE IN FEET

PBK

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PHASE 2 CONSTRUCTION DOCUMENTS

PROFESSIONAL SEAL

REGISTERED PROFESSIONAL ENGINEER
JEFFREY D. GRUNS
No. 36,182
CIVIL
STATE OF CALIFORNIA

9/11/2024
Date Signed:

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DATE	09/11/2024
DSA APPLICATION NO.	02-122784
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DRAWN BY	DG

REVISIONS

#	DESCRIPTION	DATE

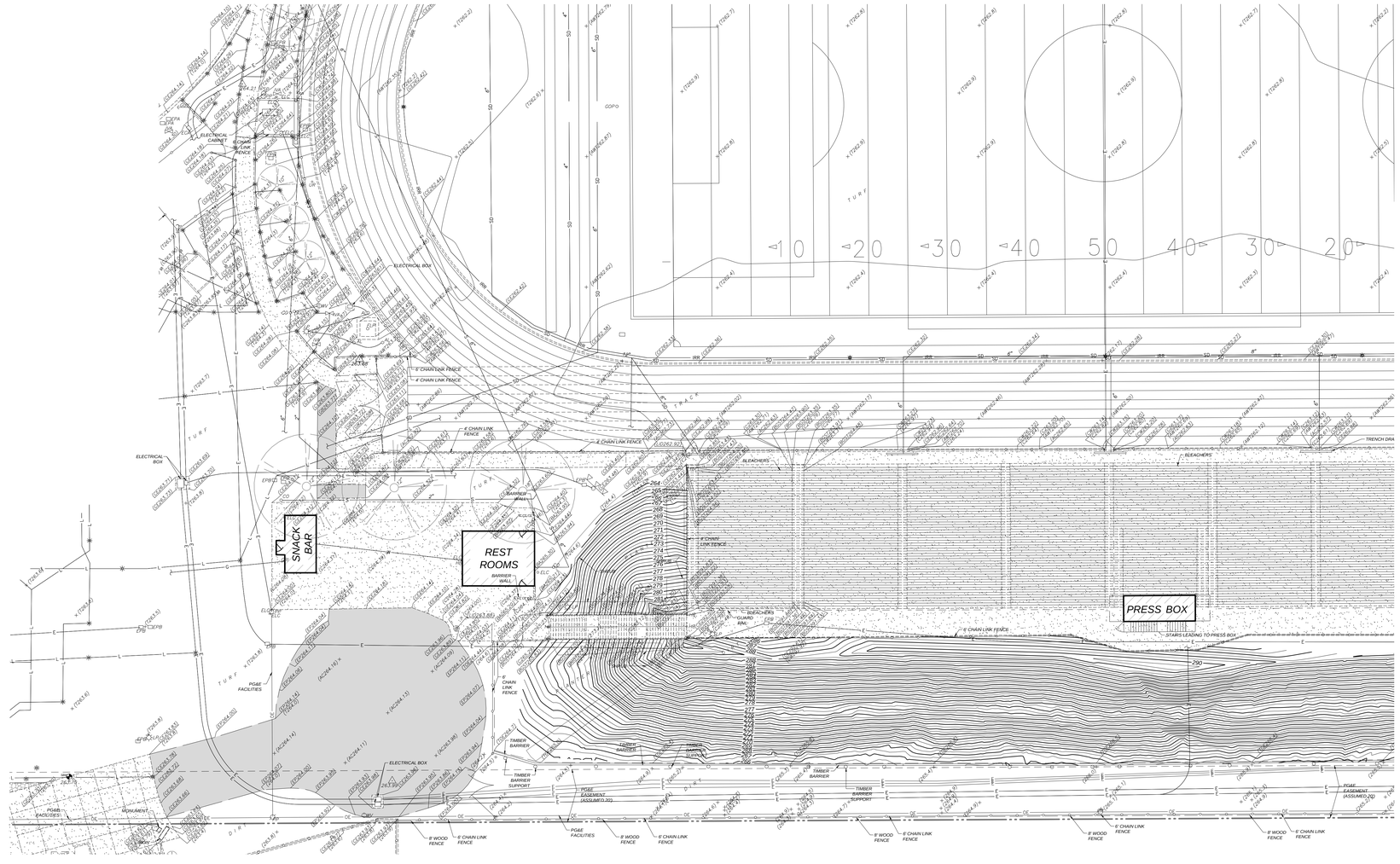
CONSTRUCTION DOCUMENTS

TOPOGRAPHIC SURVEY

C1.2

Drawing: P:\20-20\Drawings\submittals\drawings\222352_TOGO.dwg, C1.2 — Plot By: Jessica Jan 14, 2025 - 11:39am

SEE SHEET C1.1 FOR CONTINUATION



SEE SHEET C1.4 FOR CONTINUATION

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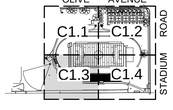
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KEYMAP

SCALE: (N) 1"=20'

0 5 20 40
SCALE IN FEET

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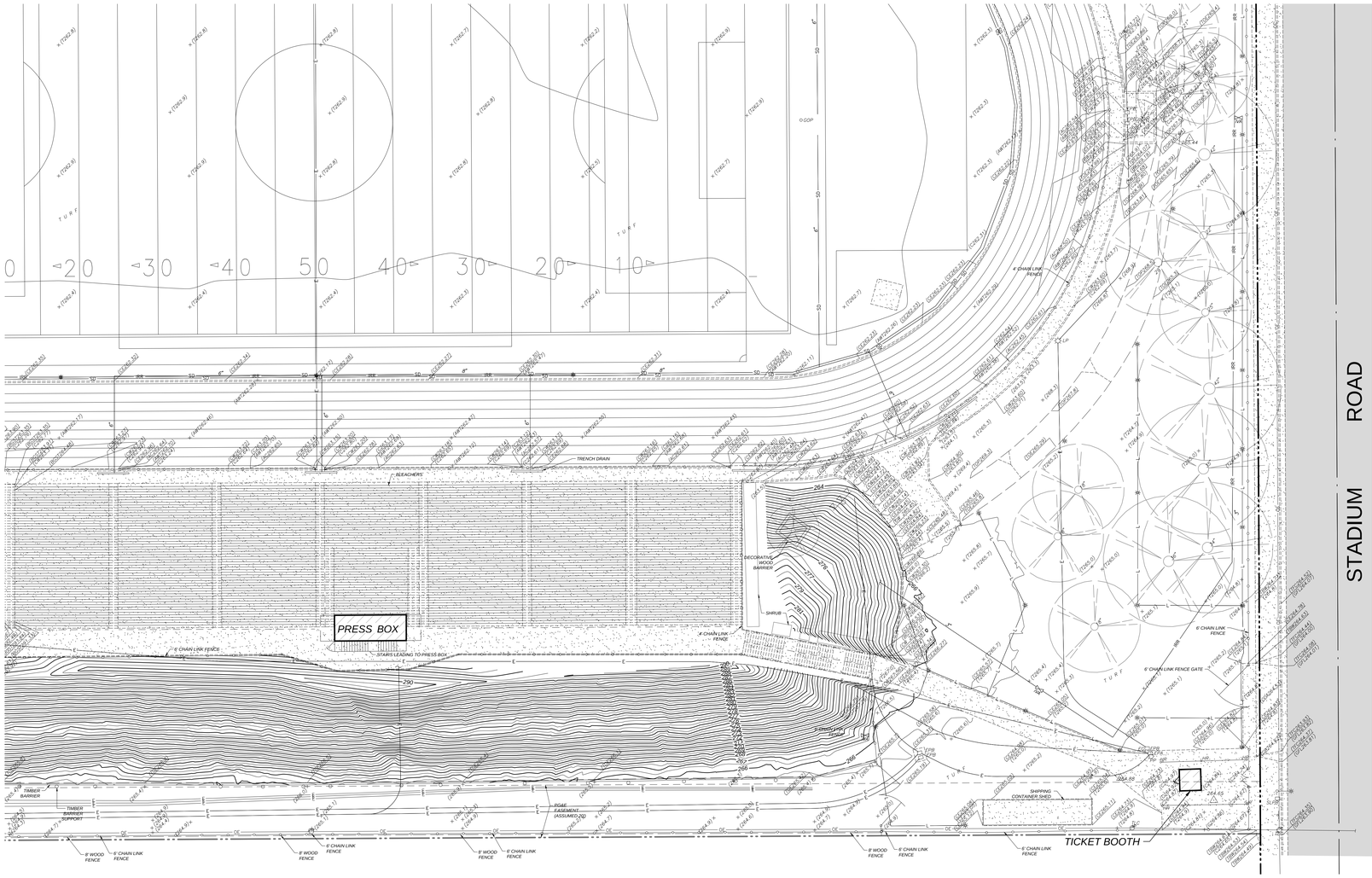
CONSTRUCTION DOCUMENTS

TOPOGRAPHIC SURVEY

C1.3

Drawing: P:\20-51\05\Bldg\produced\drawings\222283_TOPO.dwg, C1.3 — Plot By: Jeffrey Brandt, Jan 31, 2025 - 10:31am

SEE SHEET C1.2 FOR CONTINUATION



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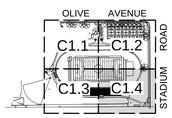
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SCALE IN FEET

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PHASE 2 CONSTRUCTION DOCUMENTS

PROFESSIONAL SEAL

REGISTERED PROFESSIONAL ENGINEER
JEFFREY D. GRAMS
No. 36,182
CIVIL
STATE OF CALIFORNIA

9/11/2024
Date Signed:

PROJECT NUMBER	20-51
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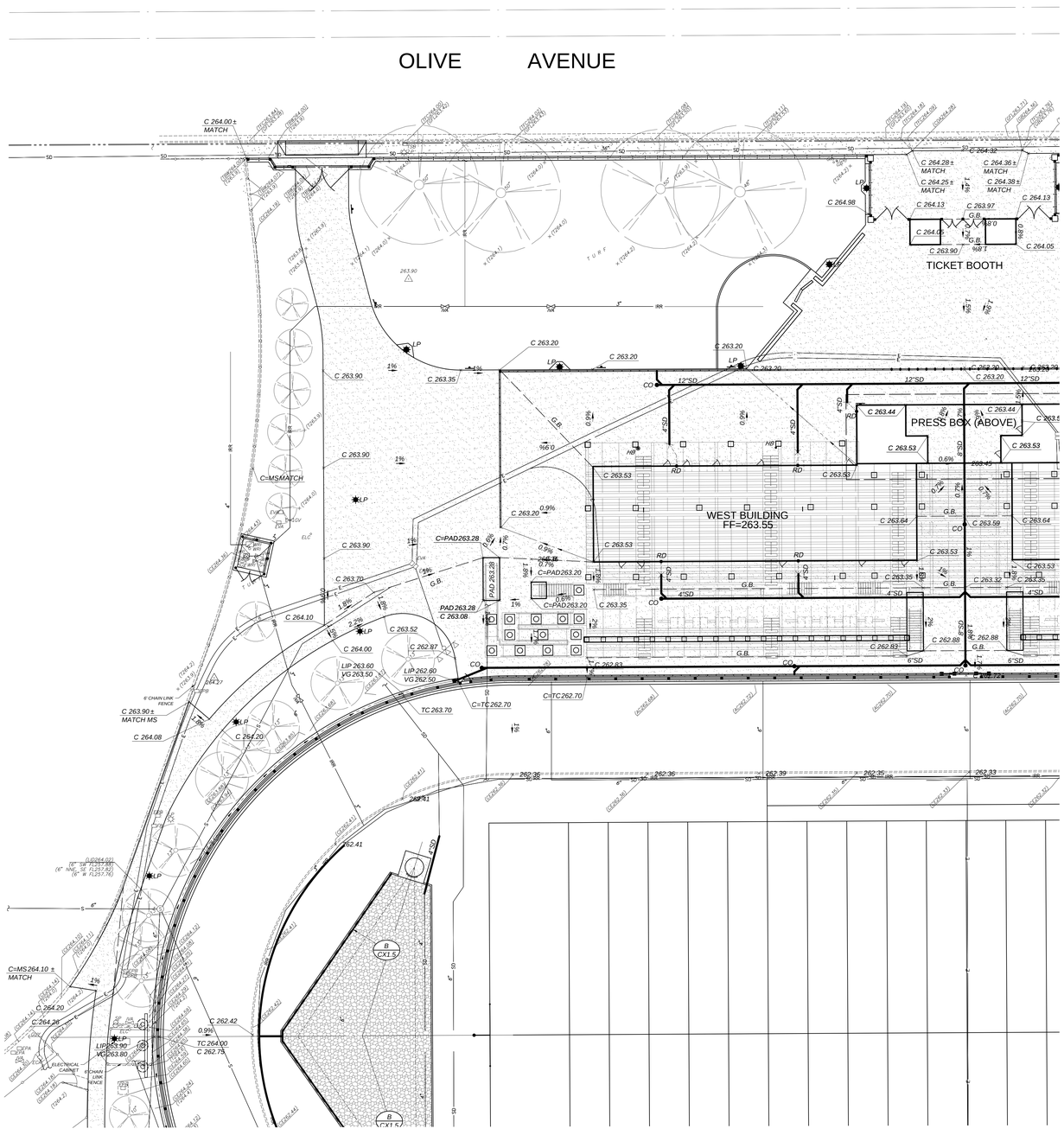
CONSTRUCTION DOCUMENTS

TOPOGRAPHIC SURVEY

C1.4

Drawing: P:\20-51\Drawings\Architectural\Images\220353_TOGO.dwg, C1.4 — Plotted by: dcooper Jan 14, 2025 - 11:38am

E – Grading and Drainage Sheets



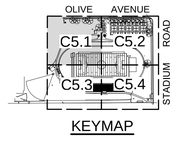
GRADING AND DRAINAGE LEGEND:

C	CONCRETE
FF	FINISHED FLOOR
FG	FINISHED GRADE
FL	FLOWLINE
GR	STORM DRAIN GRATE
MS	MOWSTRIP
SW	SWALE
T	TURF
TD	TRENCH DRAIN
(344.9)	EXISTING ELEVATION
328.78	NEW FINISHED GRADE
328.78	FUTURE GRADE
	DIRECTION OF SURFACE DRAINAGE
G.B.	GRADE BREAK
S=0.0050	PIPE SLOPE AND DIRECTION OF FLOW
	SWALE AND DIRECTION OF FLOW
1	P6 STORM DRAIN INLET PER DETAIL [H/CX1.1]
2	CDS PRE-TREATMENT SYSTEM PER DETAIL [A/ CX1.7]
3	CONNECT CHANNEL DRAIN TO EXISTING STORM DRAIN WITH WATER-TIGHT CONNECTION
4	CONNECT TO EXISTING STORM DRAIN WITH WATER-TIGHT CONNECTION
	TRENCH DRAIN PER DETAIL [A/CX1.2]
CO	SURFACE CLEANOUT PER DETAIL [F/CX1.1]
SD	STORM DRAIN PIPELINE; SIZE AS NOTED. TRENCH AND BACKFILL PER DETAIL [D/CX1.1]
S=0.0020	FLOWLINE SLOPE AND DIRECTION OF FLOW

GENERAL GRADING AND DRAINAGE NOTES:

THE REQUIREMENTS AND INFORMATION SET OUT BELOW ARE PROVIDED FOR THE CONTRACTOR'S CONVENIENCE AND DO NOT ENCOMPASS ALL PROJECT REQUIREMENTS DESCRIBED BY THE PROJECT PLANS AND SPECIFICATIONS AND/OR APPLICABLE LAWS, REGULATIONS AND/OR BUILDING CODES.

1. *CONSTRUCTION OF ALL PROJECT SITE IMPROVEMENTS SUBJECT TO ADA ACCESS COMPLIANCE, INCLUDING ACCESSIBLE PATH OF TRAVEL, CURB RETURNS, PARKING STALL(S) AND UNLOADING AREAS, BARRIER FREE AMENITIES AND/OR OTHER APPLICABLE SITE IMPROVEMENTS SHALL CONFORM TO THE AMERICANS WITH DISABILITIES ACT, CALIFORNIA TITLE 24, THE CALIFORNIA BUILDING CODE, CURRENT EDITION(S).*
2. *CONTRACTOR SHALL FIELD VERIFY ALL GRADES AND SLOPES PRIOR TO THE PLACEMENT OF CONCRETE AND/OR PAVEMENT FOR CONFORMANCE WITH ADA ACCESS COMPLIANCE REQUIREMENTS. EXAMPLES OF MINIMUM AND MAXIMUM LIMITS RELATED TO ADA ACCESS COMPLIANCE INCLUDE, BUT ARE NOT LIMITED TO:*
   a) *ACCESSIBLE PATH OF TRAVEL CROSS-SLOPE SHALL NOT EXCEED 2%*
   b) *ACCESSIBLE PATH OF TRAVEL LONGITUDINAL SLOPES SHALL NOT EXCEED 5%*
   c) *RAMP LONGITUDINAL SLOPES SHALL NOT EXCEED 8.33%*
   d) *ACCESSIBLE WALKS SHALL NOT HAVE LESS THAN 48 INCHES IN UNOBSTRUCTED WIDTH*
   e) *ACCESSIBLE PARKING SPACES AND ACCESS AISLES SHALL NOT EXCEED 2% SLOPE IN ANY DIRECTION*
   f) *LANDINGS AT THE TOP AND BOTTOM OF ACCESSIBLE RAMPS SHALL NOT EXCEED 2% SLOPE IN ANY DIRECTION*
   g) *GUTTERS AND ROAD SURFACES DIRECTLY ADJACENT TO AND WITHIN 2 FEET OF A CURB RAMP SHALL HAVE A COUNTER SLOPE NOT TO EXCEED 5%*
3. *CONTRACTOR MUST IMMEDIATELY NOTIFY THE ENGINEER OF RECORD, IDENTIFIED BY THE PROFESSIONAL ENGINEERING SEAL AND SIGNATURE ON THESE PLANS, OF ANY SITE CONDITION(S) AND/OR DESIGN INFORMATION THAT PREVENTS THE CONTRACTOR FROM COMPLYING WITH THE LAWS, REGULATIONS AND/OR BUILDING CODES GOVERNING ADA ACCESS COMPLIANCE.*
4. *GROUND SLOPES AWAY FROM BUILDING PADS IN LANDSCAPED OR DIRT AREAS SHALL BE NO LESS THAN 5% FOR AT LEAST TEN (10) FEET, OR AS OTHERWISE NOTED ON THE PLANS.*
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6. *ALL FILL MATERIAL USED TO SUPPORT THE FOUNDATIONS OF ANY BUILDING OR STRUCTURE SHALL BE PLACED UNDER THE DIRECTION OF A LICENSED GEOTECHNICAL ENGINEER, AND IN COMPLIANCE WITH THE PROJECT SPECIFICATIONS. A SOILS COMPACTION REPORT SHALL BE SUBMITTED TO THE ENGINEER OF RECORD AS REQUIRED BY THE PROJECT SPECIFICATIONS.*
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11. *WATER TEST PAVEMENT WITHIN NEW IMPROVEMENT AREA. REPLACE PAVEMENT WHERE BIRD BATHS OCCUR AFTER TEST AS DIRECTED BY THE INSPECTOR OR ENGINEER.*
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KEYMAP

SCALE: N 1"=20'

0 5 20 40
SCALE IN FEET

Know what's below. Call before you dig.

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7790 North Palm Avenue
Fresno, CA 93711
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559-448-8467 F
PBK.com

Blair, Church & Flynn
CONSULTING ENGINEERS

MADERA HIGH SCHOOL STADIUM

200 SOUTH L STREET
MADERA, CA 93637

PHASE 2 CONSTRUCTION DOCUMENTS

PROFESSIONAL SEAL

REGISTERED PROFESSIONAL ENGINEER
TEVFIK T. D. BIRINCI
No. 35,180
CIVIL
STATE OF CALIFORNIA

9/11/2024
Date Signed

PROJECT NUMBER
20-51

DATE
09/11/2024

DSA APPLICATION NO.
02-122784

FILE NO.
20-H3

PTN NO.
65243-154

DRAWN BY
DG

REVISIONS

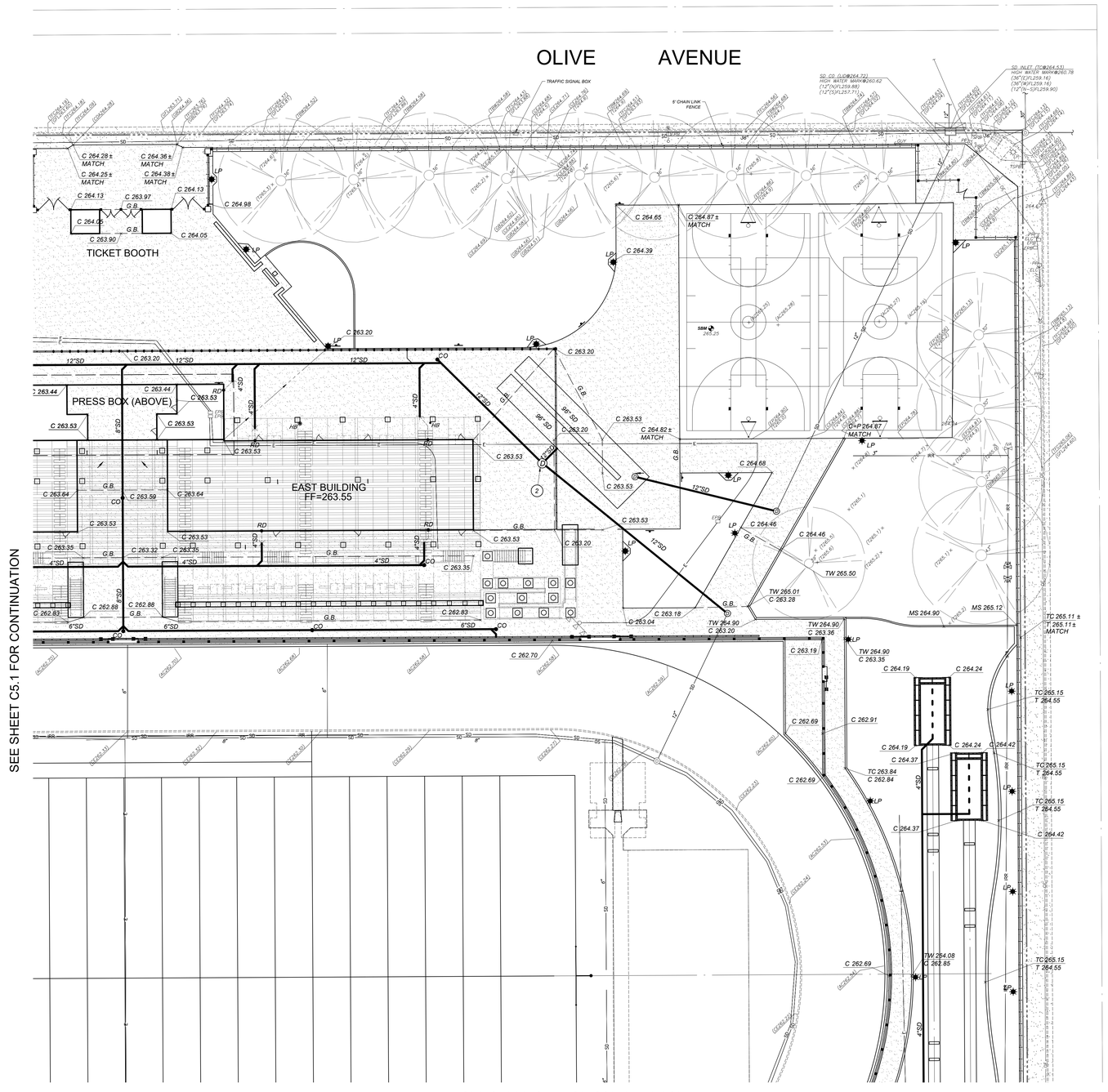
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CONSTRUCTION DOCUMENTS

GRADING AND DRAINAGE PLAN

C5.1

Drawing: P:\20-51\DSA\plansfordrawing\222252_G002.dwg, C5.1 — Plotted by: Andrew Jan 14, 2025 - 11:16am



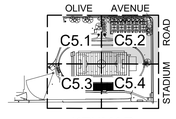
GRADING AND DRAINAGE LEGEND:

C	CONCRETE
FF	FINISHED FLOOR
FG	FINISHED GRADE
FL	FLOWLINE
GR	STORM DRAIN GRATE
MS	MOWSTRIP
SW	SWALE
T	TURF
TD	TRENCH DRAIN
(344.9)	EXISTING ELEVATION
328.78	NEW FINISHED GRADE
328.78	FUTURE GRADE
	DIRECTION OF SURFACE DRAINAGE
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SCALE IN FEET

811 Know what's below. Call before you dig.

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ARCHITECT PBK Architects, Inc.

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7790 North Palm Avenue
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200 SOUTH L STREET
MADERA, CA 93637

MADERA HIGH SCHOOL STADIUM

PHASE 2 CONSTRUCTION DOCUMENTS

PROFESSIONAL SEAL

REGISTERED PROFESSIONAL ENGINEER JEFFREY D. GRAMS No. 36,181 CIVIL CALIFORNIA

9/11/2024
Date Signed:

PROJECT NUMBER	20-51
DATE	09/11/2024
DSA APPLICATION NO.	02-122784
FILE NO.	20-H3
PTN NO.	65243-154
DRAWN BY	DG

REVISIONS

#	DESCRIPTION	DATE

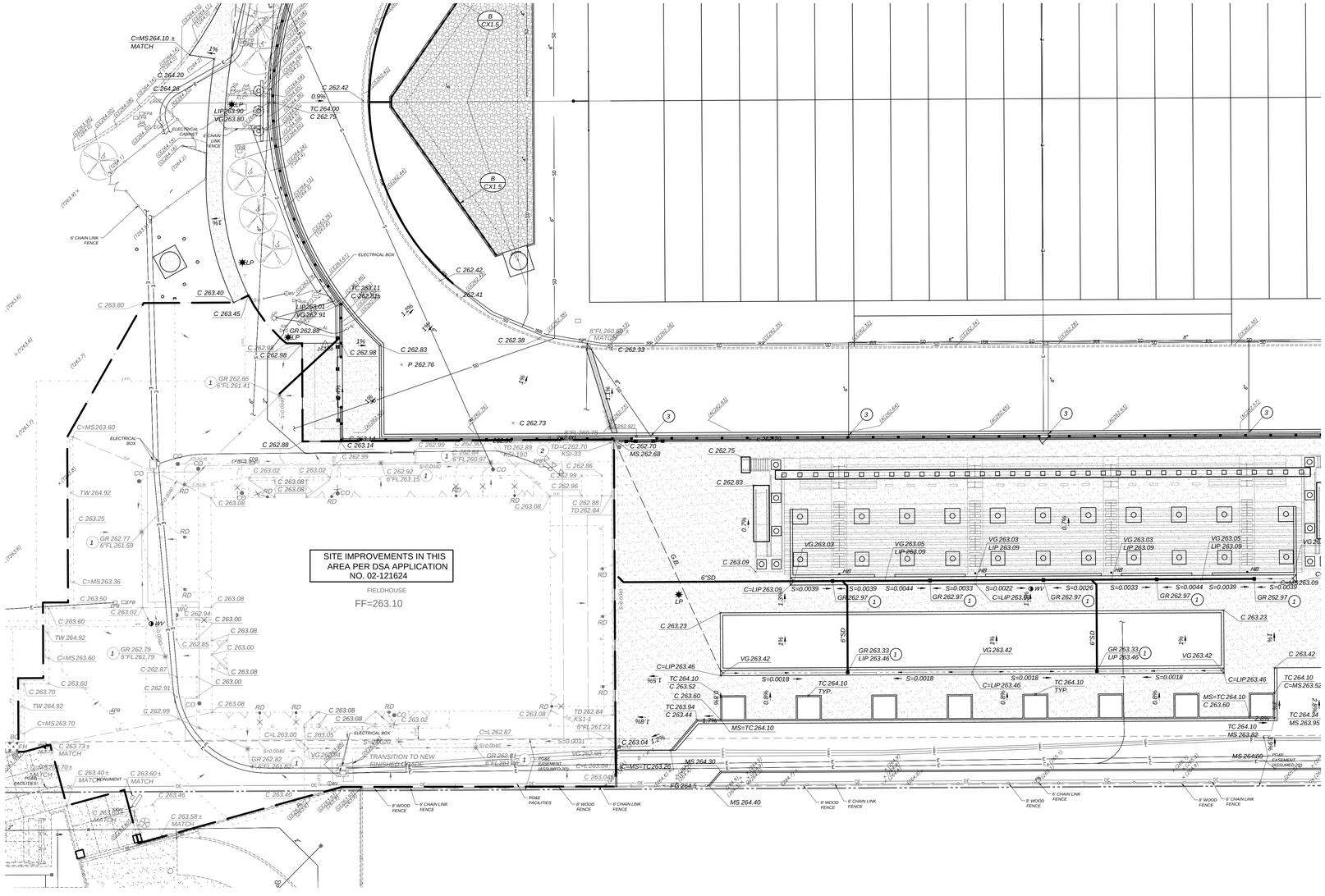
CONSTRUCTION DOCUMENTS

GRADING AND DRAINAGE PLAN

C5.2

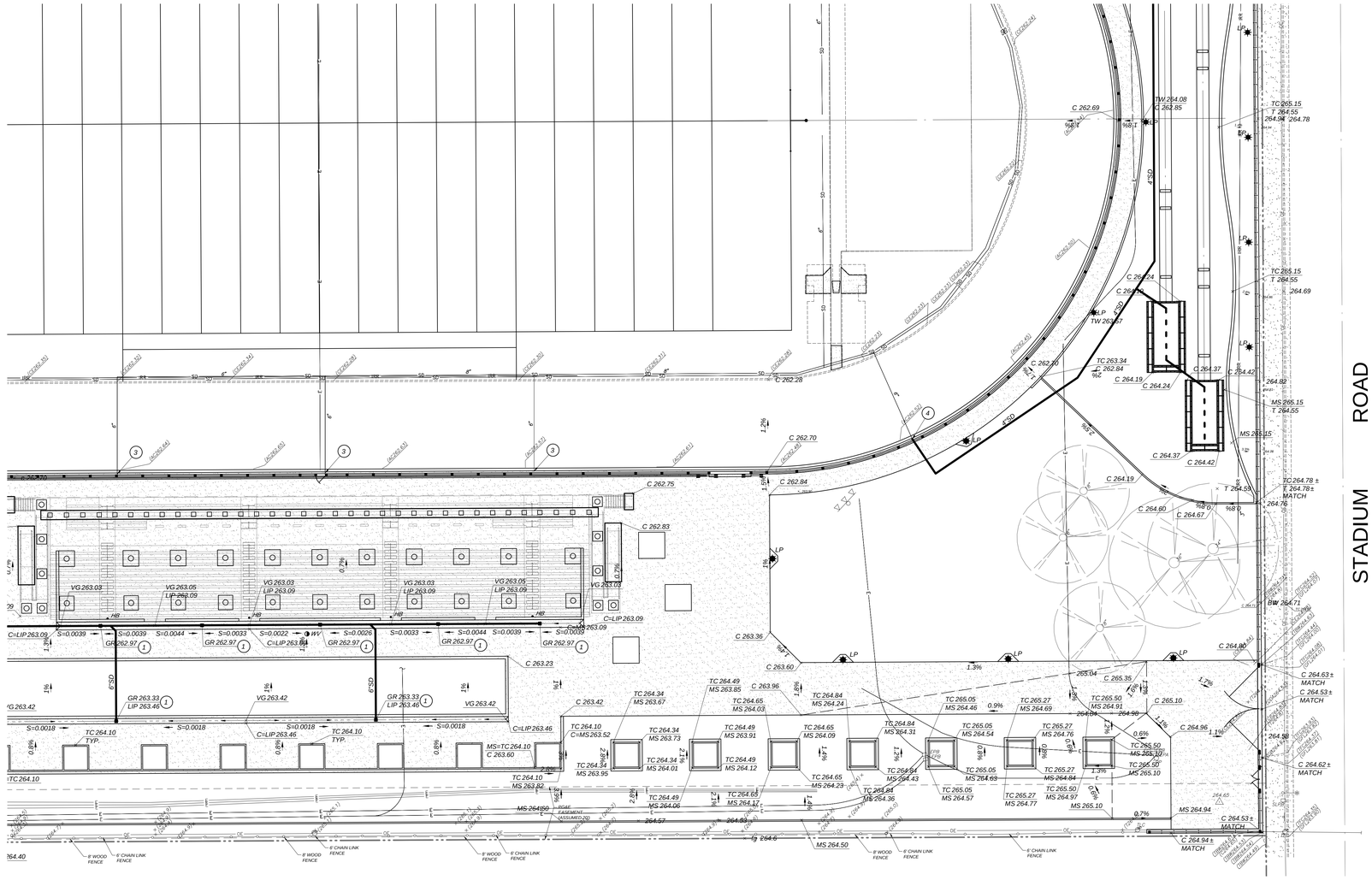
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SEE SHEET C5.1 FOR CONTINUATION

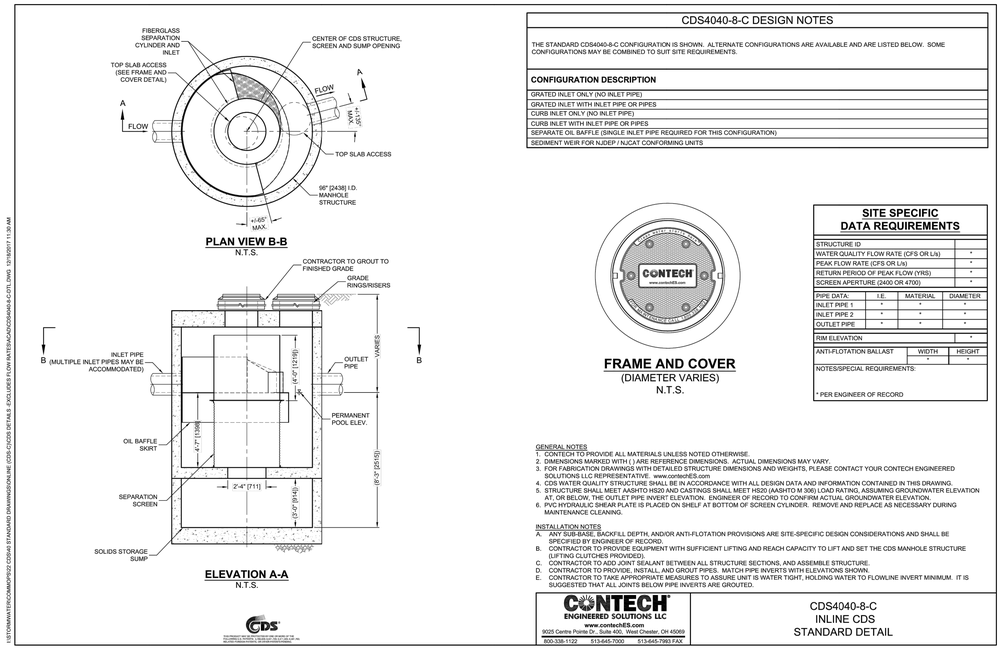


SEE SHEET C5.2 FOR CONTINUATION

SEE SHEET C5.3 FOR CONTINUATION


OLIVE AVENUE
STADIUM ROAD
C 262.28
C 262.70
C 262.75
C 262.84
C 262.83
C 263.36
C 263.23
C 263.42
C 263.96
C 263.60
C 262.69
TW 264.08
C 262.85
TC 265.15
T 264.55
264.94
264.78
TC 263.34
C 262.84
TW 263.47
C 264.24
C 264.19
C 264.37
C 264.42
264.69
264.82
MS 265.15
T 264.55
C 264.60
C 264.67
T 264.59
TC 264.78 ±
T 264.78±
MATCH
264.76
C 264.80
C 264.63 ±
MATCH
C 264.53 ±
MATCH
C 264.62 ±
MATCH
C 264.94 ±
MATCH
264.58
264.94
MS 264.50
MS 264.94
VG 263.03
LIP 263.09
VG 263.05
LIP 263.09
C=LIP 263.09
S=0.0039
S=0.0044
S=0.0033
S=0.0022
S=0.0026
S=0.0018
GR 262.97
GR 263.33
LIP 263.46
VG 263.42
C=LIP 263.46
TC 264.10
TYP.
MS=TC 264.10
C 263.60
TC 264.10
C=MS 263.52
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TC 265.50
MS 265.10
C 265.35
C 265.10
C 264.96
264.98
265.04
264.63
264.57
264.65
264.66
MS 265.10
MS 264.94
1.3%
0.9%
0.6%
1.1%
0.7%
2.0%
2.2%
4" SD
6" SD
8" SD
10" SD
12" SD
LP
HB
GR
6' WOOD FENCE
6' CHAIN LINK FENCE
OE
UGE EASEMENT (ASSUMED)
(GE262.41)
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F – Contech CDS Unit Detail



CDS4040-8-C DESIGN NOTES
THE STANDARD CDS4040-8-C CONFIGURATION IS SHOWN. ALTERNATE CONFIGURATIONS ARE AVAILABLE AND ARE LISTED BELOW. SOME CONFIGURATIONS MAY BE COMBINED TO SUIT SITE REQUIREMENTS.
CONFIGURATION DESCRIPTION
GRATED INLET ONLY (NO INLET PIPE)
GRATED INLET WITH INLET PIPE OR PIPES
CURB INLET ONLY (NO INLET PIPE)
CURB INLET WITH INLET PIPE OR PIPES
SEPARATE OIL BAFFLE (SINGLE INLET PIPE REQUIRED FOR THIS CONFIGURATION)
SEDIMENT WEIR FOR NJDEP / NJCAT CONFORMING UNITS

FRAME AND COVER
(DIAMETER VARIES)
N.T.S.

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID			
WATER QUALITY FLOW RATE (CFS OR L/s)			*
PEAK FLOW RATE (CFS OR L/s)			*
RETURN PERIOD OF PEAK FLOW (YRS)			*
SCREEN APERTURE (2400 OR 4700)			*
PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	*	*	*
INLET PIPE 2	*	*	*
OUTLET PIPE	*	*	*
RIM ELEVATION			*
ANTI-FLOTATION BALLAST		WIDTH	HEIGHT
		*	*
NOTES/SPECIAL REQUIREMENTS:			

* PER ENGINEER OF RECORD

GENERAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. DIMENSIONS MARKED WITH ( ) ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.
3. FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE, www.contechES.com
4. CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING.
5. STRUCTURE SHALL MEET AASHTO HS20 AND CASTINGS SHALL MEET HS20 (AASHTO M 306) LOAD RATING, ASSUMING GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION.
6. PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.

INSTALLATION NOTES
A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CDS MANHOLE STRUCTURE (LIFTING CLUTCHES PROVIDED).
C. CONTRACTOR TO ADD JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS, AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT PIPES. MATCH PIPE INVERTS WITH ELEVATIONS SHOWN.
E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

CONTECH ENGINEERED SOLUTIONS LLC
www.contechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CDS4040-8-C
INLINE CDS
STANDARD DETAIL

I:\STORMWATER\CONWORP\CDS CDS\40 STANDARD DRAWINGS\ONLINE (CDS)\CDS DETAILS - EXCLUDES FLOW RATES\AUTOCAD\CDS4040-8-C-DTL.DWG 13/18/2017 11:30 AM
THIS PRODUCT AND/OR METHOD OF USE MAY BE COVERED BY ONE OR MORE OF THE FOLLOWING U.S. PATENTS: 5,322,629; 5,624,576; 5,707,527; 5,759,415; 6,027,639; 6,350,407; 6,649,048; 6,991,114; 7,186,333; 7,296,692; 7,297,266; 7,513,998; 7,566,402; 7,686,951; 7,896,586; 8,431,005; 8,470,173; 8,671,992; 8,673,157; 8,801,926; 8,852,436; 9,068,324; 9,095,792; 9,199,184; 9,266,045; 9,352,260; 9,475,008; 9,504,939; 9,643,107; 9,656,190; 9,675,913; 9,675,914; 9,675,915; 9,675,916; 9,687,761; 9,687,762; 9,687,763; 9,687,764; 9,694,301; 9,694,302; 9,694,303; 9,694,304; 9,694,305; 9,694,306; 9,694,307; 9,694,308; 9,694,309; 9,694,310; 9,694,311; 9,694,312; 9,694,313; 9,694,314; 9,694,315; 9,694,316; 9,694,317; 9,694,318; 9,694,319; 9,694,320; 9,694,321; 9,694,322; 9,694,323; 9,694,324; 9,694,325; 9,694,326; 9,694,327; 9,694,328; 9,694,329; 9,694,330; 9,694,331; 9,694,332; 9,694,333; 9,694,334; 9,694,335; 9,694,336; 9,694,337; 9,694,338; 9,694,339; 9,694,340;

G – Geotechnical Report

GEOTECHNICAL ENGINEERING INVESTIGATION REPORT

PROPOSED NEW BLEACHERS AT MADERA HIGH SCHOOL
MADERA HIGH SCHOOL STADIUM
800-820 W OLIVE AVENUE
MADERA, CALIFORNIA 93637

BSK PROJECT G00001118

PREPARED FOR:

MADERA UNIFIED SCHOOL DISTRICT
1902 HOWARD ROAD
MADERA, CALIFORNIA 93637

JULY 14, 2023

GEOTECHNICAL ENGINEERING INVESTIGATION REPORT

PROPOSED NEW BLEACHERS AT MADERA HIGH SCHOOL
MADERA HIGH SCHOOL STADIUM
800-820 W OLIVE AVENUE
MADERA, CALIFORNIA 93637

Prepared for:

Madera Unified School District
1902 Howard Road
Madera, California 93637

BSK Project: G00001118

July 14, 2023

Prepared by:

Tolleman Gorham, EIT
Staff Engineer II

Neva M. Popenoe, PE, GE
Fresno Branch Manager



BSK Associates
691 N Laverne Avenue, Suite 101
Fresno, California 93727
(559) 497-2880
www.bskassociates.com

DISTRIBUTION: Ms. Rosalind Cox, Madera USD (pdf)

Table of Contents

1 INTRODUCTION 1
1.1 General 1
1.2 Project Description 1
1.3 Purpose and Scope of Services 1
2 FIELD INVESTIGATION AND LABORATORY TESTING 2
2.1 Field Exploration 2
2.2 Laboratory Testing 2
3 SITE CONDITIONS 2
3.1 Site Description 2
3.2 Subsurface Conditions 2
3.3 Groundwater 3
4 CONCLUSIONS AND RECOMMENDATIONS 3
4.1 General 3
4.2 Soil Corrosivity 3
4.3 Seismic Design Criteria 4
4.4 Site Preparation and Earthwork Construction 4
4.5 Shallow Foundations 6
4.6 Lateral Earth Pressures and Frictional Resistance 7
4.7 Concrete Slabs-on-Grade 8
4.8 Excavation Stability 9
4.9 Utility Trench Excavation and Backfill 10
4.10 Surface Drainage Control 10
5 PLANS AND SPECIFICATIONS REVIEW 10
6 CONSTRUCTION TESTING AND OBSERVATIONS 10
7 LIMITATIONS 11

Figures

Figure 1: Site Vicinity Map
Figure 2: Boring Location Map

Appendices

Appendix A: Field Exploration
Appendix B: Laboratory/Field Testing

1 INTRODUCTION

1.1 General

This report presents the results of our Geotechnical Engineering Investigation for the proposed bleachers to be located at the stadium within Madera High School in Madera, California, as shown on the Site Vicinity Map, Figure 1. The geotechnical engineering investigation was conducted in general accordance with the scope of services outlined in BSK Proposal G00001118, dated May 1, 2023. The proposed improvements and exploratory borings are shown on Figure 2, Boring Location Map.

Previous geotechnical investigations were performed at the site (BSK Project Number G2115811F, dated June 10, 2021) and referenced for this investigation.

In the event that significant changes occur in the design or location of the proposed structure, the conclusions and recommendations presented in the report will not be considered valid unless the changes are reviewed by BSK and the conclusions and recommendations are modified or verified in writing, as necessary.

1.2 Project Description

BSK understands that the project consists of the development of two new bleacher structures and another small structure at the Madera High School Stadium in Madera, California. We understand, based on the provided site plan and on email correspondence, that the bleachers are planned to occupy approximately 17,700 square feet and 8,300 square feet respectively. The building is anticipated to occupy approximately 7,200 square feet. Floor slab loads were not provided but anticipated to be less than 2,000 psf with minimal grading. A berm is anticipated to be removed at the south end of the site, adjacent to the existing and future bleachers. Other improvements are anticipated to include underground utilities, hardscaping, and landscaping.

1.3 Purpose and Scope of Services

The purpose of the geotechnical investigation is to assess soil conditions at the project site and provide geotechnical engineering recommendations for use by the project designers during preparation of the project plans and specifications for the proposed improvements. The scope of the investigation included a field exploration, laboratory testing, engineering analysis, and report preparation. It is understood new geologic and site hazards investigation were not required for the proposed improvements.

2 FIELD INVESTIGATION AND LABORATORY TESTING

2.1 Field Exploration

The field exploration, conducted on June 23, 2022, consisted of a site reconnaissance, and drilling six (6) exploratory test borings from depths of 10 to 21.5 feet bgs. The borings were drilled within or adjacent to the proposed improvement areas using a truck-mounted drill rig equipped with hollow stem augers and hand auger equipment. The borings were advanced to a maximum depth of 21.5 feet below ground surface (bgs). The approximate boring locations are presented on Figure 2. Details of the field exploration and the boring logs are provided in Appendix A.

2.2 Laboratory Testing

Laboratory testing of selected soil samples were performed to evaluate certain physical, chemical, and engineering characteristics and properties. The testing program included: in-situ moisture and density, gradation, shear strength, collapse potential, and corrosion potential. The in-situ moisture and dry density test results are presented on the boring logs in Appendix A. Descriptions of the laboratory test methods and test results are provided in Appendix B.

3 SITE CONDITIONS

3.1 Site Description

The project site is situated at the existing Madera High School stadium southwest of Olive Avenue and Stadium Road in Madera, California. The project site was bounded to the west by athletic fields with Coyote Lane beyond, to the south by residences, to the east by Stadium road with Madison Elementary School beyond, and by Olive Avenue to the North. The berm at the south end of the site was approximately 12 feet high and was covered with grasses and landscaping on the south side. The topmost portion of the berm and the north side consisted on concrete walkways and the existing bleachers.

3.2 Subsurface Conditions

The subsurface soil generally consisted of sandy silt and silty sand to the maximum depth of exploration (21.5 bgs.). The boring logs in Appendix A provide a more detailed description of the soils encountered in each boring, including the applicable Unified Soil Classification System symbols. The approximate locations of the soil borings are shown on the Boring Location Map (Figure 2).

Soils encountered had low potential for collapse and non-expansive, see Appendix B for laboratory testing results.

3.3 Groundwater

Groundwater was not encountered within the borings to the maximum depth explored, 21.5 feet bgs. Historical groundwater data near the site indicates a maximum groundwater height at more than 50 feet bgs. However, fluctuations in the groundwater level or the presence of perched groundwater may occur due to variations in rainfall, irrigation, seasonal factors, pumping from wells and other factors that were not evident at the time of our investigation.

To ascertain groundwater levels for the area during other time periods, groundwater elevation data from the California Department of Water Resources (DWR) were obtained for the period 1935 to 1976. The water level hydrograph from well 11S17E26A001M is presented on Figure 2 in the previous report. The hydrograph indicates that the highest historic groundwater elevation in the general area of the site was approximately 244 feet in 1945. Using a Site elevation of 262 feet, the shallowest historic depth to groundwater was approximately 18 feet bgs.

4 CONCLUSIONS AND RECOMMENDATIONS

4.1 General

Based upon the data collected during this investigation and from a geotechnical engineering standpoint, it is our opinion that there are no soil conditions that would preclude the construction of the proposed improvements provided that the recommendations presented in this report are incorporated into the project design and construction. The planned improvements may be supported on shallow reinforced isolated or continuous concrete spread footings.

4.2 Soil Corrosivity

A surface soil sample obtained from the Site was tested to provide a preliminary screening of the potential for concrete deterioration or steel corrosion due to attack by soil-borne soluble salts. The test results are presented in Appendix B.

Based on test results, on-site near-surface soils have low soluble sulfates, low chloride contents and a low minimum resistivity, and are alkaline. Thus, the on-site soils are considered to have a low corrosion potential with respect to buried concrete and a corrosive potential for unprotected metal in contact with the soil.

BSK recommends that a Type II cement be used in the formulation of concrete and that buried reinforcing steel protection be provided with a minimum concrete cover required by the American Concrete Institute (ACI) Building Code for Structural Concrete, ACI 318, Chapter 20. Buried metal conduits must have protective coatings in accordance with the manufacturer's specifications. If detailed recommendations for corrosion protection are desired, a corrosion specialist should be consulted.

4.3 Seismic Design Criteria

There are no known active fault zones within the vicinity of the project site. In accordance with Section 1613.2.2 of the 2022 California Building Code (CBC) and Table 20.3-1 of ASCE 7-16, the site can be classified as Site Class D (stiff soil profile).

Use of the 2022 California Building Code (CBC) seismic design criteria is considered appropriate and the following parameters are considered applicable for the structural design of foundations.

Table 1: Seismic Design Parameters

Seismic Design Parameter	2022 CBC Value		Reference
MCE Mapped Spectral Acceleration (g)	S_S = 0.602	S_1 = 0.235	USGS Mapped Value
Amplification Factors (Site Class D)	F_a = 1.319	F_v = null[1](2.130)[2]	ASCE Table 11.4
Site Adjusted MCE Spectral Acceleration (g)	S_{MS} = 0.793	S_{M1} = null[1](0.501)[2]	ASCE Equations 11.4.1-2
Design Spectral Acceleration (g)	S_{DS} = 0.529	S_{D1} = null[1] (0.334)[2]	ASCE Equations 11.4.1-4
Geometric Mean PGA (g)	PGA_M = 0.348		Section 11.8.3, ASCE 7-16
Site Short Period – T_s (seconds)	T_s = 0.631		$T_s = S_{D1}/ S_{DS}$
Site Long Period – T_L (seconds)	T_L = 12		USGS Mapped Value

Notes: [1] Requires site-specific ground motion procedure or exception as per ASCE 7-16 Section 11.4.8.

[2] Values from ASCE 7-16 supplement shall only be used to calculate T_s. Values provided based on use of exception, as provided in Section 11.4.8.2 to Site-Specific Ground Motion Procedures and assumes the value of the seismic response coefficient C_s is determined by Eq. 12.8-2 for values of $T \leq 1.5T_s$ and taken as equal to 1.5 times the value computed in accordance with either Eq. 12.8-3 for $T_L \geq T > 1.5T_s$ or Eq. 12.8-4 for $T > T_L$.

The long period design spectral response acceleration coefficient, S_{D1}, is greater than 0.2, therefore the Site lies in Seismic Design Category D as specified in Section 1613.2.5 of the 2022 CBC. In accordance with the 2022 CBC, each structure shall be assigned to the more severe seismic design category in accordance with Table 1613.2.5(1) or 1613.2.5(2), irrespective of the fundamental period of vibration of the structure.

4.4 Site Preparation and Earthwork Construction

The following procedures must be implemented during site preparation for the proposed improvements. It should be noted that references to maximum dry density, optimum moisture content, and relative compaction are based on ASTM D1557 (latest test revision) laboratory test procedures.

1. Prior to any site grading, all miscellaneous surface obstructions must be removed from the improvement area. Near surface soils containing vegetation, roots, organics, or other objectionable material must be stripped to a depth of at least 3-inches to expose a clean soil surface. Where trees or bushes are to be removed, the associated roots are expected to extend 3 feet or more below existing grade, as such, deeper excavation may be necessary for root removal. Roots larger than ½-inch in diameter must be removed. Surface strippings must not be incorporated into engineered fill unless the organic content is less than 3 percent by weight (ASTM D2974).

2. Within the area of the planned improvements, remove existing concrete curbs, sidewalks, underground utilities, and debris to expose a clean soil surface free of deleterious material.

   Existing utilities or irrigation pipes must be removed to a point at least 5-feet horizontally outside the proposed building area. Resultant cavities must be backfilled with engineered fill. Abandoned pipelines to remain that are less than 2 inches in diameter must be capped at the cutoff point, while pipelines greater than 2 inches in diameter must be filled with a 1-sack sand-cement slurry.

   Existing concrete may be crushed and used as base material, provided it sufficiently crushed to less than 3 inch diameter.

3. Soil disturbed as a result of demolition, undocumented fill deemed to possess inadequate compaction or uniformity, debris, and abandoned underground structures must be excavated to expose undisturbed native soil or suitable fill.

4. Following the required demolition, stripping, and/or removal of underground structures, the exposed soil surface in areas to support fill or proposed improvements must be over-excavated a minimum of 12 inches below existing site grade or 12 inches below the proposed foundations, which ever depth is greater. The exposed subgrade must be proof-rolled under the observation of a BSK field representative to detect soft or pliant areas. Soft or pliant areas must be over-excavated to firm native soil. Earthwork must extend at least 5-feet laterally beyond the outside edge of proposed improvements and areas to receive fill.

5. Non-expansive excavated soils, free of deleterious substances (organic matter, demolition debris, tree roots, etc.) and with less than 3 percent organic content by weight, may be returned to the excavations as engineered fill. Engineered fill must be placed in uniform layers not exceeding 8-inches in loose thickness, moisture-conditioned to at or above optimum moisture content and compacted to at least 90 percent of the maximum dry density. The upper 12 inches of engineered fill placed as backfill under pavement sections must be compacted to at least 95 percent of the maximum dry density. Acceptance of engineered fill placement must be based on both moisture content at time of compaction and relative compaction.

6. Imported fill materials must be free of deleterious substances and have less than 3 percent organic content by weight. The project specifications must require the contractor to contact BSK for review of the proposed import fill materials for conformance with these recommendations at least two weeks prior to importing to the site, whether from on-site or off-site borrow areas.

Imported fill soils must be non-hazardous and be derived from a single, consistent soil type source conforming to the following criteria:

Maximum Particle Size:	3-inches
Percent Passing #4 Sieve:	65 – 100
Percent Passing #200 Sieve:	20 – 45
Plasticity Index:	less than 12
Expansion Index:	< 20
Low Corrosion Potential:	
Soluble Sulfates:	< 1,500 mg/kg
Soluble Chlorides:	< 300 mg/kg
Soil Resistivity:	> 2,000 ohm-cm

Grading operations must be scheduled as to avoid working during periods of inclement weather. Should these operations be performed during or shortly following periods of inclement weather, unstable soil conditions may result in the soils exhibiting a "pumping" condition. This condition is caused by excess moisture, in combination with compaction, resulting in saturation and near zero air voids in the soils. If this condition occurs, the affected soils must be over-excavated to the depth at which stable soils are encountered and replaced with suitable soils compacted as engineered fill. Alternatively, the Contractor may proceed with grading operations after utilizing a method to stabilize the soil subgrade, which must be subject to review by BSK prior to implementation.

The Department of Toxic Substance Control (DTSC) has detailed guidelines for the testing of import soils to school sites. These guidelines take into account the past and present land usage at a borrow pit, the acreage of the borrow pit and the volume of import soil to establish the amount of chemical testing of import fill recommended. BSK must be contacted for review and analytical testing of proposed import fill materials for conformance with these recommendations at least 15 days prior to transporting fill to the site.

4.5 Shallow Foundations

The proposed building and retaining walls may be supported on reinforced concrete spread footings bearing on subgrade soil and engineered fill. The allowable bearing pressure applies to the dead load plus live load (DL + LL), and is presented for lighter and maximum loading, and may be increased by 1/3 for short duration wind or seismic loads. The foundation must be designed with reinforcing steel as recommended by the project Structural Engineer. The allowable bearing capacity presented below considers a safety factor of 3. Footing design must follow the criteria listed below:

TABLE 2 SHALLOW FOOTING BEARING CAPACITY				
Footing Embedment [1] (inches)	Minimum Footing Width (inches)		Allowable Bearing Capacity (psf)	
	Continuous Footing	Isolated Spread Footing	Continuous Footing	Isolated Spread Footing
12	12	24	3,000	3,000

Note (1) – Measure with respect to the lowest adjacent subgrade surface

The estimated total and differential settlement for the recommended spread footings shown below assumes maximum wall and column loads of 2 kip/ft and 14 kips, respectively.

TABLE 3 ANTICIPATED SETTLEMENT			
Footing Type	Post-Construction Settlement (inches)	Differential Settlement (inches)	Angular Distortion
Continuous	1.0	--	0.005
Isolated	1.0	0.5	--

Isolated footing differential settlement is based on adjacent similarly loaded footings spaced at 30-feet. The settlement values given above are applicable to the maximum loading conditions. For loads other than the design maximum loads, the settlements can be adjusted proportionally. Due to the nature of the foundation soils, a significant fraction of the settlement is expected to occur following the end of construction as the design building loads area applied.

4.6 Lateral Earth Pressures and Frictional Resistance

Lateral loads applied against foundations may be resisted by a combination of passive resistance against the vertical faces of the foundations and friction between the foundation bottom and the supporting subgrade. The parameters shown in the table below are for drained conditions of select engineered fill or undisturbed native soil.

TABLE 4 Recommended Lateral Earth Pressures	
Lateral Pressure Condition	Equivalent Fluid Density
Active Pressure (psf/ft)	45
At-Rest Pressure (psf/ft)	66
Passive Pressure (psf/ft)	270
Dynamic Increment (psf) (H=Height)	9.5H

An unfactored coefficient of friction of 0.24 may be used between soil subgrade and the precast foundation bottom, or an unfactored coefficient of friction of 0.51 between the soil subgrade and the cast in-place foundation bottoms. The coefficient of friction and passive earth pressure values given above represent ultimate soil strength values. BSK recommends that a safety factor consistent with the design conditions be included in their usage. For resistance against lateral sliding that is countered solely by the passive earth pressure against footings or friction along the bottom of footings, a minimum safety factor of 1.5 is recommended. For stability against lateral sliding that is resisted by combined passive pressure and frictional resistance, a minimum safety factor of 2.0 is recommended. For lateral resistance against seismic loading conditions, a minimum safety factor of 1.2 is recommended. We based these lateral resistance values on the assumption that the concrete for the foundations is either placed directly against undisturbed soils or that the voids created from the use of forms are backfilled with engineered fill or other approved materials, such as lean concrete. Passive resistance in the upper foot of soil cover below finished grades should be neglected unless the ground surface is confined by concrete slabs, pavements, or other such positive protection.

4.7 Concrete Slabs-on-Grade

Non-structural concrete slab-on-grade must be a minimum of 4-inches thick and must be supported on a compacted subgrade prepared in accordance with the "Site Preparation and Earthwork Construction" section of this report. Existing onsite surface soils are considered to have a low expansion potential for design purposes. In order to regulate cracking of the slabs, construction joints and/or saw-cut control joints must be provided in each direction at a maximum spacing of 10 feet on centers along with steel reinforcement as recommended by the project's Structural Engineer. Control joints must have a minimum depth of one-quarter of the slab thickness. It is recommended that steel reinforcement used in concrete slabs-on-grade consist of steel rebar. Structural concrete slabs-on-grade may be designed using an unadjusted long-term Modulus of Subgrade Reaction (Ks) of 150 pounds per cubic inch (pci) constructed on a properly compacted subgrade or engineered fill. This value is based on the correlations to soil strength using one foot by one foot plate-load tests and should therefore be scaled (adjusted) to the actual slab width. For sandy soils, the adjusted Ks value can be obtained by multiplying the value provided above by $[(B+B_1)/(2B)]^2$, where B is the slab width in feet and B_1 is 1 foot (width of a one foot by one foot plate-load test apparatus).

Interior concrete slabs must be successively underlain by: 1-½ inches of washed concrete sand; a durable vapor retarder; and a smooth, compacted subgrade surface. The vapor retarder must meet the requirements of ASTM E1745 Class A and have a water vapor transmission rate (WVTR) of less than or equal to 0.012 Perms as tested by ASTM E96. Examples of acceptable vapor retarder products include: Stego Wrap (15-mil) Vapor Barrier by STEGO INDUSTRIES LLC; W.R. Meadows Premoulded Membrane with Plasmatic Core; and Zero-Perm by Alumiseal. Because of the importance of the vapor retarder, joints must be carefully spliced and taped.

If migration of subgrade moisture through the slab is not a concern, then the use of a vapor retarder and overlying sand may be reconsidered. The slab subgrade must be kept in a moist condition until the vapor retarder or concrete slab is placed. BSK's representative must be called to the site to review soil and moisture conditions immediately prior to placing the vapor retarder or concrete slab.

As indicated in the PCA Engineering Bulletin 119, Concrete Floors and Moisture, and applicable ACI Committee reports (see ACI 360R-06, Design of Slabs-on-Ground, dated October 2006 and ACI 302.1R-04, Guide for Concrete Floor and Slab Construction, dated June 2004), the sand layer between the vapor retarder and concrete floor slab may be omitted. The advantage of this option is that it can reduce the amount of moisture that can be transmitted through the slab (especially if the sand layer becomes moist or wet prior to placing the concrete); however, the risk of slab "curling" is much greater. The "curling" may result from a sharp contrast in moisture-drying conditions between the exposed slab surface and the surface in contact with the membrane. As recommended in the referenced ACI Committee reports, measures must be taken to reduce the risk of "curling" such as reducing the joint spacing, using a low shrinkage mix design, and reinforcing the concrete slab. In order to regulate cracking of the slab, we recommend that full depth construction joints and control joints be provided in each direction with slab thickness and steel reinforcing recommended by the structural engineer.

Excessive landscape water or leaking utility lines could create elevated moisture conditions under concrete slabs, which could result in adverse moisture or mildew conditions in floor slabs or walls. Accordingly, care must be taken to avoid excess irrigation around the structures, as well as to periodically monitor for leaking utility lines. Likewise, positive surface drainage must be provided around the perimeter of the structures as discussed in the "Surface Drainage Control" Section 4.10.

The adverse effects of moisture vapor transmission on flooring materials can be substantially reduced by the use of a low porosity concrete. This can be achieved by specifying a low water-cement ratio (0.45 or less by weight) a minimum compressive strength of 4,000 psi at 28 days, and a minimum of 7 days wet-curing.

4.8 Excavation Stability

Soils encountered within the upper 5-feet are generally Type C soil in accordance with OSHA (Occupational Safety and Health Administration). Temporary excavations for the project construction must be left open for as short a time as possible and must be protected from water runoff. Slope height, slope inclination, and excavation depths (including utility trench excavations) must in no case exceed those specified in local, state, or federal safety regulations (e.g., OSHA Health and Safety Standards for Excavations 29 CFR Part 1926, or successor regulations). These excavation recommendations are based on soil characteristics derived from the borings. Variations in soil conditions will likely be encountered during excavation. At the time of construction, BSK must be afforded the opportunity to observe and document sloping and shoring conditions, and the opportunity

to provide review of actual field conditions to account for condition variations not otherwise anticipated in the preparation of these recommendations.

4.9 Utility Trench Excavation and Backfill

Pipes and conduits must be bedded and shaded in accordance with the requirements of the pipe manufacturer. Where no specific requirements exist, we recommend a minimum of 6-inches of sand bedding material for pipe installations 12 to 24-inches in diameter. For pipe diameters smaller than 12-inches, the bedding thickness may be reduced to 4-inches. The bedding material and envelope (up to 6-inches above the pipe) must consist of sand (Sand Equivalent greater than 30), be placed in loose lifts not exceeding 8-inches in thickness, compacted to at least 90 percent of the maximum dry density, and moisture conditioned to within 2 percent of optimum moisture content. Water jetting to attain compaction must not be allowed.

Adequate excavation width must be provided to permit uniform compaction on both sides of utility lines installed within the trench. The trench backfill material may consist of engineered fill. Trench backfill outside the building footprint must be placed in loose lifts not to exceed 8-inches in loose thickness, compacted to at least 90 percent of the maximum dry density, and moisture conditioned to within 2 percent of optimum moisture content. The upper 12-inches of trench backfill below pavement sections must be compacted to at least 95 percent of the maximum dry density. Conduits extending through or below footings must be “sleeved” as determined by the Project Structural Engineer. Utility trench backfill beneath the building areas must be backfilled in accordance with Section 4.3 (Site Preparation and Earthwork Construction).

4.10 Surface Drainage Control

Final grading around site improvements must provide for positive and enduring drainage. Ponding of water must not be allowed on or near the building or paved surfaces. Saturation of the soils immediately adjacent to or below the building area must not be allowed. Irrigation water must be applied in amounts not exceeding those required to offset evaporation, sustain plant life, and maintain a relatively uniform moisture profile around and below, site improvements.

5 PLANS AND SPECIFICATIONS REVIEW

BSK recommends that it be retained to review the draft plans and specifications for the project, with regard to foundations, and earthwork, prior to their being finalized and issued for construction bidding.

6 CONSTRUCTION TESTING AND OBSERVATIONS

Geotechnical testing and observation during construction is a vital extension of this geotechnical investigation. BSK recommends that it be retained for those services. Field review during site

preparation and grading allows for evaluation of the exposed soil conditions and confirmation or revision of the assumptions and extrapolations made in formulating the design parameters and recommendations. BSK's observations must be supplemented with periodic compaction tests to establish substantial conformance with these recommendations. BSK must also be called to the site to observe foundation excavations, prior to placement of reinforcing steel or concrete, in order to assess whether the actual bearing conditions are compatible with the conditions anticipated during the preparation of this report. BSK must also be called to the site to observe placement of foundation and slab concrete.

If a firm other than BSK is retained for these services during construction, that firm must notify the owner, project designers, governmental building officials, and BSK that the firm has assumed the responsibility for all phases (i.e., both design and construction) of the project within the purview of the geotechnical engineer. Notification must indicate that the firm has reviewed this report and any subsequent addenda, and that it either agrees with BSK's conclusions and recommendations, or that it will provide independent recommendations.

7 LIMITATIONS

The analyses and recommendations submitted in this report are based upon the data obtained from the test borings performed at the locations shown on Figure 2. The report does not reflect variations which may occur between or beyond the borings. The nature and extent of such variations may not become evident until additional exploration and testing is performed or construction is initiated. If variations then appear, a re-evaluation of the recommendations of this report will be necessary after performing on-site observations during the excavation period and noting the characteristics of the variations.

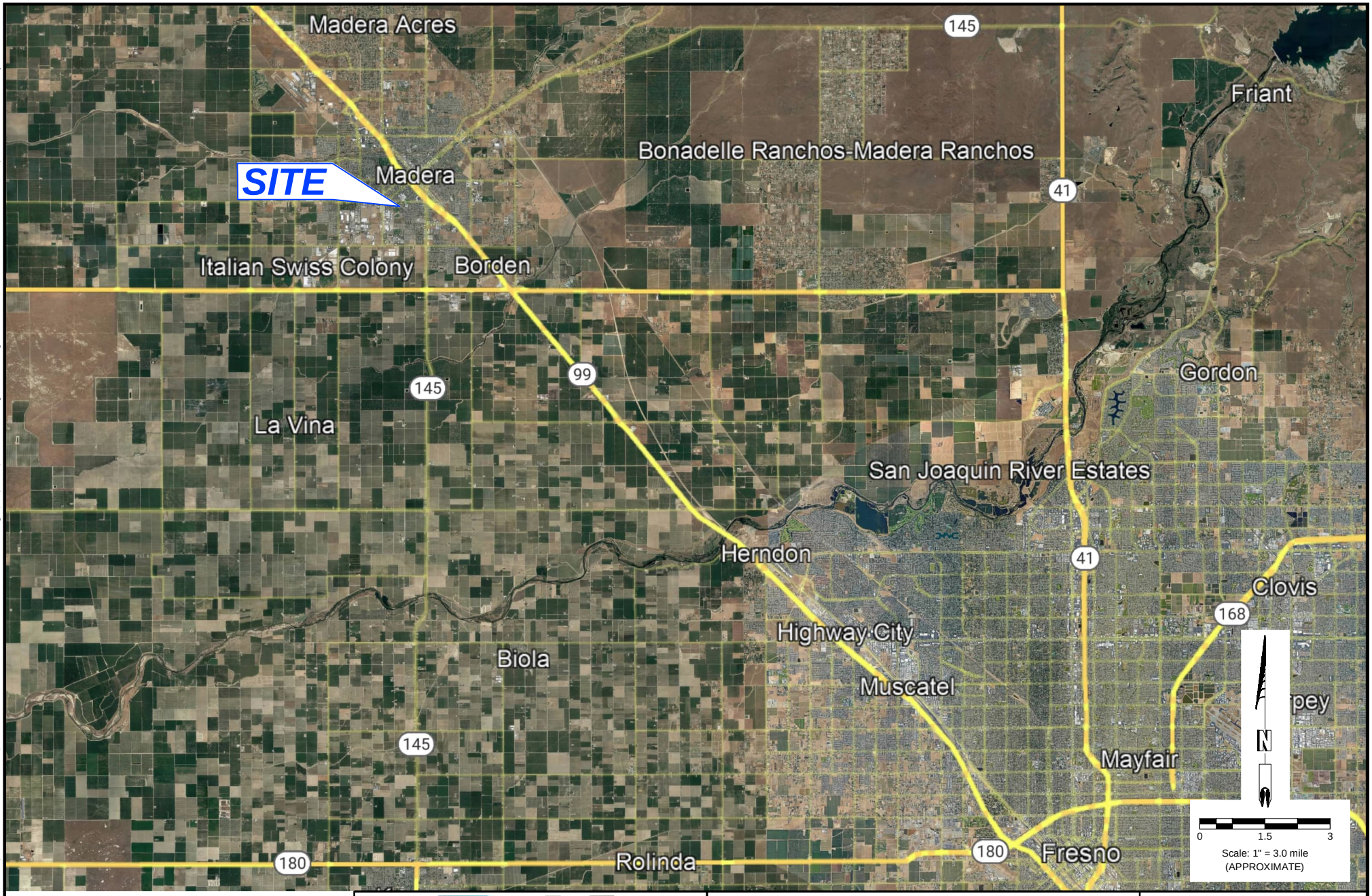
The validity of the recommendations contained in this report is also dependent upon an adequate testing and observation program during the construction phase. BSK assumes no responsibility for construction compliance with the design concepts or recommendations unless it has been retained to perform the testing and observation services during construction as described above.

The findings of this report are valid as of the present. However, changes in the conditions of the site can occur with the passage of time, whether caused by natural processes or the work of man, on this property or adjacent property. In addition, changes in applicable or appropriate standards may occur, whether they result from legislation, governmental policy or the broadening of knowledge.

BSK has prepared this report for the exclusive use of the Client and members of the project design team. The report has been prepared in accordance with generally accepted geotechnical engineering practices which existed in Madera County at the time the report was written. No other warranties either express or implied are made as to the professional advice provided under the terms of BSK's agreement with Client and included in this report.

FIGURES

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REFERENCE IMAGE: Google Earth

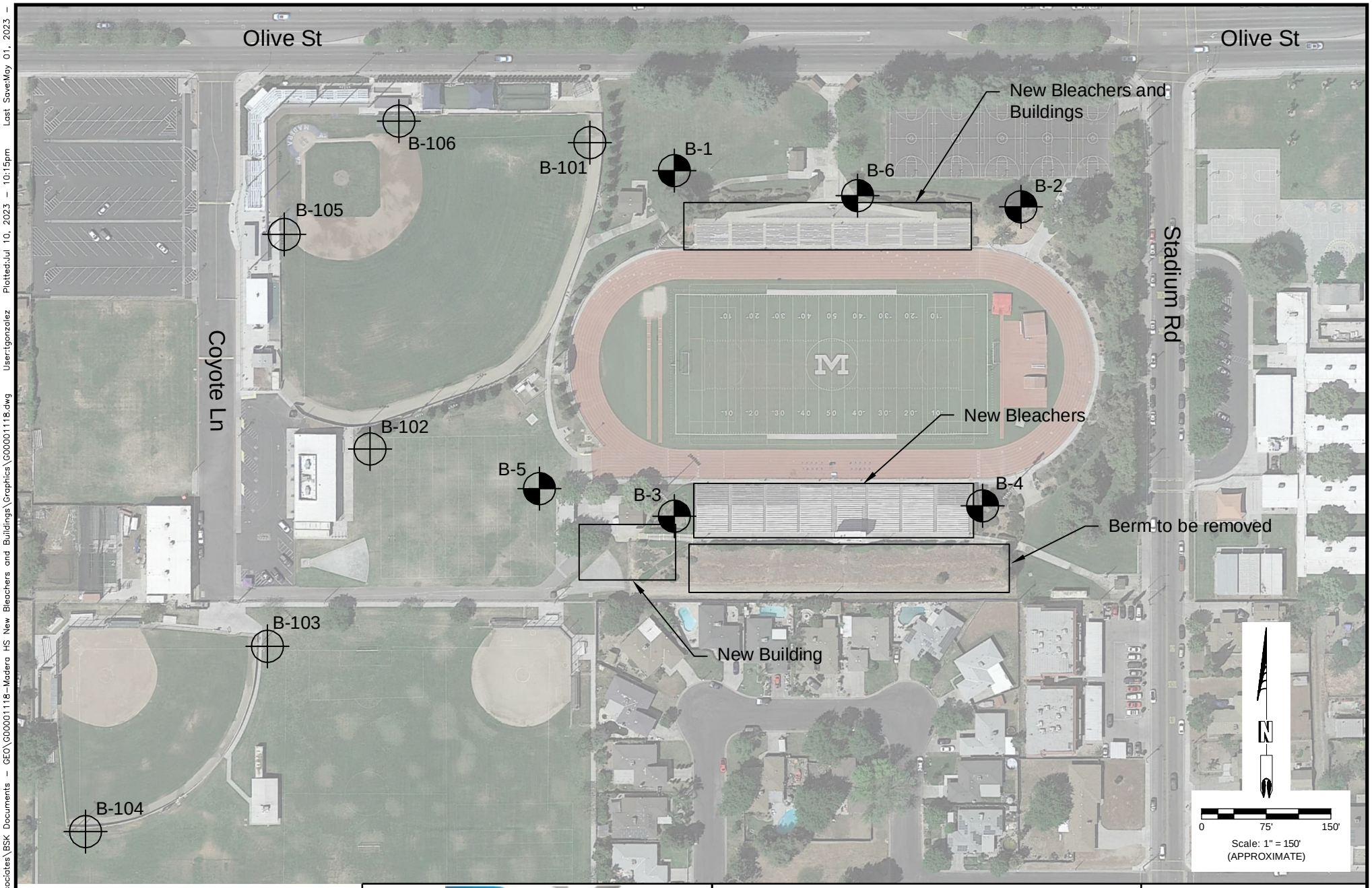
BSK ASSOCIATES
691 N. Laverne Avenue
Fresno, California 93727
Tel. (559) 497-2880

SITE VICINITY MAP

Madera High School
New Bleachers and Buildings
W Olive Avenue
Madera, California

FIGURE 1

JOB NO. G00-001-118
DATE July 10, 2023
DR. BY TG
CH. BY NP
SCALE AS SHOWN
SHEET NO. 1
OF 1 SHEETS



LEGEND:

B-6 APPROXIMATE BORING LOCATIONS

B-106 APPROXIMATE PREVIOUS BORING LOCATIONS

REFERENCE IMAGE: Google Earth

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BORING LOCATION MAP

Madera High School
New Bleachers and Buildings
W Olive Avenue
Madera, California

FIGURE 2

JOB NO. G00-001-118
DATE July 10, 2023
DR. BY TG
CH. BY NP
SCALE AS SHOWN
SHEET NO. 1
OF 1 SHEETS

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APPENDIX A

FIELD EXPLORATION

APPENDIX A
Field Exploration

The field exploration, conducted on June 23, 2022, consisted of a site reconnaissance, and drilling six (6) exploratory test borings from depths of 10 to 21.5 feet bgs. The borings were drilled within or adjacent to the proposed improvement areas using a truck-mounted drill rig equipped with hollow stem augers and hand auger equipment. The borings were advanced to a maximum depth of 21.5 feet below ground surface (bgs). The approximate boring locations are presented on Figure 2.

The soil materials encountered in the test borings were visually classified in the field, and the logs were recorded during the drilling and sampling operations. Visual classification of the materials encountered in the test borings was made in general accordance with the Unified Soil Classification System (ASTM D 2488) and further verified by ASTM D2487 for selected samples. A soil classification chart is presented herein. Boring logs are presented herein and should be consulted for more details concerning subsurface conditions. Stratification lines were approximated by the field staff based on observations made at the time of drilling, while the actual boundaries between soil types may be gradual and soil conditions may vary at other locations.

Subsurface samples were obtained at the successive depths shown on the boring logs by driving samplers which consisted of a 2.5-inch inside diameter (I.D.) California Sampler or a 1.4-inch I.D. Standard Penetration Test (SPT) Sampler. The samplers were driven 18 inches using a 140-pound, automatic hammer dropping 30 inches. The number of blows required to drive the last 12 inches was recorded as the blow count (blows/foot) on the log of borings. The relatively undisturbed soil core samples were capped at both ends to preserve the samples at their natural moisture content. Disturbed soil samples were obtained using the Split-Spoon Sampler (marked X in logs) and were placed and sealed in polyethylene bags. At the completion of the field exploration, the test borings were backfilled with the excavated soil cuttings, as set forth in BSK's proposal.

It should be noted that the use of terms such as "loose", "medium dense", "dense" or "very dense" to describe the consistency of a soil is based on sampler blow count and is not necessarily reflective of the in-place density or unit weight of the soils being sampled. The relationship between sampler blow count and consistency is provided in the following Tables A-1 and A-2 for coarse grained (sandy and gravelly) soils and fine grained (silty and clayey) soils, respectively.

Table A-1: Density of Coarse-Grained Soil versus Sampler Blow Count		
Consistency	**SPT Blow Count Blows / Foot)**	**2.5" I.D. Cal. Sampler (Blows / Foot)**
Very Loose	<4	<6
Loose	4 – 10	6 – 15
Medium Dense	10 – 30	15 – 45
Dense	30 – 50	45 – 80
Very Dense	>50	>80

Table A-2: Consistency of Fine-Grained Soil versus Sampler Blow Count		
Consistency	**SPT Blow Count (Blows / Foot)**	**2.5" I.D. Cal. Sampler (Blows / Foot)**
Very Soft	<2	<3
Soft	2 – 4	3 – 6
Medium Stiff	4 – 8	6 – 12
Stiff	8 – 15	12 – 24
Very Stiff	15 – 30	24 – 45
Hard	>30	>45

MAJOR DIVISIONS				TYPICAL NAMES
COARSE GRAINED SOILS More than Half > #200 sieve	GRAVELS MORE THAN HALF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE	CLEAN GRAVELS WITH LITTLE OR NO FINES	GW	WELL GRADED GRAVELS, GRAVEL-SAND MIXTURES
			GP	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES
		GRAVELS WITH OVER 15% FINES	GM	SILTY GRAVELS, POORLY GRADED GRAVEL-SAND-SILT MIXTURES
			GC	CLAYEY GRAVELS, POORLY GRADED GRAVEL-SAND-CLAY MIXTURES
	SANDS MORE THAN HALF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE	CLEAN SANDS WITH LITTLE OR NO FINES	SW	WELL GRADED SANDS, GRAVELLY SANDS
			SP	POORLY GRADED SANDS, GRAVELLY SANDS
		SANDS WITH OVER 15% FINES	SM	SILTY SANDS, POOORLY GRADED SAND-SILT MIXTURES
			SC	CLAYEY SANDS, POORLY GRADED SAND-CLAY MIXTURES
FINE GRAINED SOILS More than Half < #200 sieve	SILTS AND CLAYS LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS, OR CLAYEY SILTS WITH SLIGHT PLASTICITY
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
			OL	ORGANIC CLAYS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACIOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS			Pt	PEAT AND OTHER HIGHLY ORGANIC SOILS

■	Modified California	RV	R-Value
⊠	Standard Penetration Test (SPT)	SA	Sieve Analysis
☒	Split Spoon	SW	Swell Test
◪	Pushed Shelby Tube	TC	Cyclic Triaxial
▯	Auger Cuttings	TX	Unconsolidated Undrained Triaxial
✋	Grab Sample	TV	Torvane Shear
⊘	Sample Attempt with No Recovery	UC	Unconfined Compression
CA	Chemical Analysis	(1.2)	(Shear Strength, ksf)
CN	Consolidation	WA	Wash Analysis
CP	Compaction	(20)	(with % Passing No. 200 Sieve)
DS	Direct Shear	▽	Water Level at Time of Drilling
PM	Permeability	▼	Water Level after Drilling(with date measured)
PP	Pocket Penetrometer		

SOIL CLASSIFICATION CHART AND LOG KEY

Figure A-1

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Project: Madera HS New Bleachers and Buildings

Location: 800-820 W Olive Avenue, Madera, CA

Project No.: G00-001-118

Logged By: D. Ferrer

Checked By: N. Popenoe

Boring: **B-1**

Depth (Feet)	Samples	Bulk Samples	Penetration Blows / Foot	In-Situ Dry Density (pcf)	In-Situ Moisture Content (%)	% Passing No. 200 Sieve	Graphic Log	USCS	MATERIAL DESCRIPTION	REMARKS
1–4								ML	**Sandy SILT** - brown, moist, fine to coarse grained sand	
3	■		6	108.9	14.3					
5–9								SM	**Silty SAND** - brown, moist, fine to coarse grained sand	
6	■		10	102.0	13.8					
10–14										
11	■		27	117.0	12.4					
15–16									Boring terminated at approximately 16.5 feet bgs. No groundwater encountered. Boring backfilled with soil cuttings.	
16	■		15							
17–29										

Drilling Contractor: Baja Exploration
Drilling Method: Mobile B-61
Drilling Equipment: Hollow Stem Auger
Date Started: 6-23-23
Date Completed: 6-23-23

Surface Elevation:
Sample Method: 2.5" Modified Cal & 1.5" I.D. SPT Split Spoon
Groundwater Depth: Not Encountered
Completion Depth: 16.5 Feet
Borehole Diameter: 8"

* See key sheet for symbols and abbreviations used above.

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Location: 800-820 W Olive Avenue, Madera, CA

Project No.: G00-001-118

Logged By: D. Ferrer

Checked By: N. Popenoe

Boring: **B-2**

Depth (Feet)	Samples	Bulk Samples	Penetration Blows / Foot	In-Situ Dry Density (pcf)	In-Situ Moisture Content (%)	% Passing No. 200 Sieve	Graphic Log	USCS	MATERIAL DESCRIPTION	REMARKS
1–5								SM	**Silty SAND** - brown, moist, fine to coarse grained sand	
3			12	111.0	5.3					
6			15	107.8	6.6					
11			48	119.3	8.4					
16			71							
19								SP	**Poorly Graded SAND** - yellowish brown, moist, fine to coarse grained sand	
21			14							
22									Boring terminated at approximately 21.5 feet bgs. No groundwater encountered. Boring backfilled with soil cuttings.	

Drilling Contractor: Baja Exploration
Drilling Method: Mobile B-61
Drilling Equipment: Hollow Stem Auger
Date Started: 6-23-23
Date Completed: 6-23-23

Surface Elevation:
Sample Method: 2.5" Modified Cal & 1.5" I.D. SPT Split Spoon
Groundwater Depth: Not Encountered
Completion Depth: 21.5 Feet
Borehole Diameter: 8"

* See key sheet for symbols and abbreviations used above.

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Project: Madera HS New Bleachers and Buildings

Location: 800-820 W Olive Avenue, Madera, CA

Project No.: G00-001-118

Logged By: D. Ferrer

Checked By: N. Popenoe

Boring: **B-3**

Depth (Feet)	Samples	Bulk Samples	Penetration Blows / Foot	In-Situ Dry Density (pcf)	In-Situ Moisture Content (%)	% Passing No. 200 Sieve	Graphic Log	USCS	MATERIAL DESCRIPTION	REMARKS
1–10				96.1	5.9			SM	**Silty SAND** - brown, moist, fine to coarse grained sand, fine grained gravel	Hand Auger Difficulty: Medium
10									Boring terminated at approximately 10 feet bgs. No groundwater encountered. Boring backfilled with soil cuttings.	

Drilling Contractor: BSK Associates
Drilling Method: Hand Auger
Drilling Equipment: Hand Auger
Date Started: 6-23-23
Date Completed: 6-23-23

Surface Elevation:
Sample Method: 2.5" Modified Cal & 1.5" I.D. SPT Split Spoon
Groundwater Depth: Not Encountered
Completion Depth: 10 Feet
Borehole Diameter: 4"

* See key sheet for symbols and abbreviations used above.

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Project: Madera HS New Bleachers and Buildings

Location: 800-820 W Olive Avenue, Madera, CA

Project No.: G00-001-118

Logged By: D. Ferrer

Checked By: N. Popenoe

Boring: **B-4**

Depth (Feet)	Samples	Bulk Samples	Penetration Blows / Foot	In-Situ Dry Density (pcf)	In-Situ Moisture Content (%)	% Passing No. 200 Sieve	Graphic Log	USCS	MATERIAL DESCRIPTION	REMARKS
1–10								SM	**Silty SAND** - brown, moist, fine to coarse grained sand, fine grained gravel	Hand Auger Difficulty: Medium
3				96.5	7.0					
10									Boring terminated at approximately 10 feet bgs. No groundwater encountered. Boring backfilled with soil cuttings.	

Drilling Contractor: BSK Associates
Drilling Method: Hand Auger
Drilling Equipment: Hand Auger
Date Started: 6-23-23
Date Completed: 6-23-23

Surface Elevation:
Sample Method: 2.5" Modified Cal & 1.5" I.D. SPT Split Spoon
Groundwater Depth: Not Encountered
Completion Depth: 10 Feet
Borehole Diameter: 4"

* See key sheet for symbols and abbreviations used above.

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Project: Madera HS New Bleachers and Buildings

Location: 800-820 W Olive Avenue, Madera, CA

Project No.: G00-001-118

Logged By: D. Ferrer

Checked By: N. Popenoe

Boring: **B-5**

Depth (Feet)	Samples	Bulk Samples	Penetration Blows / Foot	In-Situ Dry Density (pcf)	In-Situ Moisture Content (%)	% Passing No. 200 Sieve	Graphic Log	USCS	MATERIAL DESCRIPTION	REMARKS
1–10								SM	**Silty SAND** - brown, moist, fine to coarse grained sand	
3			11	112.4	7.3					
6			12	109.6	8.3					
10–13								ML	**Sandy SILT** - brown, moist, fine to coarse grained sand	
11			19	107.7	19.2					
14–21								SM	**Silty SAND** - yellowish brown, mosit, fine to coarse grained sand	
16			20	113.9	6.8					
21			22							
22									Boring terminated at approximately 21.5 feet bgs. No groundwater encountered. Boring backfilled with soil cuttings.	

Drilling Contractor: Baja Exploration
Drilling Method: Mobile B-61
Drilling Equipment: Hollow Stem Auger
Date Started: 6-23-23
Date Completed: 6-23-23

Surface Elevation:
Sample Method: 2.5" Modified Cal & 1.5" I.D. SPT Split Spoon
Groundwater Depth: Not Encountered
Completion Depth: 21.5 Feet
Borehole Diameter: 8"

* See key sheet for symbols and abbreviations used above.

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Project: Madera HS New Bleachers and Buildings

Location: 800-820 W Olive Avenue, Madera, CA

Project No.: G00-001-118

Logged By: D. Ferrer

Checked By: N. Popenoe

Boring: **B-6**

Depth (Feet)	Samples	Bulk Samples	Penetration Blows / Foot	In-Situ Dry Density (pcf)	In-Situ Moisture Content (%)	% Passing No. 200 Sieve	Graphic Log	USCS	MATERIAL DESCRIPTION	REMARKS
1–29			9	117.5	8.6			SM	**Silty SAND** - brown, moist, fine to coarse grained sand	
			10	110.9	7.9					
			53	113.2	17.4					
			12						Boring terminated at approximately 16.5 feet bgs. No groundwater encountered. Boring backfilled with soil cuttings.	

Drilling Contractor: Baja Exploration
Drilling Method: Mobile B-61
Drilling Equipment: Hollow Stem Auger
Date Started: 6-23-23
Date Completed: 6-23-23

Surface Elevation:
Sample Method: 2.5" Modified Cal & 1.5" I.D. SPT Split Spoon
Groundwater Depth: Not Encountered
Completion Depth: 16.5 Feet
Borehole Diameter: 8"

* See key sheet for symbols and abbreviations used above.

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Project: Madera HS Lighting Improvements
Location: Madera, California
Project No.: G14-113-11F
Logged By: J. Frank
Checked By: L. Suehiro

Boring: B-101

Depth (Feet)	Samples	Bulk Samples	Penetration Blows / Foot	In-Situ Dry Density (pcf)	In-Situ Moisture Content (%)	% Passing No. 200 Sieve	Graphic Log	USCS	MATERIAL DESCRIPTION	REMARKS
1–4								SM	**Silty SAND** Brown, fine to medium-grained, moist, slightly plastic, micaceous	Baseball field
3			8	97.5	15.4					
5–7										
6			8	94.5	14.8				...increase in sands	
8–9								SC	**Clayey SAND** Brown, fine to medium-grained, moist, very dense	
11			57	105.2	19.6					
16			44							
20–21			48	107.0	5.7			SP	**SAND** Light brown, fine to coarse-grained, moist, dense, some silt	
25–26			34					CL	**Silty CLAY** Red orange, mottled green, hard, moist, some fine sands	
								SM	**Silty SAND** Red brown, fine to medium-grained, moist, dense	
30–31			48					SC	**Clayey SAND** Gray moist, very dense	
31.5									Boring terminated at 31.5-feet bgs Borehole backfilled with soil cuttings Groundwater not encountered	

Drilling Contractor: Dave's Drilling
Drilling Method: Hollow Stem Auger
Drilling Equipment: Mobile BK-81
Date Started: 7/21/14
Date Completed: 7/21/14

Surface Elevation:
Sample Method: 2.4-inch I.D. Modified & 1.5-inch I.D. SPT Split Spoon
Groundwater Depth: Not Encountered
Completion Depth: 31.5 Feet
Borehole Diameter: 8-inch

* See key sheet for symbols and abbreviations used above.

GEO BORING LOGS G14-113-11F 101 104 GPJ BSK.GDT 8/5/14

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Project: Madera HS Lighting Improvements
Location: Madera, California
Project No.: G14-113-11F
Logged By: J. Frank
Checked By: L. Suehiro

Boring: B-102

Depth (Feet)	Samples	Bulk Samples	Penetration Blows / Foot	In-Situ Dry Density (pcf)	In-Situ Moisture Content (%)	% Passing No. 200 Sieve	Graphic Log	USCS	MATERIAL DESCRIPTION	REMARKS
1–4								SM	**Silty SAND** Brown, fine to medium-grained, moist, organics, medium dense	Baseball field
2–3			21							
5–8			20	104.4	3.0					
9–14			50-5"					SC	**Clayey SAND** Red orange, moist, very dense, slight cementation	
14–24			13					SM	**Silty SAND** Brown, fine to medium-grained, moist, trace mica	
20–24			43	111.8	19.6				...gray brown, moist, hard, fine grained	
24–27			28					SP	**SAND** Light brown, fine to medium-grained, moist, medium dense, trace coarse	
27–30								SM	**Silty SAND** Red orange, fine to medium-grained, trace clay, very dense	
29–30									...gray brown, moist, trace clay	
30–31			49						Boring terminated at 31.5-feet bgs Borehole backfilled with soil cuttings Groundwater not encountered	

Drilling Contractor: Dave's Drilling
Drilling Method: Hollow Stem Auger
Drilling Equipment: Mobile BK-81
Date Started: 7/21/14
Date Completed: 7/21/14

Surface Elevation:
Sample Method: 2.4-inch I.D. Modified & 1.5-inch I.D. SPT Split Spoon
Groundwater Depth: Not Encountered
Completion Depth: 31.5 Feet
Borehole Diameter: 8-inch

* See key sheet for symbols and abbreviations used above.

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Project: Madera HS Lighting Improvements
Location: Madera, California
Project No.: G14-113-11F
Logged By: J. Frank
Checked By: L. Suehiro

Boring: B-103

Depth (Feet)	Samples	Bulk Samples	Penetration Blows / Foot	In-Situ Dry Density (pcf)	In-Situ Moisture Content (%)	% Passing No. 200 Sieve	Graphic Log	USCS	MATERIAL DESCRIPTION	REMARKS
1–14								SM	**Silty SAND** Brown, fine to medium-grained, moist, trace organics	Softball field
3			15	104.3	4.9				...medium dense	
6			16	109.9	3.8				...trace coarse	
11			26						...increase in clay content	
14–15								SP	**SAND** Light brown, fine to medium-grained, moist	
16			57					SM	**Silty SAND** Red orange, mottled gray, fine to medium-grained, trace clay, moist, very dense	
21			26					ML	**Sandy SILT** Gray, fine-grained, moist, trace clay, very stiff, mica	
24–25								SP	**SAND** Light brown, fine to coarse-grained, moist, medium dense	
26			28						Boring terminated at 26.5-feet bgs Borehole backfilled with soil cuttings Groundwater not encountered	
27–34										

Drilling Contractor: Dave's Drilling
Drilling Method: Hollow Stem Auger
Drilling Equipment: Mobile BK-81
Date Started: 7/21/14
Date Completed: 7/21/14

Surface Elevation:
Sample Method: 2.4-inch I.D. Modified & 1.5-inch I.D. SPT Split Spoon
Groundwater Depth: Not Encountered
Completion Depth: 26.5 Feet
Borehole Diameter: 8-inch

* See key sheet for symbols and abbreviations used above.

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Project: Madera HS Lighting Improvements
Location: Madera, California
Project No.: G14-113-11F
Logged By: J. Frank
Checked By: L. Suehiro

Boring: B-104

Depth (Feet)	Samples	Bulk Samples	Penetration Blows / Foot	In-Situ Dry Density (pcf)	In-Situ Moisture Content (%)	% Passing No. 200 Sieve	Graphic Log	USCS	MATERIAL DESCRIPTION	REMARKS
1–4			10	102.2	9.3			SM	**Silty SAND** Brown, fine to medium-grained, moist, coarse ...loose	Softball field
5–9			9							
10–14			14	107.5	16.4				...medium dense	
15–16			24					SC	**Clayey SAND** Brown, fine to medium-grained, moist, very stiff	
17–21			50-6"						...olive brown, mottled orange, very dense	
22–24								ML	**Sandy SILT** Gray, moist, very stiff	
25–26			27							
27–34									Boring terminated at 26.5-feet bgs Borehole backfilled with soil cuttings Groundwater not encountered	

Drilling Contractor: Dave's Drilling
Drilling Method: Hollow Stem Auger
Drilling Equipment: Mobile BK-81
Date Started: 7/21/14
Date Completed: 7/21/14

Surface Elevation:
Sample Method: 2.4-inch I.D. Modified & 1.5-inch I.D. SPT Split Spoon
Groundwater Depth: Not Encountered
Completion Depth: 26.5 Feet
Borehole Diameter: 8-inch

* See key sheet for symbols and abbreviations used above.

GEO BORING LOGS G14-113-11F 101 104.GPJ BSK.GDT 8/5/14

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Project: Proposed Bleachers, Backstop and Restroom

Location: Madera, CA

Project No.: G16-128-11F

Logged By: S. Demmers

Checked By: H. Ngo

Boring: **B-105**

Depth (Feet)	Samples	Bulk Samples	Penetration Blows / Foot	In-Situ Dry Density (pcf)	In-Situ Moisture Content (%)	% Passing No. 200 Sieve	Graphic Log	USCS	MATERIAL DESCRIPTION	REMARKS
1								SM	**Silty SAND** - dark brown, moist, loose, fine to medium grained	
2						48				
3			11	105.1	9.3				. . . orange brown, medium dense	
4										
5										
6			17	105.1	11.9					
7										
8										
9								CL	**Silty CLAY** - orange brown, moist, hard	
10										
11			47							
12										
13										
14										
15										
16			48	116.7	15.9			SC	**Clayey SAND** - orange brown, moist, dense, fine to medium grained	
17										
18										
19								SM	**Silty SAND** - light brown, moist, medium dense, fine to coarse grained, trace fine gravel	
20										
21			29							
22									Boring terminated at approximately 21.5 feet Borehole backfilled with soil cuttings No groundwater encountered	
23										
24										

Drilling Contractor: Dave's Drilling
Drilling Method: HSA
Drilling Equipment: Mobile 61
Date Started: 7/7/16
Date Completed: 7/7/16

Surface Elevation:
Sample Method: 2.5-inch I.D. Modified & 1.5-inch I.D. SPT Split Spoon
Groundwater Depth: Not Encountered
Completion Depth: 20 Feet
Borehole Diameter: 8"

* See key sheet for symbols and abbreviations used above.

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Project: Proposed Bleachers, Backstop and Restroom

Location: Madera, CA

Project No.: G16-128-11F

Logged By: S. Demmers

Checked By: H. Ngo

Boring: **B-106**

Depth (Feet)	Samples	Bulk Samples	Penetration Blows / Foot	In-Situ Dry Density (pcf)	In-Situ Moisture Content (%)	% Passing No. 200 Sieve	Graphic Log	USCS	MATERIAL DESCRIPTION	REMARKS
1			44	114.8	5.0			ML	**Sandy SILT** - light brown, moist, very stiff, fine grained sand, trace clay	
2										
3										
4										
5								SM	**Silty SAND** - orange brown, moist, medium dense, fine to medium grained, with clay	
6			24							
7										
8										
9										
10									. . . light brown, no clay	
11			29	114.7	16.3			CL	**Sandy Clay** - orange brown, moist, very stiff	
12										
13										
14										
15										
16			26						. . . trace fine gravel, weakly cemented	
17										
18										
19								SP	**Poorly Graded SAND** - light brown, moist, dense, fine to coarse grained, trace fine gravel	
20										
21			50	119.8	4.3					
22									Boring terminated at approximately 21.5 feet Borehole backfilled with soil cuttings No groundwater encountered	
23										
24										

Drilling Contractor: Dave's Drilling
Drilling Method: HSA
Drilling Equipment: Mobile 61
Date Started: 7/7/16
Date Completed: 7/7/16

Surface Elevation:
Sample Method: 2.5-inch I.D. Modified & 1.5-inch I.D. SPT Split Spoon
Groundwater Depth: Not Encountered
Completion Depth: 20 Feet
Borehole Diameter: 8"

* See key sheet for symbols and abbreviations used above.

APPENDIX B

LABORATORY TESTING

APPENDIX B
Laboratory Testing

The results of laboratory testing performed in conjunction with this project are contained in this Appendix. The following laboratory tests were performed on soil samples in general conformance with applicable standards.

In-Situ Moisture and Density

The field moisture content and in-place dry density determinations were performed on relatively undisturbed samples obtained from the test borings. The field moisture content, as a percentage of dry weight of the soils, was determined by weighing the samples before and after oven drying in accordance with ASTM D2216 test procedures. Dry densities, in pounds per cubic foot, were also determined for undisturbed core samples in accordance with ASTM D2937 test procedures. Test results are presented on the boring logs in Appendix A.

Direct Shear Test

Two (2) direct shear tests were performed on test specimens trimmed from a selected soil sample. The three-point shear test was performed in general accordance with ASTM D3080, Direct Shear Test for Soil under Consolidated Drained Conditions. The test specimens, each 2.42 inches in diameter and 1 inch in height, were saturated then subjected to shear along a plane at mid-height after allowing for pore pressure dissipation. The test results are presented on Figure B-1 and Figure B-2.

Collapse Potential Test

One (1) Collapse Potential Test was performed on a relatively undisturbed soil sample to evaluate collapse potential characteristics. The test was performed in general accordance with ASTM D5333. The sample was initially loaded under as-received moisture content to a selected stress level, loaded to a load of 2000 psf, saturated, and lastly loaded to a maximum load of 4000 psf. The test results are presented on Figure B-3.

Soil Corrosivity

The results of chemical analyses performed on a bulk soil sample using California Test Method (CT) 643 (for minimum resistivity and pH) and CT 417 and 422 (for soluble sulfate and chlorides, respectively) are presented in Table B-1.

TABLE B-1
SUMMARY OF CHEMICAL TEST RESULTS

Test Boring	Sample Depth	pH	Sulfate (mg/kg)	Chloride (mg/kg)	Minimum Resistivity (ohms-cm)
B-1	0 - 5'	7.61	Not Detected	Not Detected	4,300

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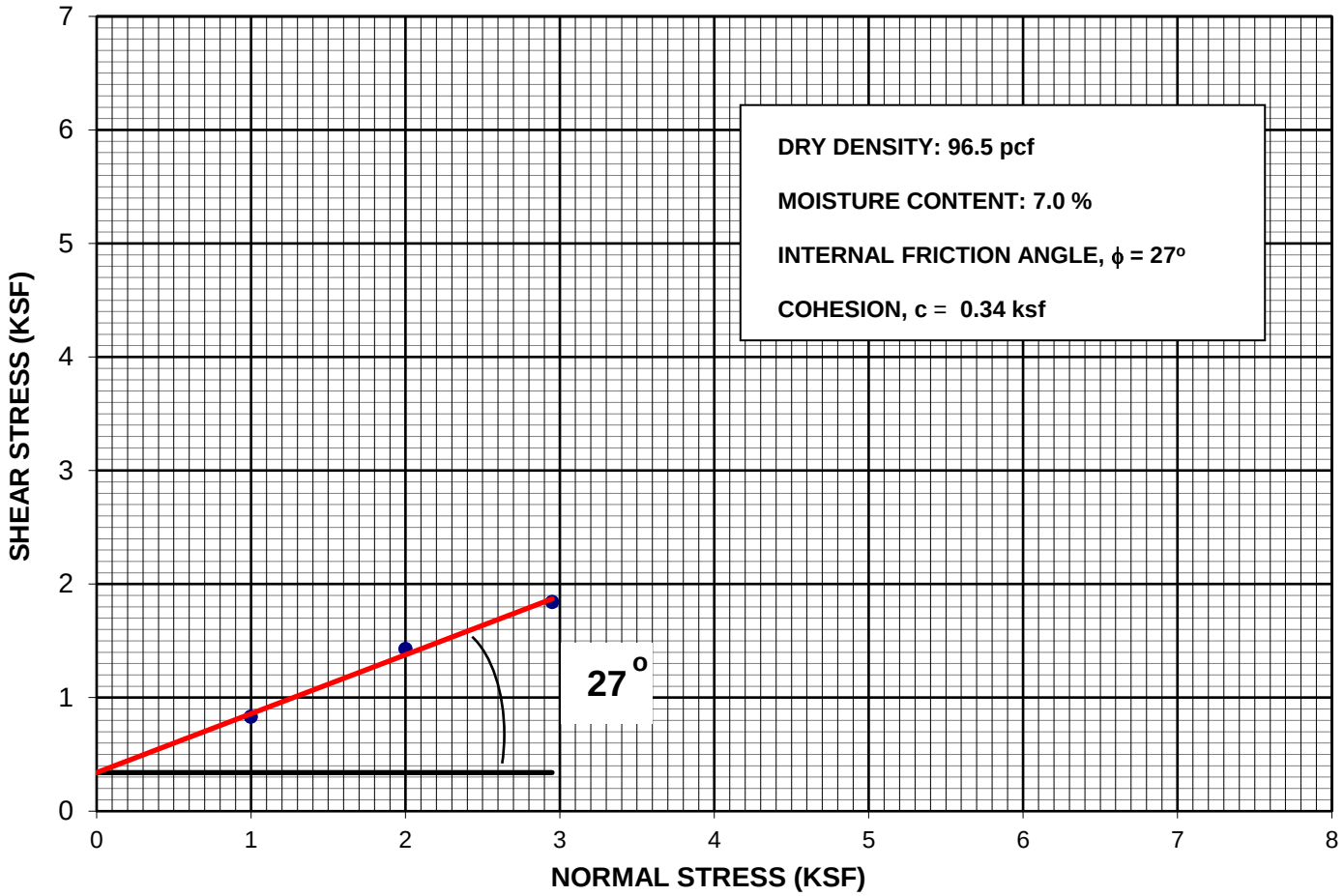
Direct Shear Test

ASTM D-3080

FIGURE B-1

Project Name:	Madera HS	**Sampled By:**	D. Ferrer	**Sample Date:**	6/26/23
		Tested By:	D. Messfin	**Test Date:**	6/28/23
Project Number:	G00001118	**Lab Tracking ID:**	N/A	**Report Date:**	07-07-23
Sample Location:	B-4 @ 3'	**Sample Description:**	Silty Sand - brown, moist, fine to coarse grained sand, fine grained gravel		

SHEAR STRENGTH DIAGRAM



691 N Laverne, Ste 101
Fresno, CA 93727
Ph: (559) 497-2880

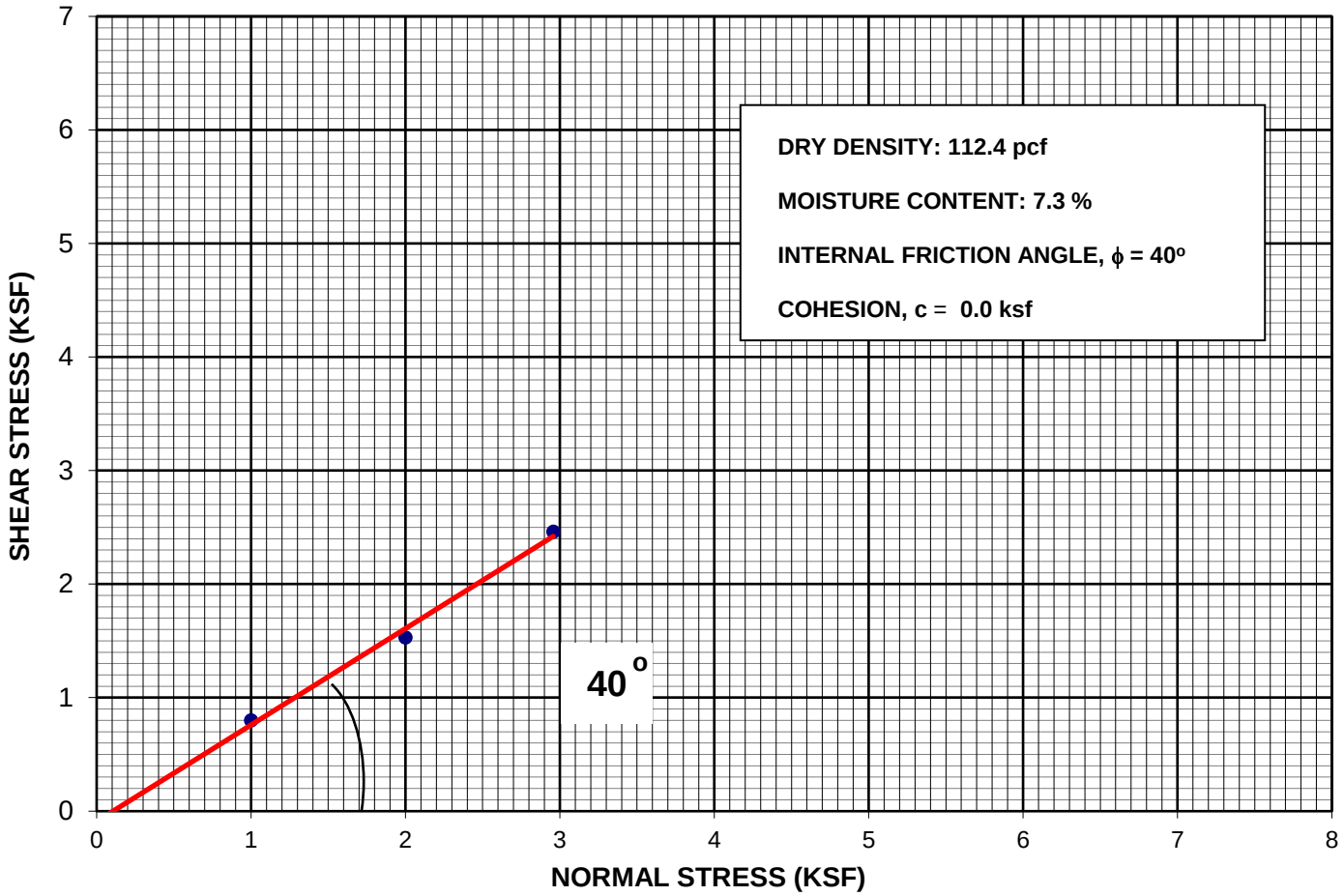
FIGURE B-2

Direct Shear Test

ASTM D-3080

Project Name:	Madera HS	**Sampled By:**	D. Ferrer	**Sample Date:**	6/26/23
		Tested By:	D. Messfin	**Test Date:**	6/28/23
Project Number:	G00001118	**Lab Tracking ID:**	N/A	**Report Date:**	07-07-23
Sample Location:	B-5 @ 3'	**Sample Description:**	Silty Sand - brown, moist, fine to coarse grained sand		

SHEAR STRENGTH DIAGRAM

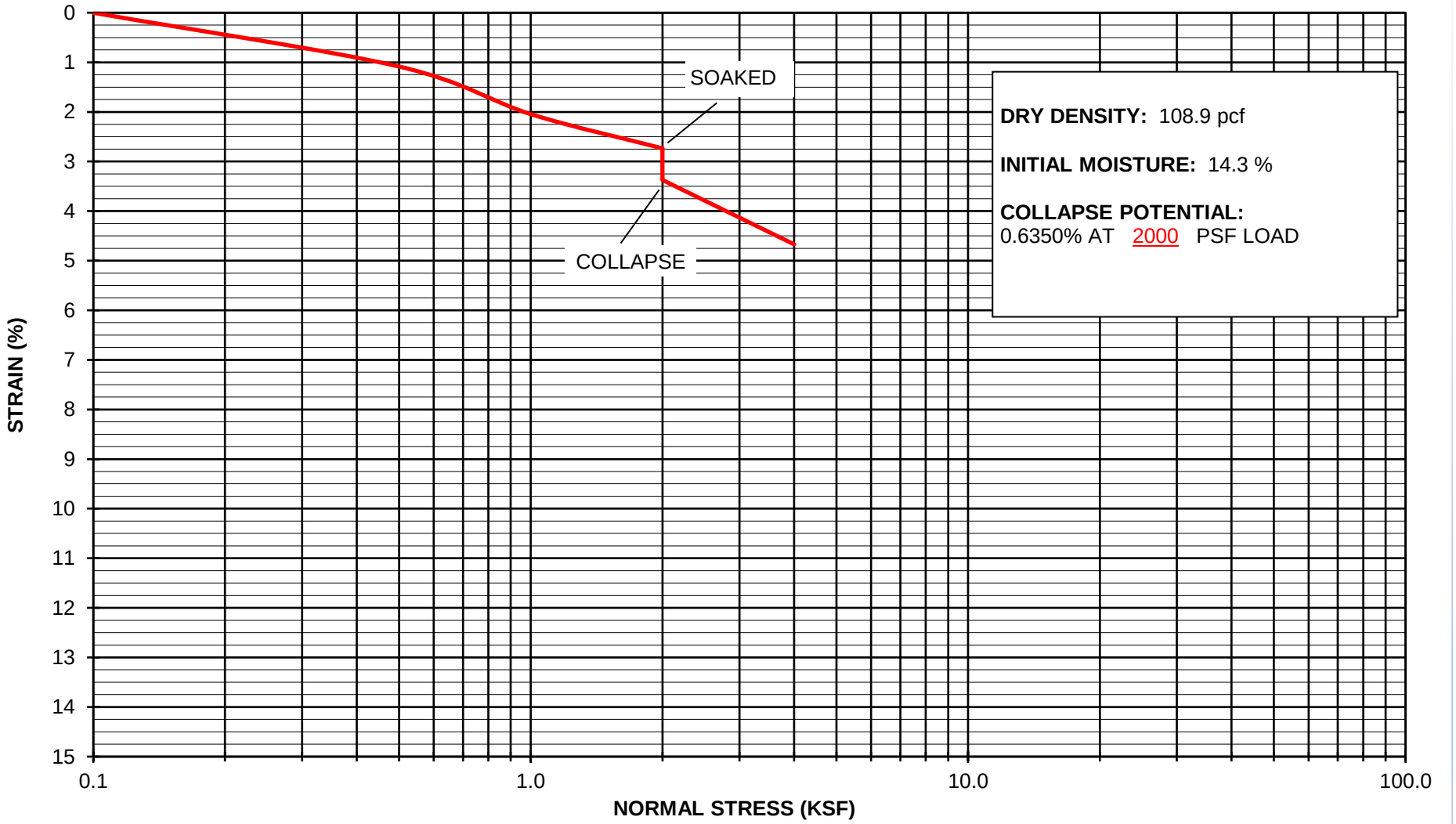


BSK ASSOCIATES
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Fresno, CA 93727
Ph: (559) 497-2880

COLLAPSE POTENTIAL
ASTM D-5333

FIGURE B-3

Project Name:	Madeera USD Bleachers	**Sampled By:**	D.F	**Sample Date:**	6-23-23
		Tested By:	D.Messfin	**Test Date:**	6-26-23
Project Number:	G000011118	**Lab Tracking ID:**	N/A	**Report Date:**	7-7-23
Sample Location:	B-1 @ 3'	**Sample Description:**	Sandy Silt - brown, moist, fine to coarse grained sand		



H – Inspection and Maintenance Guide

Contech® CMP Detention Inspection and Maintenance Guide

Underground stormwater detention and infiltration systems must be inspected and maintained at regular intervals for purposes of performance and longevity.

Inspection

Inspection is the key to effective maintenance of CMP detention systems and is easily performed. Contech recommends ongoing, annual inspections. Sites with high trash load or small outlet control orifices may need more frequent inspections. The rate at which the system collects pollutants will depend more on-site specific activities rather than the size or configuration of the system.

Inspections should be performed more often in equipment washdown areas, in climates where sanding and/or salting operations take place, and in other various instances in which one would expect higher accumulations of sediment or abrasive/corrosive conditions. A record of each inspection is to be maintained for the life of the system.

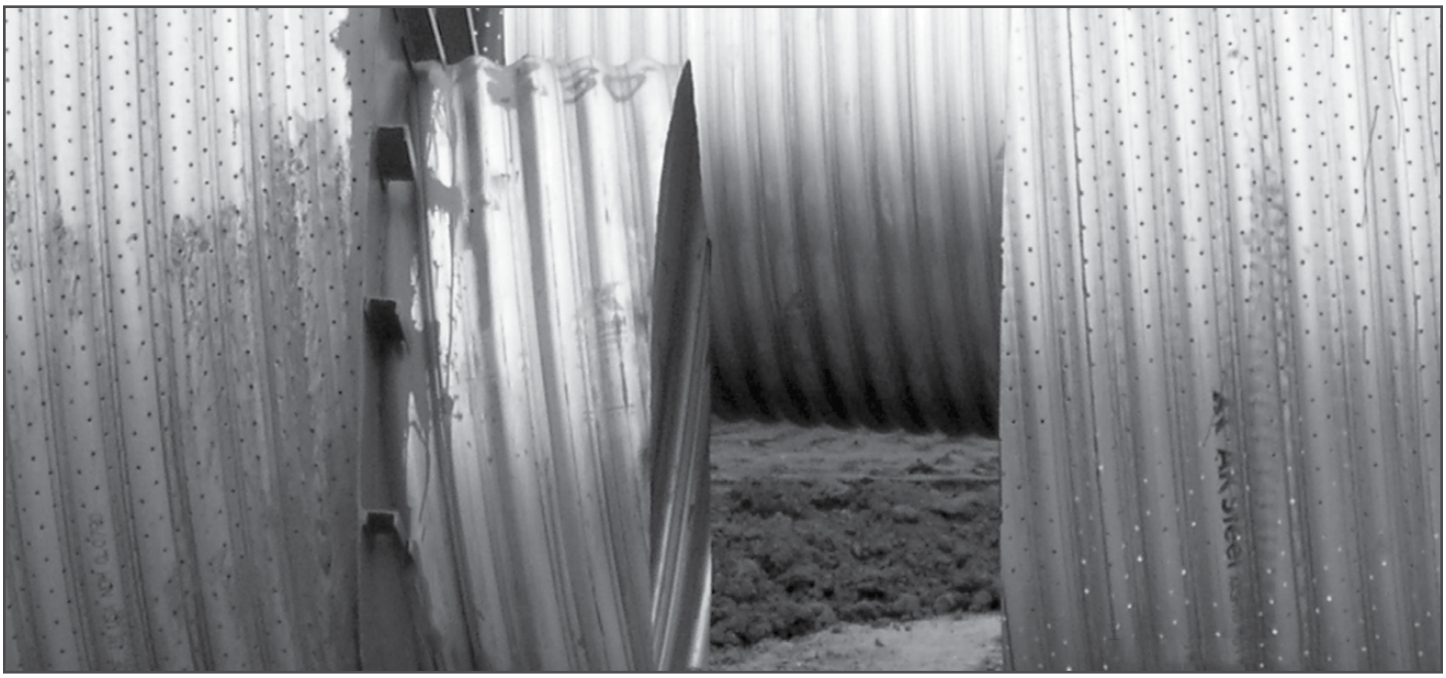
Maintenance

CMP detention systems should be cleaned when an inspection reveals accumulated sediment or trash is clogging the discharge orifice. Accumulated sediment and trash can typically be evacuated through the manhole over the outlet orifice. If maintenance is not performed as recommended, sediment and trash may accumulate in front of the outlet orifice. Manhole covers should be securely seated following cleaning activities. Contech suggests that all systems be designed with an access/inspection manhole situated at or near the inlet and the outlet orifice. Should it be necessary to get inside the system to perform maintenance activities, all appropriate precautions regarding confined space entry and OSHA regulations should be followed.

Annual inspections are best practice for all underground systems. During this inspection if evidence of salting/de-icing agents is observed within the system, it is best practice for the system to be rinsed, including above the spring line soon after the spring thaw as part of the maintenance program for the system.

Maintaining an underground detention or infiltration system is easiest when there is no flow entering the system. For this reason, it is a good idea to schedule the cleanout during dry weather.

The foregoing inspection and maintenance efforts help ensure underground pipe systems used for stormwater storage continue to function as intended by identifying recommended regular inspection and maintenance practices. Inspection and maintenance related to the structural integrity of the pipe or the soundness of pipe joint connections is beyond the scope of this guide.



NOTHING IN THIS CATALOG SHOULD BE CONSTRUED AS A WARRANTY. APPLICATIONS SUGGESTED HEREIN ARE DESCRIBED ONLY TO HELP READERS MAKE THEIR OWN EVALUATIONS AND DECISIONS, AND ARE NEITHER GUARANTEES NOR WARRANTIES OF SUITABILITY FOR ANY APPLICATION. CONTECH MAKES NO WARRANTY WHATSOEVER, EXPRESS OR IMPLIED, RELATED TO THE APPLICATIONS, MATERIALS, COATINGS, OR PRODUCTS DISCUSSED HEREIN. ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND ALL IMPLIED WARRANTIES OF FITNESS FOR ANY PARTICULAR PURPOSE ARE DISCLAIMED BY CONTECH. SEE CONTECH'S CONDITIONS OF SALE (AVAILABLE AT WWW.CONTECHES.COM/COS) FOR MORE INFORMATION.

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CMP DETENTION SYSTEMS

CONTECH®
ENGINEERED SOLUTIONS

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Appendix M: Weather Reports

The discharger must obtain the precipitation forecast information from the National Weather Service Forecast Office (http://forecast.weather.gov). A printed copy with the date and time of printing should be retained in this Appendix.

Appendix N: Monitoring Records

Place completed BMP Inspection Forms, photographic documentation, Effluent Sampling, Receiving Water, and Dewatering Field Logs, Monitoring Exceptions, NAL Exceedance Reports, and Receiving Water Monitoring Trigger Exceptions in this appendix.

Appendix O: Storm Event/Dewatering Monitoring Forms

Rain Gauge Log Sheet				
Construction Site Name:				
WDID #:				
Date (mm/dd/yy)	Time (24-hr)	Initials	Rainfall Depth (Inches)	Notes:

Risk Level 1, 2, 3 ***Visual Inspection Field Log Sheet***					
Date and Time of Inspection:				Report Date:	
Inspection Type:	☐ Weekly	☐ Pre Qualifying Precipitation Event (QPE)	☐ During QPE	☐ Post QPE	☐ Dewatering Discharge
Site Information					
Construction Site Name:					
Construction stage and completed activities:				Approximate area of exposed site:	
Weather and Observations					
Date Rain Predicted to Occur:			Predicted % chance of precipitation (PoP): Predicted quantity of precipitation (QPF):		
Estimate storm beginning: _____ (date and time)		Estimate storm duration:_____ (hours)	Estimate time since last storm: _____ (days or hours)	Rain gauge reading:_____ (inches)	
Observations: If yes identify location					
Odors	Yes ☐	No ☐			
Floating material	Yes ☐	No ☐			
Suspended Material	Yes ☐	No ☐			
Sheen	Yes ☐	No ☐			
Discolorations	Yes ☐	No ☐			
Turbidity	Yes ☐	No ☐			
Site Inspections					
Outfalls or BMPs Evaluated			**Deficiencies Noted**		
(add additional sheets or attached detailed BMP Inspection Checklists)					
Photos Taken:	Yes ☐	No ☐	Photo Reference IDs:		
Corrective Actions Identified (note if SWPPP change is needed)					
Inspector Information					
Inspector Name:			Inspector Title:		
Signature:				Date:	

Risk Level 1, 2, 3 ***Effluent Sampling Field Log Sheets***			
Construction Site Name:		Date:	Time Start:
Sampler:			
Sampling Event Type:	☐ Stormwater	☐ Dewatering Discharge	☐ Non-visible pollutant
Field Meter Calibration			
pH Meter ID No./Desc.: Calibration Date/Time:		Turbidity Meter ID No./Desc.: Calibration Date/Time:	

Field pH and Turbidity Measurements			
Discharge Location Description	pH	Turbidity	Time

Grab Samples Collected		
Discharge Location Description	Sample Type	Time

Additional Sampling Notes:
Time End:

Risk Level 3 ***Receiving Water Sampling Field Log Sheets***		
Construction Site Name:	Date:	Time Start:
Sampler:		
Receiving Water Description and Observations		
Receiving Water Name/ID:		
Observations:		
Odors Yes ☐ No ☐		
Floating material Yes ☐ No ☐		
Suspended Material Yes ☐ No ☐		
Sheen Yes ☐ No ☐		
Discolorations Yes ☐ No ☐		
Turbidity Yes ☐ No ☐		
Field Meter Calibration		
pH Meter ID No./Desc.: Calibration Date/Time:	Turbidity Meter ID No./Desc.: Calibration Date/Time:	

Field pH and Turbidity Measurements			
Upstream Location			
Type	Result	Time	Notes
pH			
Turbidity			
Downstream Location			
Type	Result	Time	Notes
pH			
Turbidity			
Additional Sampling Notes:			
Time End:			

NAL Exceedance Evaluation Summary Report	Page __ of __
Project Name	
Project WDID	
Project Location	
Date of Exceedance	
Type of Exceedance	**NAL ☐ pH ☐ Turbidity** **☐ Other (specify) _____**
Measurement or Analytical Method	**☐ Field meter** **(Sensitivity: _____)** **☐ Lab method (specify) _____** **(Minimum Level: _____)** **(MDL: _____)**
Calculated Daily Average	**☐ pH _____ pH units** **☐ Turbidity _____ NTU**
Rain Gauge Measurement	**_____ inches**
Visual Observations on Day of Exceedance	

NAL Exceedance Evaluation Summary Report	Page __ of __
Description of BMPs in Place at Time of Event	
Initial Assessment of Cause	
Corrective Actions Taken (deployed after exceedance)	
Additional Corrective Actions Proposed	
Report Completed By	_____ **(Print Name, Title)**
Signature	_____

CHAIN-OF-CUSTODY **DATE:** **Lab ID:**

DESTINATION LAB: ATTN: **ADDRESS:** **Office Phone:** **Cell Phone:**							REQUESTED ANALYSIS				Notes:
SAMPLED BY:											
Contact:											
Project Name											
Client Sample ID	**Sample Date**	**Sample Time**	**Sample Matrix**	**Container #**	**Container Type**	**Container Pres.**					

SENDER COMMENTS:	**RELINQUISHED BY**	
	Signature:	
	Print:	
	Company:	
	Date:	TIME:
LABORATORY COMMENTS:	**RECEIVED BY**	
	Signature:	
	Print:	
	Company:	
	Date:	TIME:

Appendix P: Field Meter Instructions

Appendix Q: Supplemental Information

ORDINANCE NO. -_____ C.S.

AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF MADERA, ADDING CHAPTER 9 TO TITLE V, OF THE MADERA MUNICIPAL CODE REGARDING STORM WATER QUALITY MANAGEMENT

BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF MADERA AS FOLLOWS:

SECTION 1. The City Council have held a public hearing on _____ and have determined that the proposed ordinance text is consistent with the General Plan.

SECTION 2. The City Council have determined the Ordinance to be consistent with the purpose and intent of title V of the Madera Municipal Code

§5-9.01 TITLE.

This Chapter shall be known as the "Storm Water Quality Management" of the City of Madera.

§5-9.02 FINDINGS.

(A) The Council of the City of Madera hereby finds and determines that the City of Madera's storm and surface water drainage system is planned, designed, and operated to handle storm water runoff flows from public and private properties.

(B) In order to function effectively, this system requires all private connections to it to be properly constructed, maintained, and operated. Storm water runoff flows from individual properties onto the streets, then through storm drains to catch basins and ultimately storm water basins, the Fresno River or Madera Irrigation District facilities. It is therefore in the public interest to ensure that both public and private drainage systems are properly maintained to facilitate the proper functioning of the City's storm and surface water drainage system, and to prevent pollutants from entering these catch basins and the surrounding bodies of water.

(C) The federal Clean Water Act provides for the regulation and reduction of pollutants discharged into the waters of the United States by extending National Pollutant Discharge Elimination System ("NPDES") requirements to the state and local level and make it necessary for owners and operators of municipal storm drain systems to implement programs to reduce and control pollutants in urban storm water to the maximum extent practicable.

(D) The City of Madera is a permittee under a National Pollutant Discharge Elimination System (NPDES) Municipal Permit and as such is obligated to implement Best Management Practices ("BMP") procedures to prevent and control the entry of pollutants and non-storm water runoff into the City storm drain system. The most significant pollutants in urban runoff come from particulates, oil, and grease. To better control the quantity and quality of urban runoff pollution, an active program requiring existing

properties to adopt "good housekeeping" practices is essential. To reduce runoff contamination and runoff volume from new construction, private and publicly owned properties which will be newly developed, substantially rehabilitated or redeveloped in the future, a program ensuring that new developments incorporate design elements which facilitate such control is required.

§5-9.03 PURPOSE.

The purpose of this Chapter is to implement policies and procedures to reduce and control storm water pollution. The objectives of this Chapter include the reduction of both runoff volume and runoff contamination from existing residential and nonresidential properties and from future construction and developments. It aims to ensure that project sites maximize on-site percolation of runoff and/or have the capacity to convey or store peak runoff from a storm and release it at a slow rate so as to minimize the peak discharge into storm drains. Also, to ensure that rain water is directed or contained so as not to become polluted by passage through contaminating material. This Chapter will prohibit illicit connections and discharges into the Municipal Separate Storm Sewer System (MS4). Lastly, the final goal of this chapter is to authorize the City of Madera Engineering Department to enforce the BMP procedures as set forth in the NPDES permit.

§5-9.04 DEFINITIONS.

(A) Except where the context otherwise requires, the definitions given in this section govern the construction of this article. If any of the definitions in this section conflict with the definitions in other chapters of the Municipal Code, these definitions shall prevail for the purpose of interpreting and enforcing this section. If a term is not defined in this section, or other sections of the Municipal Code, the most common dictionary definition shall be assumed to be correct.

(B) The following definitions are listed in alphabetical order.

AUTHORIZED ENFORCEMENT AGENCY. The City of Madera Community Development and Engineering Department.

AREA SUSCEPTIBLE TO RUNOFF. Any non-permeable surface directly exposed to precipitation or in the path of runoff caused by precipitation which leads directly to neighboring properties or to the street.

BEST MANAGEMENT PRACTICES ("BMP"). Practices principally applicable to construction sites, parking lots, and new developments which reduce the toxicity contained in, and the volume of, water which runs into storm drains, treatment facilities, and catch basins.

CASQA HANDBOOKS. The California Stormwater Quality Association Stormwater Best Management Practices Handbooks.

CLEARING. Any activity that removes the vegetative surface cover.

CONSTRUCTION GENERAL PERMIT. A permit to be obtained prior to construction activity resulting in a land disturbance of one acre or more, or less than one acre but part of a larger common plan of development or sale.

CONSTRUCTION SITE. Any project, including projects requiring coverage under the General Construction Permit, that involves soil disturbing activities including, but not limited to, clearing, grading, paving, disturbances to ground such as stockpiling, and excavation.

DEVELOPMENT PROJECT. Any construction-activity or alteration of the landscape, its terrain, contour or vegetation, including the erection or alteration of single or multiple structures, and any grading for projects that create and/or replace (including projects with no net increase in impervious footprint) between 2,500 square feet and 5,000 square feet of impervious surface, including detached single family homes that create and/or replace 2,500 square feet or more of impervious surface and are not part of a larger plan of development.

DIRECT DISCHARGE. A discharge that is routed directly to waters of the United States by means of a pipe, channel, or ditch (including a municipal storm sewer system), or through surface runoff.

DISCHARGE. Any release, spill, leak, pumping, flow. escape or leaching, including subsurface migration to groundwater, dumping or disposal of any gas, liquid, semi-solid or solid substance, whether accidental or intentional.

DISCHARGE OF A POLLUTANT. The addition of any pollutant or combination of pollutants to waters of the United States from any point source. The term includes additions of pollutants to waters of the United States from: surface runoff which is collected or channeled by man; discharges through pipes, sewers, or other conveyances owned by a State, municipality, or other person which do not lead to a treatment works; and discharges through pipes, sewers, or other conveyances, leading into privately owned treatment works.

DRAINAGE WAY. Any channel that conveys surface runoff throughout the site.

EROSION CONTROL. A measure that prevents erosion.

GRADING. Excavation or fill of material including the resulting conditions thereof.

GOOD HOUSEKEEPING REQUIREMENTS ("GHR"). Storm water pollution control practices applicable to existing properties which have been demonstrated to significantly reduce and control storm water urban runoff pollution which runs into storm drains, treatment facilities, and the catch basins.

ILLICIT DISCHARGE. Any discharge to a municipal separate storm sewer (storm drain) system (MS4) that is prohibited under local, state, or federal statutes, ordinances, codes, or regulations. The term illicit discharge includes all non-storm water discharges not composed

entirely of storm water and discharges that are identified under the Discharge Prohibitions section of this General Permit. The term illicit discharge does not include discharges that are regulated by an NPDES permit (other than the NPDES permit for discharges from the MS4).

INCIDENTAL RUNOFF. Any unintended amounts (volume) of runoff, such as unintended, minimal over-spray from sprinklers that escapes the area of intended use. Water leaving an intended use area is not considered incidental if it is part of the facility design, if it is due to excessive application, if it is due to intentional overflow or application, or if it is due to negligence.

INDUSTRIAL ACTIVITY. Activities subject to NPDES Industrial Permits as defined in 40 CFR, Section 122.26 (b) (14).

INDUSTRIAL AND COMMERCIAL FACILITIES – facilities such as savage yards, metal and other recycling collection facilities, waste transfer facilities, vehicle mechanical repair, maintenance or cleaning, building trade center or yards, corporation yards, landscape nurseries and greenhouses, building material retailers and storage, plastic manufactures, other facilities designated by the Permitees or Regional Water Boards to have reasonable potential to contribute to pollution of storm water runoff.

LOW IMPACT DEVELOPMENT (LID). A sustainable practice that benefits water Supply and contributes to water quality protection. Unlike traditional storm water management, which collects and conveys storm water runoff through storm drains. pipes, or other conveyances to a centralized storm water facility, Low Impact Development (LID) takes a different approach by using site design and storm water management to maintain the site's pre-development runoff rates and volumes, The goal of LID is to mimic a site's predevelopment hydrology by using design techniques that infiltrate, filter, store, evaporate, and detain runoff close to the source of rainfall.

LINEAR UNDERGROUND/OVERHEAD PROJECTS (LUPs). Include, but are not limited to, any conveyance, pipe, or pipeline for the transportation of any gaseous, liquid (including water and wastewater for domestic municipal services), liquescent, or slurry substance; any cable line or wire for the transmission of electrical energy; any cable line or wire for communications (e.g., telephone, telegraph, radio, or television messages); and associated ancillary facilities. Construction activities associated with LUPs include, but are not limited to, (a) those activities necessary for the installation of underground and overhead linear facilities (e.g., conduits, substructures, pipelines, towers, poles, cables, wires, connectors, switching, regulating and transforming equipment, and associated ancillary facilities); and include, but are not limited to, (b) underground utility mark-out, potholing, concrete and asphalt cutting and removal, trenching, excavation, boring and drilling, access road and pole/tower pad and cable/wire pull station, substation construction, substructure installation, construction of tower footings and/or foundations, pole and tower installations, pipeline installations, welding, concrete and/ or pavement repair or replacement, and stockpile/borrow locations.

MS4. Municipal Separate Storm Sewer Systems is a conveyance or system of conveyances that is: owned by a state, city, town, village, or other public entity that discharges to waters of the

U.S., designed or used to collect or convey stormwater (e.g., storm drains, pipes, ditches), not a combined sewer, and not part of a sewage treatment plant, or publicly owned treatment works

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT. A discharge permit issued by the State Water Resources Control Board, the Regional Water Quality Control Board or the United States Environmental Protection Agency.

NEW DEVELOPMENT. Land disturbing activities; structural development, including construction or installation of a building or structure, creation of impervious surfaces; and land subdivision on an area that has not been previously developed.

NON-STORM WATER DISCHARGE. Any discharge to the storm drain system that is not composed entirely of storm water.

POLLUTANT. Anything which causes or contributes to pollution. Pollutants may include, but are not limited to: paints, varnishes, and solvents; oil and other automotive fluids; non-hazardous liquid and solid wastes and yard wastes; refuse, rubbish, garbage, litter, or other discarded or abandoned objects, ordinances (explosives) and accumulations, so that same may cause or contribute to pollution; floatables; pesticides, herbicides, and fertilizers; hazardous substances and wastes; sewage, fecal coli form and pathogens; dissolved and particulate metals; animal wastes; wastes and residues that result from constructing a building or structure; and noxious or offensive matter of any kind.

PERIMETER CONTROL. A barrier that prevents sediment from leaving a site by filtering sediment laden runoff or diverting it to a sediment trap or basin.

PREMISES. Any building, lot, parcel of land, or portion of land whether improved or unimproved including adjacent sidewalks and parking strips.

PHASING. Clearing a parcel of land in distinct phases with the stabilization of each phase completed before the clearing of the next.

REDEVELOPMENT. Land-disturbing activity that results in the creation, addition, or replacement of exterior impervious surface area on a site on which some past development has occurred. Redevelopment does not include trenching, excavation and resurfacing associated with LUPs; pavement grinding and resurfacing of existing roadways; construction of new sidewalks, pedestrian ramps, or bike lanes on existing roadways; or routine replacement of damaged pavement such as pothole repair or replacement of short, non-contiguous sections of roadway.

SEDIMENT CONTROL. Measures that prevent eroded sediment from leaving the site.

SITE. A parcel of land or a contiguous combination thereof where grading work is performed as a single unified operation.

STABILIZATION. The use of practices that prevent exposed soil from eroding.

START OF CONSTRUCTION. The first land-disturbing activity associated with a development, including but not limited to: land preparation such as clearing, grading, and filling; installation of streets and walkways; excavation for basements, footings, piers, or foundations; erection of temporary forms; and installation of accessory buildings such as garages.

STATE WATER RESOURCES CONTROL BOARD. The Department of the State that ensure violations of orders and permits result in firm, fair, and consistent enforcement through direct actions, the development of policies and guidance, and the identification of metrics for decision-making on enforcement issues.

STORM DRAINAGE SYSTEM. Publicly-owned facilities by which storm water is collected and/or conveyed, including but not limited to any roads with drainage systems, municipal streets, gutters, curbs, inlets, piped storm drains, pumping facilities, retention and detention basins, natural and human-made or altered drainage channels, reservoirs, and other drainage structures.

STORM WATER. Any surface flow, runoff, and drainage consisting entirely of water from any form of natural precipitation, and resulting from such precipitation.

STORM WATER POLLUTION PREVENTION PLAN. A plan required by the State Water Resources Control Board, the Regional Water Quality Control Board or the United States Environmental Protection Agency which sets forth the site map, identifies the activities that have the potential to pollute storm water which may enter the City's storm drain system, describes the proposed BMPs to be implemented by the discharger, and contains a description of any other requirements that the State Water Resources Control Board, the Regional Water Quality Control Board or the United States Environmental Protection Agency requires the discharger to list in the SWPPP.

WATERCOURSE Any body of water, including, but not limited to lakes, ponds, rivers, streams, and bodies of water.

WATERWAY. A channel that directs surface runoff to a watercourse or to the public storm drain.

§5-9.05 ENFORCEMENT AND LEGAL AUTHORITY.

The *City Engineer* or his or her designee, is legally authorized to enforce this chapter as follows:

(A) Effectively prohibit non-storm water discharges through the Municipal Separate Storm Sewer System (MS4).
(B) Detect and eliminate illicit discharges and illegal connections to the MS4. Illicit connections include pipes, drains, open channels, or other conveyances that have the potential to allow an illicit discharge to enter the MS4. Illicit discharges include all non-storm water discharges not otherwise authorized including, but not limited to, discharges from privately owned septic systems; discharges of runoff from material storage areas; discharges from spills; and discharges from organized car washes, mobile cleaning and pressure wash operations.

(C) Respond to the discharge of spills, and prohibit dumping or disposal of materials other than storm water into the MS4.

(1) May, without prior notice, suspend MS4 discharge access to a person when such suspension is necessary to stop an actual or threatened discharge which presents or may present:

(a) imminent and substantial danger to the environment,

(b) to the health or welfare of persons, or

(c) to the MS4 or Waters of the United States.

(2) No user shall discharge any substances directly into a manhole or other opening in a public storm drain system, unless the owner has been issued a permit by the Engineering Department.

If the violator fails to comply with a suspension order issued in an emergency, the authorized enforcement agency may take such steps as deemed necessary to prevent or minimize damage to the MS4 or Waters of the United States, or to minimize danger to persons. Cost of abatement will be borne by the violator.

(D) Require parties responsible for runoff in excess of incidental runoff to:

(1) Detect leaks (for example, from broken sprinkler heads) and correct the leaks within 72 hours of learning of the leak;

(2) Properly design and aim sprinkler heads;

(3) Not irrigate during precipitation events as described in the City's Water Restriction Policy; and

(4) Manage pond containing recycled water such that no discharge occurs unless the discharge is a result of a 25-year, 24-hour storm event or greater, and the appropriate Regional Water Board is notified by email no later than 24 hours after the discharge. The notification is to include identifying information, including the Permittee's name and permit identification number.

(E) Require vendors, contractors and operators of commercial facilities, construction sites, new or redevelopment land to minimize the discharge of pollutants to the MS4 through the installation, implementation, and maintenance of BMPs consistent with the CASQA Best Management Practice Handbooks or equivalent.

(F) Inspect public and private construction projects and conduct enforcement as necessary. Enter private property for the purpose of inspecting, at reasonable times, any facilities, equipment, practices, or operations for active or potential storm water discharges, or non-compliance with local ordinances/standards or requirements in this Chapter, as consistent with any applicable state and federal laws.

(G) Require that dischargers promptly cease and desist discharging and/or cleanup and abate a discharge, including the ability to:

(1) Effectively require the discharger to abate and clean up their discharge, spill, or pollutant release within 72 hours of notification; high risk spill should be cleaned up as soon as possible.

(2) Require abatement within 30 days of notification, for uncontrolled sources of pollutants that could pose an environmental threat;

(3) Perform the clean-up and abatement work and bill the responsible party, if necessary;

(4) Provide the option to order the cessation of activities until such problems are adequately addressed if a situation persists where pollutant-causing sources or activities are not abated;

(5) Require a new timeframe and notify the appropriate Regional Water Board when all parties agree that clean-up activities cannot be completed within the original timeframe and notify the appropriate Regional Water Board in writing within five business days of the determination that the timeframe requires revision.

(H) For the first failure to comply with provisions in this chapter, the *City* shall issue to the affected person a written notice which includes the following information:

(1) A statement specifying the violation committed;

(a) A specified time period within which the affected person must correct the failure or file a written notice disputing the notice of failure to comply;

(b) A statement of the penalty for continued noncompliance.

(I) Levy citations or administrative fines against responsible parties either immediately at the site or within a few days. The violation of this Chapter shall constitute an infraction punishable by a fine as listed on the City Master Penalty Schedule. Each day that a violation occurs shall constitute a separate offense.

(J) Impose more substantial civil or criminal sanctions and escalate corrective response for persistent non-compliance, repeat or escalating violations, or incidents of major environmental harm.

(K) A violation of any provision of this Chapter is declared to be a public nuisance and the City is authorized to abate such violation(s) by means of a civil action.

(L) The penalties and remedies established by this Chapter shall be cumulative.

(1) Any penalty collected hereunder shall be deposited in the *Urban Runoff Fund* to be used as reimbursement to the *Engineering Department for* costs and expenses of administration and enforcement of this Chapter

§5-9.06 CONSTRUCTION SITE STORM WATER RUNOFF CONTROL.

The following Best Management Practices which address the problem of urban runoff shall apply to all projects undergoing construction in the City. The Best Management Practices list set forth below is required by the City. The requirements set forth below shall apply at the time of demolition of an existing structure or commencement of construction and until receipt of a certificate of occupancy:

(A) Applicability - All projects that disturb soil are subject to the Urban Runoff Requirements for projects under construction. Projects that disturb one acre or more of soil or disturb less than one acre but are part of a larger common plan or development or sale are subject to the State Water Board's Construction General Permit in addition to the Construction Site Storm Water Runoff Control requirements.

(B) Prior to issuing a grading or building permit, the City of Madera shall require each operator of a construction activity within the *City* of Madera's jurisdiction to prepare and submit for review and approval an erosion and sediment control plan (ESCP). The ESCP shall contain appropriate site specific construction site BMPs that meet the minimum requirements to control storm water pollution due to construction activities. The City of Madera holds the right to require additional specific BMPs before approving the ESCP.

(1) The ESCP shall include the rationale used for selecting BMPs including, if necessary, supporting soil loss calculations. The ESCPs shall contain, as needed, erosion and sediment controls, soil stabilization, dewatering. source controls, and pollution prevention measures per the CASQA Best Management Practices Handbooks or as approved by the City of Madera.

(2) The ESCP shall list all applicable permits directly associated with any grading activity, including State Water Boards' Construction General Permit, State Water Boards' 401 Water Quality Certification, U.S. Army Corps of Engineers 404 Permit, and the California Department of Fish and Wildlife 1600 Streambed Alteration Agreement. The responsible party shall submit evidence to the City of Madera that all permits directly associated with the grading activity have been obtained prior to commencing the soil disturbing activities authorized by the grading permit.

(3) Conduct and document review of each erosion and sediment control plan using a checklist or similar process.

(4) The Storm Water Pollution Prevention Plan (SWPPP) developed pursuant to the Construction General Permit may substitute for the ESCP for projects where a SWPPP is developed. The City of Madera holds the right to require additional BMPs before approving the SWPPP.

(C) Require operators of construction sites, new or redeveloped land, and industrial and commercial facilities to minimize the discharge of pollutants to the MS4 through the installation, implementation, or maintenance of Best Management Practices (BMPs) consistent with the California Storm Water Quality Association (CASQA) Best Management Practice Handbooks or equivalent.

(D) Construction Site Inspection and Enforcement

(1) The Authorized Enforcement Agency or designated agent shall make inspections as required and either shall approve that portion of the work completed or shall notify the permittee when the work fails to comply with the Storm Water Pollution Prevention Plan or ESCP as approved. The approved plans for grading, stripping, excavating, and filling work shall be maintained at the site during the progress of the work.

§5-9.07 POST CONSTRUCTION STORM WATER MANAGEMENT.

(A) Site Design Measures

(1) All projects that create and/or replace (including projects with no net increase in impervious footprint) between 2,500 square feet and 5,000 square feet of impervious surface, including detached single family homes that create and/or replace 2,500 square feet or more of impervious surface and are not part of a larger plan of development are required to implement one or more of the following site design measures to reduce project site runoff:

(a) Stream Setbacks and Buffers - a vegetated area including trees, shrubs, and herbaceous vegetation, that exists or is established to protect a stream system, lake reservoir, or coastal estuarine area;

(b) Soil Quality Improvement and Maintenance - improvement and maintenance soil through soil amendments and creation of microbial community;

(c) Tree Planting and Preservation - planting and preservation of healthy, established trees that include both evergreens and deciduous, as applicable;

(d) Rooftop and Impervious Area Disconnection - rerouting of rooftop drainage pipes to drain rainwater to rain barrels, cisterns, or permeable areas instead of the storm sewer;

(e) Porous Pavement - pavement that allows runoff to pass through it, thereby reducing the runoff from a site and surrounding areas and filtering pollutants;

(f) Green Roofs - a vegetative layer grown on a roof (rooftop garden);

(g) Vegetated Swales - a vegetated, open-channel management practice designed specifically to treat and attenuate storm water runoff;

(h) Rain Barrels and Cisterns - system that collects and stores storm water runoff from a roof or other impervious surface.

(2) Project proponents shall use the State Water Board SMARTS Post-Construction Calculator to quantify and submit to the City of Madera the runoff reduction resulting from implementation of site design measures.

(3) Site design measures as specified in this section are not applicable to linear underground/overhead projects (LUPs).

(B) Regulated Projects:

Projects that create and/or replace 5,000 square feet or more of impervious surface (Regulated Projects) are required to implement measures for site design, source control, runoff reduction, storm water treatment and baseline hydromodification management.

(1) Regulated Projects do not include:

(a) Detached single family home projects that are not part of a larger plan of development;

(b) Interior remodels;

(c) Routine maintenance or repair such as: exterior wall surface replacement, pavement resurfacing within the existing footprint.

(d) LUPs - Unless the LUP has a discrete location that has 5,000 square feet or more of newly constructed contiguous impervious surface. When the LUP has a discrete location that has 5,000 sq-ft or more of new contiguous impervious surface, only that specific discrete location is considered a regulated project.

(2) Development Projects are regulated projects. Development includes new and redevelopment projects on public or private land that fall under the planning and permitting authority of the City of Madera. Redevelopment is any land-disturbing activity that results in the creation, addition, or replacement of exterior impervious surface area on a site on which some past development has occurred. Redevelopment does not include trenching, excavation and resurfacing associated with LUPs; pavement grinding and resurfacing of existing roadways; construction of new sidewalks, pedestrian ramps, or bike lanes on existing roadways; or routine replacement of damaged pavement such as pothole repair or replacement of short, non-contiguous sections of roadway. The following (a-b) describe specific Regulated Project requirements for redevelopment, road projects and LUPs:

(a) Where a redevelopment project results in an increase of more than 50 percent of the impervious surface of a previously existing development, runoff from the entire project, consisting of all existing, new, and/or replaced impervious surfaces, must be included to the extent feasible.

(b) Where a redevelopment project results in an increase of less than 50 percent of the impervious surface of a previously existing development, only runoff from the new and/or replaced impervious surface of the project must be included.

(3) Road Projects and LUPs that are regulated projects. Any of the following types of road projects and LUPs that create 5,000 square feet or more of newly constructed contiguous impervious surface and that are public road projects and/or fall under the building and planning authority of the City of Madera shall comply with the Low Impact Development section of this ordinance except that treatment of runoff of the 85th percentile that cannot be infiltrated onsite shall follow U.S. EPA guidance regarding green infrastructure to the extent feasible.

(a) Construction of new streets or roads, including sidewalks and bicycle lanes built as part of the new streets or roads.

(b) Widening of existing streets or roads with additional traffic lanes.

(1) Where the addition of traffic lanes results in an alteration of more than 50 percent of the impervious surface of an existing street or road, runoff from the entire project, consisting of all existing, new, and/or replaced impervious surfaces, must be included in the treatment system design.

(2) Where the addition of traffic lanes results in an alteration of less than 50 percent (but 5,000 square feet or more) of the impervious surface of an existing street or road, only the runoff from new and/or replaced impervious surface of the project must be included in the treatment system design.

(c) Construction of linear underground/overhead projects (LUPs).

(d) Specific exclusions are:

(1) Sidewalks built as part of new streets or roads and built to direct storm water runoff to adjacent vegetated areas.

(2) Bicycle lanes that are built as part of new streets or roads that direct storm water runoff to adjacent vegetated areas.

(3) Impervious trails built to direct storm water runoff to adjacent vegetated areas, or other non-erodible permeable areas, preferably away from creeks or towards the outboard side of levees.

(4) Sidewalks, bicycle lanes, or trails constructed with permeable surfaces.

(5) Trenching, excavation and resurfacing associated with LUPs; pavement grinding and resurfacing of existing roadways and parking lots; construction of new sidewalks, pedestrian ramps, or bike lanes on existing roadways; or routine replacement of damaged pavement such as pothole repair or replacement of short, non-contiguous sections of roadway.

(C) Source Control Measures

Regulated Projects with pollutant-generating activities and sources are required to implement standard permanent and/or operation source control measures. Measures for the following pollutant generating activities and sources shall be designed consistent with recommendations from the CASQA Storm Water BMP Handbook for New Development and Redevelopment or equivalent manual:

(1) Accidental spills or leaks
(2) Interior floor drains
(3) Parking/storage areas and maintenance
(4) Indoor and structural pest control
(5) Landscape/outdoor pesticide use
(6) Pools, spas, ponds, decorative fountains, and other water features
(7) Restaurants, grocery stores, and other food service operations
(8) Refuse areas
(9) Industrial processes
(10) Outdoor storage of equipment or materials
(11) Vehicle and equipment cleaning
(12) Vehicle and equipment repair and maintenance
(13) Fuel dispensing areas
(14) Loading docks
(15) Fire sprinkler test water
(16) Drain or wash water from boiler drain lines, condensate drain lines, rooftop equipment, drainage sumps, and other sources
(17) Unauthorized non-storm water discharges
(18) Building and grounds maintenance

(D) Low Impact Development (LID)

All Regulated Projects must implement low impact development (LID) standards as follows:

(1) Site Assessment: Regulated Projects are required to assess and evaluate how site conditions, such as soils, vegetation, and flow paths, will influence the placement of buildings and paved surfaces. The evaluation will be used to meet the goals of capturing and treating runoff and assuring these goals are incorporated into the project design. The Regulated Projects are required to optimize the site layout through the following methods:

(a) Define the development envelope and protected areas, identifying areas that are most suitable for development and areas to be left undisturbed.
(b) Concentrate development on portions of the site with less permeable soils and preserve areas that can promote infiltration.
(c) Limit overall impervious coverage of the site with paving and roofs.
(d) Set back development from creeks, wetlands, and riparian habitats.
(e) Preserve significant trees.
(f) Conform the site layout along natural landforms.
(g) Avoid excessive grading and disturbance of vegetation and soils.
(h) Replicate the site's natural drainage patterns.
(i) Detain and retain runoff throughout the site.

(2) Drainage Management Areas- Regulated Projects must provide a map or diagram dividing the developed portions of the project site into discrete Drainage Management Areas (DMAs), and to manage runoff from each DMA using Site Design Measures, Source Controls and/or Storm Water Treatment and Baseline Hydromodification Measures.

(3) Numeric Sizing Criteria for Storm Water Retention and Treatment- Regulated projects shall be design to evapotranspire, infiltrate, harvest/use, and biotreat storm water are required to meet at least one of the following hydraulic sizing design criteria:

(a) Volumetric Criteria:

(1) The maximized capture storm water volume for the tributary area, on the basis of historical rainfall records, determined using the formula and volume capture coefficients in Urban Runoff Quality Management, WEF Manual of Practice No. 23/ASCE manual of Practice No. 87 (1998) pages 175-178 (that is, approximately the 85th percentile 24-hour storm runoff event); or

(2) The volume of annual runoff required to achieve 80 percent or more capture, determined in accordance with the methodology in Section 5 of the CASQA's Storm Water Best Management Practice Handbook, New Development and Redevelopment (2003), using local rainfall data.

(b) Flow-based Criteria:

(1) The flow of runoff produced from a rain event equal to at least 0.2 inches per hour intensity; or

(2) The flow of runoff produced from a rain event equal to at least 2 times the 85th percentile hourly rainfall intensity as determined from local rainfall records.

(4) Site Design Measures, as defined above, site layout, and design measures shall be implemented on the objective of achieving infiltration, evapotranspiration and/or harvesting/reuse of the 85th percentile 24-hour storm runoff event. Site design measures shall be used to reduce the amount of runoff, to the extent technically feasible, for which retention and runoff is required. Any remaining runoff from impervious DMAs may then be directed to one or more bioretention facilities as specified in Storm Water Treatment Measures and Baseline Hydromodifications Management below.

(5) Source Controls- All Regulated Projects shall implement Source Control Measures as defined above

(6) Storm Water Treatment Measures and Baseline Hydromodifications Management- After implementation of Site Design Measures on Regulated Projects, the remaining runoff from impervious DMAs must be directed to one or more facilities designed to infiltrated, evapotranspire, and/or bioretain the amount of runoff specified in Numeric Sizing Criteria for Storm Water Retention and Treatment. The facilities must be demonstrated to be at least as effective as a bioretention system with the following design parameters:

(a) Maximum surface loading rate of 5 inches per hour, based on the flow rates calculated. A sizing factor of 4% of tributary impervious area may be used.

(b) Minimum surface reservoir volume equal to surface area times a depth of 6 inches.
(c) Minimum planting medium depth of 18 inches. The planting medium must sustain a minimum infiltration rate of 5 inches per hour throughout the life of the project and must maximize runoff retention and pollutant removal. A mixture of sand (60%-70%) meeting the specifications of American Society for Testing and Materials (ASTM) C33 and compost (30%-40%) may be used.
(d) Subsurface drainage/storage (gravel) layer with an area equal to the surface area and having a minimum depth of 12 inches.
(e) Underdrain with discharge elevation at top of gravel layer.
(f) No compaction of soils beneath the facility, or ripping/loosening of soils if compacted.
(g) No liners or other barriers interfering with infiltration.
(h) Appropriate plant palette for the specified soil mix and maximum available water use.

(7) Alternative Design- Facilities, or a combination of facilities, of a different design than in Storm Water Treatment Measures and Baseline Hydromodifications Management may be permitted if all of the following measures of equivalent effectiveness are demonstrated:
(a) Equal or greater amount of runoff infiltrated or evapotranspired;
(b) Equal or lower pollutant concentrations in runoff that is discharged after biotreatment;
(c) Equal or greater protection against shock loadings and spills;
(d) Equal or greater accessibility and ease of inspection and maintenance.

(8) Allowed Variations for Special Site Conditions - The bioretention system design parameters in Storm Water Treatment Measures and Baseline Hydromodifications Management may be adjusted for the following special site conditions:
(a) Facilities located within 10 feet of structures or other potential geotechnical hazards established by the geotechnical expert for the project may incorporate an impervious cutoff wall between the bioretention facility and the structure or other geotechnical hazard.
(b) Facilities with documented high concentrations of pollutants in underlying soil or groundwater, facilities located where infiltration could contribute to a geotechnical hazard, and facilities located on elevated plazas or other structures may incorporate an impervious liner and may locate the underdrain discharge at the bottom of the subsurface drainage/storage layer (this configuration is commonly known as a “flow-through planter”).
(c) Facilities located in areas of high groundwater, highly infiltrative soils or where connection of underdrain to a surface drain or to a subsurface storm drain are infeasible, may omit the underdrain.
(d) Facilities serving high-risk areas such as fueling stations, truck stops, auto repairs, and heavy industrial sites may be required to provide additional treatment to address pollutants of concern unless these high-risk areas are isolated from storm water runoff or bioretention areas with little chance of spill migration.

(9) Exceptions to Requirements of Bioretention Facilities- Contingent on a demonstration that use of bioretention or a facility of equivalent effectiveness is infeasible, other types of biotreatment or media filters (such as tree box-type biofilters or in-vault media filters) may be used for the following categories of Regulated Projects:

(a) Projects creating or replacing an acre or less of impervious area, and located in a designated pedestrian-oriented commercial district (i.e., smart growth projects), and having at least 85% of the entire project site covered by permanent structures;

(b) Facilities receiving runoff solely from existing (pre-project) impervious areas; and

(c) Historic sites, structures or landscapes that cannot alter their original configuration in order to maintain their historic integrity.

(10) Hydromodification Management- Hydromodification management projects are Regulated Projects that create and/or replace one acre or more of impervious surface. A project that does not increase impervious surface area over the pre-project condition is not a hydromodification management project.

(a) Post-project runoff for hydromodification management projects shall not exceed estimated pre-project flowrate for the 2-year, 24-hour storm.

(11) Operation and Maintenance of Post-Construction Storm Water Management Measures- All Regulated Projects shall at a minimum, require from all project proponents and their successors in control of the Project or successors in fee title:

(a) The property owner or responsible party shall sign a Statement of Responsibility accepting responsibility for the on-going operation, inspection, and maintenance of the treatment control measures until the property and/or responsibility is legally transferred to another entity. The Statement of Responsibility shall be on a form approved by the City.

(b) Written conditions in the sales or lease agreements or deed for the project that requires the recipient to assume responsibility for maintenance of any treatment control measures until such responsibility is legally transferred to another entity;

(c) Written text in project deeds, or conditions, covenants and restrictions for multi-unit residential projects that require the home owner's association or, if there is no association, each individual owner to assume responsibility for the O&M of the installed treatment system(s) and hydro modification control(s) (if any) until such responsibility is legally transferred to another entity; or

(d) Any other legally enforceable agreement or mechanism, such as recordation in the property deed, that assigns the O&M responsibility for the installed treatment system(s) and hydro modification control(s) (if any) to the project owner(s) or the Permittee.

(e) The City will send the responsible party an Operation and Maintenance self-certification form. The responsible party will certify that the Operations and Maintenance program is being implemented and that the Treatment Control measures are in an effective operational condition. The

responsible party will have sixty (60) days to complete and return the annual Operation and Maintenance self-certification form.

(f) If the Operation and Maintenance self-certification form is not received within the sixty (60) day period, the City of Madera will perform the inspection and assessment. The responsible party will be billed for the inspection and assessment as applicable.

(12) All projects subject to this Section shall submit a completed Post Construction Storm Water Worksheet to the City of Madera.

(13) Post-Construction Best Management Practice Condition Assessment

§5-9.08 EXCEPTIONS TO DISCHARGE PROHIBITION.

(A) The following discharges are exempt from the prohibitions set forth in Section

(1) Any discharge regulated under a NPDES permit issued to the discharger provided that the discharger is in compliance with all requirements of the permit and all other applicable laws and regulations.

(2) Discharges from the following non-storm water activities unless identified by either the City or the Regional Water Quality Control Board as a significant source of pollutants to waters of the United States:

(a) water line flushing;
(b) individual residential car washing;
(c) diverted stream flows;
(d) rising ground waters;
(e) uncontaminated ground water infiltration (as defined at 40 C.F.R. §35.2005(20)) to separate storm sewers;
(f) uncontaminated pumped ground water;
(g) discharges from potable water sources;
(h) foundation drains;
(i) air conditioning condensation;
(j) springs;
(k) water from crawl space pumps;
(l) footing drains;
(m) flows from riparian habitats and wetlands;
(n) dechlorinated swimming pool discharges; and
(o) Discharges or flows from fire fighting activities;
(p) City municipal storm drain maintenance line clearing activities; and
(q) Incidental runoff from landscaped areas as defined below:

(1) Discharges in excess of an amount deemed to be incidental runoff shall be controlled.
(2) Non-storm water runoff discharge that is not incidental is prohibited, unless otherwise listed above in a-q
(3) Incidental runoff may be regulated by waste discharge requirements or, where necessary, waste discharge requirements that serve as a NPDES permit, including MS4 permits.

SECTION 4. If any section, subsection, sentence, clause or phrase of this Ordinance is for any reason held to be unconstitutional, such decision shall not affect the validity of the remaining portions of this Ordinance. The City Council hereby declares that it would have passed this Ordinance and each section, subsection, sentence, clause or phrase thereof irrespective of the fact that any one or more sections, subsections, sentences, clauses or phrases be declared unconstitutional or void for any other reason.

SECTION 5. This Ordinance shall be effective and of full force and effect at 12:01 am on the thirty-first day after its passage.

The foregoing Ordinance was introduced on _____, 2018, and duly and regularly passed by the Council of the City of Madera at a regular meeting thereof held on the _____ day of _____, 2018, by the following vote:

AYES:

NOES:

ABSENT:

_____,
Mayor of the City of Madera

ATTEST:

By:_____
Sonia Alvarez, City Clerk

APPROVED AS TO FORM:

_____
Brent Richardson, City Attorney

* * * * *

Appendix R: Construction General Permit

Copies of the Construction Stormwater General Permit may be downloaded from the State Water Board website at:

http://www.waterboards.ca.gov/water_issues/programs/stormwater/construction.shtml.

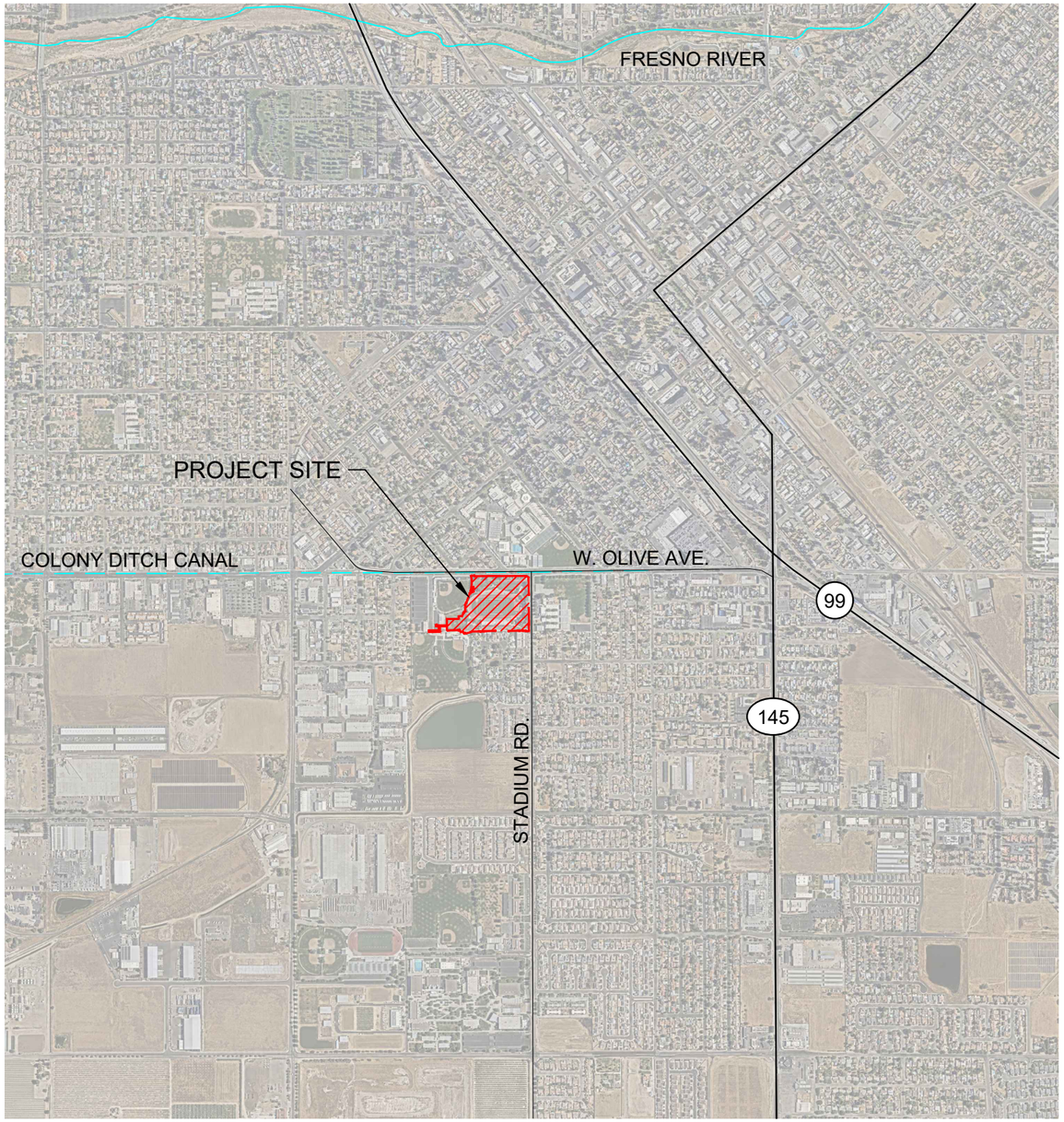
This Project has an active Stormwater Pollution Prevention Plan (SWPPP)

The Project WDID# is: 5F20C408034

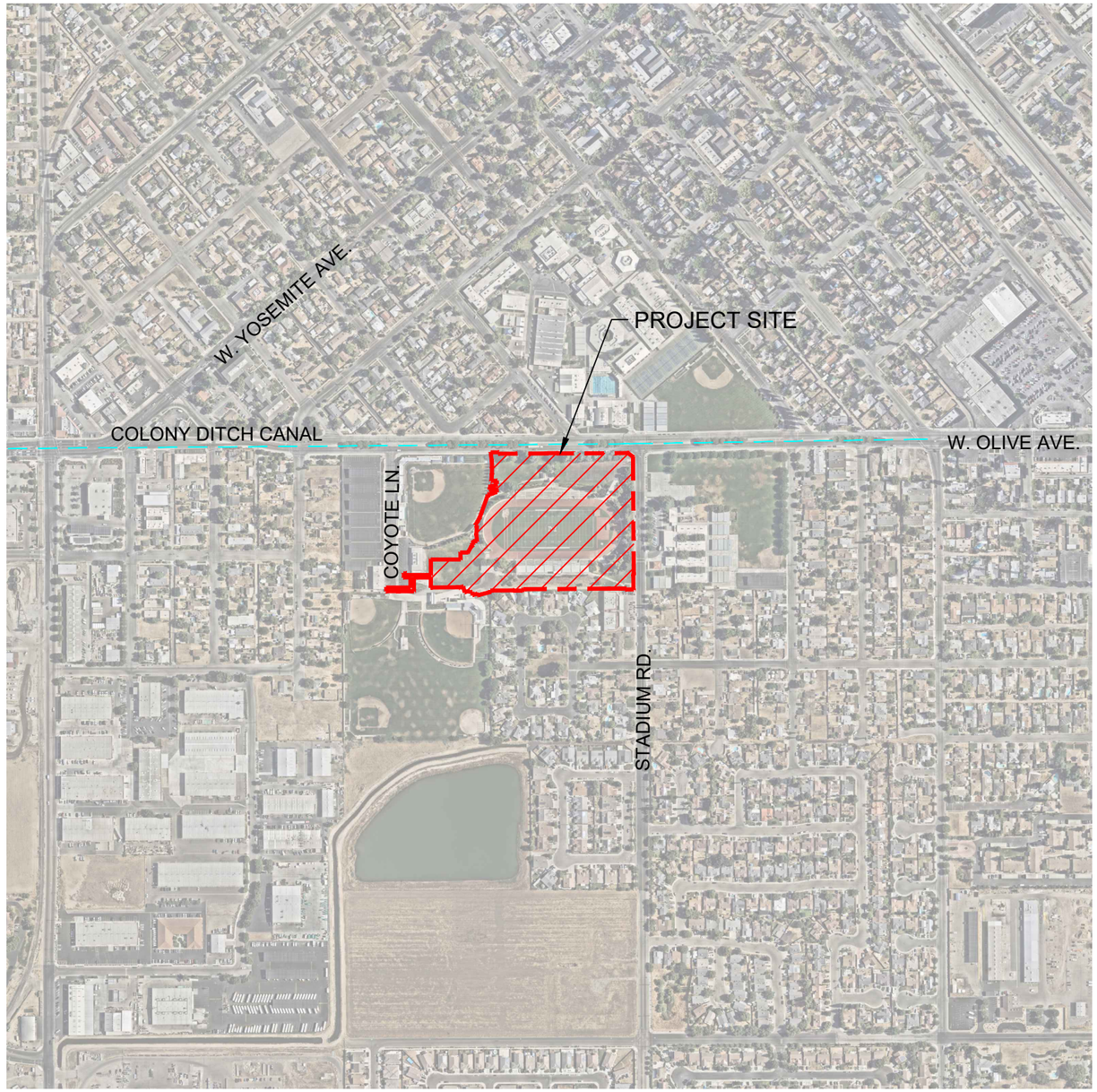
This number can be searched online at:

www.smarts.waterboards.ca.gov

Madera High School Stadium



LOCATION MAP
NOT TO SCALE



PROJECT SITE
SCALE: 1"=600'

SITE LOCATION: 800 - 820 W. OLIVE AVE. | MADERA, CA 93637 | 36.952085, -120.066450

FIGURE: 1A

Blair, Church & Flynn CONSULTING ENGINEERS

CONSULTANT
Blair, Church & Flynn Consulting Engineers
4hXt Clovis Avenue, Suite 200
Clovis, California 93612
Tel (559) 326-1400
Fax (559) 326-1500

MADERA UNIFIED SCHOOL DISTRICT

STORM WATER POLLUTION PREVENTION PLAN
MADERA HIGH SCHOOL STADIUM
LOCATION AND VICINITY MAPS

DR. BY GL
CH. BY MG
DATE 02-06-25
SCALE: AS NOTED

SHEET NO. 1
OF 11 SHEETS

Drawing: C:_data\backup\222352_Madera HS Stadium and Field House SWPPP Figures.dwg; Figure 1A Plot by: gledesma Feb 07, 2025 - 10:31am

CONSTRUCTION SYMBOL LEGEND:

- PROTECT PROPOSED DRAIN INLET PER CASQA SE-10
- PROTECT EXISTING DRAIN INLET PER CASQA SE-10
- SURFACE FLOW DIRECTION
- PROJECT BOUNDARY
- LOCATION OF LINEAR SEDIMENT CONTROL BMPS. REFER TO NOTE 1 AND 2. EXACT LOCATIONS OF THE SEDIMENT CONTROL BMP'S SHALL BE COORDINATED WITH THE QSP PRIOR TO INSTALLATION OR REMOVAL.
- EXISTING STORM DRAIN PIPELINE
- PROPOSED STORM DRAIN PIPELINE
- PROPOSED GAS PIPELINE/WATER PIPELINE
- PROPOSED TRENCH STORM DRAIN
- PROPOSED PERFORATED STORM DRAIN PIPELINE
- PROPOSED ASPHALT CONCRETE (NON-ROOF IMPERVIOUS AREAS)
- PROPOSED CONCRETE (NON-ROOF IMPERVIOUS AREAS)
- PROPOSED BUILDING (ROOF IMPERVIOUS AREA)
- PROPOSED BUILDING OVERHANG (IMPERVIOUS AREAS)
- PROPOSED LANDSCAPING (PERVIOUS AREAS)
- AREAS OF SYNTHETIC TURF (NON-ROOF IMPERVIOUS AREAS)
- PROPOSED SAND PIT (NON-ROOF IMPERVIOUS AREAS)
- PROPOSED GRAVEL (PERVIOUS AREA)
- PROPOSED RUBBER TRACK SURFACE (NON-ROOF IMPERVIOUS AREAS)
- LOCATION OF STABILIZED CONSTRUCTION ENTRANCE/EXIT PER CASQA TC-1
- AREAS OF NON-BUILT LAND DISTURBANCE FOR FINAL STABILIZATION. DISTURBED SOIL AREAS NOT PLANNED FOR CONSTRUCTION ACTIVITIES OVER THE NEXT 14 DAYS SHALL BE STABILIZED BY USE OF EROSION CONTROL BMPS. SEE NOTE 3 ON FIGURE 1B.

EARTHWORK SYMBOL LEGEND:

- PROTECT EXISTING DRAIN INLET PER CASQA SE-10
- SURFACE FLOW DIRECTION
- PROJECT BOUNDARY
- LOCATION OF LINEAR SEDIMENT CONTROL BMPS. REFER TO NOTE 1 AND 2. EXACT LOCATIONS OF THE SEDIMENT CONTROL BMP'S SHALL BE COORDINATED WITH THE QSP PRIOR TO INSTALLATION OR REMOVAL.
- EXISTING STORM DRAIN PIPELINE
- EXISTING SWALE/DRAINAGE DITCH/FLOWLINE/GUTTER
- PROPOSED STORM DRAIN PIPELINE
- PROPOSED SWALE/DRAINAGE DITCH/FLOWLINE/GUTTER
- AREAS OF DEMOLITION. DISTURBED SOIL AREAS NOT PLANNED FOR CONSTRUCTION ACTIVITIES OVER THE NEXT 14 DAYS SHALL BE STABILIZED BY USE OF EROSION CONTROL BMPS. SEE NOTE 3 ON FIGURE 1B.
- AREAS OF NON-BUILT LAND DISTURBANCE. DISTURBED SOIL AREAS NOT PLANNED FOR CONSTRUCTION ACTIVITIES OVER THE NEXT 14 DAYS SHALL BE STABILIZED BY USE OF EROSION CONTROL BMPS. SEE NOTE 3 ON FIGURE 1B.
- AREAS OF PROPOSED CUT. DISTURBED SOIL AREAS NOT PLANNED FOR CONSTRUCTION ACTIVITIES OVER THE NEXT 14 DAYS SHALL BE STABILIZED BY USE OF EROSION CONTROL BMPS. SEE NOTE 3 ON FIGURE 1B.
- AREAS OF PROPOSED MINOR GRADING. DISTURBED SOIL AREAS NOT PLANNED FOR CONSTRUCTION ACTIVITIES OVER THE NEXT 14 DAYS SHALL BE STABILIZED BY USE OF EROSION CONTROL BMPS. SEE NOTE 3 ON FIGURE 1B.
- LOCATION OF STABILIZED CONSTRUCTION ENTRANCE/EXIT PER CASQA TC-1

DRAINAGE AREA/NON-VISIBLE SAMPLING SYMBOL LEGEND:

- DRAINAGE AREA "X" BOUNDARY
- ## DRAINAGE AREA NUMBER
- CA## STORMWATER CONTAINMENT AREA
- CS## STORMWATER RUN-ON CONTROL SAMPLE LOCATION
- SL## QSD IDENTIFIED DISCHARGE AND SAMPLING LOCATION. THE QSP SHALL FIELD VERIFY THE EXACT LOCATION OF DISCHARGE FOR A REPRESENTATIVE STORMWATER SAMPLE FOR NON-VISIBLE POLLUTANT SAMPLING.

STAGING AREA ITEMS:

- 1 CONCRETE WASHOUT LOCATION PER CASQA WM-08
- 2 LOCATION OF JOB TRAILER CONTAINING SPILL KIT AND ONSITE SWPPP
- 3 LOCATION OF RAIN GAUGE
- 4 MATERIAL STORAGE LOCATION PER CASQA WM-01
- 5 OVERNIGHT EQUIPMENT/VEHICLE STORAGE AND MAINTENANCE PER CASQA NS-8, NS-9 AND NS-10
- 6 RESTROOMS AND SANITARY FACILITIES PER CASQA WM-09
- 7 SOLID WASTE STORAGE LOCATION PER CASQA WM-05
- 8 STOCKPILE STORAGE LOCATION PER CASQW WM-03
- WS WATER SUPPLY LOCATION PER CASQA NS-1

PRE-EARTHWORK SYMBOL LEGEND:

- PROTECT EXISTING DRAIN INLET PER CASQA SE-10
- EXISTING DRAIN INLET TO BE REMOVED. PROTECT DRAIN INLET PER CASQA SE-10
- SURFACE FLOW DIRECTION
- PROJECT BOUNDARY
- LOCATION OF LINEAR SEDIMENT CONTROL BMPS. REFER TO NOTE 1 AND 2. EXACT LOCATIONS OF THE SEDIMENT CONTROL BMP'S SHALL BE COORDINATED WITH THE QSP PRIOR TO INSTALLATION OR REMOVAL.
- EXISTING STORM DRAIN PIPELINE
- EXISTING STORMWATER GUTTER
- EXISTING ASPHALT (NON-ROOF IMPERVIOUS AREAS)
- EXISTING CONCRETE (NON-ROOFTOP IMPERVIOUS AREAS)
- EXISTING ROOFTOP IMPERVIOUS AREAS
- EXISTING PERVIOUS AREAS
- LOCATION OF STABILIZED CONSTRUCTION ENTRANCE/EXIT PER CASQA TC-1
- PRE-CONSTRUCTION GEOTECHNICAL INVESTIGATION BORING LOCATION

NOTES TO CONTRACTOR:

1. REFER TO SECTION 3 OF THE PROJECT SWPPP FOR THE BMP IMPLEMENTATION SCHEDULE AND A COMPLETE NARRATIVE ON APPLICABLE BMPS FOR THE PROJECT. REFER TO THE CASQA CONSTRUCTION BMP HANDBOOK IN APPENDIX G TECHNICAL DETAILS ON ALL BMPS.
2. IN ADDITION TO THE BMPS DEPICTED HEREON, THE QSP AND CONTRACTOR SHALL STUDY SECTION 3 OF THE PROJECT SWPPP AND APPENDIX G TO SELECT, IMPLEMENT AND MAINTAIN EFFECTIVE BMPS FOR ALL CONSTRUCTION POLLUTANTS ORIGINATING FROM THE SITE THROUGHOUT THE LIFE OF THE PROJECT, IN ACCORDANCE WITH THE CGP.
3. THE CONTRACTOR AND QSP SHALL IDENTIFY DISTURBED AREAS THAT ARE NOT PLANNED FOR DISTURBANCE WITHIN THE NEXT 14 DAYS AND IMMEDIATELY TEMPORARILY (OR PERMANENTLY) STABILIZE THESE AREAS USING EFFECTIVE EROSION CONTROL BMPS AS DISCUSSED IN SECTION 3.2 OF THE SWPPP.
4. SUFFICIENT QUANTITIES OF TEMPORARY SEDIMENT CONTROL MATERIALS SHALL BE MAINTAINED ON-SITE THROUGHOUT THE DURATION OF THE PROJECT. ALLOWING FOR IMPLEMENTATION OF TEMPORARY SEDIMENT CONTROLS IN THE EVENT OF PREDICTED RAIN AND FOR RAPID RESPONSE DUE TO FAILURES OR EMERGENCY, IN CONFORMANCE WITH OTHER CGP REQUIREMENTS AS DESCRIBED IN THE PROJECT SWPPP.
5. STREET SURFACES SHALL BE SWEPT BY THE CONTRACTOR PER CASQA SE-7. VISIBLE SEDIMENT TRACKING SHALL BE SWEPT OR VACUUMED ON A DAILY BASIS.
6. DUST CONTROL PRACTICES SHALL CONFORM WITH THE LOCAL AIR DISTRICT AND CASQA WE-1.
7. IF CONSTRUCTION IS PHASED, BMPS MAY BE INSTALLED ONLY WITHIN ACTIVE AREAS OF CONSTRUCTION. ONCE EACH PHASE OF CONSTRUCTION IS COMPLETE AND PROJECT AREA IS STABILIZED, BMPS MAY BE REMOVED WITHIN THE STABILIZED AREA.
8. THE QSP SHALL CONTINUALLY UPDATE FIGURE 2-4 WITH THE ACTUAL LOCATIONS OF ALL BMPS, AND MAINTAIN A CURRENT COPY IN THE SITE SWPPP BINDER OR ACTIVE DIGITAL VERSION ACCESSIBLE ON-SITE. IF THE IMPLEMENTED BMPS ARE SIGNIFICANTLY DIFFERENT FROM THOSE INDICATED IN THE SWPPP, THE QSP SHALL CONTACT THE QSD TO REQUEST A SWPPP AMENDMENT BE PREPARED AND SUBMITTED TO THE WATER BOARD.
9. THE INDICATED STAGING AREAS ARE ASSUMED FOR SCHEMATIC PURPOSES ONLY, AND SHOULD BE COORDINATED WITH THE OWNER. DEPICTION OF STAGING AREAS SHALL NOT GUARANTEE USE OF THOSE AREAS WITHOUT PRIOR PERMISSION. THE QSP SHALL CONTINUALLY UPDATE THESE FIGURES WITH THE ACTUAL LOCATIONS OF ALL STAGING, AND MAINTAIN A CURRENT COPY IN THE SITE SWPPP BINDER. ALL STAGING AREAS SHALL BE FULLY STABILIZED BEFORE CLOSEOUT.
10. THE CONTRACTOR SHALL PLAN AND ACHIEVE FINAL STABILIZATION FOR ALL AREAS DISTURBED BY PROJECT ACTIVITIES WITHIN 90 DAYS OF COMPLETING CONSTRUCTION ACTIVITIES. FOR THE PURPOSES OF THIS PROJECT ACCEPTABLE FINAL STABILIZATION CONDITIONS INCLUDES 70% OR GREATER UNIFORM VEGETATIVE COVER OR NON-VEGETATIVE STABILIZATION PER CASQA EC-15.
11. REFER TO THE CONSTRUCTION DRAWINGS FOR MORE DETAIL.

SITE LOCATION: 800 - 820 W. OLIVE AVE. | MADERA, CA 93637 | 36.952085, -120.066450 — FIGURE: 1B

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MADERA UNIFIED SCHOOL DISTRICT

STORM WATER POLLUTION PREVENTION PLAN
MADERA HIGH SCHOOL STADIUM
LEGENDS AND NOTES

DR. BY GL
CH. BY MG
DATE 02-06-25
SCALE: AS NOTED

SHEET NO. 2
OF 11 SHEETS

Drawing: C:_data\backup\222352_Madera HS Stadium and Field House SWPPP Figures.dwg; Figure 1B Plot by: gledesma Feb 07, 2025 - 10:31am

EROSION AND SEDIMENT CONTROL BMPS

CASQA BMP#	BMP REQUIREMENT SUMMARY
EC-1	SCHEDULE CLEARING AND GRUBBING DURING DRY WEATHER, WHEN FEASIBLE.
EC-3, EC-4, EC-5, EC-6, EC-7, EC-8, EC-14, EC-15, EC-16	IMPLEMENT EROSION CONTROL BMPS TO DISTURBED SOIL AREAS NOT PLANNED FOR CONSTRUCTION ACTIVITIES OVER THE NEXT 14 DAYS.
WE-1	WATER DISTURBED SOIL DAILY TO MITIGATE DUST PER SJVAPCD DUST CONTROL REQUIREMENTS. ESTABLISH CRUST AT END OF WEEK BY WATERING DISTURBED AREAS AND RESTRICTING VEHICLE ACCESS.
SE-10	PROTECT STORM DRAIN INLETS, TRENCH DRAINS, GUTTERS, DITCHES, AND DRAINAGE COURSES WITH APPROPRIATE BMPS, SUCH AS GRAVEL BAGS, INLET FILTER, BERMS, ETC. (SEE DETAILS SE-10a & SE-10b)
SE-1, SE-2, SE-3, SE-4, SE-5, SE-6, SE-8, SE-12, SE-13	PREVENT SEDIMENT FROM MIGRATING OFFSITE BY INSTALLING AND MAINTAINING SEDIMENT CONTROLS, SUCH AS FIBER ROLLS, SILT FENCES, OR SEDIMENT BASINS.
WM-7	IF ANY OF THE FOLLOWING CONDITIONS ARE OBSERVED, TEST FOR CONTAMINATION AND CONTACT LOCAL COUNTY ENVIRONMENTAL HEALTH DEPARTMENT, REGIONAL WATER QUALITY CONTROL BOARD, AND LOCAL MUNICIPAL INSPECTOR: UNUSUAL SOIL CONDITIONS, DISCOLORATION, OR ODOR, ABANDONED UNDERGROUND TANKS ABANDONED WELLS, BURIED BARRELS, DEBRIS, OR TRASH.
TC-1, TC-2	ESTABLISH AND MAINTAIN EFFECTIVE STABILIZED CONSTRUCTION EXIT AT ALL CONSTRUCTION EXITS TO SUFFICIENTLY CONTROL TRACKING OFF SITE (SEE DETAIL TC-1).
SE-7	SWEEP OR VACUUM ANY STREET TRACKING IMMEDIATELY UPON OBSERVATION. NEVER HOSE DOWN STREETS TO CLEAN UP TRACKING.

SPILL PREVENTION AND CONTROL BMPS

CASQA BMP#	BMP REQUIREMENT SUMMARY
WM-4, WM-6	KEEP SPILL KIT AVAILABLE AT SITE AT ALL TIMES (ABSORBENT, SPILL BOOMS, DISPOSAL BAGS, PPE). TRAIN STAFF ON SPILL CLEANUP RESPONSIBILITY AND PROCEDURES.
WM-4, WM-6, NS-10	INSPECT VEHICLES AND EQUIPMENT FREQUENTLY FOR AND REPAIR LEAKS PROMPTLY. USE DRIP PANS TO CATCH LEAKS UNTIL REPAIRS ARE MADE.
WM-4, WM-6	CLEAN UP SPILLS OR LEAKS IMMEDIATELY AND DISPOSE OF CLEANUP MATERIALS PROPERLY.
WM-4, WM-6	DO NOT HOSE DOWN SURFACES WHERE FLUIDS HAVE SPILLED. USE DRY CLEANUP METHODS (ABSORBENT MATERIALS).
WM-4, WM-6	SWEEP UP SPILLED DRY MATERIALS IMMEDIATELY (CONCRETE, MORTAR, DRYWALL PLASTER ETC.). DO NOT WASH THEM AWAY WITH WATER, OR BURY THEM.
WM-4, WM-6, WM-7	CLEAN UP SPILLS ON DIRT AREAS BY DIGGING UP AND PROPERLY DISPOSING OF CONTAMINATED SOIL.
WM-4, WM-6	REPORT SIGNIFICANT SPILLS IMMEDIATELY. YOU ARE REQUIRED BY LAW TO REPORT ALL SIGNIFICANT RELEASES OF HAZARDOUS MATERIALS, INCLUDING OIL. TO REPORT A SPILL: DIAL 911.

PAINTING AND PAINT REMOVAL BMPS

CASQA BMP#	BMP REQUIREMENT SUMMARY
WM-6, WM-10	NEVER CLEAN BRUSHES OR RINSE PAINT CONTAINERS INTO STREET, GUTTER, STORM DRAIN, SOIL, OR SURFACE WATERS.
WM-6, WM-10	FOR WATER-BASED PAINTS, PAINT OUT BRUSHES TO THE EXTENT POSSIBLE. RINSE TO THE SANITARY SEWER ONCE YOU HAVE GAINED PERMISSION FROM THE LOCAL WASTEWATER TREATMENT AUTHORITY. NEVER POUR PAINT DOWN A DRAIN OR ONTO SOIL.
WM-6, WM-10	FOR OIL-BASED PAINTS, PAINT OUT BRUSHES TO THE EXTENT POSSIBLE AND CLEAN WITH THINNER OR SOLVENT IN A PROPER CONTAINER. FILTER AND REUSE THINNERS AND SOLVENTS. DISPOSE OF RESIDUE AND UNUSABLE THINNER/SOLVENTS AS HAZARDOUS WASTE.
WM-5, WM-6,	CHEMICAL PAINT STRIPPING RESIDUE AND CHIPS AND DUST FROM PAINTS CONTAINING LEAD OR TRIBUTYLTIN MUST BE DISPOSED OF AS HAZARDOUS WASTE.
WM-5, WM-6,	PAINT CHIPS AND DUST FROM NON-HAZARDOUS DRY STRIPPING AND SAND BLASTING MAY BE SWEPT UP OR COLLECTED IN PLASTIC DROP CLOTHS AND DISPOSED OF AS TRASH.

ASPHALT, CONCRETE, MORTAR, STUCCO BMPS

CASQA BMP#	BMP REQUIREMENT SUMMARY
NS-3, NS-12, NS-13	DO NOT PAVE, SEAL COAT, OR POUR CONCRETE IN WET WEATHER, OR WHEN RAIN IS FORECAST BEFORE FRESH PAVEMENT/CONCRETE WILL HAVE TIME TO CURE.
NS-3, NS-12, NS-13	COVER STORM DRAIN INLETS AND MANHOLES WHEN APPLYING SEAL COAT, TACK COAT, SLURRY SEAL, FOG SEAL, ETC.
WM-5	COLLECT AND RECYCLE OR APPROPRIATELY DISPOSE OF EXCESS ABRASIVE GRAVEL OR SAND. DO NOT SWEEP OR WASH IT INTO GUTTERS.
NS-3, NS-12, NS-13, WM-8	DO NOT USE WATER TO WASH DOWN FRESH ASPHALT OR CONCRETE PAVEMENT.
NS-3, WM-8	COMPLETELY COVER OR BARRICADE STORM DRAIN INLETS WHEN SAW CUTTING. USE DRAIN INLET PLUG OR SAND BAGS TO KEEP SLURRY OUT OF THE STORM DRAIN SYSTEM.
NS-3, WM-8	ABOSORB, OR VACUUM SAW-CUT SLURRY AND DISPOSE OF ALL WASTE AS SOON AS YOU ARE FINISHED IN ONE LOCATION OR AT THE END OF EACH WORK DAY (WHICHEVER IS SOONER).
NS-3, WM-8	IF SAWCUT SLURRY ENTERS A CATCH BASIN, CLEAN IT UP IMMEDIATELY.
WM-1	STORE CONCRETE, GROUT, MORTAR, STUCCO, ETC. UNDER COVER AND RAISED OFF GROUND, AND AWAY FROM DRAINAGE COURSES. THESE MATERIALS MUST NEVER REACH A STORM DRAIN.
WM-4, WM-8	CONCRETE WASHOUT AND OTHER LIQUID WASTE FROM MORTAR, GROUT, STUCCO, PLASTER, DRYWALL, ETC. MUST BE STORED IN CONTAINMENT BIN/BUCKET. THESE LIQUID WASTES MAY NOT BE DISPOSED ON SOIL OR DRAINAGE COURSES. SELECT A CONTAINER LARGE ENOUGH FOR THE JOB AND LEAVE FREEBOARD TO PREVENT SPILLS OF CONTAINER. COVER CONTAINERS FOR ALL RAIN EVENTS.
WM-4, WM-8	COLLECT THE WASH WATER FROM WASHING EXPOSED AGGREGATE CONCRETE AND REMOVE IT FOR APPROPRIATE DISPOSAL OFFSITE.
WM-2, WM-5, WM-8	PLACE TARP UNDER SOIL OF MORTAR, STUCCO, PLASTER, ETC. MIXING STATIONS AND UNDER APPLICATION AREAS. CONTAIN THESE MATERIALS ON TARP FROM SCRAPING FROM OVER-APPLICATION. COLLECT AND DISPOSE MATERIALS ACCUMULATED ON TARP IMMEDIATELY AFTER CURING.

RUN-ON AND DEWATERING BMPS

CASQA BMP#	BMP REQUIREMENT SUMMARY
SE-8, EC-9	EFFECTIVELY DIVERT RUN-ON TO DISTURBED AREAS BY USE OF SANDBAG BERMS OR DIVERSION PIPE/HOSE. WHEN DIVERSION IS INFEASIBLE, SCHEDULE WORK DISTURBANCE TO RUN-ON AREAS DURING DRY WEATHER IF FEASIBLE. IF RUN-ON TO DISTURBED AREAS IS UNAVOIDABLE, IMPLEMENT A COMBINATION OF EFFECTIVE EROSION AND SEDIMENT CONTROLS TO MINIMIZE POLLUTANT TRANSPORT FROM RUN-ON.
NS-2	WHEN DEWATERING OFF-SITE, NOTIFY AND OBTAIN APPROVAL FROM THE LOCAL MUNICIPALITY AND REGIONAL WATER QUALITY CONTROL BOARD BEFORE DISCHARGING IMPOUNDED WATER OFF-SITE. SEE SECTION 7 OF THE PROJECT SWPPP FOR SITE-SPECIFIC DEWATERING PERMIT/SAMPLING REQUIREMENTS.
EC-10	UTILIZE VELOCITY DISSIPATION DEVICES WHEN DEWATERING TO PERVIOUS AREAS.
NS-2, WM-7	IN AREAS OF KNOWN CONTAMINATION, TESTING IS REQUIRED PRIOR TO REUSE OR DISCHARGE OF GROUNDWATER OR IMPOUNDED STORMWATER. CONSULT WITH THE ENGINEER AND MUNICIPAL STAFF TO DETERMINE WHETHER TESTING IS REQUIRED AND HOW TO INTERPRET RESULTS. CONTAMINATED GROUNDWATER OR IMPOUNDED WATER MUST BE TREATED OR HAULED OFFSITE FOR PROPER DISPOSAL.

EQUIPMENT MAINTENANCE AND PARKING BMPS

CASQA BMP#	BMP REQUIREMENT SUMMARY
NS-8, NS-9, NS-10	DESIGNATE AN AREA, FITTED WITH APPROPRIATE BMPS, FOR VEHICLE AND EQUIPMENT PARKING AND STORAGE.
NS-8, NS-9, NS-10	PERFORM MAJOR MAINTENANCE, REPAIR JOBS, AND VEHICLE AND EQUIPMENT WASHING OFF-SITE.
NS-9, NS-10	IF REFUELING OR VEHICLE MAINTENANCE MUST BE DONE ONSITE, WORK IN A BERMED AREA AWAY FROM STORM DRAINS AND OVER A DRIP PAN BIG ENOUGH TO COLLECT FLUIDS. RECYCLE OR DISPOSE OF FLUIDS AS HAZARDOUS WASTE.
NS-8	IF VEHICLE OR EQUIPMENT CLEANING MUST BE DONE ONSITE, CLEAN WITH WATER ONLY IN A BERMED AREA THAT WILL NOT ALLOW RINSE WATER TO RUN INTO GUTTERS, STREETS, STORM DRAINS, OR SURFACE WATERS
NS-8	DO NOT CLEAN VEHICLES OR EQUIPMENT ON-SITE USING SOAPS, SOLVENTS, DEGREASERS, STEAM CLEANING EQUIPMENT, ETC.

MATERIAL & WASTE MANAGEMENT BMPS

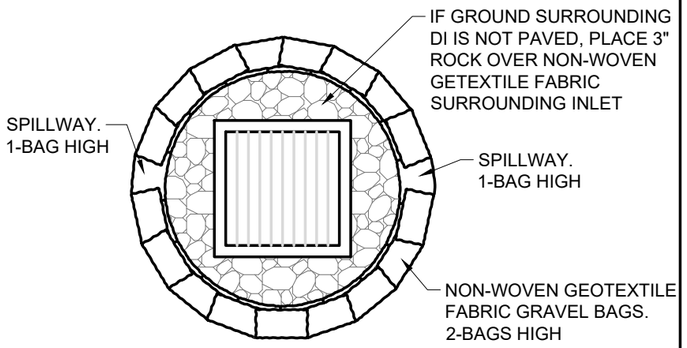
CASQA BMP#	BMP REQUIREMENT SUMMARY
WM-1, WM-3	BERM AND SECURELY COVER STOCKPILES OF SAND, DIRT, OR OTHER CONSTRUCTION MATERIALS WITH TARPS WHEN RAIN IS FORECAST OR IF STOCKPILES ARE NOT ACTIVELY BEING USED. FOR BEST RESULTS, THIS SHOULD BE DONE AT THE END OF THE WORK DAY THROUGHOUT CONSTRUCTION WHEN FEASIBLE.
WM-5, WM-6	BERM AND SECURELY COVER STOCKPILES OF ALL DEMOLISHED BUILDING RUBBLE.
WM-4, WM-6, WM-10	LABEL ALL HAZARDOUS MATERIALS AND HAZARDOUS WASTES (SUCH AS PESTICIDES, PAINTS, THINNERS, SOLVENTS, FUEL, OIL, AND ANTIFREEZE) IN ACCORDANCE WITH CITY, COUNTY, STATE AND FEDERAL REGULATIONS.
WM-4, WM-6, WM-10	STORE HAZARDOUS MATERIALS AND WASTES IN WATER TIGHT CONTAINERS, STORE IN APPROPRIATE SECONDARY CONTAINMENT, AND COVER THEM AT THE END OF EVERY WORK DAY OR DURING WET WEATHER OR WHEN RAIN IS FORECAST.
WM-2,WM-4, WM-6, WM-10, NS-12, NS-13	FOLLOW MANUFACTURER'S APPLICATION INSTRUCTIONS FOR HAZARDOUS MATERIALS AND BE CAREFUL NOT TO USE MORE THAN NECESSARY. DO NOT APPLY CHEMICALS OUTDOORS WHEN RAIN IS FORECAST WITHIN 24 HOURS.
WM-6	ARRANGE APPROPRIATE DISPOSAL OF ALL HAZARDOUS WASTES.
WM-5	COVER WASTE DISPOSAL CONTAINERS SECURELY WITH TARPS AT THE END OF EVERY WORK DAY AND DURING WET WEATHER.
WM-9	CLEAN OR REPLACE PORTABLE TOILETS, AND INSPECT THEM FREQUENTLY FOR LEAKS AND SPILLS. ADD SECONDARY CONTAINMENT AND LOCATE THEM AWAY FROM STORM DRAIN INLETS. ENSURE TOILETS ARE PROTECTED FROM TIPPING FROM HIGH WIND.
WM-5	WHEN CUTTING OR GRINDING METAL OR PLASTIC MATERIALS (PVC PIPE, SIDING, ETC.) PLACE DROPCLOTH OR TARP TO CONTAIN INORGANIC (TRASH) SHARDS/SHAVINGS/DUST. DISPOSE COLLECTED MATERIALS AFTER COMPLETING CUTTING/GRINDING ACTIVITY.

LANDSCAPING BMPS

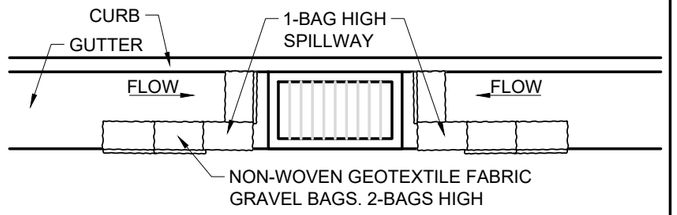
CASQA BMP#	BMP REQUIREMENT SUMMARY
WM-1, WM-3	CONTAIN STOCKPILED LANDSCAPING MATERIALS BY STORING THEM UNDER TARPS AND BERMED FROM RUN-ON WHEN THEY ARE NOT ACTIVELY BEING USED.
WM-1, WM-3	STORE ERODIBLE LANDSCAPE MATERIAL ON PALLETS. COVER OR STORE THESE MATERIALS WHEN THEY ARE NOT ACTIVELY BEING USED OR APPLIED.
WM-1, WM-3	DISCONTINUE APPLICATION OF ANY ERODIBLE LANDSCAPE MATERIAL WITHIN 2 DAYS BEFORE A FORECAST RAIN EVENT OR DURING WET WEATHER.
NS-7	COORDINATE WITH OWNER TO MODIFY EXISTING IRRIGATION SYSTEMS IN/AROUND PROJECT SITE TO ENSURE IRRIGATION WATER IS NOT A SOURCE OF NON-STORMWATER INTO DISTURBED AREAS.

ADDITIONAL BMP GUIDANCE DETAILS

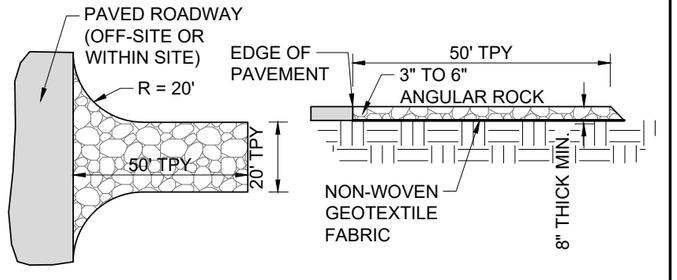
BMP DETAILS SHOWN BELOW PROVIDE ADDITIONAL BMP GUIDANCE NOT INCLUDED IN THE CASQA BMP FACTSHEET. ALL OTHER BMPS SHALL FOLLOW GUIDANCE IN THE FACTHEET IN APPENDIX G OF THE PROJECT SWPPP.



SE 10a *LEVEL GRADE DRAIN INLET PROTECTION*
NOT TO SCALE



SE 10b *CURB & GUTTER DRAIN INLET PROTECTION*
NOT TO SCALE



NOTES:
1. CONSTRUCTION EXIT SHALL BE KEPT IN GOOD CONDITION BY OCCASIONAL TOP DRESSING AND/OR ROUGHENING.
2. "RUMBLE PLATES" MAY BE ADDED AND COUNT TOWARDS 50' FT REQUIREMENT.
3. CONTRACTOR SHALL INSPECT EXIT WEEKLY AND DURING RAIN EVENTS.
4. CONTRACTOR SHALL SWEEP TRACKOUT WEEKLY AND PRIOR TO RAIN EVENTS PER CASQA SE-7 AND PER SJVAPCD DUST CONTROL REQUIREMENTS

TC 1 *STABILIZED CONSTRUCTION EXIT*
NOT TO SCALE

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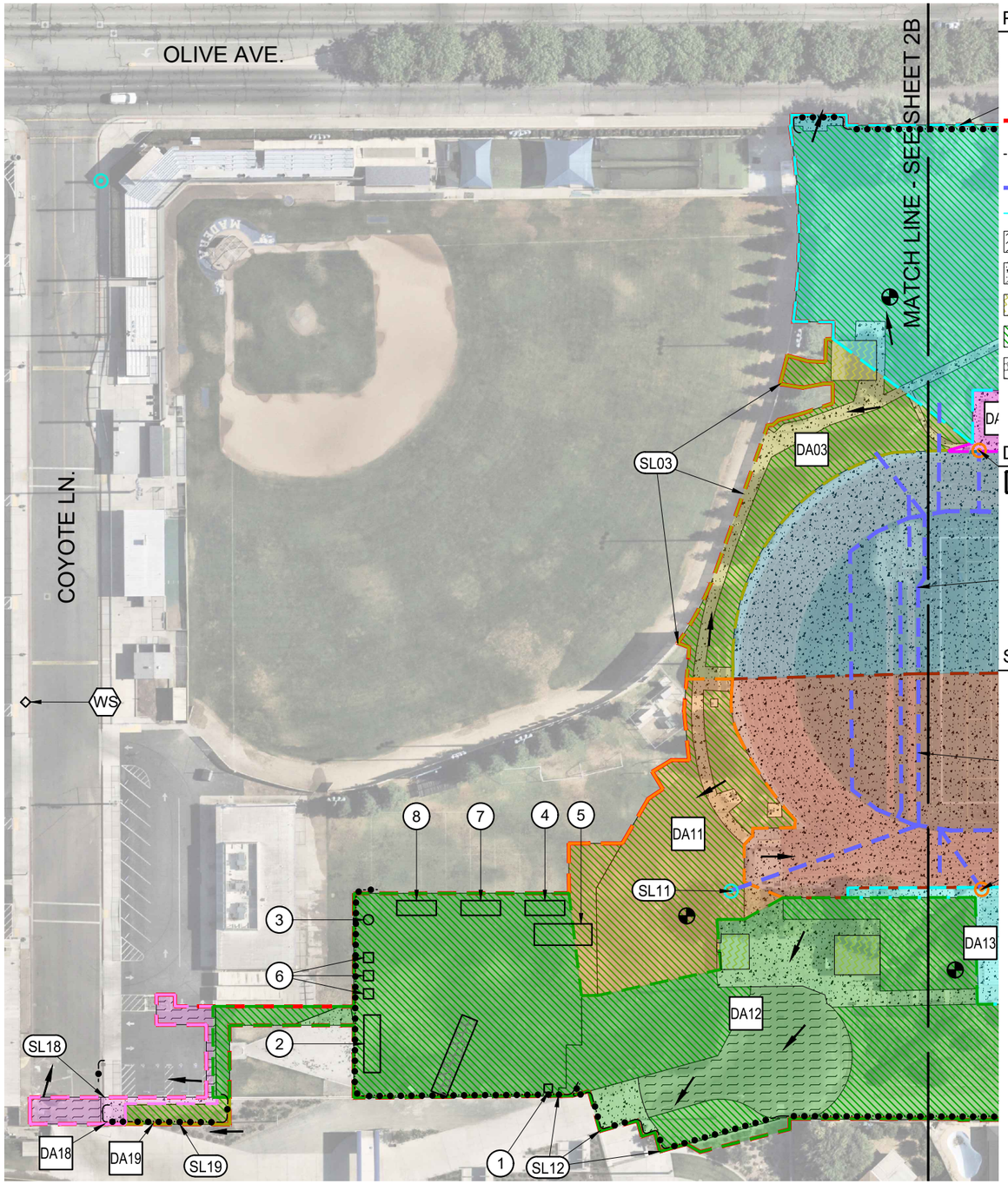
MADERA UNIFIED SCHOOL DISTRICT

STORM WATER POLLUTION PREVENTION PLAN
MADERA HIGH SCHOOL STADIUM
BMP SUMMARY AND DETAILS

DR. BY GL
CH. BY MG
DATE 02-06-25
SCALE: AS NOTED

SHEET NO. 3
OF 11 SHEETS

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PRE-EARTHWORK SYMBOL LEGEND:

- PROTECT EXISTING DRAIN INLET PER CASQA SE-10
- EXISTING DRAIN INLET TO BE REMOVED. PROTECT DRAIN INLET PER CASQA SE-10
- SURFACE FLOW DIRECTION
- PROJECT BOUNDARY
- LOCATION OF LINEAR SEDIMENT CONTROL BMPS. REFER TO NOTE 1 AND 2. EXACT LOCATIONS OF THE SEDIMENT CONTROL BMP'S SHALL BE COORDINATED WITH THE QSP PRIOR TO INSTALLATION OR REMOVAL.
- EXISTING STORM DRAIN PIPELINE
- EXISTING STORMWATER GUTTER
- EXISTING ASPHALT (NON-ROOF IMPERVIOUS AREAS)
- EXISTING CONCRETE (NON-ROOFTOP IMPERVIOUS AREAS)
- EXISTING ROOFTOP IMPERVIOUS AREAS
- EXISTING PERVIOUS AREAS
- LOCATION OF STABILIZED CONSTRUCTION ENTRANCE/EXIT PER CASQA TC-1
- PRE-CONSTRUCTION GEOTECHNICAL INVESTIGATION BORING LOCATION

DRAINAGE AREA/NON-VISIBLE SAMPLING SYMBOL LEGEND:

- DRAINAGE AREA "X" BOUNDARY
- ## DRAINAGE AREA NUMBER
- CS## STORMWATER RUN-ON CONTROL SAMPLE LOCATION
- SL## QSD IDENTIFIED DISCHARGE AND SAMPLING LOCATION. THE QSP SHALL FIELD VERIFY THE EXACT LOCATION OF DISCHARGE FOR A REPRESENTATIVE STORMWATER SAMPLE FOR NON-VISIBLE POLLUTANT SAMPLING.

STAGING AREA ITEMS:

1. CONCRETE WASHOUT LOCATION PER CASQA WM-08
2. LOCATION OF JOB TRAILER CONTAINING SPILL KIT AND ONSITE SWPPP
3. LOCATION OF RAIN GAUGE
4. MATERIAL STORAGE LOCATION PER CASQA WM-01
5. OVERNIGHT EQUIPMENT/VEHICLE STORAGE AND MAINTENANCE PER CASQA NS-8, NS-9 AND NS-10
6. RESTROOMS AND SANITARY FACILITIES PER CASQA WM-09
7. SOLID WASTE STORAGE LOCATION PER CASQA WM-05
8. STOCKPILE STORAGE LOCATION PER CASQW WM-03

WS WATER SUPPLY LOCATION PER CASQA NS-1

N

0 20 40 80 120 160
SCALE IN FEET

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FIGURE: 2A

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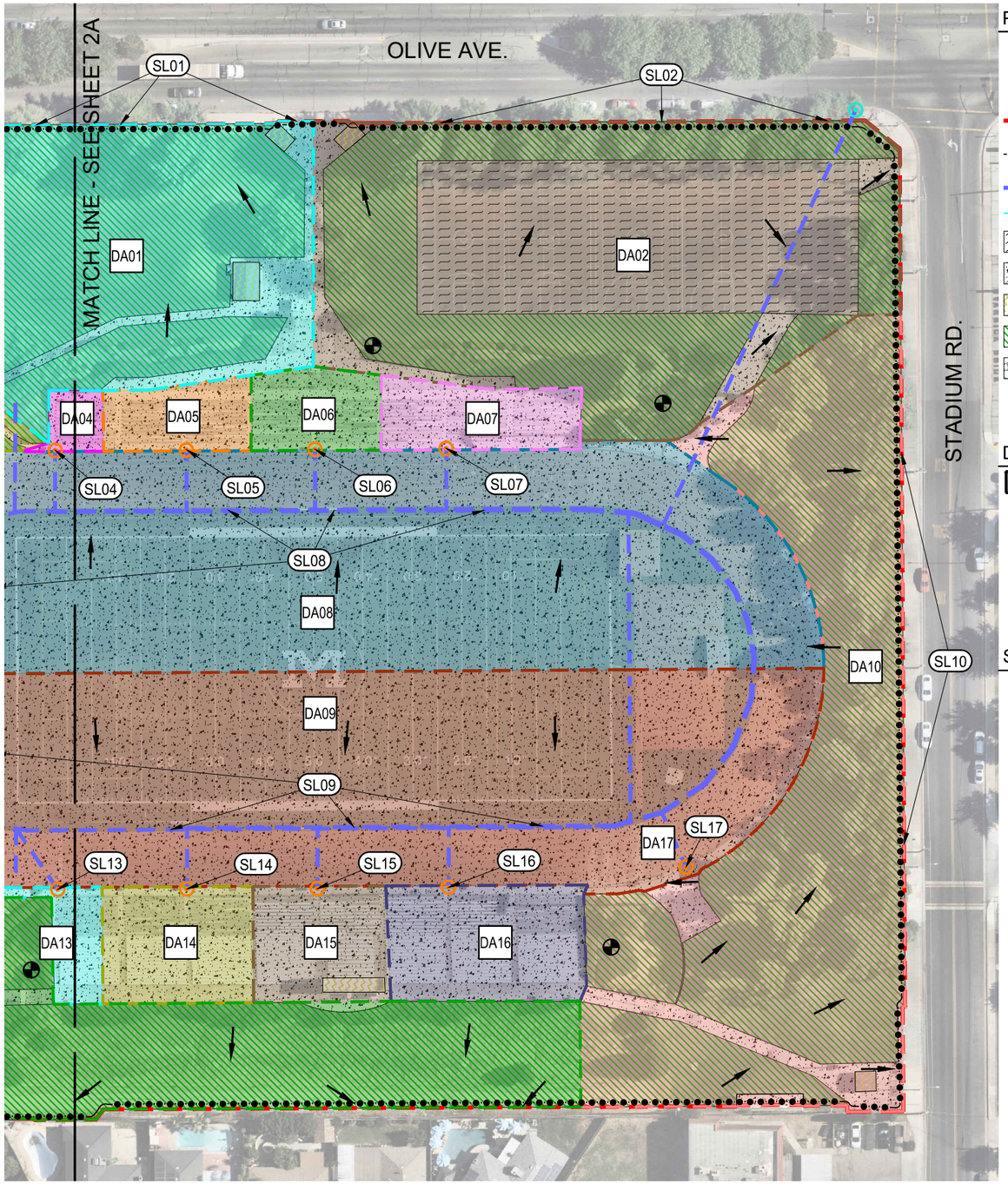
MADERA UNIFIED SCHOOL DISTRICT

STORM WATER POLLUTION PREVENTION PLAN
MADERA HIGH SCHOOL STADIUM
PRE-EARTHWORK SITE MAP

DR. BY GL
CH. BY MG
DATE 02-06-25
SCALE: AS NOTED

SHEET NO. 4
OF 11 SHEETS

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PRE-EARTHWORK SYMBOL LEGEND:

- PROTECT EXISTING DRAIN INLET PER CASQA SE-10
- EXISTING DRAIN INLET TO BE REMOVED. PROTECT DRAIN INLET PER CASQA SE-10
- SURFACE FLOW DIRECTION
- PROJECT BOUNDARY
- LOCATION OF LINEAR SEDIMENT CONTROL BMPS. REFER TO NOTE 1 AND 2. EXACT LOCATIONS OF THE SEDIMENT CONTROL BMP'S SHALL BE COORDINATED WITH THE QSP PRIOR TO INSTALLATION OR REMOVAL.
- EXISTING STORM DRAIN PIPELINE
- EXISTING STORMWATER GUTTER
- EXISTING ASPHALT (NON-ROOF IMPERVIOUS AREAS)
- EXISTING CONCRETE (NON-ROOFTOP IMPERVIOUS AREAS)
- EXISTING ROOFTOP IMPERVIOUS AREAS
- EXISTING PERVIOUS AREAS
- LOCATION OF STABILIZED CONSTRUCTION ENTRANCE/EXIT PER CASQA TC-1
- PRE-CONSTRUCTION GEOTECHNICAL INVESTIGATION BORING LOCATION

DRAINAGE AREA/NON-VISIBLE SAMPLING SYMBOL LEGEND:

- DRAINAGE AREA "X" BOUNDARY
- ## — DRAINAGE AREA NUMBER
- CS## — STORMWATER RUN-ON CONTROL SAMPLE LOCATION
- SL## — QSD IDENTIFIED DISCHARGE AND SAMPLING LOCATION. THE QSP SHALL FIELD VERIFY THE EXACT LOCATION OF DISCHARGE FOR A REPRESENTATIVE STORMWATER SAMPLE FOR NON-VISIBLE POLLUTANT SAMPLING.

STAGING AREA ITEMS:

1. CONCRETE WASHOUT LOCATION PER CASQA WM-08
2. LOCATION OF JOB TRAILER CONTAINING SPILL KIT AND ONSITE SWPPP
3. LOCATION OF RAIN GAUGE
4. MATERIAL STORAGE LOCATION PER CASQA WM-01
5. OVERNIGHT EQUIPMENT/VEHICLE STORAGE AND MAINTENANCE PER CASQA NS-8, NS-9 AND NS-10
6. RESTROOMS AND SANITARY FACILITIES PER CASQA WM-09
7. SOLID WASTE STORAGE LOCATION PER CASQA WM-05
8. STOCKPILE STORAGE LOCATION PER CASQW WM-03
- WS — WATER SUPPLY LOCATION PER CASQA NS-1

N

0 20 40 80 120 160
SCALE IN FEET

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FIGURE: 2B

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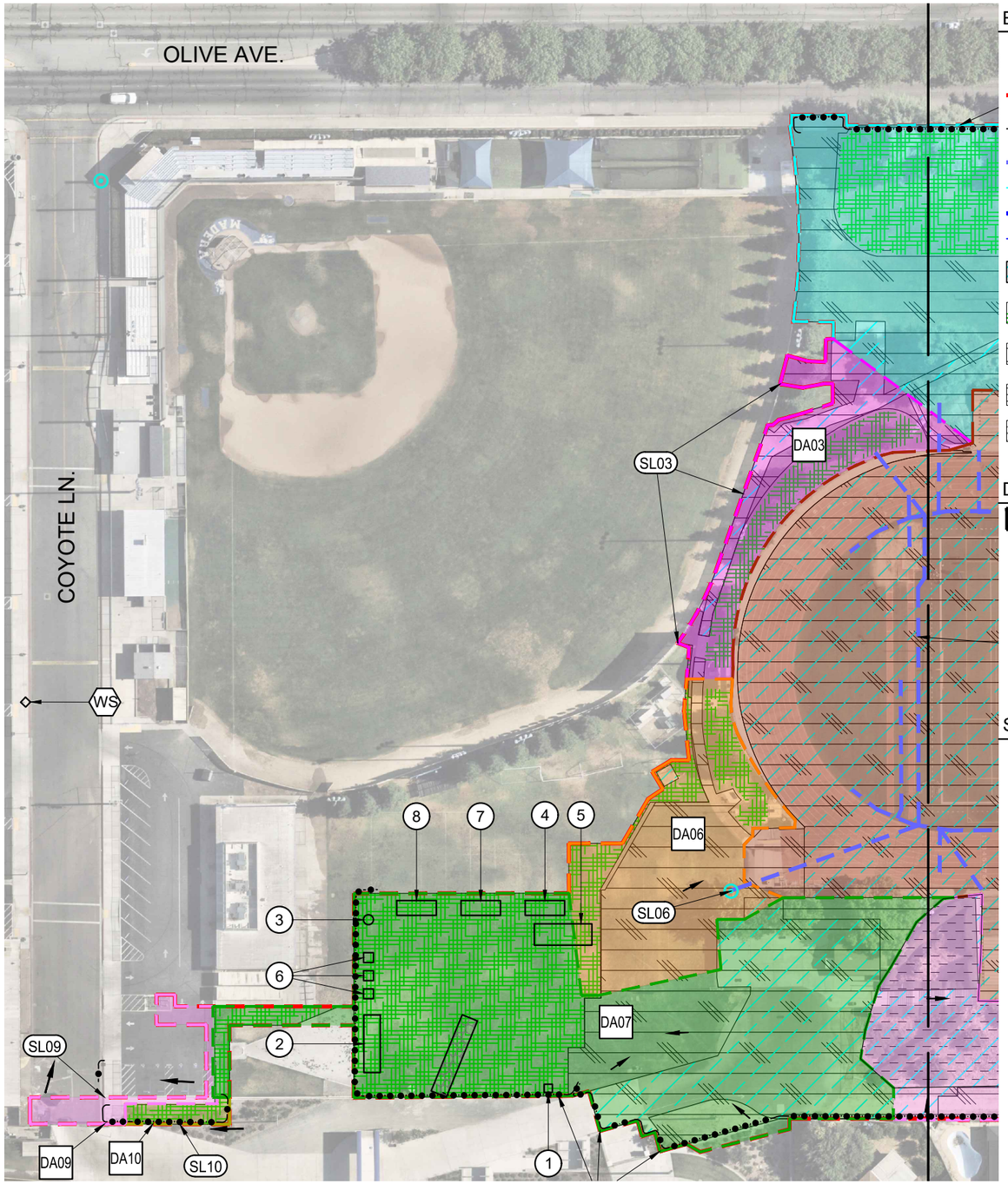
MADERA UNIFIED SCHOOL DISTRICT

STORM WATER POLLUTION PREVENTION PLAN
MADERA HIGH SCHOOL STADIUM
PRE-EARTHWORK SITE MAP

DR. BY GL
CH. BY MG
DATE 02-06-25
SCALE: AS NOTED

SHEET NO. 5
OF 11 SHEETS

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EARTHWORK SYMBOL LEGEND:

- PROTECT EXISTING DRAIN INLET PER CASQA SE-10
- SURFACE FLOW DIRECTION
- PROJECT BOUNDARY
- LOCATION OF LINEAR SEDIMENT CONTROL BMPS. REFER TO NOTE 1 AND 2. EXACT LOCATIONS OF THE SEDIMENT CONTROL BMP'S SHALL BE COORDINATED WITH THE QSP PRIOR TO INSTALLATION OR REMOVAL.
- EXISTING STORM DRAIN PIPELINE
- EXISTING SWALE/DRAINAGE DITCH/FLOWLINE/GUTTER
- PROPOSED STORM DRAIN PIPELINE
- PROPOSED SWALE/DRAINAGE DITCH/FLOWLINE/GUTTER
- AREAS OF DEMOLITION. DISTURBED SOIL AREAS NOT PLANNED FOR CONSTRUCTION ACTIVITIES OVER THE NEXT 14 DAYS SHALL BE STABILIZED BY USE OF EROSION CONTROL BMPS. SEE NOTE 3 ON FIGURE 1B.
- AREAS OF NON-BUILT LAND DISTURBANCE. DISTURBED SOIL AREAS NOT PLANNED FOR CONSTRUCTION ACTIVITIES OVER THE NEXT 14 DAYS SHALL BE STABILIZED BY USE OF EROSION CONTROL BMPS. SEE NOTE 3 ON FIGURE 1B.
- AREAS OF PROPOSED CUT. DISTURBED SOIL AREAS NOT PLANNED FOR CONSTRUCTION ACTIVITIES OVER THE NEXT 14 DAYS SHALL BE STABILIZED BY USE OF EROSION CONTROL BMPS. SEE NOTE 3 ON FIGURE 1B.
- AREAS OF PROPOSED MINOR GRADING. DISTURBED SOIL AREAS NOT PLANNED FOR CONSTRUCTION ACTIVITIES OVER THE NEXT 14 DAYS SHALL BE STABILIZED BY USE OF EROSION CONTROL BMPS. SEE NOTE 3 ON FIGURE 1B.
- LOCATION OF STABILIZED CONSTRUCTION ENTRANCE/EXIT PER CASQA TC-1

DRAINAGE AREA/NON-VISIBLE SAMPLING SYMBOL LEGEND:

- DRAINAGE AREA "X" BOUNDARY
- ## — DRAINAGE AREA NUMBER
- CA## — STORMWATER CONTAINMENT AREA
- CS## — STORMWATER RUN-ON CONTROL SAMPLE LOCATION
- SL## — QSD IDENTIFIED DISCHARGE AND SAMPLING LOCATION. THE QSP SHALL FIELD VERIFY THE EXACT LOCATION OF DISCHARGE FOR A REPRESENTATIVE STORMWATER SAMPLE FOR NON-VISIBLE POLLUTANT SAMPLING.

STAGING AREA ITEMS:

1. CONCRETE WASHOUT LOCATION PER CASQA WM-08
2. LOCATION OF JOB TRAILER CONTAINING SPILL KIT AND ONSITE SWPPP
3. LOCATION OF RAIN GAUGE
4. MATERIAL STORAGE LOCATION PER CASQA WM-01
5. OVERNIGHT EQUIPMENT/VEHICLE STORAGE AND MAINTENANCE PER CASQA NS-8, NS-9 AND NS-10
6. RESTROOMS AND SANITARY FACILITIES PER CASQA WM-09
7. SOLID WASTE STORAGE LOCATION PER CASQA WM-05
8. STOCKPILE STORAGE LOCATION PER CASQW WM-03
- WS — WATER SUPPLY LOCATION PER CASQA NS-1

N

0 20 40 80 120 160
SCALE IN FEET

SITE LOCATION: 800 - 820 W. OLIVE AVE. | MADERA, CA 93637 | 36.952085, -120.066450 — FIGURE: 3A

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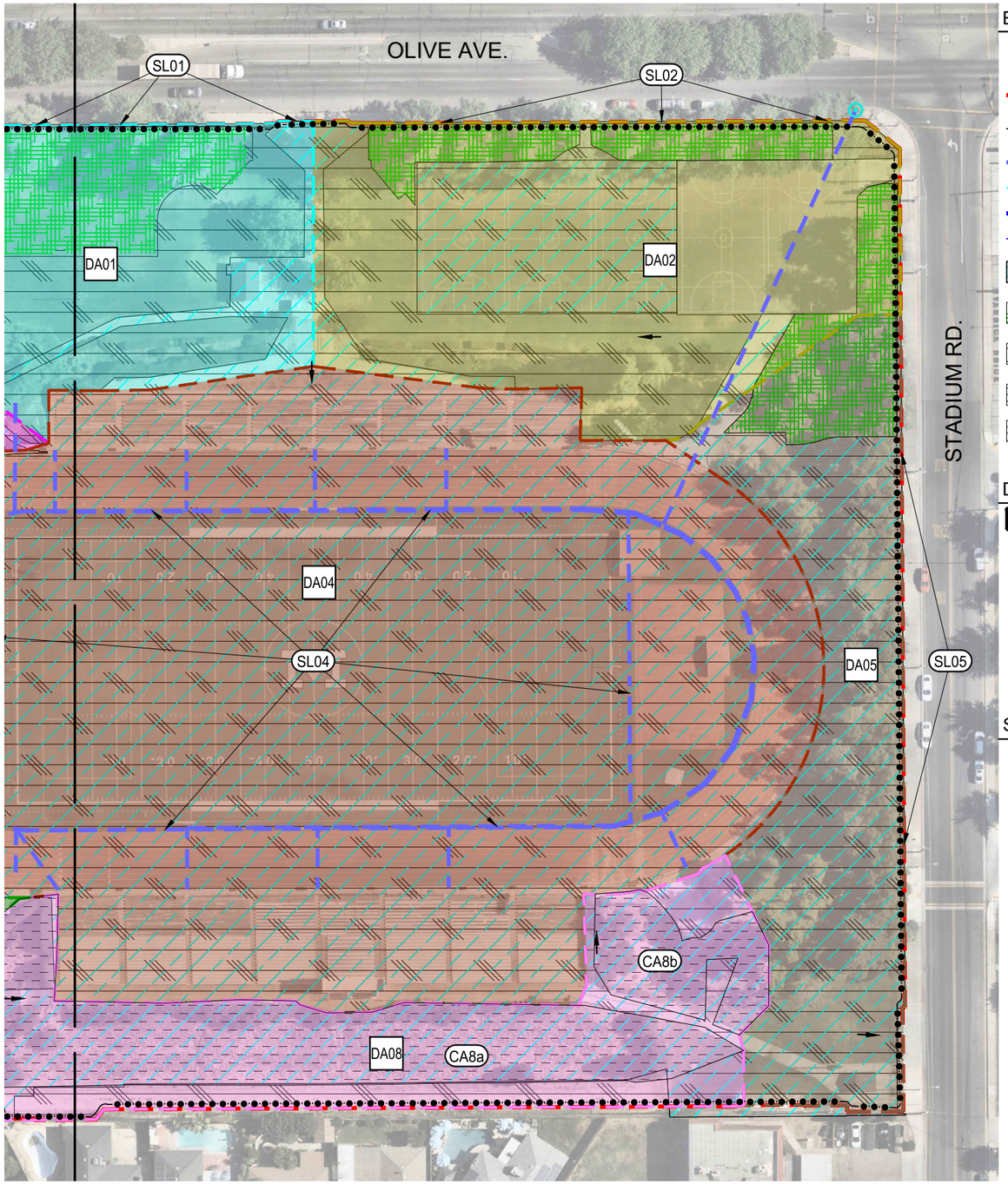
MADERA UNIFIED SCHOOL DISTRICT

STORM WATER POLLUTION PREVENTION PLAN
MADERA HIGH SCHOOL STADIUM
EARTHWORK SITE MAP

DR. BY GL
CH. BY MG
DATE 02-06-25
SCALE: AS NOTED

SHEET NO. 6
OF 11 SHEETS

Drawing: C:_data\backup\222352_Madera HS Stadium and Field House SWPPP Figures.dwg; Figure 3A Plot by: gledesma Feb 07, 2025 - 10:31am



EARTHWORK SYMBOL LEGEND:

- PROTECT EXISTING DRAIN INLET PER CASQA SE-10
- SURFACE FLOW DIRECTION
- PROJECT BOUNDARY
- LOCATION OF LINEAR SEDIMENT CONTROL BMPS. REFER TO NOTE 1 AND 2. EXACT LOCATIONS OF THE SEDIMENT CONTROL BMP'S SHALL BE COORDINATED WITH THE QSP PRIOR TO INSTALLATION OR REMOVAL.
- EXISTING STORM DRAIN PIPELINE
- EXISTING SWALE/DRAINAGE DITCH/FLOWLINE/GUTTER
- PROPOSED STORM DRAIN PIPELINE
- PROPOSED SWALE/DRAINAGE DITCH/FLOWLINE/GUTTER
- AREAS OF DEMOLITION. DISTURBED SOIL AREAS NOT PLANNED FOR CONSTRUCTION ACTIVITIES OVER THE NEXT 14 DAYS SHALL BE STABILIZED BY USE OF EROSION CONTROL BMPS. SEE NOTE 3 ON FIGURE 1B.
- AREAS OF NON-BUILT LAND DISTURBANCE. DISTURBED SOIL AREAS NOT PLANNED FOR CONSTRUCTION ACTIVITIES OVER THE NEXT 14 DAYS SHALL BE STABILIZED BY USE OF EROSION CONTROL BMPS. SEE NOTE 3 ON FIGURE 1B.
- AREAS OF PROPOSED CUT. DISTURBED SOIL AREAS NOT PLANNED FOR CONSTRUCTION ACTIVITIES OVER THE NEXT 14 DAYS SHALL BE STABILIZED BY USE OF EROSION CONTROL BMPS. SEE NOTE 3 ON FIGURE 1B.
- AREAS OF PROPOSED MINOR GRADING. DISTURBED SOIL AREAS NOT PLANNED FOR CONSTRUCTION ACTIVITIES OVER THE NEXT 14 DAYS SHALL BE STABILIZED BY USE OF EROSION CONTROL BMPS. SEE NOTE 3 ON FIGURE 1B.
- LOCATION OF STABILIZED CONSTRUCTION ENTRANCE/EXIT PER CASQA TC-1

DRAINAGE AREA/NON-VISIBLE SAMPLING SYMBOL LEGEND:

- DRAINAGE AREA "X" BOUNDARY
- ## — DRAINAGE AREA NUMBER
- CA## — STORMWATER CONTAINMENT AREA
- CS## — STORMWATER RUN-ON CONTROL SAMPLE LOCATION
- SL## — QSD IDENTIFIED DISCHARGE AND SAMPLING LOCATION. THE QSP SHALL FIELD VERIFY THE EXACT LOCATION OF DISCHARGE FOR A REPRESENTATIVE STORMWATER SAMPLE FOR NON-VISIBLE POLLUTANT SAMPLING.

STAGING AREA ITEMS:

1. CONCRETE WASHOUT LOCATION PER CASQA WM-08
2. LOCATION OF JOB TRAILER CONTAINING SPILL KIT AND ONSITE SWPPP
3. LOCATION OF RAIN GAUGE
4. MATERIAL STORAGE LOCATION PER CASQA WM-01
5. OVERNIGHT EQUIPMENT/VEHICLE STORAGE AND MAINTENANCE PER CASQA NS-8, NS-9 AND NS-10
6. RESTROOMS AND SANITARY FACILITIES PER CASQA WM-09
7. SOLID WASTE STORAGE LOCATION PER CASQA WM-05
8. STOCKPILE STORAGE LOCATION PER CASQW WM-03
- WS — WATER SUPPLY LOCATION PER CASQA NS-1

N

0 20 40 80 120 160
SCALE IN FEET

SITE LOCATION: 800 - 820 W. OLIVE AVE. | MADERA, CA 93637 | 36.952085, -120.066450 — FIGURE: 3B

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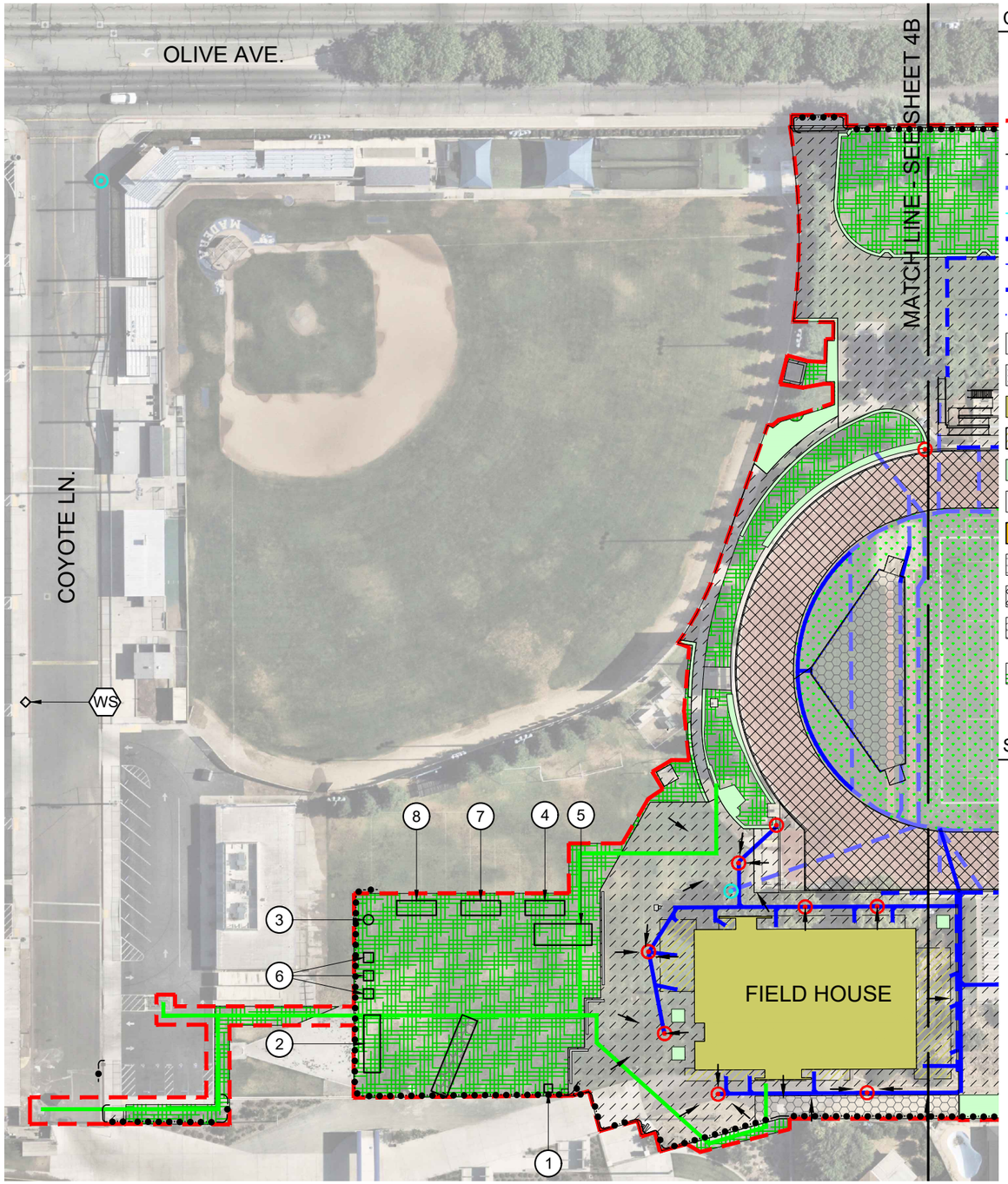
MADERA UNIFIED SCHOOL DISTRICT

STORM WATER POLLUTION PREVENTION PLAN
MADERA HIGH SCHOOL STADIUM
EARTHWORK SITE MAP

DR. BY GL
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SHEET NO. 7
OF 11 SHEETS

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CONSTRUCTION SYMBOL LEGEND:

- PROTECT PROPOSED DRAIN INLET PER CASQA SE-10
- PROTECT EXISTING DRAIN INLET PER CASQA SE-10
- SURFACE FLOW DIRECTION
- PROJECT BOUNDARY
- LOCATION OF LINEAR SEDIMENT CONTROL BMPS. REFER TO NOTE 1 AND 2. EXACT LOCATIONS OF THE SEDIMENT CONTROL BMP'S SHALL BE COORDINATED WITH THE QSP PRIOR TO INSTALLATION OR REMOVAL.
- EXISTING STORM DRAIN PIPELINE
- EXISTING SWALE/DRAINAGE DITCH/FLOWLINE/GUTTER
- PROPOSED STORM DRAIN PIPELINE
- SWALE/DRAINAGE/DITCH/CULVERT/FLOWLINE/VALLEY GUTTER
- PROPOSED TRENCH STORM DRAIN
- PROPOSED PERFORATED STORM DRAIN PIPELINE
- PROPOSED ASPHALT CONCRETE RESURFACING (NON-ROOF IMPERVIOUS AREAS)
- PROPOSED CONCRETE (NON-ROOF IMPERVIOUS AREAS)
- PROPOSED BUILDING (ROOF IMPERVIOUS AREA)
- PROPOSED BUILDING OVERHANG (IMPERVIOUS AREAS)
- PROPOSED LANDSCAPING (PERVIOUS AREAS)
- AREAS OF SYNTHETIC TURF (NON-ROOF IMPERVIOUS AREAS)
- PROPOSED SAND PIT (NON-ROOF IMPERVIOUS AREAS)
- PROPOSED GRAVEL (PERVIOUS AREA)
- PROPOSED RUBBER TRACK SURFACE (NON-ROOF IMPERVIOUS AREAS)
- LOCATION OF STABILIZED CONSTRUCTION ENTRANCE/EXIT PER CASQA TC-1
- AREAS OF NON-BUILT LAND DISTURBANCE FOR FINAL STABILIZATION. DISTURBED SOIL AREAS NOT PLANNED FOR CONSTRUCTION ACTIVITIES OVER THE NEXT 14 DAYS SHALL BE STABILIZED BY USE OF EROSION CONTROL BMPS. SEE NOTE 3 ON FIGURE 1B.

STAGING AREA ITEMS:

1. CONCRETE WASHOUT LOCATION PER CASQA WM-08
2. LOCATION OF JOB TRAILER CONTAINING SPILL KIT AND ONSITE SWPPP
3. LOCATION OF RAIN GAUGE
4. MATERIAL STORAGE LOCATION PER CASQA WM-01
5. OVERNIGHT EQUIPMENT/VEHICLE STORAGE AND MAINTENANCE PER CASQA NS-8, NS-9 AND NS-10
6. RESTROOMS AND SANITARY FACILITIES PER CASQA WM-09
7. SOLID WASTE STORAGE LOCATION PER CASQA WM-05
8. STOCKPILE STORAGE LOCATION PER CASQW WM-03
- WS. WATER SUPPLY LOCATION PER CASQA NS-1

N

0 20 40 80 120 160
SCALE IN FEET

SITE LOCATION: 800 - 820 W. OLIVE AVE. | MADERA, CA 93637 | 36.952085, -120.066450 — FIGURE: 4A

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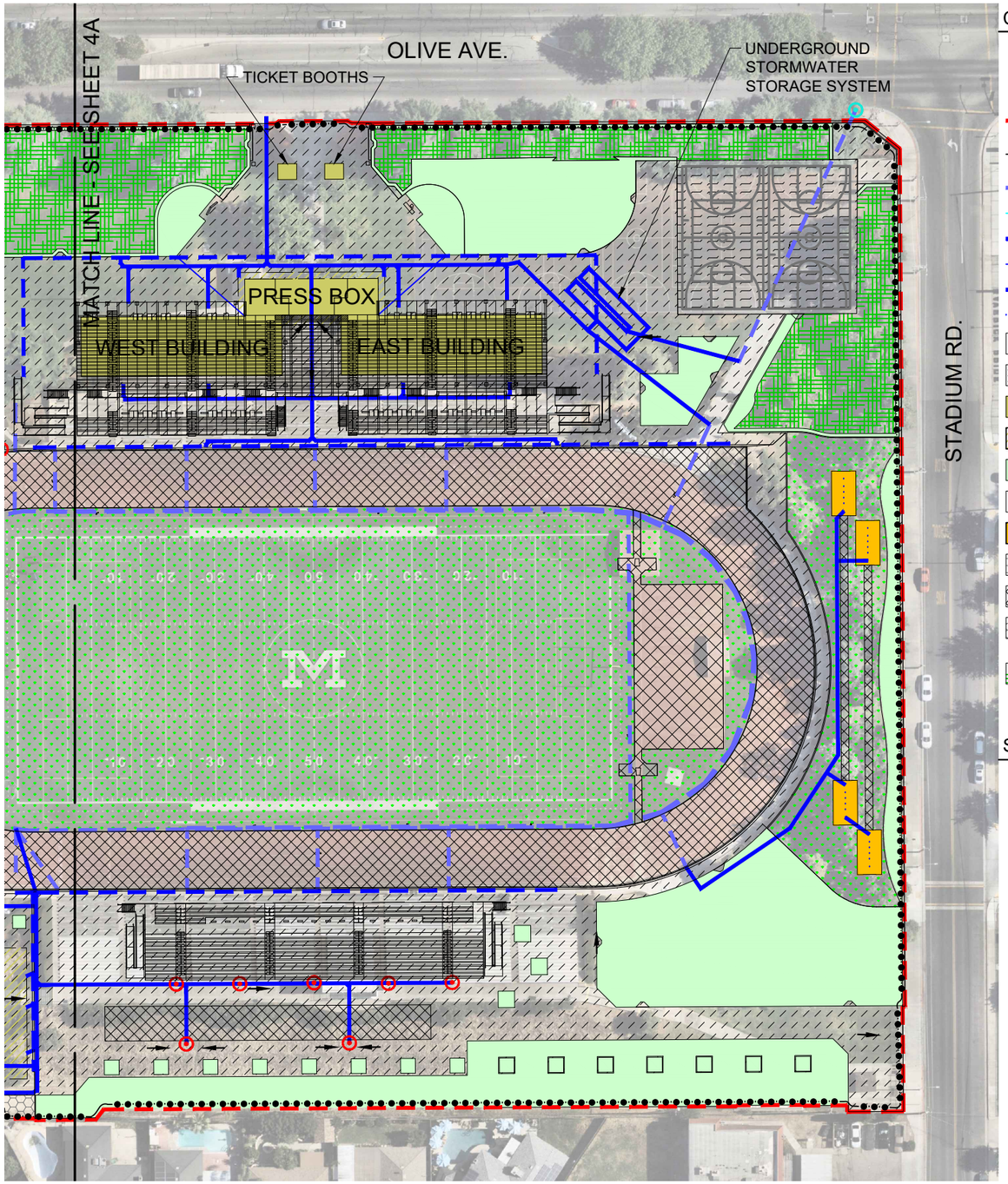
MADERA UNIFIED SCHOOL DISTRICT

STORM WATER POLLUTION PREVENTION PLAN
MADERA HIGH SCHOOL STADIUM
CONSTRUCTION SITE MAP

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SHEET NO. 8
OF 11 SHEETS

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CONSTRUCTION SYMBOL LEGEND:

- PROTECT PROPOSED DRAIN INLET PER CASQA SE-10
- PROTECT EXISTING DRAIN INLET PER CASQA SE-10
- SURFACE FLOW DIRECTION
- PROJECT BOUNDARY
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- EXISTING STORM DRAIN PIPELINE
- EXISTING SWALE/DRAINAGE DITCH/FLOWLINE/GUTTER
- PROPOSED STORM DRAIN PIPELINE
- SWALE/DRAINAGE/DITCH/CULVERT/FLOWLINE/VALLEY GUTTER
- PROPOSED TRENCH STORM DRAIN
- PROPOSED PERFORATED STORM DRAIN PIPELINE
- PROPOSED ASPHALT CONCRETE RESURFACING (NON-ROOF IMPERVIOUS AREAS)
- PROPOSED CONCRETE (NON-ROOF IMPERVIOUS AREAS)
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- AREAS OF SYNTHETIC TURF (NON-ROOF IMPERVIOUS AREAS)
- PROPOSED SAND PIT (NON-ROOF IMPERVIOUS AREAS)
- PROPOSED GRAVEL (PERVIOUS AREA)
- PROPOSED RUBBER TRACK SURFACE (NON-ROOF IMPERVIOUS AREAS)
- LOCATION OF STABILIZED CONSTRUCTION ENTRANCE/EXIT PER CASQA TC-1
- AREAS OF NON-BUILT LAND DISTURBANCE FOR FINAL STABILIZATION. DISTURBED SOIL AREAS NOT PLANNED FOR CONSTRUCTION ACTIVITIES OVER THE NEXT 14 DAYS SHALL BE STABILIZED BY USE OF EROSION CONTROL BMPS. SEE NOTE 3 ON FIGURE 1B.

STAGING AREA ITEMS:

1. CONCRETE WASHOUT LOCATION PER CASQA WM-08
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8. STOCKPILE STORAGE LOCATION PER CASQW WM-03
- WS WATER SUPPLY LOCATION PER CASQA NS-1

N

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SCALE IN FEET

SITE LOCATION: 800 - 820 W. OLIVE AVE. | MADERA, CA 93637 | 36.952085, -120.066450 — FIGURE: 4B

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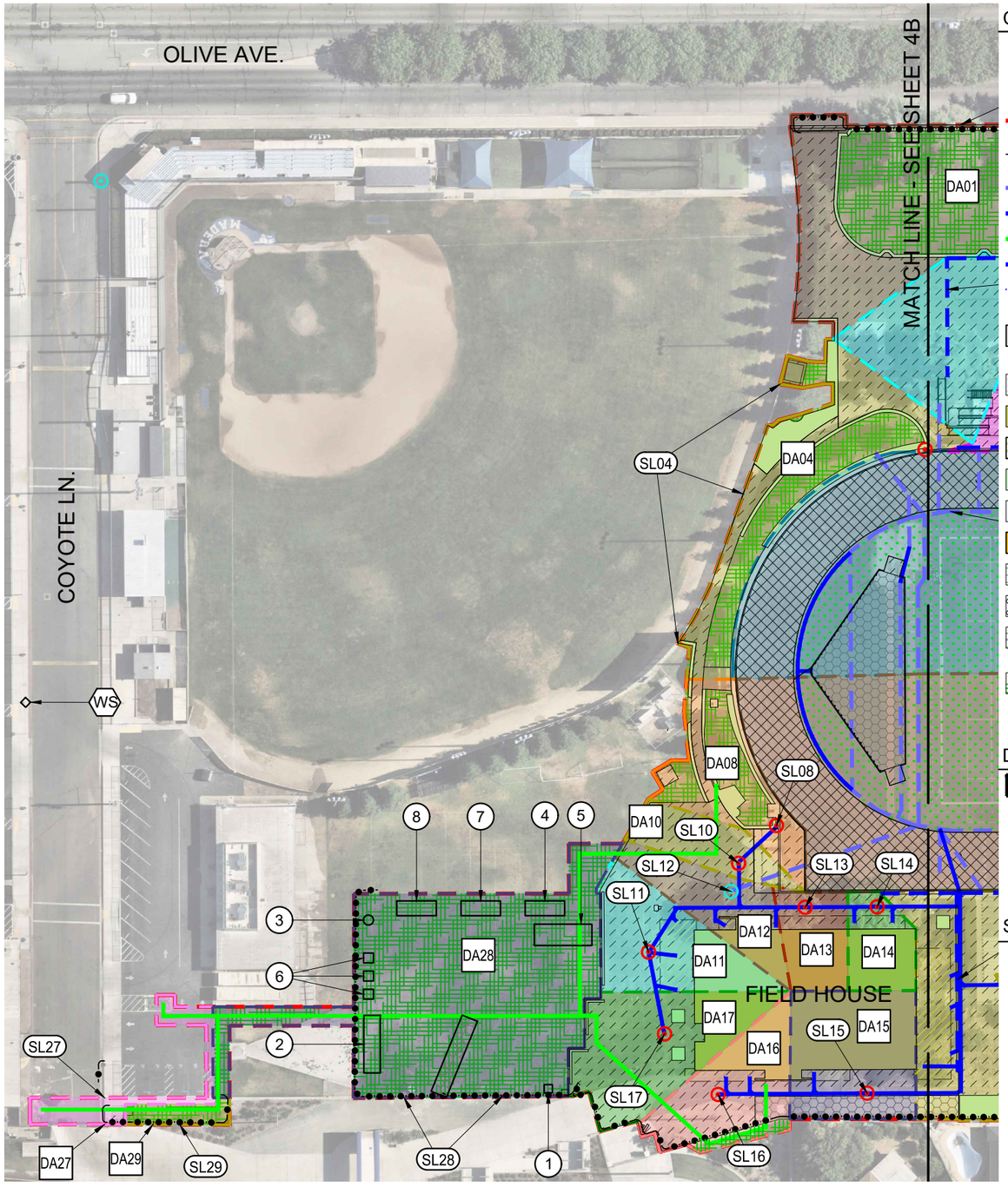
MADERA UNIFIED SCHOOL DISTRICT

STORM WATER POLLUTION PREVENTION PLAN
MADERA HIGH SCHOOL STADIUM
CONSTRUCTION SITE MAP

DR. BY GL
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DATE 02-06-25
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SHEET NO. 9
OF 11 SHEETS

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CONSTRUCTION SYMBOL LEGEND:

- PROTECT PROPOSED DRAIN INLET PER CASQA SE-10
- PROTECT EXISTING DRAIN INLET PER CASQA SE-10
- SURFACE FLOW DIRECTION
- PROJECT BOUNDARY
- LOCATION OF LINEAR SEDIMENT CONTROL BMPS. REFER TO NOTE 1 AND 2. EXACT LOCATIONS OF THE SEDIMENT CONTROL BMP'S SHALL BE COORDINATED WITH THE QSP PRIOR TO INSTALLATION OR REMOVAL.
- EXISTING STORM DRAIN PIPELINE
- PROPOSED STORM DRAIN PIPELINE
- PROPOSED GAS PIPELINE/WATER PIPELINE
- PROPOSED TRENCH STORM DRAIN
- PROPOSED PERFORATED STORM DRAIN PIPELINE
- PROPOSED ASPHALT CONCRETE (NON-ROOF IMPERVIOUS AREAS)
- PROPOSED CONCRETE (NON-ROOF IMPERVIOUS AREAS)
- PROPOSED BUILDING (ROOF IMPERVIOUS AREA)
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- PROPOSED GRAVEL (PERVIOUS AREA)
- PROPOSED RUBBER TRACK SURFACE (NON-ROOF IMPERVIOUS AREAS)
- LOCATION OF STABILIZED CONSTRUCTION ENTRANCE/EXIT PER CASQA TC-1
- AREAS OF NON-BUILT LAND DISTURBANCE FOR FINAL STABILIZATION. DISTURBED SOIL AREAS NOT PLANNED FOR CONSTRUCTION ACTIVITIES OVER THE NEXT 14 DAYS SHALL BE STABILIZED BY USE OF EROSION CONTROL BMPS. SEE NOTE 3 ON FIGURE 1B.

DRAINAGE AREA/NON-VISIBLE SAMPLING SYMBOL LEGEND:

- DRAINAGE AREA "X" BOUNDARY
- ## — DRAINAGE AREA NUMBER
- SL## — QSD IDENTIFIED DISCHARGE AND SAMPLING LOCATION. THE QSP SHALL FIELD VERIFY THE EXACT LOCATION OF DISCHARGE FOR A REPRESENTATIVE STORMWATER SAMPLE FOR NON-VISIBLE POLLUTANT SAMPLING.

STAGING AREA ITEMS (REFER TO FIGURE 4A AND 4B)

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0 20 40 80 120 160
SCALE IN FEET

SITE LOCATION: 800 - 820 W. OLIVE AVE. | MADERA, CA 93637 | 36.952085, -120.066450 — FIGURE: 4A.i

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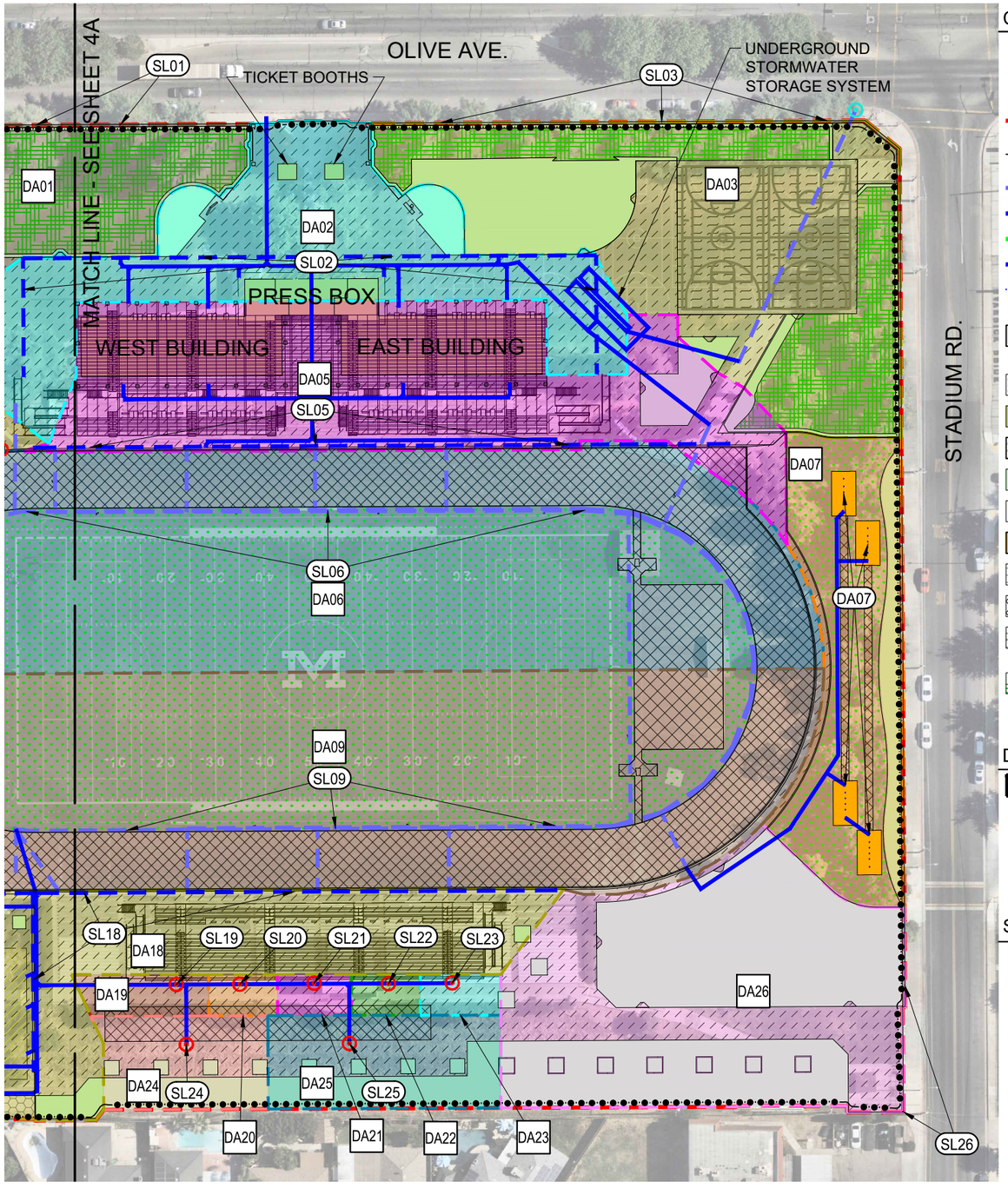
MADERA UNIFIED SCHOOL DISTRICT

STORM WATER POLLUTION PREVENTION PLAN
MADERA HIGH SCHOOL STADIUM
DRAINAGE AREA AND SAMPLING SITE MAP - CONSTRUCTION

DR. BY GL
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DATE 02-06-25
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SHEET NO. 10
OF 11 SHEETS

Drawing: C:_data\backup\222352_Madera HS Stadium and Field House SWPPP Figures.dwg; Figure 4A.i Plot by: gledesma Feb 07, 2025 - 10:31am



CONSTRUCTION SYMBOL LEGEND:

- PROTECT PROPOSED DRAIN INLET PER CASQA SE-10
- PROTECT EXISTING DRAIN INLET PER CASQA SE-10
- SURFACE FLOW DIRECTION
- PROJECT BOUNDARY
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- EXISTING STORM DRAIN PIPELINE
- PROPOSED STORM DRAIN PIPELINE
- PROPOSED GAS PIPELINE/WATER PIPELINE
- PROPOSED TRENCH STORM DRAIN
- PROPOSED PERFORATED STORM DRAIN PIPELINE
- PROPOSED ASPHALT CONCRETE (NON-ROOF IMPERVIOUS AREAS)
- PROPOSED CONCRETE (NON-ROOF IMPERVIOUS AREAS)
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- PROPOSED SAND PIT (NON-ROOF IMPERVIOUS AREAS)
- PROPOSED GRAVEL (PERVIOUS AREA)
- PROPOSED RUBBER TRACK SURFACE (NON-ROOF IMPERVIOUS AREAS)
- LOCATION OF STABILIZED CONSTRUCTION ENTRANCE/EXIT PER CASQA TC-1
- AREAS OF NON-BUILT LAND DISTURBANCE FOR FINAL STABILIZATION. DISTURBED SOIL AREAS NOT PLANNED FOR CONSTRUCTION ACTIVITIES OVER THE NEXT 14 DAYS SHALL BE STABILIZED BY USE OF EROSION CONTROL BMPS. SEE NOTE 3 ON FIGURE 1B.

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STAGING AREA ITEMS (REFER TO FIGURE 4A AND 4B)

N

0 20 40 80 120 160
SCALE IN FEET

SITE LOCATION: 800 - 820 W. OLIVE AVE. | MADERA, CA 93637 | 36.952085, -120.066450 | FIGURE: 4B.i

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CONSULTANT
Blair, Church & Flynn Consulting Engineers
[redacted]

MADERA UNIFIED SCHOOL DISTRICT

STORM WATER POLLUTION PREVENTION PLAN
MADERA HIGH SCHOOL STADIUM
DRAINAGE AREA AND SAMPLING SITE MAP - CONSTRUCTION

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SHEET NO. 11
OF 11 SHEETS

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Memorial Stadium Modernization: Bid No. 073025

Pre-Bid RFI Log

	Question	Response	Submitted by
1	Can the bid time be revised to 2:00 PM or 3:00 PM?	Yes, bids are due at 2:00PM	Ardent General
2	RFI Description: General Requirements 01 57 15 Integrated Pest Management - Attached is Section 01 57 15 Integrated Pest Management. Is integrated pest management really required fo this project? I have searched the Central Valley and could not find anyone interested in bidding for this work nor anyone or firm that is IPM Star Certified. Is this just for the Stadium and not the Fieldhouse or the entire site during construciton for the full 548 calendar days?	No pest control needed.	Ardent General
4	Are there any allowances or contingencies i.e. rebar or steel that are to be carried in the bid amount? Sometimes they are buried in the plans and specs?	It is the responsibility of the Contractor to read through all the Specifications and Plans. Irrigation Plans ask for $8000.00 allowance for the stadium project. The specs ask to provide 10% of the total reinforced steel tonnage in addition to the quanitities. These are some examples, G.C. to verify and include as part of the bid documents.	Harris Construction
5	Article 11 of the Notice to Bidders makes reference to Tidal Wave and Earthquake Insurance. Are those insurances a requirement of this bid?	No tidal wave insurance is needed. Other coverages should be included in the builder's risk policy.	Harris Construction
6	How many calendar days are we to hold our bid? I could not find that requirement in the specs.	Bids should be held for 90 days.	Harris Construction
7	Section 019113 General Commissioning Requirements mentions a commissioning agent. Is the intent of the spec for the GC to provide a third party commissioning agent or can the subcontractor perform that duty?	No commissioning is required.	Harris Construction

8	Section 024100 Site Demolition Hazardous Materials Item 3.4.B.1 states to “Identify chemicals, gases, explosives, acids, flammables, or other dangerous materials before proceeding with demolition operations, and notify such jurisdictional agencies as may be required. Collect and legally dispose of such materials at official disposal locations away from the site.” Will these hazardous materials be identified in the plans and specs for the GC to quantity and include a cost in their bid amount?	See Addendum 01 for hazardous materials report.	Harris Construction
9	There are 2 Notice Inviting Bid documents. One is loose and one is in the Notice to Bidders. One states to refer to George Cummings via email for questions the other states to refer to Susan Harautuneian via email for questions. Please clarify who we send RFI questions to.	Please send all requests for information to George Cummings at georgecummings@maderausd.org.	Harris Construction
10	I’m reaching out regarding the MUSD Memorial Stadium Modernization project. Could you please confirm whether this project requires a PLA or a PSA?	This project does not require a PLA or a PSA.	Escon Builders
11	The bid time of 10am is not typical for hard bids. Can that time be changed to 2pm.	Yes, see Addendum 01	Harris Construciton
12	EX4.1 Calls out EST as the Fire Alarm System Brand, However the district standard is Gamewell FCI. Can we substitute the EST system for a Gamewell FCI system?	Yes, Gamewell is the district standard. Please see pending addendum.	Magnetar
13	I was wondering if there was an asbestos or lead report for the Madera HS Stadium Modernization project? I’ve looked on the Builders Exchange Website and in your plan room but did not find one.	See Addendum 01	E.T. Abatement
14	I would like to ask if the pre-qualification window can either be extended for our subcontractors or that an electronic submission will be accepted in lieu of the mail in requirement. Thank you for your time and consideration.	We do not plan to extend the prequalification window.	BCI
15	Can we email the prequel application to you, or does it need to be mailed?	Applications can be emailed, make sure to include the financials.	Binns Plumbing

16	In reviewing the bid instructions for the Memorial Stadium Modernization project, we see the current bid receipt time is 10:00 a.m. PT on 09/04/25. Would you consider moving the bid time to 2:00 p.m. PT on 09/04/25?	Please See Addendum 01	Soltek Pacific