

ATTACHMENT 4

**Flood Risk Mitigation Strategy (Kennedy/Jenks
Consultants, 2016)**

29 July 2016

Technical Memorandum

To: Gerhardt Hubner, South San Luis Obispo County Sanitation District (District)
From: John M. Wyckoff
Subject: Redundancy Project – Flood Risk Mitigation Strategy
K/J 1669009*00

Kennedy/Jenks Consultants scope of work for the subject project includes evaluation and recommendation of strategies to include in the project design to flood-proof certain new and existing facilities at the District's Wastewater Treatment Facility in Oceano, California. In general, the flood risk mitigation measures will likely include flood protection of critical existing and new structures and accommodation of access impacts at the site through 2050. Year 2050 coincides with the anticipated design life of other improvements implemented with the Redundancy Project. The design will address risks from a 100-year or lesser flood event on Arroyo Grande Creek, as well as address risks from nuisance flooding on Meadow Creek that may become more frequent due to sea level rise.

Flood protection will be considered for both new facilities that will be constructed as part of the Redundancy Project and existing facilities at the site. A majority of the existing facilities have flood proofing measures that were installed as part of the 1979 Improvements Project. Additional flood protection was implemented after a 2010 flood event by raising the flood protection wall height around the Headworks and Pumping Plant and installing heavy-duty floodgates. Exhibit A (South San Luis Obispo County Sanitation District Facility Flood Elevations – 6/3/16 – Draft), which is attached contains information on the elevations of the existing flood control measures at the plant. The protection provided by the existing flood protection measures range from elevation 13.81 feet at the Standby Power Building to elevation 17.75 feet at the Centrifuge Building.

It is District's intent that, as part of the Redundancy Project, all critical new and existing facilities will be installed or upgraded to be protected from the 100-year flood event on Arroyo Grande Creek as defined by Flood Insurance Rate Map (FIRM) maps. This would also protect these facilities from floods caused by sea level rise for the design life of the facilities. In the Environmental Science Associates (ESA) Sea Level Rise Analysis dated 20 July 2016, maximum flood elevations for existing and future conditions due to sea level rise are predicted to be as follows:

- Existing: 12.3 feet North American Vertical Datum of 1988 (NAVD)
- 2050: 12.7 to 13.2 feet NAVD (30+ years from present)
- 2100: 13.9 to 15.6 feet NAVD (80+ years from present).

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The ranges for the 2050 and 2100 conditions are levels resulting from medium to high scenarios for climate change per State of California planning guidance.

Flood protection for new critical facilities will be provided to protect the facilities from flood levels of up to 15.25 feet. This flood protection will be provided by installing mechanical equipment and electrical devices above this elevation or within areas enclosed by permanent barriers to flood waters (i.e., block/concrete walls).

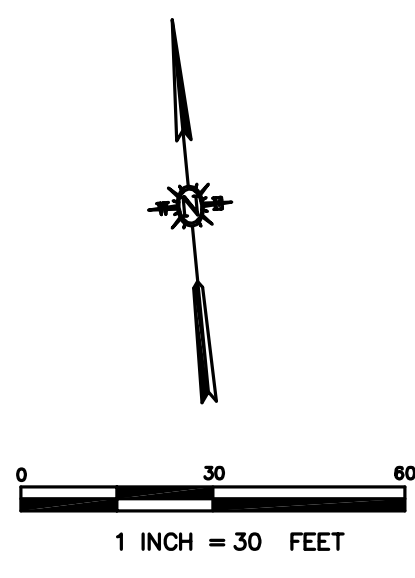
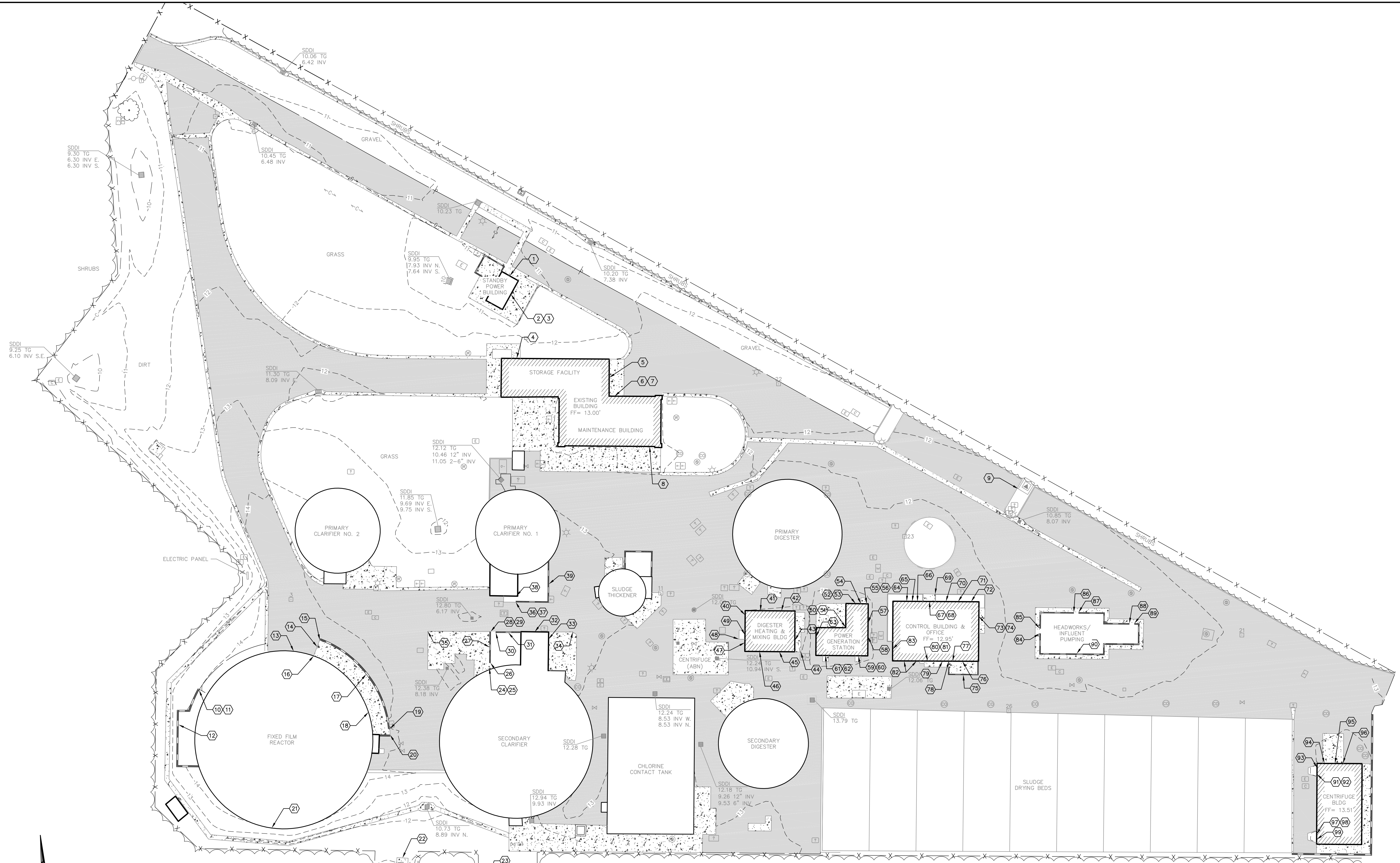
The flood proofing of existing critical facilities will be modified and raised, as necessary, to accommodate for protection for these facilities from the flood elevations, as indicated on Exhibit A. The exact modifications to be utilized will be determined during the detailed design of the Redundancy Project and may include techniques such as raising the height of existing flood brackets and floodgates, installing walls around openings in structures, or combinations of these methods. Critical facilities will be identified as a part of the detailed design effort.

By protecting the new and existing critical facilities to the 100-year FIRM flood elevation, these facilities will also be protected from the estimated maximum level floods through the year 2050 time horizon indicated in the ESA Sea Level Rise Analysis. In the year 2050, when there is an additional 30 years of data on sea level rise, the District will re-evaluate the projected maximum flood levels due to sea level rise. Flood protection at the site will be increased if it is deemed to be prudent and necessary based upon any new information and data available at that time. This additional flood protection may entail the installation of a flood protection wall around the treatment plant site, if warranted and/or feasible.

Access to the treatment plant site through the current main plant entrance at 1600 Aloha Place during flooding events may be a future issue with sea level rise. As stated in the ESA Sea Level Rise Study, the threshold elevation at which site access is impacted is 10.4 feet NAVD. This threshold access elevation is below current maximum flood elevations, and the ESA Sea Level Rise Analysis indicates flooding at this elevation may become more common by year 2050.

Currently, the plant has a second entrance (back entrance) near the existing Centrifuge Building. This back entrance is at elevation 13.0 feet and, therefore, would provide a means of access to the plant during maximum flooding events associated with sea level rise through the year 2050.

Attachment: Exhibit A



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SSLOCSD WWTF TOPOGRAPHIC SURVEY FACILITY FLOOD ELEVATIONS OCEANO, CALIFORNIA		
DRAWN BY AK	DATE 06-03-2016	CA JOB NO. 151211
CHECKED BY	SCALE 1" = 30'	SHEET 1 OF 1

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**South San Luis Obispo County Sanitation District
Facility Flood Elevations**

Notes:

(1) Refer to Facility Flood Elevations exhibit for keynote locations

(2) Existing Elevations based on topographic survey, prepared by Cannon, dated May 2016. Elevations based on NAVD 88 datum

(3) Elevation estimated from FIRM map. Final Flood Elevation will be based on Flood Study.

Existing Facilities					
Keystone per Plan ⁽¹⁾	Location	Description	Existing Elevation ⁽²⁾	100-year Flood Elevation ⁽³⁾	Notes
1	Standby Power Building	Finish Floor	10.85	14.75	Critical - can be floodproofed
2	Standby Power Building	Bottom of Window Sill	11.56	14.75	
3	Standby Power Building	Top of Metal Flood Bracket	13.81	14.75	
4	Storage Facility	Finish Floor	12.92	15.00	Not Critical
5	Storage Facility	Finish Floor	12.99	15.00	
6	Maintenance Building	Finish Floor	13.02	15.00	
7	Maintenance Building	Bottom of Window Sill	13.18	15.00	
8	Maintenance Building	Bottom of Window Sill	19.42	15.00	Critical - Can be floodproofed
9	Transformer	Concrete Pad	12.28	15.25	
10	Fixed Film Reactor	Top of Metal Flood Bracket	15.60	14.75	Not Critical after Redundancy Project is completed
11	Fixed Film Reactor	Edge of Pavement	14.02	14.75	
12	Fixed Film Reactor	Top of Wall	15.51	14.75	
13	Fixed Film Reactor	Bottom of Fan	15.24	14.75	
14	Fixed Film Reactor	Edge of Pavement	14.23	14.75	
15	Fixed Film Reactor	Top of Metal Flood Bracket	15.65	14.75	
16	Fixed Film Reactor	Top of Metal Flood Bracket	15.57	14.75	
17	Fixed Film Reactor	Top of Wall	15.56	14.75	
18	Fixed Film Reactor	Finish Floor	8.65	14.75	
19	Fixed Film Reactor	Top of Metal Flood Bracket	15.58	14.75	
20	Fixed Film Reactor	Top of Metal Flood Bracket	15.59	14.75	
21	Fixed Film Reactor	Bottom of Fan	15.36	14.75	Can be flooded
22	Pressure Regulation Station	Concrete Pad	11.85	15.00	
23	Outfall Manhole	Concrete Pad	12.72	15.00	Not Critical after Redundancy Project is completed
24	Secondary Clarifier	Concrete	13.70	15.00	
25	Secondary Clarifier	Top of Metal Flood Bracket	14.40	15.00	
26	Secondary Clarifier	Top of Metal Flood Bracket	14.41	15.00	
27	Secondary Clarifier	Top of Wall	14.52	15.00	
28	Secondary Clarifier	Concrete	13.70	15.00	

Existing Facilities					
Keynote per Plan ⁽¹⁾	Location	Description	Existing Elevation ⁽²⁾	100-year Flood Elevation ⁽³⁾	Notes
29	Secondary Clarifier	Top of Metal Flood Bracket	14.42	15.00	Not Critical after Redundancy Project is completed
30	Secondary Clarifier	Top of Metal Flood Bracket	14.04	15.00	
31	Secondary Clarifier	Top of Wall	14.46	15.00	
32	Secondary Clarifier	Bottom of Window Sill	15.08	15.00	
33	Secondary Clarifier	Bottom of Window Sill	15.12	15.00	
34	Secondary Clarifier	Concrete Pad	13.56	15.00	
35	Secondary Clarifier	Concrete Pad	13.71	15.00	
36	Primary Clarifier No. 1	Edge of Pavement	13.56	15.00	Sludge pumps can be down for up to 2 weeks
37	Primary Clarifier No. 1	Top of Metal Flood Bracket	14.40	15.00	
38	Primary Clarifier No. 1	Top of Metal Flood Bracket	14.41	15.00	
39	Primary Clarifier No. 1	Top of Wall	14.51	15.00	
40	Digester Heating & Mixing Bldg	Bottom of Window Sill	16.22	15.00	Not Critical - Can be down for up to 2 weeks
41	Digester Heating & Mixing Bldg	Bottom of Window Sill	16.24	15.00	
42	Digester Heating & Mixing Bldg	Bottom of Window Sill	16.31	15.00	
43	Digester Heating & Mixing Bldg	Finish Floor	13.20	15.00	
44	Digester Heating & Mixing Bldg	Concrete Pad	13.01	15.00	
45	Digester Heating & Mixing Bldg	Bottom of Window Sill	16.25	15.00	
46	Digester Heating & Mixing Bldg	Bottom of Window Sill	16.25	15.00	
47	Digester Heating & Mixing Bldg	Bottom of Window Sill	16.39	15.00	
48	Digester Heating & Mixing Bldg	Concrete Pad	13.15	15.00	
49	Digester Heating & Mixing Bldg	Finish Floor	13.21	15.00	
50	Power Generation Station	Finish Floor	14.26	15.00	Backside of Station is Motor Control Center - Critical. Can be floodproofed.
51	Power Generation Station	Top of Metal Flood Bracket	15.61	15.00	
52	Power Generation Station	Bottom of Window Sill	14.23	15.00	
53	Power Generation Station	Top of Metal Flood Bracket	15.56	15.00	
54	Power Generation Station	Top of Metal Flood Bracket	15.66	15.00	
55	Power Generation Station	Finish Floor	14.28	15.00	
56	Power Generation Station	Top of Metal Flood Bracket	15.73	15.00	
57	Power Generation Station	Bottom of Window Sill	16.47	15.00	
58	Power Generation Station	Bottom of Window Sill	16.33	15.00	
59	Power Generation Station	Finish Floor	14.26	15.00	
60	Power Generation Station	Top of Metal Flood Bracket	15.61	15.00	
61	Power Generation Station	Finish Floor	14.24	15.00	
62	Power Generation Station	Top of Metal Flood Bracket	15.57	15.00	
63	Power Generation Station	Bottom of Window Sill	16.39	15.00	
64	Control Building & Office	Top of Metal Flood Panel	15.49	15.25	
65	Control Building & Office	Top of Metal Flood Panel	15.49	15.25	

Existing Facilities						
Keynote per Plan ⁽¹⁾	Location	Description	Existing Elevation ⁽²⁾	100-year Flood Elevation ⁽³⁾	Notes	
66	Control Building & Office	Top of Metal Flood Panel	15.47	15.25		
67	Control Building & Office	Finish Floor	12.95	15.25		
68	Control Building & Office	Top of Metal Flood Bracket	14.40	15.25		
69	Control Building & Office	Concrete Pad	12.81	15.25		
70	Control Building & Office	Top of Metal Flood Panel	15.43	15.25		
71	Control Building & Office	Top of Metal Flood Panel	15.42	15.25		
72	Control Building & Office	Top of Metal Flood Panel	15.42	15.25		
73	Control Building & Office	Finish Floor	12.97	15.25		
74	Control Building & Office	Top of Metal Flood Bracket	14.42	15.25		
75	Control Building & Office	Top of Wall	18.00	15.25		
76	Control Building & Office	Finish Floor	12.95	15.25		
77	Control Building & Office	Bottom of Window Sill	13.13	15.25		
78	Control Building & Office	Top of Metal Flood Bracket	14.43	15.25		
79	Control Building & Office	Bottom of Window Sill	15.92	15.25		
80	Control Building & Office	Finish Floor	12.95	15.25		
81	Control Building & Office	Top of Metal Flood Bracket	14.43	15.25		
82	Control Building & Office	Bottom of Window Sill	17.29	15.25		
83	Control Building & Office	Top of Metal Flood Panel	14.39	15.25		
84	Headworks/Influent Pumping	Top of Metal Flood Bracket	16.38	15.25		Critical - already floodproofed
85	Headworks/Influent Pumping	Top of Metal Flood Bracket	16.38	15.25		
86	Headworks/Influent Pumping	Top of Metal Flood Bracket	16.41	15.25		
87	Headworks/Influent Pumping	Top of Metal Flood Bracket	16.39	15.25		
88	Headworks/Influent Pumping	Top of Metal Flood Bracket	16.39	15.25		
89	Headworks/Influent Pumping	Top of Metal Flood Bracket	16.40	15.25		
90	Headworks/Influent Pumping	Top of Wall	16.40	15.25		
91	Centrifuge Bldg	Finish Floor	13.51	15.25	Not Critical - Can recover/repair after flood subsidies	
92	Centrifuge Bldg	Top of Metal Flood Bracket	17.69	15.25		
93	Centrifuge Bldg	Top of Metal Flood Bracket	17.72	15.25		
94	Centrifuge Bldg	Top of Metal Flood Bracket	17.77	15.25		
95	Centrifuge Bldg	Finish Floor	13.51	15.25		
96	Centrifuge Bldg	Top of Metal Flood Bracket	17.75	15.25		
97	Centrifuge Bldg	Finish Floor	13.54	15.25		
98	Centrifuge Bldg	Top of Metal Flood Bracket	17.75	15.25		
99	Centrifuge Bldg	Top of Metal Flood Bracket	17.75	15.25		