Pease Tradeport
Water System Overview and History
July 27, 2015

Portsmouth Water Division
City of Portsmouth Department of Public Works
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Portsmouth, NH 03801
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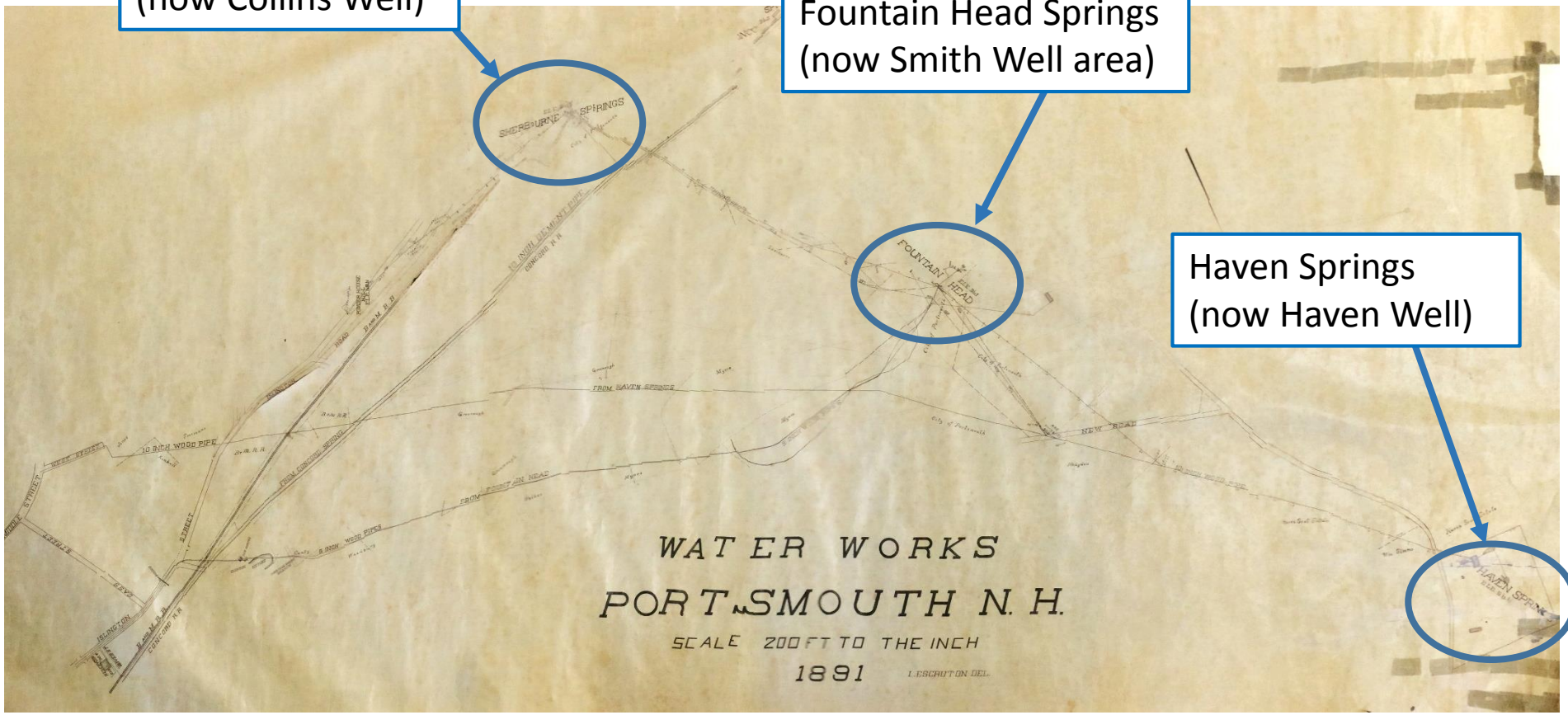
Peter Rice, Director of Public Works
Brian Goetz, Deputy Director of Public Works

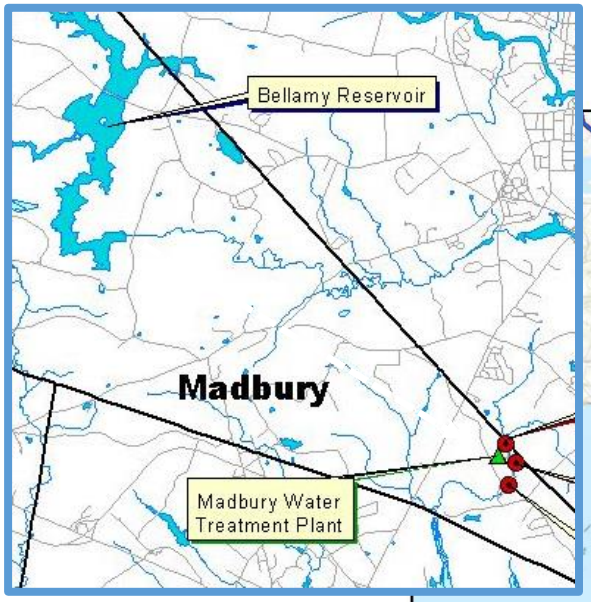
History of Portsmouth Water System

- 1797 - Portsmouth Aqueduct Company formed by act of NH Legislature
- Fountain Head Spring Developed (near current Haven Well) and piped to City
- 1867 – Sherburne and Concord Springs added
- 1891 – City takes over system
- 1950's – Pease Air Base takes over Haven Well and builds new tanks and pipes in Pease area for it's own, separate water system. Madbury Wells, Bellamy Reservoir and Madbury Water Treatment Facility are built by Air Force to replace water sources for City
- 1990's – Pease system turned over to Pease Development Authority. City takes over operations.

Water Sources in 1891



Portsmouth Regional Water System



Newington

~ 8,000 Accounts

Portsmouth

New Castle –
& New Castle Water District

Rye –
& Rye Water District

Greenland

Newington Tank
NHANG Tank
Osprey Landing Tank
Hobbs Tank
Haven Well
Harrison Well
Smith Well
Spinney Tank
Collins Well
Portsmouth Well No. 1
Lafayette Road Tank
Greenland Well

Sources: Esri, DeLorme, NAVTEQ, TomTom, Intermap, iPC, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), and the GIS User Community

Portsmouth Regional Water System

- Bellamy Reservoir
- Madbury Water Treatment Facility
- 8 Wells (6 Portsmouth, 2 Pease)
- 5 Storage Tanks (3 Portsmouth, 2 Pease)
- Two Pressure Zones (Portsmouth and Pease)
- 3.5 to 6.5 Million Gallons a Day total demand

Portsmouth Regional Water System

- 190 miles of pipe
- 972 Fire Hydrants
- 2,840 Valves
- 8,203 Meters/Customers

Newington Booster

Installed in 1957

Currently in design for Replacement

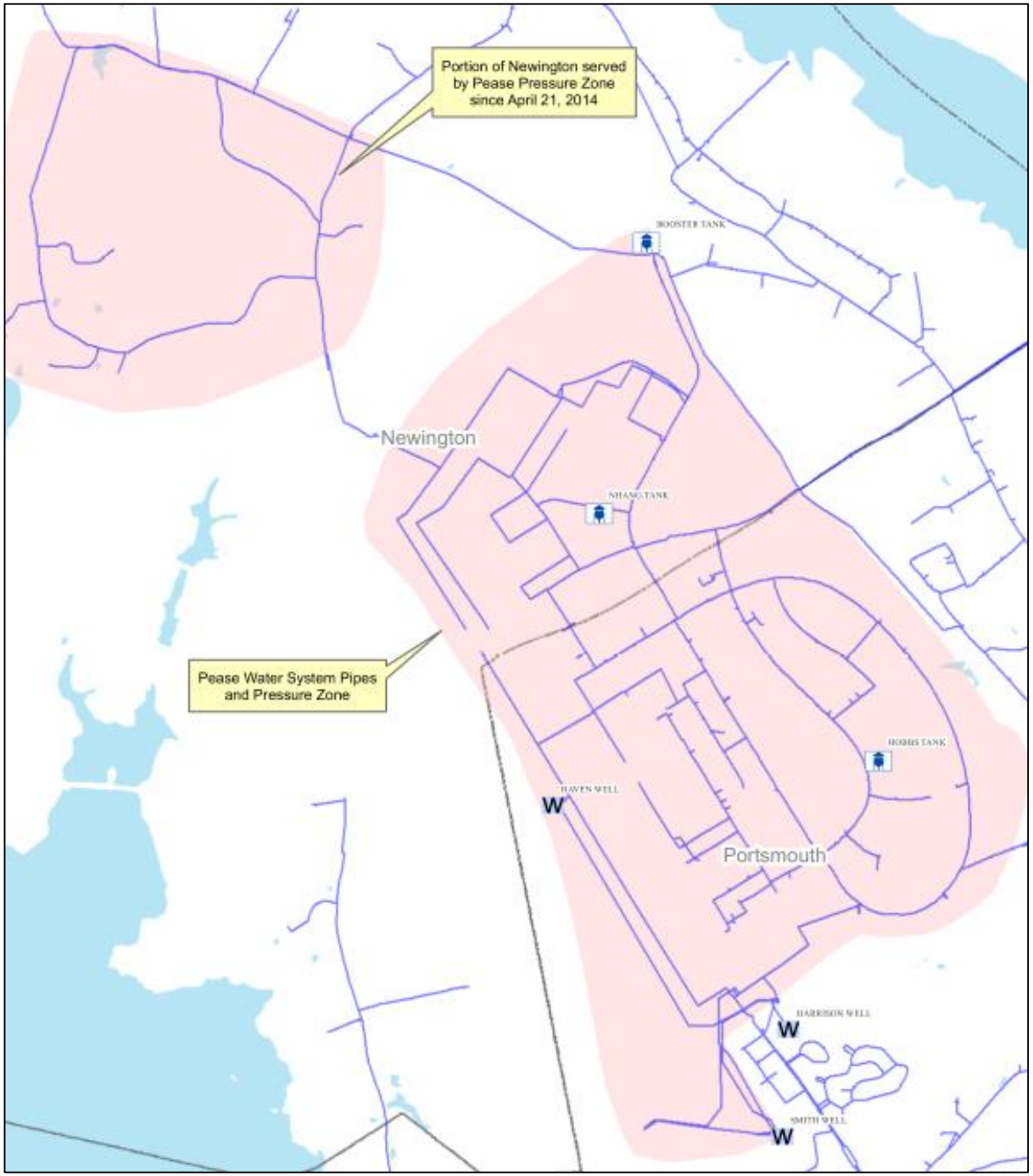
Boosts Pressure from Madbury to Portsmouth System

Pumps to Pease system are no longer in use

Pease International Trade Port Water System

- Built in the 1950's for the Pease Air Force Base
- Turned over to Pease Development Authority (PDA) in the 1990's
- Operated by the City of Portsmouth under agreements with PDA since 1992
- Three groundwater sources:
  - Haven Well (originally developed in 1870 by the City of Portsmouth's water system)
  - Smith Well (installed in 1958 as part of Air Base water system)
  - Harrison Well (reactivated in 2007)
- Two 366,000 Gallon Elevated Storage Tanks
  - Hobbs Hill Landing (slated to be replaced in 2014-2015)
  - Air National Guard
- 30 miles of water main
- 122 Customers (as of June 2015)
- Average Day Water Demand of 450,000 GPD (2011 to 2014)
- Peak Day Water Demand of 1,098,000 GPD (May 27, 2015)
- Growing customer base which includes Lonza, who are currently fitting out one of their buildings which will need an additional 150,000 to 250,000 GPD.

Pease Trade Port Water System



Smith Well

Installed in 1957

250 GPM Pump

Harrison Well

Installed in 1957

Replaced in 2006

225 GPM Pump

Pease Booster

Installed in 1990's

Two 450 GPM Pumps

Boosts water from Portsmouth to Pease

Haven Well

Installed in 1875 (Haven Springs)

Part of Pease Air Base: 1956 to 1992

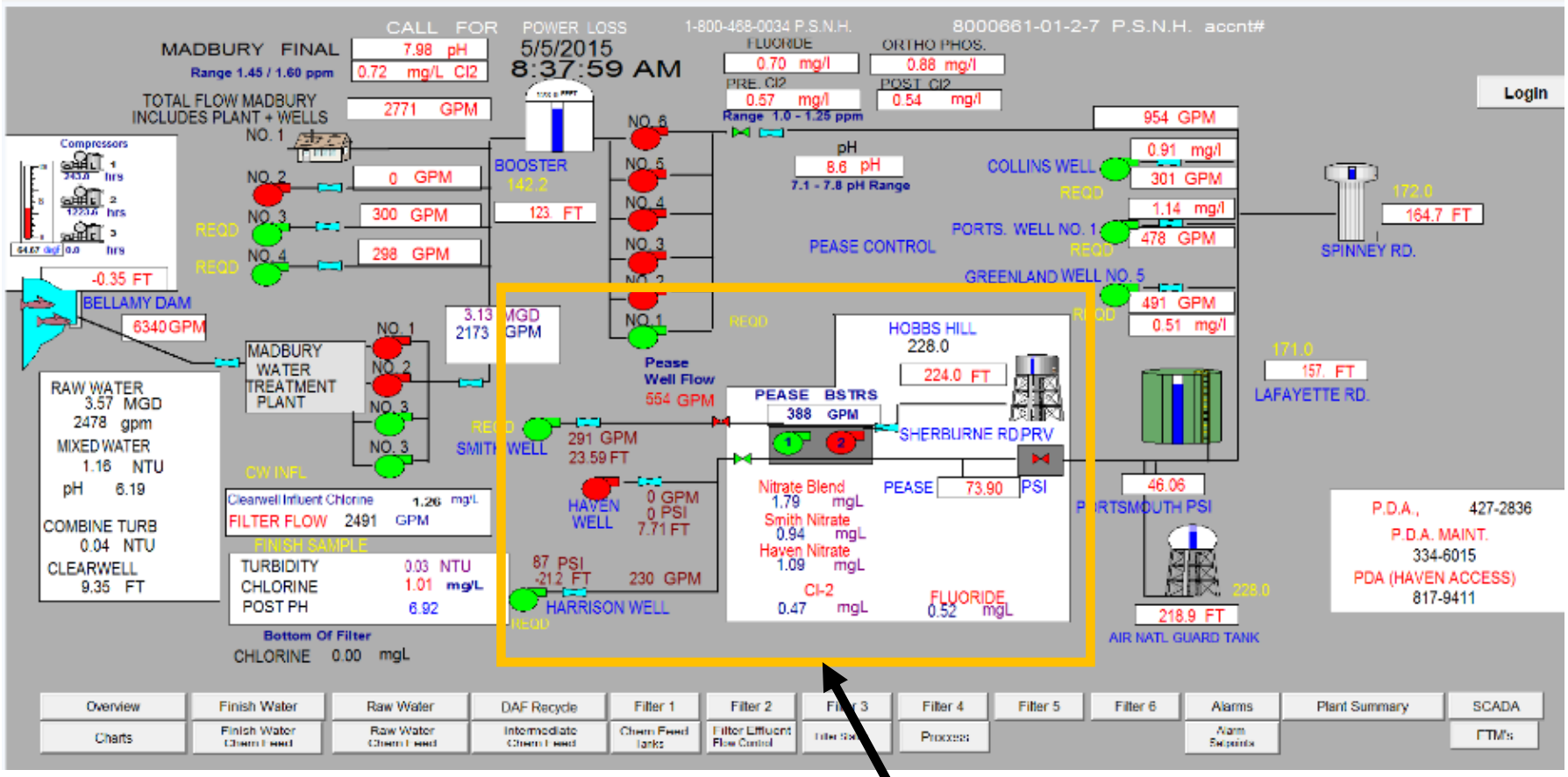
PDA/Portsmouth: 1992 to 2014

500 GPM Pump

System Operations

- Regulated by the Federal Safe Drinking Water Act
- Administered by EPA and NHDES Drinking Water and Groundwater Bureau
- Testing and reporting requirements for all sources of supply
- Six State Certified Water Treatment Operators
- Chemist
- Water Resources Engineer
- 24/7 Coverage

System Operations – Computer Control Master Control Screen



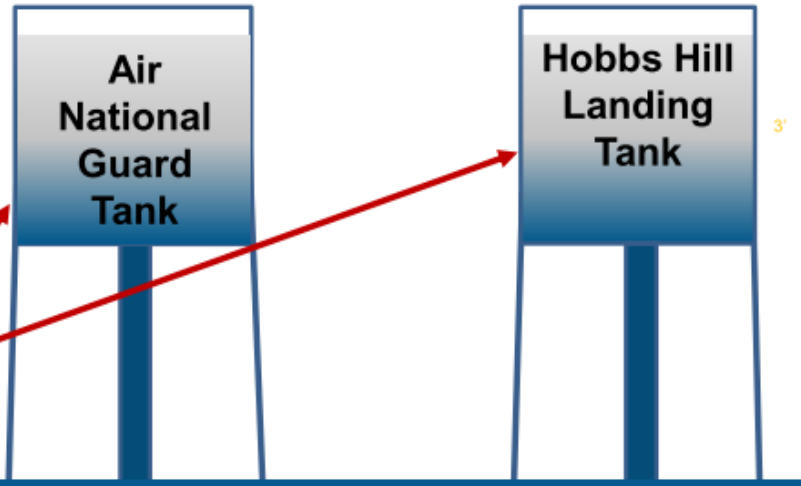
Pease Tradeport Water System Controls

Haven Well Shutdown: Chronology of Events

- Air Force Consultant sampled all three Pease wells in mid-April 2014 for PFCs
- May 12, 2014 – City staff are notified that PFC levels in Haven Well exceeded the EPA's Health Advisory Standard
- May 12, 2014 - Haven Well is shut down
- Since May 12, 2014 - Pease water system is supplemented with water from Portsmouth's water system (50% of demand supplied by Portsmouth)

Pease International Tradeport Water System Components:
Operational Parameters Prior to Shutdown of Haven Well on May 12, 2014

Water Tank levels rise and fall based on system pressure and water demands. Normally filling at night and dropping down during the day.



Pease International Tradeport Water System Pressure Zone

Sherburne Road PRV (normally closed)

Northwood Road PRV (normally closed)

Pease Blvd. PIV (normally closed)

All water is piped through the Pease Water Treatment Facility where it is blended prior to being distributed to customers

Pease Water Treatment Facility

Portsmouth Water System Pressure Zone

Portsmouth to Pease Booster Pumps

Haven Well

Harrison Well

Smith Well

Water can be transferred between the two pressure zones:
- Pease to Portsmouth via valves that have been opened only on occasion for emergency supply
- Portsmouth to Pease via a booster pump system which has been used more often to supplement Pease source waters

Normal Operations had all three wells turning on and off together based on tank levels with occasional use of Portsmouth booster. Current Operation uses Harrison, Smith and booster together with Haven off.

Pease International Tradeport Water System – Pumpage Data (2003 to May 12, 2014)

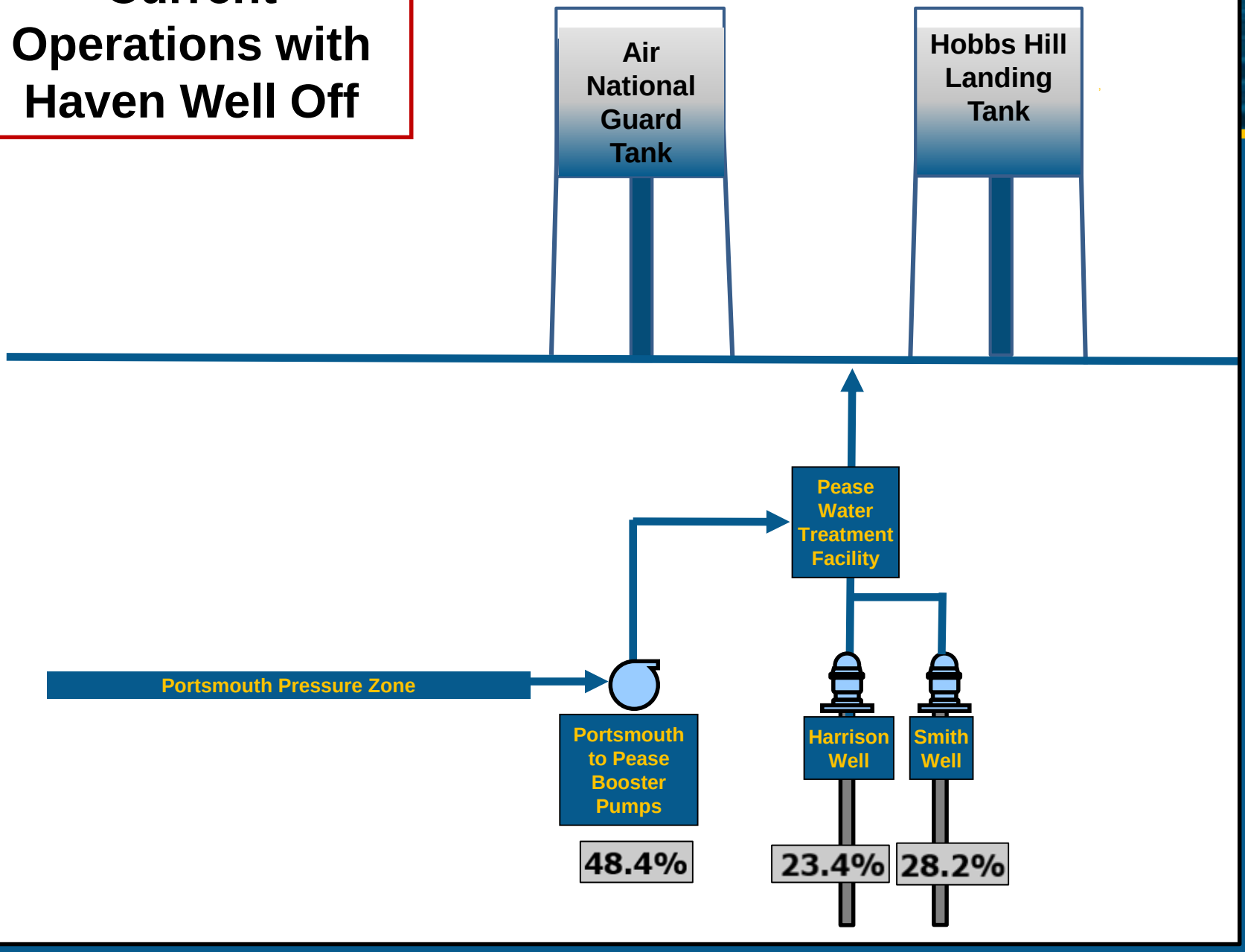
Average Pumpage from Each Source (based on monthly reports)

Timeframe	Haven	Smith	Harrison
January 2003 to May 2006	51%	49%	0%
June 2006 to April 2014	46%	21%	33%

Note: The entire Portsmouth/Pease Water System computer controls were upgraded in 2011 as part of the Madbury Water Treatment Facility upgrades. At that time the Portsmouth to Pease Booster system pumpage information was added to the system data.

Aug 2011 to Dec 2013	Harrison	Smith	Haven	Booster	Total
TOTAL Gallons	96,279	95,398	185,240	80,074	456,991
Percentage	21.1%	20.9%	40.5%	17.5%	

Current Operations with Haven Well Off



Pease International Tradeport Water System – Current Operations (since May 12, 2014)

Average Pumpage from Each Source (based on current operations)

Timeframe	Haven	Smith	Harrison	Ports Booster to Pease
May 12, 2014 to Present	Off	28.2%	23.4%	48.4%

Effect Loss of Haven Well Has on Pease Water System

- Loss of the largest water source serving the Pease Tradeport:
  - Safe yield of 534 Gallons per minute (GPM) – 769,000 Gallons per day (GPD)
- Only backup supply is Portsmouth water system:
  - An average of 423,000 GPD were pumped from Portsmouth to Pease in July and August 2014.
  - Reduced the available water to Portsmouth by 9 percent, necessitating the use of supplemental water from the Rye Water District – approximately 250,000 GPD when in service.
- Limited backup if Smith or Harrison Wells were out of service
  - Existing booster pump system is capable of pumping 450 GPM or 648,000 GPD.
  - Peak days for Pease are over 1,100,000 GPD

Effect Loss of Haven Well Has on Pease Tradeport

- A 2013 Pease WWTF Evaluation updated these water demands and projected the Tradeport water demand at buildout to be 1,578,000 GPD, an increase of 1,087,000 GPD. (source: Draft Pease Wastewater Treatment Facility Evaluation – Underwood Engineers, Inc., January 2014)
- The Smith and Harrison Wells have a combined sustained yield of 410,000 GPD based on the 2012 Water Supply Master Plan. This is 1,168,000 GPD less than Underwood Engineer's buildout projections.

Pease Tradeport Economic Analysis

From Ghost Town to Economic Engine

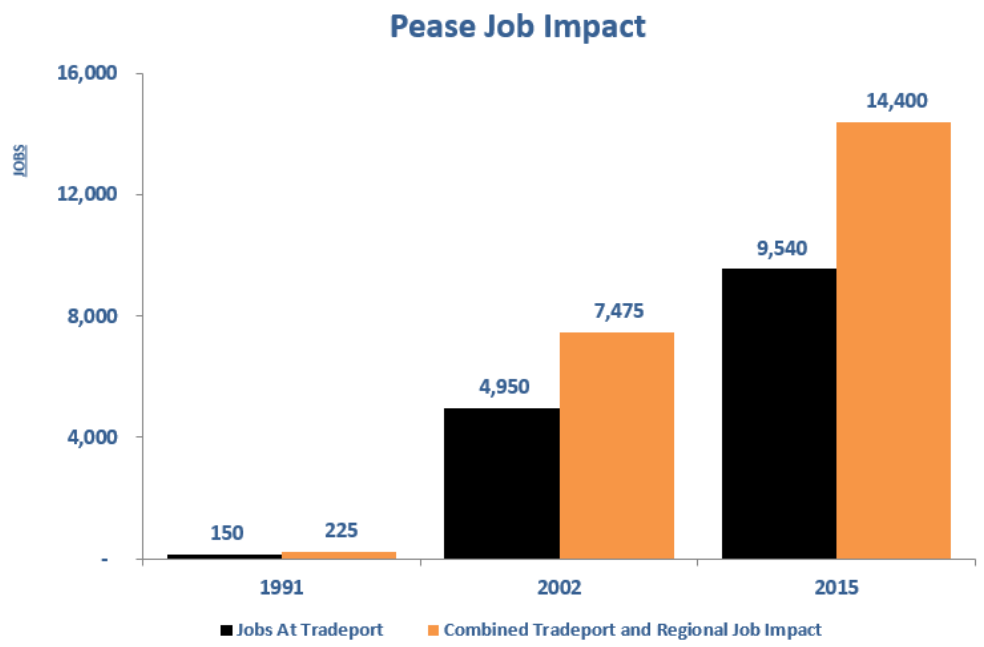
Pease 25 Years After Its Closing

PEASE INTERNATIONAL
PORTSMOUTH, NH

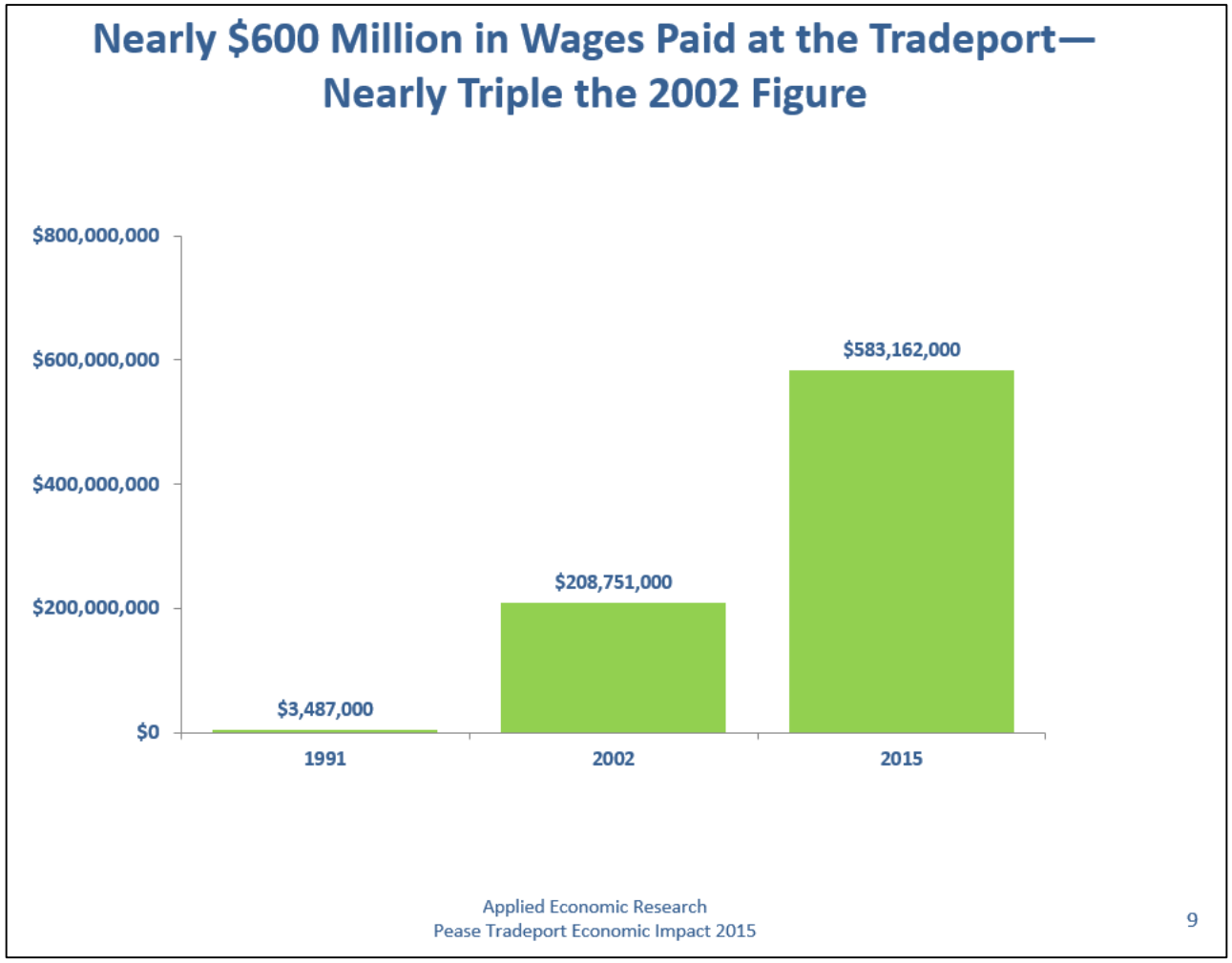
Applied Economic Research
Laconia, New Hampshire
June 2015

Pease Tradeport Economic Analysis

9,540 Jobs at Tradeport +1,750 Projected; 14,400 Regional Jobs Including Supported Off-Tradeport Jobs



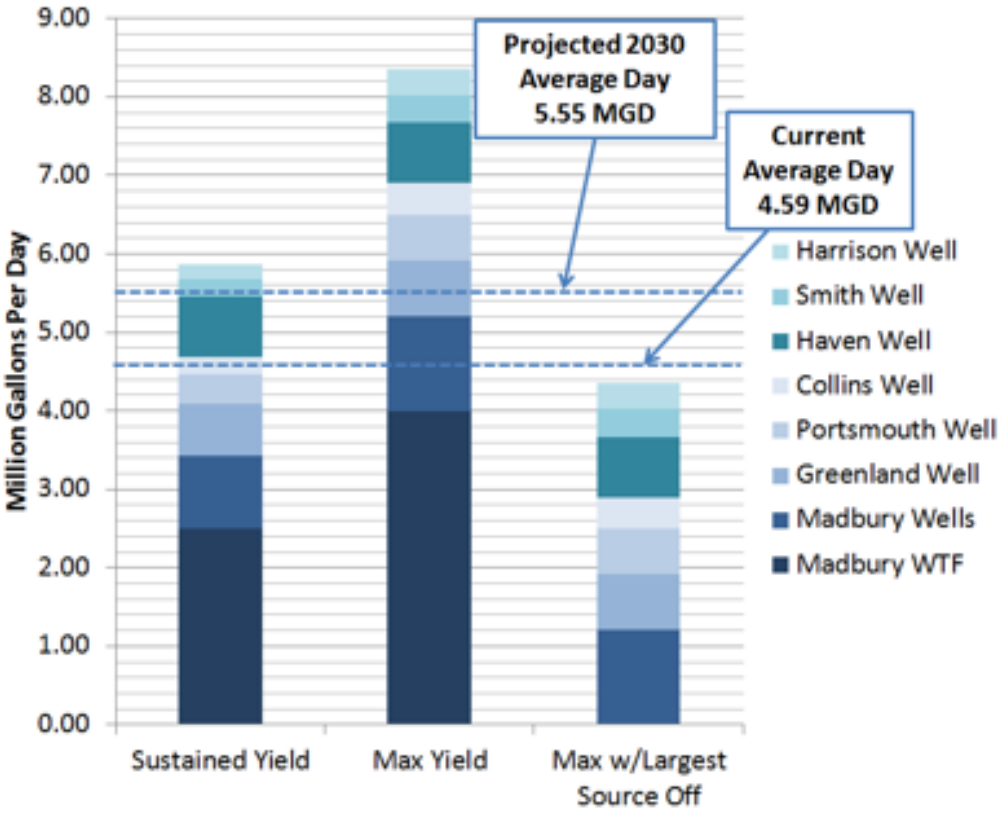
Pease Tradeport Economic Analysis



2012 Water Supply Master Plan Analysis:

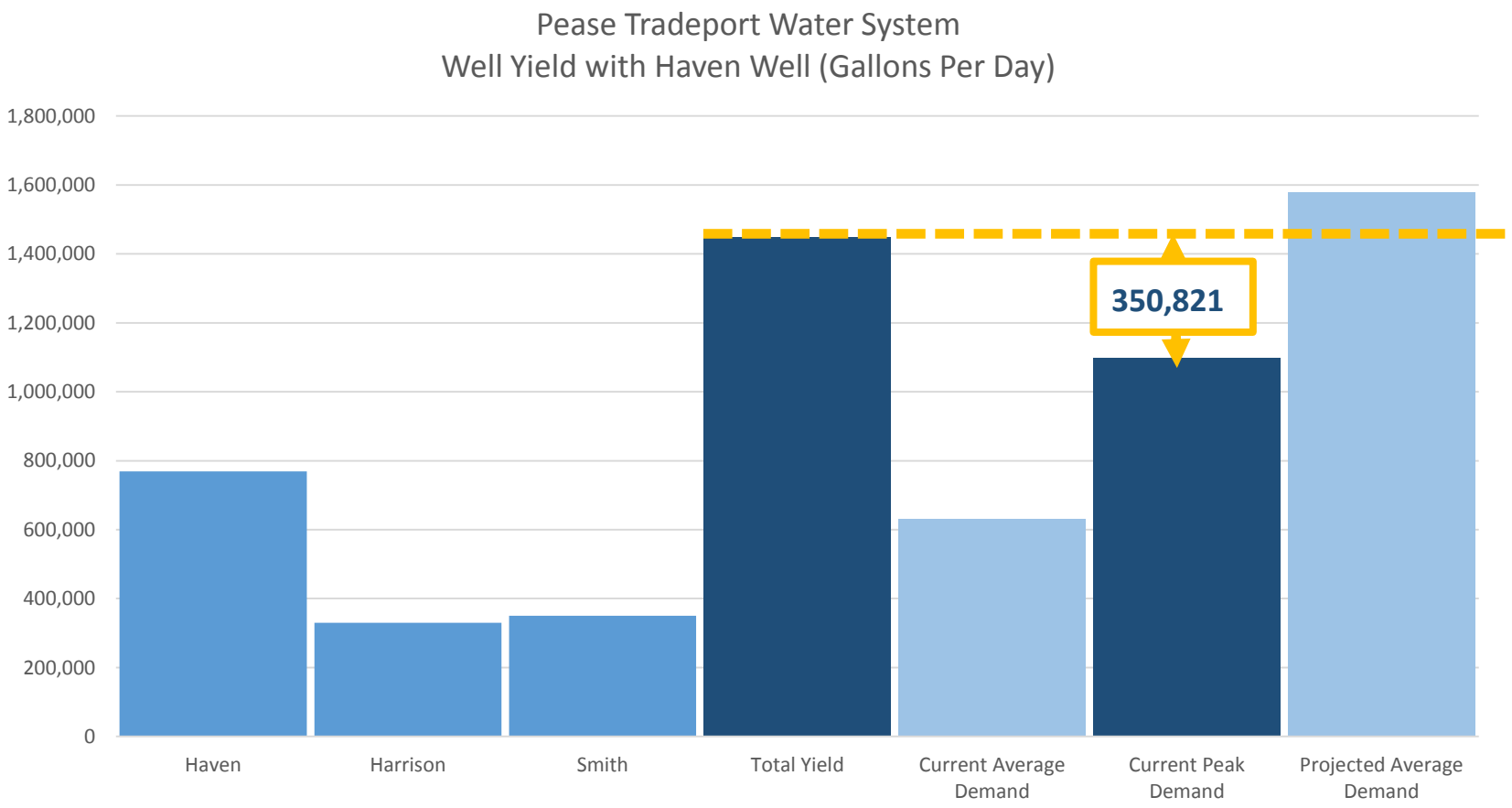
TABLE 1-24
Sustained Yield vs. Maximum Yield of Portsmouth's Water Supply Sources

Source	Sustained Yield (mgd)	Maximum Yield (mgd)	Max vs. Sustained (mgd)
Madbury WTF	2.50	4.00	+1.50
Madbury Wells	0.93	1.21	+0.28
Greenland Well	0.66	0.71	+0.05
Portsmouth Well	0.38	0.58	+0.20
Collins Well	0.22	0.40	+0.18
Haven Well	0.77	0.77	+0.00
Smith Well	0.22	0.35	+0.13
Harrison Well	0.19	0.33	+0.14
TOTAL	**5.87**	**8.35**	**+2.48**



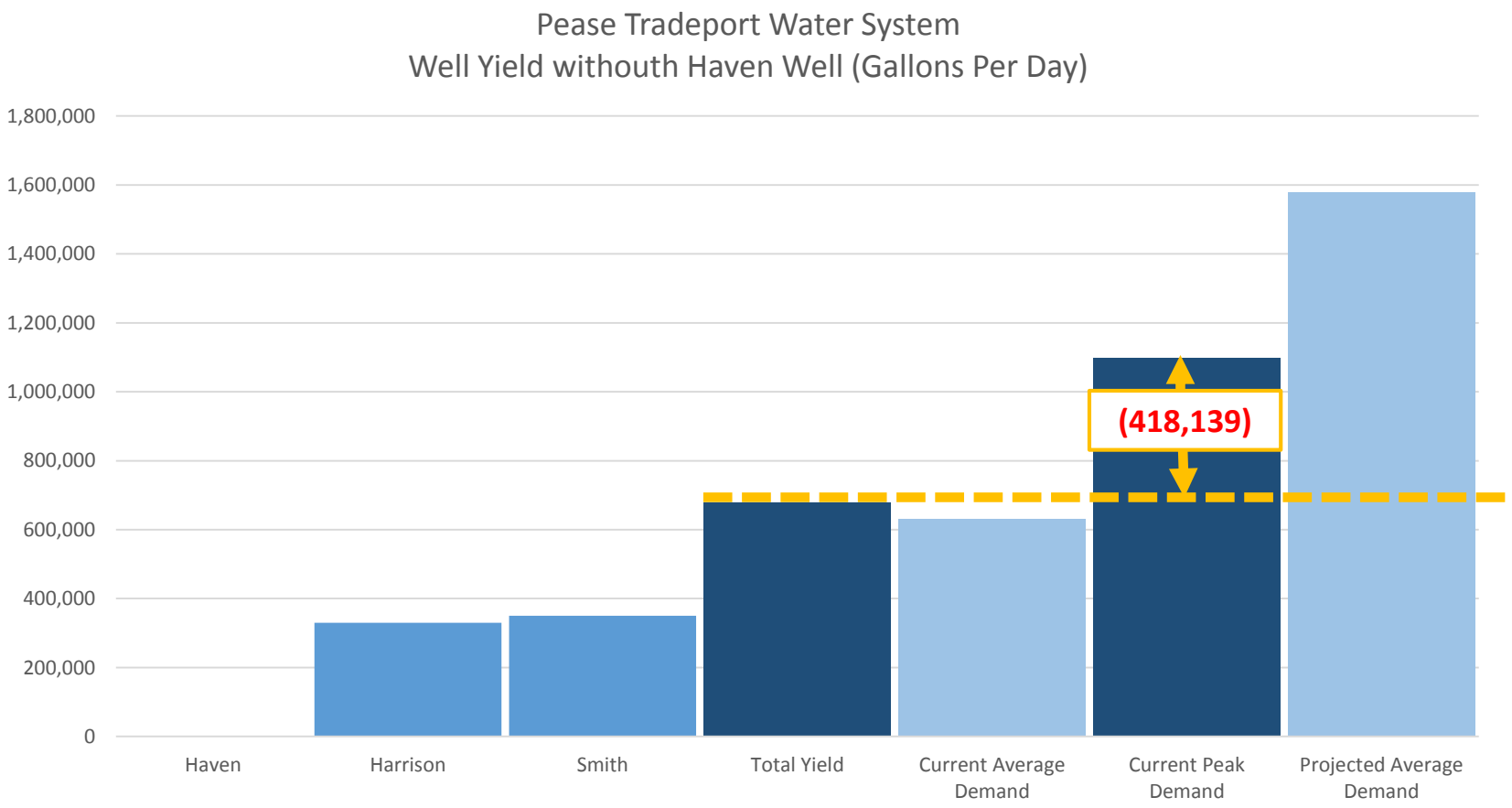
Pease Water System – Supply Capability with Haven Well

350,821 Gallons of excess capacity meeting current peak demand



Pease Water System –
Supply Capability without Haven Well

418,139 Gallons short of meeting current peak Demand



May 2015 Pease Water System Demand