18 October 2007

Memorandum

To: Mr. James X. Kelly, P.E.
Utilities Manager
City of Arlington Utilities Division
154 W. Cox
Arlington, WA 98223

From: Christopher W. Kelsey, P.E.

Subject: K/J Design Team Responses
City of Arlington Schematic (10%) Design Review Comments
K/J 0597002.02

This memorandum enumerates our design team responses to the individual review comments offered by the City for the Schematic Design Technical Memorandum, 10% design plan sets for the Wastewater Treatment Plant (WWTP) and Biosolids Composting Facility (BCF) expansions, and the preliminary draft of the Membrane Bioreactor (MBR) Request for Qualifications and Request for Proposals package. The memorandum, in combination with these delivered items, cumulatively represent an official documentation of the 10% design review period.

<u>WWTP and BCF Schematic Design Technical Memorandum</u>

1. Page 7; prior to final selection of screens we would like the opportunity to see some of the different types in operation.

   Response: Kennedy/Jenks has sent the City general information on the two manufacturer models of perforated plate rotary drum screens being considered, along with contact information for the nearest installation of each manufacturer of the same or similar model. Please let us know if the City would like to arrange site visits and we can coordinate this with the vendors.

2. Section 2.1.2 Grit Removal; the existing grit removal system needs a new bottom end. During the last few years the bottom has became inoperable or worn out. Also, as to the last paragraph, adding redundancy for airlift blower and grit scour pump is a good choice.

   Response: More specific information concerning the failing components of the vortex cone to the grit removal system is desired from the City (photographs would be helpful if the unit can be removed from service for a short period of time), and necessary replacement and/or upgrade of those components will be incorporated into design. Also, redundant airlift blower and grit scour pump have been added to the design.

3. Page 10 third paragraph date reads 20250.

   Response: Date was meant to read 2025.

4. Page 10, Section 2.1.3.2; do these flows take in to consideration the Water Treatment Plant back flushing or other discharges to the WWTP.

Response: All flows measured by the influent Parshall flume were included in the projections, which currently excludes only the WTP filter backwash water. Reviewing the information provided by the City on backwash flow rates from the WTP, it appears that the average backwash flow rate from the WTP for 2007 has averaged around 70,000 gpd. This would add approximately 4% to the projected maximum month flow of 1.71 MGD for 2007. However, the backwash flow rate mirrors water demand, as would be expected. Therefore, backwash flow rates are lower during the winter, when influent wastewater flows are highest, and higher during the summer when water demand is greatest. As a result, the backwash flow rate appears to drop to as low as about 50,000 gpd during the winter, and jump as high as about 130,000 gpd during the summer. This relatively small increase in the influent flow should not have any significant impact on the hydraulics or membrane flux rates, particularly with the inclusion of flow equalization. Given that the backwash flow has very few solids, there should also be negligible impact on biological treatment and solids handling from this source.

5. Page 16 second paragraph; the pumps specified are submersible centrifugal pumps. Was there any consideration for non submersible centrifuge, and positive displacement pumps? How would we retrieve and clean pumps during maintenance?

   Response: Consideration was given to using non-submersible centrifugal pumps and positive displacement pumps for RAS and WAS pumping. Typically, the cost of installing a non-submersible pump inside a building is significantly more than installing a submersible pump in a tank, due to the additional building space and appurtenances required. Per our discussion during the 10% design review workshop, Kennedy/Jenks has performed a preliminary cost comparison of these two options. It appears that the use of submersible pumps would save on the order of $50,000 in capital cost. In many applications, the cost savings would be greater, but the cost savings are tempered by the fact that the membrane tanks and covers would need to be elongated some to allow for the installation of the submersible RAS pump. Currently, the design includes a separate, metered submersible RAS pump for each membrane tank, rather than a common wet well, based on our discussion during the 10% design review workshop. Due to that revision in the configuration, the WAS pumps are now non-submersible centrifugal pumps. Non-submersible centrifugal pumps are recommended rather than positive displacement pumps because the sludge is relatively thin (about 1% solids), which does not require positive displacement pumps, and positive displacement pumps are significantly more expensive than similar sized centrifugal pumps. The RAS pumps will be retrievable using the bridge crane that will also be used to remove the membrane module assemblies. Hose bibs will be located around the membrane tanks to wash the pumps off over the tank before unloading them outside the tank. If the City chooses, the design can be modified to use non-submersible RAS pumps, which would be located in an enlarged MBR Support Building.

6. Page 16 third paragraph; recommendations are being made to leave the aeration basins uncovered. If we do this the screens need to be moved to the end of the aeration basin to eliminate cotton wood seeds, leaves and other debris. As mentioned during the July 13, 2007 meeting we see huge amounts of the cotton type material during certain times of the year. If we

are covering the screenings system and flow equalization portion, would it be that much more cost and work to cover the rest of the tankage? I assume all the equipment in the proposed covered area has retrieval devices that could easily span the additional space.

Response: Per our discussion during the 10% design review workshop, the aeration basins will be covered with aluminum covers. Spring assisted hatches will be located throughout the covers for removal of mechanical equipment. Also, the entire cover will be removable in sections (via crane), if complete open access to the tank is ever required.

7. Page 18 second paragraphs; comment only - the second sentence implies that we consistently have poor quality effluent. Effluent TSS for the past year has averaged at 13 mg/l with the maximum of 44 mg/l. The transmittance of the system is, low of 54%, average of 63% and a high of 68%. Does this alter design decisions?

   Response: As noted in the comment above, the WWTP effluent is normally of high quality. The paragraph was meant to convey the need for a third UV reactor due to the struggles the City indicated they have experienced at times during recent summer months as influent flows and loads approach or begin to exceed the capacity of the existing WWTP. We appreciate the City providing information on the UV transmittance of the existing effluent. In the case of this application, the NWRI standards used to design UV systems for production of Class A reclaimed water will dictate the size and number of UV reactors required.

8. Page 18, Section 2.1.6; Comment only - solids handling, since the start up of the MBT we have noticed that the higher the SRT and/or the thicker the sludge, then the higher the solids concentration off the press is as well as better performance of tons of solids to the press.

   Response: Thank you for the information. We thought that might be the case regarding the thicker feed sludge, so it is good to have information confirming that. This should be considered when selecting either a 20 day SRT with thickening or 10 day SRT without thickening. Regarding higher SRT, literature suggests dewaterability decreases with increasing SRT, but this could be offset by the fact that, with a longer SRT, you have higher MLSS and lower observed yield.

9. Page 18, Section 2.1.6 - in my opinion, the compost facility as planned will not make it till 2025 due to mix ratios for solids concentration and C/N. We should evaluate the nitrogen reduction with longer SRT. While looking at cost for the 20 year life cycle, we should include other improvements that will be needed to achieve class A and or B biosolids as well as the cost of the additional amendments with the possible higher nitrogen with the younger sludge.

   Response: The preliminary model runs do not indicate a very large difference in the nitrogen load of the sludge based on 10 day or 20 day SRT. The following is a model prediction of the digested sludge produced on an annual average basis at 2025 for both 10 day SRT and 20 day SRT:

10 day SRT (no thickening):
TSS – 5,140 lbs/day
VSS – 3,540 lbs/day
TKN – 250 lbs/day
TP – 210 lbs/day

20 day SRT (with thickening):
TSS – 4,830 lbs/day
VSS – 3,340 lbs/day
TKN – 230 lbs/day
TP – 210 lbs/day

The following is a model prediction of the digested sludge produced at the 2025 maximum month flows and loads for both 10 day and 20 day SRT:

10 day SRT @ Max Month (no thickening):
TSS – 6,670 lbs/day
VSS – 4,630 lbs/day
TKN – 335 lbs/day
TP – 275 lbs/day

20 day SRT @ Max Month (with thickening):
TSS – 6,360 lbs/day
VSS – 4,410 lbs/day
TKN – 315 lbs/day
TP – 275 lbs/day

These preliminary estimates will be refined as the model is refined, but are not expected to change significantly. Using data provided by the City on the compost ratios (4 yards of amendments [i.e., alder hog fuel and overs] to 1 yard of sludge) and nitrogen and total solids loading and VSS destruction data for a 10-day SRT from the preliminary WWTP modeling runs, we have recalculated the space requirements for the BCF and have prepared a revised site plan for the City. Based on this information, the total volume of sludge to be processed is 17.5 yards per day on average. The proposed volumes and building footprints for each of the process areas are listed in the table below. The bottleneck with this layout is final compost storage, which is limited to 2 months. If the City can find one or more users that will remove sufficient amounts of compost from the site year round or find an alternate storage site, the BCF should have sufficient capacity through 2025. If neither of those objectives can be accomplished, the City would also have the option of loading the BCF to capacity and lime stabilizing the rest of the biosolids using the existing lime stabilization equipment, if the biosolids don't already meet Class B requirements. This could be continued to the end of the planning horizon (2025), after which a different biosolids handling approach could be implemented.

Proposed BCF Storage Volumes and Building Sizes

Process Area	Volume (CY)	Building Footprint (feet x feet)	Assumptions & Design Criteria
Sludge Storage	50	20 x 40	Sludge to fill 2 primary composting bays, or 3 days worth of sludge produced at the plant. 3-foot stockpile height. 15% solids.
Alder Hog Fuel Storage	430	40 x 60	Alder required for 14 days of operation based on 2-week delivery schedule. 8-foot stockpile height.
Recycled Amendment (Overs) Storage	320	40 x 60	Storage for contents of 4 primary compost bays. Includes 20 feet of width for trommel screen with 20 feet on either side for screenings and final compost storage. 8-foot stockpile height.
Primary Composting	2,600	40 x 160 (existing) 40 x 200 (new)	Includes 10 new bays, 8-foot pile height, with 21-day detention time and ecology block divider walls between bays. Assumes either no expansion of the biofilter, or no truck turnaround at east end.
Curing	2,000	40 x 170	Assumes 10-foot pile height and no divider walls with 50-day detention time. Assumes 56% of primary screened out as Overs.
Final Compost Storage	1800	40 x 200	Provides only 2 months of storage instead of the 5 months initially proposed. Assumes offsite storage or higher demand for product.

10. Section 2.1.6, second paragraph; it states 20 days SRT will normally provide sufficient sludge stabilization to meet Class B Biosolids. Chapter 173-308-170 (3) (i) is the method to meet Class B pathogen reduction using aerobic digestion. This requires time of aerobic digestion at different temperatures. The Mean Cell Residence Time must be between forty days at 20 deg. C and sixty days at 15 deg. C. Either of them is far greater than 20 days. Also WAC 173-308-180 (2) talks

about 38% volatile reduction. If this is the section discussed I do not believe we will achieve 38% reduction in twenty days. Please explain.

Response: WAC 173-308-170 describes 3 methods for meeting pathogen reduction requirements. One method is to design the digestion process in accordance with the criteria mentioned above. A second method is to perform tests for fecal coliform on the biosolids prior to beneficial use. Seven samples must be collected at the time of each use and the geometric mean of the samples must indicate fecal coliform counts less than 2,000,000 MPN per gram of total solids. The third method is to get the process approved by EPA or Ecology as providing biosolids of the same quality as that identified in the first method above.

On a similar note, there are six methods described under WAC 173-308-180 for meeting the vector attraction reduction requirement. This requirement is normally met by achieving 38% reduction of VSS. With a MBR system, the WAS is typically partially digested by the time it is wasted. Therefore, it is often difficult to achieve 38% reduction of VSS in the WAS within a reasonable time frame. As an alternative, the vector attraction reduction requirement can also be met by testing the specific oxygen uptake rate, which must be less than 1.5 mg of O_2 per gram of total biosolids. The preliminary model predicts an oxygen uptake rate of less than 1.5 mg O2 per gram biosolids, which would meet the vector attraction reduction requirement.

11. Section 2.1.6, Paragraph 9; Yes, the City is familiar with the belt press technology and it is not complex. I agree that we should make sure our decision is based on the quality of finished product, the cost to operate, the O&M requirements of the equipment and the capital costs.

    Response: Kennedy/Jenks is in the process of preparing a preliminary evaluation of dewatering technologies, including: belt filter press, centrifuge, screw press, and fan press. This evaluation will consider the items mentioned above.

12. Section 2.1.6, last paragraph; this section notes that the sludge should be dewatered to a minimum of 15%. At this time we dewater sludge between 11.5% and 13%, this moisture level ensures the compost % moisture is about optimal. If we dewater to 15 percent with out reducing the N in the sludge, we will have to address the addition of adding moisture in primary compost mix.

    Response: Using the average moisture contents for sludge, hog fuel and overs stated in Comments 12 and 32, the initial mixture has an average moisture content of 56.1%, which is near the optimum value of 60%. With solids concentration of 15% the moisture content of the initial mix would be 55.5%, less than a 1% change in the moisture content of the initial mix, which is not likely to require additional water. However, the difference in sludge moisture content going from a current solids concentration of around 12% to a design of 15% results in a 4.4 cubic yard per day reduction in the volume of sludge requiring composting, which would save nearly 420 yards (2 bays) in primary composting space based on a 21-day detention time. As discussed in our conference call on October 1, 2007 the dewatering facility will be designed for a target solids concentration of 15% to minimize the BCF footprint. We are currently performing an evaluation of dewatering technologies to verify that it is reasonable to consistently expect a cake concentration of 15% and make a recommendation on a dewatering technology for implementation. We are also inquiring from each manufacturer their ability to guarantee a minimum % cake solids and what that minimum guarantee would be.

It would be more economical to design a dewatering system that could run unattended (for instance startup on Monday and run continuously to end of the work day on Friday), as this would reduce the size and/or number of units needed, thereby significantly reducing the capital cost. Please provide feedback on the acceptability of such a system. If the City requires that the dewatering equipment only run during normal work hours, we will need to re-examine the economics of providing sludge thickening, as it then may be less expensive to add sludge thickening than to have more and/or larger dewatering units.

FYI: Kennedy/Jenks recently assisted the City of La Center, running a short pilot test of a rotary fan press at their WWTP. The rotary fan press pilot unit has a stated capacity of 15 gpm. It received a steady stream of 0.4% WAS from an SBR and was run at hydraulic loading rates ranging from 20 to 12.5 gpm. When operating at or below the stated capacity, the unit produced between 15.4 and 17.7% cake solids. It produced between 13.6 and 17.4% cake solids when operating in excess of its stated capacity. Average polymer demand was around 7 lbs/ton. Average capture efficiency was around 85%. These results would likely be improved some with optimization of polymer selection and dose.

13. Section 2.1.7, paragraph 1; this section suggests reusing the existing effluent pumps for other applications such as the pumping reclaimed water. I believe these pumps are low head, high volume pumps. Make sure these pumps will match the proper application.

    Response: Agreed. The suitability of these pumps for other uses will need to be verified. There are certainly applications where they would not be suitable, such as pumping reclaimed water into a pressurized distribution system, but could potentially be suitable for pumping reclaimed water to the discussed constructed wetland adjacent to the WWTP site to the west.

14. Section 2.1.8; should ferric be included for sludge dewatering or is polymer sufficient?

    Response: Currently, we plan on leaving the existing ferric chloride dosing system in place and extending its feed line to the new dewatering unit. It is possible that it will not be needed, but there is no way to conclusively determine that until the new plant is in operation. As the City is aware of, pre-conditioning the sludge with ferric chloride to reduce fines can significantly reduce polymer requirements.

15. Section 2.1.9; would we want to also investigate chemical scrubbers, and other media based air scrubbing technologies such as carbon filters as well?

Response: Yes. We will be looking at activated carbon, wet chemical scrubbers, and synthetic media biofilters as alternatives for treatment of odors.

16. Section 2.1.12; Grit Removal; the lower end of the existing grit removal system will need to be replaced. Also, support equipment should be included to reduce down time.

    Response: Agreed. See response to Comment #2 above. Per our discussion during the 10% design review workshop, new components will be installed in the grit removal system, as needed, and a redundant airlift blower and grit scour pump will be added to the design.

17. Section 2.1.12; Aeration basins; need to consider covering both basins.

    Response: Agreed. See response to Comment #6 above. Per our discussion during the 10% design review workshop, the aeration basins will be covered.

18. Section 2.1.12; Hydraulics; if we bypass the effluent pump station we will need to incorporate a way to keep the effluent pump station dry so we do not collect stagnate water.

    Response: We will leave one of the pumps active to pump precipitation that accumulates in the pump station and discharge it to the headbox, based on simple level control.

19. Section 2.1.12; Chemicals; the polymer system already runs close to capacity, we will need to increase the polymer capacity.

    Response: We will design a new polymer feed system for the new dewatering unit. The old system will be left in place for use as a backup, or can removed if desired. The new polymer system could be either a dry polymer system, like the exisiting, or a liquid emulsion polymer system. We typically recommend an emulsion polymer system.

20. Section 2.1.12; Chemicals; it is suggested that coagulation dosing be used for enhanced phosphorus removal (alum or polyaluminumchloride). How will we handle the solids generated from this process? Is there any special handling requirements?

    Response: As the City is probably aware, the addition of alum will result in a small depression in pH. Polyaluminum chloride typically requires lower dosage and results in a smaller pH drop compared to alum. The addition of alum or polyaluminum chloride will increase the quantity of solids (generally a 5 to 25% increase, depending on amount of chemical added) that are wasted from the process, due to the production of metal precipitates and metal hydroxides. The solids should be handled the same as wasted solids without addition of coagulant. Since aluminum is not a pollutant in biosolids and the pH drop will need to be controlled to be relatively small, the solubility of pollutant metals is not anticipated to change significantly, and we would not anticipate an increase in pollutant metals in the biosolids. There also should not be any special handling of the biosolids required. When and if chemical phosphorus removal becomes necessary at the plant, other adaptive management strategies outlined in the WWTP engineering report may also be implemented if any operational concerns arise from the chemical phosphorus removal process.

21. Section 2.1.12; Odor Control; reminder to evaluate all types of odor control technology. How can we determine which technology is appropriate for our odors? Will air sampling be required?

    Response: Agreed. Per response to Comment #15 above, we will be evaluating activated carbon, wet chemical scrubbers, and synthetic media biofilters as alternatives for treatment of odors. Based on this evaluation, we will make a recommendation for this particular application and discuss this recommendation with the City. We've asked our odor control specialist to let us know whether or not there will be a benefit to collecting and analyzing air samples, and if so where samples should be collected and how many. We will inform the City soon of any requested air sampling and testing.

    Four alternatives were evaluated for expanding capacity of odor treatment at the BCF, as follows:

    1. Expand the existing biofilter with current organic media.
    2. Replace organic media with synthetic media (Biosorbens®).
    3. Install a packaged biofilter system (Biorem® or Bio-Reaction®) .
    4. Install a packaged carbon filter (Duall™).

    The Biorem® packaged biofilter system is the most expensive of all the odor treatment alternatives investigated in terms of capital cost, media replacement cost, and present worth cost (see table below). The present worth discount rate was assumed to be 5%. The 20-year Lifecycle Cost includes 8.5% sales tax, 15% for contractor overhead and profit, and a 25% contingency. The Bio-Reaction® packaged biofilter system is less expensive in terms of capital cost and media replacement costs. However, replacing the media on a 5 year basis makes the present worth cost comparable to Biorem®. The carbon filter has the lowest overall footprint, but due to potential for frequent media replacement costs, the 20-year lifecycle cost is relatively high.

    Expanding the existing biofilter appears to be the least expensive, and also has the lowest media replacement cost. The synthetic media alternative would allow the existing biofilter to maintain the current footprint and treat the additional flow; only the retaining wall height would increase to six feet. The synthetic media overall present worth is estimated to be over 2 times that of expanding the existing biofilter with organic media. This preliminary evaluation indicates that a reduced footprint would be possible with synthetic media, but at more than twice cost of expanding the existing biofilter with organic media. The recommendation is to expand the existing biofilter using organic media.

BCF Biofilter Preliminary Cost Evaluation

System	Footprint	Installed Cost	Media Life (years)	Present Worth Media Replacement and O&M Costs	Present Worth 20-year Lifecycle Cost
Expanded Biofilter	36' x 72'	$102,000	5	$58,000	$253,000
Biosorbens®, Synthetic Media	36' x 36'	$186,000	10	$185,000	$592,000
Biorem®	36' x 54'	$730,000	10	$340,000	$1,672,000
Bioreaction®	24' X 40'	$469,000	5	$279,000	$1,188,000
Duall™ Carbon Filter	20' x 20'	$180,000	0.66	$693,000	$1,393,000

22. Section 2.2.2; Conveyor; the conveyor needs to have a minimum height of 12 feet. I have information on some conveyors and mixers with estimated prices.

    Response: The conveyor will have a minimum discharge height of 12 feet as requested. We are interested in evaluating the information the City has obtained on the conveyors. We have received some product literature. Please provide us any proposal information the City has been provided.

23. Section 2.2.2 Conveyor; I do not believe that it would be time and control efficient to have the mixer move in and out of the bay every time a new batched is mixed with a shorter conveyor system. Operational problems could come in to play as the mixer drives over compost and the angle of the mixer changes. After a few times back and forth we could have to straiten the equipment out. Since the system will be a two part system mixer and conveyor it would be hard to realign.

    Response: The mixer and conveyor will be moved by the front end loader as requested. The long mixer will still have to be pulled outward from the bay for short distances as the bay is filled, to achieve a uniform pile height. Consideration should still be given to how a longer mixer/conveyor train would be moved while filling the bay. When loading the front of the bay, the mixer operator would only have a few feet to maneuver the conveyor before backing into the curing shed. The length of the proposed mixer (25 feet), conveyor (40 feet) and front end loader (20 feet) exceeds the 60 feet between the bays, so moving will have to be done at an angle to the bays with the conveyor length proposed. K/J will conduct a turning radius evaluation when reviewing submittals on the proposed equipment provided by the City.

24. Section 2.2.4.1; Primary Composting; the design of the facility should be based on real time and data and information. 2.4/1 mix ratio is unreal – please use supplied data for best and/or optimum mix ratio to achieve C/N and moisture content that will work at the facility.

Response: Using the data recently provided, and taking the average for the last three months of operation, the overall ratio appears to be much higher than what was used for the original design at 2.4:1. The current average operating ratio is 4.4 yards of amendments to 1 yard of sludge (4.4:1). However based on a volumetric ratio of 3.0 cy of hog fuel to 3.0 cy of overs and 1.5 cy of sludge, as discussed in the 1 October 2007 conference call, it was agreed the mix ratio for design will be 4.0:1. This ratio assumes a similar amount of amendments will be required with a similar amount of Total Keldahl Nitrogen (TKN) and similar or higher solids concentration in the sludge following the WWTP improvements. The predicted TKN concentration for the WWTP facility design is estimated to be similar to the current sludge TKN concentration.

25. Section 2.2.4.1; second paragraph; this section discusses reprocessing piles that do not meet time and temperature being and occupy the primary bays. At this time we do not re-blend the compost. We have found that we have re-growth of fecal coliform and we need to reheat the piles in the cure side. We have also found that we screen more efficiently by keeping the piles in the primary bays for as long as we can. We make two piles per week, every week we screen two piles and thus keep the primary bays full. Once we screen two to three piles we begin the cure pile and re heat the piles for time and temperature.

    Response: By the term "reprocess" we meant that piles were brought up to temperature again in the curing shed when they did not meet temperature in the composting shed. A better term would have been "extended processing." It was discussed during a site visit and while observing temperature data records for primary composting, that piles occasionally do not come up to temperature rapidly and require extended detention times in the primary bays. The City has indicated there is not an issue with piles coming up to temperature rapidly in primary composting as stated in Comment 27. We now understand this extended processing was due to fecal re-growth and the need to generate compost that screens easily.

26. Section 2.2.4.1; last paragraph; several items do not match the rest of the document and need to be re-evaluated.

    - increased dewatering capacity at the WWTP will probably not increase the solids concentration value to 18 to 20% solids. We may see some increase in % solids due to better equipment and or cell wall destruction.
    - 30% reduction has not been mentioned in previous sections. There has been discussion of 20% reduction. Even at 20% reduction we will likely not see huge amounts of capacity increase unless the nitrogen content in the sludge is decreased. However, I do agree that the reduction will help in the overall capacity issues.

    Response: For volume reduction purposes, it would be advantageous to have as high a solids concentration as possible in the dewatered sludge, while still maintaining suitable moisture content for composting, thus reducing costs for operation and construction of the expanded BCF. We will design to 15% cake solids as discussed in our conference call on October 1, 2007 and as described in Comment #12. The 20% reduction is accurate as stated elsewhere in the document.

The revised footprint for the BCF will be based on 20% reduction of solids during digestion at the WWTP.

27. Section 2.2.4.2; Optimizing Primary Composting; These are all good suggestions as how to optimize the primary composting process, however we should discuss what should be implemented at the expanded facility. Below are our comments to the four items:

    - Item 1: Based on experience, piles heat up quickly with no ammonia odors. This would make us assume that the pile C/N is sufficient and the compost is in the correct moisture range. The moisture is typically the same during mix. We have seen temp problems when we use other hog fuels such as Maple and if the overs were stored in the rain.

    - Item 2: We do not cover the piles for insulating. The biggest reason for this is the pile is constructed 40 feet deep 20 feet across and 10 feet high. The pile starts in the back of a three sided bay and progresses to the front. In order to put a layer of finished compost or other insulating material on you would have to pile it on top. By attempting to pile the material on the top of the compost you would have the insulating material fall down the face of the pile and take up large amounts of the compost bay. The other option would be to apply after the pile was built. You would have to put the material on the front of the pile and then manually apply it. This would cause mass settling do to walking over the top of the pile and cause more problems that it is worth. Also if the material used did not compost or was stable and mature it would not come up to temp.

    - Item 3: This is somewhat confusing. We use air for two reasons at the compost facility, one is to promote aerobic conditions to increase compost performance and reduce possible odors, and the other reason is to cool the piles down so as to keep the pile temperatures out of the spontaneous combustion region.

    - Item 4: We already have a problem with pile temperature being too high. By recycling the hot air we would only magnify the problems.

    Response: Item 1: Upon further discussion with the City the C:N ratio is adequate. Based on the data provided by the City, there is some variability in the sludge (the range for data collected in 2007 is 9.75% to 14.29% solids), which should not significantly affect the moisture content of the initial compost mixture, as solids are approximately 20% of the mix. However, the moisture content of the hog fuel varies the most (26% to 53% moisture), while the moisture content of the overs varies the least (54% to 63%). The variability in the moisture content of the hog fuel has an impact on the overall moisture content. For example, under drier ambient conditions, the overs had 48% moisture in June 2007 and the compost mixture was similar at 45% moisture, indicating that variability in the moisture content of the overs has a significant affect on the initial mix.

    Item 2: Due to space constraints and the additional labor required, insulating the pile is not likely to benefit the composting facility and will not be considered in design for operation of the expanded facility.

Items 3 and 4: Since increasing pile temperature is not necessary, we will not consider addition of recycled air to preheat flow going to the piles.

28. Section 2.2.4.2 Optimizing Primary Composting; second paragraph; We do not reprocess any piles.

    Response: Noted. See Response to Comment 25.

29. Section 2.2.4.2 Optimizing Primary Composting; second paragraph; we continually are reevaluating the mix ratios, C/N and moisture content of the raw material as well as screened and cured.

    Response: Noted. The additional data provided by the City on moisture content and compost ratios indicates the process is being adequately monitored.

30. Section 2.2.4.2 Optimizing Primary Composting; second paragraph; it is mentioned that we have undigested sludge, however we will not see much more digestion In the proposed new system.

    Response: With the MBT in operation, the current SRT in the digesters is probably about 3 days, which probably yields around 6% VSS destruction, compared to about 20% VSS destruction for a 10-day SRT. In addition, excessive digestion would leave less energy remaining in the solids, making them more difficult to compost, and typically leads to more difficult dewatering. Typically, aerobically digested sludge with a 10-day SRT would be easier to dewater than sludge from a 20-day SRT digester, all else being equal. Optimum digester SRT for dewatering is 1 to 5 days, after which sludge dewaterability decreases. However, the inclusion of thickening with the 20-day SRT alternative would likely offset reduced dewaterability, since dewaterability typically increases with thicker feed solids concentration. It is difficult to say which would produce the best sludge dewaterability, but we are inclined to believe the results would not be substantially different. Other benefits of a 10-day SRT without thickening are an apparent correlation between lower solids concentration in the sludge and lower polymer consumption (Mikkelsen and Keiding, 2001, Water Science and Technology). Apparently, turbidity in the sludge typically increases with increased solids concentration (due to increased surface erosion resulting in breakup of floc structures), which requires higher polymer dose. Therefore, we are proposing a 10-day SRT without thickening prior to dewatering, leaving more energy for composting and perhaps resulting in better dewatering and reduced polymer consumption compared to the option of a 20-day SRT with thickening.

31. Section 2.2.4.2 Options to decrease the rater of batch reprocessing; since the start up of the facility the City has operated the blowers for two reasons. First is to keep the piles aerobic to improve compost performance and minimize odors, and second to cool piles down. Compost is piled into the bays for primary composting. Once the bay is full we start tracking pile temperatures and blowers. Piles are typically built in two to three days. Once the pile is online the blower

automatically turns on in the positive position at 5% of the blower's capacity. During the heating of the pile and until the pile has reached a minimum of 55 C the blower never increases above the 5% level. The blower does change from positive to negative aeration to attempt to maintain a consistent temp throughout the pile. Once the pile reaches 60C on all four probes two top and two bottom the blower increases to attempt to maintain that temperature. If the bottom temperature falls lower than 3 C of the top the blower switches to negative aeration to draw the hotter air to the bottom and allow colder air to cool the top of the pile. If the top of the pile is 3 C less than the bottom the blower goes in to positive aeration and heats the upper layer. During the primary composting the blend has so much energy that the pile often times reaches in excess of 70 C with the blower at 100%. At this time we are not composting but the pile is in the heat range of spontaneous combustion and has destroyed all microorganisms in the blend.

Response: Larger blowers will be supplied for the new curing bays as requested by the City to increase air flow through the compost to improve temperature regulation.

32. Section 2.2.4.2 Options to decrease the rater of batch reprocessing; the moisture content6 is often looked at throughout our facility to optimize the process. However we will keep to the primary bays. Our blend starts at 60% moisture content and reduces from that point on. We currently have moisture contents between 50 and 60% for overs, 36% and 47% for hog fuel and 87% to 90% for sludge.

    Response: Noted. See Response to Comment 27. As we discussed in our October 1, 2007 conference call the moisture variability in the overs affects the initial moisture content in the primary bays.

33. Section 2.2.4.2 Options to decrease the rater of batch reprocessing; a couple items first the positive and negative valve position is in no way random. The position is based on pile temperature. Forcing hot air in the piles during primary composting will magnify heat problems. One common blower should not be used. The air will tend to go to the pile that is the youngest and least packed causing cooling and heating problems. As the piles compost in the earlier stages we see problems with compaction.

    Response: The intent of the preheated air was to compensate for piles not coming up to temperature rapidly. Since this not an issue, it will not be considered for the expanded design. The expanded facility will be designed with one blower per primary composting bay and with one large blower for the new curing shed.

34. Section 2.2.4.2; Temperature Loss; our primary reason for temperature loss is compaction. As the piles compact they starve for air and the biological process decreases. The bugs slow down and the temperature drops.

    Response: Once again, low temperature does not appear to be an issue. Larger blowers will increase the aeration air supply and help regulate temperature.

35. Section 2.2.4.3 Land Requirements; is the existing property sufficient in size to accommodate an expansion for sludge loading requirements and compost processing until 2025? We need to look at this. Should we be making plans now for off-site storage of finished product?

    Response: The existing site is sufficient to handle the composting operation through 2025 using the design volumetric amendment to sludge ratio of 4:1, at an average loading of 17.5 cubic yards per day of sludge dewatered to 15% solids, based on a 10-day SRT. The revised site plan provides for 30 days of primary composting, 50 days of curing and 2 months of final product storage at the average solids loading. The expanded facility has capacity for the design 2025 maximum month loading of 22.8 cubic yards per day with 21 days of primary composting, 40 days of curing and 1.5 months of final product storage. Offsite storage will need to be considered if demand for finished compost is less than 50 cubic yards per day for any length of time greater than 1.5 months, when the facility is treating the 2025 maximum month loading. It is recommended that the City continue to market their biosolids compost product and have customers store product at their utilization site.

36. Section 2.2.5.2; I suggest that we leave the existing system as is. The cost of retrofitting the existing system is an un-needed expense. We may want to increase the size of the blowers to produce more air through the pile for cooling during the early stages of composting. What would this cost be?

    Response: A 5-hp motor is the largest motor recommended for the composting fans. Increasing the motor size from a 3-hp to a 5-hp motor would increase the flow from the fan by only 18% or slightly more depending on the increase in static pressure from the compost and air piping at the higher flow rate. For this increase in flow, a preliminary estimate for labor and materials provided by a local blower supplier to replace the motors, sheaves, VFD's and wiring is estimated at $20,000. This assumes that the larger motors can be mounted on the existing motor base and the belt guards will work with the new sheaves. Engineering, tax, administrative costs and reprogramming of the aeration control system (if necessary) were not included in this estimate.

37. Section 2.2.5.2; the less expensive valves tend to fail with continual modulation; this observation is based on experience during the earlier stages of BCF.

    Response: The dampers and direct-coupled actuators proposed are the same as those used on the existing curing shed. We assume from the comment the City requires valves on the composting blowers that are more rugged. Rotork motorized valve actuators and Hayward butterfly valves similar to the existing equipment will be specified for the new composting shed.

38. Section 2.2.5.2; a single large blower may not be a good option with the different in pile densities.

    Response: A single large blower for composting would require built-in pressure regulation for each leg of the manifold to equilibrate flow between the bays, thus requiring a higher capital cost for a decrease in long-term O&M costs. We will design with individual blowers for each bay on the new composting shed unless instructed otherwise by the City to further evaluate one large blower.

39. Section 6.1; the phasing of construction looks good. Maybe we should consider starting the work in the south basin and use the north SBR as an aeration basin that will also function as an EQ basin. By allowing the basin to rise and lower as needed to keep consistent flow to the MBR tank. It seems that the warranty period will start on the day of start up weather it is as a filter for effluent or mixed liquor. Once the EQ (south) basin is complete, we could then transfer all the mixed liquor to the south basin and retrofit the north one. By doing this we would also be thickening the sludge and running the MBR as designed and not taking a chance of running young sticky sludge to the membranes causing premature fowling.

    Response: We thought it would be easier to do the aeration basin conversion first, because once that conversion is complete, the secondary process can be put into operation as designed. That would reduce the amount of time the secondary process would need to run in an interim mode of operation, which should simplify matters. During the conversion to aeration basins, the south SBR tank will operate as a complete mix aeration basin, rather than an SBR. This seems to be preferred by the MBR system suppliers, as it will allow better control of the SRT to ensure a longer sludge age and will be operating closer to the design conditions. There still may need to be cycling of aeration to recover alkalinity. There should not be a need to operate the basin for flow EQ. Enough of the membranes can be installed so that they don't need equalization, as the flow during construction will be significantly lower than the design flow. Any remaining membranes not installed for interim operations can be installed before full startup of the facility to save their warranty period. As you mentioned, the warranty period for the equipment and membranes used for the interim operation will start the day they are placed into service for the interim operation. As indicated above, mixed liquor can be transferred from the complete mix basin to the newly converted aeration basins, once they are ready to be placed into service.

40. Section 6.1; if we are moving the MBR as discussed during the 10% meeting at K/J office, will we need to build the WWTP office first so we can demo the existing WWTP main office location.

    Response: Yes, the new Lab/Office Building will need to be built before the existing lab is demolished. It appears that the membrane tanks, MBR Support Building, Lab/Office Building and Equipment Building can all be constructed without needing to demolish any existing buildings.

41. Section 7.1; discussion of staff is some what different for the City of Arlington WWTP since we are not just a WWTP we are a Wastewater Utility that includes many functions (WWTP operation, BCF operation, Collection System O&M, Lift Station O&M, drawing reviews, and construction inspection). As stated in the first sentence of 7.1 the numbers are based on WWTP only not to include any other part of the system. At this time, we have all lab for the WWTP, compost facility and storm system all included in the lab. The lab is operated 7 days a week and does to the sampling requirements and times we staff it 8 hours a day to include weekends. During the weekends we do have the operator perform all other duties such as operation of the press and collection system inspections. The maintenance person or operator also does not only operate and maintain the equipment in the WWTP but the compost facility as well. He also is the primary

person to haul sludge to he compost facility. We have one other full time staff for the WWTP however he is moved around to accommodate time off, training and heavy work loads in other areas. We need to perform a detailed staff allocation assessment to determine the full staffing requirements of the Sewer Department.

Response: The main purpose of the staffing information provided in the Schematic Design Technical Memorandum is to communicate what additional staffing needs are expected as a result of the proposed WWTP and BCF improvements. It is recognized that some facilities at the expanded WWTP will serve, and provide support of, more than just the WWTP. The City can use the information provided in combination with staffing projections related to other personnel and tasks to formulate a comprehensive staffing plan for the wastewater utility as a whole.

42. Section 7.2; at this time we staff the compost facility at over 1 FTE. The facility is operated at minimum 45 hours per week. This does not give enough time for vacation, training and or sick leave. We need to perform a detailed staff allocation assessment to determine the full staffing requirements of the Sewer Department.

    Response: Understood. Let us know if you would like our assistance with the wastewater utility staffing evaluation. We recently completed a similar staffing evaluation for the City of Snohomish wastewater utility.

43. Section 8 Building space; the building is being size for 5.5 staff. This number should be increased to represent the collections crew and pretreatment person as well. We currently have three collections crew and one pretreatment operator. We see in the future that there may be 2 more collection workers. In the office building there needs to be an area for drawing review and storage for developments and facilities. We need to perform a detailed staff allocation assessment to determine the full staffing requirements of the Sewer Department.

    Response: The building spaces listed in the Schematic Design Technical Memorandum were provided as a starting point for discussion and development of preliminary costs. Based on discussions during the 10% design review workshop, it is apparent that there will need to be office space for more personnel, since the City intends to use this building for the entire wastewater utility, not just personnel assigned specifically to the WWTP. In addition, space for plan review and storage will be provided as requested. Based on the information noted in the comment above, it appears that the City would like the building to accommodate 12 personnel (6 WWTP personnel, 5 collection system personnel, and 1 pretreatment person). If the City can verify that the building needs to be sized to accommodate 12 personnel, we can revise the space allocation and prepare a preliminary layout of the Lab/Office Building for the 30% submittal. Otherwise, please let us know how you'd like to proceed on this issue and how we can be of assistance to move this portion of the design forward.

44. Section Table 8-1; the lab needs to be large enough to accommodate two staff and have enough counter top space to perform all tests for WWTP, Pretreatment, Compost, and Storm water. We need to formalize the lab sizing study.

    Response: Understood. The lab space listed in the Schematic Design Technical Memorandum was provided as a starting point for discussion and development of preliminary costs. Please let us know how you'd like to proceed on this issue and how we can be of assistance to move this portion of the design forward.

45. Section Lab sink does not need a garbage disposal. However all sinks should be double compartment (two sided).

    Response: Garbage disposal will not be provided. All sinks will have dual compartments.

46. Section 8; the shop and garage area should be capable of housing on TV trailer, Flusher and trailer mounted generator. The shop needs to be large enough to work on pumps motors and valve for the collection system and WWTP staff. We need to formalize a garage sizing study.

    Response: Understood. The garage and shop spaces listed in the Schematic Design Technical Memorandum were provided as a starting point for discussion and development of preliminary costs. Please let us know how you'd like to proceed on this issue and how we can be of assistance to move this portion of the design forward.

47. Support Building Sizing – We need to work on a tech memo supporting our sizing and layout – needs to be discussed with crew.

    Response: The size of the support buildings (existing SBR Support Building, new MBR Support Building, and expanded Solids Handling Building) will be largely determined by the equipment they will be holding. It is currently our intent to have the MBR Support Building be a 2 level building (ground level and below ground level). It is intended to house the membrane blowers, permeate pumps, UV reactors, MCCs, chemical feed equipment for CIP, and future chemical feed equipment for chemical phosphorus removal. It may also house the backpulse tank (if needed), CIP solution tank (if needed), and citric acid and sodium hypochlorite storage tanks, depending on space and code issues. Alternately, these tanks may be insulated and heat-taped for location outside, along with the standby generator. The existing SBR support building is intended to house the aeration blowers, WAS pumps, scum pumps, and plant water system. The Solids Handling Building is intended to house the existing belt filter press and lime stabilization equipment, digester sludge pumps, new and existing polymer feed systems, new lime feeder-solution system for supplemental alkalinity addition, and the new sludge dewatering unit.

WWTP Upgrade & Expansion 10% Design Drawings

1. Drawing G6; can individual flow meters be installed on all RAS lines from the MBR's, and to individual aeration tanks. This will allow more accurate flow evaluation for process monitoring and trouble shooting.

   Response: Per the discussion during the 10% design review workshop, the RAS pumping will be modified to have a dedicated RAS pump for each membrane tank. Each RAS pump will have its own flow meter.

2. Drawing G6; should flow meters for MBR air should be to individual trains not a common meter for all units.

   Response: Individual air flow meters to each membrane tank have been added to the drawing. However, this may not be necessary. Air for membrane scour is generally supplied at a constant rate, since air supply is based on cleaning requirements for the membranes rather than biology. So, there should be no need to meter the air. It would seem that air supply should just be on/off. This will be discussed with the selected MBR system supplier.

3. Drawing C2; the MBR could be moved to the foot print of the Lab/ office building; the lab could be moved further south and then the equipment room. This way the MBR is more centrally located to the rest of the facility and allows the Admin office to stay in place.

   Response: Per the discussion during the 10% design review workshop, the membrane tanks and MBR support building will be moved as suggested in the comment so that the Admin Building can remain in place. It is currently planned to have the membrane tanks, MBR Support Building, Lab/Office Building, and Equipment Building all built together with common walls and arranged in that order north to south. Once the size of the Lab/Office and Equipment buildings is confirmed by the City, the architect will investigate that layout option to verify there are no code issues that would prohibit or make difficult such an arrangement.

4. Drawing I 101- The WTP flow should be moved up before the influent partial flume and a flow meter should be installed for record purposes.

   Response: Per the discussion during the 10% design review workshop, the WTP filter backwash pipeline will be extended upstream of the influent flow measurement. In addition, the design will include a flow meter on that pipeline extension as requested in the comment above.

5. Drawing I 101- The screening system will need some sort of conveyance system to move screenings to the dumpster.

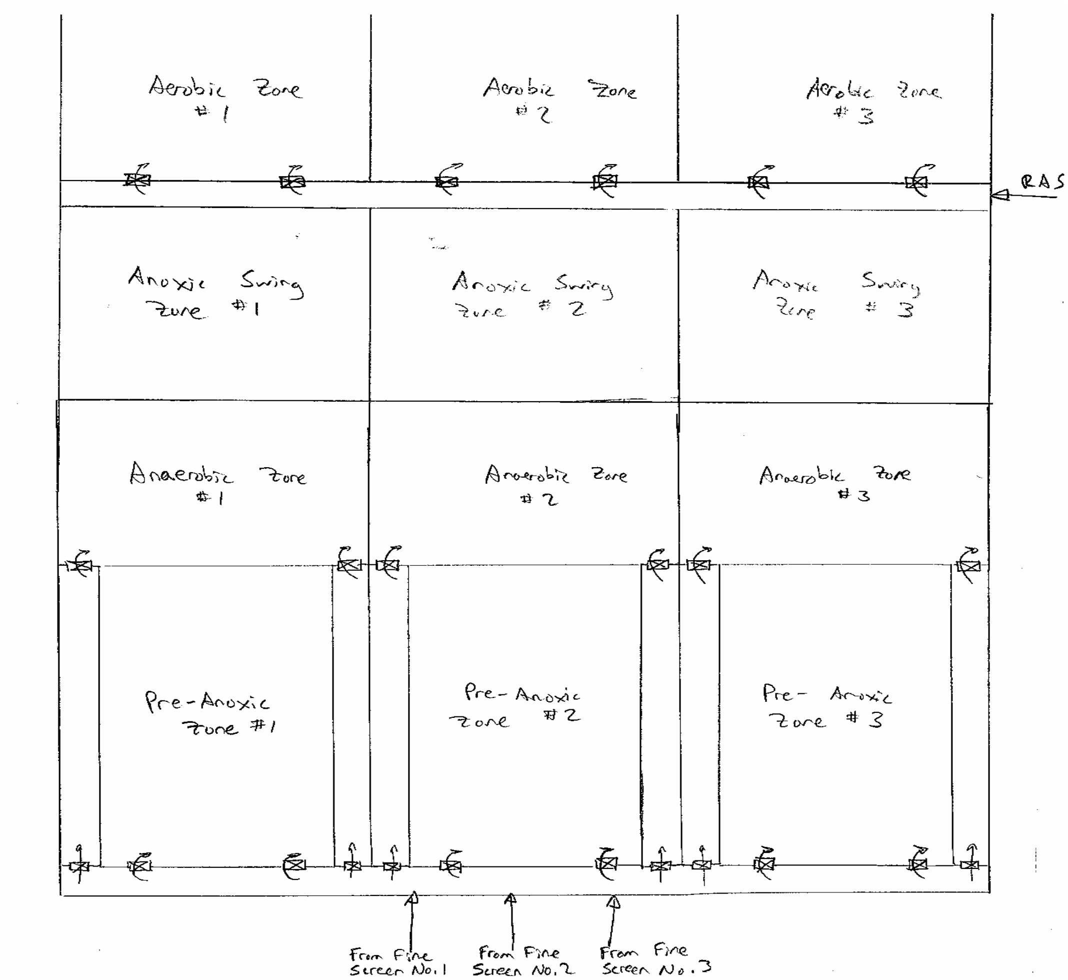
   Response: Per the discussion during the 10% design review workshop, an enclosed conveyor will be used to transport screenings from the new coarse screen to the screening dumpster, since the new screen will not be located in close vicinity to the screening dumpster.

6. Drawing I 202- A flow measuring device of some sort (ultrasonic or velocity or something) would be nice after the slide gate and before the aeration basins; this would be for process control and trouble shooting.

   Response: The current design is to have a main distribution channel with 2 downward opening weir (slide) gates that will control the flow of influent into the pre-anoxic zone of each aeration basin. The main distribution channel will be sized to create negligible headloss so that flow can be evenly distributed among the aeration basins. There will also be 6 step feed channels off of the main distribution channel (2 per aeration basin, one on each side) to allow influent flow to also be introduced into the anaerobic zone. The step feed channels will be capable of being isolated from the main distribution channel using flush-bottom slide gates when not in use. The flow could be split between the zones or directed entirely to one of the zones by adjusting the weir gates. It is recommended that the gates be operated manually and that staff gauges and position indicators be included for each weir gate so the height of the gate and flow over each gate can be visually compared to confirm a proper balance. Adjustment of these gates should be very infrequent, such that automation of the gates and instrumentation of the flow should not be necessary. Please let us know if you agree with this method of flow distribution.

   Similar to the description above, RAS from a common header will be distributed among the aerobic zones using downward opening weir gates off of a main distribution channel. As with the configuration described above, consideration was given to piping the flow directly to each basin, but then balancing the flow becomes much more difficult (requires either manual or automated valve adjustment) and requires flow meters on each distribution pipeline if one membrane tank is out of service, as will be the occasion whenever there is a recovery clean. Therefore, the use of distribution channels with downward opening weir gates is recommended for simplicity and lower cost. A sketch of the proposed distribution channels is shown below.

   Alternately, influent wastewater and RAS could be distributed through piping to each aeration basin zone. This would be more complex than using the distribution channels, but certainly not impossible. The distribution piping would have to be arranged so that each fine screen could feed at least two aeration basins, because if one aeration basin or one screen is out of service then different screens would need to feed different aeration basins. Piping for distribution of the influent wastewater would extend not only to the anaerobic zone but also the pre-anoxic zone for step feed flexibility to improve denitrification and/or de-oxygenation of the recycle stream introduced into the pre-anoxic zone (though this option is not a necessity). Because flow downstream of the fine screen is by gravity and the screen is the high point, the pipes would likely not be flowing full at times, which limits the type of flow measurement devices available for use. Magnetic flow meters could only be used if the piping alignment dipped so that the portion of the pipe with the meter was always full (i.e., never drained). This could result in some solids deposition, but would probably get flushed out on occasion during peak flows. An ultrasonic Doppler type flow meter can measure partial pipe flow, but we are not aware of an ultrasonic unit that can measure both open channel and full pipe flow. In addition, we have had mixed results with ultrasonic flow meters. To balance the distribution of influent wastewater and RAS flow among the distribution pipes, valves on each distribution pipe would need to be throttled to balance the flow among the aeration basin zones, which is perhaps no more precise than using weir gates. For simplicity, we suggest using the distribution channels with downward opening weir gates to split the flow and relying on flow measurement on individual RAS and permeate pumps to actually calculate flows through the membrane tanks and flow meters on the influent pumps to calculate the aggregate flow to the aeration basins. Staff gauges on the downward opening weir gates could be used to verify equal flow distribution to the aeration basins, but there would not be an electronic measurement of flow in that location. This of course can be modified to a hard piped distribution system described above if you'd prefer to have instrumentation for flow measurement to each aeration basin zone.



7. Drawing I 301; aeration is metered to the aerobic zone but not the anoxic swing zone - why.

   Response: A thermal mass flow meter will be included on the drop leg to the anoxic swing zone as well.

8. Drawing I 501- if we have two UVs in series we need to be able to bypass if one is not to be used so we do not have flow going through when we do not need it……how were the Redlands and Hyrum UV systems arranged?

   Response: There will likely be times of the year when only a single UV reactor is needed, particularly during the first years of operations at times when no reclaimed water is being produced. In this case, the other UV reactor would not be operating, but still subject to fouling on the lamp sleeves. It may be beneficial to allow bypassing of the unit not in use to keep it clean. However, this would then put all of the wear on one unit and not allow automatically cycling operation of the units to produce even wear on the reactors. This needs to be evaluated and discussed with the UV manufacturer.

9. Drawing I 503- this drawing shows a common flow meter for air to the MBRs, can we have one per unit.

   Response: As discussed in the response to Comment #2 above, individual air flow meters have been added, but it seems that this may not be necessary. This will be discussed with the selected MBR system supplier.

BCF Upgrade & Expansion 10% Design Drawings

1. Compost Drawing G5; remove Ground construction grind and replace with recycled amendments. These two are one in the same.

   Response: Noted and corrected. Refer to revised Drawing G5.

2. Drawing G5- sludge storage is not a biosolids - it has not been processed. Also 95 yards of sludge would be a huge odor source. Even in the worst case we would only hold half that with lime added for transport by others. Before we rearrange bays and locations, we need to come to a consensus on the total space required for all requirements (primary composting, curing, sludge storage, amendment storage, and compost storage).

   Response: Refer to response to comment #35 for sizing information. In accordance with our conference call on October 1, 2007 the sludge storage area has been reduced to 40 feet by 20 feet, which provides 3-days of storage at the maximum month design solids loading.

3. Drawing G5- the reference to the fan as being by-directional is incorrect, this blower only operates one direction with valving to cause positive and negative aeration.

Response: Noted and corrected. Refer to attached Drawing G5.

4. Drawing C1- the collection line going from the end manhole does not show the collection line running north east to the corner of the property.

   Response: Noted. Refer also to revised Drawing C3. The sewer and fiber optic lines are shown on the drawing in their approximate location based on sketches provided by the City. However, the City is in the process of locating the lines and will provide the location to K/J, so the line location and associated design modifications to the new curing shed can be shown accurately as design proceeds.

5. Drawing C3- The sludge storage area seems very large and should be more centrally located. Attempts to have the sludge away from screenings and curing compost should be made to avoid cross contamination.

   Response: Noted and corrected. Refer to revised Drawing C3. The sludge storage shed has been reduced in size and located adjacent to the proposed amendment storage shed.

6. Drawing I2- Remove Amendment storage for construction grind.

   Response: Noted and corrected. Refer also to revised Drawing G5.

7. Need to finalize issue regarding turn-around requirements for fire department, amendment haulers, and compost haulers.

   Response: According to the City, turn-around requirements are satisfied with 20 feet of separation between expanded biofilter and proposed new composting shed. K/J will evaluate adding a loading platform and options for loading compost hauler trucks using either the new or existing pile build conveyor. The existing pile-build conveyor has a discharge height of 10 feet, according to the O&M manual.

<u>MBR System Procurement Documents Quality Control Review Memorandum</u>

1. Action Items, #2; how should we work together to protect our mutual concern? What is the risk?

   Response: The primary concern is that the proposers that receive the information from the City will distribute it to others, who may use it for their own financial gain. Kennedy/Jenks suggests that the documents state that they are the property of the City and may contain trade secrets of its Consultants. Therefore, the information is provided solely for use by the proposer to prepare their SOQ and proposal. Requests from other parties to access this information should be directed to the City. The City can then determine (perhaps by asking K/J if it chooses) if releasing the requested information would reveal trade secrets of its Consultants. This would not violate the Public Records Act, but still provide the protection we're looking for.

2. Action Items, #6; warranty issues regarding the MBR – how will this be incorporated into the RFQ-RFP?

   Response: The warranty on equipment that is provided early for use during construction will start at the time of beneficial use. The warranty on the remaining equipment will start once it is installed and placed into service. This was discussed with the three main MBR suppliers and none of them had objections.

3. Action Items, #13; the proposal should include sales tax per rule 171 (WAC 458-20-171) and Rule 170 (WAC 458-20-170).

   Response: Sales tax is now included on the proposal forms.

Request for Qualifications and Proposals for MBR Equipment – Preliminary Draft

1. Section 1.1, first paragraph; please correct to read City of Arlington Public Works Utility Department.

   Response: Change has been made.

2. Section 1.1.1, fourth paragraph; this paragraph looks like it belongs in Section 1.3 as it requests specific supplier qualifications – this section (1.1.1) is generally discussing how SOQ should be prepared and submitted.

   Response: Paragraph has been relocated to Section 3.1, Required Minimum Qualifications.

3. Section 1.1.3, first paragraph; second sentence; the City intends to "assign a phase or portion of the agreement" to a General Contractor- we are not assigning the whole agreement to a General Contractor.

   Response: Language has been inserted as requested.

4. Section 1.1.3, first paragraph; last sentence; same comment as above - the City intends to "assign a phase or portion of the agreement" to a General Contractor.

   Response: Language has been inserted as requested.

5. Section 1.2; third paragraph; (and section 01000); reference information in section 01001 is available for viewing? Or they can make copies? Also, correct the date in section 01001.

   Response: Reference information is available for viewing, and as specified in section 01001, copies can be made at bidder's request and expense. Alternatively, some bidders may bring their own copying or scanning equipment, which is fairly common. Date has been corrected as noted.

6. Section 1.3.3; do you want to change this section to allow suppliers offer improved membrane cassette configurations that have not reached 6-mo experience or in a facility with 1 MGD capacity.

   Response: Section 1.3.3 has been amended to allow newer configurations with less than the required MBR System Configuration Experience, provided that they meet the MBR System Supplier Experience requirements, and certify that they will honor all warranty requirements. This section has been relocated and is now Section 3.1.3.

7. Section 1.5; PHASE 2; does phase 2 include the first year of warranty where the contractor is still involved with the project?

   Response: The first year of the warranty is part of Phase 3, which commences on Substantial Completion. Please note, however, that some of the equipment warranties will start when the equipment is placed into service, which, for the interim operations, will be well before Substantial Completion.

8. Section 1.5, PHASE 2; has the SUBSTANTIAL COMPLETION term been defined?

   Response: Substantial Completion is defined in Section 01770, Contract Closeout.

9. Section 2.1.2; Category C; do we want to specify in level of effort that we need a estimated maintenance hours/ MGD of membrane?

   Response: Estimated maintenance hours have been included as a data element to be provided by the supplier on the MBR System Operation Data Form in Appendix C.

10. Section 2.1.2; Category C; do we want to provide a base salary rate ($35/hr) so we can have the proposer provide an accurate O & M Cost?

    Response: Per previous messages, we have not included an hourly labor rate in the RFQ/RFP because we feel it could be used to manipulate the estimated level of effort.

11. Section 2.2 ; need to update the schedule

    Response: Schedule has been updated.

12. Section 3; lets work together on cleaning up the EJCDC documents and City forms before including in the next submittal.

    Response: EJCDC documents have been modified by the team and are included in the Issue for Bid RFQ/RFP package.

13. Gen Req Section 01025; Part 3, execution seems to indicate the City will pay for Phase 2 line items (2.1 – 2.2.8)?

Response: Section 01025, Measurement & Payment does not specify who will be making the payments but does have a Payment Schedule. If and when the contract is assigned, the General Contractor will be responsible for making payments to the MBR System Supplier.

Meeting Memorandum No. 3 – 10% Design Workshop and Design Workshop Checklists for WWTP, BCF, and MBR RFP-RFQ

1. The notes look fine – we need to track all of the identified items to make sure they were properly addressed. KJ?

   Response: Each task lead (Tom Giese – WWTP, Mark Cullington – BCF, and Eric deMontigny – RFQ/RFP package) is taking responsibility for tracking and following through on the items pertaining to their specific part of the project.

2. Action Items – Please email electronic text of COA action items so I can properly respond.

   Response: The action items listed in the meeting minutes were e-mailed to the City for use, along with a few other City action items that had come up since the 10% design review workshop.

Action Items

In order to finalize the 10% design period, Kennedy/Jenks Consultants will review the 17 October 2007 update provided by the City on the action items that were established during the 10% Design Review Workshop. Any unaddressed action items remaining from that list will be added to an upcoming Request For Information (RFI #2). The RFI will be comprised primarily of items for which Kennedy/Jenks Consultants is seeking City direction on design issues which have already been discussed, and for which alternative evaluation has been performed. The RFI will be divided into sections pertaining to each of the WWTP and BCF facilities.

Enclosure: BCF Sheets C03 and G05