LANGAN TREADWELL ROLLO

Memorandum

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To: Kate Aufhauser, Golden State Warriors
Clarke Miller, Strada Investment Group

From: Dorinda Shipman, PG, CHG
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Re: Construction Dewatering Discharge Options
Golden State Warriors Arena
San Francisco, California
Langan Project No.: 731617205

This memorandum presents the dewatering discharge options for the Golden State Warriors Arena construction. Construction activities requiring groundwater dewatering will commence in Fall 2015 and is expected to last approximately nine months. The initial estimated and peak water discharge rate will start at 1,850 gallons per minute (gpm) and will likely last three to four days. By the end of the first week, the discharge rate will reduce to approximately 300 gpm. By the end of the second week, the discharge rate will reduce to approximately 100 gpm. By the end of the initial 45 day construction period, the discharge rate will reduce to approximately 30 to 40 gpm; this rate is expected to last the duration of the remaining construction period approximately seven and a half months.

The three potential construction dewatering discharge options are:

1) SFPUC combined sewer system;
2) Treated water to the San Francisco Bay (Bay); and
3) Combination treated water to Bay and to SFPUC combined sewer system.

These options are summarized below.

1. SFPUC Combined Sewer System

This option involves discharging extracted water to the SFPUC combined sewer system at a 16th Street and Illinois Street location. This discharge would be authorized under a SFPUC Batch Discharge Permit application. Discharged water at 16th Street and Illinois is routed through the Mariposa Pump Station (MPS) for ultimate treatment at the Southeast Treatment Plant. No on-site treatment of groundwater would be required prior to discharge to the SFPUC combined sewer system.

Due to the anticipated nine month construction dewatering period, water sample collection (prior to discharge to the SFPUC combined sewer system) may be required for analysis of specified constituents listed in Appendix 1.0 of the permit. The completed application should be completed at least seven days prior to the commencement of construction dewatering period.

The batch discharge permit will be issued within three days of receiving the completed permit application and supporting documentation.

There may be discharge capacity restrictions at MPS, specifically during the three to four day period of initial peak flow, which may coincide with the rainy season. Additionally, SFPUC may require dewatering pumps to be shut down if the combined sewer system overflows at any point during the nine month dewatering period (potential shutdowns may last up to four to six hours).

Outstanding issues regarding discharge to the SFPUC combined sewer system include:

- maximum allowable capacity at both the anticipated discharge location (at 16th and Illinois Streets) and MPS need to be confirmed;
- use of wet weather pumps at MPS needs to be confirmed; and
- SFPUC needs to review recent analytical groundwater results to confirm that groundwater meets SFPUC pre-treatment requirements.

2. Treated Water to the San Francisco Bay

This option involves installing an on-site dewatering treatment system designed to treat hydrocarbons and metals that are detected in groundwater. The treatment system would involve a series of sedimentation, sand filtration and resin treatment tanks. Treated water would be discharged to the Bay through a storm water swale discharge point or outfall pipe downstream of Pump Station #5 (i.e. water would not be discharged to or pumped through PS5). Although peak flow could be as high as 1,800 gallons per minute (gpm), a 500 gpm capacity treatment system is anticipated to be feasible assuming discharge can be reduced over the first week.

Discharge to the Bay would be authorized and monitored under the San Francisco Regional Water Quality Control's (Water Board) Order Number R2-2012-0012: Volatile Organic Compounds (VOCs) and Fuel General Permit. Approximately one month is required for Water Board approval of a completed permit notice of intent (NOI) to discharge application. A public and/or Board comment period would not be required.

A treatability study would be conducted prior to installing the full-scale treatment system to verify the system effectiveness and that treated water meets effluent limits per Table 2 of Order R2-2012-0012. The treatability study is expected to last one week and should be conducted prior to final purchase and with enough lead time for procurement and installation of the full-scale system prior to construction. Potential locations for the on-site treatment system include along 16th Street, directly adjacent to Block 32, and south of the site, across 16th Street at Park 23 (P23). PS5 and P23 are currently owned and operated by the Mission Bay Development Group (MBDG).

After the treatability study is completed and the full-scale system is installed, construction dewatering will commence. Extracted groundwater would be conveyed to the on-site treatment system. The full-scale treatment system startup is expected to last approximately

two weeks. Water would be monitored at influent and effluent locations on the first and fifth day of startup and monthly and/or quarterly thereafter. Water samples would be analyzed for constituents of interest (total petroleum hydrocarbons as gasoline and diesel, metals, and water quality parameters), as specified in the discharge authorization.

Outstanding issues regarding on-site treatment and discharge to the Bay include verifying whether the overseeing regulatory body for discharge is the Water Board and/or SFPUC.

3. Combined Discharge: Treatment to San Francisco Bay and SFPUC Combined Sewer System

This treatment option involves using an on-site treatment system and discharging treated water to the Bay at the PS5 outfall during the initial construction phase, when discharge rates are highest (an approximate duration of one month). Once the discharge rate decreases, the on-site treatment system would be removed and water would be discharged to the SFPUC combined sewer system at the discharge location at 16th and Illinois Streets. As discussed above, discharge to the Bay would be authorized and monitored under the Order Number R2-2012-0012 and discharge to the SFPUC combined sewers system would be authorized and monitored under an SFPUC Batch Discharge Permit.

Outstanding issues regarding combined discharge to the SFPUC combined sewer system and the Bay include those listed above under Options 1 and 2.