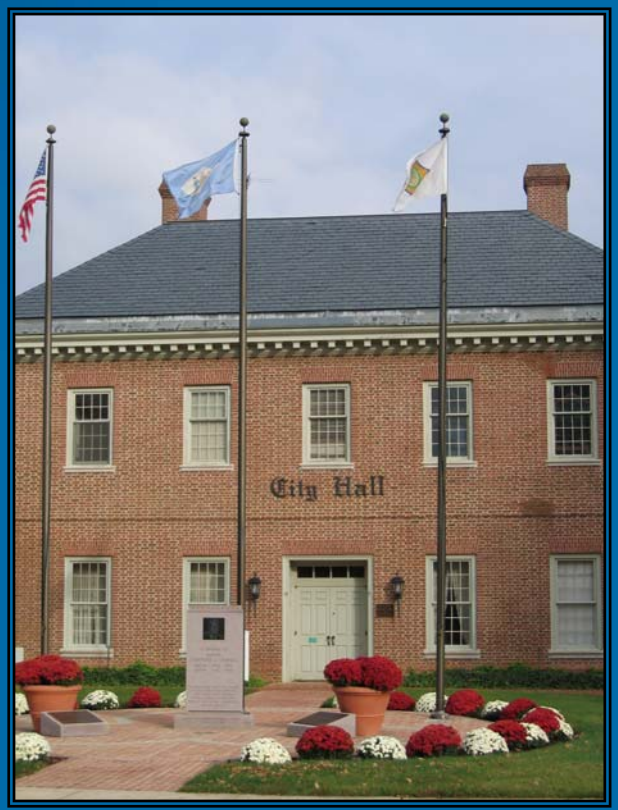
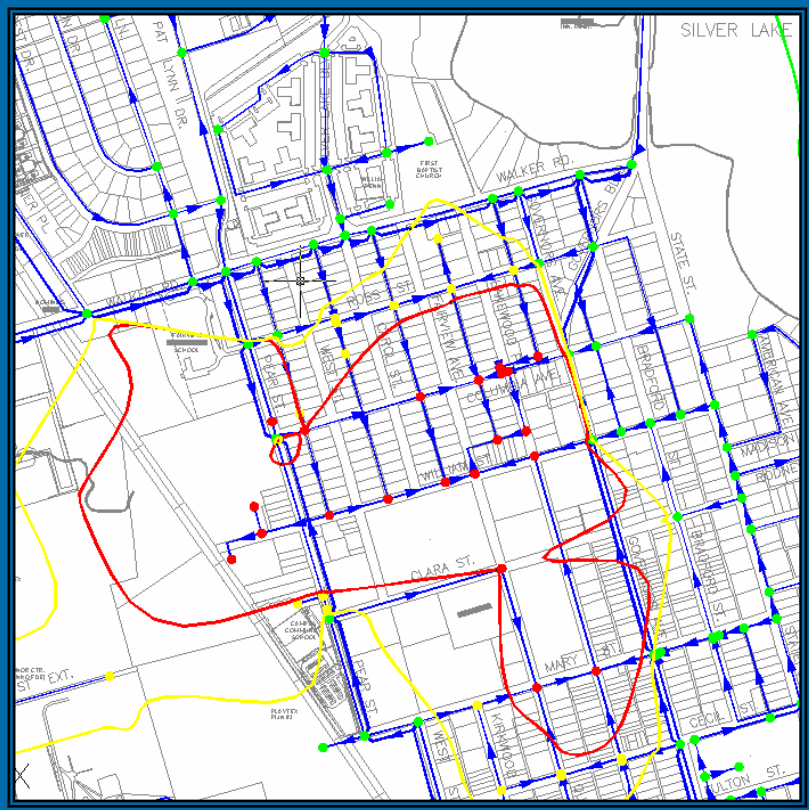
# Water System Master Plan

## City of Dover Utility Committee Presentation



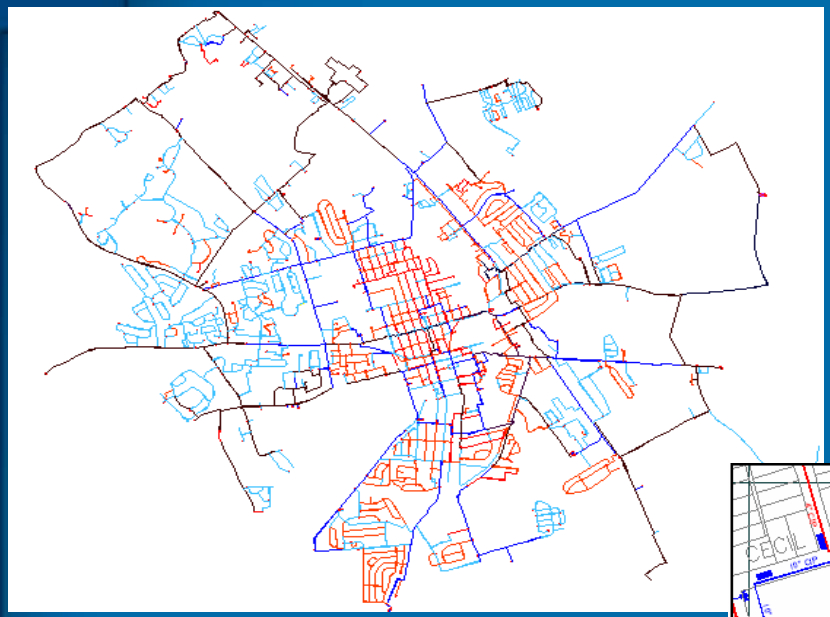




April 25, 2005

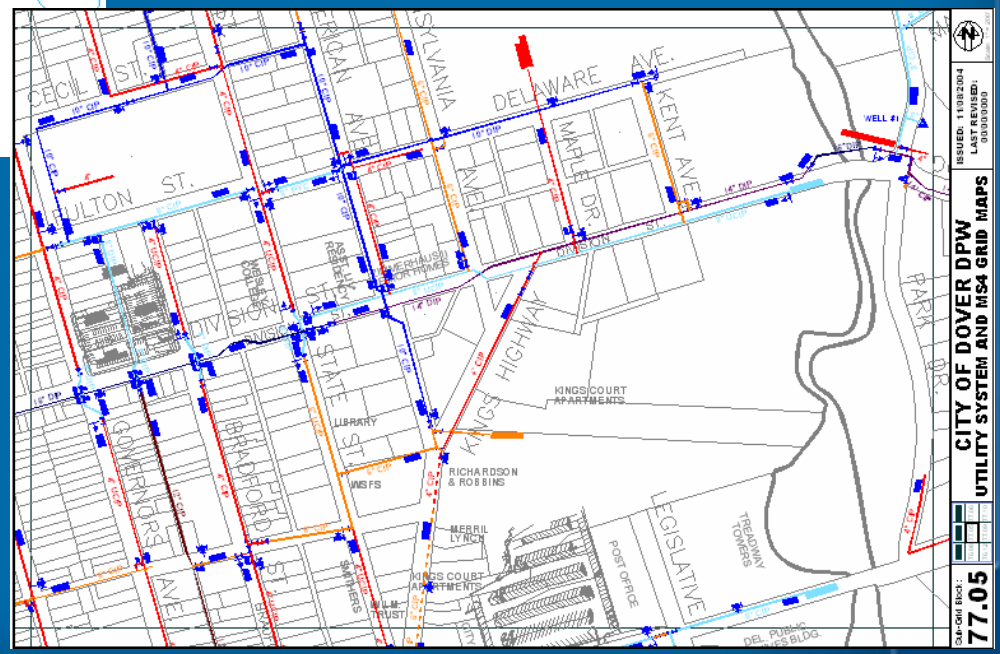
# Water System Master Plan

- System Mapping and Demands
- Update of Hydraulic Model
- Distribution System Summary
- Preliminary Capital Improvement Program – Water Supply, Storage and Distribution

# Water System Mapping



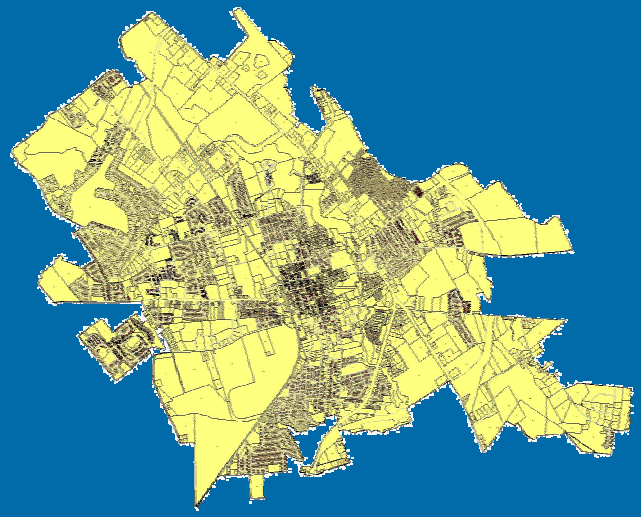
Complete Water System Update by City

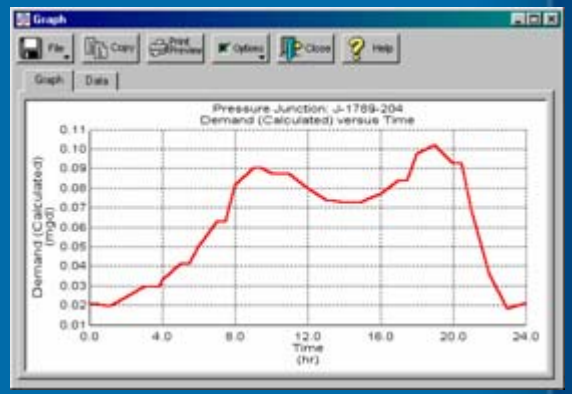



Map Book Development

# Water System Demands





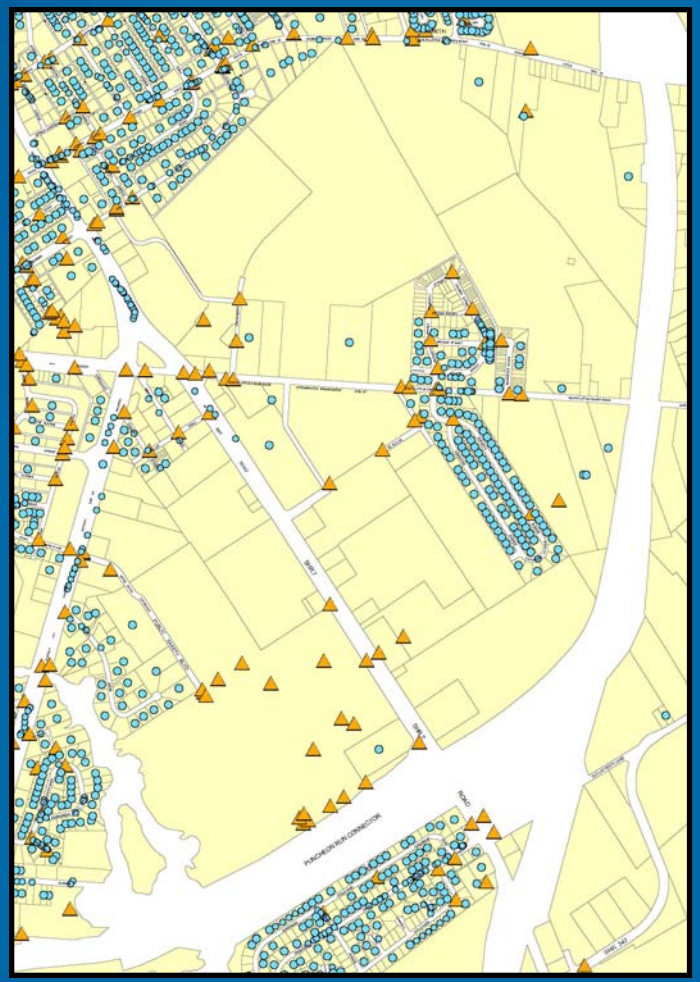



Billing Data → GIS → Hydraulic Modeling Software

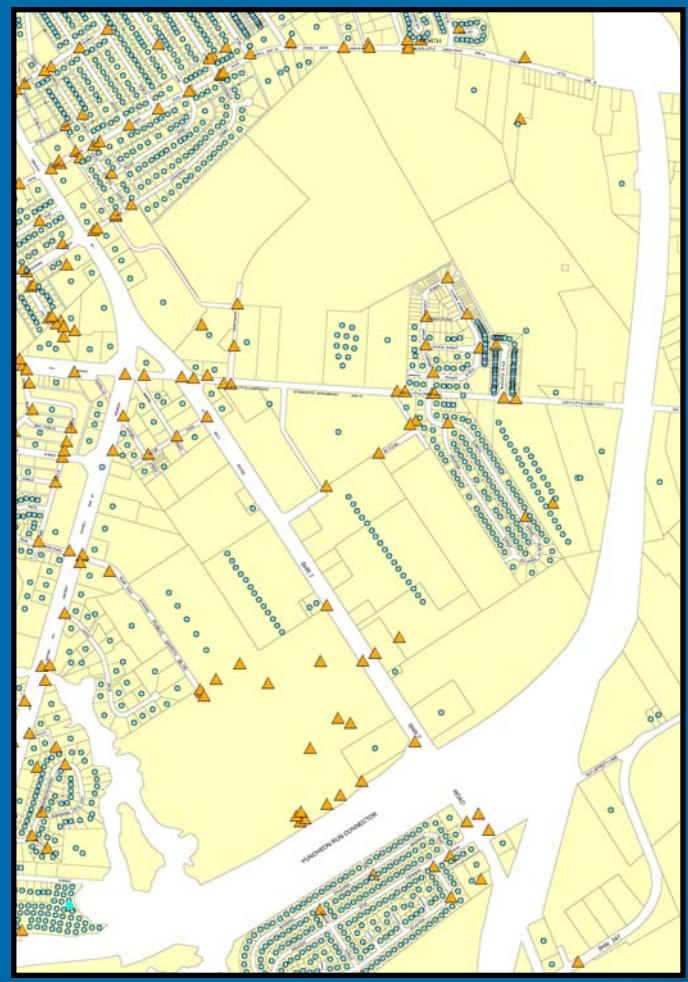
- **GIS software acts as a bridge to link textually based data to spatially based software.**

# Water System Demand Distribution

BEFORE

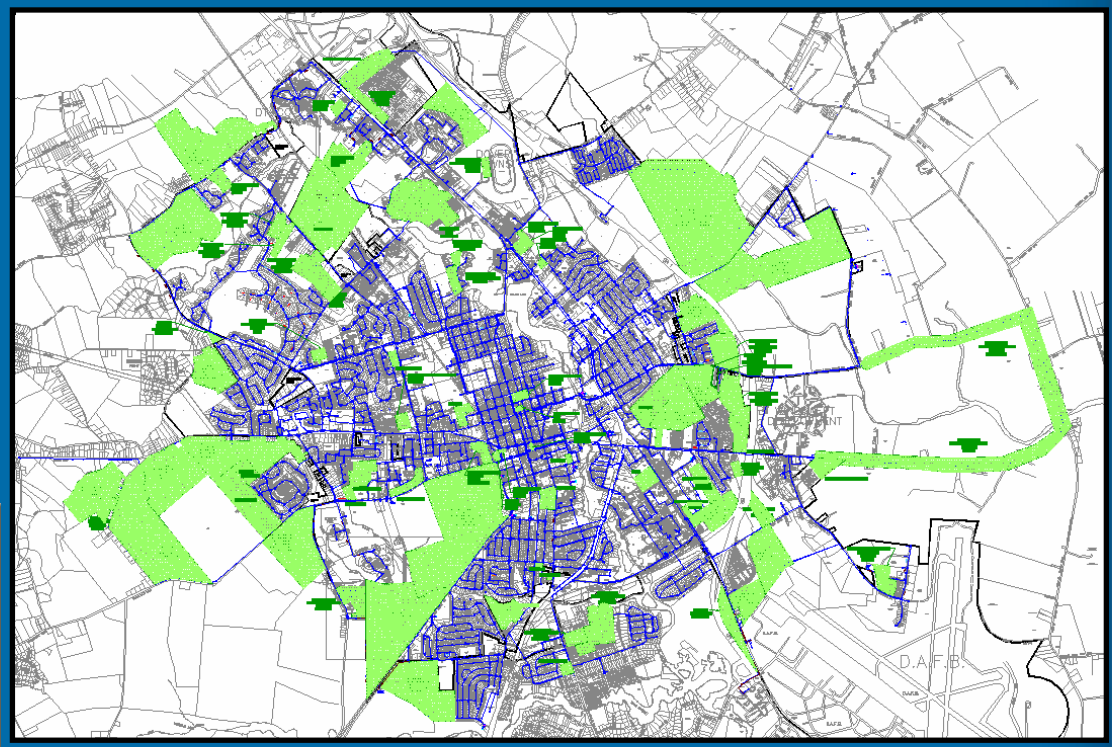


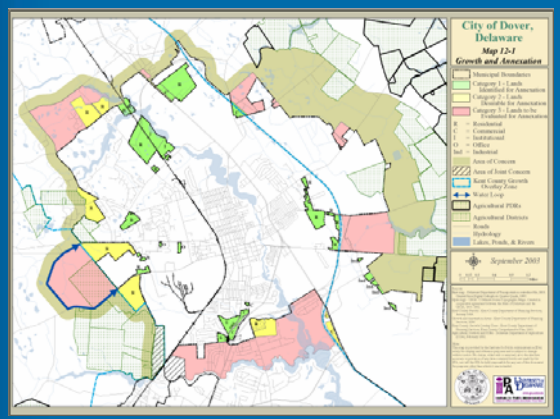
AFTER



# Water System Demand Projections

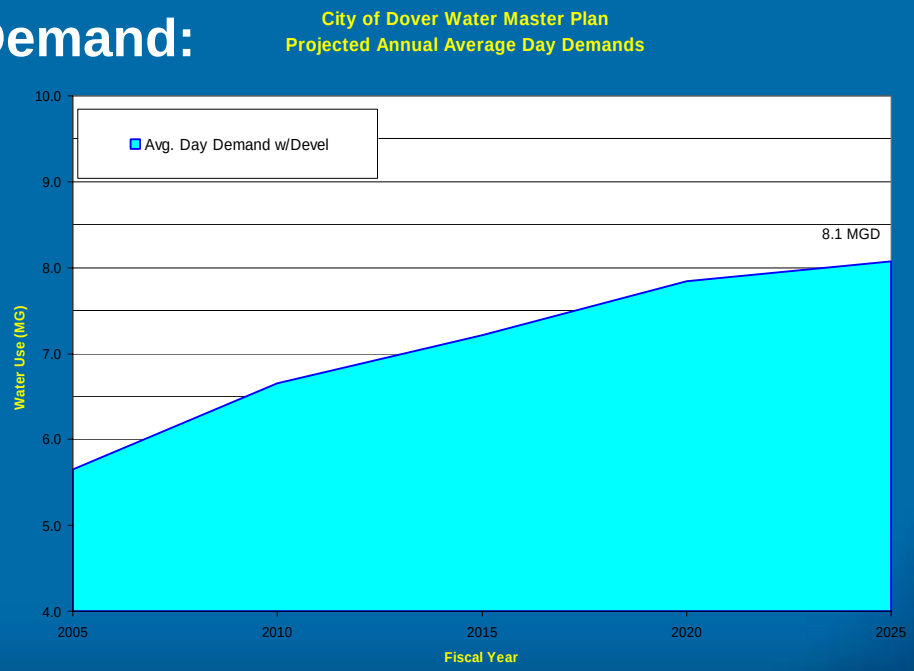
- Planned/Projected Growth
- Annexation
- Service Area Expansion
- Bulk Customers
- Flat Industrial Growth





# Water System Demand Projections

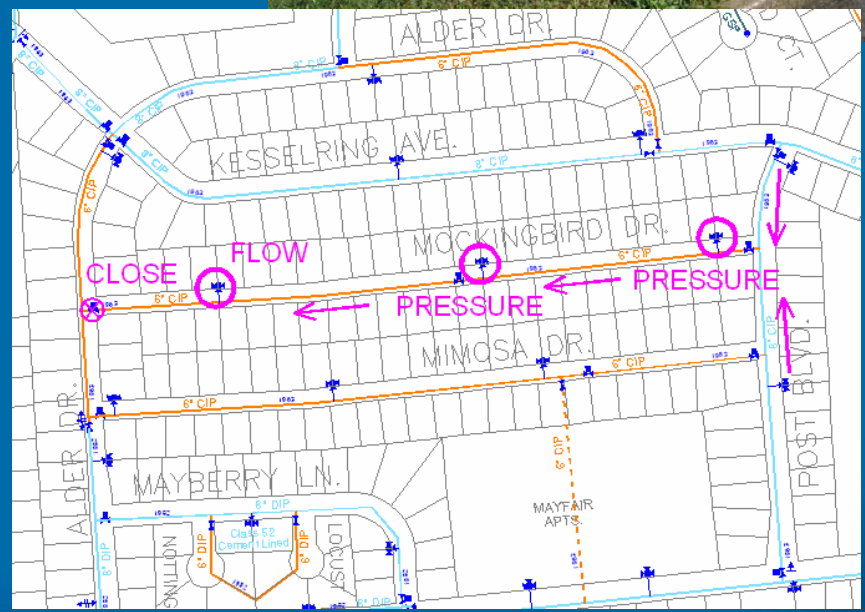
- 2005 Average Day Demand: 5.7 MGD
- 2025 Average Day Demand: 8.1 MGD
- Maximum Day Factor: 1.7
- 2025 Maximum Day Demand: 13.7 MGD



# Update of Hydraulic Model

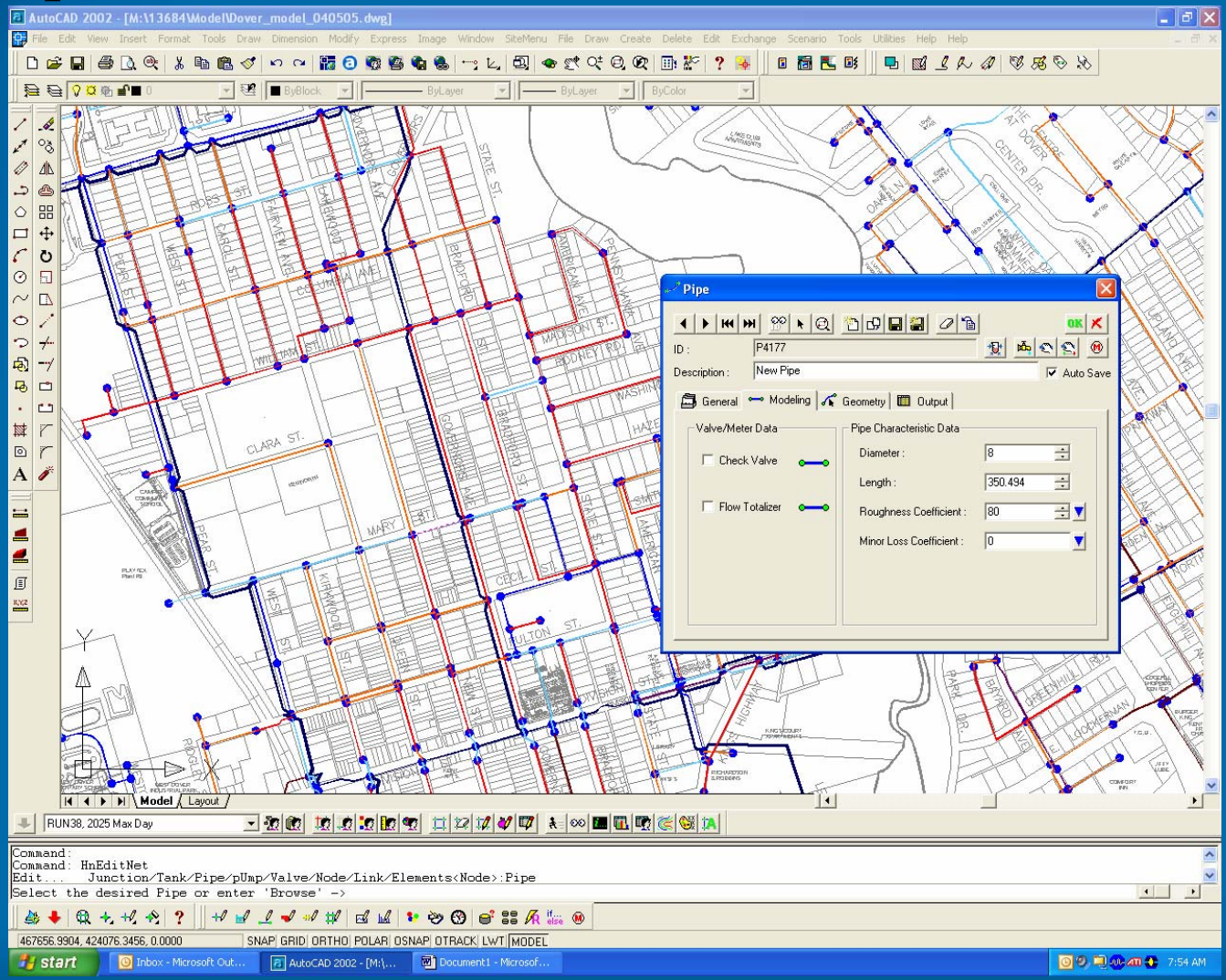
- **Software**
  - H2ONet (City-Owned, GIS-Compatible)
- **Model**
  - Re-create model
  - Assign demand to pipe nodes via City billing record – County tax map link
- **Calibration**
  - Flow and pressure testing
  - Compare system performance vs. model





# Distribution System Summary

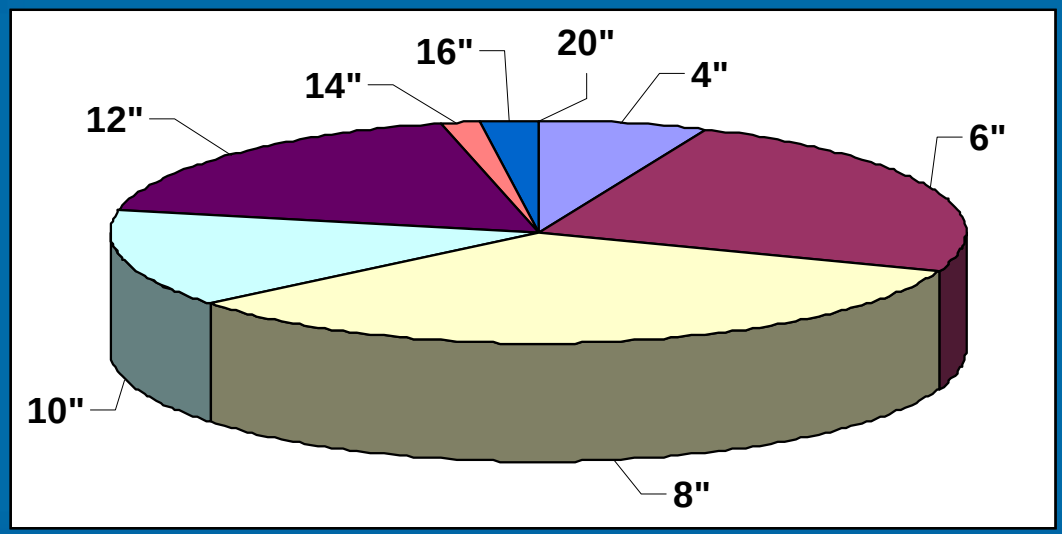
## *Pipe Size – Water Model*



# Distribution System Summary

## *Pipe Size*

| Pipe Diameter | Pipe Length (miles) | Percent |
|---|---|---|
| 4" | 11.34 | 6.44% |
| 6" | 42.29 | 24.01% |
| 8" | 59.09 | 33.55% |
| 10" | 24.81 | 14.08% |
| 12" | 32.41 | 18.40% |
| 14" | 2.45 | 1.39% |
| 16" | 3.67 | 2.08% |
| 20" | 0.07 | 0.04% |
| *Total* | *176.13* | *100.00%* |

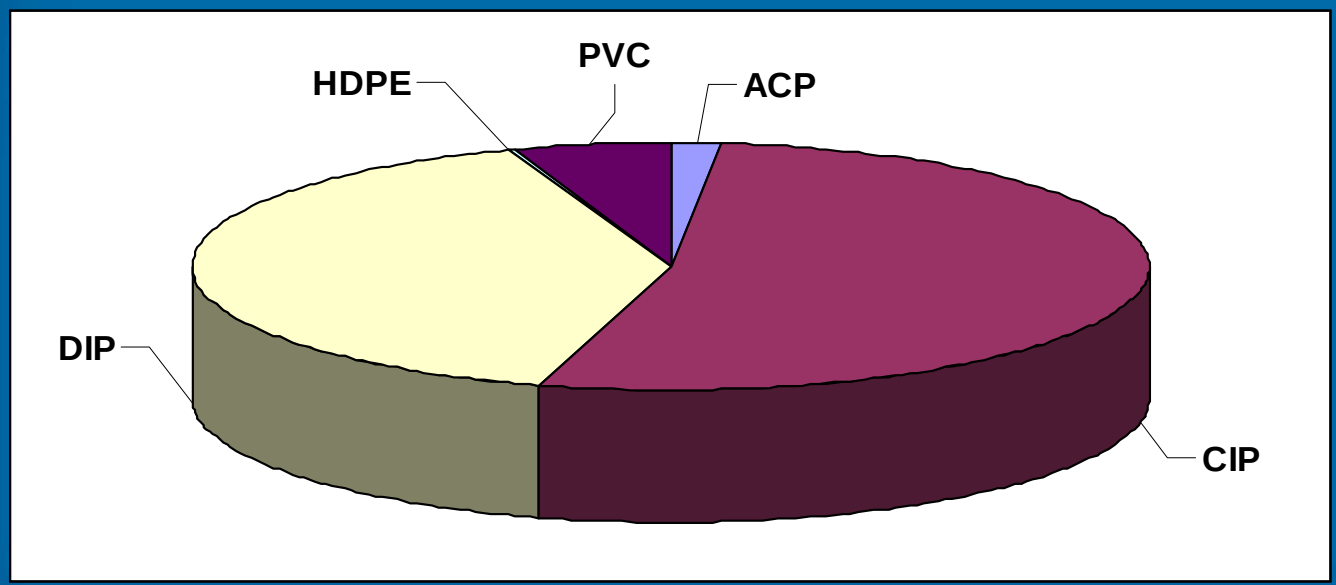



City Of Dover

# Distribution System Summary

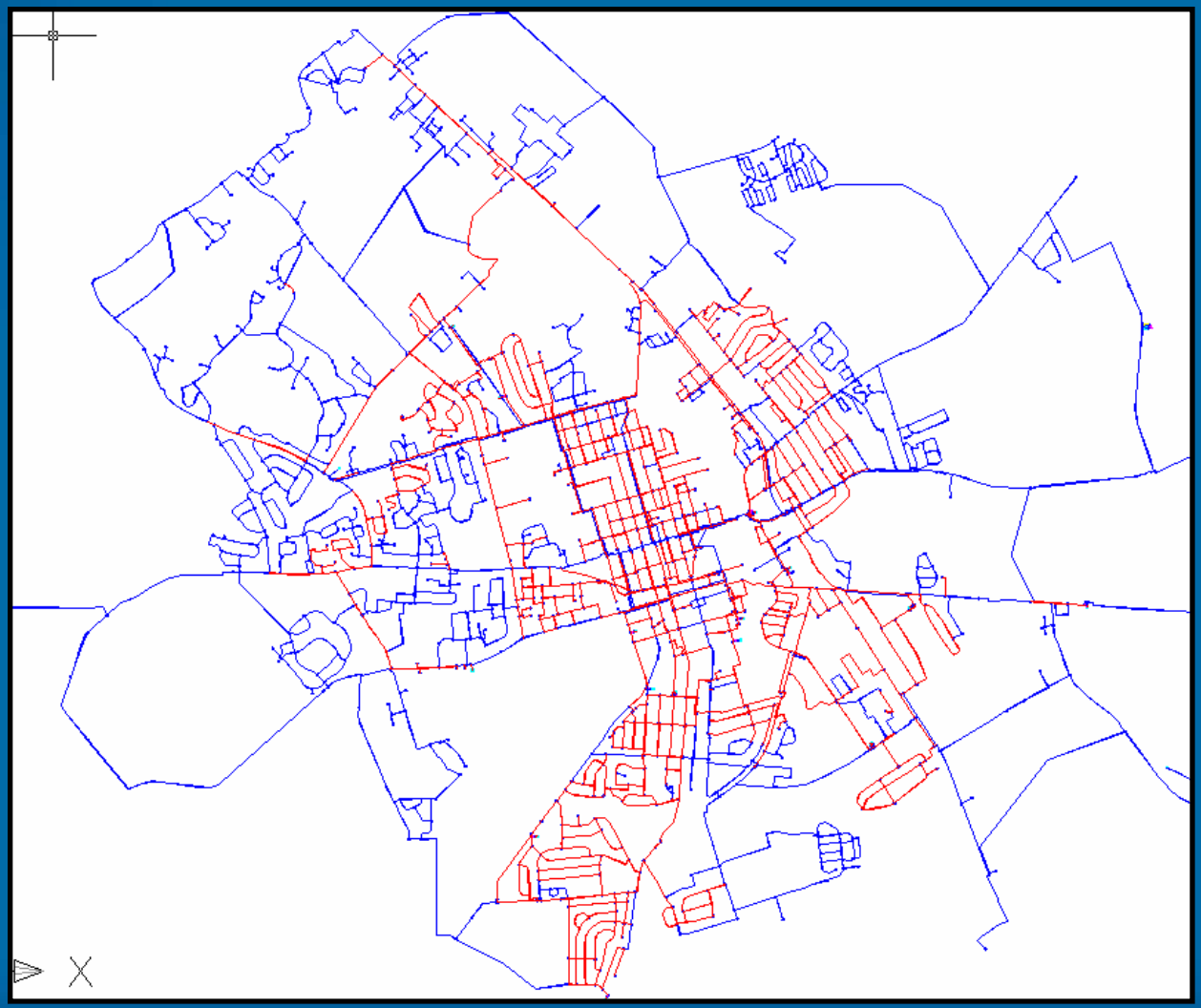
## *Pipe Material*

| Pipe Material | Pipe Length (miles) | Percent |
|---|---|---|
| ACP | 2.81 | 1.59% |
| CIP | 92.97 | 52.78% |
| DIP | 70.71 | 40.15% |
| HDPE | 0.13 | 0.07% |
| PVC | 9.52 | 5.40% |
| *Total* | *176.13* | *100.00%* |



# Distribution System Summary

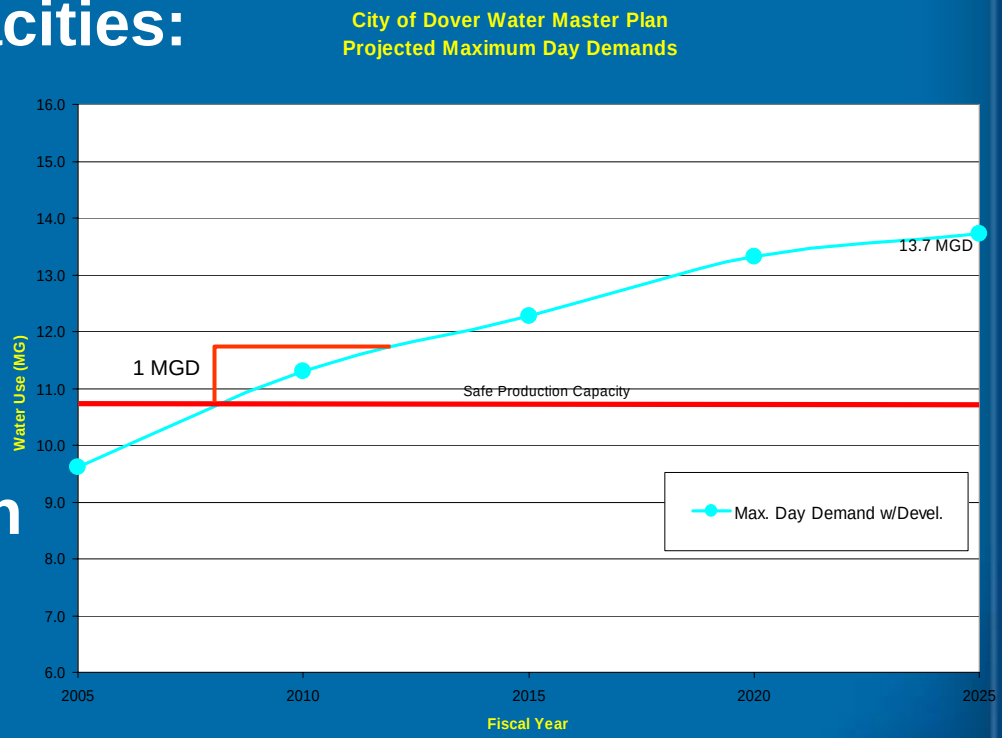
## *Pipe Material – Cast Iron Pipe*



City Of Dover

# Preliminary CIP - Water Supply

- Maximum Day Demand
- Permitted Daily Capacities:
  - Deep Well: 11.96 MGD
  - WTP: 4.68 MGD
- Actual Production Capacity: 13.15 MGD
- Total Safe Production Capacity: 10.64 MGD



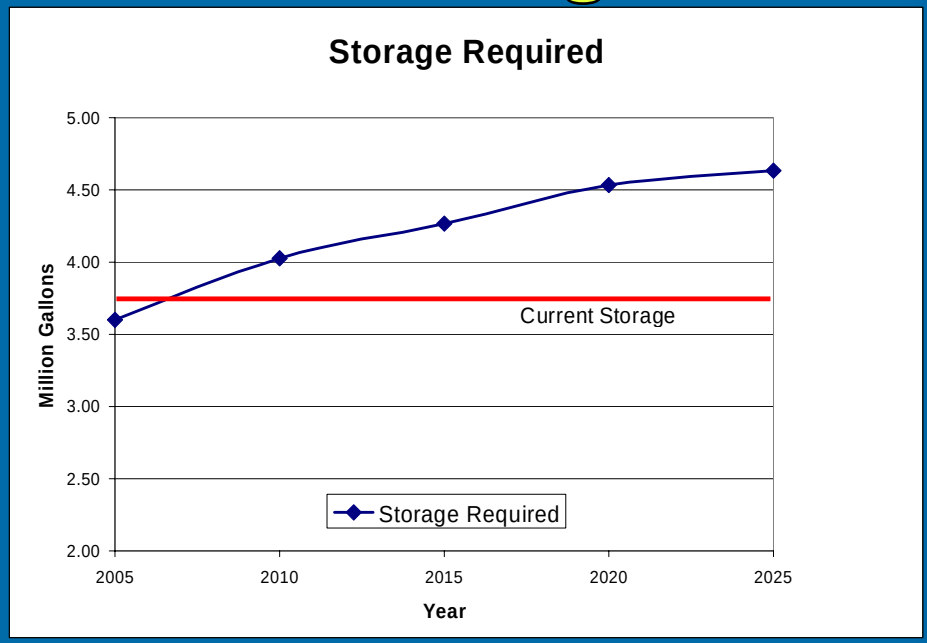
# Preliminary CIP - Water Storage

## Capacity / Storage Needs:

**Equalization:**
- 0.15 * max day

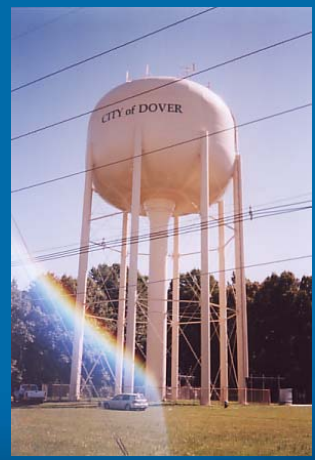
**Fire Flow:**
- 5,000 gpm for 4 hours

**Emergency:**
- 0.10 * max day

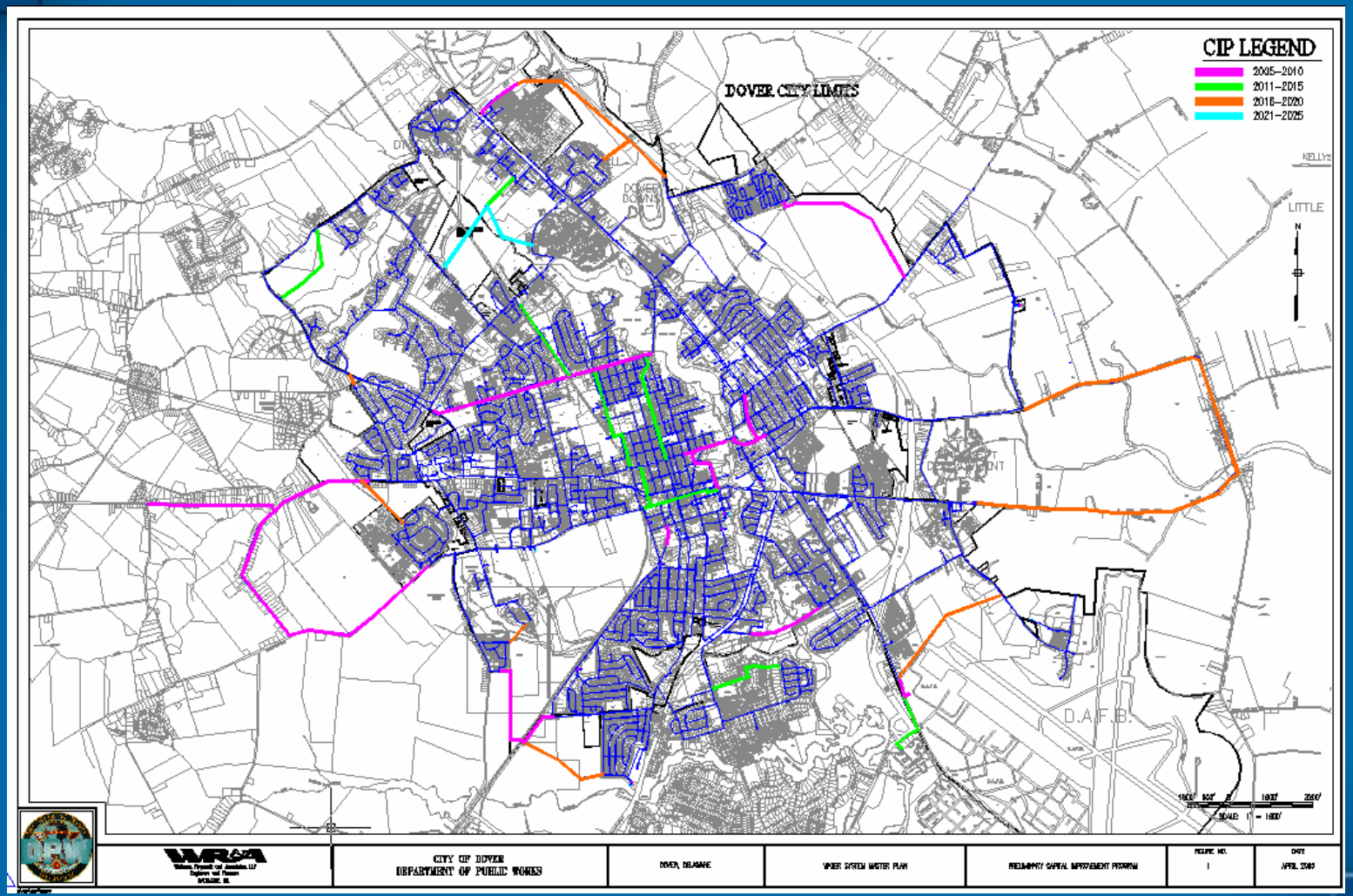



**Water Storage Requirement (Million Gallons)**

| Year | Avg. Day Demand w/Devel | Max. Day Demand w/Devel. | Equaliz: 15% of Max. Day | Fire Flow: 5,000 gpm for 4 Hours | Emerg: 10% of Max. Day | Storage Required |
|---|---|---|---|---|---|---|
| 2005 | 5.65 | 9.61 | 1.44 | 1.2 | 0.96 | **3.60** |
| 2010 | 6.65 | 11.31 | 1.70 | 1.2 | 1.13 | **4.03** |
| 2015 | 7.22 | 12.27 | 1.84 | 1.2 | 1.23 | **4.27** |
| 2020 | 7.84 | 13.32 | 2.00 | 1.2 | 1.33 | **4.53** |
| 2025 | 8.07 | 13.72 | 2.06 | 1.2 | 1.37 | **4.63** |



# Preliminary CIP - Distribution



# Preliminary Capital Improvement Program

