TRANSMITTAL

Date: August 3, 2012
Kleinfelder Project Number: 127227

TO:

Mr. Travis Hultin, PE
Chief Engineer
City of Troutdale
342 SW 4th Street
Troutdale, OR 97060

Subject:

DEMOLITION ACTION PLAN
CITY OF TROUTDALE STP PROPERTY
410 AND 320 NW 257th WAY
TROUTDALE, OREGON

We are sending the following:

Ten (10) color hard copies and two (2) digital copies of the above-referenced report.

Remarks:

If you have any questions, please contact our office at (503) 644-9447.

Thank you.

By:

Randall A. Reid
Senior Project Manager

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9200 SW Nimbus Ave., Suite A, Portland, OR 97008 **p |** 503.644.9447 **f |** 503.643.1905

DEMOLITION ACTION PLAN
CITY OF TROUTDALE STP PROPERTY
410 AND 320 NW 257th WAY
TROUTDALE, OREGON
KLEINFELDER PROJECT NO. 127227

August 3, 2012

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Date: August 3, 2012
Kleinfelder Project Number: 127227

Mr. Travis Hultin, PE
Chief Engineer
City of Troutdale
342 SW 4th Street
Troutdale, OR 97060

Subject: Demolition Action Plan
City of Troutdale STP Property
410 AND 320NW 257th Way
Troutdale, Oregon

Dear Mr. Hultin:

Kleinfelder is pleased to submit this finalized report that comprises the demolition action plan for the City of Troutdale Sewer Treatment Plant (STP). The finalized report includes revisions to the draft report per the City's comment letter dated July 27, 2012. The comments were addressed as follows:

1. **Maintenance building - One component of the existing facility was omitted in the draft plan: the blue maintenance building at the north end of the site. Please add the demolition of this treatment plant site component to the plan.**

   The demolition of the maintenance building has been added to the report as Sections 2.13 and 3.17 and in the applicable appendices.

2. **Odor Control - It was quite evident from the draft plan and our discussion that the greatest potential for impact to surrounding properties from this demolition will be foul odors. The plan should provide guidance on best management practices for controlling and/or mitigating odors during the demolition.**

   Odor control has been addressed in the report as Section 6.0.

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3. **Influent Sewer Removal - The influent sewer should be removed back to the beginning of its branch at the junction where the trunk turns westward. This includes both 21" and 15" pipe (see attached map), as well as the 6" and 8" force mains.**

   The influent sewer removal has been revised in Section 3.3.

4. **Section 3.14 indicates that all pipes other than the water main feeding the fire hydrant are to be removed. However, there are other pipes that must remain. The main trunk sewer line that enters the site from the south, turns east, then north again and across I-84 to the new plant must be left in place. This is the main trunk sewer for the entire southern portion of the City. See attached map.**

   Section 3.14 has been revised to include pipes that must remain.

5. **Details regarding where hazardous materials are likely to be found are in a separate section (4.2) form the demolition narratives. Each demolition narrative section includes a paragraph that repeats the general guidance that hazardous materials must be disposed at an approved facility. Please add to that paragraph in each se tion a reference to section 4.2.**

   A reference to Section 4.2 has been added to the applicable component demolition sequences.

6. **Clarification is needed on sequencing and "ala carte" demolition. Please clarify in the narrative which components can be done individually, out of the recommended sequence in Appendix E, and any special considerations if the component is demolished out of sequence. If there are components that have an imperative prerequisite that one or more other components be demolished first, clearly indicate that.**

   A sequencing section has been added to the applicable component demolition sequences to address demolition out of the proposed sequence.

7. **Page 18, clerical error in "The lagoon is currently halinear feet full".**

   The clerical error on page 18 was addressed.

8. **Appendix C - On the overall site plan, the utility lines are very difficult to see. Please makes the utility lines in this figure more visible.**

   The utility lines on the overall site plan have been made more visible.

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9. **Costs and cost recovery through recycling - Please clarify in the cost information whether or not the estimated costs incorporate anticipated resale value of recyclable and/or salvage materials.**

   Clarification related to resale and recycling has been added to the applicable components cost sections.

10. **The City has an opportunity to have the aeration basin or, possibly, the digesters demolished in the immediate future by the ODOT bridge contractor. As discussed at Monday's meeting, the City would like to have standalone packets prepared providing the information on those two components that the City can provide as basic demolition parameters and procedures to the contractor. This is not preparation of a bid package; it will only include information already in the plan. The City understand that this may constitute Extra Work. If Kleinfelder considers this Extra Work, please provide the additional fee that will be required to prepare these separate standalone packets.**

    Standalone packets for the aeration basin and digesters have been submitted along with this final report.

We trust that the information contained in this report will meet your needs at this time.

Kleinfelder appreciates the opportunity to be of service on this project. Should you require additional information or have any questions regarding this report, please contact this office at your convenience.

Sincerely,

KLEINFELDER, INC.

Randall A. Reid
Senior Project Manager

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1.0 INTRODUCTION

This report details an action plan for the demolition and restoration of the City of Troutdale's (City) former Sewer Treatment Plant (STP) located at 410 and 320 NW 257th Way. Included in the report are:

- background information on the STP site and components;
- a narrative action plan for the demolition of each component;
- permitting and regulatory requirements;
- reusable and recyclable material analysis;
- odor control information; and
- public awareness information.

This report can be used as a guide for subsequent projects by the City to demolish the facility and/or as an informational and planning tool for potential developers of the site.

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2.0 BACKGROUND

The following sections detail the history of the components of the STP in sequential order.

2.1 OVERALL SITE BACKGROUND

From 1969 to 2000, the City operated a wastewater treatment facility, the former STP, at 410 NW 257th Way. The original STP facility was constructed in the 1969 as a treatment system and sludge (humus) ponds. A Phase I Expansion was performed in the 1970's that included headwork improvements, a secondary clarifier, screw pumps, an aeration basin, and a chlorine contact tank. In the 1990's the treatment system was expanded to include digesters, an access road, and a new sludge storage lagoon. In 2000, the City commissioned a new Water Pollution Control Facility and retired the former STP.

From the mid-1980's to the mid-1990's, a portion of the STP site at 320 NW 257th Way was leased to a private company, Waste Water Management Incorporated. Waste Water Management Incorporated operated a facility, the Waste Water Management site, that processes hauled wastewater. The facility was shut down in 1996, and the City reacquired use of the property for material storage and yard space only.

Since the retirement of the STP, the facility and Waste Water Management site have remained inactive and the City has maintained ownership of the site.

2.2 HEADWORKS

The original headworks for the plant consisted of a bar screen and shredder. The influent to the plant was via a single 21" concrete sewer entering from the south. The sewer entered a manhole located west of the headworks structure where the flow was directed toward the east and into the headworks. Discharge to the plant was via a 12" welded steel pipe. A 20" welded steel bypass was provided to the primary clarifier inlet basin allowing sewer to be diverted around the headworks for maintenance. Figure #1 in Appendix A shows a plan view of the original influent headworks structure.

The original concrete structure consisted of 8" walls reinforced with # 4 bars at 12" each way running down the center of the walls. The floor of the structure was constructed of

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12” of concrete reinforced with #4 bars at 12” each way along the lower face of the floor slab. A small section of 6” elevated slab was installed over the influent gallery, reinforced with #4 bars at 12” each way on each face. Figure #2 in Appendix A shows a cross section of the influent headworks structure. Additional information can be found on the original design plans prepared by CH2M dated December, 1966 on file in the City of Troutdale Public Works Department and included in PDF format in Appendix G of the digital version of this report.

In the late 1970’s, the Phase I Expansion of the STP added a 21” concrete pipe from the existing headworks to the newly installed screw pumps. In the early 1980’s, modifications to the headworks facility were installed. The project included a new concrete grit chamber, a mechanical bar screen, and space for a grit screw conveyor. The conveyor was apparently installed after the other modifications were completed. Please refer to Figure #3 in Appendix A.

The new grit chamber was constructed using a 5’ diameter concrete pipe vertically installed on a below-grade slab. The grit chamber extends approximately 10’ below grade. The support slab has dimensions of 6’-6” square, is 12” thick, and is reinforced with #4 bars at 12” each way along the top of the slab. The remainder of the headworks improvements were constructed of reinforced concrete walls and slabs nominally 8” in thickness reinforced with #4 bars at 12” each way in the center of the section. Figure #4 in Appendix A details the design of the grit chamber addition. Additional information can be found on the original design plans prepared by Lee Engineering dated August 1983 on file in the City of Troutdale Public Works Department and included in PDF format in Appendix G of the digital version of this report.

Digital photos of the site were collected in May of 2012 and indicate the current condition of the site. Photo #1 in Appendix B, facing in a north westerly direction, shows the influent manhole on the site. An existing 21” concrete sewer main enters this manhole from the left side of the photo and continues to the headworks toward the lower right. Photo #2 in Appendix B, facing generally northeast, shows the existing headworks facility. The 21” influent sewer enters the headworks from the lower left of the photo. Photos #3 - #9 in Appendix B give additional details of the current condition of the headworks facility.

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2.3 PRIMARY CLARIFIER

The primary clarifier was installed in the late 1960's. The primary clarifier was originally designed as a multi-purpose basin with the primary clarification in the center and aeration and sludge digestion in the outer ring. The structure was constructed of reinforced concrete with steel internal walls and weirs. The concrete walls of the 65' diameter structure were constructed using 12" concrete walls, #5 reinforcing bars at 12" vertically on each face, and #5 bars running the circumference of the walls on each face spaced at 6", 8", and 12" up the side of the tank. The floor of the structure has an approximately 7' x 12" foundation ring under the perimeter walls and a 4' x 12" ring foundation under the steel baffle wall. The floor of the clarifier is 6" thick. Each of these foundation sections is 12" thick with #5 bars radiating from the center of the tank and #5 hoops at 12" on center in the center of the slab.

Sewage entered the original clarifier through an inlet basin adjacent to the clarifier from the bar screen and shredder via a 12" diameter welded steel pipe. Following treatment, discharge from the system was via a 24" welded steel pipe to the discharge outfall. The original system included miscellaneous piping for air and waste water. A 20" welded steel pipe provided a bypass from the headworks structure to the inlet basin, and a 24" welded steel pipe provided a bypass from the inlet structure to the discharge outfall. Figure #5 in Appendix A shows the piping to and from the clarifier as originally designed and shown on the CH2M plans dated October, 1966.

The Phase I Expansion of the STP, completed in the late 1970's, added a secondary clarifier, screw pumps, a pumping control building, and a chlorine contact facility to the system. The Phase I Expansion project left key components in place for a future upgrade to the facility to include additional primary and secondary clarification. A 21" concrete pipe was installed from the existing headworks to the new screw pumps. This new pipe runs immediately west of the existing primary clarifier and was presumably used to divert all influent flow to the screw pumps influent gallery, which would be used for plant equalization when the new primary clarifier was installed. It is unclear whether this influent pipe was used for this purpose as the plant was decommissioned prior to the construction of the additional primary clarifiers. Please refer to Figure #6 in Appendix A.

The Phase I Expansion included installation of an aeration basin and secondary clarifier. At that time, the aeration basin inside the original plant was converted to additional

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sludge digestion. Additional piping changes to the original primary clarifier included rerouting the clarifier effluent to the screw pumps via a 16" diameter concrete pipe; 4" supernatant, scum and sludge piping; and a 12" steel secondary clarifier bypass. All of these pipes remain in the ground, including the original 24" steel bypass from the existing headworks and the original 24" steel effluent line from the original clarifier discharge gallery. Figure #7 in Appendix A shows the site plan for the Phase I Expansion. Additional information can be found on the original design plans prepared by Lee Engineering dated July, 1978 on file in the City of Troutdale Public Works Department and included in PDF format in Appendix G of the digital version of this report.

Photos #10 and #11 in Appendix B indicate the condition of the primary clarifier in May of 2012. Both photos are facing in a northerly direction. The photos show that the clarifier is full of water. It is assumed that some sludge will be found settled to the base of the clarifier. Dewatering the clarifier from the center influent gallery should also allow dewatering of the headworks and influent sewer.

The clarifier is currently full of water. Algae and floating surface material prevents identification of a sludge layer in the clarifier, but it is assumed that some solids exist. Dewatering of the clarifier will be required prior to removal of the concrete structure. Dewatering the clarifier will also dewater the headworks structure and influent sewer piping. Dewatering should be accomplished using a portable engine-driven trash pump and hose discharge to the existing lagoon.

2.4 SCREW PUMPS AND CONTROL BUILDING

The screw pumps and control building were designed and installed as part of the Phase I Expansion project implemented in the late 1970's. The intent of the design and future upgrades was for the screw pumps and the control building to essentially be the heart of the upgraded plant, with influent entering the screw pump structure following the headworks and then being diverted to the primary clarifiers through an influent gallery cast into the screw pump structure. Following primary clarification, water would be returned to the screw pump influent gallery, pumped to the aeration ditches by the screw pumps, and then sent to corresponding secondary clarifiers directly from the effluent basin on each aeration ditch. Sludge and supernatant was delivered via the pumps in the basement of the control building. Only one of the screw pumps was ever installed. Improvements to the disinfection system, new anaerobic digesters, and a new

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lagoon were installed each at a later date; however the plant was never upgraded to include a second primary clarifier, aeration ditch, or secondary clarifier. It appears that the influent gallery of the screw pump structure was never used as ultimately intended. Sewage appears to have continued to travel from the headworks directly to the clarifier. For this reason, the 21' concrete pipe extended from the headworks to the influent gallery of the screw pumps may be found isolated with a closed sliding gate valve. It is assumed that this pipe is full of water and that the valves isolating it will need to be opened or removed prior to dewatering. Figure #8 in Appendix A shows a cross section of the screw pumps and control building structure.

The control building basement is currently filled with water to a depth of approximately four feet, making inspection of the pumps and piping difficult. Removal of the screw pumps and control building will begin with dewatering the screw pump structure, the basement of the control building, and associated piping.

The screw pumps and control building were constructed in four basic sections: the screw pumps, the influent gallery, the basement pump room, and the building. The screw pumps were constructed on 12" concrete walls extending to 12' below grade, reinforced with #4 bars at 12" each way on each face. The walls are supported by a continuous 3'-6" footing reinforced with #4 bars at 12" each way in the center of the footing. A 12"-square center column on a 3' x 3' footing supports the center of the screw pump discharge gallery. The pumps are supported on an inclined 8" slab extending from the discharge gallery to the screw pump influent gallery. The discharge gallery floor and inclined slab are reinforced with #6 bars at 6" each way in the center of the slab.

The influent gallery is constructed of reinforced concrete walls extending 15' below grade. The 1'-4" thick walls are reinforced with #5 bars at 10" each way on each face of the walls. The walls are supported by a 1'-6" thick by 9'-8" wide footing reinforced with #8 bars at 10" each way on each face of the footing.

The pump room, or basement of the control building, was constructed with a basement floor slab 12" thick reinforced with a mixture of #4 and #5 bars on the bottom face and #5 bars in the top face. The pump room shares a common wall with the influent gallery. The remaining walls are 12" thick reinforced with #6 bars at 12" vertically on each face and #5 bars at 12" horizontally on each face. Figure #9 in Appendix A shows a cross section of the screw pumps and pump room structure including reinforcing steel.

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Additional information can be found on the original design plans prepared by Lee Engineering dated July, 1978 on file in the City of Troutdale Public Works Department and included in PDF format in Appendix G of the digital version of this report. Photo #12 in Appendix B, facing west, shows the entrance to the control building. Photo's #13 and #14 in Appendix B show the screw pumps.

2.5 CONTROL BUILDING

The control building was constructed as part of the Phase 1 Expansion in the late 1970's. The building has dimensions of 19'-6" x 24'-0" and is constructed of 2" x 4" walls sheathed in plywood on the outside and 5/8" gypsum board on the inside. Unreinforced concrete columns support the corners of the building. In addition, one column is centered on each exterior wall. Figure #10 in Appendix A is a floor plan of the control building.

The hip roof of the control building is constructed of laminated beams supporting rafters, sheathing, and cement roof tiles. Figure #11 in Appendix A shows the roof framing. Additional information can be found on the original design plans prepared by Lee Engineering dated July, 1978 on file in the City of Troutdale Public Works Department and included in PDF format in Appendix G of the digital version of this report.

Photo #15 in Appendix B, facing southwest, shows the current condition of the control building including the exterior siding, loading dock, corner, and mid wall columns. The control building housed the motor control center (MCC) for the plant. Electrical conduit and wiring will be encountered running from the MCC to all parts of the site. Photo #16 in Appendix B shows the MCC cabinets and some of the remaining wiring and control equipment. As previously discussed, the basement level of the control building is filled with water to a depth of about 4'. Photo #17 in Appendix B shows the condition of the pump room in May of 2012. The orange pumps and piping are for sludge while gray pumps and piping are for supernatant and dewatering. Prior to demolition of the control building, the pump room will need to be dewatered to the existing lagoon.

2.6 AERATION BASIN

The existing aeration basin was constructed during the Phase I Expansion project in the late 1970's. Prior to the expansion project, a section of the clarifier was used for aeration. The Phase I Expansion project added the aeration basin, a secondary clarifier, the screw pumps, and the control building. Piping additions during the Phase I

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Expansion set the stage for additional expansion of the plant, which would include additional primary clarifiers and a second aeration basin. Figure #12 in Appendix A shows a plan view of the aeration basin.

During normal operation of the plant, effluent from the primary clarifier was directed to the screw pump influent gallery via a 16" welded steel pipe. The screw pumps lifted the effluent to the aeration basin influent diffuser. Photo #18 in Appendix B shows the condition of the aeration basin and influent diffuser in May of 2012.

As water entered the aeration basin, mechanical brushes swept the water into a clockwise direction and agitated the surface to aerate the water. Photos #19-21 in Appendix B show the condition of the mechanical aerators and drive motors in May of 2012. Following aeration, water discharged from the aeration basin to the secondary clarifier via a 16" diameter concrete pipe.

The aeration basin has dimensions of 52' wide x 132' long. The ends are oval shaped. The walls of the basin are constructed of 8" reinforced concrete with #4 bars at 12" each way on each face. The maximum depth of the basin is 10'. The floor of the basin is constructed of a reinforced concrete slab 6" thick reinforced with #4 bars at 16" each way in the center of the section. The center wall is 8" thick reinforced with #4 bars at 12" each way on each face. The flow alignment walls, located in the curved ends of the basin, are 6" thick and are reinforced with #4 bars at 12" each way in the center of the section. A 1' x 4'-8" footing supports the perimeter walls and is reinforced with #6 bars at 12" each way on the top face of the footing and #4 bars at 12" each way on the bottom face. Figure #13 in Appendix A shows a cross section of the aeration basin walls. Additional information can be found on the original design plans prepared by Lee Engineering dated July, 1978 on file in the City of Troutdale Public Works Department and included in PDF format in Appendix G of the digital version of this report.

2.7 SECONDARY CLARIFIER

The secondary clarifier was installed during the Phase I Expansion project in the late 1970's. The 66' diameter structure receives effluent from the aeration basin and discharges to the chlorine contact tank. The structure is constructed of reinforced concrete with steel weirs. The walls are constructed using 12" concrete with #5 reinforcing bars at 12" vertically on each face and #5 bars running the circumference of the walls on each face spaced at 7 ½" on the inner face and 12" on the outer face of the

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tank. The floor of the structure has a 10” x 2’-10” foundation ring under the perimeter walls reinforced with #5 bars. The floor of the clarifier is 6” thick reinforced with #4 hoops at 12” and #4 radial bars. Figure #14 in Appendix A shows a sectional view of the secondary clarifier and Figure #15 in Appendix A shows the reinforcement of the walls and slab. Additional information can be found on the original design plans prepared by Lee Engineering dated July, 1978 on file in the City of Troutdale Public Works Department and included in PDF format in Appendix G of the digital version of this report.

Sewage enters the secondary clarifier from the aeration basin through a 16” concrete pipe under the slab to the center of the clarifier. A 14” concrete return sludge line runs from the center of the clarifier to the screw pump influent gallery. A 6” diameter waste sludge line and drain runs from the sump in the clarifier to the pump room under the control building. The sump is hydraulically the lowest point of the secondary clarifier. Figure #16 in Appendix A shows the center sump.

Discharge from the secondary clarifier to the chlorine contact tank is via a perimeter weir and effluent gallery discharging into a sump. A 21” concrete pipe conveys secondary effluent to the flow measuring chamber in the chlorine contact tank.

Photo #22 in Appendix B shows the condition of the secondary clarifier in May of 2012. The clarifier is currently filled with water and debris. Dewatering of the secondary clarifier will be required prior to removal of the concrete structure and piping. Dewatering should be accomplished from the center sump using a portable engine-driven trash pump and discharge hose to the existing lagoon.

2.8 CHLORINE CONTACT TANK

The chlorine contact chamber was installed during the Phase I Expansion of the plant in the late 1970’s. Prior to the plant expansion, effluent from the plant was disinfected following clarification by injecting chlorine solution into the effluent stream at a discharge manhole adjacent to the original control building. Figure #17 in Appendix A shows the original plant layout and Figure #18 in Appendix A shows the Phase I Expansion.

The chlorine contact tank included a flow measuring flume in the influent gallery where a 21” concrete pipe entered the tank form the secondary clarifier. Chlorine was injected into the secondary effluent immediately upstream of the flume. Water then travelled through four serpentine chambers for adequate mixing prior to discharge from the tank

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into a 30” concrete discharge pipe to the river. Figure #19 in Appendix A shows the plan view of the chlorine contact tank that was installed during the Phase I Expansion.

The tank is constructed with exterior reinforced concrete walls 12’ in height, 12” thick, with #5 bars at 12” each way on the interior face and #4 bars at 12” each way on the exterior face. The internal walls are 10’ in height, 8” thick, with #4 bars at 12” each way centered in the section. The floor of the basin is nominally 12” thick, sloping to the center of each serpentine track, and reinforced with #4 bars at 12” each way on the bottom and #6 bars at 12” each way on the top of the section. A 3’ foundation footing extends beyond the exterior walls. The footing is reinforced with the same steel reinforcement as the tank floor.

Ultraviolet disinfection equipment was installed in the last channel of the disinfection tank in the mid-1990’s as part of plant modifications that also included a new jib crane and a new disinfection station adjacent to the screw pumps. The disinfection equipment was installed in new channels formed in the final disinfection track within the existing disinfection tank. Figure #20 in Appendix A shows a plan view of the improvements and Figure #21 in Appendix A shows a cross section of the newly constructed channels. The channels are constructed of reinforced concrete walls 10” thick on each side of the channel reinforced with #5 bars at 12” each way on each face. The center divider wall is 1’-5” thick with the same reinforcement. The floor of the channels is approximately 3’ thick with the same reinforcement schedule as the walls. Following the installation of the channels, the reinforced concrete walls of the original chlorine contact tank increase to 18” in the last track along the tank exterior, the interior wall increases to 1’-10” thick, and the floor of the last track increases to nearly 4’. The jib crane stands approximately 12’ high and has a steel pedestal base bolted to a reinforced concrete foundation. The crane has a steel I-beam jib onto which a roller chain hoist rides.

Photo #23 in Appendix B shows the condition of the chlorine contact tank in May of 2012. This photo is facing generally toward the west and indicates that the basin is halinear feet-full of water and debris. Photo #24 in Appendix B, also facing west, shows the UV disinfection system. Photo #25 in Appendix B shows the jib crane. Additional information can be found on the original design plans prepared by CH2M Hill dated March, 1994 on file in the City of Troutdale Public Works Department and included in PDF format in Appendix G of the digital version of this report.

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2.9 DIGESTERS

In the early 1990's new anaerobic sludge digesters were designed and installed at the facility. Prior to this plant upgrade, sludge digestion was accomplished in the outer ring of the primary clarifier. Digested sludge was pumped to a sludge loading area adjacent to the laboratory building. The new digesters consisted of two 300,000 gallon digester tanks with floating covers, a gravity thickener, new pumps, boilers, and yard piping.

The upgrade allowed primary sludge to be drawn from the aerobic digester and pumped to the gravity thickener via the sludge pumps in the pump room. Waste activated sludge from the secondary clarifier was also pumped to the gravity thickener through the pump room. From the gravity thickener, sludge was pumped to heat exchangers on the boilers and then into the digesters. Figure #22 in Appendix A shows a piping schematic of the new sludge processing facility. Photo #26 in Appendix B, facing north, shows the rear entrance to the sludge digester facility. The photo shows the general condition of the facility in May of 2012.

The digesters have a 45' inside diameter and are constructed of 12" thick exterior walls clad with vertical steel siding. The walls are reinforced with #4 bars at 10" on each face vertically, and a graduated reinforcement schedule for the horizontal bars. From the base to 3', the reinforcement steel consists of #6 bars at 3" on each face, from 3' to 11' the reinforcement is #6 bars at 4", from 11' to 16' #5 bars at 4", and from 16' to 26' the reinforcement is #5 bars at 6". The floor of the each digester slopes 4 ½' to the center and is 18" thick reinforced with #5 bars at 10" each way on each face, except in an 8' center ring where the top face reinforcement is increased to #5 bars at 5". Figure #23 in Appendix A shows a cross section of the digester walls and floor.

The cover of the digesters is constructed of steel and rises on the sludge blanket. The cover travels a maximum of 6' vertically and rides on roller bearings in a vertical track along the digester wall. It is estimated that the digester covers weigh 50,000 pounds each. The covers have lifting lugs that will allow removal, however it is anticipated that a crane will be required to lift the covers from the digesters. Photo #27 in Appendix B, facing generally west, shows the condition of the cover over the primary digester in May of 2012. As the photo shows, the cover is at its lowest point of travel, indicating that there is likely an open valve or a piping leak allowing rainwater to escape from the digester. Figure #24 in Appendix A is a cross section of the digesters showing the walls and cover.

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Equipment inside the digesters includes piping for mixing and gas collection. Flexible hoses on the gas collection lines allow movement of the cover. Photo #28 in Appendix B, facing in an easterly direction, shows the cover over the secondary digester. The flexible hoses are readily apparent. This cover is at the top of its travel, indicating that it is floating, likely on rainwater. It is anticipated that when the covers are removed, there will be residual sludge inside both digesters. Dewatering of the digesters is best accomplished from the pump room and will be discussed in the next section.

Between the digesters is a pump room housing pumps for digester feed, heat exchanger feed, and sludge loading. The pump room is located on the lower level, with the boilers located on the upper. Currently the lower level is filled with water to a depth of approximately 2'. Photo #29 in Appendix B shows the current condition of the pump room. The pump room is constructed of reinforced concrete with an 18" thick floor reinforced with #5 bars at 10" each way on each face. The pump room floor is 11' below grade. Figure #25 shows a cross section of the pump room indicating the concrete and reinforcement.

Dewatering of the digesters may best be accomplished through the pump room. After dewatering the basement, opening of the sludge piping and pumping to the lagoon can be accomplished.

The boiler room is constructed over the pump room on a 6" reinforced concrete slab. 14" x 14" concrete beams support the floor. The reinforcing steel is a combination of #4 and #5 bars spaced through the floor and beams. Figure #25 in Appendix A shows the reinforcing steel pattern. Two 375,000 Btu gas fired boilers are housed in the boiler room to heat the sludge. Figure #26 in Appendix A shows a portion of the piping to and from the boilers. Photo #30 in Appendix B, facing in a southerly direction shows the two boilers. The boiler room is enclosed in a metal framed building clad in metal siding. The concrete digesters are also clad in metal siding.

A gravity thickener is located immediately to the north of the digesters. Sludge from the primary and secondary clarifiers enters the gravity thickener via a 6" diameter ductile iron main from the control building pump room. The thickener has a 20' inside diameter and is constructed of 12' thick reinforced concrete walls. The reinforcement for the walls consists of #4 bars at 10" on each face vertically, and #4 bars at 7" horizontally from the base to 5' and #4 bars at 11" from 5' to the top. The top of the wall is 3 ½' above grade and the base of the thickener is 9'-8" below grade. The floor of the

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thickener slopes approximately 2' to the center sump and is 12" thick reinforced with #4 bars at 10' each way on each face. The center sump extends 2 ½' below the floor of the thickener. Figure #27 in Appendix A shows a cross section of the thickener and the steel reinforcement. Figure #27 also shows a plan view of the thickener. Photo #31 in Appendix B, facing east, and Photo #32 in Appendix B, facing north, show the condition of the thickener as of May 2012. The thickener is filled with water. It is anticipated that the thickener will also contain residual solids and will need to be dewatered to the lagoon. Additional information can be found on the original design plans prepared by Gibbs & Olsen dated July, 1991 on file in the City of Troutdale Public Works Department and included in PDF format in Appendix G of the digital version of this report.

2.10 LAB BUILDING

The existing laboratory building was constructed during the original plant installation in the early 1970's. The structure is a 33' square wood-framed building with a hip roof. The exterior is constructed of 2" x 4" stud walls with exterior plywood sheathing and interior wall board. The floor is constructed of 4" reinforced concrete with #3 bars at 14" each way in the center of the section. An 8' x 18" concrete footing supports the exterior walls and is reinforced with three #4 bars running the length of the footing. The building houses office areas, a restroom, rotary blowers, a sludge pump, chlorine disinfection equipment, and laboratory space. Figure #28 in Appendix A shows a floor plan of the facility, and Figure #29 in Appendix A shows a cross section of the building. A sludge loading area was located outside the building. A 6" cast iron pipe supplied sludge to the sludge pump from the digester in the primary clarifier. A 6" cast iron main carried discharge from the pump to the sludge loading area. Photo #33 in Appendix B, facing west, shows the exterior of the building. Photos #34 - #36 in Appendix B show the condition of the building as of May of 2012. Photo #37 in Appendix B shows one of the blowers and the sludge pump. Additional information can be found on the original design plans prepared by Cornell, Howland, Hayes, & Merryfield dated May, 1970 on file in the City of Troutdale Public Works Department and included in PDF format in Appendix G of the digital version of this report.

2.11 WASTE WATER MANAGEMENT SITE

The Waste Water Management site was constructed in the mid-1980's to produce a commercial soil conditioning product from heavily chlorinated sludge. At the plant, sludge was trucked to dump stations and pumps to a sludge storage tank. From the

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tank, the sludge was conveyed to the Purifax sludge conditioning units. The chlorinated sludge was then sent to drying beds. Water released from the sludge during the drying process was collected and stored in a steel tank. This water was used as backwash water for the Purifax units in other parts of the process. Following after the drying beds, the sludge was moved to a blending area where other materials, namely sand or clay, were added to produce a soil conditioning product. The finished product was then sold to nurseries, municipalities, or other consumers. Apparently, the project had limited commercial success, was plagued by odor problems, and had a relatively short life span. Figure #30 in Appendix A shows a layout of the Waste Water Management facility.

The main components of the facility requiring demolition are the above-ground steel storage tanks and foundations, the operations building and concrete floor, and the concrete drying beds. Miscellaneous piping and storage shed structures are also present on the site.

The steel tanks on the site are both 35' in diameter and constructed of welded steel. The tanks are approximately 12' high and have a steel dome cover. Foundation information is unavailable. Two 4" PVC lines run from the water storage tank, one each to the drying beds and the dump station. A 6" ductile iron main supplies filtrate from the drying bed to the tank. The sludge storage tank has two 6" ductile iron lines running from the dump stations. Sludge was supplied to the Purifax units from the sludge storage tank via a 6" PVC line. Photo #38 in Appendix B, facing east, shows the sludge storage tank adjacent to the rear of the operations building. Photo # 39, facing south, shows the water storage tank. It is assumed that the tanks are empty; however, it is likely that there are residual materials left in both tanks.

The operations building and dump stations occupy a roughly 50' x 100' area in the center of the site. Design details of the building are not available; however several photos included in the appendix show the current condition of the building in May of 2012. As shown in Photo #40 in Appendix B, facing in a southeasterly direction, the building is approximately 14' from ground level to roof, and is constructed with a concrete knee-wall and metal-clad exterior. We expect that the structure is comprised of steel framing and wood stud walls sheathed with drywall on the interior and likely plywood and metal siding on the exterior. The interior contains miscellaneous electrical, plumbing, and HVAC conduits and wiring. Photos #41 - #49 in Appendix B show various rooms in the interior of the building.

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The dump stations are constructed of concrete and include a concrete pad where transfer trucks parked to discharge sludge into the system, a grated dumping gallery at each dump station, a holding tank, and discharge piping to the sludge storage tank. Information currently available does not give specific design information on the components; however it is likely that the dumping galleries and holding tank are all pre-cast concrete units with wire reinforcement. Figure #31 in Appendix A shows a cross section of the dump station.

The drying beds, shown in cross section in Figure #32 in Appendix A, have a similar lack of design information. The sidewalls of the drying beds are cast-in-place concrete, and are likely unreinforced. The floor of the beds is constructed of 2" asphalt over 6" crushed rock. A 1,250 gallon holding tank below the first bed collects filtrate water for each bed. A submersible pump delivers collected water to the water storage tank. The drying bed area is approximately 100' x 60'. Photos #50 - #52 in Appendix B show the current condition of the drying beds. Bed #1, in photos #50 and #52 is largely clear of debris with the exception of some stumps and g 5-gallon containers of roofing tar. Bed #2, shown in Photo #51 is essentially free of debris.

There are several storage sheds located immediately north of the waste management operation. The three sheds are wood frame construction approximately 10' x 10' square. Photos # 53 and #54 show the condition of the sheds in May of 2012.

The blending area is shown in Photo #55, facing generally east, has been used for yard and street tree debris storage. The blending area is constructed of asphalt pavement. Additional information is limited and can be found on the original design plans prepared by William Whitley Architect dated February, 1994 on file in the City of Troutdale Public Works Department and included in PDF format in Appendix G of the digital version of this report.

2.12 LAGOON

During the original design of the plant in the early 1970's, sludge storage was accomplished in two humus ponds located west of the treatment plant site. Figure #33 in Appendix A shows the original location of these ponds, roughly between the existing aeration basin and digesters. These ponds were abandoned at some time during the life of the facility, however this date is unknown. The lagoon currently found on the southern portion of the site was designed in the 1993 as part of the Phase II plant

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improvement project. The lagoon is approximately 245' x 215' and is approximately 18' deep at its deepest point. The lagoon walls have a 3:1 slope and are constructed of compacted fill with a 60 mil HDPE liner. A gunnite ballast cover was sprayed on the inner area of the liner as shown on Figure #34 in Appendix A. The capacity of the lagoon is 2.6 MG and has 3' of freeboard at the operating depth. Photos #56 and #57 in Appendix B, both facing generally south, show the condition of the lagoon in May of 2012. Weeds and debris have invaded the edges of the lagoon, and the current level appears to be about 2' below the operating level of the lagoon. Since the lagoon is holding water, it is assumed that the integrity of the liner is sound below the current water level. During the demolition of the facility, dewatering will be accomplished by pumping to the lagoon. With the concurrence of the City, decanted water can be slowly pumped to a nearby sewer. Additional information can be found on the original design plans prepared by Gibbs & Olsen dated March, 1993 on file in the City of Troutdale Public Works Department and included in PDF format in Appendix G of the digital version of this report.

2.13 MAINTENANCE BUILDING

As part of the treatment modifications in the 1990's, a storage and maintenance building was constructed north of the aeration basin. The building is a 100' x 60' metal-framed structure with metal siding and a pitched, metal roof. The building sits on a 6" concrete slab that is reinforced with #4 bars at 18" on center each way. The slab rests on a 1" layer of sand over a vapor barrier over 12" of compacted, crushed rock. The building is 16' tall and generally has three sizes of columns, each supported by three different sizes of footings. The perimeter columns are two different sizes. The larger perimeter columns, six total, are supported by 8'-6" square, 1'-6" thick concrete footings reinforced with seven #6 bars each way. The smaller perimeter columns are supported by two different sizes of footings depending on whether the columns are located on the corners or the interior. The interior perimeter column footings, four total, are 1' thick, 5' square, and reinforced concrete with five #5 bars each way. The corner perimeter column footings, four total, are 1' thick, 3'-6" square, and reinforced concrete with four #5 bars each way. There are two interior columns that support an interior wall. The two interior columns are supported by a 1' thick concrete footing that is 2'-6" square at the slab bottom and 1'-6" square at the footing bottom.

The interior wall is the same as the exterior walls, and it separates three 25' x 60' maintenance bays from an equal size work area. There is an 8' x 8' wood-framed

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compressor room at the northeast corner of the maintenance bays. The work area has 3' wide metal work counters on each side and a wood-framed restroom at the northeast corner. The work area is bisected by a hoist beam. A 10" wide grated drain is centered along the 100' length of the building and outlets on the east side. There is a 12' x 30' loading dock on the southeast side of the building. The loading dock is a 6" concrete slab with a catch basin at the center. The building has five 12' roll-up doors each with a 4" concrete apron that extends 4' outside of the building. The metal roof has six skylight panels over the maintenance bay area.

The building plan views are shown on Figures #35 and #36 in Appendix A. Photo #58 in Appendix B shows the condition of the maintenance building in May of 2012. As shown in the photo, the building was being used by the Oregon Department of Transportation for activities related to the nearby construction of the I-84 bridge over the Sandy River.

Additional information can be found on the original design plans prepared by Gibbs & Olsen dated July, 1991 on file in the City of Troutdale Public Works Department and included in PDF format in Appendix G of the digital version of this report.

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3.0 NARRATIVE ACTION PLAN

This plan has been prepared with the end product of the demolished and restored site being an evenly graded, grass field. Generally, any sequencing prerequisites are solely based on hydraulic considerations for effective dewatering of different components. However, it is understood that the sequence of items to be removed may or may not follow this plan. In most cases, the sequencing of events as presented in this plan may be altered with no adverse effects to the remaining items. The sections below describe the sequential action plan for site demolition and restoration.

3.1 EROSION AND SEDIMENT CONTROL MEASURES

Description

Erosion and sediment control measures are required to be installed prior to commencement of demolition, and the measures will require inspection and maintenance during construction operations until the site is stabilized. Refer to Section 4.1 for more information.

Location

The erosion and sediment control measures will be placed throughout the site per an approved Erosion and Sediment Control Plan.

Permits and Regulatory Requirements

Refer to Section 4.0 for permitting and regulatory requirements.

Specialized Consultant or Construction Service Requirements

No specialized service requirements are foreseen for erosion and sediment control measure installation.

Estimated Duration

The time estimated for installation of erosion and sediment control measures is 2 days.

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Estimated Cost

The estimated cost for the installation and maintenance of erosion and sediment control measures is $15,000.

3.2 DEWATERING PHASE 1

Description

Dewatering will be required as the primary step for the demolition of the existing Troutdale Sewer Treatment Plant. A number of treatment plant components on the site are currently occupied with polluted water. This water will need to be removed prior to the demolition and removal of the components containing it.

Location

Dewatering will be needed throughout the entire site. See Keynote #1 on the Overall Site Plan in Appendix C.

Demolition, Removal, and Disposal Sequence

Begin dewatering operations at the primary clarifier using portable trash pumps and hoses. Dewatering the primary clarifier should also dewater the headworks structure and influent sewer piping. Pump effluent from dewatering operations into the existing lagoon on-site. Pumps and hoses used for dewatering shall be capable of passing up to 3” solids. The lagoon is currently approximately half full, with approximately 1,805,950 gallons (241,420 cubic feet) of available storage. A volume of approximately 1,545,290 gallons (206,575 cubic feet) of water is expected to be produced from dewatering activities. This volume is a result of existing pipes and structures on the site that currently contain water. Care must be taken to ensure the lagoon does not overflow during dewatering operations. In the event that the lagoon becomes full during dewatering activities, water shall be pumped to the existing sanitary sewer, with permission from the City. All solids remaining in the lagoon after dewatering activities are complete will need to be moved offsite in an environmentally safe and legal manner.

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Permits and Regulatory Requirements

Refer to Section 4.0 for permitting and regulatory requirements.

Specialized Consultant or Construction Service Requirements

The contractor will need to ensure that all contaminated solids are removed safely and to a facility capable of handling the solids.

Estimated Duration

The time estimated for dewatering is approximately 4 days.

Estimated Cost

The estimated cost for dewatering and solids removal is $8,000.

3.3 INFLUENT SEWER REMOVAL (UPSTREAM OF INFLUENT MH TO HEADWORKS)

Description

Inflow to the treatment plant flowed into a manhole in the center of the site through the following pipes:

- a 6” force main from the east;
- an 8” force main from the east; and
- a 21” gravity concrete pipe from the south.

A 15” gravity concrete pipe may flow to the manhole from the south, but that could not be confirmed through existing plan information. A 21” concrete pipe connects the influent manhole to the headworks. These pipes and associated manhole will need to be removed once initial dewatering activities are completed.

Location

See Keynote #2 on the Overall Site Plan in Appendix C.

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Demolition, Removal, and Disposal Sequence

Upon completion of the first phase of dewatering operations, begin removal of influent sewer pipes and manholes. All pipe removed at this time shall be dug up and disposed of off-site. Beginning at the influent manhole upstream of the headworks structure, remove the 6" force main, 8" force main, 21" gravity concrete pipe, and if it exists, the 15" gravity concrete pipe. Ensure pipes have been drained as much as practicable prior to removal. Approximately 500 linear feet (or to an extent determined by the owner) of 15" and 21" gravity concrete pipe will be removed to the existing manhole at the southeast corner of the lagoon. Approximately 150 linear feet (or to an extent determined by the owner) of 6" and 8" force main will be removed. The contractor should be prepared to perform additional dewatering during force main removal, as necessary.

In addition to the 6" and 8" influent force mains, a 6" line from the former humus ponds may have been abandoned in place previously. This line connected to the 21" concrete gravity pipe just upstream of the manhole. If this line is still in place, it shall be removed as well.

After the pipes upstream of the manhole have been removed, the manhole and remaining 60 linear feet of 21" concrete pipe connected to the headworks structure can be removed and disposed of.

Following removal of all influent sewer manholes and pipes up to the connection to the headworks structure, the trenches shall be backfilled with suitable material, compacted, and re-seeded (See Section 3.15 Pavement Removal, Finished Grading, and Ground Stabilization below). Approximately 92 cubic yards of material will be required to fill the pipe and manhole trenches.

All materials that are produced as a result of the influent sewer removal will need to be disposed of in a locally approved waste facility.

Permits and Regulatory Requirements

Refer to Section 4.0 for permitting and regulatory requirements.

Specialized Consultant or Construction Service Requirements

No specialized service requirements are foreseen for the influent sewer removal.

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Estimated Duration

The time estimated for influent sewer removal is approximately 4 days.

Estimated Cost

The estimated cost for influent sewer removal is $27,600. The estimated cost does not incorporate anticipated resale value or recyclable materials.

3.4 HEADWORKS REMOVAL

Description

The plant headworks are located in the southeast corner of the site near the primary clarifier and consist of screening and grit removal equipment. This serves as the first step in the treatment process by removing solid material from the sewage. The headworks and all associated equipment will need to be removed following the influent sewer removal.

Location

See Keynote #3 on the Overall Site Plan in Appendix C.

Demolition, Removal, and Disposal Sequence

Pump out any water remaining in the headworks structure prior to removing equipment or beginning excavations. Vegetation in the vicinity of the headworks structure may also need to be removed to allow adequate access and clearance. Begin headworks demolition by removing above ground fixtures including grit screw conveyor, piping, and electrical components. Next, remove below ground components of the headworks: grit chamber structure, remainder of grit screw conveyor, bar screens and any additional parts that can be removed from the concrete.

Following removal of all components in the structure, demolish and remove the concrete structure and channels. While removing the structure, contractor shall also remove the 20” headworks bypass pipe up to the blind flange shown in Figure 3 and as much of the 21” concrete pipe leading to the screw pumps and influent gallery as necessary to facilitate excavation and removal of the headworks. Approximately 16 CUBIC YARDS of concrete will be removed during this portion of the demolition.

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Following removal of the headworks structure, approximately 25 linear feet of 20" welded steel bypass pipe, and 10 linear feet of 21" concrete pipe, the trenches shall be backfilled with suitable material, compacted, and re-seeded (See Section 3.15 Pavement Removal, Finished Grading, and Ground Stabilization below). Approximately 38 cubic yards of material will be required to fill the structure and pipe trenches.

All materials that are produced as a result of the headworks removal will need to be disposed of in a locally approved waste facility. Refer to Section 4.2 for regulatory concerns related to the potential of hazardous materials.

Permits and Regulatory Requirements

Refer to Section 4.0 for permitting and regulatory requirements.

Specialized Consultant or Construction Service Requirements

No specialized service requirements are foreseen for the headworks removal.

Estimated Duration

The time estimated for the headworks removal is approximately 4 days.

Estimated Cost

The estimated cost for the headworks removal is $5,600. The estimated cost does not incorporate anticipated resale value or recyclable materials.

3.5 PRIMARY CLARIFIER REMOVAL

Description

The primary clarifier is located in the southeast corner of the site beside the headworks structure. The primary clarifier was one of the original parts of the treatment plant, and it allowed heavier particles to settle out of the slow moving wastewater.

The primary clarifier includes: a 12" influent; a 20" influent bypass from the existing headworks; a 12" secondary clarifier bypass line; a 16" effluent pipe to the screw pumps; the original 24" effluent line from the clarifier outlet to the discharge outfall; and the original 24" bypass line from the inlet structure to the discharge outfall. There are also various supernatant, scum, and sludge pipes ranging in size from 4" to 8"

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connected to the primary clarifier at various points. The primary clarifier should be removed following the demolition and removal of the headworks structure and equipment.

Location

See Keynote #4 on the Overall Site Plan in Appendix C.

Demolition, Removal, and Disposal Sequence

Check any valves connected to the supernatant, scum, and sludge pipes to be sure they are open and to ensure that they were also drained during the initial dewatering phase.

After any remaining water has been removed from the clarifier, removal can begin. Vegetation may need to be cleared from around the clarifier to allow sufficient access. Begin dismantling the primary clarifier from the top down, removing all railing, piping, metalworks, and electrical components. When all the interior piping has been removed, the interior walls and weirs can be removed.

Following removal of all metal and piping inside the clarifier, the concrete outer walls and base can be demolished and removed. At this time, the supernatant, scum, and sludge piping around the clarifier can also be removed. After excavations have begun, care shall be taken to plug the upstream end of the original 24” effluent line from the clarifier discharge and the 24” bypass line to the outfall to prevent unwanted water or waste from draining into them during the project.

At this time, the 12” influent, 20” headworks bypass lines, and an 8” emergencubic yards RAS line can also be removed from the primary clarifier to the headworks.

Approximately 35 linear feet of 12” pipe, 35 linear feet of 20” pipe, 35 linear feet of 8” pipe, and 144 cubic yards of concrete will be removed during this portion of the project. Approximately 2,600 cubic yards of material will be required to backfill the structure and pipe trenches.

All materials that are produced as a result of the primary clarifier removal will need to be disposed of in a locally approved waste facility. Refer to Section 4.2 for regulatory concerns related to the potential of hazardous materials.

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Sequencing

It is recommended that the headworks and primary clarifier be removed in sequence following dewatering of the primary clarifier. This is mainly due to the hydraulic connectivity between the primary clarifier and the influent sewer and headworks. Should only one component be removed, prolonged dewatering from the primary clarifier may be required.

Permits and Regulatory Requirements

Refer to Section 4.0 for permitting and regulatory requirements.

Specialized Consultant or Construction Service Requirements

No specialized service requirements are foreseen for the primary clarifier removal.

Estimated Duration

The time estimated for the primary clarifier removal is approximately 6 days.

Estimated Cost

The estimated cost for the primary clarifier removal is $65,200. The estimated cost does not incorporate anticipated resale value or recyclable materials.

3.6 SCREW PUMPS AND CONTROL BUILDING REMOVAL

Description

The screw pumps and control building are located in the center of the site. This portion of the plant was originally intended to be the “heart” of the plant with all flow travelling through it and being directed to the appropriate treatment stage.

The basement of the control building and influent gallery are currently filled with water and require dewatering prior to beginning demolition. The screw pump outlets into two 16” pipes, one that connects to the aeration basin and another that bypasses the aeration basin and connects directly to the secondary clarifier. The influent gallery drains a 21” influent pipe from the headworks, a 16” pipe connected to the primary clarifier, and a 14” pipe from the secondary clarifier. Valves on the 21” concrete pipe from the headworks may have been closed previously to isolate the line. If possible,

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this valve will need to be opened prior to dewatering the influent gallery in order to drain the 21” pipe as much as possible. The screw pumps and control building will need to be removed once the primary clarifier has been demolished and removed.

Location

See Keynote #5 on the Overall Site Plan in Appendix C.

Demolition, Removal, and Disposal Sequence

After dewatering the influent gallery and control building basement, demolish and remove the control building structure. Next, begin removing the screw pumps and appurtenances from the influent gallery. In addition to the pipes connected to the influent gallery, there are several supernatant and sludge pipes and pumps connected to and in the control building basement. All of the pipes, pumps, electrical conduit, railings, and any other appurtenances will need to be removed prior to demolishing the concrete walls and influent gallery.

When all of the equipment has been removed, demolition can begin on the concrete. During excavation, care should be taken to ensure that the 16” pipe to the aeration basin and the 14” pipe to the secondary clarifier and the supernatant lines are properly drained and do not spill into the open trenches. At this time, the remainder of the 21” pipe to the headworks and the 16” pipe to the primary clarifier can be removed.

Approximately 100 linear feet of 21” pipe, 90 linear feet of 16” pipe, and 185 cubic yards of concrete will be removed during this portion of the project. Approximately 535 cubic yards of material will be required to backfill the structure and pipe trenches.

All materials that are produced as a result of the screw pumps and control building removal will need to be disposed of in a locally approved waste facility. Refer to Section 4.2 for regulatory concerns related to the potential of hazardous materials.

Sequencing

The screw pumps may be removed out of sequence from the remainder of the plant, with the sole exception of the 21” concrete pipe connecting the headworks to the screw pump influent gallery. This pipe flows by gravity from the headworks to the screw pumps. The line is currently fitted with a knife gate valve at the headworks, although the condition of that valve is unknown. To prevent dewatering of the primary clarifier to

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the screw pump influent gallery, it is recommended that either the primary clarifier be dewatered prior to removal of the screw pumps and control building, or the integrity of the valve isolating the headworks from the screw pumps be assured.

With the exception of the screw pump influent gallery, the control building and pumping room are essentially isolated from the remainder of the plant. Some piping may allow draining of water into the pump room. Particular attention must be paid to sludge return lines to the clarifiers as they may allow gravity flow from the clarifiers to the pump room through these lines, or they may siphon water and sludge from the clarifiers when opened. It is recommended that the clarifiers be dewatered prior to opening these pipes to prevent inadvertent dewatering of the clarifiers.

Permits and Regulatory Requirements

Refer to Section 4.0 for permitting and regulatory requirements.

Specialized Consultant or Construction Service Requirements

Abatement of asbestos-containing materials (as noted in Section 4.2) must be conducted prior to disturbing these materials and be performed by a qualified licensed asbestos abatement contractor.

Estimated Duration

The time estimated for the screw pumps and control building removal is approximately 5 days.

Estimated Cost

The estimated cost for the screw pumps and control building removal is $54,800. The estimated cost does not incorporate anticipated resale value or recyclable materials.

3.7 AERATION BASIN REMOVAL

Description

The aeration basin is located in the northwest corner of the site. The purpose of the aeration basin was to introduce air into the wastewater, increasing the oxygen content and improving the removal of pollutants. The basin has a 16” influent pipe from the

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screw pumps and a 16” effluent pipe that connects to the secondary clarifier. The aeration basin will need to be removed once the screw pumps and control building demolition activities are complete.

Location

See Keynote #6 on the Overall Site Plan in Appendix C.

Demolition, Removal, and Disposal Sequence

The aeration basin has water in it that will require removal prior to demolition. After the water has been removed, start demolition by removing the rotors, brushes, and concrete bridges at the top of the aeration basin. Then remove any interior piping or conduit, including the 12” to 16” influent diffuser. Following the removal of the rotors, interior piping, and metal railings, begin demolition and removal of the concrete structure. The remainder of the 16” influent pipe from the screw pumps can be removed at this time. Only remove the portion of the 16” effluent pipe necessary to allow removal of all of the concrete structure. The remainder of this pipe will be removed along with the secondary clarifier.

Approximately 50 linear feet of 16” pipe and 335 cubic yards of concrete will be removed during this portion of the project. Approximately 1,650 cubic yards of material will be required to backfill the structure and pipe trenches.

All materials that are produced as a result of the aeration basin removal will need to be disposed of in a locally approved waste facility. Refer to Section 4.2 for regulatory concerns related to the potential of hazardous materials.

Sequencing

The aeration basin receives influent from the screw pumps and discharges through an overflow weir to the secondary clarifier. Therefore, the aeration basin is essentially isolated hydraulically from the rest of the plant. This item may be removed out of sequence with no adverse effect to the remainder of the plant.

Permits and Regulatory Requirements

Refer to Section 4.0 for permitting and regulatory requirements.

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Specialized Consultant or Construction Service Requirements

No specialized service requirements are foreseen for the aeration basin removal.

Estimated Duration

The time estimated for the aeration basin removal is approximately 9 days.

Estimated Cost

The estimated cost for the aeration basin removal is $98,700. The estimated cost does not incorporate anticipated resale value or recyclable materials.

3.8 SECONDARY CLARIFIER REMOVAL

Description

The secondary clarifier is located in the northeast corner of the site beside the chlorine contact tank. The 66' diameter structure receives effluent from the aeration basin and discharges to the chlorine contact tank. The structure is constructed of reinforced concrete with steel weirs. Figure #14 in Appendix A shows a sectional view of the secondary clarifier, and Figure #15 in Appendix A shows the reinforcement of the walls and slab.

Sewage enters the secondary clarifier from the aeration basin through a 16" concrete pipe under the slab to the center of the clarifier. This 16" pipe also branches off to collect discharge from the screw pump. A 14" concrete return sludge line runs from the center of the clarifier to the screw pump influent gallery. A 6" diameter waste sludge line and drain runs from the sump in the clarifier to the pump room under the control building. The sump is hydraulically the lowest point of the secondary clarifier. Figure #16 in Appendix A shows the center sump.

Discharge from the secondary clarifier to the chlorine contact tank is via a perimeter weir and effluent gallery discharging into a sump. A 21" concrete pipe conveys secondary effluent to the flow measuring chamber in the chlorine contact tank.

Location

See Keynote #7 on the Overall Site Plan in Appendix C.

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Demolition, Removal, and Disposal Sequence

Dewater any remaining water in the secondary clarifier prior to removal of the concrete structure and piping. Dewatering should be accomplished from the center sump using a portable engine-driven trash pump and discharge hose to the existing lagoon.

After any remaining water has been removed from the clarifier, demolition can begin. Vegetation may need to be cleared from around the clarifier to allow sufficient access. Begin dismantling the secondary clarifier from the top down, removing all railing, piping, metalworks, and electrical components. Remove the existing metal bridge that runs from the outside of the clarifier to the center of the clarifier. When all the interior piping has been removed, the interior walls and weirs can be removed.

Following removal of all metal and piping inside the clarifier, the concrete outer walls and base can be demolished and removed. After excavations have begun, care shall be taken to plug the upstream end of the original 21” effluent line from the clarifier discharge to the outfall to prevent unwanted water or waste from draining into this line during the project.

At this time, the 16” influent, 14” concrete return sludge line, and a 6” diameter waste sludge line and drain can also be removed from the secondary clarifier to the aeration basin, screw pump and control room. The 16” pipe that connects the screw pumps to the pipe connecting the aeration basin and secondary clarifier should also be removed.

Approximately 175 linear feet of 16” pipe, 100 linear feet of 14”pipe, 75 linear feet of 6” pipe, 220 cubic yards of concrete, and associated metalworks and electrical components will be removed during this portion of the project. Approximately 1,875 cubic yards of material will be required to backfill the structure and pipe trenches.

All materials that are produced as a result of the secondary clarifier removal will need to be disposed of in a locally approved waste facility. Refer to Section 4.2 for regulatory concerns related to the potential of hazardous materials.

Sequencing

The secondary clarifier receives influent by gravity flow from the aeration basin and is therefore hydraulically lower in elevation. Discharge to the chlorine contact tank is via an overflow weir. Dewatering the clarifier will essentially remove water in the influent

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pipe to the clarifier. Sludge lines, however, run to the pump room in the control building and are likely sloping downhill to the pump room. It is recommended that the secondary clarifier be dewatered prior to opening pipes in the control building pump room to prevent draining of the clarifier into the pump room. However, removal of the secondary clarifier may be completed prior to removal of the control building without adverse effects to the remaining components on the site. Care should be taken when removing the discharge line from the secondary clarifier to the chlorine contact tank to prevent prematurely dewatering the chlorine contact tank.

Permits and Regulatory Requirements

Refer to Section 4.0 for permitting and regulatory requirements.

Specialized Consultant or Construction Service Requirements

No specialized service requirements are foreseen for the secondary clarifier removal.

Estimated Duration

The time estimated for the secondary clarifier removal is approximately 6 days.

Estimated Cost

The estimated cost for the secondary clarifier removal is $81,600. The estimated cost does not incorporate anticipated resale value or recyclable materials.

3.9 CHLORINE CONTACT BASIN REMOVAL

Description

The chlorine contact basin is located in the northeast corner of the site beside the secondary clarifier.

The chlorine contact tank included a flow measuring flume in the influent gallery where a 21” concrete pipe entered the tank form the secondary clarifier. Chlorine was injected into the secondary effluent immediately upstream of the flume. Water then travelled through four serpentine chambers for adequate mixing prior to discharge from the tank into a 30” concrete discharge pipe to the river.

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Ultraviolet disinfection equipment was installed in the last channel of the disinfection tank in the mid-1990's as part of plant modifications that also included a new jib crane and a new disinfection station adjacent to the screw pumps.

Location

See Keynote #8 on the Overall Site Plan in Appendix C.

Demolition, Removal, and Disposal Sequence

Dewater any remaining water in the chlorine contact basin prior to removal of the concrete structure and piping. After any remaining water has been removed from the basin, demolition can begin. Vegetation may need to be cleared from around the clarifier to allow sufficient access. Begin dismantling the chlorine contact basin from the top down, removing all railing, grates, metalworks, and electrical/UV equipment. Remove the existing jib crane that is located alongside the chlorine contact basin. Following removal of the metalworks, electrical/UV equipment, and crane, the interior concrete basin walls can be removed.

Following removal of the inner walls, the concrete outer walls and base can be demolished and removed. After excavations have begun, care shall be taken to plug the upstream end of the original 30" concrete pipe from the chlorine contact tank discharge to the outfall to prevent unwanted water or waste from draining into this line during the project.

A 10" corrugated steel pipe is located directly south of the chlorine contact basin and the pipe conveys stormwater drainage from west to east. This pipe and the 10" pipe downstream of it shall be removed along with the two stormwater catch basins that connect the pipes.

At this time, the 21" concrete pipe can be removed from the chlorine contact basin to the secondary clarifier. Next, remove the 12" ductile iron secondary clarifier bypass line that runs from the secondary clarifier to the primary clarifier. The 16" concrete effluent pipe that runs from the primary clarifier to the 21" effluent pipe of the secondary clarifier shall then be removed. Following the removal of the chlorine contact basin and associated pipes in the vicinity, the 30" concrete pipe, running from the contact basin to Sandy River, shall be removed. A portion of this 30" pipe from the river towards the treatment plant has already been removed, but the remainder of the pipe will need to be

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removed. Also at this time, the 24” and 30” concrete bypass pipes that flow from the primary clarifier to Sandy River should be removed along with the two manholes that are located on the lines. Finally, the 24” effluent pipe from the primary clarifier to the manhole located on the bypass line can be removed.

Approximately 110 linear feet of 10” pipe, 75 linear feet of 12” pipe, 55 linear feet of 16” pipe, 25 linear feet of 21” pipe, 180 linear feet of 24” pipe, 330 linear feet of 30” pipe, 210 cubic yards of concrete, two catch basins, two manholes, and associated metalworks will be removed during this portion of the project. Approximately 1,035 cubic yards of material will be required to backfill the structure and pipe trenches.

All materials that are produced as a result of the chlorine contact basin removal will need to be disposed of in a locally approved waste facility. Refer to Section 4.2 for regulatory concerns related to the potential of hazardous materials.

Sequencing

The chlorine contact tank is hydraulically lower than the secondary clarifier. Following dewatering of the chlorine contact tank, this item can be removed in any sequence without adverse effect to the remaining items on the site.

Permits and Regulatory Requirements

Refer to Section 4.0 for permitting and regulatory requirements.

Specialized Consultant or Construction Service Requirements

No specialized service requirements are foreseen for the chlorine contact basin removal.

Estimated Duration

The time estimated for the chlorine contact basin removal is approximately 10 days.

Estimated Cost

The estimated cost for the chlorine contact basin removal is $92,900. The estimated cost does not incorporate anticipated resale value or recyclable materials.

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3.10 PRIMARY AND SECONDARY DIGESTER REMOVAL

Description

In the early 1990's new anaerobic sludge digesters were designed and installed at the facility. Prior to this plant upgrade, sludge digestion was accomplished in the outer ring of the primary clarifier. The new digesters consisted of two 300,000 gallon digester tanks with floating covers, a gravity thickener, new pumps, boilers, and yard piping.

The upgrade allowed primary sludge to be drawn from the aerobic digester and pumped to the gravity thickener via the sludge pumps in the pump room. Waste activated sludge from the secondary clarifier was also pumped to the gravity thickener through the pump room. From the gravity thickener, sludge was pumped to heat exchangers on the boilers and then into the digesters. Prior to the installation of the sludge storage lagoon, digested sludge was pumped to transfer trucks at a sludge loading dock installed adjacent to the digester facility. Following installation of the lagoon, digested sludge was pumped to the lagoon and then from the lagoon to the sludge loading dock.

Between the digesters is a pump room housing pumps for digester feed, heat exchanger feed, and sludge loading. The pump room is located on the lower level, with the boilers located on the upper. Currently the lower level is filled with water to a depth of approximately 2'.

A gravity thickener is located immediately to the north of the digesters. Sludge from the primary and secondary clarifiers enters the gravity thickener via a 6" diameter ductile iron main from the control building pump room. The thickener has a 20' inside diameter and is constructed of 12' thick reinforced concrete walls.

Location

See Keynote #9 on the Overall Site Plan in Appendix C.

Demolition, Removal, and Disposal Sequence

Dewater any water in the digesters, gravity thickener, and heat exchange room/control room prior to removal of the concrete structures and piping. The heat exchange/control building contains two levels with the lower level being underground. The lower level is expected to be completely filled with water and this is a good location to begin

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dewatering activities. Dewatering should be accomplished using a portable engine-driven trash pump and discharge hose to the existing lagoon.

After any remaining water has been removed from the digesters and associated buildings, demolition can begin. Vegetation may need to be cleared from around the digesters to allow sufficient access. Begin dismantling the primary and secondary digester from the top down, removing all railing, piping, metalworks, and electrical components. This demolition should occur from the inside out and all interior walls, appurtenances, and metalworks should be removed before the outer walls. The gravity thickener, which is located directly north of the secondary digester, can now be removed. Dismantle the gravity thickener using the same methods as those used to dismantle the digesters. Next, remove the heat exchange/control building starting with the upper level and finishing with demolition of the lower level. All interior pipes, walls, metalworks, and electrical components should be removed in both levels of the heat exchange/control building prior to removing the outer walls and foundation.

Following removal of the digesters, heat exchange/control building, and gravity thickener, the concrete sludge loading dock located to the northeast of the primary digester can be removed. A catch basin located in the center of the loading dock will need to be removed along with a 12' tall metal pipe on the side of the dock.

At this time, the 6" ductile iron pipe, 6" concrete stormwater pipe, and 8" concrete stormwater pipe can also be removed. The 6" sludge loading supernatant ductile iron line runs along south and west sides of the digesters and connects to the sludge loading dock. The 6" ductile iron thickener/digester feed lines run to the northeast where they connect to the control building just east of the screw pumps. The 6" and 8" concrete stormwater pipes are located to the north of the digesters and flow from west to east. Two catch basins will need to be removed during the demolition of the stormwater pipes.

Approximately 560 linear feet of 6" ductile iron pipe, 35 linear feet of 6" concrete pipe, 170 linear feet of 8" concrete pipe, 705 cubic yards of concrete, three catch basins, and associated metalworks and electrical components will be removed during this portion of the project. Approximately 2,620 cubic yards of material will be required to backfill the structure and pipe trenches.

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All materials that are produced as a result of the secondary clarifier removal will need to be disposed of in a locally approved waste facility. Refer to Section 4.2 for regulatory concerns related to the potential of hazardous materials.

Sequencing

Nearly all of the influent and effluent from the digester facility is pumped either to the facility from the control building pump room or from the facility from the digester pump room. The pipes from the control building pump room may flow by gravity to the pump room floor when opened, and there is the chance that water may siphon through the control room pumps from the clarifiers if the clarifiers are not dewatered first. Should the decision be made to demolish the digester facility out of sequence, special care should be taken to isolate (close all valves) discharge lines in the control building pump room that lead to the digester facility. Following isolation of these lines, the digester facility may be removed in any sequence without disturbing the remaining items on the site.

Permits and Regulatory Requirements

Refer to Section 4.0 for permitting and regulatory requirements.

Specialized Consultant or Construction Service Requirements

No specialized service requirements are foreseen for the primary and secondary digester removal.

Estimated Duration

The time estimated for the primary and secondary digester removal is approximately 15 days.

Estimated Cost

The estimated cost for the primary and secondary digester removal is $203,900. The estimated cost does not incorporate anticipated resale value or recyclable materials.

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3.11 LAB BUILDING REMOVAL

Description

The existing laboratory building was constructed during the original plant installation in the early 1970's. The structure is a 33' square wood-framed building with a hip roof. The building houses office areas, a restroom, rotary blowers, a sludge pump, chlorine disinfection equipment, and laboratory space. A sludge loading area was located outside the building. A 6" cast iron pipe supplied sludge to the sludge pump from the digester in the primary clarifier. A 6" cast iron main carried discharge from the pump to the sludge loading area.

Location

See Keynote #10 on the Overall Site Plan in Appendix C.

Demolition, Removal, and Disposal Sequence

No dewatering should be needed prior to beginning demolition of the lab building. Demolition of the lab building will begin in the inside and end with demolition of the exterior walls, roofing, and the foundation. First, demolish all interior walls, appurtenances, and metalworks. Next, begin dismantling the lab building from the top down, removing all roofing, walls, framing, and the building foundation. The sludge loading dock which is located just to the southeast of the lab building can now be removed.

Finally, the 6" ductile iron pipes around the lab building can be removed. These pipes consist of a 6" airline and 6" sludge drawoff pipe to the primary clarifier along with a 6" pipe that ties the lab building and sludge loading dock to a manhole to the north.

Approximately 280 linear feet of 6" ductile iron pipe, 15 cubic yards of concrete, and associated metalworks and electrical components will be removed during this portion of the project. Approximately 50 cubic yards of material will be required to backfill the structure and pipe trenches.

All materials that are produced as a result of the lab building removal will need to be disposed of in a locally approved waste facility. Refer to Section 4.2 for regulatory concerns related to the potential of hazardous materials.

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Sequencing

The lab building may be removed in any sequence without disturbing the remaining items on the site.

Permits and Regulatory Requirements

Refer to Section 4.0 for permitting and regulatory requirements.

Specialized Consultant or Construction Service Requirements

No specialized service requirements are foreseen for the lab building removal.

Estimated Duration

The time estimated for the lab building removal is approximately 5 days.

Estimated Cost

The estimated cost for the lab building removal is $6,800. The estimated cost does not incorporate anticipated resale value or recyclable materials.

3.12 WASTE WATER MANAGEMENT SITE REMOVAL

Description

The Waste Water Management site was constructed in the mid-1980's to produce a commercial soil conditioning product from heavily chlorinated sludge. The main components of the facility requiring demolition are the above-ground steel storage tanks and foundations, the operations building and concrete floor, and the concrete drying beds. Miscellaneous piping and storage shed structures are also present on the site.

The steel tanks on the site are both 35' in diameter and constructed of welded steel. The tanks are approximately 12' high and have a steel dome cover. Foundation information is unavailable. Two 4" PVC lines run from the water storage tank, one each to the drying beds and the dump station. A 6" ductile iron main supplies filtrate from the drying bed to the tank. The Sludge storage tank has two 6" ductile iron lines running from the dump stations. Sludge was supplied to the Purifax units from the sludge storage tank via a 6" PVC line.

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The operations building and dump stations occupy a roughly 50’ x 100’ area in the center of the site. The dump stations are constructed of concrete and include a concrete pad where transfer trucks parked to discharge sludge into the system, a grated dumping gallery at each dump station, a holding tank, and discharge piping to the sludge storage tank. The sidewalls of the drying beds are cast-in-place concrete, and are likely unreinforced. The floor of the beds is constructed of 2” asphalt over 6” crushed rock. A 1,250 gallon holding tank below the first bed collects filtrate water for each bed. A submersible pump delivers collected water to the water storage tank. The drying bed area is approximately 100’ x 60’.

Location

See Keynote #11 on the Overall Site Plan in Appendix C.

Demolition, Removal, and Disposal Sequence

Dewater any water in the operations building, filtrate storage tank, sludge tank, and all other underground tanks/enclosures prior to removal of the concrete structures and piping. Dewatering should be accomplished using a portable engine-driven trash pump and discharge hose to the existing lagoon.

After any remaining water has been removed, demolition can begin. Vegetation may need to be cleared from the site to allow sufficient access. Begin dismantling the above ground filtrate and storage tanks from the top down, removing all railing, piping, metalworks, and electrical components. This demolition should occur from the inside out and all interior walls, appurtenances, and metalworks should be removed before the outer walls. The operations building which is located in the center of the site can now be removed. All interior pipes, walls, metalworks, and electrical components should be removed in the operations building prior to removing the outer walls and foundation. Next, remove the two concrete pads located to the west and northeast of the operations building along with the two dumping stations and the underground holding tank. The dumping stations and underground holding tank are located in the center of the concrete pad directly west of the operations building. At this time, all of the wooden storage sheds located on the north part of the site should be removed.

Following removal of the operations building and storage tanks, the drying beds located on the south part of the site can be removed. The concrete side walls should be removed first and then the asphaltic concrete floor layer should be removed. During

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removal of the drying beds floor, the 72' receiving trough and associated receiving tank with pump should be removed. Two catch basins located to the west of the drying beds should be removed next.

At this time, the 6" ductile iron pipe and 6" PVC pipe on the site can also be removed. These 6" pipes are located throughout the site and connect the operations building to the filtrate storage tank, drying beds, sludge tank, and underground holding tank. Additional smaller pipes are located throughout the site and interconnect to the operations building, drying beds, and storage/sludge tanks. These pipes should be removed as they are encountered.

Approximately 165 linear feet of 6" ductile iron pipe, 190 linear feet of 6" PVC pipe, 470 cubic yards of concrete, two catch basins, and associated metalworks and electrical components will be removed during this portion of the project. Approximately 850 cubic yards of material will be required to backfill the structure and pipe trenches.

All materials that are produced as a result of the secondary clarifier removal will need to be disposed of in a locally approved waste facility. Please refer to Section 4.2 for regulatory concerns related to the potential of hazardous materials.

Sequencing:

The Waste Water Management site may be removed in any sequence without disturbing the remaining items on the site.

Permits and Regulatory Requirements

Refer to Section 4.0 for permitting and regulatory requirements.

Specialized Consultant or Construction Service Requirements

Abatement of asbestos-containing materials (as noted in Section 4.2) must be conducted prior to disturbing these materials and be performed by a qualified licensed asbestos abatement contractor.

Estimated Duration

The time estimated for the WWM site removal is approximately 15 days.

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Estimated Cost

The estimated cost for the WWM site removal is $122,600. The estimated cost does not incorporate anticipated resale value or recyclable materials.

3.13 LAGOON REMOVAL

Description

During the original design of the plant in the early 1970's, sludge storage was accomplished in two humus ponds located west of the treatment plant site. These ponds were abandoned at some time during the life of the facility, however this date is unknown. The lagoon currently found on the southern portion of the site was designed in the 1993 as part of the Phase II plant improvement project. The lagoon is approximately 245' x 215' and is approximately 18' deep at its deepest point. Weeds and debris have invaded the edges of the lagoon, and the current level appears to be about 2' below the operating level of the lagoon. Since the lagoon is holding water, it is assumed that the integrity of the liner is sound below the current water level. During the demolition of the facility, dewatering will be accomplished by pumping to the lagoon. The lagoon has a total volume of 3,611,895 gallons (482,840 cubic feet) and approximately 1,805,950 gallons (241,420 cubic feet) of available storage above the current water level. An expected volume of approximately 1,545,290 gallons (206,575 cubic feet) of water will result from dewatering activities on the site. With the concurrence of the City, decanted water can be slowly pumped to a nearby sewer.

Location

See Keynote #12 on the Overall Site Plan in Appendix C.

Demolition, Removal, and Disposal Sequence

Demolition of the lagoon should begin with pumping decanted water that is in the lagoon into a nearby sewer. This should only occur with approval of the City. Once the lagoon has been pumped dry, the inlet, outlet, and other perimeter structures around the lagoon should be removed. Following this, remove the concrete tethering anchors on the north and south side of the lagoon. Once the anchors have been removed, the HDPE liner and gunnite ballast cover along the bottom of the lagoon should be

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removed. Next, remove the concrete barge landing that serves as the entrance to the lagoon.

Following removal of the lagoon liner, barge landing, and structures, the ductile iron pipes at the site will need to be removed. Begin by removing the 4” ductile iron sludge lines that run from the lagoon towards the digesters and loading dock. Next, the 8” ductile iron gravity overflow pipe that runs from the lagoon to near the digester sludge loading dock should be removed.

Approximately 260 linear feet of 4” ductile iron pipe, 250 linear feet of 8” ductile iron pipe, and 30 cubic yards of concrete will be removed during this portion of the project. Approximately 19,705 cubic yards of material will be required to backfill the lagoon, structure, and pipe trenches.

Sequencing

While from a hydraulic standpoint the lagoon may be removed at any time during the demolition process, we have identified the lagoon as a storage location for waste water from the dewatering process for nearly all demolition items on the site. Should demolition of the lagoon be initiated out of sequence, careful consideration must be given to dewatering activities for the remainder of items on the site. Discharge of water directly to the sanitary sewer is an option, as is collection and hauling to a suitable processing facility. Any sludge remaining in the lagoon should be pumped to a transfer truck and taken to a sludge processing facility for disposal.

Permits and Regulatory Requirements

Refer to Section 4.0 for permitting and regulatory requirements.

Specialized Consultant or Construction Service Requirements

No specialized service requirements are foreseen for the lagoon removal.

Estimated Duration

The time estimated for the lagoon removal is approximately 15 days.

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Estimated Cost

The estimated cost for the lagoon removal is $248,200. The estimated cost does not incorporate anticipated resale value or recyclable materials.

3.14 REMOVAL OF UNDERGROUND PIPES (THROUGHOUT PROJECT)

Description

In addition to the pipes mentioned above, small waterlines and drain lines (1" to 8" diameter) will be encountered throughout this project and should be removed to the greatest extent practicable when encountered. Several existing underground pipes are to remain including:

- the 8" and 6" waterlines that connect to the existing fire hydrant on site;
- the sewer main that enters the site from the south, turns west at the manhole at the southeast corner of the lagoon, and then continues north; and
- the existing 30" and 60" storm drainage pipes the enter the site from the north and turn east toward the river.

The contractor should coordinate closely with the City during this phase to avoid removing underground pipes that are still in use.

Location

Underground pipe removal will occur throughout the entire site. See Keynote #13 on the Overall Site Plan in Appendix C.

Demolition, Removal, and Disposal Sequence

On-site pipes (1" to 8" diameter) should be removed as they are encountered during the demolition and removal activities detailed above. These lines should be removed to the greatest extent practical whenever encountered. The 8" and 6" waterlines that connect to the existing fire hydrant on the site, the large sewer main that enters the site from the south, and the large storm drainage pipes that convey drainage from off-site should all remain in place.

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All materials that are produced as a result of the underground pipe removal will need to be disposed of in a locally approved waste facility. Refer to Section 4.2 for regulatory concerns related to the potential of hazardous materials.

Permits and Regulatory Requirements

Refer to Section 3.0 for permitting and regulatory requirements.

Specialized Consultant or Construction Service Requirements

No specialized service requirements are foreseen for the underground pipe removal.

Estimated Duration

The time estimated for the underground pipe removal is approximately 10 days.

Estimated Cost

The estimated cost for the underground pipe removal is $35,000. The estimated cost does not incorporate anticipated resale value or recyclable materials.

3.15 PAVEMENT REMOVAL, FINISHED GRADING, AND GROUND STABILIZATION

Description

Existing pavement that is remaining after the demolition of all pipes and structures will need to be removed from the site. The project site contains approximately 85,070 square feet (1.95 acres) of pavement. In addition to removing pavement, other remaining items on the site should be removed at this time. This includes, but is not limited to, concrete pads, light posts, curbs, fencing, etc. The areas on the site, where existing pavement or other items have been removed and where disturbed areas remain, need to be graded and seeded. During demolition and removal activities, the contractor should make an effort to stockpile and preserve good topsoil from the site so that this topsoil can be re-used when final grades are achieved. Following the demolition and removal activities listed above, any remaining disturbed, uneven, or un-stabilized areas on the site will need to be uniformly graded and seeded with a grass species native to the site location. Existing trees on the site should be preserved whenever possible. Final grading of disturbed areas should provide shallow uniform

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slopes that allow for overland drainage that meets the existing drainage patterns on the site.

Location

Pavement removal, finished grading, and ground stabilization will occur throughout the entire site. See Keynote #12 on the Overall Site Plan in Appendix C.

Pavement Removal, Finished Grading, and Stabilization Sequence

Remove any pavement and associated curbs that are remaining on the site and dispose of offsite. All debris such as rocks, stumps, wood, building debris, and rubble should be removed from the soil during final grading activities. Any topsoil that was stockpiled during demolition activities should be replaced after demolished areas have reached final grade. Additional topsoil may need to be brought to the project site to ensure that planted areas have a suitable growth medium. Graded areas will need to be prepared for seeding by tilling or ripping the topsoil using a ripper, harrow, chisel plow, or similar method. Once the soil has been scarified, the soil should be fertilized, planted with native grassy vegetation, and mulched. Areas with existing trees on the site should be preserved wherever conditions allow. Regular watering may be required until vegetation on the site has become fully established.

Approximately 1,050 cubic yards of pavement will be removed during this portion of the project. Approximately 1,050 cubic yards of material will be required to backfill the previously paved areas.

All materials that are produced as a result of the pavement removal will need to be disposed of in a locally approved waste facility. In addition, any other waste materials resulting from demolition activities should be removed from the site at this time. All areas that were disturbed as a result of mobilizing construction equipment or creating stockpiles shall be returned to a uniform grade and seeded.

Permits and Regulatory Requirements

Refer to Section 4.0 for permitting and regulatory requirements.

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Specialized Consultant or Construction Service Requirements

A specialized landscape contractor may be used to perform the final vegetative stabilization of the site.

Estimated Duration

The time estimated for the pavement removal, finished grading, and stabilization is approximately 25 days.

Estimated Cost

The estimated cost for the pavement removal, finished grading, and stabilization is $412,800. The estimated cost does not incorporate anticipated resale value or recyclable materials.

3.16 MAINTENANCE BUILDING REMOVAL

Description

The existing maintenance building was constructed during the treatment upgrades in the mid-1990's. The building is a 100' x 60' metal-framed structure with metal siding and a pitched, metal roof that sits on a 6" reinforced concrete slab with reinforced concrete footings for the metal columns. The building has three 25' wide maintenance bays, a 25' wide work area, a wood-framed compressor room, a wood-framed bathroom, and an exterior loading dock.

Location

See Keynote #15 on the Overall Site Plan in Appendix C.

Demolition, Removal, and Disposal Sequence

No dewatering should be needed prior to beginning demolition of the maintenance building. Demolition of the lab building will begin in the inside and end with demolition of the exterior walls, roofing, and the foundation. First, demolish all interior walls, appurtenances, and metalworks. Next, begin dismantling the maintenance building from the top down, removing all roofing, walls, framing, and the building foundation.

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Approximately 342 cubic yards of concrete and associated metalworks and electrical components will be removed during this portion of the project. Approximately 644 cubic yards of material will be required to backfill the foundation.

All materials that are produced as a result of the maintenance building removal will need to be disposed of in a locally approved waste facility. Please refer to Section 4.2 for regulatory concerns related to the potential of hazardous materials.

Sequencing

The maintenance building may be removed in any sequence without disturbing the remaining items on the site. However, it may be advantageous to use the maintenance building as a staging and storage facility during demolition of other components.

Permits and Regulatory Requirements

Refer to Section 4.0 for permitting and regulatory requirements.

Specialized Consultant or Construction Service Requirements

No specialized service requirements are foreseen for the maintenance building removal.

Estimated Duration

The time estimated for the maintenance building removal is approximately 7 days.

Estimated Cost

The estimated cost for the lab building removal is $88,000. The estimated cost does not incorporate anticipated resale value or recyclable materials.

3.17 DEMOLITION SUMMARY

Estimated Duration

The time estimated for demolition and restoration of the entire STP site is approximately 142 days.

Estimated Cost

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The estimated cost for demolition and restoration of the entire STP site is $1,566,700. The estimated cost does not incorporate anticipated resale value or recyclable materials.

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4.0 PERMITTING AND REGULATORY REQUIREMENTS

4.1 PERMITTING REQUIREMENTS

Permitting requirements were evaluated among the applicable state and local agencies. The permits identified for the STP Demolition include an Erosion Control Permit and a Demolition Permit, both of which are issued by the City of Troutdale. The requirements for these permits are described below.

Erosion Control Permit

Total disturbance for demolition and restoration of the entire site will be approximately eight acres. A National Pollutant Discharge Elimination System (NPDES) Stormwater Discharge Permits (Erosion Control Permits) are required for sites disturbing more than one acre of land. The City of Troutdale administers the Erosion Control Permit process. The permittee will be required to submit a 1200-C Stormwater Discharge Permit Application and an Erosion and Sediment Control Plan (ESCP) to the City of Troutdale Public Works Permit Specialist. The application form can be obtained from the Oregon Department of Environmental Quality (DEQ) website at the following address.

http://www.deq.state.or.us/wq/stormwater/constappl.htm

The above address contains guidance related to the application and the ESCP. The permittee is also encouraged to coordinate with the City Permit Specialist. Additional responsibilities for the permittee include:

- implementing the erosion control Best Management Practices (BMPs) in the ESCP according to sequence of construction events;
- revising the ESCP and submit the revisions to the City if there are changes to project design, conditions, schedule, BMPs, or other elements of the project;
- visually inspecting BMPs daily when stormwater runoff, including runoff from snowmelt, is occurring and at least once every two weeks, regardless of whether stormwater runoff is occurring; and
- documenting all monitoring and inspections, and keep documentation on-site and updated.

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The City of Troutdale anticipates approximately 30 days for administration of the Erosion Control Permit process. For sites over five acres, DEQ will be required to review the application and ESCP for a period of 14 days and post the application for public comment for a period of 14 days. The coordination with DEQ may extend the overall process time frame with the City.

The permittee may wish to break the project up into smaller areas for demolition and restoration. The City of Troutdale requires a Site Development Permit for sites that disturb less than one acre. However, DEQ may still view the smaller projects as part of a larger plan of development that ultimately disturbs more than one acre and, therefore, would require an Erosion Control Permit. If the permittee wishes to pursue permitting smaller areas, Kleinfelder recommends coordination with the City and DEQ.

Demolition Permit Process

A Demolition Permit will be required from the City of Troutdale Building Safety Department. The demolition may be permitted by component or by the entire site. The application form can be obtained from the City of Troutdale website at the following address.

http://www.ci.troutdale.or.us/building/documents/demolition.pdf

The permit fee is based on the value of the demolition per the fee schedule on the application with the fee not to exceed $20,000. The City of Troutdale anticipates approximately 14 days for administration of the Demolition Permit process. The application and a demolition plan are required for submittal, and this report may suffice as the demolition plan.

The City will require that the Erosion Control Permit is approved prior to issuance of the demolition permit, and the erosion and sediment control BMPs will be required to be installed prior to commencement of demolition.

4.2 REGULATORY REQUIREMENTS

In 2006, Kleinfelder conducted Phase I and II Environmental Site Assessments (ESAs) and a Hazardous Building Material Survey on the STP property. Those reports are on file in the City of Troutdale Public Works Department and included in PDF format in Appendix F of the digital version of this report.

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Hazardous materials found on site include asbestos-containing materials (ACMs) and lead-containing paint and may potentially include mercury-containing-fixtures and PCB-containing fixtures. Regulatory requirements associated with these materials are described below.

Asbestos-containing Materials

Asbestos was detected in floor tile (5%) and mastic (10%) in the control building. The materials are considered in good condition and non-friable. Additionally, a sample of an exposed gasket on a flange of one of the aboveground storage tanks adjacent to the former Wastewater Management Site contained 65% asbestos. The gasket is considered friable. The floor tile and mastic and the asbestos-containing gaskets at the site must be removed prior to the renovation or demolition.

Notification of the presence of ACMs to the employees and sub-contractors is required under Hazard Communication regulation (29 CFR 1926.59) and the Occupational Exposure to Asbestos Final Rule (29 CFR 1910.1001), as long as there are ACMs in the building. The burden of the notification is on the building owner and facility operator. In addition, the persons mentioned above must be notified of the presence and location of ACMs; the health risk related to asbestos; and work activities to avoid because asbestos is located in the work place. This can be provided by an Asbestos Awareness two-hour training class.

Prior to demolition of the control building, an asbestos abatement plan (Project Specification) must be developed by a certified asbestos project designer in accordance with federal regulations. Abatement of the ACMs must be conducted prior to disturbing these materials and be performed by a qualified licensed asbestos abatement contractor. Additionally, the abatement contractor must manage the ACMs in accordance with Oregon-OSHA, U.S. EPA, and the Oregon DEQ regulations. If un-sampled building materials are encountered during future construction activities, they must be considered to be ACMs until testing proves otherwise. Handling of un-sampled building materials must be conducted as if they were ACMs.

Drywall/joint compound wall systems with a trace amount of asbestos (<1%) are not considered asbestos-containing building materials by U.S. EPA or Oregon DEQ. Cutting the wallboard should be avoided. However, Oregon and Federal OSHA do not allow compositing results across building material layers, even for wallboard systems.

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Thus, wallboard sample results that have greater than 1% asbestos in any individual layer are regulated by OSHA, and these materials may require full abatement prior to renovation or demolition.

Lead-containing Paint

Lead was detected in 9 out of 24 paint coating samples collected from the predominant interior and exterior paint coatings. The detectable concentrations ranged from 70 to 500 mg/kg lead. The highest lead result was for a paint chip sample of exterior green paint that contained 500-mg/kg lead. The lead-containing paints on the site buildings were considered to be in good condition and well adhered to the substrate.

The U.S. Occupational Safety and Health Administration (OSHA) recognizes the painted surfaces as lead-containing; therefore, they must be handled accordingly. If these materials are left in their present state and undisturbed, they are not expected to present a health hazard. If renovation, remodeling, or demolition requires disturbing any of the lead-containing paint or if the lead-containing painted surfaces are to be removed, then the materials must be managed by a qualified licensed contractor. Additionally, the contractor must manage the lead-containing paint in accordance with OSHA, U.S. EPA, and any state or local regulations that are applicable to lead paint abatement projects.

Demolition of the site buildings with the lead-containing paint is generally permissible if:

- basic engineering dust controls are employed during demolition;
- the contractor is notified and is using notified and properly trained personnel;
- a waste characterization sample is collected of the paint and substrate (core) and analyzed by TCLP lead analysis and shown to be less than the hazardous waste characteristic of 5 mg/l; and
- a Subtitle D permitted landfill with a composite liner and leachate collection system may exercise the DEQ Policy 97-PO-002A that allows acceptance of building debris with lead-containing paint without TCLP lead analysis.

The demolition contractor is responsible for determining the appropriate level of training and medical monitoring for their employees. Notification of the presence of lead-containing paint coatings to employees, sub-contractors, and building owners is

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required under Hazard Communication regulation (29 CFR 1926.59). Disturbance of lead-containing paint coatings should be avoided. Activities to avoid include: sanding, grinding, heat application, etc. Deteriorating/delaminating paint on the site building must be properly abated, packaged, and disposed as lead-containing paint waste. The OSHA Lead in Construction Standard (29 CFR 1926.62) is applicable, which includes information on when medical surveillance for employees is required. A licensed qualified contractor must manage the lead-containing paint in accordance with OSHA, U.S. EPA, state, or local regulations that are applicable to lead paint abatement projects.

Kleinfelder recommends that the contractor pre-arrange disposal of the construction and demolition waste with an appropriate landfill that is notified about the lead-containing paint. Kleinfelder further recommends that engineering controls be implemented to control dust, and potentially, release of lead dust to the environment.

Mercury-containing Fixtures

The thermostats in the site buildings may potentially contain mercury switches. Additionally, approximately 100 fluorescent light tubes were identified as having the potential to contain mercury. The mercury switches and light tubes can be recycled and considered “universal waste” rather than hazardous waste.

Kleinfelder recommends removal of the mercury switches and light tubes within the site buildings for recycling as “universal waste” prior to building demolition.

PCB-containing Fixtures

Light ballasts that are not labeled as “non-PCB” must be assumed to contain PCBs and must be disposed as Toxic Substance Control Act (TSCA) waste at an appropriate facility. Approximately 50 fluorescent light fixture ballasts were identified as having the potential to contain PCBs.

Kleinfelder recommends that the abatement contractor or demolition contractor dismantle each of the fluorescent light fixtures after they are de-energized to look for “non-PCB” labels. If there are any ballast labels that do not have “non-PCB” or “does not contain PCBs,” then the ballasts must be packaged for transportation and disposal as TSCA waste at an appropriate facility. The ballast should be removed from the light fixture to reduce the quantity of material for disposal.

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5.0 REUSABLE/RECYCLABLE MATERIALS

We have inspected the components of the plant with an eye toward reuse or recycling of materials to the extent possible. Possible reuse and recycling opportunities exist with demolition material being used for fill, recycling of asphalt and miscellaneous metals, and reuse of equipment found at the site.

Demolition material can be used as fill in certain circumstances. Often we see demolition rubble used in land reclamation projects. Frequently, demolition rubble causes problems as fill materials when compaction issues arise, or the material is encountered during the redevelopment of the property causing difficulties in installing pilings, foundations, or utilities. There is a large volume of reinforced concrete available on the site, and the majority of the material does not appear to be compromised with hazardous coatings. For any of the reinforced concrete to be used as fill materials, we would recommend that the concrete be broken into small (<6" diameter) pieces and the reinforcement removed. This will likely add to the overall cost of the demolition. Where hauling fees to a landfill are estimated at $100 per ton, reducing the concrete to small pieces and removing rebar will likely increase that cost significantly. A dust control plan needs to be considered for any concrete demolition activity, especially when mechanical crushing and screening equipment is used.

Asphalt recycling is a standard practice for nearly all asphalt producers. Stripping or milling asphalt and trucking to an asphalt plant should be considered standard practice. We estimate over 200 tons of asphalt available on the site for recycling.

Miscellaneous metals are abundant on the site including railings, gratings, steel piping, conduit, and wiring. All of these materials are readily recyclable. We estimate in excess of 50 tons of recyclable metals are available on the site.

Unfortunately, we see little availability for the existing equipment to be reused. Most of the equipment pre-dates the 1990's making the equipment over 22 years old. The design life of this type of equipment is typically 25 years, so even the newest equipment on the site is nearing the end of its design life.

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6.0 ODOR CONTROL

It is likely that sewer and settled sludge found in the bottom of the clarifiers, digesters, and in pipes may produce foul odors. Exposing settled sludge in the lagoon may also create problems with odors from neighboring properties and businesses. Due to the proximity of several stores and restaurants to the former STP site, special attention will need to be given to minimizing the sources of odors and to the treatment of them should an odor problem develop.

For the planned demolition of the site, it will be a requirement of the contractor that an odor control plan be developed and approved prior to commencing demolition activities on the site. We recommend that an odor control plan focus on prevention, monitoring, and mitigation. The following shall be regarded as a minimum effort for the containment of odors on the site.

Prevention

Prevention is regarded as the first and best defense against release of odors from the site. Careful consideration of the sources of odors will be essential to successfully preventing them. Experience gained as the demolition activities progress across the site will yield valuable information to the location and likelihood of potential odorous materials.

Where possible, sludge and potentially odorous materials should be pumped directly to the sewer or to a transfer truck for disposal and not to the lagoon. In the case of dewatering clarifiers or other large volumes, it is recommended that surface waters be discharged into the lagoon. If sludge is encountered, it should be pumped to the sewer or to a transfer truck for disposal and not to the lagoon.

Waters pumped to the lagoon should be pumped in such a manner that the discharge into the lagoon does not promote mixing of stratified water within the lagoon. In no case should water be allowed to splash into the lagoon. Water discharged into the lagoon shall enter the lagoon below the existing water surface. When dewatering the lagoon, an undisturbed blanket of water shall remain above any sludge layer.

When dewatering pipes, a pit shall be excavated below the joint or section to be opened for dewatering. The pit shall be appropriately lined. Should the material in the pipe

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contain nuisance odors, the material shall be pumped directly to the sewer or to a transfer truck for disposal and not to the lagoon.

Where possible, dewatering of pipes may be completed in a closed space. In the case of the screw pump control building and the digester pump room, pipes may be opened and allowed to empty into the floor sump. Should the material in the pipes contain nuisance odors, the material shall be pumped directly to the sewer or to a transfer truck for disposal and not to the lagoon. Hydrogen Sulfide and oxygen levels shall be monitored at all times when emptying pipes into an enclosed space. Adherence to confined space entry requirements may become necessary.

The lagoon shall be slowly and carefully dewatered. In no case shall the lagoon be mixed or agitated. When the water level above any sludge blanket reaches 2', the sludge blanket shall be removed by pumping to a transfer truck for disposal. Decanted water shall be discharged to the sewer or, with appropriate treatment and necessary permitting and approvals, to the river.

Monitoring

At all times during the course of the demolition, the site and surrounding areas shall be monitored for the presence on nuisance odors. The public should be invited to participate, with a response number available to report nuisance odors. The contractor shall have a response plan and team available to respond to complaints or notification of the presence of nuisance odors.

Mitigation

Should a situation develop where nuisance odors are released from the site that significantly affect neighboring residents and businesses, appropriate treatment shall be immediately implemented. Treatment options include dosing the affected areas with lime or disinfectant. The contractor shall have an adequate supply of lime or a supply of disinfectant (hypochlorite) to treat the largest volume affected to maintain a residual disinfectant level of 5 mg/l.

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7.0 PUBLIC AWARENESS

Engaging the public on this project will be essential to its success. Prior to commencement of demolition activities, Kleinfelder recommends that a public awareness plan be implemented to educate and inform the public of the proposed demolition activities. Anticipated concerns of the public will be noise generated by the activities and construction traffic to and from the site. As part of the public awareness plan, we recommend:

- notification through a newspaper or other means;
- informational flyers delivered to the adjacent outlet mall tenants;
- limitations set on working hours to conform to the City's noise ordinance; and
- a construction traffic plan to allow construction vehicles to access the site with minimal disturbance to the outlet mall and other public.

The public awareness plan should also include a discussion of the potential for nuisance odors generated by the demolition activities on the site. Discussing the potential for nuisance odors might bring swift negative reaction from the neighboring public. However, educating the public to the planned demolition activities and the possible sources of odors, enlisting their participation in monitoring for odors, and implementing a response mechanism in the event that nuisance odors are detected will give the public a participatory role in managing the potential adverse effects of the project on their activities.

A successful public awareness plan will limit potential public outcry during demolition activities and aid in demonstrating the benefits of the project once it is completed.

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Important Information About Your Geoenvironmental Report

Geoenvironmental studies are commissioned to gain information about environmental conditions on and beneath the surface of a site. The more comprehensive the study, the more reliable the assessment is likely to be. But remember: Any such assessment is to a greater or lesser extent based on professional opinions about conditions that cannot be seen or tested. Accordingly, no matter how many data are developed, risks created by unanticipated conditions will always remain. *Have realistic expectations.* Work with your geoenvironmental consultant to manage known and unknown risks. Part of that process should already have been accomplished, through the risk allocation provisions you and your geoenvironmental professional discussed and included in your contract's general terms and conditions. This document is intended to explain some of the concepts that may be included in your agreement, and to pass along information and suggestions to help you manage your risk.

Beware of Change; Keep Your Geoenvironmental Professional Advised

The design of a geoenvironmental study considers a variety of factors that are subject to change. Changes can undermine the applicability of a report's findings, conclusions, and recommendations. *Advise your geoenvironmental professional about any changes you become aware of.* Geoenvironmental professionals cannot accept responsibility or liability for problems that occur because a report fails to consider conditions that did not exist when the study was designed. Ask your geoenvironmental professional about the types of changes you should be particularly alert to. Some of the most common include:

- modification of the proposed development or ownership group,
- sale or other property transfer,
- replacement of or additions to the financing entity,
- amendment of existing regulations or introduction of new ones, or
- changes in the use or condition of adjacent property.

Should you become aware of any change, *do not rely on a geoenvironmental report.* Advise your geoenvironmental professional immediately; follow the professional's advice.

Recognize the Impact of Time

A geoenvironmental professional's findings, recommendations, and conclusions cannot remain valid indefinitely. The more time that passes, the more likely it is that important latent changes will occur. *Do not rely on a geoenvironmental report if too much time has elapsed since it was completed.* Ask your environmental professional to define "too much time." In the case of Phase I Environmental Site Assessments (ESAs), for example, more than 180 days after submission is generally considered "too much."

Prepare To Deal with Unanticipated Conditions

The findings, recommendations, and conclusions of a Phase I ESA report typically are based on a review of historical information, interviews, a site "walkover," and other forms of noninvasive research. When site subsurface conditions are not sampled in any way, the risk of unanticipated conditions is higher than it would otherwise be.

While borings, installation of monitoring wells, and similar invasive test methods can help reduce the risk of unanticipated conditions, *do not overvalue the effectiveness of testing.* Testing provides information about actual conditions only at the precise locations where samples are taken, and only when they are taken. Your geoenvironmental professional has applied that specific information to develop a general opinion about environmental conditions. *Actual conditions in areas not sampled may differ (sometimes sharply) from those predicted in a report.* For example, a site may contain an unregistered underground storage tank that shows no surface trace of its existence. *Even conditions in areas that were tested can change,* sometimes suddenly, due to any number of events, not the least of which include occurrences at

adjacent sites. Recognize, too, that *even some conditions in tested areas may go undiscovered,* because the tests or analytical methods used were designed to detect only those conditions assumed to exist.

Manage your risks by retaining your geoenvironmental professional to work with you as the project proceeds. Establish a contingency fund or other means to enable your geoenvironmental professional to respond rapidly, in order to limit the impact of unforeseen conditions. And to help prevent any misunderstanding, identify those empowered to authorize changes and the administrative procedures that should be followed.

Do Not Permit Any Other Party To Rely on the Report

Geoenvironmental professionals design their studies and prepare their reports to meet the specific needs of the clients who retain them, in light of the risk management methods that the client and geoenvironmental professional agree to, and the statutory, regulatory, or other requirements that apply. The study designed for a developer may differ sharply from one designed for a lender, insurer, public agency...or even another developer. *Unless the report specifically states otherwise, it was developed for you and only you.* Do not unilaterally permit any other party to rely on it. The report and the study underlying it may not be adequate for another party's needs, and you could be held liable for shortcomings your geoenvironmental professional was powerless to prevent or anticipate. Inform your geoenvironmental professional when you know or expect that someone else—a third-party—will want to use or rely on the report. *Do not permit third-party use or reliance until you first confer with the geoenvironmental professional who prepared the report.* Additional testing, analysis, or study may be required and, in any event, appropriate terms and conditions should be agreed to so both you and your geoenvironmental professional are protected from third-party risks. *Any party who relies on a geoenvironmental report without the express written permission of the professional who prepared it and the client for whom it was prepared may be solely liable for any problems that arise.*

Avoid Misinterpretation of the Report

Design professionals and other parties may want to rely on the report in developing plans and specifications. They need to be advised, in writing, that their needs may not have been considered when the study's scope was developed, and, even if their needs were considered, they might misinterpret geoenvironmental findings, conclusions, and recommendations. *Commission your geoenvironmental professional to explain pertinent elements of the report to others who are permitted to rely on it, and to review any plans, specifications or other instruments of professional service that incorporate any of the report's findings, conclusions, or recommendations.* Your geoenvironmental professional has the best understanding of the issues involved, including the fundamental assumptions that underpinned the study's scope.

Give Contractors Access to the Report

Reduce the risk of delays, claims, and disputes by giving contractors access to the full report, *providing that it is accompanied by a letter of transmittal that can protect you* by making it unquestionably clear that: 1) the study was not conducted and the report was not prepared for purposes of bid development, and 2) the findings, conclusions, and recommendations included in the report are based on a variety of opinions, inferences, and assumptions and are subject to interpretation. Use the letter to also advise contractors to consult with your geoenvironmental professional to obtain clarifications, interpretations, and guidance (a fee may be required for this service), and that—in any event—they should conduct additional studies to obtain the specific type and extent of information each prefers for preparing a bid or cost estimate. Providing access to the full report, with the appropriate caveats, helps prevent formation of adversarial attitudes and claims of concealed or differing conditions. If a contractor elects to ignore the warnings and advice in the letter of transmittal, it would do so at its own risk. Your geoenvironmental professional should be able to help you prepare an effective letter.

Do Not Separate Documentation from the Report

Geoenvironmental reports often include supplemental documentation, such as maps and copies of regulatory files, permits, registrations, citations, and correspondence with regulatory agencies. If subsurface explorations were performed, the report may contain final boring logs and copies of laboratory data. If remediation activities occurred on site, the report may include: copies of daily field reports; waste manifests; and information about the disturbance of subsurface materials, the type and thickness of any fill placed on site, and fill placement practices, among other types of documentation. *Do not separate supplemental documentation from the report. Do not, and do not permit any other party to redraw or modify any of the supplemental documentation for incorporation into other professionals' instruments of service.*

Understand the Role of Standards

Unless they are incorporated into statutes or regulations, standard practices and standard guides developed by the American Society for Testing and Materials (ASTM) and other recognized standards-developing organizations (SDOs) are little more than aspirational methods agreed to by a consensus of a committee. The committees that develop standards may not comprise those best-qualified to establish methods and, no matter what, no standard method can possibly consider the infinite client- and project-specific variables that fly in the face of the theoretical "standard conditions" to which standard practices and standard guides apply. In fact, these variables can be so pronounced that geoenvironmental professionals who comply with every directive of an ASTM or other standard procedure could run afoul of local custom and practice, thus violating the standard of care.

Accordingly, when geoenvironmental professionals indicate in their reports that they have performed a service "in general compliance" with one standard or another, it means they have applied professional judgement in creating and implementing a scope of service designed for the specific client and project involved, and which follows some of the general precepts laid out in the referenced standard. To the extent that a report indicates "general compliance" with a standard, you may wish to speak with your geoenvironmental professional to learn more about what was and was not done. *Do not assume a given standard was followed to the letter.* Research indicates that that seldom is the case.

Realize that Recommendations May Not Be Final

The technical recommendations included in a geoenvironmental report are based on assumptions about actual conditions, and so are preliminary or tentative. Final recommendations can be prepared only by observing actual conditions as they are exposed. For that reason, you should retain the geoenvironmental professional of record to observe construction and/or remediation activities on site, to permit rapid response to unanticipated conditions. *The geoenvironmental professional who prepared the report cannot assume responsibility or liability for the report's recommendations if that professional is not retained to observe relevant site operations.*

Understand That Geotechnical Issues Have Not Been Addressed

Unless geotechnical engineering was specifically included in the scope of professional service, a report is not likely to relate any findings, conclusions, or recommendations about the suitability of subsurface materials for construction purposes, especially when site remediation has been accomplished through the removal, replacement, encapsulation, or chemical treatment of on-site soils. The equipment, techniques, and testing used by geotechnical engineers differ markedly from those used by geoenvironmental professionals; their education, training, and experience are also significantly different. If you plan to build on the subject site, but have not yet had a geotechnical engineering study conducted, your geoenvironmental professional should be able to provide guidance about the next steps you should take. The same firm may provide the services you need.

Read Responsibility Provisions Closely

Geoenvironmental studies cannot be exact; they are based on professional judgement and opinion. Nonetheless, some clients, contractors, and others assume geoenvironmental reports are or certainly should be unerringly precise. Such assumptions have created unrealistic expectations that have led to wholly unwarranted claims and disputes. To help prevent such problems, geoenvironmental professionals have developed a number of report provisions and contract terms that explain who is responsible for what, and how risks are to be allocated. Some people mistake these for "exculpatory clauses," that is, provisions whose purpose is to transfer one party's rightful responsibilities and liabilities to someone else. Read the responsibility provisions included in a report and in the contract you and your geoenvironmental professional agreed to. *Responsibility provisions are not "boilerplate."* They are important.

Rely on Your Geoenvironmental Professional for Additional Assistance

Membership in ASFE exposes geoenvironmental professionals to a wide array of risk management techniques that can be of genuine benefit for everyone involved with a geoenvironmental project. Confer with your ASFE-member geoenvironmental professional for more information.

ASFE

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