



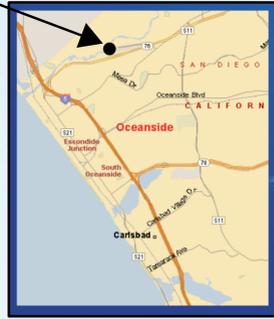
City of Oceanside 511 Pump Station

Prepared by : Nero Consultants 



Project Background

- Client:** City of Oceanside
Location: Mission Basin Groundwater Purification Facility (MBGPF) 215 Fireside Dr Oceanside, CA
Design – Build project to increase potable water distribution to 4.5 million gallons per day from MBGPF to 511 zone.
Scope of Work:
- Environmental & Permitting Analysis
 - Hydraulic Analysis
 - Geotechnical Analysis
 - Design/Construction Cost Estimate
 - Design/Construction Schedule
 - Pump Station Building Design
 - Drawing Plan Set



Pump Station Building

The **Pump Station Building** will house the 3 new vertical turbine pumps, 7 existing pumps, and an electrical room. The **design approach focus on making maintenance access & safety**. Five removable skylights on the roof provide access to the pumps for removal when needed (Figure 3&4).

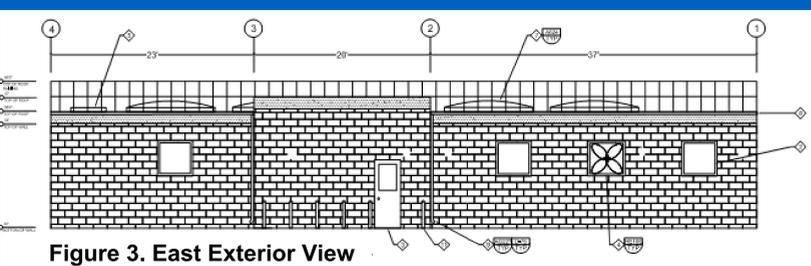


Figure 3. East Exterior View

- Maintenance & Safety Features:**
- Removable Skylights
 - Generous Spacing Around Pumps
 - Low Sloping Roof
 - Rooftop Walkway System
 - Rooftop Guardrail
 - Protection Posts

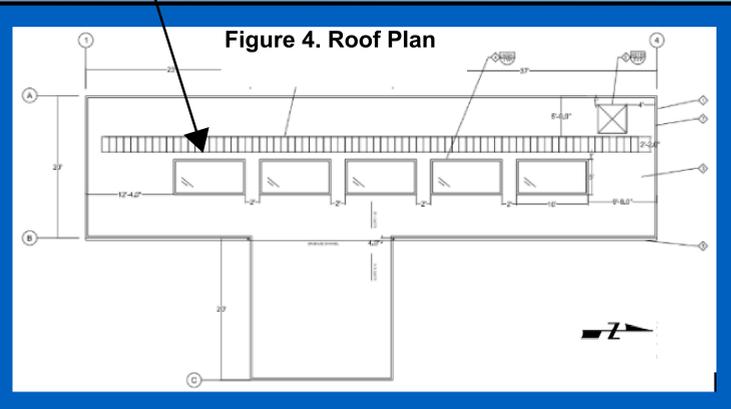


Figure 4. Roof Plan

Hydraulic Analysis

City of Oceanside Specifications:
 Three vertical turbine pumps
 Max. Flow 1,560 gpm
 Min. Flow 1,000 gpm
 Ductile Iron Pipe
 Pipe Diameter 18 in.
 Pipeline length 2,544 ft

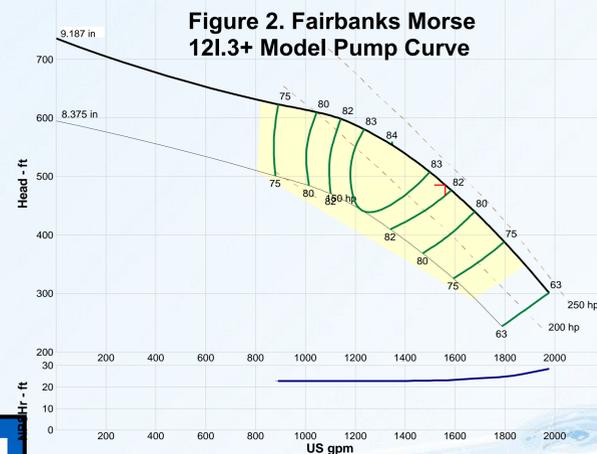


Figure 2. Fairbanks Morse 121.3+ Model Pump Curve

Multiple operating scenarios were tested on various pump models at maximum and minimum flow conditions in **PIPE-FLO Professional software**.

The **best-fit pump** was selected by determining the model with the highest efficiency, lowest power requirement, and most centered operation point on the curve. Nero Consultants determined the **Fairbanks Morse 121.3+ model** as it meets expectations specified by the City, and offers the most cost advantageous and highest performing solution (Figure 2).

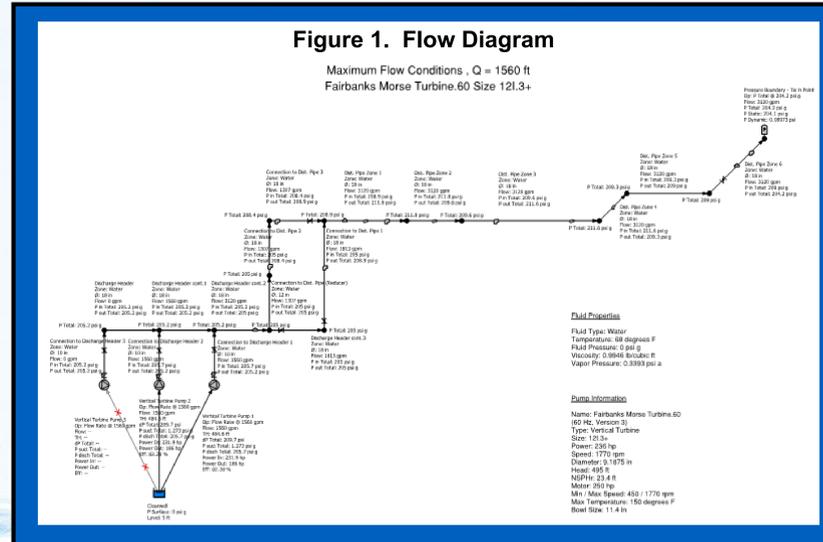


Figure 1. Flow Diagram

A **flow diagram** (Figure 1) was developed with calculated and assumed parameters along the flow path and direction of travel.

Cost Estimate

Table 3. Cost Estimate	
Type of Work	Total Cost
Total Material Costs	\$2,331,346
Construction/Equipment Costs (20%)	\$466,269
Labor Costs (35%)	\$815,917
California State Sales Tax (7.5%)	\$271,019
Design Engineering & Bidding Phase (10%)	\$388,460
Permitting (1%)	\$38,846
Construction Engineering & Admin. (15%)	\$582,690
Profit (5%)	\$244,730
Contingency (3%)	\$146,838
Total Cost	\$5,286,171

The **total cost for design and construction** services is estimated to be **\$5.3 million** (Table 3).

An estimated **31% of total cost**, \$1.67 million, is from **purchase of mechanical materials**, including the three vertical turbine pumps and the 18" ductile iron pipe.

Environmental Impact & Compliance

Table 1. Approvals Required for 511 Pump Station Project		
Agency	Authorization	Reason Needed
City Community Services Department	Debris Management Plan	Required of all City projects
	Construction Permit	Required for new construction & demo within City limits
	Right of Way Permit	Needed for affecting traffic in City public right of way
Public Works Department, Traffic Engineering Division	Traffic Control Permit	Required for construction in public right of way
	Haul Route Permit	Required for transport of materials to and from site
Development Service Department	Grading Permit	Required for earthwork, erosion control & drainage
	Building Permit	Needed when building in City

Table 2. Summary of Environmental Factors Potentially Affected		
<input type="checkbox"/> Aesthetics	<input type="checkbox"/> Agricultural	<input checked="" type="checkbox"/> Air Quality
<input type="checkbox"/> Biological Resources	<input type="checkbox"/> Cultural Resources	<input checked="" type="checkbox"/> Geological
<input type="checkbox"/> Hazards	<input checked="" type="checkbox"/> Water	<input checked="" type="checkbox"/> Land Use & Planning
<input type="checkbox"/> Public Services	<input checked="" type="checkbox"/> Noise	<input type="checkbox"/> Population & Housing
<input checked="" type="checkbox"/> Utility Systems	<input type="checkbox"/> Recreation	<input type="checkbox"/> Transportation

Meet the Team




 Cassidy Thornbury, Env E
Project Manager


 Sydney Johnson, Env E
Water Resources Engineer


 Courtney Harr, Env E
Water Resources / AutoCAD Engineer


 Connor Cornelius, Con E
Site Development Manager


 Rory Cornelius, Con E
Construction Manager


 Ryan Shively, Civ E
Geotechnical Engineer

Schedule

Table 2. Schedule Milestones			
Activity	Duration (days)	Start Date	End Date
Notice to Proceed	-	2/3/20	-
Design Phase	146 days	2/7/20	7/1/20
Construction Phase	205 days	7/1/20	1/21/21
Procurement	247 days	2/12/20	10/15/20
Total Project Duration	357 days	1/31/20	1/21/21

Schedule is designed to fast track the project by getting the **long procurement items approved first** (Table 2). This allowed for these items to be ordered as the rest of the design progressed, resulting in construction work starting as soon as the site civil work design package gets approved.

Geotechnical



Previously collected boring logs by Robert Prater suggest **loose sands with a water table detected close to the surface**. The data indicates layers of loose alluvial soil 9-15 ft below the surface.

There may also be a possibility of soil liquefaction in the event of an earthquake.

- Recommendations during construction:**
- Dewatering
 - Vertical shoring
 - Removal and compaction of soil
 - In-situ Sampling