

Pipe Decision Matrix

The conveyance pipeline connecting the wet well pump station to the Advanced Water Purification Facility was evaluated to determine the most suitable material for hydraulic performance, constructability, durability, and long-term maintenance. Pipe material selection was a critical component of the design because it directly affects system reliability, installation efficiency, lifecycle cost, and compatibility with pump station infrastructure.

Pipe Materials Evaluated

Table 1. Pipe Materials

Alternative	Description
PCCP	High structural strength commonly used for large diameter pipelines
DIP	Flexible, durable, and practical for municipal systems
Steel	Strong and customizable but corrosion-sensitive
HDPE	Corrosion resistant with lower structural rigidity

Evaluation Criteria

Each material was scored using a weighted engineering decision matrix.

Table 2. Decision Matrix Criteria

Criteria	Weight
Hydraulic Performance	20%
Structural Strength	15%
Constructability	30%
Sustainability	20%
Corrosion Resistance	15%

Recommended Pipe Material

After evaluation, Ductile Iron Pipe (DIP) achieved the highest overall weighted score and was selected as the preferred pipeline material.

Selected Design

- **Material:** Ductile Iron Pipe (DIP)
- **Diameter:** 42-inch
- **Application:** Pump station discharge main
- **Design Flow Capacity:** 40 MGD

Key Advantages of DIP

- Strong structural performance under buried conditions
- Easier alignment adjustments during installation
- Compatible with valves, fittings, and pump connections
- Reliable for municipal water infrastructure
- Lower complexity than steel fabrication
- Better flexibility than PCCP in constrained layouts