

## SECTION 312319 - DEWATERING

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. Section includes regular construction dewatering.
- B. Related Sections:
  - 1. Division 31 Section 21200 "Earth Moving" for excavating, backfilling, site grading, and for site utilities.

## 1.2 SCOPE

- A. This Section specifies requirements for groundwater generated during construction related dewatering as part of the project. Also covered are procedures to be followed by the Contractor for the handling of groundwater prior to discharge.
- B. This specification takes special precautions for the testing, identification, and treatment of groundwater that has been contaminated by jet fuel which cannot be discharged into storm drains or sewer systems.
- C. This specification lists the minimum requirements for this project. The Contractor shall provide an independent State of California certified testing laboratory. Submit the laboratory and consultant qualifications for approval. Any laboratory completing chemical analysis on any media shall possess a Comprehensive Quality Assurance Plan (CQAP). The contractor must provide proof of compliance.
- D. This Section specifies work that shall be performed by Federal and State of California approved methods. It is the Contractor's responsibility to implement his work in full compliance with Federal, Local and State of California regulations.
- E. At least three days before the start of dewatering activities, a written notification shall be sent to the Owner.
- F. Activities for which the Contractor shall be responsible and which are covered by this Section include:
  - 1. Collecting groundwater from the construction dewatering systems to assure conformance with Federal, State and Local regulations. The Contractor will obtain all necessary permits.
  - 2. Providing an air stripper, a settling/equalization tank (i.e., sedimentation tank) carbon filters and mobile storage tanks (i.e., vacuum trucks). The mobile storage tanks shall be utilized for the transfer of contaminated groundwater to an approved storage facility.
  - 3. Groundwater samples will be collected from the settling/equalization tanks by the San Bernardino Airport Authority which will assess whether treatment of the groundwater is necessary prior to discharge to the storm water system and determine NPDES discharge criteria compliance.
  - 4. If the San Bernardino Airport Authority determines that groundwater collected during dewatering activities must be treated, the Contractor will be required to transport the contaminated groundwater in the mobile storage tank to the storage facility.

### 1.3 PERFORMANCE REQUIREMENTS

- A. Dewatering Performance: Design, furnish, install, test, operate, monitor, and maintain dewatering system of sufficient scope, size, and capacity to control hydrostatic pressures and to lower, control, remove, and dispose of ground water and permit excavation and construction to proceed on dry, stable subgrades.
1. Delegated Design: Design dewatering system, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
  2. Continuously monitor and maintain dewatering operations to ensure erosion control, stability of excavations and constructed slopes, that excavation does not flood, and that damage to subgrades and permanent structures is prevented.
  3. Prevent surface water from entering excavations by grading, dikes, or other means.
  4. Accomplish dewatering without damaging existing buildings, structures, and site improvements adjacent to excavation.
  5. Remove dewatering system when no longer required for construction.

### 1.4 SUBMITTALS

- A. The Contractor shall submit complete dewatering plan to include, but not limited to:
1. Prior to the initiation of site work, the Contractor shall certify that all personnel assigned for the purpose of performing project tasks in accordance with the provisions of the HASP and have received appropriate safety training in compliance with 29 CFR 1910.120. Documentation of all such training shall be submitted for review before any on-site personnel will be allowed in an area where worker protection is required by the Contractor's HASP.
  2. The air stripper, settling/equalization tank, carbon filters, well points, pumps, piping, hoses, sheeting, shoring and bracing and all equipment and materials required for the dewatering.

### 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer that has specialized in design of dewatering systems and dewatering work.
- B. Regulatory Requirements: Comply with governing EPA notification regulations before beginning dewatering. Comply with hauling and disposal regulations of authorities having jurisdiction.
- C. The Contractor is responsible for performing field chemical quantitative analysis using portable gas chromatograph instrumentation for evaluation of groundwater from dewatering activities and/or visual inspection. The San Bernardino Airport Authority Port Authority will direct the General Contractor to:
1. Discharge groundwater into the storm sewer system if the quality of the groundwater meets the NPDES Permit requirements, or;
  2. Transport the groundwater in the mobile storage tank for the transfer of the groundwater to the storage facility.

## 1.6 PROJECT CONDITIONS

- A. Interruption of Existing Utilities: Do not interrupt any utility serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility according to requirements indicated:
  - 1. Notify Engineer no fewer than five days in advance of proposed interruption of utility.
  - 2. Do not proceed with interruption of utility without Engineer's written permission.
- B. Project-Site Information: A geotechnical report has been prepared for this Project and is available for information only. The opinions expressed in this report are those of geotechnical engineer and represent interpretations of subsoil conditions, tests, and results of analyses conducted by geotechnical engineer. Owner will not be responsible for interpretations or conclusions drawn from this data.
  - 1. Make additional test borings and conduct other exploratory operations necessary for dewatering.
  - 2. The geotechnical report is included elsewhere in the Project Manual.
- C. Survey Work: Engage a qualified land surveyor or professional engineer to survey adjacent existing buildings, structures, and site improvements, establishing exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations.
  - 1. During dewatering, regularly resurvey benchmarks, maintaining an accurate log of surveyed elevations for comparison with original elevations. Promptly notify Engineer if changes in elevations occur or if cracks, sags, or other damage is evident in adjacent construction.

## 1.7 RESPONSIBILITY OF THE CONTRACTOR

- A. The Contractor shall be responsible for adhering to regulations, Specifications, and recognized standard practices related to the management of contaminated groundwater. The Owner shall not be responsible at any time for the Contractor's violation of pertinent Local, State or Federal regulations or endangerment of laborers, passers-by or any others.
- B. Dewatering operations shall comply with the requirements of appropriate regulatory agencies. Permits to initiate dewatering activities must be obtained by the Contractor through the appropriate water management district.
- C. Minimum precautions noted in this Section shall in no way relieve the Contractor of the responsibility for implementing stricter health and safety precautions should they be warranted by the Work.

## 1.8 OVERVIEW OF MANAGEMENT OF GROUNDWATER FROM DEWATERING

- A. The concentration and nature of contamination may vary depending on location and/or depth of dewatering.
- B. Groundwater from dewatering shall be pumped directly from the excavation by the Contractor to a settling/equalization tank.
- C. The purpose of the settling/equalization tanks is to settle out construction related and other sediment in the treatment system influent stream. The San Bernardino Airport Authority will sample sediment material upon removal from the tank by the Contractor and identify disposal options.

## 1.9 SAMPLING PROTOCOL

- A. Field screening (jar head space analyses) will be performed by the San Bernardino Airport Authority on groundwater samples collected from dewatering activities at a minimum frequency of daily and will involve:
1. Visual and olfactory inspection. The presence of a hydrocarbon (fuel) sheen will trigger the requirement to treat the groundwater at the treatment facility.
  2. Headspace analysis for total VOCs with a portable photoionization detector. Detection of VOCs in headspace at a concentration exceeding 10 ppmv above background is the threshold for the requirement to treat groundwater in the storage facility.
  3. Gas chromatographic analysis via modified EPA Method 3800. Detected concentrations exceeding regulatory limits will be the thresholds for groundwater treatment. Gas chromatographic analyses will be conducted by the Port of Oakland utilizing an on-site gas chromatograph (GC). The San Bernardino Airport Authority will be responsible for providing all required material and equipment for operating the GC.
- B. If any of the above criterion are exceeded, the San Bernardino Airport Authority will direct the Contractor to transport the water off site for disposal. If none of the criterion are exceeded, the San Bernardino Airport Authority will direct the Contractor to discharge the groundwater from the sedimentation tank(s) to the storm water discharge system.
1. Laboratory chemical analyses of settling/equalization tank samples collected will be in accordance with the latest versions of the following:
    - a. Volatile Organic Compounds (VOCs) - USEPA Method 8260.
    - b. Semi-Volatile Organic Compounds (SVOCs) - USEPA Method 8270.
    - c. Total Petroleum Hydrocarbons (TPH) - USEPA Modified Method 418.1.
    - d. Dissolved RCRA(8) Metals plus Beryllium, Copper, Nickel, and Zinc.
    - e. pH - ASTM Method D 516-88.
    - f. Total Suspended Solids (TSS) - Standard Method - SM-2540D.
    - g. Toxicity Testing Requirements – State of California
  2. Samples will be collected by the San Bernardino Airport Authority from influent and effluent sampling ports built into the equalization/settling tank.
- C. DECONTAMINATION OF EQUIPMENT
1. Tools and equipment which are to be taken and reused off-site shall be decontaminated. This requirement shall apply to all tools, treatment process equipment, and sampling equipment.

## PART 2 - PRODUCTS (Not Used)

## PART 3 - EXECUTION

### 3.1 MOBILE HOLDING TANK

- A. The contractor shall have on site Mobile Holding Tank(s) for transporting contaminated groundwater pumped from excavations to storage facility if dewatering is required. The tank(s) shall be a minimum of 5,000 gallon capacity and be complete with a PTO driven pump, hoses, sump, fuel and driver.

### 3.2 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by dewatering operations.
  - 1. Prevent surface water and subsurface or ground water from entering excavations, from ponding on prepared subgrades, and from flooding site and surrounding area.
  - 2. Protect subgrades and foundation soils from softening and damage by rain or water accumulation.
- B. Install dewatering system to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.
  - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.
- C. Provide temporary grading to facilitate dewatering and control of surface water.
- D. Monitor dewatering systems continuously.
- E. Promptly repair damages to adjacent facilities caused by dewatering.
- F. Protect and maintain temporary erosion and sedimentation controls, which are during dewatering operations.

### 3.3 INSTALLATION

- A. Install dewatering system utilizing wells, well points, or similar methods complete with pump equipment, standby power and pumps, filter material gradation, valves, appurtenances, water disposal, and surface-water controls.
  - 1. Space well points or wells at intervals required to provide sufficient dewatering.
  - 2. Use filters or other means to prevent pumping of fine sands or silts from the subsurface.
- B. Before excavating below ground-water level, place system into operation to lower water to specified levels. Operate system continuously until drains, sewers, and structures have been constructed and fill materials have been placed or until dewatering is no longer required.
- C. Provide an adequate system to lower and control ground water to permit excavation, construction of structures, and placement of fill materials on dry subgrades. Install sufficient dewatering equipment to drain water-bearing strata above and below bottom of foundations, drains, sewers, and other excavations.
  - 1. Do not permit open-sump pumping that leads to loss of fines, soil piping, subgrade softening, and slope instability.
- D. Reduce hydrostatic head in water-bearing strata below subgrade elevations of foundations, drains, sewers, and other excavations.
  - 1. Maintain piezometric water level a minimum of 24 inches (600 mm) below surface of excavation.

- E. Dispose of water removed by dewatering in a manner that avoids endangering public health, property, and portions of work under construction or completed. Dispose of water and sediment in a manner that avoids inconvenience to others. Provide sumps, sedimentation tanks, and other flow-control devices as required by authorities having jurisdiction.
- F. Provide standby equipment on site, installed and available for immediate operation, to maintain dewatering on continuous basis if any part of system becomes inadequate or fails. If dewatering requirements are not satisfied due to inadequacy or failure of dewatering system, restore damaged structures and foundation soils at no additional expense to Owner.
  - 1. Remove dewatering system from Project site on completion of dewatering. Plug or fill well holes with sand or cut off and cap wells a minimum of 36 inches (900 mm) below overlying construction.
- G. Damages: Promptly repair damages to adjacent facilities caused by dewatering operations.
- H. The contractor shall have on site Mobile Holding Tank(s) for transporting contaminated groundwater pumped from excavations to storage facility. The tank(s) shall be a minimum of 5,000 gallon capacity and be complete with a PTO driven pump, hoses, sump, fuel and driver.
- I. Control grading around excavations to prevent surface water from flowing into excavation areas.
- J. Drain or pump as required to continually maintain all excavations and trenches free of water or mud from any source, and discharge to approved drains, channels or mobile storage tanks. Commence when water first appears and continue until Work is complete to the extent that no damage will result from hydrostatic pressure, flotation, or other causes.
- K. Remove subgrade materials rendered unsuitable by excessive wetting and replace with approved backfill material.
- L. Cap fuel pipe immediately to keep water from accessing the fuel pipe.
- M. When dewatering is required to complete the scope of work and potentially contaminated groundwater may be drawn into the dewatering system, the Contractor must provide on-site groundwater remediation services.
- N. The Contractor shall provide an Air Stripper Unit capable of treating the maximum calculated volume of groundwater drawn into the well-point/sock dewatering system. This includes the initial "surge" volume and the status column produced after drawdown has occurred. The air stripper will be linked to the discharge time of the dewatering system.
  - 1. The Contractor must obtain the necessary discharge permit for dewatering operations.
  - 2. Influent and effluent samples for laboratory analysis will be collected and analyzed at a certified laboratory during the course of dewatering. The Permit will outline the frequency, required laboratory test methods, and California Environmental Protection Agency and the Department of Toxic Substances Control Reporting Requirements.
  - 3. A portable gas chromatograph (GC) is an acceptable tool in analyzing the influent and effluent samples; however, for all sampling events associated with groundwater treatment during dewatering, a representative of a firm operating under a current CQAP must complete all relevant sampling activities.
  - 4. Contractor assumes all responsibility and liability, and agrees to absorb all costs associated with any addition assessment and/or remediation tasks which are the direct or indirect result of

contaminant transfer from the Air Stripper/Dewatering System to surface water bodies, and/or soils, and/or drainage systems present in proximity to or at a distance from the project site. The Contractor must take precautions to avoid contaminant transfer from the work site to any other on-site or off-site location.

### 3.4 FIELD QUALITY CONTROL

- A. Provide continual observation to ensure that subsurface soils are not being removed by the dewatering operation.

### PART 4 - METHOD OF MEASUREMENT

- A. Measurement for Dewatering shall be the number of days it is necessary for the Contractor to perform Dewatering operations at the project location in accordance with the Airport's NPDES Permit. Measurement shall also include but not be limited to any incidental items for Dewatering, such as lawful discharge of dewatering water, any equipment to perform dewatering operations, transportation of water, disposal, storage, etc. in accordance with the plans, Technical Specifications, and Contract Documents.

END OF SECTION 312319