SPECIAL MEETING
OF THE MADERA CITY COUNCIL

205 W. 4th Street, Madera, California 93637

NOTICE AND AGENDA

Wednesday, October 10, 2018
6:00 p.m.

Council Chambers
City Hall

CALL TO ORDER

ROLL CALL: **Mayor Andrew J. Medellin**
Mayor Pro Tem Jose Rodriguez, District 2
Council Member Cece Gallegos, District 1
Council Member William Oliver, District 3
Council Member Derek O. Robinson Sr., District 4
Council Member Charles F. Rigby, District 5
Council Member Donald E. Holley, District 6

INVOCATION: Pastor David Votaw, Harvest Community Church

PLEDGE OF ALLEGIANCE:

PUBLIC COMMENT:

The first fifteen minutes of the meeting are reserved for members of the public to address the Council on items which are within the subject matter jurisdiction of the Council. Speakers shall be limited to three minutes. Speakers will be asked to identify themselves and state the subject of their comment. If the subject is an item on the Agenda, the Mayor has the option of asking the speaker to hold the comment until that item is called. Comments on items listed as a Public Hearing on the Agenda should be held until the hearing is opened. The Council is prohibited by law from taking any action on matters discussed that are not on the Agenda, and no adverse conclusions should be drawn if the Council does not respond to public comment at this time.

PRESENTATIONS None.

INTRODUCTIONS None.

A. WORKSHOP

There are no items for this section.

B. CONSENT CALENDAR

There are no items for this section.

C. HEARINGS, PETITIONS, BIDS, RESOLUTIONS, ORDINANCES, AND AGREEMENTS

There are no items for this section.

D. WRITTEN COMMUNICATIONS

There are no items for this section.

E. ADMINISTRATIVE REPORTS

E-1 Informational Report on Waste Water Treatment Plant Primary Effluent Pump Station Repair and Request for Direction on Preferred Method (Report by Keith Helmuth)

F. COUNCIL REPORTS

G. CLOSED SESSION

There are no items for this section.

ADJOURNMENT – Next regular meeting October 17, 2018

- Please silence or turn off cell phones and electronic devices while the meeting is in session.
- Regular meetings of the Madera City Council are held the 1st and 3rd Wednesday of each month at 6:00 p.m. in the Council Chambers at City Hall.
- Any writing related to an agenda item for the open session of this meeting distributed to the City Council less than 72 hours before this meeting is available for inspection at the City of Madera Office of the City Clerk, 205 W. 4th Street, Madera, California 93637 during normal business hours.
- The meeting room is accessible to the physically disabled, and the services of a translator can be made available. Request for additional accommodations for the disabled, signers, assistive listening devices, or translators needed to assist participation in this public meeting should be made at least seventy two (72) hours prior to the meeting. Please call the Human Resources Office at (559) 661-5401. Those who are hearing impaired may call 711 or 1-800-735-2929 for TTY Relay Service.
- Questions regarding the meeting agenda or conduct of the meeting, please contact the City Clerk's office at (559) 661-5405.
- Para asistencia en Español sobre este aviso, por favor llame al (559) 661-5405.

I, Sonia Alvarez, City Clerk for the City of Madera, declare under penalty of perjury that I posted the above agenda for the special meeting of the Madera City Council for October 10, 2018, near the front entrances of City Hall at 4:00 p.m. on October 9, 2018.

Sonia Alvarez

Sonia Alvarez, City Clerk

Return to Agenda

REPORT TO CITY COUNCIL

Approved By:

Department Director

For *City Administrator*

Council Meeting of October 10, 2018

Agenda Item Number E-1

SUBJECT: INFORMATIONAL REPORT ON WATER TREATMENT PLANT PRIMARY EFFLUENT PUMP STATION REPAIR AND REQUEST FOR DIRECTION ON PREFERRED METHOD

RECOMMENDATION:

That the City Council receive and consider this informational report.

SUMMARY:

City Council was apprised of two separate discoveries of unanticipated damage at the Waste Water Treatment Plant (WWTP) via email on September 17. Of those two concerns, correction of the sinkhole and associated damage is well on its way to completion. The second item, wetwell damage, underwent additional review that included bringing in a structural engineer to review the integrity of the structure. That review and the conclusion by the design engineer, Stantec, has resulted in this report and a recommendation that the City immediately proceed with one of two alternatives for an critical repair.

BACKGROUND:

The wastewater treatment plant improvement project includes a variety of repairs to existing equipment and facility at the plant. Repairs at the wetwell were anticipated to include a 3-inch layer of resurfacing compound of the wetwell concrete surface and a protective epoxy coating to areas that were subject to sulfur attack. After the bypass was in place and the wetwell was completely emptied and cleaned, Stantec, the design engineer, determined that damage to the wetwell was more extensive than could be

observed during initial observations. Prior to emptying the wetwell, it was not possible to observe the additional damage. This most recent observation led Stantec to conclude that the structure was a safety hazard and should be evaluated by their structural engineer. Following review by the structural engineer, it became clear that the structure was in fact unsafe and had an unacceptable risk of failure. As such, there are two identifiable options to mitigate the risk: 1) Construct major repairs to the existing structure or 2) Construct a new structure.

DISCUSSION:

The attached report was prepared by Stantec at the request of the City. It describes the damage to the wetwell within the WWTP Primary Effluent Pump Station and alternatives to how the damage can be mitigated. The wetwell is basically a holding area for sewage until the flow can be pumped out of it. The incoming sewage comes from the upstream primary clarifiers and recycled flow from secondary clarifiers where it is held briefly in the wetwell. This mixed sewage is then pumped downstream to the next WWTP process known as the oxidation ditch. Portions of the walls and ceiling of the wetwell are not structurally sound and must be mitigated in some fashion. If allowed to operate in their current condition, one or more of the massive pumps could break through the ceiling. In the short term, flows though this facility are being bypassed and the ceiling has been shored up against possible collapse.

The attached report also provides a description of the possible mitigation alternatives, pros and cons of each and a rating scale of each; all of which are intended to provide a reasonable methodology in selecting the preferred alternative. The following extracted directly from the Stantec report provides the pros and cons in one table and the selection matrix in the other. The selection matrix attempts to assist in providing the most logical choice based on a series of weighted criteria. Depending on how the criteria is weighted, the differential in scoring can vary and even result in switching of the preferred alternatives. Staff review of the criteria has concluded that the weighting is reasonable. For additional insight into how the selection Matrix was prepared, please refer to the Stantec report.

As of the writing of this report, staff only has verbal estimates of costs based on review by the contractor on-site at the WWTP. Those indicate a substantial difference between the two alternatives. Alternative 1 (Partially Replace and Restore) is estimated at $675,000 including engineering costs. Alternative 2 (Build New) ranges from $1,050,000 to as much as $1,250,000 depending on use of some existing equipment. In conversations with Stantec, they have noted that the Build New cost may include some conservative assumptions that, under design, can potentially be discounted as not being needed.

The anticipated time frame associated with the alternative is: Rehab – 3 to 4 months, Build New – 5 to 7 months depending on whether the construction is constructed as a change order with the current contractor or it is subject of a bid and award process.

As seen in the tables above, construction of a new wetwell receives the highest rankings. As such, the consultant recommends this alternative. Staff agrees with this recommendation as well.

If Council agrees with this recommendation, staff will direct the consultant to immediately begin design of a new wetwell based on this measure being declared an emergency. Staff will also investigate the relative merits of preparing a change order with the contractor currently working at the WWTP or hiring a separate contractor. Ultimately this review will consider the ability to move the project to construction in an accelerated bid and award fashion versus the possible cost associated with a change order with the current contractor.

FISCAL IMPACT:

The cost for this emergency repair will be paid for out of the Sewer Enterprise Fund. Subject to the results of this meeting, it is anticipated that a budget appropriation will be submitted to Council at a future meeting.

CONSISTENCY WITH THE VISION MADERA 2025 PLAN

Action 101.6 – This entire effort supports this strategy to ensure infrastructure can sustain population growth in the development of the General Plan.

Table 1 Wetwell Comparison

Wetwell Option	Design Criteria	Pros	Cons
Alternative 1: Partially Replace and Restore Existing Pump Station	• 3 pumps (2 duty, 1 standby, no future space) • Capacity = 25 MGD reliable (37.6 MGD total) • 1970 building codes • Epoxy lined (20-year life) • Unventilated	• Relatively quick to construct (4-months) • Relatively cheap to build ($700,000)	• Will not be designed to current building code • Protective coating requires frequent inspection/ maintenance • Cannot maintain wetwell without bypass pumps • Construction interrupts normal operation • Does not easily accommodate future expansion
Alternative 2: Build a New Pump Station	• 4 pumps (2 duty, 1 standby, 1 future) • Capacity = 37.6 MGD reliable (with 4th pump), (50 MGD total) • Current building codes • Plastic lined (50-year life) • Ventilated	• Will be designed to meet current building codes • Protective plastic lining does not require replacing • Will be properly ventilated • Will allow for future expansion	• Takes longer to design and construct (6 months) • Relatively expensive to build ($1.2M)

Table 4 Wetwell Alternative Selection Matrix

		Comparative Score (Score Total Must Equal 10)		Criterion Score (Relative Weight Times Comparative Score)	
Criteria	*Relative Weight*	Rehab Existing	Build New	Rehab Existing	Build New
Capital Costs	*22*	6	4	132	88
O&M Costs	*21*	4	6	84	126
Risk After Install	*28*	3	7	84	196
Construciton Time	*13*	7	3	91	39
Temporary Effect on Process	*13*	3	7	39	91
Safety	*27*	3	7	81	189
Life Expectancy of Structure	*26*	3	7	78	182
Upgrades/Improvements	*18*	2	8	36	144
		TOTAL SCORE		625	1055

City of Madera WWTP
Primary Effluent Pump Station
Emergency Repair Evaluation

October 9, 2018

Prepared for:

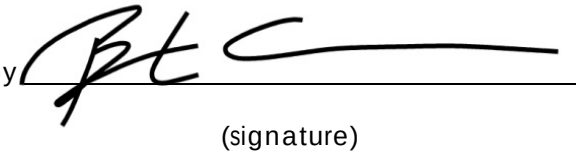
City of Madera

Prepared by:

Stantec Consulting Services Inc.

Sign-off Sheet

This document entitled City of Madera WWTP: Primary Effluent Pump Station Emergency Repair Evaluation was prepared by Stantec Consulting Services Inc. ("Stantec") for the account of City of Madera (the "Client"). Any reliance on this document by any third party is strictly prohibited. The material in it reflects Stantec's professional judgment in light of the scope, schedule and other limitations stated in the document and in the contract between Stantec and the Client. The opinions in the document are based on conditions and information existing at the time the document was published and do not take into account any subsequent changes. In preparing the document, Stantec did not verify information supplied to it by others. Any use which a third party makes of this document is the responsibility of such third party. Such third party agrees that Stantec shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party as a result of decisions made or actions taken based on this document.

Prepared by 

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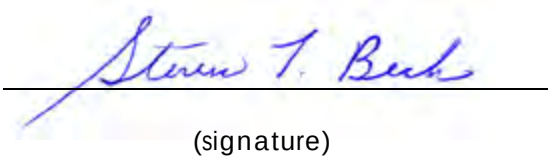
Beth Cohen

Reviewed by 

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Steven L. Beck

Stantec

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1.0 INTRODUCTION

As documented in the Emergency Support Memorandum, dated 09/14/2018, extensive damage was discovered in the Primary Effluent Pump Station wetwell. The wetwell is basically a holding area for sewage until the flow can be pumped out of it. The incoming sewage comes from the upstream primary clarifiers and recycled flow from secondary clarifiers where it is held briefly in the wetwell. This mixed sewage is then pumped downstream to the next WWTP process known as the oxidation ditch.

After Cushman Contracting Corporation, the general contractor for the WWTP Rehabilitation Project, installed bypass pumping and cleaned the wetwell, Stantec was able to fully inspect the level of deterioration. Stantec's Senior Structural Engineer (Steve Stoll, SE) arrived on site Friday, 09/28/2018, and worked with Richard Tomlinson (Cushman's project superintendent), Myron Kadillak (Sika's Concrete Restoration Expert), and Frank Holguin (the City of Madera's Engineering Project Manager) to inspect and discuss solutions for the pump station wetwell.

The condition of the concrete within the Primary Clarifier Effluent Pump Station wetwell has deteriorated beyond the condition of the adjacent primary clarifier effluent channels, exposing much of the rebar to the corrosive environment. Based on photographs taken during the inspection (see Figures 1, 2, and 3), the wetwell concrete requires structural repair, in addition to the resurfacing and coating that are currently part of the Rehabilitation Project.

As shown in Figure 1, the interior mat rebar is exposed on the western exterior wall, interior baffle walls, and overhead slab where corrosive gas was exposed to the unprotected concrete. Further, there are areas within the wetwell that have deteriorated past the point of repair and have large sections of wall without any remaining structural integrity (both rebar and concrete is completely missing).

Figure 1 Discovered Condition of Concrete: Primary Effluent Pump Station Wetwell

2.0 BACKGROUND

Sewage collected from the City of Madera flows to the Wastewater Treatment Plant (WWTP) into a three-story Headworks building, that supports screens (to remove large debris from the wastewater), influent pumps (to lift the wastewater to the downstream processes) and primary sludge pumps (for the coupled primary clarifier basins, which remove solids from the process stream). The primary effluent pump station pumps water out of the primary clarifiers and return activated sludge (RAS) to the downstream processes (oxidation ditch splitter box) for further treatment. At buildout, the plant is designed to have 15 MGD peak influent flow rates with an additional 22.5 MGD RAS flow, for a total required primary effluent pumping of 37.5MGD.

Influent flow can be diverted to an emergency storage pond, but its storage capacity is limited to less than one day at design flow, making diversion around the primary processes complicated and costly (as bypass pumps must be rented).

During design, Stantec was able to visually observe several challenges at the plant that became the basis of the Rehabilitation Project construction contract, including repairing the primary clarifier effluent channel and pump station wetwell concrete. At the time of design, the Primary Effluent Pump Station (channel and wetwell) was identified as having corroded concrete requiring resurfacing and coating because the aggregate within the concrete walls was starting to show (with small areas where rebar had been exposed).

The channel was inspected by opening large sections of grating, but the wetwell could not been seen because it is under a solid concrete slab (supporting three vertical turbine pumps) and was fully submerged under water. Without having the ability to bypass the pump station, it was assumed that the level of concrete deterioration within the wetwell was similar to the primary effluent channel, as shown in Figure 2. Therefore, the design (and current construction scope of work) includes a 3-inch layer of resurfacing compound (polymer enhanced concrete) and a protective epoxy coating (to limit impacts from sulfur attack).

Figure 2 Known Condition of Concrete in Primary Clarifier Channel

3.0 FIELD OBSERVATIONS

Once the water level inside the wetwell was lowered and Stantec had access to the Primary Effluent Pump Station, the extent of damage to the concrete baffle walls and ceiling (within the Wetwell) could be fully assessed and is identified as more severe than observed during the initial inspection. Years of exposure to hydrogen sulfide (H2S) has allowed the concrete inside the wetwell to corrode and expose much of the interior mat rebar (corroding the rebar and compromising the structural integrity of the top half of the wetwell).

This wetwell supports three massive vertical turbine pumps on the top slab (each weigh over 5 tons with 20" columns, ~20' tall, with coupled 50 HP motors) and is now considered unsafe. Stantec recommends that operators stay off the slab (to the extent possible) until structural remediation measures can take place and the Contractor keep their shoring inside the wetwell to secure the roof prior to rehabilitation.

As shown in Figure 3, damage to the walls is most extreme above the water level (where sulfur is released into gaseous form) and the concrete that remained submerged during operation is found to be in relatively good condition. The bottom half of the structure can therefore be repaired and coated, as defined in the Contract Specifications and included in the current scope of work.

Figure 3 Submerged Concrete Condition: Primary Effluent Pump Station Wetwell

4.0 ALTERNATIVE ANALYSIS

There are two alternative options to allow the City to pump primary effluent:

1. Partially replace and restore existing pump station
2. Construct a new pump station

4.1 ALTERNATIVE 1, PARTIALLY REPLACE AND RESTORE EXISTING PUMP STATION

The bottom half of the structure can be repaired, as defined in the Contract Specifications. The top half of the structure will need to be removed and replaced because the level of deterioration makes it cost prohibitive to use the previously specified top coating repair system. The top of the exterior walls, interior baffle walls, and elevated slab have large sections of wall standing without any remaining structural integrity (both the rebar and concrete is missing). The intent of the rehabilitation is to replace the structure in 'like-kind' to the best of our ability with the understanding that materials used have changed since the construction of the original structure, approximately 50 years ago.

The like-kind wetwell replacement approach will be:

1. Continue bypass pumping operation for an extended period of time (approximately four months)
2. Demolish and replace existing walls (exterior and interior), trough slabs, and top slabs, where reinforcing has been degraded beyond a state of repair. This demolition will occur through areas where non-degraded reinforcing exists.
3. Where this demolition has occurred, weld new reinforcing onto existing reinforcing.
4. Form new walls, trough slabs, and top slabs and pour new concrete.
5. Where walls can be rehabilitated via contract, it will be done.
6. There is a portion of wall below the trough slab that will need a hybrid approach. We will use cementitious grout and welded rebar in that area.
7. See the attached marked up drawings for areas mentioned above.
8. The entire structure will be topped with protective epoxy coating (with predicted 20-year life), which is already part of the construction contract.
9. The three pumps would be re-installed into the existing wetwell (totaling 25 MGD of reliable pumping capacity)

This option requires four months of bypass pumping to allow for construction to take place (which interrupts normal operation of the treatment process).

The construction cost change order is estimated to be $673,000, including the following items:

A. excavation to allow access to walls
B. demolition of top half of walls and elevated slab
C. installation of new rebar/concrete for top half of walls and elevated slab
D. bypass pumping for extended time period to complete above items
E. credit for removing resurfacing layer from scope of work

Calculations will not be produced for this project since the intent is to replace in like-kind without any verification of loading. It must be understood that the rehabilitation approach being taken will not bring the structure up to current code requirements.

4.2 ALTERNATIVE 2, CONSTRUCT NEW PUMP STATION

This option will build a new modern pump station that will be seismically and structurally sound (in accordance with updated building codes), east of the existing pump station and allow the existing wetwell to be decommissioned. See Figure 1 for a preliminary layout of the new pump station.

The new wetwell approach will be:

1. Temporarily continue to use existing pump station (install shoring that is designed by the subcontractor into the eastern and middle bay and install two pumps for use during construction)
2. Construct a new pump station, including:
    a. Installing a larger wetwell, with sufficient room for a future fourth pump, to match the treatment plant capacity (totaling 37.6 MGD of reliable pumping capacity)
    b. Providing a long-lasting plastic lining over the concrete structure (Ameron T-lock, GSE StudLiner, or equivalent), to reduce maintenance costs associated with recoating and prevent future concrete corrosion (with predicted 50-year life)
    c. Properly ventilating the structure to limit noxious fume buildup and further reduce corrosion of equipment
3. Relocate the existing pumps to the new pump station
4. Extend the new discharge manifold to the existing pipe
5. Decommission the existing pump station

This option requires six months to design and construct, if done under the current contract as a change order. Unlike Alternative 1, this option allows the existing pump station to be temporarily placed back into operation and will have only minor treatment process operational interruptions.

The construction cost change order is estimated to be $1,250,000 (this price can be reduced to approximately $1,050,000 if all the discharge pipes and valves can be reused), including the following items:

A. design of new structure
B. excavation to form new slab and walls
C. installation of new pump station
D. connecting new piping and electrical with existing
E. credit for removing resurfacing layer and epoxy coating from scope of work

Calculations will be produced for this alternative that verify the structural integrity of the wetwell and that it is designed and constructed in accordance with the current building codes. The City may elect to bid the scope of work under an emergency procurement processes, as a separate contract, but it will delay the construction of the new wetwell by approximately eight months, which will offset the cost savings from a competitive bid environment. Competitive bids may come in 30% lower than the change order price, which equates to $840,000.

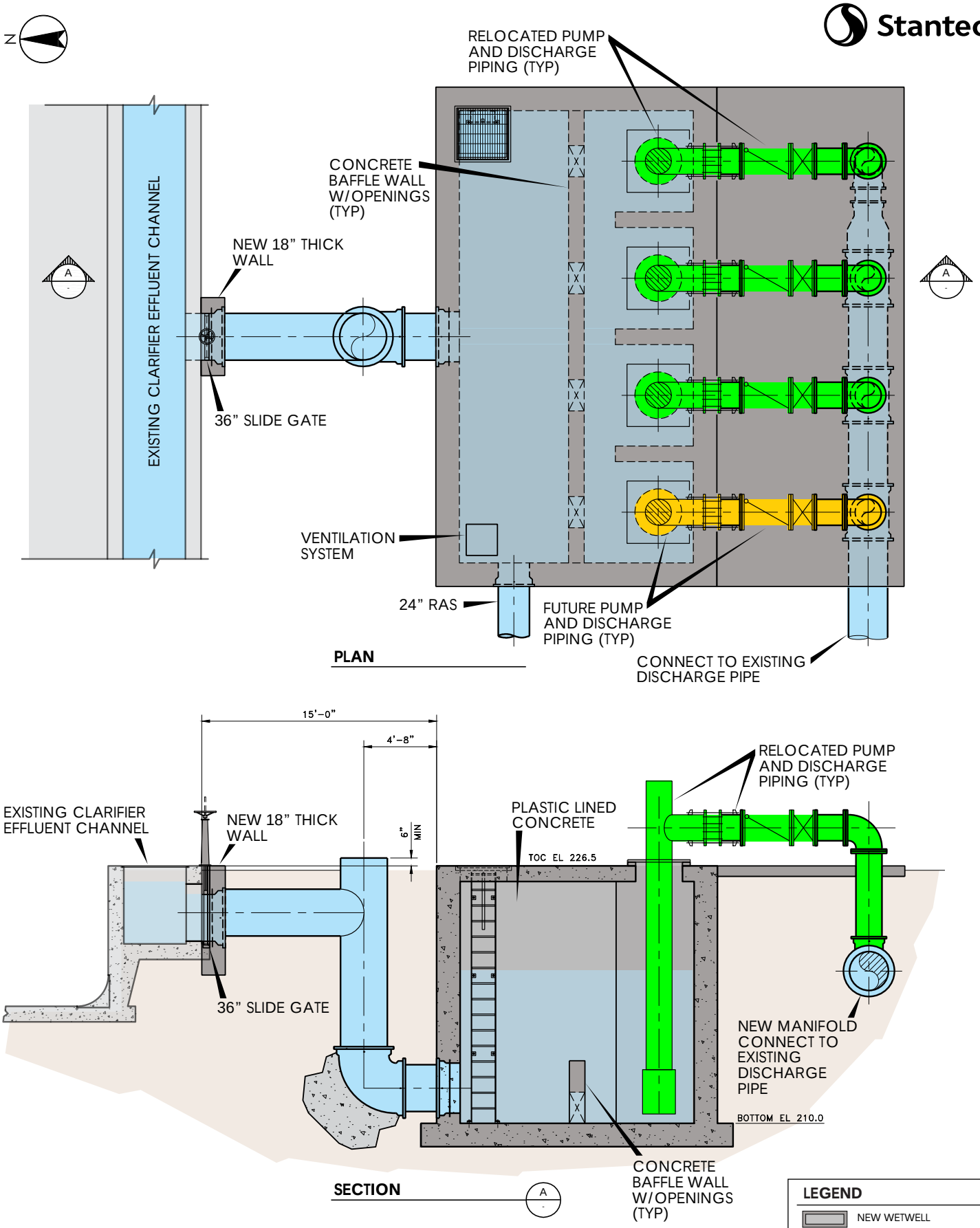

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Figure 4
Primary Effluent Pump Station Plan and Section

4.3 ALTERNATIVE ANALYSIS RECOMMENDATIONS

The two alternative wetwell options discussed above, rehabilitating the existing versus building a new wetwell, have various positive and negative aspects. Most notably, the rehabilitation of the existing wetwell will keep the current configuration (using 1970's building codes), with room for three pumps to be installed. This layout limits the reliable pumping capacity of the pump station (with one pump out of service) to 25 MGD. The new pump station layout will be designed to modern building codes and have sufficient room to install a fourth pump in the future, which allows the reliable pumping capacity to be 37.6 MGD. As noted previously, at buildout, the plant is designed to have a peak influent raw sewage flow rate of 15 MGD and an additional 22.5 MGD of return activated sludge (RAS), totaling 37.5 MGD of required primary effluent pumping.

Rehabilitate the existing wetwell in Alternative 1, means that (at buildout) the existing primary effluent pump station does not have the reliable capacity to keep up with the peak flow rate (with only 25 MGD reliable pumping capacity, instead of 37.5 MGD). Therefore, an additional solution must be implemented to achieve the appropriate level of reliability. If the existing pump station remains in operation, a fourth pump could be purchased and placed in storage, to provide backup during a pump failure. However, pumps that remain in storage will need to be routinely circulated into service, to allow for equal wear and scheduled maintenance to take place. Alternatively, a small adjacent wetwell could be constructed (similar to the new wetwell option) to allow the fourth pump to be used in parallel to the existing pump station.

Installing a new wetwell in Alternative 2, means that (at 10.1 MGD average daily flow rate) the pump station will have the reliable capacity to keep up with the peak flow rate (37.6 MGD). It will also be built using updated building codes, have proper ventilation, and a long-lasting lining system.

Table 1 Wetwell Comparison

Wetwell Option	Design Criteria	Pros	Cons
Alternative 1: Partially Replace and Restore Existing Pump Station	• 3 pumps (2 duty, 1 standby, no future space) • Capacity = 25 MGD reliable (37.6 MGD total) • 1970 building codes • Epoxy lined (20-year life) • Unventilated	• Relatively quick to construct (4-months) • Relatively cheap to build ($700,000)	• Will not be designed to current building code • Protective coating requires frequent inspection/ maintenance • Cannot maintain wetwell without bypass pumps • Construction interrupts normal operation • Does not easily accommodate future expansion
Alternative 2: Build a New Pump Station	• 4 pumps (2 duty, 1 standby, 1 future) • Capacity = 37.6 MGD reliable (with 4th pump), (50 MGD total) • Current building codes • Plastic lined (50-year life) • Ventilated	• Will be designed to meet current building codes • Protective plastic lining does not require replacing • Will be properly ventilated • Will allow for future expansion	• Takes longer to design and construct (6 months) • Relatively expensive to build ($1.2M)

The wetwell alternatives considered for implementation in the rehabilitation of the WWTP must be evaluated not only for their benefits to the treatment process at the plant, but also for their ranking against the other options. To compare the options, a list of criteria is developed by which the alternatives will be ranked.

Table 2 provides a list of criteria and a brief explanation why it is important in the evaluation process

Table 2 Wetwell Selection Criteria

Criterion	Description
Capital cost	Cost to purchase equipment and construct facilities
Operational cost	Cost to operate new facilities – including power costs, periodic coating replacement costs, maintenance costs, etc.
Risk after installation	The probability of failure and the consequence of such failure
Construction time	The amount of time it will take to build the new wetwell
Temporary effects on process	Measuring the negative impacts the option will have on the upstream and downstream facilities. In this instance, the primary clarifiers, oxidation ditches, and digesters
Safety	Potential negative impacts on public/employee health and safety
Life expectancy of structure	A measure of how long the structure is expected to remain operational before needing to be replaced
Upgrades and Improvements	Allowing for ease of operation, benefits to upstream and downstream processes, reducing maintenance, provide modernized design

The criteria themselves are given a score from one to five based their importance to the project. A score of five carries the highest level of relative importance while a score of one has a relatively lower level of importance. The value entered in the blue squares compares the criterion in the row to the criterion in the column for relative importance in the selection process. Each score entered in the blue squares will have a paired score in the white squares and the two paired scores will equal six. The relative weight of each criterion is calculated and ranked in the two columns on the right. Table 3 provides a matrix assigning a score for each of the alternatives and its relative weight in determining the preliminary treatment process selected.

Table 4 presents a comparative score (with the total of the scores equal to exactly ten) for the two alternatives evaluated. This matrix also takes the relative weight determined in Table 3 for each of the evaluation criteria and multiplies that number by the comparative score for each of the criteria. This calculation returns a weighted score for each of the evaluation criteria and each of the alternative preliminary processes. The sums of these weighted scores for the eight evaluation criteria is presented as a total score on the bottom row. The higher the total score, the better the option for this application.

As shown in Table 4, the new wetwell scores highest compared to the rehabilitation option evaluated in the analysis.

Table 3 Wetwell Alternatives Criteria Weight

	Capital Costs	O&M Costs	Risk After Install	Construciton Time	Temporary Effect on Process	Safety	Life Expectancy of Structure	Upgrades/Improvements	Relative Weight	Rank
Capital Costs		3	2	4	4	2	3	4	*22*	4
O&M Costs	3		2	4	4	2	2	4	*21*	5
Risk After Install	4	4		4	5	3	4	4	*28*	1
Construciton Time	2	2	2		2	2	1	2	*13*	7.5
Temporary Effect on Process	2	2	1	4		2	1	1	*13*	7.5
Safety	4	4	3	4	4		3	5	*27*	2
Life Expectancy of Structure	3	4	2	5	5	3		4	*26*	3
Upgrades/Improvements	2	2	2	4	5	1	2		*18*	6

Evaluate the criteria in a row to that of the item in the column.

The combined numeric score will equal 6 between the same paired items in a colume to a row. Only enter numbers in the light blue cells. The paired numbers will calculate.

The evaluation should be based upon the following 'relative' evaluation.

Evaluation Criterion	Entered Score	Paired Score
Substantially More Important	5	1
Somewhat More Important	4	2
Equal Importance	3	3
Somewhat Less Important	2	4
Substantially Less Important	1	5

Table 4 Wetwell Alternative Selection Matrix

		Comparative Score (Score Total Must Equal 10)		Criterion Score (Relative Weight Times Comparative Score)	
Criteria	*Relative Weight*	Rehab Existing	Build New	Rehab Existing	Build New
Capital Costs	*22*	6	4	132	88
O&M Costs	*21*	4	6	84	126
Risk After Install	*28*	3	7	84	196
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Safety	*27*	3	7	81	189
Life Expectancy of Structure	*26*	3	7	78	182
Upgrades/Improvements	*18*	2	8	36	144
		TOTAL SCORE		625	1055

It is recommended to replace the existing structure with a new modern pump station because the benefits to the new structure far outweigh the additional capital costs, including reduced maintenance, increased reliability, longer life expectancy, designed in accordance with updated building codes, lowered risk of operation, increase safety.

The additional budget needed to provide engineering services to support the new pump station design is estimated to be $50,000 (including preparation of design drawings, field verification and coordination with contractor, and attendance at a City Council meeting). The additional fee is recommended to be added to the 2017 Professional Services Agreement.