

Site and Technical Constraints

King County is building the Murray Combined Sewer Overflow (CSO) Control Facility to help clean up Puget Sound and comply with state and federal regulations. The facility will be built immediately east of Lowman Beach Park on Beach Drive Southwest in West Seattle. The facility includes a 1 million gallon storage tank, supporting pumps and electrical equipment, odor control equipment and a standby generator. The odor control and generator will serve the tank and the existing Murray Pump Station in Lowman Beach Park.

Since October 2010, the Murray CSO project team has been developing a preliminary design of the facility through a facility needs analysis, site assessments, community meetings and discussions with permitting authorities. The site assessment, facility analysis and discussions with permitting authorities have yielded the following constraints to the project's design:

Murray Avenue Right of Way

- The Murray Avenue right of way may be improved for use as an access to the new facility.
- No structures or below grade facilities may be built in the Murray Avenue right of way immediately south of the project site. The facility design must allow for excavation down to Seattle Public Utilities' (SPU) existing 48-inch sewer in the Murray Avenue right of way.

Building Orientation

- To minimize facility footprint, all below-grade facilities must reside within the storage tank's shoring ring.
- Above grade structures must be setback 10 feet from the property line. Locating the southern edge of the above grade structure parallel to the Murray Avenue right of way maintains the required 10-foot setback and maximizes the site area north of the structure for other uses.
- The above and below grade structures should be aligned to optimize structural integrity, ease of operation and maintenance use, and efficiency in the design and footprint.
- Operational access to below grade equipment requires approximately 70 percent of the top slab be accessible to vehicles. Locating above grade structures on the tank and in a position to serve as a retaining wall for Lincoln Park Way limits access to the top slab on the eastern sector of the below grade circular structure.
- Locating the eastern edge of the above grade structure in the slope of Lincoln Park Way allows the buildings to serve as a retaining wall for the adjacent Lincoln Park Way steep slope. Geotechnical conditions limit the wall's height to 14 feet.
- Roof configuration should be coordinated with the structural walls below.

Building Orientation (continued)

- Pipes/ducts/electrical utilities from the existing Murray Pump Station are routed to the CSO facilities through a corridor located north of the CSO facilities. This alignment simplifies the design and avoids conflicts with existing utilities in the rights-of-way including large sewer pipes entering the existing pump station.
- Rotating and shifting the above grade structures has the following trade offs for the facility's engineering, operational reliability and constructability:
    - Reduced access to a majority of the top of the tank for wheeled vehicles which is necessary for operation and maintenance of equipment in the areas and rooms below.
    - No access to the odor units from above within the storage tank ring results in a need to locate the odor control units outside the circle; either in Murray Ave right of way, which is not permitted by SPU, or on the north side of buried tank which increases the footprint of the facility.
    - The corresponding rotation or reconfiguration of the below grade areas/rooms would limit functionality and the ability to operate and maintain the facility.
    - Access to the below grade areas would likely be through the above grade structure, increasing the size of the above grade structure.
    - Does not take advantage of the eastern wall of the above grade structure to act as a retaining wall for Lincoln Park Way Southwest slope.

Storage Tank

- The circular underground storage tank location provides the maximum footprint within the site's limits and maintains a constructible cut into the slope of adjacent Lincoln Park Way.
- Tipping buckets are used to clean the tank after a storm and are located in a below grade tipping bucket gallery. Tipping bucket locations result in the tipping bucket gallery extending across the entire length of the storage tank.
- The tipping bucket gallery requires a stairway access separate from the odor control room stairway, and either hatches or removable panels for ground level access to equipment below.
- The viewing gallery requires a catwalk extending below grade across the top of the tank to allow operations staff to inspect conditions in each channel.
- The viewing gallery requires access hatches for safe access and egress.
- The viewing gallery catwalk and tipping bucket gallery must be located in opposite sectors of the tank to accommodate installation and safe, reliable operation of the tank.
- Drainage pumps are provided in the storage tank. Hatches are required for pump maintenance.

Odor Control Room

- The odor control room is below grade and above the storage tank to simplify maintenance. This room requires stairway access separate from tipping bucket gallery.
- The odor control vessels in the odor control room require a suitable road and hatches above them for maintenance.
- With access to the facility from Murray Avenue right of way and the need to access the top of the odor scrubbers, the odor scrubber access hatches must be located in an area where wheeled vehicles can directly access the hatches from the Murray Avenue right of way.
- Routing of utilities into the below grade rooms can best be achieved by having the odor control room accessible from the northern edge of the circular footprint.
- The tipping bucket gallery and viewing gallery must occupy opposite sectors of the below grade circular tank, leaving only the center sector of the tank for the odor control room.

Engine Generator Room:

- The engine generator room and diesel fuel storage tank should be located close to each other.
- The engine generator room requires at least one and preferably two exposed walls to accommodate intake and exhaust air. The louvers require an approximately 12 foot x 12 foot opening in each wall.
- The engine generator room requires adequate access to allow removal of larger components of the engine generator without removing the exhaust or intake louver.
- The engine generator room requires a minimum clear height to allow for engine maintenance and an engine exhaust silencer. The current estimation for minimum clear height is 16 feet. This estimation may be further optimized as part of the design process.

Electrical Room:

- The electrical room is located above grade to prevent flooding and groundwater intrusion.
- The electrical room floor plan requires adequate space to allow an equipment arrangement that provides working space clearances in-front-of and around electrical panels per the National Electrical Code.
- The Electrical Room will need two means of access and egress. Exterior door size must allow for equipment installation or removal – minimum 4 feet wide x 8 feet high.

Mechanical Room:

- The mechanical room must be located above grade due to equipment requirements.
- The mechanical room exterior door size must be at least 6 feet wide x 8 feet high to allow for equipment installation and maintenance.

###