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Memorandum

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Subject	**Activity 1: Assessment – Evaluate Onsite Containment Options at the Monterey WWTP**
Project Name	JEA System Resiliency Program, Task Order No. 15, Monterey WWTP Assessment Services
Attention	JEA
From	Jacobs Engineering Group Inc. (Jacobs)[1]
Date	July 19, 2019
JEA Contract No.	174097

The Monterey Wastewater Treatment Plant (WWTP) was upgraded to its current capacity in 1996 for United Water of Florida. JEA acquired the Monterey WWTP in 2002 when it acquired United Water's assets while assuming responsibility for water and wastewater in Duval, Nassau, and St. Johns counties.

Executive Summary

In September 2018, a power loss incident occurred at the Monterey WWTP during a storm event that resulted in a sanitary sewer overflow (SSO) of the influent manhole and wet well. The offsite movement of the SSO is JEA's primary concern, and under the JEA System Resiliency Program, Jacobs assessed backup onsite containment options for the Monterey WWTP. Following several site visits to understand the SSO event, site topography, and constraints, the following backup onsite containment options were developed:

1a) Expand Retention Pond "B"

1b) Construct Separate, Dedicated Lined-Overflow Pond

2) Overflow Wet Well and Pump(s)

3) Overflow Storage Tank

The source of the SSO has been identified and a proposed solution developed; therefore, the likelihood of another overflow is low. Option 1b – Construct Separate, Dedicated Lined-Overflow Pond, is recommended should JEA choose to implement better spill containment around the influent screening facility.

1. Purpose and Background

In September 2018, a power loss incident occurred at the Monterey WWTP during a storm event that resulted in an SSO of the influent manhole and wet well. JEA asked Jacobs to assess the potential for backup onsite containment should another overflow event occur. This technical memorandum (TM) documents the results of the assessment.

[1] On December 15, 2017, CH2M HILL Engineers, Inc., became a wholly owned subsidiary of Jacobs Engineering Group Inc.

Several site visits were conducted to understand the overflow event as well as the site topography and constraints. Attachment 1-1 shows the existing plant site, the location of the overflow event, and the site facilities. In general, Manhole (MH)-3 (Metering Manhole) was the main location of the discharge. From there the flow went around the office building and moved westward off the site behind the adjacent shopping center. The site is mostly flat, but there is a slight slope toward the entrance by the shopping center. The influent screening/pumping facility is a relatively high spot on the site; therefore, MH-3 is on the downgradient side that leads to the entrance. The offsite movement of the overflow is the main concern and reason for this onsite containment assessment.

2. Potential Onsite Containment Options

Regulatory guidance indicates that if an overflow should occur from a sanitary sewer system, that overflow should be contained, reported, and cleaned up. This evaluation is a proactive review to determine how to avoid potential offsite impacts in the future from a similar event. In general, this potential containment could be considered as part of the Monterey WWTP emergency response plan. Any changes related to containment would have to be approved by the Florida Department of Environmental Protection (FDEP). Three potential containment options are described in this section.

2.1 Option 1a: Expand Retention Pond "B"

One potential option for onsite containment is to regrade the site around MH-3 to flow to an expanded stormwater Retention Pond "B" (see Attachment 1-2). The retention pond captures some of the runoff from the site to provide water quality improvements in accordance with Florida stormwater rules. Regrading the site with a swale would likely be the least expensive, but could also have potential challenges such as the following:

- If a spill occurs and fills the pond, it would no longer be available for a rainfall event. This could lead to a spill offsite to the north and/or east, which is a single-family residential neighborhood. Additional grading and diking may be required to better protect this side of the plant site.
- If a spill occurs and exceeds the pond capacity, the new spill path offsite will likely be to the north and/or east, which is a single-family residential neighborhood.
- If a spill occurs, the spill would have to be reported to FDEP and a significant cleanup effort would still be required to clean up the onsite spill.
- Modifications to this stormwater pond will require an FDEP Environmental Resource Permit (ERP) modification. During the permitting process, the reviewers will question the drainage pattern modification and may not approve the pond's use for wastewater containment. JEA should make the case that enlarging the pond to capture runoff from around the influent screens improves the site's stormwater water quality. Using the pond for wastewater capture would only be in unavoidable, rare circumstances and is needed to better protect against public exposure to raw sewage. Because this is a dry retention pond without an outfall pipe leading offsite, Option 1 may be allowed to improve stormwater runoff normally and, in the event of a spill around the influent screening facility, better contain an overflow occurring near the headworks.

2.2 Option 1b: Construct Separate, Dedicated Lined-Overflow Pond

Another option would be to construct a separate lined pond adjacent to the existing pump station to receive and temporarily store the overflow. An overflow structure would need to be constructed in the wet well to direct the overflow to the lined pond. Potentially, MH-3 would need to be raised to prevent discharge from the structure prior to the pump station. The lined-overflow pond should be constructed to prevent stormwater runoff from entering the pond to ensure maximum capacity during a rainfall/storm event. In addition, the WWTP site should be regraded and either a modification to the existing pond or a new stormwater pond may need to be constructed to improve drainage and more effectively collect and store stormwater runoff onsite. The lined pond would provide additional time to respond in the case of an overflow and would contain sump pumps to pump sewage or small amounts of stormwater to the beginning of the treatment process. As in the previous option, the use of the lined pond for overflow

capture would only be during rare unavoidable circumstances for public protection. This option would cost more than the previous option but would improve site drainage and could better mitigate the permitting challenges with FDEP by separating stormwater and sewage systems entirely and would alleviate concerns of storage volume availability during a rainfall event.

- Modifications to this stormwater pond will require an FDEP ERP modification.
- If an overflow into this structure occurs, plant staff would have to clean out the structure, as it would not be used again for a long time.

2.3 Option 2: Overflow Wet Well and Pump(s)

Another potential option is to build an adjacent wet well and pump station directly northeast of the existing influent screening/pumping station (see Attachment 1-3). A high-water overflow connection would be installed between the two structures, allowing water to overflow into the new wet well should the existing pumps fail. This option is essentially an auxiliary pump station, and the new pump station would then pump directly into the sequencing batch reactors. Because this is a backup facility, the sizing could be more modest than the original (for example, no additional redundancy would be required, but sizing is yet to be determined). This option would cost significantly more than Option 1 but would mitigate its challenges. New challenges this option would pose include the following:

- New impervious area would require stormwater pond expansion and a permit modification.
- If an overflow into this structure occurs, plant staff would have to clean out the structure, as it would not be used again for a long time.
- A pump station would have similar backup power requirements as any other pump station. Its power would have to be isolated from the primary influent pump station to function as a backup to the primary station.

2.4 Option 3: Overflow Storage Tank

A third potential option is to build an adjacent aboveground storage tank (AST; see Attachment 1-4). In the event of a main influent screening/pumping station failure, the backup diesel pump could be rerouted to discharge into a new AST. This tank could then be drained back into the influent screening/pumping station during periods of low flow. This option would also likely cost significantly more than Option 1 but would similarly mitigate its challenges. New challenges this option would pose include the following:

- New impervious area would require stormwater pond expansion and a permit modification.
- The existing backup diesel pump would have to be evaluated to ensure it can handle peak flow rates; otherwise, an overflow may still occur if a failure happens during peak flow. If the pump cannot handle peak flows, it may have to be replaced or additional backup pumping capacity added.
- If an overflow into this structure occurs, plant staff would have to clean out the structure, as it would not be used again for a long time.

3. Conclusions and Recommendations

The source of the overflow has been identified and a proposed solution developed; therefore, the likelihood of another overflow is low. Option 1b is recommended if JEA wants to implement better spill containment around the influent screening facility as part of their emergency response plan for the Monterey WWTP.

4. Preliminary Cost Estimate

A conceptual cost estimate for each option is provided in Table 1. The cost estimate prepared is a facility planning level estimate and is considered a Class 5 estimate in the Association for the Advancement of Cost Engineering (AACE) International classification system. Based on AACE International guidelines, Class 5 estimates range in accuracy is -20 to -50 percent on the low side and +30 to +100 percent on the high side.

Table 1. Conceptual Cost Estimate

Cost Item	Estimated Cost
Option 1a Expand Retention Pond "B"	$156,680
Option 1b Construct Separate, Dedicated Lined-Overflow Pond	$180,387
Option 2 Overflow Wet Well and Pump(s)	$681,640
Option 3 Overflow Storage Tank	$1,068,333

Attachment 1-1
Site Plan

ATTACHMENT 1-1
MONTEREY WWTP
OVERALL SITE PLAN

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Attachment 1-1.dgn

Attachment 1-2
Option 1

ATTACHMENT 1-2
MONTEREY WWTP
OPTION 1

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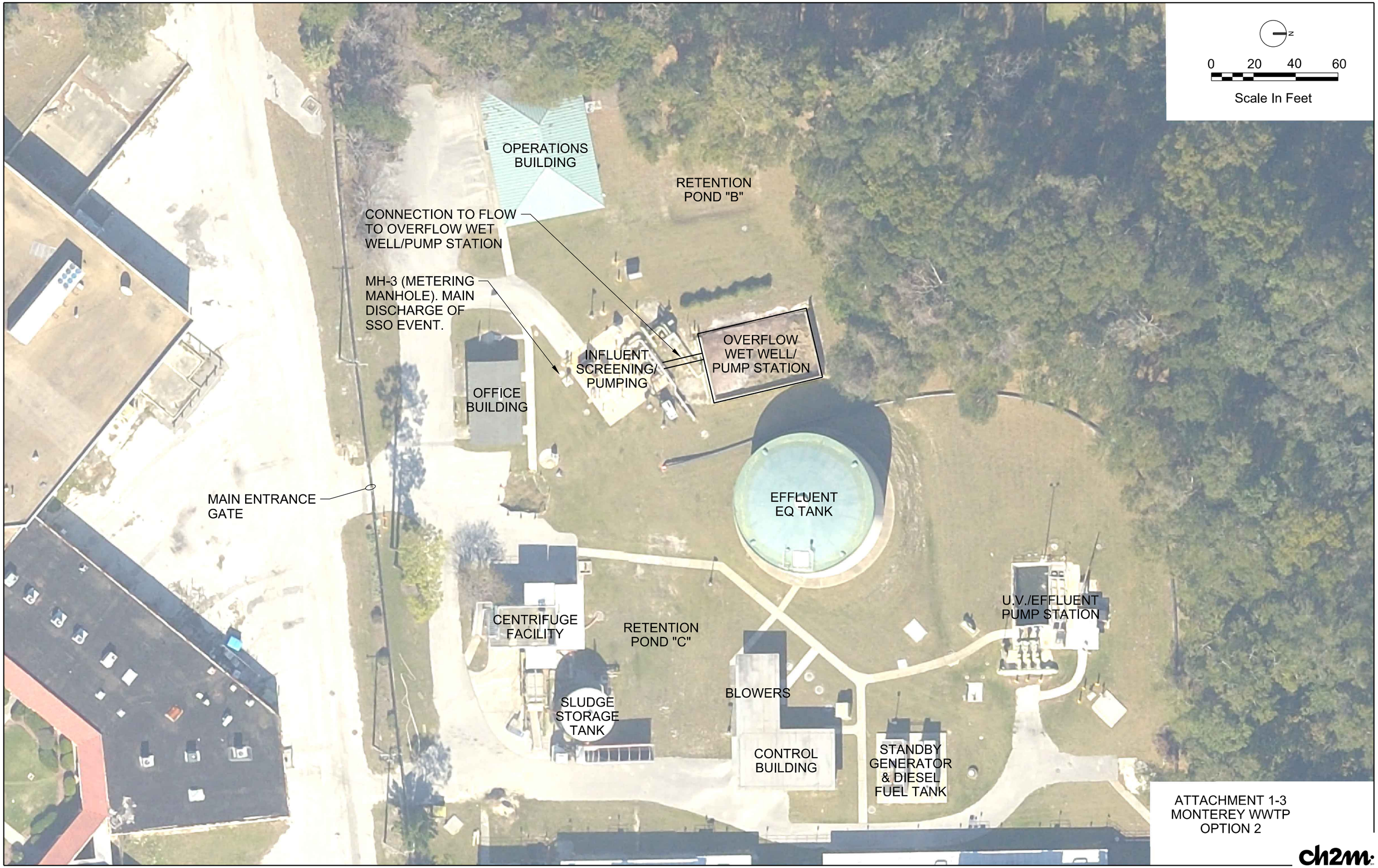
Attachment 1-2.dgn

Attachment 1-3
Option 2



ATTACHMENT 1-3
MONTEREY WWTP
OPTION 2

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Attachment 1-3.dgn

Attachment 1-4
Option 3

ATTACHMENT 1-4
MONTEREY WWTP
OPTION 3

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Attachment 1-4.dgn