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TECHNICAL MEMORANDUM

To: Jeremy Ghent
District Administrator
South San Luis Obispo County Sanitation District

From: Eileen Shields, PE
David Edgren

Date: September 26, 2019

Re: **South San Luis Obispo County Sanitation District**
WWTP Redundancy Project Review of Potential Floodplain Impacts

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The proposed improvements to the South San Luis Obispo County Sanitation District (SSLOCSD) as part of the Wastewater Treatment Plant (WWTP) Redundancy Project are located in the 100-Year floodplain as identified by the Federal Emergency Management Agency (FEMA). The District is pursuing funding for this project through the United States Department of Agriculture (USDA) Rural Development.

Under Executive Order 11988 (1977), the USDA is required to ensure the project avoids creating an adverse impact on the floodplain due to additional development. The construction of the proposed development is expected to have negligible impact on the floodplain. The following factors were considered when evaluating potential impacts to the floodplain:

1. Natural Environment (topography, water sources, habitat areas, etc.) – No impact to the natural environment as the proposed area of development is within the existing wastewater treatment plant site boundary and is already disturbed.
2. Social Concerns (aesthetics, historic and cultural values, land use patterns, etc.) – No impact to social concerns as the land use will not change and there will be negligible impact to the aesthetics of the land.
3. Economic and Engineering Aspects (costs of construction, transportation, access, ingress, egress, etc.) – There will be negligible impact to the floodplain during construction. All access to the site will use existing roads.
4. Legal Considerations (permits, leases, deed restrictions, setbacks, etc.) – No applicable impacts, since the land is already owned by the District.

MKN also investigated the potential for the proposed improvements to impact the depth or velocity of flood waters within the floodplain. Figure 1, attached, shows the existing floodplain and area surrounding the WWTP site. Figure 2 shows the same figure with the proposed development. Section A-A across the site plan is upstream of the majority of the WWTP facilities and near the base flood elevation of 15 feet. The profile of Section A-A shows the topography, the WWTP facilities, and the FEMA base flood elevation. The facilities are well above the base flood elevation. It is also evident that the new development, labeled as G and H in Figure 2, adds a negligible amount in the way of facilities in the cross-sectional flow area to the already developed site.

The construction of the proposed development would add an estimated 30 square feet (SF) of cross-sectional facility area to the floodplain flow area. This would increase the average velocity of a 100-year flood flowing

across the floodplain from 3.78 fps to 3.80 fps (and a 500-year flood from 9.80 to 9.87 fps). This is a negligible impedance in the flow across the site during a flood. These conclusions are based on the following calculations.

The gross cross-sectional flow area (across Section A-A), not including any facilities, is approximately 4,843 SF (Table 1). The total area of current facilities within the flow area are estimated at 660 SF for existing conditions and 690 SF for future conditions (Table 2). Table 3 summarizes the estimated velocities for the 100-year flood event and the 500-year flood event for the existing and future proposed conditions. The variation is based on the slightly reduced net flow area, calculated by subtracting the total facilities area from the estimated gross flow area. The estimated peak discharge for the various flow events is based on the FEMA Flood Insurance Study (Revised May 16, 2017, Table 10 Summary of Discharges, Arroyo Grande Creek).

Table 1. Estimated Gross Flow Area (Cross Section A-A)

Stationing	Width (ft)	Height (ft)	Area (SF)
4+25 to 7+70	345	3	1035
7+70 to 8+00*	30	4	120
8+00 to 15+00	700	5	3500
15+00 to 15+75*	75	2.5	187.5
Total Gross Flow Area			**4842.5**

Notes:
* Average triangle height was used

Table 2. WWTP Facilities Area (Cross Section A-A)

Facility	Width (ft)	Base Flood Height (ft)	Area (SF)
Secondary Digester	60	3	180
Heating and Mixing Building	30	3	90
Primary Digester	70	3	210
Maintenance Building and Storage Facility	40	3	120
Standby Power Building	20	3	60
Aeration Basin (Future)	10	3	30
Total Facilities Area (Existing)			**660**
Total Facilities Area (Future)			**690**

Table 3. Estimated Velocities at Various Flood Conditions

Condition	Peak Discharge (cfs)	Velocity (Existing WWTP) (fps)	Velocity (Future WWTP) (fps)
100-year event	15,800	3.78	3.80
500-year event	41,000	9.80	9.87

Notes:
cfs = cubic feet per second. fps = feet per second.
Peak Discharge based on FEMA Flood Insurance Study, May 16, 2017, Table 10 Summary of Discharges, for Arroyo Grande Creek

It is the opinion of MKN that the project will cause negligible impact on the existing floodplain, potentially increasing stream velocity by approximately 0.5% for the 100-year event and 0.7% during the 500-year event.

Additionally, the project includes floodproofing measures to help ensure minimal disruptions to operations at the plant during a flood. The design includes provisions for pumps and other new critical infrastructure to be located above the base flood elevation, and flood walls and gates are specified for floodproofing existing critical infrastructure.

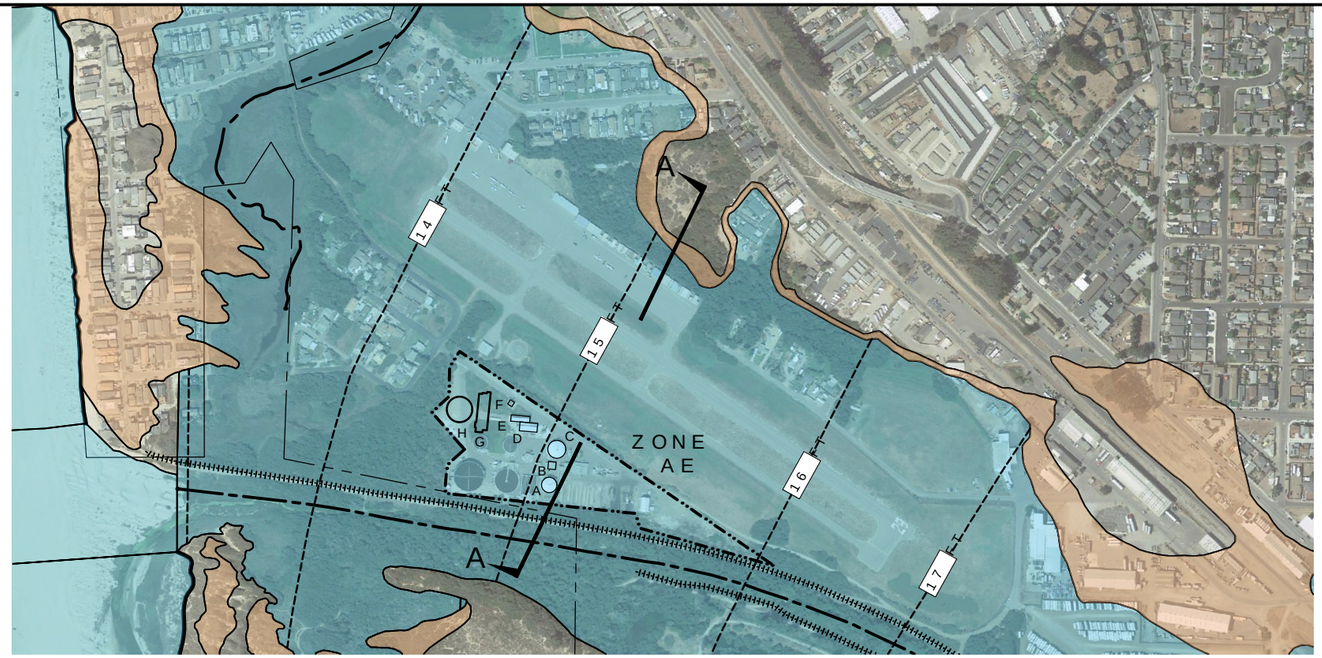
Finally, it is our understanding that the floodplain maps created by FEMA do not take into account the Arroyo Grande Creek levee located adjacent to the WWTP, since it is not a federally-accredited levee. The projected base flood elevation by FEMA is approximately 15 feet lower than the top of the levee. The levee may provide additional protection to the WWTP during a 100 or 500 year flood event that is not currently accounted for with the FEMA base flood elevations.

Attached:

WWTP Redundancy Project Location Map

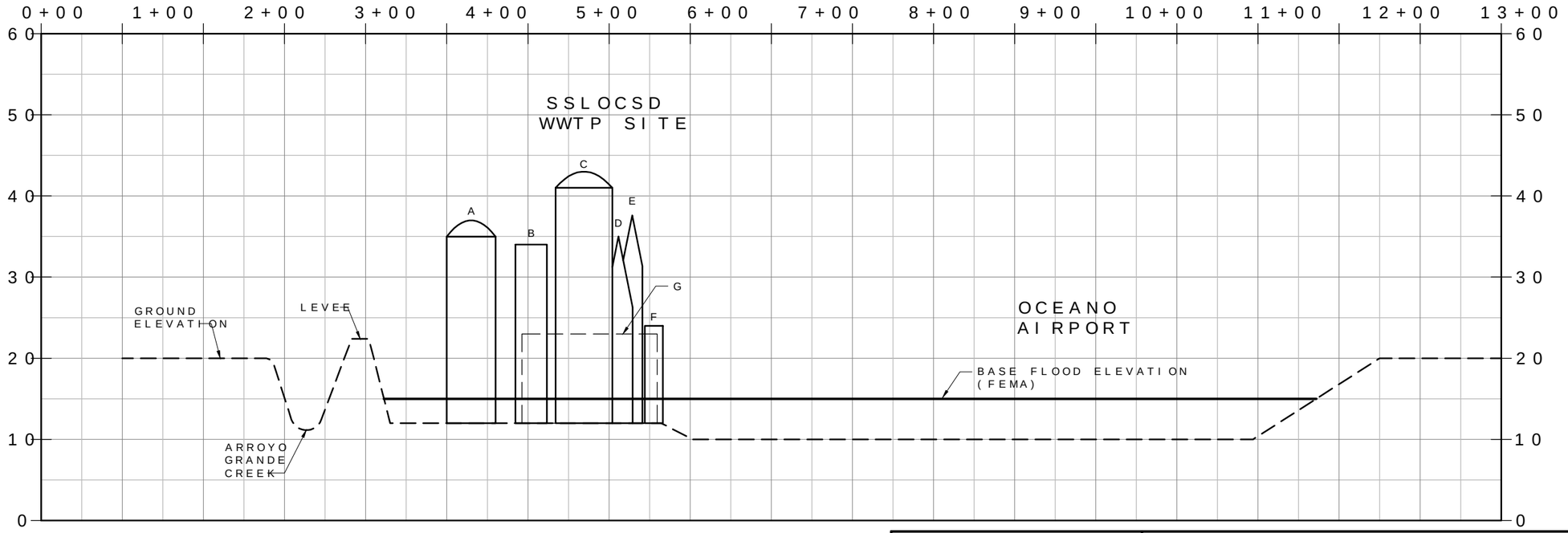
Figure 1: Flood Analysis Existing WWTP

Figure 2: Flood Analysis Future WWTP



SITE PLAN

SCALE: 1" = 600'



SECTION A-A

SCALE: 1" = 150' HORIZ
1" = 15' VERT

LEGEND

- SPECIAL FLOOD HAZARD AREA WITH BASE FLOOD ELEVATION
- 0.2% ANNUAL CHANCE FLOOD AREA
- LEVEE
- 15 FT BASE FLOOD ELEVATION LINE

NOTES:

1. GROUND ELEVATION IS APPROXIMATE AND BASED ON USGS QUADRANGLE OCEANO, CA, 2018.
2. FLOOD HAZARD LAYERS AND BASE FLOOD ELEVATION DATA DOWNLOADED FROM FEMA ON 8/2/2019.

	FACILITY	WIDTH/ DIAMETER (FT)	HEIGHT (FT)
A	SECONDARY DIGESTER	60	25
B	HEATING AND MIXING BUILDING	30	22
C	PRIMARY DIGESTER	70	31
D	MAINTENANCE BUILDING	35	23
E	STORAGE FACILITY	25	25.6
F	STANDBY POWER BUILDING	20	12
G	AERATION BASIN (FUTURE)	125	11
H	SECONDARY CLARIFIER (FUTURE)	100	8

mkn
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South San Luis Obispo County Sanitation Services District

FLOOD ANALYSIS
FUTURE WWTP

FIGURE 2

DWG: C:\Users\Mike Thorne\Documents\MKN\SSLOCSD-2019-002 Redundancy Admin\Planset\FIGURE 1.dwg USER: Mike Thorne
DATE: Aug 19, 2019 2:39pm XREFS: IMAGES: C-IG-01.jpg
1colorTag.jpg