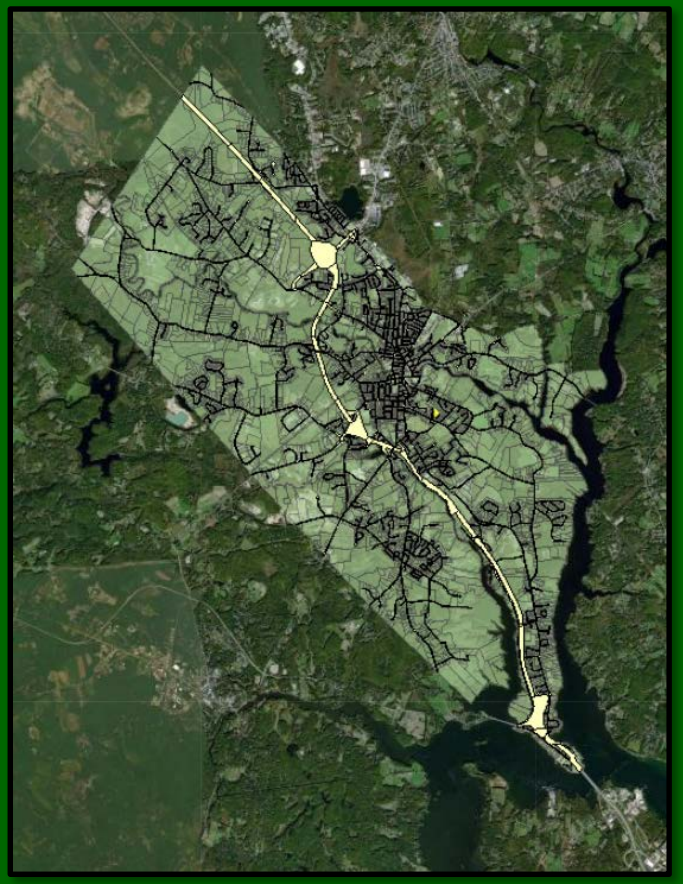
Seacoast Drinking Water Commission

April 23, 2021

By: Gretchen Young, PE
Environmental Projects Manager

Dover Water System

- **30,000 population (approx. 80% with public water)**
- **1.8 to 2.4 mgd**
- **All groundwater**
- **11 wells in 4 Aquifers**
- **2 artificial recharge**
- **3 treatment facilities**
- **2 storage tanks**
- **2 pressure zones**
- **1 booster station**
- **1 interconnect with Somersworth**
- **Approx. 780,000 lf water main**
- **Approx. Asset Value = $200 Million**



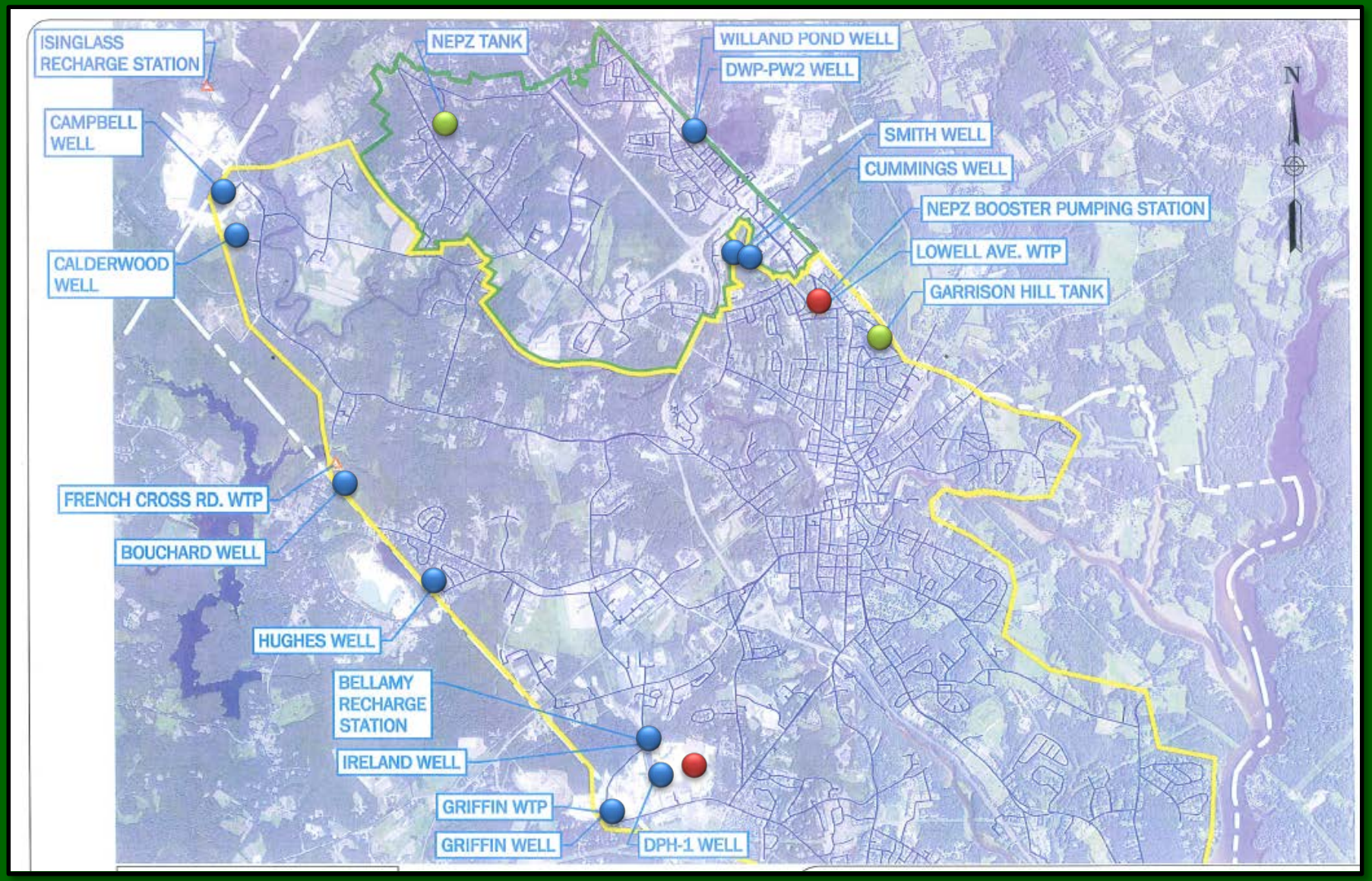
Dover Water System

- 8 Water/Sewer Utilities Crew members
- 5 Water/Sewer pump stations and wells
- 2 Meters
- 2 Water/Sewer billing
- Other professional and admin staff
- 2 primary consultants

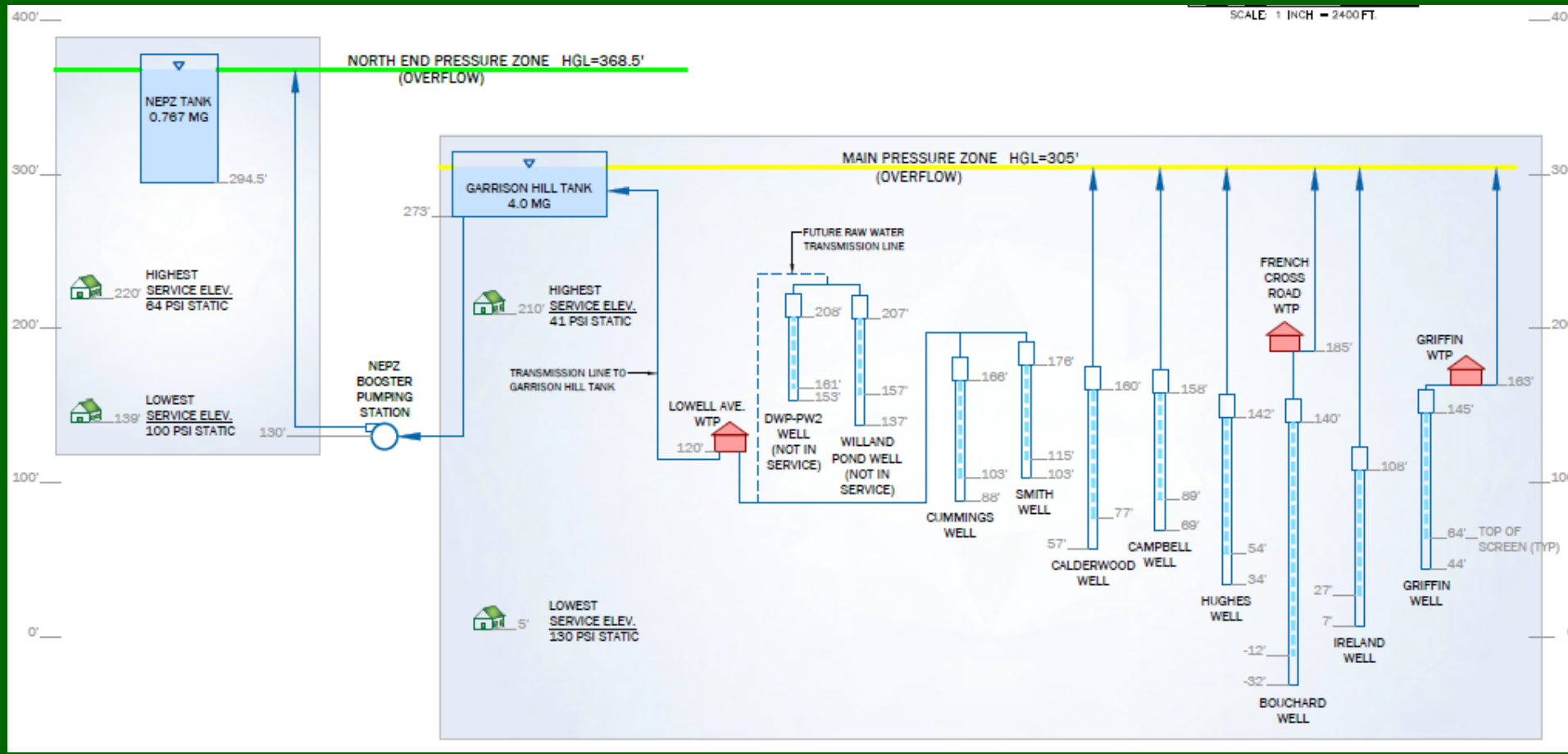
Emery & Garrett
GROUNDWATER INVESTIGATIONS
A Division of GZA

UNDERWOOD engineers

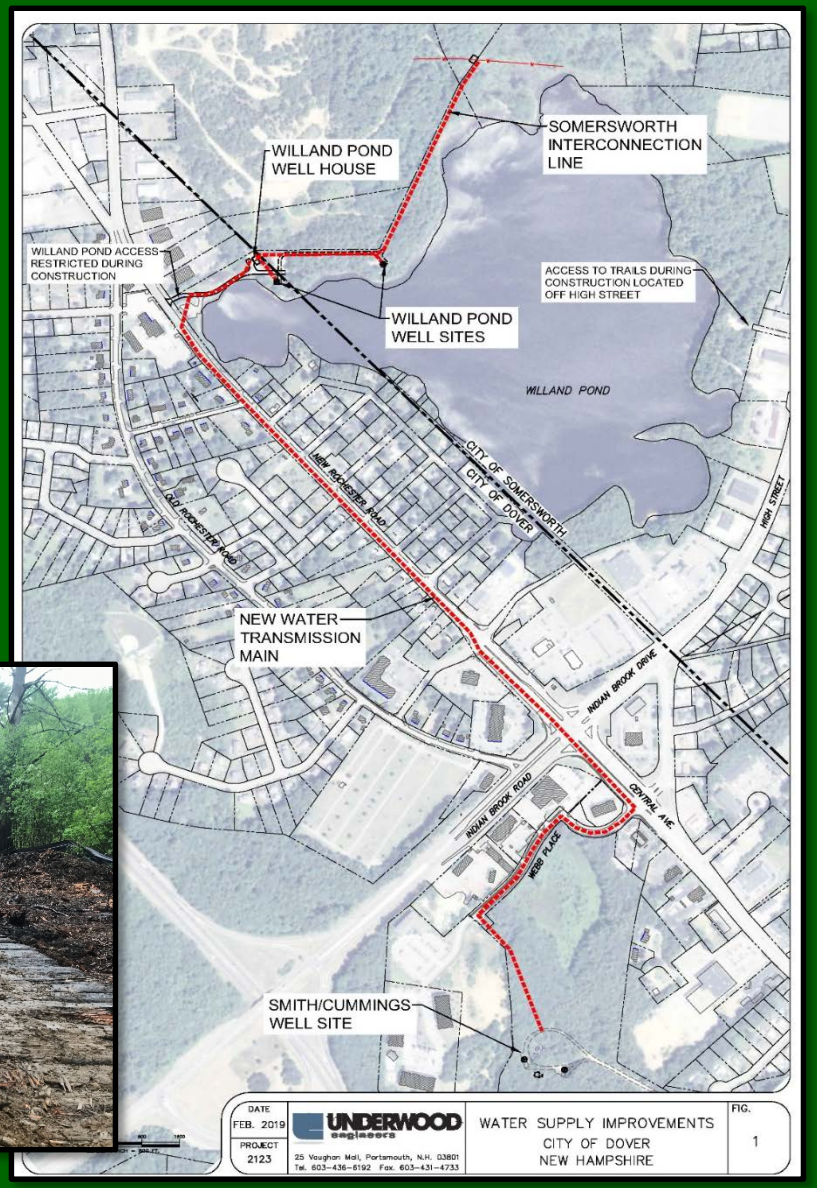
Dover Water System



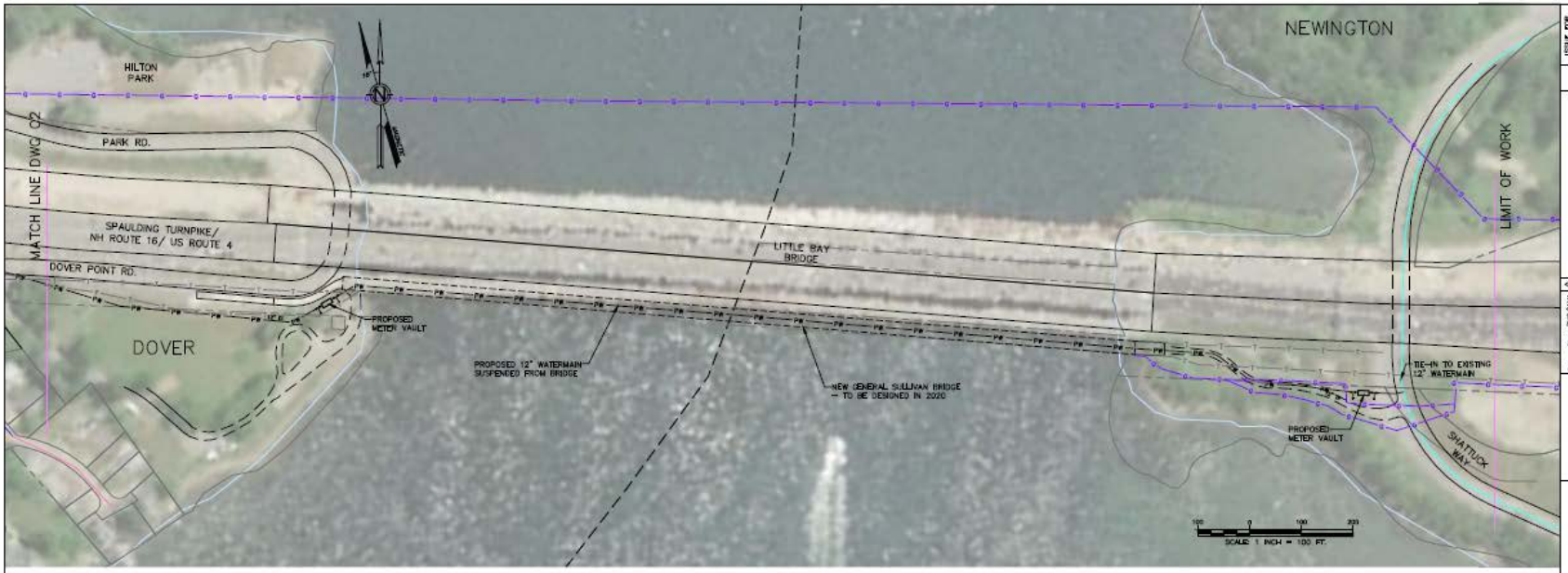
Two Presser Zones (2012)

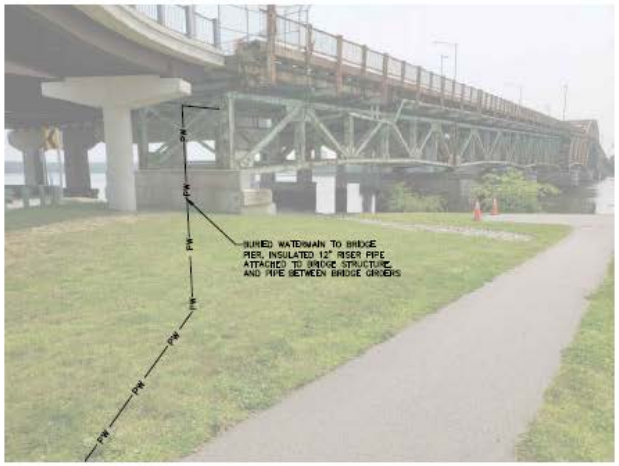


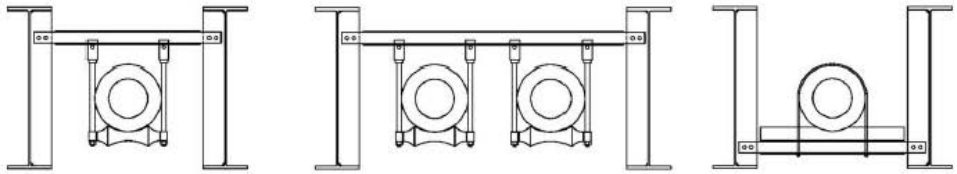
Somersworth Interconnect (2019)



Portsmouth Interconnect??



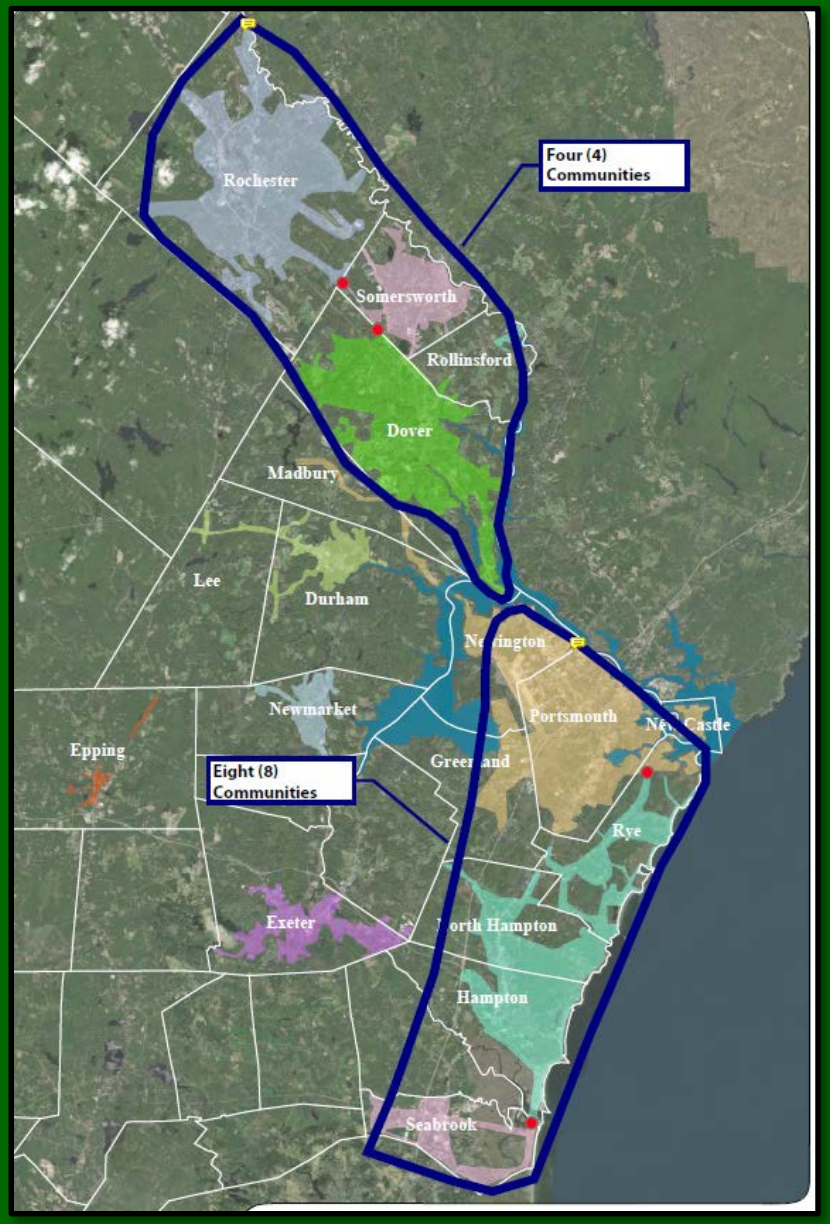




PIPE SUPPORT OPTIONS

DOVER POINT INTERCONNECTION #1
DOVER – PORTSMOUTH EMERGENCY WATER INTERCONNECTIONS
CITY OF DOVER
DOVER, NEW HAMPSHIRE

Regional Connection??



Treatment
Iron and Manganese in groundwater


ENVIRONMENTAL
Fact Sheet

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

29 Hazen Drive, Concord, New Hampshire 03301 • (603) 271-3503 • www.des.nh.gov

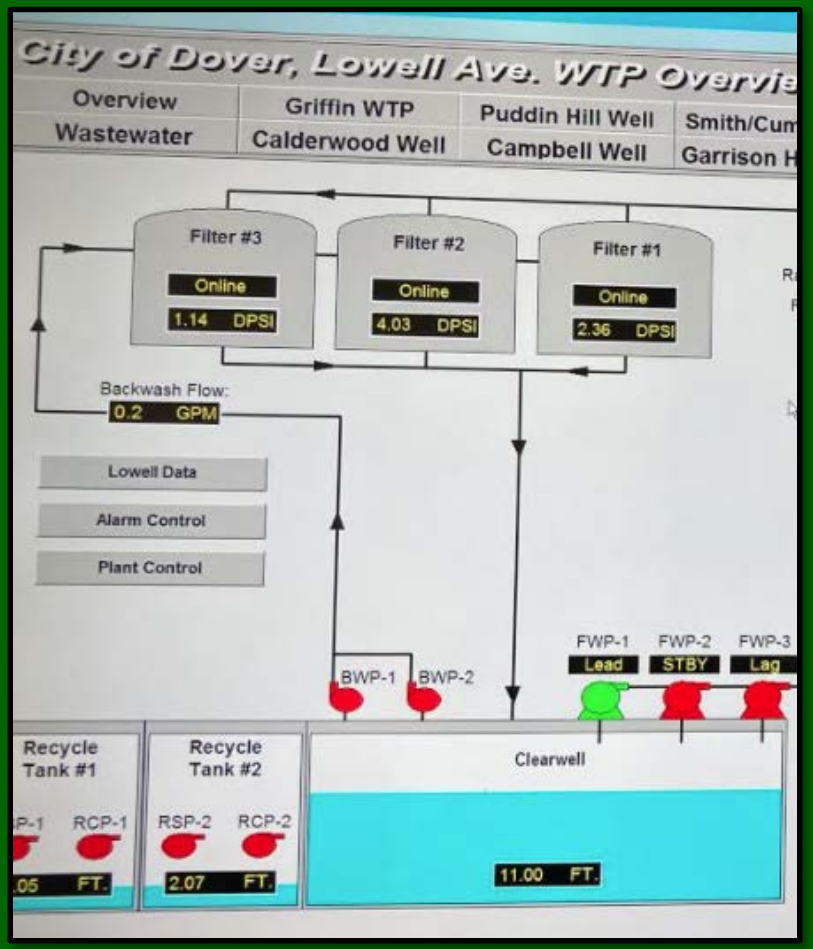
DWGB-3-8 2020

Iron and/or Manganese in Drinking Water

US EPA issued a manganese Health Advisory Level of 0.3 mg/L indicating that infant exposure should be avoided because of their inability to purge excess manganese.

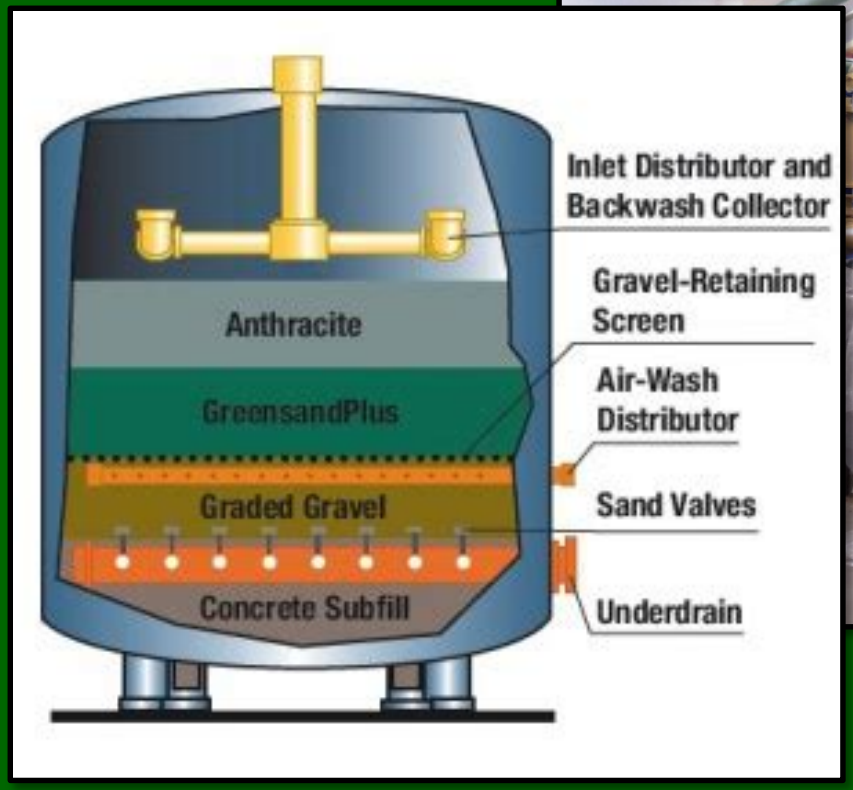
Treatment (8 of the 11 wells)

- **Pretreat with caustic and hypochlorite to adjust pH and oxidize iron and manganese**
- **The iron and manganese precipitates are removed in the GreensandPlus filters**
- **Finished water is treated with fluoride and zinc orthophosphate and additional caustic treatment for final PH adjustment. Additional chlorination as needed for residual.**

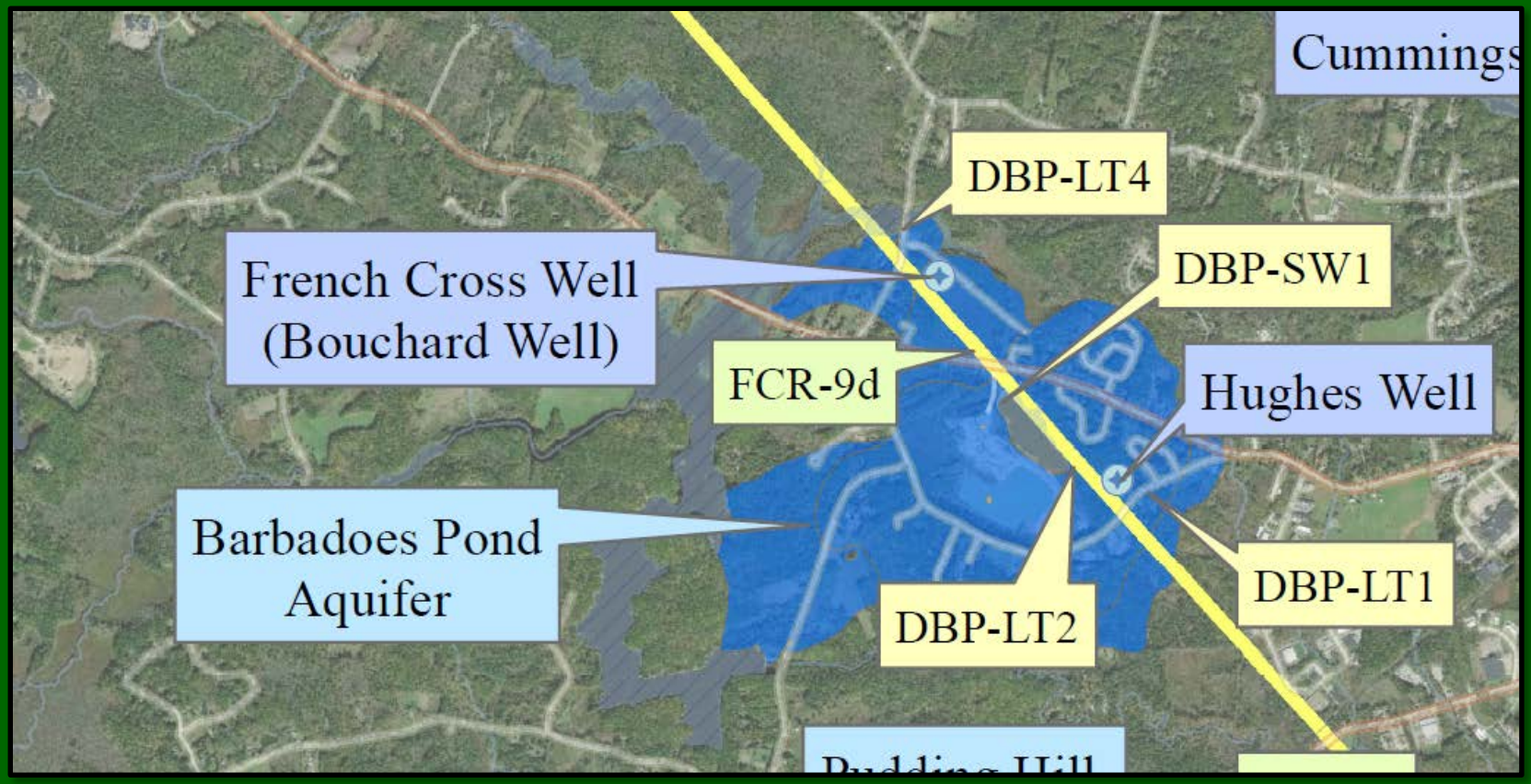


Treatment

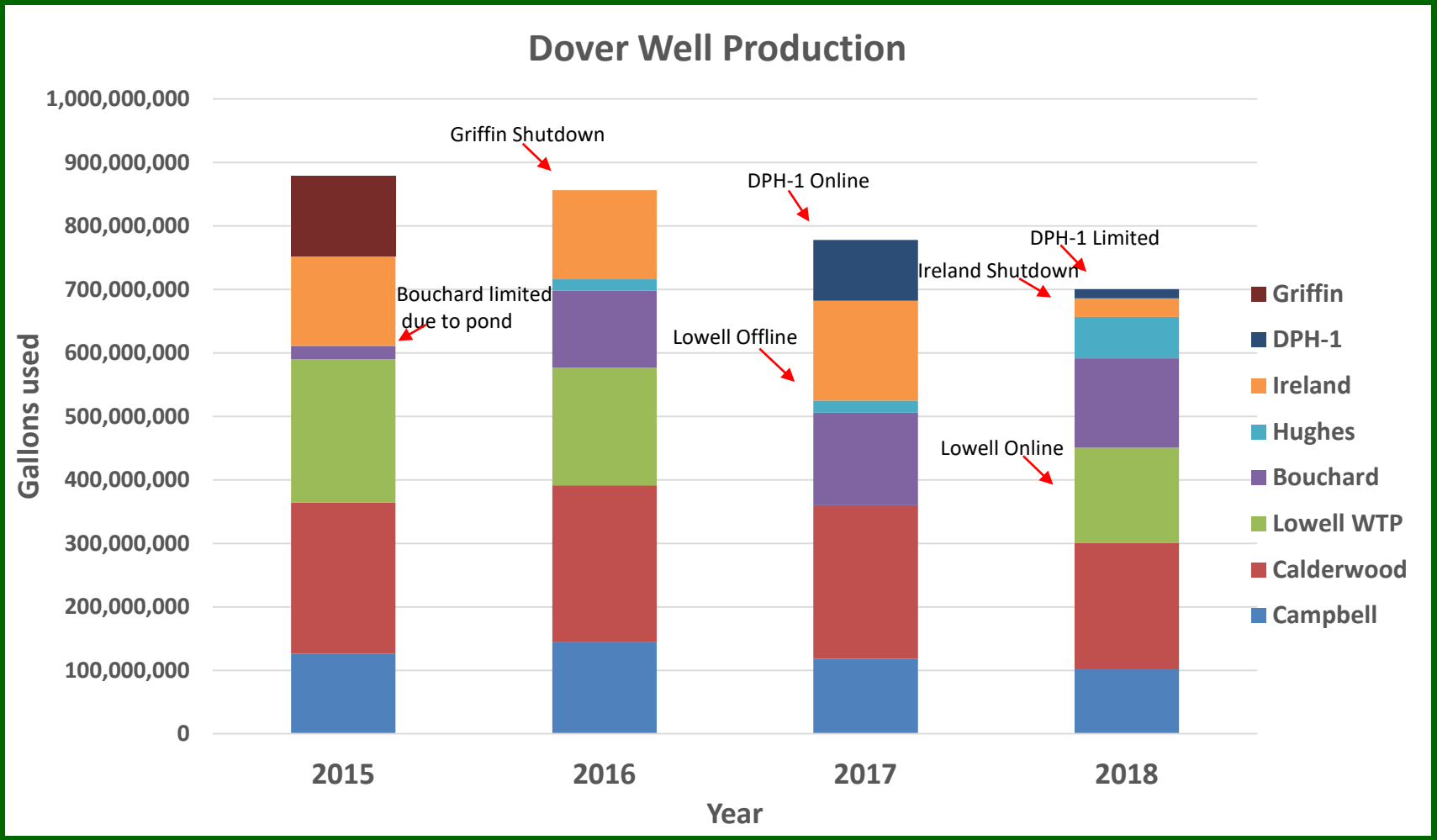

03.25.2016


Inlet Distributor and Backwash Collector
Gravel-Retaining Screen
Air-Wash Distributor
Sand Valves
Underdrain
Anthracite
GreensandPlus
Graded Gravel
Concrete Subfill

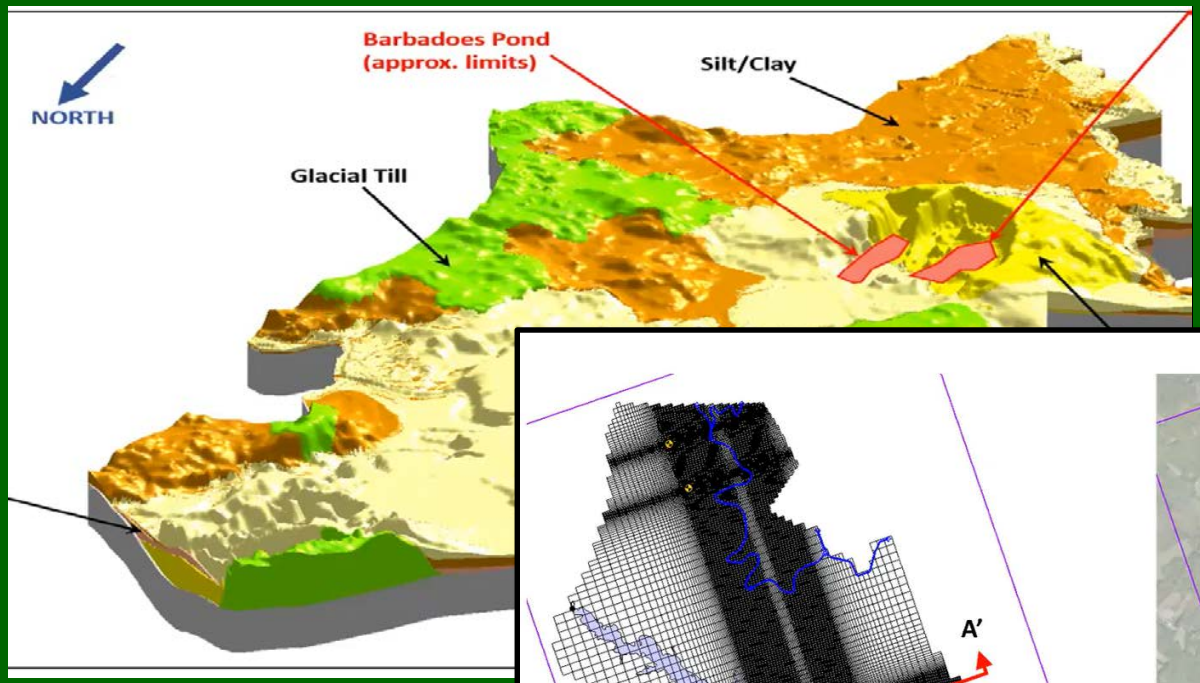
Barbados Pond Aquifer

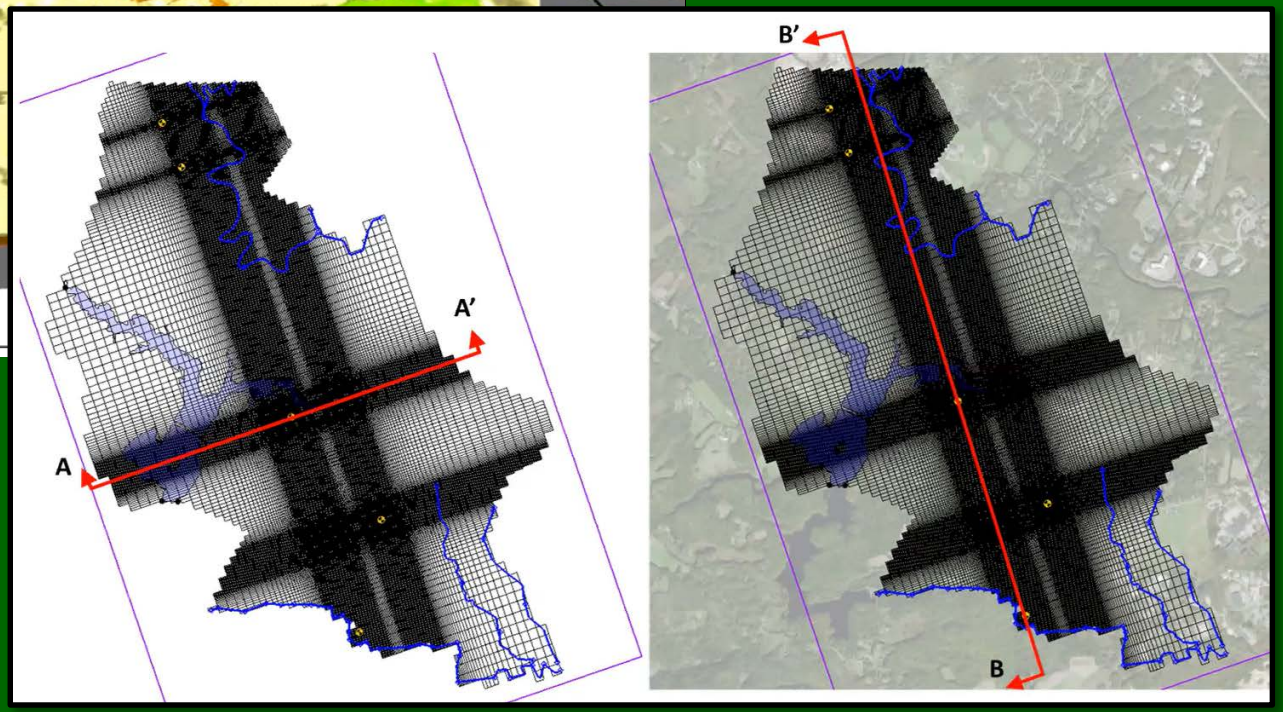


Well Usage – Barbados Pond Aquifer

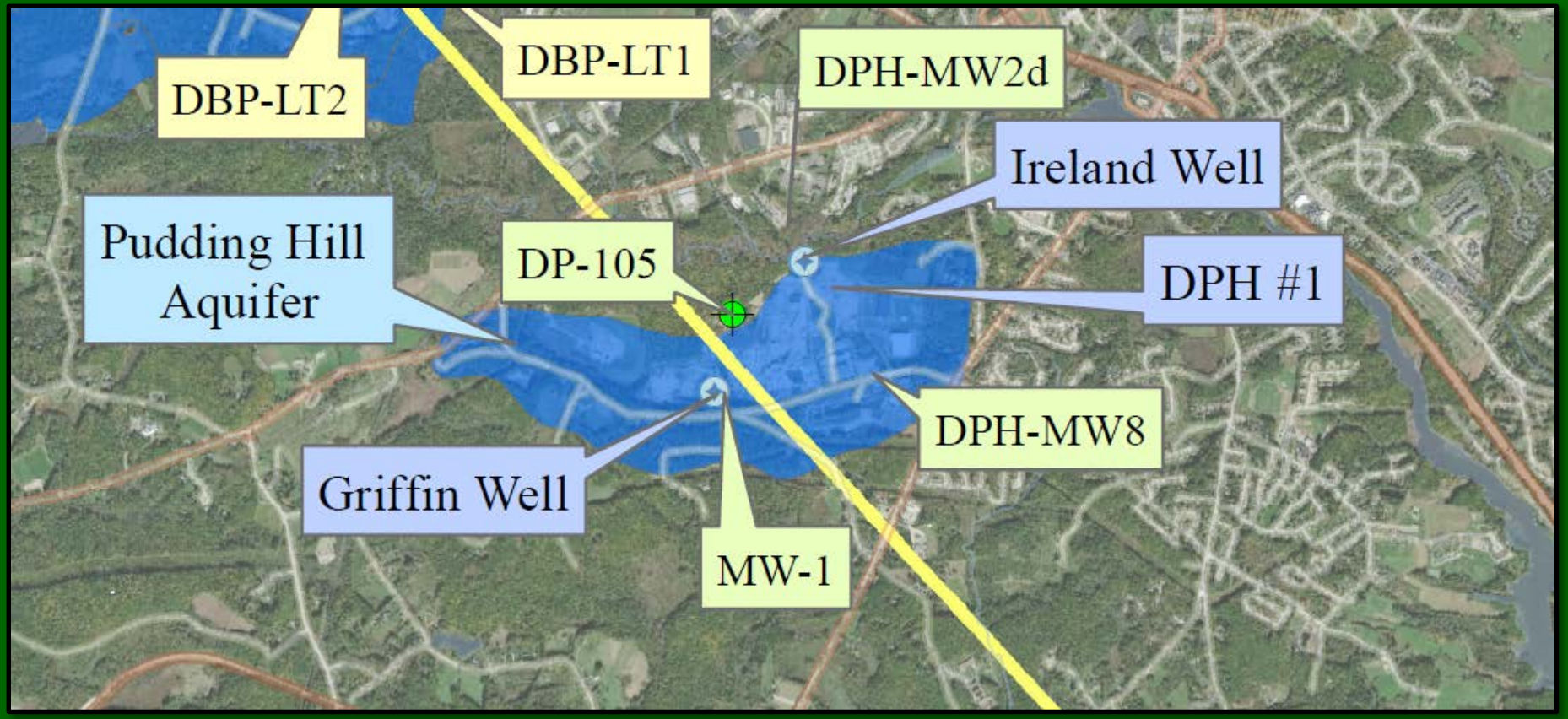


Well Usage – Barbados Pond Aquifer

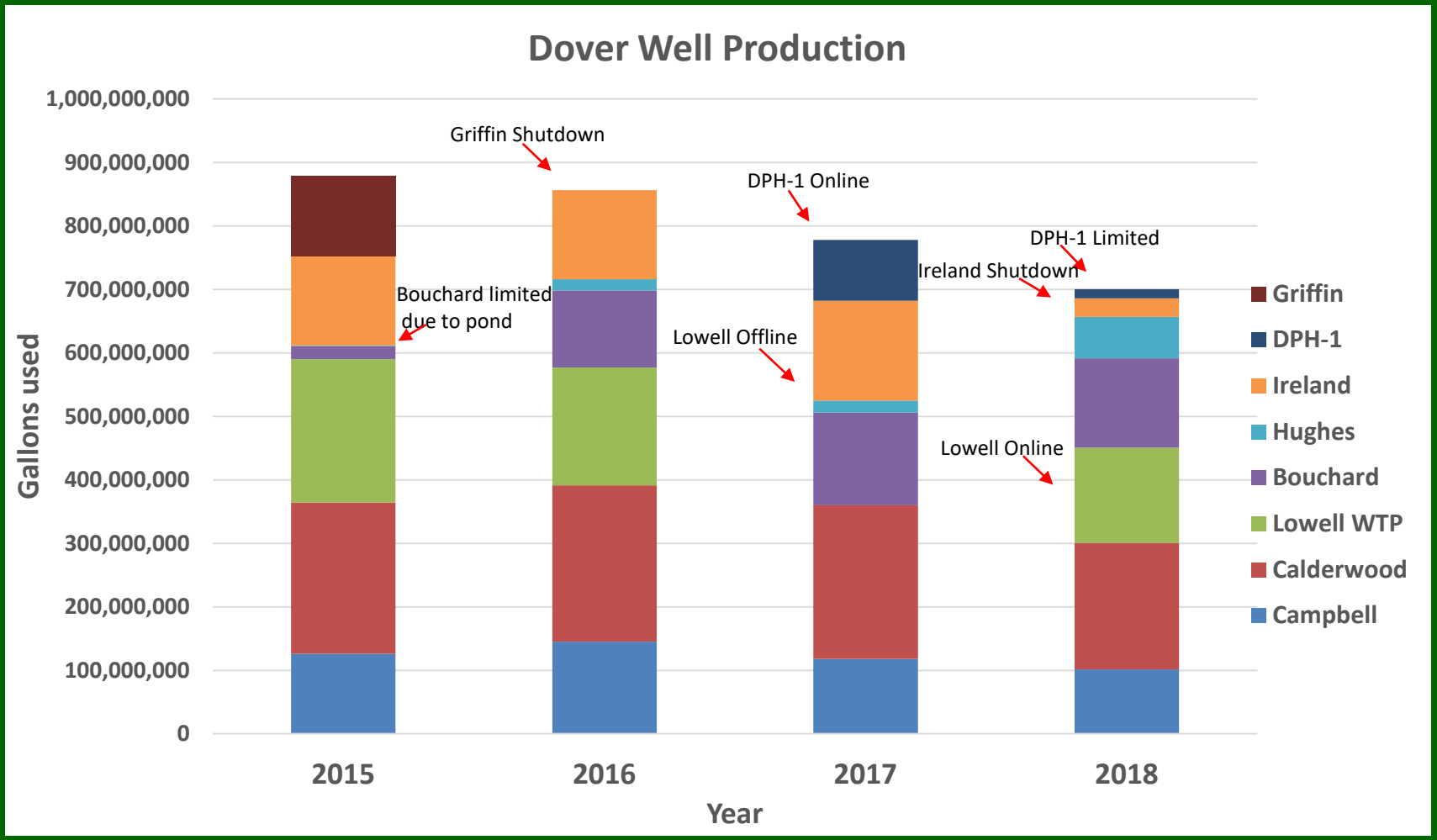




Well Usage – Pudding Hill Aquifer



Well Usage – Pudding Hill Aquifer

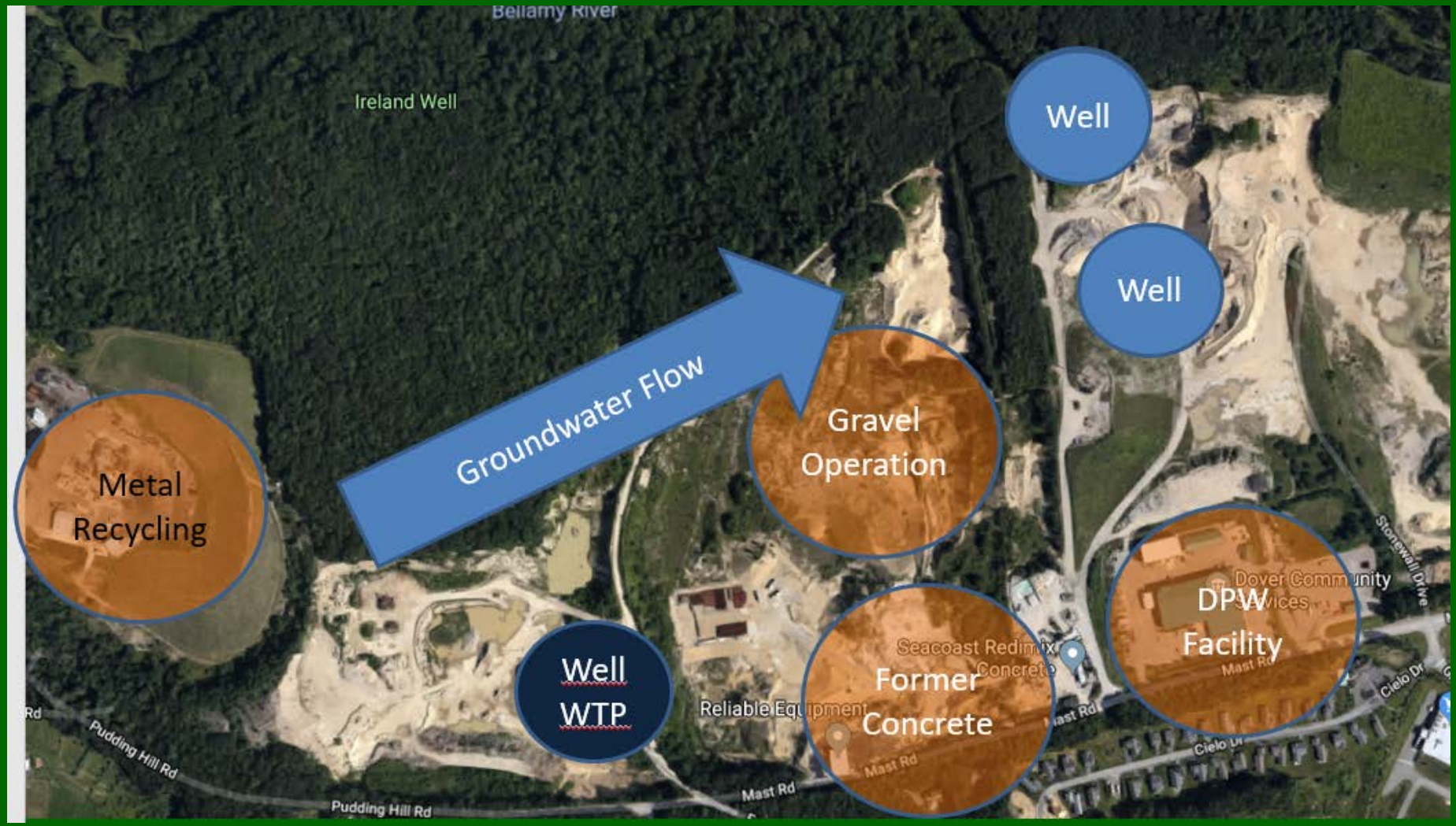


Pudding Hill – PFAS Contaminants

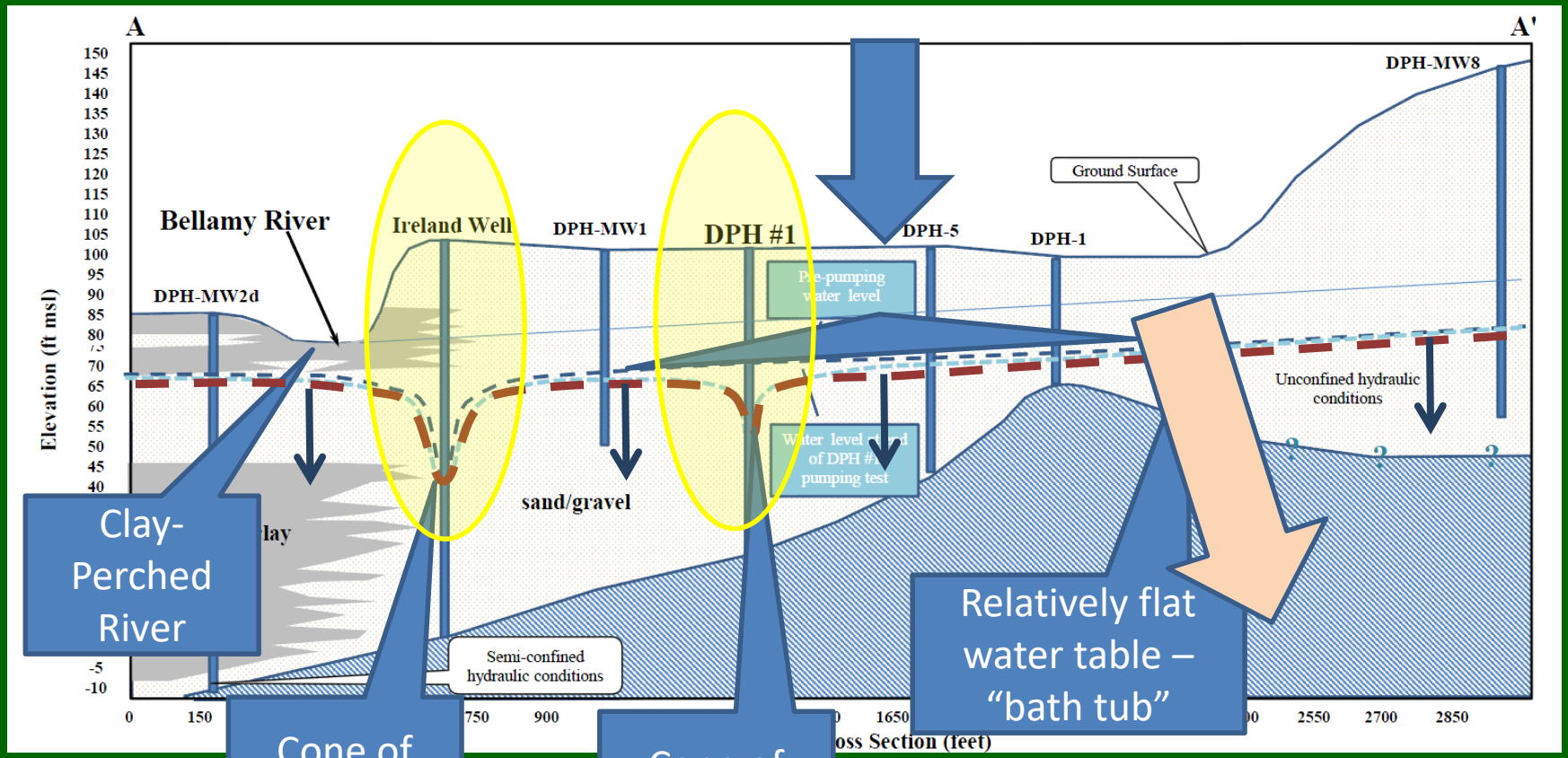
NEWS

Dover, N.H. shuts down drinking water well due to contamination

Pudding Hill – Source of Contaminants



Pudding Hill



Pudding Hill – Source of Contaminants

Pudding Hill – Contaminants

Contaminant	MCL	Griffin Well	Ireland Well	DPH-1 Well	
PFAS (ppt)					
PFHxS	18	**24.7**	**50.7**	4.66	8.14
PFOA	12	**84**	**106**	4.42	9.51
PFNA	11	ND	ND	ND	ND
PFOS	15	**217**	**173**	ND	2.02
MtBE (pbb)	13	1.6	1.9	ND	
1,4 Dioxane (pbb)	0.32	**0.59**	**1.2**	**0.34**	
Fe (mg/L)	0.3	**0.40**	0.19	**0.315**	
Mn (mg/L)	0.05	**0.30**	**0.238**	**0.059**	

Pudding Hill – Monitoring

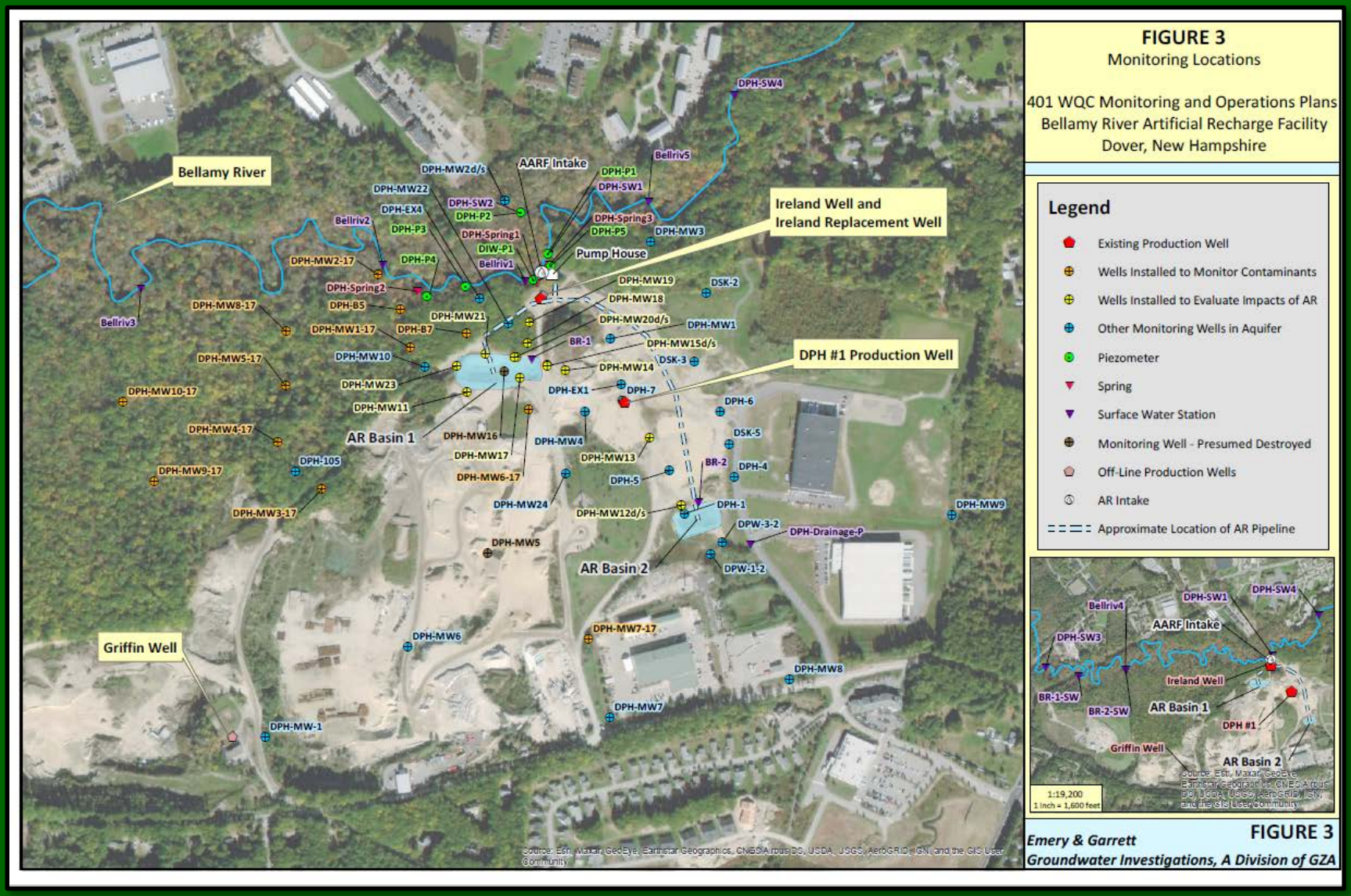


FIGURE 3
Monitoring Locations

401 WQC Monitoring and Operations Plans
Bellamy River Artificial Recharge Facility
Dover, New Hampshire

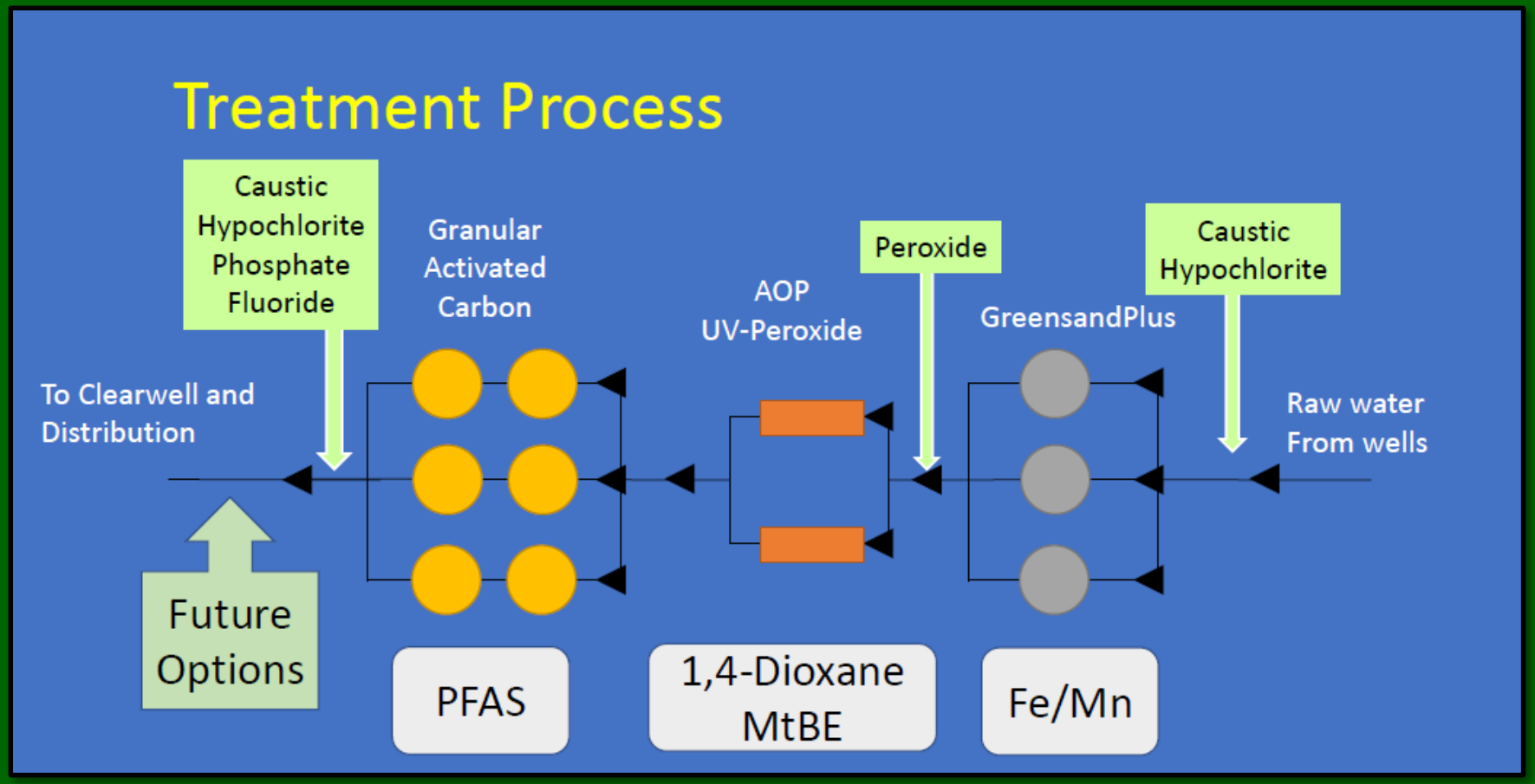
Legend

- Existing Production Well
- Wells Installed to Monitor Contaminants
- Wells Installed to Evaluate Impacts of AR
- Other Monitoring Wells in Aquifer
- Piezometer
- Spring
- Surface Water Station
- Monitoring Well - Presumed Destroyed
- Off-Line Production Wells
- AR Intake
- Approximate Location of AR Pipeline

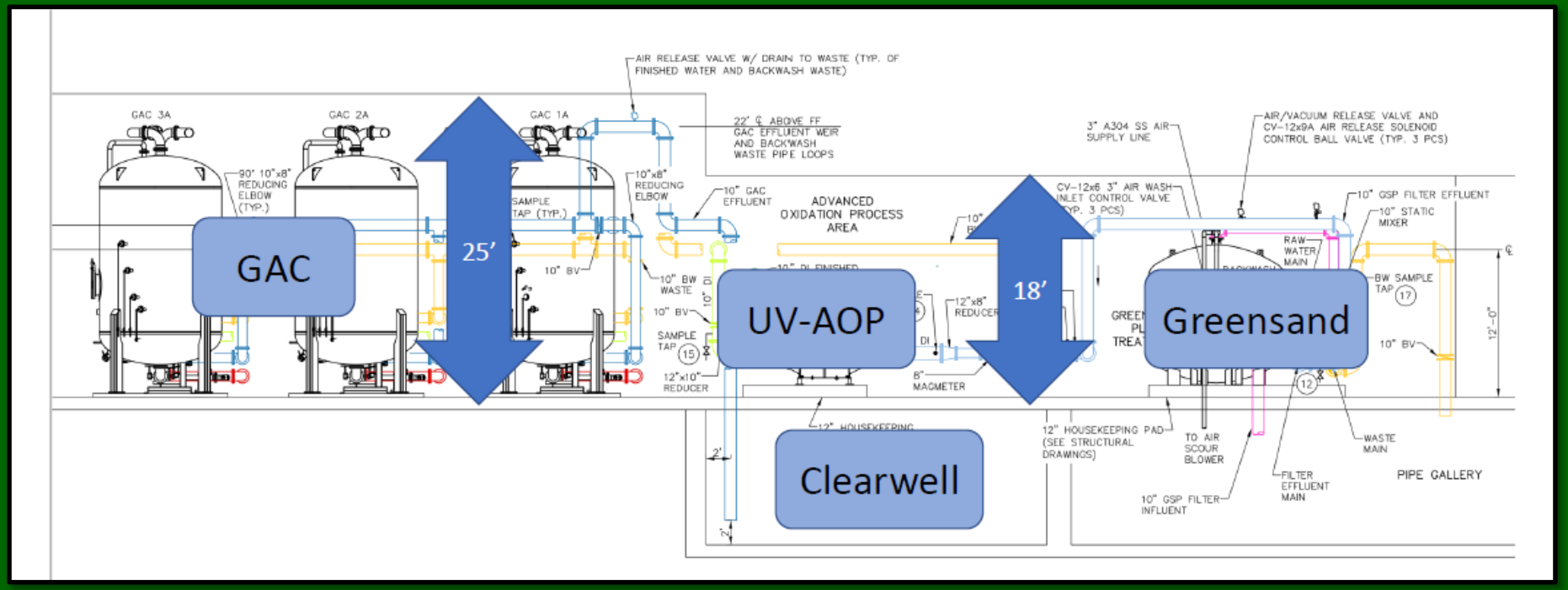
FIGURE 3

Emery & Garrett
Groundwater Investigations, A Division of GZA

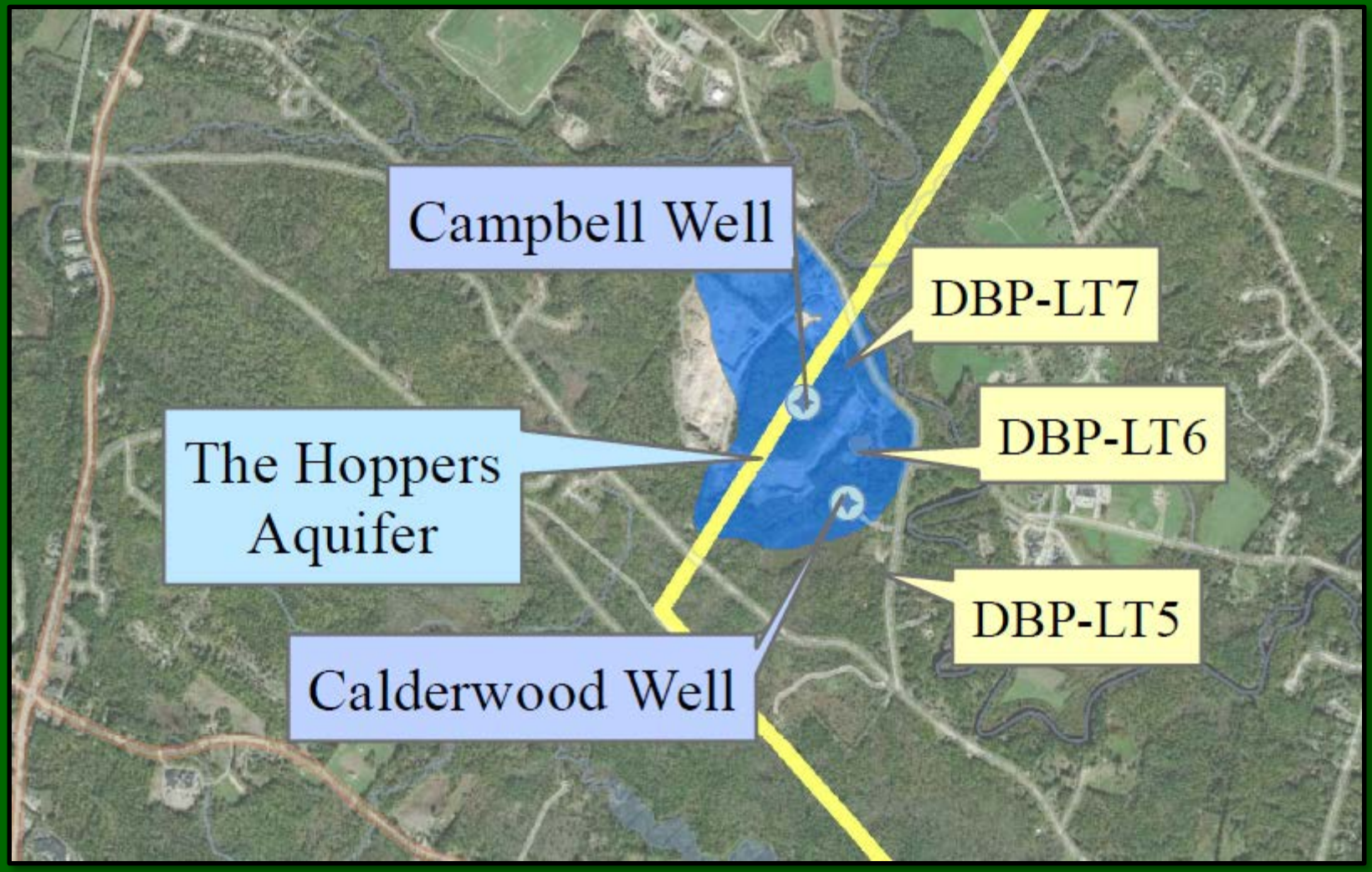
Pudding Hill Treatmentt



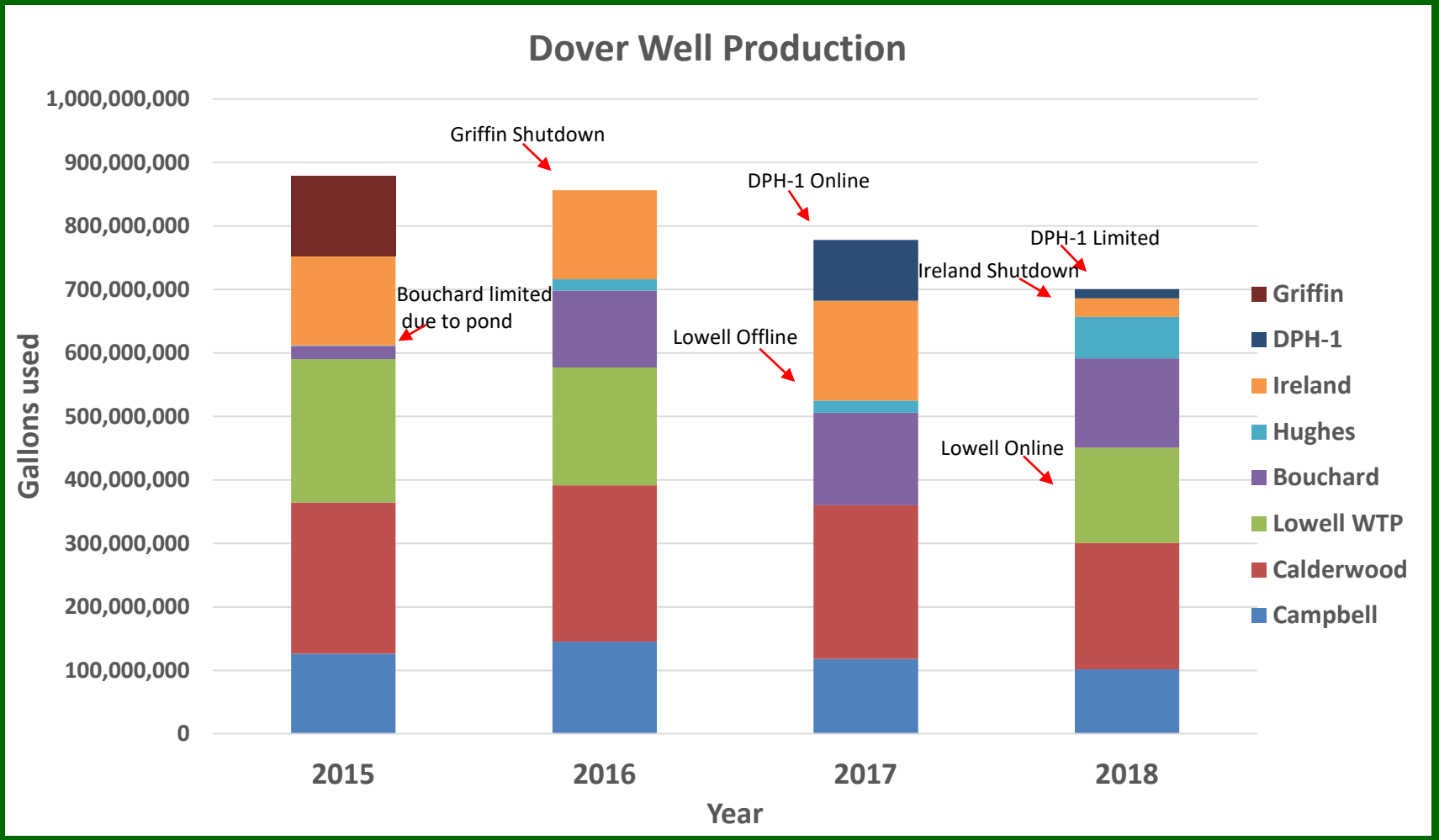
Pudding Hill Treatment



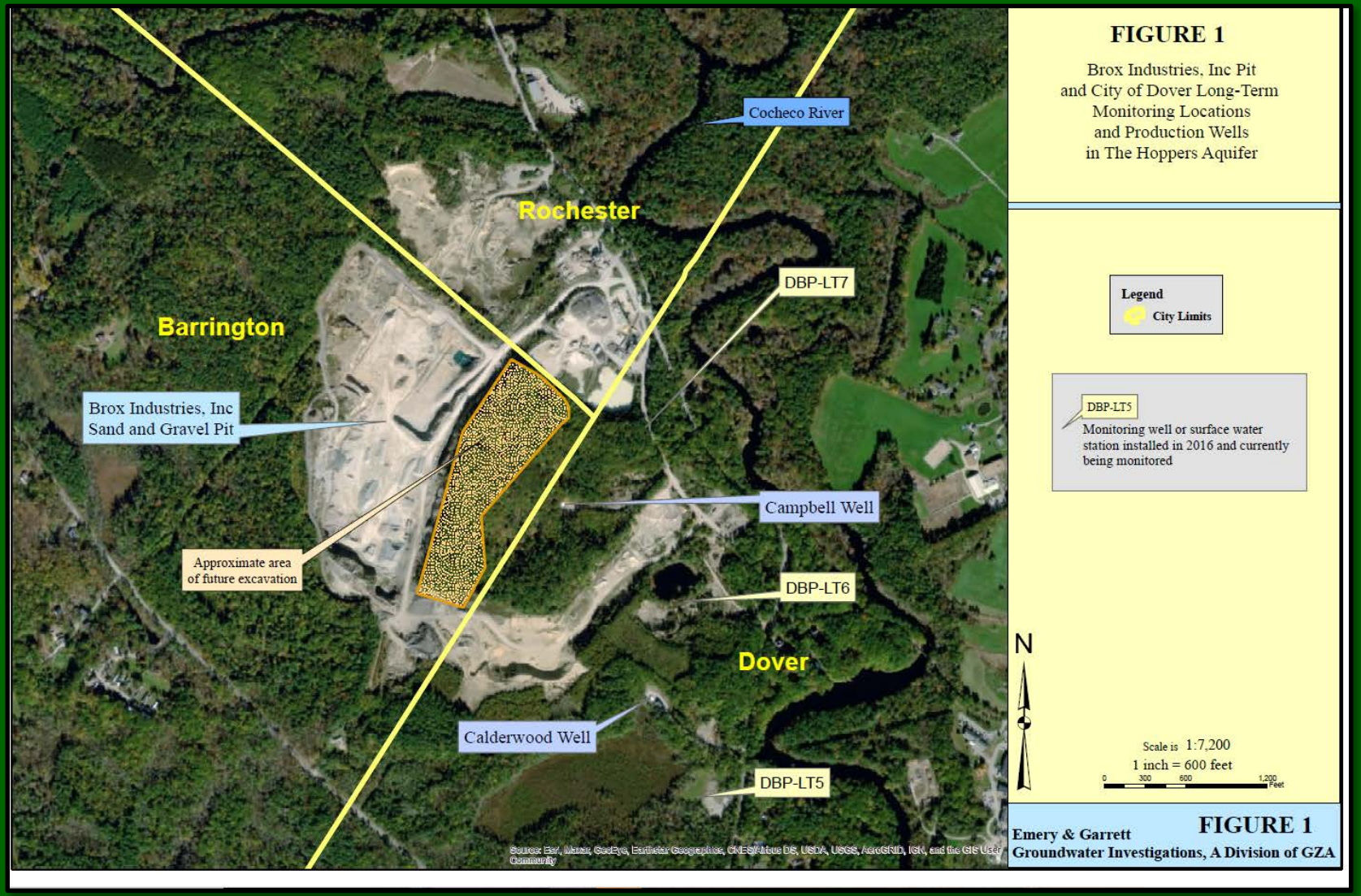
Hoppers Aquifer



Water Usage - Hoppers Aquifer



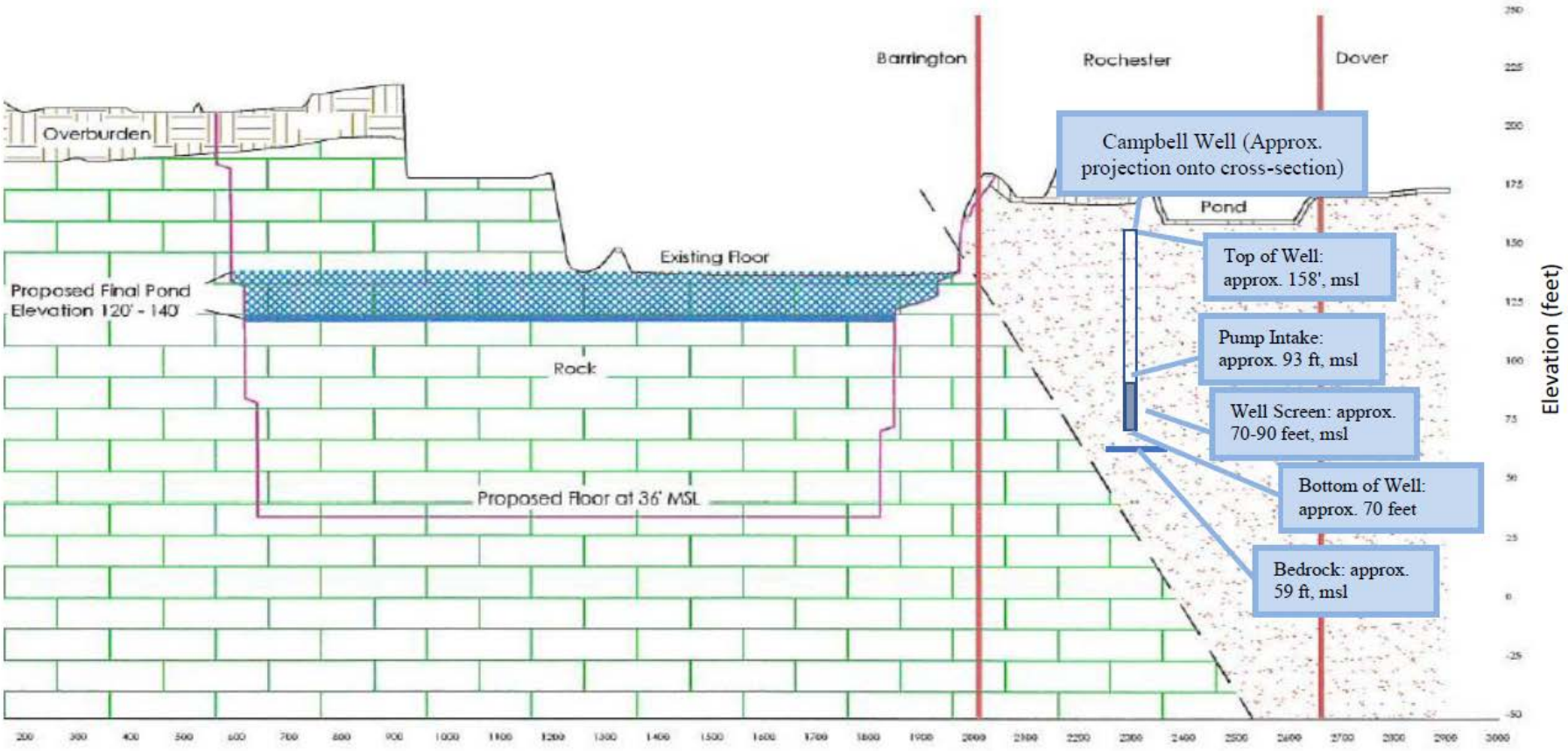
Hoppers Aquifer



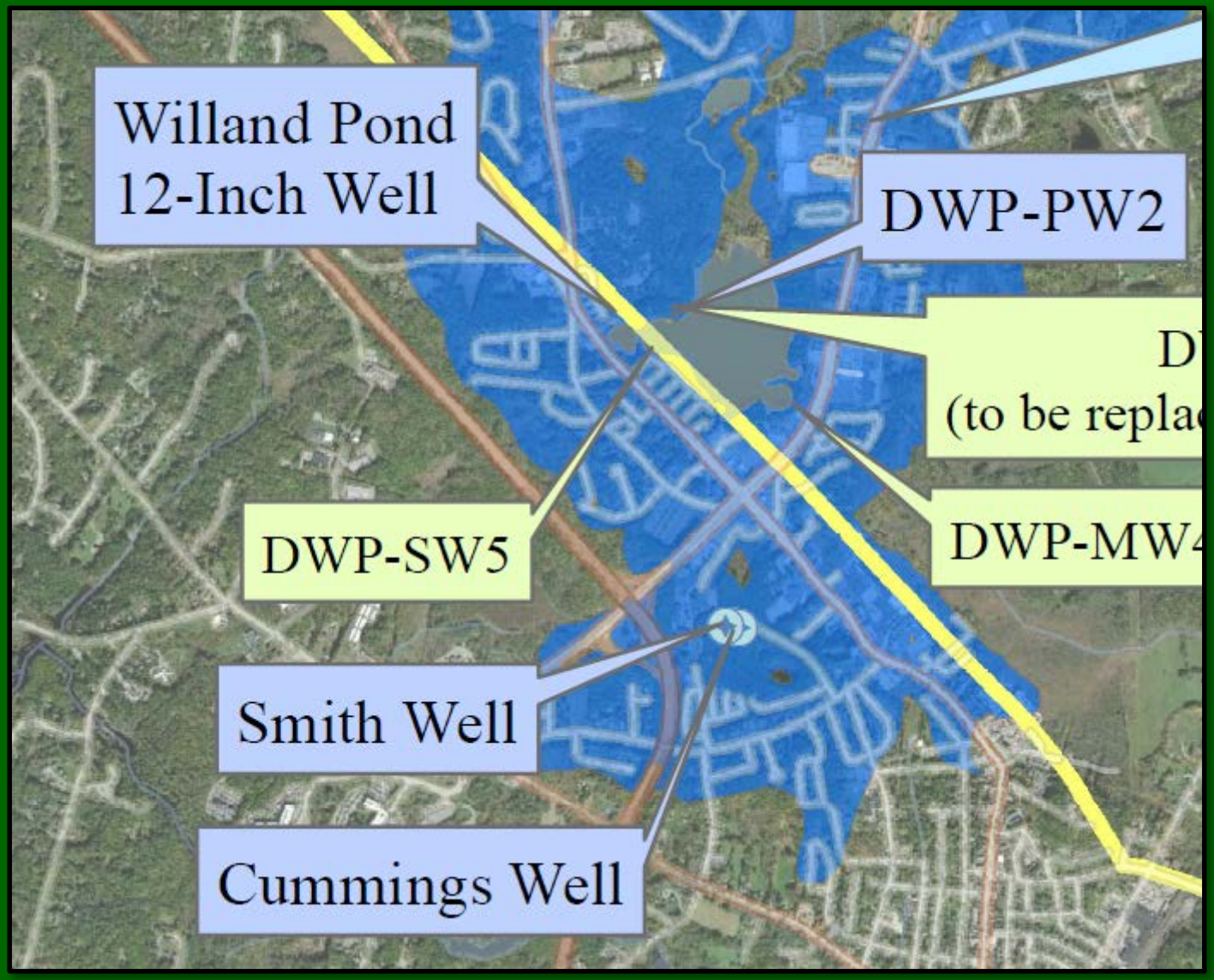
Hoppers Aquifer

FIGURE 2

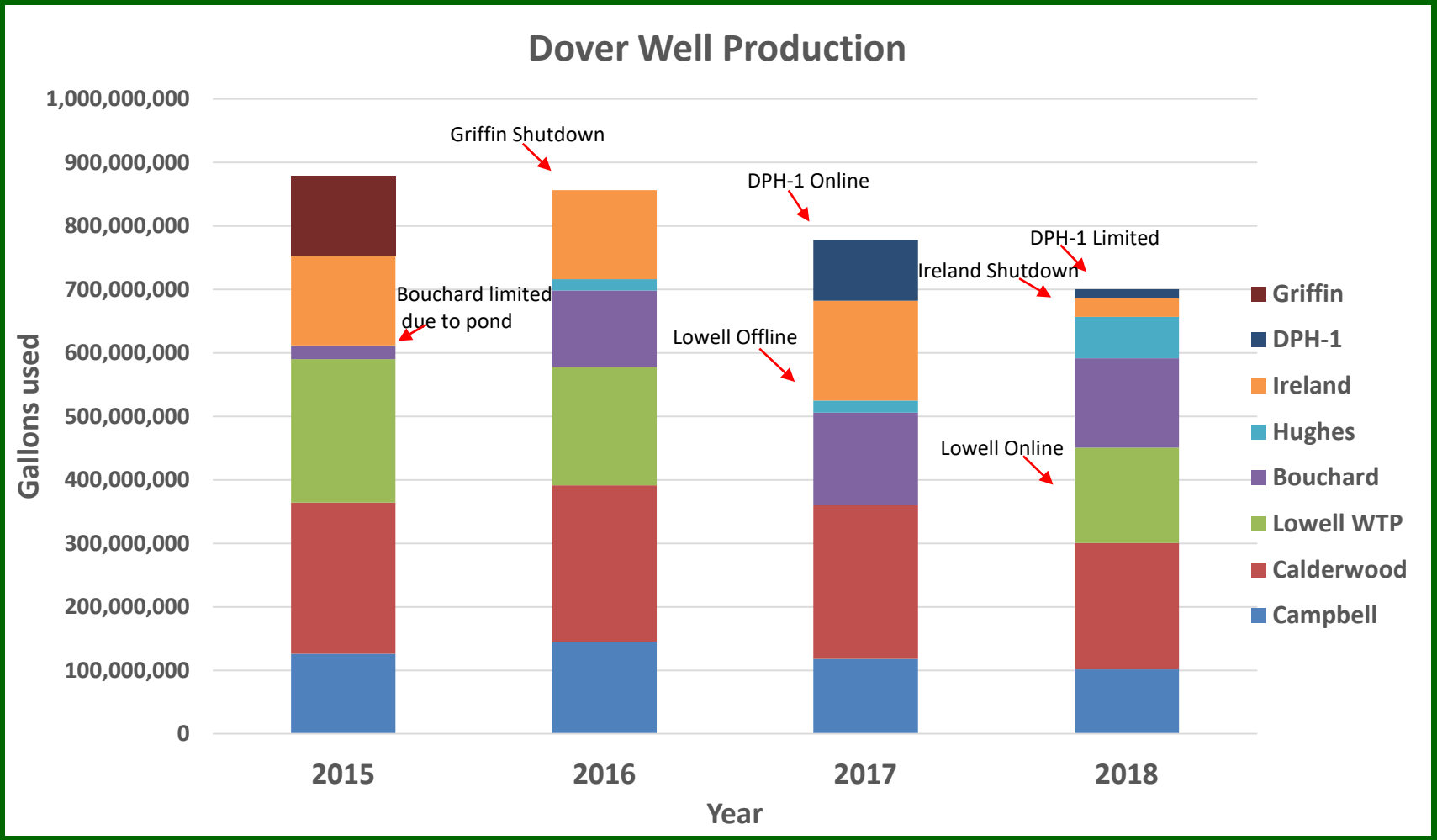
Schmatic cross-section excerpted from Figure 2 in Brox Industries, Inc 2009
Operational Plan with added information pertaining to Campbell Well



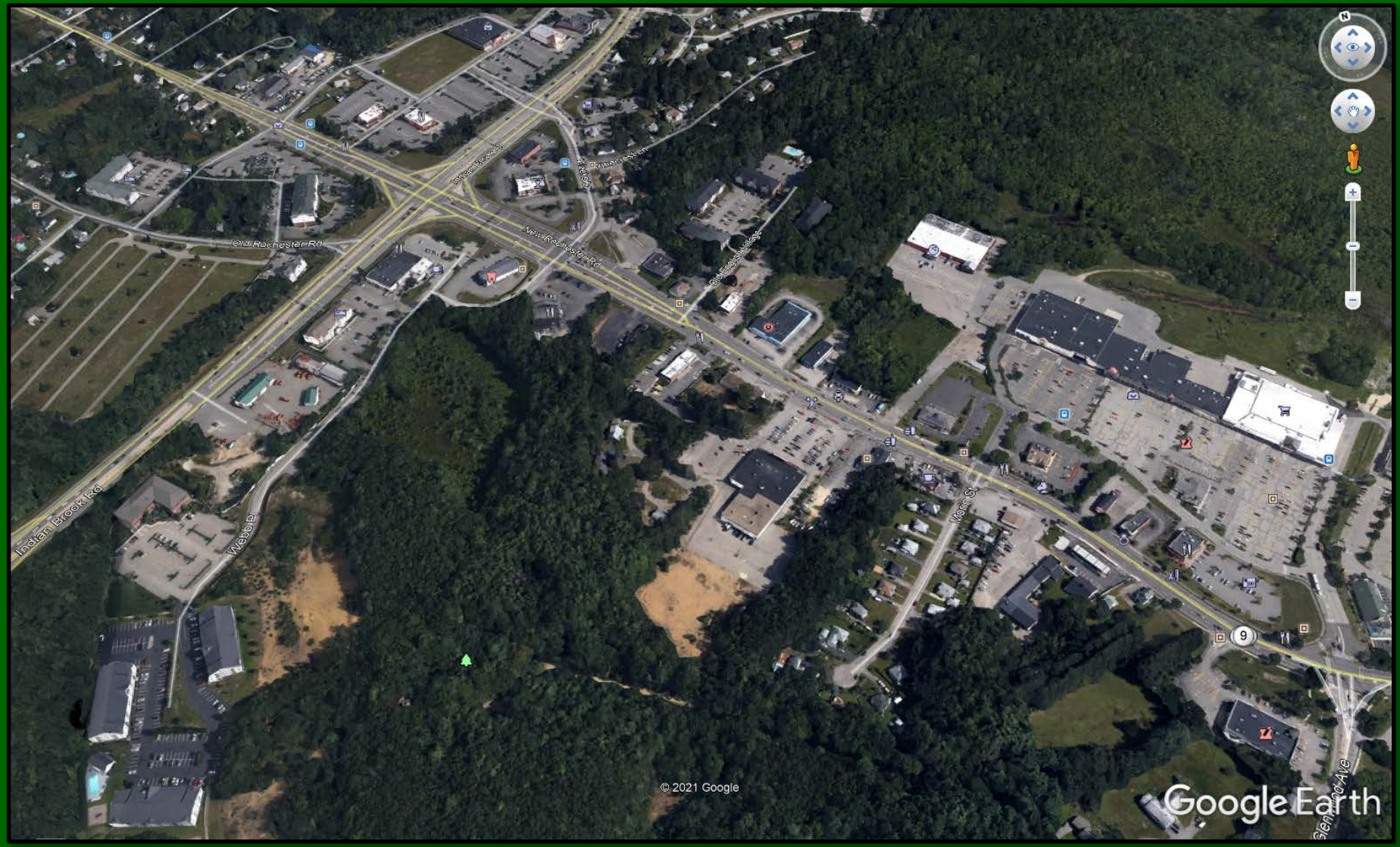
Smith/Cummings Aquifer



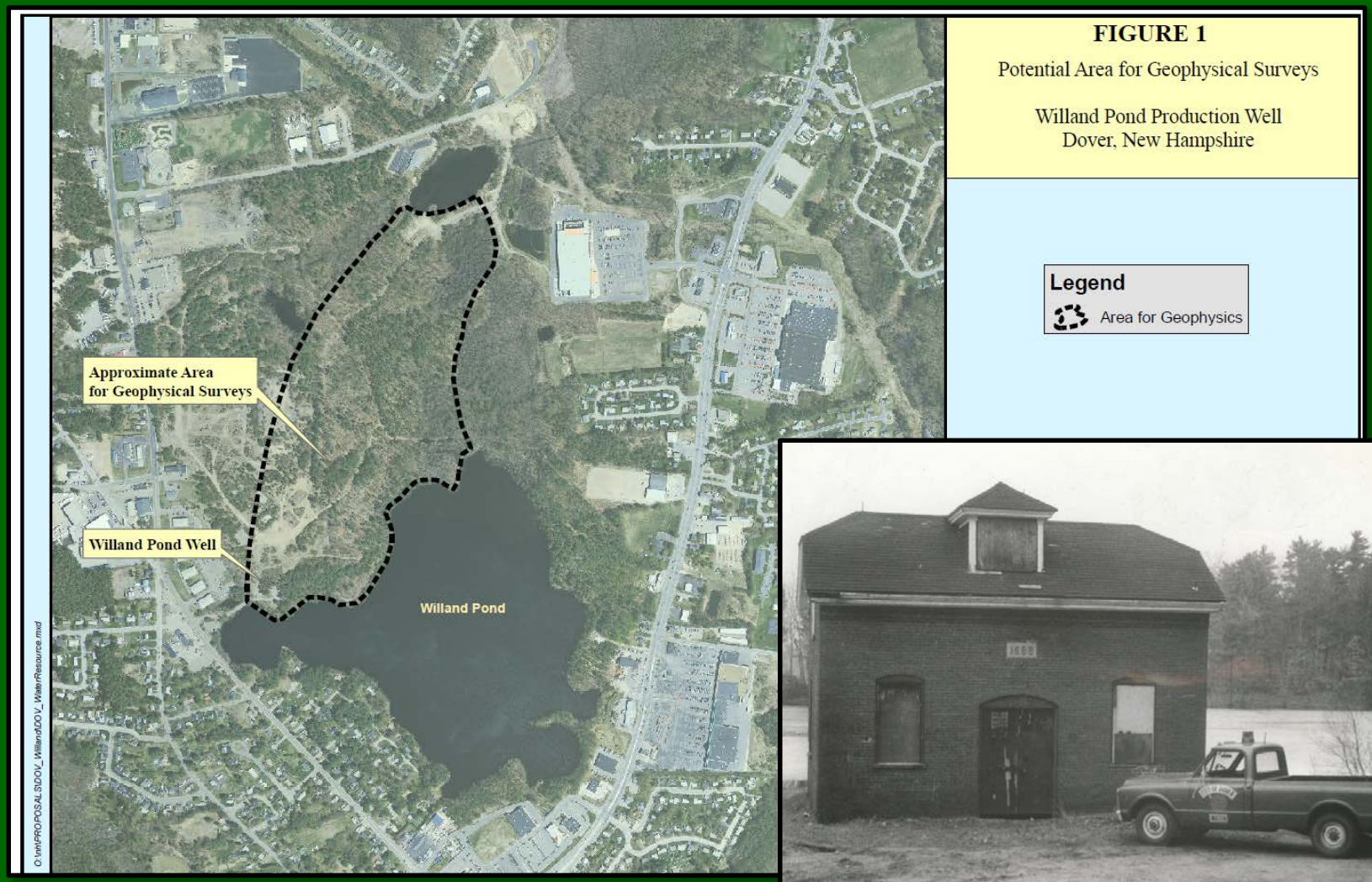
Water Usage – Smith/Cummings



Highly Developed Aquifer

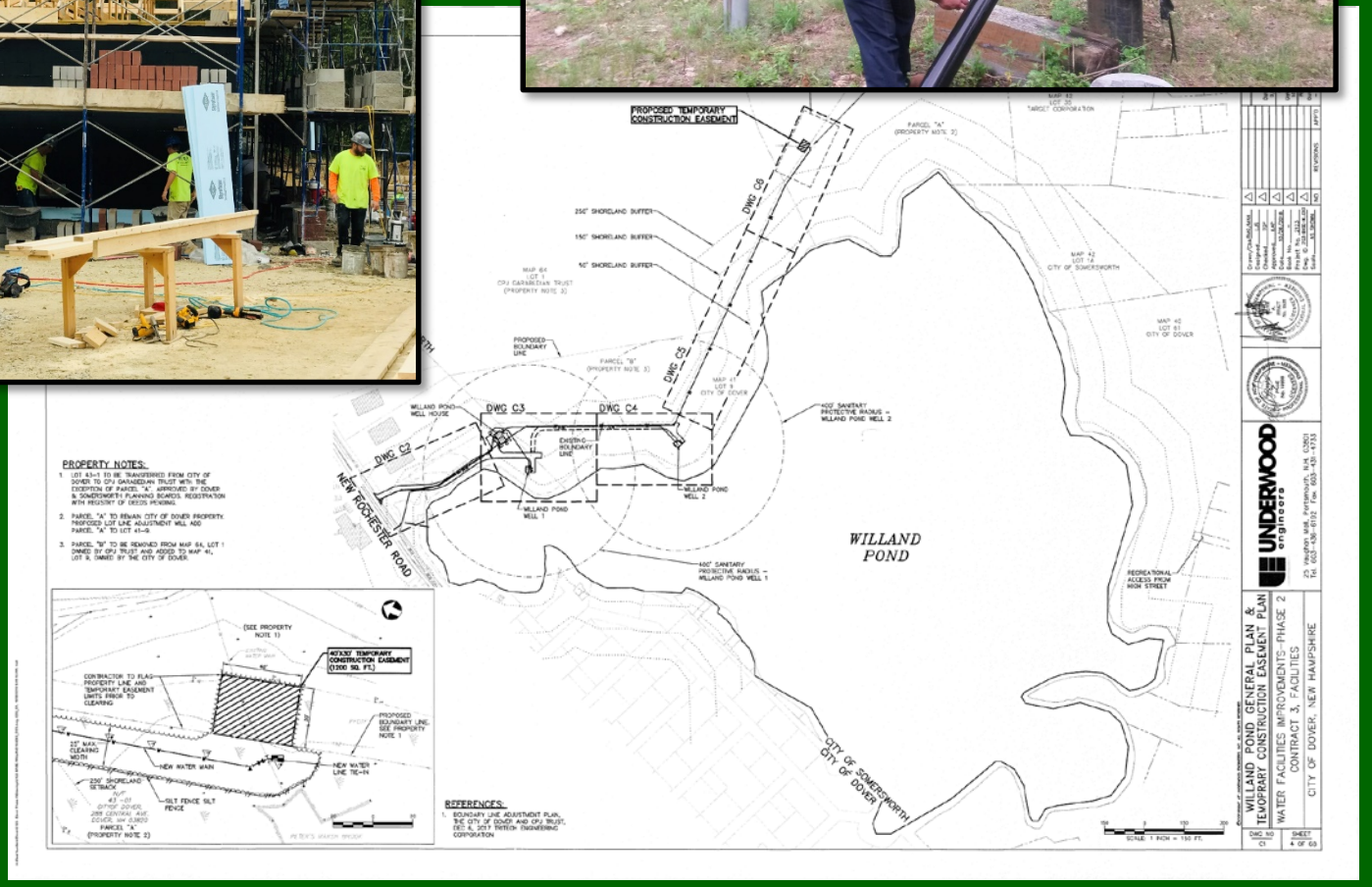


Willand Pond



Willand Pond

Willand Pond



Willand Pond

NEWS

Willand Pond water levels dip to record lows

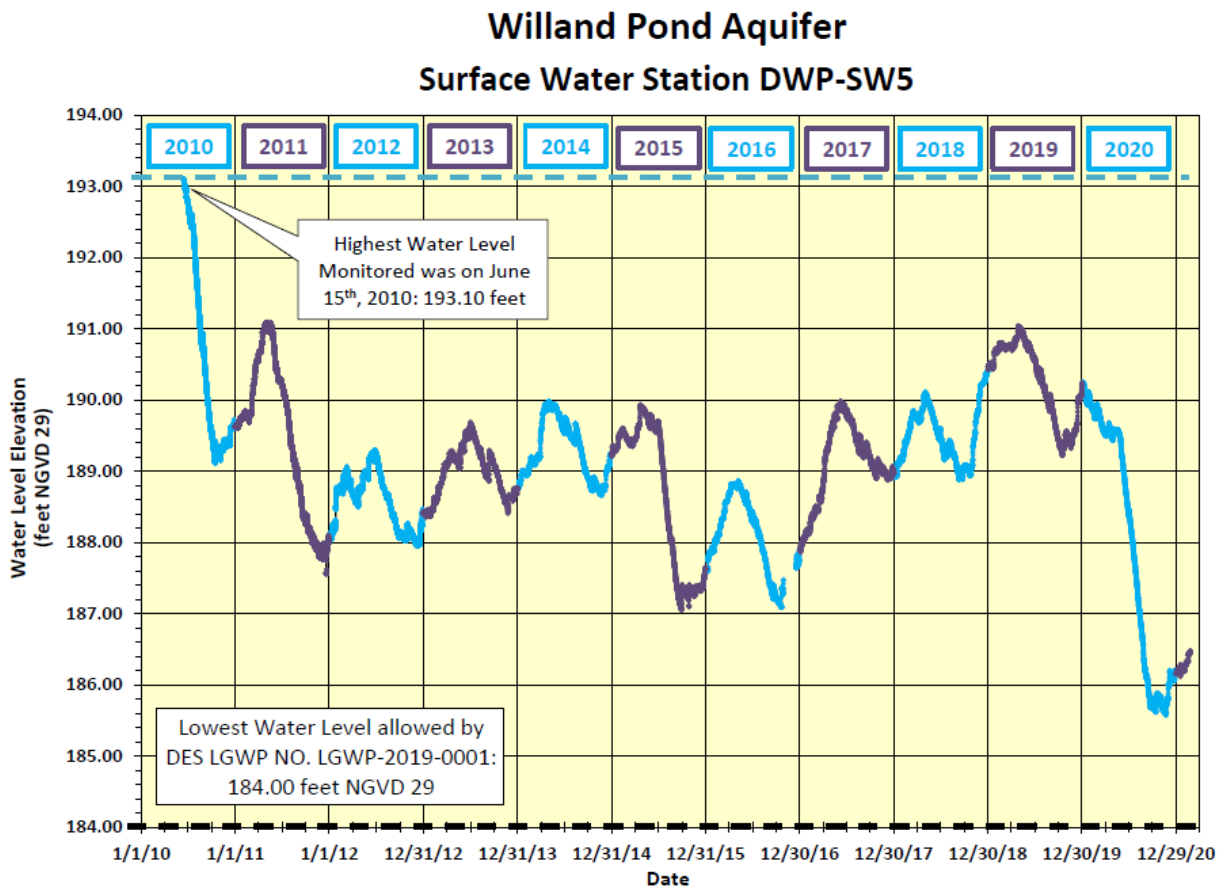
Jeff McMenemy

Published 5:39 p.m. ET Aug. 27, 2020

View Comments

Water levels are low, as seen recently on the Dover side of Willand Pond, due to the lack of rain this summer. *Deb Cram/Fosters.com, File*

Willand Pond



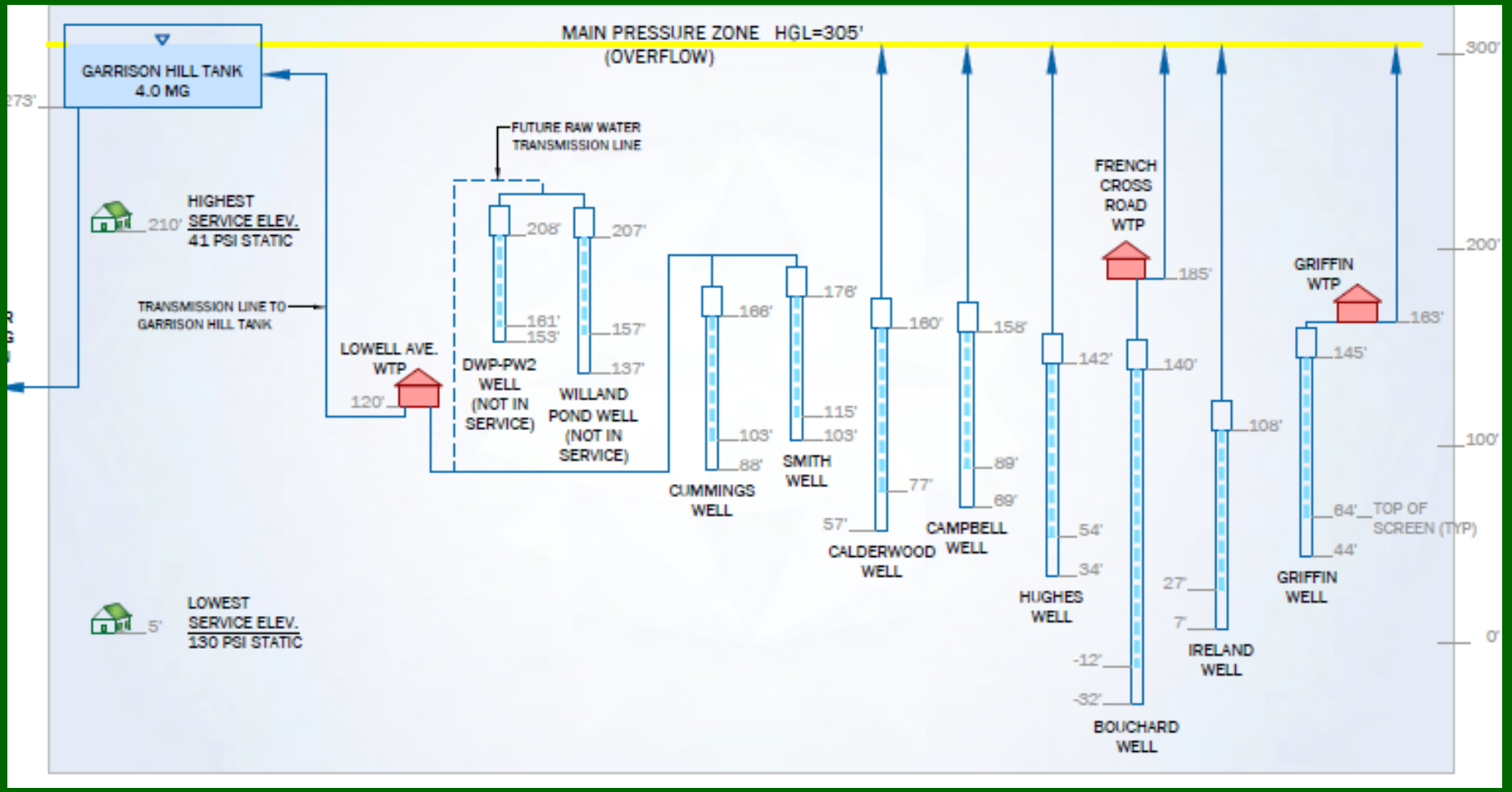
Plot of Water Level versus Time for June 15, 2010 to September 25, 2020

Long-Term Groundwater Monitoring Program

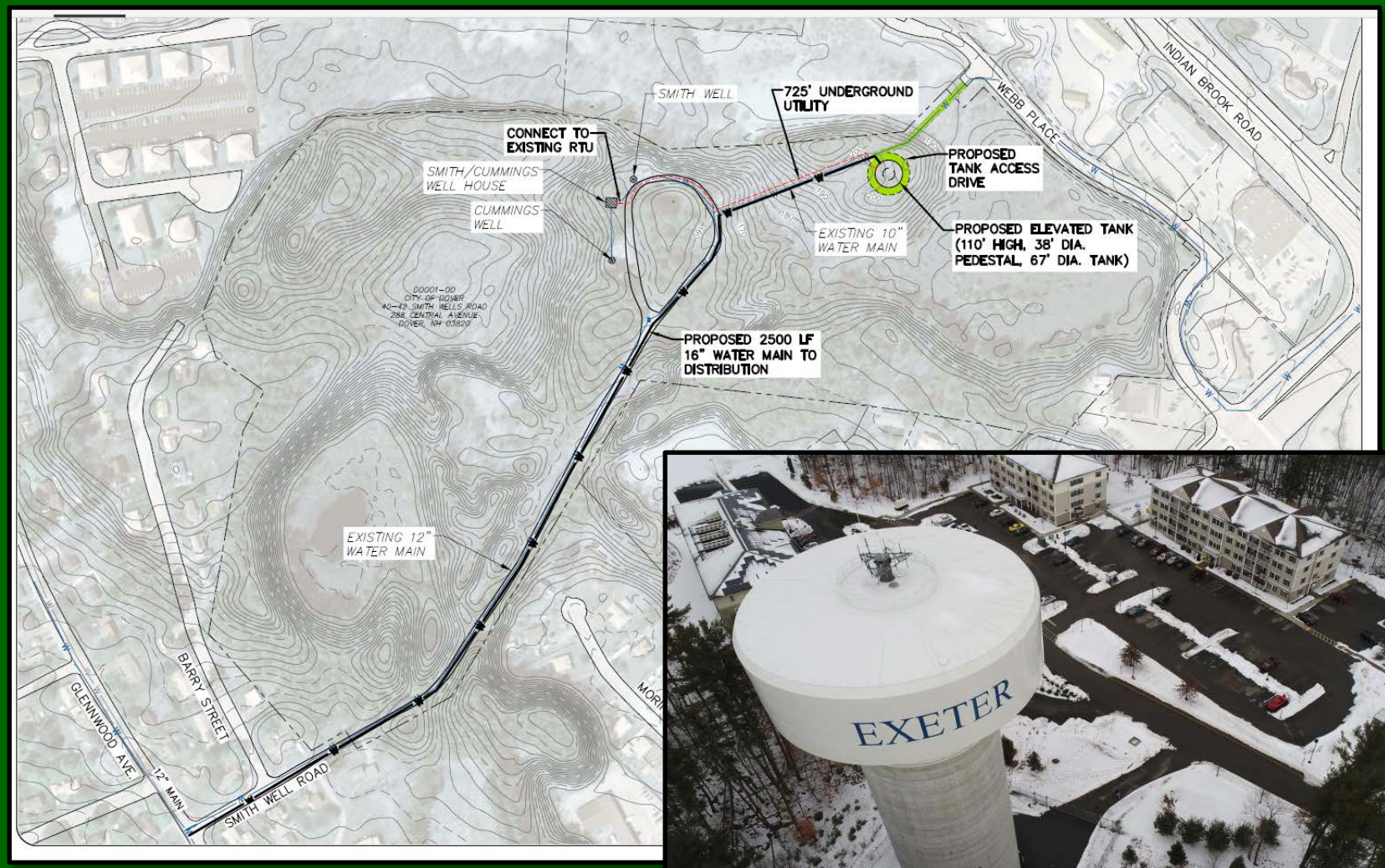
Dover, New Hampshire

Water Storage

Water Storage



Water Storage



Drought

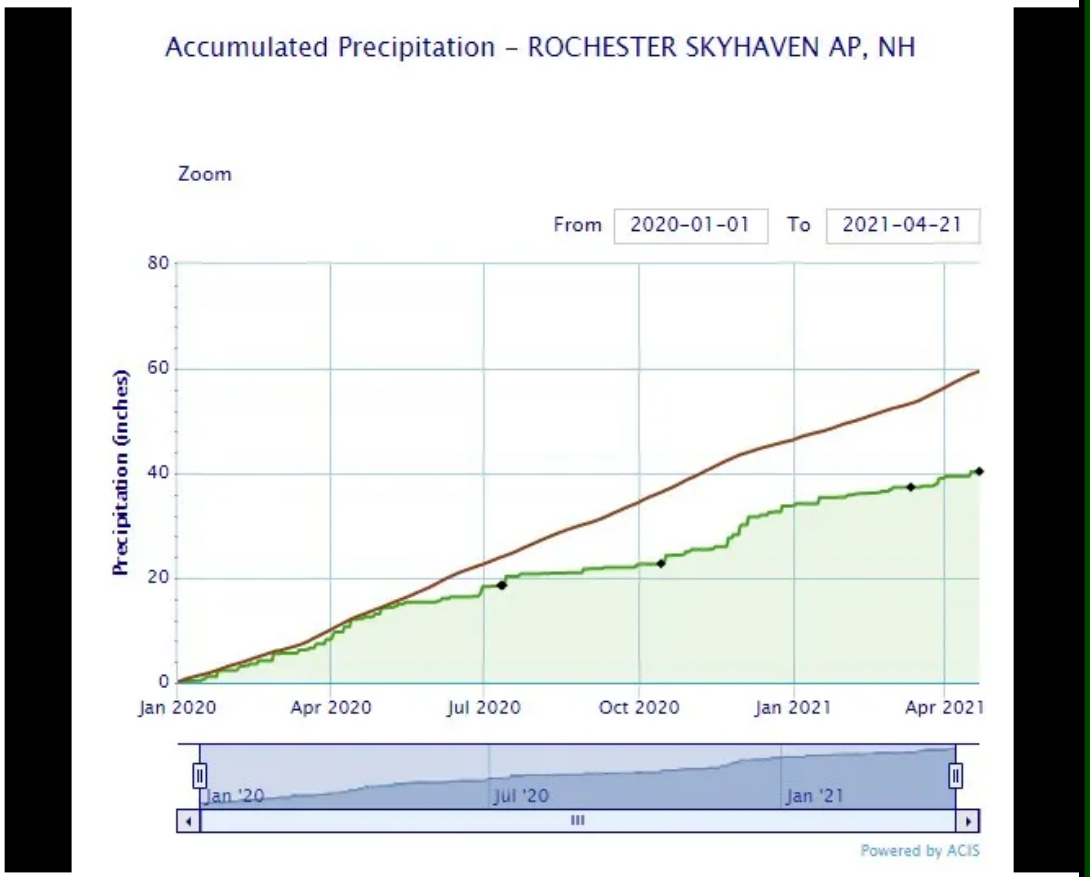
LOCAL

'Concerningly low levels': Dover urges voluntary water conservation

Special to Foster's City of Dover

Published 5:05 p.m. ET Apr. 21, 2021

View Comments



Questions??

By: Gretchen Young, PE
Environmental Projects Manager
&
John B. Storer
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