

FIGURE 1

Topographic Setting
Location of Existing Municipal Wells
City of Portsmouth, New Hampshire
Groundwater Exploration Study Area

Wells Operated by City of Portsmouth

■ Portsmouth Groundwater Supply Wells

■ Pease Groundwater Supply Wells

Portsmouth Water Pipelines

DIAMETER (inches)

— 10- 13

— 14 - 24

Regional Groundwater Study Area

Town/City Boundary

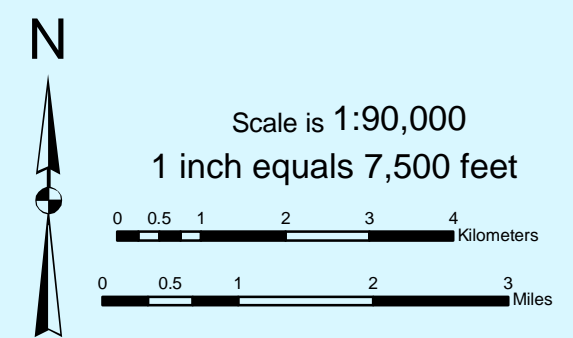
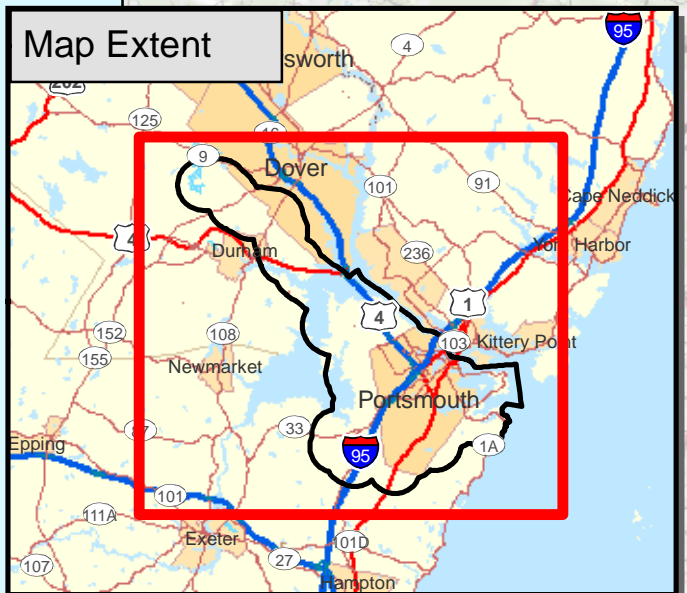
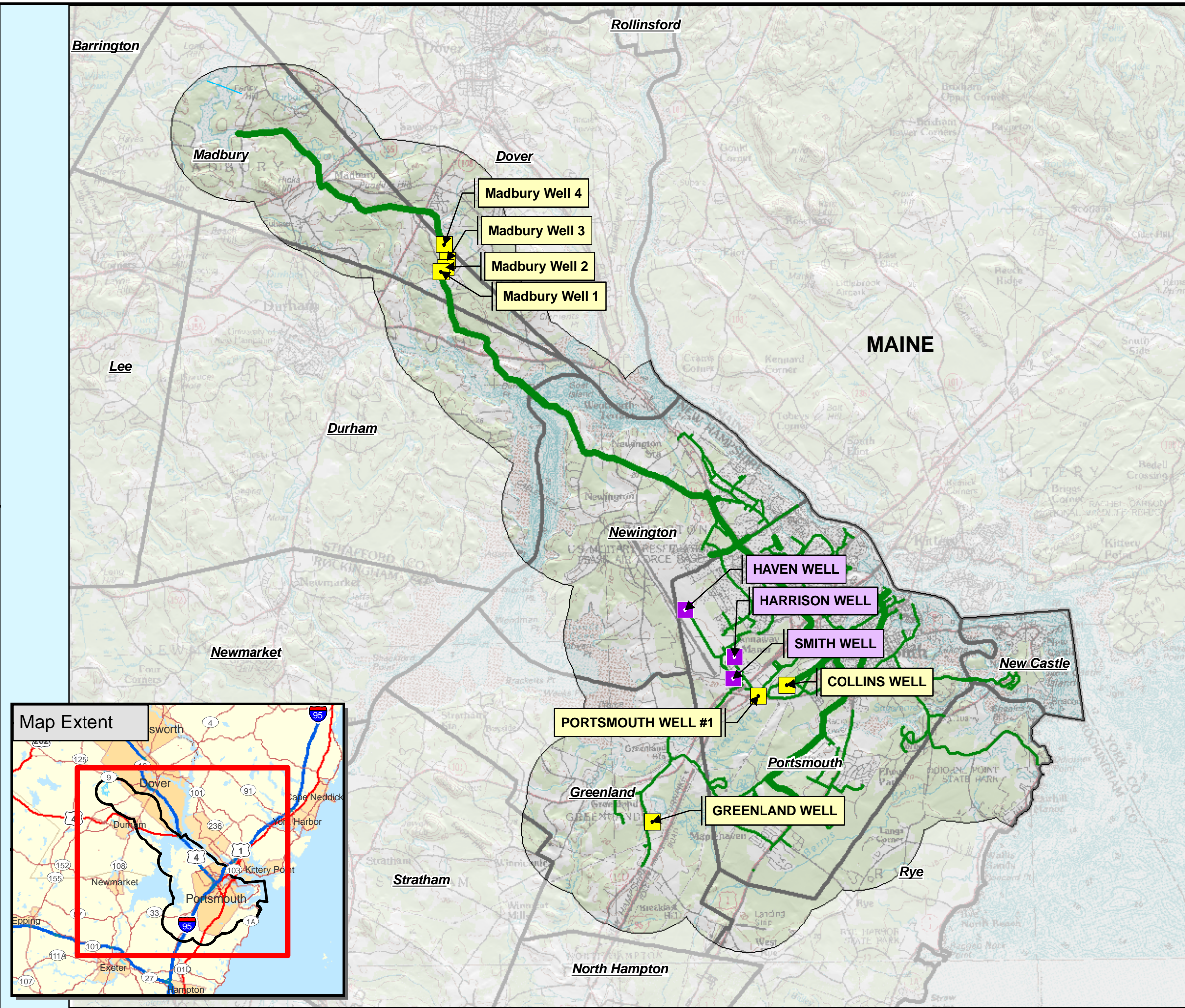
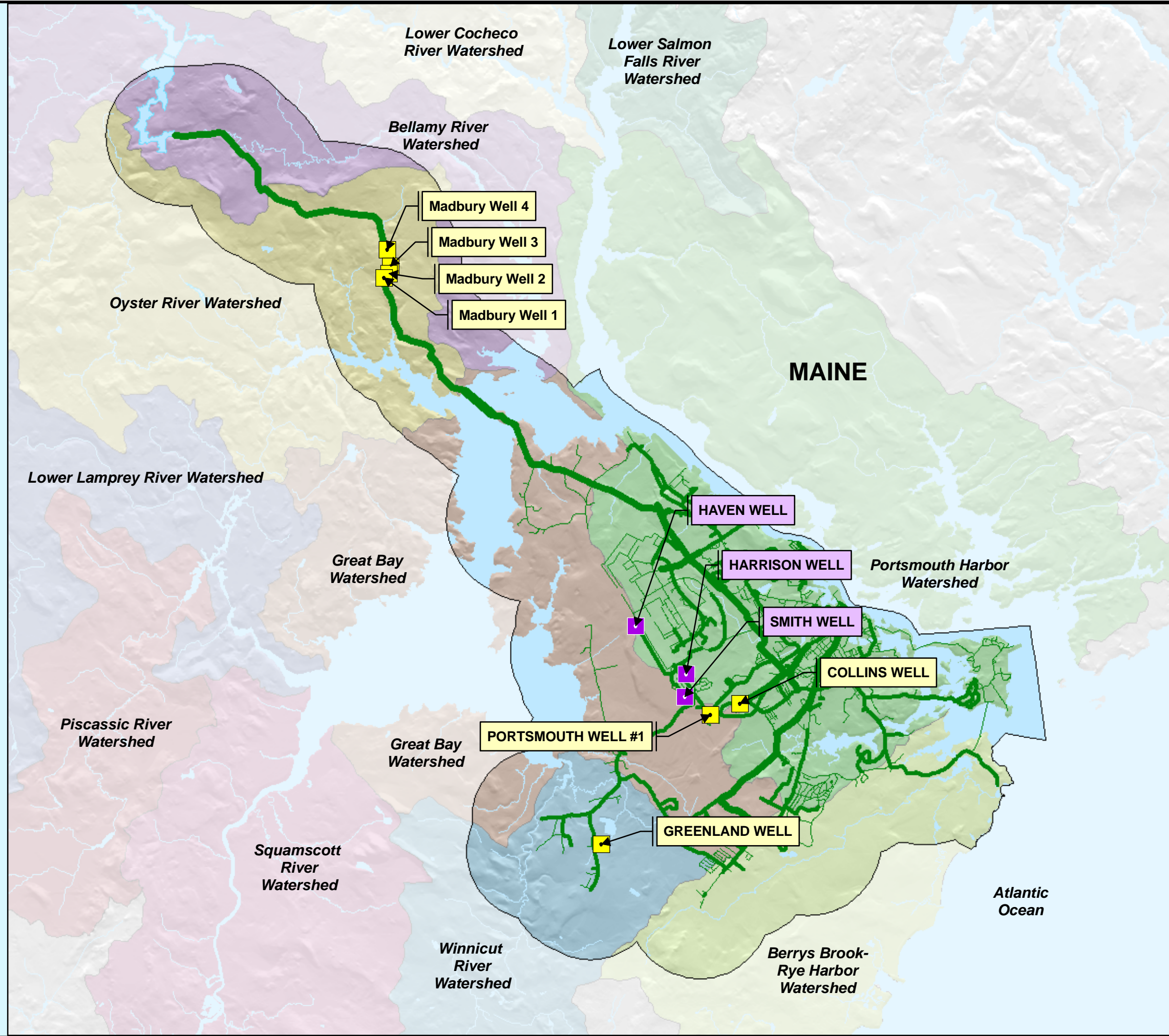


FIGURE 1
Emery & Garrett Groundwater, Inc.

FIGURE 2

Regional Watersheds

City of Portsmouth, New Hampshire
Groundwater Exploration Study Area



Wells Operated by City of Portsmouth

- Portsmouth Groundwater Supply Wells
- Pease Groundwater Supply Wells

Portsmouth Water Pipelines

DIAMETER (inches)

- 6 and 8
- 10 to 14
- 16 to 24

Watershed delineation obtained from NH GRANIT GIS database of HUC-12 Watersheds



Scale is 1:90,000

1 inch equals 7,500 feet



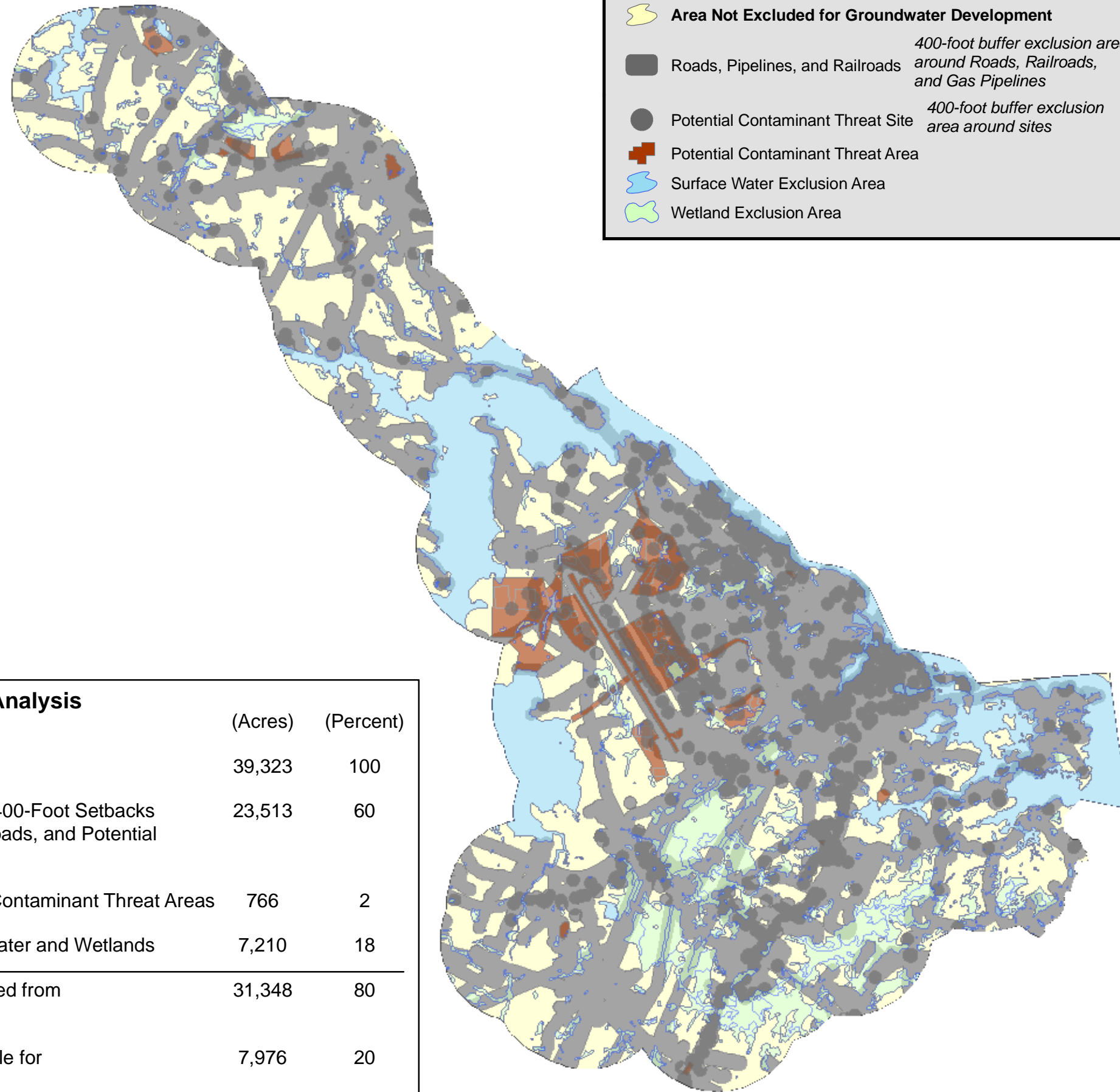
FIGURE 2

Emery & Garrett Groundwater, Inc.

FIGURE 3

Groundwater Availability Exclusion Analysis

City of Portsmouth, New Hampshire
Groundwater Exploration Study Area



Legend

- Area Not Excluded for Groundwater Development**
- Roads, Pipelines, and Railroads** *400-foot buffer exclusion area around Roads, Railroads, and Gas Pipelines*
- Potential Contaminant Threat Site** *400-foot buffer exclusion area around sites*
- Potential Contaminant Threat Area**
- Surface Water Exclusion Area**
- Wetland Exclusion Area**

Results of Exclusion Analysis	(Acres)	(Percent)
Total Size of Study Area	39,323	100
Area Excluded by Required 400-Foot Setbacks from Roads, Pipelines, Railroads, and Potential Contaminant Threat Sites	23,513	60
Area Excluded by Potential Contaminant Threat Areas	766	2
Area Excluded by Surface Water and Wetlands	7,210	18
Total Area Potentially Excluded from Groundwater Development	31,348	80
Total Area Potentially Available for Groundwater Development	7,976	20

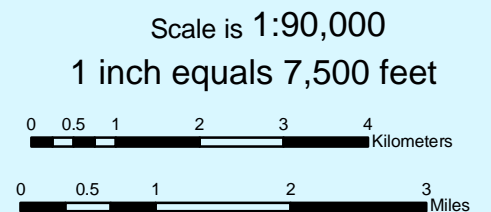


FIGURE 3

Emery & Garrett Groundwater, Inc.

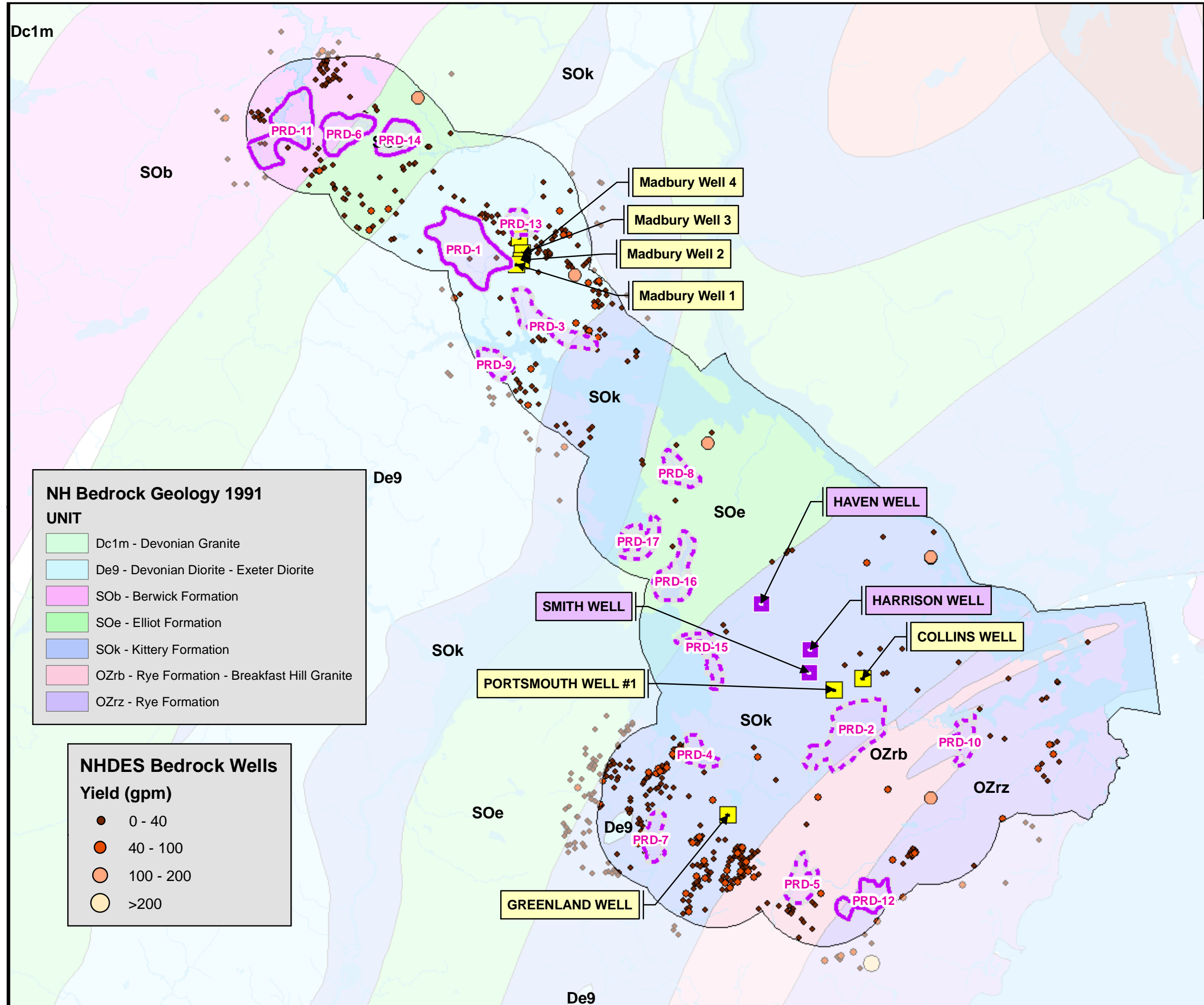


FIGURE 4
 Bedrock Wells and
 Bedrock Geology
 City of Portsmouth, New Hampshire
 Groundwater Exploration Study Area

NH Bedrock Geology 1991

UNIT

- Dc1m - Devonian Granite
- De9 - Devonian Diorite - Exeter Diorite
- SOb - Berwick Formation
- SOe - Elliot Formation
- SOk - Kittery Formation
- OZrb - Rye Formation - Breakfast Hill Granite
- OZrz - Rye Formation

NHDES Bedrock Wells

Yield (gpm)

- 0 - 40
- 40 - 100
- 100 - 200
- >200

**Proposed Groundwater Development Zones
Bedrock Aquifer(s)**

Potential Groundwater Quality

- More Favorable *PRD-1, PRD-6, PRD-11, PRD-12, and PRD-14*
- Less Favorable *PRD-2, PRD-3, PRD-4, PRD-5, PRD-7, PRD-8, PRD-9, PRD-10, PRD-13, PRD-15, PRD-16, and PRD-17*

Wells Operated by City of Portsmouth

- Portsmouth Groundwater Supply Wells
- Pease Groundwater Supply Wells
- Regional Study Area

Numeric Ranking of Potential Groundwater Development Zones is According to Yield Potential

N

Scale is 1:90,000
 1 inch equals 7,500 feet

0 0.5 1 2 3 4 Kilometers

0 0.5 1 2 3 Miles

FIGURE 4
 Emery & Garrett Groundwater, Inc.

FIGURE 5

Surficial Geology and Proposed Groundwater Development Zones

City of Portsmouth, New Hampshire
Groundwater Exploration Program

Proposed Groundwater Development Zones Potential Groundwater Quality

- More Favorable *PRD-SG1, PRD-SG3, PRD-SG4, PRD-SG8, PRD-SG9, and PRD-SG12*
- Less Favorable *PRD-SG2, PRD-SG5, PRD-SG6, PRD-SG7, PRD-SG10, PRD-SG11, and PRD-SG13*

Wells Operated by City of Portsmouth

- Portsmouth Groundwater Supply Wells
- Pease Groundwater Supply Wells
- Regional Groundwater Study Area

Numeric Ranking of Potential Groundwater Development Zones is According to Yield Potential



Scale is 1:90,000

1 inch equals 7,500 feet

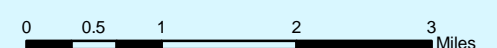


FIGURE 5

Emery & Garrett Groundwater, Inc.

- Portsmouth Groundwater Supply Wells
- Pease Groundwater Supply Wells

pease

- Pease Groundwater Supply Wells

Surficial Geology

Deposit Type

- af Artificial Fill*
- Qal Alluvium*
- Qb Beach Deposits*
- Qmwt Thin Wave-Formed Deposits*
- Qmw Wave-Formed Deposits*
- Qmwdt Thin Wave-Modified Marine Delta Deposits*
- Qmwd Wave-Modified Marine Delta Deposits*
- Qpt Thin Presumpscot Formation - facies undifferentiated*
- Qp Presumpscot Formation - facies undifferentiated*
- Qpct Thin Presumpscot Formation: clayey silt facies*
- Qpc Presumpscot Formation: clayey silt facies*
- Qps Presumpscot Formation: sandy facies*
- Qt Till*
- Qtt Thin Till*
- Qw Fresh-Water Wetlands Deposits*
- bedrock Bedrock Outcrop*

Label for Delta Deposit as Referenced in Text

A

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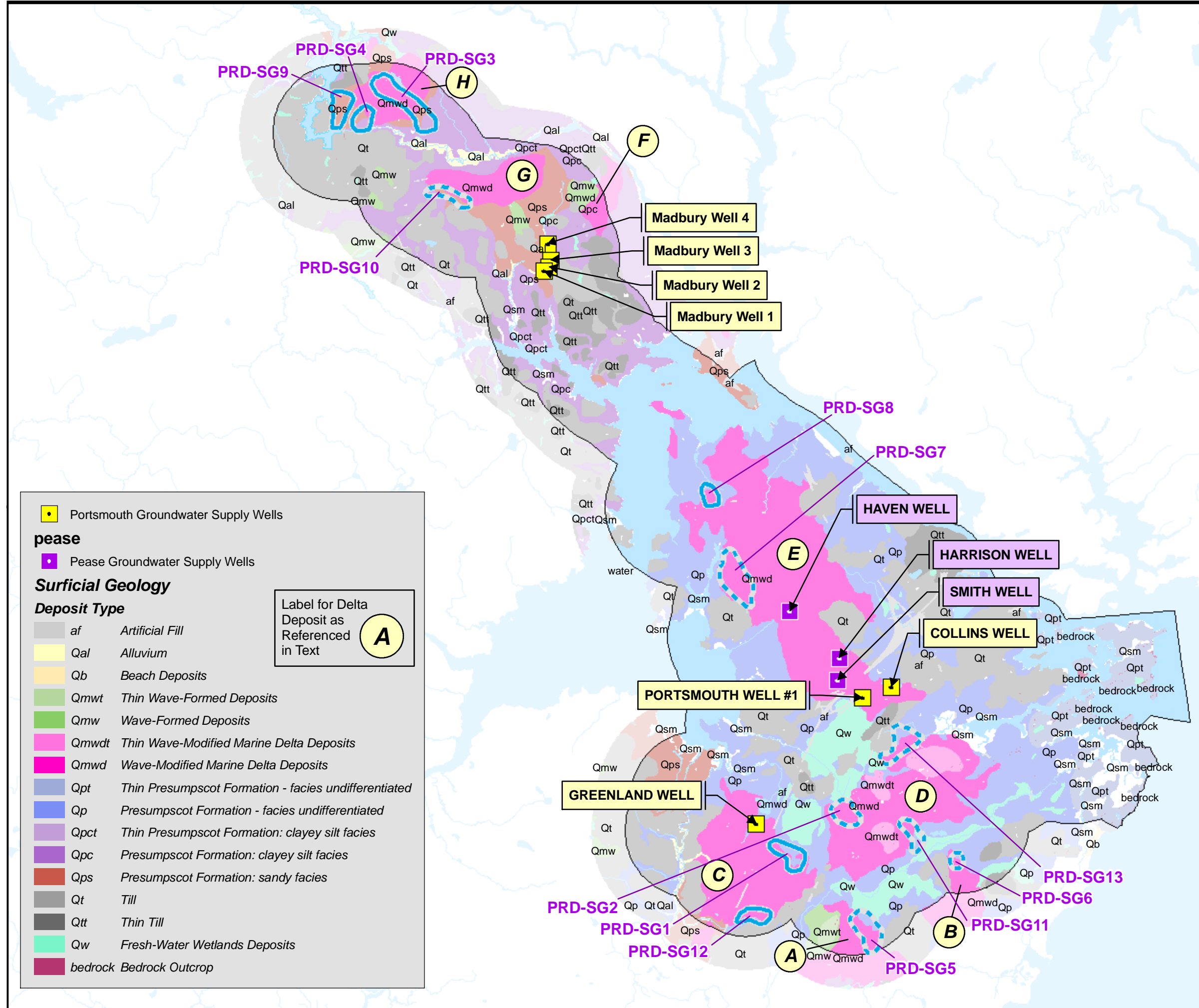


FIGURE 6



Proposed Groundwater Development Zones
Bedrock and Sand & Gravel Aquifer(s)

City of Portsmouth, New Hampshire
Groundwater Exploration Program

Proposed Groundwater Development Zones



SAND & GRAVEL AQUIFER(S)

Potential Groundwater Quality




-  More Favorable PRD-SG1, PRD-SG3, PRD-SG4, PRD-SG8, PRD-SG9, and PRD-SG12
-  Less Favorable PRD-SG2, PRD-SG5, PRD-SG6, PRD-SG7, PRD-SG10, PRD-SG11, and PRD-SG13

BEDROCK AQUIFER(S)

Potential Groundwater Quality

-  More Favorable PRD-1, PRD-5, PRD-6, PRD-11, PRD-12, and PRD-14
-  Less Favorable PRD-2, PRD-3, PRD-4, PRD-7, PRD-8, PRD-9, PRD-10, PRD-13, PRD-15, PRD-16, and PRD-17

Wells Operated by City of Portsmouth


-  Portsmouth Groundwater Supply Wells
-  Pease Groundwater Supply Wells
-  Regional Groundwater Study Area

Portsmouth Water Pipelines

DIAMETER (inches)

 10-13

 14-24

 Town/City Boundary

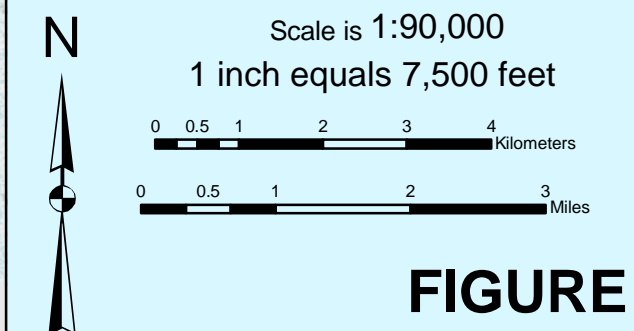
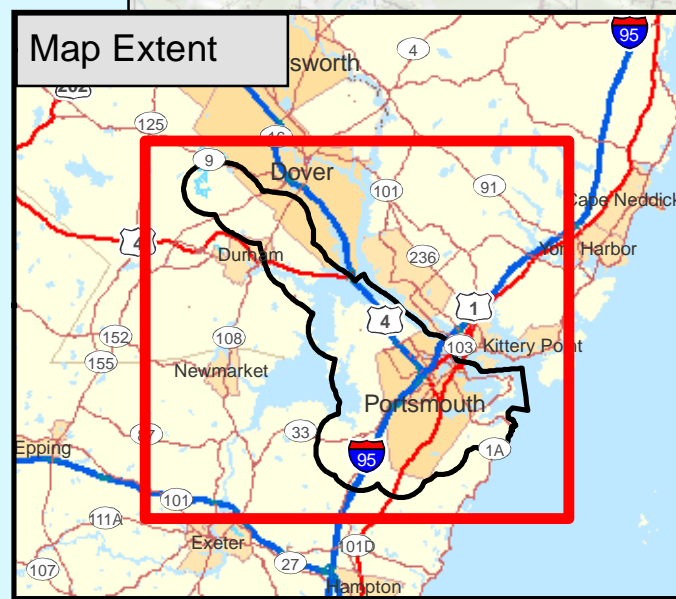


FIGURE 6

Emery & Garrett Groundwater, Inc.

FIGURE PRD-1 Proposed Groundwater Development Zone PRD-1 Bedrock Aquifer(s)

City of Portsmouth, New Hampshire
Groundwater Exploration Program

**Proposed Groundwater
Development Zones
Bedrock Aquifer(s)**

Potential Groundwater Quality

- More Favorable
- Less Favorable

**Wells Operated by
City of Portsmouth**

- Portsmouth Groundwater Supply Wells

**Portsmouth Water Pipelines
DIAMETER (inches)**

- 6 and 8
- 10 to 14
- 16 to 24

Tax Map Parcels

Potential Contaminant Threats are labeled within 3,000 feet of the Proposed Groundwater Development Zone. Refer to Plate 2 legend for the potential contaminant threats and Appendix B for specific site information.

3000-foot buffer around Zone PRD-1 within which potential contaminant threats are identified

Proposed Groundwater Development Zone PRD-1

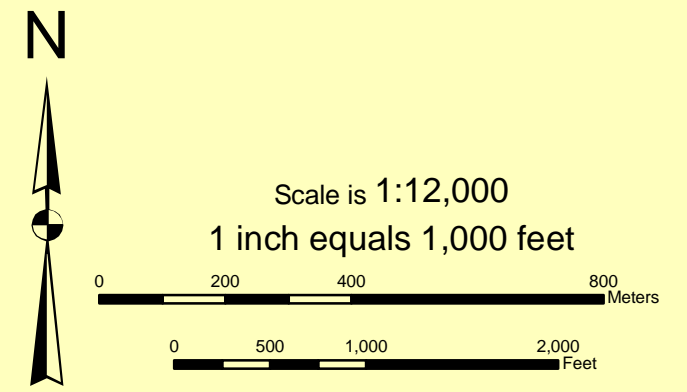
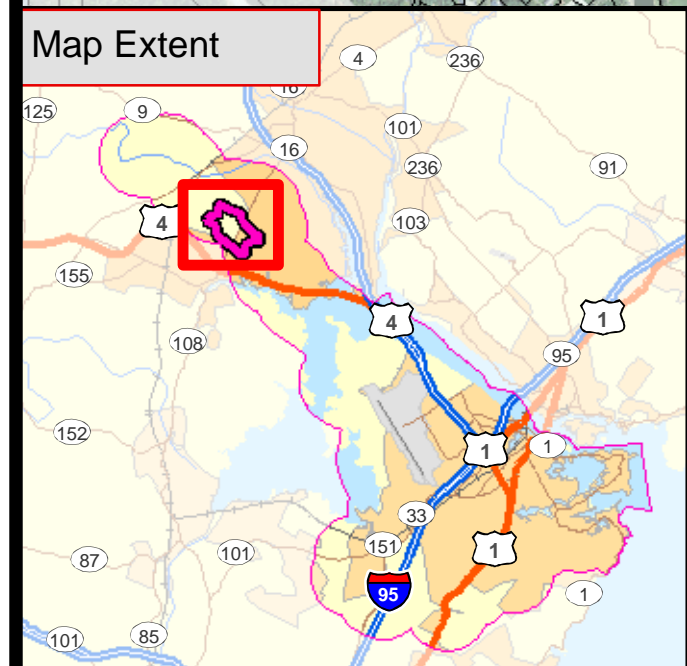
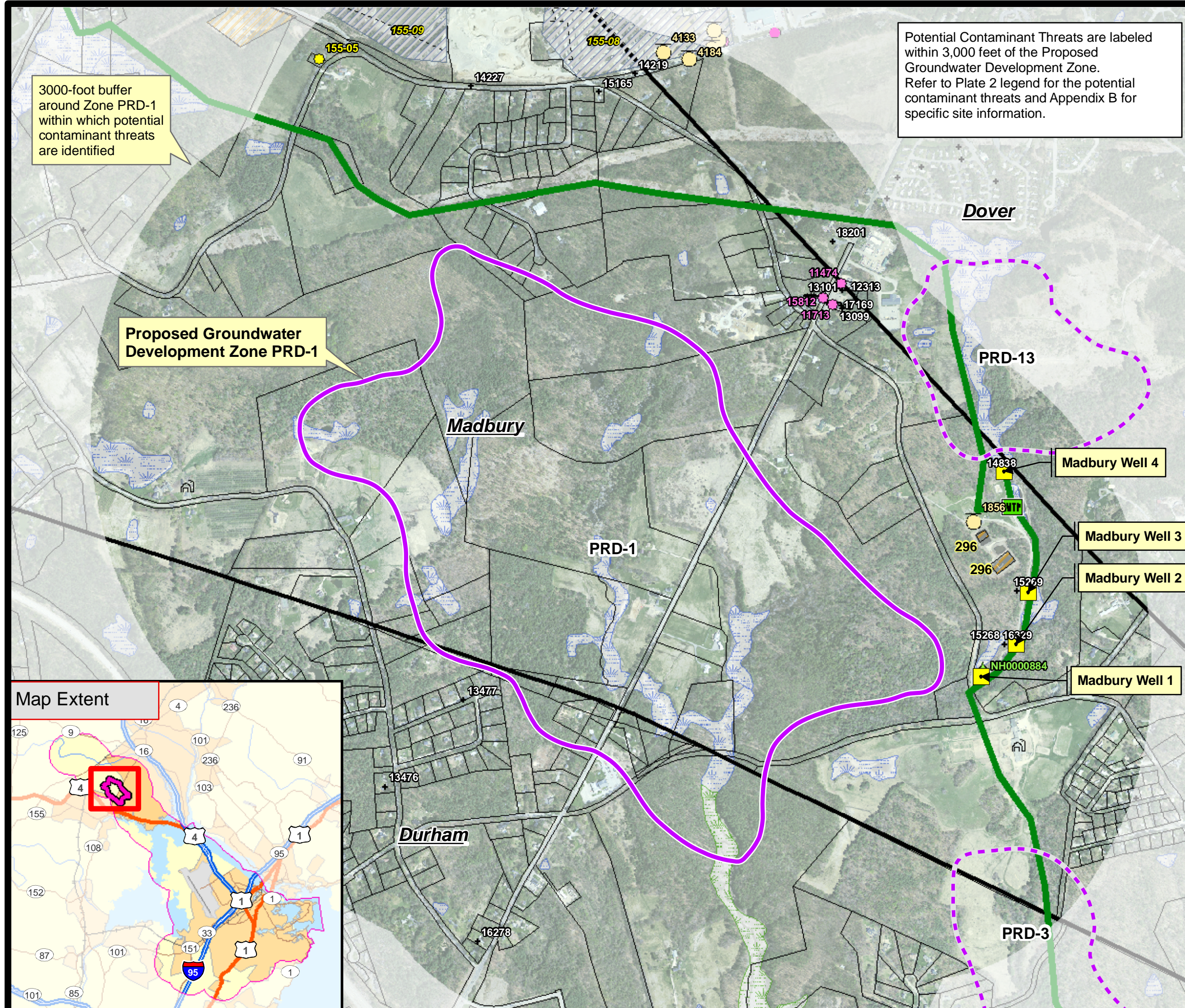


FIGURE PRD-1
Emery & Garrett Groundwater, Inc.

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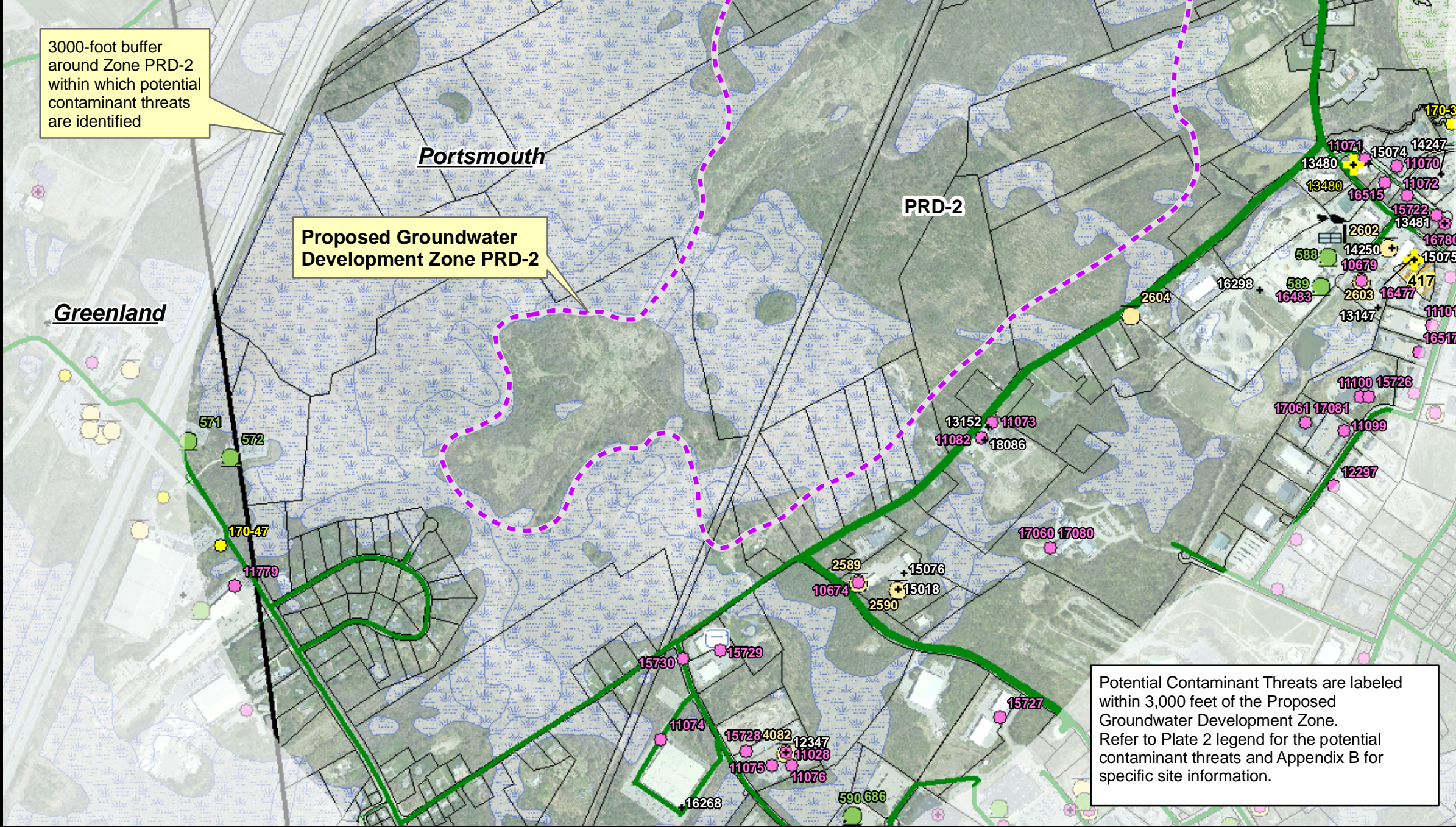
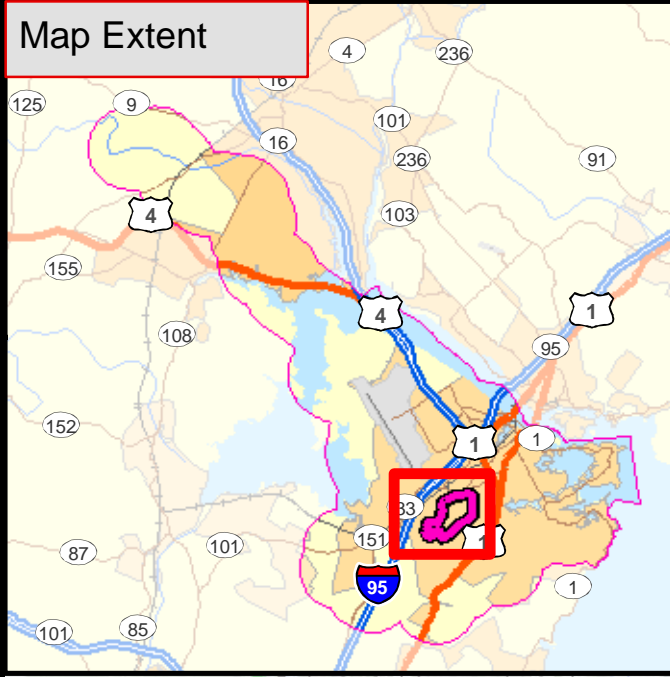


FIGURE PRD-2
 Proposed Groundwater
 Development Zone PRD-2
 Bedrock Aquifer(s)
 City of Portsmouth, New Hampshire
 Groundwater Exploration Program

Proposed Groundwater Development Zones Bedrock Aquifer(s)

Potential Groundwater Quality

- More Favorable
- Less Favorable

Wells Operated by City of Portsmouth

- Portsmouth Groundwater Supply Wells

Portsmouth Water Pipelines

DIAMETER (inches)

- 6 and 8
- 10 to 14
- 16 to 24

Tax Map Parcels

Scale is 1:12,000
 1 inch equals 1,000 feet

FIGURE PRD-2
 Emery & Garrett Groundwater, Inc.

3000-foot buffer around Zone PRD-2 within which potential contaminant threats are identified

Proposed Groundwater Development Zone PRD-2

Potential Contaminant Threats are labeled within 3,000 feet of the Proposed Groundwater Development Zone. Refer to Plate 2 legend for the potential contaminant threats and Appendix B for specific site information.

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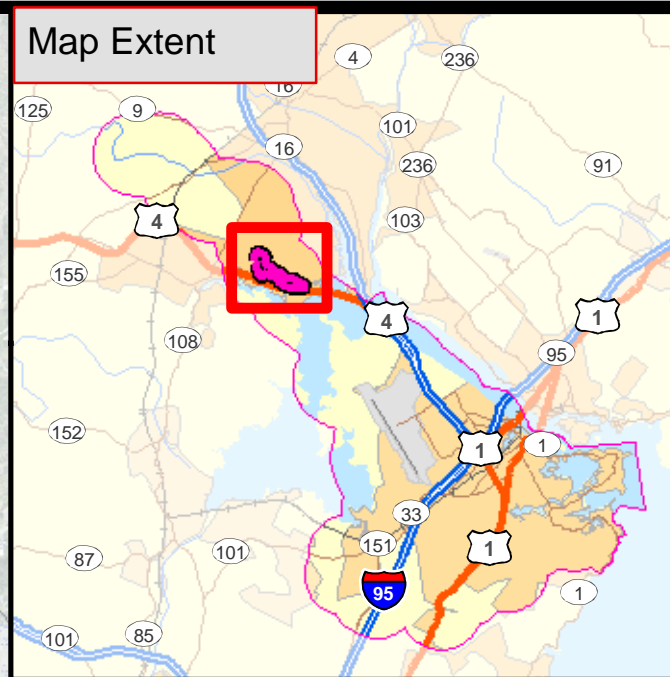
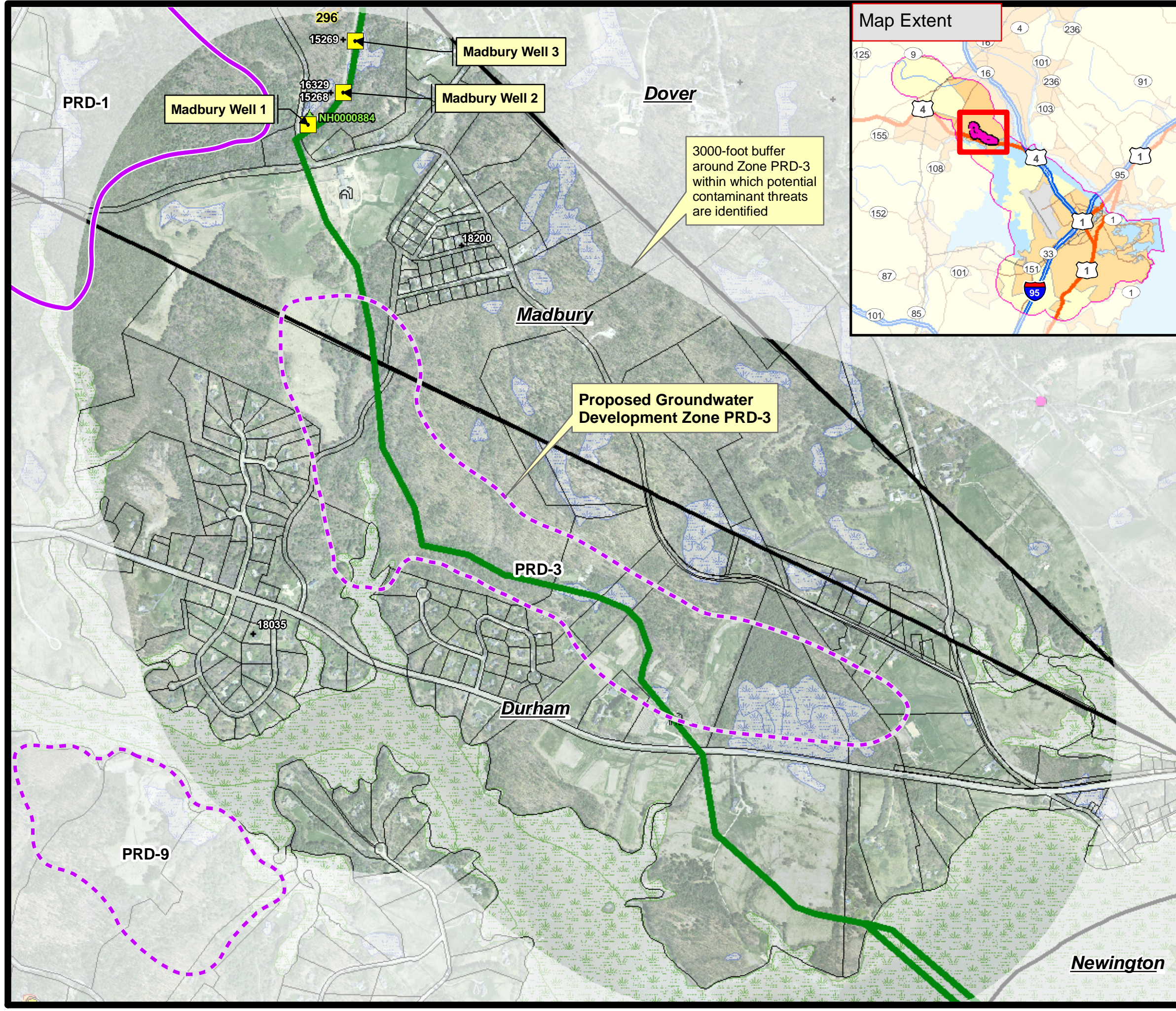


FIGURE PRD-3
 Proposed Groundwater Development Zone PRD-3
 Bedrock Aquifer(s)
 City of Portsmouth, New Hampshire
 Groundwater Exploration Program

Proposed Groundwater Development Zone PRD-3 Bedrock Aquifer(s)

Potential Groundwater Quality

- More Favorable
- Less Favorable

Wells Operated by City of Portsmouth

- Portsmouth Groundwater Supply Wells

Portsmouth Water Pipelines

DIAMETER (inches)

- 6 and 8
- 10 to 14
- 16 to 24

- Tax Map Parcels

Potential Contaminant Threats are labeled within 3,000 feet of the Proposed Groundwater Development Zone. Refer to Plate 2 legend for the potential contaminant threats and Appendix B for specific site information.

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FIGURE PRD-3
 Emery & Garrett Groundwater, Inc.