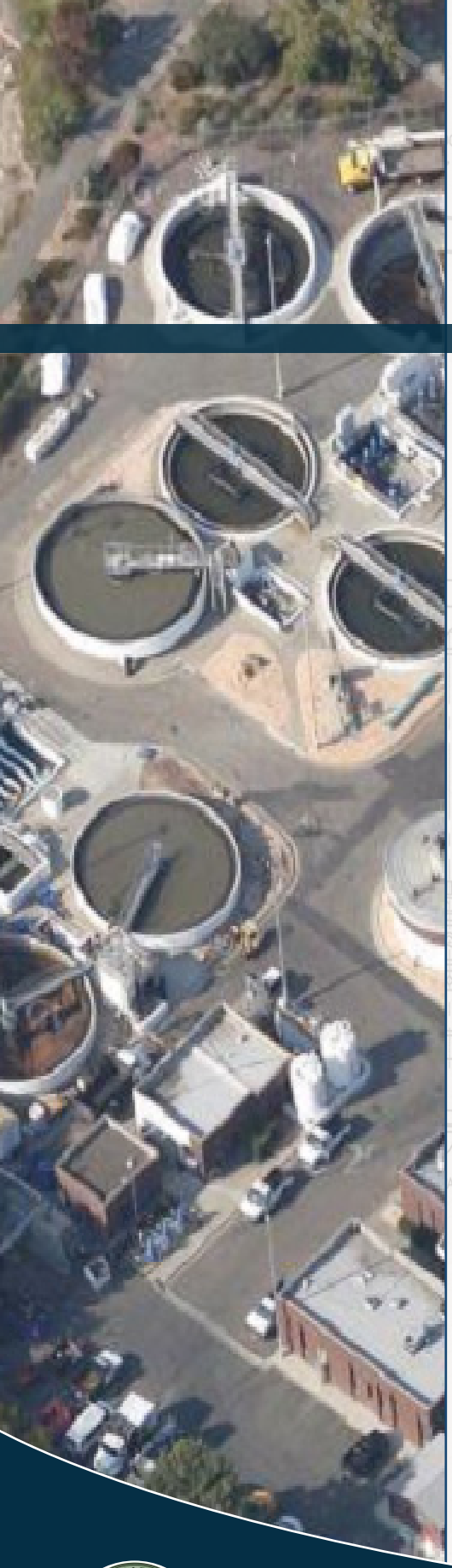


PINOLE-HERCULES

WATER POLLUTION CONTROL PLANT UPGRADE PROJECT

Peer Review of Pre-Design Documents

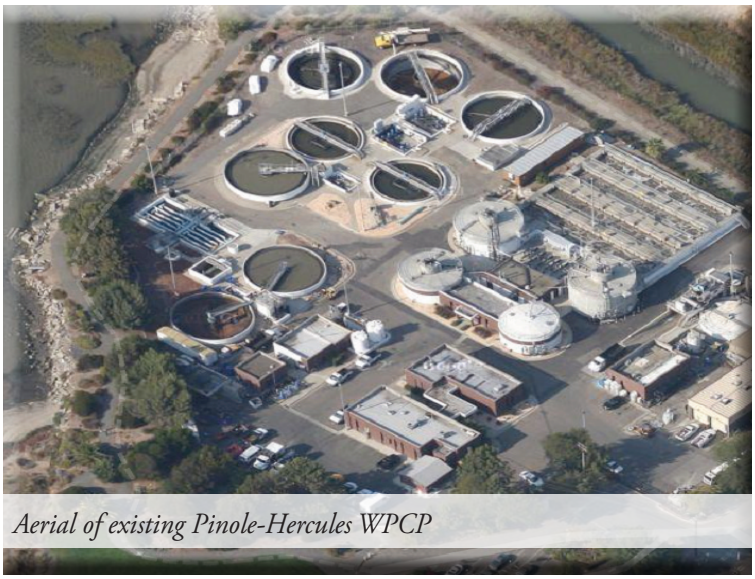
Prepared and Submitted by,

The Covello Group

December 2013

Introduction

The City of Pinole (City), in conjunction with the City of Hercules, must complete upgrades to their water pollution control plant (WPCP)to comply with the requirements of their National Pollutant Discharge Elimination System (NPDES) discharge permit. To that end, the City retained the design firm of HDR to complete the pre-design for the Pinole-Hercules Water Pollution Control Plant Upgrades Project (Project). The project is one of the City's largest capital improvement undertakings and as such retained The Covello Group to perform a Peer Review (Review) of HDR's pre-design. The two goals of the review were to do the following:



Aerial of existing Pinole-Hercules WPCP

1. Validate the Pre-design Approach
2. Identify potential areas of the design that could be modified that would enhance the function and constructability of the treatment facilities

To accomplish the Review, The Covello Group assembled a team of highly respected industry professionals, each who has an extensive background in one of the major facets of this project type; process, design, construction and operations. The team members each were allotted up to eight hours to review the pre-design package prior to convening for a two-day workshop held on October 15 and 16, 2013. During the two-day workshop, the members reviewed each process stream and working together as a team, assessed the overall design approach for reasonableness and adequacy and developed and analyzed alternatives that had the potential of saving construction time, reducing capital costs and improving efficiency to make best use of costs.

Outside Review Team Members	
Christopher Davenport, P.E. (Team Leader)	**Lea Fisher, P.E.**
Specialty- Constructability and Sequencing The Covello Group, Inc.	Specialty- Process Wm. Lea Fisher, Consulting Engineer
Levi Fuller	**Jean-Marc Petit, P.E.**
Specialty- Operations Dublin San Ramon Services District WWTP Operations Supervisor	Specialty- Design Carollo Engineers, Inc.

The City of Pinole's WWTP Manager (Ron Tobey) and Operations Manager (Tim Harless) also participated in the review, joining the team during the two-day workshop, providing important historical background and input on current and future operational goals.

Pinole-Hercules WPCP

The workshop followed the below agenda:

Day 1 (Tuesday October 15, 2013):

Morning – HDR's Design Team presented an overview of the pre-design to the Review Team. After the presentation, the Review Team toured the plant site with Pinole's Operations and Plant Managers.

Afternoon – The Review Team started their review effort and focused on the following:

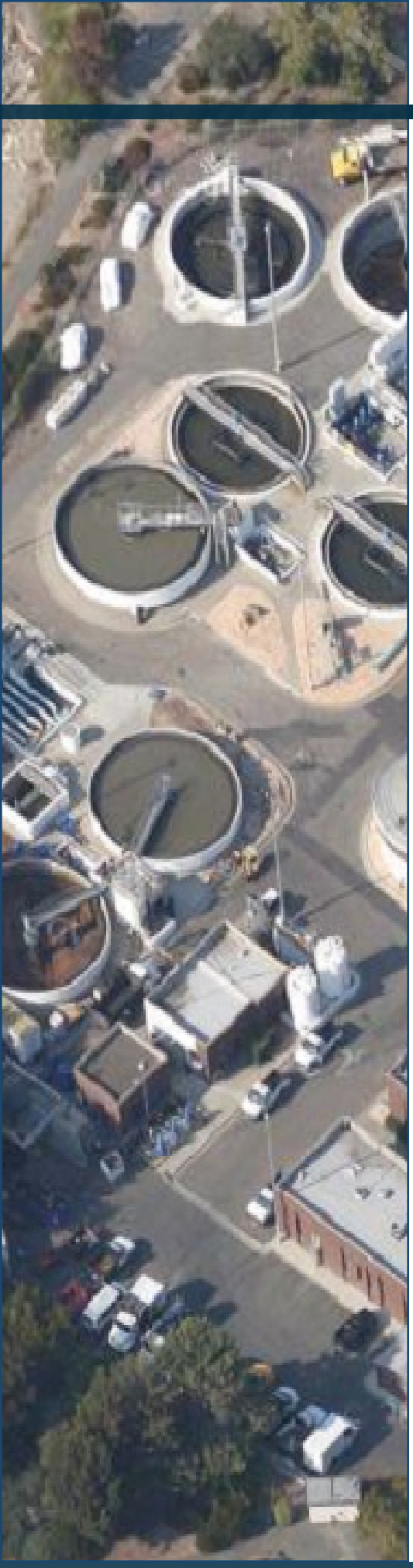
- Headworks: Influent Pumps, Screening and Grit Removal
- Flow Equalization (including Primary Treatment)
- Solids Handling
- Aeration Basins and Blowers
- Plant Utilities and Yard Piping

DAY 2:

Morning – The Review Team continued pre-design analysis and focused on the following:

- Secondary Clarifiers and Return Activated Sludge/Waste Activated Sludge (RAS/WAS) Pumping
- Effluent Pumping
- Disinfection System
- Electrical Distribution System
- Construction Phasing

Afternoon – The Review Team met with the HDR Design Team and provided an overview of the Review Team's efforts and initial findings.



The findings and recommendations developed during the workshop are summarized in the following pages of this Report. This Report is broken up into the following four sections:

1. **Summary of Findings and Major Recommendations**
2. **Detailed Discussion**
3. **Conclusion**
4. **Appendix**

1. Summary of Findings and Major Recommendations:

Findings

- **Pre-Design Approach-** The Review Team concluded that HDR's reasoning was sound, their process recommendations are consistent with standards of the industry and found no reasons that should preclude HDR from proceeding with the 65% design effort. The recommended processes are currently being used by other Northern California agencies to successfully treat wastewater to meet similar discharge water quality standards as is currently required of the City.

Recommendations

- **Headworks-** The Review Team recommends the deletion of the bypass weir downstream of the influent pump discharge point and relocate the gate to keep the existing grit process bypass channel. Downstream of the grit process, conveys all flow through one pipe to the existing primary influent box. Swap locations of the grit and bypass channel and move all new grit equipment to the north side of the new structure. Combine all grit and screenings by conveying to a single dumpster.

  Estimated Capital Savings = *$0*
  Estimated Operational Savings = *$15,000 per year*

- **Yard Piping-** Delete 30-inch diameter bypass pipeline from the new Headworks structure to the existing primary effluent junction box, modify existing primary influent box to allow diversion of the overflow to the Aeration Basins, install new pipeline from modified primary influent box to new junction structure to connect to existing primary effluent pipeline, reroute 24-inch diameter effluent pipe from new Primary Clarifier No. 3 (PC3) to proposed new primary effluent junction box, shorten RAS return pipeline and connect it to the proposed new primary effluent junction box.

  Estimated Capital Savings = *$90,500*
  Estimated Operational Savings = *$0*

- **Effluent Pumping-** Reduce the size of one or two pumps from 400 to 200 Hp. If wet weather redundancy is a high priority, then install two 200 Hp and two 400 Hp pumps; the additional 400 Hp pump can be installed in a separate can if necessary.

  Estimated Capital Savings = *$194,00*
  Estimated Operational Savings = *$117,000 per year*

Total of Estimated Potential Savings
Capital Savings = $284,500
Operational Savings = $132,000 per year

2. Detailed Discussion:

The following sections provide a list of the Review Team's recommendations for each process area. Many of the sections include expanded detail and figures to better illustrate the Review Team's ideas.

Existing Headworks Pinole-Hercules WPCP

Headworks

The Review Team identified and discussed the following:

Recommendations to the Headworks (HW)	
HW- 1	Eliminate 30-inch diameter bypass pipeline and weir downstream of the influent pumps. Maintain bypass gate to isolate inlet of bypass channel from grit chamber feed.
HW- 2	To increase redundancy and reliability, offset screen location, allow discharge from the washer compactors to be individually conveyed to the screening dumpster.
HW- 3	Change orientation of grit tank to north side of the new Headworks Structure to improve access for Plant Staff and to keep construction confined within the current fence line.
HW- 4	Combine washer compactor screenings and grit into a single dumpster.
HW- 5	Reduce the number of bends in the grit system piping by adding an additional suction line and dedicated discharge from each pump to each cyclone.
HW- 6	Provide additional space for Ferrous/Ferric Tank next to the grit chamber (6,000 gallon).
HW- 7	Suggest roughing out the footprint for bio-filter. Due to space constraints, a similar odor control system as called for the solids handling may be required at Headworks.
HW- 8	Evaluate odor control for the grit and rag bins.
HW- 9	Consensus on the recommended size of screen openings was not achieved. However, the majority of the Review Team recommends that the 65% design consider using small screen openings (1/8 or 1/4-inch) to improve capture of non-organic material. This will reduce downstream problems caused by 'ragging' of equipment and taking up digester capacity.
HW- 10	The 65% design should consider using heavier duty screens such as the Mahr type, and constructed of all 316 stainless steel. Representative manufactures of this screen type include Huber, Headworks and Vulcan.

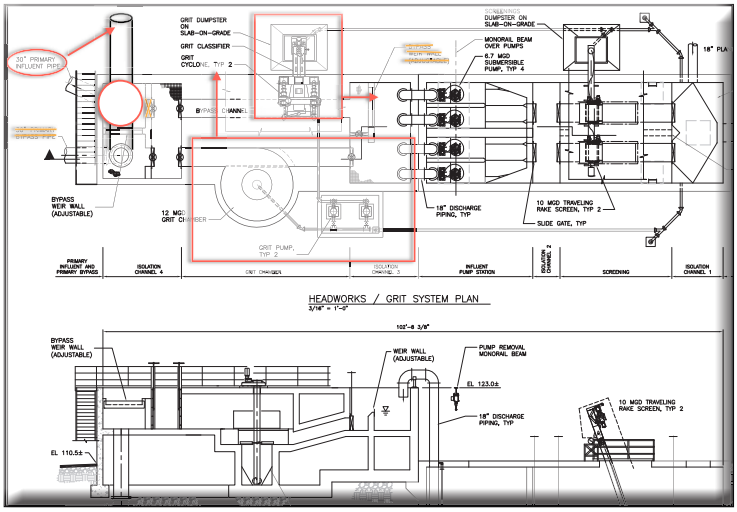
Existing Bar Screen Structure at Pinole-Hercules WPCP

The Review Team's primary recommendation for this area is ***HW-1***, to eliminate the 30-inch diameter bypass weir and pipeline from the design. Instead of routing two 30-inch diameter pipelines from the Headworks Structure, the Review Team recommends that HDR consider designing one pipeline to the Primary Clarifier Splitter box and modify the splitter box to handle the additional flow. The flow will then be routed through a new pipeline that connects with the existing Primary effluent pipeline, located southeast of new Secondary Clarifier No.1 (SC1). This re-routing will eliminate the new 30-inch diameter bypass piping, that is now shown to be installed outside of the plant fencing under the adjoining pedestrian pathway and PC3's effluent discharge pipeline, refer to attached *figure 5.5* for more detail.

Recommendations HW- 2 through HW- 5 focus on reconfiguring the grit system and equipment. Relocating all of the equipment to the north side of the new structure will provide better access for the WPCP's Operations and Maintenance Staff. The new location will also result in the installation of a conveyance system that can consolidate the rags and grit into a single container, covered with odor control ducting. Refer to attached *Figure 5.5* for more detail.

Recommendation HW-6 is only possible if HDR can incorporate ***Recommendation HW- 1*** into their design. The ability to store the chemical directly adjacent to the dosing point will benefit plant operations and minimize potential service interruptions due to potential pipeline leaks.

The balance of the items are topics that the Review Team recommends for HDR's consideration when working on their 65% design. The Review Team recommends that HDR brief the City on how each item was addressed during the design development.



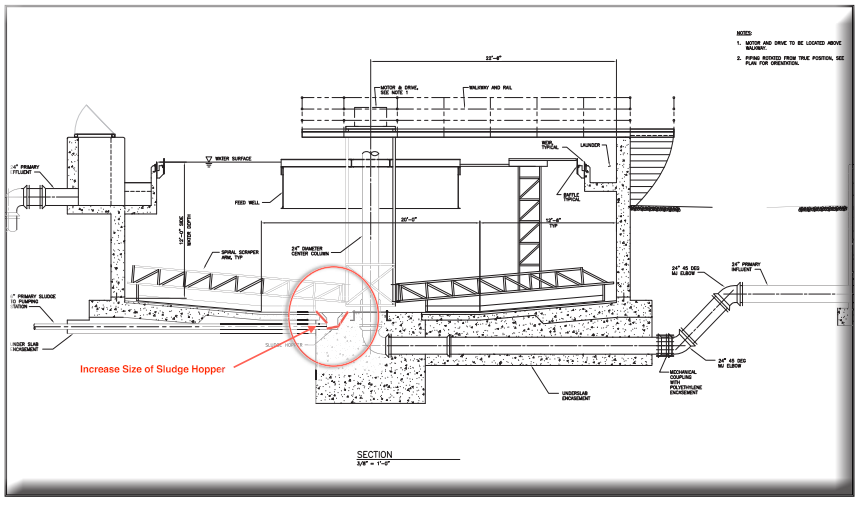
Excerpt from Figure 5-5; Alternative 1 HW Changes (full size available in Appendix)

Primary Clarifiers

The Review Team identified and discussed the following:

Recommendations to the Primary Clarifiers (PC)	
PC- 1	Build PC3 in Stage 2
PC- 2	Enlarge the sludge hopper for new PC3. Refer to *Figure 8-13* for detail.
PC- 3	Consider Stainless Steel over painted steel for the clarifier mechanism
PC- 4	All nuts and bolts should be stainless steel.
PC- 5	Add scum pumping to PC3 and route to digesters.

Existing Primary Clarifier at Pinole-Hercules WPCP



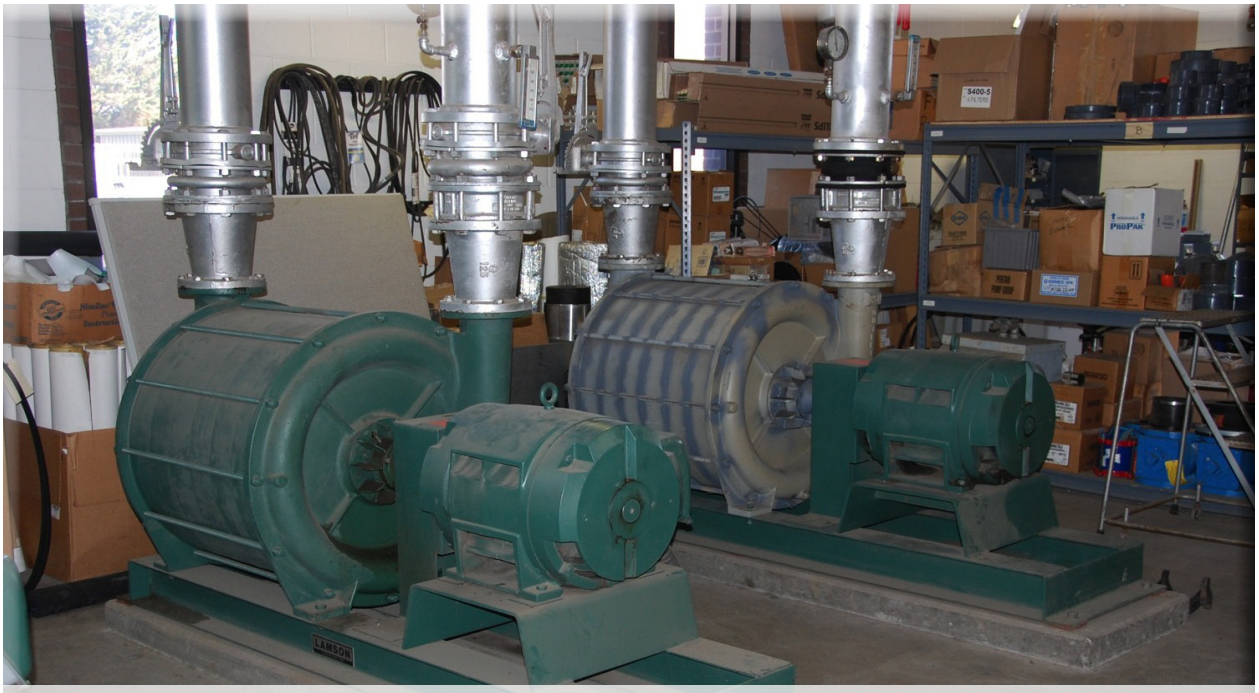
Excerpt from Figure 8-13; PC3 (full size available in Appendix)

Recommendation PC- 1, has the biggest potential to lower initial construction cost by allowing the contractor to build PC3 earlier than currently planned. The advantages are further detailed in the Construction Sequencing Section.

Recommendation PC- 2, enlarging PC3's sludge hopper will help better achieve the design and operational goal of thickening the sludge in the primary process. A larger hopper will also allow a more consistent rate of pumping sludge to the Solids Handling facility.

Recommendations PC- 3 and PC- 4, stainless steel mechanism and hardware will increase the initial capital costs but has the potential to save coating and corrosion costs over the average 25- year design life of the mechanism. Additionally, the State of California continues to enact more stringent regulations that limit the available coating materials once prevalent in the wastewater industry thereby reducing the viable coating alternatives.

Aeration Basins

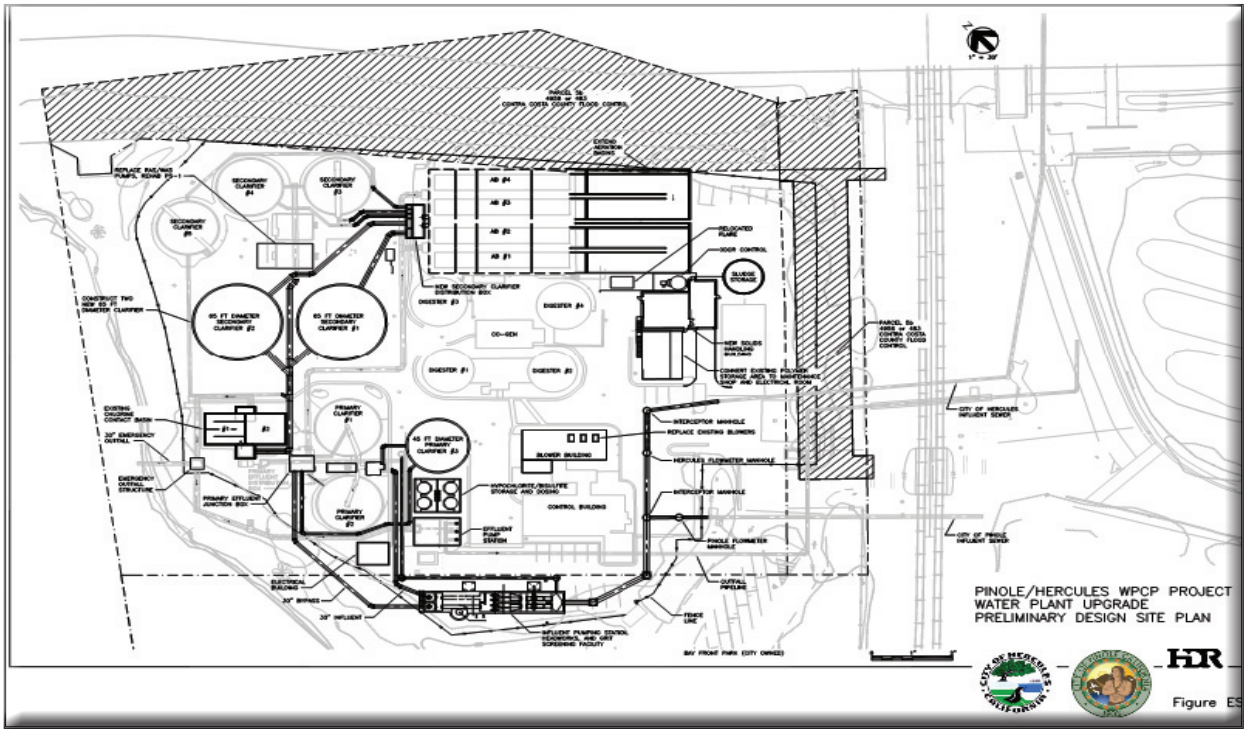


Existing Aeration Blowers at Pinole-Hercules WPCP

The Review Team identified and discussed the following:

Recommendations to the Aeration Basins (AB)	
AB- 1	Adjusting design discharge pressure for the blowers from 10 psi to 7.5 psi to match design criteria.
AB- 2	Reconfigure blower, air intake for blowers including filtering. As currently configured, the high-speed turbo blowers will be using ambient air from within the blower room. Rather, the Review Team recommends using the filtered outside intake which provides better quality air to the blowers, keeps dust down and avoids creating a negative pressure atmosphere in the blower room.
AB- 3	Add automated control of gates and valves to switch from plug flow to contact stabilization. Reduce the number of existing step feed gates. Consider eliminating the y-wall configuration for the new extended ABs and use a pipeline to handle step feed for contact stabilization.
AB- 4	Suggest adding a sump in each of the new ABs to aid in dewatering. Need to discuss pump down system with Operations; one idea is to install permanent piping to allow easy hookup for existing trash pump.
AB- 5	Build extensions to AB and call for one train to be temporarily placed in service while completing the entire retrofit and upgrade to the other side.

AB- 6	Recommend having manufacturer perform analysis to determine proper sizing for propeller mixers; there is concern that one mixer, is not large enough to handle mixing of a rectangular shaped anoxic zone. The Review Team's recommendation is to consider adding a lifting device at each mixer to facilitate an easier removal.
AB- 7	Control Strategies need to address both Dissolved Oxygen (DO) and Air Flow for each aeration zone.
AB- 8	Explore the installation of Total Suspended Solids (TSS) meters to measure RAS and Mixed Liquor Suspended Solids (MLSS) concentrations. This will provide Operations more information to make finer process adjustments and eventually the ability to control the Solids Retention Time (SRT) automatically.
AB- 9	Existing 18- inch pipeline currently shown incorrectly on *Figure 8-14* at the end of the new extended aerators versus at the end of the existing aeration basins. Need to consider air-piping modifications.
AB- 10	APG-Neuros' cost estimate does not include many of the needed options (master control panel, harmonic filters, etc.) that are recommended to run the system as described in the pre-design report. An updated cost estimate is needed to reflect the total blower equipment cost inclusive of all options and then include those same requirements in the 65% design specifications. To keep APG-Neuros competitive, the Review Team recommends naming additional blower manufactures such as HSI (Atlas-Copco) and ABB.
AB- 11	Design needs to coordinate with Operations to determine optimal and safest way to access bottom of basins to conduct routine maintenance, inspect fine bubble diffusers and any other required work.



Excerpt from Pinole-Hercules WPCP Project Preliminary Design Site Plan

Existing Aeration Basin at Pinole-Hercules WPCP

The Review Team did not find many areas of the AB design that could be optimized or changed to reduce initial construction or long-term operational costs. The Review Team discussed the merits of requiring one AB to be totally completed and placed into service early and subsequently building the extension on the second AB. There was concern that the Contractor would prefer to proceed with building both new basin extensions at the same time, therefore, at this time there is no recommendation to spend additional design time to detail this phased approach.

It is worth to note that when checking the Project Drawings from the previous clarifier project, the Review Team noted that the AB Effluent and Clarifier No. 5 feed influent piping around the existing SC splitter box was different than shown in the pre-design report. This led the group to conclude that HDR may have used the design (and not the record drawings) to develop the pre-design report. Therefore, it is recommended that HDR work with WPCP Plant Staff to get copies of all past project record drawings.

The listed items are areas that need further consideration that HDR should address during their 65% design effort.

Secondary Clarifiers

Existing RAS Pump Station at Pinole-Hercules WPCP

The Review Team identified and discussed the following:

Recommendations to the Secondary Clarifiers (SC)	
SC- 1	Further review access around new clarifiers to allow for boom truck to access existing clarifiers and other equipment.
SC- 2	Consider offsetting new clarifiers by moving SC2 north and move the new SC1 and SC2 closer together to improve access around and to get to the remaining clarifiers.
SC- 3	Add a single point of chlorination for RAS system on return line to Headworks.
SC- 4	Add a second skimmer to each new clarifier mechanism, resulting in two skimmers on each mechanism.
SC- 5	Side water depth should be 18-feet per hydraulic profile not 12-feet as shown.
SC- 6	Confirm actual piping sizes and hopper configuration for RAS to match design criteria because the information currently shown appears smaller than required.
SC- 7	Add a scum pump system to each secondary clarifier to be able to pump scum to solids handling area. Need to consider scum piping route(s). One possible alignment is in the outside y-wall of aerators.
SC- 8	Recommend removing one pump from the RAS pump station for SC1 and SC2; and use SC3 instead of SC4.
SC- 9	Need to consider algae control in secondaries, brushes or chlorine injection.

Existing SC3 through SC5 are located in the far northwest corner of the treatment plant with minimal access. The access will be further impacted during construction and potentially long term if the new facilities are not situated to maintain the current access. To maximize access to this area of the plant, the group recommends offsetting the two new clarifiers, as described in ***Recommendation SC- 2***.

The Review Team also recommends adding a system to pump secondary scum to the sludge holding tank. This will add to the initial construction cost, yet, it will result in reduced long-term maintenance and operational costs by eliminating the need to rod and flush the existing gravity drain system.

Disinfection System

The Review Team identified and discussed the following:

Recommendations to the Disinfection System (DS)	
DS- 1	Recommend installing a concrete channel (east and south walls) to convey all secondary flow to disinfection channel instead of a new pipe. Move chlorination point to just north of new SCs. (This measure is recommended only if replacement of the 42-inch diameter pipeline is required, as shown on the current project documents.) This will also require re-routing the effluent pipeline from SC5 to north of new SC2.

The current design includes minor modifications to the existing chlorine contact basin and disinfection system. Consequently there were limited opportunities to review alternatives to what is currently shown in the pre-design report. The one area on which the Review Team, was the new 42-inch secondary effluent pipeline. The pre-design document shows the installation of a new 42-inch secondary effluent pipeline from a point just north of the two new SCs to the inlet of the existing chlorine contact tank; this would require the Contractor to set up temporary pumps to handle all of the WPCP's flow for an extended period of time and may not be possible due to interference with existing structures. In addition, to facilitate construction, a portion of the Primary Effluent Junction Box may need to be demolished. To avoid these and many of the issues associated with temporary pumping and provide Operations future flexibility, the Review Team arrived at the idea of installing a new concrete box channel around the existing 42-inch pipeline that would eventually become the effluent conduit once the 42-inch pipeline was removed. The new effluent conduit would be divided into two channels, providing operational flexibility by allowing WPCP staff the ability to clean one channel at a time without taking the plant out of service. The new SCs, along with the SC5 can be connected to the concrete channel; proposed location is north of the new facilities. This would allow the chlorine injection point to be moved several hundred feet upstream of the current point, providing approximately three extra minutes detention time.

Existing Chlorine Contact at Pinole-Hercules WPCP

Solids Handling

The Review Team identified and discussed the following:

Recommendations to the Solids Handling (SH)	
SH- 1	Connect area drains to downstream of Hercules metering manhole, The proposed location of the Hercules metering manhole may need to be moved further upstream. (see *p. 16 Yard Piping* of this document for further detail).
SH- 2	To meet the operational goal to continuously pump primary and WAS sludge will require a larger holding tank of 180,000 to 200,000 gallons. All sludge goes to the holding tank first, then to rotary screen thickener (RST) and then to Digesters. Control strategies to allow for 24- hour operation of RSTs eventually but always allows for wasting from main process stream.
SH- 3	Add ability for Operations to mix and feed alkaline chemicals (such as sodium bicarbonate) to the Digesters
SH- 4	Consider lining sludge holding tank to reduce corrosion degradation.
SH- 5	The Mixing Pump for sludge tank should not be a positive displacement pump; the Review Team recommends a Vaughn chopper pump or Hidrostal pump.
SH- 6	Bridge crane on second story of building should be extended to allow for loading to a truck or reorient the bridge crane so it can lower loads through the floor to the existing truck bay.
SH- 7	Confirm no issues with BCDC on height of building.

This process is one of the areas that The Review Team spent considerable time discussing with the WPCP Operations Personnel. The current approach is to feed digesters during the day, when the plant is staffed. The Plant staff would really like to be able to feed the digesters more consistently and ***Recommendation SH- 2*** focused on meeting this desire. The Plant has plenty of digester capacity. Designing the system now to allow plant staff the ability to feed the digesters continuously using automatic controls will improve digester performance, gas production and overall solids handling, which in the long run will lower operational and maintenance needs of this system.

Existing Solids Handling at Pinole-Hercules WPCP

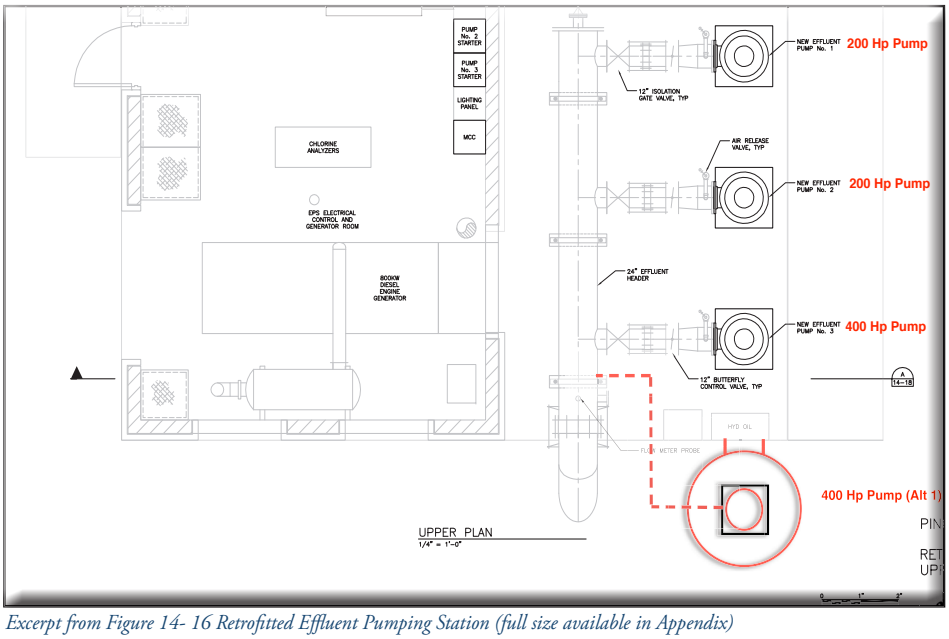
The other listed items are areas that need further consideration that HDR should address during their 65% design effort.

Effluent Pumping

The Review Team identified and discussed the following:

Recommendations to the Effluent Pumping (EP)	
EP- 1	Change three pump configuration from three 400Hp motors to one 200Hp motor and two 400Hp motors or two 200Hp motors and one 400Hp motor. Another option is to add an external steel can and fourth pump and then tee into the discharge header. This limits concrete deck mods and lowers energy demand for majority of operating conditions.
EP- 2	Need to add ability to add Caustic for pH control to offset the reduction in alkalinity caused by nitrification and maintain the effluent pH above that which could cause potential damage to the asbestos cement effluent pipeline.
EP- 3	Confirm that the final sampling point is located past the de-chlorination injection point.

Recommendation EP- 1 is an area that has large potential cost savings over a 20- year operational horizon. The pre-design requires the addition of three new 400-hp motors to pump anticipated wet weather flows while maintaining appropriate redundancy. The Review Team confirmed with WPCP Operations that it is very rare, in the current plant configuration to operate more than one 200Hp. Existing and predicted future minimum night flows are approximately 1.5 mgd, which with the new proposed 400Hp configuration has the high potential to operate on a start stop sequence. This is based on a review of the pump data, which shows that the 1.5 mgd is below the effective turn down rate of the new pumps. The Review Team recommends a minimum of one lower flow pump be maintained (and possibly two), which would handle approximately 90% of the pumping conditions. The third pump would be used during maximum wet weather flows. If there is concern with wet weather pumping redundancy, then the Review Team recommends initially installing another 400 Hp pump in its own steel can connected to the existing wet well. The costs of the additional pump will be offset by the energy savings of using the smaller pumps during the vast majority of the year. See *Figure 14-16* for additional detail.



Excerpt from Figure 14- 16 Retrofitted Effluent Pumping Station (full size available in Appendix)

Existing Variable Frequency Drives at Pinole-Hercules WPCP

Electrical System

The Review Team identified and discussed the following:

Recommendations to the Electrical System (ES)	
ES- 1	Conduit routing scheme to new electrical building and existing transformer is not identified in pre-design documents. The Review Team presumes it will run underground, not overhead. Route adjacent to new influent piping a consideration.
ES- 2	Consider developing load-shedding protocols when using emergency generators. WPCP Operations preference is to power influent pumps first and everything else second (i.e. do not run large effluent pumps at the cost of losing an influent pump).

The Review Team did not find many areas of the Electrical System design that could be optimized or changed to reduce initial construction or long-term operational costs. WPCP Operations staff did voice concerns of, *"developing some type of load shedding protocol in the event that the new standby generation system could not handle required plant electrical loads."* This statement is focused on the new electrical building that will be backed up by two 800 Hp generators. If one of the standby generators goes fails, WPCP Operations want to maintain the ability to pump into the plant.

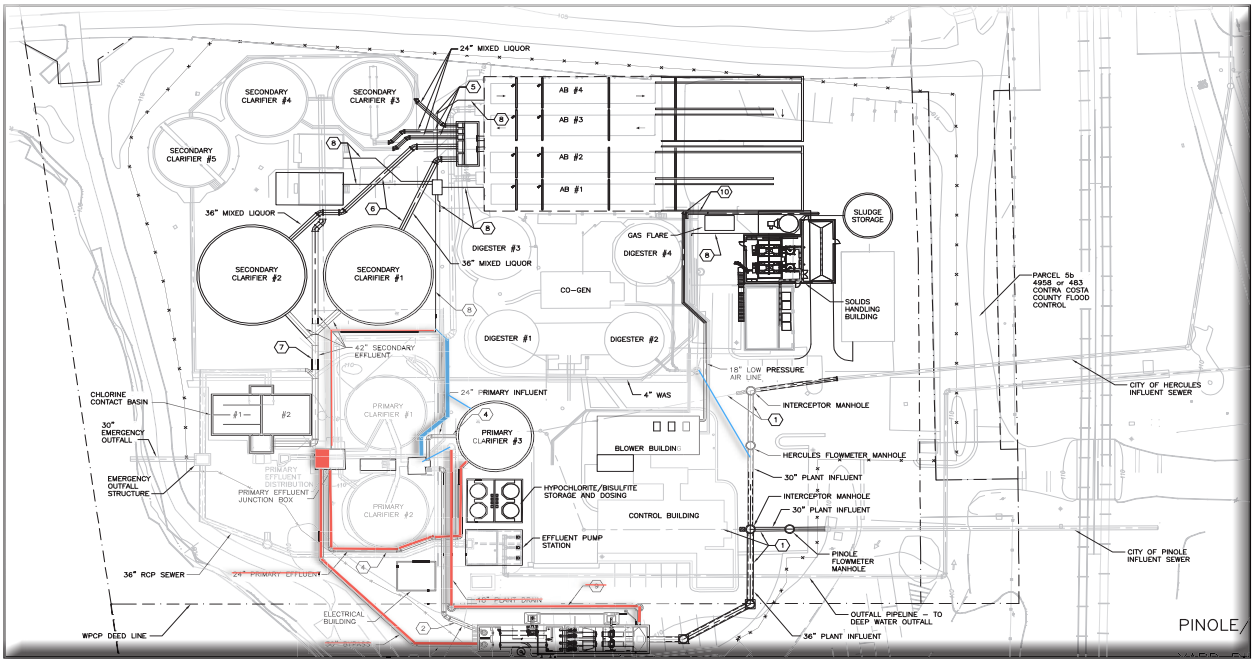
Existing Generator at Pinole-Hercules WPCP

Yard Piping

The Review Team identified and discussed the following:

Recommendations to the Yard Piping (YP)	
YP- 1	Eliminate 30- inch diameter Bypass Piping from Headworks to Primary Effluent Box.
YP- 2	Re-route 24- inch diameter PC3 effluent pipeline from bypass structure to proposed new bypass pipe.
YP- 3	Reduce RAS feed line length and connect to new primary bypass pipe.
YP- 4	Re-route the effluent line from SC5 north of SC1 if the secondary effluent channel is constructed.
YP- 5	Route plant drain from solids handling area to new influent sewer line, downstream of Hercules meter.
YP- 6	Eliminate plant drain from existing discharge point (at existing influent wet well) to new Headworks. Instead, install a new wet well at the existing low point and pump discharge into primary clarifier feed distribution box.
YP- 7	Use PVC or HDPE for large diameter low head pipelines instead of steel, dip or rccp.

Recommendations YP- 1 and ***YP- 2*** were presented in the Headworks section on p.5 and p.6 of this document. If this concept can be incorporated, this will enable the existing bypass structure to be modified, demolishing the bypass side giving the Contractor more room to install the new Chlorine Contact piping/box channel connection. ***Recommendation YP- 3*** can be accommodated by routing the new RAS/WAS feed to the new bypass line, thus eliminating the pipe to the primary effluent junction structure. See attached marked up *Figure 19-1* for illustrative information.



Excerpt from Figure 19 - 1 Yard Piping (full size available in Appendix)

Recommendations YP- 4 and ***YP- 5*** provide alternatives to current plan of installing a new drain line connecting the current low point to the Headworks facility. The Review Team's concern is that the new drain would need to be installed under the existing plant effluent pipeline, the new PC3 influent and effluent pipes and new electrical duct banks. Because this area is already crowded and the existing condition of the final effluent is not know, we recommend not pursuing this option. The solids handling area produces the majority of drain volume and can be routed so it drains via gravity to the Headworks. The expected volume of flow conveyed in the remaining drain system for the vast majority of time is low and can easily be handled by a small lift station, installed in the manhole adjacent to the existing Headworks facility. An extra pump can be placed in the pump station to handle storm water flows. The drain water could then be pumped directly into the primary influent distribution box.

The Review Team recommends that HDR consider non-ferrous plastic materials (such as PVC or HDPE) as alternatives for the large pipe. Plastic pipe is made in the required diameters and provide excellent corrosion resistance to both outside soils and internal sewer gasses.

Recommendations for Further Consideration

The Review Team identified and discussed additional items beyond what was presented in the pre-design report. Each of the items noted below posed problems or are areas of potential challenges based on similar project experience. The Review Team recommends addressing these items in the early design phase to reduce their impact during the construction or operation phase of the Project.

North Property Line at Pinole-Hercules WPCP

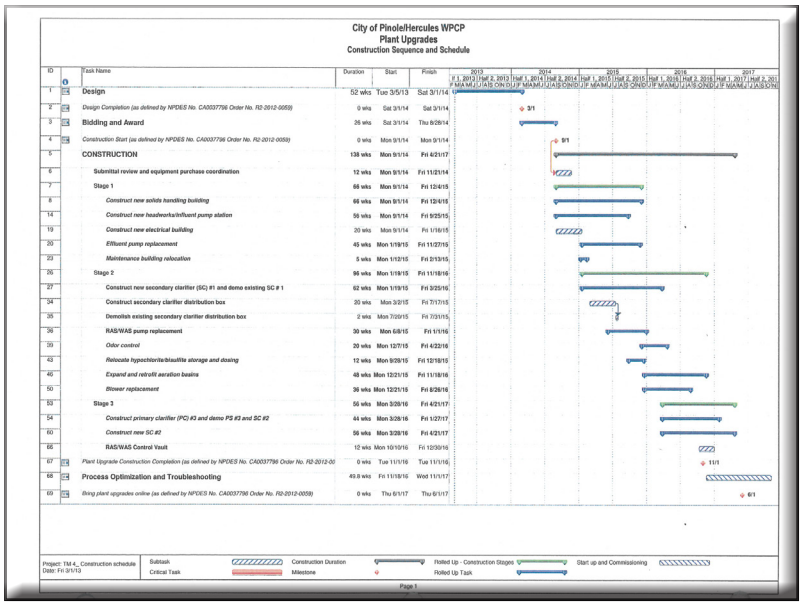
Recommendations for Further Consideration (FC)	
FC- 1	3W routing and operation.
FC- 2	Electrical outlet placement and size; discuss adding 480v and 220v plugs.
FC- 3	New Air Board (BAAQD) permits for digester gas flare relocation. There is concern that Air Board will require an enclosed flare and additional generator.
FC- 4	Confirm no National Fire Protection Association (NFPA)requirement to sprinkler chemical areas.
FC- 5	Recommend negotiating a contract with a System Integrator and assign to the General Contractor to minimize coordination concerns during construction.
FC- 6	Need to define work along the north side of the WPCP; the block wall for creek. Can the area between new wall and plant be filled in with excavated soils from site?
FC- 7	Recommend checking Record Drawings against original designs.
FC- 8	Not sure where temporary facility costs are reflected. Expect extensive use of shoring (sheet piles or slurry walls) around the site.
FC- 9	Railroad trestle height limitation of 13 feet 6 inches on Tennet Drive. Access is limited and needs to be noted.
FC- 10	Due to proximity to the neighborhood, need to consider work hour constraints and parking restrictions in final documents.
FC- 11	Consider locating and securing the use of temporary offsite storage prior to bid. This can also include space for work force parking since it appears there will not be enough space on the plant site and parking in the park will not be allowed.

Construction Phasing:

The WPCP is a confined site bordered by the San Francisco Bay to the west, a flood control channel to the north, active railroad tracks to the east and a City owned park to the south. The City's Police Department stores impounded vehicles on the site and the City's Public Works' Field Crews park vehicles and store materials at the site as well. There is very little room to add new facilities without impacting the current plant operations, which is why Construction Phasing is one of the most important aspects of this Project. The Review Team kept this in mind when discussing the individual process areas; looking for alternatives to the proposed sequencing that would allow efficient construction without reducing the plant capacity or impair the current treatment processes.

Existing Electrical Box at Pinole-Hercules WPCP

The WPCP Staff indicated that the minimum facilities needed to handle dry weather flows are two PCs and four SCs. It was also noted that one of the new SCs will have approximately 2.5 times more treatment capacity as the existing SC. Using that information as a basis, the Review Team looked at different scenarios with the intent of moving more of the construction into the first two stages of the three stages of construction, which has the potential to shorten the overall schedule and more importantly, putting more of the new systems in service earlier. These new systems will increase plant treatment efficiencies, provide the needed redundancies and bring the plant into compliance with its permit requirements prior to the mandated deadline of June 2017.



Pre-Design Construction Sequence and Schedule

After reviewing the each of the processes, and considering the Plant Staff's input, the group came up with the following recommendations:

Recommendations for Construction Phasing (CP)	
CP- 1	Build new Secondary Clarifier distribution box in Stage 1
CP- 2	Build PC3 and SC2 in Stage 2
CP- 3	Connect SC5 during Stage 2
CP- 4	Start work on new AB Extensions in Stage 1
CP- 5	Make modifications to existing primary effluent junction box after new Headworks is in service

Recommendation CP- 1 - It is recommended that the new Secondary Influent splitter box be built in Stage 1. WPCP Record Drawings show the existing splitter box is fed from the ABs by two 30-inch diameter and two 24-inch diameter pipelines. WPCP staff confirmed that they only use the two 24-inch diameter pipes thus allowing the Contractor to plug and remove the 30-inch pipe from the existing box and connect to the new box. The Contractor can then build all of the new feed influent lines to each of the Secondary Clarifiers and connect them during subsequent dry weather seasons.

Recommendation CP- 2 - Once the new Headworks is operational, the old Headworks facility becomes obsolete and can be demolished. At this time the Contractor will have to either install

a temporary pumping system to handle the existing plant drain system or have the new drainpipe installed to the new Influent Pump Station. Once the old Headworks facility is demolished the Contractor could start constructing new PC3. Then once the second dry season began, the Contractor could focus on demolishing existing PC3 and existing SC2 and construct new SC2.

Recommendation CP- 3 – If the Contractor is replacing either the 42-inch diameter pipeline or installing a new secondary effluent box channel, the Review Team recommends that existing SC5 effluent line be connected in Stage 2. This will provide the plant adequate treatment capacity in the final Stage to allow the Contractor to demolish and construct new SC1 and connect existing SC4 and SC5.

Recommendation CP- 4 – Once the area in the northeast corner of the plant is cleared the Contractor can start building the new AB extensions. The new extensions can almost be entirely built before doing any connecting to the existing basins. One consideration is that upon extension completion, the Contractor can punch large openings in one of the existing basins to create a temporary connection. This can be done during a nighttime shutdown. Once one extended AB is in service, the plant has enough treatment capacity to allow the Contractor time to completely renovate the existing half of the offline basin. Then when that AB is completely renovated and placed in service, the other basin can be renovated.

Recommendation CP- 5 – This work goes in tandem with the Review Team's recommendation to eliminate the separate 30-inch diameter bypass flow pipeline and instead route a pipe from the primary influent feed structure to the existing primary effluent pipeline.

Ideas Discussed and Not Included in Any Recommendations:

Individual review members raised ideas for group consideration. However, the majority of the Review Team did not feel there was either enough information or merit to move forward and develop detailed recommendations based on the suggestions. Although the items were not included in the above sections, the Review Team agreed, that because there was some discussion, they should be listed in the report.

Additional Ideas	
1	DAFT instead of RST and holding tank for thickening.
2	Eliminate PC3 and use Aerators to handle the additional solid loading and treatment.
3	Instead of adding PC3 use a Salness type system. Trojan Technologies manufactures a unit that they report has the hydraulic capacity of 3 mgd and a TSS removal rate of 40%. The cost for the unit is $260,000. To help with construction phasing, the Review Team discussed using a unit during construction. Trojan rents a smaller unit for approximately $6,000/week that would require temporary piping, flat area and 50-600 gpm variable speed pump. Additional information is included in the Appendix.
4	Consider potential location of direct nitrification treatment (example: Anammox) of solids side streams.

3. Conclusion:

The Review Team reviewed each section of the pre-design report (dated March 2013) for the Pinole-Hercules Water Pollution Control Plant Upgrades Project prepared by the design firm of HDR. Based on this Review, the Review Team concluded there were minimal issues related to design. The confined site, capacity constraints and condition of the existing facilities reduced the potential treatment alternatives available for HDR's consideration. Adding the short duration available for compliance, the team determined HDR's approach reasonable and appropriate.

It was clear to the Review Team that the WPCP Staff positively participated in the pre-design effort. During the two-day workshop, they provided (operational) context to help the Review Team understand the historical data used as the basis for the pre-design report. Their participation was invaluable and their collaborative frankness was refreshing. It was apparent from the Workshop discussion that the pre-design does not incorporate all of Operations requests. The Review Team presumes that this was a result of HDR trying to balance the limited Project budget and resources. Understanding that the greatest cost of any project is the long-term operations and maintenance, the Review Team presented several recommendations that if instituted, has the potential to maximize operations and the longevity of the plant with slight capital cost increase.

HDR's recommendations are based on reasonable assumptions and engineering practices and we see no reason why they should not proceed using the pre-design report as the basis for the 65% design.

We suggest that HDR and the representatives of Pinole and Hercules consider the recommendations contained in this report during the 65% design effort. Accepting and incorporating the recommendations will benefit the Pinole-Hercules Water Pollution Control Plant Upgrade Project during construction and throughout the useful life of the facility.

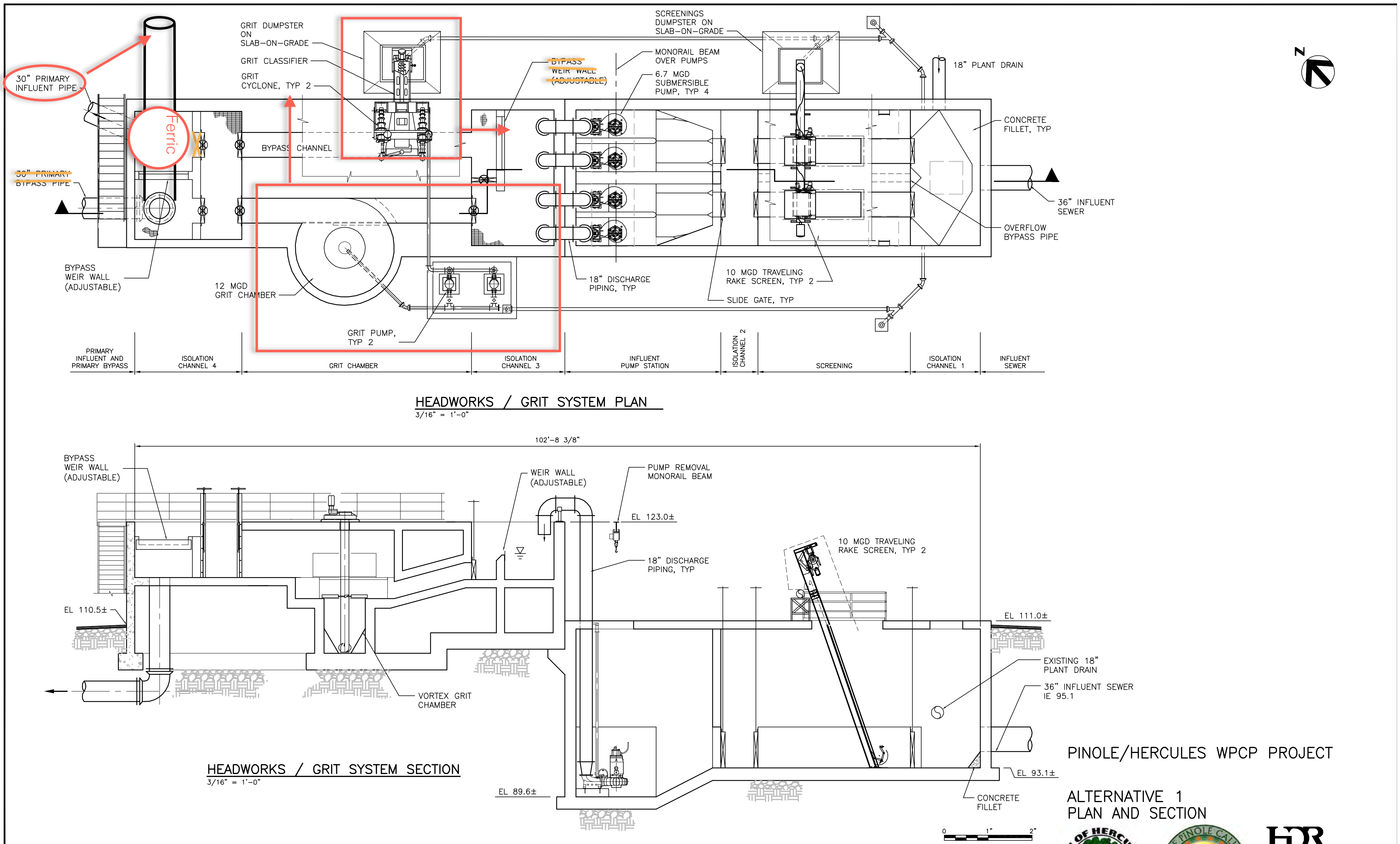
Christopher Davenport, P.E.

Lea Fisher, P.E.

Levi Fuller

Jean- Marc Petit, P.E.

4. Appendix:


30" PRIMARY INFLUENT PIPE
Ferric
30" PRIMARY BYPASS PIPE
GRIT DUMPSTER ON SLAB-ON-GRADE
GRIT CLASSIFIER
GRIT CYCLONE, TYP 2
BYPASS CHANNEL
BYPASS WEIR WALL (ADJUSTABLE)
SCREENINGS DUMPSTER ON SLAB-ON-GRADE
MONORAIL BEAM OVER PUMPS
6.7 MGD SUBMERSIBLE PUMP, TYP 4
18" PLANT DRAIN
CONCRETE FILLET, TYP
36" INFLUENT SEWER
OVERFLOW BYPASS PIPE
BYPASS WEIR WALL (ADJUSTABLE)
12 MGD GRIT CHAMBER
GRIT PUMP, TYP 2
18" DISCHARGE PIPING, TYP
10 MGD TRAVELING RAKE SCREEN, TYP 2
SLIDE GATE, TYP
PRIMARY INFLUENT AND PRIMARY BYPASS
ISOLATION CHANNEL 4
GRIT CHAMBER
ISOLATION CHANNEL 3
INFLUENT PUMP STATION
ISOLATION CHANNEL 2
SCREENING
ISOLATION CHANNEL 1
INFLUENT SEWER
HEADWORKS / GRIT SYSTEM PLAN
3/16" = 1'-0"
102'-8 3/8"
BYPASS WEIR WALL (ADJUSTABLE)
WEIR WALL (ADJUSTABLE)
PUMP REMOVAL MONORAIL BEAM
EL 123.0±
18" DISCHARGE PIPING, TYP
10 MGD TRAVELING RAKE SCREEN, TYP 2
EL 110.5±
EL 111.0±
EXISTING 18" PLANT DRAIN
36" INFLUENT SEWER IE 95.1
VORTEX GRIT CHAMBER
HEADWORKS / GRIT SYSTEM SECTION
3/16" = 1'-0"
EL 89.6±
EL 93.1±
CONCRETE FILLET
0 1" 2"

PINOLE/HERCULES WPCP PROJECT

ALTERNATIVE 1
PLAN AND SECTION

HDR

FIGURE 5-5

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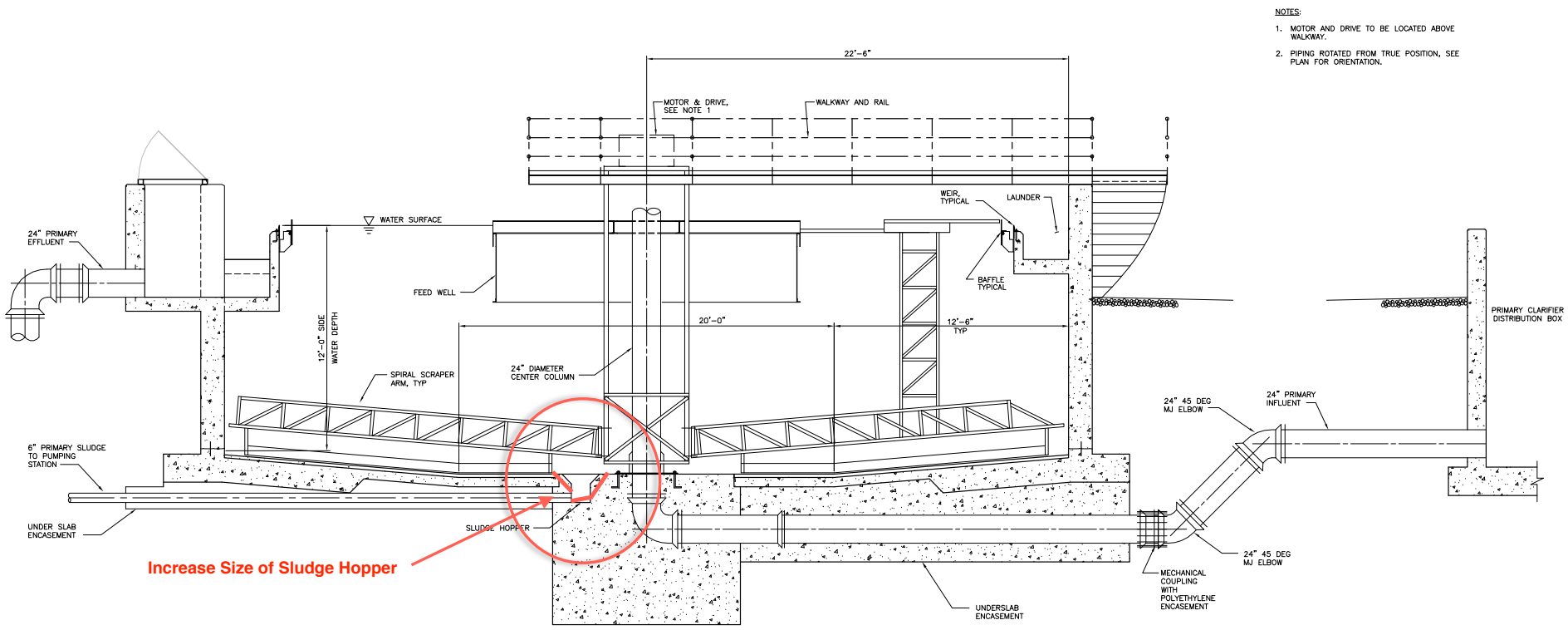


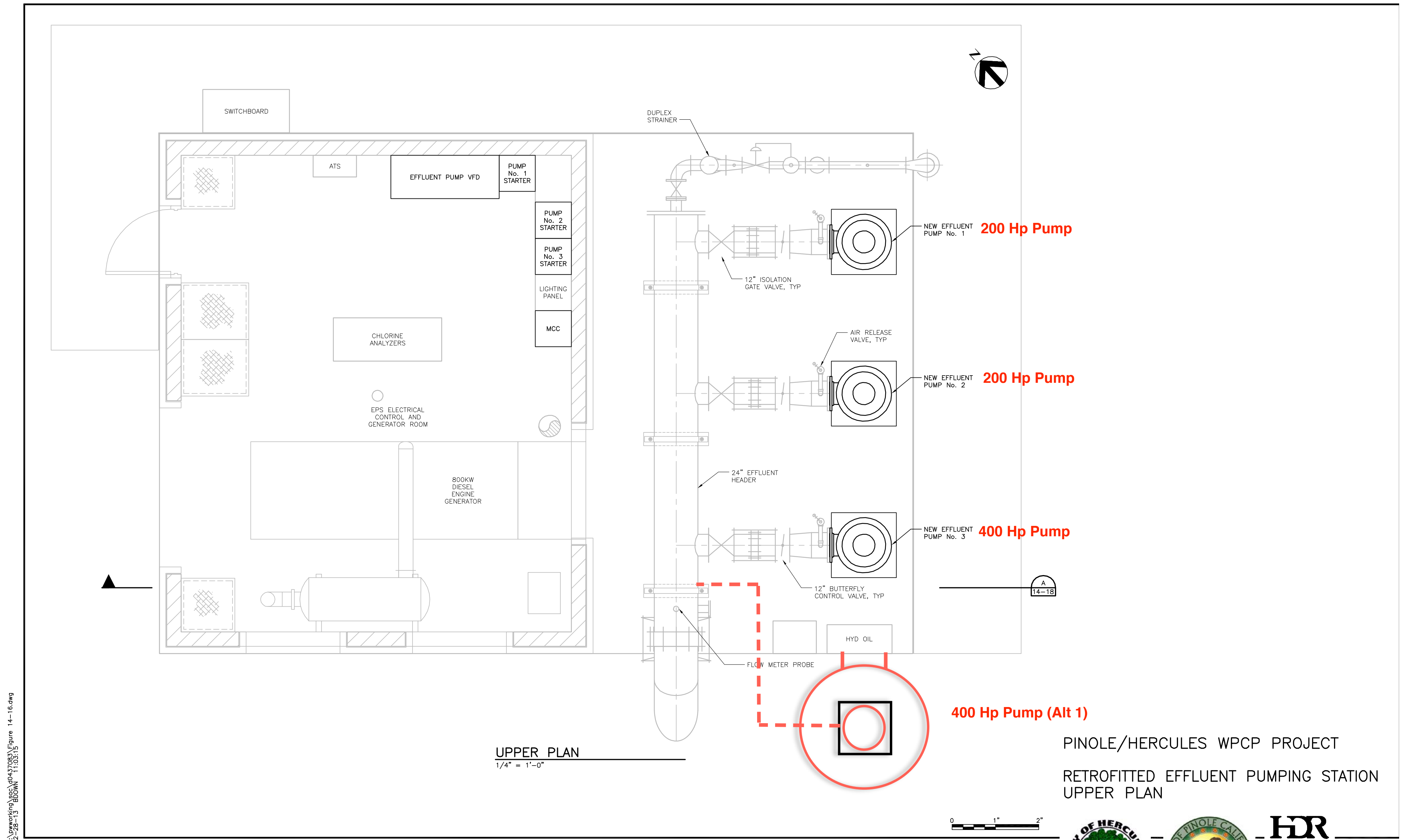
SECTION
3/8" = 1'-0"

PINOLE/HERCULES WPCP PROJECT

PRIMARY CLARIFIER NO 3 SECTION

0 1" 2"

Figure 8-13


SWITCHBOARD
ATS
EFFLUENT PUMP VFD
PUMP No. 1 STARTER
PUMP No. 2 STARTER
PUMP No. 3 STARTER
LIGHTING PANEL
MCC
CHLORINE ANALYZERS
EPS ELECTRICAL CONTROL AND GENERATOR ROOM
800KW DIESEL ENGINE GENERATOR
DUPLEX STRAINER
12" ISOLATION GATE VALVE, TYP
AIR RELEASE VALVE, TYP
24" EFFLUENT HEADER
12" BUTTERFLY CONTROL VALVE, TYP
FLOW METER PROBE
HYD OIL
NEW EFFLUENT PUMP No. 1
200 Hp Pump
NEW EFFLUENT PUMP No. 2
200 Hp Pump
NEW EFFLUENT PUMP No. 3
400 Hp Pump
400 Hp Pump (Alt 1)
A
14-18
UPPER PLAN
1/4" = 1'-0"
0
1"
2"
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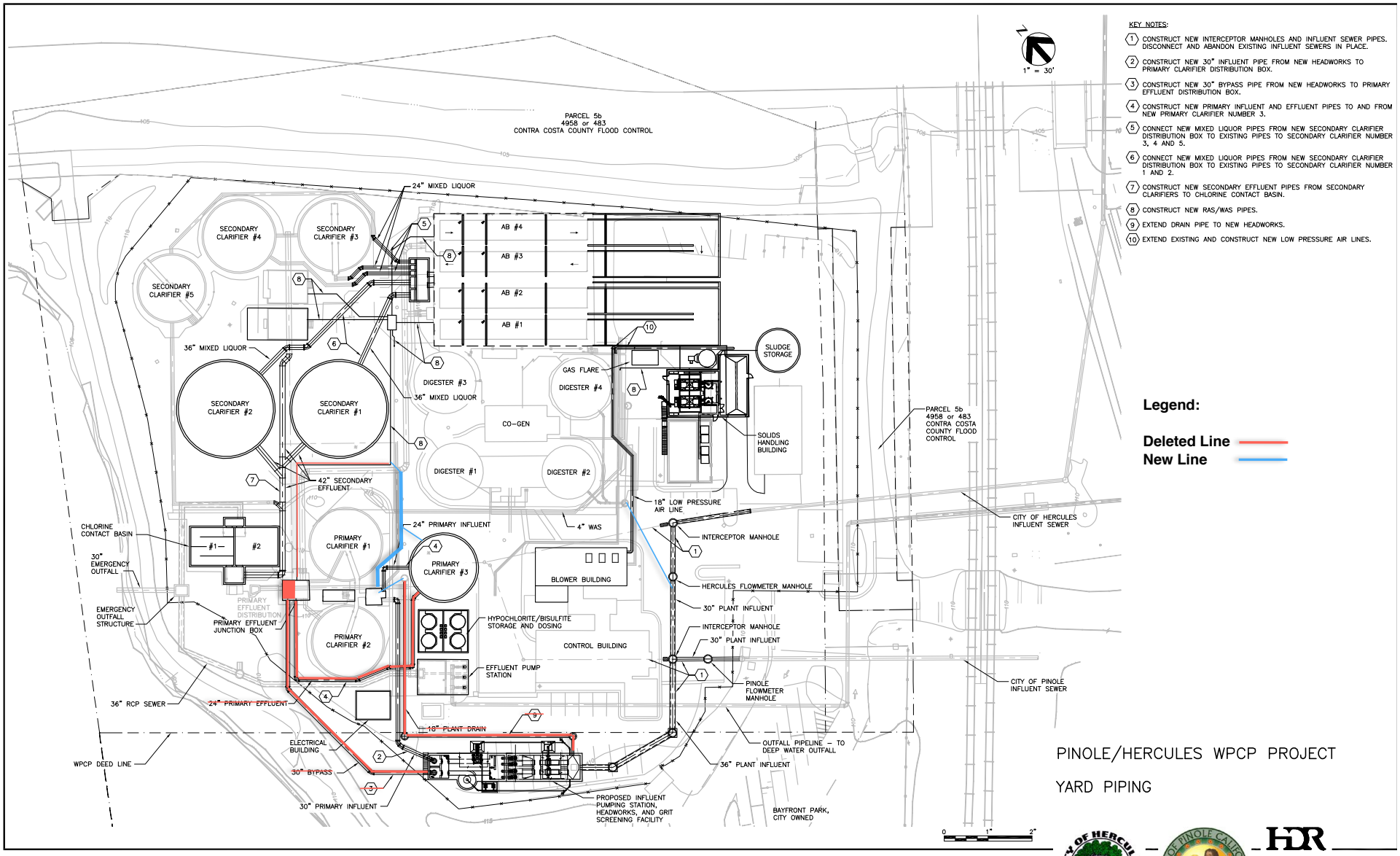
PINOLE/HERCULES WPCP PROJECT

RETROFITTED EFFLUENT PUMPING STATION
UPPER PLAN

HDR

Figure 14–16



PINOLE/HERCULES WPCP PROJECT

YARD PIPING

Figure 19-1

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