Memo - KC WPTP ME Sequencing-Temporary Odor Control-100% Submittal

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# MEMORANDUM

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| To: | File |
| From: | Ken Andersen, PE |
| | Project Manager |
| Date: | July 21, 2020 (updated September 28, 2020) |
| Project: | West Point Treatment Plant Primary Sedimentation Area Roof Structure Project |
| | King County WTD Project No. 1127489 |
| Subject: | Phasing and Sequencing of M&E Construction and Requirements for Temporary Odor Control |

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**Background**

Sequencing and scheduling of the construction is determined by the General Contractor as part of their "means and methods" and approach to construction. Sequencing and scheduling of the work will vary from contractor to contractor depending on a number of factors. Although the over-all construction schedule is the responsibility of the contractor, there are some requirements that the contractor must conform to and incorporate into his schedule. The following paragraphs summarize some of the restrictions on construction activities that will be incorporated into the project documents. The memo also describes a possible sequencing of work associated with the removal and replacement of the odor control ductwork.

The primary sedimentation roof structure project includes demolition of a majority of the existing concrete Z-beams, girders and columns from both the East and West Sedimentation Basins. A substantial amount of the odor control ductwork, electrical conduit and lighting fixtures are supported on or suspended from the roof framing. Existing odor control ducts will have to be removed prior to demolition of the roof framing.

Phasing and sequencing assumptions and restrictions include the following:

- In-tank work will occur during the dry season, identified as from approximately May thru September of each year.
- Roof demolition and other construction activities can occur year round.
- Nine of the twelve tanks for the combined East and West Basins must be operational at all times. The contractor will be given access to three tanks at a time (a "quadrant" – 1/4$^{th}$ of the total number of tanks).
- Construction in the East Basin tanks will occur in 2021, commencing in the spring of 2021.
    - The contractor will start construction in the north quadrant, tanks 1E, 2E and 3E.

    - Tanks 1E, 2E and 3E will be drained and turned over to the contractor no later than May 17, 2021.
    - Once in tank work is complete in the north quadrant of tanks, and the tanks are placed back into service, the contractor will be given access to the south quadrant of tanks, tanks 4E, 5E and 6E.
    - The East Basin must be placed back in service no later than 6:00 PM on September 17, 2021.
- Construction in the West Basin tanks will occur in 2022, commencing in the spring of 2022.
    - The contractor will start construction in the south quadrant, tanks 4W, 5W and 6W.
    - Tanks 4W, 5W and 6W will be drained and turned over to the contractor no later than May 16, 2022.
    - Once in tank work is complete in the south quadrant of tanks, and the tanks are placed back into service, the contractor will be given access to the north quadrant of tanks, tanks 1W, 2W and 3W.
    - The West Basin must be placed in service no later than 6:00 PM on September 16, 2022.
- Removal and replacement of the odor control work must be coordinated with in-tank construction. Overhead or roof related construction shall not proceed simultaneously with in-tank construction unless appropriate safety provisions are in place to prevent injuries or damage from falling debris or crane/lifting operations.
- When a quadrant of tanks is out of service, the odor control system for the other quadrant of tanks must remain operational
- As the new odor control ducts will be installed at the same locations or close to the same locations as the existing duct runs, temporary odor control ductwork will be required while existing ducts and supports are removed and replaced. The quantity, location and sequencing for temporary odor control will depend on the contractor's methodology and schedule.
- Certain tasks will require the temporary shutdown of the odor control system, even for active tanks. These include:
    - Connection of temporary ductwork to existing ductwork
    - Connection of temporary ductwork to fans
    - Connection of new ductwork to fans

  Shutdowns will occur during the low flow summer season and are anticipated to have a duration of one to three days. Depending on the Contractor's sequencing of the work, we anticipate 3-5 shutdowns per basin. Shutdowns need to be identified in the Contractor's schedule and coordinated with WPTP O&M well in advance of execution of the work. The following narrative on mechanical sequencing identifies possible shutdowns based on our assessment of how the removal and replacement of the odor control ductwork will proceed.

**Sequencing – Mechanical**

The sequencing and scheduling of construction associated with the removal and replacement of mechanical and electrical systems is determined by the General Contractor and is affected by the Contractor's approach and schedule for the removal of the roof Z-beams. The following paragraphs describes a possible sequence of tasks associated with the removal and replacement of the odor

control ductwork and the use of temporary ductwork to maintain a functioning odor control system when any tanks with a basin are in use.

Phase 1 – East Basin, Sedimentation Tanks 1E, 2E and 3E under Renovation

1) Cap airtight the main 32" ducts at column line H, at the east and west side of the East Basin.
2) Demolish N-S ducts, north of grid H, that serve tanks 1E through 3E.
3) Exhaust fans EF22BA061, EF22BA051 and EF22BA021 remain in operation. This maintains the odor control system for tanks 4E to 6E.
4) Provide 32" temporary duct from column line H to exhaust fan EF22BA051. The E-W section of temporary duct can be installed on the flat "canopy" roof. The location of the temporary N-S ducts on both ends of the basin will depend on the contractor's schedule for Z-beam removal. The temporary ductwork could also be installed on the operating level of the basins, if acceptable to WPTP O&M staff. Exhaust fan EF22BA051 serving the East Basin shall be temporarily re-balanced to 22,260 CFM, all other fans perform at their full capacity.
5) Provide temporary ductwork from the existing fiberglass duct serving Influent Screenings Building to exhaust fan EF22BA061. The duct could be installed on the canopy roof. Exhaust fan EF22BA061 shall operate at its full capacity. *Task 5 results in a temporary shutdown of the odor control system for the Influent Screenings Building*.
6) Provide ductwork and its supports serving tanks 1E to 3E on the east and west side of the East Basin. Each branch serving those tanks shall be roughly balanced to the CFM indicated on the air flow diagram on contract drawing no. M132. The scheduling of this portion of Phase 1 is very dependent on the contractor's schedule for roof demolition. The supports or stanchions for the new ducts are supported on steel frames which span between the existing concrete girders between grids 2E and 4E and grids 19E and 20E. These girders were retained specifically to support the steel frames that support the new duct stanchions. All Z-beams in these two areas must be removed prior to setting the steel support frames. In-tank work for tanks 1E to 3E is anticipated to be complete in the Fall or early Winter of 2021. Z-beam removal may not be complete until December 2021. The ductwork required to return operation of the odor control system to tanks 1E to 3E may be either additional temporary duct, or permanent duct, depending on the contractor's schedule for removal of the Z-beams in this area of the roof. Options for task 6 include:

   6a. Install temporary ductwork supporting tanks 1E to 3E. The temporary ductwork may need to remain in operation after tanks 1E to 3E are placed back into operation.
   6b. Install permanent ductwork supporting tanks 1E to 3E. This assumes that the Z-beams in this area are removed and the new steel framing for supporting the new ducts is installed.

Phase 2 – East Basin, Sedimentation Tanks 4E, 5E and 6E under Renovation

1) Connect ductwork serving tanks 1E to 3E, either temporary or permanent, to the 32" temporary duct at column line H, at the east and west side of the East Basin.

2) Connect temporary duct serving tanks 1E to 3E to fan EF22BA051. *Task 2 results in a temporary shutdown of the odor control system for all six tanks in the East Basin*.
3) Demolish existing ducts serving tanks 4E to 6E.
4) Provide permanent duct to the Influent Screenings Building.
5) Connect permanent duct from the Influent Screenings Building to fan EF22BA061. Demolish temporary duct serving the Influent Screenings Building. *Tasks 5 results in a temporary shutdown of the odor control system for the Influent Screenings Building until the connection is completed*.
6) After the Influent Screenings Building foul exhaust system is completed, balance EF22BA061 to the CFM indicated in the schedule on contract drawing no. M002.
7) Provide new duct and supports from column line H (at both the east and west ends of the East Basin) up to fan EF22BA051. (This task could be completed only if the Z-beams in this area of the roof have already be removed.
8) Connect new duct serving tanks 1E to 6E to fan EF22BA051 and demolish temporary duct. *Task 8 results in a temporary shutdown of the odor control system for tanks 1E to 6E until the connection is completed*.
9) After the East Basin foul exhaust system is completed, balance each foul air intake to the CFM indicated on Air Flow Diagram on drawing M132 and balance EF22BA051 to the CFM indicated in schedule on drawing M002.

<u>Phase 3 – West Basin, Sedimentation Tanks 4W, 5W and 6W under Renovation</u>

1) Provide temporary duct from grid H to grid Q on the east and west ends of the West Basin to allow Z-beam removal to proceed prior to the commencement of in-tank work
2) Connect temporary duct to existing ductwork serving tanks 1W through 3W on both the east and west side of the West Basin.
3) Connect existing duct from the Influent Screenings Building. Combined temporary ducts serving tanks 1W through 3W and Influent Building shall be connected to existing EF22BA021. *Task 3 results in a temporary shutdown of the odor control system for tanks 1W to 6W and the Influent Screenings Building until the connection of the temporary N-S duct to the existing EW duct and exhaust fan is completed*.
4) Provide temporary duct from grid P to exhaust fan EF22BA021.
5) Exhaust fan EF22BA021 serving the West Basin shall be temporarily re-balanced to 18,515 CFM. All other fans perform at their full capacity.
6) Remove existing ducts serving tanks 4W through 6W.
7) Once in-tank work commences in tanks 4W to 6W, provide new permanent ducts serving tanks 4W through 6W – cap new ductwork airtight at grid H.
8) Provide a new section of north/south duct connecting the duct serving the Influence Screenings Building to the new permanent duct. Connect to EF22BA021. *Task 6 results in a temporary shutdown of the odor control system for tanks 1W to 6W and the Influent Screenings Building until the connection of the temporary N-S duct to the existing EW duct and exhaust fan is completed*.

9) Exhaust fan EF22BA021 serving the West Basin shall be temporarily re-balanced to 25,920 CFM. All other fans perform at their full capacity.

<u>Phase 4 – West Basin, Sedimentations Tank 1W, 2W and 3W under Renovation</u>

1) Demolish existing duct serving tanks 1W to 3W.
2) Exhaust fans EF22BA021 to remain in operation.
3) Provide new ductwork serving tanks 1W to 3W on both the east and west side of the West Basin.
4) Connect new ductwork serving tanks 1W to 3W to new duct at column line H, at the east and west side of the West Basin.
5) After the West Basin foul exhaust system is completed and balance each foul air intake to the CFM indicated on the Air Flow Diagram on drawing M132, balance EF22BA021 to the CFM indicated in the schedule on drawing M002.

**Sequencing - Electrical**

The schedule for the removal and replacement of existing electrical system components, including conduits, conductors and motors, is part of the Contractor's means and methods. The issues impacting the sequencing of the electrical work are not as restrictive as for the removal and replacement of the odor control ductwork, but must consider several factors, including

- Roof Demolition: Much of the electrical system components are supported from the underside of the Z-beams. Conduits must be either removed and replaced prior to roof demolition or supported on temporary or permanent frames.
- In-Tank Work: Tanks will be taken out of operation in each basin in quadrants. Electrical work, including the removal and replacement of motors operating the flights, must ensure that power is supplied to active, in use tanks at all times.
- Illumination must be provided for all sedimentation basin zones during in-tank work, demolition, and construction to facilitate 24/7 operation of the facility. Temporary lighting shall be provided with manual on/off control of each zone within the sedimentation basin.

The sequencing issues associated for the East and West Basins are essentially the same for each basin, therefore an approach to the electrical work is provide for the East Basin only. The main difference is that in-tank work in the East Basin will commence in the north quadrant of tanks, whereas in-tank work in the West Basin will commence in the south quadrant of tanks.

1) Prior to roof demolition, install temporary lighting, permanent supports for the primary E-W conduit runs, and install temporary supports under the N-S conduit runs at the east and west ends of the basin.
2) North Quadrant – Once tanks 1E to 3E are out of operation:
   a. Isolate circuits serving equipment and devices for tanks 1E to 3E. Disconnect and remove existing conductors to be demolished.
   b. At the east end of the basin, between grids 14E and 15E, install new conduit on the concrete tie beams on the operating level of the basins. Install conduit to service new pole

mounted light fixtures, within the basin, and new light fixtures under the perimeter canopy roof areas.

c. At the west end of the basin, between grids 3E and 4E, install new conduit along the N-S conduit runs. The conduit will need to be temporarily supported until the new partial roof is constructed.
d. Remove and replace light fixtures under the north canopy roof.
e. Remove and replace wiring devices and motors serving tanks 1E to 3E.
f. Pull new conductors and connect equipment and devices.
g. Remove existing conduits no longer in use.
h. Once roof framing is installed in the partial roof, suspend N-S elevated conduit from new roof framing and remove temporary supports.

3) South Quadrant – Once tanks 1E to 3E are back in service:
   a. Isolate circuits serving equipment and devices for tanks 4E to 6E. Disconnect and remove existing conductors to be demolished.
   b. At the east end of the basin, between grids 14E and 15E, install new conduit on the concrete tie beams on the operating level of the basins. Install conduit to service new pole mounted light fixtures, within the basin, and new light fixtures under the canopy roof areas.
   c. At the west end of the basin, between grids 3E and 4E, install new conduit along the N-S conduit runs. The conduit will need to be temporarily supported until the new partial roof is constructed.
   d. Remove and replace light fixtures under the south canopy roof.
   e. Remove and replace wiring devices and motors serving tanks 4E to 6E.
   f. Pull new conductors and connect equipment and devices.
   g. Remove existing conduits no longer in use.
   h. Once roof framing is installed in the partial roof, suspend N-S elevated conduit from new roof framing and remove temporary supports.
   i. Install light poles.

**Temporary Shutdown of the Odor Control System**

The following tasks will require the temporary shutdown of the odor control system.

- Connection of temporary ductwork to existing ductwork
- Connection of temporary ductwork to fans
- Connection of new ductwork to the fans

We estimate that removal and replacement of the odor control ductwork will require approximately 3-5 shutdowns per basin. Shutdowns will have a short duration – approximately one to three days per shutdown. Shutdowns will occur during the low flow summer season.

**End of memo.**

# Memo - Restrictions Constraints and Options for Crane Operation at the WPTP

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| To: | File |
| From: | Ken Andersen, PE |
| | Project Manager |
| Date: | September 28, 2020 |
| Project: | West Point Treatment Plant Primary Sedimentation Area Roof Structure Project |
| | King County WTD Project No. 1127489 |
| Subject: | Restrictions, Constraints and Options for Crane Operation at the WPTP |

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## Purpose

This memo summarizes our evaluation of the requirements and issues associated with selecting, mobilizing and operating a crane to the WPTP for construction of the upgrades at the East and West Sedimentation Basins to be performed under the Primary Sedimentation Area Roof Structure Project.

### Crane Requirements

General Requirements

This report provides information on options for cranes that will be appropriate for the demolition and construction at the Primary Sedimentation Area Roof Structure Project. Based on project demands and site limitations, the crane will need to meet these basic criteria:

- Pick length and capacity: The crane must have the lifting capacity and pick length to lift the heaviest sections of demolished girders, Z-beams, and columns.
- Mobility: The only route into the site is thru the neighborhood of Magnolia and Discovery Park. The crane must be delivered by truck and will probably need to be assembled on-site. The site access road through the WPTP has additional restrictions and constraints.
- Footprint: The proposed crane will need to fit in the designated contractor staging areas that have been approved by the West Point Treatment Plant. These staging areas are located on the north side of the basins. The north side of the site access loop road ("North Road" for discussion purposes) may need to be temporarily blocked by the crane during lifting operations.
- No below-grade excavation: The West Point Treatment Plant is located on a site that was occupied by Native Americans at one time. Any activity that would disturb the existing soils requires additional permitting and archeological studies and evaluations. Cranes recommended in this report do not require foundations.

The following sections provide more detailed information on site restrictions and crane requirements.

Demolition

Demolition includes the removal, from both the East and West Basins, of the majority of the concrete roof framing members, including all the Z-beams between grids B and P and the majority of the concrete girders and columns along grids D, F, K and M. Table 1 summarizes the quantity, weight and lengths of the existing framing and ductwork to be removed.

| Item | Quantity | | Weight | | Max Length |
|---|---|---|---|---|---|
| | Amount | Unit | (lbs) | (tons) | (ft) |
| Z-Beam | 558 | Each | 10,800 | 5.4 | 38 |
| Girders | 136 | Each | 9,000 | 4.5 | 15 |
| Columns | 128 | Each | 3,600 | 1.8 | 8 |
| Aluminum Ducts | | Lf | Note 1 | | Note 1 |

1. Duct diameter varies from 10” to 54”. A 54” diameter duct x 40 ft length equals approximately 2,200 lbs.

New Construction

Demolition activities will govern the required lifting capacity and requirements for the crane. The weight of the heaviest new component is significantly lower than the weight of the heaviest demolished concrete member. New construction consists primarily of the steel framing and fiberglass decking in the new partial roof areas, steel supports for the ductwork and the new ductwork. The heaviest steel beam will be the W18x50 for the new roof framing, which will be approximately 38 feet in length and weigh approximately 2,000 lbs each. The 54-inch fiberglass duct will weigh approximately 60 plf.

Pick Lengths

The basins are approximately 250-feet wide and 320 feet long. If a crane could be positioned at any location around the perimeter of the basins, the maximum pick length would be approximately 125 feet. However, site access is restricted around the Sedimentation Basins and based on the approved contractor staging areas in Figure 1 the maximum pick length is approximately 200 ft.

**Site Access and WPTP Site Restrictions**

Access to the WPTP

Access to the WPTP is through the neighborhood of Magnolia and Discovery Park. A turning study was performed on the portion of the access route between the intersection of W. Emerson Place and NW 15th Street to the WPTP. This portion of the route follows W. Emerson Place to Gillman Ave. W which turns into W. Government Way and Discovery Park Blvd. The study determined that standard tractor trailer rigs can access the site. Flaggers or lead vehicles may be required depending on the size of the trailer and load. In summary:

- WB-40 design vehicle, with a 33-foot trailer, can maneuver the route without any restrictions.
- Beginning with a WB-50 truck and a 42.5-foot trailer, the trucks may experience difficulty negotiating some of the intersections while staying completely within the lane.
- A WB-67 design vehicle, with a 48-foot trailer, can maneuver through all intersections but will have difficulty staying in its lane.

There are no overpasses between the WPTP and the intersection of Emerson Way and NW 15th Street, but over-head clearance is limited in two locations at the WPTP. The pedestrian overpass at the entrance to the WPTP has a posted clearance of 16'-5". The loop road on the site passes under the Solids Handling Building with a posted clearance of 14'-0". These clearances are noted in Figure 1.

Oversized Vehicles

A load wider than 8.5 feet or 14 feet in height is considered oversized and requires special permits and possibly lead cars.

Traffic Flow Thru the Site

The access road to the WPTP provides a two-lane circular route completely around the East and West Basins. The width of the road varies, depending on location, from approximately 25 feet to 44 feet. The narrowest location is at the northwest corner of the West Basin, adjacent to the propone tanks. Photos 3, 4 and 5 show the loop road around the basins.

For one-way traffic during construction, the contractor should allow for maintaining a minimum one 10-foot wide lane opening at all times. Optionally, WPTP may want to consider closing the North Road completely for certain times of the day to allow for crane operations.

Fire Lane Access

The fire department requires full access to any building at all times. Even if the crane temporarily blocks the North Road during lifting operations, fire department trucks and vehicles can access areas adjacent to the blockage from two directions.

Since the North Road is considered a private road, operations along the road are exempt from standard City or State requirements for traffic along public roadways. However, it is typically recommended to maintain a minimum 10-feet minimum width lane width to allow safe passage of vehicles.

Staging Areas for Cranes

Figure 1 below shows the currently approved staging areas that have been coordinated with the West Point Treatment Plant. Each staging area runs the length of the sedimentation basin and covers a width of approximately 25 feet. As noted above, the WPTP may want to consider allowing closure of the north access road temporarily, which will allow the contractor to use the entire width of the road for crane operations. When cranes aren't in operation, they can be rotated such that two lane traffic can be maintained with cranes aren't in operation.

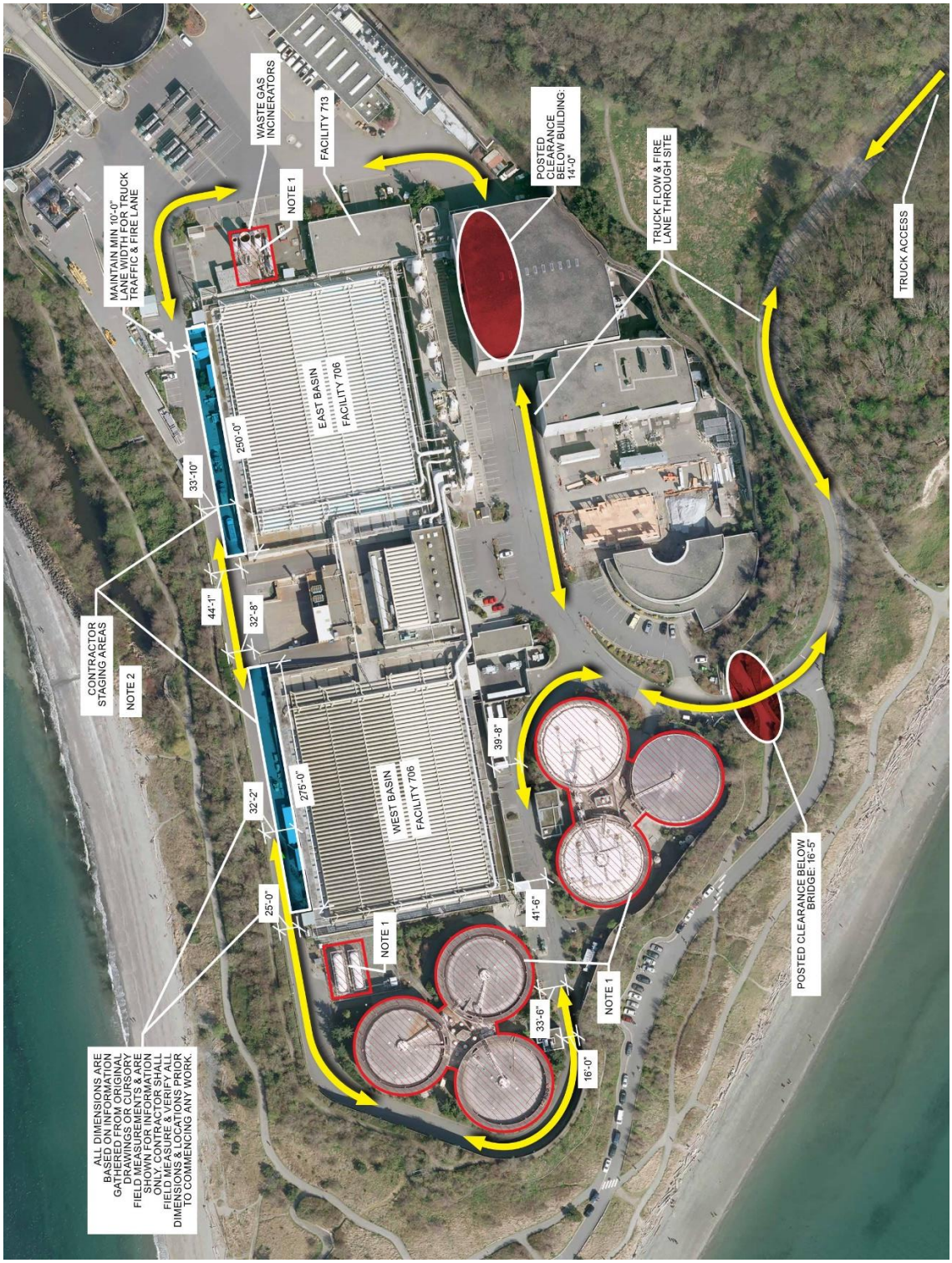


**Figure 1. WPTP Site Access Road and Staging Areas**

**Crane Types**

There are a variety of crane types available for construction projects including mobile cranes (both wheeled and crawler cranes), tower cranes, and gantry cranes. Demolition and constructed could be completed with a variety of mobile cranes. The cranes would be delivered to the site on lowboy tractor trailer rigs. Depending on the size of the crane, it may be necessary to remove the crane from the lowboy to clear the 16'5"height restriction on the entry bridge.

As any construction that requires excavation into existing subgrade for installation of a foundation pad to support the crane would trigger additional permitting and potentially an archeological investigation, cranes that required the construction of a sub-grade pad were not considered. The evaluation focused only on mobile cranes, crawler cranes and gantry cranes.

<u>Tower Cranes</u>

A conventional tower crane consists of a simple tower with a jib (horizontal beam) attached to the top of the tower, with the counterweight attached to the back of the jib arm. This type of crane requires a substantial footing pad at the base. Therefore, tower cranes were not considered for the project.

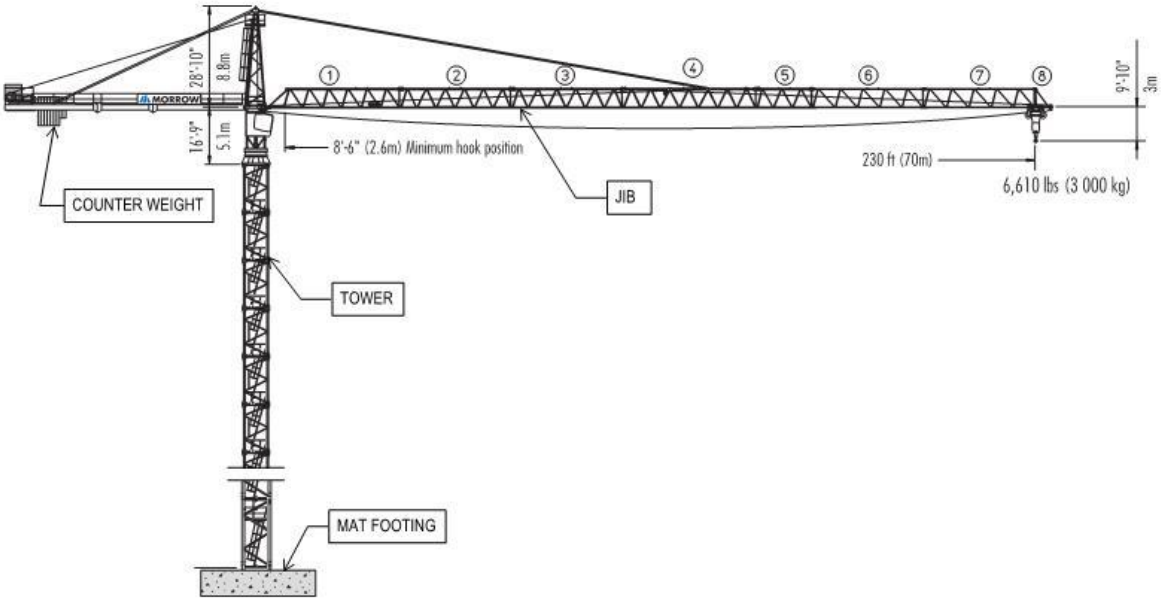


**Figure 2. Tower Crane**

Crawler Cranes

Crawlers are the largest type of mobile crane. These cranes are called "crawlers" because they are mounted on tracks rather than wheels. Because of the size of this type of crane, it is transported to the site on flat-bed trucks in pieces and assembled on-site. There are crawler cranes, available in Seattle, which can be positioned on the north side of the basins and "pick" the heaviest concrete member (Z-beams) from the south side of the basins. Figure 3 shows a typical crawler crane required for the project.

A mobile, telescoping crane is similar to a crawler crane except it is wheel mounted. The "heaviest" mobile crane only has the capacity to "reach" approximately half way across the basins. To remove all the framing members from the basins, a mobile crane would have to operate on both the north and south sides of the basins.

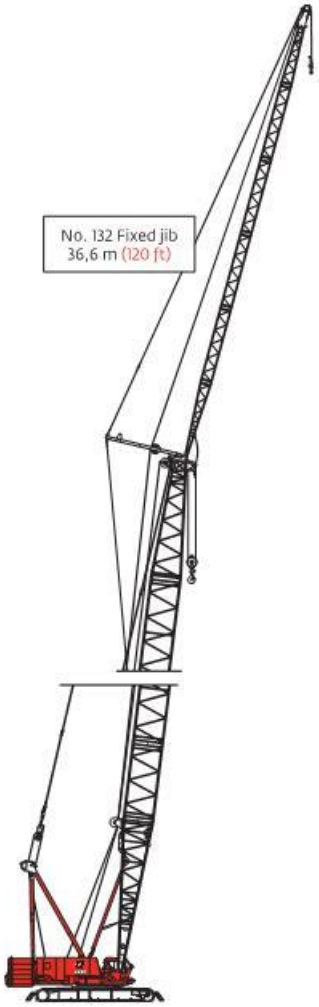


**Figure 3. Crawler Crane**

Self-Erecting Cranes by Potain

Potain is a crane manufacturer that makes self-erecting cranes with a compact footprint. This type of crane is similar in construction to a tower crane except that it does not require a footing. Counterweights are stacked on the base of the crane, rather than on the jib. The self-erecting cranes have limited capacity and reach compared to the crawler cranes.

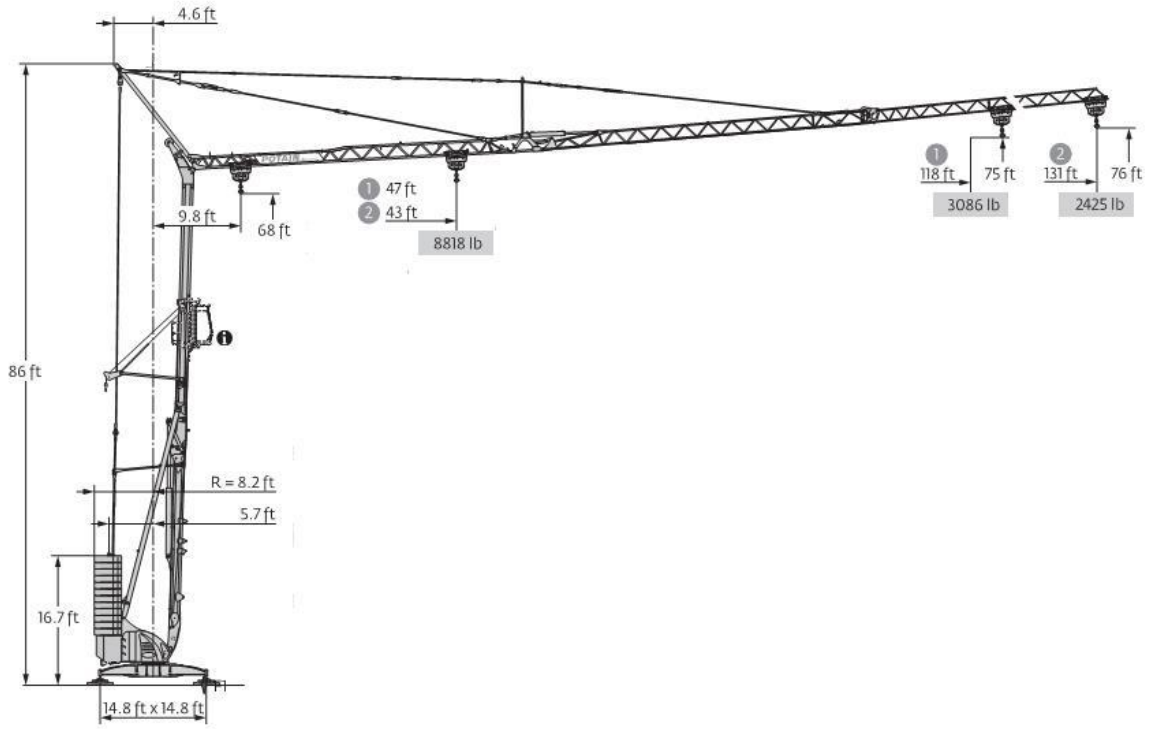


**Figure 4. Potain Self-Erecting Crane**

Gantry Cranes

A gantry crane consists of a frame with supports at both ends and a cross beam with hoist. The end frames are mounted to a roller or track that will allow it to move horizontally. Gantry cranes are constructed of a steel frame and will be erected on-site.


**Figure 5. Gantry Crane (shown on tracks)**

South Plant Roof Demolition

The sedimentation basins at South Plant in Renton, were constructed using the same concrete framing system as constructed at the WPTP. In the 1990's, the roof framing was removed from the sedimentation basins at South Plant. The Z-beams were removed with a gantry crane mounted on the concrete girders supporting the roof framing and loaded onto flat-bed trucks for removal from the site. Further discussion on the gantry crane option is provided in the following section.

**Selected Crane Options**

A local crane supplier was consulted to review crane options for the project and site. Based on those discussions, two options were considered as likely options for the project.

- Crawler Crane: The crawler crane option is to use a single large crane to pick each concrete segment and load directly on to a truck for transport.
- Gantry Crane: The gantry crane involves a gantry crane that picks the concrete z-beams and then rolls them to the end of the basin where it can be picked by a mobile crane or lowered directly on to a truck.

<u>Crawler Crane Option</u>

The crane consultant recommended the Manitowoc 2250 Crawler Crane, shown in Figure 6. The crane would be delivered to the site in segments on a lowboy trailers and assembled on-site.

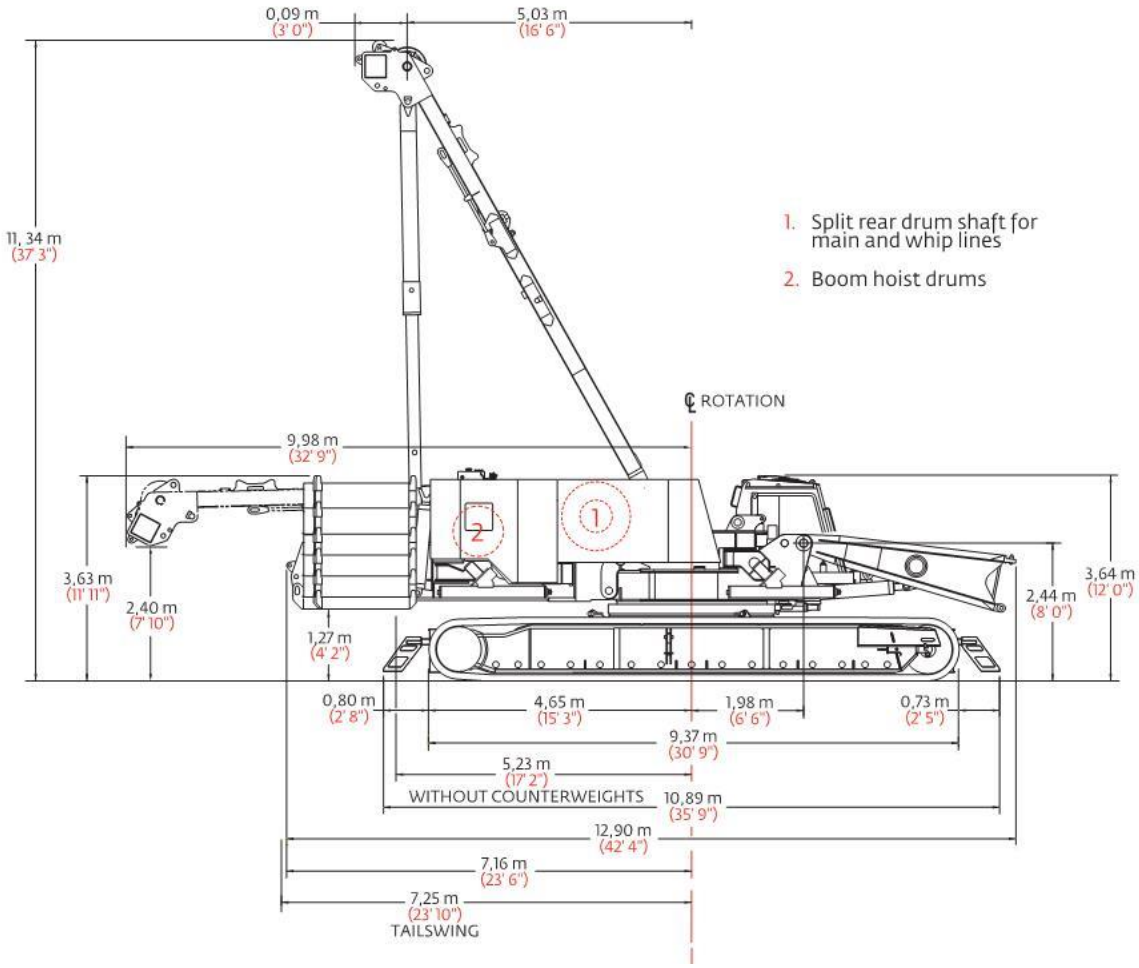


**Figure 6. Manitowoc 2250 Crawler Crane**

The Manitowoc 2250 Crane is compact enough to fit on the north access road near the basins at locations shown in Photo 4 and Photo 6, but also has the capacity and pick length needed to lift all demolished concrete segments from the staging areas on the north side of each basin. The crane is also mobile enough to move along the north access road as required to access different bays within each basin.

As shown in Figure 6, the Manitowoc 2250 is approximately 42-feet long, and will block the north access road temporarily while it is in use. However, the crane can be rotated to allow traffic through if necessary. The width of the crane and tracks is approximately 27-feet.

With the crawler crane, the Z-beams can be suspended while they are cut at the ends or into segments as needed. Scaffolding could be installed on the operating level that supported the Z-beams during cutting operations, with the crane only used for lifting and removal. The cut pieces could then be lifted out and installed onto a flat-bed trailer for transport or placed in a temporary lay-down area.

Depending on the Contractor's approach to roof demolition, it may be possible to use the larger crawler crane to remove the Z-beams and girders from the south side of both basins, and then switch to a mobile telescoping crane for demolition on the north side of the basins.

Gantry Crane Option

This option is similar to the technique used at the South Plant in Renton in the 1990's. A steel-frame platform spanning approximately 40 feet between the existing concrete girders was designed to support, at each end, a lifting frame with hoist (see Photo 1). The steel platform was supported on motorized end trucks that travelled along a crane rail mounted to the top of each concrete girder. The platform could travel the full length of the basins.

At WPTP, crane rails would be installed on the concrete girders. The platform would then have to be lifted, by crane, onto the crane rails. The platform would be installed at the end of the tank closest to the "pick point", the location where the cranes would lift the Z-beams and transfer them to flatbeds. Once the platform was in position, each end of the Z-beam would be suspended in a sling fastened to the hoist. Once the Z-beam is secured, the ends of the beam would be cut loose from the supporting girder. At South Plant, saw cutting was found to be too time consuming. Instead, concrete was jack hammered to expose the steel dowels passing from the beams to the girders. The dowels were cut, releasing the Z-beam from the girder. After each beam is detached from the girder, the platform moves the beam to the pick point for removal.

At South Plant, the "runway" girders supporting the platform were extended beyond the end of the basins with steel framing (see Photo 2). This allowed the platform to travel beyond the end of the basins and lower the Z-beams directly onto flatbeds. Space restrictions at WPTP may not allow this process. It may be necessary to have a second, smaller capacity crane at the site to transfer the Z-beams from the gantry crane to the flatbed trailers. At WPTP, a platform could be constructed at the operating level at each end of the tanks for temporarily stacking the Z-beams until removed by cranes.

Once the Z-beams are removed, the platform would work in reverse order and remove the concrete girders and columns in a similar manner to the removal of the Z-beams. For the first five tanks in a

basin, only one girder/column line can be removed at a time, as the platform needs the two girder lines for operation of the gantry crane. Upon completion of the demolition in a tank, the gantry crane would have to be moved to the next span and proceed with the same process.


**Photo 1. Gantry Crane at South Plant.**
*(Note Z-beam end cuts on side of girders and protective coverings over tanks)*

**Photo 2. Gantry Crane at South Plant.**

**Photo 3. Northwest Corner of East Basin**

**Photo 4. Southwest Corner of West Basin**

**Photo 5. Northwest Corner of West Basin**

**Crane Loads on Existing Galleries and Utilities**

Mobile cranes must be evaluated for travel on the access road and imposed loads on the road surface. The WPTP has a utility tunnel below the north road. The tunnel extends the length of both basins and also extends from the southeast corner of the east basin up to the secondary clarifiers on the east side of the site. Other below-grade structures should be verified by the contractor prior to planning truck access. We reviewed the selected crawler crane and found that the tunnel structure below the north access road has adequate capacity to support the maximum pressures from the assumed crane operations.

**Conclusions**

Two crane options were considered for demolition and construction of the WPTP Primary Sedimentation Area Roof Structure Project.

The crawler crane option utilizes a single large crane for demolition and construction.

Pros:

- No gantry required. This option only requires one crane for demolition and construction.
- The crane has the capacity to pick all members from the north access road.
- Sequencing is flexible. The crane can lift at several locations from the same spot.

Cons:

- The crawler crane is relatively expensive to operate and the contractor may only want to use the crane for a limited time. A smaller crane may be brought in for new construction.
- The crawler crane will temporarily block the north access road while in use. The contractor will need to coordinate with the plant when the crane needs to be moved and rotated to allow access.

The gantry crane option requires a steel frame and possibly a secondary mobile crane.

Pros:

- Using a gantry crane should reduce the capacity and pick length requirements for a mobile crane by rolling the members to be lifted to the end of the basin.
- In some girder bays, it is possible for the gantry to lift the Z-beam and place it directly on to a truck parked at the end of the basin (without a mobile crane).

Cons:

- Requires a mobile crane to pick the Z-beams from the end of the basin.
- The gantry is a custom crane and must be designed and fabricated by the contractor.
- The gantry travel is limited to the girder lines. To lift at different areas, the gantry must be lifted by a crane and placed on a new line.

Both crane options noted above are feasible for the WPTP Sedimentation Area Roof Structure Project. It is possible to use a combination of the two options, or to use different cranes for demolition and construction. The general contractor will be able to coordinate with their subcontractors to determine the best approach to demolition and construction.

**End of memo.**

Memo-KC WPTP-Z-Beam Removal at South Plant

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Ph. (425) 741-3800
File No. 262016.077.002

# MEMORANDUM

| | |
|---|---|
| To: | File |
| From: | Ken Andersen, PE |
| | Project Manager |
| Date: | March 10, 2020 (updated September 28, 2020) |
| Project: | West Point Treatment Plant Primary Sedimentation Area Roof Structure Project |
| | King County WTD Project No. 1127489 |
| Subject: | Z-Beam Removal at South Plant |

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**PURPOSE**

The South Treatment Plant at Renton was designed and constructed in the 1960s. The roof framing over the primary sedimentation tanks at South Plant is essentially the same construction as exists at the West Point Treatment Plant (WPTP) primary sedimentation basins – unique precast, pre-stressed concrete Z-beams that frame into concrete girders supported on concrete columns (Photo 1). In the 1990s, King County, as part of an expansion project at South Plant, removed the roof framing over the sedimentation basins.

Photo 1. Z-Beams, Girders and Columns at the WPTP

On February 23, 2017, Reid Middleton met with WTD South Plant staff to discuss the removal of the concrete framing from the sedimentation basins at South Plant. Several of the South Plant staff in attendance at the meeting were employed at South Plant during demolition and removal of the Z-beams. This memorandum summarizes discussions from that meeting.

**DISCUSSION**

Original Construction

1) South Plant went on line in 1965, approximately one year before the WPTP.
2) The Z-beams were installed in three buildings at South Plant: over the sedimentation tanks, the Maintenance Shop and the Pump Station building. The Z-beams are still in place at the Maintenance Shop and the Pump Station building.
3) Figure 1, the roof demolition plan from the 1990s expansion drawings, shows the layout of the Z-beams at South Plant. Photo 2 is an aerial view of the basins with the Z-beams removed.
4) The Z-beams weigh approximately 280 plf (Figure 2 and Photo 3).
5) The roof at the South Plant sedimentation basins consists of three spans, covering a total of six tanks. The grid spacing between girder/column lines is 35-feet. The cut length of the beams was approximately 34 feet resulting in a weight of approximately 9,500 lbs per beam.
6) South Plant had two identical sedimentation basins with (111) Z-beams per basin, (222) Z-beams total.

Roof Removal (per WTD South Plant Staff)

1) Z-beams were removed one girder at a time, full length. On the East Basin, the contractor installed steel beams at each girder line that supported a rolling gantry crane (Photo 4 thru Photo 7). It appears that the steel "runway" beams were supported on steel columns bearing on the top of the tank walls. It does not appear that the existing concrete columns and girders were used to support the runway beams and gantry crane.
2) The Z-beam to be removed was supported from slings suspended from the gantry crane. With the Z-beam supported, the contractor initially tried to saw cut the ends of the Z-beam but found that this process was too time consuming (up to 3 days per beam). They revised procedures and used jackhammers to expose the rebar that secured the beams to the concrete girders. The rebar were "torched" (cut), freeing the Z-beam from the girders. The crane then transferred the Z-beam to the end of the basin where it was lowered onto flatbed trucks.
3) Z-beams at the West Basin were removed by cranes.
4) Z-beams were removed while the tanks were out of operation. Typically two tanks could be taken down at a time during summer low flow periods.
5) During Z-beam removal, tanks were covered to prevent concrete debris from falling into the tanks.
6) Girder removal: WTD staff did not remember how the girders were removed.
7) Production: WTD staff's comments on production rates for beam removal varied from one to two Z-beams a day to 3-4 Z-beams a day. One WTD staff person stated that Z-beam removal took approximately 60 days.
8) WTD staff does not remember any significant issues during construction.

Comments/Observations

1) Size and Weight: The Z-beams at WPTP span 39 feet resulting in a cut length of approximately 38-feet and a weight of 10,600 lbs. Z-beams at South Plant weighed approximately 9,500 lbs each.
2) Quantity: At WPTP, there are (279) Z-beams per basin or 558 total – substantially more than at South Plant (222 Z-beams total).
3) Production: Production rates at South Plant were unclear. Estimates of production varied from one every two days, to 1-2 per day, to up to three per day. One WTD staff member thought that all Z-beams were removed in 60 days. This translates into approximately 43 working days and a production rate of five Z-beams per day. For preparation of construction schedules for the WPTP project, we are assuming an average removal rate of three Z-beams per day.

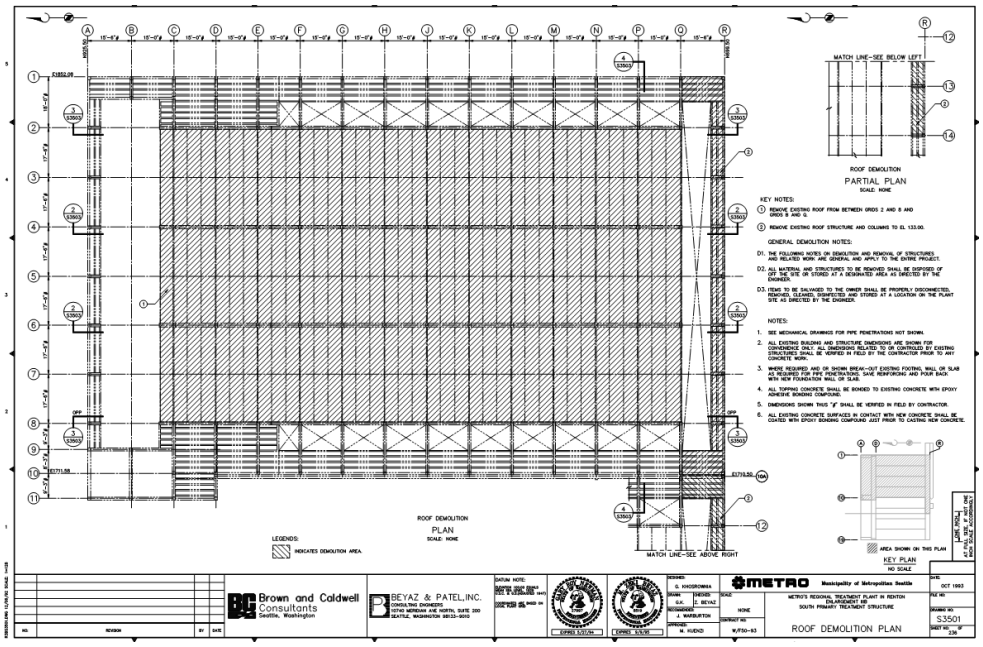


Figure 1. Roof Demolition Plan – South Plant Sedimentation Basin

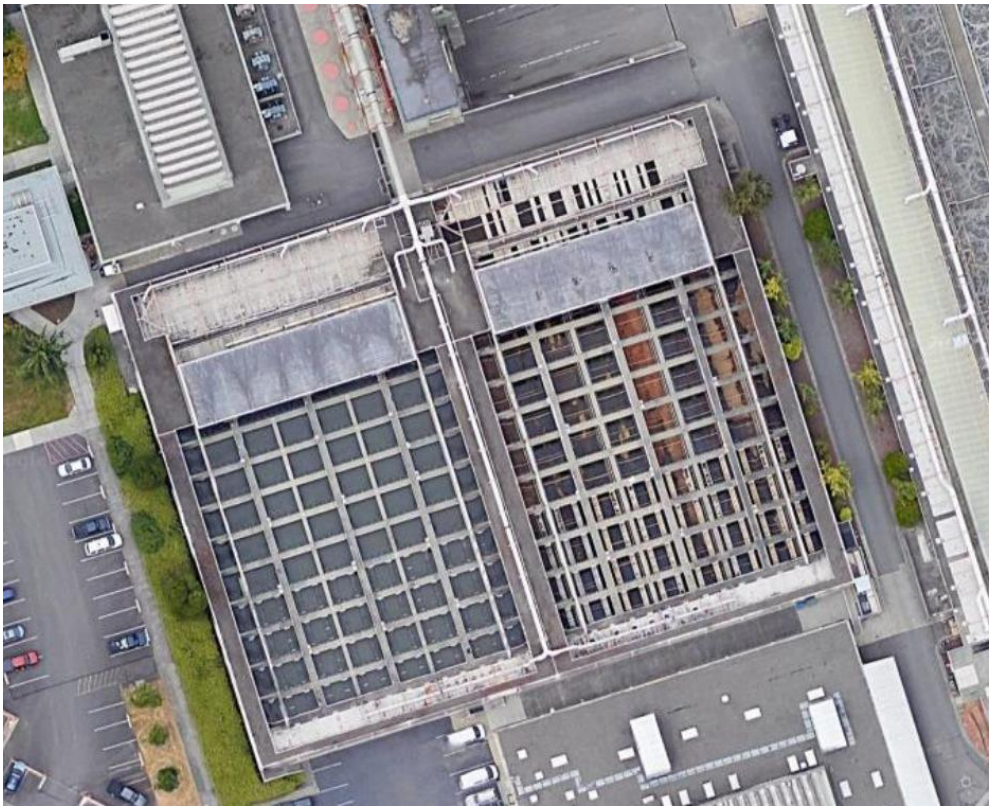

Photo 2. Aerial view of South Plant Treatment Plant Sedimentation Basins after Z-Beam Removal

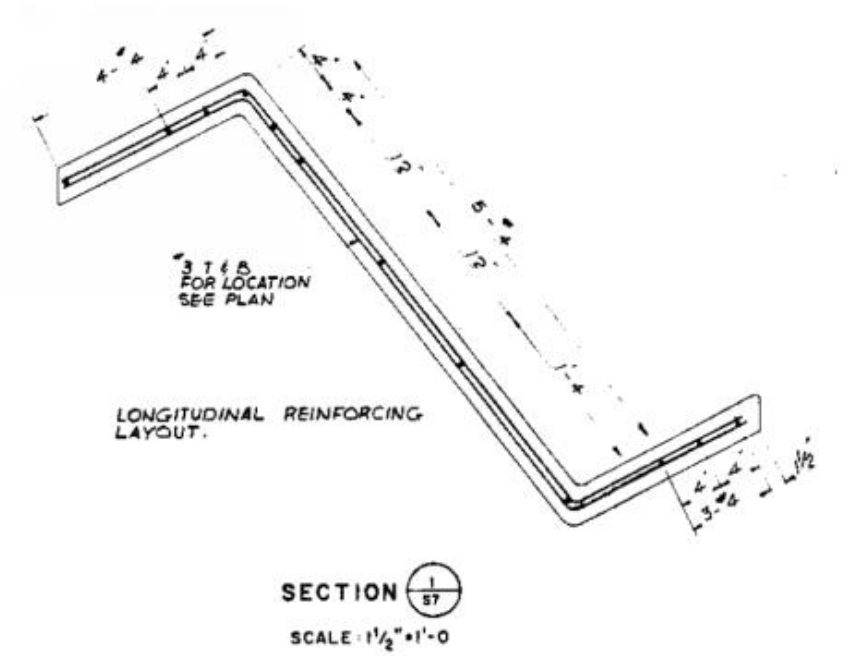


Figure 2. Z-Beam Section

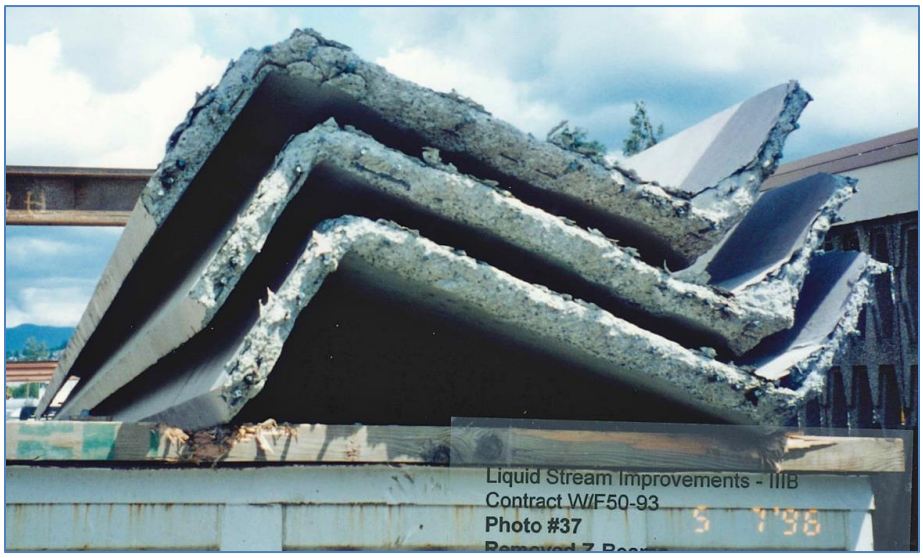


Photo 3. Removed Z-Beams at South Plant


Photo 4. Gantry Crane at South Plant

Photo 5. Gantry Crane at South Plant

Photo 6. Gantry Crane at South Plant


Photo 7. Gantry Crane at South Plant

# Memo-Project Impact on Traffic along the Haul Route

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262016.077.002

# MEMORANDUM

| | |
|---|---|
| To: | File |
| From: | Ken Andersen, PE |
| | Project Manager |
| Date: | March 10, 2020 (updated September 28, 2020) |
| Project: | West Point Treatment Plant Primary Sedimentation Area Roof Structure Project |
| | King County WTD Project No. 1127489 |
| Subject: | Project Impact on Traffic along the Haul Route |

## Purpose

This memorandum summarizes traffic issues associated with the proposed removal and disposal of the concrete roof framing from the primary sedimentation basins at King County's West Point Treatment Plant (WPTP) located adjacent to Discovery Park. The memo provides an overview of the project, identification of truck haul routes, truck loads, impact on traffic and the results of a truck turning study performed on roads along the haul route through Magnolia and at the WPTP.

## Project Background

The West Point Treatment Plant, Figure 1, is an integral component of King County's regional wastewater treatment system. During the dry season approximately 90 million gallons of wastewater come through the plant every day from homes and businesses in the Seattle and North King County areas. During heavy rain events and in the wet weather season, the plant treats between 300 million to 440 million gallons per day (mgd).

The project proposes work at the WPTP's primary sedimentation basins. The primary sedimentation basins separate solids from liquids. The WPTP's two primary sedimentation basins are shown in Figure 2.

Figure 1. King County West Point Treatment Plant. Source: King County Wastewater Treatment Division.


Figure 2. Primary sedimentation basins at the WPTP (2017). Source: King County iMap.

The primary sedimentation basins were placed in operation in 1966 and have been in continuous operation for more than 50 years. A seismic evaluation performed in 2017 determined that the roof framing of the basins did not provide a minimum Life Safety performance level under seismic loads – nearly 50% of the roof framing members were overstressed under a significant seismic event. Further studies determined that the most cost effective solution was to remove, but not replace, the deficient structural framing. Removal of the roof structure does not affect treatment processes at the plant.

The plant's odor control system was installed in the late 1990s during the Secondary Treatment Expansion and has been in operation for more than 20 years without significant repairs or upgrades. Significant corrosion has occurred in the ductwork. The project also includes the removal and replacement of all the ductwork associated with the odor control system.

The recommended design option results in a substantial amount of demolition to be removed from the site. Demolition includes the removal of approximately 820 concrete framing members with lengths up to 38-feet and weights approaching 11,000 lbs. The largest and heaviest members are unique precast, pre-stressed concrete Z-beams. Each beam, as shown in Figure 3, is approximately 2 feet wide, 5 feet deep and 38 feet in length. The project also includes the removal and replacement of approximately 3,200 lineal feet of mechanical duct and fittings.

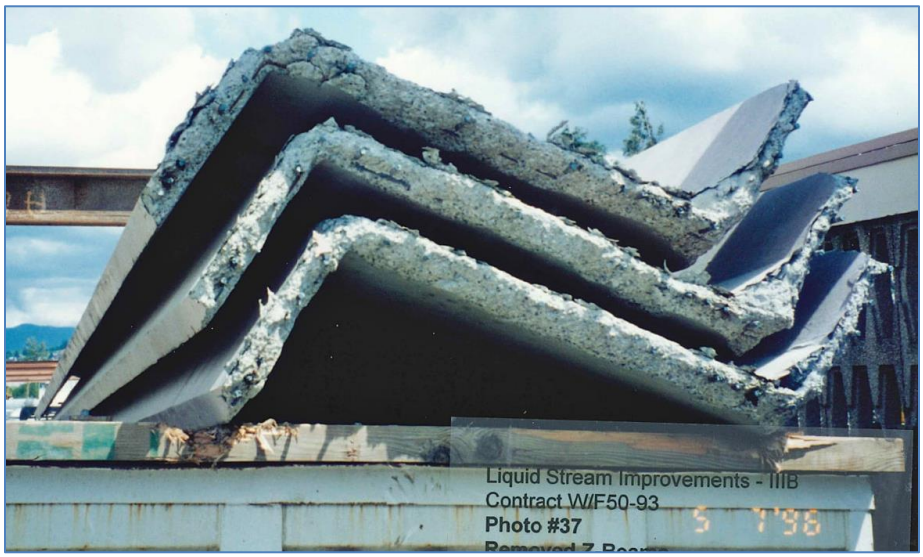



Figure 3. Z-Beams removed from the roof of the South Plant Sedimentation Basins in Renton.

## Access to West Point Treatment Plant

The only road access to the WPTP is through the neighborhoods of Magnolia and Discovery Park, Figure 4 and Drawing No. C103 (attached). Drawing C103 will be included in the contract drawings. All construction trucking associated with the delivery of materials and equipment and the removal of construction debris must access the facility via Discovery Park Boulevard West, Government Way,

Gilman Avenue West, and West Emerson Place. Trucks will exit the WPTP along Discovery Park Boulevard, which merges into West Government Way, which merges into Gilman Avenue West. From Gilman Avenue West, trucks will follow West Emerson Place to its intersection with 15th Avenue NW. At this point, trucks have three options:

- Northbound: turn north onto 15th Avenue NW and cross the Ballard Bridge for access to Highway 99 and I-5.
- Eastbound: turn onto West Nickerson Street, which merges into Westlake Avenue North with connections to I-5 and 520.
- Southbound: turn south on 15th Avenue NW, which turns into Elliot Avenue West with access to Highway 99 and I-5.


Figure 4. Access to West Point Treatment Plant.

## Vehicle Load Limits

The contract drawings and specifications will specify and limit the maximum axle or wheel loads to current load ratings for the roads that will be used for accessing the facility. The allowable axle load for a standard AASHTO (American Association of State Highway and Transportation Officials) HS 20-44 tractor trailer is 32,000 pounds per axle or 64,000 pounds total for the trailer (see Figure 5). The Z-beams weigh approximately 11,000 pounds each. The concrete girders weigh approximately 9,000 pounds for a

15-foot section. Approximately four to five Z-beams or five to six concrete girders could be removed from the site with each load and not exceed legal load limits.

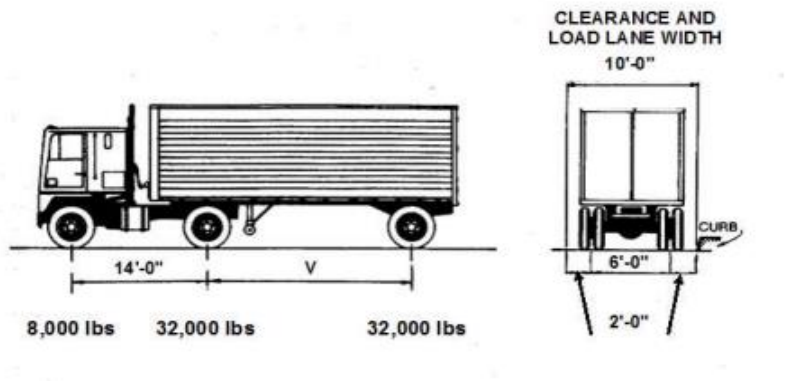



Figure 5. AASHTO HS20-44 Truck Loading.

## Traffic Through Magnolia

The project will increase truck traffic through Magnolia during the estimated two-year construction period. During this period, there will be a consistent flow of construction-related vehicles through the Magnolia and Fort Lawton neighborhoods, including laborers, delivery trucks, concrete mix trucks, and larger trucks and tractor-trailer rigs associated with the removal of the concrete debris and the delivery of structural steel. The increase in traffic will vary depending on the contractors sequencing of construction and the amount of on-site staging area provided to the contractor. The larger trucks and tractor-trailers will be associated with the removal of the concrete roof framing members and the delivery of the structural steel and ductwork for the odor control system. Table 1 provides an approximation of the number of truck loads anticipated for each primary construction activity, such as concrete demolition, demolition of the existing ductwork, and delivery of new structural steel and roof decking, ductwork, and other construction material. These estimated truck trips will be spread out over the two year construction schedule.

**Table 1. Total Estimated Truck Counts**

| Type of Load | Estimated Number of Truck Trips |
|---|---|
| Concrete Demolition | 200 – 240 |
| Ductwork Demolition | 30 – 60 |
| Concrete Steel Delivery | 4 – 8 |
| Concrete Mix Trucks | 20 – 40 |
| Structural Steel | 10 – 12 |
| Roof Decking | 16 – 20 |
| Mechanical Ductwork | 40 – 60 |

| | |
|---|---|
| **Total** | 320 – 440 |

Construction at the WPTP for this project will extend from approximately March 2021 to October 2022 – a 20 month period. This translates into approximately 430 working days. Over the duration of the project, truck traffic should average only 1-2 semi-trailer loads per day. Given limitations on staging areas at the WPTP, the Contractor will need to remove construction debris on nearly a daily basis. Therefore, truck traffic along the haul route should be fairly uniform at 1-2 trucks a day with peak days of 2-4 trucks.

The WPTP has an agreement with the City of Seattle on the hours of operation for truck operations. The agreement does not place a restriction on the number of truck trips per day, just on the hours of operation. Truck operations for the project will be restricted to the same hours of operation required for the removal of the plants bio-solids, which are from 6 a.m. to 4:30 p.m. and 6 p.m. to 9 p.m., Monday through Friday.

The requirements for a Traffic Control Plan (TCP) is typically required when work is on or impacts mobility on an arterial street. The 90% contract documents were submitted to the City of Seattle for a construction permit. The requirement for a TCP was never raised by the City of Seattle or the Seattle Department of Transportation (SDOT) during review of the permit documents. The construction permit issued by the City of Seattle did not require that a TCP be prepared for the project.

Permits for the 1990s expansion of the WPTP included special requirements or restrictions on truck traffic generated from construction activities, summarized in a document known as the Settlement Agreement. The agreement was developed based on that project potentially generating in excess of 50 truck trips a day. The contract documents for the current project will include some of the restrictions on construction activities contained in the Settlement Agreement for the 1990s' expansion project, including:

- All material and equipment shall be properly secured.
- Trucks cannot use un-muffled compression brakes.
- Noise from truck traffic cannot exceed normal outdoor noise levels by 10 dba.
- Strict adherence to posted traffic speed limits.
- Construction workers cannot park in Discovery Park or on the streets in the vicinity of the Park.
- Departures of trucks from the site during rush hour periods are limited to minimum intervals of 1.5 minutes. The Settlement Agreement defines rush hours as 7:00 a.m. to 9:00 a.m. and 4:00 p.m. to 6:00 p.m., weekends and holidays excluded.

## Truck Turning Study – Magnolia and WPTP

A truck turning study was performed for both the haul route through Magnolia and at the WPTP site. The analysis was performed using AutoTURN 10 for AutoCAD Civil 3D 2018.

The truck turning study was performed on a variety of standardized construction tractor-trailer combinations, including a WB-67 with a trailer length of 48 feet, which is the length of a standard flatbed trailer.

Along the haul route from the West Point Treatment Plant to NW 15th Street, three intersections were identified that appear to have tight turning radiuses for large vehicles, including:

- Discovery Park Blvd & Illinois Ave
- Gilman Ave W & W Emerson Pl
- W Emerson St & 15th Ave W.

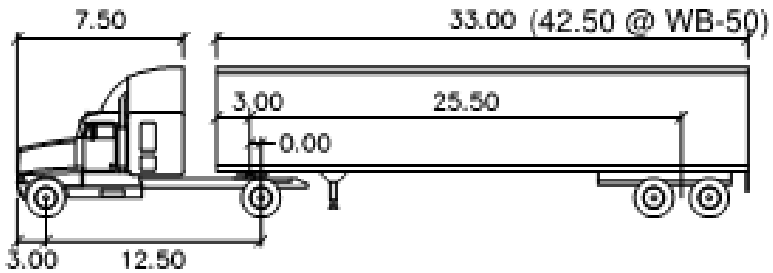
The study, as shown on the attached exhibits, determined the following:

- Design vehicles from the WB-40 to the WB-67 can all maneuver through the haul route and the WPTP site.
- The WB-40, with a 33-foot trailer, can maneuver the routes without any restriction.
- Beginning with a WB-50 truck, with a 42.5-foot trailer, the trucks may experience difficulty negotiating some of the intersections while staying completely within the lane.
- For the WB-67, with a 48-foot trailer, the design vehicle can maneuver through all intersections identified above but will have difficulty staying in its lane.

RCW 46.44.034, Maximum Lengths – Front and Rear Protrusions, allows loads to extend 15-feet beyond the rear axle. The maximum length of any framing member either removed from or delivered to the site will not exceed 39 feet. It would be possible to load framing members on a trailer shorter than the standard 48 foot trailer and maneuver the haul route with minimal impact on traffic.

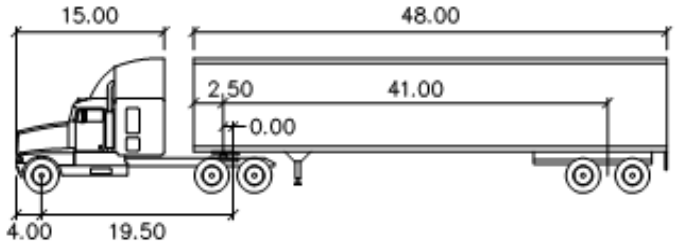
The Contractor will be required to conform to City of Seattle and SDOT criteria. The turning study was performed using standard design vehicle lengths, however, tractor trailers are fabricated in a variety of lengths. The study determined that it will be possible for the contractor to remove the concrete framing from the site with standard sized trailers that do not impinge on adjacent traffic lanes. The use of larger tractor-trailer rigs may require the use of pilot cars or flaggers.

**Truck Turning Study Design Vehicles**




WB−40

| | feet | | |
|---|---|---|---|
| Tractor Width | : 8.00 | Lock to Lock Time | : 6.0 |
| Trailer Width | : 8.00 | Steering Angle | : 20.3 |
| Tractor Track | : 8.00 | Articulating Angle | : 70.0 |
| Trailer Track | : 8.00 | | |




WB−62

| | feet | | |
|---|---|---|---|
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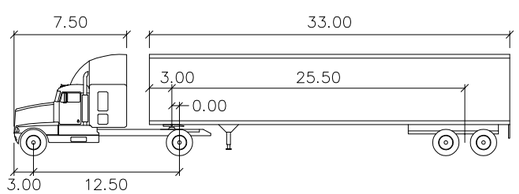
| Trailer Width | : 8.50 | Steering Angle | : 28.4 |
| Tractor Track | : 8.00 | Articulating Angle | : 70.0 |
| Trailer Track | : 8.50 | | |


DESIGN VEHICLE




WB-40

| | feet | | |
|---|---|---|---|
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| Tractor Track | : 8.00 | Articulating Angle | : 70.0 |
| Trailer Track | : 8.00 | | |

NOT TO SCALE

ReidMiddleton

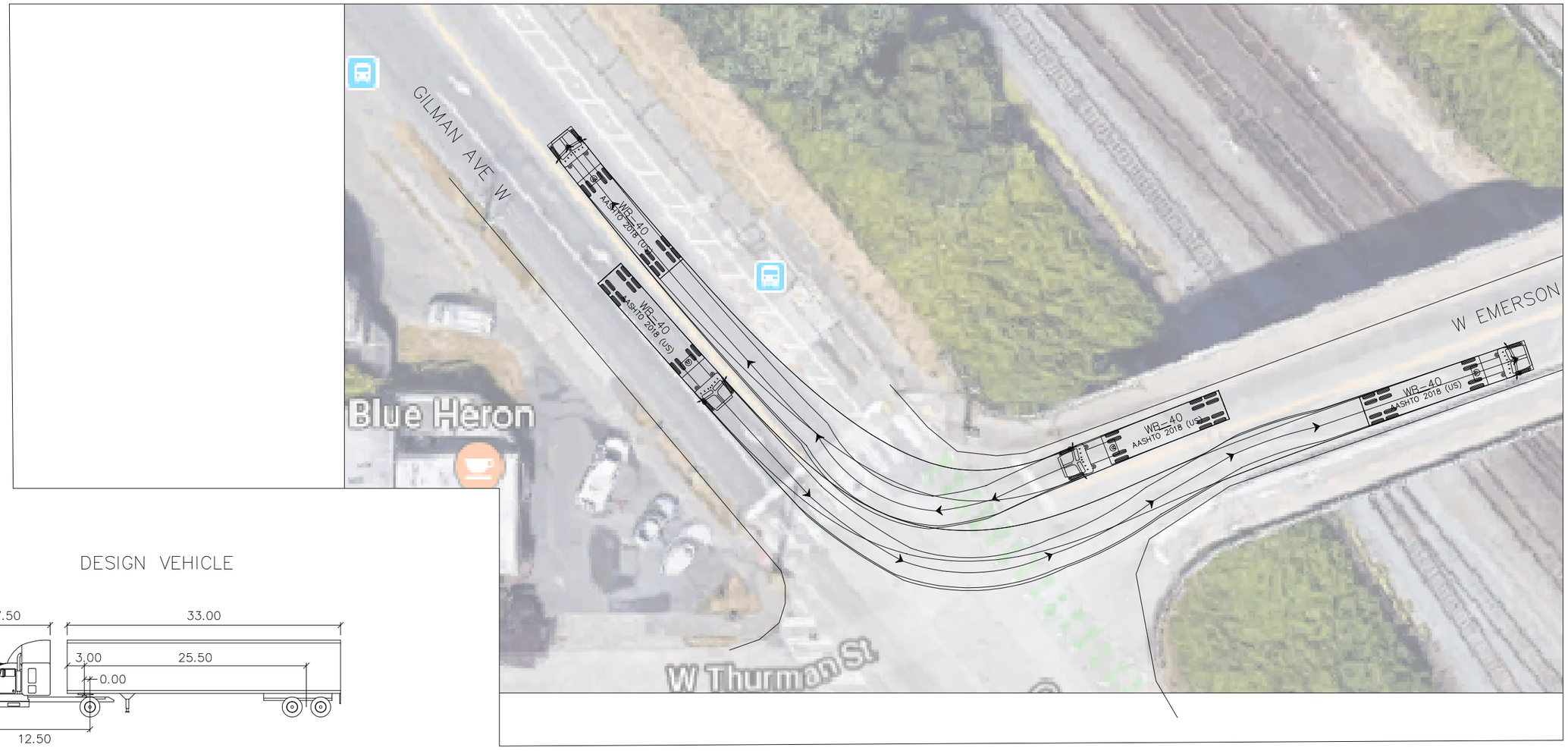
DISCOVERY PARK BLVD & ILLINOIS AVE
WB-40

***TRUCK TURNING ASSESSMENT***

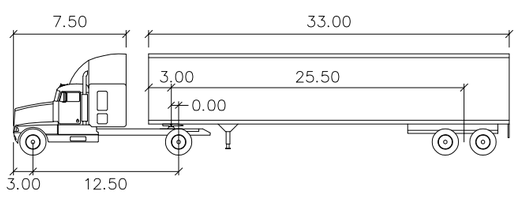
*KING COUNTY WPTP*

**Fig No.1**

07/20/2020 6:01pm I:\26\2016\077 King County West Point\Truck Turning\Work RMF\ATRN.dwg




DESIGN VEHICLE




WB-40

| | feet | | |
|---|---|---|---|
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| Trailer Width | : 8.00 | Steering Angle | : 20.3 |
| Tractor Track | : 8.00 | Articulating Angle | : 70.0 |
| Trailer Track | : 8.00 | | |

NOT TO SCALE

ReidMiddleton

GILMORE AVE W. & W. EMERSON
WB-40

***TRUCK TURNING ASSESSMENT***

*KING COUNTY WPTP*

**Fig No.2**

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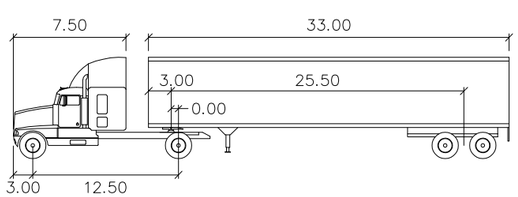
DESIGN VEHICLE




WB−40

| | feet | | |
|---|---|---|---|
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| Tractor Track | : 8.00 | Articulating Angle | : 70.0 |
| Trailer Track | : 8.00 | | |

NOT TO SCALE

ReidMiddleton

W. EMERSON & 15TH AVE W.
WB−40

***TRUCK TURNING ASSESSMENT***

*KING COUNTY WPTP*

**Fig No.3**

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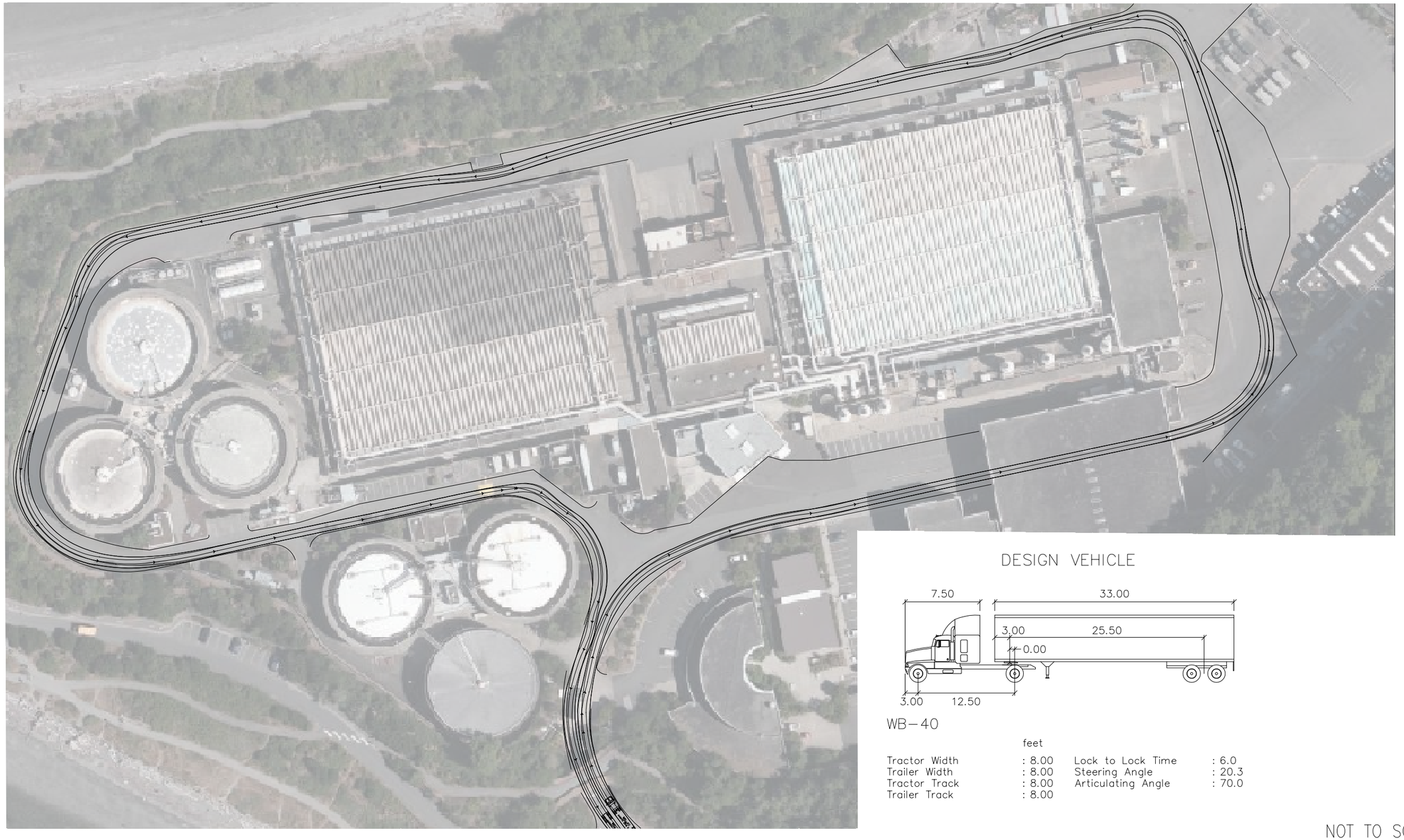


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ReidMiddleton

WPTP SITE
WB-40

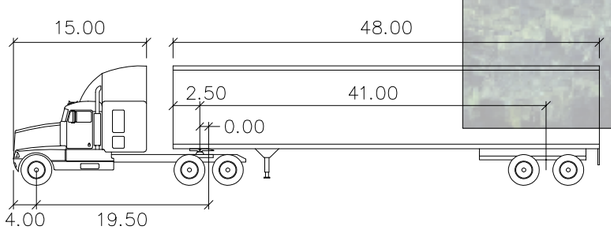
***TRUCK TURNING ASSESSMENT***

*KING COUNTY WPTP*

**Fig No.4**

07/20/2020 6:44pm I:\26\2016\077 King County West Point\Truck Turning\Work RMF\ATRN.dwg


DESIGN VEHICLE




WB-62

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|---|---|---|---|
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| Tractor Track | : 8.00 | Articulating Angle | : 70.0 |
| Trailer Track | : 8.50 | | |

NOT TO SCALE

Reid Middleton

DISCOVERY PARK BLVD & ILLINOIS AVE
WB-62

***TRUCK TURNING ASSESSMENT***

*KING COUNTY WPTP*

**Fig No.5**

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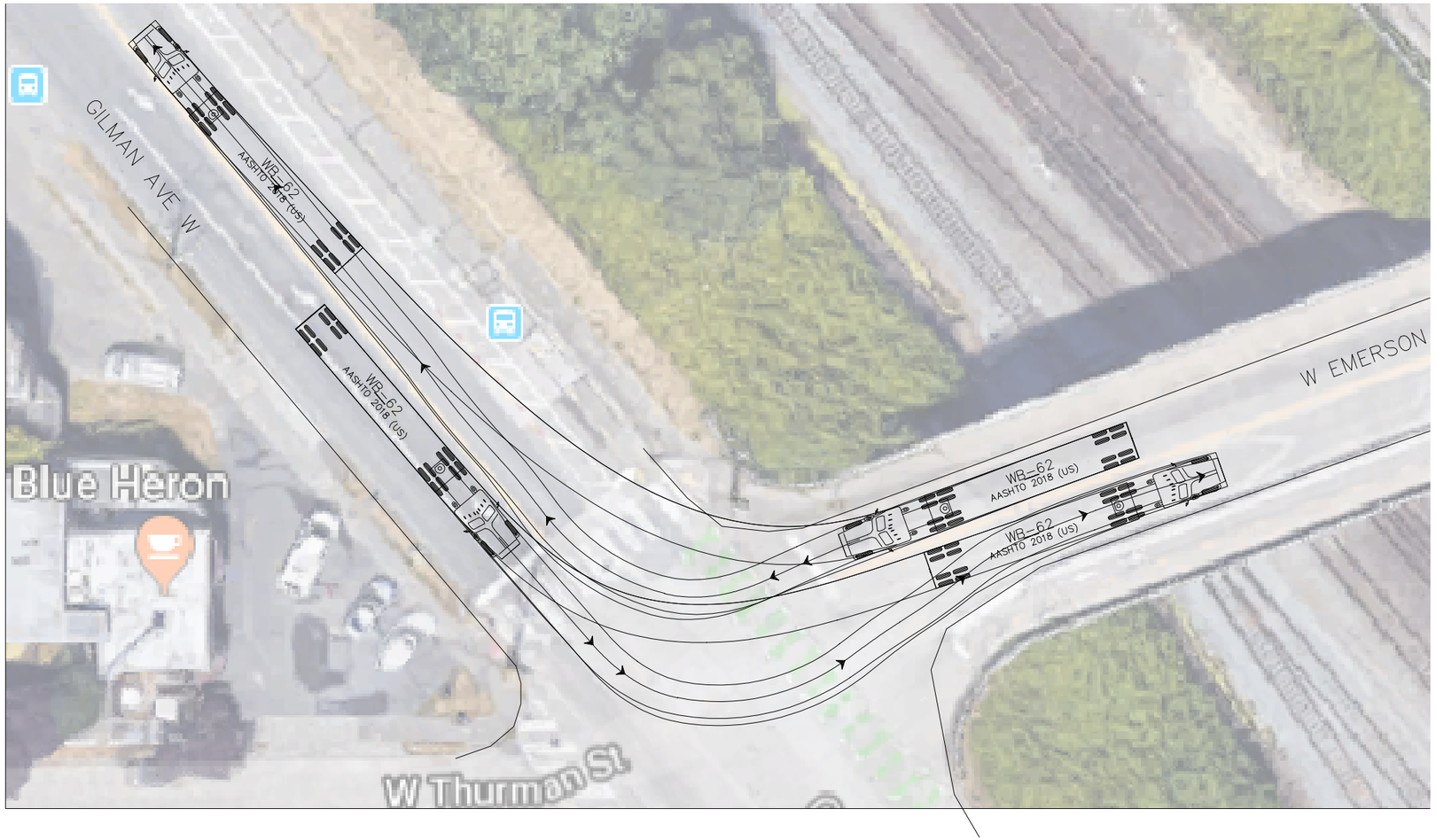
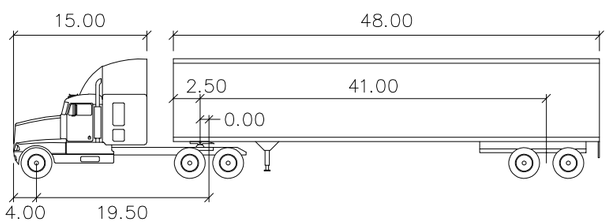



DESIGN VEHICLE




WB-62

| | feet | | |
|---|---|---|---|
| Tractor Width | : 8.00 | Lock to Lock Time | : 6.0 |
| Trailer Width | : 8.50 | Steering Angle | : 28.4 |
| Tractor Track | : 8.00 | Articulating Angle | : 70.0 |
| Trailer Track | : 8.50 | | |

NOT TO SCALE

Reid Middleton

GILMORE AVE W. & W. EMERSON
WB-62

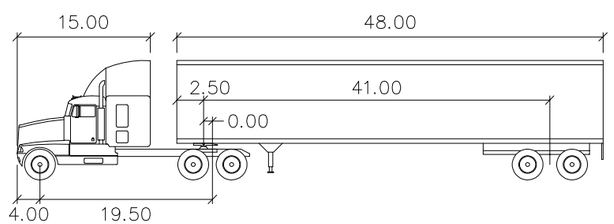
**TRUCK TURNING ASSESSMENT**

*KING COUNTY WPTP*

**Fig No.6**

07/20/2020 5:47pm I:\26\2016\077 King County West Point\Truck Turning\Work RMF\ATRN.dwg


DESIGN VEHICLE




WB-62

| | feet | | |
|---|---|---|---|
| Tractor Width | : 8.00 | Lock to Lock Time | : 6.0 |
| Trailer Width | : 8.50 | Steering Angle | : 28.4 |
| Tractor Track | : 8.00 | Articulating Angle | : 70.0 |
| Trailer Track | : 8.50 | | |

NOT TO SCALE

ReidMiddleton

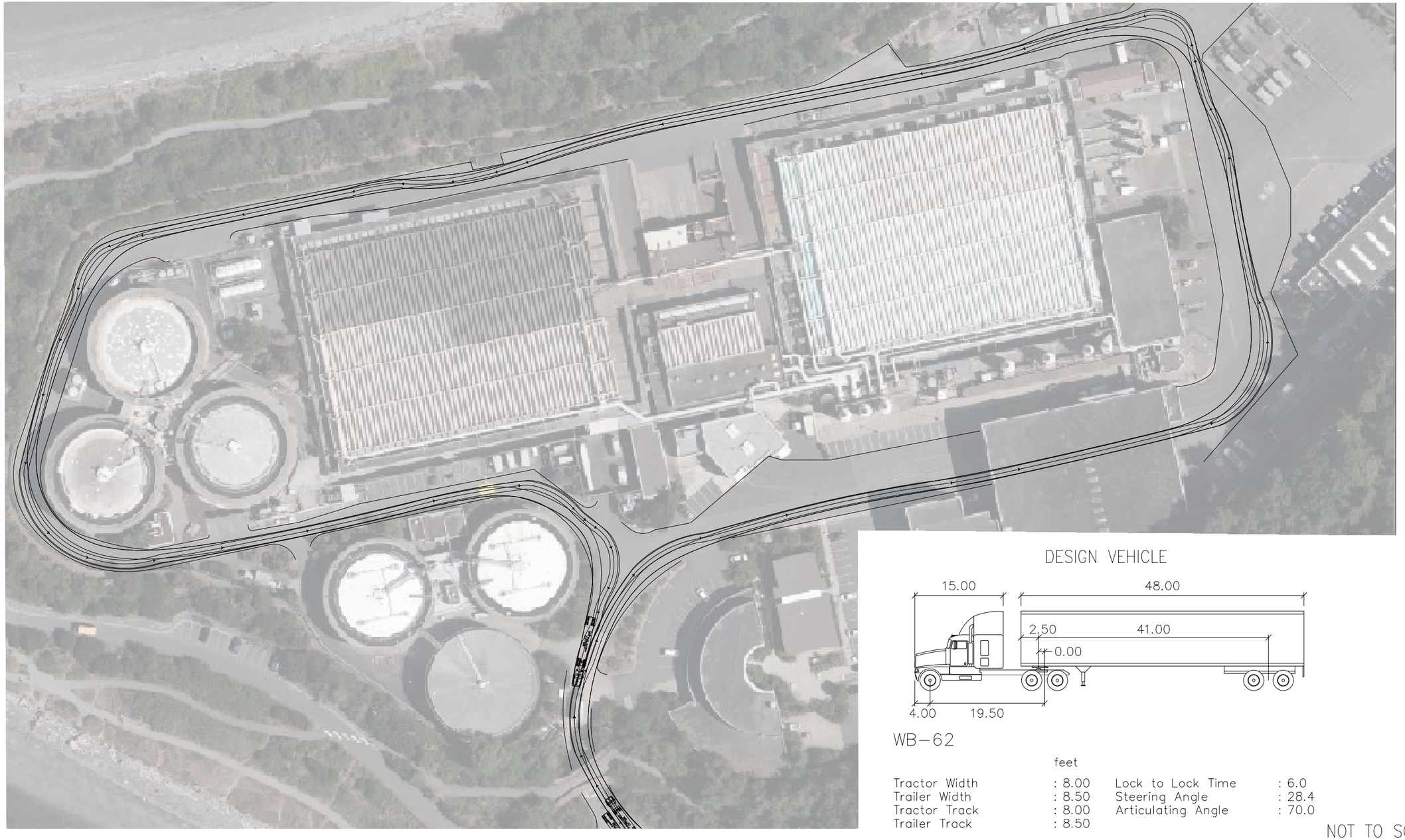
W. EMERSON & 15TH AVE W.
WB-62

***TRUCK TURNING ASSESSMENT***

*KING COUNTY WPTP*

**Fig No.7**

07/20/2020 5:48pm I:\26\2016\077 King County West Point\Truck Turning\Work RMF\ATRN.dwg



DESIGN VEHICLE




WB-62

| | feet | | |
|---|---|---|---|
| Tractor Width | : 8.00 | Lock to Lock Time | : 6.0 |
| Trailer Width | : 8.50 | Steering Angle | : 28.4 |
| Tractor Track | : 8.00 | Articulating Angle | : 70.0 |
| Trailer Track | : 8.50 | | |

NOT TO SCALE

ReidMiddleton

WPTP SITE
WB-62

**TRUCK TURNING ASSESSMENT**

*KING COUNTY WPTP*

**Fig No.8**

07/20/2020 5:49pm I:\26\2016\077 King County West Point\Truck Turning\Work RMF\ATRN.dwg

Memo-Lead PaintTesting-Abatement-Disposal

728 134th Street SW, Suite 200
Everett, WA 98204
www.reidmiddleton.com
Ph. (425) 741-3800
File No. 262016.077.002

# MEMORANDUM

| | |
|---|---|
| To: | File |
| From: | Ken Andersen, PE |
| | Project Manager |
| Date: | July 21, 2020 (updated September 28, 2020) |
| Project: | West Point Treatment Plant Primary Sedimentation Area Roof Structure Project |
| | King County WTD Project No. 1127489 |
| Subject: | Lead Paint Testing, Concrete Demolition and Disposal |

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**Purpose**

This memo summarizes the results of the lead paint sampling and testing program for the Sedimentation Area Roof Structure Project and the impacts on the recycling and/or disposal of the concrete Z-beams, girders, and columns being demolished for the project.

Appendix A includes the lead paint testing report prepared by DH Environmental with a summary of the testing results.

Appendix B includes a summary of concrete disposal options and preliminary approvals from landfills that will accept the concrete, also prepared by DH Environmental.

**Background**

The primary sedimentation roof structure project includes the demolition of a majority of the existing concrete Z-beams, girders, and columns from the roof structure of both the East and West Sedimentation Basins. A previous study by King County WTD determined that the paint on the top side of the Z-beams and the top and sides of the concrete girders contained lead, affecting the requirements for and costs associated with either recycling or disposing of concrete framing. For project planning and estimating purposes, it is important to know if the concrete can be disposed in a standard landfill and/or recycled, or if it would be considered a hazardous waste and transferred to a designated regional hazardous waste disposal facility.

Reid Middleton contracted with DH Environmental, Inc. to provide materials testing and evaluations related to the lead paint on the existing concrete Z-beams and girders, including field sampling, laboratory testing, and consultation with regional landfills to determine the requirements and costs for disposing of the concrete.

**Volume and Weight of Demolished Concrete**

The quantity of concrete to be demolished and removed from the project site includes:

| Member | Quantity | Volume (CY) | Weight (tons) |
|---|---|---|---|
| Z-Beams | 558 | 1,484 | 3,006 |
| Girders | 120 | 267 | 540 |
| Columns | 112 | 12 | 25 |
| Total | 790 | 1,763 | 3,571 |

**Lead Paint Survey**

In 2018 King County confirmed that the paint on the top surfaces of the roof Z-beams and tops and sides of the concrete girders contained lead paint. The concrete columns do not appear to have ever been painted. In June and July of 2019 DH Environmental confirmed the results of the King County study by scanning 85 locations in both basins with an X-Ray Fluorescence (XRF) spectrometer. The XRF spectrometer can detect lead in the paint and can also determine the level of lead concentration. Lead paint was confirmed on the top side of the existing Z-beams, tops and sides of girders, and in the light blue paint on some of the valves at the operating level. See Appendix A for the report by DH Environmental that includes an explanation of testing methods and a summary of testing results.

**Concrete Sampling and Testing**

To qualify as hazardous waste in accordance with federal regulations, materials must contain a level of lead above the allowable concentration level of leachable lead (see attached report for a complete explanation). The testing method used to determine the concentration of leachable lead is called the TCLP test (Toxicity Characteristic Leaching Procedure).

The material samples used for the TCLP test are representative of the total ratio of paint to volume of concrete in the Z-beams and girders. Ten material samples were taken with a roto-hammer drill from various locations on the Z-beams and girders. In each of the ten samples, testing indicated that the leachable concentration of lead was below the threshold level.

DH Environmental also performed a “fish bioassay” test as required to conform to State of Washington regulations. This test uses live fish (minnows) that are placed in contact with a representative sample of material. The fish bioassay resulted in zero mortality for the fish, indicating that the sample is not a toxic “dangerous waste” according to the State of Washington.

**Summary of Sampling and Testing for Lead Paint**

All samples tested below threshold levels for leachable lead and are considered non-hazardous waste. The painted Z-beams and girders at the sedimentation basins may be disposed of in a landfill.

The report by DH Environmental is included in Appendix A to this memo and provides a detailed explanation of testing methods and results.

**Impact to Demolition and Recycling and Disposal**

Demolition and Abatement

Although the Z-beams and girders may be classified as non-hazardous, the lead paint on the surface of the concrete still poses a risk. To limit exposure to lead, the paint must be abated (removed) from any surface to be cut prior to demolition. There are several methods for removing lead paint from existing surfaces including sand blasting and chemical stripping. Cost estimates for the project assume that the ends of each Z-beam and cut areas will be abated, prior to cutting or chipping, by chemical stripping. Chemical stripping typically must be performed when average daily temperatures are above 55 degrees F. This results in an early start date of May for roof demolition.

Abatement, prior to demolition, may not be required if a Negative Exposure Assessment is performed that shows that exposure to air borne lead paint, released from demolition efforts, results in exposure levels less than "Action Levels". A Negative Exposure Assessment (NEA) is a written statement within the past 12 months by an EHSS industrial hygienist indicating that a specific lead-disturbing job (or a class of very similar lead-disturbing jobs) does not result in worker exposure above the Action Level. Action Level is employee exposure established by the federal Occupational Safety and Health Administration (OSHA) as airborne lead at an eight-hour time-weighted average concentration of 30 micrograms of lead per cubic meter (µ/m3) of air or 0.030 milligrams per cubic meter (mg/m3) of air, without regard to the use of respirators

This NEA requires the contractor to demolish a Z-beam (or representative sample) and cut or chip the concrete as planned while wearing special equipment to protect workers and also to collect air samples for testing. The contractor must demonstrate that each employee's exposure during the operation will be consistently below the permissible exposure limits.

Recycling

Concrete containing lead paint is not accepted by recyclers. Recycling will require full abatement of the concrete.

Disposal

Concrete members can be disposed of in registered landfills. DH Environmental obtained written confirmation from regional landfills that they are willing to accept the volume of concrete to be removed from the basins. Written approvals from each landfill are included in the attached summary report by DH Environmental in Appendix B.

Estimated Disposal and Hauling Costs:

DH Environmental obtained approval letters from three regional landfills that would accept the type and volume of concrete demolished from the WPTP sedimentation projects under this project. All three facilities are located in eastern Washington or Oregon. The three landfills include:

| Landfill | Location | Operator |
|---|---|---|
| • Columbia Ridge Landfill | Arlington, OR | Waste Management |
| • Greater Wenatchee Reginal Landfill | Wenatchee, WA | Waste Management |
| • Roosevelt Regional Landfill | Roosevelt, WA | Republic Services |

Total disposal costs include a number of considerations, including the size of the demolished material, the cost to reduce the member to the size required for disposal including the cost to abate the lead paint prior to cutting or chipping, and the cost to haul the material from the project site to the landfill.

For all three landfills, the standard or preferred maximum size for disposal is a 2-foot by 2-foot segment or piece. For debris that fits within this size restriction, material can be hauled by the contractor to landfill or to local transfer stations. This option would require full abatement reducing the framing member to maximum 2-foot by 2-foot pieces.

The landfills will take member sizes up to 10-foot maximum dimensions; however, the contractor would have to arrange for the hauling to the landfill, either by truck or by rail. The contractor would also have to provide equipment and operators at the landfill to unload the concrete. Each concrete member would have to be abated at any location where the member is cut or chipped for removal.

Based on information provided by Waste Management and Republic Services, costs were developed, summarized in Table 1, for three options for the disposal of the concrete:

**Option A:** Direct Haul to Landfill, 10-foot Segments, Partial Abatement
This option assumes that the contractor will provide hauling from the site directly to the landfill. This option is the basis for the 95% construction cost estimate. In Option A, the lead paint will be abated in strips only where cuts are to be made, and the Z-beams and girders will be cut into segments no longer than 10 feet. This will allow the contractor to place the segments in a dump truck and haul them directly to the landfill for disposal. Three separate landfills have given preliminary approval to dispose of the concrete if delivered to the landfill as noted.

**Option B**: Removal to Transfer Station or Container, 2'x2' Segments, Abate Only at Ends of Beams
Option B assumes that Negative Exposure Assessment demonstrates that dust exposure from the lead paint is not hazardous. If the Negative Exposure Assessment is favorable, the contractor may only need to abate lead paint at the ends of beams and girders as required to remove the member from the basin. Once removed from the basin, the contractor will need to haul the member to a site for full demolition to 2'x2' pieces, without the need to perform full abatement. In Option B, the contractor avoids the cost of abatement and also avoids the cost of self-hauling and dumping at the regional landfill. The contractor will reduce the concrete to a maximum size of 2 feet by 2 feet and send to a transfer station or ship by rail. Two of the largest regional disposal companies with several local transfer stations have given preliminary approval to accept the concrete.

**Option C:** Removal to Transfer Station or Container, 2'x2' Segments, Full Abatement
This option assumes that the contractor provides full abatement and reduces the concrete to a maximum size of 2 feet by 2 feet. The concrete can then be sent to a transfer station or shipped by rail. Note that in Option C the concrete could also be accepted by a recycler.

**Table 1. Disposal Options for Concrete with Lead Paint**

| | |
|---|---|
| **OPTION A: Direct Haul to Landfill, 10' Segments With Partial Abatement:** | |
| Republic Services, Roosevelt | $ 1,357,305 |
| Waste Management, Columbia Ridge | $ 1,437,159 |
| Waste Management, Wenatchee | $ 1,357,209 |
| **OPTION B: Transfer Station or Container, 2' x 2' Segments, Abate Only At Ends Of Beam:** | |
| Republic Services | $ 916,665 |
| Waste Management | $ 970,683 |
| **OPTION C: Transfer Station or Container, 2' x 2' Segments, Full Abatement:** | |
| Republic Services | $ 4,965,665 |
| Waste Management | $ 5,019,683 |
| | |

**Conclusion**

The concrete removed from the roof framing of the WPTP sedimentation basins may be recycled or disposed of at regional landfills.

Recycling would require full abatement of lead paint and a cost of approximately $5.0 million.

Partial abatement of lead paint, only as required to demolish the beams into a maximum length of 10 feet for disposal at a regional landfill, results in a total disposal cost of $1.4 million.

If a Negative Exposure Assessment determines that the concrete can be demolished into 2-foot by 2-foot sections without abatement, disposal costs are reduced to approximately $1.0 million.

The 95% cost estimate is based on Option A, demolition into 10-foot maximum segments with partial abatement and hauling to a regional landfill for disposal.

**End of Memo.**

# APPENDIX A
# LEAD PAINT TESTING SUMMARY

1011 SW Klickitat Way, Suite 107
Seattle, WA 98134

July 16, 2019

Mr. Seth Stapleton, PE
Reid Middleton
728 134th St SW, Suite 200
Everett, WA 98204

**Re: West Point Wastewater Treatment Plant Waste Designation**

Dear Mr. Stapleton,

This letter and attachments comprise the Waste Designation Package for the concrete roof structure overlying the sedimentation basins at the West Point Wastewater Treatment Plant (WWTP), located at 1400 Discovery Park Boulevard in Seattle, Washington (Facility). The concrete roof structure overlying both the East and West Sedimentation basins has been identified for removal as part of the engineering design for seismic upgrades planned at the Facility. We recommend the concrete identified for removal to be designated as Non-Dangerous Solid Waste. A summary of the analytical methods, results, and assumptions supporting the waste designation is provided below. A copy of the Dangerous Waste Designation Form is included in Attachment 1.

DH Environmental, Inc. (DH Environmental) designed the waste characterization sampling with the objective of designating, in situ, an estimated 4,000 tons of concrete that comprise the roof structures identified for removal. Previous screening indicated that portions of the concrete may have been painted with lead-based paint, however, the concentration of lead was unknown at the time of sampling. DH Environmental performed a new lead paint survey in each sedimentation basin and collected bulk samples of the concrete to determine if the concrete would be considered a “hazardous waste” under the federal Resource Conservation and Recovery Act (RCRA; 40 CFR 261.24), or a “dangerous waste” under Washington Administrative Code (WAC) 173-303.

Under RCRA, solid waste with a concentration of leachable lead greater than 5 milligrams per liter (mg/L) is considered to have “failed” the Toxicity Characteristic Leachate Procedure (TCLP) test (Environmental Protection Agency [EPA] Method 1311) for lead and would therefore be considered a hazardous waste for lead toxicity. Under Washington State Dangerous Waste regulations (WAC 173-303), solid waste exceeding an “Equivalent Concentration” of 0.001% via a book designation performed in accordance with WAC 173-303-100(5)(b), *or* solid waste exceeding the criteria defined in Biological Testing Methods 80-12 (Ecology, 2009) under WAC 173-303-100(5)(c), the “fish bioassay” test, would be considered a Washington State Dangerous Waste under the toxic criteria designation.

**Lead Paint Survey**

Prior to collecting physical samples via destructive testing of the concrete girders and "Z" beams, DH Environmental conducted a lead paint survey using a non-destructive, portable X-Ray Fluorescence (XRF) analyzer. In summary, an XRF spectrometer is an instrument that emits x-rays towards a sample, which then fluoresces and emits secondary X-rays back towards a detector. This generates a spectrum of x-ray intensity peaks and their respective energy levels which are unique to specific elements in the sample. Although an XRF can measure a wide range of elements in a sample, lead was the primary element of interest at this Facility. The XRF instrument used on this project was an Innov-X Alpha Series (serial number 11766). Instrument standardization and calibration tests of the portable XRF unit were conducted in accordance with the manufacturers recommendations as presented in the instrument user manual. Operational and test procedures conformed to manufacturer's instructions.

To maintain consistency with previous lead-paint survey efforts, DH Environmental surveyed 85 locations across both sedimentation basins. The majority of the XRF survey was performed directly on the painted surfaces of the concrete girders and "Z" beams identified for removal. A smaller subset of survey locations included areas beyond the concrete roof structure (e.g., painted valves, piping, duct work, and other miscellaneous equipment) to provide plant operators additional information on the potential presence of lead-based paint.

The results of the XRF survey are included in Attachment 2. The location of each survey point is described along with the XRF screening results, and the locations are shown on Figures 1 and 2. The survey confirmed the presence of lead-based paint on the majority of concrete girders and Z-beams. Lead based paint was detected at concentrations up to 2.99 milligrams per square centimeter ($mg/cm^2$). In addition, lead based paint was present on the surfaces of several light blue painted valves located throughout the sedimentation basins. Physical samples were not collected from materials other than the concrete girders and "Z" beams that comprise the roof structure of each sedimentation basin.

**Other Potential Hazardous Building Materials**

Over the course of the sampling and XRF survey, sampling personnel noted the presence of materials that have a potential to contain hazardous building materials (HBM), other than lead based paint, which may warrant further investigation. These included the following:

- Fluorescent light fixtures were noted throughout both sedimentation basins. Fluorescent light fixture ballasts can contain polychlorinated biphenyls (PCBs). The ballasts were not inspected or sampled, so it is unknown if they contain PCBs.
- Caulking was noted along joint locations between sections of girders (and potentially in other locations), and there is a potential for this caulking to contain PCBs. The caulking was not inspected or sampled as part of this assessment.

No other potential HBM were noted, however, a full HBM survey was not conducted. We recommend a full HBM survey be conducted to determine if other potential hazards may be present which would affect the handling and/or disposition of the concrete.

### Sample Collection

Sample collection was conducted by DH Environmental on June 18, 2019. A certified lead risk inspector/assessor, certified under WAC 365-230, was on site as part of the sampling team. Sample collection was performed in general accordance with the requirements of the Washington State Dangerous Waste Regulations in WAC 173-303, the technical requirements of the United States Environmental Protection Agency (EPA) publication SW-846 (EPA, 2015), the procedures described in ASTM E1908-16 (ASTM, 2016), and the EPA's draft RCRA Waste Sampling Technical Guidance (EPA, 2002). These guidelines specify that the samples be collected to proportionally represent the *entirety* of the waste stream being generated (i.e., not just the paint chips). This includes the unpainted concrete beneath the thin layer of lead-based paint.

The sample design incorporated the collection of 10 samples (five from each sedimentation basin) from locations chosen randomly throughout each structure. Each sample was collected from the top or side surface of a concrete girder or "Z" beam with visible paint on the surface. The sampling locations are shown on Figures 1 and 2. Samples were collected using a roto-hammer concrete drill with a 5/8-inch or 3/4-inch diameter drill bit. A dedicated piece of card stock was folded in half and taped to the concrete directly below the sampling location using painters' tape. As the drill was advanced into the concrete, the fragments of paint and concrete chips were captured in the folded card stock, which was then transferred to laboratory supplied sampling jars.

The samples were submitted to Onsite Environmental, Inc. of Redmond, Washington (Onsite), an accredited environmental laboratory by the Washington Department of Ecology under WAC 173-50. All samples were submitted for analysis of leachable lead via the TCLP test. Two samples were also selected for analysis of leachable arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver (the list of RCRA 8 metals), and volatile organic compounds (VOCs). The analysis of the TCLP RCRA 8 metals and VOCs were necessary to perform a full characterization of the waste stream and to determine its acceptance at regional disposal facilities. Results of the sampling are summarized in Table 1. The analytical results from the waste characterization sampling event are included in Attachment 3.

## Sample Results

### Characteristic Hazardous Waste (RCRA D Series)

To characterize the concrete roof structures, the concentration of leachable metals was evaluated and compared with the maximum concentration of contaminants for the toxicity characteristic, listed in Table 1 under 40 CFR 261.24. Lead was not detected in the TCLP extract for any of the 10 samples at concentrations greater than the laboratory practical quantitation limit (PQL) of 0.020 mg/L. Similarly,

the concentration of leachable arsenic, cadmium, mercury, selenium, and silver were all less than the laboratory PQL. Chromium was detected in two samples with a maximum concentration of 0.085 mg/L, and barium was detected in one sample at a concentration of 0.31 mg/L. The reported concentrations of chromium and barium are well below the threshold levels of 5.0 mg/L and 100 mg/L, respectively, as defined in 40 CFR 261.24 and WAC 173-303-090 (Maximum Concentration of Contaminants for the Toxicity Characteristic). Therefore, the concrete roof structure should not be considered a Characteristic Hazardous Waste or Dangerous Waste for any of the RCRA 8 metals.

**Discarded Chemical Products List (U, P Series)**

None of the constituents listed in WAC 173-303-9903, *Discarded chemical products list*, were reported in the samples, and there is no reason to suspect these compounds would be present in the concrete. As such, any potential process that could have generated these compounds is unknown and any previously applicable waste codes are unknown. Therefore, none of the RCRA U and P Series listings are applicable[1].

**Non-Specific Sources (RCRA F Series)**

Sample analysis indicated trace amounts of acetone, which is listed in WAC 173-303-9904, *Wastes from Non-Specific Sources*, were reported in two samples. Acetone is a common laboratory contaminant and, along with the other F-listed compounds, is not expected to be present in concrete. In addition, the original processes generating any of these trace constituents are unknown and any previously applicable waste codes are unknown. Therefore, none of the RCRA F Series listings are applicable.

**Specific Sources (RCRA K Series)**

The concrete beams, and any associated contaminants are not subject to the RCRA K Series listing.

**Washington State Toxic Criteria**

In accordance with WAC 173-303-100(5)(c), a fish bioassay was requested on a composite sample comprised of material from each of the 10 samples.

The fish bioassay resulted in zero mortality of the population tested. The results of the fish bioassay concluded that the concrete is not a toxic Dangerous Waste under WAC 173-303-100. A copy of the Dangerous Waste Fish Bioassay Report is included as Attachment 4.

[1] Where a facility owner/operator makes a good faith effort to determine if a material is a listed hazardous waste but cannot make such a determination because documentation regarding a source of contamination, contaminant, or waste is unavailable or inconclusive, EPA has stated that one may assume the source, contaminant or waste is not listed hazardous waste. Management of Remediation Waste Under RCRA, EPA530-F-98-026.

**Persistent Dangerous Waste, HOCs**

In accordance with WAC-173-303-100, a waste will designate as a persistent dangerous waste and carry a Washington State Dangerous Waste code of WP02 if it contains a halogenated organic compound (HOC) total concentration of 0.01% - 1.0% (100 – 10,000 parts per million [ppm]), and a Washington State Dangerous Waste code of WP01 if HOCs exceed 1.0% (10,000 ppm). Based on the analytical results, the concentration of analyzed HOCs was well below 100 ppm, and there is no reason to suspect these compounds are present in concrete.

**Persistent Dangerous Waste, PAHs**

In accordance with WAC-173-303-100, a waste will designate as a persistent dangerous waste and carry a Washington State Dangerous Waste code of WP03 if it contains a total carcinogenic polycyclic aromatic hydrocarbon (cPAH) concentration of greater than 1.0% (10,000 ppm). There is no reason to suspect cPAHs are present in the concrete, much less at concentrations greater than 10,000 ppm.

**PCB Source Waste**

There is no reason to suspect the concrete contains polychlorinated biphenyls (PCBs) at concentrations greater than the generally regulated federal threshold of 50 ppm. Further, the original processes generating the PCBs would be unknown and therefore not subject to the Washington State PCB source designation WPCB, which only applies to discarded transformers, capacitors or bushings containing PCBs at concentrations of 2 ppm or greater (except when drained of all free flowing liquid) and cooling and insulating fluids and cores, including core papers, generated from the salvaging, rebuilding, or discarding of transformers, capacitors or bushings containing PCBs at concentrations of 2 ppm or greater.

**Summary**

DH Environmental collected samples of the concrete girders and "Z" beams that comprise the roof structure over the east and west sedimentation basins at the West Point WWTP. This sampling was conducted to support a waste designation of the concrete roof structure in accordance with WAC 173-303-070. The results have been applied to the Dangerous Waste Regulations as documented in this Designation Package. Based on these results, we recommend the concrete be designated as Non-Dangerous Solid Waste suitable for disposal at a RCRA Subtitle D landfill, or properly permitted solid waste handling facility or recycling facility.

Although the concrete is designated as Non-Dangerous Solid Waste, the XRF survey confirmed that lead-based paint is present on some of the concrete surfaces. Per WAC 296-155-17607, employers must ensure that no employee is exposed to lead at concentrations greater than 50 micrograms per cubic meter (50 $\mu g/m^3$) of air averaged over an 8-hour period. Therefore, we recommend implementation of engineering and work practice controls during demolition and handling of the beams

to reduce and maintain employee exposure to lead below the permissible exposure limit to the extent that such controls are feasible in accordance with WAC 296-155-17611.

This concrete may also be suitable for recycling rather than disposal. We recommend engaging with concrete recycling companies to determine if the material can be accepted. A cost analysis may be necessary to compare the cost of disposal in a landfill with the cost of recycling.

If you have any questions regarding this designation, please do not hesitate to call.

Sincerely,

Nathan Moxley, LG, LHG
Senior Project Geologist
DH Environmental, Inc.

Reviewed by:


David J. Hill, PE, CHMM, CPEA
Principal Engineer
DH Environmental, Inc.

<u>Attachments</u>

1. Waste Designation Form
2. Table 1, TCLP Lead Results
3. Figures 1 and 2, XRF Survey and Waste Characterization Sample Locations
4. XRF Survey Results
5. Waste Characterization Sampling Laboratory Analytical Report (Onsite Environmental Report 1906-201)
6. Fish Bioassay Laboratory Analytical Report (Sample ID: WPWWTP-WC-1,2,3,4,5,6,7,8,9,10 comp)

**References**:

*ASTM, 2016. Standard Guide for Sample Selection of Debris Waste from a Building Renovation or Lead Abatement Project for Toxicity Characteristic Leaching Procedure (TCLP) Testing for Leachable Lead (Pb)*. ASTM International. April.

Ecology, 2009. Biological Testing Methods 80-12 For the Designation of Dangerous Waste. Ecology publication no. 80-12. Revised June 2009.

EPA, 2002. RCRA Waste Sampling Draft Technical Guidance; Planning, Implementation, and Assessment. EPA Office of Solid Waste. Publication EPA 530-D-02-002.

EPA, 2015. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, EPA publication SW-846, Third Edition, Final Updates I (1993), II (1995), IIA (1994), IIB (1995), III (1997), IIIA (1999), IIIB (2005), IV (2008), and V (2015).

# WASTE DESIGNATION FORM

West Point Wastewater Treatment Plant
Sedimentation Basins Roof Structure
1400 Discovery Park Blvd.
Seattle, Washington

## A. WASTE STREAM NAME AND GENERATION INFORMATION

**Waste Stream Name:** Concrete

**Generation Process:** Building demolition of the concrete Girders and "Z" beams that comprise the roof structure overlying the East and West Sedimentation Basins

| RCRA ID Number that waste will be managed under: | Total Quantity and/or Estimated Generation rate: |
|---|---|
| Not applicable | Approximately 4,000 tons |
| Other Descriptions (i.e. Shop, Project, Etc.): | |

## B. WASTE PROPERTIES, CHARACTERISTICS, and CONSTITUENTS:

**Physical State:**
- ☒ Solid (pass paint filter)
- ☐ Solid w/freestanding or absorbed liquid
- ☐ Liquid (If liquid, indicate if the liquid is:
  - ☐ Single Layer
  - ☐ Multi-layer

**pH:** ☐ < 2 [D002]
☐ > 2 but < 12.5
☒ N/A ☐ > 12.5 [D002]

**Flashpoint:** ☐ < 140 °F [D001]
☐ > 140 °F but < 200 °F
☒ N/A ☐ > 200 °F

| Characteristic | PCB Content | TCLP Metals |
|---|---|---|
| ☐ Ignitable [D001] | ☐ Not Detected [non TSCA or State Regulated] | ☐ Arsenic ≥ 5.0 mg/L [D004] |
| ☐ Corrosive [D002] | ☒ Not Sampled | ☐ Barium ≥ 100.0 mg/L [D005] |
| ☐ Reactive [D003] | ☐ ≥ 2 ppm and < 50 ppm [Potentially TSCA Regulated or State Regulated PCB Waste-WPCB] | ☐ Cadmium ≥ 1.0 mg/L [D006] |
| ☐ Toxic [D004 – D043] | ☐ ≥ 50 ppm [TSCA Regulated] | ☐ Chromium ≥ 5.0 mg/L [D007] |
| List Here: | ☐ < 1 ppm | ☐ Lead ≥ 5.0 mg/L [D008] |
| | Note: **IF WASTE STREAM IS BEING MANAGED AS TSCA WASTE, DO NOT USE WPCB STATE CODE PER WAC 173-303-071(3)(k)** | ☐ Mercury ≥ 0.2 mg/L [D009] |
| | | ☐ Selenium ≥ 1.0 mg/L [D010] |
| | | ☐ Silver ≥ 5.0 mg/L [D011] |
| | | Check if: ☐ Assumed ☒ TCLP Conducted ☐ TCLP Not Conducted |
| | | **Comments:** |

**Total Metals** ☐mg/kg ☐ug/kg ☐mg/L ☐ug/L

| | | |
|---|---|---|
| Arsenic: | -- | ☐ND |
| Barium: | -- | ☐ND |
| Cadmium: | -- | ☐ND |
| Chromium: | -- | ☐ND |
| Lead: | -- | ☐ND |
| Mercury: | -- | ☐ND |
| Selenium: | -- | ☐ND |
| Silver: | -- | ☐ND |
| Copper: | -- | ☐ND |
| Nickel: | -- | ☐ND |
| Zinc: | -- | ☐ND |

**Comments:** Only TCLP metals were analyzed.

**Physical Composition (list all constituents, including debris, any absorbents, liquid range, etc.).**

| Constituent | Volume (Range %) |
|---|---|
| Solid | 100 |
| | |
| | |
| | |

# WASTE DESIGNATION FORM

## C. LISTED WASTE

☐ **Discarded Listed Chemical Product (U or P List):**
☐ **Listed Source Waste (F or K List):**
☒ **Not Applicable:**

## D. WA STATE CRITERIA WASTE

☐**Not applicable per WAC 173-303-070(5): Further designation will not change the generator status or change the way the waste must be managed.**

| WA Toxic Criteria Equivalent Concentration (E.C): | | WA Persistent Criteria Total HOC | | WA Persistent Criteria Total PAH | |
|---|---|---|---|---|---|
| ☒ < 0.001 % | [not a Toxic Criteria DW] | ☒ < 0.01 % | [NOT APPLICABLE] | ☒ < 1.0% | [NOT APPLICABLE] |
| ☐ 0.001 ≥ 1.0 % | [WT02 – DW] | ☐ 0.01 to 1.0% | [WP02 – DW] | ☐ > 1.0% | [WP03 – EHW] |
| ☐ ≥ 1.0% | [WT01 – EHW] | ☐ > 1.0 % | [WP01 – EHW] | | |

*DW: Dangerous Waste EHW: Extremely Hazardous Waste HOC: Halogenated Organic Compounds PAH: Polycyclic Aromatic Hydrocarbons*

## E. ADDITIONAL INFORMATION (Describe any additional information about the waste (e.g. process knowledge statement, regulatory exemptions, assumptions made, etc.)

**A fish bioassay test was conducted in accordance with WAC 173-303-110(3)(b), *Biological Testing Methods for the Designation of Dangerous Waste Method 80-12*. The fish bioassay demonstrated zero fish mortality and this waste stream is therefore designated as non-dangerous waste in accordance with WAC 173-303-100(5)(c) .**

**Attachments:**
☐ **Field Report**
☐ **Sample Log**
☒ **Laboratory Data (OnSite Environmental, Inc., Lab Report 1906-201)**
☐ **Dangerous Waste Toxic Equivalent Concentration Calculation**
☒ **Fish Bioassay Test Biological Testing Method 80-12 (Rainier Environmental Sample ID: WPWWTP-WC-1,2,3,4,5,6,7,8,9,10 comp)**
☒ **Other: Letter and attachments comprising Waste Designation Package, addressed to Reid Middleton, Dated July 11, 2019.**

## F. WASTE DESIGNATION SUMMARY

☐ **RCRA Hazardous Waste**
**USDOT Proper Shipping Name:**
**RCRA Waste Codes:**

☐ **TSCA Regulated Waste**
**TSCA Description:**

☒ **Non-Hazardous Solid Waste/RCRA Exempt/RCRA Excluded**
**Description: Non-Hazardous Solid Waste, concrete**

Designation Performed by: Nathan Moxley, LHG
Title: Senior Project Geologist Date: July 10th, 2019

Designation Reviewed by Dave Hill, PE, CHMM, CPEA
Title: Principal Date: July 10th 2019

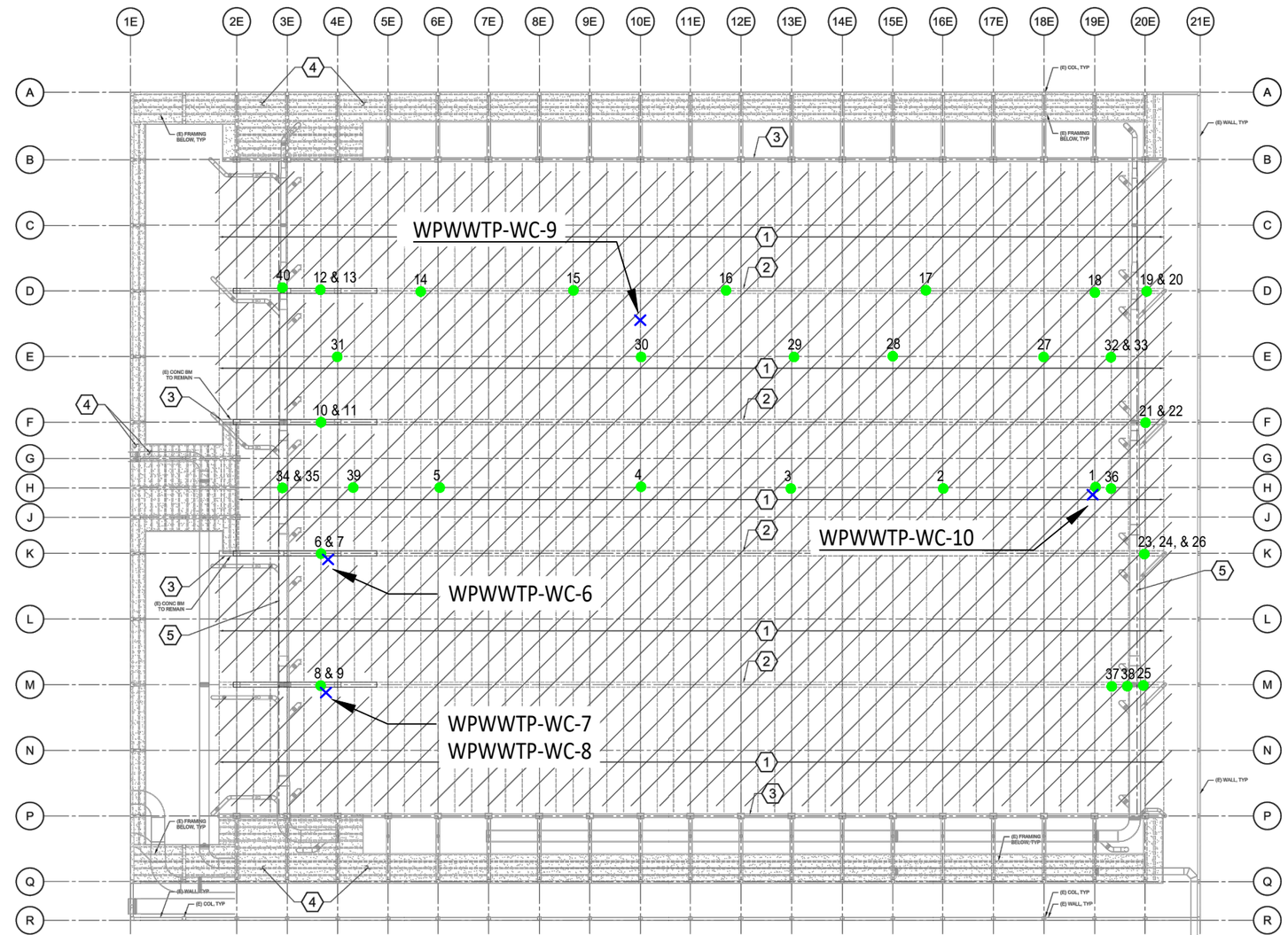
**Table 1**
**TCLP Lead Results**
Waste Characterization Sampling
King County West Point Wastewater Treatment Plant
Sedimentation Basin Roof Structures
6/18/2019

**West basin**

| Sample ID | Item Description | TCLP Lead (mg/L) | Location Description |
|---|---|---|---|
| WPWWTP-WC-1 | Girder | ND | North side of Girder K at the 7th beam from the east (near XRF locations 1 & 2) |
| WPWWTP-WC-2 | Z-Beam | ND | 7th beam from the east, adjacent to and north of Girder K |
| WPWWTP-WC-3 | Girder | ND | Girder D at the 7th beam from the east |
| WPWWTP-WC-4 | Z-Beam | ND | 26th beam from the west, between Girders F & K |
| WPWWTP-WC-5 | Girder | ND | West end of Girder K, between first and second beams from the west |
| **East Basin** | | | |
| WPWWTP-WC-6 | Girder | ND | Girder K at the 7th beam from the west |
| WPWWTP-WC-7 | Girder | ND | Girder M at the 7th beam from the west |
| WPWWTP-WC-8 | Z-Beam | ND | 7th beam from the west, at Girder M |
| WPWWTP-WC-9 | Z-Beam | ND | 25th beam from the west between Girders D & E |
| WPWWTP-WC-10 | Z-Beam | ND | 5th beam from the east between Girders F & K |

Notes:

1. TCLP = Toxicity Characteristic Leachate Procedure test (Environmental Protection Agency [EPA] Method 1311)
2. mg/L = milligrams per liter
3. XRF = X-Ray Fluorescence analyzer
4. 'ND' = Non-detect at the laboratory practical quantitation limit (PQL) of 0.20 mg/L
5. Sample locations are shown on Figures 1 and 2 of the waste designation package




LEGEND:

- EXISTING CONCRETE COLUMN TO REMAIN.
- EXISTING CONCRETE COLUMN TO BE REMOVED.
- APPROXIMATE AREA OF DEMO - SEE KEY NOTES FOR ADDITIONAL INFORMATION

KEY NOTES:

1. DEMO EXISTING PRECAST Z-BEAMS.
2. DEMO EXISTING GIRDER. SEE D-S112 FOR COLUMN DEMO.
3. EXISTING GIRDER TO REMAIN.
4. REMOVE EXISTING MEMBRANE ROOFING FROM ALL FLAT ROOF AREAS.
5. SALVAGE EXISTING DUCT SUPPORT BEAMS AND BRACKETS.

NOTES:

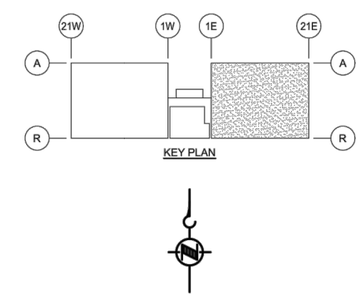
1. CONTRACTOR SHALL ABATE LEAD PAINT PRIOR TO DEMOLITION. DEMOLITION NOT FALL INTO TANK.

● XRF Survey Locations

✕ Waste Characterization Sample Location and Designation

SHEET NOTE:

ALL DIMENSIONS, ELEVATION, AND LOCATIONS OF EXISTING STRUCTURAL COMPONENTS ARE BASED ON INFORMATION GATHERED FROM ORIGINAL DRAWINGS OR CURSORY FIELD MEASUREMENTS AND ARE SHOWN FOR INFORMATION ONLY. CONTRACTOR SHALL FIELD MEASURE AND VERIFY ALL CONDITIONS PRIOR TO COMMENCING ANY WORK. NOTIFY ENGINEER WHERE CONDITIONS VARY FROM THOSE SHOWN.




| NO | REVISION DESCRIPTION | BY | APVD | DATE |
|---|---|---|---|---|
| 0 | INITIAL ISSUE | | | |

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Everett, Washington 98204
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PRELIMINARY ISSUE DRAWING
INFORMATION ONLY
DRAFT PRE-DESIGN SUBMITTAL
OCTOBER 15, 2018

| | |
|---|---|
| DESIGNED/DRAWN: EPP / RLC | CHECKED: DRN |
| PROJECT ENGINEER: SES | SCALE: 1/16" = 1'-0" |
| DESIGN APPROVAL: KDA | FACILITY NUMBER: 706 |
| PROJECT ACCEPTANCE: XXX | CONTRACT NO: E00405E15 |

King County

DEPARTMENT OF NATURAL RESOURCES & PARKS
WASTEWATER TREATMENT DIVISION
WEST POINT TREATMENT PLANT
PRIMARY SEDIMENTATION AREA ROOF STRUCTURE

DEMO
EAST BASIN OVERALL
ROOF LEVEL PLAN

DATE: OCT 18
PROJECT FILE NO: 18-1127489
DRAWING NO: D-S122
SHT NO XXX / TOTAL XXX REV NO: 0

BORDER FILE EDITION: KCWTD-2015R0-Dalze-TB-Border
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PLOTTED: Oct 23, 2018-12:48:53pm By sperra
XREFS: 1127489-Dalze-TB.dwg; 1127489-strmoofplan.dwg; 1127489-strgrid.dwg; 1127489-keyplan.dwg
IMAGES:

Date: 07-10-2019

By: Sellers Weatherall

DH Environmental Inc

Site Address: King County West Point Wastewater Treatment Plant

Project Number: NA

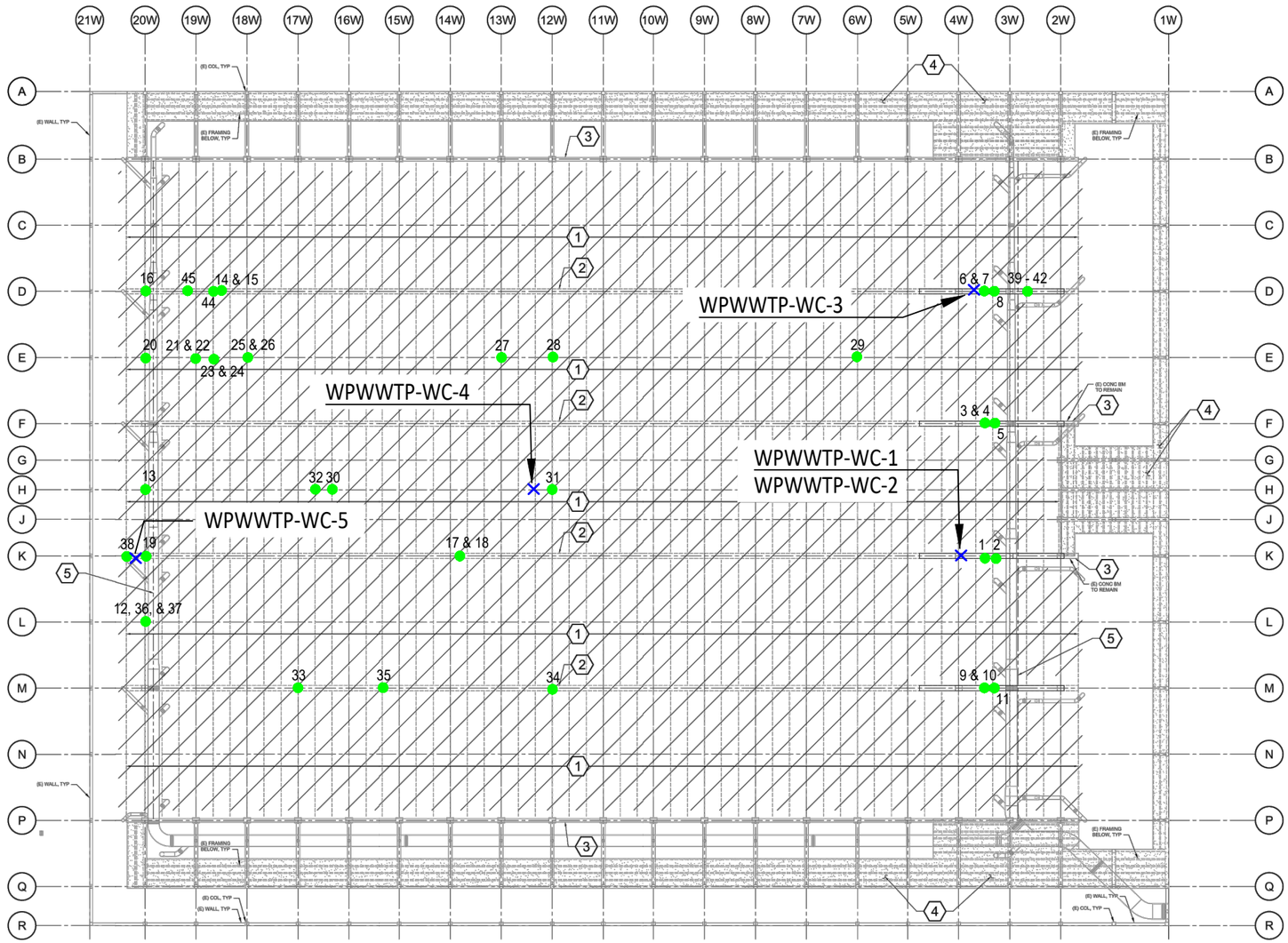
# XRF Survey and Waste Characterization Sample Locations

King County West Point Wastewater Treatment Plant

Sedimentation Basin Roof Structures

## East Basin

Figure 1




LEGEND:

- EXISTING CONCRETE COLUMN TO REMAIN.
- EXISTING CONCRETE COLUMN TO BE REMOVED.
- APPROXIMATE AREA OF DEMO - SEE KEY NOTES FOR ADDITIONAL INFORMATION

KEY NOTES:

1. DEMO EXISTING PRECAST Z-BEAMS.
2. DEMO EXISTING GIRDER. SEE D-S111 FOR COLUMN DEMO.
3. EXISTING GIRDER TO REMAIN.
4. REMOVE EXISTING MEMBRANE ROOFING FROM ALL FLAT ROOF AREAS.
5. SALVAGE EXISTING DUCT SUPPORT BEAMS AND BRACKETS.

NOTES:

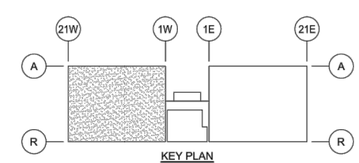
1. CONTRACTOR SHALL ABATE LEAD PAINT PRIOR TO DEMOLITION. DEMOLITION NOT FALL INTO TANK.

● XRF Survey Locations

✕ Waste Characterization Sample Location and Designation

SHEET NOTE:

ALL DIMENSIONS, ELEVATION, AND LOCATIONS OF EXISTING STRUCTURAL COMPONENTS ARE BASED ON INFORMATION GATHERED FROM ORIGINAL DRAWINGS OR CURSORY FIELD MEASUREMENTS AND ARE SHOWN FOR INFORMATION ONLY. CONTRACTOR SHALL FIELD MEASURE AND VERIFY ALL CONDITIONS PRIOR TO COMMENCING ANY WORK. NOTIFY ENGINEER WHERE CONDITIONS VARY FROM THOSE SHOWN.




KEY PLAN

| NO | REVISION DESCRIPTION | BY | APVD | DATE |
|---|---|---|---|---|
| 0 | INITIAL ISSUE | | | |

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PRELIMINARY ISSUE DRAWING
INFORMATION ONLY
DRAFT PRE-DESIGN SUBMITTAL
OCTOBER 15, 2018

| | |
|---|---|
| DESIGNED/DRAWN: EPP / RLC | CHECKED: DRN |
| PROJECT ENGINEER: SES | SCALE: 1/16" = 1'-0" |
| DESIGN APPROVAL: KDA | FACILITY NUMBER: 706 |
| PROJECT ACCEPTANCE: XXX | CONTRACT NO: E00405E15 |

King County

DEPARTMENT OF NATURAL RESOURCES & PARKS
WASTEWATER TREATMENT DIVISION
WEST POINT TREATMENT PLANT
PRIMARY SEDIMENTATION AREA ROOF STRUCTURE

**DEMO**
**WEST BASIN OVERALL ROOF LEVEL PLAN**

DATE: OCT 18
PROJECT FILE NO: 18-1127489
DRAWING NO: D-S121
SHT NO XXX / TOTAL XXX REV NO: 0

BORDER FILE EDITION: KCWTD-2015R0-Dalze-TB-Border
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XREFS: 1127489-Dalze-TB.dwg; 1127489-strroofplan.dwg; 1127489-strgrid.dwg; 1127489-keyplan.dwg
IMAGES:

Date: 07-10-2019

By: Sellers Weatherall

DH Environmental Inc

Site Address: King County West Point Wastewater Treatment Plant  Project Number: NA

# XRF Survey and Waste Characterization Sample Locations

King County West Point Wastewater Treatment Plant
Sedimentation Basin Roof Structures

## West Basin

Figure 2

**Table 2A**
**XRF Survey Results**
King County West Point Wastewater Treatment Plant
West Sedimentation Basin
6/18/2019

| Reading # | Item Description | Location Description | XRF Result ($mg/cm^2$) |
|---|---|---|---|
| 1 | Girder | Girder K, north side, between the 6th and 7th beam from the east (previous sample WP-04 was collected from the south side of the girder) | 0.67 |
| 2 | Z-Beam | 6th beam from the east, north of Girder K (south side of girder was previous sample location WP-05) | 0.53 |
| 3 | Girder | Girder F, between the 6th and 7th beams from the east - blue surface | 0.00 |
| 4 | Girder | Girder F, between the 6th and 7th beams from the east - brown surface | 1.67 |
| 5 | Z-Beam | 6th beam from the east, at Girder F | 0.35 |
| 6 | Girder | Girder D, between the 6th and 7th beams from the east - blue surface | 0.00 |
| 7 | Girder | Girder D, between the 6th and 7th beams from the east - brown surface | 1.07 |
| 8 | Z-Beam | 6th beam from the east at Girder D | 0.64 |
| 9 | Girder | Girder M, between the 6th and 7th beams from the east - blue surface | 0.01 |
| 10 | Girder | Girder M, between the 6th and 7th beams from the east - brown surface | 1.55 |
| 11 | Z-Beam | 6th beam from the east at Girder M | 1.04 |
| 12 | Z-Beam | 2nd beam from the west between Girders M and K | 1.31 |
| 13 | Z-Beam | 2nd beam from the west between Girders F and K | 1.00 |
| 14 | Girder | Girder D, between the 1st and 2nd beams from the west - blue surface | 0.01 |
| 15 | Girder | Girder D, between the 1st and 2nd beams from the west - brown surface | 1.07 |
| 16 | Z-Beam | 2nd beam from the west, at Girder D | 1.00 |
| 17 | Girder | Girder K, between the 20th and 21st beams from the west - blue surface (adjacent to previous sample location "WP-06") | 0.01 |
| 18 | Girder | Girder K, between the 20th and 21st beams from the west - brown surface (adjacent to previous sample location "WP-06") | 1.39 |
| 19 | Z-Beam | 2nd beam from the west, at Girder K | 0.71 |
| 20 | Z-Beam | 2nd beam from the west between Girders D & F | 0.96 |
| 21 | Z-Beam | 5th beam from the west between Girders D & F, west facing surface with brown fresher looking paint | 0.00 |
| 22 | Z-Beam | 5th beam from the west between Girders D & F, top surface | 1.01 |
| 23 | Z-Beam | 6th beam from the west between Girders D & F, west facing surface with brown fresher looking paint | 0.00 |
| 24 | Z-Beam | 6th beam from the west between Girders D & F, top surface | 1.17 |
| 25 | Z-Beam | 8th beam from the west between Girders D & F, west facing surface with brown | 0.00 |
| 26 | Z-Beam | 8th beam from the west between Girders D & F, top surface | 0.59 |
| 27 | Z-Beam | 23rd beam from the west between Girders D & F, top surface | 0.39 |
| 28 | Z-Beam | 26th beam from the west between Girders D & F, top surface | 0.67 |
| 29 | Z-Beam | 44th beam from the west between Girders D & F, top surface | 1.16 |
| 30 | Z-Beam | 13th beam from the west between Girders F & K, top surface | 1.33 |
| 31 | Z-Beam | 26th beam from the west between Girders F & K, top surface | 1.00 |
| 32 | Z-Beam | 12th beam from the west between Girders F & K, top surface | 1.01 |
| 33 | Z-Beam | 11th beam from the west, south of Girder M | 0.41 |
| 34 | Z-Beam | 26th beam from the west, south of Girder M | 1.46 |
| 35 | Z-Beam | 16th beam from the west, south of Girder M | 0.61 |
| 36 | Misc. Equipment | gray "rototork" controller, under the 2nd beam from the west between Girders K | 0.00 |
| 37 | Misc. Equipment | blue pump cover under 2nd beam from the west between Girders K & M | 0.02 |
| 38 | Misc. Equipment | brown colored round ducting, at the west end of Girder K | 0.00 |
| 39 | Misc. Equipment | blue colored valve beneath the 4th beam from the east, directly south of Girder D | 1.00 |
| 40 | Misc. Equipment | blue colored valve beneath the 4th beam from the east, 2nd valve south of Girder D | 0.30 |
| 41 | Misc. Equipment | blue colored valve beneath the 4th beam from the east, 3rd valve south of Girder D | 0.99 |
| 42 | Misc. Equipment | blue colored valve beneath the 4th beam from the east, 4th valve south of Girder D | 0.50 |
| 43 | Misc. Equipment | brown ducting between survey locations 39 and 40 | 0.00 |
| 44 | Misc. Equipment | blue colored pump under the 6th beam from the east, beneath Girder D | 0.00 |
| 45 | Misc. Equipment | red pole base north of Girder D, between the 4th and 5th beams from the east | 0.00 |

**Table 2B**
**XRF Survey Results**
King County West Point Wastewater Treatment Plant
East Sedimentation Basin
6/18/2019

| Reading # | Item Description | Location Description | XRF Result ($mg/cm^2$) |
|---|---|---|---|
| 1 | Z-Beam | 5th beam from the east, between girders F and K | 1.00 |
| 2 | Z-Beam | 14th beam from the east, between girders F and K | 2.12 |
| 3 | Z-Beam | 23rd beam from the east, between girders F and K | 1.19 |
| 4 | Z-Beam | 32nd beam from the east, between girders F and K | 1.69 |
| 5 | Z-Beam | 13th beam from the west, between girders F and K | 2.77 |
| 6 | Girder | Girder K, at 7th beam from west (adjacent to sample WC-06) | 1.82 |
| 7 | Z-Beam | 7th beam from west, at Girder K (N. side) | 0.65 |
| 8 | Girder | Girder M at 7th beam from the west (adjacent to sample WC-07) | 1.39 |
| 9 | Z-Beam | 7th beam from west, at Girder M | 0.34 |
| 10 | Girder | Girder F at 7th beam from the west | 0.97 |
| 11 | Z-Beam | 7th beam from west, north of Girder F | 0.73 |
| 12 | Girder | Girder D at the 7th beam from the west | 2.01 |
| 13 | Z-Beam | 7th beam from the west, just north of Girder D | 1.19 |
| 14 | Z-Beam | 13th beam from the west, north of Girder D | 2.44 |
| 15 | Z-Beam | 22nd beam from the west, north of Girder D | 2.99 |
| 16 | Z-Beam | 31st beam from the west, north of Girder D | 2.46 |
| 17 | Z-Beam | 43rd beam from the west, north of Girder D | 2.19 |
| 18 | Z-Beam | 5th beam from the east, north of Girder D | 2.78 |
| 19 | Girder | Girder D at 2nd beam from the east | 1.19 |
| 20 | Z-Beam | 2nd beam from the east, north of Girder D | 1.23 |
| 21 | Girder | Girder F at 2nd beam from the east | 2.53 |
| 22 | Z-Beam | 2nd beam from the east, north of Girder F | 0.71 |
| 23 | Girder | Girder K at the second beam from the east | 1.83 |
| 24 | Z-Beam | 2nd beam from the east, north of Girder K | 0.88 |
| 25 | Girder | Girder M at the 2nd beam from the east | 1.41 |
| 26 | Z-Beam | 2nd beam from the east, north of Girder K | 1.86 |
| 27 | Z-Beam | 8th beam from the east, between Girders D and F | 0.00 |
| 28 | Z-Beam | 17th beam from the east, between Girders D and F | 2.52 |
| 29 | Z-Beam | 23rd beam from the east, between Girders D and F | 1.42 |
| 30 | Z-Beam | 32nd beam from the east, between Girders D and F (adjacent to sample WC-09) | 2.35 |
| 31 | Z-Beam | 8th beam from the east, between Girders D and F | 1.99 |
| 32 | Misc. Equipment | blue valve beneath the 4th beam from the west, between girders D and F. (Adjacent to previous sample EP-031) | 1.67 |
| 33 | Misc. Equipment | blue valve beneath the 4th beam from the west, directly north of Girder F | 2.23 |
| 34 | Misc. Equipment | blue valve directly east of control room | 0.00 |
| 35 | Misc. Equipment | yellow pole directly behind blue valve and XRF reading # 34 | 0.02 |
| 36 | Misc. Equipment | blue valve beneath the 4th beam from the west, between girders F and K | 1.00 |
| 37 | Misc. Equipment | blue valve beneath the 4th beam from the west, directly north of Girder M | 1.90 |
| 38 | Misc. Equipment | round vertical duct behind (directly east of) XRF reading # 37 | 0.00 |
| 39 | Misc. Equipment | yellow hose hanger beneath the 8th beam from the west, between Girders F and K | 0.06 |
| 40 | Misc. Equipment | yellow crane hoist arm north of Girder D | 0.00 |

OnSite Environmental Inc.
14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

June 27, 2019

Nathan Moxley
DH Environmental, Inc.
1011 SW Klickitat Way, Suite C-107
Seattle, WA 98103

Re: Analytical Data for Project King County-WPWWTP
Laboratory Reference No. 1906-201

Dear Nathan:

Enclosed are the analytical results and associated quality control data for samples submitted on June 19, 2019.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: June 27, 2019
Samples Submitted: June 19, 2019
Laboratory Reference: 1906-201
Project: King County-WPWWTP

**Case Narrative**

Samples were collected on June 18, 2019 and received by the laboratory on June 19, 2019. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Volatiles EPA 8260C Analysis:

Surrogate Standard Dibromofluoromethane is outside control limits for samples WPWWTP-WC-1 and WPWWTP-WC-6 due to a known sample matrix effects.

TCLP Metals EPA 1311/6010D/7470A Analysis:

Due to a limited amount of sample, less than the required 100g was tumbled for TCLP analysis. The amount of sample used for each sample is listed below.

| Sample ID | Lab ID | Amount Used |
|---|---|---|
| WPWWTP-WC-2 | 06-201-02 | 65g |
| WPWWTP-WC-3 | 06-201-03 | 70g |
| WPWWTP-WC-4 | 06-201-04 | 75g |
| WPWWTP-WC-5 | 06-201-05 | 50g |
| WPWWTP-WC-7 | 06-201-07 | 80g |
| WPWWTP-WC-8 | 06-201-08 | 85g |
| WPWWTP-WC-9 | 06-201-09 | 70g |
| WPWWTP-WC-10 | 06-201-10 | 85g |

**Please note that any other QA/QC issues associated with these extractions and analyses will be indicated with a footnote reference and discussed in detail on the Data Qualifier page.**

Date of Report: June 27, 2019
Samples Submitted: June 19, 2019
Laboratory Reference: 1906-201
Project: King County-WPWWTP

**VOLATILE ORGANICS EPA 8260C**
page 1 of 2

Matrix: Solid
Units: mg/kg

| Analyte | Result | PQL | Method | Date Prepared | Date Analyzed | Flags |
|---|---|---|---|---|---|---|
| **Client ID:** | **WPWWTP-WC-1** | | | | | |
| Laboratory ID: | 06-201-01 | | | | | |
| Dichlorodifluoromethane | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Chloromethane | ND | 0.0052 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Vinyl Chloride | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Bromomethane | ND | 0.0013 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Chloroethane | ND | 0.0052 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Trichlorofluoromethane | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 1,1-Dichloroethene | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Acetone | 0.24 | 0.010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Iodomethane | ND | 0.0052 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Carbon Disulfide | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Methylene Chloride | ND | 0.0052 | EPA 8260C | 6-20-19 | 6-20-19 | |
| (trans) 1,2-Dichloroethene | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Methyl t-Butyl Ether | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 1,1-Dichloroethane | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Vinyl Acetate | ND | 0.0052 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 2,2-Dichloropropane | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| (cis) 1,2-Dichloroethene | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 2-Butanone | ND | 0.0052 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Bromochloromethane | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Chloroform | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 1,1,1-Trichloroethane | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Carbon Tetrachloride | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 1,1-Dichloropropene | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Benzene | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 1,2-Dichloroethane | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Trichloroethene | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 1,2-Dichloropropane | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Dibromomethane | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Bromodichloromethane | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 2-Chloroethyl Vinyl Ether | ND | 0.0052 | EPA 8260C | 6-20-19 | 6-20-19 | |
| (cis) 1,3-Dichloropropene | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Methyl Isobutyl Ketone | ND | 0.0052 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Toluene | ND | 0.0052 | EPA 8260C | 6-20-19 | 6-20-19 | |
| (trans) 1,3-Dichloropropene | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |

Date of Report: June 27, 2019
Samples Submitted: June 19, 2019
Laboratory Reference: 1906-201
Project: King County-WPWWTP

**VOLATILE ORGANICS EPA 8260C**
page 2 of 2

| Analyte | Result | PQL | Method | Date Prepared | Date Analyzed | Flags |
|---|---|---|---|---|---|---|
| **Client ID:** | **WPWWTP-WC-1** | | | | | |
| Laboratory ID: | 06-201-01 | | | | | |
| 1,1,2-Trichloroethane | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Tetrachloroethene | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 1,3-Dichloropropane | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 2-Hexanone | ND | 0.0052 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Dibromochloromethane | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 1,2-Dibromoethane | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Chlorobenzene | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 1,1,1,2-Tetrachloroethane | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Ethylbenzene | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| m,p-Xylene | ND | 0.0021 | EPA 8260C | 6-20-19 | 6-20-19 | |
| o-Xylene | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Styrene | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Bromoform | ND | 0.0052 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Isopropylbenzene | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Bromobenzene | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 1,1,2,2-Tetrachloroethane | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 1,2,3-Trichloropropane | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| n-Propylbenzene | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 2-Chlorotoluene | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 4-Chlorotoluene | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 1,3,5-Trimethylbenzene | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| tert-Butylbenzene | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 1,2,4-Trimethylbenzene | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| sec-Butylbenzene | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 1,3-Dichlorobenzene | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| p-Isopropyltoluene | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 1,4-Dichlorobenzene | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 1,2-Dichlorobenzene | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| n-Butylbenzene | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 1,2-Dibromo-3-chloropropane | ND | 0.0052 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 1,2,4-Trichlorobenzene | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Hexachlorobutadiene | ND | 0.0052 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Naphthalene | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 1,2,3-Trichlorobenzene | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| ***Surrogate:*** | ***Percent Recovery*** | ***Control Limits*** | | | | |
| ***Dibromofluoromethane*** | ***18*** | ***76-131*** | | | | Q |
| ***Toluene-d8*** | ***98*** | ***78-128*** | | | | |
| ***4-Bromofluorobenzene*** | ***90*** | ***71-130*** | | | | |

Date of Report: June 27, 2019
Samples Submitted: June 19, 2019
Laboratory Reference: 1906-201
Project: King County-WPWWTP

**VOLATILE ORGANICS EPA 8260C**
page 1 of 2

Matrix: Solid
Units: mg/kg

| Analyte | Result | PQL | Method | Date Prepared | Date Analyzed | Flags |
|---|---|---|---|---|---|---|
| **Client ID:** | **WPWWTP-WC-6** | | | | | |
| Laboratory ID: | 06-201-06 | | | | | |
| Dichlorodifluoromethane | ND | 0.0012 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Chloromethane | ND | 0.0059 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Vinyl Chloride | ND | 0.0012 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Bromomethane | ND | 0.0015 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Chloroethane | ND | 0.0059 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Trichlorofluoromethane | ND | 0.0012 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 1,1-Dichloroethene | ND | 0.0012 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Acetone | 0.13 | 0.012 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Iodomethane | ND | 0.0059 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Carbon Disulfide | ND | 0.0012 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Methylene Chloride | ND | 0.0059 | EPA 8260C | 6-20-19 | 6-20-19 | |
| (trans) 1,2-Dichloroethene | ND | 0.0012 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Methyl t-Butyl Ether | ND | 0.0012 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 1,1-Dichloroethane | ND | 0.0012 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Vinyl Acetate | ND | 0.0059 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 2,2-Dichloropropane | ND | 0.0012 | EPA 8260C | 6-20-19 | 6-20-19 | |
| (cis) 1,2-Dichloroethene | ND | 0.0012 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 2-Butanone | ND | 0.0059 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Bromochloromethane | ND | 0.0012 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Chloroform | ND | 0.0012 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 1,1,1-Trichloroethane | ND | 0.0012 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Carbon Tetrachloride | ND | 0.0012 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 1,1-Dichloropropene | ND | 0.0012 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Benzene | ND | 0.0012 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 1,2-Dichloroethane | ND | 0.0012 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Trichloroethene | ND | 0.0012 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 1,2-Dichloropropane | ND | 0.0012 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Dibromomethane | ND | 0.0012 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Bromodichloromethane | ND | 0.0012 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 2-Chloroethyl Vinyl Ether | ND | 0.0059 | EPA 8260C | 6-20-19 | 6-20-19 | |
| (cis) 1,3-Dichloropropene | ND | 0.0012 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Methyl Isobutyl Ketone | ND | 0.0059 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Toluene | ND | 0.0059 | EPA 8260C | 6-20-19 | 6-20-19 | |
| (trans) 1,3-Dichloropropene | ND | 0.0012 | EPA 8260C | 6-20-19 | 6-20-19 | |

Date of Report: June 27, 2019
Samples Submitted: June 19, 2019
Laboratory Reference: 1906-201
Project: King County-WPWWTP

**VOLATILE ORGANICS EPA 8260C**
page 2 of 2

| Analyte | Result | PQL | Method | Date Prepared | Date Analyzed | Flags |
|---|---|---|---|---|---|---|
| **Client ID:** | **WPWWTP-WC-6** | | | | | |
| Laboratory ID: | 06-201-06 | | | | | |
| 1,1,2-Trichloroethane | ND | 0.0012 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Tetrachloroethene | ND | 0.0012 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 1,3-Dichloropropane | ND | 0.0012 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 2-Hexanone | ND | 0.0059 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Dibromochloromethane | ND | 0.0012 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 1,2-Dibromoethane | ND | 0.0012 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Chlorobenzene | ND | 0.0012 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 1,1,1,2-Tetrachloroethane | ND | 0.0012 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Ethylbenzene | ND | 0.0012 | EPA 8260C | 6-20-19 | 6-20-19 | |
| m,p-Xylene | ND | 0.0024 | EPA 8260C | 6-20-19 | 6-20-19 | |
| o-Xylene | ND | 0.0012 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Styrene | ND | 0.0012 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Bromoform | ND | 0.0059 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Isopropylbenzene | ND | 0.0012 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Bromobenzene | ND | 0.0012 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 1,1,2,2-Tetrachloroethane | ND | 0.0012 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 1,2,3-Trichloropropane | ND | 0.0012 | EPA 8260C | 6-20-19 | 6-20-19 | |
| n-Propylbenzene | ND | 0.0012 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 2-Chlorotoluene | ND | 0.0012 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 4-Chlorotoluene | ND | 0.0012 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 1,3,5-Trimethylbenzene | ND | 0.0012 | EPA 8260C | 6-20-19 | 6-20-19 | |
| tert-Butylbenzene | ND | 0.0012 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 1,2,4-Trimethylbenzene | ND | 0.0012 | EPA 8260C | 6-20-19 | 6-20-19 | |
| sec-Butylbenzene | ND | 0.0012 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 1,3-Dichlorobenzene | ND | 0.0012 | EPA 8260C | 6-20-19 | 6-20-19 | |
| p-Isopropyltoluene | ND | 0.0012 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 1,4-Dichlorobenzene | ND | 0.0012 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 1,2-Dichlorobenzene | ND | 0.0012 | EPA 8260C | 6-20-19 | 6-20-19 | |
| n-Butylbenzene | ND | 0.0012 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 1,2-Dibromo-3-chloropropane | ND | 0.0059 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 1,2,4-Trichlorobenzene | ND | 0.0012 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Hexachlorobutadiene | ND | 0.0059 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Naphthalene | ND | 0.0012 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 1,2,3-Trichlorobenzene | ND | 0.0012 | EPA 8260C | 6-20-19 | 6-20-19 | |
| ***Surrogate:*** | ***Percent Recovery*** | ***Control Limits*** | | | | |
| ***Dibromofluoromethane*** | ***36*** | ***76-131*** | | | | Q |
| ***Toluene-d8*** | ***100*** | ***78-128*** | | | | |
| ***4-Bromofluorobenzene*** | ***94*** | ***71-130*** | | | | |

Date of Report: June 27, 2019
Samples Submitted: June 19, 2019
Laboratory Reference: 1906-201
Project: King County-WPWWTP

**VOLATILE ORGANICS EPA 8260C**
**METHOD BLANK QUALITY CONTROL**
page 1 of 2

Matrix: Solid
Units: mg/kg

| Analyte | Result | PQL | Method | Date Prepared | Date Analyzed | Flags |
|---|---|---|---|---|---|---|
| Laboratory ID: | MB0620S1 | | | | | |
| Dichlorodifluoromethane | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Chloromethane | ND | 0.0050 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Vinyl Chloride | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Bromomethane | ND | 0.0013 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Chloroethane | ND | 0.0050 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Trichlorofluoromethane | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 1,1-Dichloroethene | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Acetone | ND | 0.010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Iodomethane | ND | 0.0050 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Carbon Disulfide | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Methylene Chloride | ND | 0.0050 | EPA 8260C | 6-20-19 | 6-20-19 | |
| (trans) 1,2-Dichloroethene | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Methyl t-Butyl Ether | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 1,1-Dichloroethane | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Vinyl Acetate | ND | 0.0050 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 2,2-Dichloropropane | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| (cis) 1,2-Dichloroethene | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 2-Butanone | ND | 0.0050 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Bromochloromethane | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Chloroform | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 1,1,1-Trichloroethane | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Carbon Tetrachloride | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 1,1-Dichloropropene | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Benzene | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 1,2-Dichloroethane | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Trichloroethene | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 1,2-Dichloropropane | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Dibromomethane | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Bromodichloromethane | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 2-Chloroethyl Vinyl Ether | ND | 0.0050 | EPA 8260C | 6-20-19 | 6-20-19 | |
| (cis) 1,3-Dichloropropene | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Methyl Isobutyl Ketone | ND | 0.0050 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Toluene | ND | 0.0050 | EPA 8260C | 6-20-19 | 6-20-19 | |
| (trans) 1,3-Dichloropropene | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |

Date of Report: June 27, 2019
Samples Submitted: June 19, 2019
Laboratory Reference: 1906-201
Project: King County-WPWWTP

**VOLATILE ORGANICS EPA 8260C**
**METHOD BLANK QUALITY CONTROL**
page 2 of 2

| Analyte | Result | PQL | Method | Date Prepared | Date Analyzed | Flags |
|---|---|---|---|---|---|---|
| Laboratory ID: | MB0620S1 | | | | | |
| 1,1,2-Trichloroethane | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Tetrachloroethene | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 1,3-Dichloropropane | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 2-Hexanone | ND | 0.0050 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Dibromochloromethane | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 1,2-Dibromoethane | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Chlorobenzene | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 1,1,1,2-Tetrachloroethane | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Ethylbenzene | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| m,p-Xylene | ND | 0.0020 | EPA 8260C | 6-20-19 | 6-20-19 | |
| o-Xylene | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Styrene | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Bromoform | ND | 0.0050 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Isopropylbenzene | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Bromobenzene | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 1,1,2,2-Tetrachloroethane | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 1,2,3-Trichloropropane | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| n-Propylbenzene | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 2-Chlorotoluene | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 4-Chlorotoluene | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 1,3,5-Trimethylbenzene | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| tert-Butylbenzene | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 1,2,4-Trimethylbenzene | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| sec-Butylbenzene | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 1,3-Dichlorobenzene | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| p-Isopropyltoluene | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 1,4-Dichlorobenzene | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 1,2-Dichlorobenzene | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| n-Butylbenzene | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 1,2-Dibromo-3-chloropropane | ND | 0.0050 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 1,2,4-Trichlorobenzene | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Hexachlorobutadiene | ND | 0.0050 | EPA 8260C | 6-20-19 | 6-20-19 | |
| Naphthalene | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |
| 1,2,3-Trichlorobenzene | ND | 0.0010 | EPA 8260C | 6-20-19 | 6-20-19 | |

| ***Surrogate:*** | ***Percent Recovery*** | ***Control Limits*** |
|---|---|---|
| ***Dibromofluoromethane*** | ***102*** | ***76-131*** |
| ***Toluene-d8*** | ***100*** | ***78-128*** |
| ***4-Bromofluorobenzene*** | ***95*** | ***71-130*** |

Date of Report: June 27, 2019
Samples Submitted: June 19, 2019
Laboratory Reference: 1906-201
Project: King County-WPWWTP

**VOLATILE ORGANICS EPA 8260C**
**SB/SBD QUALITY CONTROL**

Matrix: Solid
Units: mg/kg

| Analyte | Result | | Spike Level | | Percent Recovery | | Recovery Limits | RPD | RPD Limit | Flags |
|---|---|---|---|---|---|---|---|---|---|---|
| **SPIKE BLANKS** | | | | | | | | | | |
| Laboratory ID: | SB0620S1 | | | | | | | | | |
| | SB | SBD | SB | SBD | SB | SBD | | | | |
| 1,1-Dichloroethene | **0.0530** | **0.0488** | 0.0500 | 0.0500 | 106 | 98 | 57-133 | 8 | 18 | |
| Benzene | **0.0480** | **0.0460** | 0.0500 | 0.0500 | 96 | 92 | 71-129 | 4 | 16 | |
| Trichloroethene | **0.0496** | **0.0483** | 0.0500 | 0.0500 | 99 | 97 | 71-122 | 3 | 16 | |
| Toluene | **0.0481** | **0.0471** | 0.0500 | 0.0500 | 96 | 94 | 74-125 | 2 | 15 | |
| Chlorobenzene | **0.0465** | **0.0456** | 0.0500 | 0.0500 | 93 | 91 | 72-120 | 2 | 14 | |
| ***Surrogate:*** | | | | | | | | | | |
| ***Dibromofluoromethane*** | | | | | ***101*** | ***99*** | ***76-131*** | | | |
| ***Toluene-d8*** | | | | | ***101*** | ***102*** | ***78-128*** | | | |
| ***4-Bromofluorobenzene*** | | | | | ***94*** | ***94*** | ***71-130*** | | | |

Date of Report: June 27, 2019
Samples Submitted: June 19, 2019
Laboratory Reference: 1906-201
Project: King County-WPWWTP

**TCLP METALS**
**EPA 1311/6010D/7470A**

Matrix: TCLP Extract
Units: mg/L (ppm)

| Analyte | Result | PQL | Method | Date Prepared | Date Analyzed | Flags |
|---|---|---|---|---|---|---|
| **Client ID:** | **WPWWTP-WC-1** | | | | | |
| Laboratory ID: | 06-201-01 | | | | | |
| Arsenic | **ND** | 0.40 | EPA 6010D | 7-26-19 | 7-26-19 | |
| Barium | **0.31** | 0.20 | EPA 6010D | 7-26-19 | 7-26-19 | |
| Cadmium | **ND** | 0.020 | EPA 6010D | 7-26-19 | 7-26-19 | |
| Chromium | **0.070** | 0.020 | EPA 6010D | 7-26-19 | 7-26-19 | |
| Lead | **ND** | 0.20 | EPA 6010D | 7-26-19 | 7-26-19 | |
| Mercury | **ND** | 0.0050 | EPA 7470A | 7-26-19 | 7-26-19 | |
| Selenium | **ND** | 0.40 | EPA 6010D | 7-26-19 | 7-26-19 | |
| Silver | **ND** | 0.040 | EPA 6010D | 7-26-19 | 7-26-19 | |
| **Client ID:** | **WPWWTP-WC-2** | | | | | |
| Laboratory ID: | 06-201-02 | | | | | |
| Lead | **ND** | 0.20 | EPA 6010D | 7-26-19 | 7-26-19 | |
| **Client ID:** | **WPWWTP-WC-3** | | | | | |
| Laboratory ID: | 06-201-03 | | | | | |
| Lead | **ND** | 0.20 | EPA 6010D | 7-26-19 | 7-26-19 | |
| **Client ID:** | **WPWWTP-WC-4** | | | | | |
| Laboratory ID: | 06-201-04 | | | | | |
| Lead | **ND** | 0.20 | EPA 6010D | 7-26-19 | 7-26-19 | |
| **Client ID:** | **WPWWTP-WC-5** | | | | | |
| Laboratory ID: | 06-201-05 | | | | | |
| Lead | **ND** | 0.20 | EPA 6010D | 7-26-19 | 7-26-19 | |

Date of Report: June 27, 2019
Samples Submitted: June 19, 2019
Laboratory Reference: 1906-201
Project: King County-WPWWTP

**TCLP METALS**
**EPA 1311/6010D/7470A**

Matrix: TCLP Extract
Units: mg/L (ppm)

| Analyte | Result | PQL | Method | Date Prepared | Date Analyzed | Flags |
|---|---|---|---|---|---|---|
| **Client ID:** | **WPWWTP-WC-6** | | | | | |
| Laboratory ID: | 06-201-06 | | | | | |
| Arsenic | **ND** | 0.40 | EPA 6010D | 7-26-19 | 7-26-19 | |
| Barium | **ND** | 0.20 | EPA 6010D | 7-26-19 | 7-26-19 | |
| Cadmium | **ND** | 0.020 | EPA 6010D | 7-26-19 | 7-26-19 | |
| Chromium | **0.085** | 0.020 | EPA 6010D | 7-26-19 | 7-26-19 | |
| Lead | **ND** | 0.20 | EPA 6010D | 7-26-19 | 7-26-19 | |
| Mercury | **ND** | 0.0050 | EPA 7470A | 7-26-19 | 7-26-19 | |
| Selenium | **ND** | 0.40 | EPA 6010D | 7-26-19 | 7-26-19 | |
| Silver | **ND** | 0.040 | EPA 6010D | 7-26-19 | 7-26-19 | |
| **Client ID:** | **WPWWTP-WC-7** | | | | | |
| Laboratory ID: | 06-201-07 | | | | | |
| Lead | **ND** | 0.20 | EPA 6010D | 7-26-19 | 7-26-19 | |
| **Client ID:** | **WPWWTP-WC-8** | | | | | |
| Laboratory ID: | 06-201-08 | | | | | |
| Lead | **ND** | 0.20 | EPA 6010D | 7-26-19 | 7-26-19 | |
| **Client ID:** | **WPWWTP-WC-9** | | | | | |
| Laboratory ID: | 06-201-09 | | | | | |
| Lead | **ND** | 0.20 | EPA 6010D | 7-26-19 | 7-26-19 | |
| **Client ID:** | **WPWWTP-WC-10** | | | | | |
| Laboratory ID: | 06-201-10 | | | | | |
| Lead | **ND** | 0.20 | EPA 6010D | 7-26-19 | 7-26-19 | |

Date of Report: June 27, 2019
Samples Submitted: June 19, 2019
Laboratory Reference: 1906-201
Project: King County-WPWWTP

**TCLP METALS**
**EPA 1311/6010D/7470A**
**QUALITY CONTROL**

Matrix: TCLP Extract
Units: mg/L (ppm)

| Analyte | Result | PQL | Method | Date Prepared | Date Analyzed | Flags |
|---|---|---|---|---|---|---|
| **METHOD BLANK** | | | | | | |
| Laboratory ID: | MB0626TM1 | | | | | |
| Arsenic | **ND** | 0.40 | EPA 6010D | 7-26-19 | 7-26-19 | |
| Barium | **ND** | 0.20 | EPA 6010D | 7-26-19 | 7-26-19 | |
| Cadmium | **ND** | 0.020 | EPA 6010D | 7-26-19 | 7-26-19 | |
| Chromium | **ND** | 0.020 | EPA 6010D | 7-26-19 | 7-26-19 | |
| Lead | **ND** | 0.20 | EPA 6010D | 7-26-19 | 7-26-19 | |
| Selenium | **ND** | 0.40 | EPA 6010D | 7-26-19 | 7-26-19 | |
| Silver | **ND** | 0.040 | EPA 6010D | 7-26-19 | 7-26-19 | |
| Laboratory ID: | MB0626T1 | | | | | |
| Mercury | **ND** | 0.0050 | EPA 7470A | 7-26-19 | 7-26-19 | |

| Analyte | Result | | Spike Level | | Source Result | Percent Recovery | | Recovery Limits | RPD | RPD Limit | Flags |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **DUPLICATE** | | | | | | | | | | | |
| Laboratory ID: | 06-201-01 | | | | | | | | | | |
| | ORIG | DUP | | | | | | | | | |
| Arsenic | **ND** | **ND** | NA | NA | | NA | | NA | NA | 20 | |
| Barium | **0.308** | **0.304** | NA | NA | | NA | | NA | 1 | 20 | |
| Cadmium | **ND** | **ND** | NA | NA | | NA | | NA | NA | 20 | |
| Chromium | **0.0700** | **0.0670** | NA | NA | | NA | | NA | 4 | 20 | |
| Lead | **ND** | **ND** | NA | NA | | NA | | NA | NA | 20 | |
| Selenium | **ND** | **ND** | NA | NA | | NA | | NA | NA | 20 | |
| Silver | **ND** | **ND** | NA | NA | | NA | | NA | NA | 20 | |
| Laboratory ID: | 06-201-01 | | | | | | | | | | |
| Mercury | **ND** | **ND** | NA | NA | | NA | | NA | NA | 20 | |
| **MATRIX SPIKES** | | | | | | | | | | | |
| Laboratory ID: | 06-201-01 | | | | | | | | | | |
| | MS | MSD | MS | MSD | | MS | MSD | | | | |
| Arsenic | **3.82** | **3.80** | 4.00 | 4.00 | ND | **96** | **95** | 75-125 | 0 | 20 | |
| Barium | **4.12** | **4.17** | 4.00 | 4.00 | 0.308 | **95** | **97** | 75-125 | 1 | 20 | |
| Cadmium | **1.83** | **1.82** | 2.00 | 2.00 | ND | **92** | **91** | 75-125 | 0 | 20 | |
| Chromium | **3.76** | **3.75** | 4.00 | 4.00 | 0.0700 | **92** | **92** | 75-125 | 0 | 20 | |
| Lead | **9.02** | **8.94** | 10.0 | 10.0 | ND | **90** | **89** | 75-125 | 1 | 20 | |
| Selenium | **3.94** | **4.07** | 4.00 | 4.00 | ND | **99** | **102** | 75-125 | 3 | 20 | |
| Silver | **0.956** | **0.954** | 1.00 | 1.00 | ND | **96** | **95** | 75-125 | 0 | 20 | |
| Laboratory ID: | 06-201-01 | | | | | | | | | | |
| Mercury | **0.0467** | **0.0475** | 0.0500 | 0.0500 | ND | **93** | **95** | 75-125 | 2 | 20 | |

Date of Report: June 27, 2019
Samples Submitted: June 19, 2019
Laboratory Reference: 1906-201
Project: King County-WPWWTP

**% MOISTURE**

| Client ID | Lab ID | % Moisture | Date Analyzed |
|---|---|---|---|
| **WPWWTP-WC-1** | 06-201-01 | **2** | 6-20-19 |
| **WPWWTP-WC-6** | 06-201-06 | **2** | 6-20-19 |

OnSite Environmental Inc.

**Data Qualifiers and Abbreviations**

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical _____.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a mercury cleanup procedure.

X1- Sample extract treated with a sulfuric acid/silica gel cleanup procedure.

Y - The calibration verification for this analyte exceeded the 20% drift specified in methods 8260 & 8270, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

**OnSite Environmental Inc.**
Analytical Laboratory Testing Services
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

# Chain of Custody



Company: DH Environmental
Project Number:
Project Name: King County - WPWWTP
Project Manager: Nathan Moxley
Sampled by: N. Moxley, B. Johnson

Turnaround Request (in working days) (Check One)
☐ Same Day ☐ 1 Day
☐ 2 Days ☐ 3 Days
☒ Standard (7 Days)
☐ _____ (other)

Laboratory Number: 06-201

| Lab ID | Sample Identification | Date Sampled | Time Sampled | Matrix | Number of Containers | NWTPH-HCID | NWTPH-Gx/BTEX | NWTPH-Gx | NWTPH-Dx (☐ Acid / SG Clean-up) | Volatiles 8260C | Halogenated Volatiles 8260C | EDB EPA 8011 (Waters Only) | Semivolatiles 8270D/SIM (with low-level PAHs) | PAHs 8270D/SIM (low-level) | PCBs 8082A | Organochlorine Pesticides 8081B | Organophosphorus Pesticides 8270D/SIM | Chlorinated Acid Herbicides 8151A | ~~Total~~ TCLP RCRA Metals | Total MTCA Metals | TCLP Metals LEAD | HEM (oil and grease) 1664A | Hold | | | | % Moisture |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | WPWWTP-WC-1 | 6/18/19 | 1005 | Concrete | 4 | | | | | X | | | | | | | | | X | | | | X | | | | X |
| 2 | WPWWTP-WC-2 | | 1045 | | 1 | | | | | | | | | | | | | | | | X | | | | | | |
| 3 | WPWWTP-WC-3 | | 1110 | | | | | | | | | | | | | | | | | | X | | | | | | |
| 4 | WPWWTP-WC-4 | | 1130 | | | | | | | | | | | | | | | | | | X | | | | | | |
| 5 | WPWWTP-WC-5 | | 1205 | | | | | | | | | | | | | | | | | | X | | | | | | |
| 6 | WPWWTP-WC-6 | | 1240 | | 4 | | | | | X | | | | | | | | | X | | | | | | | | X |
| 7 | WPWWTP-WC-7 | | 1250 | | 1 | | | | | | | | | | | | | | | | X | | | | | | |
| 8 | WPWWTP-WC-8 | | 1300 | | | | | | | | | | | | | | | | | | X | | | | | | |
| 9 | WPWWTP-WC-9 | | 1315 | | | | | | | | | | | | | | | | | | X | | | | | | |
| 10 | WPWWTP-WC-10 | | 1330 | | | | | | | | | | | | | | | | | | X | | | | | | |

| | Signature | Company | Date | Time |
|---|---|---|---|---|
| Relinquished | [signature] | DH Environmental | 6/19/19 | 9:35 |
| Received | [signature] | AcPHA | 6/19/19 | 9:35 |
| Relinquished | [signature] | AcPHA | 6/19/19 | 12:59 |
| Received | [signature] | OSE | 6/19/19 | 1259 |
| Relinquished | | | | |
| Received | | | | |
| Reviewed/Date | | Reviewed/Date | | |

Comments/Special Instructions
~~Analysis Instructions to Follow via Email.~~
Hold additional sample volume for possible follow-up analysis.
Data to: nathan.moxley@dhenviro.com
X - Added 6/19/19. DB (STA)

Data Package: Standard ☒ Level III ☐ Level IV ☐
Chromatograms with final report ☐ Electronic Data Deliverables (EDDs) ☐

OnSite Environmental Inc.
14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

July 10, 2019

Nathan Moxley
DH Environmental, Inc.
1011 SW Klickitat Way, Suite C-107
Seattle, WA 98103

Re: Analytical Data for Project King County-WPWWTP
Laboratory Reference No. 1906-201B

Dear Nathan:

Enclosed are the analytical results and associated quality control data for samples submitted on June 19, 2019.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

Rainier ENVIRONMENTAL

# Dangerous Waste Characterization

Sample ID: WPWWTP-WC-1,2,3,4,5,6,7,8,9,10 Comp.

Report date: July 10, 2019

Submitted to:

**OnSite Environmental**
14648 NE 95th Street
Redmond, WA 98052

*Rainier Environmental*
5013 Pacific Hwy East
Suite 20
Tacoma, WA 98424

## 1.0 INTRODUCTION

A dangerous waste characterization using the test organism *Oncorhynchus mykiss* (rainbow trout) was conducted on one sample submitted by OnSite Environmental to Rainier Environmental. Testing was conducted following the Washington State Department of Ecology Publication 80-12.

## 2.0 METHODS

The sample WPWWTP-WC-1,2,3,4,5,6,7,8,9,10 Comp., was received in the laboratory on July 2, 2019. Upon arrival at the laboratory the sample was inspected and contents verified against information provided on the chain-of-custody form. The sample was stored at 4°C in the dark until use. The test procedure is outlined in Table 1.

**Table 1. Summary of Dangerous Waste Characterization Test Conditions**

| Parameter | Standard Fish Toxicity Test |
|---|---|
| Test number | 1907-007 |
| Sample ID | WPWWTP-WC-1,2,3,4,5,6,7,8,9,10 Comp. |
| Test initiation date; time | 7/3/2019; 0930h |
| Test termination date; time | 7/7/2019; 1015h |
| Endpoint | Mortality at 96-hours |
| Test chamber | 7.5 L Plastic tank |
| Test temperature | 12 ± 1°C |
| Dilution water | Moderately hard synthetic water |
| Test solution volume | 6 L |
| Test concentrations (mg/L) | 100, 10, 0 |
| Number of organisms/ chamber | 10 |
| Number of replicates | 3 |
| Test organism | *Oncorhynchus mykiss* (rainbow trout) |
| Feeding | No feeding during test |
| Photoperiod | 16 hours light/ 8 hours dark |
| Extraction | Rotary agitation (30 +/- 2 rpm) for 18 hours |
| Reference Toxicant | Copper sulfate |
| Deviations | None |

The test organisms used in the test are outlined in Table 2. The sample was tested using fish received on May 15, 2019.

**Table 2. Test organisms (*Oncorhynchus mykiss*)**

| | |
|---|---|
| Test organism age | 71 days post swim-up (hatch date 3/31/2019) |
| Mean weight | 0.41g |
| Mean length | 40mm |
| Ratio of longest to shortest | 1.3 |
| Loading | 0.68 g/L |
| Test organism source | Trout Lodge; Sumner, WA |

## 3.0 RESULTS

A summary of results for the dangerous waste characterization conducted on sample WPWWTP-WC-1,2,3,4,5,6,7,8,9,10 Comp. is contained in Table 3. There was no mortality during the test. Based on these results, the sample does not designate as either a dangerous or extremely hazardous waste. Copies of the laboratory bench sheets, statistical summaries of reference toxicant tests, and chain-of-custody form are provided in Appendices A through C.

**Table 3. Summary of Results**

| Sample ID | Concentration (mg/L) | Survival (# fish, N=30) | Percent Mortality | Dangerous Waste Designation |
|---|---|---|---|---|
| Control | 0 | 30 | 0 | NA |
| WPWWTP-WC-1,2,3,4,5,6,7,8,9,10 Comp. | 10<br>100 | 30<br>30 | 0<br>0 | None |

## 4.0 QUALITY ASSURANCE

The most recently completed reference toxicant test was initiated June 21, 2019. The $LC_{50}$ of 141 µg/L copper fell within the acceptable range of mean ± two standard deviations of historical test results indicating that the test organisms were of an appropriate degree of sensitivity. The coefficient of variation (CV) for the last 21 tests was 20.1 percent, which is considered excellent by the Biomonitoring Science Advisory Board.

## 5.0 REFERENCES

WDOE. 2008. Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria. Washington State Department of Ecology. Water Quality Program. Publication number: WQ-R-95-80, Revised December 2008.

WDOE. 2009. Biological Testing Methods 80-12 for the Designation of Dangerous Waste. Washington State Department of Ecology. Hazardous Waste and Toxics Reduction Program. Publication number: 80-12, Revised June 2009.

# Appendix A

## *Oncorhynchus mykiss* Dangerous Waste Toxicity Test

## Raw Bench Sheets

# Dangerous Waste Toxicity Test

Client: OnSite Environmental Inc.
Sample ID: WPWWTP-WC-1,2,3,4,5,6,7,8,9,10 Comp.
Test #: 1907-007
Log In #: T19-189

Start Date & Time: 7/3/19 0930
End Date & Time: 7/7/19 1015
Test Organism: *Oncorhynchus mykiss*
Test Protocol: **Washington State Department of Ecology Publ. 80-12**

| Rep | Conc. | Cont # | Number of Live Organisms | | | | | Dissolved Oxygen (mg/L) | | | | | pH (units) | | | | | Conductivity (umhos/cm) | | | | | Temperature (°C) | | | | | Percent Survival |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 0 | 24 | 48 | 72 | 96 | 0 | 24 | 48 | 72 | 96 | 0 | 24 | 48 | 72 | 96 | 0 | 24 | 48 | 72 | 96 | 0 | 24 | 48 | 72 | 96 | |
| 1 | CON | 13 | 10 | 10 | 10 | 10 | 10 | 8.8 | 8.1 | 7.9 | 7.6 | 7.1 | 7.48 | 7.35 | 7.12 | 6.93 | 6.87 | 330 | | | | 315 | 12.1 | 12.5 | 12.5 | 11.8 | 12.4 | |
| 2 | | 25 | 10 | 10 | 10 | 10 | 10 | 9.0 | 8.2 | 7.9 | 7.5 | 7.3 | 7.51 | 7.38 | 7.11 | 6.97 | 6.91 | 332 | | | | 321 | | | | | | |
| 3 | | 6 | 10 | 10 | 10 | 10 | 10 | 8.9 | 8.5 | 8.1 | 7.8 | 7.4 | 7.50 | 7.34 | 7.18 | 7.01 | 6.94 | 331 | | | | 324 | | | | | | |
| 1 | 10 PPM | 12 | 10 | 10 | 10 | 10 | 10 | 8.7 | 8.2 | 8.0 | 7.9 | 7.5 | 7.90 | 7.43 | 7.22 | 7.10 | 6.98 | 293 | | | | 305 | 11.7 | 12.3 | 12.5 | 11.8 | 12.1 | |
| 2 | | 18 | 10 | 10 | 10 | 10 | 10 | 8.8 | 8.4 | 8.0 | 7.8 | 7.3 | 7.94 | 7.45 | 7.24 | 7.05 | 7.01 | 291 | | | | 279 | | | | | | |
| 3 | | 1 | 10 | 10 | 10 | 10 | 10 | 9.0 | 8.5 | 8.2 | 8.0 | 7.9 | 7.93 | 7.40 | 7.25 | 7.07 | 7.01 | 292 | | | | 301 | | | | | | |
| 1 | 100PPM | 20 | 10 | 10 | 10 | 10 | 10 | 8.6 | 8.1 | 7.8 | 7.6 | 7.4 | 8.52 | 7.85 | 7.18 | 7.07 | 6.98 | 294 | | | | 307 | 11.8 | 12.4 | 12.5 | 11.9 | 12.2 | |
| 2 | | 27 | 10 | 10 | 10 | 10 | 10 | 8.7 | 8.2 | 7.9 | 7.7 | 7.5 | 8.50 | 7.92 | 7.19 | 7.08 | 6.97 | 296 | | | | 318 | | | | | | |
| 3 | | 9 | 10 | 10 | 10 | 10 | 10 | 8.4 | 7.9 | 7.6 | 7.5 | 7.2 | 8.55 | 7.97 | 7.28 | 7.03 | 6.95 | 297 | | | | 305 | | | | | | |
| 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Technician Initials | | | AL | CT | CT | CT | CT | AL | CT | CT | CT | CT | | | | | | | | | | | | | | | | |

| Sample | Alk. (init.) | Hard. (init.) | Alk. (fin.) | Hard. (fin.) | Chlorine |
|---|---|---|---|---|---|
| | (mg/L as CaCO3) | | | | (mg/L Cl2) |
| Control | 60 | 84 | 60 | 84 | <0.03 |
| 100PPM | 60 | 84 | 60 | 84 | |
| | | | | | |
| | | | | | |

Animal Source: Troutlodge
Date Received: 5/15/19

Test Volume: 6.0L
Date of Hatch: 3/31/19
Date of Swim up: 4/22/19

Weights (g): .39 .45 .40 .41 .42 .37 .38 .41 .41 .44 μ = .41
Lengths(mm): 38 46 42 38 42 36 41 40 39 42 μ = 40
Length max/min: 46/36 1.3
Loading: 0.68 g/L

Rainier Environmental
Washington Laboratory
5013 Pacific HWY E Suite 20
Tacoma, WA 98424

Dilution Water Source: MHSW 056

QA Check CT

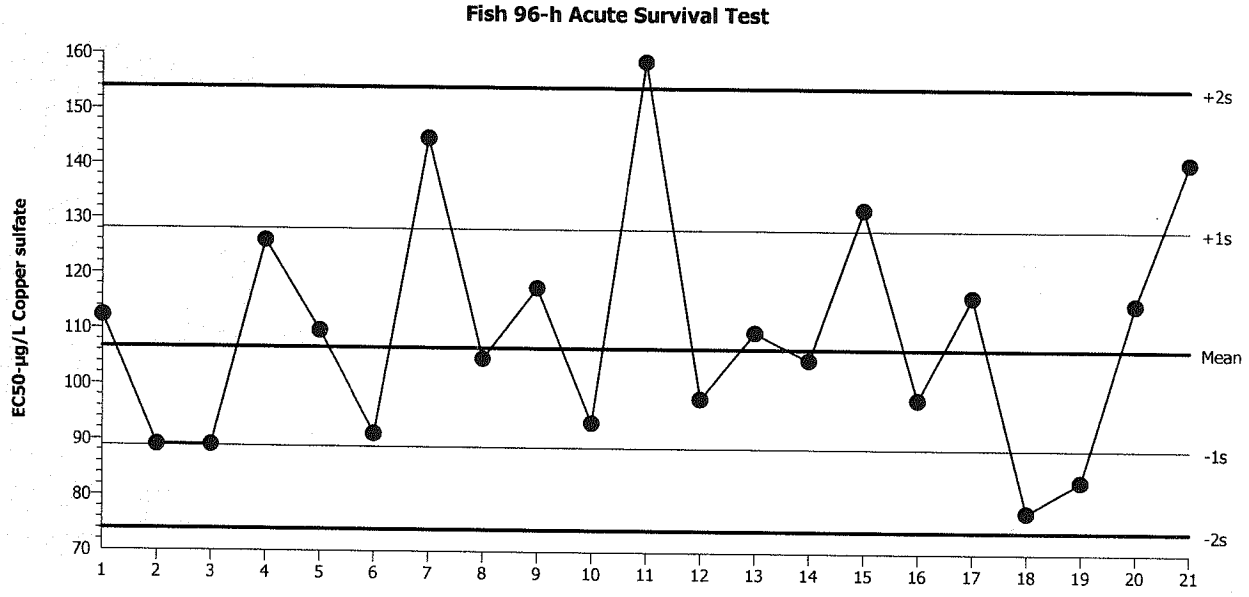
# Appendix B
# Reference Toxicant Test
# Control Chart and Statistical Summary

# CETIS QC Plot

**Report Date:** 01 Jul-19 10:32 ( 1 of 1)

**Fish 96-h Acute Survival Test** — **Rainier Environmental Laboratory**

| | | | | | |
|---|---|---|---|---|---|
| **Test Type:** | Survival (96h) | **Organism:** | Oncorhynchus mykiss (Rainbow Tro | **Material:** | Copper sulfate |
| **Protocol:** | Not Applicable | **Endpoint:** | 96h Survival Rate | **Source:** | Reference Toxicant-REF |




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Mean:** | 106.7 | **Count:** | 20 | **-1s Warning Limit:** | 88.84 | **-2s Action Limit:** | 73.97 |
| **Sigma:** | NA | **CV:** | 20.10% | **+1s Warning Limit:** | 128.1 | **+2s Action Limit:** | 153.9 |

**Quality Control Data**

| Point | Year | Month | Day | QC Data | Delta | Sigma | Warning | Action | Test ID | Analysis ID |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2017 | Sep | 6 | 112.2 | 5.548 | 0.2767 | | | 20-3302-1945 | 19-8536-6321 |
| 2 | | Oct | 10 | 89.09 | -17.61 | -0.9845 | | | 16-6680-8798 | 20-0898-2992 |
| 3 | | Nov | 14 | 89.09 | -17.61 | -0.9845 | | | 03-8806-4974 | 08-0487-5780 |
| 4 | | Dec | 17 | 126 | 19.29 | 0.9073 | | | 21-2907-2796 | 14-7957-6406 |
| 5 | 2018 | Jan | 16 | 109.7 | 2.985 | 0.1506 | | | 07-7088-1157 | 16-4889-5798 |
| 6 | | Feb | 15 | 91.17 | -15.53 | -0.8583 | | | 06-6357-5370 | 00-6522-6981 |
| 7 | | Mar | 17 | 144.7 | 38.03 | 1.664 | (+) | | 00-4331-1834 | 10-4388-1035 |
| 8 | | Apr | 21 | 104.7 | -1.968 | -0.1016 | | | 00-5606-6972 | 09-2556-2363 |
| 9 | | May | 23 | 117.6 | 10.86 | 0.529 | | | 20-2785-4749 | 16-3316-3415 |
| 10 | | Jun | 20 | 93.3 | -13.39 | -0.7322 | | | 05-6858-8909 | 21-3433-5668 |
| 11 | | Jul | 25 | 158.7 | 52.04 | 2.168 | (+) | (+) | 03-7661-5860 | 05-4916-3169 |
| 12 | | Aug | 30 | 97.72 | -8.982 | -0.48 | | | 01-6631-0399 | 00-2872-0274 |
| 13 | | Oct | 5 | 109.7 | 2.985 | 0.1506 | | | 09-8718-1650 | 14-5303-2875 |
| 14 | | Nov | 6 | 104.7 | -1.968 | -0.1016 | | | 20-5282-8357 | 01-3690-0719 |
| 15 | | Dec | 5 | 132 | 25.25 | 1.16 | (+) | | 01-4499-1094 | 07-5652-1457 |
| 16 | 2019 | Jan | 7 | 97.72 | -8.982 | -0.48 | | | 03-9395-5944 | 09-6087-0434 |
| 17 | | Feb | 9 | 116.1 | 9.446 | 0.463 | | | 13-6349-4914 | 05-5573-8325 |
| 18 | | Mar | 12 | 77.56 | -29.14 | -1.741 | (-) | | 03-9582-1391 | 08-0363-8342 |
| 19 | | Apr | 19 | 83.12 | -23.57 | -1.363 | (-) | | 16-0727-4914 | 09-8538-6220 |
| 20 | | May | 21 | 114.9 | 8.172 | 0.4028 | | | 13-0213-5670 | 12-8044-7071 |
| 21 | | Jun | 21 | 140.6 | 33.94 | 1.508 | (+) | | 18-7198-9789 | 02-0902-1290 |

# CETIS Summary Report

Report Date: 01 Jul-19 10:45 (p 1 of 1)
Test Code: RA062119OM | 18-7198-9789

**Fish 96-h Acute Survival Test** — **Rainier Environmental Laboratory**

| | | | | | |
|---|---|---|---|---|---|
| **Batch ID:** | 15-1508-9685 | **Test Type:** | Survival (96h) | **Analyst:** | Eric Tollefson |
| **Start Date:** | 21 Jun-19 14:45 | **Protocol:** | Not Applicable | **Diluent:** | Mod-Hard Synthetic Water |
| **Ending Date:** | 25 Jun-19 14:30 | **Species:** | Oncorhynchus mykiss | **Brine:** | |
| **Duration:** | 96h | **Source:** | Trout Lodge Fish Farm | **Age:** | 36d |

| | | | | | |
|---|---|---|---|---|---|
| **Sample ID:** | 21-1731-0617 | **Code:** | RA062119OM | **Client:** | Internal Lab |
| **Sample Date:** | 21 Jun-19 | **Material:** | Copper sulfate | **Project:** | |
| **Receive Date:** | 21 Jun-19 | **Source:** | Reference Toxicant | | |
| **Sample Age:** | 15h | **Station:** | In House | | |

**Comparison Summary**

| Analysis ID | Endpoint | NOEL | LOEL | TOEL | PMSD | TU | Method |
|---|---|---|---|---|---|---|---|
| 00-1957-3977 | 96h Survival Rate | 50 | 100 | 70.71 | 17.4% | | Dunnett Multiple Comparison Test |

**Point Estimate Summary**

| Analysis ID | Endpoint | Level | µg/L | 95% LCL | 95% UCL | TU | Method |
|---|---|---|---|---|---|---|---|
| 02-0902-1290 | 96h Survival Rate | LC50 | 140.6 | 120.2 | 164.6 | | Trimmed Spearman-Kärber |

**96h Survival Rate Summary**

| C-µg/L | Control Type | Count | Mean | 95% LCL | 95% UCL | Min | Max | Std Err | Std Dev | CV% | %Effect |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Dilution Water | 3 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0.0% | 0.0% |
| 25 | | 3 | 0.9667 | 0.9451 | 0.9882 | 0.9 | 1 | 0.03333 | 0.05774 | 5.97% | 3.33% |
| 50 | | 3 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0.0% | 0.0% |
| 100 | | 3 | 0.7667 | 0.7451 | 0.7882 | 0.7 | 0.8 | 0.03333 | 0.05774 | 7.53% | 23.33% |
| 200 | | 3 | 0.2333 | 0.1556 | 0.3111 | 0 | 0.4 | 0.1202 | 0.2082 | 89.21% | 76.67% |
| 400 | | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 100.0% |

**96h Survival Rate Detail**

| C-µg/L | Control Type | Rep 1 | Rep 2 | Rep 3 |
|---|---|---|---|---|
| 0 | Dilution Water | 1 | 1 | 1 |
| 25 | | 1 | 1 | 0.9 |
| 50 | | 1 | 1 | 1 |
| 100 | | 0.8 | 0.7 | 0.8 |
| 200 | | 0.3 | 0 | 0.4 |
| 400 | | 0 | 0 | 0 |

**96h Survival Rate Binomials**

| C-µg/L | Control Type | Rep 1 | Rep 2 | Rep 3 |
|---|---|---|---|---|
| 0 | Dilution Water | 10/10 | 10/10 | 10/10 |
| 25 | | 10/10 | 10/10 | 9/10 |
| 50 | | 10/10 | 10/10 | 10/10 |
| 100 | | 8/10 | 7/10 | 8/10 |
| 200 | | 3/10 | 0/10 | 4/10 |
| 400 | | 0/10 | 0/10 | 0/10 |

# Appendix C
# Chain-of-Custody Form

**OnSite Environmental Inc.**

14648 NE 95th Street, Redmond, WA 98052 · (425) 883-3881

Laboratory Reference #: 06-201

Laboratory: Rainier Environmental

Attention: Eric Tollefson

Address: 5013 Pacific Highway E, Suite 20, Fife, WA 98424

Phone Number: ( 253 ) 922-8898

Turnaround Request

1 Day 2 Day 3 Day

Standard

Other:

Project Manager: David Baumeister

email: dbaumeister@onsite-env.com

Project Number:

Project Name: King County- WPWWTP

| Lab ID | Sample Identification | Date Sampled | Time Sampled | Matrix | # of Cont. | Requested Analyses |
|---|---|---|---|---|---|---|
| | WPWWTP-WC-1,2,3,4,5,6,7,8,9,10 Comp. | 6/18/19 | | solid | 1 | Fish Bioassay (Dangerous Waste 80-12 Test) |
| | | | | | | |
| | | | | | | |
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| | | | | | | |
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| | | | | | | |
| | | | | | | |

| Signature | Company | Date | Time | Comments/Special Instructions |
|---|---|---|---|---|
| Relinquished by: | OSE | 7/1/19 | 1600 | Lab # T19-189 |
| Received by: | UPS | | | |
| Relinquished by: | UPS | | | |
| Received by: Eric Tollefson | RAINIER | 7/2/19 | 1230 | |
| Relinquished by: | | | | |
| Received by: | | | | |

**OnSite Environmental Inc.**
Analytical Laboratory Testing Services
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

# Chain of Custody



Company: DH Environmental
Project Number:
Project Name: King County - WPWWTP
Project Manager: Nathan Moxley
Sampled by: N. Moxley, B. Johnson

**Turnaround Request (in working days)**
(Check One)
☐ Same Day ☐ 1 Day
☐ 2 Days ☐ 3 Days
☒ Standard (7 Days)
☐ _____ (other)

**Laboratory Number:** 06-201

| Lab ID | Sample Identification | Date Sampled | Time Sampled | Matrix | Number of Containers | NWTPH-HCID | NWTPH-Gx/BTEX | NWTPH-Gx | NWTPH-Dx (☐ Acid / SG Clean-up) | Volatiles 8260C | Halogenated Volatiles 8260C | EDB EPA 8011 (Waters Only) | Semivolatiles 8270D/SIM (with low-level PAHs) | PAHs 8270D/SIM (low-level) | PCBs 8082A | Organochlorine Pesticides 8081B | Organophosphorus Pesticides 8270D/SIM | Chlorinated Acid Herbicides 8151A | ~~Total~~ RCRA Metals TCLP | Total MTCA Metals | TCLP Metals LEAD | HEM (oil and grease) 1664A | Hold | | FISH BIOASSAY | | % Moisture |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | WPWWTP-WC-1 | 6/18/19 | 1005 | Concrete | 4 | | | | | X | | | | | | | | | X | | | | X | | (X) | | X |
| 2 | WPWWTP-WC-2 | | 1045 | | 1 | | | | | | | | | | | | | | | | X | | | | (X) | | |
| 3 | WPWWTP-WC-3 | | 1110 | | | | | | | | | | | | | | | | | | X | | | | (X) | | |
| 4 | WPWWTP-WC-4 | | 1130 | | | | | | | | | | | | | | | | | | X | | | | (X) | | |
| 5 | WPWWTP-WC-5 | | 1205 | | | | | | | | | | | | | | | | | | X | | | | (X) | | |
| 6 | WPWWTP-WC-6 | | 1240 | | 4 | | | | | X | | | | | | | | | X | | | | | | (X) | | X |
| 7 | WPWWTP-WC-7 | | 1250 | | 1 | | | | | | | | | | | | | | | | X | | | | (X) | | |
| 8 | WPWWTP-WC-8 | | 1300 | | | | | | | | | | | | | | | | | | X | | | | (X) | | |
| 9 | WPWWTP-WC-9 | | 1315 | | | | | | | | | | | | | | | | | | X | | | | (X) | | |
| 10 | WPWWTP-WC-10 | | 1330 | | | | | | | | | | | | | | | | | | X | | | | (X) | | |

COMPOSITE

| | Signature | Company | Date | Time |
|---|---|---|---|---|
| Relinquished | [signature] | DH Environmental | 6/19/19 | 9:35 |
| Received | [signature] | ACPHA | 6/19/19 | 9:35 |
| Relinquished | [signature] | ACPHA | 6/19/19 | 12:59 |
| Received | [signature] | OSE | 6/19/19 | 1259 |
| Relinquished | | | | |
| Received | | | | |
| Reviewed/Date | | Reviewed/Date | | |

**Comments/Special Instructions**
~~Analysis Instructions to Follow via Email.~~
Hold additional sample volume for possible follow-up analysis.
Data to: nathan.moxley@dhenviro.com
X - Added 6/19/19. DB (STA)
(X) Added 6/28/19. DB (STA) COMPOSITE ALL

Data Package: Standard ☒ Level III ☐ Level IV ☐
Chromatograms with final report ☐ Electronic Data Deliverables (EDDs) ☐

# APPENDIX B
# CONCRETE DISPOSAL OPTIONS

1011 SW Klickitat Way, Suite 107
Seattle, WA 98134

June 3, 2020

Mr. Seth Stapleton, PE, SE
Reid Middleton
728 134th St SW, Suite 200
Everett, WA 98204

**Re: West Point Wastewater Treatment Plant – Concrete Disposal Waste Profiles**

Dear Mr. Stapleton,

This letter summarizes the waste disposal options for the concrete beams of the roof structures overlying the sedimentation basins at the West Point Wastewater Treatment Plant (WWTP), located at 1400 Discovery Park Boulevard in Seattle, Washington (Facility). The concrete beams are partially coated in lead-based paint, and were previously sampled and designated as a non-hazardous waste (DH Environmental, 2019).

Based on this designation, the concrete was profiled and accepted to several disposal facilities operated by both Republic Services and Waste Management. Copies of the approval letters are included in Attachments 1 and 2. A summary of the disposal options and pricing is included below. Copies of the disposal quotes are included in Attachments 3 through 5.

**Waste Management**

Waste Management accepted the concrete for disposal to their Columbia Ridge Landfill (CRL) near Arlington, Oregon, and the Greater Wenatchee Regional Landfill (GWRL) near Wenatchee, Washington (Profile Number 115156WA; Attachment 1). Disposal rates for both facilities are approximately $53/ton, including taxes and fees (Attachments 3 and 4). Note that WM has specified a size restriction of 2-feet x 2-feet in their quotes. However, in verbal discussions with Matt Essig, an Account Manager for Waste Management, Matt indicated WM could accept larger pieces of beams at their landfill, if the customer can provide a means of unloading them.

If the material is disposed of at the CRL, WM offers transportation by rail in 40-ft or 48-ft long containers at a rate of $655 for up to 28 tons per load (approximately $23.39/ton). The containers would have an additional $20/day rental fee. Rental fees could be expected for anywhere from 1 to 10 days as the containers are transported to the rail yard and then the landfill for unloading. For this option the concrete would have to meet the 2-foot x 2-foot size restriction.

Waste Management did not provide a quote for the use of their Seattle transfer station, however, that may be a potential option for the selected disposal contractor. The contractor would have to contact Waste Management directly for rates and transportation options, and the 2-foot x 2-foot size restriction would still likely apply.

**Republic Services**

Republic Services accepted the concrete for disposal to their Roosevelt Regional Landfill, near Roosevelt, Washington (Waste Profile Number 4178205561; Attachment 2). Republic offered several different options and pricing for disposal ranging from $58/ton up to $128/ton. The most cost-effective option is to ship the material in 47-cubic yard containers to their Black River Transfer Station in Renton, Washington, for approximately $60/ton, including taxes. Concrete would be restricted in size to 2-ft x 2-ft using this option, and containers would be limited to 25-tons per container (Attachment 5).

If the concrete could not be reduced in size, Republic offered a rate for direct disposal to their landfill for approximately $37/ton, with a size restriction of 10-feet in length. As with Waste Management, the customer would need to provide a means of unloading the concrete.

**Special conditions**

The above profiles are for the lead painted concrete only. No other materials will be accepted until they have been sampled and an amended profile submitted. The quotes provided for this project should be considered as a reference only. The quotes have expiration dates and are likely to change before the project moves to the construction phase. In addition, the contractor selected for the job may be able to secure different disposal rates, and/or find alternative disposal facilities based on their networks and relationships with the facilities.

We recommend that King County include a requirement in the disposal specifications that if the material is submitted to an alternative facility, the facility needs to be properly permitted under WAC 173-350 Solid Waste Handling Regulations or applicable state and local requirements to accept the waste, and that King County should review and approve of the facility in advance.

Sincerely,

Nathan Moxley, LG, LHG
DH Environmental, Inc.

<u>Attachments</u>

1. Waste Management Approval Form, Profile 115156WA
2. Republic Approval Letter, Profile 4178205561
3. WM Quote, GWRL, Quote 5260
4. WM Quote, CRL, Quote 5261
5. Republic Services Price Options

# Non-Hazardous WAM Approval

Requested Management Facility: Columbia Ridge Landfill, Greater Wenatchee Regional Landfill

Profile Number: 115156WA

Waste Acceptance Expiration Date: 05/01/2021

Common Name: LF01 - Concrete with Lead Based Paint

WM Regulatory Volume Limit: ☑ NA

**APPROVAL DETAILS**

Approval Decision: ☑ Approved ☐ Not Approved

Profile Renewal: ☐ Yes ☑ No

Management Method: Direct Landfill

Generator Name: King County - West Point Wastewater Treatment

Profile Expiration Date: 05/01/2021

Periodic Testing Due Date: ☑ NA

Other Due Date: ☑ NA (Specify)

Management Facility Precautions, Special Handling Procedures or Limitation on approval:

**Generator Conditions**

- Shall not contain free liquids.
- Shipment must be scheduled into the disposal facility at least 24 hours in advance. Contact information will be provided by your TSR.
- Waste manifest or applicable shipping document must accompany load.
- The waste profile number must appear on the shipping papers.

WM Authorization Name: Donald Lavrinc

Title: Waste Approval Manager

WM Authorization Signature: Donald R Lavrinc

Date: 05/01/2020

Agency Authorization (if Required):

Date:

# Republic Services

18500 N. Allied Way, Phoenix, AZ 85054

## SPECIAL WASTE DEPARTMENT DECISION

| | | | |
|---|---|---|---|
| | **Waste Profile #** 4178205561 | **Expiration Date** 4/23/2021 | |
| **I. Decision Request:** | ☑ **Initial** ☐ **Recertification** ☐ **Change** | | |
| **Disposal Facility:** 4178 - Roosevelt Regional MSW L/F | | | |
| **Generator Name:** King County - Wastewater Treatment Division | | | |
| **Generator Site Address:** 1400 Discovery Park Blvd | | | |
| **City:** Seattle | **County:** | **State:** WA | **Zip:** |
| **Name of Waste:** Concrete with Lead Paint | | | |
| **Estimated Annual Volume:** 4000 Tons | | | |

**II. Special Waste Department Decision:** ☑ **Approved** ☐ **Rejected**

**Management Method(s):** ☑ Landfill ☐ Solidification ☐ Bioremediation ☐ Deep Well ☐ Transfer Facility

**Problematic Special Waste according to Republic?** ☐ Yes ☑ No

**If yes, which one?**

**Approved by Special Waste Review Committee?** ☐ Yes ☐ No ☑ Not Applicable

**Precautions, Conditions or Limitations on Approval**

**Special Waste Analyst Signature:** _____ **Name (Printed):** KEITH DIAMANTI

**Date: 4/24/2020**

**III. Facility Decision:** ☐ **Approved** ☐ **Rejected**

**Precautions, Conditions or Limitations on Approval**

By signing below, the General Manager or Designee agrees that a fully executed Special Waste Service Agreement is on file for this profile and that the special waste file is complete.

**General Manager or Designee:** _____ **Name (Printed):** _____

**Date: 4/24/2020**

Quote number: 5260
Date: 4/30/2020

Nathan Moxley
DH Environmental
1011 SW Klickitat Way
Seattle, WA, 98134
Office:
Mobile: (509) 332-9281
email: nathan.moxley@dhenviro.com

**Exhibit A - Confidential**

Regarding: King County - Discovery Park Blvd Crushed Concrete Beams Greater Wenatchee

Dear Nathan,

Thank you for considering Waste Management (WM) for your Industrial and Hazardous Waste needs. We appreciate your business and look forward to providing you with the best waste services in the industry. The attached quotation is based on our discussions regarding your service needs as summarized below.

**Scope of Service**

- WM will provide Disposal only.
- See Special Conditions.

This quotation is made subject to: (1) the terms and conditions of Waste Management's standard Industrial Waste Service Agreement, which shall be executed by the parties in connection with performing the services described above, (2) the proper submittal of an acceptable Generator Waste Profile Sheet(s), which must be submitted to and approved by an authorized Waste Management facility, including any analytical data requested by Waste Management regarding the waste stream.

Waste Management is a recognized leader in the waste disposal business with the ability to manage the quoted services at or through our permitted and licensed facilities. To accept this proposal and initiate project start, please sign the acknowledgement block below and return this document to my attention.

I look forward to assisting you with your environmental needs. If you have any questions or need further assistance, you may reach me at the contact information listed below.

Sincerely,

*Matt Essig*

Matt Essig
Industrial Account Manager
206.437.9460 messig@wm.com

## PRICE SCHEDULE

**Disposal Pricing**

| Code / Description | Price | Unit | Facility |
|---|---|---|---|
| LF01<br>*Non Hazardous Solids for direct landfill* | $34.00 | Ton | SPW/GWRL |

**Transportation Pricing**

**Assessorial**

| Code / Description | Price | Unit |
|---|---|---|
| CERT001<br>*Certificate of disposal per profile, per manifest (if desired)* | $35.00 | Each |

**Fees and Taxes**

- $75 profile fee charged to each profile submitted.
- A variable fuel, environmental and administrative fee (FEA), currently at 6% will be charged to the invoice total.
- Chelan Douglas Health District fee of $1/ton.
- City of Seattle Tax of $13.27/ton (only if generated in City of Seattle).
- City of Seattle Garbage System tax of 14.1% of Gross Revenue
- Washington State Refuse tax of 3.6% of invoiced total.

**General Conditions**

1. Pricing is contingent upon waste profile acceptance as proposed.
2. Railroad schedules are dictated by the corresponding Railroad. WM will not be liable for any charges resulting in delays caused by the Railroad.
3. Pricing in this proposal is valid for a term of 30 days from the date listed above. Upon acceptance, pricing will be valid for one calendar year.
4. Generator is responsible for waste characterization.
5. Material with a density < 75 pounds/cubic foot will be billed by the cubic yard.
6. Unless otherwise noted, applicable state, local and federal taxes are not included in the enclosed rates and will be assessed during invoicing.
7. Waste removal scheduling is dependent upon available equipment at the time of project startup.
8. Nonconforming waste is subject to additional charges and fees.
9. Unless otherwise noted, a 10 - ton/yard per load disposal minimum will apply to all bulk solid disposal rates at Columbia Ridge or Chemical Waste Management
10. Unless otherwise noted, a 1 ton disposal minimum applies at all other Subtitle D landfills not listed above.
11. Demurrage charges of $130/hr will be assessed on delays exceeding ½ hour load and unload time.
12. Rinsate from tanker washout will be invoiced at quoted disposal rates.
13. Transportation quoted by weight or volume will be subject to a minimum charge.
14. Certificates of disposal (other than TSCA waste) will be charged $35.00/cert if noted at the time of profile generation.
15. Standard profile approval time is 2-5 days. 1 day expedited approval available for an additional fee of $500.
16. Transportation ordered, but not used will be invoiced at cost plus 15%.

17. Unless noted above, a variable fuel and environmental fee currently 17.5% will apply to the invoice total.
18. Excluding certain contracted rates, pricing will be increased annually based on consumer product index, customarily ranging between 2%-8%.
19. Expedited delivery of manifests, LDR's or other paperwork will be $100
20. All waste shipped using a hazardous waste manifest will be subject to a $25.00 e-manifest surcharge
21. It is the generators responsibility to deliver DOT compliant loads to WM Rail Reload Facilities. Non compliant loads will be remedied or rejected at customers expense.
22. Incidental release of hazardous material, fines and associated clean-up costs, will be charged at cost plus 10%.
23. Customer will provide a safe and accessible work area

**Special Conditions**
Customer is self-hauling material.
Concrete must be sized to 2' in any dimension.

**Acknowledgement**

Your signature below indicates your acceptance of the pricing and terms detailed in the quote above.

Thank you for the opportunity.

Signature Date

Printed Name

**Waste Category Definitions**

| | |
|---|---|
| LF01 | Must pass paint filter test, non regulated, non-TSCA, no friable asbestos, for comingle disposal |

Quote number: 5261
Date: 4/30/2020

Nathan Moxley
DH Environmental
1011 SW Klickitat Way
Seattle, WA, 98134
Office:
Mobile: (509) 332-9281
email: nathan.moxley@dhenviro.com

**Exhibit A - Confidential**

Regarding: King County - Discovery Park Blvd Crushed Concrete Beams - Columbia Ridge

Dear Nathan,

Thank you for considering Waste Management (WM) for your Industrial and Hazardous Waste needs. We appreciate your business and look forward to providing you with the best waste services in the industry. The attached quotation is based on our discussions regarding your service needs as summarized below.

**Scope of Service**

- WM will provide Disposal only.
- See Special Conditions.

This quotation is made subject to: (1) the terms and conditions of Waste Management's standard Industrial Waste Service Agreement, which shall be executed by the parties in connection with performing the services described above, (2) the proper submittal of an acceptable Generator Waste Profile Sheet(s), which must be submitted to and approved by an authorized Waste Management facility, including any analytical data requested by Waste Management regarding the waste stream.

Waste Management is a recognized leader in the waste disposal business with the ability to manage the quoted services at or through our permitted and licensed facilities. To accept this proposal and initiate project start, please sign the acknowledgement block below and return this document to my attention.

I look forward to assisting you with your environmental needs. If you have any questions or need further assistance, you may reach me at the contact information listed below.

Sincerely,

*Matt Essig*

Matt Essig
Industrial Account Manager
206.437.9460 messig@wm.com

## PRICE SCHEDULE

### Disposal Pricing

| Code / Description | Price | Unit | Facility |
|---|---|---|---|
| LF01<br>*Non Hazardous Solids for direct landfill* | $33.00 | Ton | SPW/CRL |

### Transportation Pricing

| Code / Description | Price | Unit | Minimum |
|---|---|---|---|
| BRAIL01<br>*Rail Transportation* | $655.00 | Per each | |
| BCONT07<br>*Container Rental Fee* | $20.00 | Per day | |

### Assessorial

| Code / Description | Price | Unit |
|---|---|---|
| CERT001<br>*Certificate of disposal per profile, per manifest (if desired)* | $35.00 | Each |

### Fees and Taxes

- $75 profile fee charged to each profile submitted.
- A variable fuel, environmental and administrative fee (FEA), currently at 6% will be charged to the invoice total.
- $1.89/ton Oregon DEQ fee.
- City of Seattle Tax of $13.27/ton (only if generated in City of Seattle).
- City of Seattle Garbage System tax of 14.1% of Gross Revenue
- Washington State Refuse tax of 3.6% of invoiced total.

### General Conditions

1. Pricing is contingent upon waste profile acceptance as proposed.
2. Railroad schedules are dictated by the corresponding Railroad. WM will not be liable for any charges resulting in delays caused by the Railroad.
3. Pricing in this proposal is valid for a term of 30 days from the date listed above. Upon acceptance, pricing will be valid for one calendar year.
4. Generator is responsible for waste characterization.
5. Material with a density < 75 pounds/cubic foot will be billed by the cubic yard.
6. Unless otherwise noted, applicable state, local and federal taxes are not included in the enclosed rates and will be assessed during invoicing.
7. Waste removal scheduling is dependent upon available equipment at the time of project startup.
8. Nonconforming waste is subject to additional charges and fees.
9. Unless otherwise noted, a 10 - ton/yard per load disposal minimum will apply to all bulk solid disposal rates at Columbia Ridge or Chemical Waste Management
10. Unless otherwise noted, a 1 ton disposal minimum applies at all other Subtitle D landfills not listed above.
11. Demurrage charges of $130/hr will be assessed on delays exceeding ½ hour load and unload time.
12. Rinsate from tanker washout will be invoiced at quoted disposal rates.
13. Transportation quoted by weight or volume will be subject to a minimum charge.

14. Certificates of disposal (other than TSCA waste) will be charged $35.00/cert if noted at the time of profile generation.
15. Standard profile approval time is 2-5 days. 1 day expedited approval available for an additional fee of $500.
16. Transportation ordered, but not used will be invoiced at cost plus 15%.
17. Unless noted above, a variable fuel and environmental fee currently 17.5% will apply to the invoice total.
18. Excluding certain contracted rates, pricing will be increased annually based on consumer product index, customarily ranging between 2%-8%.
19. Expedited delivery of manifests, LDR's or other paperwork will be $100
20. All waste shipped using a hazardous waste manifest will be subject to a $25.00 e-manifest surcharge
21. It is the generators responsibility to deliver DOT compliant loads to WM Rail Reload Facilities. Non compliant loads will be remedied or rejected at customers expense.
22. Incidental release of hazardous material, fines and associated clean-up costs, will be charged at cost plus 10%.
23. Customer will provide a safe and accessible work area

**Special Conditions**
Customer is self-hauling 40'/48' containers on chassis from rail yard to jobsite, containers hold a maximum of 28 tons.
Concrete must be sized to 2' in any dimension.

**Acknowledgement**
Your signature below indicates your acceptance of the pricing and terms detailed in the quote above.
Thank you for the opportunity.

Signature Date

Printed Name

**Waste Category Definitions**

| | |
|---|---|
| LF01 | Must pass paint filter test, non regulated, non-TSCA, no friable asbestos, for comingle disposal |

April 10, 2020

Nathan Moxley
DH Environmental
503-221-9281`
@dhenviro.com

**RE: 20s containers of lead Contaminated concrete**

Republic Services appreciates the opportunity to work with you and your team on the Wastewater Treatment Plant. Per our discussion the project is anticipated to be 4000 tons.

- Contaminated concrete no larger than 2X2-the size restriction is due to the damaging of containers

Republic services can accept the contaminated concrete for disposal provided the material is properly represented on a profile. All material must meet Republic Services acceptance criteria through our profiling process. Each load must be accompanied by a completed and signed manifest / bill of lading and or waste information sheet which includes an assigned profile number.

**Disposal Options and Rates:**

1. Concrete in 20ft (47 cubic yards) containers delivered to the Black River transfer station and intermodal yard in Renton, Washington will be charged at a rate of $1450.00 minimum charge per container based on 25 tons of material per container (= $58/ton). Size restricted to 2' x 2'.

2. Concrete in 20 ft (47 cubic yards) containers delivered to the Seattle transfer station and intermodal yard will be charged at a rate of $1450.00 minimum charge per container based on 25 tons of material per container + a $13.27/ton City of Seattle tax (= $71.27/ton). Size restricted to 2' x 2'

3. Customer directly transports concrete to Black River transfer station. Cost is $128/ton. Size restrictions = 2' x 2'.

4. Direct disposal to Roosevelt landfill, 500 Roosevelt Grade Rd., Roosevelt, WA. Disposal rate $36/ton. Can accept beams up to 10' in length. Customer must provide means of unloading material at landfill.

- Washington State refuse tax of 3.6% is not included in the above costs
- Above rates are good thru December 2020 only.
- Payment terms net 30-day.
- Material must meet Washington State Department of Ecology regulations for "Non-Dangerous" Wastes in order to be approved.
- Documentation: Prior to delivery of material, RDC requires that an authorized individual execute all documentation on behalf of the client. Documentation shall include a master service agreement along with a bill of lading or waste information sheet or both.
- Material loading: Customer is responsible
- In addition, customer shall be responsible to load all containers within legal weight limits for over the road transport.

Teresa Dillashaw
Special Waste Sales Executive
Tdillashaw@republicservices.com

# Existing Odor Control Balancing Report - 2014

**EXISTING ODOR CONTROL BALANCING REPORT – FOR REFERENCE ONLY**

# AIRTEST Co., Inc.

## *Fan Unit*

**PROJECT:** DNR - West Point Treatment Plant - Screenings
**LOCATION:** Seattle, WA
**PROJECT #:** 13-1017-1

**DATE:** 7/15/2014
**CONTACT:** Shaun Pettit

***SYSTEM/UNIT: EF-22BA021***
AREA: West Primary Sedimentation Tank

Tested By: Scott Davies
Test Date: December 12, 2013

| Unit Data | |
|---|---|
| **Unit Location** | Fan Platform |
| **Unit Serves** | Scrubber |
| **Unit Manufacturer** | Verantis |
| **Model Number** | CLUB 4850 |
| **Serial Number** | 3942-001 |
| **Fan Type / Class** | BC / 1 |

| Test Data | |
|---|---|
| **Fan RPM Design** | 1218 RPM |
| **Fan RPM Actual** | 1216 RPM |
| **External SP Design** | 10 in. wc |
| **SP In Actual** | -3.97 in. wc |
| **SP Out Actual** | 5.7 in. wc |
| **External SP Actual** | 9.67 in. wc |

| Electrical Test Data | |
|---|---|
| **Motor Volts 1** | 465 Volts |
| **Motor Volts 2** | 462 Volts |
| **Motor Volts 3** | 465 Volts |
| **Motor Amps 1** | 92 Amps |
| **Motor Amps 2** | 94 Amps |
| **Motor Amps 3** | 92 Amps |

| Motor Data | |
|---|---|
| **Motor Manufacturer** | Marathon |
| **Motor HP** | 100 HP |
| **Motor RPM** | 1775 RPM |
| **Motor Frame** | 405T |
| **Motor Rated Volts** | 460 Volts |
| **Motor Phase** | 3 |
| **Motor Hertz** | 60 Hz |
| **Motor FL Amps** | 113 Amps |
| **Motor Service Factor** | 1.15 |

| Sheave Data | |
|---|---|
| **Drive Type** | Belt |
| **Motor Sheave** | 6B5V10.9 |
| **Motor Sheave Bore** | 2 7/8 B in. |
| **Fan Sheave** | 6B5V16.0 |
| **Fan Sheave Bore** | 3 7/16 B in. |
| **Belt Size** | 5VX150 |
| **Belt Quantity** | 4 |
| **Sheave Center Line** | 48.5 in. |

| Air Test Data | |
|---|---|
| **Total Fan CFM Des.** | 44500 CFM |
| **Total Fan CFM Act.** | 38201 CFM |

*** Notes**

| | | | |
|---|---|---|---|
| EF-22BA021 | 12-Dec-13 | Scott Davies | The fan blast gate is open and the fan capacity is at 86%. There is room on the motor for a drive change if desired. |
| EF-22BA021 | 12-Dec-13 | Scott Davies | The inlet static to the Hydrogen Sulfide Scrubber ME220A021 was 4.85". |

# AIRTEST Co., Inc.

## *Fan Unit*

**PROJECT:** DNR - West Point Treatment Plant - Screenings
**LOCATION:** Seattle, WA
**PROJECT #:** 13-1017-1

**DATE:** 7/15/2014
**CONTACT:** Shaun Pettit

***SYSTEM/UNIT: EF-22BA051***
AREA: Pre-Demo

Tested By: Scott Davies
Test Date: December 12, 2013

| Unit Data | |
|---|---|
| **Unit Location** | Fan Platform |
| **Unit Serves** | N/A |
| **Unit Manufacturer** | Cellcote |
| **Model Number** | CLUB4850 |
| **Serial Number** | 62115-10 |
| **Fan Type / Class** | AF / 1 |

| Test Data | |
|---|---|
| **Fan RPM Actual** | 980 RPM |
| **SP In Actual** | -1.80 in. wc |
| **SP Out Actual** | 5.10 in. wc |
| **External SP Actual** | 6.90 in. wc |

| Electrical Test Data | |
|---|---|
| **Motor Volts 1** | 461 Volts |
| **Motor Volts 2** | 461 Volts |
| **Motor Volts 3** | 462 Volts |
| **Motor Amps 1** | 60 Amps |
| **Motor Amps 2** | 62 Amps |
| **Motor Amps 3** | 62 Amps |

| Motor Data | |
|---|---|
| **Motor Manufacturer** | Marathon |
| **Motor HP** | 100 HP |
| **Motor RPM** | 1775 RPM |
| **Motor Frame** | 405T |
| **Motor Rated Volts** | 480 Volts |
| **Motor Phase** | 3 |
| **Motor Hertz** | 60 Hz |
| **Motor FL Amps** | 113 Amps |
| **Motor Service Factor** | 1.15 |

| Sheave Data | |
|---|---|
| **Drive Type** | Belt |
| **Motor Sheave** | 4B5V11.8 |
| **Motor Sheave Bore** | 2 7/8 B in. |
| **Fan Sheave** | 4 B V21.2 |
| **Fan Sheave Bore** | 2 11/16 B in. |
| **Belt Size** | 5VX15000 |
| **Belt Quantity** | 4 |
| **Sheave Center Line** | 48.5 in. |

| Air Test Data | |
|---|---|
| **Total Fan CFM Act.** | 33287 CFM |

*** Notes**

| | | | |
|---|---|---|---|
| EF-22BA051 | 25-Nov-13 | Scott Davies | The inlet static to the Hydrogen Sulfide Scrubber ME220A041 was 4.35". |

# AIRTEST Co., Inc.

## *Fan Unit*

**PROJECT:** DNR - West Point Treatment Plant - Screenings
**LOCATION:** Seattle, WA
**PROJECT #:** 13-1017-1

**DATE:** 7/15/2014
**CONTACT:** Shaun Pettit

***SYSTEM/UNIT: EF-22BA061***
AREA: Pre-Demo

Tested By: Scott Davies
Test Date: December 12, 2013

| Unit Data | |
|---|---|
| **Unit Location** | Fan Platform |
| **Unit Serves** | N/A |
| **Unit Manufacturer** | Ceilcote |
| **Model Number** | CLUB1825 |
| **Serial Number** | 62115 11 |
| **Fan Type / Class** | AF / 3 |

| Test Data | |
|---|---|
| **Fan RPM Actual** | 2886 RPM |
| **SP In Actual** | -2.2 in. wc |
| **SP Out Actual** | 3.2 in. wc |
| **External SP Actual** | 5.4 in. wc |

| Electrical Test Data | |
|---|---|
| **Motor Volts 1** | 463 Volts |
| **Motor Volts 2** | 462 Volts |
| **Motor Volts 3** | 462 Volts |
| **Motor Amps 1** | 12 Amps |
| **Motor Amps 2** | 13 Amps |
| **Motor Amps 3** | 12.6 Amps |

| Motor Data | |
|---|---|
| **Motor Manufacturer** | N/A |
| **Motor HP** | 15 HP |
| **Motor RPM** | 1745 RPM |
| **Motor Frame** | 254T |
| **Motor Rated Volts** | 460 Volts |
| **Motor Phase** | 3 |
| **Motor Hertz** | 60 Hz |
| **Motor FL Amps** | 18 Amps |
| **Motor Service Factor** | 1.15 |

| Sheave Data | |
|---|---|
| **Drive Type** | Belt |
| **Motor Sheave** | 3V8.0 |
| **Motor Sheave Bore** | 1 5/8 B in. |
| **Fan Sheave** | 3V5.0 |
| **Fan Sheave Bore** | 1 7/16 B in. |
| **Belt Size** | 3V560 |
| **Belt Quantity** | 3 |
| **Sheave Center Line** | 18 in. |

| Air Test Data | |
|---|---|
| **Total Fan CFM Act.** | 7063 CFM |

| * Notes | | | | |
|---|---|---|---|---|
| | EF-22BA061 | 10-Dec-13 | Scott Davies | This fan needs a new latch on the inlet side. |