

JB RANKIN ENGINEERING Inc.

CIVIL ENGINEERING

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JAMES B. RANKIN, PE
President

February 24, 2015

Mr. Mark Schacher, Chairman
Sundown Sanitary Sewer District
36245 Bartoldus Loop
Astoria, OR. 97103

Mr. Schacher:

As agreed, I am providing a final report on the outcome of the sanitary sewer repair work undertaken in 2014. I will be sending a copy of this report to Mr. Pinney at the Department of Environmental Quality. In summary, the District funded necessary improvements to reduce and minimize the volume of groundwater entering the old WWII gravity sewer lines and manholes. The gravity sewer repair work included the installation of HDPE pipe, slightly smaller in diameter than the existing pipe. Each 20-foot section of HDPE pipe was thermal welded together to create a single section of pipe, with no joints. The pipe to be repaired included the entire section between upper and lower manholes. The ends of the new pipe were grouted into the manholes. Manholes were replaced as needed. Near the Bornstein residence new sewer laterals were installed by directional drilling in order to eliminate the need to restore damaged landscaped yards.

The sewer line repair work was undertaken by General Utilities Company. The work began in May 2014 and ended in June 2014. The value of the contract was \$54,870.00. Repair work included:

- 1) The installation of 540 feet of 6-inch HDPE pipe through the existing 8-inch clay pipe between manhole #24 and manhole #30 near Drucker Place;
- 2) The installation of 455 feet of 6-inch HDPE pipe through an existing 8-inch clay pipe between manhole #1 and manhole #4;
- 3) Manhole #2 and manhole #4 were removed and replaced;
- 4) Two new sanitary sewer services between the old Fastabend residence and the new Bornstein residence were directionally drilled directly into manhole #3;
- 5) The installation of 175-feet of new 8-inch HDPE pipe through an existing 10-inch clay pipe between manhole #4 and manhole #5

The degree of success can be approximated by comparing the monthly rainfall and sewer flows through the sewer treatment plant before and after the contract work. Attached are the monthly records for June 2012 through December 2012 along with the monthly records for June 2014 through December 2014.

A few comments should be noted when reviewing these charts:

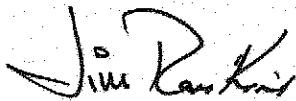
- 1) The discharge limit of 22,000 gallons per day is a limit established by the DEQ. It is uncertain if the 22,000-gpd is the actual "treatment limit" of the ORENCO system;
- 2) The hydraulic limit of the treatment plant is approximately 90,000-gpd. This is the maximum volume of water that can drain through the system and of which the treatment of waste is minimized. At this level the sewer flows will back-up and flood the gravity sewer lines;
- 3) The rainfall records are measurements recorded at the Astoria Airport, not the actual rainfall events at River Point.
- 4) In October 2012 the sewer flows began to spike after 1-inch plus rainfall events. In comparison with September 2014 the sewer flows only slightly increased after two 2-inch rainfall events.
- 5) In November 2012 the treatment system began to flood with a recorded total flow of 1,473,000 gallons and 13.76-inches of rainfall. In December 2012 there was a similar occurrence with 1,855,000 gallons and 14.62-inches of rainfall.
- 6) In comparison, December 2014 after sewer repairs were completed, the treatment plant recorded a total flow of 890,000-gallons with 10.57-inches of rainfall;
- 7) There were significant rainfall events in December 2014 that did not result in 90,000-gpd flooding. However, the monthly records for October 2014 to December 2014 illustrates that groundwater is still entering the system from a yet to be determined location.

As the ground becomes saturated from the Fall rains there is a slight increase in the amount of infiltration. The remaining problem areas will probably not be located where the recent repairs were undertaken. The problems may be the result of either surface water inflow through a manhole lid or groundwater infiltration through the old manholes due to raising groundwater pressure. During the sewer repair work it was observed that the old manholes were constructed in a manner that did not seal the barrel of the manhole with the base. The large concrete section of the manhole was just sitting on the concrete base without the benefit of a proper seal of the barrel to the base as with newer construction.

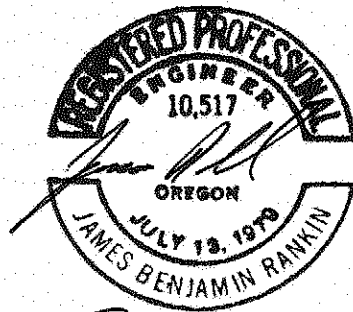
The good news is there is a significant improvement to the sewer collection system after the latest repairs. Total flows have decreased due to repairs and the elimination of major infiltration sources. And, flooding is no longer a reoccurring problem. Decreased flows will result in lower pumping costs and reduce the amount of silt and solids entering the system.

The remaining sources of leaks should be easier to identify and cost less to repair now that the most expensive repairs have been completed and system flooding has been minimized.

Respectively Submitted,



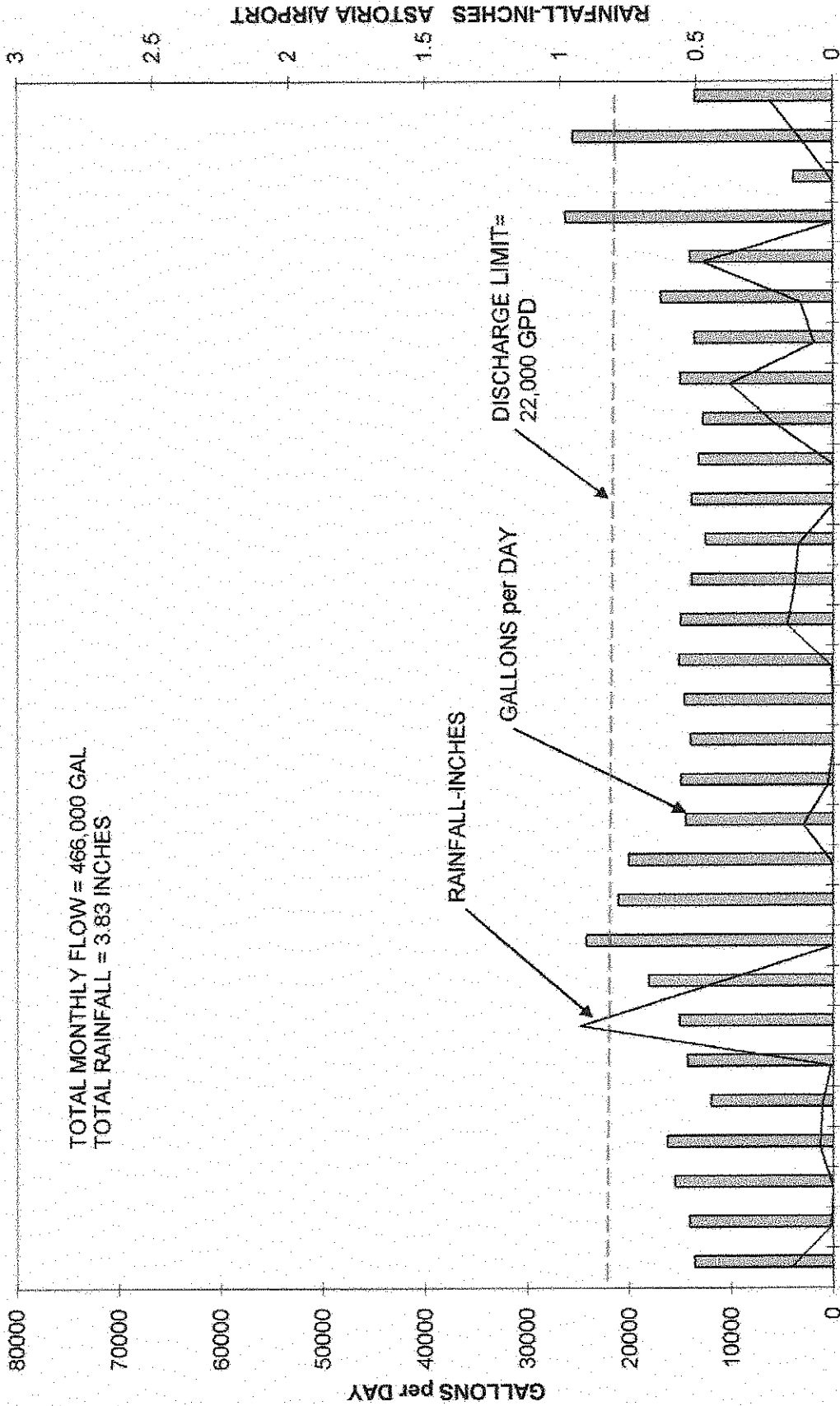
James B. Rankin, PE
cc: Mr. Michael Pinney, PE
Attachments



Renew 12/31/2016

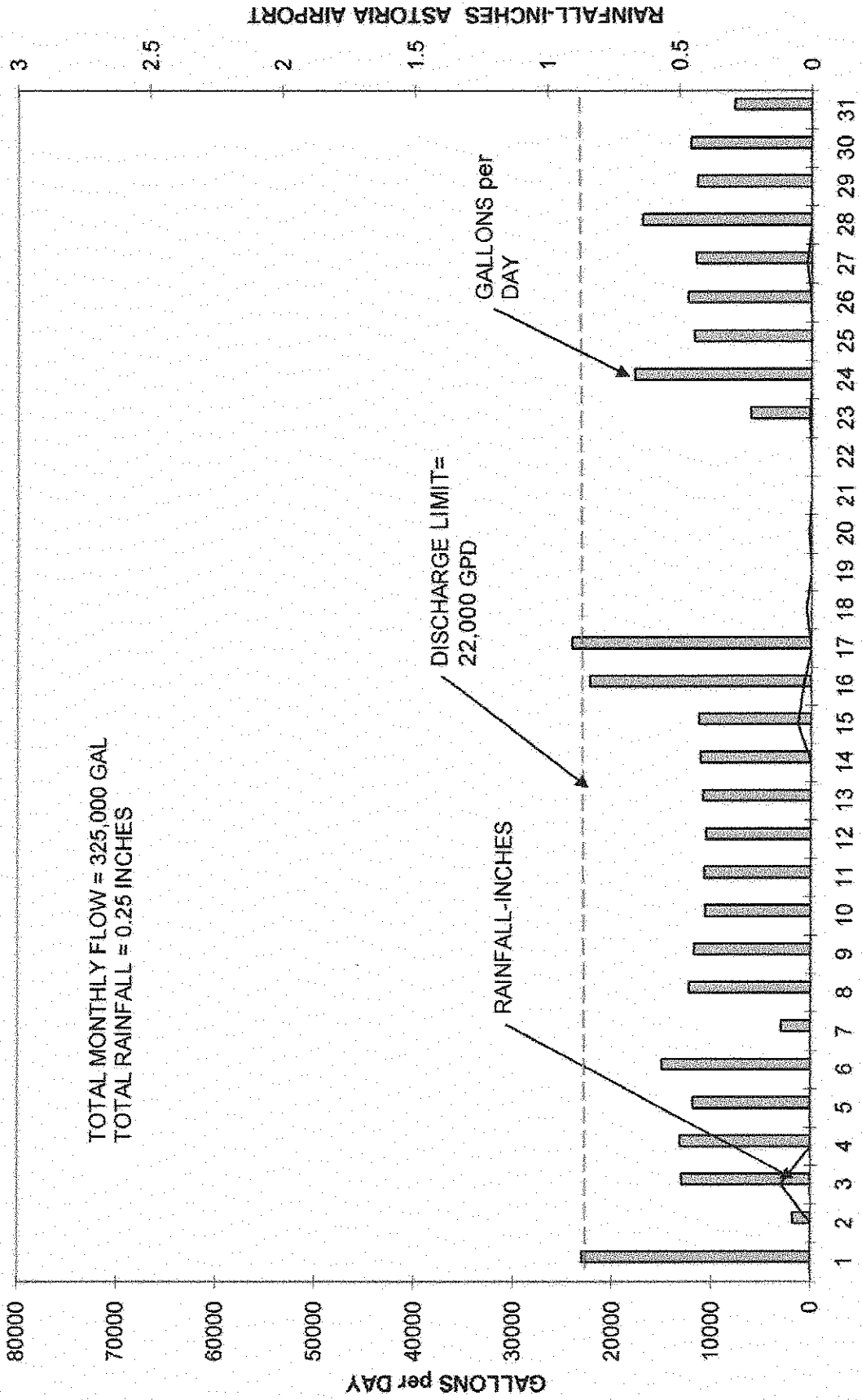
SUNDOWN SANITARY SEWER DISTRICT

TOTAL MONTHLY FLOW = 466,000 GAL
 TOTAL RAINFALL = 3.83 INCHES



JUNE 2012

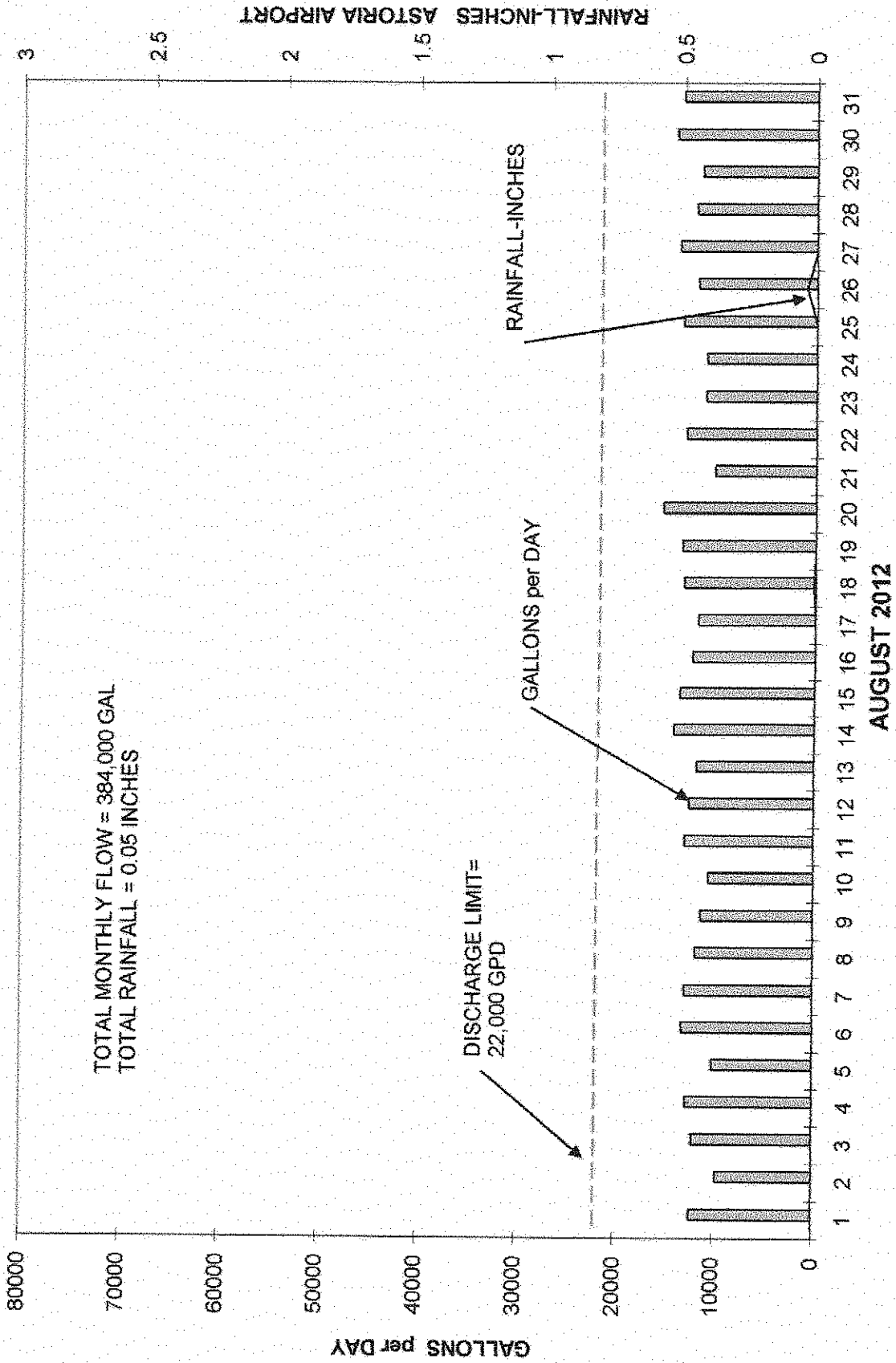
SUNDOWN SANITARY SEWER DISTRICT



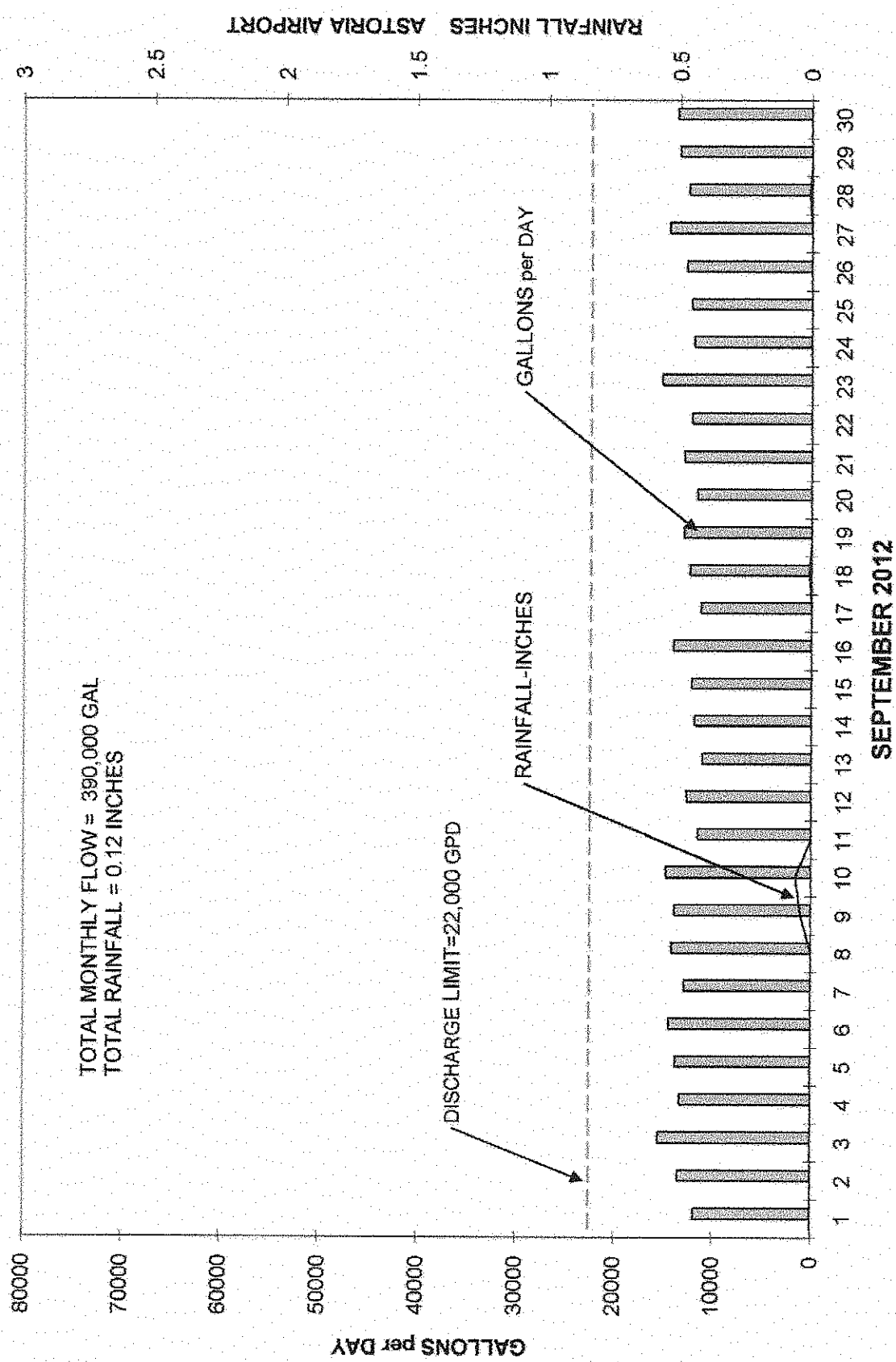
JULY 2012

SUNDOWN SANITARY SEWER DISTRICT

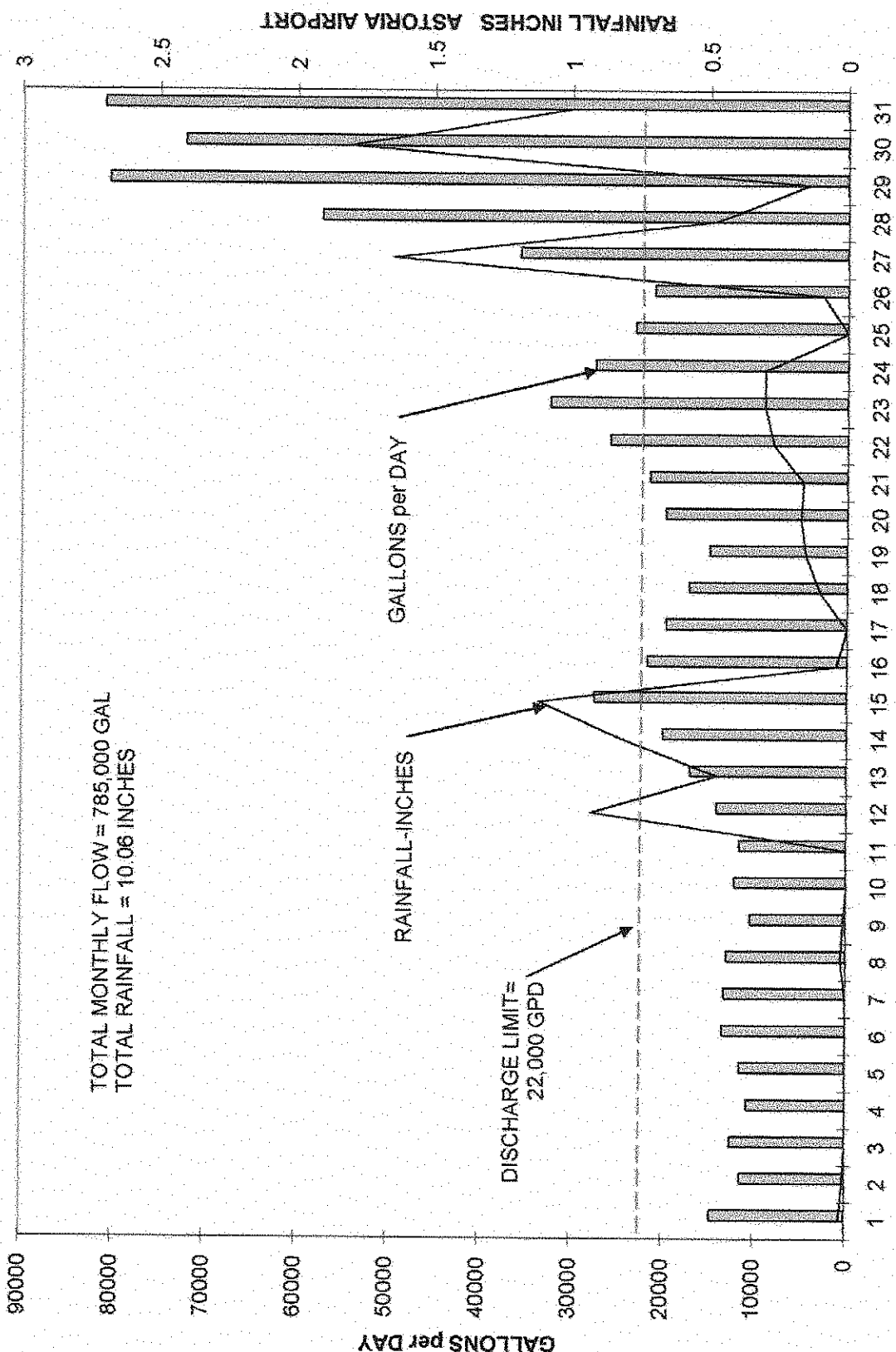
TOTAL MONTHLY FLOW = 384,000 GAL
 TOTAL RAINFALL = 0.05 INCHES



SUNDOWN SANITARY SEWER DISTRICT

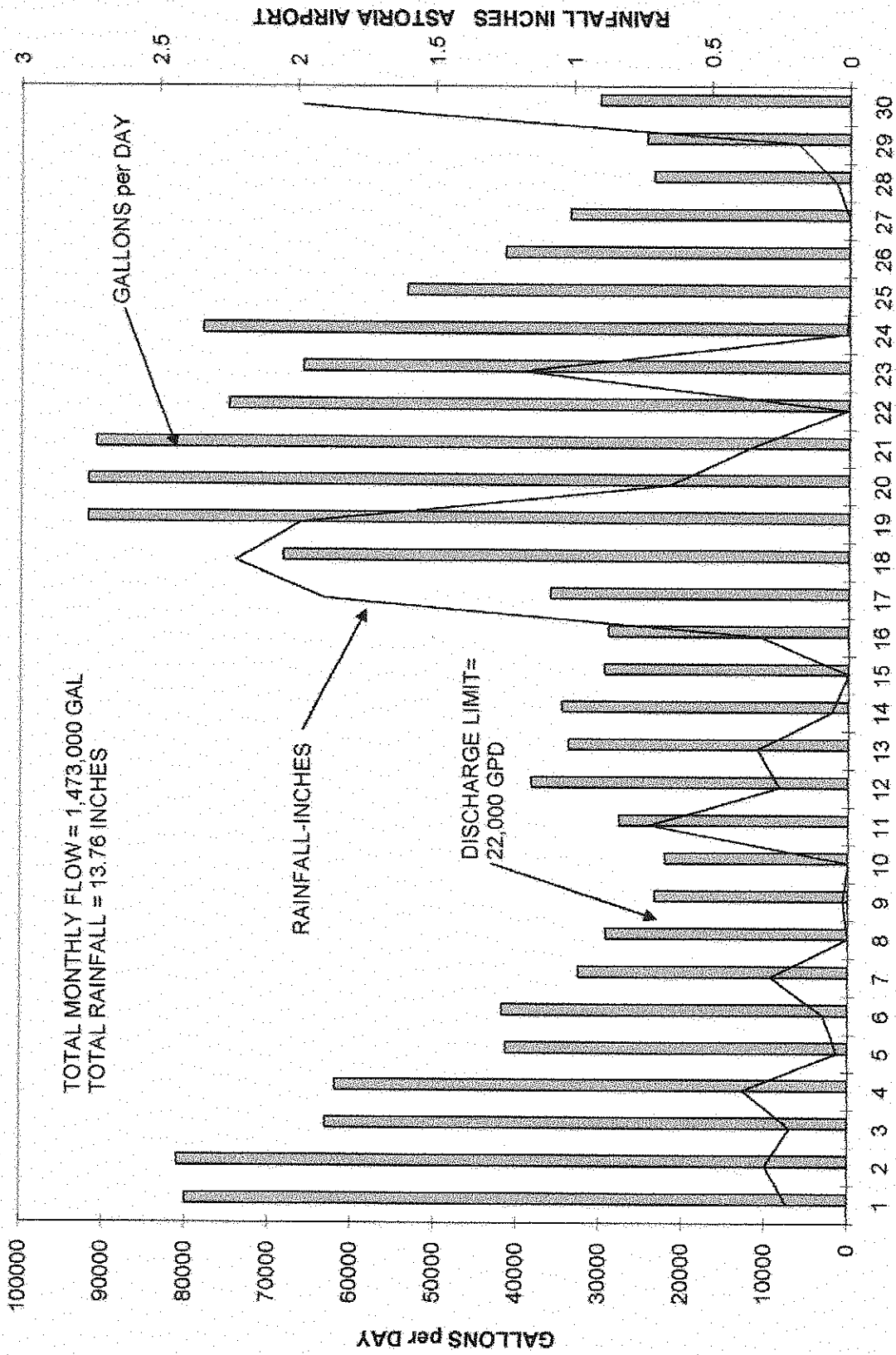


SUNDOWN SANITARY SEWER DISTRICT



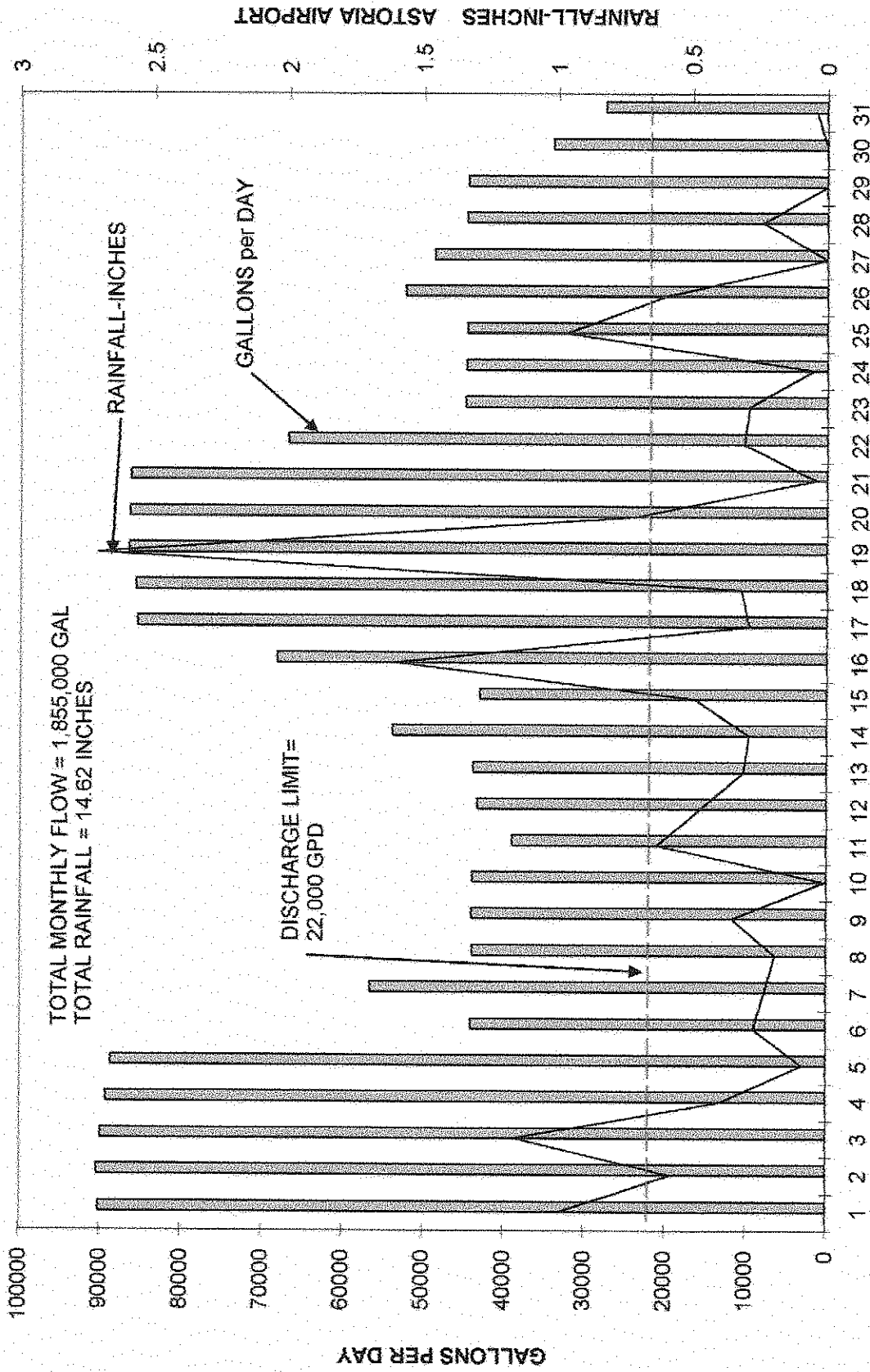
OCTOBER 2012

SUNDOWN SANITARY SEWER DISTRICT



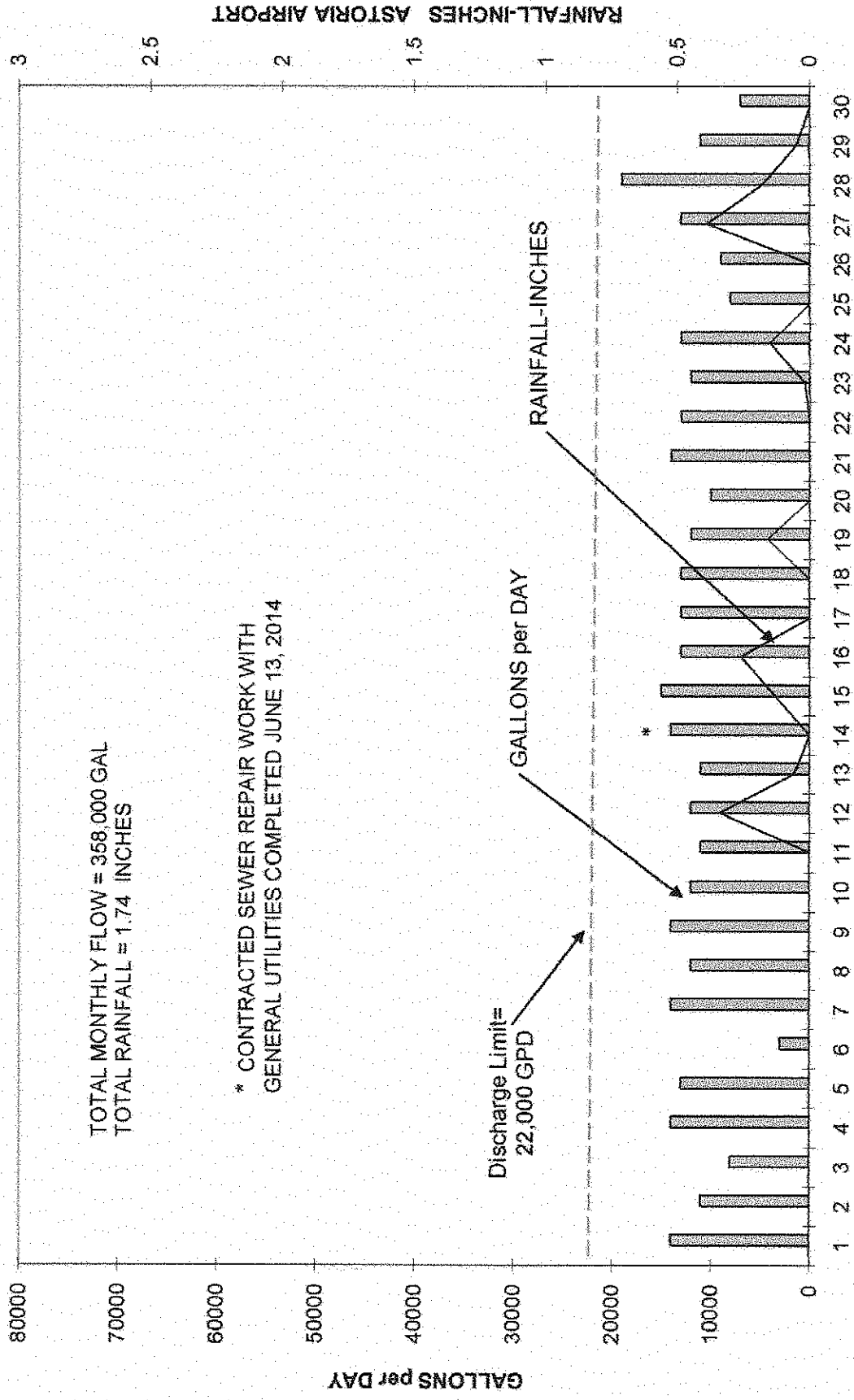
NOVEMBER 2012

SUNDOWN SANITARY SEWER DISTRICT

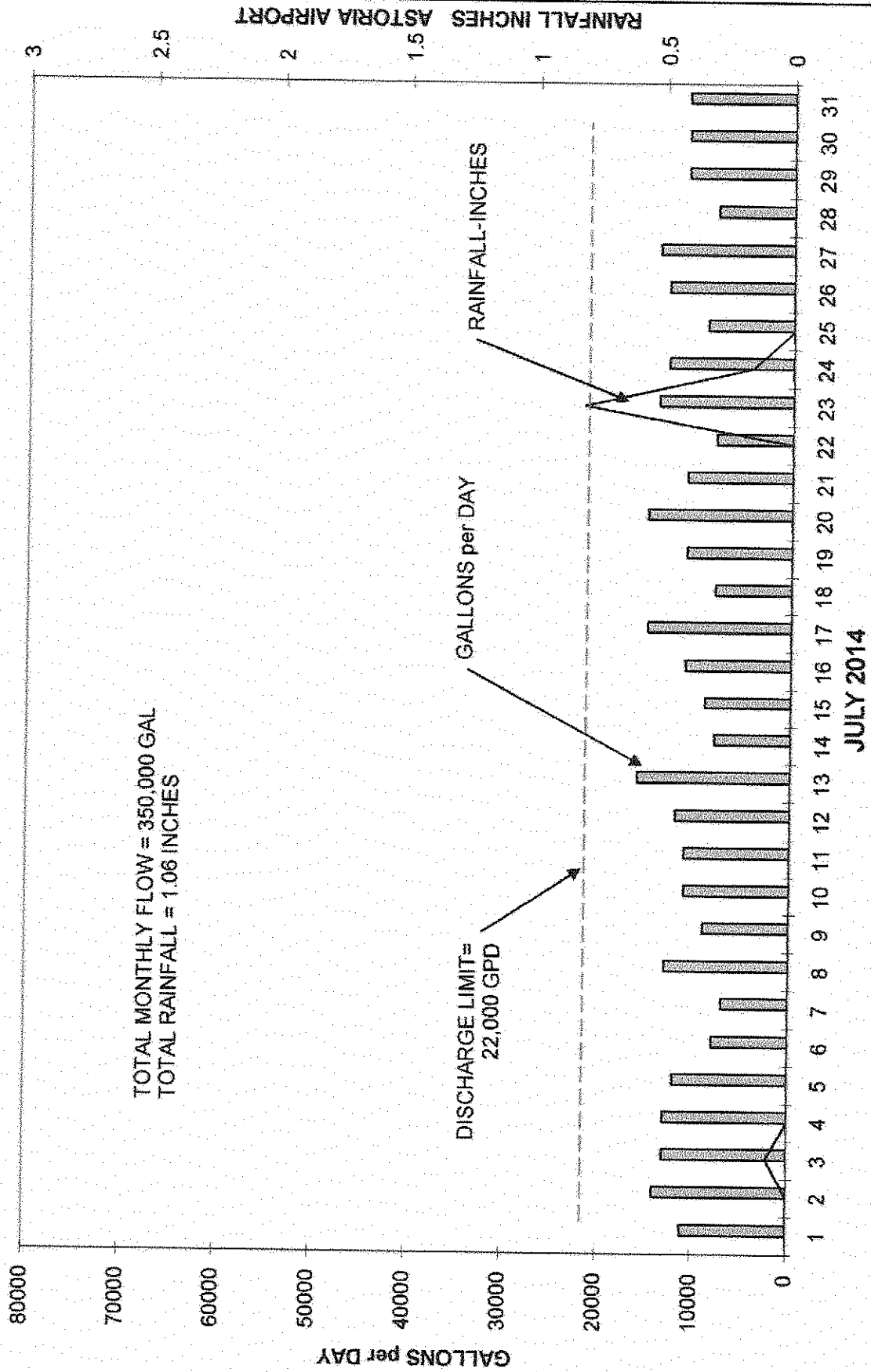


DECEMBER 2012

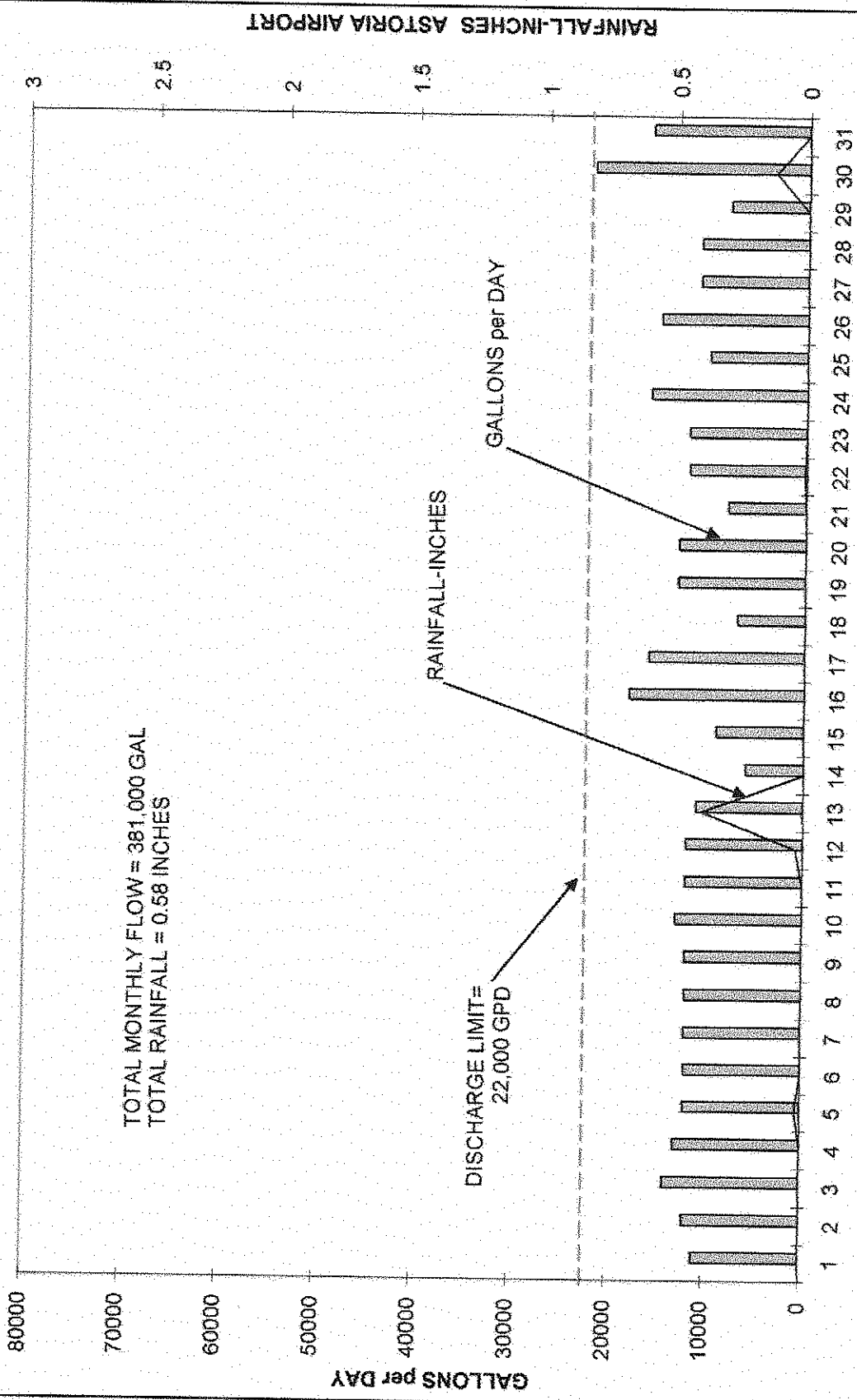
SUNDOWN SANITARY SEWER DISTRICT



SUNDOWN SANITARY SEWER DISTRICT

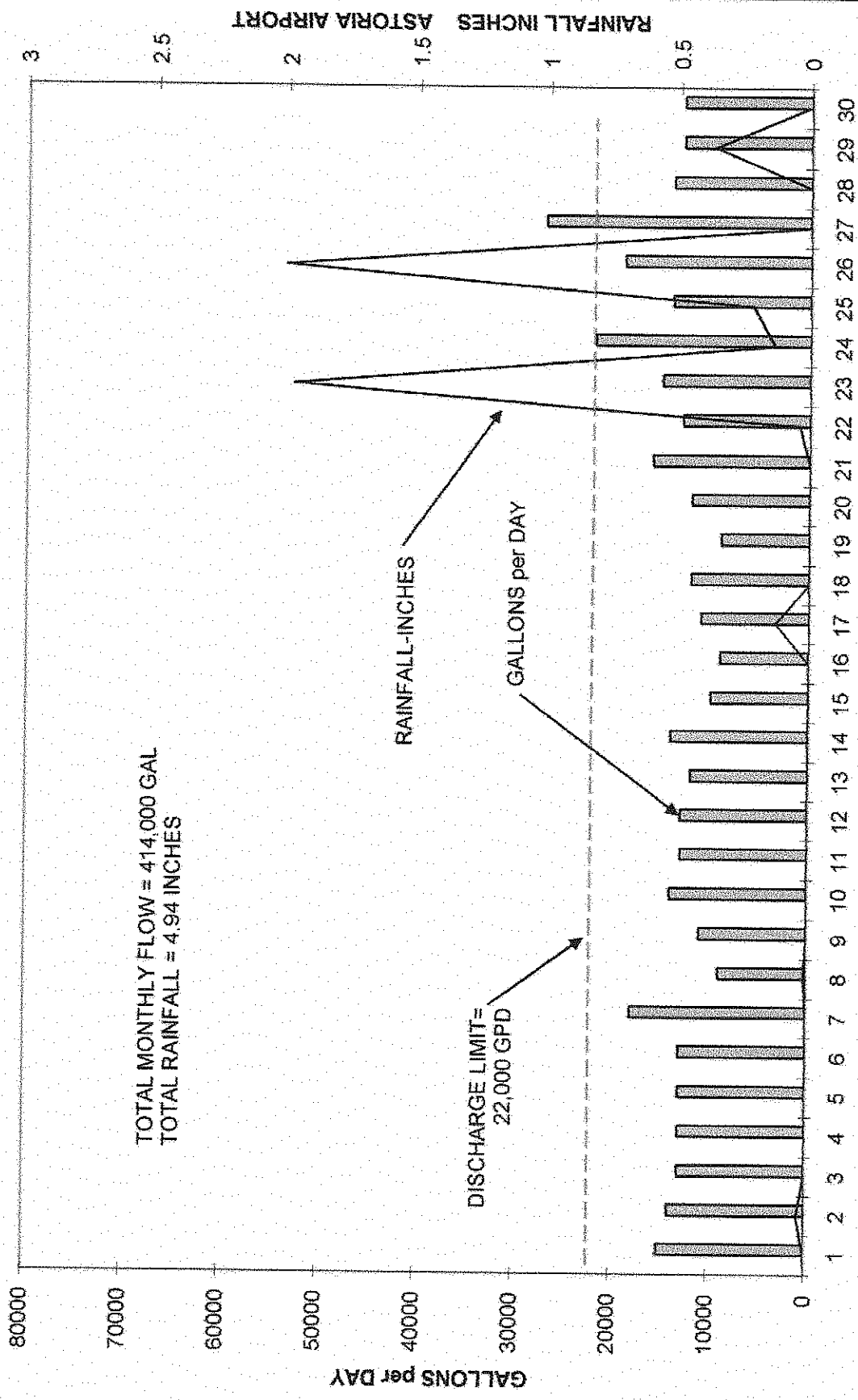


SUNDOWN SANITARY SEWER DISTRICT



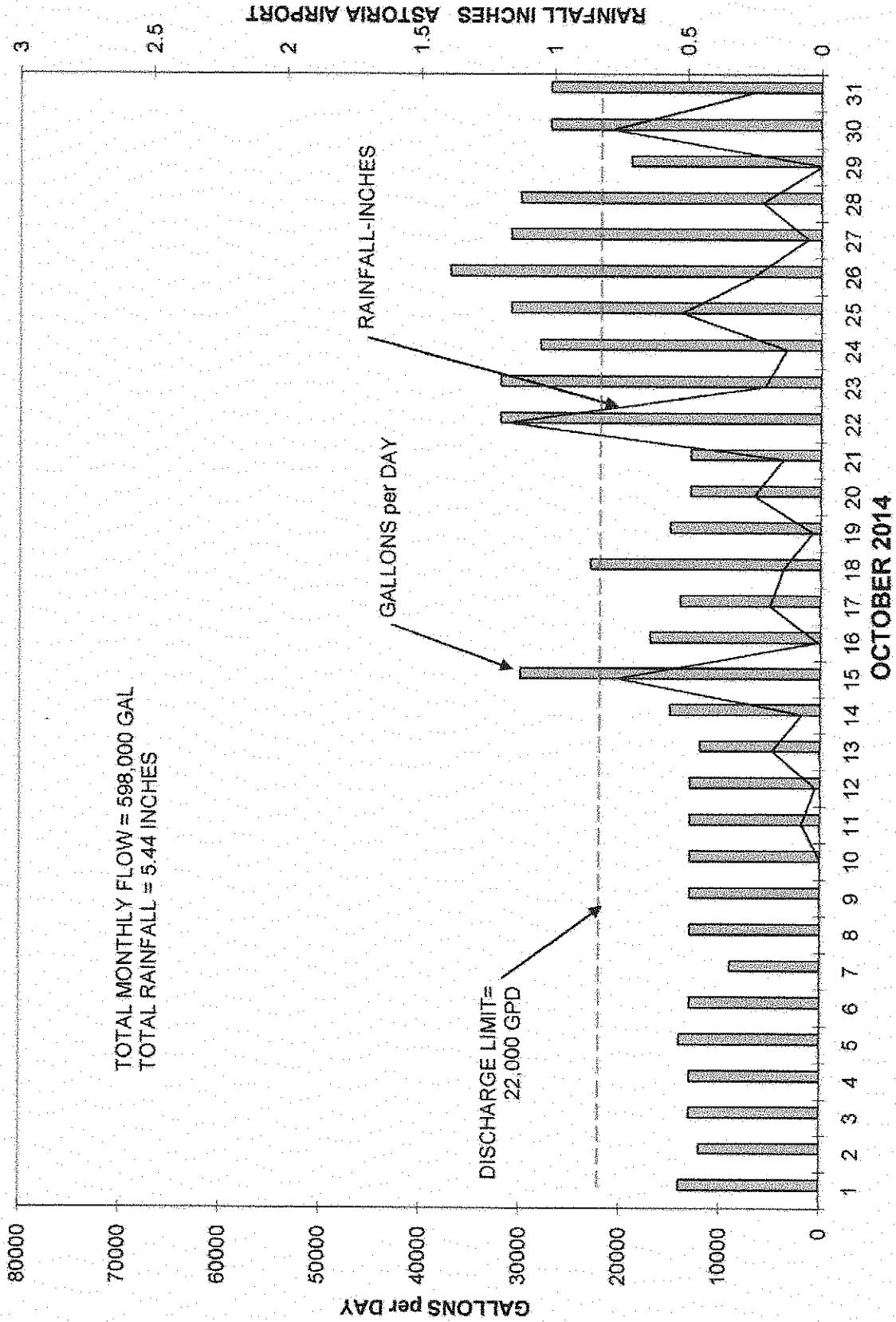
AUGUST 2014

SUNDOWN SANITARY SEWER DISTRICT

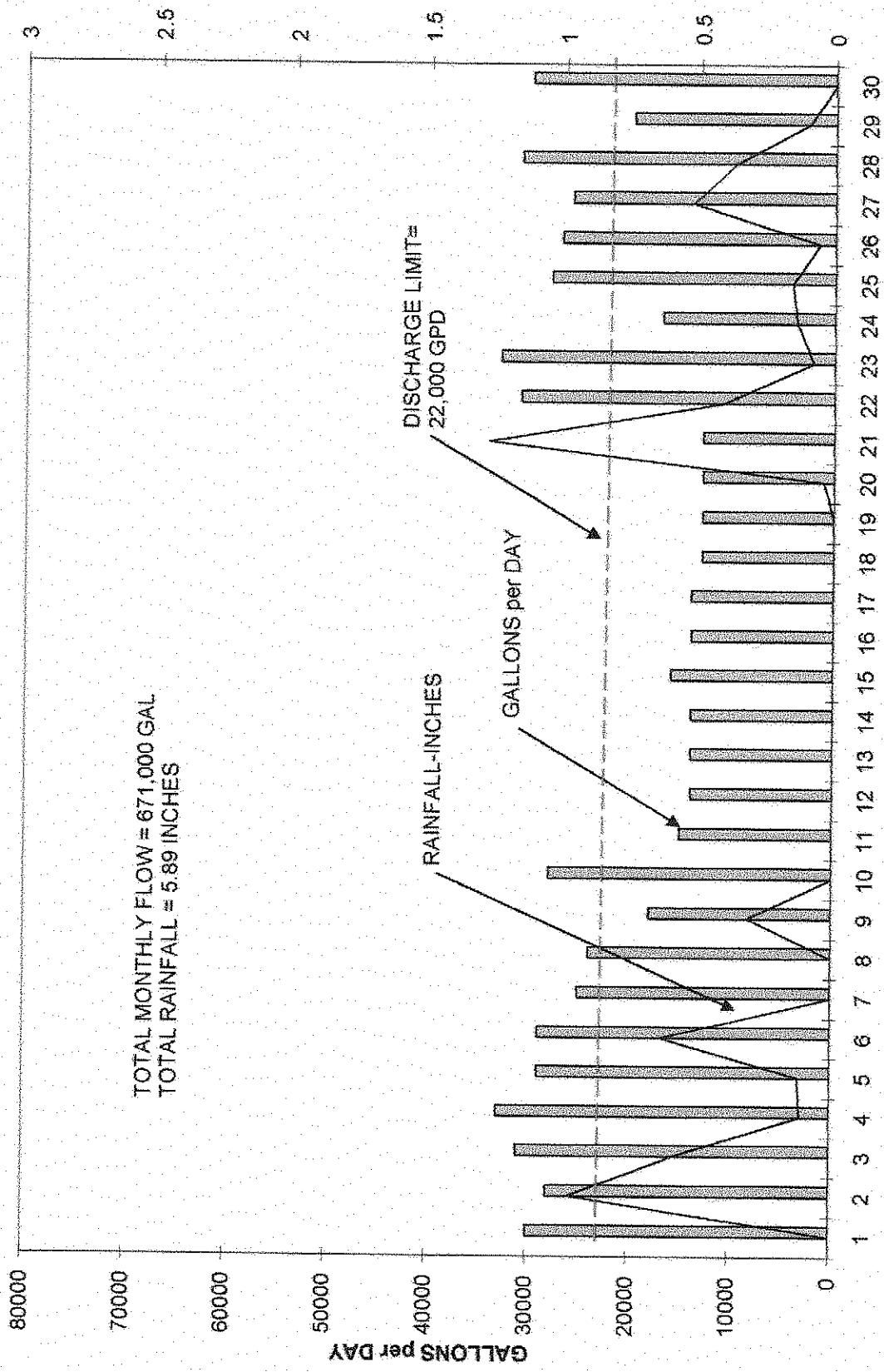


SEPTEMBER 2014

SUNDOWN SANITARY SEWER DISTRICT



SUNDOWN SANITARY SEWER DISTRICT



NOVEMBER 2014

SUNDOWN SANITARY SEWER DISTRICT

