**STORMWATER POLLUTION PREVENTION PLAN**

**for**

# HAWTHORNE MIDDLE SCHOOL TURF FIELD & TRACK IMPROVEMENTS

**WDID:** TBD
**RISK LEVEL:** I

**Legally Responsible Person (LRP):**
Hawthorne school District
14120 Hawthorne Blvd
Mara Pagniano
310-676-2276

**Duly Authorized Representative (DAR):**
Marisela Vasquez
310-263-3692

**Project Address:**
4366 W 129TH STREET
HAWTHORNE, CA 90250

**Site Operating Hours:**
8:00Am - 4:30pm

**Estimated Project Dates:**
Start of Construction: TBD
Completion of Construction: TBD

**SWPPP Prepared by:**
Jamie Wallis



VERDE DESIGN
3685 Main Street, Suite 350
Riverside, CA 92501
**SWPPP Preparation Date:**
October 2026

DRAFT PRINT PENDING APPROVAL BY SMARTS

11/04/2026 11:29:03 AM

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**Contact Information**

| Role | Name | Phone Number | License or Certification Number, if Applicable |
|---|---|---|---|
| **Qualified SWPPP Developer (QSD)** | Jamie Wallis | (408) 850-3407 | 26164 |
| **Qualified SWPPP Practitioner (QSP)** | | | |
| **Qualified SWPPP Practitioner (QSP)** | | | |
| **QSP Delegate** | | | |
| **QSP Delegate** | | | |
| **QSP Delegate** | | | |
| **QSP Delegate** | | | |

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# Qualified SWPPP Developer

Approval and Certification of the Stormwater Pollution Prevention Plan

Project Name: HAWTHORNE MIDDLE SCHOOL TURF FIELD & TRACK IMPROVEMENTS

"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*

*10/10/2026*

*Date*

*Jamie Wallis*

*QSD Name*

25440

*QSD Certificate Number*

*Project Manager, Verde Design*

*Title and Affiliation*

*(408) 850-3407*

*Telephone Number*

*jamie@verdedesigninc.com*

*Email*

# Legally Responsible Person

Approval and Certification of the Stormwater Pollution Prevention Plan

Project Name: HAWTHORNE MIDDLE SCHOOL TURF FIELD & TRACK IMPROVEMENTS

"I certify under penalty of law that this document and all Attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, to the best of my knowledge and belief, the information submitted is, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

| | |
|---|---|
| Legally Responsible Person | |
| Signature of Legally Responsible Person or Approved Signatory | Date |
| Name of Legally Responsible Person or Approved Signatory | Telephone Number |

# Amendment Log

Project Name: Hawthorne Middle School Turf Field & Track Improvements

| Amendment No. | Date | Brief Description of Amendment (include section and page number) | Prepared and Approved By |
|---|---|---|---|
| | | | Name:<br>QSD# |
| | | | Name:<br>QSD# |
| | | | Name:<br>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);
- 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.).

SWPPP Amendment QSD Certifications are located in Appendix C.

# 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 Hawthorne Middle School Turf Field & Track Improvement project comprises approximately 2.309 acres, of which 1.93 acres will be disturbed. The Project is located at 4366 W 129th Street,Hawthorne, Ca 90250. The property is owned by [LRP or if different specify owner] and is being developed by [developer]. The project's location is shown on the Site Maps in Appendix A.

## 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:
    - Post-construction water balance calculation;
6. Annual Fee per the current 23 California Code of Regulations Chapter 9 fee schedule for National Pollutant Discharge Elimination System (NPDES) stormwater permits; and
7. 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

SWPPP changes or amendments will be uploaded through SMARTS within 30 calendar days. 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) | Check changes that can be field located or field determined by QSP |
|---|---|
| Increase quantity of an Erosion or Sediment Control Measure | *X* |
| Relocate/add stockpiles or stored materials | *If approved by owner* |
| Relocate or add toilets | *X* |
| Relocate vehicle storage and/or fueling locations | *X* |
| Relocate areas for waste storage | *X* |
| Relocate water storage and/or water transfer location | *X* |
| Changes to access points (entrance/exits) | *If approved by owner* |
| Change type or location of Erosion or Sediment Control Measure | *If approved by QSD and owner* |
| Minor changes to schedule or phases | *X* |
| Changes in construction materials | *If approved by owner* |

**Table 1-1 List of Changes to be Field Determined**

| Candidate changes for field location or determination by QSP (1) | Check changes that can be field located or field determined by QSP |
|---|---|
| *(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

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 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. 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.

## 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 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.

Custom method for which Regional Water Board approval has been obtained, supported by documentation required by the Regional Water Board and pre- and pos- 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

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 Hawthorne Middle School Turf Field & Track Improvement project site is Risk Level 1 that comprises approximately 2.31 acres and is located at 4366 W 129th Street, Hawthorne, California. Bounded by West 130th Street to the South, Washington Avenue to the east, and West 129th Street to the north, the project site is located approximately 1.06 mile east of Interstate 405 and 4.5 miles east of Los Angeles Harbor.

The more geographically accurate project location is [33.91473/ -118.35104]. The project location 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 occupied by a series of school athletics

facilities including natural grass practice and play fields, fences and backstop, walkways, ramp, parking lot and restrooms. There are no known historic sources of contamination at the site. Soil sampling and analysis is required when soil contamination is found or suspected. The results of this analysis are in Appendix Q.

### 2.1.3 Existing Drainage

The project site is relatively flat to gently sloping, with existing surface elevations of approximately 66 feet above mean sea level (MSL).

The existing site is divided into five drainage areas: Parking Lot North, Parking Lot South, Corridors in front of the staff restroom, Track & Field, and Asphalt Slope adjacent to the boys' and girls' restrooms. Surface runoff generally flows as sheet flow toward existing catch basins, concrete gutters, or street curb and gutter systems at the respective low points before ultimately discharging into the municipal storm drain system.

Parking Lot North

This drainage area consists of a concrete walkway and asphalt paving along the north side of 129th Street, with the street centerline serving as the drainage boundary. Surface runoff flows directly into the curb and gutter along the north side of the street and is conveyed to an existing municipal curb inlet approximately two blocks downstream along 129th Street.

Parking Lot South

This drainage area is located at the main entrance of the school and includes concrete walkways, two landscaped planters, the school entrance, and an accessible ramp. Surface runoff generally flows as sheet flow toward the curb and gutter along the south side of 129th Street and is conveyed eastward to an existing municipal curb inlet approximately two blocks downstream, opposite the discharge location serving Parking Lot North.

Corridors

This drainage area consists of an existing concrete corridor directly in front of the staff restroom. Surface runoff from the paved corridor flows directly into the adjacent landscaped planter, where stormwater is retained and allowed to infiltrate into the underlying soil.

Track & Field

The majority of the existing track and field area is not served by a formal storm drain system. The field is relatively flat, with a measured soil infiltration rate of approximately 0.81 inch per hour. Stormwater runoff is primarily retained on site and allowed to infiltrate into the underlying soil.
The surrounding asphalt pavement has cross slopes ranging from approximately 1.5% to 2.5%, directing surface runoff toward the adjacent sidewalks and street curb and gutter systems. Runoff is subsequently conveyed to existing municipal curb inlets located approximately two blocks downstream along 129th and 130th Streets.

Asphalt Slope

Surface runoff from the existing concrete corridor and adjacent asphalt slope flows as sheet flow toward a concrete gutter located downslope between the school's asphalt play courts and turf field. The gutter conveys runoff to an existing catch basin at its downstream end near 130th Street. Collected stormwater is then conveyed through an existing 4-inch pipe beneath the sidewalk and discharged into the curb and gutter along the north side of 130th Street. Runoff continues eastward along the street to an existing municipal curb inlet.

Existing site topography, drainage patterns, and stormwater conveyance systems are shown on Site Maps in Appendix A.

### 2.1.4 Geology and Groundwater

The earth materials encountered during the investigation consist of existing fill soils placed during previous site grading operations and natural alluvial soils to a maximum depth explored of 11.0 feet bgs. The fill soils encountered consist primarily of clayey silts and silty sands. The alluvial soil deposits below the fill consist of clayey silts and silty sands. Sampling blow-counts correlate to loose to moderately dense conditions near surface, and generally become denser with depth.

Groundwater was not encountered during our subsurface exploration to the deepest depth drilled of 11.0 feet below ground surface. Based on review of Historically Highest Groundwater Map, Plate No. 1.2, in the Seismic Hazard Zone report for the Inglewood 7.5-minute Quadrangle (1998), the historically highest groundwater level contours in the vicinity of the site are interpreted to be approximately 45 feet bgs.

Refer to geotechnical report in Supplemental information.

### 2.1.5 Project Description

Project grading will occur on approximately 1.93 acre of the project, which comprises approximately 83.5% percent of the total area. The limits of grading are shown on Site Maps in Appendix A. Grading will include both cut and fill activities, with the total graded material estimated to be 1342 cubic yards. Approximately 1086 cubic yards are expected to be hauled away. Soil will be stockpiled per the QSP's direction.

Construction activities will include removal of existing natural grass play fields and existing paving, backstops, followed by construction of the synthetic turf field, all weather track surfacing with asphalt paving underneath, new accessible ramp and railing, new accessible parking and new track and field lighting.

### 2.1.6 Developed Condition

Post- construction surface discharge on sub drainage area Parking Lot North, Corridor and Asphalt Slope matches with existing drainage patterns. Surface runoff generally flows as sheet flow toward existing catch basin, concrete gutters, or street curb and gutter systems at the respective low points before ultimately discharging into the municipal storm drain system.

Two modified sub areas include Parking Lot South and Track & Field.

Parking Lot South

Three new accessible parking spaces will be added along the existing street, with portions of the existing turf area replaced by concrete walkways and curb ramps to meet accessibility requirements. A new concrete swale will be installed along the south side of 129th Street to intercept surface runoff and convey it as concentrated flow to a proposed catch basin at the downstream end of the swale.

Surface run off generated by the 85th-percentile, 24-hour storm event will be detained on site within a 24-inch perforated pipe and associated 3-foot-wide aggregate trench before discharging into the existing street curb and gutter. The perforated pipe, aggregate trench, and downstream weir plate collectively constitute Basin #1.

Track & Field

The proposed all-weather track is graded with cross slopes toward the synthetic turf field. Surface runoff from the track and precipitation falling directly onto the synthetic turf will infiltrate through the permeable turf system and clean aggregate subbase before being collected and detained on site within perforated pipes and associated 3-foot-wide aggregate trenches.

Total 10 perforated pipes, aggregate trenches, and weir plates installed in the outlet junction boxes collectively constitute Basins #2 and detain runoff generated by the synthetic turf and tributary hardscape areas during the 85th-percentile, 24-hour storm event.

During larger storm events, excess runoff will overflow the downstream weir plates and be conveyed through the storm drain system to the existing catch basin near 130th Street. Stormwater will then discharge through the existing 4-inch pipe beneath the sidewalk into the curb and gutter along the north side of 130th Street, following the existing drainage pattern.

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

**Table 2-2-1 Construction Site Estimates – Parking Lot North**

| | | |
|---|---|---|
| Construction site area | 0.08 | acres |
| Total area of disturbance | 0.0685 | acres |
| Percent impervious before construction | 100 | % |
| Runoff coefficient before construction | 0.95 | |
| Percent impervious after construction | 100 | % |
| Runoff coefficient after construction | 0.95 | |

**Table 2-2-2 Construction Site Estimates – Parking Lot South**

| | | |
|---|---|---|
| Construction site area | 0.107 | acres |
| Total area of disturbance | 0.102 | acres |
| Percent impervious before construction | 73.5 | % |
| Runoff coefficient before construction | 0.77 | |
| Percent impervious after construction | 86 | % |
| Runoff coefficient after construction | 0.86 | |

**Table 2-2-3 Construction Site Estimates – Corridor**

| | | |
|---|---|---|
| Construction site area | 0.014 | acres |
| Total area of disturbance | 0.014 | acres |
| Percent impervious before construction | 100 | % |
| Runoff coefficient before construction | 0.95 | |
| Percent impervious after construction | 100 | % |
| Runoff coefficient after construction | 0.95 | |

**Table 2-2-4 Construction Site Estimates – Track & Field**

| | | |
|---|---|---|
| Construction site area | 1.69 | acres |
| Total area of disturbance | 1.69 | acres |
| Percent impervious before construction | 17.8 | % |
| Runoff coefficient before construction | 0.71 | |
| Percent impervious after construction | 100 | % |
| Runoff coefficient after construction | 0.95 | |

**Table 2-2-5 Construction Site Estimates – Asphalt Slope & Walkway**

| | | |
|---|---|---|
| Construction site area | 0.141 | acres |
| Total area of disturbance | 0.084 | acres |
| Percent impervious before construction | 100 | % |
| Runoff coefficient before construction | 0.95 | |
| Percent impervious after construction | 100 | % |
| Runoff coefficient after construction | 0.95 | |

## 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

## 2.3 STORMWATER RUN-ON FROM OFFSITE AREAS

Approximately 9,000 square feet of existing offsite asphalt pavement drains toward the proposed construction area, with surface slopes ranging from approximately 2% to 7%.

Prior to commencing earth-disturbing activities, the contractor shall install Gravel bag berms (CASQA SE-6) or sandbag barriers (CASQA SE-8) as temporary diversion device per L3.0 to intercept and redirect offsite stormwater run-on away from disturbed areas. Runoff shall be conveyed to an approved stable discharge location without causing erosion, flooding, or adverse impacts to adjacent properties. All temporary drainage controls shall be inspected and maintained throughout construction, particularly before and after qualifying storm events.

Contractor shall be responsible for determining and implementing additional temporary drainage and protection measures as necessary, subject to hydraulic capacity and site conditions. All temporary drainage controls shall be inspected and maintained throughout construction, particularly before and after qualifying storm events.

## 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 risk level was determined through the use of the SMARTS site specific analysis. 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 | 27.55 | Erosivity Calculator Link on SMARTS (EPA Calculator) |
| K | 0.32 | Populated on SMARTS |
| LS | 0.44 | Populated on SMARTS |
| **Total Predicted Sediment Loss (tons/acre)** | | **3.9** |
| **Overall Sediment Risk**<br>Low Sediment Risk < 15 tons/ acre<br>Medium Sediment Risk >= 15 and < 75 tons/acre<br>High Sediment Risk >= 75 tons/acre | | ☒ **Low**<br>☐ **Medium**<br>☐ **High** |

Runoff from the project site discharges into Los Angeles and Long Beach Harbor.

**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) |
|---|---|---|---|
| Los Angeles and Long Beach Harbor | ☐ Yes ☒ No | ☐ Yes ☒ No | ☐ Yes ☒ No |
| **Overall Receiving Water Risk** | | | ☒ **Low**<br>☐ **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).

## 2.5 CONSTRUCTION SCHEDULE

The site sediment risk was determined based on construction taking place between [start date] and [end date]. 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

The project is not subject to TMDL requirements.

## 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:

- NONE

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:

- Discharges associated with illegal dumping/ discharging by others not associated with the project
- Wind erosion control watering discharges
- Fueling discharges
- Vehicle and equipment maintenance discharges
- Landscaping operations
- Demolition activities
- Grading operations
- Utility operations
- General waste and site litter
- Spills
- Material use and waste discharges

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.

The following discharge(s) have been authorized by (a) regional NPDES permit(s):

- NONE

## 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** | |
| A-1 | Site and project boundaries |
| N/A | Areas disturbed during geotechnical or other preconstruction investigation work |
| L1.0-1.1 | Existing roads and trails |
| L6.1 | Drainage areas |
| L6.1 | Discharge locations |
| L6.1 | Existing storm drain system if applicable |
| L3.0 | Proposed locations of storage areas for waste |
| L3.0 | Proposed locations of construction materials |
| L3.0 | Proposed locations of project staging areas |
| L3.0 | Proposed locations of stockpiles |
| L3.0 | Proposed locations of vehicles, equipment staging and vehicle maintenance |
| L3.0 | Proposed locations of loading/unloading materials |
| L3.0 | Proposed locations of site access (entrance/exits) |
| L3.0 | Proposed locations of fueling, water storage, water transfer for dust control |
| L4.0 | Proposed locations of demolition |
| L4.0 | Proposed locations of other construction support activities |
| **Construction and Earthwork Drawing(s)** | |
| L5.0-5.1 | Site layout (grading plans) including roads |
| A-1 | Site and project boundaries |
| L6.2 | Drainage areas |
| L6.2 | Discharge locations |
| L6.2 | Sampling locations |
| L5.0-5.1 | Areas of soil disturbance (temporary or permanent) |
| L5.0-5.1 | Proposed active areas of soil disturbance (cut or fill) |
| L3.0 | Proposed locations of erosion control BMPs |
| L3.0 | Proposed locations of sediment control BMPs |

**Table 2-9 Required Map Information**

| Included on Map/Plan Sheet No. (1) | Required Element |
|---|---|
| L6.0 | Proposed locations of run-off BMPs |
| L3.0 | Temporary and/or permanent run-on conveyance |
| N/A | Proposed locations of active treatment systems(s) (if applicable) |
| L3.0 | Proposed locations of storage areas for waste |
| L3.0 | Proposed locations of construction materials |
| L3.0 | Proposed locations of project staging areas |
| L3.0 | Proposed locations of stockpiles |
| L3.0 | Proposed locations of vehicles, equipment and vehicle maintenance |
| L3.0 | Proposed locations of loading/unloading materials |
| L3.0 | Proposed locations of site access (entrance/exits) |
| L3.0 | Proposed locations of fueling, water storage, water transfer for dust control |
| L4.0 | Proposed locations of demolition |
| N/A | Proposed locations of other construction support activities |
| L4.0 | 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 | As shown in drawings or directed by QSP | Prior to Construction | Entirety of Project |
| | EC-2, Preservation of Existing | As shown in drawings or directed by QSP | Start of Construction | Entirety of Project |
| | EC-4, Hydroseeding | As shown in drawings or directed by QSP | After soil disturbance of areas outside of field limits | Entirety of Project |
| | EC-7, Geotextiles and Mats | As shown in drawings or directed by QSP | Start of Construction | Entirety of Project |
| | | | | |
| **Sediment Control BMPs** | SE-5 Fiber Rolls | As shown in drawings or directed by QSP | Start of Construction | Entirety of Project |
| | SE-6 Gravel Bag Barriers | As shown in drawings or directed by QSP | Start of Construction | Entirety of Project |
| | SE-10 Storm Drain Inlet Protection | As shown in drawings or directed by QSP | Start of Construction | Entirety of Project |
| | | | | |
| **Wind Erosion Control BMPs** | WE-1, Wind Erosion Control | As shown in drawings or directed by QSP | Start of Construction | Entirety of Project |
| | | | | |
| | | | | |
| **Tracking Control BMPs** | TC-1 Stabilized Construction Entrance and Exit | As shown in drawings or directed by QSP | Start of Construction | Entirety of Project |
| | | | | |
| | | | | |
| | | | | |

## 3.2 EROSION AND SEDIMENT CONTROL

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.

## 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 | ✓ | X | | |
| EC-2 | Preservation of Existing Vegetation | ✓ | X | | |
| EC-3 | Hydraulic Mulch | ✓[2] | | X | Not anticipated |
| EC-4 | Hydroseed | ✓[2] | X | | |
| EC-5 | Soil Binders | ✓[2] | | X | Not anticipated |
| EC-6 | Straw Mulch | ✓[2] | | X | Not anticipated |
| EC-7 | Geotextiles and Mats | ✓[2] | X | | |
| EC-8 | Wood Mulching | ✓[2] | | X | Not anticipated |
| EC-9 | Earth Dike and Drainage Swales | ✓[3] | | X | Not anticipated |
| EC-10 | Velocity Dissipation Devices | ✓[3] | | X | Not anticipated |
| EC-11 | Slope Drains | ✓[3] | | X | Not anticipated |
| EC-12 | Stream Bank Stabilization | | | X | Not anticipated |
| EC-14 | Compost Blankets | ✓[2] | | X | Not anticipated |
| EC-15 | Soil Preparation-Roughening | ✓ | | X | Not anticipated |
| EC-16 | Non-Vegetated Stabilization | ✓[2] | | X | Not anticipated |
| WE-1 | Wind Erosion Control | ✓ | X | | |

[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.

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. The QSP has the option of using additional BMPs listed as not anticipated at their discretion.

### *EC-1, Scheduling*

The Contractor/ QSP shall sequence construction activities with the installation of both soil stabilization and sediment control measure BMPs to reduce the discharge of sediment and pollutants to storm drain facilities or watercourses. The contractor shall create a schedule detailed enough to show major activities sequences with the implementation of construction site BMPs.

### *EC-2, Preservation of Existing Vegetation*

The Contractor shall protect and preserve existing vegetation on site as much as possible. The Contractor shall clearly establish the work limits and not disturb vegetation outside those limits. The contractor shall protect trees that are to remain and other areas where existing vegetation is to be preserved with construction fencing. The mature vegetation has extensive root systems helping to hold soil in place and serves to control erosion and filter out sediment.

### *Ec-4, Hydroseed*

The contractor shall apply a mixture of wood fiber, seed, fertilizer, and stabilizing emulsion with hydro-mulch equipment to protect exposed soils from erosion by water and wind until permanent vegetation is established.

### *Ec-7, Geotextiles and Mats*

The contractor will use plastic covers in conjunction with sandbags or fiber rolls to cover all stockpiles within 72 hours of stockpiling material or before a forecasted storm event, whichever occurs first. Seams are to be taped or weighted down and the edges/ bottom of the covers are to be weighted down with weights or sandbags placed no more than 10 ft. apart to prevent wind damage. Plastic sheeting will also be used under equipment to catch drips if the equipment is not in use. The contractor shall inspect all sheeting periodically and after significant storm events to check for tears, erosions, undermining, and anchorage failure. Failures are to be repaired immediately.

### *WE-1, Wind Erosion Control*

The contractor shall apply potable water to disturbed soil areas of the project site to control dust and maintain optimum moisture levels for compaction. The water shall be applied using water trucks.
Wind Erosion Control and Water Conservation Practices BMPs will be implemented to provide dust control and prevent discharges from dust control activities and water supply equipment. Water application rates shall be minimized as necessary to prevent runoff and ponding, and water equipment leaks shall be repaired immediately.
During windy conditions (forecast or actual wind conditions of approximately 25 mph or greater), dust control shall be applied to disturbed site areas, including haul roads/ construction entry points to adequately control wind erosion.

### 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.

## 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] | | X | Not applicable |
| SE-2 | Sediment Basin | | | X | Not applicable |
| SE-3 | Sediment Trap | | | X | Not applicable |
| SE-4 | Check Dams | | | X | Not applicable |
| SE-5 | Fiber Rolls | ✓[2][3] | X | | |
| SE-6 | Gravel Bag Berm | ✓[3] | X | | |
| SE-7 | Street Sweeping | ✓ | | X | Not necessary as project site is located off existing dirt access road |
| SE-8 | Sandbag Barrier | | | X | Not applicable |
| SE-9 | Straw Bale Barrier | | | X | Not applicable |
| SE-10 | Storm Drain Inlet Protection | ✓ RL2&3 | X | | |
| SE-11 | ATS | | | X | Not applicable |
| SE-12 | Manufactured Linear Sediment Controls | | | X | Not applicable |
| SE-13 | Compost Sock and Berm | ✓[3] | | X | Not applicable |
| SE-14 | Biofilter Bags | ✓[3] | | X | Not applicable |
| NA | Passive Treatment System | | | X | Not applicable |
| TC-1 | Stabilized Construction Entrance and Exit | ✓ | X | | |
| TC-2 | Stabilized Construction Roadway | | | X | Not applicable |
| TC-3 | Entrance Outlet Tire Wash | | | X | Using TC-1 |

[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.

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.

### *SE-5, Fiber Rolls*

The Contractor shall install fiber rolls at the perimeter of the project areas as shown on the Erosion Control Plan in Appendix A. Obstruction including rocks, clods, and debris greater than one inch in diameter will be removed from the ground before placing fiber rolls. Repair fiber rolls within 24 hours of discovering damage.

### *SE-6, Gravel Bag Berm*

The contractor shall install gravel bags at the corners of the construction washout area, around storm drain inlets per the detail on the Erosion Control Plan in Appendix A, and around temporary stockpiles and spoil areas as a linear sediment control measure. Contractor shall reshape or replace gravel bags as needed. Sediment should be removed from the BMP when the sediment accumulation reaches one-third of the barrier height. Removed gravel berm bags when no longer needed. Remove sediment accumulation and clean, re-grade, and stabilize the area. Removed sediment should be incorporated in the project of disposed of at an appropriate location.

### *SE-10, Storm Drain Inlet Protection*

Storm drain inlet protection will be used at all storm drain inlets within the project limits. Locations of storm drain inlets are shown on the Erosion Control Plan in Appendix A. The contractor shall determine the appropriate type of drain inlet protection to meet conditions around the drainage inlets. Drain inlet shall be placed in a manner that does not cause ponding or pose a threat to traffic safety. The Contractor shall inspect drainage locations and protect them prior to commencing work. When the contractor identifies any storm drains, the contractor shall use all measures to protect that inlet. After construction, the contractor shall remove this BMP from all locations where implemented in a manner such that any debris around the storm drain inlet is not able to enter the storm drain system.

### *TC-1, Stabilized Construction Entrance and Exit*

A stabilized construction entrance/exit will be constructed and maintained at construction site entrances and exits. The site entrance/exit will be stabilized to reduce tracking of sediment as a result of construction traffic. The entrance shall be designated and graded to prevent runoff from leaving the site. Stabilization material will be 3-inch minus aggregate over filter fabric. The entrance shall be flared where meets the existing road to provide an adequate turning radius. The entrance shall include rumble strips 15 feet wide for a minimum of 50 feet in length. The location of the site entrance/ exit is shown on the Erosion Control Plan in Appendix A.

## 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.

## 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 | ✓ | X | | |
| NS-2 | Dewatering Operation | ✓ | | X | No dewatering planned |
| NS-3 | Paving and Grinding Operation | | | X | Not applicable |
| NS-4 | Temporary Stream Crossing | | | X | Not applicable |
| NS-5 | Clear Water Diversion | | | X | Not applicable |
| NS-6 | Illicit Connection/Discharge | ✓ | X | | |
| NS-7 | Potable Water/Irrigation | ✓ | X | | |
| NS-8 | Vehicle and Equipment Cleaning | ✓ | X | | |
| NS-9 | Vehicle and Equipment Fueling | ✓ | X | | |
| NS-10 | Vehicle and Equipment Maintenance | ✓ | X | | |
| NS-11 | Pile Driving Operation | | | X | Not applicable |
| NS-12 | Concrete Curing | | X | | |
| NS-13 | Concrete Finishing | | X | | |
| NS-14 | Material and Equipment Use Over Water | | | X | Not applicable |
| NS-15 | Demolition Removal Adjacent to Water | | | X | Not applicable |
| NS-16 | Temporary Batch Plants | | | X | Not applicable |

[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.

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.

### *NS-1, Water Conservation Practices*

Water application rates will be minimized as necessary to prevent runoff and ponding and water equipment leaks will be repaired immediately. The water truck filling area will be stabilized. Minimize exposure of construction materials to precipitation. This does not include materials and equipment that are designed to be outdoors and exposed to environmental conditions (i.e. poles, equipment pads, cabinets, conductors, insulators, bricks, etc.).

### *NS-6, Illicit Connection/Discharge*

The site will be inspected before the project commences and regularly during the project for illicit connections or illegal dumping or discharge. If any are found, they will be reported to the QSP and QSD at the time of discovery.

### *NS-7, Potable Water/Irrigation*

Potable water will be used for dust control purposes. The contractor shall inspect irrigated areas within the construction limits for excess watering. Watering times and schedules will be adjusted to ensure that the appropriate amount of water is being used and to minimize runoff.

### *NS-8, Vehicle and Equipment Cleaning*

Due to the nature of the project, vehicle and equipment cleaning or washing at the job site will not be allowed except what is necessary to control vehicle tracking or hazardous waste using TC-3. Clean or wash vehicles and equipment in a structure equipped with disposal facilities. You may wash vehicles in an outside area if the area is, paved with asphalt concrete, HMA, or PCC; Surrounded by a containment berm; Equipped with a sump to collect and dispose of wash water.

### *NS-9, Vehicle and Equipment Fueling*

Construction vehicles are to be fueled offsite when possible. When necessary, NS-9 will be used on all vehicles that cannot be fueled offsite. If fueling or maintenance must be done onsite, activities must be performed on level ground in areas protected from stormwater run-on and runoff. The area for equipment fueling onsite is to be determined by the QSP.

### *NS-10, Vehicle and Equipment Maintenance*

Most construction vehicles will be stored offsite but NS-10 will be utilized for all equipment that must be stored onsite. Plastic Sheeting will be placed under equipment that is not in use.

### *NS-11, Concrete Curing*

All constructed concrete elements are subject to curing requirements of NS-12.

### *NS-12, Concrete Finishing*

All constructed concrete elements are subject to finishing requirements of NS-13.

### 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.

## 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 | ✓ | X | | |
| WM-02 | Material Use | ✓ | X | | |
| WM-03 | Stockpile Management | ✓ | X | | |
| WM-04 | Spill Prevention and Control | ✓ | X | | |
| WM-05 | Solid Waste Management | ✓ | X | | |
| WM-06 | Hazardous Waste Management | ✓ | | X | Not applicable |
| WM-07 | Contaminated Soil Management | | X | | |
| WM-08 | Concrete Waste Management | ✓ | X | | |
| WM-09 | Sanitary-Septic Waste Management | ✓ | | X | Not applicable |
| WM-10 | Liquid Waste Management | ✓ | X | | |

[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.

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.

### *WM-1, Material Delivery and Storage*

The contractor shall establish laydown areas at various locations throughout the project site. Secondary containment shall be provided for any hazardous chemicals. Construction materials shall be brought onsite when needed to complete construction operations. Employees shall be trained on proper material delivery and storage practices. The contractor shall implement delivery and storage primarily during unloading and handling of materials onsite. Spill clean-up materials, material safety data sheets, a material inventory, and emergency contact numbers shall be maintained and stored on site.

### *WM-2, Material Use*

Contractor shall use materials in accordance with Manufacture's specifications to avoid misuse. Spill kits, absorbent pads, drip Pans, material safety data sheets, a material inventory, and emergency contact numbers shall be maintained onsite. The contractor shall have Safety Data Sheets (SDS) readily available upon request.

### *WM-3, Stockpile Management*

Implement water pollution control practices within 72 hours of stockpiling material or before a forecasted storm event, whichever occurs first. If stockpiles are being used, do not allow soil, sediment, or other debris to enter storm drains, open drainages, and watercourses. Active and inactive soil stockpiles and stockpiles of asphalt concrete and PCC rubble, HMA, aggregate base, or aggregate subbase must be covered with plastic sheeting and surrounded with a linear sediment barrier, such as fiber rolls or gravel bags. Stockpiles of cold mix asphalt concrete must be; placed on an impervious surface, covered with an impermeable material, such as plastic sheeting, and be protected from stormwater run-on and runoff. Control wind erosion year-round under Section 14-9.02, "Dust Control," of the Standard Specifications Stockpile management practices will be performed per the special provisions and standard specifications.

### *WM-4, Spill Prevention and Control*

Throughout the entirety of the project the contractor shall implement spill and leak prevention procedures for chemicals and hazardous substances when encountered on the jobsite per WM-4. The contractor will keep a spill and clean up kit readily available at all times while onsite to allow for quick clean-up of all spills or leaks. Chemicals shall be stored in watertight containers (with appropriate secondary containment to prevent any spillage or leakage) or in a storage shed (completely enclosed).

### *WM-5, Solid Waste Management*

Solid Waste Management shall be implemented to minimize stormwater contact with waste materials and prevent waste discharges. Throughout project, the contractor will load solid wastes directly into trucks and/or waste disposal containers for off-site disposal. Waste disposal containers will be covered at the end of every business day and during rain events. There will be watertight, closed-lid dumpsters to contain the solid waste generated by work activities. Dumpsters and trash receptacles will be placed in locations where workers eat lunch in order to reduce litter. When refuse reaches the fill line, the dumpsters shall be emptied. Dumpster will not be allowed to be washed out at the job site.

### *WM-7, Contaminated Soil Management*

Identify contaminated soil that is naturally occurring or that is from spills or leaks by noticing discoloration, odors, or differences in soil properties. Soil with evidence of contamination must be sampled and tested by a laboratory certified by ELAP. If levels of contamination are found to be hazardous, handle and dispose of the soil as hazardous waste.

### *WM-8, Concrete Waste Management*

The contractor will implement concrete waste management in the construction project yard and multiple areas throughout the construction project area. The temporary concrete washout will be furnished, maintained, and removed as necessary. The contractor will use portable temporary concrete washouts as a water pollution control practice for any concrete waste that is produced. All concrete washouts will be properly marked, covered before any rain event, and will be maintained properly. Employees, subcontractors, and suppliers shall be fully educated on the concrete waste management techniques outlined in the following practices and procedures: PCC and AC wastes shall not be allowed to enter storm drains or watercourses. Concrete pours or operations that will generate concrete slurries will not be conducted during or immediately prior to rainfall events.

### *WM-10, Liquid Waste Management*

Contractor shall implement the Liquid Waste Management BMP when liquid wastes are anticipated to prevent it from entering the storm drain and receiving waters. Hold liquid waste in structurally sound, leak-proof containers, such as roll-off bins or portable tanks. Liquid waste containers must be of sufficient quantity and volume to prevent overflow, spills, and leaks. Store containers at least 50 feet from moving vehicles and equipment. All liquid wastes shall be stored in covered storage areas and within leak proof containers. Liquid wastes shall be properly collected and disposed of offsite. Liquid waste management practices will be performed per the special provisions and standard specs.

## 3.4 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 compliance with 2022 CGP Provision IV.N.3 and use of the SMARTS water balance calculator. The post construction requirements 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 |
|---|---|---|
| | | |
| | | |

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: | XX |
| Title: | XX |
| Contractor Company: | XX |
| Address | XX |
| Phone Number: | XX |
| Phone Number (24/7) | XX |

Or: To be filled out by Contractor/ QSP prior to site mobilization.

# 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 and Numeric Action Levels (NALs);
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.

- 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 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. 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 Los Angeles INTL AP, https://forecast.weather.gov/data/obhistory/KLAX.html

## 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 local and federal guidelines and OSHA requirements.

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 8 am-5 pm.

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

Per Section III.B.2. of Attachment D in the 2022 CGP, "For inactive projects, dischargers may reduce the visual inspection frequency and suspend sampling per Section III.G of the 2022 CGP. Dischargers shall provide an explanation with supporting information for all missed visual inspections or sampling required by this Attachment, to be included in the Annual Report."

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] | |
| BMP Inspections | Weekly[2] |
| BMP Inspections – Tracking Control | Daily |
| Non-Stormwater Discharge Observations | Quarterly during daylight hours |
| *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: Contact phone:

Assigned QSP Delegate: Contact 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 7 days of the inspection submit copies of the completed inspection report to the QSD.

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 7 days of the inspection submit copies of the completed *Inspection Field Log Sheet* or *BMP Inspection Report* with the corrective actions to the QSD.

Results of visual monitoring must be summarized and reported in the Annual Report by the QSP.

### *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.

There are 14 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

**Table 7-2 Site Drainage Areas**

| Location No. | Location |
|---|---|
| - | Refer to SWCP in Appendix A for Drainage Area locations |

There are 5 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**

| Location No. | Location |
|---|---|
| POI#1 | located along the north side of 129th Street, at the tie-in point between the proposed and existing curb and gutter |
| POI#2 | located along the north side of 129th Street, at the tie-in point between the proposed and existing curb and gutter |
| POI#3 | Existing catch basin at the end of concrete swale near the entrance at 130th Street |
| | **Visual monitoring shall occur across entire site |

## 7.7 Water Quality Sampling and Analysis

### *7.7.1 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.

Table 7-4 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 where the source is present are shown on 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 | Site Drainage Area |
|---|---|---|---|
| Asphalt Work | VOCs | Construction/Contractor Activity | Entire Site |
| Concrete/ Masonry Work | SVOCs, VOCs, pH, Al, Ca, Va, Zn | Construction/Contractor Activity | Entire Site |
| Grading/ Earthwork | pH, Contaminated Soil | Construction/Contractor Activity | Entire Site |
| Painting | COD, SVOCs, VOCs | Construction/Contractor Activity | Entire Site |

**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 | Site Drainage Area |
|---|---|---|---|
| Demolition | Zn, VOCs, PCBs | Construction/Contractor Activity | Entire Site |

#### *7.7.1.1 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.

#### *7.7.1.2 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.

Additional sampling location(s) on the project site and the contractor's yard shall be identified by the QSP 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.

The QSP is to identify a sampling location(s) for the collection of an uncontaminated sample of runoff as a background sample for comparison with the samples being analyzed for non-visible pollutants. This location(s) was selected 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.

The QSP is to identify a sampling location(s) for the collection of samples of run-on to the project site. Run-on from these locations has the potential to combine with discharges from the site being sampled for non-visible pollutants. These samples are intended to identify potential sources of non-visible pollutants that originate off the project site.

**Table 7-6 Non-Visible Pollutant Sample Locations**

| Sample Location Identifier | Sample Location Description | Sample Location Latitude and Longitude (Decimal Degrees) | Runoff or Run-on |
|---|---|---|---|
| NV-1 | Construction Staging/ Washout Area | N 33° 54' 55.20" W 118° 21' 4.06" | Runoff |
| NV-2 | Construction Staging/ Washout Area | N 33° 54' 54.71" W 118° 21' 2.49" | Runoff |
| **Additional locations to be field determined by the QSP according to stage of construction and/or unforeseen construction activities that require it. | | | |

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.

*7.7.1.3 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.

#### *7.7.1.4 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.

#### *7.7.1.5 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.

Grab samples shall be collected and preserved in accordance with the methods identified in the Table 7-7, "Sample Collection, Preservation and Analysis for Monitoring Non-Visible Pollutants" provided in Section 7.7.1.6. Only the QSP, or QSP Delegates trained on sample collection identified in Section 7.7.1.3 shall collect samples.

Sample collection and handling requirements are described in Section 7.7.7.

**Table 7-7 Sample Collection, Preservation and Analysis for Monitoring Non-Visible Pollutants**

| Constituent | Analytical Method | Minimum Sample Volume | Sample Containers | Sample Preservation | Minimum Level | Maximum Holding Time |
|---|---|---|---|---|---|---|
| pH | EPA 150.1 | 500 ml | PE or glass | 4 degrees C | 0.1 pH Unit HHn | 15 minutes |
| OCPs | EPA 8081 | 1 liter | PE or glass | 4 degrees C | 3ppb | 7 days |
| Pesticides/PCBs | EPA 8081A/8082 | 1 liter | PE or glass | 4 degrees C | Per Lab | Per Lab |
| Phosphate | EPA 365.3 | 1 liter | PE or glass | 4 degrees C | 0.1 mg/L | 2 days |
| Nitrate | EPA 300.0 | 1 liter | PE or glass | 4 degrees C | 1 mg/L | 2 days |
| VOCs-Solvents | EPA 8260B | 3 x 40 mL | VOA-glass | Store at 4˚C, HCl to pH<2 | 1 µg/L | 14 Days |
| COD | EPA 410.4 | 1 x 250 mL | 1 x 250 mL | Store at 4˚C, H2S04 to pH<2 | 5 mg/L | 28 days |
| SVOCs | EPA 8260B | 3 x 40 mL | Glass-Amber | Store at 4˚ C | 10 pg/L | 7 days |
| Metals (Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, Se, Na, Th, Va, Zn) | EPA 6010B/7470A | 1 x 250 mL | Polypropylene | Store at 4˚C, HNO3 to pH<2 | 0.1 mg/L | 6 months |
| Notes: Analytical laboratories may use the term Reporting Level in lieu of Minimum Level | | | | | | |

#### *7.7.1.6 Sample Analysis*

Samples shall be analyzed using the analytical methods identified in the Table 7-7.

Samples will be analyzed by (Lab to be selected and identified by the QSP):

Laboratory Name:

Street Address:

City, State Zip:

Telephone Number:

Point of Contact:

ELAP Certification Number:

Samples will be delivered to the laboratory by: **To Be Determined by QSP**

#### *7.7.1.7 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.

Analytical results of non-visible pollutant monitoring shall be submitted to SMARTS within 30 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.

### *7.7.2 Sampling and Analysis Plan for pH and Turbidity in Stormwater Runoff Discharges*

Sampling and analysis of runoff for pH and turbidity is not required for Risk Level 1 projects.

### *7.7.3 Sampling and Analysis Plan for pH and Turbidity in Receiving Water*

This project is not subject to Receiving Water Monitoring.

### *7.7.4 Sampling and Analysis Plan for Dewatering Discharges*

No dewatering activities are planned for this project. Any emergency dewatering that is required during construction will be the responsibility of the QSP.

### *7.7.5 Sampling and Analysis Plan for Other Pollutants Required by the Regional Water Board*

The Regional Water Board has not specified monitoring for additional pollutants.

### *7.7.6 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 |
|---|---|

The QSP and QSP Delegates have the following stormwater sampling experience:

| Name | Experience |
|---|---|

### *7.7.7 Sample Collection and Handling*

#### *7.7.7.1 Sample Collection*

Samples shall be collected at the designated sampling locations shown on the Site Maps and listed in the preceding sections. Samples shall be collected, maintained and shipped in accordance with the 2022 CGP Sample Collection and Handling Instructions.

Grab samples shall be collected and preserved in accordance with the methods identified in preceding sections.

To maintain sample integrity and prevent cross-contamination, sample collection personnel shall follow the protocols below.

- Collect samples (for laboratory analysis) in analytical laboratory-provided or specified sample containers;
  - Use of any other type of containers could cause sample contamination and may result in NAL or NEL exceedances.
- Wear clean, powder-free nitrile gloves when collecting samples;
- Change gloves whenever something not known to be clean has been touched;
- Change gloves between sampling locations;
- Decontaminate all equipment (e.g., bucket, tubing) prior to sample collection;
  - using a trisodium phosphate water wash, distilled water rinse, and final rinse with distilled water..
  - Dispose of wash and rinse water appropriately (i.e., do not discharge to storm drain or receiving water).
  - Do not decontaminate laboratory provided sample containers;
- Do not smoke during sampling events;
- Never sample near a running vehicle;
- Do not park vehicles in the immediate sample collection area (even non-running vehicles);
- Do not eat or drink during sample collection; and
- Do not breathe, sneeze, or cough in the direction of an open sample container.

The most important aspect of grab sampling is to collect a sample that represents the entire runoff stream. Typically, samples are collected by dipping the collection container in the runoff flow paths and streams as noted below.

i. For small streams and flow paths, simply dip the bottle facing upstream until full.
ii. For larger stream that can be safely accessed, collect a sample in the middle of the flow stream by directly dipping the mouth of the bottle. Once again making sure that the opening of the bottle is facing upstream as to avoid any contamination by the sampler.
iii. For larger streams that cannot be safely waded, pole-samplers may be needed to safely access the representative flow.
iv. Avoid collecting samples from ponded, sluggish or stagnant water.
v. Avoid collecting samples directly downstream from a bridge as the samples can be affected by the bridge structure or runoff from the road surface.

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.

#### *7.7.7.2 Sample Handling*

Turbidity and pH measurements must be conducted immediately. Do not store turbidity or pH samples for later measurement.

Samples for laboratory analysis must be handled as follows. Immediately following sample collection:

- Cap sample containers;
- Complete sample container labels;
- Place sealed containers in a re-sealable storage bag;
- Place sample containers into an ice-chilled cooler;
- Document sample information on the *Effluent Sampling Field Log Sheet* (Appendix O); and
- Complete the CoC.

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). Lab to be selected and identified by the QSP:

Laboratory Name:

Address:

City, State Zip:

Telephone Number:

Point of Contact:

#### *7.7.7.3 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.

## 7.8 Active Treatment System Monitoring

Will an Active Treatment System (ATS) be deployed on the site?

☐ Yes ☒ No

This project does not require a project specific Sampling and Analysis Plan for an ATS because deployment of an ATS is not planned.

## 7.9 Passive Treatment Monitoring

Will passive treatment technologies be deployed on the site?

☐ Yes ☒ No

This project does not require a project specific Sampling and Analysis Plan for passive treatment because deployment of passive treatment is not planned.

## 7.10 Watershed Monitoring Option

This project is not participating in a watershed monitoring option.

## 7.11 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.

### *7.11.1 Field Logs*

The purpose of field logs is to record sampling information and field observations during monitoring that may explain any uncharacteristic analytical results. Sampling information to be included in the field log include the date and time of water quality sample collection, sampling personnel, sample container identification numbers, and types of samples that were collected. Field observations should be noted in the field log for any abnormalities at the sampling location (color, odor, BMPs, etc.). Field measurements for pH and turbidity should also be recorded in the field log. A Visual Inspection Field Log, an Effluent Sampling Field Log Sheet, are included in Appendix O.

### *7.11.2 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.

### *7.11.3 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.

### *7.11.4 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.
(Required for all sampling plans with field measurements or laboratory analysis)

☐ Equipment Blanks at a frequency of 5 percent.
(Only needed if the equipment used to collect samples could add the pollutants to sample)

☐ Field Blanks at a frequency of 5 percent.
(Only required if sampling method calls for field blanks)

☐ Travel Blanks at a frequency of 5 percent.
(Required for sampling plans that include VOC laboratory analysis)

#### *7.11.4.1 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.

#### *7.11.4.2 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.

#### *7.11.4.3 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.

#### *7.11.4.4 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.

### *7.11.5 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.

## 7.12 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.

# Section 8 References

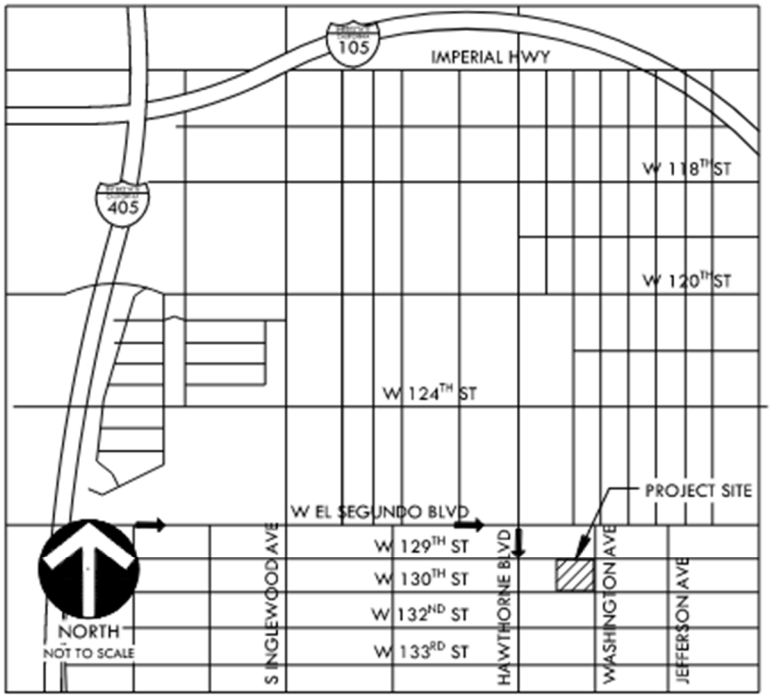
Project Plans and Specifications prepared by Verde Design, Inc.

SWRCB (State Water Resources Control Board). (2022). Order 2022-0057-DWQ, NPDES General Permit No. CAS000002: Stormwater Discharges Associated with Construction and Land Disturbing Activities. Available online at: https://www.waterboards.ca.gov/water_issues/programs/stormwater/construction/general_permit_reissuance.html.

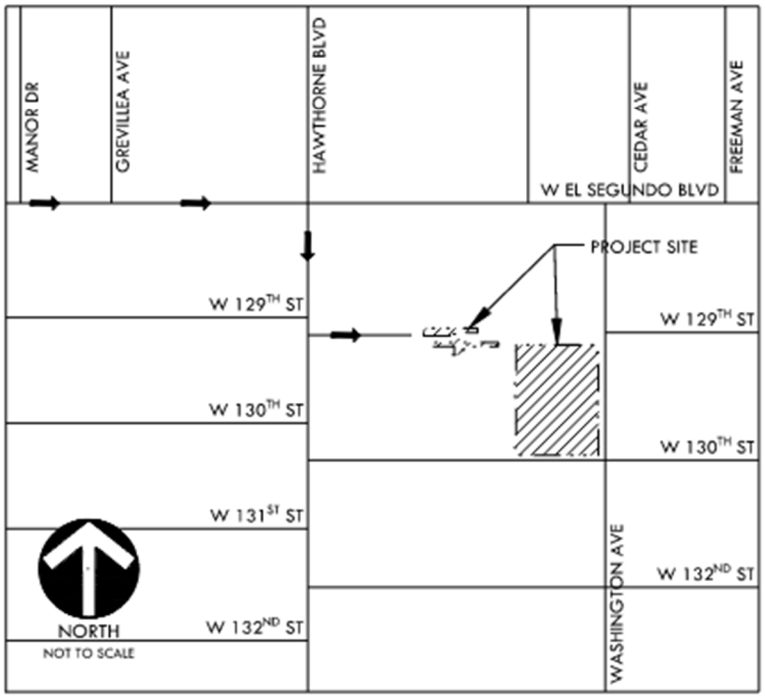
CASQA 2023. *Stormwater BMP Handbook: Construction*. Available online at: www.casqa.org

# Appendix A: Site Maps and Drawings

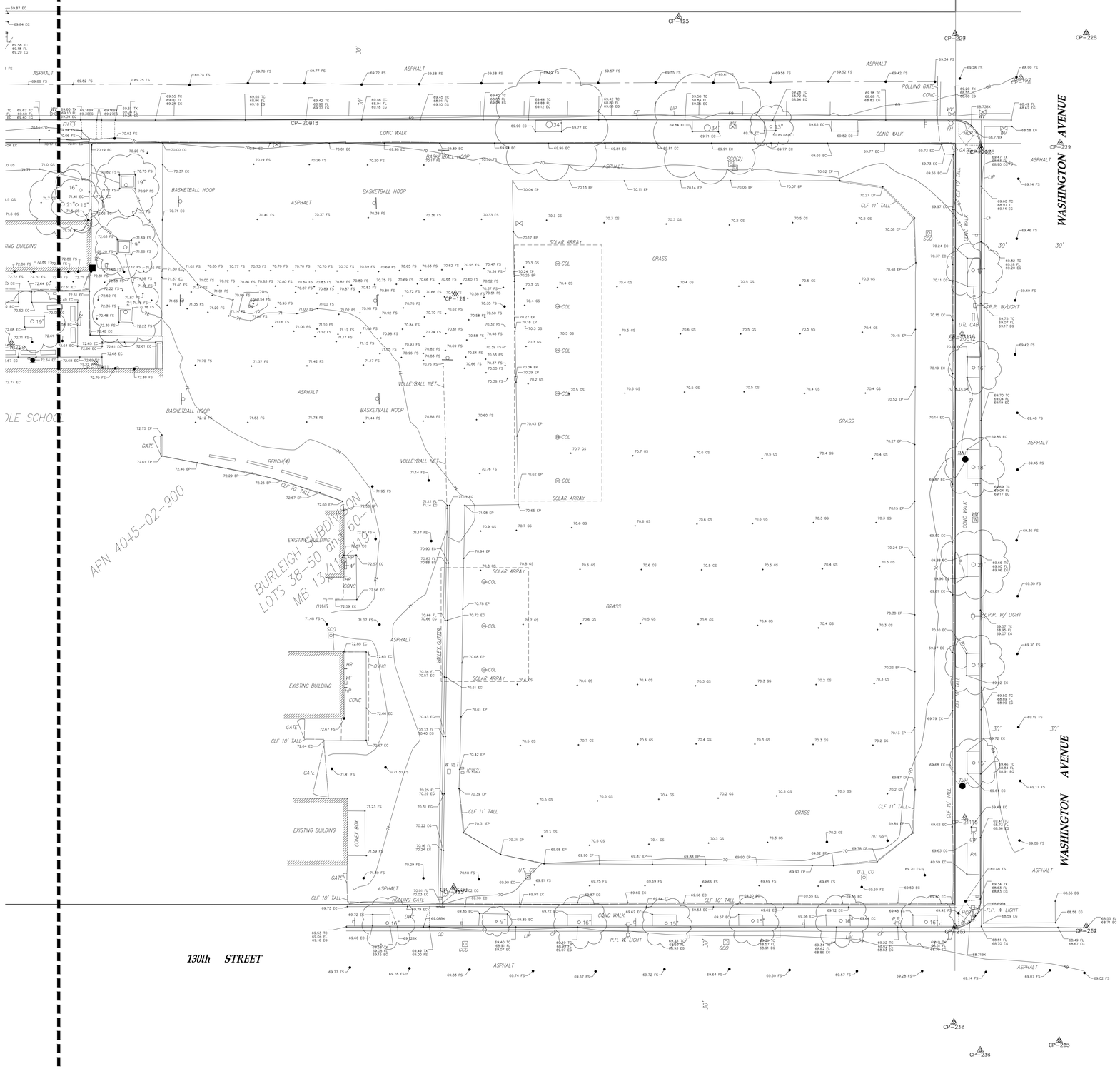
## PROJECT MAP




VICINITY MAP




SITE MAP




# SHEET INFO AND REFERENCE

1. THIS TOPOGRAPHIC SURVEY WAS PROVIDED BY IMEG . (TELEPHONE): (909) 477-6915 (ADDRESS): 901 VIA PIEMONTE, ONTARIO, CA 91764.
2. ADDITIONAL INFORMATION (SHOWN SCREENED) IS FROM RECORD DRAWINGS PROVIDED BY THE OWNER AND SITE INVESTIGATIONS BY VERDE DESIGN
3. NOTE THAT THIS IS NOT A COMPLETE UNDERGROUND SURVEY. THIS DRAWING CONTAINS ONLY PARTIAL INFORMATION FOR THE EXISTING IRRIGATION, SANITARY SEWER, STORM DRAIN SYSTEMS, ETC. CONTRACTOR IS RESPONSIBLE FOR VERIFYING EXISTING CONDITIONS.

# BASIS OF BEARING

THE BASIS OF BEARING FOR THIS SURVEY IS BASED ON THE CENTERLINE OF EL SEGUNDO BOULEVARD BEING HELD AS S89°58'30"E AS PER TRACT MAP RECORDED IN BOOK 13, PAGES 118-119, OF MAPS, RECORDS OF LOS ANGELES COUNTY, CALIFORNIA.

# BENCH MARK

LOS ANGELES COUNTY PUBLIC WORKS SURVEY SECTION

BM NUMBER: QY12543
DATUM: NAVD 88
ELEVATION: 66.238 FEET

DESCRIPTION: I&TAG IS#2625 IN CB @ S B/W ROSECRANS AVE 2FT W/O ANGLE PT @ SW COR HAWTHORNE BLVD

# SURVEYOR NOTE

THE SURVEY WAS COMPILED USING RECORD SURVEY MAPS. NO TITLE REPORT WAS SUPPLIED TO THE SURVEYOR. THE SURVEYOUR CLAIMS NO RESPONSIBILITY FOR THE ACCURACY OF BOUNDARY LINES, EASEMENTS AND/OR ANY OTHER RESTRICTIONS AFFECTING THE PROPERTY THAT NOT SHOWN, IF ANY.

# UTILITY NOTE

THE LOCATION OF UTILITIES ARE SHOWN HEREON BY OBSERVED EVIDENCE ONLY.

# SURVEY LEGEND

## ABBREVIATIONS

| | |
|---|---|
| BFP | BACKFLOW PREVENTOR |
| BX | BOTTOM OF TRANSITION |
| CAB | CABINET |
| CD | CURB DRAIN |
| CF | CURB FACE |
| CLF | CHAIN LINK FENCE |
| CO | CLEANOUT |
| COL | COLUMN |
| CONC | CONCRETE |
| DWY | DRIVEWAY |
| E | ELECTRIC |
| EC | EDGE OF CONCRETE |
| EG | EDGE OF GUTTER |
| EP | EDGE OF PAVEMENT |
| E.T. | ELECTRICAL TRANSFORMER |
| FDC | FIRE DEPARTMENT CONNECTION |
| FH | FIRE HYDRANT |
| FL | FLOWLINE |
| FS | FINISHED SURFACE |
| G | GAS |
| GH | GAS HANDHOLE |
| GM | GAS METER |
| GS | GROUND SHOT |
| GV | GAS VALVE |
| GW | GUY WIRE |
| HCR | HANDICAP RAMP |
| HR | HAND RAIL |
| ICV | IRRIGATION CONTROL VALVE |
| INV | INVERT |
| LIP | LIP OF GUTTER |
| LP | LIGHT POLE |
| MH | MANHOLE |
| OVHG | OVERHANG |
| PA | PLANTER AREA |
| PB | PULL BOX |
| P.P. | POWER POLE |
| S | SEWER |
| T | TELECOMMUNICATIONS |
| TC | TOP OF CURB |
| TX | TOP OF TRANSITION |
| UTL | UTILITY |
| VLT | VAULT |
| WF | WATER FOUNTAIN |
| WIF | WROUGHT IRON FENCE |
| WM | WATER METER |
| WV | WATER VALVE |
| _" | INDICATES APPROX. TREE TRUNK DIAMETER |
| ( ) | INDICATES QUANTITY IN AREA |

- CHAIN LINK FENCE
- WROUGHT IRON FENCE
- PROPERTY BOUNDARY LINE
- PARCEL LINE
- UNDERLYING LOT LINE
- RIGHT-OF-WAY LINE
- BREAKLINE
- CENTERLINE
- 100 CONTOUR
- 100.00 SPOT ELEVATION
- CONTROL POINT
- SIGN
- ADA STALL
- DECIDUOUS TREE
- BOLLARD
- BASKETBALL HOOP

NORTH
0' 10' 20' 40' 80'

IDENTIFICATION STAMP
DIV. OF THE STATE ARCHITECT
APP: 03-125961 INC:
REVIEWED FOR
SS ☑ FLS ☑ ACS ☑
DATE: 10/12/2026

VERDE DESIGN
LANDSCAPE ARCHITECTURE
CIVIL ENGINEERING
SPORT PLANNING & DESIGN
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Riverside, CA 92501
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LICENSED ARCHITECT — DAVID CLARK — No. C-23409 — Exp. 03-31-27 — STATE OF CALIFORNIA

CONSULTANT

IMEG
PH: 909.477.6915
www.imegcorp.com
901 Via Piemonte, Suite 400
Ontario, CA 91764

SHEET TITLE

EXISTING CONDITIONS SURVEY PLAN

PROJECT NAME

HAWTHORNE MIDDLE SCHOOL TURF FIELD & TRACK IMPROVEMENTS

PROJECT ADDRESS

4366 W 129TH ST, HAWTHORNE, CA 90250

| SUBMITTAL | DATE |
|---|---|
| DESIGN DEVELOPMENT SUBMITTAL | 11/26/25 |
| DSA SUBMITTAL | 03/10/26 |

| NO. | REVISIONS | DATE |
|---|---|---|
| 1 | | |
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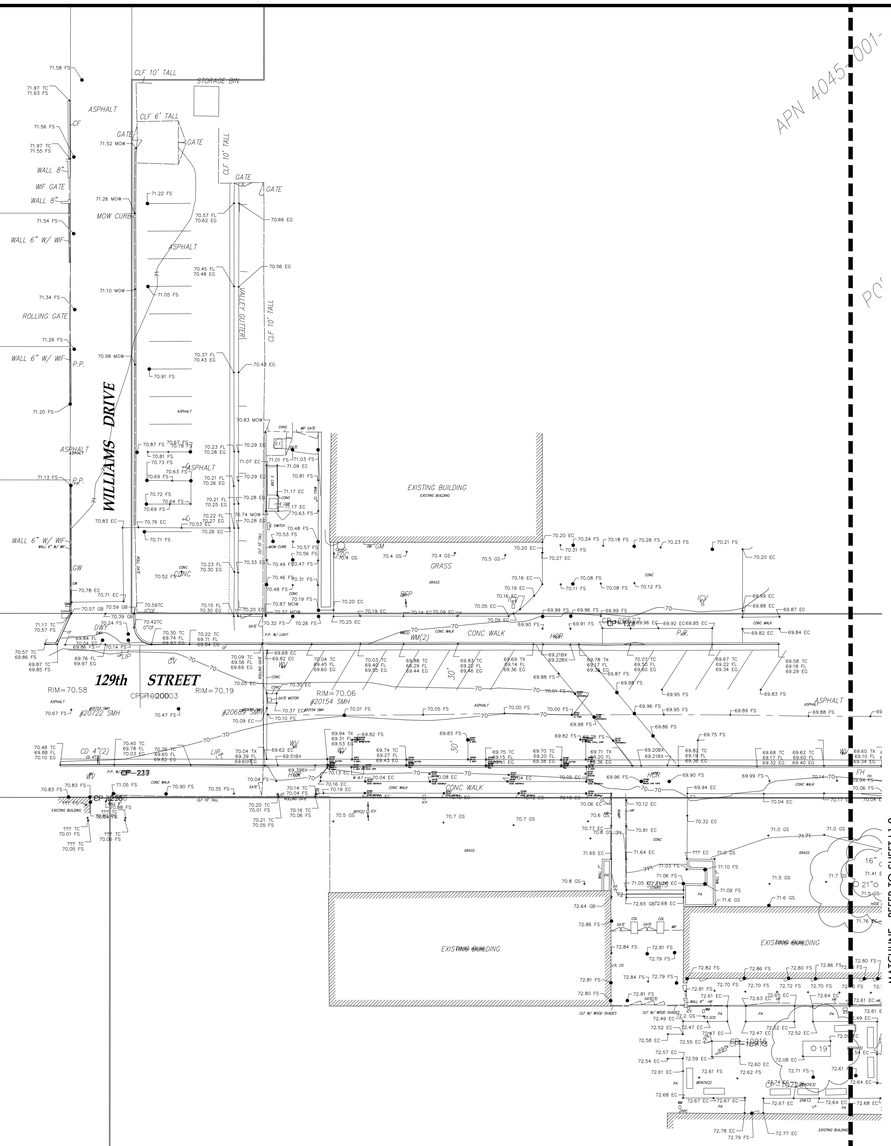
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|---|---|
| IMEG | DC/CG |
| DATE ISSUED | SCALE |
| 06/10/2026 | |

PROJ. NO. 2223000

SHEET NO. L1.0

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DRAWING NAME: Y:\Projects-R\2022\2223000 - Hawthorne MS T&F Assess\CAD_L1.0-EXC.dwg
PLOT DATE: 06-01-26 PLOTTED BY: station14




90'

HAWTHORNE BLVD.

90'

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## BENCH MARK

LOS ANGELES COUNTY PUBLIC WORKS SURVEY SECTION

BM NUMBER: QY12543
DATUM: NAVD 88
ELEVATION: 66.258 FEET

DESCRIPTION: I&TAG IS#2625 IN CB @ S B/W ROSECRANS AVE 2FT W/O ANGLE PT @ SW COR HAWTHORNE BLVD

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| CLF | CHAIN LINK FENCE |
| CO | CLEANOUT |
| COL | COLUMN |
| CONC | CONCRETE |
| DWY | DRIVEWAY |
| E | ELECTRIC |
| EC | EDGE OF CONCRETE |
| EG | EDGE OF GUTTER |
| EP | EDGE OF PAVEMENT |
| E.T. | ELECTRICAL TRANSFORMER |
| FDC | FIRE DEPARTMENT CONNECTION |
| FH | FIRE HYDRANT |
| FL | FLOWLINE |
| FS | FINISHED SURFACE |
| G | GAS |
| GH | GAS HANDHOLE |
| GM | GAS METER |
| GS | GROUND SHOT |
| GV | GAS VALVE |
| GW | GUY WIRE |
| HCR | HANDICAP RAMP |
| HR | HAND RAIL |
| ICV | IRRIGATION CONTROL VALVE |
| INV | INVERT |
| LIP | LIP OF GUTTER |
| LP | LIGHT POLE |
| MH | MANHOLE |
| OVHG | OVERHANG |
| PA | PLANTER AREA |
| PB | PULL BOX |
| P.P. | POWER POLE |
| S | SEWER |
| T | TELECOMMUNICATIONS |
| TC | TOP OF CURB |
| TX | TOP OF TRANSITION |
| UTL | UTILITY |
| VLT | VAULT |
| WF | WATER FOUNTAIN |
| WIF | WROUGHT IRON FENCE |
| WM | WATER METER |
| WV | WATER VALVE |
| _ " | INDICATES APPROX. TREE TRUNK DIAMETER |
| ( ) | INDICATES QUANTITY IN AREA |

- CHAIN LINK FENCE
- WROUGHT IRON FENCE
- PROJECT BOUNDARY LINE
- PARCEL LINE
- UNDERLYING LOT LINE
- RIGHT-OF-WAY LINE
- BREAKLINE
- CENTERLINE
- 100 CONTOUR
- 100.00 SPOT ELEVATION
- CONTROL POINT
- SIGN
- ADA STALL
- DECIDUOUS TREE
- BOLLARD
- BASKETBALL HOOP

NORTH
0' 10' 20' 40' 80'

IDENTIFICATION STAMP
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APP: 03-125961 INC:
REVIEWED FOR
SS ☑ FLS ☑ ACS ☑
DATE: 10/12/2026

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3685 Main St. Suite 350
Riverside, CA 92501
tel: 951.221.3142
faxx 408.985.7260
www.VerdeDesigninc.com

STAMP

REGISTERED PROFESSIONAL ENGINEER — DAVID CHANG — C-56494 — EXPIRATION DATE: June 30, 2027 — STATE OF CALIFORNIA

LICENSED ARCHITECT — CHRISTOPHER CLARK — No. C-33409 — EXPIRATION DATE: 03-31-27 — STATE OF CALIFORNIA

CONSULTANT

IMEG
PH: 909.477.6915
www.imegcorp.com
901 Via Piemonte, Suite 400
Ontario, CA 91764

SHEET TITLE

EXISTING CONDITIONS SURVEY PLAN

PROJECT NAME

HAWTHORNE MIDDLE SCHOOL TURF FIELD & TRACK IMPROVEMENTS

PROJECT ADDRESS

4366 W 129TH ST, HAWTHORNE, CA 90250

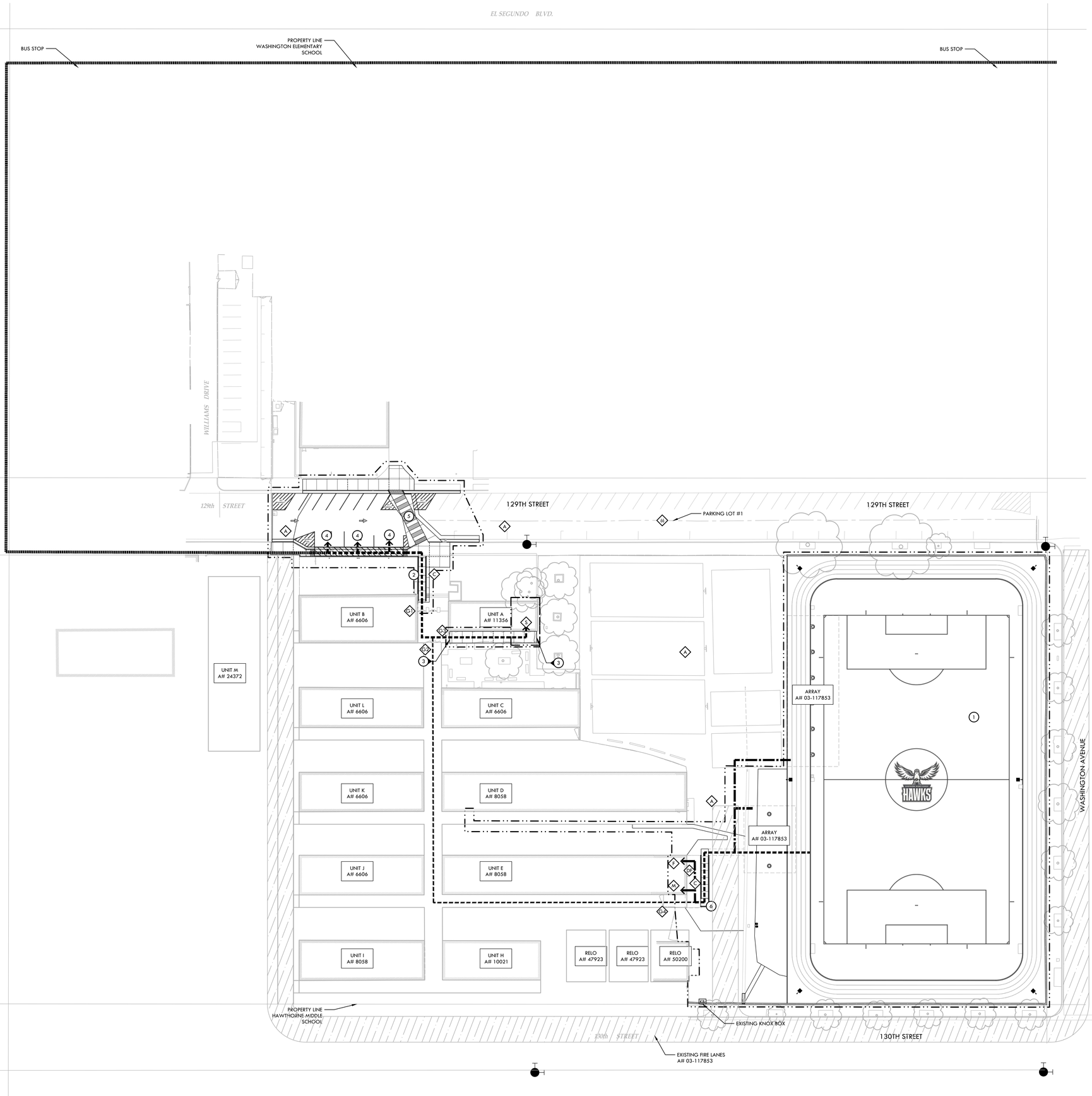
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| DSA SUBMITTAL | 03/10/26 |
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| DATE ISSUED: 06/10/2026 | SCALE: |
| PROJ. NO.: 2223000 | |
| SHEET NO.: L1.1 | |

DRAWING NAME: Y:\Projects-R\2022\2223000 - Hawthorne MS T&F Assess\CAD_L1.0-EXC.dwg
PLOT DATE: 09-01-26 PLOTTED BY: station14

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# ACCESSIBILITY PLAN NOTES

1. ACCESSIBLE PATH OF TRAVEL AS INDICATED ON PLAN IS A BARRIER FREE ACCESS ROUTE WITHOUT ANY ABRUPT LEVEL CHANGES EXCEEDING ½" BEVELED AT 1:2 MAX. SLOPE, OR VERTICAL LEVEL CHANGES EXCEEDING ½" MAX. AND A LEAST 48" WIDE. SURFACE IS SLIP RESISTANT, STABLE, FIRM, AND SMOOTH. CROSS SLOPE DOES NOT EXCEED 2% AND SLOPE IN THE DIRECTION OF TRAVEL IS LESS THAN 5% UNLESS OTHERWISE INDICATED.

2. ACCESSIBLE PATH OF TRAVEL SHALL BE MAINTAINED FREE OF OVERHANGING OBSTRUCTIONS TO 80" MINIMUM AND PROTRUDING OBJECTS GREATER THAN 4" PROJECTION FROM WALL AND ABOVE 27" AND LESS THAN 80". ARCHITECT SHALL VERIFY THAT THERE ARE NO BARRIERS IN THE PATH OF TRAVEL.

3. ACCESSIBLE PARKING
SIGNAGE REQUIREMENTS: THE AMENDED REGULATIONS INDICATE THAT THE SIGNAGE AT ACCESSIBLE PARKING SPACES SHALL INCLUDE "MINIMUM FINE $250" BELOW THE INTERNATIONAL SYMBOL OF ACCESSIBILITY AS EITHER AN ADDITIONAL SIGN OR ADDITIONAL LANGUAGE. THIS FINE POSTING REQUIREMENT IS IN ADDITION TO OTHER SIGNAGE REGULATIONS CONTAINED IN THE CALIFORNIA BUILDING CODE FOR ACCESSIBLE PARKING SPACES.

4. STRIPING REQUIREMENTS:
THE REVISED REGULATIONS INDICATE THAT THE ACCESSIBLE PARKING SPACE STRIPING SHALL BE AS FOLLOWS. THE BORDER (PERIMETER) SHALL BE PAINTED BLUE. THE HATCHING WITHIN THE LOADING AND UNLOADING ACCESS AISLE SHALL BE PAINTED A SUITABLE CONTRASTING COLOR TO THE PARKING SPACE AT 3'-0" MAXIMUM ON CENTER. BLUE OR WHITE PAINT IS PREFERRED.

5. DESIGN PROFESSIONAL IN GENERAL RESPONSIBLE CHARGE STATEMENT
THE POT IDENTIFIED IN THESE CONSTRUCTION DOCUMENTS MEETS THE REQUIREMENTS OF THE CURRENT APPLICABLE CALIFORNIA BUILDING CODE (CBC) ACCESSIBILITY PROVISIONS FOR PATH OF TRAVEL REQUIREMENTS FOR ALTERNATIONS, ADDITIONS AND STRUCTURAL REPAIRS. AS PART OF THE DESIGN OF THIS PROJECT, THE POT WAS EXAMINED AND ANY ELEMENTS, COMPONENTS OR PORTIONS OF THE POT THAT WERE DETERMINED TO BE NON COMPLIANT WITH THE CBC HAVE BEEN IDENTIFIED AND THE CORRECTIVE WORK NECESSARY TO BRING THEM INTO COMPLIANCE HAS BEEN INCLUDED WITHIN THE SCOPE OF THIS PROJECTS; WORK THROUGH DETAILS, DRAWINGS AND SPECIFICATION INCORPORATED INTO THESE CONSTRUCTION DOCUMENTS. ANY NONCOMPLIANT ELEMENTS, COMPONENTS OR PORTIONS OF THE POT THAT WILL NOT BE CORRECTED BY THIS PROJECT BASED ON VALUATION THRESHOLD LIMITATIONS OR A FINDING OF UNREASONABLE HARDSHIP ARE INDICATED IN THESE CONSTRUCTION DOCUMENTS.

6. DURING CONSTRICTION, IF POT ITEMS WITHIN THE SCOPE OF THE PROJECT REPRESENTED AS CBC COMPLAINT ARE FOUND TO BE NONCONFORMING BEYOND REASONABLE CONSTRUCTION TOLERANCES, THE ITEMS SHALL BE BROUGHT INTO COMPLIANCE WITH THE CBC AS A PART OF THIS PROJECT BY MEANS OF A CONSTRUCTION CHANGE DOCUMENT."

# ACCESSIBILITY LEGEND

| SYM | DESCRIPTION |
|---|---|
| | PROJECT LIMIT OF WORK |
| | ADA ACCESSIBLE PATH OF TRAVEL (4 FT. MIN. WIDTH @ S=5% MAX.) |
| | ADA ACCESSIBLE POINT OF ENTRY |
| | PEDESTRIAN CIRCULATION PATH |
| | EXISTING ACCESSIBLE PATH OF TRAVEL (P.O.T.) A# 117853 |
| | TRUNCATED DOMES, REFER TO DETAIL J, SHEET L2.1. |
| ◇ 68 | NUMBER OF EXISTING PARKING STALLS |
| 1 | PROPOSED ALL-WEATHER TRACK & SYNTHETIC TURF FIELD |
| 2 | UPGRADE EXISTING ACCESSIBLE RAMP, REFER TO MATERAILS PLAN, SHEET L8.0 |
| 3 | NEW CONCRETE PAVING AT PATH OF TRAVEL, REFER TO GRADING PLAN, SHEET L5.0 |
| 4 | PROPOSED ADA COMPLIANT PARKING STALLS. REFER TO DETAIL F, SHEET L2.1 |
| 5 | NEW CONCRETE CROSSWALK, REFER TO GRADING PLAN, SHEET L5.0 |
| 6 | PROPOSED SLOPED WALKWAY, REFER TO GRADING PLAN, SHEET L5.0 AND MATERIAL PLAN L8.0 |
| ◇ C | EXISTING CONCRETE PAVING |
| ◇ A | EXISTING ASPHALT PAVING |
| ◇ DF | EXISTING ACCESSIBLE DRINKING FOUNTAIN, REFER TO DETAIL K, SHEET L2.1 |
| ◇ G1 | EXISTING WROUGHT IRON ORNAMENTAL GATE REMAIN OPEN DURING SCHOOL HOURS, REFER TO DETAIL A, SHEET L2.1 |
| ◇ G-A | EXISTING CHAINLINK SWING GATE (8' TALL X 4'WIDE) WITH REQUIRED ACCESSIBLE HARDWARE, REFER TO DETAIL B, SHEET L0.3. FIELD WELDED 10" KICK PLATE ON PUSH SIDE, PER DETAIL E, SHEET L2.1. |
| ◇ G-B | EXISTING CHAINLINK SWING GATE (8' TALL X 4'WIDE) WITH REQUIRED ACCESSIBLE HARDWARE, REFER TO DETAIL C, SHEET L0.3.FIELD WELDED 10" KICK PLATE ON PUSH SIDE,PER DETAIL E, SHEET L2.1. |
| ◇ G-C | EXISTING CHAINLINK SWING GATE REMAIN OPEN DURING SCHOOL HOURS, REFER TO DETAIL D, SHEET L2.1 |
| ◇ M | EXISTING MEN'S ACCESSIBLE RESTROOM, PER PLAN 9, SHEET AS1.1 |
| ◇ F | EXISTING WOMEN'S ACCESSIBLE RESTROOM, PER PLAN 9, SHEET AS1.1 |
| ◇ S | EXISTING STAFF ACCESSIBLE RESTROOM, PER PLAN 0, SHEET AS1.1 |
| | (E) FIRE HYDRANT |
| KB | KNOX BOX |

# ACCESSIBLE PARKING

| | ACCESSIBLE STALLS | VAN ACCESSIBLE STALLS | TOTAL ACCESSIBLE STALLS | REQUIRED ACCESSIBLE STALLS* | +/- | TOTAL STALLS |
|---|---|---|---|---|---|---|
| PARKING LOT | 2 | 1 | 3 | 3 | 0 | 70 |

*NUMBER OF REQUIRED ACCESSIBLE STALLS PER CBC 118-208.2

NOTE:THIS DRAWING IS FOR AGENCY APPROVAL ONLY - NOT FOR CONSTRUCTION.

NORTH
0' 15' 30' 60' 90'

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REGISTERED PROFESSIONAL ENGINEER — DAVID CHUNG — C-56494 — CIVIL — STATE OF CALIFORNIA — EXPIRATION June 30, 2027

LICENSED ARCHITECT — DAVID CLARK — No. C-23409 — STATE OF CALIFORNIA — DATE 03.31.21

CONSULTANT

SHEET TITLE
ACCESSIBILITY
AND FIRE ACCESS PLAN

PROJECT NAME
HAWTHORNE
MIDDLE SCHOOL
TURF FIELD & TRACK
IMPROVEMENTS

PROJECT ADDRESS
4366 W 129TH ST,
HAWTHORNE, CA 90250

| SUBMITTAL | DATE |
|---|---|
| DESIGN DEVELOPMENT SUBMITTAL | 11/26/25 |
| DSA SUBMITTAL | 03/10/26 |

| NO. | REVISIONS | DATE |
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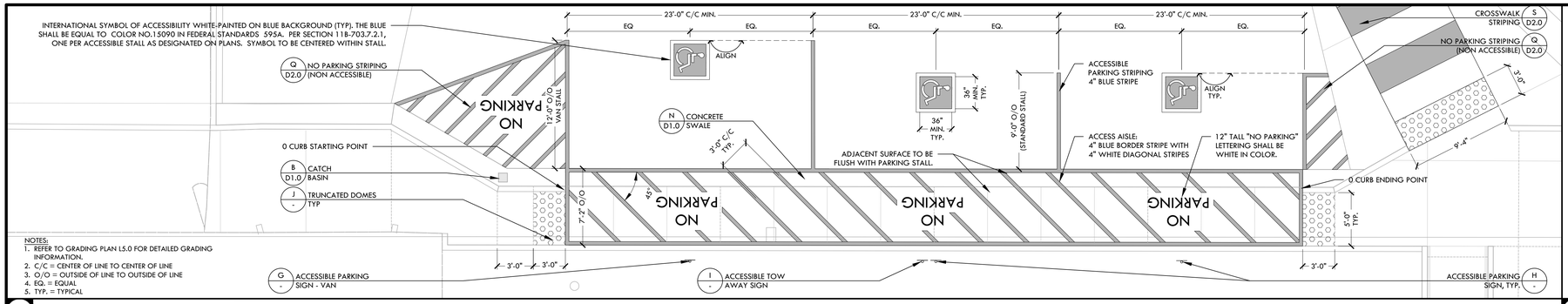
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| AC/XH | DC/CG |
| DATE ISSUED | SCALE |
| 06/10/2026 | 1"=20'-0" |

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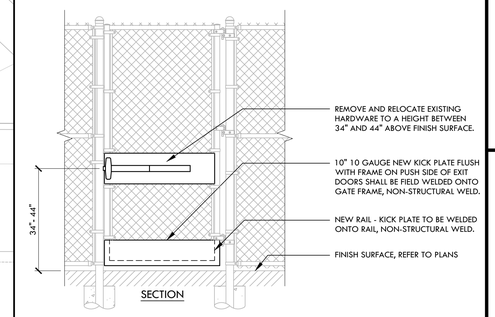
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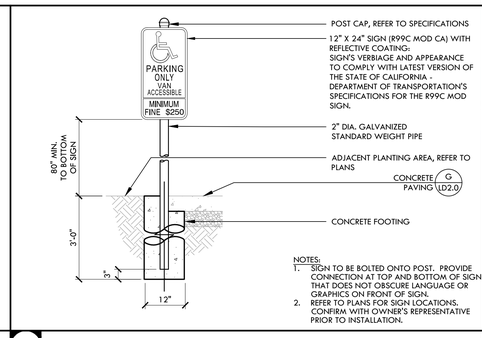
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PLOT DATE: 09-16-26 PLOTTED BY: station14



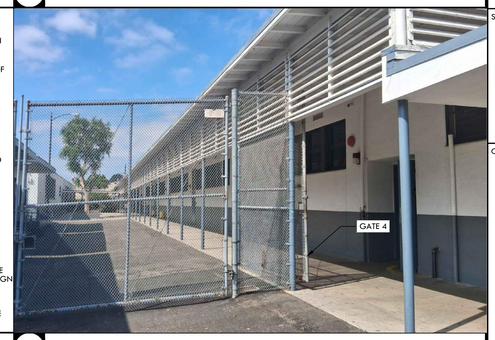

F ACCESSIBLE PARKING STALL




E EXISTING SINGLE SWING GATE IMPROVEMENTS NTS




G ACCESSIBLE PARKING SIGN - VAN NTS




D GATE G4 - REMAIN OPEN DURING SCHOOL HOURS

P



L

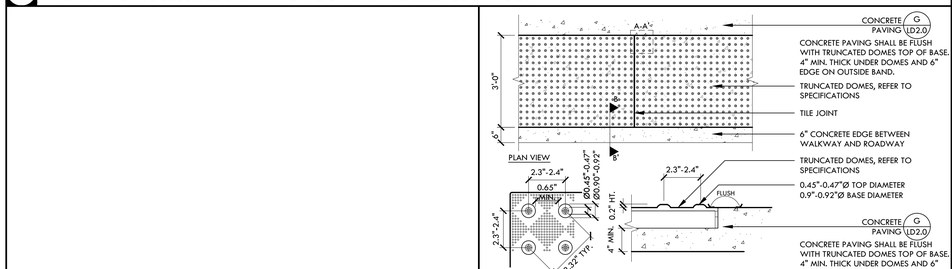


K EXISTING ACCESSIBLE DRINKING FOUNTAIN REFERENCE IMAGES



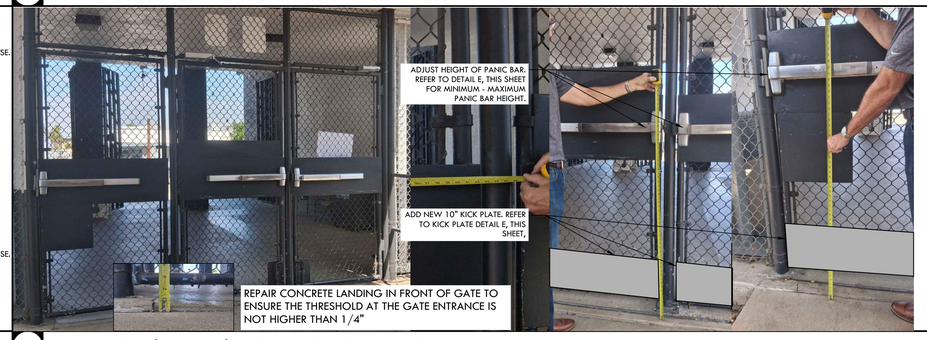

C GATE G3- 8' TALL X 4'WIDE SITE REFERENCE IMAGES

N



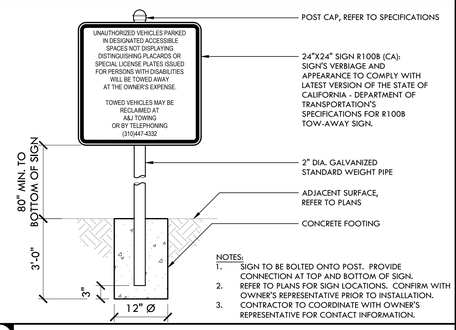

NOTE:
TRUNCATED DOMES, TYP. PER CALIFORNIA BUILDING CODE SECTIONS 118.705.1.2.2 AND 118.705.1.2.5, SHALL BE INSTALLED IN AREAS WITH 36" WIDE DETECTABLE WARNING STRIP. COLOR: FEDERAL YELLOW FS 33538. REFER TO SPECIFICATIONS AND INSTALL PER MANUFACTURER'S RECOMMENDATIONS.

J TRUNCATED DOMES (RECESSED) NTS

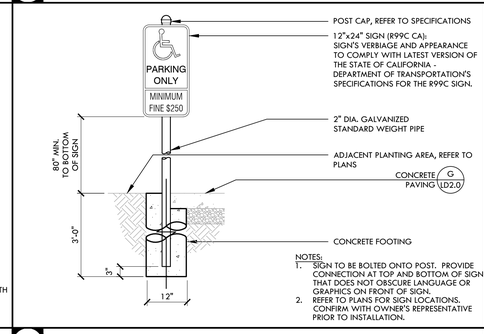



B GATE G2- 8' TALL X 4'WIDE SITE REFERENCE IMAGES

M




I PARKING TOW AWAY SIGN NTS




H ACCESSIBLE PARKING SIGN NTS




NOTE: REFER TO GRADING PLAN L5.0 FOR MORE DETAILED INFORMATION

A GATE G1- REMAIN OPEN DURING SCHOOL HOURS

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Riverside, CA 92501
tel: 951.221.31.42
faxs: 408.985.7260
www.VerdeDesigninc.com

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CONSULTANT

SHEET TITLE
ACCESSIBLE DETAILS

PROJECT NAME
HAWTHORNE MIDDLE SCHOOL TURF FIELD & TRACK IMPROVEMENTS

PROJECT ADDRESS
4366 W 129TH ST, HAWTHORNE, CA 90250

| SUBMITTAL | DATE |
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| DSA SUBMITTAL | 03/10/26 |

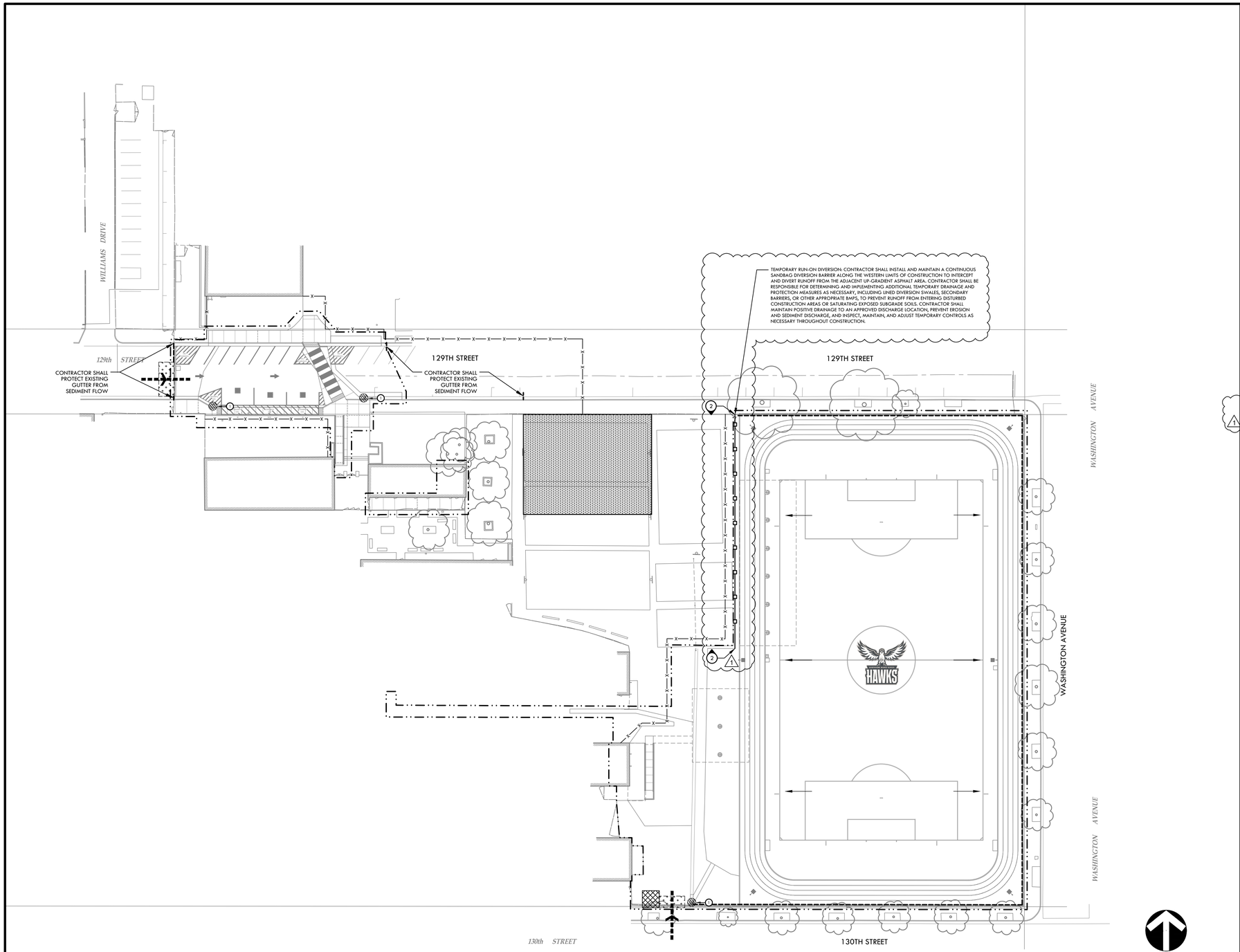
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DATE ISSUED 06/10/2026
SCALE
PROJ. NO. 2223000
SHEET NO. L2.1

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PLOT DATE: 09-01-26 PLOTTED BY: station14

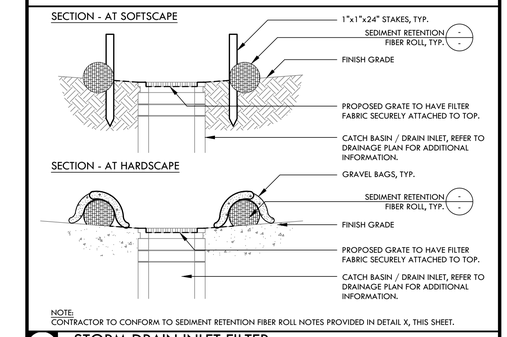



# EROSION AND SEDIMENT CONTROL NOTES

1. EROSION AND SEDIMENT CONTROL SHALL BE CONSTRUCTED DURING FIRST WEEK OF CONSTRUCTION.
2. EROSION AND SEDIMENT CONTROL SHALL REMAIN THROUGHOUT CONSTRUCTION AND BE REMOVED AND DISPOSED OF DURING MAINTENANCE PERIOD.
3. EROSION AND SEDIMENT CONTROL MAY BE ADJUSTED THROUGH CONSTRUCTION WITH APPROVAL OR AS DIRECTED BY OWNER'S REPRESENTATIVE.
4. CONTRACTOR SHALL SWEEP STREETS AND PARKING AREAS AFFECTED BY CONSTRUCTION WITH STREET SWEEPER AS REQUIRED TO KEEP PAVING CLEAN OF CONSTRUCTION DEBRIS.
5. CONTRACTOR SHALL FOLLOW ALL REQUIREMENTS AS SHOWN IN THE STORMWATER POLLUTION PREVENTION PLAN (SWPPP). REFER TO SPECIFICATIONS.
6. THIS EROSION CONTROL PLAN MAY NOT COVER ALL THE SITUATIONS THAT ARISE DURING CONSTRUCTION DUE TO UNANTICIPATED FIELD CONDITIONS. THE CONTRACTOR SHALL IMPLEMENT BEST MANAGE PRACTICES (BMPS) LISTED IN THE SWPPP AND SHALL COMPLY WITH THE STATE REGULATIONS TO CONTROL THE DISCHARGE OF STORMWATER POLLUTANTS.

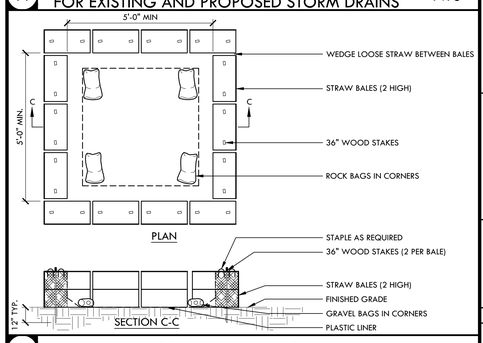
# EROSION AND SEDIMENT CONTROL LEGEND

| SYM | DESCRIPTION | DTL REF |
|---|---|---|
| | LIMIT OF WORK | |
| x x x | TEMPORARY CONSTRUCTION FENCING | |
| | PROJECT ACCESS | |
| | DIRECTION OF SURFACE FLOW | |
| | CONSTRUCTION STAGING AREA - PLACE HOLDER | |
| 1 | STORM DRAIN INLET FILTER FOR EXISTING AND PROPOSED STORM DRAINS - FILTER FABRIC TO BE SECURELY ATTACHED TO DRAINAGE STRUCTURE TOP AND PERIMETER WADDLE | A - - |
| | TEMPORARY CONCRETE WASHOUT FACILITY - PROVIDE A WASHOUT BIN FOR CONSTRUCTION WASHOUT AND REMOVE AT END OF CONSTRUCTION - PLACE HOLDER | B - - |
| | RUMBLE PLATE CONSTRUCTION ENTRY - STABILIZED CONSTRUCTION ENTRY | C - - |
| | SEDIMENT RETENTION FIBER ROLL | D - - |
| 2 | SAND BAG | |

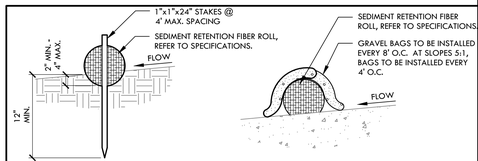



NOTE:
CONTRACTOR TO CONFORM TO SEDIMENT RETENTION FIBER ROLL NOTES PROVIDED IN DETAIL X, THIS SHEET.

**A** STORM DRAIN INLET FILTER FOR EXISTING AND PROPOSED STORM DRAINS — NTS

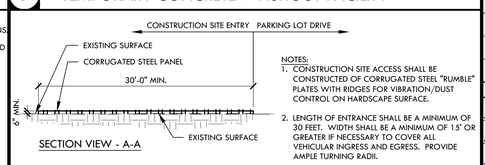



**B** TEMPORARY CONCRETE WASHOUT FACILITY




NOTES:
1. INSTALL SEDIMENT RETENTION FIBER ROLLS (FIBER ROLLS / WATTLES) AS LOCATED ON PLANS AND AS REQUIRED PER THE STATE GENERAL PERMIT FOR STORMWATER DISCHARGE.
2. FIBER ROLLS SHALL BE CONSTRUCTED LONG ENOUGH TO EXTEND ACROSS FLOW PATH OF POTENTIAL RUN-OFF AND RUN-ON.
3. PREPARE GRADES REMOVING SURFACE DEVIATIONS, LARGE STONES OR DEBRIS THAT WILL INHIBIT CONTINUOUS CONTACT OF THE FIBER ROLL WITH THE GRADE.
4. PRIOR TO FILTER ROLL INSTALLATION EXCAVATE A CONCAVE TRENCH 2" MINIMUM - 4" MAXIMUM DEEP ALONG THE PROPOSED FIBER ROLL LOCATION.
5. INSTALL FIBER ROLLS WITH CONTINUOUS CONTACT OF THE BOTTOM OF THE EXCAVATED TRENCH.
6. STAKE ROLL ON BOTH SIDES 2' FROM ENDS AND AT 4' MAXIMUM SPACING WITH 1"x1"x24" STAKES. DRIVE STAKES IN ON ALTERNATING SIDES OF THE ROLL AND OVERLAP ABUTTING ROLL ENDS 12" MINIMUM.
7. BACKFILL BOTH SIDES OF WATTLE AND TAMP SOIL TO FIRM AND STABLE.
8. CONTRACTOR SHALL MAKE WEEKLY INSPECTIONS OR AS INDICATED IN STORMWATER POLLUTION PREVENTION PLAN, OR THE STATE GENERAL PERMIT FOR STORMWATER DISCHARGE.

**D** SEDIMENT RETENTION FIBER ROLL — NTS




NOTES:
1. CONSTRUCTION SITE ACCESS SHALL BE CONSTRUCTED OF CORRUGATED STEEL "RUMBLE" PLATES WITH RIDGES FOR VIBRATION/DUST CONTROL ON HARDSCAPE SURFACE.
2. LENGTH OF ENTRANCE SHALL BE A MINIMUM OF 30 FEET. WIDTH SHALL BE A MINIMUM OF 15' OR GREATER IF NECESSARY TO COVER ALL VEHICULAR INGRESS AND EGRESS. PROVIDE AMPLE TURNING RADII.
3. CONTRACTOR SHALL UNDERLAY STEEL "RUMBLE" PLATES AS NECESSARY TO PROTECT EXISTING PAVING AND SPAN CURB HEIGHT.
4. THE ENTRANCE SHALL BE KEPT IN GOOD CONDITION BY OCCASIONAL RINSING.
5. ACCESSES SHALL BE INSPECTED WEEKLY DURING PERIODS OF HEAVY USAGE, MONTHLY DURING NORMAL USAGE, AND AFTER EACH RAINFALL, WITH MAINTENANCE PROVIDED AS NECESSARY.
6. TEMPORARY ACCESS RUMBLE PLATES SHALL BE REMOVED AT THE END OF THE PROJECT. AFFECTED AREA SHALL BE RETURNED TO AS WAS OR BETTER CONDITION.

**C** RUMBLE PLATE CONSTRUCTION ENTRY — NTS


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tel: 951.221.31.42
faxx 408.985.7260
www.VerdeDesigninc.com


STAMP

REGISTERED PROFESSIONAL ENGINEER — DARYN CONWAY — No. C-56494 — Signature — EXPIRATION June 30, 2027 — C.I.V.I. — STATE OF CALIFORNIA

CONSULTANT

SHEET TITLE
EROSION AND SEDIMENT CONTROL PLAN

PROJECT NAME
HAWTHORNE MIDDLE SCHOOL TURF FIELD & TRACK IMPROVEMENTS

PROJECT ADDRESS
4366 W 129TH ST, HAWTHORNE, CA 90250

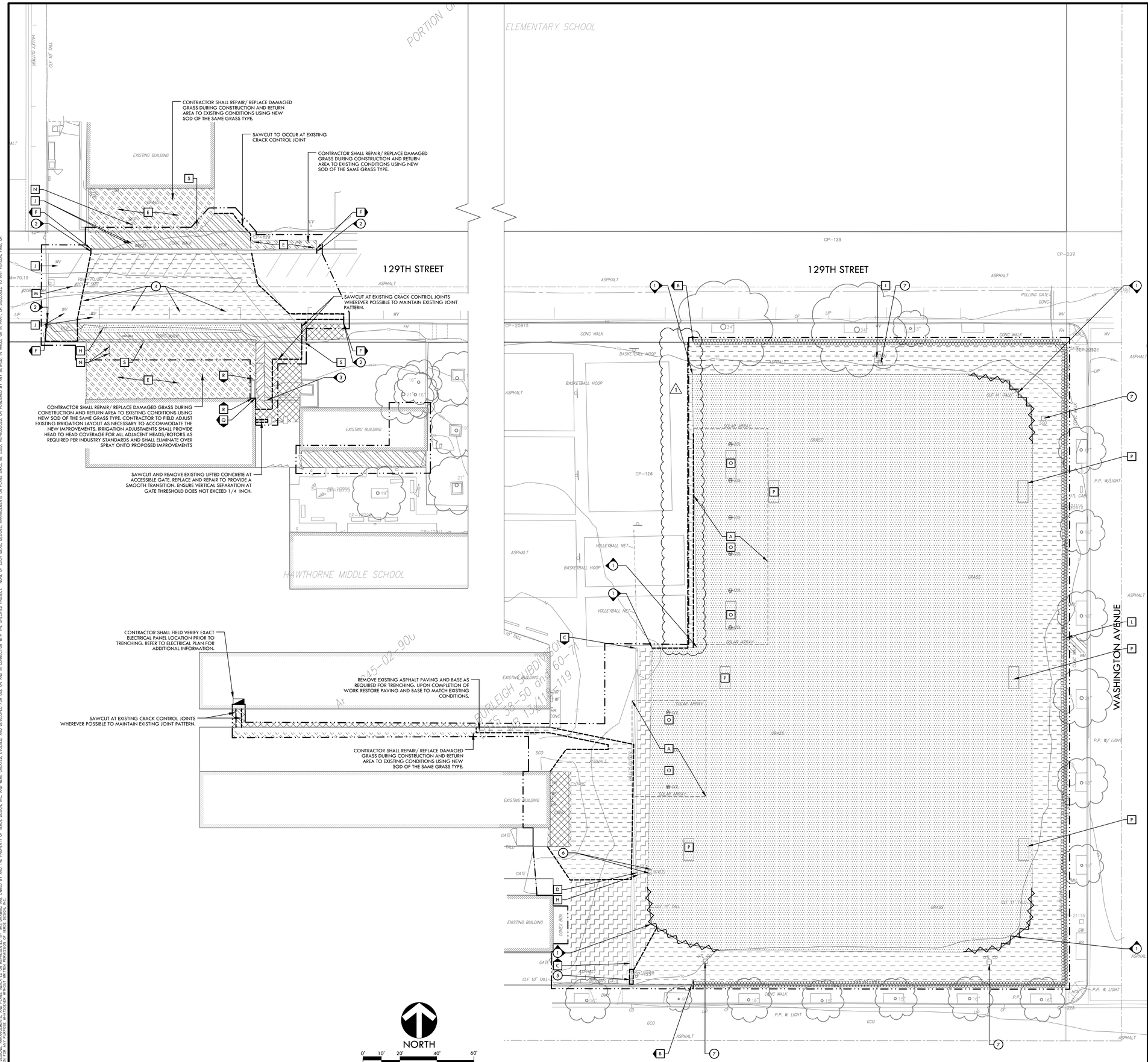
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| DESIGN DEVELOPMENT SUBMITTAL | 11/26/25 |
| DSA SUBMITTAL | 03/10/26 |

| NO. | REVISIONS | DATE |
|---|---|---|
| 1 | Drainage changes required for SWPPP compliance | 10/21/26 |

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| AC | DC/CG |
| DATE ISSUED | SCALE |
| 06/10/2026 | 1" = 30'-0" |
| PROJ. NO. | 2223000 |
| SHEET NO. | L3.0 |


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DRAWING NAME: Y:\Projects-R\2022\2223000 - Hawthorne MS T&F Assess\CAD_L3.0-ECP.dwg
PLOT DATE: 11-03-26 PLOTTED BY: station14




# DEMOLITION NOTES

1. THE CONTRACTOR SHALL PERFORM ALL CLEARING, DEMOLITION, REMOVAL OF OBSTRUCTIONS AND SITE PREPARATIONS NECESSARY FOR THE PROPER EXECUTION OF ALL WORK CONTAINED IN THE CONTRACT DOCUMENTS.
2. CONTRACTOR SHALL VERIFY LOCATION OF ALL EXISTING UTILITIES AND PROVIDE THE REQUIRED COORDINATION FOR THEIR TEMPORARY DISCONNECTION, PROTECTION, REMOVAL AND/OR STORAGE AS MAY BE REQUIRED DURING CONSTRUCTION. CONTRACTOR SHALL COORDINATE WITH THE DISTRICT TO DETERMINE WHETHER TEMPORARY SERVICES ARE NECESSARY.
3. THE CONTRACTOR SHALL VISIT THE SITE PRIOR TO BID SUBMITTAL TO DETERMINE THE EXACT EXTENT AND DEPTH OF SITE DEMOLITION REQUIRED AND VERIFY COMPLIANCE WITH DRAWINGS. THE DISTRICT SHALL BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCIES.
4. THE CONTRACTOR SHALL VERIFY THE LOCATIONS OF ALL EXISTING UTILITIES, STRUCTURES AND SERVICES BEFORE COMMENCING WORK. THE LOCATIONS OF UTILITIES, STRUCTURES AND SERVICES SHOWN IN THE CONTRACT DOCUMENTS SHALL BE DEEMED TO BE APPROXIMATIONS ONLY. ALL DISCREPANCIES BETWEEN WHAT IS SHOWN AND THE ACTUAL FIELD CONDITIONS SHALL BE REPORTED TO THE DISTRICT'S REPRESENTATIVE. THE CONTRACTOR SHALL CONTACT UNDERGROUND SERVICE ALERT (USA) AT (800) 227-2600 PRIOR TO ANY DEMOLITION OR EXCAVATION. UPON COMPLETION OF USA MARKING OPERATIONS, CONTRACTOR SHALL RECORD ALL UTILITY MARKINGS ON A SEPARATE SET OF DRAWINGS. THIS SET SHALL BE KEPT ON-SITE FOR REFERENCE FOR DURATION OF CONTRACT. NOTIFY THE DISTRICT'S REPRESENTATIVE IMMEDIATELY SHOULD CONFLICTS ARISE AND REDIRECT WORK TO AVOID DELAY.
5. ALL EXISTING ITEMS ARE TO REMAIN UNLESS OTHERWISE NOTED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIRING OR REPLACING, AT CONTRACTOR'S EXPENSE, ANY EXISTING ITEM DAMAGED OR DESTROYED BY CONSTRUCTION OPERATIONS. CONTRACTOR SHALL ALSO BE RESPONSIBLE FOR REPAIRING OR REPLACING ANY AND ALL DAMAGES TO ADJACENT PROPERTIES. THE DAMAGED ITEMS SHALL BE RESTORED TO AN "AS-WAS" OR BETTER CONDITION OR REPLACED PER THE DISCRETION OF THE DISTRICT'S REPRESENTATIVE.
6. PRIOR TO ANY DEMOLITION WORK, CONTRACTOR SHALL INSTALL SELF-SUPPORTING INTERLOCKING CHAIN-LINK TEMPORARY CONSTRUCTION FENCING TO ENCLOSE AND SECURE THE PROJECT AREA LIMIT OF WORK. THE FENCING SHALL CONTAIN PEDESTRIAN AND/OR VEHICULAR ACCESS GATES AS NECESSARY AND SHALL BE MINIMUM 6 FEET HIGH WITH A TOP AND BOTTOM RAIL WITH KNUCKLED TOP AND BOTTOM SELVAGE (NO BARBED WIRE PERMITTED). ALL FENCE SHALL INCLUDE FULL HEIGHT SCREEN SHADE CLOTH COVERING. THE CONSTRUCTION FENCING WORK SHALL BE SUBJECT TO THE DISCRETION OF THE DISTRICT'S REPRESENTATIVE.
7. PRIOR TO ANY DEMOLITION WORK, CONTRACTOR SHALL PROTECT ALL EXISTING PLANT MATERIAL NOT SCHEDULED FOR REMOVAL BY INSTALLING TEMPORARY 4 FOOT HIGH "BLAZE ORANGE" CONSTRUCTION SAFETY FENCING AT THE DRIPLINE OR PERIMETER. THE FENCING SHALL BE SECURED WITH DRIVEN METAL STAKES. ALL TREE PROTECTION WORK SHALL BE SUBJECT TO THE DISCRETION OF THE DISTRICT'S REPRESENTATIVE.
8. DEMOLITION SHALL INCLUDE THE REMOVAL OF ITEM AND ANY FOUNDATION OR STRUCTURAL SUPPORT RELATED TO ITEM FOR PLANT MATERIAL THIS SHALL INCLUDE STUMPS AND ROOTS OVER 2 INCHES IN DIAMETER. DISPOSAL SHALL BE OFF-SITE IN A LEGAL MANNER ACCEPTABLE TO THE DISTRICT'S REPRESENTATIVE AND IN COMPLIANCE WITH ALL FEDERAL, STATE AND LOCAL CODES AND ORDINANCES.
9. REFER TO SPECIFICATIONS FOR ADDITIONAL CLEARING, GRUBBING, AND OTHER PERTINENT INFORMATION.
10. EXISTING UTILITY BOXES THAT ARE TO BE PROTECTED IN PLACE SHALL BE ADJUSTED AS NECESSARY TO MEET FLUSH WITH FINAL FINISH SURFACE ELEVATIONS.

# DEMOLITION LEGEND

| SYM | DESCRIPTION |
|---|---|
| | LIMIT OF WORK / CONSTRUCTION FENCING |
| | SAWCUT EXISTING PAVING |
| | DEMOLISH AND REMOVE EXISTING FENCE, INCLUDING GATES, POSTS, FABRIC, AND FOOTINGS |
| | EXISTING CHAIN LINK FENCE FABRIC AND BOTTOM RAIL TO BE REMOVED AND PROTECTED FOR RE-USE AFTER NEW CONCRETE EDGEBAND IS INSTALLED. EXISTING FENCE POST AND TOP RAIL TO REMAIN, PROTECT IN PLACE, UNLESS NOTED OTHERWISE. EXISTING CONCRETE CURB UNDER FENCE TO BE DEMOLISHED AND REMOVED. |
| | EXISTING SURFACE VEGETATION AND TOPSOIL TO BE REMOVED PER SPECIFICATIONS. REFER TO SPECIFICATIONS FOR INFORMATION. REMOVE EXCESS SOIL FROM SITE. SEE GRADING PLAN AND SYNTHETIC TURF DETAILS. EXISTING IRRIGATION LATERAL LINES, VALVES, AND IRRIGATION HEADS TO BE REMOVED. MAINLINE TO BE PROTECTED IN PLACE. |
| | EXISTING ASPHALT PAVING AND BASE, TO BE DEMOLISHED AND REMOVED. CONTRACTOR TO SAWCUT ASPHALT. EDGES SHALL BE CUT CLEAN,WITHOUT CRUMBLING. ASPHALT PATCHING WILL BE NECESSARY BETWEEN SAWCUT EDGES AND PROPOSED IMPROVEMENT. |
| | EXISTING CONCRETE PAVING, INCLUDING BASE MATERIAL, TO BE DEMOLISHED AND REMOVED. |
| | EXISTING ACCESSIBLE RAMP, INCLUDING RAILING AND BASE MATERIAL, TO BE DEMOLISHED AND REMOVED. |
| | EXISTING CONCRETE TO REMAIN, INCLUDING STEPS, UNLESS NOTED OTHERWISE. PROTECT IN PLACE. |
| | CONTRACTOR SHALL PROTECT EXISTING GRASS/VEGETATION/PLANTING. IRRIGATION SHALL BE MAINTAINED DURING CONSTRUCTION. |
| | EXISTING PAINT STRIPING TO BE REMOVED WHERE IT EXIST, EXISTING ASPHALTIC PAVING TO REMAIN, PROTECT IN PLACE. |

# DEMOLITION ITEMS

## ITEMS TO BE DEMOLISHED AND/OR REMOVED

1. EXISTING HEADER TO BE DEMOLISHED AND REMOVED.
2. EXISTING CURB AND GUTTER TO BE DEMOLISHED AND REMOVED.
3. EXISTING CONCRETE STEPS TO BE DEMOLISHED AND REMOVED. INSTALL NEW CONCRETE STEPS IN THE SAME LOCATION TO MATCH EXISTING.
4. EXISTING PARKING STALL STRIPING TO BE REMOVED FOR NEW ACCESSIBLE PARKING STRIPING, REFER TO MATERIALS PLAN SHEET L8.0.
5. EXISTING CATCH BASIN AND PORTION OF CONCRETE SWALE TO BE REMOVED AND REPLACED WITH NEW. NEW CATCH BASIN COVER TO BE ACCESSIBLE COMPLIANT. EXISTING ASSOCIATED APPURTENANCES TO REMAIN, PROTECT IN PLACE. REFER TO DRAINAGE PLAN SHEET L6.0.
6. EXISTING IRRIGATION CONTROL VALVE BOX TO REMOVED.
7. EXISTING QUICK COUPLING VALVES AND VALVE BOXES TO BE REMOVED. ALL FORMER QUICK COUPLER LOCATIONS TO BE CAPPED.

## ITEMS TO BE PROTECTED OR RELOCATED

- A EXISTING PHOTOVOLTAIC STRUCTURE, INCLUDING ASSOCIATED APPURTENANCES TO REMAIN, PROTECT IN PLACE.
- B EXISTING CHAIN LINK FENCE, GATE, POST, INCLUDING EDGEBAND TO REMAIN. PROTECT IN PLACE, UNLESS NOTED OTHERWISE.
- C EXISTING CONCRETE SWALE TO REMAIN, PROTECT IN PLACE.
- D PROTECT EXISTING IRRIGATION MAINLINE P.O.C. IN PLACE. CONNECT THE EXISTING MAINLINE TO THE NEW QUICK COUPLING VALVE SYSTEM SERVING THE SYNTHETIC TURF FIELD. REFER TO THE IRRIGATION PLAN SHEET I.9.0.
- E EXISTING PLANTER AREA TO REMAIN, PROTECT IN PLACE.
- F EXISTING CURB AND GUTTER TO REMAIN, PROTECT IN PLACE, UNLESS NOTED OTHERWISE.
- G EXISTING SIGN TO REMAIN, PROTECT IN PLACE.
- H EXISTING WATER UTILITY VAULT TO REMAIN, PROTECT IN PLACE. PRIOR TO FINAL FINISH SURFACE, BOX TO BE BROUGHT TO FINAL FINISH GRADE. REPLACE VALVE BOX WITH NEW CONCRETE VALVE BOX, REFER TO MATERIALS PLAN SHEET L8.0.
- I EXISTING CLEAN OUT BOX TO REMAIN, PROTECT IN PLACE. PRIOR TO FINAL FINISH SURFACE, BOX TO BE BROUGHT TO FINAL FINISH GRADE.
- J EXISTING WATER BOX TO REMAIN, PROTECT IN PLACE. PRIOR TO FINAL FINISH SURFACE, BOX TO BE BROUGHT TO FINAL FINISH GRADE.
- L LOCATE LIGHT POST CENTERED BETWEEN THE EXISTING FENCE POSTS AND ENSURE PROPER ALIGNMENT. REFER MATERIALS PLAN SHEET L8.0 AND ELECTRICAL PLAN SHEET E1.0 FOR LIGHT POST LOCATION.
- M EXISTING MANHOLE TO REMAIN, PROTECT IN PLACE.
- N EXISTING BACKFLOW PREVENTER TO REMAIN, PROTECT IN PLACE.
- O EXISTING PORTABLE BLEACHERS TO BE SALVAGED AND TURNED OVER TO THE DISTRICT.
- P EXISTING PORTABLE SOCCER GOAL(S) TO BE SALVAGED AND TURNED OVER TO THE DISTRICT.
- Q EXISTING BUILDING TO REMAIN, PROTECT IN PLACE.
- R EXISTING RAISED PLANTER TO REMAIN, PROTECT IN PLACE.
- S EXISTING IRRIGATION CONTROL VALVE BOX TO REMAIN, PROTECT IN PLACE.


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REGISTERED PROFESSIONAL ENGINEER — DAVID CONNELL — No. C-56494 — Signature — EXPIRATION June 30, 2027 — CIVIL — STATE OF CALIFORNIA

CONSULTANT

SHEET TITLE
DEMOLITION PLAN

PROJECT NAME
HAWTHORNE MIDDLE SCHOOL TURF FIELD & TRACK IMPROVEMENTS

PROJECT ADDRESS
4366 W 129TH ST, HAWTHORNE, CA 90250

| SUBMITTAL | DATE |
|---|---|
| DESIGN DEVELOPMENT SUBMITTAL | 11/26/25 |
| DSA SUBMITTAL | 03/10/26 |

| NO. | REVISIONS | DATE |
|---|---|---|
| 1 | Paving changes required for SWPPP compliance | 10/21/26 |

| DRAWN BY | CHECKED BY |
|---|---|
| AC/XH | DC/CG |
| DATE ISSUED | SCALE |
| 06/10/2026 | 1"=20'-0" |

PROJ. NO. 2223000

SHEET NO. L4.0


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DRAWING NAME: Y:\Projects-R\2022\2223000 – Hawthorne MS T&F Assess\CAD_L4.0-DEM.dwg
PLOT DATE: 11-03-26 PLOTTED BY: station14

# GRADING NOTES

1. EXISTING GRADES ARE BASED ON INFORMATION PROVIDED BY: THIS TOPOGRAPHIC SURVEY WAS PROVIDED BY IMEG , (TELEPHONE): (909) 477-6915 (ADDRESS): 901 VIA PIEMONTE, ONTARIO, CA 91764.
2. CONTRACTOR SHALL VERIFY EXISTING GRADES FOR ACCURACY PRIOR TO THE START OF GRADING, NOTIFY THE OWNER'S REPRESENTATIVE IMMEDIATELY SHOULD CONFLICTS ARISE AND REDIRECT WORK TO AVOID DELAY.
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5. ALL EXISTING DRAINAGE STRUCTURES, BOXES, UTILITY VAULTS ETC. SHALL BE BROUGHT TO FINAL FINISH GRADE PRIOR TO FINAL SURFACE TREATMENT.

# GRADING LEGEND

| SYM | DESCRIPTION | SYM | DESCRIPTION |
|---|---|---|---|
| 70 | PROPOSED CONTOUR | R | RIDGE LINE |
| FE 70.00 | PROPOSED FINISH GRADE ELEVATION OF EDGEBAND | | CENTER LINE OF SWALE |
| FG 70.00 | PROPOSED FINISH GRADE ELEVATION OF SOFTSCAPE | | CONFORM TO EXISTING GRADE |
| FT 70.00 | PROPOSED ELEVATION OF TOP OF SYNTHETIC TURF INFILL | | FLOW DIRECTION IN SOFTSCAPE - PLACE HOLDER |
| FS 70.00 | PROPOSED FINISH SURFACE ELEVATION OF HARDSCAPE | 69 | EXISTING CONTOUR |
| FSR 70.00 | PROPOSED FINISH SURFACE ELEVATION OF THE RAMP | 69.18 | EXISTING ELEVATION |
| FL 70.00 | FLOW LINE OF SWALE | G8 G8 G8 | GRADE BREAK LINE |
| RIM 70.00 | LOW POINT/ RIM ELEVATION OF DRAIN | | LIMIT OF GRADING - CONFORM TO EXISTING GRADES AT THIS LINE |
| EX +/- 70.00 | EXISTING ELEVATION TO CONFORM TO | | |
| TC 70.00 | PROPOSED ELEVATION OF TOP OF CURB | | |

ENLARGEMENT A

ENLARGEMENT B

MATCHLINE - SEE BELOW LEFT

MATCHLINE - SEE ABOVE

NORTH

0' 5' 10' 20' 30'

CUT AND FILL

CUT (FINISH SURFACE) = 623.07 CUBIC YARD (CY)
MATERIAL CUT:
SYNTHETIC TURF = (50586 SF * 0.72 FT)/27 = 1348.96 CY
ASPHALT PAVING (PED)= (20015 SF * 0.75 FT)/27 = 5556 CY
ASPHALT PAVING (VEH)= (3222 SF * 1.25 FT)/27=149.17 CY
4" CONCRETE = (4310 SF * 0.33 FT)/27= 52.68 CY

TOTAL CUT = 7729.88 CY

FILL = 97.45 CY

NET CUT: 7632.43 CY OF MATERIAL TO BE EXPORTED

129TH STREET

130TH STREET

WASHINGTON AVENUE

ENLARGEMENT C

NORTH

0' 10' 20' 40' 60'


VERDE DESIGN
LANDSCAPE ARCHITECTURE
CIVIL ENGINEERING
SPORT PLANNING & DESIGN
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Riverside, CA 92501
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fax: 408.985.7260
www.VerdeDesignInc.com


STAMP

REGISTERED PROFESSIONAL ENGINEER — DAVIN COMBES — No. C-56494 — Signature — EXPIRATION June 30, 2027 — CIVIL — STATE OF CALIFORNIA

CONSULTANT

SHEET TITLE

GRADING PLAN

PROJECT NAME

HAWTHORNE MIDDLE SCHOOL TURF FIELD & TRACK IMPROVEMENTS

PROJECT ADDRESS

4366 W 129TH ST, HAWTHORNE, CA 90250

| SUBMITTAL | DATE |
|---|---|
| DESIGN DEVELOPMENT SUBMITTAL | 11/26/25 |
| DSA SUBMITTAL | 03/10/26 |

| NO. | REVISIONS | DATE |
|---|---|---|
| 1 | Paving changes required for SWPPP compliance | 10/21/26 |

| DRAWN BY | CHECKED BY |
|---|---|
| XH | DC/CG |
| DATE ISSUED | SCALE |
| 06/10/2026 | PER PLAN |
| PROJ. NO. | 2223000 |
| SHEET NO. | L5.0 |


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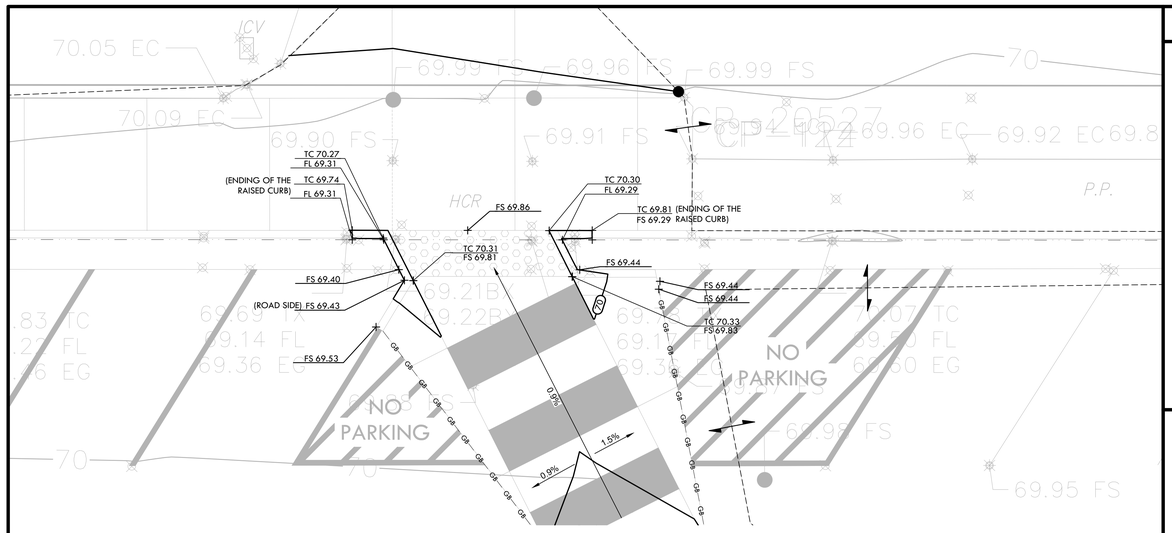
DRAWING NAME: Y:\Projects-R\2022\2223000 - Hawthorne MS T&F Assess\CAD_L5.0-GRD_C3D.dwg
PLOT DATE: 11-05-26 PLOTTED BY: station14

# GRADING NOTES

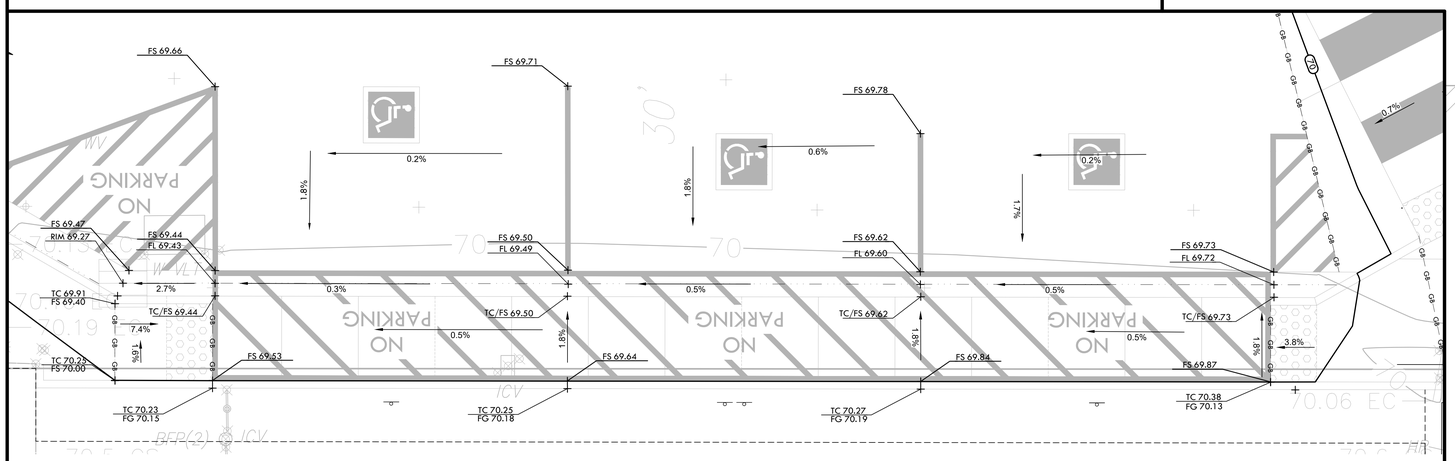
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# GRADING LEGEND

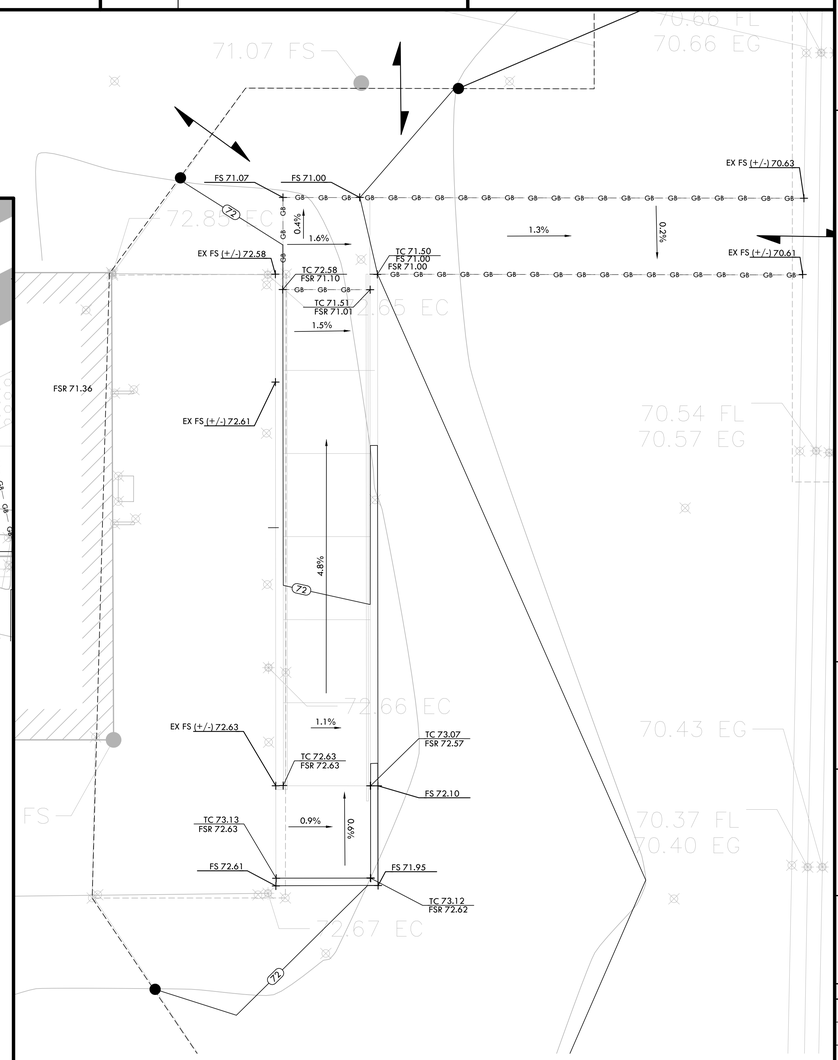
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| EX +/- 70.00 | EXISTING ELEVATION TO CONFORM TO | | |
| TC 70.00 | PROPOSED ELEVATION OF TOP OF CURB | | |




ENLARGEMENT A




ENLARGEMENT B




ENLARGEMENT C

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DRAWING NAME: Y:\Projects-R\2022\2223000 – Hawthorne MS T&F Assess\CAD_LS\5.0-GRD_030.dwg
PLOT DATE: 09-01-26 PLOTTED BY: station14

IDENTIFICATION STAMP
DIV. OF THE STATE ARCHITECT
APP: 03-125961 INC:
REVIEWED FOR
SS ☑ FLS ☑ ACS ☑
DATE: 10/12/2026

VERDE DESIGN
LANDSCAPE ARCHITECTURE
CIVIL ENGINEERING
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3685 Main St. Suite 350
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tel: 951.221.31.42
faxs 408.985.7260
www.VerdeDesigninc.com

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REGISTERED PROFESSIONAL ENGINEER — DAVID CLARK — C-56494 — Exp. June 30, 2027 — CIVIL — STATE OF CALIFORNIA

LICENSED ARCHITECT — DAVID CLARK — No. C-23405 — Exp. 03-31-27 — STATE OF CALIFORNIA

CONSULTANT

SHEET TITLE
GRADING PLAN

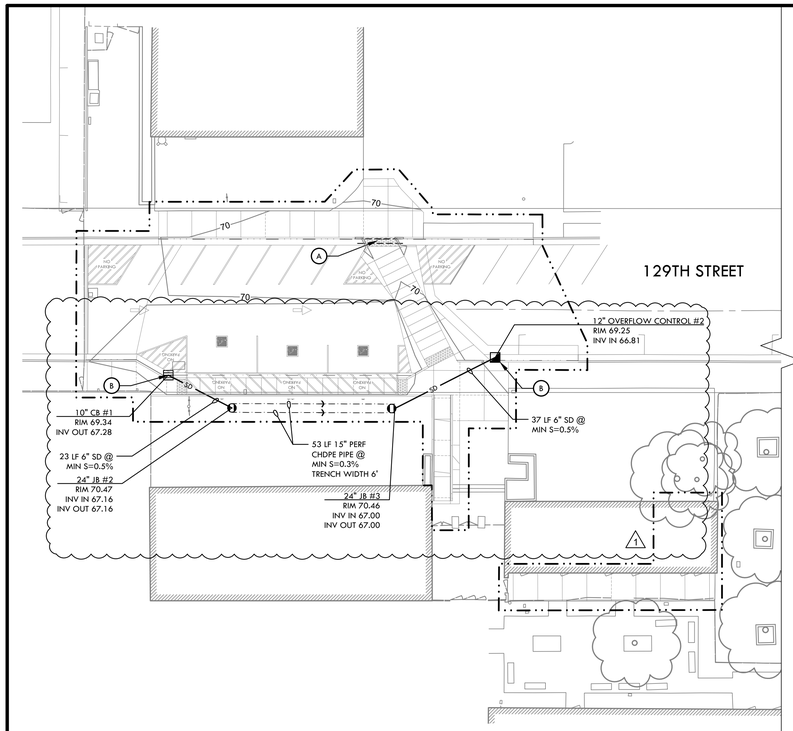
PROJECT NAME
HAWTHORNE
MIDDLE SCHOOL
TURF FIELD & TRACK
IMPROVEMENTS

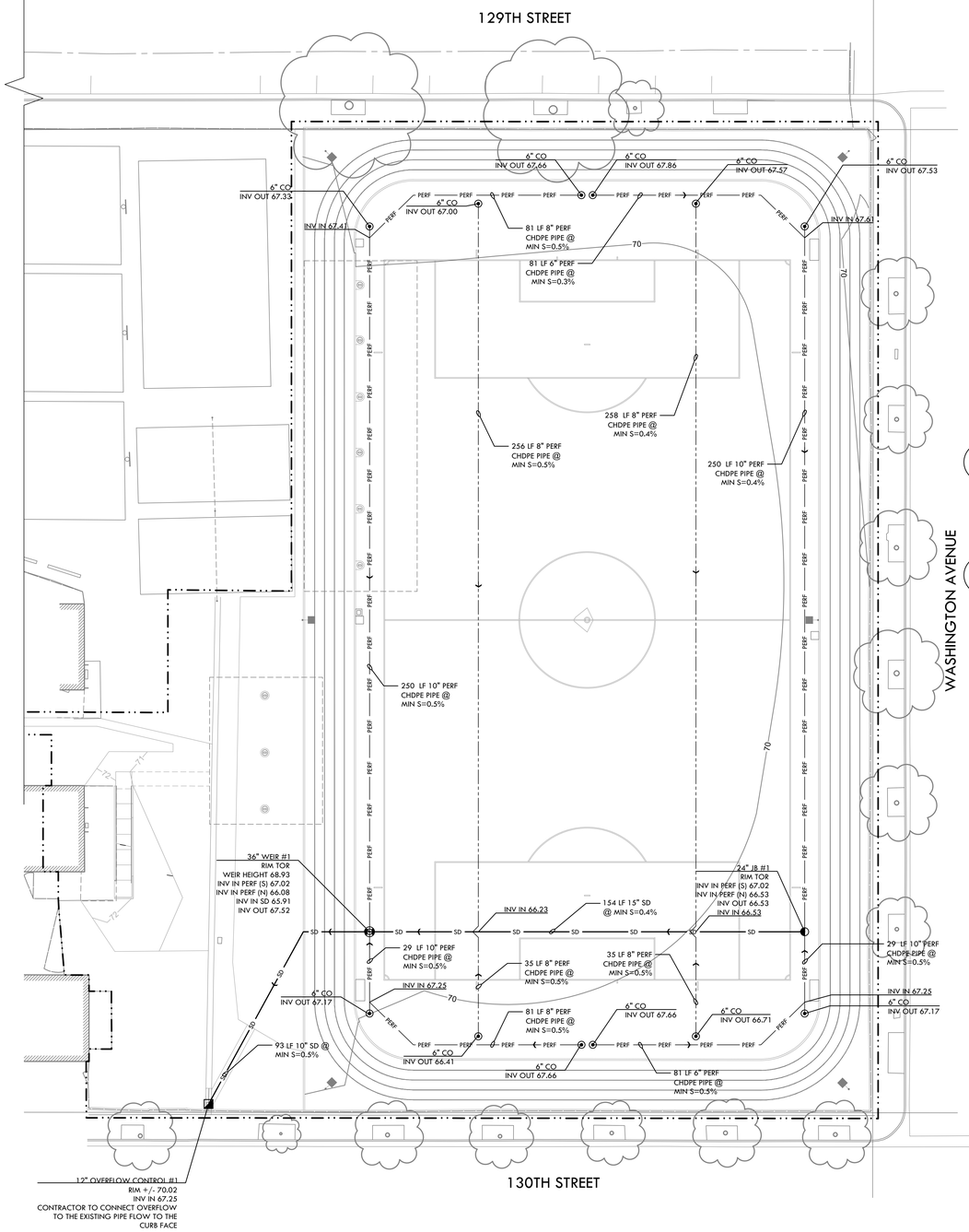
PROJECT ADDRESS
4366 W 129TH ST,
HAWTHORNE, CA 90250

| SUBMITTAL | DATE |
|---|---|
| DESIGN DEVELOPMENT SUBMITTAL | 11/26/25 |
| DSA SUBMITTAL | 03/10/26 |

| NO. | REVISIONS | DATE |
|---|---|---|
| 1 | | |
| 2 | | |
| 3 | | |
| 4 | | |
| 5 | | |
| 6 | | |

| | |
|---|---|
| DRAWN BY: XH | CHECKED BY: DC/CG |
| DATE ISSUED: 06/10/2026 | SCALE: PER PLAN |
| PROJ. NO.: 2223000 | |
| SHEET NO.: L5.1 | |




## DRAINAGE & UTILITY NOTES

1. THE CONTRACTOR SHALL VERIFY THE LOCATIONS OF ALL EXISTING UTILITIES, STRUCTURES, AND SERVICES BEFORE COMMENCING WORK. THE LOCATIONS OF UTILITIES, STRUCTURES, AND SERVICES SHOWN IN THE CONTRACT DOCUMENTS SHALL BE DEEMED TO BE APPROXIMATIONS ONLY. ALL DISCREPANCIES BETWEEN WHAT IS SHOWN AND THE ACTUAL FIELD CONDITIONS SHALL BE REPORTED TO THE DISTRICT'S REPRESENTATIVE. THE CONTRACTOR SHALL CONTACT UNDER GROUND SERVICE ALERT (USA) AT (800) 227-2600 PRIOR TO ANY DEMOLITION OR EXCAVATION. UPON COMPLETION OF USA MARKING OPERATIONS, CONTRACTOR SHALL RECORD ALL UTILITY MARKINGS ON A SEPARATE SET OF DRAWINGS. THIS SET SHALL BE KEPT ON-SITE FOR REFERENCE FOR DURATION OF CONTRACT.
2. ALL EXISTING DRAINAGE STRUCTURES, BOXES, UTILITY VAULTS ETC. TO REMAIN, SHALL BE BROUGHT TO FINAL FINISH GRADE PRIOR TO FINAL SURFACE TREATMENT.
3. THE CONTRACTOR IS TO PROTECT DRAINAGE SYSTEM FROM DEBRIS, INCLUDING SOIL, ROCK MATERIAL, AND TRASH FROM ENTERING THE PIPE DURING CONSTRUCTION. CONTRACTOR SHALL AVOID PLACING CONSTRUCTION VEHICLES OVER INSTALLED DRAINAGE TRENCHES TO PREVENT CRUSHING OF PIPE.
4. COORDINATE ALL SLEEVING AND UTILITY LOCATIONS AS SHOWN ON THE PLANS AND DETAILS CONTAINED WITHIN THESE CONTRACT DOCUMENTS.
5. THE CONTRACTOR IS TO ENSURE THAT ALL REMAINING ACTIVE AND NEW DRAINAGE AND UTILITY LINES ARE PROTECTED AND UNDAMAGED FROM TRENCHING AND FOOTING EXCAVATIONS FOR NEW FOOTINGS, PARTICULARLY FOR NEW FENCING AND WALLS.
6. ALL ABANDONED STORM LINES SHALL REMAIN IN PLACE UNLESS IN CONFLICT WITH PROPOSED DRAINAGE, UTILITY, OR SUBGRADING OPERATIONS, IN WHICH CASE ABANDONED PIPE IN CONFLICT SHALL BE REMOVED. REMAINING ABANDONED STORM PIPE SHALL BE SEALED WITH APPROPRIATELY SIZED CONCRETE CAP (3 SACK MIX) 6" ENVELOPE OUTSIDE AND INSIDE DIAMETER OF PIPE.
7. PRIOR TO ALL DRAINAGE AND UTILITY WORK, CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING ALL POTENTIAL DRAINAGE CONNECTIONS AND EXISTING UTILITY BY POTHOLING. IN ADDITION, ALL DOWNSTREAM CONNECTIONS TO EXISTING STRUCTURES SHALL BE THE START OF THESE OPERATIONS, AND GRADES SHALL BE VERIFIED.
8. WHEN WORK HAS TO OCCUR UNDER THE DRIPLINE OF EXISTING TREES NOT SCHEDULED FOR REMOVAL, THE CONTRACTOR SHALL USE ALL POSSIBLE CARE TO AVOID INJURY TO THE TREES AND TREE ROOTS. GRADE IN LINES RADIAL TO THE EXISTING TREES RATHER THAN TANGENTIAL. ALL PARTIAL CUTS OR TEARS THROUGH ROOTS TWO INCHES IN DIAMETER AND LARGER SHALL BE CUT CLEAN. TRENCHES ADJACENT TO TREES SHALL BE FILLED WITHIN 24 HOURS AFTER EXCAVATION, BUT WHERE THIS IS NOT POSSIBLE, THE SIDE OF THE TRENCH ADJACENT TO THE TREE, AND ANY EXPOSED ROOTS SHALL BE KEPT SHADED AND MOIST WITH DAMPENED BURLAP OR CANVAS.

## DRAINAGE LEGEND

| SYM | DESCRIPTION (DETAIL NUMBER / SHEET NUMBER) |
|---|---|
| ▤ | CATCH BASIN, SIZE PER PLAN (B / D1.0) |
| ◐ | JUNCTION BOX, SIZE PER PLAN (C / D1.0) |
| ◉ | CLEANOUT IN SYNTHETIC TURF (D / D1.0) |
| ◪ | OVER FLOW DRAINAGE STRUCTURE (I / D1.0) |
| 3 | CONTROL WEIR AT JUNCTION BOX (J / D1.0) |
| 1 | JUNCTION BOX AT SOFTSCAPE, SIZE PER PLAN (C / D1.1) |
| SD | SOLID WALL STORM DRAIN (A / D1.0) |
| | PERFORATED SUBDRAIN TYPE 1 (G / D1.0) |
| PERF | PERFORATED SUBDRAIN (F / D1.0) |
| 1 | PERFORATED SUBDRAIN IN SOFT SCAPE (B / D1.1) |
| A | DRAINAGE CULVERT UNDER RAISED CROSS WALK (K / D1.0) |
| B | CATCH BASIN AT CURB AND GUTTER (A / D1.1) |
| (E) | EXISTING |
| CB | CATCH BASIN |
| INV | INVERT |
| RIM | RIM ELEVATION |
| TOR | TOP OF ROCK ELEVATION |
| LF | LINEAR FEET |
| CO | CLEANOUT |
| S=0.5% | SLOPE |
| MIN. | MINIMUM |
| N, S, W EA, | NORTH, SOUTH, WEST, EAST |

NORTH

0' 10' 20' 40' 60'

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STAMP

REGISTERED PROFESSIONAL ENGINEER
DAVID CHRISTY COMBS
No. C - 56494
Signature
EXPIRATION June 30, 2027
CIVIL
STATE OF CALIFORNIA

CONSULTANT

SHEET TITLE
DRAINAGE PLAN

PROJECT NAME
HAWTHORNE MIDDLE SCHOOL TURF FIELD & TRACK IMPROVEMENTS

PROJECT ADDRESS
4366 W 129TH ST, HAWTHORNE, CA 90250

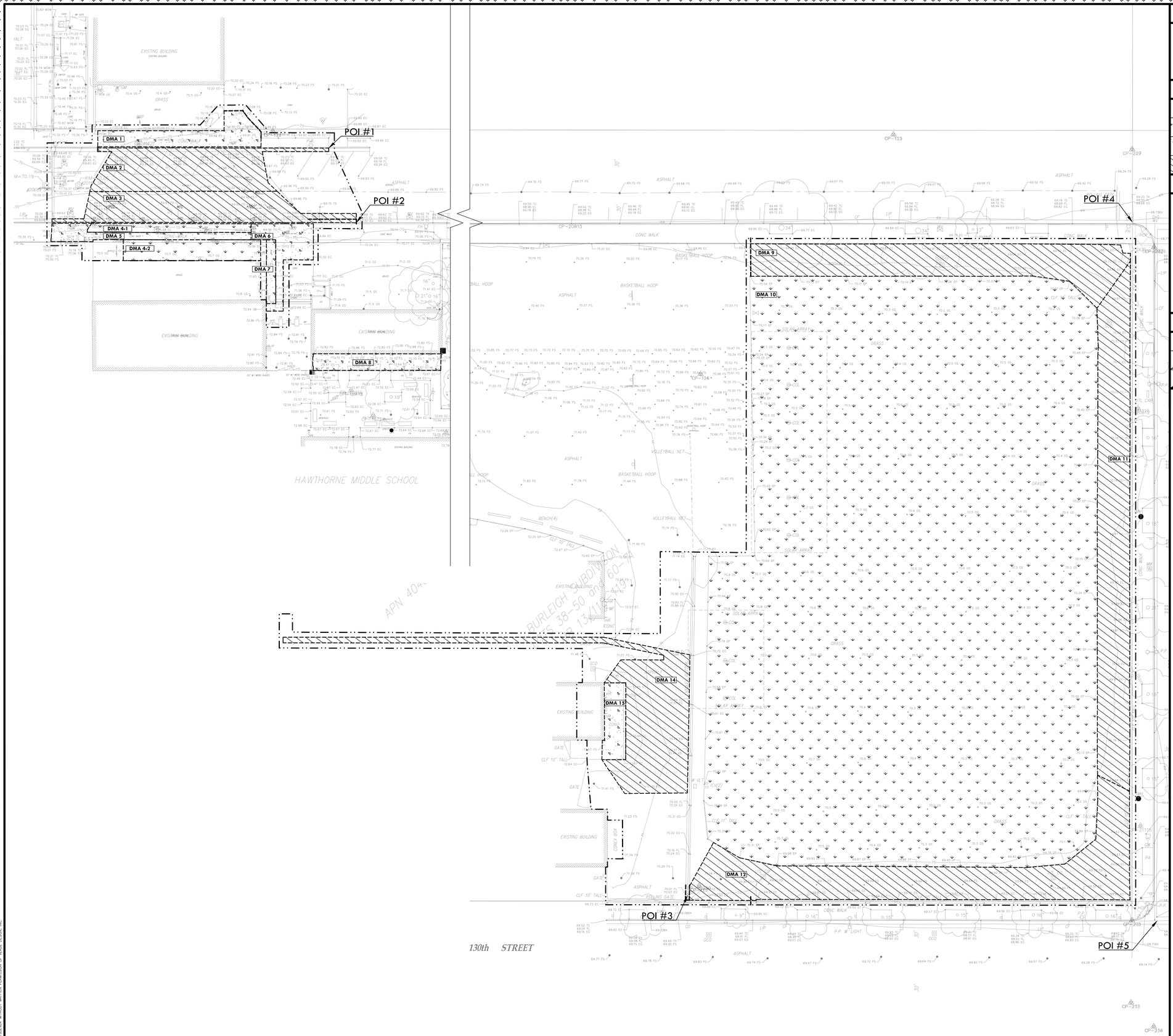
| SUBMITTAL | DATE |
|---|---|
| DESIGN DEVELOPMENT SUBMITTAL | 11/26/25 |
| DSA SUBMITTAL | 03/10/26 |

| NO. | REVISIONS | DATE |
|---|---|---|
| 1 | Drainage changes required for SWPPP compliance | 10/21/26 |

| DRAWN BY | CHECKED BY |
|---|---|
| XH | DC/CG |
| DATE ISSUED | SCALE |
| 06/10/2026 | 1"=20'-0" |
| PROJ. NO. | 2223000 |
| SHEET NO. | L6.0 |

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DRAWING NAME: Y:\Projects-RI\2022\2223000 – Hawthorne MS T&F Assess\CAD_L6.0-DRN.dwg
PLOT DATE: 11-04-26 PLOTTED BY: station14




## STORM WATER CONTROL NOTES

1. REFER TO POST-CONSTRUCTION STORMWATER QUALITY PLAN FOR INFORMATION OF DMA'S AND BMP'S.
2. REFER TO EXISTING CONDITIONS PLANS FOR MORE INFORMATION OF EXISTING NATURAL HYDROLOGIC FEATURES, DRAINAGE, UTILITIES AND EASEMENTS.
3. REFER TO DRAINAGE AND UTILITY PLANS FOR MORE INFORMATION OF PROPOSED DRAINAGE DESIGN.

## STORM WATER CONTROL LEGEND

| SYM | IMPERVIOUS / PERVIOUS | DESCRIPTION | RUNOFF COEFFICIENT (C) |
|---|---|---|---|
| | PERVIOUS | LANDSCAPING | 0.30 |
| | IMPERVIOUS | CONCRETE PAVING | 0.95 |
| | IMPERVIOUS | ASPHALT | 0.95 |

## DRAINAGE MANAGEMENT AREAS

| DMA # | AREA (SQFT) | CN | Type of Surface | DMA Type | Connects to |
|---|---|---|---|---|---|
| 1 | 890 | 98 | Impervious | Drains to Curb & Gutter | POI#1 |
| 2 | 2094 | 98 | Impervious | Drains to Curb & Gutter | POI#1 |
| 3 | 1962 | 98 | Impervious | Drains to Curb & Gutter | POI#2 |
| 4-1 | 403 | 39 | Pervious | Drains to Curb & Gutter | POI#2 |
| 4-2 | 801 | 39 | Pervious | Drains to Curb & Gutter | POI#2 |
| 5 | 522 | 98 | Impervious | Drains to Curb & Gutter | POI#2 |
| 6 | 621 | 98 | Impervious | Drains to Curb & Gutter | POI#2 |
| 7 | 168 | 98 | Impervious | Drains to Curb & Gutter | POI#2 |
| 8 | 616 | 98 | Impervious | Drains to planter | – |
| 9 | 3652 | 98 | Impervious | Drains to Curb & Gutter | POI#4 |
| 10 | 60460 | 39 | Pervious | Drains to Catch Basin | POI#3 |
| 11 | 4514 | 98 | Impervious | Drains to Curb & Gutter | POI#4 |
| 12 | 5167 | 98 | Impervious | Drains to Curb & Gutter | POI#5 |
| 13 | 472 | 98 | Impervious | Drains to Catch Basin | POI#3 |
| 14 | 3210 | 98 | Impervious | Drains to Catch Basin | POI#3 |

## LEGEND

| SYM | DESCRIPTION |
|---|---|
| | DMA LIMITS |
| | PROJECT LIMITS |

NORTH

0' 10' 20' 40' 80'

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STAMP

REGISTERED PROFESSIONAL ENGINEER
DARYN CORREA
No. C-56494
Signature
EXPIRATION June 30, 2027
CIVIL
STATE OF CALIFORNIA

CONSULTANT

SHEET TITLE
STORMWATER CONTROL PLAN PRE- CONSTRUCTION

PROJECT NAME
HAWTHORNE MIDDLE SCHOOL TURF FIELD & TRACK IMPROVEMENTS

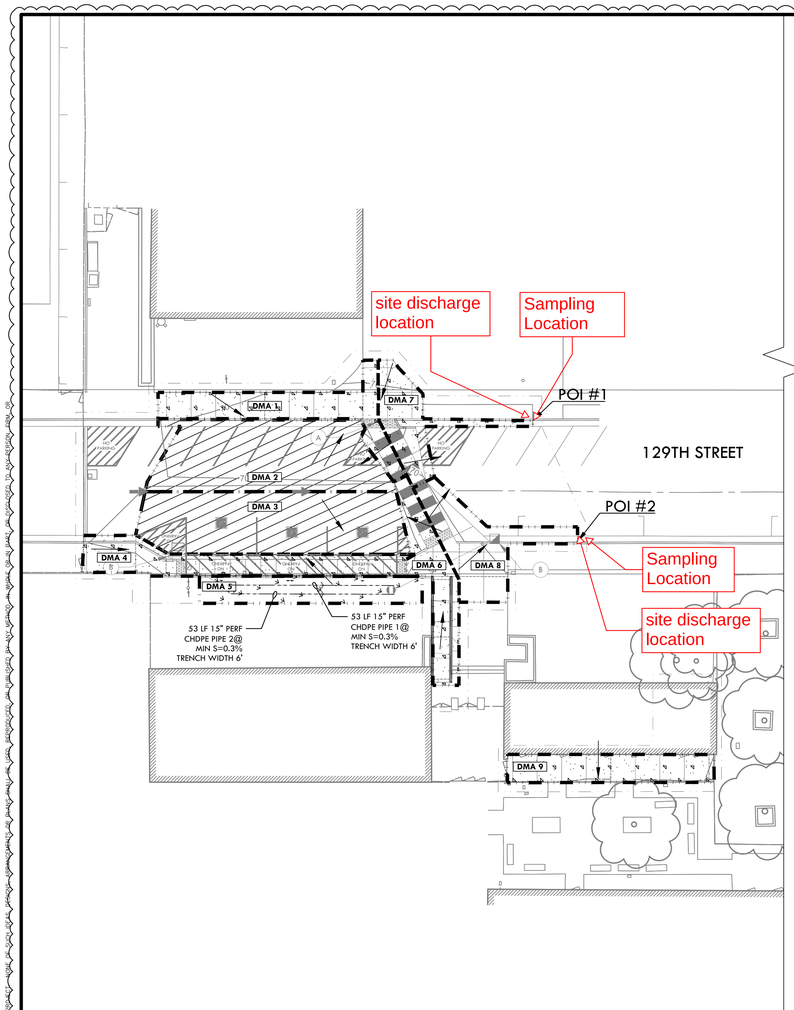
PROJECT ADDRESS
4366 W 129TH ST, HAWTHORNE, CA 90250

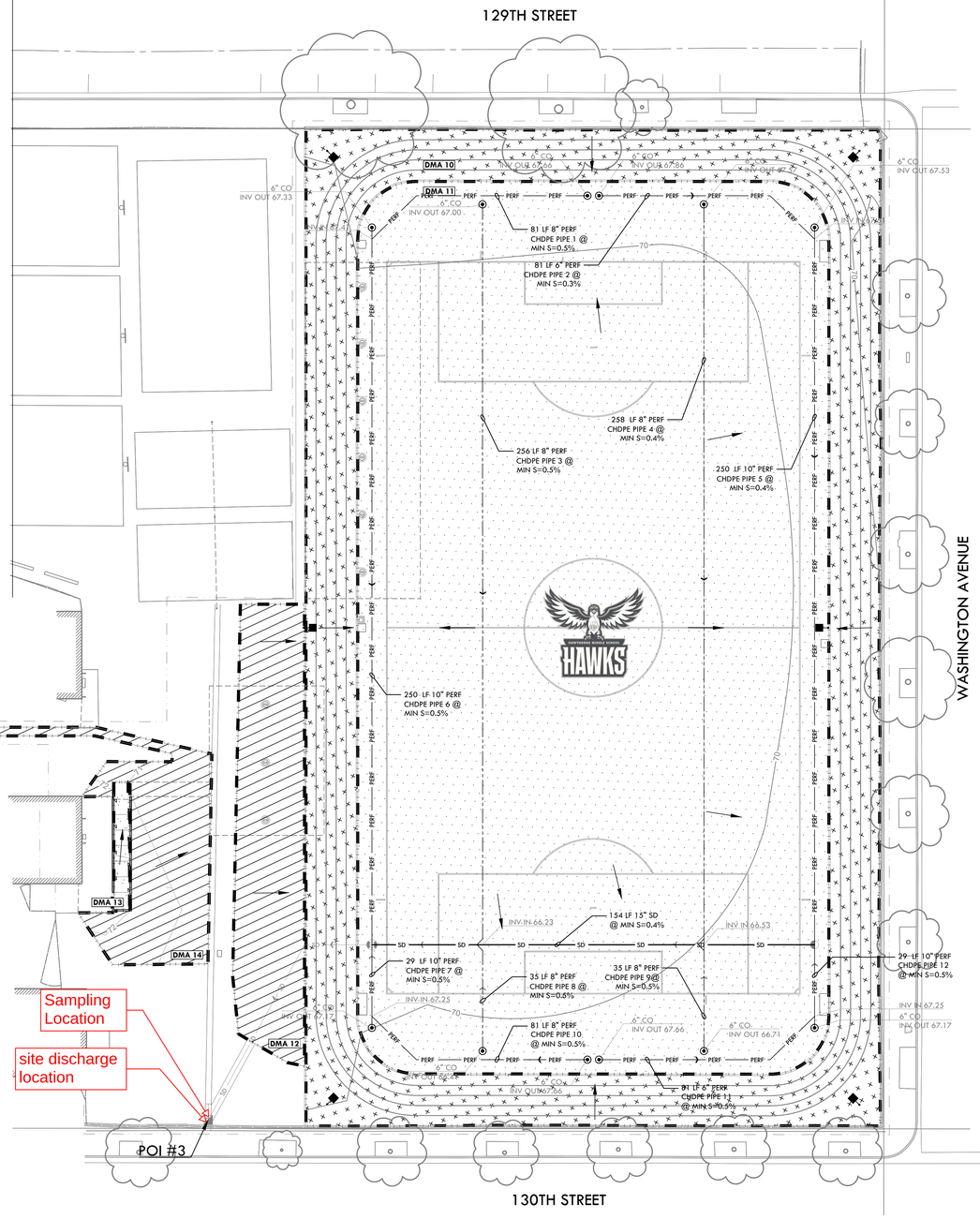
| SUBMITTAL | DATE |
|---|---|
| DESIGN DEVELOPMENT SUBMITTAL | 11/26/25 |
| DSA SUBMITTAL | 03/10/26 |

| NO. | REVISIONS | DATE |
|---|---|---|
| 1 | SWPPP Calculations | 10/21/26 |

| DRAWN BY | CHECKED BY |
|---|---|
| XH | DC/CG |
| DATE ISSUED 06/10/2026 | SCALE |
| PROJ. NO. 2223000 | |
| SHEET NO. L6.1 | |

DRAWING NAME: Y:\Projects-R\2022\223000 - Hawthorne MS T&F Assess\Stormwater\SWCP CAD\SWCP-PRE.dwg
PLOT DATE: 11-04-26 PLOTTED BY: station14




## STORM WATER CONTROL NOTES

1. REFER TO POST-CONSTRUCTION STORMWATER QUALITY PLAN FOR INFORMATION OF DMA'S AND BMP'S.
2. REFER TO EXISTING CONDITIONS PLANS FOR MORE INFORMATION OF EXISTING NATURAL HYDROLOGIC FEATURES, DRAINAGE, UTILITIES AND EASEMENTS.
3. REFER TO DRAINAGE AND UTILITY PLANS FOR MORE INFORMATION OF PROPOSED DRAINAGE DESIGN.
4. SEE ATTACHMENT F FOR DETENTION VOLUME CALCULATIONS WITHIN PERFORATED PIPE TRENCHES FOR ASSOCIATED POI.

## STORM WATER CONTROL LEGEND

| SYM | IMPERVIOUS / PERVIOUS | DESCRIPTION | RUNOFF COEFFICIENT (C) |
|---|---|---|---|
| | PERVIOUS | LANDSCAPING | 0.30 |
| | PERVIOUS | SYNTHETIC TURF | 0.75 |
| | IMPERVIOUS | ALL WEATHER TRACK SURFACE | 0.95 |
| | IMPERVIOUS | CONCRETE PAVING | 0.95 |
| | IMPERVIOUS | ASPHALT | 0.85 |

## DRAINAGE MANAGEMENT AREAS

| DMA | AREA | CN | TYPE OF SURFACE | DMA Type | Connects to |
|---|---|---|---|---|---|
| 1 | 805 | 98 | HARDSCAPE | Discharge to Catch Basin | POI #1 |
| 2 | 1640 | 98 | HARDSCAPE | Discharge to Catch Basin | POI #1 |
| 3 | 1726 | 98 | HARDSCAPE | Discharge to Infiltration Basin | BASIN #1* |
| 4 | 870 | 98 | HARDSCAPE | Discharge to Infiltration Basin | BASIN #1* |
| 5 | 647 | 39 | LANDSCAPE | Discharge to Infiltration Basin | BASIN #1* |
| 6 | 611 | 98 | HARDSCAPE | Discharge to Infiltration Basin | BASIN #1* |
| 7 | 537 | 98 | HARDSCAPE | Discharge to Catch Basin | POI #1 |
| 8 | 791 | 98 | HARDSCAPE | Discharge to Infiltration Basin | POI #2 |
| 9 | 616 | 98 | HARDSCAPE | Discharge to Street | POI #4 |
| 10 | 18625 | 98 | HARDSCAPE | Discharge to Infiltration Basin | BASIN #2* |
| 11 | 50586 | 98 | SYNTHETIC TURF | Discharge to Infiltration Basin | BASIN #2* |
| 12 | 3692 | 98 | HARDSCAPE | Discharge to Infiltration Basin | BASIN #2* |
| 13 | 254 | 98 | HARDSCAPE | Discharge to Catch Basin | POI #3 |
| 14 | 2595 | 98 | HARDSCAPE | Discharge to Catch Basin | POI #3 |

* Basin #1 — 1 perforated drain lines with associated 3-foot-wide Drain rock trenches underneath the natural turf

Basin #2 — perforated drain lines with associated 3-foot-wide Drain rock trenches underneath the synthetic turf

## LEGEND

| SYM | DESCRIPTION |
|---|---|
| | DMA LIMITS |
| | PROJECT LIMITS |
| | FLOW DIRECTION |

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REGISTERED PROFESSIONAL ENGINEER — DARVIN CORREA — No. C-56494 — Signature — EXPIRATION June 30, 2027 — C.I.V.I.L. — STATE OF CALIFORNIA

CONSULTANT

SHEET TITLE
STORMWATER CONTROL PLAN POST- CONSTRUCTION

PROJECT NAME
HAWTHORNE MIDDLE SCHOOL TURF FIELD & TRACK IMPROVEMENTS

PROJECT ADDRESS
4366 W 129TH ST, HAWTHORNE, CA 90250

| SUBMITTAL | DATE |
|---|---|
| DESIGN DEVELOPMENT SUBMITTAL | 11/26/25 |
| DSA SUBMITTAL | 03/10/26 |

| NO. | REVISIONS | DATE |
|---|---|---|
| 1 | SWPPP Design and Calculation | 10/21/26 |

| DRAWN BY | CHECKED BY |
|---|---|
| AC/RC | DC/CG |
| DATE ISSUED | SCALE |
| 06/10/2026 | 1"=20'-0" |
| PROJ. NO. | 2223000 |
| SHEET NO. | L6.2 |

NORTH
0' 10' 20' 40' 60'



DRAWING NAME: Y:\Projects-R\2022\2223000 - Hawthorne MS T&F Assess\Stormwater\SWCP CAD\SWCP-POST.dwg
PLOT DATE: 11-04-25 PLOTTED BY: allison1

## POST-CONSTRUCTION DRAINAGE MANAGEMENT AREA SUMMARY - RUNOFF VOLUME AT PARKING LOT NORTH POI#1

85TH PERCENTILE RAINFALL DEPTH (P): 0.87 INCH Source: Los Angeles Civic Center

CN 98

SOIL RETENTION S 0.204082

INITIAL ABSTRACTION Ia 0.0408163

SINCE INITIAL ABSTRACTION IS SMALLER THAN RAIN FALL DEPTH, RUNOFF DEPTH >0

RUNOFF DEPTH (Q) Q=((P−Ia)*(P−Ia))/(P-Ia+S)

| DMA # | Area | CN | Runoff Depth (inch) | Runoff Volume (cf) | TYPE OF SURFACE | Disconnected |
|---|---|---|---|---|---|---|
| 1 | 805 | 98 | 0.665 | 44.64 | HARDSCAPE | N |
| 2 | 1640 | 98 | 0.665 | 90.94 | HARDSCAPE | N |
| 7 | 537 | 98 | 0.665 | 29.78 | HARDSCAPE | N |
| Total Runoff Volume(B) | 2982 | | | **165.35** | CF (A) | |

Existing Runoff Volume at Parking North = Post Construction Runoff Volume at Corridor

## POST-CONSTRUCTION DRAINAGE MANAGEMENT AREA SUMMARY - RUNOFF VOLUME AT PARKING LOT SOUTH POI#2

85TH PERCENTILE RAINFALL DEPTH (P): 0.87 INCH Source: Los Angeles Civic Center

CN 98

SOIL RETENTION S 1139.425

INITIAL ABSTRACTION Ia 227.88506

SINCE INITIAL ABSTRACTION IS SMALLER THAN RAIN FALL DEPTH, RUNOFF DEPTH >0

RUNOFF DEPTH (Q) Q=((P−Ia)*(P−Ia))/(P-Ia+S)

| DMA # | Area | CN | Runoff Depth (inch) | Runoff Volume (cf) | TYPE OF SURFACE | Disconnected |
|---|---|---|---|---|---|---|
| 3 | 3207 | 98 | 0.665 | 177.83 | HARDSCAPE | Y |
| 4 | 870 | 98 | 0.665 | 48.24 | HARDSCAPE | Y |
| 6 | 611 | 98 | 0.665 | 33.88 | HARDSCAPE | Y |
| 8 | 791 | 98 | 0.665 | 43.86 | HARDSCAPE | N |
| Total Runoff Volume(B) | 5479 | | | **259.95** | CF (A) | |

Existing Runoff Volume at Parking **27.04** CF (B)

**LANDSCAPE RUNOFF VOLUME**

CN 39

SOIL RETENTION S 15.64103

INITIAL ABSTRACTION Ia 3.1282051

SINCE INITIAL ABSTRACTION IS GREATER THAN RAIN FALL DEPTH, RUNOFF DEPTH =0

| DMA # | Area | CN | Runoff Depth (inch) | Runoff Volume (cf) |
|---|---|---|---|---|
| 5 | 647 | 39 | 0.000 | 0.00 |
| Total | 647 | | 0.000 CF (C) | |

**TOTAL VOLUME TO STORE IN BASIN 1** **(A)-(B)+(C)** **232.91 cf**

## POST-CONSTRUCTION DRAINAGE MANAGEMENT AREA SUMMARY - RUNOFF VOLUME AT CORRIDOR

85TH PERCENTILE RAINFALL DEPTH (P): 0.87 INCH Source: Los Angeles Civic Center

CN 98

SOIL RETENTION S 1139.425

INITIAL ABSTRACTION Ia 227.88506

SINCE INITIAL ABSTRACTION IS SMALLER THAN RAIN FALL DEPTH, RUNOFF DEPTH >0

RUNOFF DEPTH (Q) Q=((P−Ia)*(P−Ia))/(P-Ia+S)

| DMA # | Area | CN | Runoff Depth (inch) | Runoff Volume (cf) | TYPE OF SURFACE | Disconnected |
|---|---|---|---|---|---|---|
| 9 | 616 | 98 | 0.665 | 34.16 | HARDSCAPE | N |

Existing Runoff Volume at Corridor = Post Construction Runoff Volume at Corridor

**POI#3**

**SYNTHETIC TURF RUNOFF VOLUME**

CN 98

SOIL RETENTION S 0.204082

INITIAL ABSTRACTION Ia 0.0408163

SINCE INITIAL ABSTRACTION IS SMALLER THAN RAIN FALL DEPTH, RUNOFF DEPTH >0

RUNOFF DEPTH (Q) Q=((P−Ia)*(P−Ia))/(P-Ia+S)

| DMA# | Area | CN | Runoff Depth (inch) | Runoff Volume (cf) |
|---|---|---|---|---|
| 11 | 50586 | 98 | 0.665 | 2805.04 |
| Total Runoff Volume | 50,586 | | | 2805.04 |

Porous Pavement credit (per SMART) 1,065.91 cf

**Runoff Volume to be stored on site (A)** **2805.04-1065.91=** **1739.13 cf**

**HARDSCAPE RUNOFF VOLUME**

CN 98

PER CALCULATION UNDER SYNTHTIC TURF WITH THE SAME CN VALUE , RUNOFF DEPTH >0

| DMA # | Area | CN | Runoff Depth (inch) | Runoff Volume (cf) | TYPE OF SURFACE | Disconnected |
|---|---|---|---|---|---|---|
| 10 | 18625 | 98 | 0.665 | 1032.77 | HARDSCAPE | Y |
| 12 | 3692 | 98 | 0.665 | 204.72 | HARDSCAPE | Y |
| Total Runoff Volume(B) | 22317 | | | 1237.50 | (B) | |

**Total Runoff Volume to be stored in BASIN 1(=A+B)** **1739.13+1237.50 =** **2976.63 cf**

## POST-CONSTRUCTION DRAINAGE MANAGEMENT AREA SUMMARY - RUNOFF VOLUME AT ASPHALT SLOPE

**HARDSCAPE RUNOFF VOLUME**

85TH PERCENTILE RAINFALL DEPTH (P): 0.87 INCH Source: Los Angeles Civic Center

SOIL RETENTION S 1139.425

INITIAL ABSTRACTION Ia 227.88506

CN 98

SINCE INITIAL ABSTRACTION IS SMALLER THAN RAIN FALL DEPTH, RUNOFF DEPTH >0

| DMA # | Area | CN | Runoff Depth (inch) | Runoff Volume (cf) | TYPE OF SURFACE | Disconnected |
|---|---|---|---|---|---|---|
| 13 | 254 | 98 | 0.665 | 14.08 | | |
| 14 | 2595 | 98 | 0.665 | 143.90 | HARDSCAPE | |
| Total Runoff Volume(B) | 2849 | | | 157.98 | | |

Existing Runoff Volume at ASPALT SLOPE > Post Construction Runoff Volume at ASPALT SLOPE

## POI 2 POST-CONSTRUCTION DRAINAGE MANAGEMENT AREA SUMMARY - RUNOFF VOLUME STORAGE - BASIN #1

Storage in Perf pipes 6"

| Basin No. | Pipe number refer to L6.4 | Pipe Length[1] [L] (ft) | Pipe Diameter[1] [D] (ft) | Pipe Slope[1] [S] (%) | Pipe Angle[2] (Degrees) | h1[3][water level in pipe] (ft) | Invert Elevation at High Point | Invert Elevation at tie-in[1] | Top of Weir Elevation[5] | Top of Pipe at the High Point | Length of pipe -full | Length of pipe - partially full | length of pipe -Empty | Volume (full portion) | Volume [Pipe tilted] from site4(cf) | Trench Width[6] [w](ft) | R[bottom of pipe to bottom of trench] (ft) | H[7] [bottom of pipe to water table] (f) | L[6][ROCK] (lf) | Volume[9] [ROCK] - triangle(cf) | Volume[9] [ROCK] - trapezoid(cf) | Total Storage [Pipe + Rock Void] (cf) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Basin #1 | 1 | 53 | 1.25 | 0.003 | 0.17 | 1.25 | 67.16 | 67 | 69.25 | 68.41 | 53 | 0 | 0 | 65.01 | 0.00 | 3 | 0.25 | 2.25 | 53.00 | N/A | 111.92 | 176.93 |
| Basin #1 | 2 | 53 | 1.25 | 0.003 | 0.17 | 1.25 | 67.16 | 67 | 69.25 | 68.41 | 53 | 0 | 0 | 65.01 | 0.00 | 3 | 0.25 | 2.25 | 53.00 | N/A | 111.92 | 176.93 |

| | |
|---|---|
| Volume Provided | 354 |
| Volume Required | 150 |
| Storage Surplus | 204 |

Check Drawdown time
Basin 1

Infiltration capacity = Basin area * infiltration Rate / 12 * 72 hours / 1.3 (factor of safety)
Storage Volume 353.9 cf
Infiltration capacity 1188.83077 cf
**Infiltration Capacity > Storage Volume**

## POI 3,4 POST-CONSTRUCTION DRAINAGE MANAGEMENT AREA SUMMARY - RUNOFF VOLUME STORAGE - BASIN #2

Storage in Perf pipes 6"

| Basin No. | Pipe number refer to L6.4 | Pipe Length[1] [L] (ft) | Pipe Diameter[1] [D] (ft) | Pipe Slope[1] [S] (%) | Pipe Angle[2] (Degrees) | h1[3][water level in pipe] (ft) | Invert Elevation at High Point | Invert Elevation at tie-in[1] | Top of Weir Elevation[5] | Top of Pipe at the High Point | Length of pipe -full | Length of pipe - partially full | length of pipe - Empty | Volume (full portion) | Volume [Pipe tilted] from site4(cf) | Trench Width[6] [w](ft) | R[bottom of pipe to bottom of trench] (ft) | H[7] [bottom of pipe to water table] (f) | L[6][ROCK] (lf) | Volume[9] [ROCK] - triangle(cf) | Volume[9] [ROCK] - trapezoid(cf) | Total Storage [Pipe + Rock Void] (cf) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Basin #2 | 2 | 81 | 0.50 | 0.003 | 0.18 | 0.50 | 67.86 | 67.61 | 68.93 | 68.36 | 81 | 0 | 0 | 15.90 | 0.00 | 3 | 0.25 | 1.32 | 81.00 | N/A | 117.33 | 133.23 |
| Basin #2 | 11 | 81 | 0.50 | 0.005 | 0.29 | 0.50 | 67.66 | 67.25 | 68.93 | 68.16 | 81 | 0 | 0 | 15.90 | 0.00 | 3 | 0.25 | 1.68 | 81.00 | N/A | 141.15 | 157.04 |
| | | | | | | | | | | | | | | | | | | | | | Total Volume Provided (CF) | 290 |

Storage in Perf pipes 8"

| Basin No. | Pipe number refer to L6.4 | Pipe Length[1] [L] (ft) | Pipe Diameter[1] [D] (ft) | Pipe Slope[1] [S] (%) | Pipe Angle[2] (Degrees) | h1[3][water level in pipe] (ft) | Invert Elevation at High Point | Invert Elevation at tie-in[1] | Top of Weir Elevation[5] | Top of Pipe at the High Point | Length of pipe -full | Length of pipe - partially full | length of pipe - Empty | Volume (full portion) | Volume [Pipe tilted] from site4(cf) | Trench Width[6] [w](ft) | R[bottom of pipe to bottom of trench] (ft) | H[7] [bottom of pipe to water table] (f) | L[6][ROCK] (lf) | Volume[9] [ROCK] - triangle(cf) | Volume[9] [ROCK] (cf) | Total Storage [Pipe + Rock Void] (cf) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Basin #2 | 1 | 81 | 0.67 | 0.003 | 0.18 | 0.67 | 67.66 | 67.41 | 68.93 | 68.33 | 81 | 0 | 0 | 28.26 | 0.00 | 3 | 0.25 | 1.52 | 81.00 | N/A | 130.02 | 158.28 |
| Basin #2 | 3 | 256 | 0.67 | 0.003 | 0.17 | 0.67 | 67.00 | 66.23 | 68.93 | 67.67 | 256 | 0 | 0 | 89.32 | 0.00 | 3 | 0.25 | 2.7 | 256.00 | N/A | 658.21 | 747.53 |
| Basin #2 | 4 | 258 | 0.67 | 0.004 | 0.23 | 0.67 | 67.57 | 66.53 | 68.93 | 68.24 | 258 | 0 | 0 | 90.01 | 0.00 | 3 | 0.25 | 2.4 | 258.00 | N/A | 545.51 | 635.53 |
| Basin #2 | 8 | 35 | 0.67 | 0.005 | 0.29 | 0.67 | 66.41 | 66.23 | 68.93 | 67.08 | 35 | 0 | 0 | 12.21 | 0.00 | 3 | 0.25 | 2.7 | 35.00 | N/A | 100.83 | 113.04 |
| Basin #2 | 9 | 35 | 0.67 | 0.005 | 0.29 | 0.67 | 66.71 | 66.53 | 68.93 | 67.38 | 35 | 0 | 0 | 12.21 | 0.00 | 3 | 0.25 | 2.4 | 35.00 | N/A | 89.81 | 102.02 |
| Basin #2 | 10 | 81 | 0.67 | 0.005 | 0.29 | 0.67 | 67.66 | 67.25 | 68.93 | 68.33 | 81 | 0 | 0 | 28.26 | 0.00 | 3 | 0.25 | 1.68 | 81.00 | N/A | 136.82 | 165.08 |
| | | | | | | | | | | | | | | | | | | | | | Total Volume Provided (CF) | 1,921 |

Storage in Perf pipes 10"

| Basin No. | Pipe number refer to L6.4 | Pipe Length[1] [L] (ft) | Pipe Diameter[1] [D] (ft) | Pipe Slope[1] [S] (%) | Pipe Angle[2] (Degrees) | h1[3][water level in pipe] (ft) | Invert Elevation at High Point | Invert Elevation at tie-in[1] | Top of Weir Elevation[5] | Top of Pipe at the High Point | Length of pipe -full | Length of pipe - partially full | length of pipe - Empty | Volume (full portion) | Volume [Pipe tilted] from site4(cf) | Trench Width[6] [w](ft) | R[bottom of pipe to bottom of trench] (ft) | H[7] [bottom of pipe to water table] (f) | L[6][ROCK] (lf) | Volume[9] [ROCK] (cf) | Total Storage [Pipe + Rock Void] (cf) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Basin #2 | 5 | 250 | 0.83 | 0.002 | 0.14 | 0.83 | 67.61 | 67.02 | 68.93 | 68.44 | 250 | 0 | 0 | 136.28 | 0.00 | 3 | 0.25 | 1.91 | 250.00 | N/A | 441.86 | 578.15 |
| Basin #2 | 6 | 250 | 0.83 | 0.005 | 0.29 | 0.83 | 67.33 | 66.08 | 68.93 | 68.16 | 250 | 0 | 0 | 136.28 | 0.00 | 3 | 0.25 | 2.85 | 250.00 | N/A | 601.99 | 738.27 |
| Basin #2 | 7 | 29 | 0.83 | 0.005 | 0.30 | 0.83 | 67.17 | 67.02 | 68.93 | 68.00 | 29 | 0 | 0 | 15.81 | 0.00 | 3 | 0.25 | 1.91 | 29.00 | N/A | 57.96 | 73.76 |
| | | | | | | | | | | | | | | | | | | | | | Total Volume Provided (CF) | 1,390 |

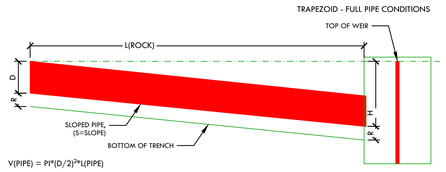
| | |
|---|---|
| Volume Provided | 3,602 |
| Volume Required | 2,977 |
| Storage Surplus | 625 |

Check Drawdown time
Basin 2

Infiltration capacity = Basin area * infiltration Rate / 12 * 72 hours / 1.3 (factor of safety)
Storage Volume 3601.9 cf
Infiltration capacity 16116.508 cf
**Infiltration Capacity > Storage Volume**

**SHEET NOTES:**

1. Pipe Label, Pipe Length, Pipe Diameter, Pipe Slope, and elevation at tie-in information refer to Drainage plan
2. Pipe Angle = Inverse Tan (Slope)
3. h1 = Pipe Diameter size when H > Pipe Diameter size; h1=H when H<Pipe Diameter. When h1 nmuber is minus, means 0 water storage in this pipe section.
4. Volume[Pipe] refer to pipe storage volume calculation
   Pipe Volume Calculation use tilted cylindrical tank fomular, if the top of pipe elevation at the high end is higher than water/weir level, section of the water filled trench is a triangle
   Pipe Volume Calculation use tilted cylindrical tank fomular +cylinder, if the trench bottom elevation at the high end is lower than water/weir level, section of the water filled trench is a trapezoid
   Pipe Volume Calculation use cylinder, if the whole pipe is full
5. Weir elevation per Drainage Plan
6. Trench Width and R[bottom of pipe to bottom of trench] refer to Perforated Subdrain
7. H[bottom of pipe to water table] = Weir elevation - elevation at tie-in
8. Rock length L(Rock) only calculate the rock saturated with water
   L[ROCK] = (R+H)/Slope S, if section of the water filled in trench is a triangle
   L(ROCK) = Pipe length, if section of water filled in trench is a trapezoid
9. Volume[ROCK] refer to trench storage volume calculation

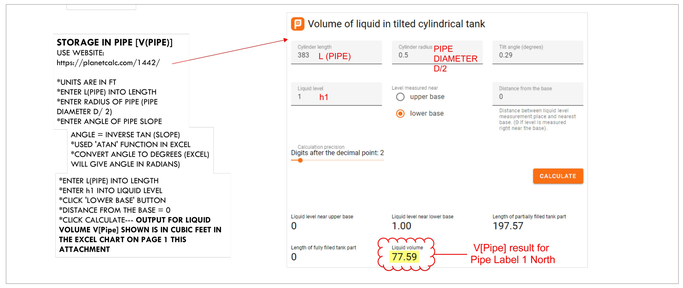


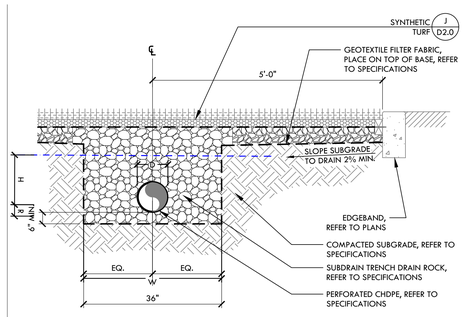

V(PIPE) = PI*(D/2)^2*L(PIPE)

L(ROCK) = L(PIPE)

STORAGE IN ROCK PROFILE V(ROCK)

= (((h1+R)+(H+R)) *L(ROCK))/2*3(TRENCH WIDTH) )-VOLUMESTORED IN PIPE (FULL + TILTED))*0.35




PERFORATED SUBDRAIN NTS


VERDE DESIGN
LANDSCAPE ARCHITECTURE
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REGISTERED PROFESSIONAL ENGINEER
DENNIS GREGORY CORPUZ
No. C-56494
Signature
EXPIRATION June 30, 2027
CIVIL
STATE OF CALIFORNIA

CONSULTANT

SHEET TITLE
STORMWATER CONTROL PLAN POST- CONSTRUCTION

PROJECT NAME
HAWTHORNE MIDDLE SCHOOL TURF FIELD & TRACK IMPROVEMENTS

PROJECT ADDRESS
4366 W 129TH ST, HAWTHORNE, CA 90250

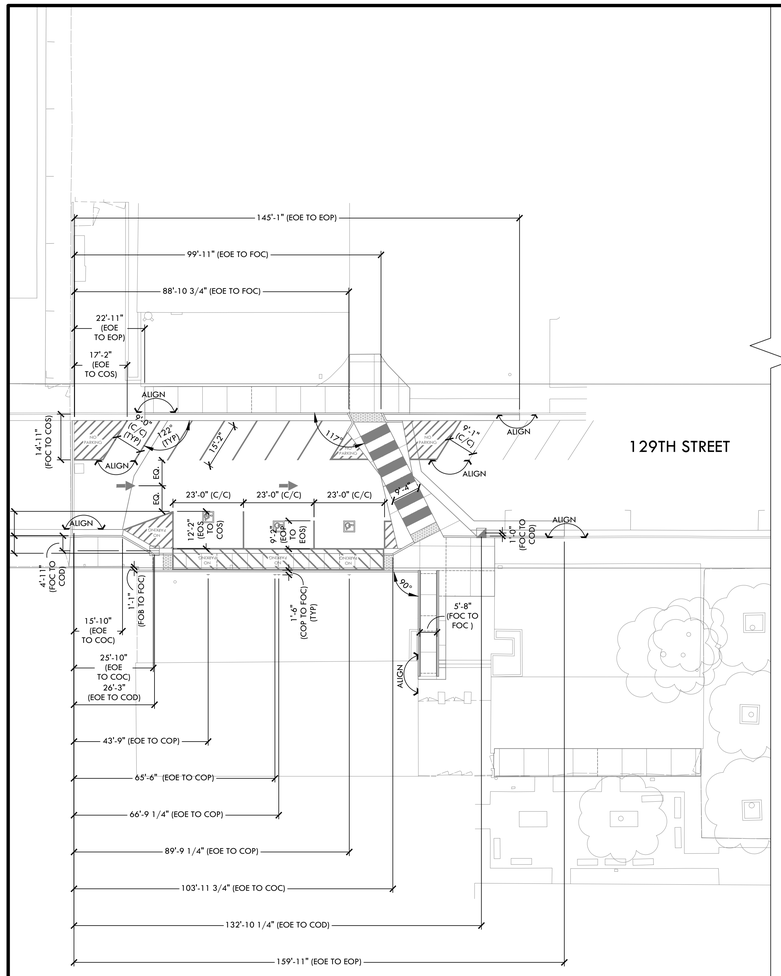
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|---|---|
| DESIGN DEVELOPMENT SUBMITTAL | 11/26/25 |
| DSA SUBMITTAL | 03/10/26 |

| NO. | REVISIONS | DATE |
|---|---|---|
| 1 | SWPPP Calculation | 10/21/26 |

| DRAWN BY | CHECKED BY |
|---|---|
| AC/RC | DC/CG |
| DATE ISSUED 06/10/2026 | SCALE 1"=20'-0" |
| PROJ. NO. 2223000 | |
| SHEET NO. L6.2.1 | |




DRAWING NAME: Y:\Projects-RI\2022\2223000 - Hawthorne MS T&F Assess\Stormwater\SWQP CAD\SWQP-POST.dwg
PLOT DATE: 11-24-26 PLOTTED BY: ajolon1A




# LAYOUT NOTES

1. THE CONTRACTOR SHALL COORDINATE ALL CONSTRUCTION ELEMENTS INCLUDING UTILITY LOCATIONS AND REQUIRED SLEEVING PRIOR TO INSTALLATION. VERIFY CRITICAL DIMENSIONS, REFERENCE POINT LOCATIONS AND CONSTRUCTION CONDITIONS PRIOR TO INITIATING CONSTRUCTION. TEMPORARY BENCHMARKS OR REFERENCE POINTS SHALL BE SET BY THE CONTRACTOR AS NECESSARY. NOTIFY THE DISTRICTS REPRESENTATIVE IMMEDIATELY SHOULD DISCREPANCY ARISE AND REDIRECT WORK TO AVOID DELAYS.
2. ALL DIMENSIONS SHALL BE VERIFIED IN FIELD AND CHALKED, STRING LINED OR FLAGGED BY THE CONTRACTOR PRIOR TO CONSTRUCTION. ANY MINOR ADJUSTMENTS MADE TO ACHIEVE OVERALL DESIGN LAYOUT SHALL BE ACCEPTED BY THE OWNER PRIOR TO CONSTRUCTION.
3. ALL LAYOUT AND GRADES SHALL BE COMPLETED BY A LICENSED SURVEYOR.

# LAYOUT LEGEND

| SYM. | DESCRIPTION |
|---|---|
| R10' | RADIUS POINT / CENTER MARK |
| 90° | PROPOSED ANGLE BETWEEN ELEMENTS |
| ALIGN | ALIGN EDGES OF ELEMENTS |
| X" | DISTANCE BETWEEN ELEMENTS |
| ℄ | CENTER LINE |
| EQ. | EQUAL |
| (C/C) | CENTER OF LINE STIPE TO CENTER OF LINE OF STRIPE |
| (COC) | CORNER OF CURB |
| (COD) | CENTER OF DRAIN |
| (COP) | CENTER OF POST |
| (COS) | CENTER OF STRIPE |
| (EOE) | EDGE OF EXISTING PAVEMENT EDGEBAND |
| (EOP) | EDGE OF PAVEMENT |
| (EOS) | EDGE OF STRIPING |
| (FOC) | FACE OF CURB |
| (RAD) | RADIUS POINT |
| (TYP) | TYPICAL |
| (TAN) | TANGENT POINT |

NORTH
0' 10' 20' 40' 60'

IDENTIFICATION STAMP
DIV. OF THE STATE ARCHITECT
APP: 03-125961 INC:
REVIEWED FOR
SS ☑ FLS ☑ ACS ☑
DATE: 10/12/2026

VERDE DESIGN
LANDSCAPE ARCHITECTURE
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REGISTERED PROFESSIONAL ENGINEER C-56494 CIVIL EXPIRATION June 30, 2027 STATE OF CALIFORNIA

LICENSED ARCHITECT GREER CLARK No. C-23240 EXP. 03-31-27 STATE OF CALIFORNIA

CONSULTANT

SHEET TITLE
HORIZONTAL CONTROL PLAN

PROJECT NAME
HAWTHORNE MIDDLE SCHOOL TURF FIELD & TRACK IMPROVEMENTS

PROJECT ADDRESS
4366 W 129TH ST, HAWTHORNE, CA 90250

| SUBMITTAL | DATE |
|---|---|
| DESIGN DEVELOPMENT SUBMITTAL | 11/26/25 |
| DSA SUBMITTAL | 03/10/26 |

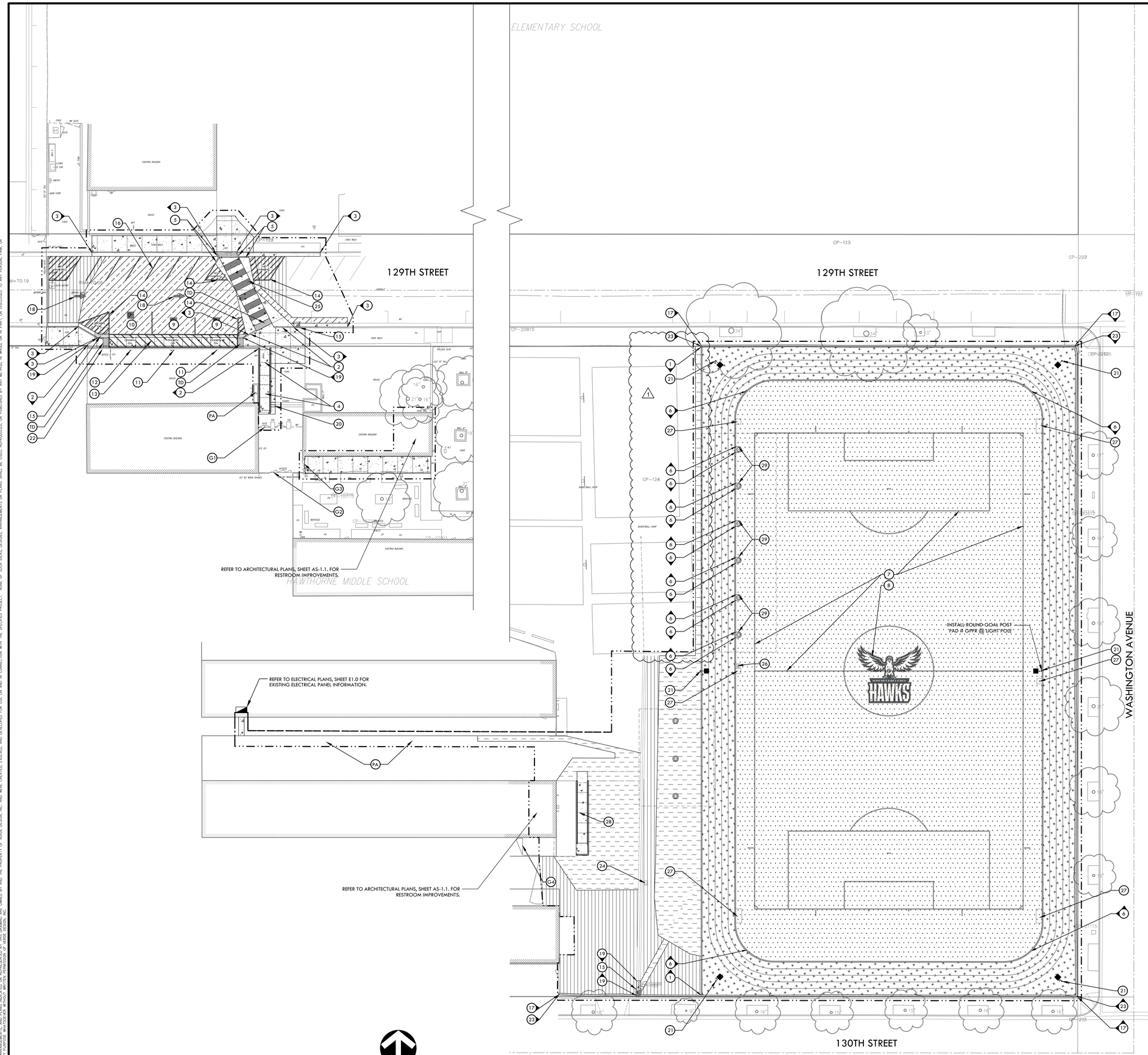
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| DRAWN BY | CHECKED BY |
|---|---|
| AC | DC/CG |
| DATE ISSUED: 06/10/2026 | SCALE: 1"=20'-0" |
| PROJ. NO.: 2223000 | |
| SHEET NO.: L7.0 | |

HORIZONTAL CONTROL PLAN

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DRAWING NAME: Y:\Projects-R\2022\2223000 - Hawthorne MS T&F Assess\CAD_L7.0-LAY.dwg
PLOT DATE: 09-01-26 PLOTTED BY: station14




# MATERIAL NOTES

1. THE CONTRACTOR SHALL COORDINATE ALL CONSTRUCTION ELEMENTS INCLUDING UTILITY LOCATIONS AND REQUIRED SLEEVING PRIOR TO INSTALLATION. VERIFY CRITICAL DIMENSIONS, REFERENCE POINT LOCATIONS AND CONSTRUCTION CONDITIONS PRIOR TO INITIATING CONSTRUCTION. TEMPORARY BENCHMARKS OR REFERENCE POINTS SHALL BE SET BY THE CONTRACTOR AS NECESSARY. NOTIFY THE DISTRICT'S REPRESENTATIVE IMMEDIATELY SHOULD DISCREPANCY ARISE AND REDIRECT WORK TO AVOID DELAYS.
2. THE INTERFACE OF ALL PROPOSED IMPROVEMENTS TO EXISTING SITE SHALL CONFORM AND BE SMOOTH AND UNIFORM.
3. ALL REINFORCING AND FORMS SHALL BE SECURED IN PLACE AND ACCEPTED BY DISTRICT'S REPRESENTATIVE PRIOR TO PLACING ANY CONCRETE.
4. CONCRETE FINISHES SHALL BE AS NOTED. CONTRACTOR SHALL PROVIDE 4'X4' SAMPLES OF ALL SPECIFIED FINISHES OF CONCRETE USING THE SAME MATERIALS THAT WILL BE USED IN THE ACTUAL CONSTRUCTION FOR EACH TYPE SPECIFIED. SAMPLES SHALL BE PREPARED WELL ENOUGH IN ADVANCE OF SCHEDULED CONCRETE POUR TO ALLOW FOR REVIEW AND POSSIBLE RE-POURING OF UNACCEPTABLE SAMPLES. UNACCEPTABLE SAMPLES SHALL BE RE-PREPARED UNTIL ACCEPTED BY THE DISTRICT'S REPRESENTATIVE. ACCEPTED SAMPLES SHALL BE PROTECTED AND REMAIN ON SITE FOR REFERENCE UNTIL FINAL ACCEPTANCE.
5. ALL FENCES AND GATES SHOWN ON PLAN ARE GRAPHIC REPRESENTATIONS; REFER TO DETAILS AND SPECIFICATIONS FOR PRECISE LOCATION.
6. ASPHALT SHALL NOT BE INSTALLED UNTIL ALL EDGES AND SITE FURNISHING PADS ARE INSTALLED.

# MATERIAL LEGEND

| SYM | DESCRIPTION | DTL |
|---|---|---|
| | LIMIT OF WORK | |
| | SYNTHETIC TURF (GREEN) | J D2.0 |
| | CONCRETE PAVING | G D2.0 |
| | SCORE JOINT | E D2.0 |
| | EXPANSION JOINT | F D2.0 |
| | ASPHALT PAVING - PEDESTRIAN | E D2.0 |
| | ASPHALT PAVING - VEHICULAR | E D2.0 |
| | SLURRY COAT ON THE SURFACE OF EXISTING ASPHALT PAVING, REFER TO SPECIFICATIONS | |
| | ALL-WEATHER TRACK SURFACING | I D2.0 |
| TD | TRUNCATED DOMES - RECESSED | J L2.1 |
| PA | PLANTING AREA | |
| G1 G2 G3 G4 | GATE IMPROVEMENTS- REFER TO ACCESSIBLE DETAILS, SHEET L2.1 | |
| 1 | 6" WIDE - EDGEBAND WITH ALL-WEATHER TRACK SURFACING | L D2.0 / L D2.1 |
| 2 | 6" WIDE - CURB | O D2.0 |
| 3 | CURB AND GUTTER | H D1.0 |
| 4 | RAMP - WITH 6" WIDE TALL CURB | A D2.1 |
| 5 | 6" WIDE - RAISED CURB AT CULVERT | P D2.0 |
| 6 | SYNTHETIC TURF CONNECTION | K D2.0 |
| 7 | SOCCER FIELD STRIPING | J D2.1 |
| 8 | TURF FIELD STRIPING GRAPHICS | K D2.1 |
| 9 | ACCESSIBLE STALL - PARALLEL | F L2.1 |
| 10 | ACCESSIBLE STALL - VAN | F L2.1 |
| 11 | ACCESSIBLE PARKING SIGNAGE | H L2.1 |
| 12 | ACCESSIBLE PARKING SIGNAGE - VAN | G L2.1 |
| 13 | ACCESSIBLE PARKING ISLE STRIPING | F L2.1 |
| 14 | NO PARKING STRIPING (NON-ACCESSIBLE) | Q D2.0 |
| 15 | DRAINAGE STRUCTURE IN CONCRETE SWALE. REFER TO DRAINAGE & UTILITY PLAN | N D1.0 |
| 16 | RE-STRIPE PARKING | |
| 17 | 12" WIDE EDGEBAND AT EXISTING FENCE | M D2.0 |
| 18 | DIRECTIONAL ARROW STRIPING | R D2.0 |
| 19 | CONCRETE SWALE | N D1.0 |
| 20 | REPAIR STAIRS AT EXISTING STAIRS | C D2.1 |
| 21 | SPORTS FIELD LIGHTING. REFER TO ELECTRICAL PLANS. | |
| 22 | PARKING TOW AWAY SIGN | I L2.1 |
| 23 | REPLACE EXISTING CHAIN LINK FABRIC WITH NEW CHAIN LINK FABRIC. RE-INSTALL EXISTING MID-RAIL AND BOTTOM FENCE RAIL. | |
| 24 | EXISTING WATER BOX TO REMAIN, PROTECT IN PLACE. REFER TO DEMOLITION PLAN. REPLACE VALVE BOX WITH NEW CONCRETE VALVE BOX | |
| 25 | CROSSWALK STRIPING | S D2.0 |
| 26 | UTILITY BOX AT SYNTHETIC TURF, REFER TO ELECTRICAL PLANS. | |
| 27 | IRRIGATION VALVE. REFER TO IRRIGATION PLAN | |
| 28 | WALKWAY WITH 6" WIDE TALL CURB AND RAILING | A D2.1 |
| 29 | 6" WIDE SYNTHETIC TURF EDGEBAND AT SOLAR ARRAY COLUMN | D D2.1 |

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REGISTERED PROFESSIONAL ENGINEER — DARYN COMBES — No. C-56494 — Signature — EXPIRATION June 30, 2027 — CIVIL — STATE OF CALIFORNIA

CONSULTANT

SHEET TITLE
MATERIAL AND DETAIL REFERENCE PLAN

PROJECT NAME
HAWTHORNE MIDDLE SCHOOL TURF FIELD & TRACK IMPROVEMENTS

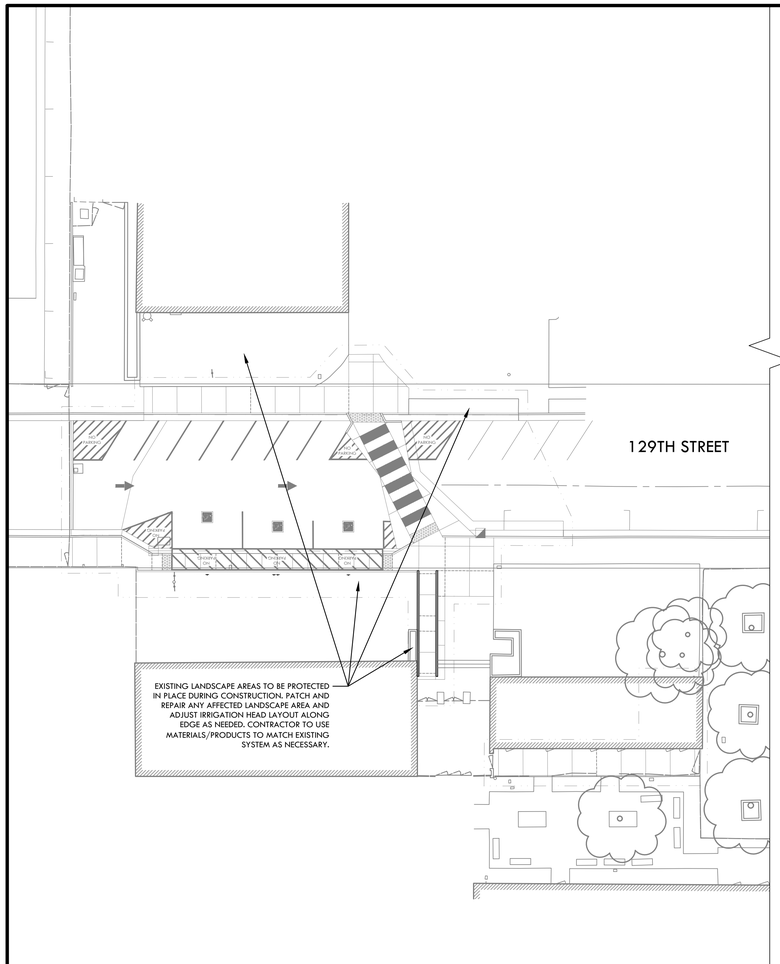
PROJECT ADDRESS
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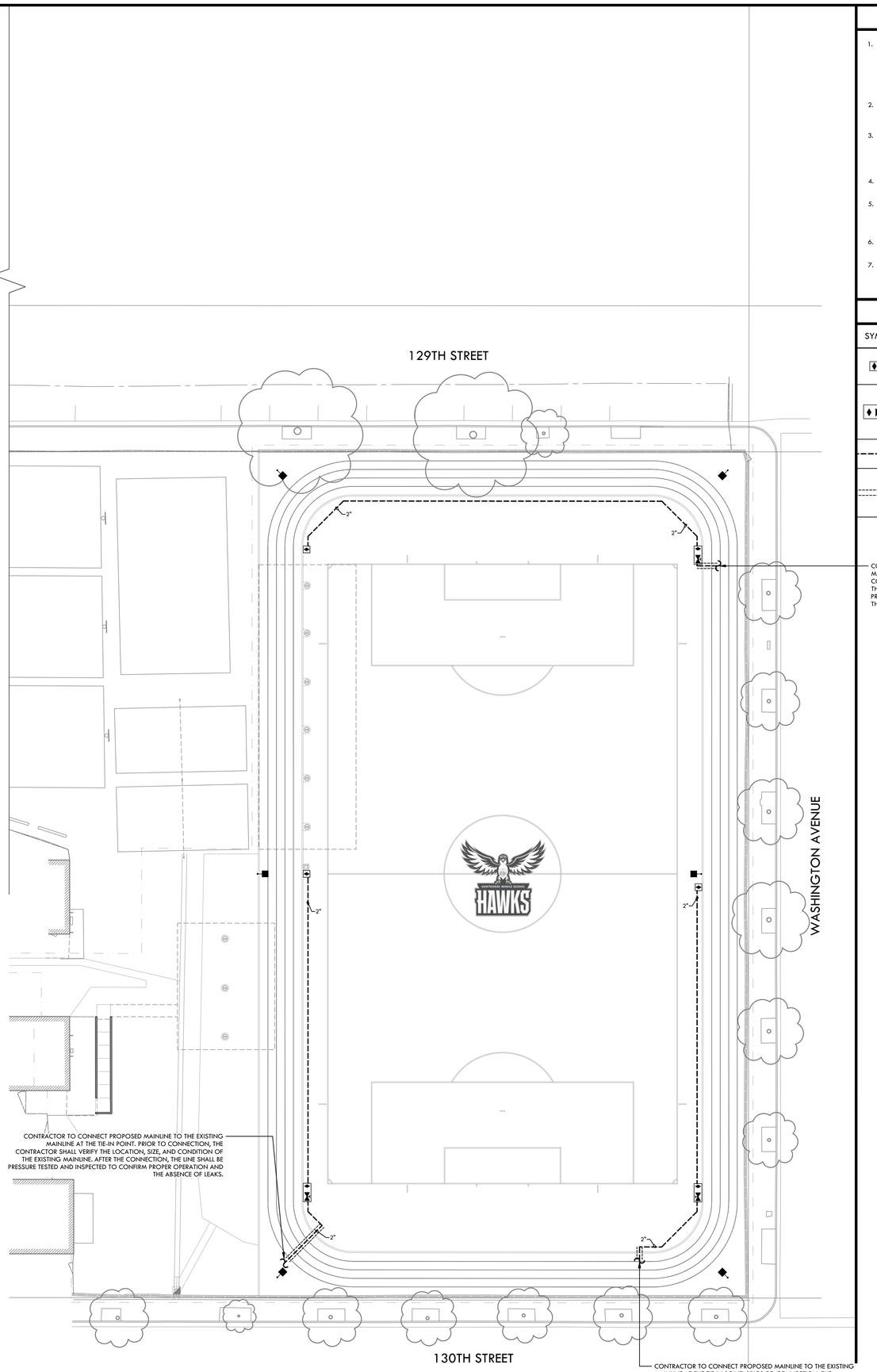
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|---|---|
| DESIGN DEVELOPMENT SUBMITTAL | 11/26/25 |
| DSA SUBMITTAL | 03/10/26 |

| NO. | REVISIONS | DATE |
|---|---|---|
| 1 | Paving changes required for SWPPP compliance | 10/21/26 |

| DRAWN BY | CHECKED BY |
|---|---|
| GA | DC/CG |
| DATE ISSUED 06/10/2026 | SCALE 1"=20'-0" |
| PROJ. NO. 2223000 | |
| SHEET NO. L8.0 | |

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## IRRIGATION NOTES

1. EXISTING STATIC PRESSURE AND THE MAXIMUM AVAILABLE FLOW (GPM) FROM THE SPORTS FIELD IRRIGATION MAINLINE IS UNKNOWN. CONTRACTOR SHALL FIELD VERIFY STATIC PRESSURE AND MAXIMUM AVAILABLE FLOW AT THE POINT OF CONNECTION PRIOR TO INSTALLATION. SUBMIT TEST RESULTS TO OWNER'S REPRESENTATIVE FOR REVIEW. IF MEASURED PRESSURE OR FLOW DOES NOT MEET SYSTEM DESIGN REQUIREMENTS, NOTIFY OWNER'S REPRESENTATIVE IMMEDIATELY AND SUSPEND WORK RELATED TO THE MAINLINE CONNECTION UNTIL FURTHER DIRECTION IS PROVIDED.
2. CONTRACTOR SHALL COORDINATE ELECTRICAL SUPPLY WITH GENERAL CONTRACTOR. GENERAL CONTRACTOR SHALL STUB APPROPRIATE POWER SUPPLY IN VICINITY OF CONTROLLER LOCATION.
3. IRRIGATION SYSTEM DESIGN IS DIAGRAMMATIC. WHERE PIPING, VALVES, QUICK COUPLERS, ETC. ARE SHOWN OUTSIDE PLANTING AREAS, OR LIMIT OF WORK, INTENT IS FOR PIPING, VALVES, ETC., TO BE INSTALLED WITHIN PLANTING AREAS OF PROPERTY. INDICATE EXACT LOCATIONS OF IRRIGATION EQUIPMENT ON RECORD DRAWINGS. REFER TO SPECIFICATIONS.
4. CONTRACTOR SHALL PROGRAM CONTROLLER TO ENSURE PROPER IRRIGATION. BASED ON PLANT TYPE, EXPOSURE AND SEASON.
5. CONTRACTOR SHALL USE EXTREME CARE WHERE IT IS NECESSARY TO TRENCH NEAR EXISTING TREES. EXCAVATION IN AREAS EXHIBITING ROOT 3" AND LARGER SHALL BE DONE BY HAND. ROOTS 2" OR LARGER IN DIAMETER DAMAGED IN CONSTRUCTION SHALL BE CLEANLY CUT.
6. CONTRACTOR SHALL MAKE MINOR ADJUSTMENTS TO HEAD LOCATIONS IN FIELD AS NECESSARY.
7. CONTRACTOR SHALL REFER TO DETAILS AND SPECIFICATIONS FOR ADDITIONAL INFORMATION.

## IRRIGATION LEGEND

| SYM. | MANUFAC. | MODEL NO./ DESCRIPTION | DTL REF |
|---|---|---|---|
| ◆ | HUNTER | HQ-44-LRC QUICK COUPLER VALVE WITH YELLOW LOCKING RUBBER COVER. INSTALLED IN HEADY DUTY QUICK CONNECT VALVE BOX FOR SYNTHETIC INFILL TURF (SPORTSFIELD SPECIALTIES MODEL # TCITQCV OR EQUAL). | E D3.0 |
| ◆⋈ | HUNTER/ NIBCO | HQ-44-LRC QUICK COUPLER VALVE WITH YELLOW LOCKING RUBBER COVER AND GATE VALVE. SIZE PER PLAN. GATE VALVE 2" AND SMALLER SHALL BE NIBCO T-113. VALVE BOX TYPE: COMBOX FOR SYNTHETIC INFILL FURF (SPORTSFIELD SPECIALTIES MODEL# CBIT 1830 OR EQUAL) NOTCHED CUT METAL AREAS WHERE PIPE PASSES THROUGH BOX. LOCATE IN SYNTHETIC TURF. | C D3.0 |
| ——— | MAINLINE - 2" AND SMALLER: SCHEDULE 40 PVC WITH SOLVENT-WELD FITTINGS. LINE SHALL HAVE 24" COVER. | | A,B D3.0 |
| - - - - | IRRIGATION SLEEVE - CLASS 200 PVC IRRIGATION SLEEVE WITH 30" OF COVER. SLEEVES SHALL BE 2X NOMINAL PIPE SIZES LARGER THAN CARRIER PIPE. EXTEND SLEEVE 24" BEYOND EDGE OF HARDSCAPE. CONTRACTOR SHALL INSTALL (1) ADDITIONAL SPARE SLEEVE AT EACH HARDSCAPE CROSSINGS. CAP BOTH ENDS OF SLEEVE. | | B D3.0 |

NORTH
0' 10' 20' 40' 60'

IRRIGATION & PLANTING PLAN

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DIV. OF THE STATE ARCHITECT
APP: 03-125961 INC:
REVIEWED FOR
SS ☑ FLS ☑ ACS ☑
DATE: 10/12/2026

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LANDSCAPE ARCHITECTURE
CIVIL ENGINEERING
SPORT PLANNING & DESIGN
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Riverside, CA 92501
tel: 951.221.3142
faxs 408.985.7260
www.VerdeDesigninc.com

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REGISTERED PROFESSIONAL ENGINEER — DAVID CHANG — C-56494 — CIVIL — STATE OF CALIFORNIA

LICENSED ARCHITECT — ROGER CLARK — No. C-23409 — STATE OF CALIFORNIA

CONSULTANT

SHEET TITLE
IRRIGATON PLAN

PROJECT NAME
HAWTHORNE MIDDLE SCHOOL TURF FIELD & TRACK IMPROVEMENTS

PROJECT ADDRESS
4366 W 129TH ST, HAWTHORNE, CA 90250

| SUBMITTAL | DATE |
|---|---|
| DESIGN DEVELOPMENT SUBMITTAL | 11/26/25 |
| DSA SUBMITTAL | 03/10/26 |

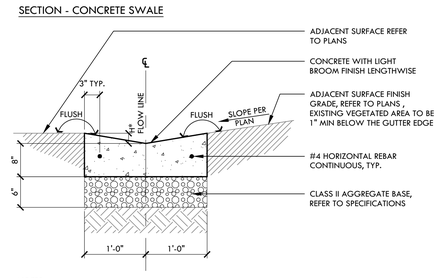
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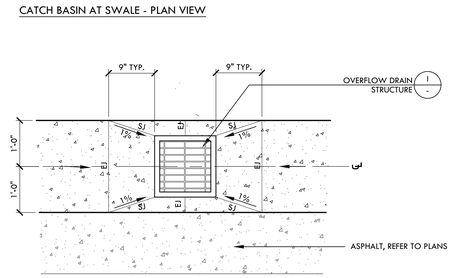
| DRAWN BY | CHECKED BY |
|---|---|
| AC/RC | DC/CG |
| DATE ISSUED: 06/10/2026 | SCALE: 1"=20'-0" |
| PROJ. NO.: 2223000 | |
| SHEET NO.: L9.0 | |

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DRAWING NAME: Y:\Projects-R\2022\2223000 - Hawthorne MS T&F Assess\CAD_L9.0-IRR.dwg
PLOT DATE: 09-16-26 PLOTTED BY: station14

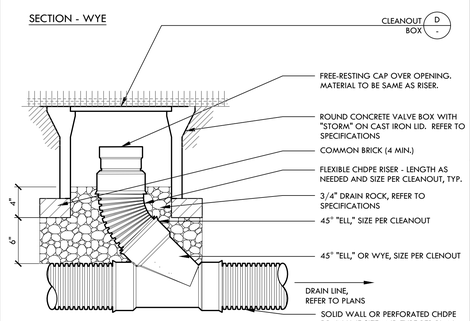
## N CONCRETE SWALE — NTS



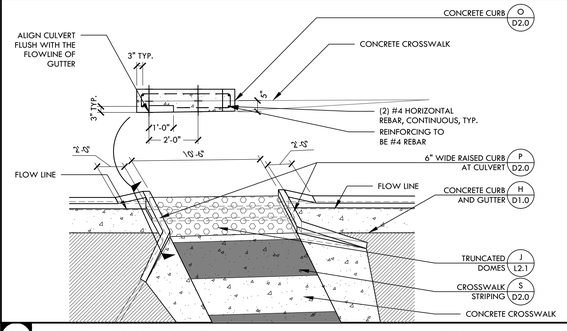




NOTES:
1. PROVIDE SCORE JOINTS 8' ON CENTER AND ALIGN WITH FENCE POSTS.
2. SJ = SAWCUT JOINT, EJ = EXPANSION JOINT, REFER TO DETAIL F, SHEET D 2.0
3. H* = 0.018' MAX ADJACENT TO ADA STALL, H* PER GRADING PLAN AT THE REGULAR STALL

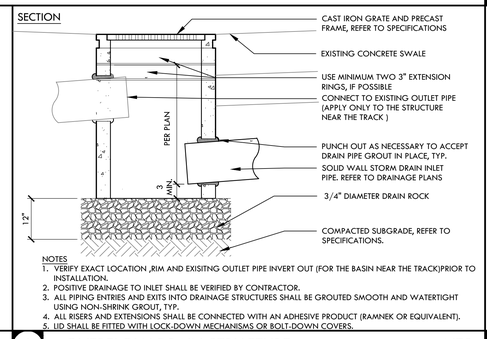
## E STORM DRAIN CLEANOUT — NTS




## K STORM DRAIN CULVERT — NTS

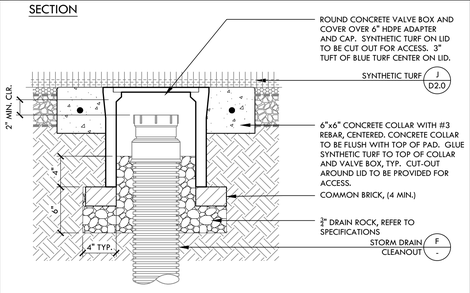



## I OVERFLOW DRAIN STRUCTURE — NTS

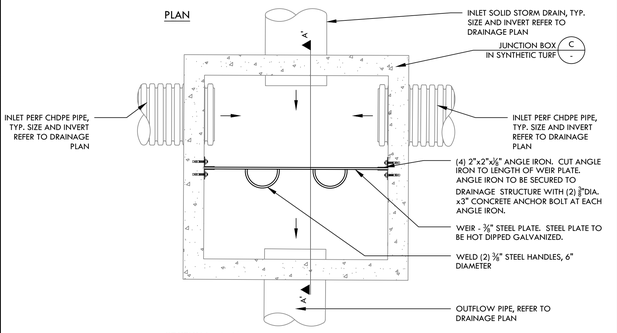



NOTES
1. VERIFY EXACT LOCATION ,RIM AND EXISITNG OUTLET PIPE INVERT OUT (FOR THE BASIN NEAR THE TRACK)PRIOR TO INSTALLATION.
2. POSITIVE DRAINAGE TO INLET SHALL BE VERIFIED BY CONTRACTOR.
3. ALL PIPING ENTRIES AND EXITS INTO DRAINAGE STRUCTURES SHALL BE GROUTED SMOOTH AND WATERTIGHT USING NON-SHRINK GROUT, TYP.
4. ALL RISERS AND EXTENSIONS SHALL BE CONNECTED WITH AN ADHESIVE PRODUCT (RAMNEK OR EQUIVALENT).
5. LID SHALL BE FITTED WITH LOCK-DOWN MECHANISMS OR BOLT-DOWN COVERS.

## D CLEANOUT IN SYNTHETIC TURF - ACCESSIBLE — NTS

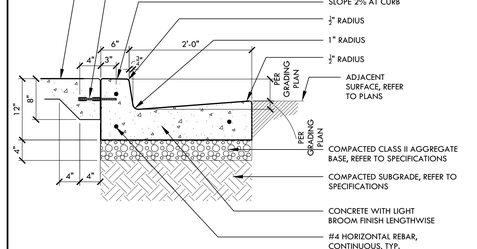



## C

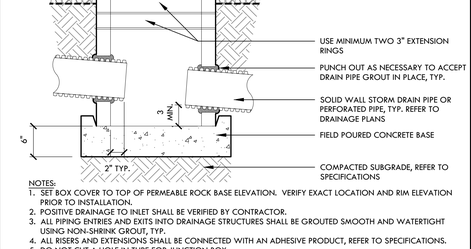



SECTION - A-A'

## H CONCRETE CURB AND GUTTER AT CONCRETE SIDEWALK — NTS



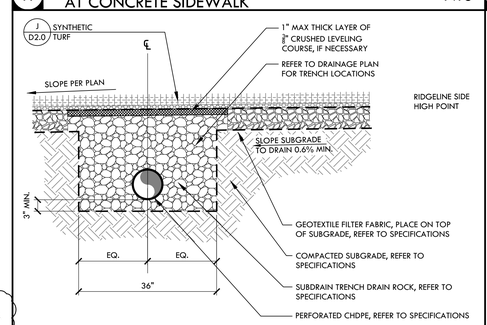

## C JUNCTION BOX - SYNTHETIC TURF — NTS



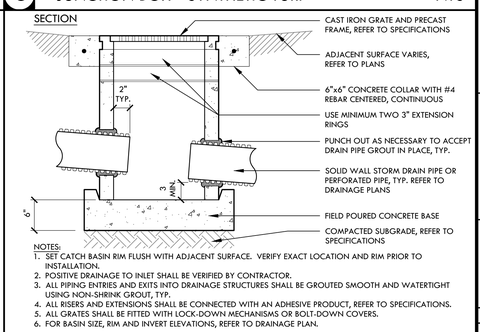

NOTES:
1. SET CATCH BASIN RIM FLUSH WITH ADJACENT SURFACE. VERIFY EXACT LOCATION AND RIM PRIOR TO INSTALLATION.
2. POSITIVE DRAINAGE TO INLET SHALL BE VERIFIED BY CONTRACTOR.
3. ALL PIPING ENTRIES AND EXITS INTO DRAINAGE STRUCTURES SHALL BE GROUTED SMOOTH AND WATERTIGHT USING NON-SHRINK GROUT, TYP.
4. ALL RISERS AND EXTENSIONS SHALL BE CONNECTED WITH AN ADHESIVE PRODUCT, REFER TO SPECIFICATIONS.
5. ALL GRATES SHALL BE FITTED WITH LOCK-DOWN MECHANISMS OR BOLT-DOWN COVERS.
6. FOR BASIN SIZE, RIM AND INVERT ELEVATIONS, REFER TO DRAINAGE PLAN.

## N

## G PERFORATED SUBDRAIN TYPE 1 — NTS



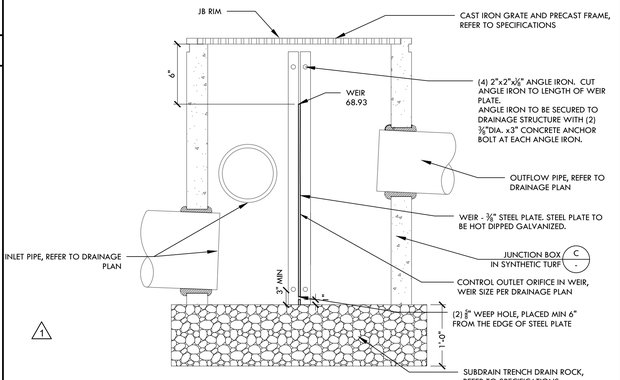

## B CATCH BASIN — NTS



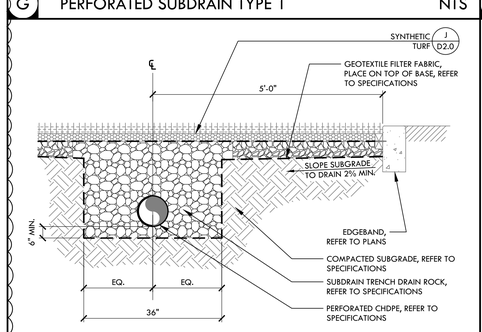

NOTE:
CONTRACTOR TO INSTALL SURFACING IMPROVEMENTS PER DRAWINGS. SECTIONS FOR SURFACING IMPROVEMENTS SHALL SUPERCEDE BACKFILL FOR STORM DRAINS.

## O

## J CONTROL WEIR AT JUNCTION BOX — NTS




## F PERFORATED SUBDRAIN — NTS




## A TRENCH BACKFILL - SOLID WALL STORM/SEWER — NTS


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www.VerdeDesigninc.com


STAMP

REGISTERED PROFESSIONAL ENGINEER — DARYN CORREA — No. C-56494 — Signature — EXPIRATION June 30, 2027 — CIVIL — STATE OF CALIFORNIA

CONSULTANT

SHEET TITLE
DRAINAGE DETAILS

PROJECT NAME
HAWTHORNE MIDDLE SCHOOL TURF FIELD & TRACK IMPROVEMENTS

PROJECT ADDRESS
4366 W 129TH ST, HAWTHORNE, CA 90250

| SUBMITTAL | DATE |
|---|---|
| DESIGN DEVELOPMENT SUBMITTAL | 11/26/25 |
| DSA SUBMITTAL | 03/10/26 |

| NO. | REVISIONS | DATE |
|---|---|---|
| 1 | Drainage changes required for SWPPP compliance | 10/21/26 |

| DRAWN BY | CHECKED BY |
|---|---|
| XH | DC/CG |
| DATE ISSUED 06/10/2026 | SCALE |
| PROJ. NO. 2223000 | |
| SHEET NO. D1.0 | |

DRAINAGE DETAILS


ALL IDEAS, DESIGNS, ARRANGEMENTS, AND PLANS INDICATED OR REPRESENTED BY THIS DRAWING ARE OWNED BY AND THE PROPERTY OF VERDE DESIGN, INC. AND WERE CREATED, EVOLVED, AND DEVELOPED FOR USE ON AND IN CONNECTION WITH THE SPECIFIED PROJECT. NONE OF SUCH IDEAS, DESIGNS, ARRANGEMENTS OR PLANS SHALL BE USED, REPRODUCED, OR PUBLISHED BY ANY METHOD, IN WHOLE OR IN PART, OR DISCLOSED TO ANY PERSON, FIRM, OR CORPORATION FOR ANY PURPOSE WHATSOEVER WITHOUT THE PRIOR WRITTEN PERMISSION OF VERDE DESIGN, INC.

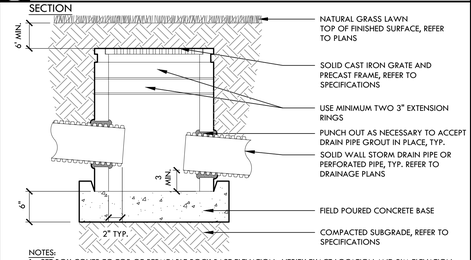


DRAWING NAME: Y:\Projects-R\2022\2223000 - Hawthorne MS T&F Assess\CAD_LD1.0-DRN.dwg
PLOT DATE: 11-04-26 PLOTTED BY: station14

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## E — JUNCTION BOX - SOFTSCAPE — NTS

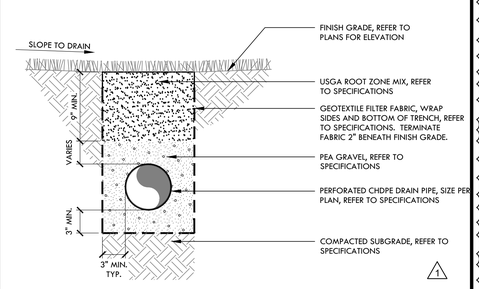
SECTION




NOTES:
1. SET BOX COVER TO TOP OF PERMEABLE ROCK BASE ELEVATION. VERIFY EXACT LOCATION AND RIM ELEVATION PRIOR TO INSTALLATION.
2. POSITIVE DRAINAGE TO INLET SHALL BE VERIFIED BY CONTRACTOR.
3. ALL PIPING ENTRIES AND EXITS INTO DRAINAGE STRUCTURES SHALL BE GROUTED SMOOTH AND WATERTIGHT USING NON-SHRINK GROUT, TYP.
4. ALL RISERS AND EXTENSIONS SHALL BE CONNECTED WITH AN ADHESIVE PRODUCT (RAMNEK OR EQUIVALENT).
5. DO NOT CUT A HOLE IN TURF FOR JUNCTION BOX.

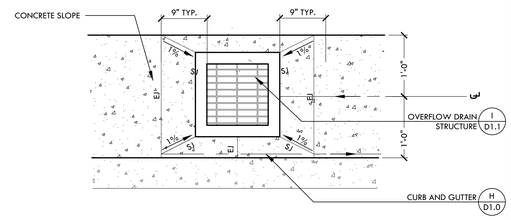
## C — JUNCTION BOX - SOFTSCAPE — NTS

SECTION



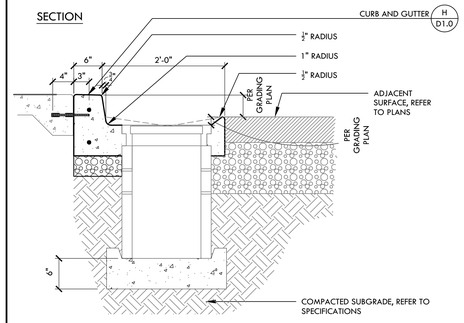

## B — FRENCH DRAIN IN SOFTSCAPE — NTS

OVERFLOW DRAIN STRUCTURE AT CURB & GUTTER - PLAN VIEW

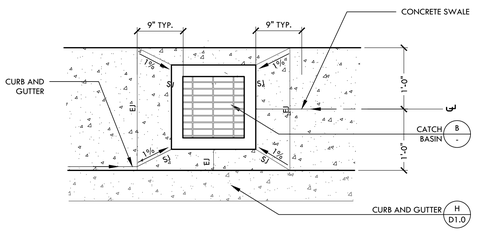



## A — CATCH BASIN AT CURB & GUTTER — NTS

SECTION




CATCH BASIN AT CURB & GUTTER - PLAN VIEW




NOTES:
1. SJ = SAWCUT JOINT, EJ = EXPANSION JOINT, REFER TO DETAIL F, SHEET D 2.0

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REGISTERED PROFESSIONAL ENGINEER — DARYN COMBES — No. C-56494 — Signature — EXPIRATION June 30, 2027 — C I V I L — STATE OF CALIFORNIA

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| | |
| | |

| NO. | REVISIONS | DATE |
|---|---|---|
| 1 | Drainage changes required for SWPPP compliance | 10/21/26 |
| 2 | | |
| 3 | | |
| 4 | | |
| 5 | | |
| 6 | | |

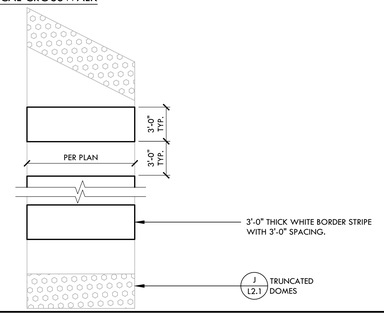
| DRAWN BY | CHECKED BY |
|---|---|
| XH | DC/CG |
| DATE ISSUED 06/10/2026 | SCALE |
| PROJ. NO. 2223000 | |
| SHEET NO. D1.1 | |

DRAINAGE DETAILS

DRAWING NAME: Y:\Projects-R\2022\2223000 – Hawthorne MS T&F Assess\CAD_\D1.0-DRN.dwg
PLOT DATE: 11-04-26 PLOTTED BY: station14

## S CROSSWALK STRIPING NTS

PLAN - TYPICAL CROSSWALK



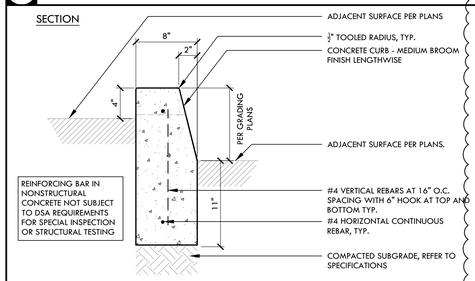

## R DIRECTIONAL ARROW STRIPING NTS

PLAN




## Q NO PARKING STRIPING (NON-ACCESSIBLE) NTS

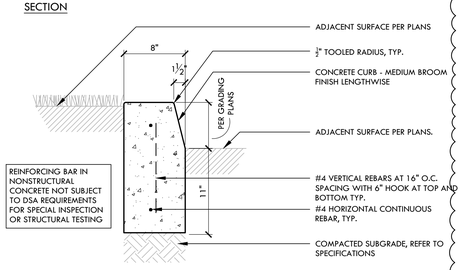
SECTION




NOTE:
REFER TO EDGEBAND AND TALL CURB NOTES, DETAIL A, THIS SHEET FOR ADDITIONAL INFORMATION.

## P 6" WIDE RAISED CURB AT CULVERT NTS

SECTION

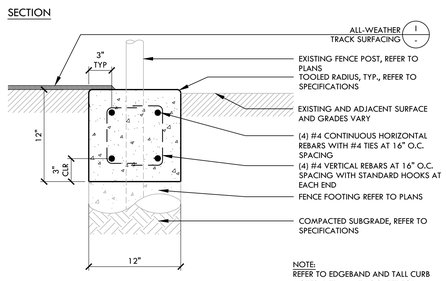



NOTE:
REFER TO EDGEBAND AND TALL CURB NOTES, DETAIL A, THIS SHEET FOR ADDITIONAL INFORMATION.

## O 6" WIDE CURB NTS

## N

SECTION




NOTE:
REFER TO EDGEBAND AND TALL CURB NOTES, DETAIL A, THIS SHEET FOR ADDITIONAL INFORMATION.

## M 12" WIDE EDGEBAND UNDER FENCE NTS

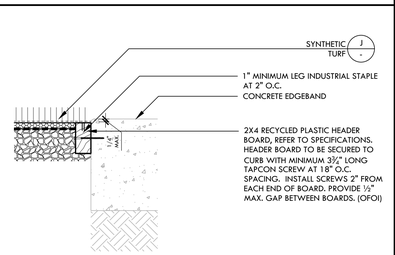
SECTION




NOTE:
REFER TO EDGEBAND AND TALL CURB NOTES, DETAIL A, THIS SHEET FOR ADDITIONAL INFORMATION.

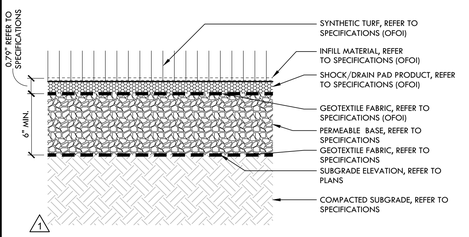
## L 6" WIDE SYNTHETIC TURF EDGEBAND AT TRACK NTS

SECTION




## K SYNTHETIC TURF CONNECTION NTS

SYNTHETIC TURF SECTION

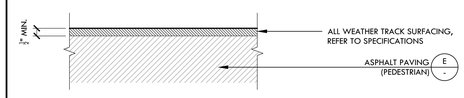



NOTE:
REFER TO SYNTHETIC TURF NOTES, DETAIL C, THIS SHEET.

## J SYNTHETIC TURF WITH SHOCK/DRAIN PAD NTS

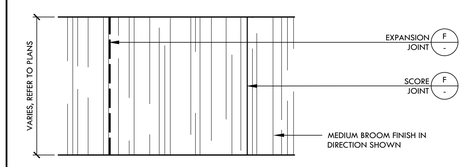
## I ALL-WEATHER TRACK SURFACING NTS

SECTION




NOTE:
TRACK SURFACING SHALL BE ADHERED A MINIMUM OF 3" ONTO ADJACENT TRACK CONCRETE EDGEBANDS.

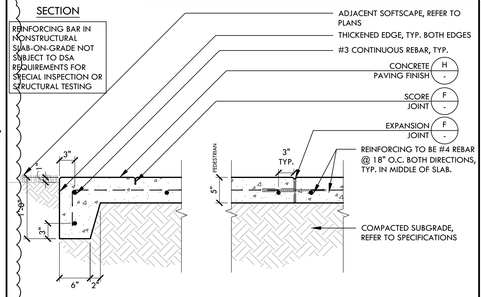
PLAN




NOTE:
PROVIDE SCORE JOINTS 5' O.C. AND 10' O.C. FOR EXPANSION JOINT UNLESS OTHERWISE NOTED.

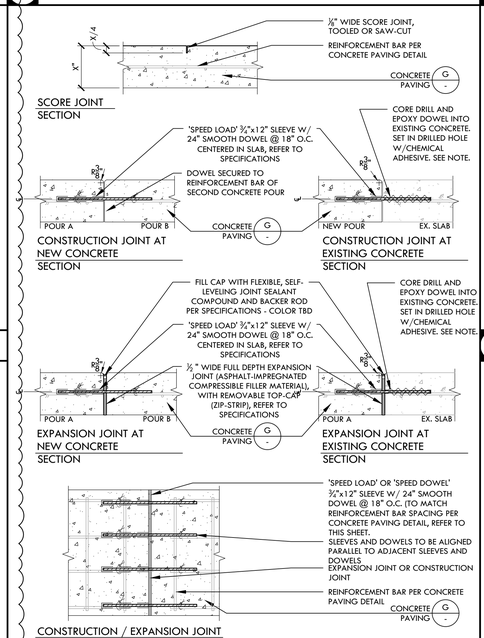
## H CONCRETE PAVING FINISH NTS

SECTION




NOTE:
PROVIDE SCORE JOINTS 5' O.C. AND 10' O.C. FOR EXPANSION JOINT UNLESS OTHERWISE NOTED.

## G CONCRETE PAVING NTS



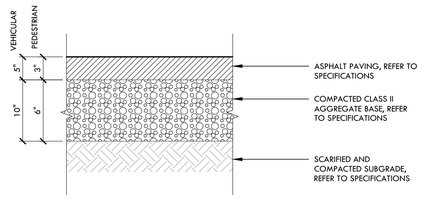

EPOXY SHEAR DOWELS IN NONSTRUCTURAL SLAB-ON-GRADE NOT SUBJECT TO DSA REQUIREMENTS FOR SPECIAL INSPECTION OR STRUCTURAL TESTING

NOTE:
USE HILTI HIT-HY 200-R V3 ADHESIVE ANCHOR SYSTEM, ICC ESR-4868 FOR HIT-HY 200 ADHESIVE ANCHORS IN CONCRETE, INSTALL PER DSA IR A-5.

## F CONCRETE JOINTS NTS

## E ASPHALT PAVING NTS

SECTION




NOTES PERTAIN TO ALL GATE AND FENCE DETAILS:

1. PLACE FENCE FABRIC ON TRACK SIDE. FENCE FABRIC ON PERIMETER FENCING IS TO BE ON FIELD SIDE.
2. BOTTOM RAIL TO BE 2" FROM FINISH GRADE, FENCE FABRIC BOTTOM EDGE TO BE 1" FROM FINISH GRADE.
3. SUBMIT SHOP DRAWINGS FOR ACCEPTANCE BY OWNER'S REPRESENTATIVE PRIOR TO INSTALLATION.
4. GATES IN PATH OF TRAVEL MUST MEET ENTRY AND EXIT DOOR REQUIREMENTS.
5. REFER TO PLANS FOR EDGEBAND TYPE UNLESS OTHERWISE NOTED.
6. REFER TO DETAIL M, THIS SHEET FOR FENCING WITH CURBS.
7. TACK WELD HINGES TO POSTS AT GATES.
8. THE PIPE SIZES INDICATED ARE NPS FOR: STANDARD GALV. PIPE SCHEDULE 40.

## D GATE AND FENCE NOTES NTS

NOTES PERTAIN TO ALL DETAILS WITH SYNTHETIC TURF:

1. IDENTIFIED FINISH GRADES OF SYNTHETIC TURF SHALL BE THE TOP OF INFILL MATERIAL. INFILL MATERIAL SHALL BE ½" BELOW ADJACENT SURFACES UNLESS EDGE IS A VERTICAL CURB.
2. SOCCER FIELD STRIPING SHALL BE INLAID OR TUFTED 4" WIDE WHITE LINES.
3. NO MANUFACTURER, CONTRACTOR OR VENDOR LOGOS ARE TO BE INSTALLED UNLESS SPECIFIED.
4. NO CUT OUTS IN TURF SHALL BE MADE UNLESS OTHERWISE NOTED AND ESPECIALLY NO CUT OUTS IN THE FIELD OF PLAY. QUICK COUPLERS ARE THE ONLY UTILITIES TO BE CUT THROUGH TURF. QUICK COUPLERS ARE LOCATED ON THE PERIMETER AND OUT OF THE FIELD OF PLAY AREAS.

## C SYNTHETIC TURF NOTES NTS

NOTES PERTAIN TO ALL DETAILS WITH ALL-WEATHER TRACK SURFACING:

1. TRACK SURFACING SHALL BE ADHERED A MINIMUM OF 3" ONTO ADJACENT TRACK CONCRETE EDGEBANDS AND/OR TRACK DRAINS.
2. FINISH SURFACE ELEVATIONS SHOWN ON DRAWINGS IN TRACK SURFACING AREAS IS OF THE PAVING UNDERNEATH, EDGEBAND OR CURB PER PLANS.
3. UTILITY BOXES SHALL BE LOCATED IN THE TRACK AREA CORNERS OR IN ADJACENT ASPHALT. THE ONLY UTILITY BOX THAT MAY LOCATED IN THE TRACK AREA IF NECESSARY IS THE PULL BOX FOR THE LIGHT POST ON THE EAST SIDE OF THE TRACK CENTERED ON THE FIELD.

## B ALL-WEATHER TRACK SURFACING NOTES NTS

NOTES PERTAIN TO ALL EDGEBAND AND CURB DETAILS:

1. FOR EDGEBANDS AND CURBS WITH FENCING, INSTALL EXPANSION JOINTS AT ALL CORNERS, BEGINNINGS, AND ENDINGS OF RADII, AND AT ALL FENCE POSTS. INSTALL SCORE JOINTS AT 5' O.C. MAXIMUM AND/OR EVENLY SPACED AND CENTERED BETWEEN FENCE POSTS AND AT EACH FENCE POST
2. FOR EDGEBAND AND CURBS WITHOUT FENCING, INSTALL SCORE JOINTS AT 10' O.C. MAX. SPACING AND FIBER EXPANSION JOINTS EVERY 20' MAX. ON STRAIGHT RUNS. ON CURVED RUNS, FIBER EXPANSION JOINTS SHALL BE SPACED 10' O.C., WITH ALTERNATING SCORE JOINTS AT 5' O.C. SPACING.
3. ALL EXPANSION JOINTS SHALL BE SEALED, PER SPECIFICATIONS.

NOTES PERTAIN TO ALL TALL CURB DETAILS:

1. PROVIDE EXPANSION JOINTS AT FENCE POST LOCATIONS AT 10' O.C. MAX. SPACING, CENTERED ON EACH FENCE POST.
2. PROVIDE EXPANSION JOINTS AT EACH LOCATION WHERE AN ELEVATION STEP OCCURS BETWEEN CHANGING CURB/EDGEBAND TYPES.
3. AT EXPANSION JOINTS, PROVIDE A 24" LONG #4 DOWEL AT EACH CURB HORIZONTAL REBAR, CENTERED ON THE JOINT, AS PER DETAIL.
4. EXPANSION JOINTS SHALL BE INSTALLED WITH A ¾" CHAMFER BUILT INTO THE FORM WORK, IN ADDITION TO THE FIBER EXPANSION JOINT MATERIAL.
5. PROVIDE A CONTROL JOINT AT EACH FENCE POST WHERE APPLICABLE. THE VERTICAL AND HORIZONTAL JOINT SHALL BE A ¾" CHAMFER BUILT INTO THE FORM WORK.
6. ALL EXPANSION JOINTS SHALL BE SEALED PER SPECIFICATION.
7. NO SCORE JOINTS ARE REQUIRED ON TALL CURBS.

FINISHES:
EDGEBANDS AND CURBS: MEDIUM BROOM
WALL AND TALL CURBS: MEDIUM SAND BLAST - TOP AND SIDES

## A EDGEBAND AND TALL CURB NOTES NTS


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REGISTERED PROFESSIONAL ENGINEER — DARYN COMBES — No. C-56494 — Signature — EXPIRATION June 30, 2027 — CIVIL — STATE OF CALIFORNIA

CONSULTANT

SHEET TITLE
CONSTRUCTION DETAILS

PROJECT NAME
HAWTHORNE MIDDLE SCHOOL TURF FIELD & TRACK IMPROVEMENTS

PROJECT ADDRESS
4366 W 129TH ST, HAWTHORNE, CA 90250

| SUBMITTAL | DATE |
|---|---|
| DESIGN DEVELOPMENT SUBMITTAL | 11/26/25 |
| DSA SUBMITTAL | 03/10/26 |

| NO. | REVISIONS | DATE |
|---|---|---|
| 1 | Edgeband & turf connection changes | 10/21/26 |

| DRAWN BY | CHECKED BY |
|---|---|
| XH / AC | DC/CG |
| DATE ISSUED: 06/10/2026 | SCALE |
| PROJ. NO.: 2223000 | |
| SHEET NO.: D2.0 | |

CONSTRUCTION DETAILS


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DRAWING NAME: I:\Projects-R\2022\2223000 - Hawthorne MS T&F Assess\CAD_\D2.0-CON.dwg
PLOT DATE: 11-04-26 PLOTTED BY: station14

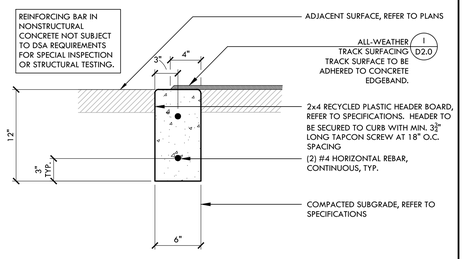
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O

M

## SECTION

REINFORCING BAR IN NONSTRUCTURAL CONCRETE NOT SUBJECT TO DSA REQUIREMENTS FOR SPECIAL INSPECTION OR STRUCTURAL TESTING.

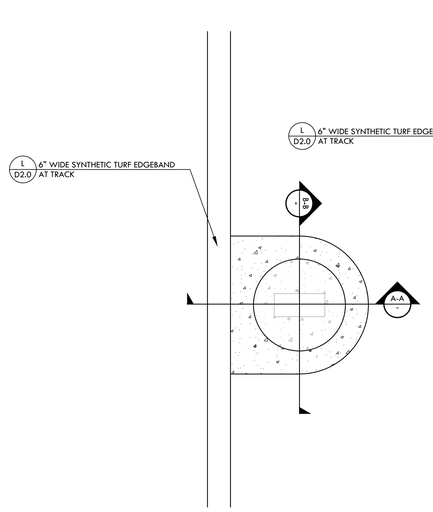


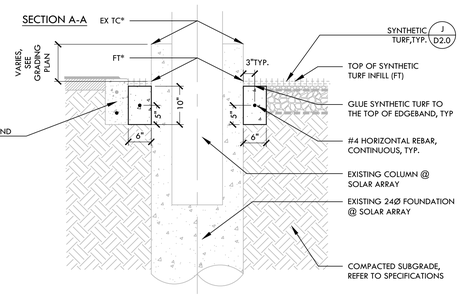

NOTE:
REFER TO EDGEBAND AND TALL CURB NOTES, SHEET 2.0, DETAIL A, FOR ADDITIONAL INFORMATION.

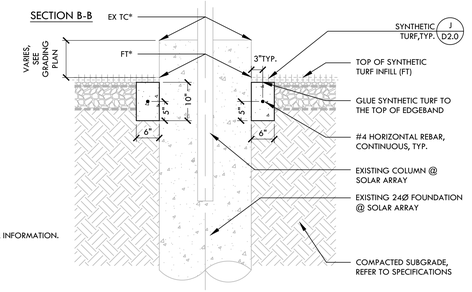
N

L

## 6" WIDE CURB AT ALL WEATHER TRACK SURFACE NTS




NOTE:
REFER TO EDGEBAND AND TALL CURB NOTES, DETAIL A, SHEET D2.0 FOR ADDITIONAL INFORMATION.
* EX TC= TOP OF EXISTING FOUNDATION, FT = TOP OF SYNTHETIC TURF INFILL

REINFORCING BAR IN NONSTRUCTURAL CONCRETE NOT SUBJECT TO DSA REQUIREMENTS FOR SPECIAL INSPECTION OR STRUCTURAL TESTING.

D

## 6" WIDE SYNTHETIC TURF EDGEBAND AT SOLAR ARRAY COLUMN NTS




| MEASUREMENTS & QUANTITIES | |
|---|---|
| FEATURES/MATERIALS | DETAILS |
| TOTAL AREA OF TURF | 50,586 SF |
| FLORIDA BLUE TURF AREA | 13,611 SF |
| GREEN TURF AREA | 36,975 SF |
| TURF PERIMETER | 916 LF |

TENCATE
tencate-americas.com

OWNER:
Hawthorne School District
Hawthorne Middle School
4366 W 129th St, Hawthorne, CA 90250
(310) 676-0167

PROJECT:
SYNTHETIC TURF SOCCER FIELD

PROJECT LOCATION:
HAWTHORNE, CALIFORNIA

COMMENTS:
All drawings and written material appearing herein constitute original unpublished work, and may not be duplicated, used or disclosed without the written consent of TenCate.
Drawing scale accurate ONLY when printed on 11x17 paper. For visual purposes only; actual color may vary.

DRAWN BY:
01 - J. DEL RIO
DATE:
NOVEMBER 2, 2026
REVISION:
3
SHEET TITLE:
COLOR RENDERING
SHEET NUMBER:
1
© 2026
SCALE: 1:30
0 15 30 45

K

## TURF FIELD STRIPING GRAPHICS

C

## STAIRS NTS

REINFORCING BAR IN NONSTRUCTURAL CONCRETE NOT SUBJECT TO DSA REQUIREMENTS FOR SPECIAL INSPECTION OR STRUCTURAL TESTING.







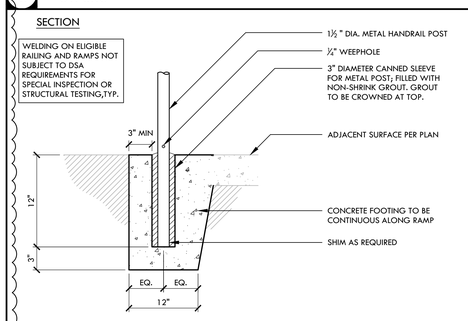
STAIR ENLARGEMENT

G

## RAILING CANNED SLEEVE NTS

SECTION

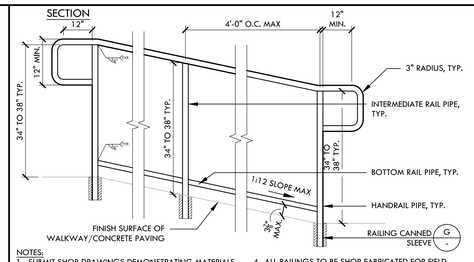
WELDING ON ELIGIBLE RAILING AND RAMPS NOT SUBJECT TO DSA REQUIREMENTS FOR SPECIAL INSPECTION OR STRUCTURAL TESTING,TYP.




B

## HANDRAIL NTS

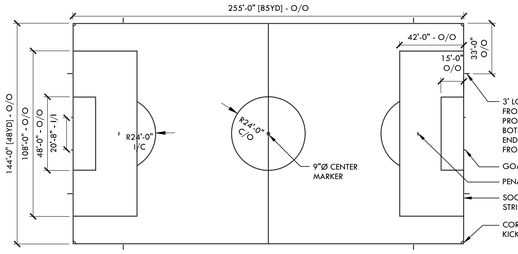
SECTION

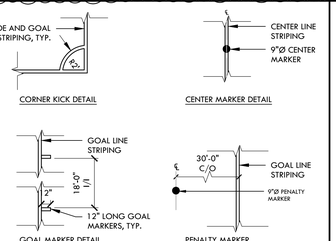



NOTES:
1. SUBMIT SHOP DRAWINGS DEMONSTRATING MATERIALS, WELDS, AND PROPOSED INSTALLATION CONFORM TO THE PLANS AND SPECIFICATIONS. REFER TO SPECIFICATIONS.
2. ALL PIPE TO BE 1½" (1.90" O.D.) DIAMETER .145" THICKNESS SCHEDULE 40 PIPE WITH PRIMERED FINISH.
3. ALL JOINTS SHALL BE ⅜" FILLET WELD; GRIND SMOOTH JOINTS; TREAT ALL FINISHED WELDS WITH GALVANIZING.
4. ALL RAILINGS TO BE SHOP FABRICATED FOR FIELD INSTALLATION.
5. PROVIDE 4.5" FROM THE CENTER OF HANDRAIL TO CURB/WALL ADJACENT TO HANDRAIL.
6. ALL RAILING AND POSTS TO RECEIVE TWO COATS OF PRIMER AND TWO COATS OF PAINT. PAINT COLOR TO MATCH EXISTING RAILING AT SCHOOL ENTRY

J

## SOCCER FIELD STRIPING NTS



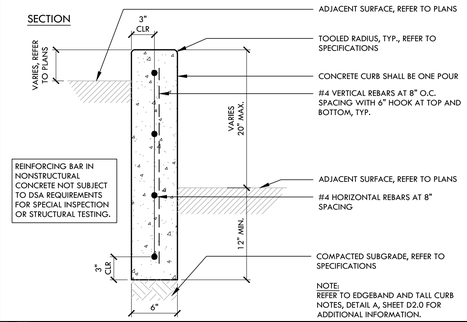

NOTES:
1. O/O = OUTSIDE OF LINE TO OUTSIDE OF LINE
2. O/I = OUTSIDE OF LINE TO INSIDE OF LINE
3. O/C = OUTSIDE OF LINE TO CENTER OF LINE
4. I/I = INSIDE OF LINE TO INSIDE OF LINE
5. I/C = INSIDE OF LINE TO CENTER OF LINE
6. C/C = CENTER OF LINE TO CENTER OF LINE
7. SOCCER FIELD STRIPING SHALL BE INLAID OR TUFTED 4" WIDE YELLOW LINES. CONTRACTOR TO PROVIDE SHOP DRAWINGS FOR REVIEW AND ACCEPTANCE.
8. [illegible]

F

## 6" WIDE TALL CURB NTS

SECTION

REINFORCING BAR IN NONSTRUCTURAL CONCRETE NOT SUBJECT TO DSA REQUIREMENTS FOR SPECIAL INSPECTION OR STRUCTURAL TESTING.

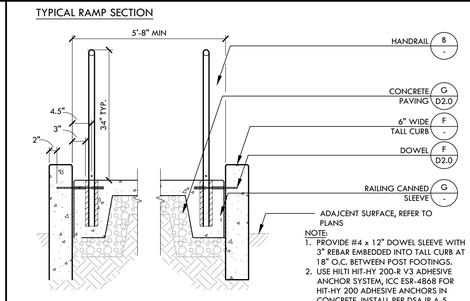



NOTE:
REFER TO EDGEBAND AND TALL CURB NOTES, DETAIL A, SHEET D2.0 FOR ADDITIONAL INFORMATION.

A

## RAMP/WALKWAY - WITH 6" WIDE TALL CURB NTS

TYPICAL RAMP SECTION




NOTE:
1. PROVIDE #4 x 12" DOWEL SLEEVE WITH 3" REBAR EMBEDDED INTO TALL CURB AT 18" O.C. BETWEEN POST FOOTINGS.
2. USE HILTI HIT-HY 200-R V3 ADHESIVE ANCHOR SYSTEM, ICC ESR-4868 FOR HIT-HY 200 ADHESIVE ANCHORS IN CONCRETE, INSTALL PER DSA IR A-5.

VERDE DESIGN
LANDSCAPE ARCHITECTURE
CIVIL ENGINEERING
SPORT PLANNING & DESIGN
3685 Main St. Suite 350
Riverside, CA 92501
tel: 951.221.3142
faxx 408.985.7260
www.VerdeDesigninc.com

STAMP

REGISTERED PROFESSIONAL ENGINEER
DARWIN CORREA
No. C-56494
Signature
EXPIRATION June 30, 2027
CIVIL
STATE OF CALIFORNIA

CONSULTANT

SHEET TITLE
CONSTRUCTION DETAILS

PROJECT NAME
HAWTHORNE MIDDLE SCHOOL TURF FIELD & TRACK IMPROVEMENTS

PROJECT ADDRESS
4366 W 129TH ST, HAWTHORNE, CA 90250

| SUBMITTAL | DATE |
|---|---|
| DESIGN DEVELOPMENT SUBMITTAL | 11/26/25 |
| DSA SUBMITTAL | 03/10/26 |

| NO. | REVISIONS | DATE |
|---|---|---|
| 1 | Edgeband & turf connection changes OFOI product change | 11/04/26 |

| DRAWN BY | CHECKED BY |
|---|---|
| XH / AC | DC/CG |
| DATE ISSUED: 06/10/2026 | SCALE: |
| PROJ. NO.: 2223000 | |
| SHEET NO.: D2.1 | |



DRAWING NAME: V:\Projects-R\2022\2223000 - Hawthorne MS T&F Assess\CAD_LD2.0-CON.dwg
PLOT DATE: 11-04-26 PLOTTED BY: station14

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R M H D

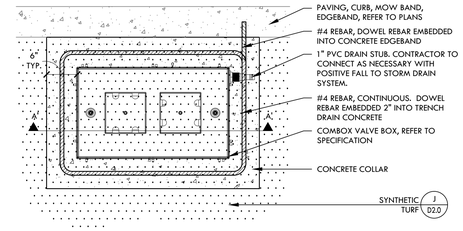
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P K F C

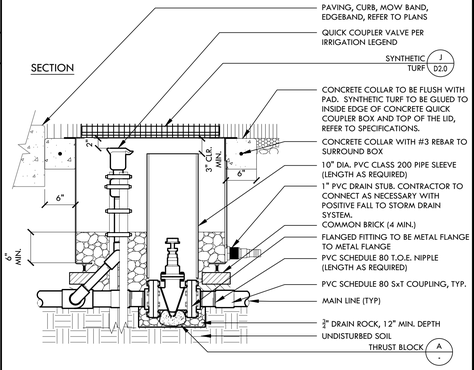
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N I E A

PLAN

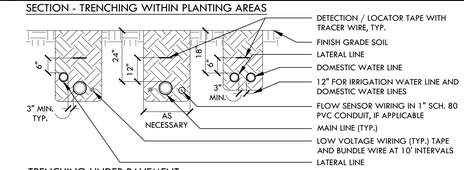



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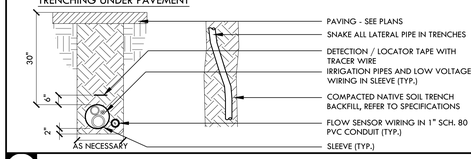



## QUICK COUPLER AND & GATE VALVE 2" & LARGER IN COMBOX IN SYNTHETIC TURF NTS

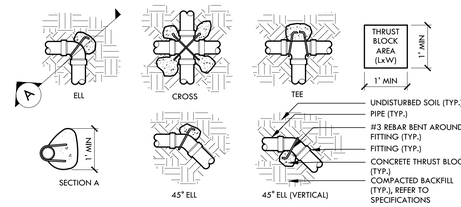
SECTION - TRENCHING WITHIN PLANTING AREAS




TRENCHING UNDER PAVEMENT




## IRRIGATION PIPE TRENCHING NTS

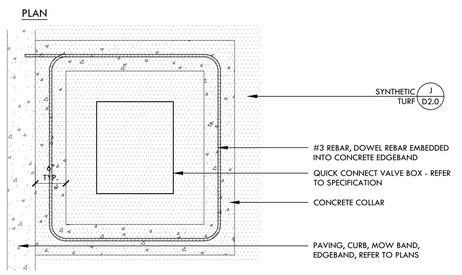



NOTES:

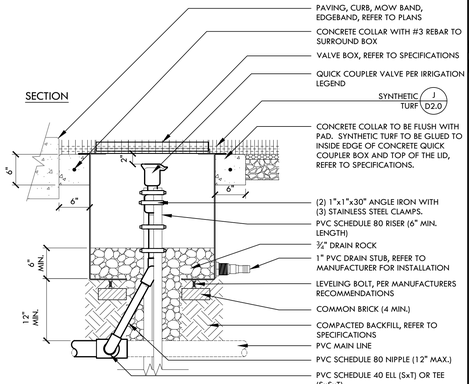
1. SUPPLY LINES 3" DIA. AND LARGER OR GATE VALVES 2½" OR LARGER SHALL RECEIVE CONCRETE THRUST BLOCKS.
2. MIN. THRUST BLOCK AREAS ARE BASE ON A PRESUMPTIVE SOIL BEARING CAPACITY OF 1,500 PSF PER CBC 1806A.2.
3. THRUST BLOCK SHALL EXTEND INTO UNDISTURBED SOIL.
4. CONCRETE SHALL NOT COVER FITTING JOINTS.
5. MAIN LINE PIPING 4" AND LARGER SHALL HAVE DUCTILE IRON FITTINGS WITH JOINT RESTRAINTS INSTALLED AT ALL FLOW DIRECTION CHANGES (CONCRETE THRUST BLOCK NOT REQUIRED).

| MINIMUM THRUST BLOCK AREA (LxW) | | | |
|---|---|---|---|
| | IRRIGATION PIPE | | |
| PIPE SIZE | TEE, DEAD END, 90° BEND | 45°,22.5° | |
| 2" | 2 SF | 1 SF | |
| 3" | 4 SF | 2 SF | |

PLAN




SECTION




## QUICK COUPLER IN SYNTHETIC TURF NTS

## THRUST BLOCK NTS

IDENTIFICATION STAMP
DIV. OF THE STATE ARCHITECT
APP: 03-125961 INC:
REVIEWED FOR
SS ☑ FLS ☑ ACS ☑
DATE: 10/12/2026

VERDE DESIGN
LANDSCAPE ARCHITECTURE
CIVIL ENGINEERING
SPORT PLANNING & DESIGN
3685 Main St. Suite 350
Riverside, CA 92501
tel: 951.221.31.42
faxs 408.985.7260
www.VerdeDesigninc.com

STAMP

REGISTERED PROFESSIONAL ENGINEER — DAVID CHANG — C-56494 — Exp. June 30, 2027 — CIVIL — STATE OF CALIFORNIA

LICENSED ARCHITECT — DOREEN CLARK — No. C-23409 — Exp. 03-31-27 — STATE OF CALIFORNIA

CONSULTANT

SHEET TITLE
IRRIGATION DETAILS

PROJECT NAME
HAWTHORNE MIDDLE SCHOOL TURF FIELD & TRACK IMPROVEMENTS

PROJECT ADDRESS
4366 W 129TH ST, HAWTHORNE, CA 90250

| SUBMITTAL | DATE |
|---|---|
| DESIGN DEVELOPMENT SUBMITTAL | 11/26/25 |
| DSA SUBMITTAL | 03/10/26 |

| NO. | REVISIONS | DATE |
|---|---|---|

| DRAWN BY | CHECKED BY |
|---|---|
| XH | DC/CG |
| DATE ISSUED 06/10/2026 | SCALE |
| PROJ. NO. 2223000 | |
| SHEET NO. D3.0 | |

DRAWING NAME: Y:\Projects-RI\2022\2223000 – Hawthorne MS T&F Assess\CAD_\D3.0-IRR.dwg
PLOT DATE: 09-01-26 PLOTTED BY: station14

## DEMOLITION NOTES

1. REFER TO LANDSCAPE AND CIVIL DEMOLITION DRAWINGS FOR MOLITION AREAS. THE SCOPE OF THE DEMOLITION WORK SHALL INCLUDE ALL LABOR, MATERIALS, SERVICES AND EQUIPMENT REQUIRED FOR THE REMOVAL OF ALL EXISTING ELECTRICAL REQUIRED TO CLEAR NEW CONSTRUCTION. THIS WORK INCLUDES, BUT IS NOT LIMITED TO, THE FOLLOWING:

   A. ALL EXISTING WIRE SHALL BE REMOVED FROM CONDUIT.

   B. ALL EXISTING CONDUIT, THAT INTERFERES WITH ANY NEW CONSTRUCTION SHALL BE CUT BACK AS REQUIRED TO CLEAR NEW CONSTRUCTION.

   C. FOR EXISTING CONSTRUCTION THAT IS TO BE REMOVED REMOVE ALL EXISTING EXPOSED, SURFACE, AND CONCEALED CONDUIT AND RACEWAYS. RECONNECT OUTLETS AND LIGHTING FIXTURES THAT REMAIN AND WHICH ARE NOW FED THROUGH THE OUTLETS TO BE REMOVED.

   D. ALL REMOVED MATERIALS AND EQUIPMENT WHICH IN THE OPINION OF THE OWNER'S REPRESENTATIVE ARE SALVAGEABLE, SHALL REMAIN THE PROPERTY OF OWNER. DELIVER SUCH SALVAGED MATERIALS AND EQUIPMENT ON PREMISES AS DIRECTED, AND NEATLY PILE OR STORE THEM AND PROTECT FROM DAMAGE.

   E. DO NOT REUSE SALVAGED MATERIALS AND EQUIPMENT UNLESS SPECIFICALLY INDICATED ON PLANS OR SPECIFIED. REMOVE FROM PREMISES AND DISPOSE OF ALL MATERIALS CONSIDERED BY ARCHITECT TO BE SCRAP.

2. ELECTRICAL DEMOLITION DRAWINGS DO NOT SHOW ALL ELECTRICAL WORK THAT IS TO BE REMOVED. REFER TO ALL DEMOLITION DRAWINGS OF OTHER TRADES/DISCIPLINES FOR WORK THAT AFFECTS ELECTRICAL DEMOLITION WORK.

3. THE EXISTING CONDITIONS SHOWN ON THESE PLANS HAVE BEEN TAKEN FROM AVAILABLE RECORD DRAWINGS AND ARE SHOWN FOR REFERENCE ONLY. THE CONTRACTOR SHALL VERIFY ACTUAL EXISTING CONDITIONS AT THE SITE PRIOR TO SUBMITTING A BID.ALL DEMOLITION,ALTERATIONS, RELOCATIONS AND RENOVATION WORK SHALL BE INCLUDED IN THE CONTRACT. NO ADDITIONAL CHANGE ORDERS OR ALLOWANCES WILL BE ACCEPTED.

4. CONTRACTOR SHALL INCLUDE ALL WORK NECESSARY TO KEEP EXISTING ELECTRICAL, SIGNAL AND FIRE ALARM SYSTEMS IN ALL AREAS ADJACENT TO DEMOLITION / RECONSTRUCTION AREAS IN SERVICE CONTINUOUSLY UNTIL WORK IN THAT AREA IS COMPLETE.

5. EQUIPMENT AND MATERIALS TEMPORARILY REMOVED FOR PROTECTION SHALL BE REPLACED IN THE ORIGINAL LOCATIONS. REPLACE EQUIPMENT OR MATERIALS THAT MAY BE DAMAGED WITH NEW EQUIPMENT AND MATERIALS OF LIKE KIND AND QUALITY.

6. DISPOSAL OF HAZARDOUS MATERIALS SUCH AS LAMPS SHALL BE DISPOSED OF IN ACCORDANCE WITH ALL STATE AND FEDERAL REQUIREMENTS.

## GENERAL NOTES

1. THESE DRAWINGS AND SPECIFICATIONS ARE INTENDED TO COVER A COMPLETE INSTALLATION OF SYSTEMS. THE OMISSION OR EXPRESSED REFERENCE TO ANY ITEM OF LABOR OR MATERIALS REQUIRED FOR THE PROPER EXECUTION OF THE WORK IN ACCORDANCE WITH PRESENT PRACTICE OF THE TRADE SHALL NOT RELIEVE THE CONTRACTOR FROM PROVIDING SUCH ADDITIONAL LABOR AND MATERIALS.

2. THESE PLANS, SPECIFICATIONS, AND ALL MATERIALS SHALL BE IN FULL ACCORDANCE WITH ALL LEGAL AND INDUSTRY REQUIREMENTS, AND STANDARDS INCLUDING WITHOUT LIMITATION TO THE FOLLOWING:

   A. CALIFORNIA CODE OF REGULATIONS TITLE 24, PARTS 1 AND 2 (CALIFORNIA BUILDING CODE), 2025 EDITION.

   B. CALIFORNIA CODE OF REGULATIONS TITLE 24, PART 3 (CALIFORNIA ELECTRICAL CODE), 2025 EDITION.

   C. CALIFORNIA CODE OF REGULATIONS TITLE 24, PART 6 (CALIFORNIA ENERGY CODE), 2025 EDITION.

   D. CALIFORNIA CODE OF REGULATIONS TITLE 24, PART 9 (CALIFORNIA FIRE CODE), 2025 EDITION.

   E. OTHER REGULATING AGENCIES WHICH MAY HAVE AUTHORITY OVER ANY PORTION OF THE WORK, INCLUDING THE STATE OF CALIFORNIA DIVISION OF INDUSTRIAL SAFETY, AND THOSE CODES AND STANDARDS LISTED IN THESE NOTES AND SPECIFICATIONS.

   F. THE ELECTRICAL SYSTEMS FUNCTIONALITY STANDARDS SET FORTH IN TITLE 7 OF THE CALIFORNIA CIVIL CODE (THE "RIGHT TO REPAIR ACT").

   G. THE MANUFACTURER'S REQUIREMENTS OR RECOMMENDATIONS FOR ANY INCORPORATED PRODUCTS.

   H. THE MOST CURRENT APPROVED ISSUES OF ANY NOTED SPECIFICATIONS, CODES AND STANDARDS, INCLUDING SUPPLEMENTS, UNLESS NOTED OTHERWISE.

3. THE PLANS REPRESENT ONLY THE FINISHED ELECTRICAL SYSTEMS, AND THEY ARE NOT INTENDED TO INDICATE OR REQUIRE ANY CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES OR PROCEDURES.

4. IN USING THE PLANS FOR BIDDING OR CONSTRUCTION PURPOSES, THE CONTRACTOR IS REQUIRED TO REVIEW ALL OF THE PROJECT'S CONSTRUCTION DOCUMENTS AS A WHOLE IN ORDER TO IDENTIFY ALL REQUIREMENTS THAT DIRECTLY OR INDIRECTLY AFFECT ITS PORTION OF THE ELECTRICAL WORK, EVEN REQUIREMENTS LOCATED IN SECTIONS DESIGNATED AS APPLICABLE TO OTHER TRADES. IN CASE OF CONFLICTS, THE CONTRACTOR SHALL EITHER OBTAIN DIRECTION FROM AN APPROPRIATE OWNER REPRESENTATIVE OR OTHERWISE APPLY THE MORE STRINGENT REQUIREMENT.

5. IN INTERPRETATING THE PLANS, THE FOLLOWING GENERAL RULES APPLY:

   A. WRITTEN DIMENSIONS SHALL TAKE PRECEDENCE OVER SCALED DRAWINGS.

   B. SCALED DIMENSIONS AND GRAPHICALLY SHOWN LOCATIONS ARE TO BE CONSIDERED ONLY APPROXIMATE. FIELD VERIFY DIMENSIONS PRIOR TO BID.

   C. BECAUSE THE PLANS ARE INTENDED TO SET FORTH THE REQUIREMENTS FOR CONSTRUCTION IN ONLY AN INDUSTRY-STANDARD LEVEL OF QUALITY AND DETAIL, AND THEREFORE ARE INTENDED TO BE SUPPLEMENTED BY APPROPRIATE REQUESTS FOR CLARIFICATION AND INFORMATION, ERRORS AND OMISSIONS ARE TO BE EXPECTED AND ANTICIPATED, AND THE CONTRACTOR IS REQUIRED TO CAREFULLY REVIEW THE PLANS FOR ERRORS AND OMISSIONS AND TO BRING THESE ERRORS AND OMISSIONS TO THE ATTENTION OF AN APPROPRIATE OWNER REPRESENTATIVE IN A TIMELY MANNER AN ASSUMES THE RISK OF THE CONSEQUENCES OF FAILING TO DO SO BEFORE BIDDING OR OTHERWISE PROCEEDING.

   D. THE CONTRACTOR SHALL REVIEW AND VERIFY ALL DIMENSIONS PRIOR TO STARTING CONSTRUCTION AND NOTIFY THE ARCHITECT IMMEDIATELY OF ANY DISCREPANCIES OR INCONSISTENCIES.

6. SUBMITTALS WILL BE REVIEWED BY THE ELECTRICAL ENGINEER, IF AT ALL, ONLY PURSUANT TO THE INDUSTRY-STANDARD PROTOCOL SET FORTH IN AIA DOCUMENT A201, AND IN NO EVENT WILL THE SUBMITTAL REVIEW PROCESS RELIEVE OR LESSEN THE SUBMITTING CONTRACTOR'S RESPONSIBILITY FOR AN INAPPROPRIATE SUBMITTAL.

7. IN NO EVENT WILL ANY SITE VISITS BY THE ELECTRICAL ENGINEER CONCERN CONSTRUCTION MEANS AND METHODS OR CONSTRUCTION SAFETY, AND ALL SUCH MATTERS SHALL REMAIN THE SOLE RESPONSIBILITY OF THE CONTRACTOR.

8. COPIES OF THE PLANS PROVIDED IN ANY ELECTRONIC FORM ARE SUBJECT TO THE SAME PROVISIONS AS THE OTHER INSTRUMENTS OF SERVICE PREPARED BY OR ON BEHALF OF ELECTRICAL ENGINEER FOR THE PROJECT, INCLUDING WITHOUT LIMITATION THE ENGINEER'S COMMON LAW, STATUTORY OR OTHER RESERVED RIGHTS, INCLUDING COPYRIGHTS. A RECIPIENT IS GRANTED AT MOST A TRANSFERABLE NONEXCLUSIVE LICENSE TO REUSE THE PLANS SOLELY FOR PROJECT PURPOSES; AND NO RECIPIENT IS AUTHORIZED TO USE OR TO ALLOW THE USE OF ALL OR ANY PORTION OF THESE PLANS FOR ANY OTHER PURPOSE, AND ANY USE FOR ANY OTHER PURPOSE WOULD CONSTITUTE ACTIONABLE PLAGIARISM. ELECTRICAL ENGINEER PROVIDES DOCUMENTS IN AN ELECTRONIC FORM ONLY IN ITS STANDARD FORMATS AND CONVENTIONS AND WITH NO GUARANTEE OF COMPATIBILITY WITH ANY RECIPIENT'S SOFTWARE OR HARDWARE, AND ANY USE WITH OR CONVERSION TO OTHER FORMATS OR CONVENTIONS, OR THE USE WITH ANY PARTICULAR SOFTWARE OR HARDWARE, IS AT THE RECIPIENT'S SOLE RISK.

9. ELECTRICAL PLANS DO NOT SHOW ELECTRICAL REQUIREMENTS FOR MECHANICAL AND PLUMBING EQUIPMENT CONTROL. REFER TO MECHANICAL AND PLUMBING PLANS AND SPECIFICATIONS. WHERE EQUIPMENT IS INDICATED TO BE BY ELECTRICAL CONTRACTOR PROVIDE ALL CONDUIT, WIRE, J-BOX, OUTLET BOXES, RELAY SWITCHES, TIME SWITCHES, CONTROL CIRCUITS, ETC. REQUIRED FOR A COMPLETE AND OPERABLE MECHANICAL AND PLUMBING INSTALLATION. ALL WIRE SHALL BE INSTALLED IN CODE SIZED CONDUIT.

10. ALL CONDUIT, STRUCTURES AND INSTALLATION FOR POWER AND TELEPHONE UTILITIES SHALL CONFORM WITH THE REQUIREMENTS (MINIMUM BEND RADIUS, CONCRETE ENCASEMENT, CONDUIT, TYPE, ETC.) OF THE UTILITIES COMPANY. VERIFY ALL REQUIREMENTS WITH UTILITY COMPANY PRIOR TO BID AND INCLUDE ALL COSTS IN BID.

11. CONTRACTOR SHALL OBTAIN SOUTHERN CALIFORNIA EDISON CO. (SCE CO.) CONSTRUCTION DRAWINGS PRIOR TO CONSTRUCTION AND SHALL INSTALL POWER CONDUIT AND STRUCTURES ACCORDING TO SCE CO. DRAWINGS. EXTRA PAYMENTS WILL NOT BE GRANTED FOR FAILURE TO DO SO.

12. LOCATIONS OF EXISTING UTILITIES ARE NOT SHOWN AND CONTRACTOR SHALL EXERCISE EXTREME CAUTION IN EXCAVATING AND TRENCHING ON THIS SITE TO AVOID EXISTING DUCTS, PIPING OR CONDUIT, ETC. AND TO PREVENT HAZARD TO PERSONNEL AND/OR DAMAGE TO EXISTING UNDERGROUND UTILITIES OR STRUCTURES WHETHER OR NOT SHOWN AND INSTALLED BY ANY OTHER CONTRACTS. THE ENGINEER IS NOT RESPONSIBLE FOR THE LOCATION OF UNDERGROUND UTILITIES OR STRUCTURES WHETHER OR NOT SHOWN OR DETAILED BY ANY OTHER CONTRACTS. THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER SHOULD SUCH UNIDENTIFIED CONDITIONS BE DISCOVERED. THESE DRAWINGS AND SPECIFICATIONS DO NOT INCLUDE NECESSARY COMPONENTS FOR CONSTRUCTION SAFETY.

13. REFER TO THE DRAWINGS AND SHOP DRAWINGS OF OTHER TRADES FOR ADDITIONAL DETAILS WHICH AFFECT THE PROPER INSTALLATION OF THIS WORK.

14. PROTECT ALL WORK, MATERIALS AND EQUIPMENT FROM DAMAGE FROM ANY CAUSE WHATSOEVER AND PROVIDE ADEQUATE AND PROPER STORAGE FACILITIES DURING THE PROGRESS OF THE WORK. PROVIDE FOR THE SAFETY AND GOOD CONDITION OF ALL THE WORK UNTIL FINAL ACCEPTANCE OF THE WORK BY THE OWNER AND REPLACE ALL DAMAGED OR DEFECTIVE WORK, MATERIALS AND EQUIPMENT BEFORE REQUESTING FINAL ACCEPTANCE

15. THE DRAWINGS INDICATE IN A DIAGRAMMATIC MANNER THE DESIRED LOCATIONS OF ARRANGEMENT OF THE COMPONENTS OF ELECTRICAL WORK. DETERMINE EXACT CONDUIT ROUTING, CONDUIT BENDS, AUXILIARY JUNCTION BOXES, SUPPORTS, AND UNDEFINED CONSTRUCTION DETAILS AS JOB CONDITION TO BE INSTALLED IN ACCORDANCE WITH THE APPLICABLE CODE REQUIREMENTS. PROPER JUDGEMENT MUST BE EXERCISED IN EXECUTING THE WORK SO AS TO SECURE THE BEST POSSIBLE INSTALLATION IN THE AVAILABLE SPACE, AND TO OVERCOME LOCAL DIFFICULTIES DUE TO SPACE LIMITATIONS OR INTERFERENCE OF CONDITIONS ENCOUNTERED.

16. IN THE EVENT CHANGES IN THE INDICATED LOCATIONS OR ARRANGEMENTS ARE NECESSARY, DUE TO DEVELOPED CONDITIONS IN THE BUILDING CONSTRUCTION OR REARRANGEMENT OF EQUIPMENT, SUCH CHANGES SHALL BE MADE WITHOUT COST PROVIDING THE CHANGE IS ORDERED BEFORE THE CONDUIT RUNS, ETC., AND WORK DIRECTLY CONNECTED TO SAME IS INSTALLED AND NO EXTRA MATERIALS ARE REQUIRED.

17. LOCATIONS OF DISCONNECT SWITCHES AND CONNECTIONS FOR MECHANICAL AND PLUMBING EQUIPMENT ARE SHOWN DIAGRAMMATICALLY. VERIFY ACTUAL CONNECTION LOCATIONS WITH EQUIPMENT SHOP DRAWINGS AND LOCATE DISCONNECT SWITCHES TO PROVIDE CODE REQUIRED CLEARANCES AND ACCESS. DISCONNECT SWITCHES ON ROOF SHALL BE 30" MINIMUM ABOVE ROOF, MOUNTING OF DISCONNECTS DIRECTLY ON MECHANICAL EQUIPMENT IS NOT ACCEPTABLE. PROVIDE ANGLE IRON SUPPORT BRACKETS BOLTED TO ROOF FRAMING. FIELD GALVANIZE ALL FIELD CUT ENDS OF UP PORTS. PROVIDE ROOF FLASHING AS REQUIRED

18. PROVIDE ALL EQUIPMENT WITH ENCLOSURES LISTED OR LABELED FOR USE AND LOCATION WHERE SUCH EQUIPMENT IS INSTALLED.

19. PROVIDE UL LISTED FIRE STOP FOR ALL PENETRATIONS THROUGH FIRE RATED FLOORS, WALLS, AND CEILINGS TO MAINTAIN ALL FIRE RATINGS. THE FIRE STOP MATERIALS SHALL BE RE-ENTERABLE AND REUSABLE.

20. ELECTRICAL PLANS DO NOT SHOW ELECTRICAL REQUIREMENTS FOR MECHANICAL AND PLUMBING EQUIPMENT CONTROL. REFER TO MECHANICAL AND PLUMBING PLANS AND SPECIFICATIONS. WHERE EQUIPMENT IS INDICATED TO BE BY ELECTRICAL CONTRACTOR PROVIDE ALL CONDUIT, WIRE, J-BOX, OUTLET BOXES, RELAY SWITCHES, TIME SWITCHES, CONTROL CIRCUITS, ETC. REQUIRED FOR A COMPLETE AND OPERABLE MECHANICAL AND PLUMBING INSTALLATION. ALL WIRE SHALL BE INSTALLED IN CODE SIZED CONDUIT.

21. ALL CONDUIT, STRUCTURES AND INSTALLATION FOR POWER AND TELEPHONE UTILITIES SHALL CONFORM WITH THE REQUIREMENTS (MINIMUM BEND RADIUS, CONCRETE ENCASEMENT, CONDUIT, TYPE, ETC.) OF THE UTILITIES COMPANY. VERIFY ALL REQUIREMENTS WITH UTILITY COMPANY PRIOR TO BID AND INCLUDE ALL COSTS IN BID.

22. CONTRACTOR SHALL OBTAIN SOUTHERN CALIFORNIA EDISON CO. (SCE CO.) CONSTRUCTION DRAWINGS PRIOR TO CONSTRUCTION AND SHALL INSTALL POWER CONDUIT AND STRUCTURES ACCORDING TO SCE CO. DRAWINGS. EXTRA PAYMENTS WILL NOT BE GRANTED FOR FAILURE TO DO SO.

23. LOCATIONS OF EXISTING UTILITIES ARE NOT SHOWN AND CONTRACTOR SHALL EXERCISE EXTREME CAUTION IN EXCAVATING AND TRENCHING ON THIS SITE TO AVOID EXISTING DUCTS, PIPING OR CONDUIT, ETC. AND TO PREVENT HAZARD TO PERSONNEL AND/OR DAMAGE TO EXISTING UNDERGROUND UTILITIES OR STRUCTURES WHETHER OR NOT SHOWN AND INSTALLED BY ANY OTHER CONTRACTS. THE ENGINEER IS NOT RESPONSIBLE FOR THE LOCATION OF UNDERGROUND UTILITIES OR STRUCTURES WHETHER OR NOT SHOWN OR DETAILED BY ANY OTHER CONTRACTS. THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER SHOULD SUCH UNIDENTIFIED CONDITIONS BE DISCOVERED. THESE DRAWINGS AND SPECIFICATIONS DO NOT INCLUDE NECESSARY COMPONENTS FOR CONSTRUCTION SAFETY.

24. REFER TO THE DRAWINGS AND SHOP DRAWINGS OF OTHER TRADES FOR ADDITIONAL DETAILS WHICH AFFECT THE PROPER INSTALLATION OF THIS WORK.

25. PROTECT ALL WORK, MATERIALS AND EQUIPMENT FROM DAMAGE FROM ANY CAUSE WHATSOEVER AND PROVIDE ADEQUATE AND PROPER STORAGE FACILITIES DURING THE PROGRESS OF THE WORK. PROVIDE FOR THE SAFETY AND GOOD CONDITION OF ALL THE WORK UNTIL FINAL ACCEPTANCE OF THE WORK BY THE OWNER AND REPLACE ALL DAMAGED OR DEFECTIVE WORK, MATERIALS AND EQUIPMENT BEFORE REQUESTING FINAL ACCEPTANCE

26. THE DRAWINGS INDICATE IN A DIAGRAMMATIC MANNER THE DESIRED LOCATIONS OF ARRANGEMENT OF THE COMPONENTS OF ELECTRICAL WORK. DETERMINE EXACT CONDUIT ROUTING, CONDUIT BENDS, AUXILIARY JUNCTION BOXES, SUPPORTS, AND UNDEFINED CONSTRUCTION DETAILS AS JOB CONDITION TO BE INSTALLED IN ACCORDANCE WITH THE APPLICABLE CODE REQUIREMENTS. PROPER JUDGEMENT MUST BE EXERCISED IN EXECUTING THE WORK SO AS TO SECURE THE BEST POSSIBLE INSTALLATION IN THE AVAILABLE SPACE, AND TO OVERCOME LOCAL DIFFICULTIES DUE TO SPACE LIMITATIONS OR INTERFERENCE OF CONDITIONS ENCOUNTERED.

27. IN THE EVENT CHANGES IN THE INDICATED LOCATIONS OR ARRANGEMENTS ARE NECESSARY, DUE TO DEVELOPED CONDITIONS IN THE BUILDING CONSTRUCTION OR REARRANGEMENT OF EQUIPMENT, SUCH CHANGES SHALL BE MADE WITHOUT COST PROVIDING THE CHANGE IS ORDERED BEFORE THE CONDUIT RUNS, ETC., AND WORK DIRECTLY CONNECTED TO SAME IS INSTALLED AND NO EXTRA MATERIALS ARE REQUIRED.

28. LOCATIONS OF DISCONNECT SWITCHES AND CONNECTIONS FOR MECHANICAL AND PLUMBING EQUIPMENT ARE SHOWN DIAGRAMMATICALLY. VERIFY ACTUAL CONNECTION LOCATIONS WITH EQUIPMENT SHOP DRAWINGS AND LOCATE DISCONNECT SWITCHES TO PROVIDE CODE REQUIRED CLEARANCES AND ACCESS. DISCONNECT SWITCHES ON ROOF SHALL BE 30" MINIMUM ABOVE ROOF. MOUNTING OF DISCONNECTS DIRECTLY ON MECHANICAL EQUIPMENT IS NOT ACCEPTABLE. PROVIDE ANGLE IRON SUPPORT BRACKETS BOLTED TO ROOF FRAMING. FIELD GALVANIZE ALL FIELD CUT ENDS OF UP PORTS. PROVIDE ROOF FLASHING AS REQUIRED

29. PROVIDE ALL EQUIPMENT WITH ENCLOSURES LISTED OR LABELED FOR USE AND LOCATION WHERE SUCH EQUIPMENT IS INSTALLED.

30. PROVIDE UL LISTED FIRE STOP FOR ALL PENETRATIONS THROUGH FIRE RATED FLOORS, WALLS, AND CEILINGS TO MAINTAIN ALL FIRE RATINGS. THE FIRE STOP MATERIALS SHALL BE RE-ENTERABLE AND REUSABLE.

31. GROUNDING SHALL BE EXECUTED IN ACCORDANCE WITH ALL APPLICABLE CODES AND REGULATIONS, BOTH OF THE STATE OF CALIFORNIA AND LOCAL AUTHORITIES HAVING JURISDICTION.

32. PROVIDE GROUND WIRE IN EACH CONDUIT CONTAINING CIRCUITS FEEDING RECEPTACLES. THE CONDUIT SHALL NOT BE PERMITTED TO SERVE AS THE ONLY ELECTRICAL GROUND RETURN PATH.

33. PROVIDE HANDLE TIES AT CIRCUIT BREAKERS TO SIMULTANEOUSLY DISCONNECT ALL UNGROUNDED CONDUCTORS OF MULTI-WIRE BRANCH CIRCUITS WITH A SHARED NEUTRAL.

34. UNLESS NOTED OTHERWISE ALL 120 VOLT HOMERUNS OVER 100 FEET SHALL BE #10 AWG MINIMUM. ADJUST CONDUIT SIZE ACCORDINGLY.

36. PROVIDE THE PROPER NUMBER OF CONDUCTORS TO ACHIEVE CIRCUITING AND SWITCHING SHOWN.

37. CIRCUIT NUMBERS AT DEVICES CORRESPOND TO PANELBOARD BREAKERS (REFER TO PANELBOARD SCHEDULE). BRANCH CIRCUITS SHALL BE SIZED ACCORDING TO THE CIRCUIT BREAKER RATING, UNLESS NOTED OTHERWISE.

## SYMBOL LIST

(ALL SYMBOLS NOT NECESSARILY USED ON THESE DRAWINGS)
ALL SYMBOL DESCRIPTIONS ARE SUBJECT TO MODIFICATION AS NOTED ON THE DRAWINGS.
VERIFY EXACT LOCATIONS AND HEIGHTS OF OUTLETS WITH ARCHITECTURAL INTERIOR ELEVATIONS PRIOR TO ROUGH-IN.

- DBL E0.2 — PANELBOARD, ADJACENT LINE INDICATES PANEL FRONT. ADJACENT BALLOON INDICATES PANEL DESIGNATION "DBL", SEE DRAWING E0.2 FOR PANEL SCHEDULE.
- CONDUIT, INSTALLED CONCEALED IN WALL OR IN CEILING SPACE.
  - 1/2" C - 2 #12
  - 1/2" C - 3 #12
  - 3/4" C - 4 #12
  - 3/4" C - 5 #12
  - 3/4" C - 6 #12
  - 1" C - 7 #12
  - 1" C - 8 #12
  - 1 1/4" C - 9 #12
- CONDUIT, INSTALLED CONCEALED IN OR UNDER FLOOR OR BELOW GRADE, 3/4" CONDUIT MINIMUM.
- EXISTING RACEWAY
- B-5,7,9 — HOMERUN TO PANEL "B" FOR CIRCUITS 5, 7, 9 WITH SEPARATE NEUTRALS.
- 2 / E1.0 — DETAIL CALLOUT, "2" INDICATES DETAIL, "E1.0" INDICATES DRAWING WHERE DETAIL OCCURS.

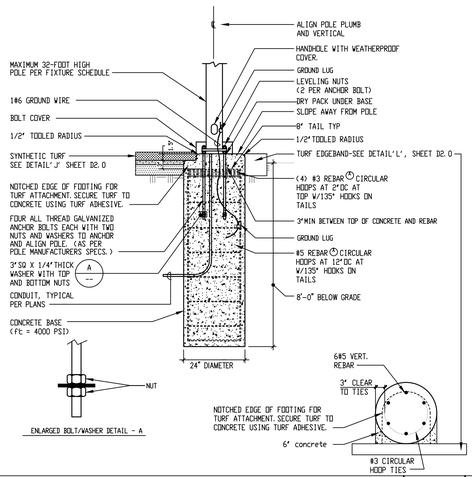
## ABBREVIATIONS LIST

| | | | |
|---|---|---|---|
| +45" | MOUNTING HEIGHT TO CENTER LINE OF DEVICE FROM FINISH FLOOR OR EXTERIOR GRADE | IG | ISOLATED GROUND AND ISOLATED NEUTRAL |
| 1 | KEY NOTE CALLOUT. REFER TO CORRESPONDING NOTE ON DRAWING WHERE CALLOUT OCCURS. | J-BOX | JUNCTION BOX |
| | | KVA | KILOVOLT AMPERES |
| | | KW | KILOWATT |
| A.F.F. | ABOVE FINISH FLOOR | LCL | LONG CONTINUOUS LOAD |
| A.F.G. | ABOVE FINISH GRADE | LTG, LTS | LIGHTING |
| AWG | AMERICAN WIRE GAUGE | MCB | MAIN CIRCUIT BREAKER |
| AMP, A | AMPERE | MLO | MAIN LUGS ONLY |
| A.I.C. | AMPERES INTERRUPTING CAPACITY (SYMMETRICAL) | NEC | NATIONAL ELECTRICAL CODE |
| | | NIC | NOT IN CONTRACT |
| CIRC.,CKT. | CIRCUIT | PH. or Φ | PHASE |
| CB | CIRCUIT BREAKER | PROVIDE | FURNISH, INSTALL AND CONNECT. |
| C | CONDUIT | REC, RECEPT | RECEPTACLE |
| CLCB | CURRENT LIMITING CIRCUIT BREAKER | RGS | RIGID GALVANIZED STEEL |
| C.O. | CONDUIT ONLY. | SECONDARY | 600 VOLTS AND LESS |
| CONN | CONNECTED | TYP | TYPICAL |
| DIA | DIAMETER | U.N.O. | UNLESS NOTED OTHERWISE |
| EMT | ELECTRICAL METALLIC TUBING | V | VOLTS |
| EF | EXHAUST FAN | VA | VOLT AMPERES |
| (E) | EXISTING EQUIPMENT TO REMAIN | WP | WEATHERPROOF |
| FLA | FULL LOAD AMPS | W | WIRE |
| GFI | GROUND FAULT CIRCUIT INTERRUPTER. | 1P | SINGLE POLE |
| GFP | GROUND FAULT PROTECTION | 2P | DOUBLE POLE |
| GRD | GROUND | 3P | TRIPLE POLE |

## LIGHTING FIXTURE SCHEDULE

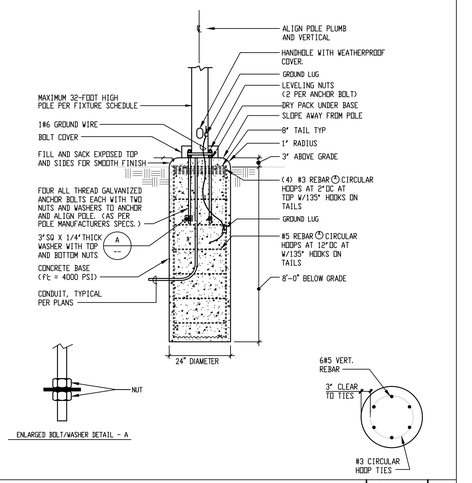
| SYMBOL | TYPE | GENERAL DESCRIPTION | MANUFACTURER MODEL # | LUMENS | CCT | SYSTEM WATTAGE | NOTES | MOUNTING |
|---|---|---|---|---|---|---|---|---|
| □→ | SP1A | SINGLE-HEAD, LED POLE FIXTURE ON ROUND STRAIGHT ALUMINUM POLE. TYPE T3 OPTIC WITH BACKLIGHT CONTROL. 0-10V DIMMABLE. PROVIDE NECESSARY POLE HEIGHT FOR FIXTURE MOUNTING AT 30'-0" A.F.G. FINISH TO BE SELECTED BY LANDSCAPE ARCHITECT. | LITHONIA<br>DSX1 LED-P4-35K-80CRI-BLC3-MVOLT-SPA-[CONTROLS?]-[FINISH?]<br>POLE: RSA-30-6G-DM19AS-[OPTIONS?]-[FINISH?] | 11190 | 3500K | 124 | CONTRACTOR TO VERIFY EXACT POLE HEIGHT TO MAINTAIN 30'-0" FROM THE BOTTOM OF THE FIXTURE TO FINISHED GRADE PRIOR TO ORDERING. | POLE |
| □→ | SP1B | SINGLE-HEAD, LED POLE FIXTURE ON ROUND STRAIGHT STEEL POLE. TYPE T3 OPTIC WITH BACKLIGHT CONTROL. 0-10V DIMMABLE. PROVIDE NECESSARY POLE HEIGHT FOR FIXTURE MOUNTING AT 30'-0" A.F.G. FINISH TO BE SELECTED BY LANDSCAPE ARCHITECT. | LITHONIA<br>DSX1 LED-P4-35K-80CRI-BLC3-MVOLT-SPA-[CONTROLS?]-[FINISH?]<br>POLE: RSS-30-6G-DM19AS-[OPTIONS?]-[FINISH?] | 11190 | 3500K | 124 | CONTRACTOR TO VERIFY EXACT POLE HEIGHT TO MAINTAIN 30'-0" FROM THE BOTTOM OF THE FIXTURE TO FINISHED GRADE PRIOR TO ORDERING. | POLE |

DO NOT REVIEW - According to IR A-22, light poles under 35' tall, supported on grade are exempt from DSA review.




SEMI-FLUSH POLE BASE DETAIL - TURF | SCALE: NTS | 2

DO NOT REVIEW - According to IR A-22, light poles under 35' tall, supported on grade are exempt from DSA review.




SEMI-FLUSH POLE BASE DETAIL | SCALE: NTS | 1

## SHEET INDEX


E0.1 GENERAL NOTES, SYMBOL LIST, AND FIXTURE SCHEDULE.
E0.2 SINGLE LINE DIAGRAM AND PANEL SCHEDULE
E1.0 SITE ELECTRICAL PLAN
E2.0 ELECTRICAL SPECIFICATIONS
E2.1 ELECTRICAL SPECIFICATIONS
E2.2 FIRE ALARM SYSTEM INFORMATION
E2.3 ENLARGED RESTROOM PLAN


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DIV. OF THE STATE ARCHITECT
APP: 03-125961 INC:
REVIEWED FOR
SS ☑ FLS ☑ ACS ☑
DATE: 10/12/2026


VERDE DESIGN
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CONSULTANT




09/22/2026


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fbaengr.com
FBA Job Number: 1175.032


SHEET TITLE
GENERAL NOTES, SYMBOL LIST, AND FIXTURE SCHEDULE

PROJECT NAME
HAWTHORNE MIDDLE SCHOOL TURF FIELD & TRACK IMPROVEMENTS

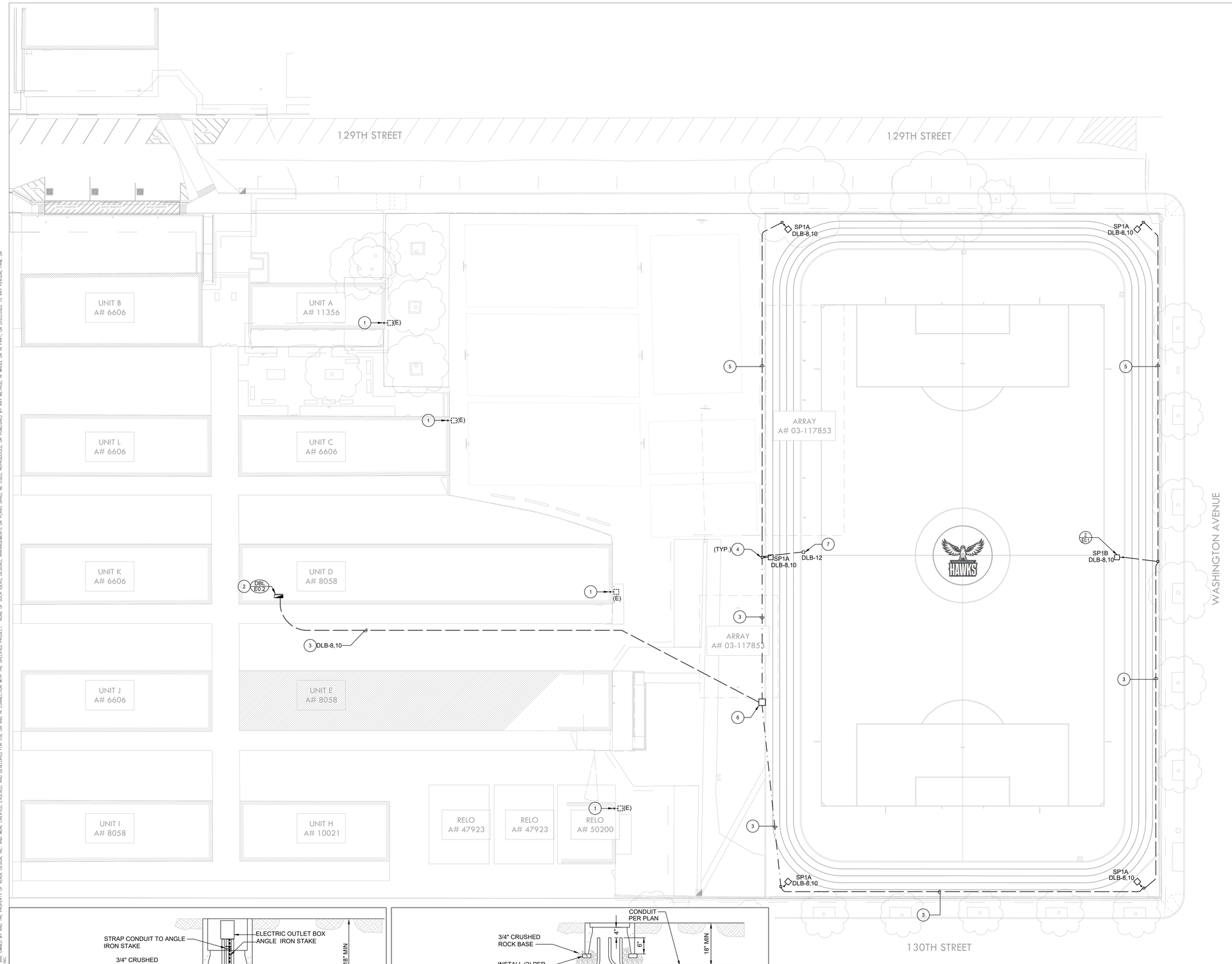
PROJECT ADDRESS
4366 W 129TH ST, HAWTHORNE, CA 90250

| SUBMITTAL | DATE |
|---|---|
| DESIGN DEVELOPMENT SUBMITTAL | 11/26/25 |
| DSA SUBMITTAL | 03/10/26 |

| NO. | REVISIONS | DATE |
|---|---|---|

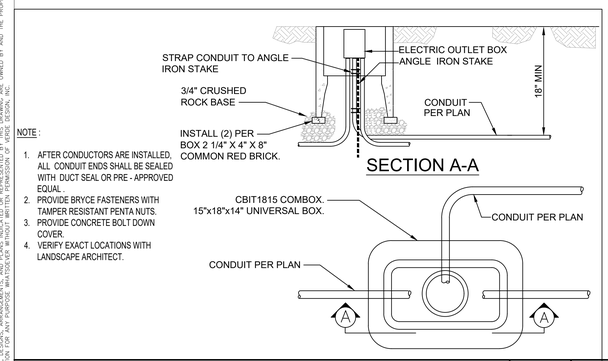
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PROJ. NO. 2223000
SHEET NO. E0.1


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## KEY NOTES

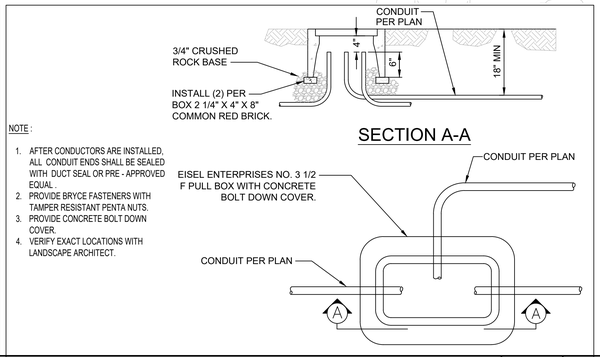
1. EXISTING FLOODLIGHT TO REMAIN. PROTECT IN PLACE.
2. EXISTING PANELBOARD IN BLDG.D TO REMAIN.
3. 3/4" C. 4#8 & 1#8 GRD.
4. 11" X 17" CONCRETE PULLBOX. ROUTE ALL CONDUITS AND WIRING AS SHOWN FROM PULLBOX TO LIGHT POLE AND CONNECT AS REQUIRED. REFER TO DETAIL 2/E1.0.
5. 3/4"C - 2#8 & 1#8 GRD.
6. 11" X 17" CONCRETE PULL BOX. REFER TO DETAIL 2/E1.0.
7. 15" X 18" CBIT1815 COMBOX WITH INTERNAL OUTLET BOX. REFER TO DETAIL 3/E1.0.




NOTE :

1. AFTER CONDUCTORS ARE INSTALLED, ALL CONDUIT ENDS SHALL BE SEALED WITH DUCT SEAL OR PRE - APPROVED EQUAL .
2. PROVIDE BRYCE FASTENERS WITH TAMPER RESISTANT PENTA NUTS.
3. PROVIDE CONCRETE BOLT DOWN COVER.
4. VERIFY EXACT LOCATIONS WITH LANDSCAPE ARCHITECT.

COMBOX + ELEVATION DETAIL | SCALE: NTS | 3




NOTE :

1. AFTER CONDUCTORS ARE INSTALLED, ALL CONDUIT ENDS SHALL BE SEALED WITH DUCT SEAL OR PRE - APPROVED EQUAL .
2. PROVIDE BRYCE FASTENERS WITH TAMPER RESISTANT PENTA NUTS.
3. PROVIDE CONCRETE BOLT DOWN COVER.
4. VERIFY EXACT LOCATIONS WITH LANDSCAPE ARCHITECT.

11" x 17" PULL BOX DETAIL | SCALE: NTS | 2

SITE ELECTRICAL PLAN | SCALE: 1"=20'-0" | 1

## SITE PLAN GENERAL NOTES

1. LOCATIONS OF EXISTING UTILITIES ARE NOT SHOWN AND CONTRACTOR SHALL EXERCISE EXTREME CAUTION IN EXCAVATING AND TRENCHING ON THIS SITE TO AVOID EXISTING DUCTS, PIPING, OR CONDUITS, ETC., AND TO PREVENT HAZARDS TO PERSONNEL AND/OR DAMAGE TO EXISTING UNDERGROUND UTILITIES OR STRUCTURES WHETHER OR NOT SHOWN AND INSTALLED BY ANY OTHER CONTRACTS. THE ENGINEER IS NOT RESPONSIBLE FOR THE LOCATION OF UNDERGROUND UTILITIES OR STRUCTURES, WHETHER OR NOT SHOWN OR DETAILED AND INSTALLED BY ANY OTHER CONTRACTS. THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER, THE ENGINEER SHOULD SEARCH UNIDENTIFIED CONDITIONS BE DISCOVERED. THESE DRAWINGS AND SPECIFICATIONS DO NOT INCLUDE THE NECESSARY ELEMENTS FOR CONSTRUCTION SAFETY.
2. CONTRACTOR SHALL VERIFY THE LOCATION OF ANY EXISTING UNDERGROUND UTILITIES AND STRUCTURES PRIOR TO COMMENCEMENT OF WORK BY CONTACTING UNDERGROUND SERVICE ALERT (U.S.A.) AT 1(800) 422-4133, OR OTHER LOCAL APPLICABLE UNDERGROUND SERVICE ALERT AGENCIES.
3. THE DRAWINGS ILLUSTRATE LOCATIONS OF EQUIPMENT AND ASSEMBLIES, PULLBOXES, MANHOLES, HANDHOLES, AND VAULTS, INCLUDING OTHER ELECTRICAL UNDERGROUND STRUCTURES AND PATHWAYS. CONTRACTOR SHALL CLOSELY COORDINATE EXACT LOCATIONS AND MOUNTING DEPTHS OF ALL DEVICES, STRUCTURES AND PATHWAYS WITH OTHER TRADES PRIOR TO PLACEMENT, TO ENSURE FINAL LOCATIONS ARE OUTSIDE FEATURE LANDSCAPE AND ARCHITECTURAL AREAS AND ARE NOT IN CONFLICT WITH THE INSTALLATION OF MATERIALS BY OTHER TRADES.
4. SEE ARCHITECTURAL, CIVIL AND LANDSCAPE PLANS FOR EXACT LOCATION OF FIXTURES, PULLBOXES, MANHOLES, OTHER ELECTRICAL EQUIPMENT AND DEVICES, ETC. COORDINATE ALL UNDERGROUND STRUCTURES AND CONDUIT ROUTING WITH ARCHITECT OR OWNERS' REPRESENTATIVE PRIOR TO ROUGH-IN, TO ENSURE SUCH ITEMS ARE NOT PLACED IN PLANTING / HARDSCAPE AREAS.
5. ALL EQUIPMENT LOCATED OUTDOORS SHALL BE WEATHERPROOF, NEMA 3R RATED.
6. ALL UNDERGROUND CONDUIT SIZE SHALL NOT BE LESS THAN ¾" – U.N.O.
7. MINIMUM CONDUCTOR SIZE SHALL BE #10 AWG. – U.N.O.
8. ALL SITE BRANCH CIRCUIT CONDUIT RUNS SHALL INCLUDE AN EQUIPMENT GROUND THAT AT A MINIMUM, MATCHES THE SIZE OF THE LARGEST BRANCH CIRCUIT CONDUCTOR.
9. PROVIDE PULL STRING IN ALL EMPTY CONDUITS.

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APP: 03-125961 INC:
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DATE: 10/12/2026

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09/21/2026

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fbaengr.com
FBA Job Number: 1175.032

SHEET TITLE
SITE ELECTRICAL PLAN

PROJECT NAME
HAWTHORNE MIDDLE SCHOOL TURF FIELD & TRACK IMPROVEMENTS

PROJECT ADDRESS
4366 W 129TH ST, HAWTHORNE, CA 90250

| SUBMITTAL | DATE |
|---|---|
| DESIGN DEVELOPMENT SUBMITTAL | 11/26/25 |
| DSA SUBMITTAL | 03/10/26 |

| NO. | REVISIONS | DATE |
|---|---|---|

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DATE ISSUED 03/10/2026
SCALE
PROJ. NO. 2223000
SHEET NO. E1.0

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DRAWING NAME: S:\1175\00 Hawthorne MS Field & Track Improvements\03_CAD\E1.0_HTMS05-SITE ELECTRICAL PLAN.dwg
PLOT DATE: 09-21-26 PLOTTED BY: Adam

# 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) |
|---|---|
| SMARTS | Notice of Intent |
| SMARTS | Risk Level Determination |
| SMARTS | Certification |
| SMARTS | Copy of Annual Fee Receipt |
| SMARTS | Post-Construction Water Balance Calculator |
| Appendix A | Site Maps and Drawings, see Appendix A |

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:**

02/01/2027

**End Date:**

06/01/2027

2 Locate your small construction project by entering the address in the search box or by clicking on the map.

**Location:**

4366 W 129TH STREET

**Search**




3 Click the "Calculate R Factor" button below.

**Calculate R Factor**

# Facility Information

| | |
|---|---|
| **Start Date:** 02/01/2027 | **Latitude:** 33.9148 |
| **End Date:** 06/01/2027 | **Longitude:** -118.3511 |

# Calculation Results

### Rainfall erosivity factor (R Factor) = **16.08**

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-

**Permit Type:** Traditional:Construction - NOI **Application ID:** 604260 **Status:** Not Submitted

- Owner Information
- On-Site Contact Information
- Site Information
- Additional Site Information
- **Risk**
- TMDL
- Post Construction
- QSD Information
- Attachments
- Billing Information
- Certification
- Linked Users

**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 sediment risk factor.**

A) R Factor Value: ***(What's this?)** 16.08 Erosivity Calculator Help

Populate K and LS using GIS layer data

B) K Factor Value: (weighted average, by area, for all site soils) ***(What's this?)** 0.32

C) LS Factor: (weighted average, by area, for all slopes) ***(What's this?)** 0.44

Watershed Erosion Estimate (=R*K*LS) in tons/acre 2.28

Project Sediment Risk Factor: **(What's this?)** **Low**

Save & Continue

Fields marked with * are mandatory fields.

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**Permit Type:** Traditional:Construction - NOI **Application ID:** 604260 **Status:** Not Submitted

- Owner Information
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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

Save & Continue

Fields marked with * are mandatory fields.

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**Permit Type:** Traditional:Construction - NOI **Application ID:** 604260 **Status:** Not Submitted

- Owner Information
- On-Site Contact Information
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- Billing Information
- Certification
- Linked Users

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**

Continue

Fields marked with * are mandatory fields.

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**Permit Type:** Traditional:Construction - NOI **Application ID:** 604260 **Status:** Not Submitted

Owner Information
On-Site Contact Information
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Certification
Linked Users

Post Construction Questions | **Post Construction Calculator**

**Sub Area Name:** Parking Lot North **Sub Area ID:** 34818 Return to Sub Area List

**Input**

**INPUT FOR SUB AREA: Enter the sub area details and click on the 'Compute & Save' button.**

I.a. Name: Parking Lot North
I.b. County: Los Angeles
I.c. Closest Rain Gauge Location: Los Angeles Civic Cente
I.d. Size of Drainage Area (acres): 0.07

**Pre-Construction:**

I.e. Dominant Soil Type: Group A Soils - High infiltration.Sand, loamy sand, or sandy loam.Infiltration rate > 0.3 inch/hr when wet.
I.f. Existing Dominant Non-built Land Use Type: Open Space: grass cover 50% to 75%
I.g. Existing Rooftop Impervious Area (acres): 0
I.h. Existing Non-rooftop Impervious Area (acres): 0.07
Existing Imperviousness (%): 100

**Post-Construction:**

I.i. Proposed Dominant Non-built Land Use Type: Open Space: grass cover 50% to 75%
I.j. Proposed Rooftop Impervious Area (acres): 0
I.k. Proposed Non-rooftop Impervious Area (acres): 0.07
Proposed Imperviousness (%): 100

*** Post-project Runoff Volume <= Pre-project Runoff Volume. No further calculation is necessary!

Compute & Save

**Permit Type:** Traditional:Construction - NOI **Application ID:** 604260 **Status:** Not Submitted

Owner Information
On-Site Contact Information
Site Information
Additional Site Information
Risk
TMDL
**Post Construction**
QSD Information
Attachments
Billing Information
Certification
Linked Users

Post Construction Questions | **Post Construction Calculator**

**Sub Area Name:** Parking Lot North **Sub Area ID:** 34818 Return to Sub Area List

**Input**

**Output**

**O.a. Existing Runoff Curve Number:** 98.00
**O.b. Design Storm(inches):** 0.87
**O.c. Pre-project Runoff Volume(cubic feet):** 169.08
**O.d. Proposed Runoff Curve Number:** 98.00
**O.e. Net Credit of Volume Credits(cubic feet):**
**O.f. Post-project Runoff Volume(cubic feet):** 169.08
**O.g. Post-project Runoff Volume minus Volume Credits(cubic feet):**

*** Post-project Runoff Volume <= Pre-project Runoff Volume. No further calculation is necessary!

Fields marked with * are mandatory fields.

**Permit Type:** Traditional:Construction - NOI **Application ID:** 604260 **Status:** Not Submitted

Owner Information
On-Site Contact Information
Site Information
Additional Site Information
Risk
TMDL
**Post Construction**
QSD Information
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Billing Information
Certification
Linked Users

Post Construction Questions | **Post Construction Calculator**

**Sub Area Name:** Parking Lot South **Sub Area ID:** 34819 Return to Sub Area List

**Input**

**INPUT FOR SUB AREA: Enter the sub area details and click on the 'Compute & Save' button.**

I.a. Name: Parking Lot South
I.b. County: Los Angeles
I.c. Closest Rain Gauge Location: Los Angeles Civic Cente
I.d. Size of Drainage Area (acres): 0.1

**Pre-Construction:**

I.e. Dominant Soil Type: Group A Soils - High infiltration.Sand, loamy sand, or sandy loam.Infiltration rate > 0.3 inch/hr when wet.
I.f. Existing Dominant Non-built Land Use Type: Open Space: grass cover >75%
I.g. Existing Rooftop Impervious Area (acres): 0
I.h. Existing Non-rooftop Impervious Area (acres): 0.08
Existing Imperviousness (%): 80

**Post-Construction:**

I.i. Proposed Dominant Non-built Land Use Type: Open Space: grass cover >75%
I.j. Proposed Rooftop Impervious Area (acres): 0
I.k. Proposed Non-rooftop Impervious Area (acres): 0.09
Proposed Imperviousness (%): 90

*** Post-project Runoff Volume minus Volume Credits <= Pre-project Runoff Volume. No further calculation is necessary!

Compute & Save

**Permit Type:** Traditional:Construction - NOI **Application ID:** 604260 **Status:** Not Submitted

Owner Information
On-Site Contact Information
Site Information
Additional Site Information
Risk
TMDL
**Post Construction**
QSD Information
Attachments
Billing Information
Certification
Linked Users

Post Construction Questions | **Post Construction Calculator**

**Sub Area Name:** Parking Lot South **Sub Area ID:** 34819 Return to Sub Area List

**Input**

**A. Porous Pavement** **Total Credit Volume: 0 cubic feet**

**B. Tree Planting** **Total Credit Volume: 0 cubic feet**

**C. Downspout Disconnection** **Credits Appear on Section I**

**D. Impervious Area Disconnection** **Credits Appear on Section I**

**E. Green Roof** **Total Credit Volume: 0 cubic feet**

**F. Stream Buffer** **Total Credit Volume: 0 cubic feet**

**G. Vegetative Swale** **Total Credit Volume: 0 cubic feet**

**H. Rain Barrels/Cisterns** **Total Credit Volume: 0 cubic feet**

**I. Soil Quality** **Total Credit Volume: 0 cubic feet**

**J. Basins** **Total Credit Volume: 354 cubic feet**

Note: Minimum drawdown times must be compliant with local vector control requirements, including in the design, to receive credit for the "Basins" credit.

Were minimum drawdown times, compliant with local vector control requirements, included in the design? Yes

Basin(s) Total Capacity (cubic feet): 354

**Total Credit Volume (cubic feet):** 354

Compute & Update

**Permit Type:** Traditional:Construction - NOI **Application ID:** 604260 **Status:** Not Submitted

Owner Information
On-Site Contact Information
Site Information
Additional Site Information
Risk
TMDL
**Post Construction**
QSD Information
Attachments
Billing Information
Certification
Linked Users

Post Construction Questions | **Post Construction Calculator**

**Sub Area Name:** Parking Lot South **Sub Area ID:** 34819 Return to Sub Area List

**Input**

**A. Porous Pavement** **Total Credit Volume: 0 cubic feet**

**B. Tree Planting** **Total Credit Volume: 0 cubic feet**

**C. Downspout Disconnection** **Credits Appear on Section I**

**D. Impervious Area Disconnection** **Credits Appear on Section I**

**E. Green Roof** **Total Credit Volume: 0 cubic feet**

**F. Stream Buffer** **Total Credit Volume: 0 cubic feet**

**G. Vegetative Swale** **Total Credit Volume: 0 cubic feet**

**H. Rain Barrels/Cisterns** **Total Credit Volume: 0 cubic feet**

**I. Soil Quality** **Total Credit Volume: 0 cubic feet**

**J. Basins** **Total Credit Volume: 354 cubic feet**

**Output**

| | | | |
|---|---|---|---|
| **O.a. Existing Runoff Curve Number:** | 86.20 | **O.e. Net Credit of Volume Credits(cubic feet):** | 354.00 |
| **O.b. Design Storm(inches):** | 0.87 | **O.f. Post-project Runoff Volume(cubic feet):** | 113.79 |
| **O.c. Pre-project Runoff Volume(cubic feet):** | 51.02 | **O.g. Post-project Runoff Volume minus Volume Credits(cubic feet):** | -240.21 |
| **O.d. Proposed Runoff Curve Number:** | 92.10 | | |

*** Post-project Runoff Volume minus Volume Credits <= Pre-project Runoff Volume. No further calculation is necessary!

**Permit Type:** Traditional:Construction - NOI **Application ID:** 604260 **Status:** Not Submitted

Owner Information
On-Site Contact Information
Site Information
Additional Site Information
Risk
TMDL
**Post Construction**
QSD Information
Attachments
Billing Information
Certification
Linked Users

Post Construction Questions | **Post Construction Calculator**

**Sub Area Name:** Corridor **Sub Area ID:** 34820 Return to Sub Area List

**Input**

**INPUT FOR SUB AREA: Enter the sub area details and click on the 'Compute & Save' button.**

I.a. Name: Corridor
I.b. County: Los Angeles
I.c. Closest Rain Gauge Location: Los Angeles Civic Cente
I.d. Size of Drainage Area (acres): 0.01

**Pre-Construction:**

I.e. Dominant Soil Type: Group A Soils - High infiltration.Sand, loamy sand, or sandy loam.Infiltration rate > 0.3 inch/hr when wet.
I.f. Existing Dominant Non-built Land Use Type: Lawn, Grass, or Pasture covering 50 to 75% of the open space
I.g. Existing Rooftop Impervious Area (acres): 0
I.h. Existing Non-rooftop Impervious Area (acres): 0.01
Existing Imperviousness (%): 100

**Post-Construction:**

I.i. Proposed Dominant Non-built Land Use Type: Open Space: grass cover 50% to 75%
I.j. Proposed Rooftop Impervious Area (acres): 0
I.k. Proposed Non-rooftop Impervious Area (acres): 0.01
Proposed Imperviousness (%): 100

*** Post-project Runoff Volume <= Pre-project Runoff Volume. No further calculation is necessary!

Compute & Save

**Permit Type:** Traditional:Construction - NOI **Application ID:** 604260 **Status:** Not Submitted

Owner Information
On-Site Contact Information
Site Information
Additional Site Information
Risk
TMDL
**Post Construction**
QSD Information
Attachments
Billing Information
Certification
Linked Users

Post Construction Questions | **Post Construction Calculator**

**Sub Area Name:** Corridor **Sub Area ID:** 34820 Return to Sub Area List

**Input**

**Output**

**O.a. Existing Runoff Curve Number:** 98.00
**O.b. Design Storm(inches):** 0.87
**O.c. Pre-project Runoff Volume(cubic feet):** 24.15
**O.d. Proposed Runoff Curve Number:** 98.00
**O.e. Net Credit of Volume Credits(cubic feet):**
**O.f. Post-project Runoff Volume(cubic feet):** 24.15
**O.g. Post-project Runoff Volume minus Volume Credits(cubic feet):**

*** Post-project Runoff Volume <= Pre-project Runoff Volume. No further calculation is necessary!

Fields marked with * are mandatory fields.

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**Permit Type:** Traditional:Construction - NOI **Application ID:** 604260 **Status:** Not Submitted

Owner Information
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Site Information
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TMDL
**Post Construction**
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Billing Information
Certification
Linked Users

Post Construction Questions | **Post Construction Calculator**

**Sub Area Name:** Track & Field **Sub Area ID:** 34821 Return to Sub Area List

**Input**

**INPUT FOR SUB AREA: Enter the sub area details and click on the 'Compute & Save' button.**

I.a. Name: Track & Field
I.b. County: Los Angeles
I.c. Closest Rain Gauge Location: Los Angeles Civic Cente
I.d. Size of Drainage Area (acres): 1.69

**Pre-Construction:**

I.e. Dominant Soil Type: Group A Soils - High infiltration.Sand, loamy sand, or sandy loam.Infiltration rate > 0.3 inch/hr when wet.
I.f. Existing Dominant Non-built Land Use Type: Lawn, Grass, or Pasture covering 50 to 75% of the open space
I.g. Existing Rooftop Impervious Area (acres): 0
I.h. Existing Non-rooftop Impervious Area (acres): 0.31
Existing Imperviousness (%): 18

**Post-Construction:**

I.i. Proposed Dominant Non-built Land Use Type: Lawn, Grass, or Pasture covering 50 to 75% of the open space
I.j. Proposed Rooftop Impervious Area (acres): 0
I.k. Proposed Non-rooftop Impervious Area (acres): 1.69
Proposed Imperviousness (%): 100

*** Post-project Runoff Volume minus Volume Credits <= Pre-project Runoff Volume. No further calculation is necessary!

Compute & Save

**Permit Type:** Traditional:Construction - NOI **Application ID:** 604260 **Status:** Not Submitted

Owner Information
On-Site Contact Information
Site Information
Additional Site Information
Risk
TMDL
**Post Construction**
QSD Information
Attachments
Billing Information
Certification
Linked Users

Post Construction Questions | **Post Construction Calculator**

**Sub Area Name:** Track & Field **Sub Area ID:** 34821 Return to Sub Area List

**Input**

**A. Porous Pavement** **Total Credit Volume: 1065.91 cubic feet**

| Question | Input | Output |
|---|---|---|
| Area of Brick without Grout on less than 12 inches of base with at least 20% void space over soil | 0 (Square feet) | 0 (Square feet) |
| Area of Brick without Grout on more than 12 inches of base with at least 20% void space over soil | 0 (Square feet) | 0 (Square feet) |
| Area of Cobbles less than 12 inches deep and over soil | 0 (Square feet) | 0 (Square feet) |
| Area of Cobbles more than 12 inches deep and over soil | 0 (Square feet) | 0 (Square feet) |
| Area of Reinforced Grass Pavement on less than 12 inches of base with at least 20% void space over soil | 0 (Square feet) | 0 (Square feet) |
| Area of Reinforced Grass Pavement on at least 12 inches of base with at least 20% void space over soil | 0 (Square feet) | 0 (Square feet) |
| Area of Porous Gravel Pavement on less than 12 inches of base with at least 20% void space over soil | 50586 (Square feet) | 19222.68 (Square feet) |
| Area of Porous Gravel Pavement on at least 12 inches of base with at least 20% void space over soil | 0 (Square feet) | 0 (Square feet) |
| Area of Poured Porous Concrete or Asphalt Pavement with less than 4 inches of gravel base (washed stone) | 0 (Square feet) | 0 (Square feet) |
| Area of Poured Porous Concrete or Asphalt Pavement with 4 to 8 inches of gravel base (washed stone) | 0 (Square feet) | 0 (Square feet) |
| Area of Poured Porous Concrete or Asphalt Pavement with 8 to 12 inches of gravel base (washed stone) | 0 (Square feet) | 0 (Square feet) |
| Area of Poured Porous Concrete or Asphalt Pavement with 12 or more inches of gravel base (washed stone) | 0 (Square feet) | 0 (Square feet) |

**Total Credit Volume (cubic feet):** 1065.91

Compute & Update

**Permit Type:** Traditional:Construction - NOI **Application ID:** 604260 **Status:** Not Submitted

Owner Information
On-Site Contact Information
Site Information
Additional Site Information
Risk
TMDL
**Post Construction**
QSD Information
Attachments
Billing Information
Certification
Linked Users

Post Construction Questions | **Post Construction Calculator**

**Sub Area Name:** Track & Field **Sub Area ID:** 34821 Return to Sub Area List

**Input**

**A. Porous Pavement** **Total Credit Volume: 1065.91 cubic feet**

**B. Tree Planting** **Total Credit Volume: 0 cubic feet**

**C. Downspout Disconnection** **Credits Appear on Section I**

**D. Impervious Area Disconnection** **Credits Appear on Section I**

**E. Green Roof** **Total Credit Volume: 0 cubic feet**

**F. Stream Buffer** **Total Credit Volume: 0 cubic feet**

**G. Vegetative Swale** **Total Credit Volume: 0 cubic feet**

**H. Rain Barrels/Cisterns** **Total Credit Volume: 0 cubic feet**

**I. Soil Quality** **Total Credit Volume: 0 cubic feet**

**J. Basins** **Total Credit Volume: 3602 cubic feet**

Note: Minimum drawdown times must be compliant with local vector control requirements, including in the design, to receive credit for the "Basins" credit.

Were minimum drawdown times, compliant with local vector control requirements, included in the design? Yes

Basin(s) Total Capacity (cubic feet): 3602

**Total Credit Volume (cubic feet):** 3602

Compute & Update

On-Site Contact Information
Site Information
Additional Site Information
Risk
TMDL
**Post Construction**
QSD Information
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Certification
Linked Users

**Sub Area Name:** Track & Field **Sub Area ID:** 34821 Return to Sub Area List

**Input**

**A. Porous Pavement** **Total Credit Volume: 1065.91 cubic feet**

**B. Tree Planting** **Total Credit Volume: 0 cubic feet**

**C. Downspout Disconnection** **Credits Appear on Section I**

**D. Impervious Area Disconnection** **Credits Appear on Section I**

**E. Green Roof** **Total Credit Volume: 0 cubic feet**

**F. Stream Buffer** **Total Credit Volume: 0 cubic feet**

**G. Vegetative Swale** **Total Credit Volume: 0 cubic feet**

**H. Rain Barrels/Cisterns** **Total Credit Volume: 0 cubic feet**

**I. Soil Quality** **Total Credit Volume: 0 cubic feet**

**J. Basins** **Total Credit Volume: 3602 cubic feet**

**Output**

**O.a. Existing Runoff Curve Number:** 57.99
**O.b. Design Storm(inches):** 0.87
**O.c. Pre-project Runoff Volume(cubic feet):** 0.00
**O.d. Proposed Runoff Curve Number:** 98.00
**O.e. Net Credit of Volume Credits(cubic feet):** 4,667.91
**O.f. Post-project Runoff Volume(cubic feet):** 4,082.10
**O.g. Post-project Runoff Volume minus Volume Credits(cubic feet):** -585.81

*** Post-project Runoff Volume minus Volume Credits <= Pre-project Runoff Volume. No further calculation is necessary!

**Permit Type:** Traditional:Construction - NOI **Application ID:** 604260 **Status:** Not Submitted

Owner Information
On-Site Contact Information
Site Information
Additional Site Information
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Linked Users

Post Construction Questions | **Post Construction Calculator**

**Sub Area Name:** Asphalt slope **Sub Area ID:** 34822 Return to Sub Area List

**Input**

**INPUT FOR SUB AREA: Enter the sub area details and click on the 'Compute & Save' button.**

I.a. Name: Asphalt slope
I.b. County: Los Angeles
I.c. Closest Rain Gauge Location: Los Angeles Civic Cente
I.d. Size of Drainage Area (acres): 0.08

**Pre-Construction:**

I.e. Dominant Soil Type: Group A Soils - High infiltration.Sand, loamy sand, or sandy loam.Infiltration rate > 0.3 inch/hr when wet.
I.f. Existing Dominant Non-built Land Use Type: Open Space: grass cover >75%
I.g. Existing Rooftop Impervious Area (acres): 0
I.h. Existing Non-rooftop Impervious Area (acres): 0.08
Existing Imperviousness (%): 100

**Post-Construction:**

I.i. Proposed Dominant Non-built Land Use Type: Open Space: grass cover >75%
I.j. Proposed Rooftop Impervious Area (acres): 0
I.k. Proposed Non-rooftop Impervious Area (acres): 0.08
Proposed Imperviousness (%): 100

*** Post-project Runoff Volume <= Pre-project Runoff Volume. No further calculation is necessary!

Compute & Save

**Permit Type:** Traditional:Construction - NOI **Application ID:** 604260 **Status:** Not Submitted

Owner Information
On-Site Contact Information
Site Information
Additional Site Information
Risk
TMDL
**Post Construction**
QSD Information
Attachments
Billing Information
Certification
Linked Users

Post Construction Questions | **Post Construction Calculator**

**Sub Area Name:** Asphalt slope **Sub Area ID:** 34822 Return to Sub Area List

**Input**

**Output**

**O.a. Existing Runoff Curve Number:** 98.00
**O.b. Design Storm(inches):** 0.87
**O.c. Pre-project Runoff Volume(cubic feet):** 193.24
**O.d. Proposed Runoff Curve Number:** 98.00
**O.e. Net Credit of Volume Credits(cubic feet):**
**O.f. Post-project Runoff Volume(cubic feet):** 193.24
**O.g. Post-project Runoff Volume minus Volume Credits(cubic feet):**

*** Post-project Runoff Volume <= Pre-project Runoff Volume. No further calculation is necessary!

Fields marked with * are mandatory fields.

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# Appendix C:SWPPP Amendment QSD Certifications

**SWPPP Amendment No.** _____

Project Name: _____

Project Number: _____

**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 Responsible Person or Duly Authorized Representative | Date |
| Name of Legally Responsible Person or Duly Authorized Representative | Telephone Number |

# Appendix E:Construction Schedule

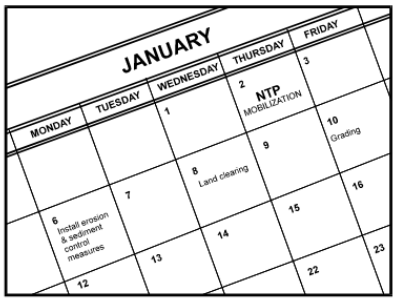
# Appendix F: Construction Activities, Materials Used, and Associated Pollutants

## Table F.1 Pollutant Source Assessment Form

| Phase | Activity | Associated Materials or Pollutants | Pollutant Category [1] |
|---|---|---|---|
| Demolition and Pre-Development Site | Building Demolition | Demolition debris between 1950-1980<br>Demolition debris from buildings with lead paint | Lead<br>PCBs |
| | Removal of existing structures | Demolition of asphalt, concrete, masonry, framing, roofing, metal structures | Metals, Oil and Grease, Synthetic Organics |
| Grading and Land Development | Soil preparation / amendments | Use of soil additives/ amendments | Nutrients |
| Streets and Utilities Phase | Asphalt paving / curbs | Hot and cold mix asphalt | Oil and grease |
| | Concrete / Masonry | Cement and brick dust<br>Colored chalks<br>Concrete curing compounds<br>Glazing compounds<br>Surfaces cleaners<br>Saw cut slurries<br>Tile cutting | Metals<br>Synthetic Organics |
| | Pools / Fountains | Chlorinated water | Synthetic Organics |
| | Sanitary Waste | Portable toilets<br>Disturbance of existing sewer lines | Nutrients |
| | Utility line testing and flushing | Hydrostatic test water<br>Pipe flushing | Synthetic Organics |
| Vertical Construction Phase | Painting | Paint thinners, acetone, stripper paints, lacquers, varnish, enamels, solvents | Metals<br>Synthetic Organics |
| | Roofing | Flashing<br>Saw cut slurries<br>Shingle scrap and debris | Metals<br>Oil and Grease<br>Synthetic Organics |
| | Drywall | Saw cutting drywall | Metals |
| | Framing/ Carpentry | Sawdust, particle wood board, and treated woods<br>Saw cut slurries | Metals<br>Synthetic Organics |
| Final Landscaping and Site Stabilization Phase | Planting / Vegetation Management | Vegetation control (herbicides / pesticides)<br>Planting<br>Plant maintenance | Nutrients, Metals<br>Synthetic Organics |
| | Solid Waste | Litter, trash, and debris<br>Vegetation | Gross Pollutants |
| | Liquid Waste | Wash waters<br>Irrigation line testing / flushing | Metals<br>Synthetic Organics |

[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




| 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

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





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

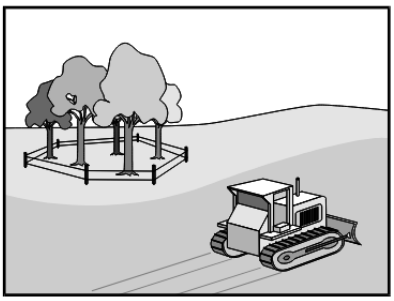
- Verify that work is progressing in accordance with the schedule. If progress deviates, take corrective actions.
- Amend the schedule when changes are warranted.
- Amend the schedule prior to the rainy season to show updated information on the deployment and implementation of construction site BMPs.

### 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

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### 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.



# 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.



# Preservation of Existing Vegetation EC-2

- 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:



# Preservation of Existing Vegetation EC-2

  - 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.

### References

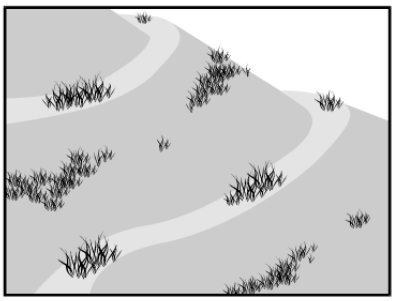
County of Sacramento Tree Preservation Ordinance, September 1981.

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

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.

# Hydroseeding EC-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 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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### 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.





- 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

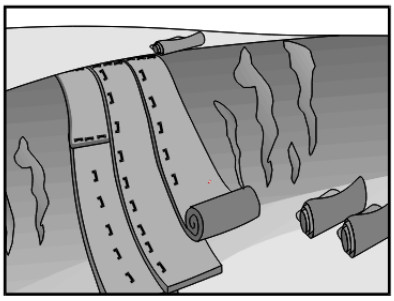
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Areas where 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.

### References

Soil Stabilization BMP Research for Erosion and Sediment Controls: Cost Survey Technical Memorandum, State of California Department of Transportation (Caltrans), July 2007.

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Guidance Document: Soil Stabilization for Temporary Slopes, State of California Department of Transportation (Caltrans), November 1999.



**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.





- 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/yd². 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/yd². 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/yd². Moderate slopes, 2:1 (H:V) to 3:1 (H:V), require a minimum of 1 ½ staples/yd². 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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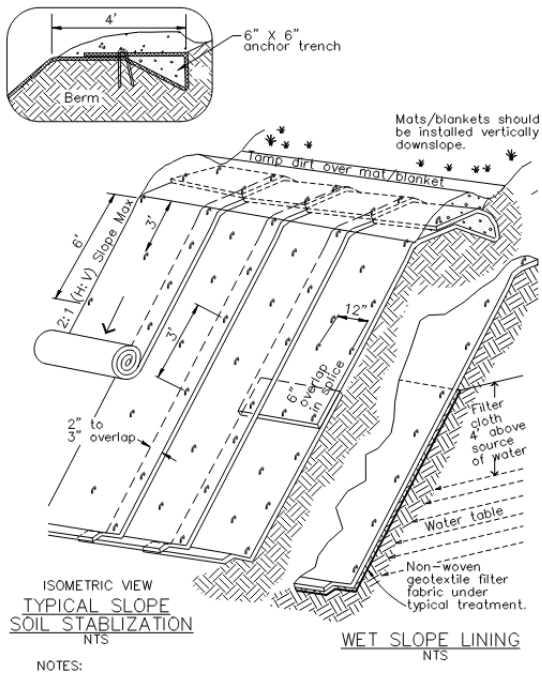
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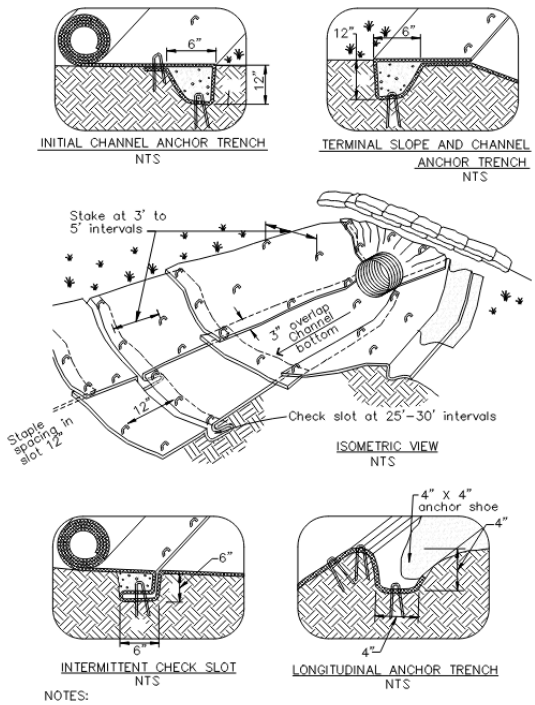

NOTES:

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



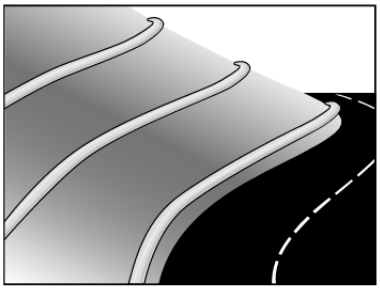





NOTES:

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



**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-6 Gravel Bag Berm
- SE-8 Sandbag Barrier
- SE-12 Manufactured Linear Sediment Controls
- SE-14 Biofilter Bags

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## 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.





- 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.

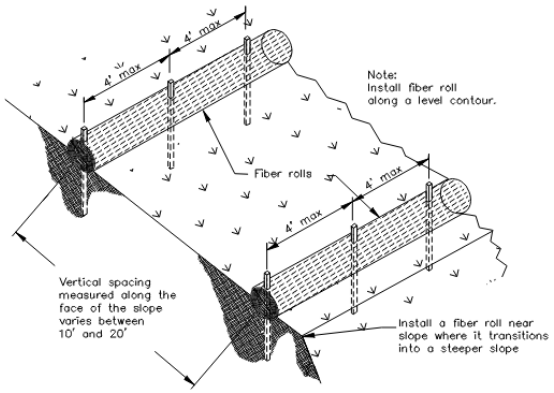
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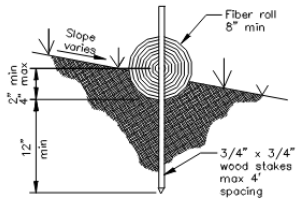
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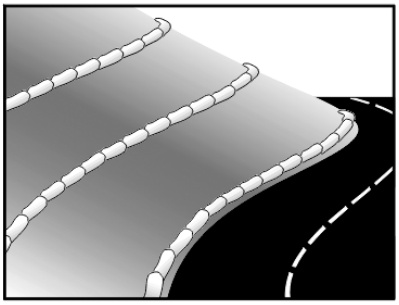
[1] Adjusted for inflation (2016 dollars) by Tetra Tech, Inc.
[2] Costs estimated based on vendor query by Tetra Tech, Inc. 2016.




TYPICAL FIBER ROLL INSTALLATION
N.T.S.




ENTRENCHMENT DETAIL
N.T.S.



| 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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### 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.





  - 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

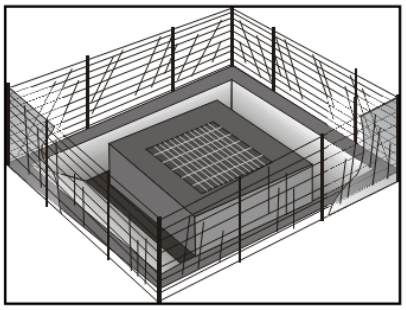
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Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.

# 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**

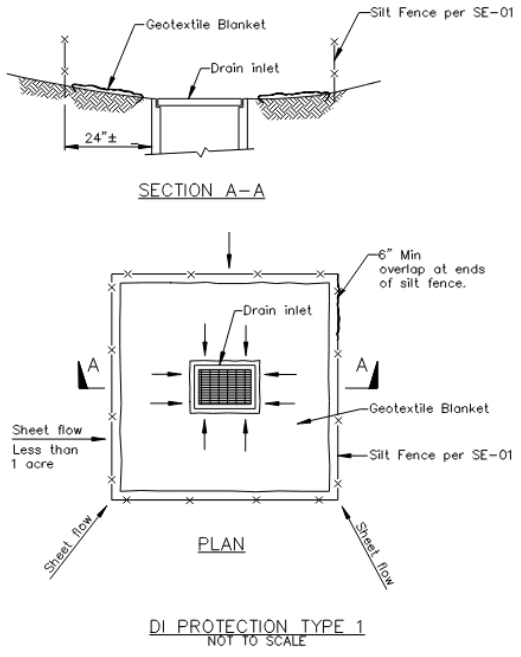
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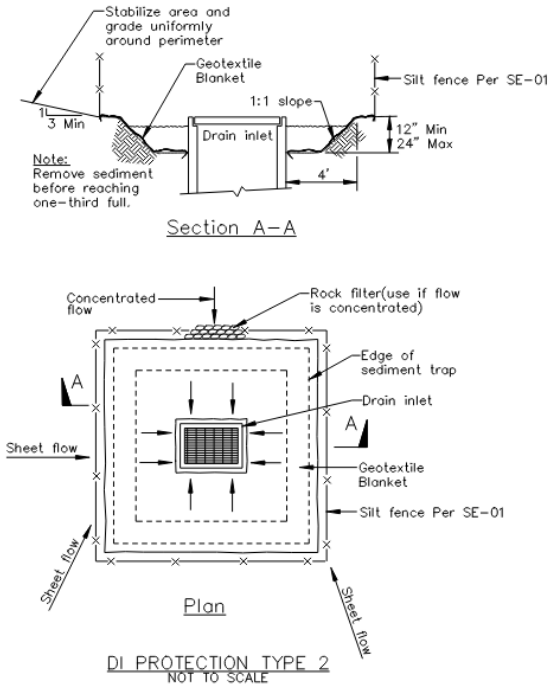

DI PROTECTION TYPE 1
NOT TO SCALE

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.

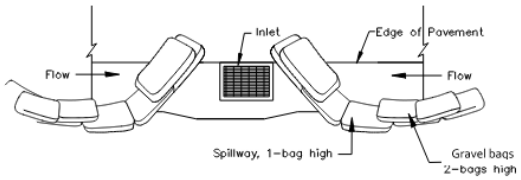




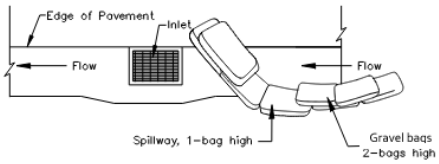



DI PROTECTION TYPE 2
NOT TO SCALE

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



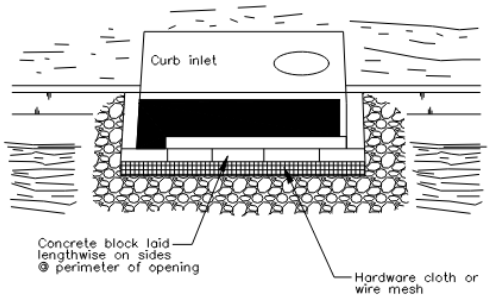

TYPICAL PROTECTION FOR INLET ON GRADE

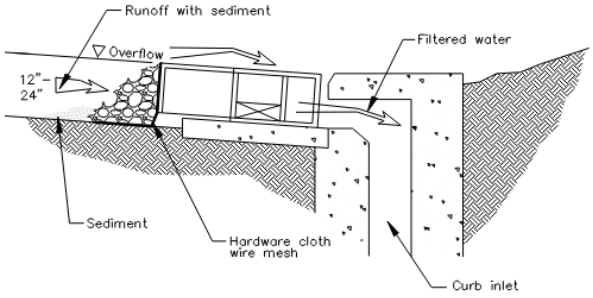
NOTES:
1. Intended for short-term use.
2. Use to inhibit non-storm water flow.
3. Allow for proper maintenance and cleanup.
4. Bags must be removed after adjacent operation is completed
5. Not applicable in areas with high silts and clays without filter fabric.
6. Protection can be effective even if 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

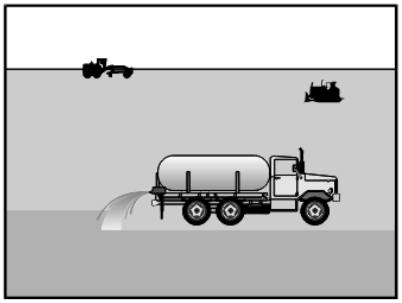







DI PROTECTION – TYPE 4
NOT TO SCALE



**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:





- 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 | |
| Trucking | | | | | 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

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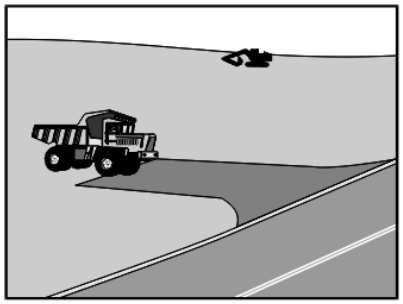
California Air Pollution Control Laws, California Air Resources Board, updated annually.

Construction Manual, Chapter 4, Section 10, "Dust Control"; Section 17, "Watering"; and Section 18, "Dust Palliative", California Department of Transportation (Caltrans), July 2001.

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# 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.



# 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.



# Stabilized Construction Entrance/Exit TC-1

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.

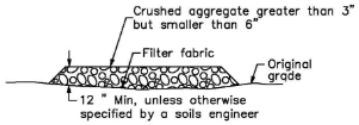
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Stormwater Management of the Puget Sound Basin, Technical Manual, Publication #91-75, Washington State Department of Ecology, February 1992.

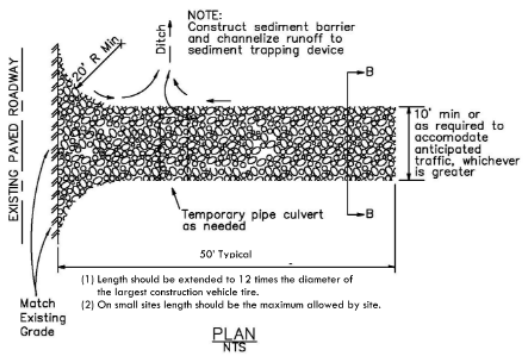
Virginia Erosion and Sedimentation Control Handbook, Virginia Department of Conservation and Recreation, Division of Soil and Water Conservation, 1991.

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.



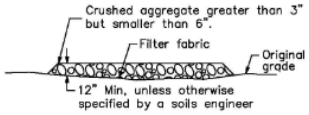

SECTION B–B
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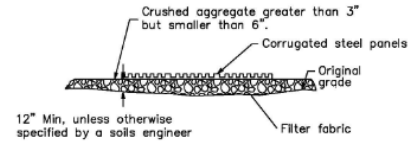

PLAN
NTS



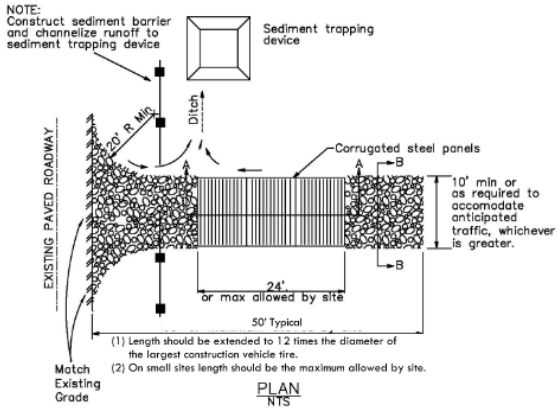
**Stabilized Construction Entrance/Exit TC-1**




SECTION B–B
NTS

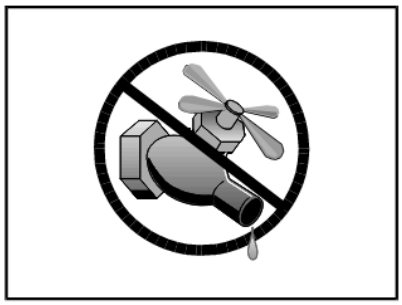



SECTION A–A
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PLAN
NTS

# 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

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## 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.



Water Conservation Practices NS-1

- 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.

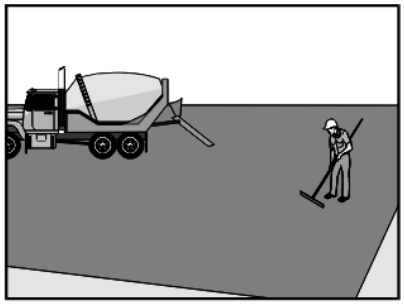
## Inspection and Maintenance

- 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.

# 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.



# Paving and Grinding Operations NS-3

## 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.



# Paving and Grinding Operations NS-3

- 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.



# Paving and Grinding Operations NS-3

***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

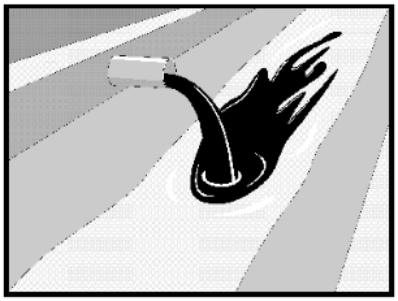
Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Hot Mix Asphalt-Paving Handbook AC 150/5370-14, Appendix I, U.S. Army Corps of Engineers, July 1991.

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.

# 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.



# Illicit Connection/Discharge NS-6

- 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.



# Illicit Connection/Discharge NS-6

## 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.

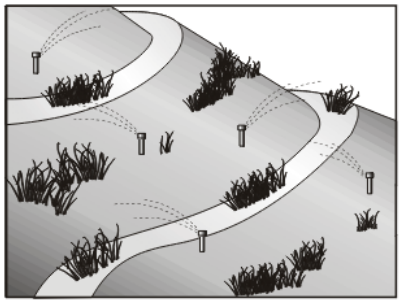
## References

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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



**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

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.

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Potable Water/Irrigation NS-7

- 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.

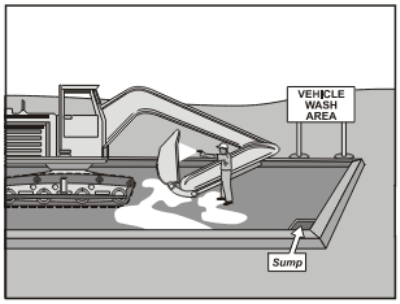
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Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

# 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:



# Vehicle and Equipment Cleaning NS-8

- 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.



# Vehicle and Equipment Cleaning NS-8

## Inspection and Maintenance

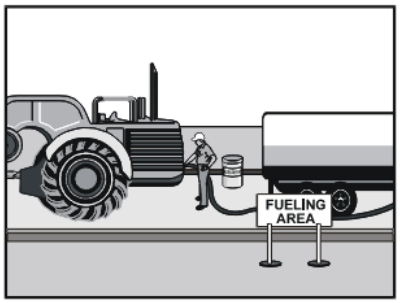
- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at 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.



# Vehicle and Equipment Fueling NS-9

- 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.



# Vehicle and Equipment Fueling NS-9

- Immediately clean up spills and properly dispose of contaminated soil and cleanup materials.

### References

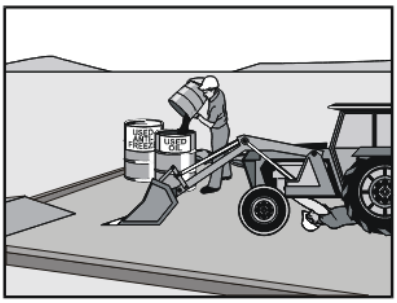
Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance, Working Group Working Paper; USEPA, April 1992.

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

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## 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,





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.





## 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.

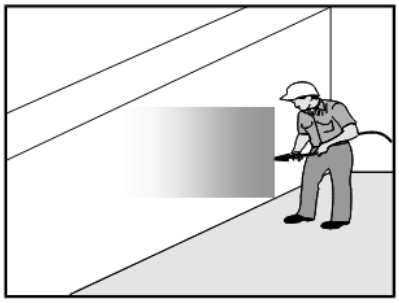
## References

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.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

# 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.



# Concrete Curing NS-12

## 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.



# Concrete Curing NS-12

- Ensure that employees and subcontractors implement appropriate measures for storage, handling, and use of curing compounds.
- Inspect cure containers and spraying equipment for leaks.

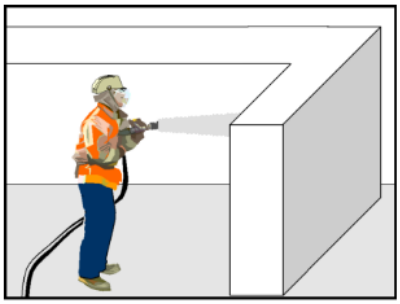
## References

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.



**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.





## 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.

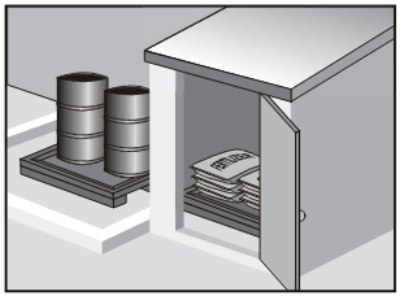
## References

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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 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





- 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**

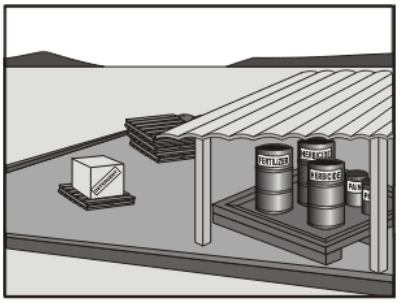
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Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance, Working Group Working Paper; USEPA, April 1992.

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





## 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.

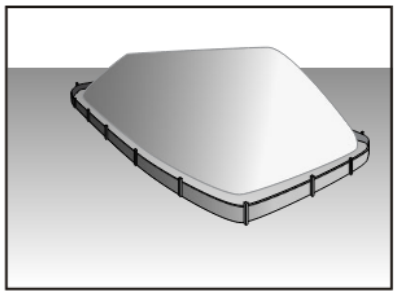
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Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

# 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

| Targeted Constituents | |
|---|---|
| Sediment | ☑ |
| Nutrients | ☑ |
| Trash | ☑ |
| Metals | ☑ |
| Bacteria | |
| Oil and Grease | ☑ |
| Organics | ☑ |

**Potential Alternatives**

None

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## 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:





- 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.)

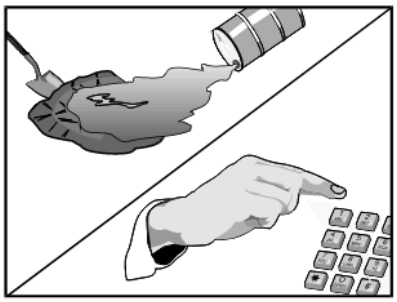
## Inspection and Maintenance

- 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



**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

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





- 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.



Spill Prevention and Control WM-4

- 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.

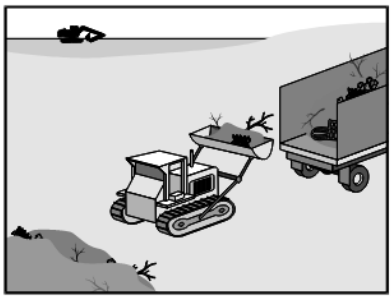
**References**

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 Practice, EPA 832-R-92005; USEPA, April 1992.

# 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



Solid Waste Management WM-5

- 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.



Solid Waste Management WM-5

- 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.



Solid Waste Management WM-5

- 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.

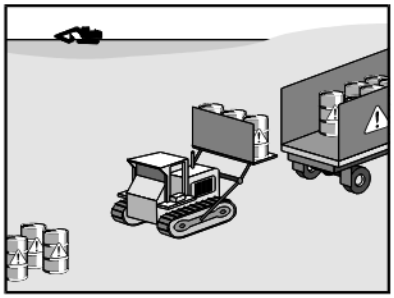
## References

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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 Practice, EPA 832-R-92005; USEPA, April 1992.

# Hazardous Waste Management WM-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

If User/Subscriber modifies this fact sheet in any way, the CASQA name/logo and footer below must be removed from each page and not appear on the modified version.

## 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





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 Waste Management WM-6

- 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**

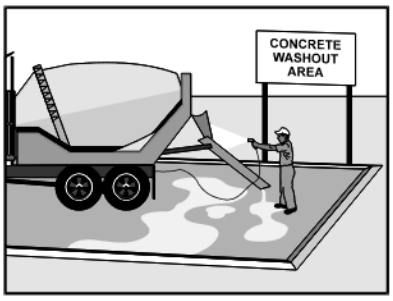
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Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

# 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.





- 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**

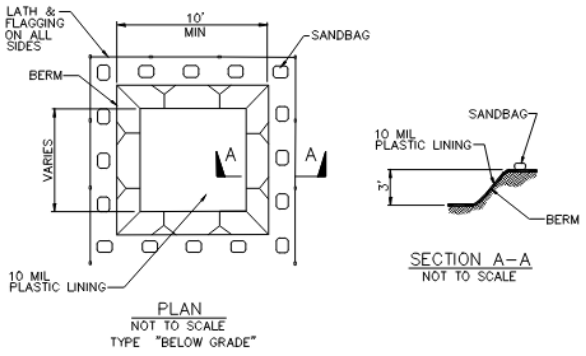
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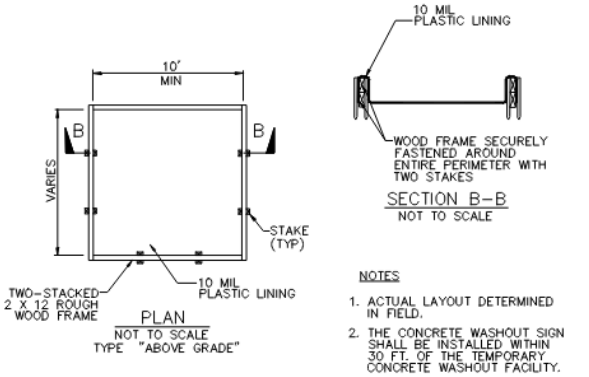
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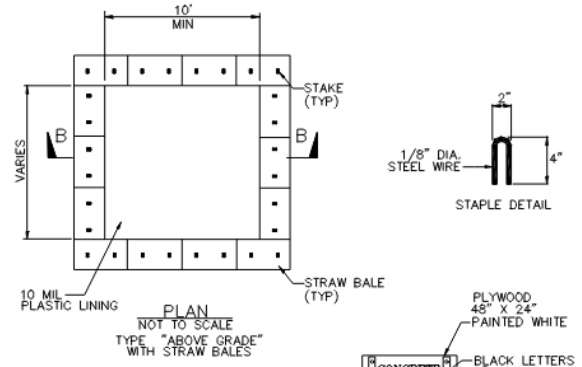



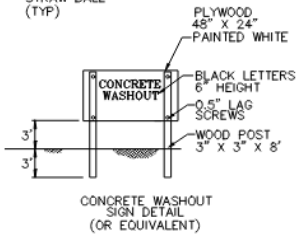

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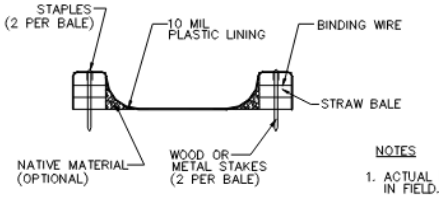
1. ACTUAL LAYOUT DETERMINED IN FIELD.
2. THE CONCRETE WASHOUT SIGN SHALL BE INSTALLED WITHIN 30 FT. OF THE TEMPORARY CONCRETE WASHOUT FACILITY.







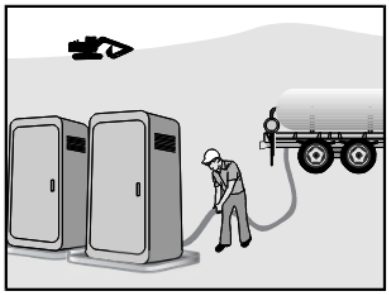




NOTES

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.



Sanitary/Septic Waste Management WM-9

- 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.



Sanitary/Septic Waste Management WM-9

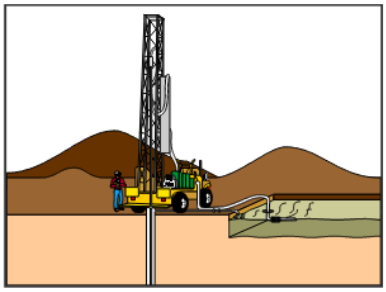
## Inspection and Maintenance

- 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.



**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

If User/Subscriber modifies this fact sheet in any way, the CASQA name/logo and footer below must be removed from each page and not appear on the modified version.

## 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





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.

# 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: | |
|---|---|
| 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 __1___ 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 __1___ Sites** | Adequately designed, implemented and effective (yes, no, N/A) | Action Required (yes/no) | Action Implemented (Date) |
| **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 | | | |
| **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: _____

WDID #: _____

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 |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
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| | | |
| | | |

# QSP Delegate Training Log

## Stormwater Management Training Log and Documentation

Project Name: _____

WDID #: _____

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

# Identification of QSP and QSP Delegates

Project Name: _____

WDID #: _____

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

| | |
|---|---|
| Contractor Name: | |
| Title: | |
| Contractor Company: | |
| Address | |
| Phone Number: | |
| Phone Number (24/7) | |

# Appendix L: Calculations

Calculations for Determining Runoff Coefficients

**PARKING LOT NORTH**

| | | | | |
|---|---|---|---|---|
| **Total Site Area** | = | 0.069 | Acres | (A) |
| **Existing Site Conditions** | | | | |
| Impervious Hardscape Area | = | 0.069 | Acres | (B) |
| Impervious Hardscape Runoff Coefficient | = | 0.95 | | (C) |
| Existing Site Area Runoff Coefficient $\frac{(BxC)}{(A)}$ | = | ***0.95*** | | |
| **Proposed Site Conditions** | | | | |
| Impervious Hardscape Area | = | 0.069 | Acres | (B) |
| Impervious Hardscape Runoff Coefficient | = | 0.95 | | (C) |
| Proposed Site Area Runoff Coefficient $\frac{(BxC)+(DxE)}{(A)}$ | = | ***0.95*** | | |

**PARKING LOT SOUTH**

| | | | | |
|---|---|---|---|---|
| **Total Site Area** | = | 0.102 | Acres | (A) |
| **Existing Site Conditions** | | | | |
| Impervious Hardscape Area = | 0.075 | Acres | (B) | |
| Impervious Hardscape Runoff Coefficient | = | 0.95 | | (C) |
| Pervious Site Area | = | 0.027 | Acres | (D) |
| Pervious Site Area Runoff Coefficient | = | 0.3 | | (E) |
| Existing Site Area Runoff Coefficient $\frac{(BxC)+(DxE)}{(A)}$ | = | **0.77** | | |
| **Proposed Site Conditions** | | | | |
| Impervious Hardscape Area = | 0.088 | Acres | (B) | |
| Impervious Hardscape Runoff Coefficient | = | 0.95 | | (C) |
| Pervious Site Area | = | 0.014 | Acres | (D) |
| Pervious Site Area Runoff Coefficient | = | 0.3 | | (E) |
| Proposed Site Area Runoff Coefficient $\frac{(BxC)+(DxE)}{(A)}$ | = | ***0.86*** | | |

**CORRIDOR**

| | | | | |
|---|---|---|---|---|
| **Total Site Area** | = | 0.014 | Acres | (A) |
| **Existing Site Conditions** | | | | |
| Impervious Asphalt & Concrete Area | = | 0.014 | Acres | (B) |
| Impervious Asphalt Area Runoff Coefficient | = | 0.95 | | (C) |
| Existing Site Area Runoff Coefficient $\frac{(BxC)}{(A)}$ | = | ***0.95*** | | |
| **Proposed Site Conditions** | | | | |
| Impervious Asphalt & Concrete Area | = | 0.069 | Acres | (B) |
| Impervious Asphalt Area Runoff Coefficient | = | 0.95 | | (C) |
| Proposed Site Area Runoff Coefficient $\frac{(BxC)}{(A)}$ | = | ***0.95*** | | |

**TRACK & FIELD**

| | | | | |
|---|---|---|---|---|
| **Total Site Area** | = | 1.69 | Acres | (A) |
| **Existing Site Conditions** | | | | |
| Impervious Asphalt & Concrete Area | = | 0.30 | Acres | (B) |
| Impervious Asphalt Area Runoff Coefficient | = | 0.95 | | (C) |
| Pervious Site Area | = | 1.39 | Acres | (D) |
| Pervious Site Area Runoff Coefficient | = | 0.3 | | (E) |
| Existing Site Area Runoff Coefficient $\frac{(BxC)+(DxE)}{(A)}$ | = | ***0.71*** | | |
| **Proposed Site Conditions** | | | | |
| Impervious Asphalt Area | = | 0.53 | Acres | (B) |
| Impervious Asphalt Area Runoff Coefficient | = | 0.95 | | (C) |
| Impervious Synthetic Turf Area | = | 1.16 | Acres | (D) |
| Pervious Site Area Runoff Coefficient | = | 0.95 | | (E) |
| Proposed Site Area Runoff Coefficient $\frac{(BxC)+(DxE)}{(A)}$ | = | ***0.95*** | | |

**ASPHALT SLOPE & WALKWAY**

| | | | |
|---|---|---|---|
| **Total Site Area** | = | 0.084 Acres | (A) |
| **Existing Site Conditions** | | | |
| Impervious Asphalt Area | = | 0.084 Acres | (B) |
| Impervious Asphalt Area Runoff Coefficient | = | 0.95 | (C) |
| Existing Site Area Runoff Coefficient $\frac{(BxC)}{(A)}$ | = | ***0.95*** | |
| **Proposed Site Conditions** | | | |
| Impervious Asphalt & Concrete Area | = | 0.084 Acres | (B) |
| Impervious Asphalt Area Runoff Coefficient | = | 0.95 | (C) |
| Proposed Site Area Runoff Coefficient $\frac{(BxC)}{(A)}$ | = | ***0.95*** | |

# 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: Example Storm Event Monitoring Forms

| Rain Gauge Log Sheet | | | | |
|---|---|---|---|---|
| Construction Site Name: | | | | |
| WDID #: | | | | |
| Date (mm/dd/yy) | Time (24-hr) | Initials | Rainfall Depth (Inches) | Notes: |
| | | | | |
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| ***Risk Level 1*** <br> ***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): <br> Predicted quantity of precipitation (QPF): | | |
| Estimate storm beginning: <br> _____ <br> (date and time) | | Estimate storm duration:_____ <br> (hours) | Estimate time since last storm: _____ <br> (days or hours) | Rain gauge reading:_____ <br> (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/REAP change is needed)** | | | | | |
| | | | | | |
| **Inspector Information** | | | | | |
| Inspector Name: | | | Inspector Title: | | |
| Signature: | | | | Date: | |

| ***Risk Level 1*** <br> ***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.: <br> Calibration Date/Time: | | Turbidity Meter ID No./Desc.: <br> 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: |

| NAL Exceedance Evaluation Summary Report | Page __ of __ |
|---|---|
| **Project Name** | |
| **Project WDID** | |
| **Project Location** | |
| **Date of Exceedance** | |
| **Type of Exceedance** | **NAL ☐ pH ☐ Turbidity**<br>**☐ Other (specify) _____** |
| **Measurement or Analytical Method** | **☐ Field meter**<br>**(Sensitivity: _____)**<br>**☐ Lab method (specify) _____**<br>**(Minimum Level: _____)**<br>**(MDL: _____)** |
| **Calculated Daily Average** | **☐ pH _____ pH units**<br>**☐ 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** | _____<br>**(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.** | | | | | |
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|---|---|---|
| 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

**Converse Consultants**
Geotechnical Engineering, Environmental & Groundwater Science, Inspection & Testing Services

May 23, 2023

Mr. Roger Leonard
Director of Facilities, Maintenance & Operations
Hawthorne School District
14120 Hawthorne Boulevard
Hawthorne, California 90250

Subject: **GEOTECHNICAL INVESTIGATION REPORT**
**New Turf Field and Asphalt Track Resurfacing**
**Hawthorne Middle School**
4366 West 129th Street, Hawthorne, California 90250
Converse Project No. 23-31-119-01

Dear Mr. Leonard:

Enclosed is the Geotechnical Investigation Report prepared by Converse Consultants (Converse) for the Hawthorne School District's New Turf Field and Asphalt Track Resurfacing project within the existing Hawthorne Middle School campus in the city of Hawthorne, Los Angeles County, California.

The purpose of the investigation was to determine the geotechnical site conditions and provide recommendations for the excavation, site preparations, concrete paving, and track resurfacing.

Based on our field exploration, laboratory testing, geologic evaluation, and geotechnical analysis, the site is suitable from a geotechnical standpoint for this project, provided our conclusions and recommendations are implemented during design and construction.

We appreciate the opportunity to be of service to the Hawthorne School District. If you should have any questions, please do not hesitate to contact us at (626) 930-1200.

Sincerely,

**CONVERSE CONSULTANTS**

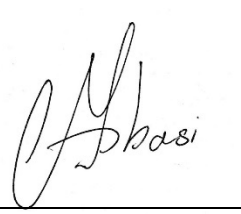
Siva K. Sivathasan, PhD, PE, GE, DGE, QSD, F. ASCE
Senior Vice President/Principal Engineer

# PROFESSIONAL CERTIFICATION

This report for the Hawthorne School District's New Turf Field and Asphalt Track Resurfacing project within the existing Hawthorne Middle School campus in Hawthorne, California, has been prepared by the staff of Converse under the professional supervision of the individuals whose seals and signatures appear hereon.

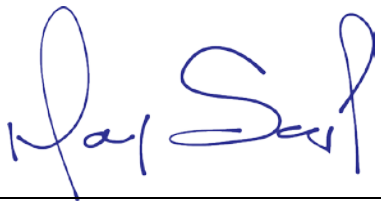
The findings, recommendations, specifications, or professional opinions contained in this report were prepared in accordance with generally accepted professional engineering and engineering geologic principles and practice in this area of Southern California. There is no warranty, either expressed or implied.

In the event that changes to the property occur, or additional, relevant information about the property is brought to our attention, the conclusions contained in this report may not be valid unless these changes and additional relevant information are reviewed, and the recommendations of this report are modified or verified in writing.






Babak Abbasi, PhD, PE
Project Manager






Douglas S. Santo, PG, CEG, CHG
Principal, Chief Engineering Geologist






Siva K. Sivathasan, PhD, PE, GE, DGE, QSD, F. ASCE
Senior Vice President/Principal Engineer

# EXECUTIVE SUMMARY

The following is a summary of our geotechnical investigation, conclusions and recommendations as presented in the body of this report. Please refer to the appropriate sections of the report for complete conclusions and recommendations. In the event of a conflict between this summary and the report, or an omission in the summary, the report shall prevail.

- The proposed project is located at 4366 West 129th Street, Hawthorne Los Angeles County, California 90250. The subject site is relatively flat to gently sloping with surface elevations of approximately 66 feet relative to mean-sea-level (MSL). The site is bounded by West 130th Street to the South, Washington Avenue to the east, and West 129th Street to the north. The site coordinates are: North latitude: 33.9150, West longitude: -118.3502 degrees.

- A total of one (1) exploratory boring (BH-1), two (2) percolation tests, and two (2) corings were advanced within the project site on March 27, 2023. Borings were advanced using a 4-inch diameter hand auger to a depth of 11.0 feet below the existing ground surface (bgs). Each boring was visually logged by a Converse engineer and sampled at regular intervals and at changes in subsurface soils.

- The project site is not located within a currently designated State of California Earthquake Fault Zone for surface fault rupture. No surface faults are known to project through or towards the site.

- The site is located within a potential liquefaction zone per the State of California Seismic Hazard Zones Map for the Inglewood Quadrangle.

- Groundwater was not encountered during our subsurface exploration to the deepest depth drilled of 11.0 feet below ground surface. Based on review of Historically Highest Groundwater Map, Plate No. 1.2, in the Seismic Hazard Zone report for the Inglewood 7.5-minute Quadrangle (1998), the historically highest groundwater level contours in the vicinity of the site are interpreted to be approximately 45 feet bgs.

- The earth materials encountered during our investigation consist of existing fill soils placed during previous site grading operations and natural alluvial soils to a maximum depth explored of 11.0 feet bgs. The fill soils encountered consist primarily of clayey silts and silty sands. The alluvial soil deposits below the fill consist of clayey silts and silty sands. Sampling blow-counts correlate to loose to moderately dense conditions near surface, and generally become denser with depth.

- In general, the pH value, chloride content, and concentrations of water-soluble sulfates saturated resistivity of the site soils are in the non-corrosive range. The saturated resistivity of the site soils is in the mildly corrosive range to ferrous metals.

- The earth materials at the site should be excavatable with conventional heavy-duty earth moving equipment. Earthwork should be performed with suitable equipment for gravelly materials.

- For non-building structures (e.g., signs, fence walls, short retaining walls, etc.), conventional footings can be used.

Results of our investigation indicate that the site is suitable from a geotechnical standpoint for the proposed development, provided that the recommendations contained in this report are incorporated into the design and construction of the project.

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# 1.0 INTRODUCTION

This report contains the findings and recommendations of our geotechnical study performed at the site of the Hawthorne Middle School New Turf Field and Asphalt Track Resurfacing Project located in Los Angeles County, California, as shown on Figure No. 1, *Site Location Map*.

The purpose of the study was to evaluate the subsurface soil conditions and provide geotechnical recommendations and design recommendations for the design and construction of the proposed project, consistent with the 2022 edition of California Building Code (CBC), Title 24, Chapter 16; Earthquake Design, Chapter 18A, Foundation and Retaining Wall; Appendix Chapter 33, Excavation and Grading; Part 1' section 4-317 (e) and CGS Note 48-Checklist for the review of Geologic/Seismic Reports for California Public Schools, Hospitals and Essential Services Buildings for new and existing (retrofit/modernization) buildings.

This report is written for the project described herein and is intended for use solely by the Hawthorne School District, Hawthorne Middle School, and its design team. It should not be used as a bidding document but may be made available to potential contractors for information on factual data only. For bidding purposes, the contractors should be responsible for making their own interpretation of the data contained in this report.

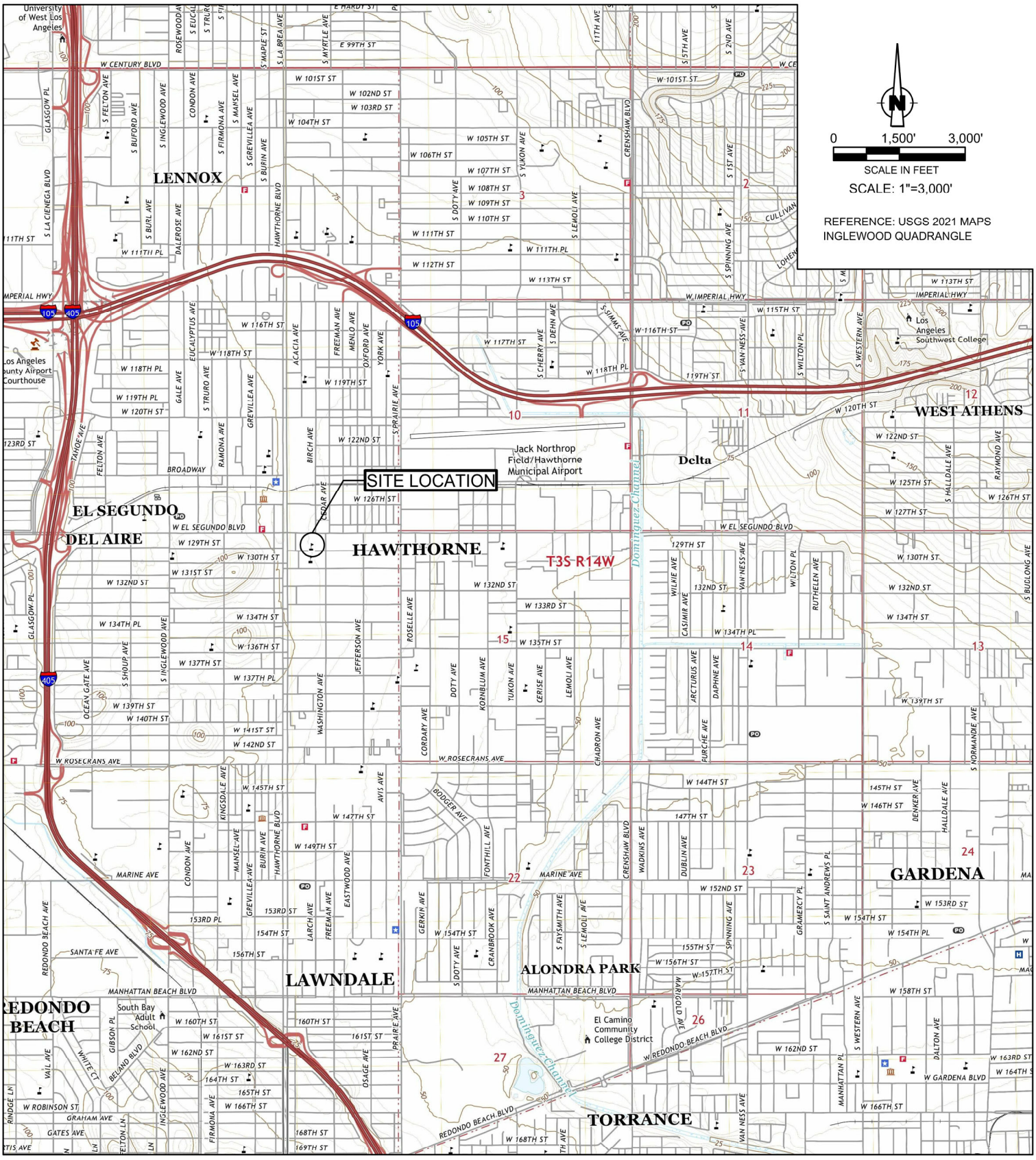
# 2.0 SITE AND PROJECT DESCRIPTION

The proposed project is located at 4366 West 129$^{th}$ Street, Hawthorne Los Angeles County, California 90250. The subject site is relatively flat to gently sloping with surface elevations of approximately 66 feet relative to mean-sea-level (MSL). The site is bounded by West 130$^{th}$ Street to the South, Washington Ave to the east, and West 129th Street to the north. The site coordinates are: North latitude: 33.9150, West longitude: -118.3502 degrees.

We understand that the proposed project consists of a new turf field for Hawthorne Middle School and will include resurfacing the asphalt track around the field with a synthetic material.

# 3.0 SCOPE OF WORK

The scope of our work included a site reconnaissance, subsurface exploration with soil sampling, laboratory testing, engineering analyses, and preparation of this report.




# SITE LOCATION MAP

New Turf Field and Asphalt Track Resurfacing
Hawthorne Middle School
4366 West 129th Street
Hawthorne, California 90250

Project No.
23-31-119-01

Figure No.
1

Converse Consultants

## 3.1 Site Reconnaissance

During the site reconnaissance, the surface conditions were noted, and the locations of the borings were determined so that access to all the locations was available for field investigation. The borings were located using existing boundary features as a guide and should be considered accurate only to the degree implied by the method used. Underground Service Alert (USA) of Southern California was notified of our proposed drilling locations at least 48 hours prior to initiation of the subsurface field work.

## 3.2 Subsurface Exploration

A total of one (1) exploratory borings (BH-1), two (2) percolation test and two (2) coring were advanced within the project sites on March 27, 2023. Borings were advanced using a hand auger with a 4-inch diameter to depth of 11.0 feet below the existing ground surface (bgs). Each boring was visually logged by a Converse engineer and sampled at regular intervals and at changes in subsurface soils. Table number one summarizes the existing pavement sections at the coring locations.

**Table No.1, Existing Pavement Sections**

| Core | AC Thickness (inches) | Base Thickness (inches) | Subgrade Soil |
|---|---|---|---|
| C-1 | 4.0 | 12.0 | Silty Sand (SM) |
| C-2 | 3.8 | 10.0 | Silty Sand (SM) |

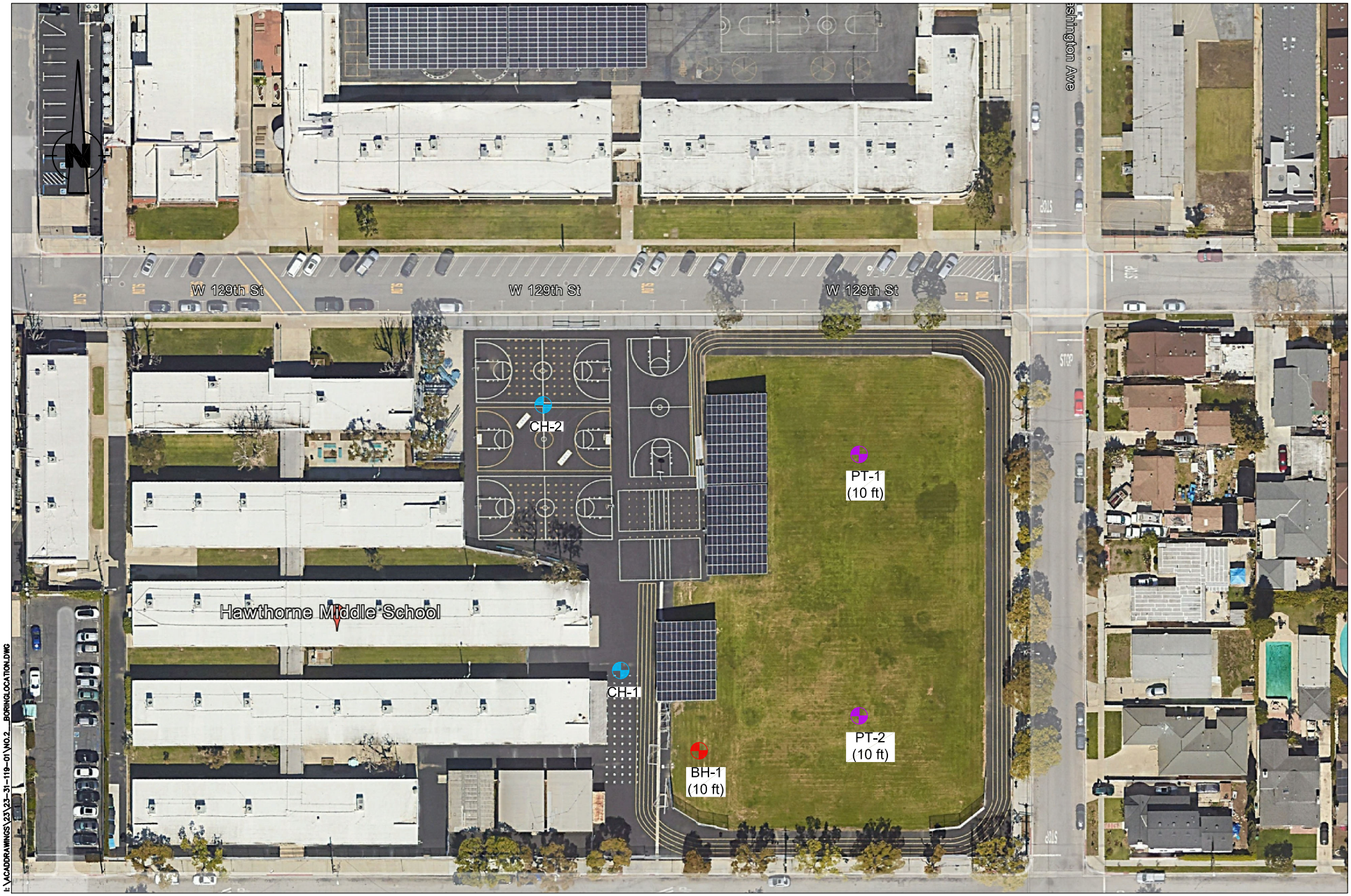
California Modified Sampler ring samples and bulk soil samples were obtained for laboratory testing. Borings were backfilled with soil cuttings, tamped and capped to match surface conditions.

The approximate locations of the exploratory borings are shown in Figure No. 2, *Approximate Boring Location Map*. Detailed descriptions of the field exploration and sampling program are presented in Appendix A, *Field Exploration*.

## 3.3 Laboratory Testing

Representative samples of the site soils were tested in the laboratory to aid in classification and to evaluate relevant engineering properties. The tests performed included:

- In Situ Moisture Contents and Dry Densities (ASTM Standard D2216)
- Passing Sieve No. 200 (ASTM D1140)
- Maximum dry density and optimum-moisture content relationship (ASTM Standard D1557)




# Approximate Boring Locations Map

Legend
- Boring Location
- Coring Location
- Percolation Testing Location

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New Turf Field and Asphalt Track Resurfacing
Hawthorne Middle School
4366 West 129th Street
Hawthorne, California 90250

Project No.
23-31-119-01

Figure No.
2

- Soil Corrosivity Tests (Caltrans 643, 422, 417, and 532)
- R-value, ASTM D2844 and CTM301

For a description of the laboratory test methods and test results, see Appendix B, *Laboratory Testing Program*. For *in-situ* moisture and density data, see the Logs of Borings in Appendix A, *Field Exploration*.

### 3.4 Engineering Analyses and Report

Data obtained from the exploratory fieldwork and laboratory-testing program were analyzed and evaluated. This report was prepared to provide the findings, conclusions and recommendations developed during our investigation and evaluation.

## 4.0 GEOLOGIC CONDITIONS

### 4.1 Regional Geologic Setting

The project site lies within the coastal plain region of Los Angeles County. This area is situated at the junction of the two major convergent fault systems. The first group includes the northwest-trending high angle strike slip faults of the San Andreas system projecting from the northern terminus of the Peninsular Ranges province. Faults in this group include the Palos Verdes, Newport-Inglewood, and Whittier-Elsinore fault zones. The second group includes the east-west trending low angle reverse or reverse-oblique faults bounding the south margin of the Traverse Ranges Province. Faults in this group include the Malibu-Santa Monica, Hollywood, Raymond and Sierra Madre fault zones. The seismic hazard for the coastal plain region is high.

### 4.2 Subsurface Profile of Project Site

The earth materials encountered during our investigation consist of existing fill soils placed during previous site grading operations and natural alluvial soils to a maximum depth explored of 11.0 feet bgs. The fill soils encountered consists primarily of clayey silts and silty sands. The alluvial soil deposits below the fill consist of clayey silts and silty sands. Sampling blow-counts correlate to loose to moderately dense conditions near surface, and generally become denser with depth.

### 4.3 Groundwater

Groundwater was not encountered during our subsurface exploration to the deepest depth drilled of 11.0 feet below ground surface. Based on review of Historically Highest Groundwater Map, Plate No. 1.2, in the Seismic Hazard Zone report for the Inglewood 7.5-minute Quadrangle (1998), the historically highest groundwater level contours in the vicinity of the site are interpreted to be approximately 45 feet below ground surface.

The groundwater level beneath the site can vary depending upon the seasonal precipitation and groundwater basin activities including recharge, storage and pumping occurring in the general site vicinity. Zones of perched groundwater may be present within the near-surface deposits due to local conditions, storm water recharge or during rainy seasons.

### 4.4 Subsurface Variations

Based on results of the subsurface exploration and our experience, some variations in the continuity and nature of subsurface conditions within the project site should be anticipated. Because of the uncertainties involved in the nature and depositional characteristics of the earth material at the site, care should be exercised in interpolating or extrapolating subsurface conditions between or beyond the boring locations. If, during construction, subsurface conditions differ significantly from those presented in this report, this office should be notified immediately so that recommendations can be modified, if necessary.

A detailed description of the earth materials encountered during our field exploration is presented in Appendix A*, Field Exploration.*

## 5.0 FAULTING AND SEISMIC HAZARDS

Geologic hazards are defined as geologically related conditions that may present a potential danger to life and property. Typical geologic hazards in Southern California include earthquake ground shaking, fault surface rupture, liquefaction and seismically induced settlement, lateral spreading, landslides, earthquake induced flooding, tsunamis and seiches, and volcanic eruption hazard. Results of a site-specific evaluation for each type of possible seismic hazards are discussed in the following sections.

### 5.1 Seismic Characteristics of Nearby Faults

The proposed project site is situated in a seismically active region. As is the case for most areas of Southern California, ground-shaking resulting from earthquakes associated with nearby and more distant faults may occur at the project site. During the life of the project, seismic activity associated with active faults can be expected to generate moderate to strong ground shaking at the site. Review of recent seismological and geophysical publications indicates that the seismic hazard for the project site is high.

The project site is not located within a currently designated State of California Earthquake Fault Zone for surface fault rupture. No surface faults are known to project through or towards the site. The closest known faults to the project site with mapped surface traces are the Newport Inglewood (approximately 2.2 miles or 3.5 kilometers to the northwest)

and the Palos Verdes (approximately 6.2 miles or 10.0 kilometers to the southwest) The Elysian Park (Upper) Fault, Santa Monica Fault, and Hollywood Fault along with other regional faults were included as capable faults modeled for the probabilistic seismic hazard analysis for the site.

## 5.2 Surface Fault Rupture

The project site is not located within a currently designated State of California Earthquake Fault Zone (formerly Alquist-Priolo Special Studies Zones) for surface fault rupture. The Alquist-Priolo Earthquake Fault Zoning Act requires the California Geological Survey to zone “active faults” within the State of California. An “active fault” has exhibited surface displacement with Holocene time (within the last 11,000 years) hence constituting a potential hazard to structures that may be located across it. Based on a review of existing geologic information, no known active faults project through or toward the site. The potential for surface rupture resulting from the movement of the nearby major faults is considered very low.

## 5.3 Liquefaction and Seismically-Induced Settlement

Liquefaction is the sudden decrease in strength of cohesionless soils due to dynamic or cyclic shaking. Saturated soils behave temporarily as a viscous fluid (liquefaction) and, consequently, lose their capacity to support the structures founded on them. The potential for liquefaction decreases with increasing clay and gravel content but increases as the ground acceleration and duration of shaking increase. Liquefaction potential has been found to be the greatest where the groundwater level and loose sands occur within 50 feet of the ground surface.

The site is not located within a potential liquefaction zone per the State of California Seismic Hazard Zones Map for the Inglewood Quadrangle.

## 5.4 Lateral Spreading

Seismically induced lateral spreading involves primarily lateral movement of earth materials due to ground shaking. It differs from slope failure in that complete ground failure involving large displacement does not occur due to the relatively smaller gradient of the initial ground surface. Lateral spreading is characterized by near-vertical cracks with predominantly horizontal movement of the soil mass involved. The topography at the project site and in the immediate vicinity of the site is relatively flat, with no significant nearby slopes or embankments. Under these circumstances, the potential for lateral spreading at the subject site is considered low.

### 5.5 Seismically-Induced Slope Instability

Seismically induced landslides and other slope failures are common occurrences during or soon after earthquakes. The project site is relatively flat. In the absence of significant ground slopes, the potential for seismically induced landslides to affect the proposed site is considered to be very low.

## 6.0 SEISMIC ANALYSIS

### 6.1 CBC Seismic Design Parameters

General seismic parameters based on the 2022 California Building Code and ASCE 7-16 with Supplement 3 are calculated using the ATC hazard, *Seismic Design by Location* website application and the site coordinates (North latitude: 33.9150, West longitude: -118.3502 degrees). The seismic parameters are presented below.

**Table No. 2, CBC Seismic Design Parameters**

| Seismic Parameter | Value |
|---|---|
| Site Class | D |
| Mapped Short Period (0.2-sec) Spectral Response Acceleration, $S_S$ | 1.833 g |
| Mapped 1-second Spectral Response Acceleration, $S_1$ | 0.645 g |
| Site Coefficient, Fa | 1.0 |
| Site Coefficient, Fv | 1.7 |
| MCE 0.2-sec Period Spectral Response Acceleration, $S_{MS}$ | 1.833 g |
| MCE 1-second Period Spectral Response Acceleration, $S_{M1}$ | 1.645 g* |
| Design Spectral Response Acceleration for Short Period, $S_{DS}$ | 1.222 g |
| Design Spectral Response Acceleration for 1-second Period, $S_{D1}$ | 1.097 g* |
| TL | 8 |
| $PGA_M$ | 0.871 |
| Seismic Design Category | D |

*Per ASCE 7-16 Supplement 3-Section 11.4.8, the $S_{M1}$ and $S_{D1}$ values listed in this table are increased by 50%.

The parameters presented in Table No. 2, *CBC Seismic Design Parameters* are only valid if requirements of ASCE 7-16 Section 11.4.8 are satisfied.

## 7.0 EARTHWORK RECOMMENDATIONS

### 7.1 General Evaluation

Based on our field exploration, laboratory testing, and analyses of subsurface conditions at the site, remedial grading will be required to prepare the sites for support of the

proposed structures that are constructed with conventional shallow footings. To reduce differential settlement, variations in the soil type, degree of compaction, and thickness of the compacted fill, the thickness of compacted fill placed underneath the shallow footings should be kept uniform.

Site grading recommendations provided below are based on our experience with similar projects in the area and our evaluation of this investigation. Site preparation for the proposed development will require removal of existing structures, improvements, and other existing underground manmade structures and utilities.

The site soils can be excavated utilizing conventional heavy-duty earth-moving equipment. The excavated site soils, free of vegetation, organics and debris, may be placed as compacted fill in structural areas after proper processing. Rocks larger than 3.0 inches in the largest dimension should not be placed as fill.

On-site fine-grained soils and with an expansion index exceeding 20 should not be re-used for compaction within 2 feet below the proposed shallow foundations and slabs on grade. Soils containing organic materials should not be used as structural fill. The extent of removal should be determined by the geotechnical representative based on soil observation during grading.

### 7.2 Over-Excavation

Prior to the start of construction, all loose soils, fill and soils disturbed during demolition should be removed to firm acceptable native materials or sedimentary bedrock. In order to provide uniform support for the minor structures on shallow foundations, the minimum depth of over-excavation should be 4 feet below the ground surface, or 2 feet below bottom of proposed shallow foundations or depth of undocumented fill, whichever is deeper. Deeper over-excavation will be needed if soft, yielding soils or earth materials are exposed on the excavation bottoms. Over-excavation should extend at least 4 feet laterally beyond the limits of footings or as limited by the existing structures and improvements to remain in place. Over excavation beneath slabs on grade, pavements and hardscape areas should have a minimum of 2 feet of engineered fill and extend at least 2 feet laterally. Excavation activities should not disturb existing utilities, buildings, sidewalks and remaining structures.

For the synthetic track and field and artificial turf areas, we recommend over-excavation be at least 2 feet below existing grade and 2 feet laterally beyond the foot prints, where space is available. These areas should be backfilled with proper subgrade materials that meet the specifications for Tarkett Sports synthetic turf or project specific requirements.

The excavations adjacent to existing structures can be done using shoring or the “A-B-C” slot cut method. The “A-B-C” slot cuts exposing native sandy soils may be excavated with

maximum 8 feet wide and 8 feet in height sections to prevent the existing utility lines and/or site structures from becoming unstable.

### 7.3 Structural Preparation

All exposed subgrade soil surface should be observed by a geotechnical engineer or their representative prior to placement of fill, base materials, slabs, and/or foundation. The exposed subgrade should be scarified at least 6 inches, moisture conditioned as needed to near-optimum moisture content, mixed and compacted to 90 percent relative compaction. The upper 12 inches of subgrade below new pavement should be compacted to 95 percent relative compaction.

If loose, yielding soil conditions are encountered at the excavation bottom, the following options can be considered:

a. Over-excavate until a firm bottom is reached.
b. Over-excavate an additional 18 inches deep, and then place at least 18-inch-thick compacted base material (CAB or equivalent) to bridge the soft bottom. Base materials should be compacted to at least 95% relative compaction.
c. Over-excavate an additional 18-inches deep, and then place a layer of geotextile (i.e., Mirafi HP570, or equivalent), then place 18-inch-thick compacted base material (CAB or equivalent) to bridge the soft bottom. Base should be compacted to at least 95% relative compaction. An additional layer of geotextile may be needed on top of the compacted base materials depending on the actual site conditions.

### 7.4 Engineered Fill

Following observation of the excavation bottom, subgrade soil surfaces should be scarified to a depth of at least 6.0 inches. The scarified soil should be moisture-conditioned to within three percent (3%) of optimum moisture for granular soils and to approximate three percent (3%) above the optimum moisture for fine-grained soils. Scarified soils shall be compacted to a minimum ninety percent (90%) of the laboratory maximum dry density as determined by the ASTM Standard D1557 test method.

Any import fill should be tested and approved by Project Geotechnical Consultant. The import fill should have an expansion potential less than 20. The imported materials should be thoroughly mixed and moisture conditioned within three percent (3%) above the optimum moisture. All fill, if not specified otherwise elsewhere in this report, should be compacted to at least ninety percent (90%) of the laboratory dry density in accordance with the ASTM Standard D1557 test method.

Where the fill is not within the areas specified above or is not to support any structures, excavated site soils, free of deleterious materials and rock particles larger than 3.0 inches in the largest dimension, should be suitable for placement as compacted fill. The site materials should be thoroughly mixed and moisture conditioned to approximately three percent (3%) above the optimum moisture, and then compacted to at least ninety percent (90%) of relative compaction.

## 7.5 Excavatability

Based on our field exploration, the earth materials at the site may be excavated with conventional heavy-duty earth moving and trenching equipment. The onsite materials may contain demolition debris and gravel and/or cobbles. Earthwork should be performed with suitable equipment and methods for removal of debris from the engineered fill.

## 7.6 Expansive Soil

During construction, grading will mix and relocate the site soils, and additional fill soils may be added. The expansion potential of the finish-grade soils should be tested at the completion of grading. Shallow foundations should be designed to accommodate the anticipated soil expansion. Any proposed import fill should have an expansion index less than 20 and should be evaluated and approved by Converse prior to import to the site.

## 7.7 Trench Zone Backfill

The following specifications are recommended to provide a basis for quality control during the placement of trench backfill.

Trench excavations to receive backfill shall be free of trash, debris, grass, roots or other unsatisfactory materials at the time of backfill placement. Excavated on-site soils free of oversize particles, defined as larger than one (1) inch in maximum dimension in the upper 12 inches of subgrade soils and larger than three (3) inches in the largest dimension in the trench backfill below, and deleterious matter after proper processing may be used to backfill the trench zone. Imported trench backfill, if used, should be approved by the project soils consultant prior to delivery at the site. No more than 30 percent of the backfill volume should be larger than ¾ inch in the largest dimension.

Trench backfill shall be compacted to 90 percent of the laboratory maximum dry density as per ASTM Standard D2922 test method. At least the upper twelve (12) inches of trench underlying pavements should be compacted to at least 95 percent of the laboratory maximum dry density.

Trench backfill shall be compacted by mechanical methods, such as sheepsfoot, vibrating or pneumatic rollers, or mechanical tampers, to achieve the density specified herein. The

backfill materials shall be brought to within three (3) percent of optimum moisture content and then placed in horizontal layers if the expansion index is less than or equal to 30. Should the expansion index be greater than 30, backfill materials shall be brought to approximately three (3) percent above optimum moisture content. The thickness of uncompacted layers should not exceed eight (8) inches. Each layer shall be evenly spread, moistened, or dried as necessary, and then tamped or rolled until the specified density has been achieved.

The contractor shall select the equipment and processes to be used to achieve the specified density without damage to adjacent ground and completed work. The field density of the compacted soil shall be measured by the ASTM Standard D1556 or ASTM Standard D2922 test methods or equivalent. Observation and field tests should be performed by geotechnical engineer or their representatives during construction to confirm that the required degree of compaction has been obtained. Where compaction is less than that specified, additional compactive effort shall be made with adjustment of the moisture content as necessary, until the specified compaction is obtained. It should be the responsibility of the contractor to maintain safe conditions during cut and/or fill operations. Trench backfill shall not be placed, spread, or rolled during unfavorable weather conditions. When the work is interrupted by heavy rain, fill operations shall not be resumed until field tests by the project's geotechnical consultant indicate that the moisture content and density of the fill are as previously specified.

Imported soils, if any, used as compacted trench backfill should be predominantly granular and meet the following criteria:

- Expansion Index less than 20
- Free of all deleterious materials
- Contain no particles larger than 3 inches in the largest dimension
- Contain less than 30 percent by weight retained on ¾-inch sieve
- Contain at least 15 percent fines (passing #200 sieve)
- Have a Plasticity Index of 10 or less

Any import fill should be tested and approved by the geotechnical representative prior to delivery to the site.

### 7.8 Shrinkage and Subsidence

Soil shrinkage and/or bulking as a result of remedial grading depends on several factors including the depth of over-excavation, and the grading method and equipment utilized, and average relative compaction. For preliminary estimation, bulking and shrinkage factors for various units of earth material at the site may be taken as presented below:

- The approximate shrinkage factor for the undocumented fill soils is estimated to range from ten (10) to fifteen (15) percent.
- The approximate shrinkage factor for the native alluvial soils is estimated to range from five (5) to ten (10) percent.
- For estimation purposes, ground subsidence may be taken as 0.1 feet as a result of remedial grading.

Although these values are only approximate, they represent our best estimates of the factors to be used to calculate lost volume that may occur during grading. If more accurate shrinkage and subsidence factors are needed, it is recommended that field-testing using the actual equipment and grading techniques be conducted.

The various design recommendations provided in this section are based on the assumptions that in preparing the site, the earthwork and site grading recommendations provided in this report will be followed.

# 8.0 DESIGN RECOMMENDATIONS

Based on the results of our background review, subsurface exploration, laboratory testing, geotechnical analyses, and understanding of the planned site development, it is our opinion that the proposed project is feasible from a geotechnical standpoint, provided the following conclusions and recommendations are incorporated into the project plans, specifications, and are followed during site construction. The proposed structures and site improvements may be supported by shallow continuous or isolated square footings.

## 8.1 Shallow Foundations

### 8.1.1 Vertical Capacity

The proposed minor structures, such as trash enclosures and storage buildings, can be supported by conventional shallow footings. We recommend continuous and square footings be founded at least 18 inches below lowest adjacent final grade entirely into compacted fill or into native soil. A minimum footing width of 24 inches is recommended for square footings and 18 inches for continuous footings. The allowable bearing value for footings with above minimum sizes founded on compacted fill and competent native soils may be designed for a net bearing pressure of 2,000 pounds per square foot (psf) for dead-plus-live-loads. The net allowable bearing pressure can be increased by 250 psf for each additional foot of excavation depth and by 250 psf for each additional foot of excavation width up to a maximum value of 3,000 psf.

The net allowable bearing values indicated above are for the dead loads and frequently applied live loads and are obtained by applying a factor of safety of 3.0 to the net ultimate bearing capacity.

### 8.1.2 Lateral Capacity

Resistance to lateral loads can be provided by friction acting at the base of the foundation and by passive earth pressure. A coefficient of friction of 0.3 may be assumed with normal dead load forces. An allowable passive earth pressure of 200 psf per foot of depth up to a maximum of 1,500 psf may be used for footings poured against properly compacted fill. The values of coefficient of friction and allowable passive earth pressure include a factor of safety of 1.5.

### 8.1.3 Static Settlement

The static settlement of structures supported on continuous and/or spread footings founded on compacted fill and native soil will depend on the actual footing dimensions and the imposed vertical loads. Based on the maximum allowable net bearing pressures presented above, static settlement is anticipated to be less than 1.0 inch. Differential settlement is expected to be up to one-half of the total settlement over a 30-foot span.

### 8.1.4 Dynamic Increases

Bearing values indicated above are for total dead load and frequently applied live loads. The above vertical bearing may be increased by 33% for short durations of loading which will include the effect of wind or seismic forces. The allowable passive pressure may be increased by 33% for lateral loading due to wind or seismic forces.

## 8.2 Cast-In-Drilled-Hole Pile Foundations for Non-building Structures

The planned non-building structures (e.g., lighting for parking lot, walkway, and court, fence walls, signs, etc.) may be supported on a Cast-In-Drilled-Hole (CIDH) pile foundation provided the following recommendations are incorporated into design and construction.

### 8.2.1 Vertical Capacity

CIDH piles should be at least 18-inches in diameter and can be designed for an allowable skin friction of 150 psf against the perimeter of pile. The diameter and length of CIDH pile shall be determined by the structural engineer based on design loads. The uplift capacities can be taken as one-half of compressive capacities for pile design.

### 8.2.2 Lateral Capacity

Resistance to lateral loads can be provided by friction acting at the base of the foundation and by passive earth pressure. A coefficient of friction of 0.30 may be assumed with

normal dead load forces. An allowable passive earth pressure of 200 psf per foot of depth up to a maximum of 1,500 psf may be used for foundations poured against compacted fill. The values of coefficient of friction and allowable passive earth pressure include a factor of safety of 1.5.

For ground surface restrained by concrete slab, the passive resistance may be calculated from the ground surface. For unrestrained ground condition, the passive resistance of the upper one (1) foot of earth material should be neglected in design.

8.2.3 Settlement

Based on the maximum allowable net vertical capacity presented above, static settlement is anticipated to be less than 0.5 inch.

## 8.3 Slabs-on-Grade

Slabs-on-grade should have a minimum thickness of five (5) inches nominal for support of normal ground-floor live loads. Minimum reinforcement for slabs-on-grade should be No. 4 reinforcing bars, spaced at 18 inches on-center each way. The thickness and reinforcement of more heavily loaded slabs will be dependent upon the anticipated loads and should be designed by a structural engineer. A static modulus of subgrade reaction equal to 125 pounds per square inch per inch may be used in structural design of concrete slabs-on-grade.

It is critical that the exposed subgrade soils should not be allowed to desiccate prior to the slab pour. Care should be taken during concrete placement to avoid slab curling. Slabs should be designed and constructed as promulgated by the ACI and Portland Cement Association (PCA). Prior to the slab pour, all utility trenches should be properly backfilled and compacted.

In areas where a moisture-sensitive floor covering (such as vinyl tile or carpet) is used, a minimum 10-mil-thick moisture retarder/barrier between the bottom of slab and subgrade that meets the performance criteria of ASTM E1745 Class A material. Retarder/barrier sheets should be overlapped a minimum of six inches and should be taped or otherwise sealed per the product specifications.

## 8.4 Modulus of Subgrade Reaction

For the subject project, design of the structures supported on compacted fill subgrade prepared in accordance with the recommendations provided in this report may be based on a soil modulus of subgrade reaction of ($k_s$) of 100 pounds per square inch per inch.

## 8.5 Lateral Earth Pressure

Although not anticipated, the following provisional design values may be used for any utility vaults and/or walls below grade that are less than 8 feet high.

The earth pressure behind any buried wall depends primarily on the allowable wall movement, type of soil behind the wall, backfill slopes, wall inclination, surcharges, and any hydrostatic pressure. The following earth pressures are recommended for vertical walls with no hydrostatic pressure.

**Table No. 3, Lateral Earth Pressures for Retaining Wall Design**

| Backfill Slope (H:V) | Cantilever Wall Equivalent Fluid Pressure (pcf) | Restrained Wall (psf) |
|---|---|---|
| Level | 40 (triangular pressure distribution) | 55 (triangular pressure distribution) |

The recommended lateral pressures assume that the walls are fully back-drained to prevent build-up of hydrostatic pressure. Adequate drainage could be provided by means of permeable drainage materials wrapped in filter fabric installed behind the walls. The drainage system should consist of perforated pipe surrounded by a minimum one (1) square feet per lineal feet of free draining, uniformly graded, 3/4-inch washed, crushed aggregate, and wrapped in filter fabric such as Mirafi 140N or equivalent. The filter fabric should overlap approximately 12 inches or more at the joints. The subdrain pipe should consist of perforated, four-inch diameter, rigid ABS (SDR-35) or Schedule 40 PVC Pipe, or equivalent, with perforations placed down. Alternatively, a prefabricated drainage composite system such as the Miradrain G100N or equivalent can be used. The subdrain should be connected to solid pipe outlets, with a maximum outlet spacing of 100 feet. Waterproofing membranes should be added to the subterranean wall levels for moisture sensitive areas to mitigate moisture migration through the walls.

In addition, walls with inclined backfill should be designed for an additional equivalent fluid pressure of one (1) pound per cubic foot for every two (2) degrees of slope inclination. Walls subjected to surcharge loads located within a distance equal to the height of the wall should be designed for an additional uniform lateral pressure equal to one-third or one-half the anticipated surcharge load for unrestrained or restrained walls, respectively. These values are applicable for backfill placed between the wall stem and an imaginary plane rising 45 degrees from below the edge (heel) of the wall footings.

Retaining walls taller than 6 feet should be designed to resist additional earth pressure caused by seismic ground shaking based on CBC latest edition. A seismic earth pressure of 24H (psf), based on an inverted triangular distribution, can be used for design of wall.

## 8.6 Soil Corrosivity Evaluation

Based on our review of soil corrosivity test results (see Appendix B), the soluble sulfate concentration, pH, and chloride content are not in the corrosive range to concrete in accordance with the Caltrans Corrosive Guidelines (2012). The minimum saturated resistivity is in the mildly corrosive range to ferrous metal. Mitigation measures to protect concrete in contact with the soils are not anticipated.

A corrosion engineer may be consulted for appropriate mitigation procedures and construction design, if needed. General considerations for corrosion mitigation measures may include the following:

- Steel and wire concrete reinforcement should have at least three inches of concrete cover where cast against soil, unformed.

- Below-grade ferrous metals should be given a high-quality protective coating, such as 18-mil plastic tape, extruded polyethylene, coal-tar enamel, or Portland cement mortar.

- Below-grade metals should be electrically insulated (isolated) from above-grade metals by means of dielectric fittings in ferrous utilities and/or exposed metal structures breaking grade.

## 8.7 Site Drainage

Adequate positive drainage should be provided away from the structures to prevent ponding and to reduce percolation of water into structural backfill. We recommend that the landscape area immediately adjacent to the foundation shall be designed sloped away from the building with a minimum 5% slope gradient for at least 10 feet measured perpendicular to the face of the wall. Impervious surfaces within 10 feet of the building foundation shall be sloped a minimum of 2% away from the building per 2022 CBC.

Planters and landscaped areas adjacent to the building perimeter should be designed to minimize water infiltration into the subgrade soils. Gutters and downspouts should be installed on the roof, and runoff should be directed to the storm drain through non-erosive devices. Lower-level walkways and open patio areas may require special drainage provisions and sump pumps to provide suitable drainage.

## 8.8 Flexible Pavement

The flexible pavement structural section design recommendations were performed in accordance with the method contained in the *CALTRANS Highway Design Manual*, Chapter 630, without the factor of safety. No specific traffic study was performed to

determine the Traffic Index (TI) for the proposed project; therefore, a wide range of TI values were evaluated.

Due to various earth materials encountered at the site, flexible pavement structural section recommendations are prepared for both subgrade soils. We recommend that the project structural engineer consider the traffic loading conditions at various locations and select the appropriate pavement sections from the following table:

**Table No. 4, Flexible Pavement Structural Sections**

| Design R-value | Design TI | Asphalt Concrete (AC) Over Aggregate Base (AB) Structural Sections | | Full AC Structural Section |
|---|---|---|---|---|
| | | AC (inches) | AB (inches) | AC (inches) |
| 3 | 4 | **3.0** | **6.0** | **5.0** |
| | 5 | **4.0** | **8.0** | **6.5** |
| | 6 | **5.0** | **10.0** | **8.0** |
| | 7 | **6.0** | **12.0** | **9.5** |
| | 8 | **7.0** | **14.0** | **11.0** |
| | 9 | **8.0** | **16.0** | **12.5** |

Base material shall conform to requirements for Aggregate Base (AB) or equivalent and should be placed in accordance with the requirements of the Standard Specifications for Public Works Construction (SSPWC, latest Edition). Asphaltic materials should conform to Section 203-1, "Paving Asphalt," of the Standard Specifications for Public Works Construction (SSPWC, latest Edition) and should be placed in accordance with Section 302-5, "Asphalt Concrete Pavement," of the SSPWC, 2012 edition.

Positive drainage should be provided away from all pavement areas to prevent seepage of surface and/or subsurface water into the pavement base and/or subgrade.

## 8.9 Rigid Pavement

Rigid pavement design recommendations were provided in accordance with the Portland Cement Association's (PCA) Southwest Region Publication P-14, Portland Cement Concrete Pavement (PCCP) for Light, Medium and Heavy Traffic Rigid Pavement. We recommend that the project structural engineer consider the loading conditions at various locations and select the appropriate pavement sections from the following table:

**Table No. 5, Rigid Pavement Structural Sections**

| Design R-Value | Design Traffic Index (TI) | PCCP Pavement Section (inches) |
|---|---|---|
| 3 | 5.0 | 8.5 |
| | 6.0 | 8.5 |
| | 7.0 | 9.0 |
| | 8.0 | 9.5 |
| | 9.0 | 10.0 |

The above pavement section is based on a minimum 28-day Modulus of Rupture (M-R) of 550 psi and a compressive strength of 3,750 psi. The third point method of testing beams should be used to evaluate modulus of rupture. The concrete mix design should contain a minimum cement content of 5.5 sacks per cubic yard. Recommended maximum and minimum values of slump for pavement concrete are 3.0 inches to 1.0 inch, respectively.

Transverse contraction joints should not be spaced more than 10 feet and should be cut to a depth of 1/4 the thickness of the slab. Longitudinal joints should not be spaced more than 12 feet apart. A longitudinal joint is not necessary in the pavement adjacent to the curb and gutter section.

Prior to placement of concrete, at least the upper 12.0 inches of subgrade soils below rigid pavement sections should be compacted to at least ninety-five percent (95%) relative compaction as defined by the ASTM D 1557 standard test method.

Positive drainage should be provided away from all pavement areas to prevent seepage of surface and/or subsurface water into pavement base and/or subgrade.

# 9.0 CONSTRUCTION RECOMMENDATIONS

## 9.1 General

Site soils should be excavatable using conventional heavy-duty excavating equipment. Temporary sloped excavation is feasible if performed in accordance with the slope ratios provided in Section 9.2, *Temporary Excavations*. Existing utilities should be accurately located and either protected or removed as required. For steeper temporary construction slopes or deeper excavations, shoring should be provided by the contractor as necessary, to protect the workers in the excavation.

## 9.2 Temporary Excavations

Based on the materials encountered in the exploratory borings, sloped temporary excavations may be constructed according to the slope ratios presented in Table No. 6, *Slope Ratios for Temporary Excavation*. Any loose utility trench backfill or other fill encountered in excavations will be less stable than the native soils. Temporary cuts encountering loose fill or loose dry sand should be constructed at a flatter gradient than presented in the following table:

**Table No. 6, Slope Ratios for Temporary Excavation**

| Maximum Depth of Cut (feet) | Maximum Slope Ratio* (horizontal: vertical) |
|---|---|
| 0 – 4 | Vertical |
| 4 – 8 | 1: 1 |
| 8+ | 1.5: 1 |

*Slope ratio assumed to be uniform from top to toe of slope.

Surfaces exposed in slope excavations should be kept moist but not saturated to minimize raveling and sloughing during construction. Adequate provisions should be made to protect the slopes from erosion during periods of rainfall. Surcharge loads, including construction equipment, should not be placed within five (5) feet of the unsupported excavation edge. The above maximum slopes are based on a maximum height of six (6) feet of stockpiled soils placed at least five (5) feet from the excavation edge.

All applicable requirements of the California Construction and General Industry Safety Orders, the Occupational Safety and Health Act of 1987 and current amendments, and the Construction Safety Act should be met. The soils exposed in cuts should be observed during excavation by the project's geotechnical consultant. If potentially unstable soil conditions are encountered, modifications of slope ratios for temporary cuts may be required.

If the excavation occurs near existing structures, special construction considerations would be required during excavation to protect these existing structures during construction. The proposed excavation should not cause loss of bearing and/or lateral supports of the existing structures.

## 9.3 Slot Cut Recommendations

Temporary excavations during possible improvements should not extend below a 1:1 horizontal:vertical (H:V) plane extending beyond and down from the bottom of the existing

utility lines or structures. The remedial grading excavations should not cause loss of bearing and/or lateral support for adjacent utilities or structures.

If remedial grading excavations extend below a 1:1 horizontal:vertical (H:V) plane extending beyond and down from the bottom of adjacent off-site utility lines or structure foundations, shoring or slot cutting shall be employed. "A-B-C" slot cuts exposing native sandy soils may be excavated with maximum 8 feet wide and 8 feet depth sections to prevent the existing utility lines or off-site structures from becoming unstable. Backfill should be accomplished in the shortest period of time possible and in alternating sections.

The ABC slot cutting method for retaining walls could be a possible option as an alternative to shoring for excavation less than 8 feet or with cohesive soils. In general, for structures it is not recommended for slot cutting if the height of excavation exceeds more than 8 feet or into sandy soils and with surcharging load.

## 9.4 Geotechnical Services During Construction

This report has been prepared to aid in the foundation plans and specifications, and to assist the architect, civil and structural engineers in the design of the proposed structures. It is recommended that this office be provided an opportunity to review final design drawings and specifications to verify that the recommendations of this report have been properly implemented.

Footing excavations should be observed by geotechnical engineer or their representative prior to placement of steel and concrete so that footings are founded on satisfactory materials and excavations are free of loose and disturbed materials. Trench backfill should be placed and compacted with observation and field density testing provided by this office.

During construction, the geotechnical engineer and/or their authorized representatives should be present at the site to provide a source of advice to the client regarding the geotechnical aspects of the project and to observe and test the earthwork performed. Their presence should not be construed as an acceptance of responsibility for the performance of the completed work, since it is the sole responsibility of the contractor performing the work to ensure that it complies with all applicable plans, specifications, ordinances, etc. This firm does not practice or consult in the field of safety engineering. We do not direct the contractor's operations and cannot be responsible for other than our own personnel on the site; therefore, the safety of others is the responsibility of the contractor. The contractor should notify the Owner if he considers any recommended actions presented herein to be unsafe.

# 10.0 CLOSURE

The findings and recommendations of this report were prepared in accordance with generally accepted professional engineering and engineering geologic principles and practice. We make no other warranty, either expressed or implied. Our conclusions and recommendations are based on the results of the field and laboratory investigations, combined with an interpolation and extrapolation of soil conditions between and beyond boring locations. If conditions encountered during construction appear to be different from those shown by the borings, this office should be notified.

Design recommendations given in this report are based on the assumption that the earthwork and site grading recommendations contained in this report are implemented. Additional consultation may be prudent to interpret Converse's findings for contractors, or to possibly refine these recommendations based upon the review of the final site grading and actual site conditions encountered during construction. If the scope of the project changes, if project completion is to be delayed, or if the report is to be used for another purpose, this office should be consulted.

# 11.0 REFERENCES

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# Appendix A

## Field Exploration

# APPENDIX A: FIELD EXPLORATION

Field exploration included a site reconnaissance and subsurface exploration program consisting of drilling soil borings. During the site reconnaissance, the surface conditions were noted, and the approximate locations of the borings were marked using existing boundary and other features as a guide and should be considered accurate only to the degree implied by the method used.

## Exploratory Borings

A total of one (1) exploratory boring (BH-1), two (2) percolation test and two (2) coring were advanced within the project sites on March 27, 2023. The excavations were advanced using a two-man hand auger crew to the depths ranging of 11.0 feet below the existing ground surface (bgs). Each boring was visually logged by a Converse geologist/engineer and sampled at regular intervals and at changes in subsurface soils.

California Modified Sampler (Ring samples) and bulk soil samples were obtained for laboratory testing the bore holes were backfilled and compacted with soil cuttings following the auguring and coring observations were patched with asphalt where necessary to match existing conditions.

The approximate locations of the exploratory borings are shown in Figure No. 2, *Approximate Boring Locations Map*. Boring logs for the most recent field exploration are presented in Appendix A, *Field Exploration*.

Ring samples of the subsurface materials were obtained at frequent intervals in the exploratory borings using a drive sampler (2.4-inches inside diameter and 3.0-inches outside diameter) lined with sample rings. The steel ring sampler was driven into the bottom of the borehole with successive drops of 45 lbs at 2 feet height. Samples are retained in brass rings (2.4-inches inside diameter and 1.0-inch in height). The central portion of the sample was retained and carefully sealed in waterproof plastic containers for shipment to the Converse laboratory. Below counts for each sample interval are presented on the logs of borings. Bulk samples of typical soil types were also obtained.

It should be noted that the exact depths at which material changes occur cannot always be established accurately. Changes in material conditions that occur between driven samples are indicated in the logs at the top of the next drive sample. For a key to soil symbols and terminology used in the boring logs, refer to Drawing No. A-1, *Unified Soil Classification and Key to Boring Log Symbols*. For the logs of the borings, see Drawing Nos. A-2 through A-4, *Logs of Borings*.

# SOIL CLASSIFICATION CHART

| MAJOR DIVISIONS | | | SYMBOLS GRAPH | SYMBOLS LETTER | TYPICAL DESCRIPTIONS |
|---|---|---|---|---|---|
| COARSE GRAINED SOILS | GRAVEL AND GRAVELLY SOILS | CLEAN GRAVELS (LITTLE OR NO FINES) | | GW | WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES |
| | | | | GP | POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES |
| | MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE | GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES) | | GM | SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES |
| | | | | GC | CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES |
| MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE | SAND AND SANDY SOILS | CLEAN SANDS (LITTLE OR NO FINES) | | SW | WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES |
| | | | | SP | POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES |
| | MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE | SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES) | | SM | SILTY SANDS, SAND - SILT MIXTURES |
| | | | | SC | CLAYEY SANDS, SAND - CLAY MIXTURES |
| FINE GRAINED SOILS | 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 SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY |
| MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE | SILTS AND CLAYS | LIQUID LIMIT GREATER THAN 50 | | MH | INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS |
| | | | | CH | INORGANIC CLAYS OF HIGH PLASTICITY |
| | | | | OH | ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS |
| HIGHLY ORGANIC SOILS | | | | PT | PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS |

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

## FIELD AND LABORATORY TESTS

| | |
|---|---|
| C | Consolidation (ASTM D 2435) |
| CL | Collapse Potential (ASTM D 4546) |
| CP | Compaction Curve (ASTM D 1557) |
| CR | Corrosion, Sulfates, Chlorides (CTM 643-99; 417; 422) |
| CU | Consolidated Undrained Triaxial (ASTM D 4767) |
| DS | Direct Shear (ASTM D 3080) |
| EI | Expansion Index (ASTM D 4829) |
| M | Moisture Content (ASTM D 2216) |
| OC | Organic Content (ASTM D 2974) |
| P | Permeablility (ASTM D 2434) |
| PA | Particle Size Analysis (ASTM D 6913 [2002]) |
| PI | Liquid Limit, Plastic Limit, Plasticity Index (ASTM D 4318) |
| PL | Point Load Index (ASTM D 5731) |
| PM | Pressure Meter |
| PP | Pocket Penetrometer |
| R | R-Value (CTM 301) |
| SE | Sand Equivalent (ASTM D 2419) |
| SG | Specific Gravity (ASTM D 854) |
| SW | Swell Potential (ASTM D 4546) |
| TV | Pocket Torvane |
| UC | Unconfined Compression - Soil (ASTM D 2166) |
| | Unconfined Compression - Rock (ASTM D 7012) |
| UU | Unconsolidated Undrained Triaxial (ASTM D 2850) |
| UW | Unit Weight (ASTM D 2937) |
| WA | Passing No. 200 Sieve (ASTM D1140) |

## BORING LOG SYMBOLS

SAMPLE TYPE

- STANDARD PENETRATION TEST — Split barrel sampler in accordance with ASTM D-1586-84 Standard Test Method
- DRIVE SAMPLE 2.42" I.D. sampler (CMS).
- DRIVE SAMPLE No recovery
- BULK SAMPLE
- GROUNDWATER WHILE DRILLING
- GROUNDWATER AFTER DRILLING

### DRILLING METHOD SYMBOLS

Auger Drilling | Mud Rotary Drilling | Dynamic Cone or Hand Driven | Diamond Core

## UNIFIED SOIL CLASSIFICATION AND KEY TO BORING LOG SYMBOLS

Converse Consultants

Project ID: 138-01.GPJ; Template: LOG

Project Name
**New Turf Field and Asphalt Track Resurfacing**
**Hawthorne Middle School**
**4366 West 129th Street Hawthorne, California 90250**

Project No.
**23-31-119-01**

Drawing No.
A-1a

## CONSISTENCY OF COHESIVE SOILS

| Descriptor | Unconfined Compressive Strength (tsf) | SPT Blow Counts | Pocket Penetrometer (tsf) | CA Sampler | Torvane (tsf) | Field Approximation |
|---|---|---|---|---|---|---|
| Very Soft | <0.25 | < 2 | <0.25 | <3 | <0.12 | Easily penetrated several inches by fist |
| Soft | 0.25 - 0.50 | 2 - 4 | 0.25 - 0.50 | 3 - 6 | 0.12 - 0.25 | Easily penetrated several inches by thumb |
| Medium Stiff | 0.50 - 1.0 | 5 - 8 | 0.50 - 1.0 | 7 - 12 | 0.25 - 0.50 | Can be penetrated several inches by thumb with moderate effort |
| Stiff | 1.0 - 2.0 | 9 - 15 | 1.0 - 2.0 | 13 - 25 | 0.50 - 1.0 | Readily indented by thumb but penetrated only with great effort |
| Very Stiff | 2.0 - 4.0 | 16 - 30 | 2.0 - 4.0 | 26 - 50 | 1.0 - 2.0 | Readily indented by thumbnail |
| Hard | >4.0 | >30 | >4.0 | >50 | >2.0 | Indented by thumbnail with difficulty |

## APPARENT DENSITY OF COHESIONLESS SOILS

| Descriptor | SPT $N_{60}$- Value (blows / foot) | CA Sampler |
|---|---|---|
| Very Loose | <4 | <5 |
| Loose | 4- 10 | 5 - 12 |
| Medium Dense | 11 - 30 | 13 - 35 |
| Dense | 31 - 50 | 36 - 60 |
| Very Dense | >50 | >60 |

## MOISTURE

| Descriptor | Criteria |
|---|---|
| Dry | Absence of moisture, dusty, dry to the touch |
| Moist | Damp but no visible water |
| Wet | Visible free water, usually soil is below water table |

## PERCENT OF PROPORTION OF SOILS

| Descriptor | Criteria |
|---|---|
| Trace (fine)/ Scattered (coarse) | Particles are present but estimated to be less than 5% |
| Few | 5 to 10% |
| Little | 15 to 25% |
| Some | 30 to 45% |
| Mostly | 50 to 100% |

## SOIL PARTICLE SIZE

| Descriptor | | Size |
|---|---|---|
| Boulder | | > 12 inches |
| Cobble | | 3 to 12 inches |
| Gravel | Coarse | 3/4 inch to 3 inches |
| | Fine | No. 4 Sieve to 3/4 inch |
| Sand | Coarse | No. 10 Sieve to No. 4 Sieve |
| | Medium | No. 40 Sieve to No. 10 Sieve |
| | Fine | No. 200 Sieve to No. No. 40 Sieve |
| Silt and Clay | | Passing No. 200 Sieve |

## PLASTICITY OF FINE-GRAINED SOILS

| Descriptor | Criteria |
|---|---|
| Nonplastic | A 1/8-inch thread cannot be rolled at any water content. |
| Low | The thread can barely be rolled, and the lump cannot be formed when drier than the plastic limit. |
| Medium | The thread is easy to roll, and not much time is required to reach the plastic limit; it cannot be rerolled after reaching the plastic limit. The lump crumbles when drier than the plastic limit. |
| High | It takes considerable time rolling and kneading to reach the plastic limit. The thread can be rerolled several times after reaching the plastic limit. The lump can be formed without crumbling when drier than the plastic limit. |

## CEMENTATION/ Induration

| Descriptor | Criteria |
|---|---|
| Weak | Crumbles or breaks with handling or little finger pressure. |
| Moderate | Crumbles or breaks with considerable finger pressure. |
| Strong | Will not crumble or break with finger pressure. |

**NOTE:** This legend sheet provides descriptions and associated criteria for required soil description components only. Refer to Caltrans Soil and Rock Logging, Classification, and Presentation Manual (2010), Section 2, for tables of additional soil description components and discussion of soil description and identification.

# UNIFIED SOIL CLASSIFICATION AND KEY TO BORING LOG SYMBOLS

# Log of Boring No. PT-01

Dates Drilled: 3/27/2023 Logged by: Musfiqur Ali Checked By: Babak Abbasi

Equipment: 4" HAND AUGER Driving Weight and Drop: 45 lbs / 24 in

Ground Surface Elevation (ft): 66 Depth to Water (ft): NOT ENCOUNTERED

| Depth (ft) | Graphic Log | SUMMARY OF SUBSURFACE CONDITIONS<br>This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered. | SAMPLES: DRIVE | SAMPLES: BULK | BLOWS/12" | MOISTURE (%) | DRY UNIT WT. (pcf) | LAB TESTS |
|---|---|---|---|---|---|---|---|---|
| | | **GRASS 2", PATCHY DARK SOIL**<br>**FILL (Af)**<br>**CLAYEY SILT (ML):** Low Plasticitywith some fine-grained sand, some silt, brown. | | | | | | CP |
| 5 | | **ALLUVIUM (Qal)**<br>**CLAYEY SILT (ML):** Low plasticity, with some fine-grained sand, brown/gray. | | | 25 | 20 | 106.7 | WA (fc=69.4%) |
| 10 | | **SILTY SAND (SM):** fine grained sand, loose, dry, dark brown/gray. | | | 35 | 13 | 103.4 | |
| | | End of boring at 11 feet below ground surface.<br>No ground water encountered.<br>Borehole used for percolation testing.<br>Borehole was backfilled with soil cuttings on 3/27/3023. | | | | | | |

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Project Name
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**Hawthorne Middle School**
**4366 West 129th Street Hawthorne, California 90250**

Project No. **23-31-119-01**

Drawing No. **A-2**

# Log of Boring No. PT-02

Dates Drilled: 3/27/2023 Logged by: Musfiqur Ali Checked By: Babak Abbasi

Equipment: 4" HAND AUGER Driving Weight and Drop: 45 lbs / 24 in

Ground Surface Elevation (ft): 66 Depth to Water (ft): NOT ENCOUNTERED

| Depth (ft) | Graphic Log | SUMMARY OF SUBSURFACE CONDITIONS<br>This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered. | SAMPLES DRIVE | SAMPLES BULK | BLOWS/12" | MOISTURE (%) | DRY UNIT WT. (pcf) | LAB TESTS |
|---|---|---|---|---|---|---|---|---|
| | | **GRASS 2", PATCHY DARK SOIL** | | | | | | R |
| | | **FILL (Af)**<br>**CLAYEY SILT (ML):** Low Plasticity, with some fine-grained sand, some silt, brown. | | | | | | |
| 5 | | **ALLUVIUM (Qal)**<br>**CLAYEY SILT (ML):** Low plasticity, with some fine-grained sand, brown/gray. | | | 20 | 19 | 103.5 | |
| 10 | | **SILTY SAND (SM):** fine grained, moderately indurated, grayish brown. | | | 25 | 23 | 112.1 | WA (fc=24.1%) |
| | | End of boring at 11 feet below ground surface.<br>No ground water encountered.<br>Borehole used for percolation testing.<br>Borehole was backfilled with soil cuttings on 3/27/3023. | | | | | | |

Converse Consultants

Project Name
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Project No. **23-31-119-01**

Drawing No. **A-3**

# Log of Boring No. BH-03

Dates Drilled: 3/27/2023 | Logged by: Musfiqur Ali | Checked By: Babak Abbasi

Equipment: 4" HAND AUGER | Driving Weight and Drop: 45 lbs / 24 in

Ground Surface Elevation (ft): 66 | Depth to Water (ft): NOT ENCOUNTERED

| Depth (ft) | Graphic Log | SUMMARY OF SUBSURFACE CONDITIONS | SAMPLES DRIVE | SAMPLES BULK | BLOWS/12" | MOISTURE (%) | DRY UNIT WT. (pcf) | LAB TESTS |
|---|---|---|---|---|---|---|---|---|
| | | This log is part of the report prepared by Converse for this project and should be read together with the report. This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered. | | | | | | |
| | | **2" INCH GRASS, PATCHY DARK SOIL** | | | | | | CR |
| | | **FILL (Af):** | | | | | | |
| | | **SILTY SAND (SM):** fine-grained, some silt, brown. | | | | | | |
| 5 | | **ALLUVIUM (Qal):** | | | 30 | 17 | 120.8 | |
| | | **SILTY SAND (SM):** fine grained sand, trace silt, moist to wet, reddish-brown. | | | | | | |
| 10 | | | | | 35 | 15 | 105.7 | |
| | | End of boring at 11 feet below ground surface. | | | | | | |
| | | No ground water encountered. | | | | | | |
| | | Borehole was backfilled with soil cuttings on 3/27/3023. | | | | | | |

Converse Consultants

Project Name
**New Turf Field and Asphalt Track Resurfacing**
**Hawthorne Middle School**
**4366 West 129th Street Hawthorne, California 90250**

Project No. **23-31-119-01**

Drawing No. **A-4**

# Appendix B

## Laboratory Testing Program

# APPENDIX B: LABORATORY TESTING PROGRAM

Tests were conducted in our laboratory on representative soil samples for the purpose of classification and evaluation of their relevant physical characteristics and engineering properties. The amount and selection of tests were based on the geotechnical requirements of the project. Test results are presented herein and on the Logs of Borings in Appendix A, *Field Exploration*. The following is a summary of the laboratory tests conducted for this project.

## In-situ Moisture Content and Dry Density

Results of moisture content and dry density tests performed on relatively undisturbed ring samples in accordance with ASTM standards D2216 and D7263 were used to aid in the classification of the soils and to provide quantitative measure of the *in situ* dry density. Data obtained from this test provides qualitative information on strength and compressibility characteristics of site soils. For test results, see the Logs of Borings in Appendix A, *Field Exploration*.

## Soil Corrosivity

One (1) representative soil sample was tested to determine minimum electrical resistivity, pH, and chemical content, including chloride concentrations, and soluble sulfate. The purpose of the testing was to determine the corrosion potential of site soils when placed in contact with common construction materials. The testing was performed by AP Engineering in Pomona, California. The test result received from AP Engineering is included in the following table:

**Table No. B-1, Summary of Corrosivity Test Result**

| Boring No. | Sample Depth (feet) | pH (Caltrans 643) | Soluble Chlorides (Caltrans 422) ppm | Soluble Sulfate (Caltrans 417) (%) | Saturated Resistivity (Caltrans 643) Ohm-cm |
|---|---|---|---|---|---|
| BH-3 | 1-5 | 7.15 | 130 | 0.011 | 10,200 |

## Percent Finer Than Sieve No. 200

The percent finer than Sieve No. 200 test was performed on three (3) selected soil samples to aid in the classification of the on-site soils and to estimate other engineering parameters. Testing was performed in general accordance with the ASTM Standard D1140 test method. The test results are presented in the boring logs.

**Table No. B-2, Summary of Percent Passing Sieve #200 Test Results**

| Boring No. | Depth (feet) | Soil Classification | Percent Passing Sieve No. 200 |
|---|---|---|---|
| PT-1 | 5.0-5.5 | Clayey Silt (ML) | 69.4 |
| PT-2 | 10.0-10.5 | Silty Sand (SM) | 24.1 |

## R-Value

One (1) representative bulk soil sample was tested for resistance value (R-Value) in accordance with ASTM D2844 Standard. This test is designed to provide a relative measure of soil strength for use in pavement design. The test result is shown in the following table:

**Table No. B-3, R-Value Test Result**

| Boring No. | Depth (feet) | Soil Classification | Measured R-Value |
|---|---|---|---|
| PT-2 | 0.2-5 | Clayey Silt (ML) | 3 |

## Maximum Dry Density Test

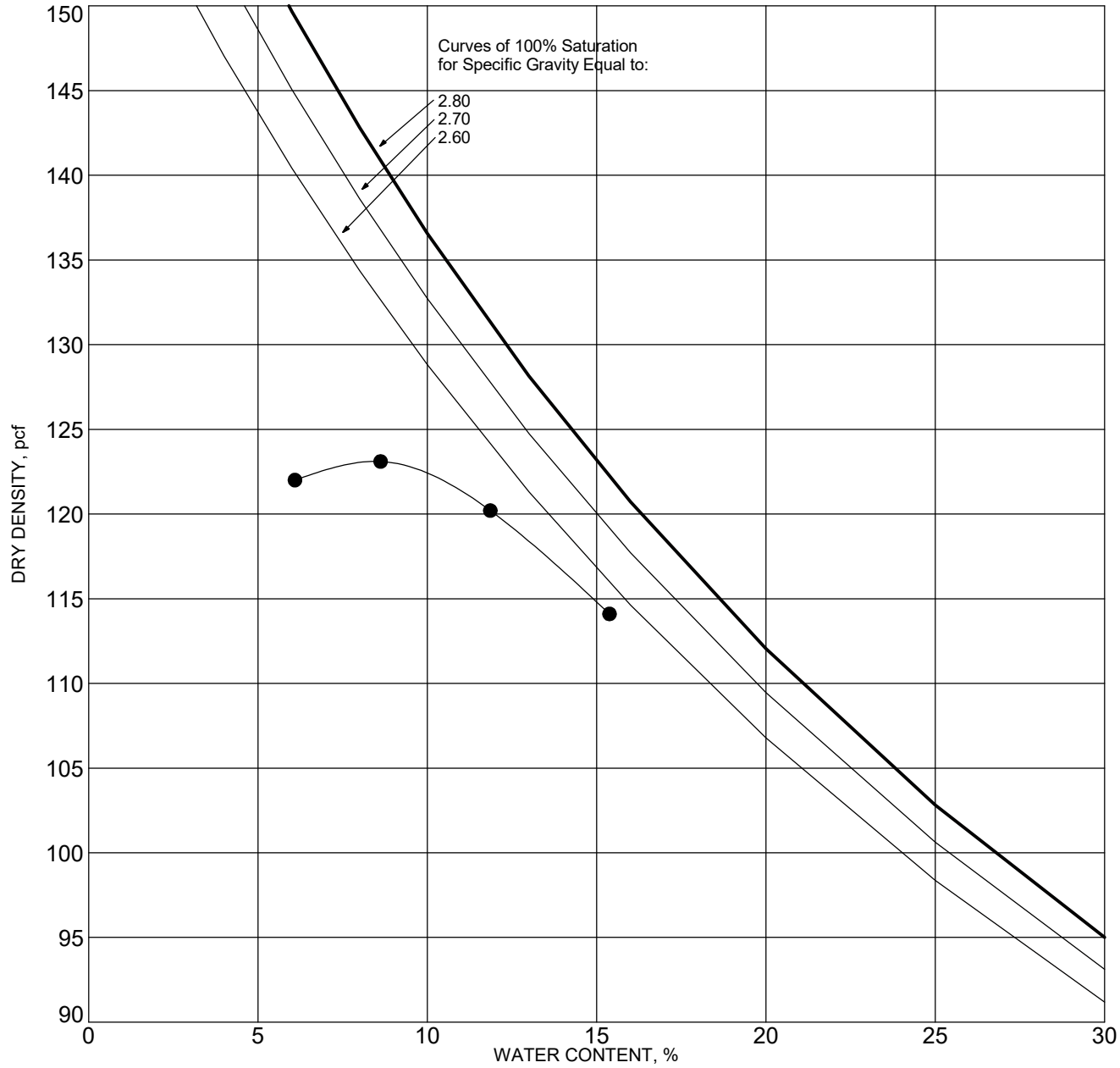
One (1) laboratory maximum dry density moisture content relationship test was performed on a representative bulk sample of the upper 5 feet of soil material. The testing was conducted in accordance with ASTM Standard D1557 laboratory procedure. The test result is presented on Drawing No. B-4, *Summary of Moisture-Density Relationship Result*.

**Table No. B-4, Summary of Moisture-Density Relationship Result**

| Boring No. | Depth (feet) | Soil Description | Optimum Moisture (%) | Maximum Density (lb/cft) |
|---|---|---|---|---|
| PT-1 | 0.2-5 | Clayey Silt (ML) | 9.0 | 123.5 |

## Sample Storage

Soil samples presently stored in our laboratory will be discarded 30 days after the date of this report, unless this office receives a specific request to retain the samples for a longer period of time.




| SYMBOL | BORING NO. | DEPTH (ft) | DESCRIPTION | ASTM TEST METHOD | OPTIMUM WATER, % | MAXIMUM DRY DENSITY, pcf |
|---|---|---|---|---|---|---|
| ● | PT-01 | 0.2-5.0 | Clayey Silt (ML) | D1557-Method B | 9.0 | 123.5 |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

# MOISTURE-DENSITY RELATIONSHIP RESULTS

Converse Consultants

Project Name
**New Turf Field and Asphalt Track Resurfacing**
**Hawthorne Middle School**
**4366 West 129th Street Hawthorne, California 90250**

Project No.
**23-31-119-01**

Drawing No.
**B-1**

# Appendix C

Earthwork Specifications

# APPENDIX C: EARTHWORK SPECIFICATIONS

## Scope of Work

The work includes all labor, supplies and construction equipment required to construct the structures in a good, workmanlike manner, herein specified. The major items of work covered in this section include the following.

- Site Inspection
- Authority of Geotechnical Engineer
- Site Clearing
- Excavations
- Preparation of Fill Areas
- Placement and Compaction of Fill
- Observation and Testing

## Site Inspection

- The Contractor shall carefully examine the site and make all inspections necessary, to determine the full extent of the work required to make the completed work conform to the drawings and specifications. The Contractor shall satisfy himself as to the nature and location of the work, ground surface and the characteristics of equipment and facilities needed prior to and during prosecution of the work. The Contractor shall satisfy himself as to the character, quality, and quantity of surface and subsurface materials or obstacles to be encountered. Any inaccuracies or discrepancies between the actual field conditions and the drawings, or between the drawings and specifications, must be brought to the Owner's attention to clarify the exact nature of the work to be performed.

- This *Geotechnical Investigations Report* by Converse Consultants may be used as a reference to the surface and subsurface conditions on this project. The information presented in this report is intended for use in design and is subject to confirmation of the conditions encountered during construction. The exploration logs and related information depict subsurface conditions only at the time and location designated on the boring logs. Subsurface conditions at other locations may differ from conditions encountered at the exploration locations. In addition, the passage of time may result in a change in subsurface conditions at the exploration locations. Any review of this information shall not relieve the Contractor from performing such independent investigation and evaluation to satisfy himself as to the nature of the surface and subsurface conditions to be encountered and the procedures to be used in performing his work.

## Site Clearing

- Clearing and grubbing shall consist of the removal from project areas to be graded of all existing structures, pavement, utilities, and vegetation.

- Organic and inorganic materials resulting from the clearing and grubbing operations shall be hauled away from the areas to be graded.

## Excavations

- Based on observations made during our field explorations, the surficial soils can be excavated with conventional earthwork equipment.

## Preparation of Fill Areas

- All organic material, organic soils, incompetent alluvium, undocumented fill soils and debris should be removed from the proposed building areas.

- All loose, soft or disturbed earth materials should be removed from the bottom of excavations before placing structural fill. The actual depth of removal should be determined based on observations made during grading.

- The subgrade in all areas to receive fill shall be scarified to a minimum depth of 6 inches, the soil moisture adjusted within 3 percent of the optimum moisture for granular soils and at above approximately 3 percent of the optimum moisture for fine-grained soils, then compacted to at least 90 percent of the laboratory maximum dry density as determined by ASTM Standard D1557 test method. Scarification may be terminated on moderately hard to hard, cemented earth materials with the approval of the Geotechnical Engineer.

- Compacted fill may be placed on native soils that have been properly scarified and recompacted as discussed above.

- All areas to receive compacted fill will be observed and approved by the Geotechnical Engineer before the placement of fill.

## Placement and Compaction of Fill

- Compacted fill placed for the support of footings, slabs-on-grade, exterior concrete flatwork, and driveways will be considered structural fill. Structural fill may consist of approved on-site soils or imported fill that meets the criteria indicated below.

- Native sediments and fill prepared for subgrades below planned infiltration chambers may require specialized preparation and limited compaction so as to not to significantly reduce the permeability and infiltration characteristics of the underlying sediments. Infiltration chamber structures shall be backfilled and constructed in accordance with the manufacturer's recommendations and specifications.

- Fill consisting of selected on-site earth materials or imported soils approved by the Geotechnical Engineer shall be placed in layers on approved earth materials. Soils used as compacted structural fill shall have the following characteristics:

    - All fill soil particles shall not exceed 3 inches in nominal size and shall be free of organic matter and miscellaneous inorganic debris and inert rubble.
    - Imported fill materials shall have an Expansion Index (EI) less than 20. All imported fill should be compacted to at least 90 percent of the laboratory maximum dry density (ASTM Standard D1557) at about 3 percent above optimum moisture for fine grained soils, and within 3 percent of optimum for granular soils.

- Fill soils shall be evenly spread in maximum 8-inch lifts, watered or dried as necessary, mixed and compacted to at least the density specified below. The fill shall be placed and compacted on a horizontal plane, unless otherwise approved by the Geotechnical Engineer.

- All fill placed at the site shall be compacted to at least 90 percent of the laboratory maximum dry density as determined by ASTM Standard D1557 test method. The on-site soils shall be moisture conditioned within 3 percent of the optimum moisture for granular soils and at above approximately 3 percent of the optimum moisture for fine-grained soils. At least the upper 12 inches of subgrade soils underneath the concrete apron, pavement and parking areas should be compacted to a minimum of 95 percent relative compaction.

- Fill exceeding 5 feet in height shall not be placed on native slopes that are steeper than 5:1 horizontal:vertical (H:V). Where native slopes are steeper than 5:1 H:V, and the height of the fill is greater than 5 feet, the fill shall be benched into competent materials. The height and width of the benches shall be at least 2 feet.

- Representative samples of materials being used as compacted fill will be analyzed in the laboratory by the Geotechnical Engineer to obtain information on their physical properties. Maximum laboratory density of each soil type used in the compacted fill will be determined by the ASTM Standard D1557 compaction method.

- Fill materials shall not be placed, spread or compacted during unfavorable weather conditions. When site grading is interrupted by heavy rain, filling operations shall not resume until the Geotechnical Engineer approves the moisture and density conditions of the previously placed fill.

- It shall be the Grading Contractor's obligation to take all measures deemed necessary during grading to provide erosion control devices in order to protect slope areas and adjacent properties from storm damage and flood hazard originating on this project. It shall be the contractor's responsibility to maintain slopes in their as-graded form until all slopes are in satisfactory compliance with job specifications, all berms have been properly constructed, and all associated drainage devices meet the requirements of the Civil Engineer.

**Trench Backfill**

The following specifications are recommended to provide a basis for quality control during the placement of trench backfill.

- Trench excavations to receive backfill shall be free of trash, debris or other unsatisfactory materials at the time of backfill placement.

- Trench backfill shall be compacted to a minimum relative compaction of 90 percent as per ASTM Standard D1557 test method.

- Rocks larger than one inch should not be placed within 12 inches of the top of the pipeline or within the upper 12 inches of pavement or structure subgrade. No more than 30 percent of the backfill volume shall be larger than 3/4-inch in largest dimension diameter, and rocks shall be well mixed with finer soil.

- The pipe design engineer should select bedding material for the pipe. Bedding materials generally should have a Sand Equivalent (SE) greater than or equal to 30, as determined by the ASTM Standard D2419 test method.

- Trench backfill shall be compacted by mechanical methods, such as sheepsfoot, vibrating or pneumatic rollers, or mechanical tampers, to achieve the density specified herein. The backfill materials shall be brought to within 3 percent of optimum moisture content for granular soils and fine-grained soils, then placed in horizontal layers. The thickness of uncompacted layers should not exceed 8 inches. Each layer shall be evenly spread, moistened or dried as necessary, and then tamped or rolled until the specified density has been achieved.

- The contractor shall select the equipment and processes to be used to achieve the specified density without damage to adjacent ground and completed work.

- The field density of the compacted soil shall be measured by the ASTM Standard D1556 or ASTM Standard D2922 test methods or equivalent.

- Observation and field tests should be performed by Converse during construction to confirm that the required degree of compaction has been obtained. Where compaction is less than that specified, additional compactive effort shall be made with adjustment of the moisture content as necessary, until the specified compaction is obtained.

- It should be the responsibility of the Contractor to maintain safe conditions during cut and/or fill operations.

- Trench backfill shall not be placed, spread or rolled during unfavorable weather conditions. When the work is interrupted by heavy rain, fill operations shall not be resumed until field tests by the project's geotechnical consultant indicate that the moisture content and density of the fill are as previously specified.

**Observation and Testing**

- During the progress of grading, the Geotechnical Engineer will provide observation of the fill placement operations.

- Field density tests will be made during grading to provide an opinion on the degree of compaction being obtained by the contractor. Where compaction of less than specified herein is indicated, additional compactive effort with adjustment of the moisture content shall be made as necessary, until the required degree of compaction is obtained.

A sufficient number of field density tests will be performed to provide an opinion to the degree of compaction achieved. In general, density tests will be performed on each one-foot lift of fill, but not less than one for each 500 cubic yards of fill placed.

# Appendix D

Infiltration Testing

# APPENDIX D: INFILTRATION TESTING

Infiltration testing was performed utilizing exploratory borings PT-1 and PT-2 on March 27, 2023. The continuous pre-soak falling-head test method for water Infiltration testing was utilized to evaluate soil infiltration rates of the native soils encountered below the ground surface at the respective boring locations in accordance with Los Angeles County Public Works administrative manual Guidelines for investigation and reporting low impact development stormwater infiltration (2021).

The borings were cased using a two-inch diameter perforated casing. Water was added to the bore hole until the water level was as near the ground surface as could be achieved and allowed to pre-soak for at least 1 hour if the water did not drain entirely within 30 minutes. After pre-soaking, water was added to the bore hole until the water level was as near the target depth of the project 10 feet below ground surface level. The water level was measured to the nearest 1/8-inch. There were at least eight (8) readings that were taken or until a stabilized rate of drop is obtained, whichever occurs first. A stabilized rate is when the highest and lowest readings are within 10 percent of each other from three consecutive readings. Reduction factors RF (Based on the GS200.1 procedures), $RF_t$=1, $RF_v$=1 and $RF_s$=1 was used to calculate design infiltration rates. Design Infiltration rate was calculated as the average of the last three readings. Percolation test results can vary depending on location, depth, soil type and variability of the underlying alluvial sediments. The results of the infiltration tests are tabulated in the tables below:

**Table No. D-1, Soil Boring Infiltration Test Results**

| Boring No. | Depth of Test (feet) | Topsoil Types (USCS) | Ground Water Encountered (feet) | Design Percolation Rate (inches/hour) |
|---|---|---|---|---|
| PT-1 | 0-10 | Clayey Silt and Silty Sand (SM) | N/E | 1.07 |
| PT-2 | 0-10 | Clayey Silt and Silty Sand (SM) | N/E | 0.81 |

*Percolation rate was obtained from a 4-inch diameter bore hole to a depth which shows in the next column (Depth of Test). The percolation rate may change with different well dimensions. The adjustment to the provided percolation rate to a well with different dimensions should be determined by the well designer.

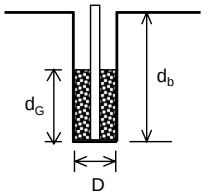
In accordance with County of Los Angeles requirements, the minimum percolation rate for design of infiltration system for storm water management is 0.30 inch per hour. Percolation rates of PT-1 and Pt-2 meet the minimum percolation rate. The project Civil Engineer should review the raw data of percolation test presented herein to determine specific soil layers and percolation rates for design of the proposed infiltration system. Such systems should be constructed a minimum distance of 10 feet laterally from any existing or future planned building or subsurface structure so as not to disturb or undermine foundations. The proposed infiltration system should be constructed 10 feet

above seasonal ground water table. The percolation rates were determined in general accordance with Los Angeles County guidelines. The detailed percolation test results are shown on the following data sheets.

## Percolation Testing

Job Name: New Turf Field and Asphalt Track Resurfacing
Job No.: 23-31-119-01
Location: Hawthorne Middle School
Test Date: March 27, 2023

**Test Boring No.** **PT-01**
Depth of Boring ($d_b$): 10.0 feet
Diameter of Boring (D): 0.33 feet
Diameter of Casing ($d_c$): 0.25 feet
Percolation Test Zone: 0 to 10 feet bgs
Test Performer: MA




| Time of Testing | | | Water Level Measurement | | Water Level Calculations | | | | Infiltration Rate Calculations | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial Time | Final Time | Time Interval | Initial depth to water | Final depth to water | Initial Height of water column | Final Height of water column | Drop in Height | Average height of water column | Pre-adjusted Percolation Rate | Reduction Factor | Adjusted Percolation Rate | Infiltration Rate by Porchet Method* |
| $T_i$ | $T_f$ | $\Delta T$ | $d_1$ | $d_2$ | $d_i$ | $d_f$ | $\Delta d = d_i - d_f$ | $L_{ave}$ | $P_i = \Delta d / \Delta T$ | $R_f$ | $k = P_i / R_f$ | $I = \Delta dD / [2\Delta T(D/2+2L_{ave})R_f]$ |
| | | (hr) | (feet) | (feet) | (feet) | (feet) | (feet) | (feet) | (inch/hr) | | (inch/hr) | (inch/hr) |
| **Percolation Test** | | | | | | | | | | | | |
| 0:00 | 0:10 | 0.17 | 0.00 | 7.50 | 10.00 | 2.50 | 7.50 | 6.25 | 539.63 | 3.0 | 179.88 | 2.37 |
| 0:10 | 0:20 | 0.17 | 0.00 | 4.50 | 10.00 | 5.50 | 4.50 | 7.75 | 323.78 | 3.0 | 107.93 | 1.15 |
| 0:20 | 0:30 | 0.17 | 0.00 | 4.00 | 10.00 | 6.00 | 4.00 | 8.00 | 287.80 | 3.0 | 95.93 | 0.99 |
| 0:30 | 0:40 | 0.17 | 0.00 | 4.25 | 10.00 | 5.75 | 4.25 | 7.88 | 305.79 | 3.0 | 101.93 | 1.07 |
| 0:40 | 0:50 | 0.17 | 0.00 | 3.85 | 10.00 | 6.15 | 3.85 | 8.08 | 277.01 | 3.0 | 92.34 | 0.94 |

Reference: Adminstrative Manual - County of Los Angeles Public Works Guidelines for Geotechnical Investigation and Reporting Low Impact Development Stomrwater Infiltration, dated 6/30/21
* Inverse Borehole Method

**Reduction Factors:**
$RF_t$ (small diameter boring) = 1
$RF_v$ (site variability) = 1
$RF_s$ (siltation, plugging) = 1

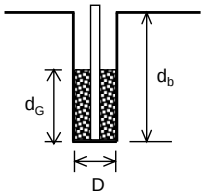
Total Reduction Factor (RF) = RFt +RFv +RFs 3

**Design Infiltration Rate = 1.07 inch/hr**
Note: Design Infiltration Rate = Average of last three adjusted precolation rate readings

## Percolation Testing

Job Name: New Turf Field and Asphalt Track Resurfacing
Job No.: 23-31-119-01
Location: Hawthorne Middle School
Test Date: March 27, 2023

**Test Boring No.** **PT-02**
Depth of Boring ($d_b$): 10.0 feet
Diameter of Boring (D): 0.33 feet
Diameter of Casing ($d_c$): 0.25 feet
Percolation Test Zone: 0 to 10 feet bgs
Test Performer: MA




| Time of Testing | | | Water Level Measurement | | Water Level Calculations | | | | Infiltration Rate Calculations | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial Time | Final Time | Time Interval | Initial depth to water | Final depth to water | Initial Height of water column | Final Height of water column | Drop in Height | Average height of water column | Pre-adjusted Percolation Rate | Reduction Factor | Adjusted Percolation Rate | Infiltration Rate by Porchet Method* |
| $T_i$ | $T_f$ | $\Delta T$ | $d_1$ | $d_2$ | $d_i$ | $d_f$ | $\Delta d = d_i - d_f$ | $L_{ave}$ | $P_i = \Delta d / \Delta T$ | $R_f$ | $k = P_i / R_f$ | $I = \Delta d D / [2\Delta T(D/2+2L_{ave})R_f]$ |
| | | (hr) | (feet) | (feet) | (feet) | (feet) | (feet) | (feet) | (inch/hr) | | (inch/hr) | (inch/hr) |
| **Percolation Test** | | | | | | | | | | | | |
| 0:00 | 0:10 | 0.17 | 0.00 | 4.30 | 10.00 | 5.70 | 4.30 | 7.85 | 309.39 | 3.0 | 103.13 | 1.08 |
| 0:10 | 0:20 | 0.17 | 0.00 | 3.40 | 10.00 | 6.60 | 3.40 | 8.30 | 244.63 | 3.0 | 81.54 | 0.81 |
| 0:20 | 0:30 | 0.17 | 0.00 | 3.50 | 10.00 | 6.50 | 3.50 | 8.25 | 251.83 | 3.0 | 83.94 | 0.84 |
| 0:30 | 0:40 | 0.17 | 0.00 | 3.30 | 10.00 | 6.70 | 3.30 | 8.35 | 237.44 | 3.0 | 79.15 | 0.78 |

Reference: Adminstrative Manual - County of Los Angeles Public Works Guidelines for Geotechnical Investigation and Reporting Low Impact Development Stormrwater Infiltration, dated 6/30/21
* Inverse Borehole Method

**Reduction Factors:**
$RF_t$ (small diameter boring) = 1
$RF_v$ (site variability) = 1
$RF_s$ (siltation, plugging) = 1

Total Reduction Factor (RF) = RFt +RFv +RFs 3

**Design Infiltration Rate = 0.81 inch/hr**
Note: Design Infiltration Rate = Average of last three adjusted precolation rate readings

# 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.