

## **Section VIII – System Evaluation and Capacity Assurance Plan**

### **Background and Regulatory Requirements**

The Statewide WDRs governing sanitary sewers specify that each Wastewater Collection Agency shall prepare and implement a capital improvement plan (CIP) that will provide hydraulic capacity of key sanitary sewer system elements for dry weather peak flow conditions, as well as the appropriate design storm or wet weather event as part of the Sanitary Sewer Management Plan (SSMP).

### **Leucadia Wastewater District Actions**

The District has reached approximately 92 percent of buildout and has transitioned its capital improvement program from growth-based projects to replacement-based projects. The District has never experienced an SSO due to a capacity shortfall and has conducted several evaluations of existing and buildout flows to insure this continued success in preventing and minimizing SSOs. In addition, historical flow data has been analyzed to verify the theoretically established system capacity of 215 gpd/EDU and the District has access to real-time web based flow data to track District flows. The following sections highlight the District's system evaluations, design criteria, capacity enhancement measures, and CIP schedule related to capacity.

**Treatment Capacity Evaluation** – Flows generated within the District are treated at the regional Encina Water Pollution Control Facility and are monitored on a continual basis by both the District and the Encina Wastewater Authority (EWA). Flow data has been collected for the District for approximately 20 years, allowing for a long-term comparison of flows generated by the District. Flows are reported monthly to the six EWA member agencies as a continual check that each agency is within its contracted treatment capacity. The facility presently has a capacity of approximately 41 mgd with the District owning 7.11 mgd of this capacity. Within the ultimate flow projection is 6.46 mgd, the District has at least 0.55 mgd of emergency reserve capacity.

**Joint Facilities Conveyance Evaluation** – There are five major infrastructure elements, aside from the treatment plant, that the District owns jointly with other agencies. These include: (1) the Batiquitos Influent Sewer, (2) the Batiquitos Pump Station, (3) the Batiquitos Pump Station force mains, (4) the Lanikai Gravity sewer, owned jointly with the City of Encinitas and (5) the Occidental sewer, owned jointly with the City of Encinitas and the City of Carlsbad. The 2008 Asset Management Master Plan summarizes these facilities and details the District's ownership percentage in each facility. Like the treatment plant capacity, the flowrate through these facilities is continually monitored by the District and the EWA.

**Overall System Evaluation** – In 1994, the District completed a Planning Study Update which established the primary system capacity design criteria of 215 gpd/EDU. In 1999 the District’s Wastewater Master Plan was completed which evaluated the capacity of the sewer system by sub-basin based on flows existing at the time and the projected ultimate build-out flows of the District. The plan identified capacity-related improvement projects and those projects adequate to address short-term capacity concerns were completed. The 2008 Asset Management Master Plan confirmed that the conveyance system in place could convey the ultimate projected peak wet weather flow through the system. Hydraulic modeling of the collection system was completed as part of this effort.

The Asset Management Master Plan marked the transition for the District from land use based capacity evaluations and projections, to evaluations and projections based on actual recorded flow data. Using 10 years of historic flow data, the Asset Management Master Plan analyzed existing and ultimate average and peak flows based on the known and anticipated number of equivalent dwelling units (EDUs) in the District. The analysis found that in comparison to the previous land use based theoretical projections, the actual dry weather peaking experienced in the District was less. For wet weather flows, the analysis found that wet weather peaking was greater than previous theoretical projections. These comparisons are discussed further in the following paragraphs and illustrate that the 215 gpd/EDU design criteria is both appropriate and conservative.

Table 1 provides a comparison of existing average flows based on flow data and the land use based projection as well as the same comparison for ultimate average flows.

<b>TABLE 1 EXISTING AND ULTIMATE AVERAGE FLOW CALCULATION COMPARISON</b>			
<b>Existing Flow Comparison *</b>		<b>Ultimate Flow Comparison</b>	
Number of EDUs	27,150	Number of EDUs	30,045
Average flow from flow data	4.589 mgd (169 gpd/EDU)	Projected ultimate average flow from flow data (169 gpd/EDU)	5.08 mgd
Average flow from land use based factor (215 gpd/EDU)	5.84 mgd	Projected ultimate average flow from land use based factor (215 gpd/EDU)	6.46 mgd

\* Based on 2006 data

Table 2 illustrates the comparison between wet weather peaking factors and ultimate buildout flows for the District. The Asset Management Master Plan concluded that since the ultimate wet weather flows were within 5 percent, additional wet weather capacity studies of the District were not warranted. However, the plan did recommend that the District continue their present efforts to reduce inflow and infiltration as much as possible.

TABLE 2 WET WEATHER PEAK FACTORS AND ULTIMATE FLOWS CALCULATION COMPARISON		
Projection Type	Wet Weather Flow Peaking Factor	Ultimate Wet Weather Flow
Land Use Based as 215 gpd/EDU	2.33	13.7 mgd
Flow Data Based as 169 gpd/EDU	2.96	14.4 mgd

As part of the development of the predictive failure model, flow evaluations utilizing hydraulic modeling software were conducted for dry weather and wet weather scenarios. The evaluations determined that there were no pipe reaches to be replaced solely for capacity reasons. It was recommended however that the District continue to evaluate the occurrence of inflow and infiltration in the District and to take steps to mitigate as appropriate. These efforts are discussed further in the On-Going Evaluation and Capacity Enhancement Measures section.

**Design Criteria** – As discussed in the previous section, for planning purposes utilizing 215 gpd/EDU as a generation rate is a conservative factor for the District. This design criteria is stated in the LWD Standard Spec, which also provides EDU factors for different use types and peaking factors based on population.

**Pump Station Capacity Evaluation** – As part of the 2008 Asset Management Master Plan, all eleven of the collection system pump stations were evaluated to have sufficient capacity for both average and wet weather flows as well as 100 percent redundancy.

**On-going Evaluation and Capacity Enhancement Measures** – Currently, the District utilizes a web-based system to access real-time data from seven flow meters throughout the District. Each of the meters is strategically located to monitor the flow of a sub-basin within the District. On a monthly basis this data is compiled and reported to the Board. As part of this compilation, month to month and year to year comparisons of data are made. Additionally, staff evaluates and compares the flow per EDU in each sub-basin and compares to total flow to monitor each sub-basin. The data collected from these meters will be used to evaluate storm events to monitor inflow and infiltration. This data will also be compared with hydraulic modeling software to confirm assumptions and buildout projections.

**Schedule** – As there are no capacity-driven replacement projects currently identified for the District, there is no schedule necessary.

**District Documents Referenced By This Section**

- April 1995, *1994 Planning Study Update* by Parsons Engineering Science, Inc.
- *1999 Wastewater Master Plan* by Dudek and Associates, Inc.
- June 11, 2008, *Asset Management Master Plan* by Dexter Wilson Engineering, Inc., available at [www.lwwd.org](http://www.lwwd.org)
- District Standard Spec