IMPERIAL IRWMP

INTEGRATED REGIONAL WATER MANAGEMENT PLAN

Exhibit 3.3 – City of El Centro Water Supply Master Plan

Imperial Region
2014 IRWM Drought Grant Proposal

City of El Centro

FINAL REPORT

February 2008

Water Master Plan

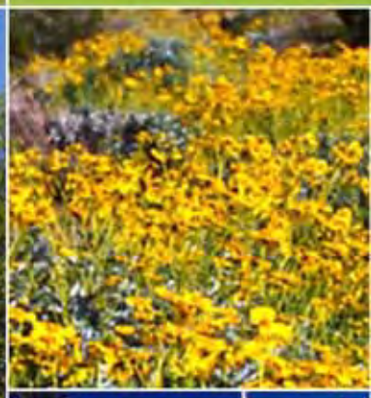

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Table 5.1	Pipeline Diameter Distribution Water System Master Plan City of El Centro		
Diameter (in)	**Length (ft)**	**Length (mi)**	**Percent (%)**
4" or smaller	13,200	2.5	2%
6	184,700	35.0	24%
8	292,600	55.0	39%
10	8,900	1.7	1%
12	173,000	32.8	23%
14	0	0.0	<1%
18	64,400	12.2	8%
20	11,900	2.3	2%
24	5,600	1.1	1%
30	3,800	0.7	<1%
Total	**758,200**	**144.0**	**100%**

Notes:
(1) The total length and distribution of pipe diameters included in the hydraulic model differs from the GIS summary presented in Table 3.2 due to modifications made during model construction, calibration, and verification with City staff.

The roughness coefficients (C-factors) in the model were initially assigned based on the pipeline material presented in Table 5.2. As shown in this table, the C-factors in the model range from 90 to 130. It should be noted that some of these factors were adjusted during model calibration as discussed in Section 5.2.

Table 5.2	C-Factor Allocation Water System Master Plan City of El Centro	
Material Code in Model	**Material Description**	**C-factor**
PVC	Polyvinyl Chloride Pipe (PVC)	130
STL	Steel (Unlined)	110
DIP	Ductile Iron Pipe	120
AC	Asbestos Cement	130
CIP	30-yr Cast Iron Pipe Slight Attack	110
GALV	Galvanized Pipe	110

it is less than the 7 MG available supply from the storage tanks. The available pumping capacity at the La Brucherie PS is 8,000 gpm or 2.9 MG in six hours. This is also less than the 3.5 MG available from storage at this site, so the pumping capacity governs at both locations. The total available supply during a power outage at the WTP and La Brucherie sites is 8.6 MG, which is 5.1 MG more than the required supply of 3.5 MG. Thus, the evaluation criterion is met.

The hydraulic model was used to verify the system pressures under this scenario. The model results show that the system pressures range from 51 to 60 psi.

6.5.2.2 Outage at the La Brucherie Site

As the City has full back-up power at both locations, the available pumping and storage capacities are the same during a power outage at the WTP and the La Brucherie PS. As described above, the total available supply would be 8.6 MG, which is 3.5 MG more than the required supply. Thus, the evaluation criterion is met and the system pressures are predicted to range from 51 to 60 psi.

6.5.3 Earthquake

The evaluation criterion states that the City should be able to meet MinDD for 14 days in case of an earthquake. Two cases were evaluated:

1. An earthquake destroying the WTP site facilities.
2. An earthquake destroying the La Brucherie PS site facilities.

The City's existing MinDD is 6.0 mgd, which equals 84.3 MG over 14 days. As discussed previously, it is assumed that the available storage from the reservoirs is limited to 70 percent of the full capacity, resulting in 7 MG at the WTP site and 3.5 MG at the La Brucherie site.

6.5.3.1 Earthquake Destroying the WTP Site

The only available supply after an earthquake that damages the facilities at the WTP site is the storage at the La Brucherie tank. The available supply in storage is 3.5 MG, which is less than the available pumping capacity (8,000 gpm or 11.5 mgd). Thus, the storage volume governs. As shown in Table 6.4, the total supply deficit accumulated over 14 days is 81 MG.

As stated in Section 6.5.1, the City's water system is vulnerable to extreme emergencies such as earthquakes due to its single source of supply and additional remote storage is cost prohibitive to address this deficiency. The use of raw water with boil-water-notices would also apply to the earthquake scenario. If the raw water inlet structure would be destroyed, the City could construct temporary above ground pipelines to other IID canals to continue its water supply service.

To minimize the impact of an earthquake of the City's water supply, it is recommended that a detailed emergency response plan for the WTP be kept up to date. In addition, the City could decide to purchase spare parts of key components with long delivery times to facilitate fast repairs.

The hydraulic model was used to verify the system pressures under this scenario. The model results show that the system pressures range from 52 to 66 psi, as long as enough supply is available. It is estimated that the supplies would be depleted after approximately 12 hours.

6.5.3.2 Earthquake Destroying the La Brucherie Site

When earthquake damages the facilities at the La Brucherie site, the system can be supplied from the WTP and WTP PS. As shown in Table 6.4, the available supply from the WTP site would be 217 MG, which is based on a WTP production of 15 mgd during 14 days and 7 MG of storage. This is more than the required supply of 84 MG, thus, the criterion is met.

The hydraulic model was used to verify the system pressures under this scenario. The model results show that the system pressures range from 52 to 65 psi. These are normal operating pressures as the La Brucherie PS would be off during MinDD conditions to allow the tank to refill.

6.6 TRANSMISSION MAIN BREAKS

The evaluation criterion states that the City should be able to maintaining a minimum pressure of 40 psi during a major transmission main break. The hydraulic model was used to verify the system pressures with the ten major pipeline breaks. The location of these hypothetical pipe breaks are shown on Figure 6.4, while the model results and proposed recommendations are summarized in Table 6.5.

As listed in Table 6.5, the system pressures range from 49 to 59 psi under most pipe break conditions. However, three of the ten pipe breaks that were modeled resulted in a substantial pressure drop with areas where the system pressures were below 40 psi. The locations of these pipe breaks and the recommended pipe break (PB) improvements are listed in Table 6.5.