

PROVINCETOWN'S WASTEWATER SYSTEM IMPLEMENTATION

Using Design-Build-Operate: 20 Years Later

January 2023

ENVIRONMENTAL
 PARTNERS

— An Apex Company —

SPEAKERS



Jim Vincent
DPW DIRECTOR
Provincetown

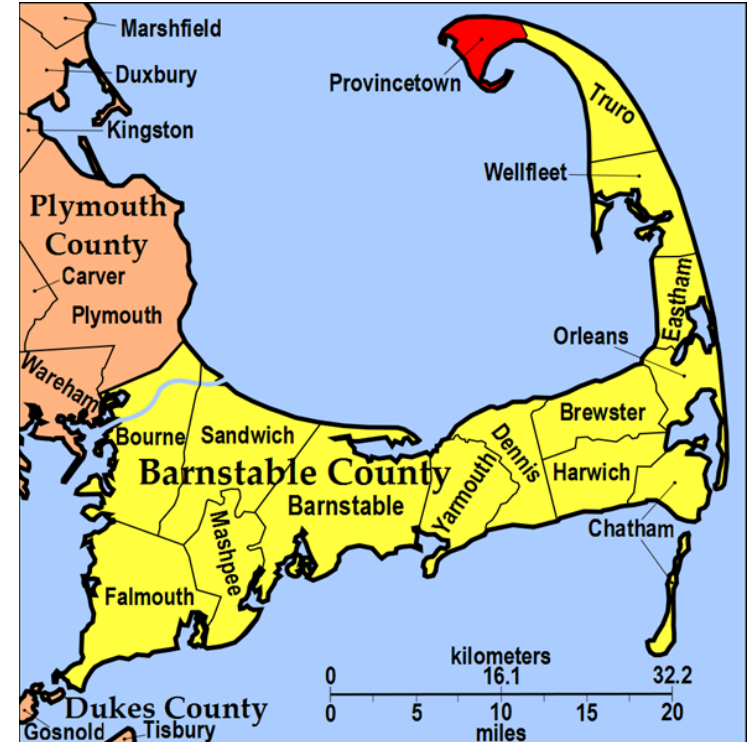


Paul Millett, PE
SENIOR PRINCIPAL
Environmental Partners



TEAM

- AECOM
 - Prime DBO Contractor & “Design”
- Robert B. Our Construction
 - Collection System
- Woodard & Curran
 - O&M
- Environmental Partners
 - OPM/Indep. Review
- John Goodrich
 - DPW Advisor
- Water & Sewer Board



PROVINCETOWN

- Tip of the Cape
- Evolved from Fishing Community to Major Tourist Center
- Known for: Arts; Art Galleries; Theater; Diversity
- Population: Year Round: 3582; 1610 households
- Summer: 40-50-60,000
- Community: Balance Drivers of Tourism/Economic Development/Infrastructure
- Loud Democracy



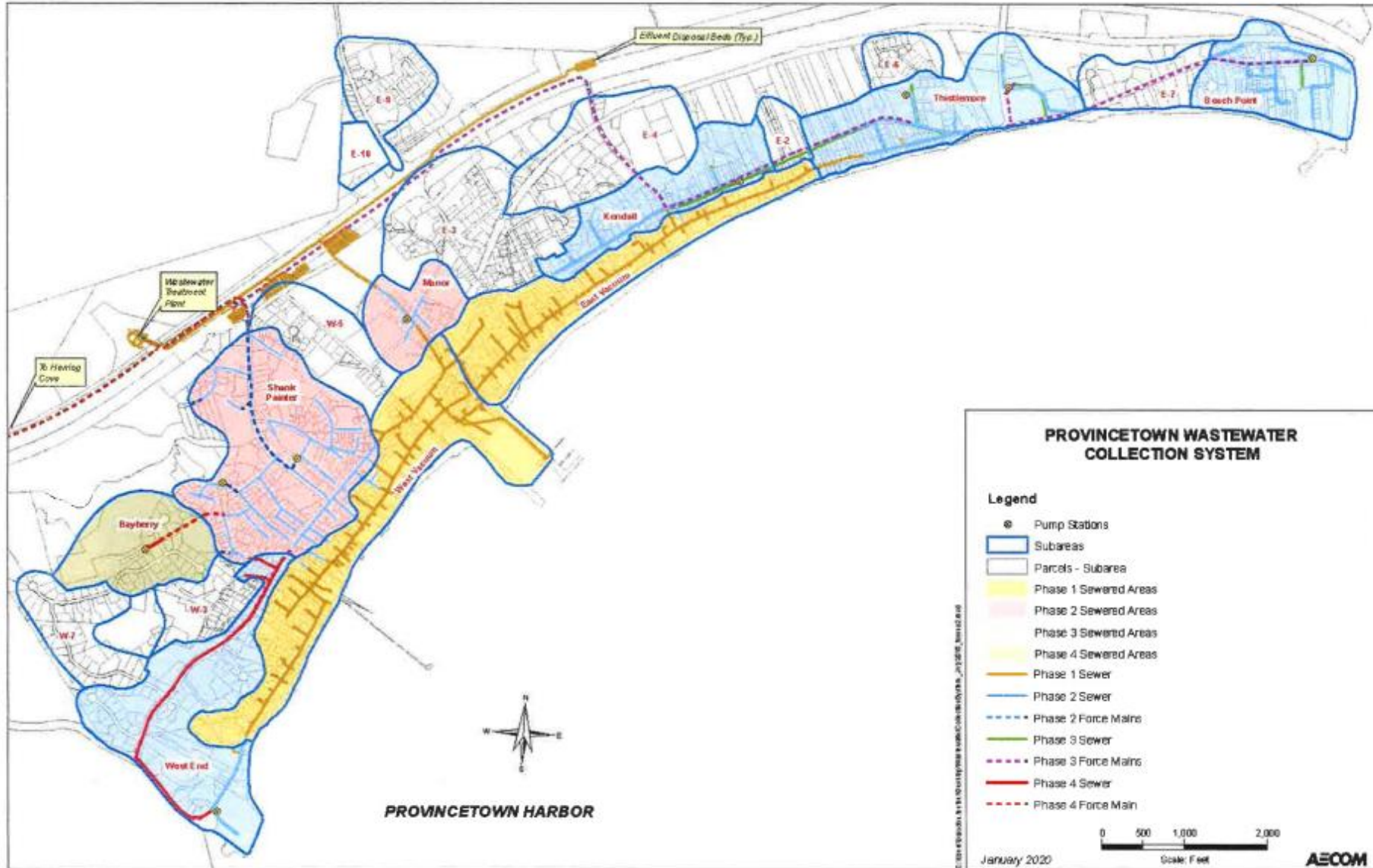
PROVINCETOWN STATISTICS

- Population
 - Year Round: 3470/1610 Households
 - Summer: 40-50-60,000 ...15x-17x swing
- Community
 - Balance Drivers of Tourism/Economic Development/Infrastructure
- 2000 – Strong and Mixed Opinion on Sewer Program
- 2022 – Widespread Acceptance



SEWER MAP

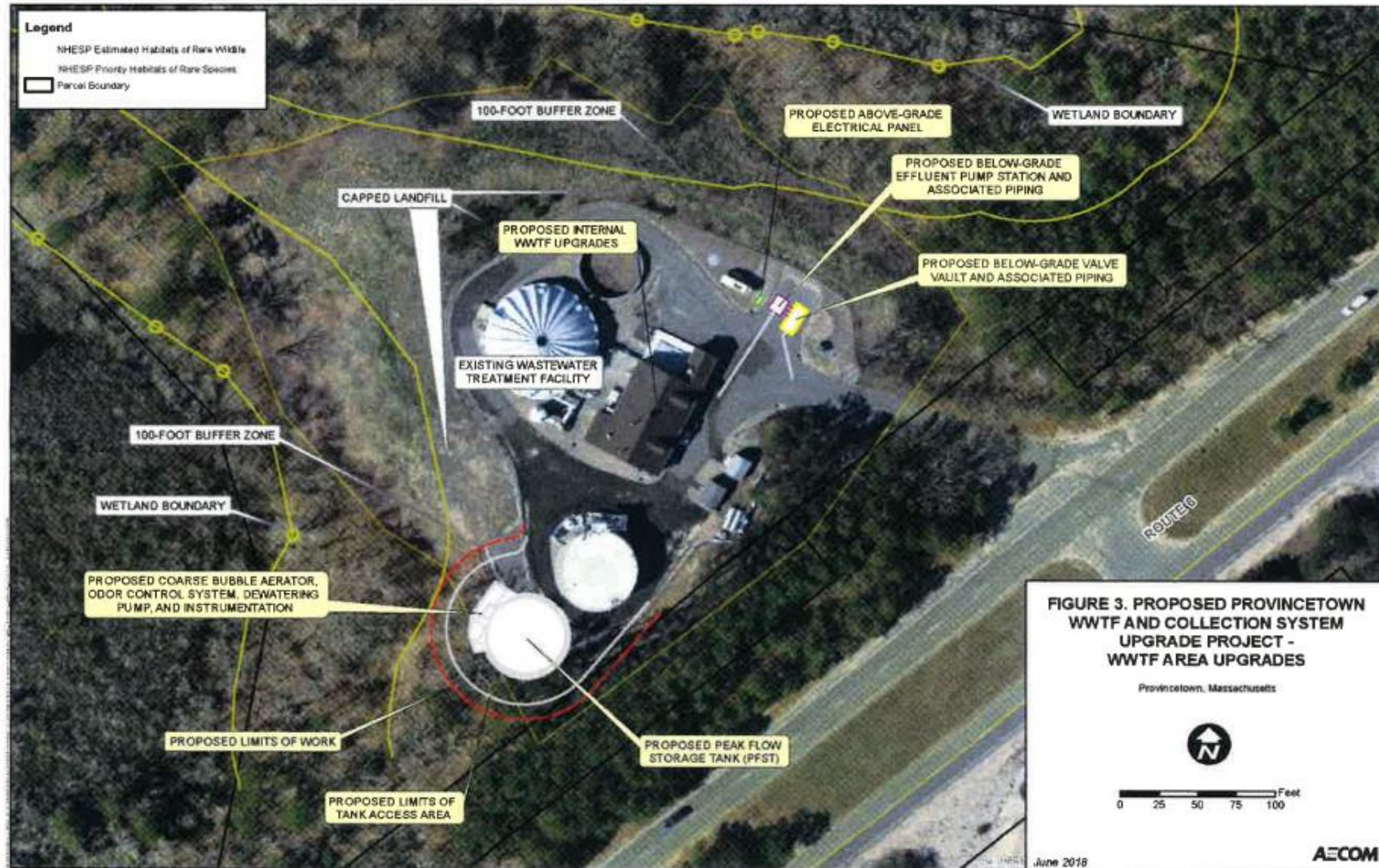
History of the Provincetown Municipal Sewer System



DBO HISTORY

- 1999/2000 Planning; RFQ and RFP
- Traditional and DBO Approach Evaluated
- Initial Scope
 - Collection system “downtown” for 350+ properties; new WWTF and GW disposal beds
- 3 responses
- AECOM Team Selected
- WWTF
 - SBR plant; located on old burn dump site; capped landfill; opposite side of Rt.6
- Collection System
 - Hybrid: Grinder pumps and Vacuum sewers





COLLECTION SYSTEM

- Gravity
- Low Pressure
- Vacuum (~550 properties)
- 11 Pump Stations (2 Grinder stations)
- Overall Reliability: Good; with some intermitted Vacuum system events
- Future Phase: Town – wide coverage
- As of 2022: 1083 users: 588 to be served.



BACKGROUND

- 1947 First Sewer Plan
- 2000 Town Meeting Approval Phase 1
- 2003 Phase 1 Completed
New WWTF; Downtown Collection System
1A: Delay Properties; Pier; Laundromat
- 2008 Phase 2
Shankpainter Area; Seashore Point, Province Landing
- 2013 Phase 3
WWTF - Pre Eq. Tank; West End/Bradford St. East End - Beach Point,
- 2015 Phase 4
West End Extensions; Shankpainter Pond
- 2022 Phase 5
WWTF - Peak flow Storage Tank; CVS upgrades, Connections
- 2023 Phase 6 and 7....

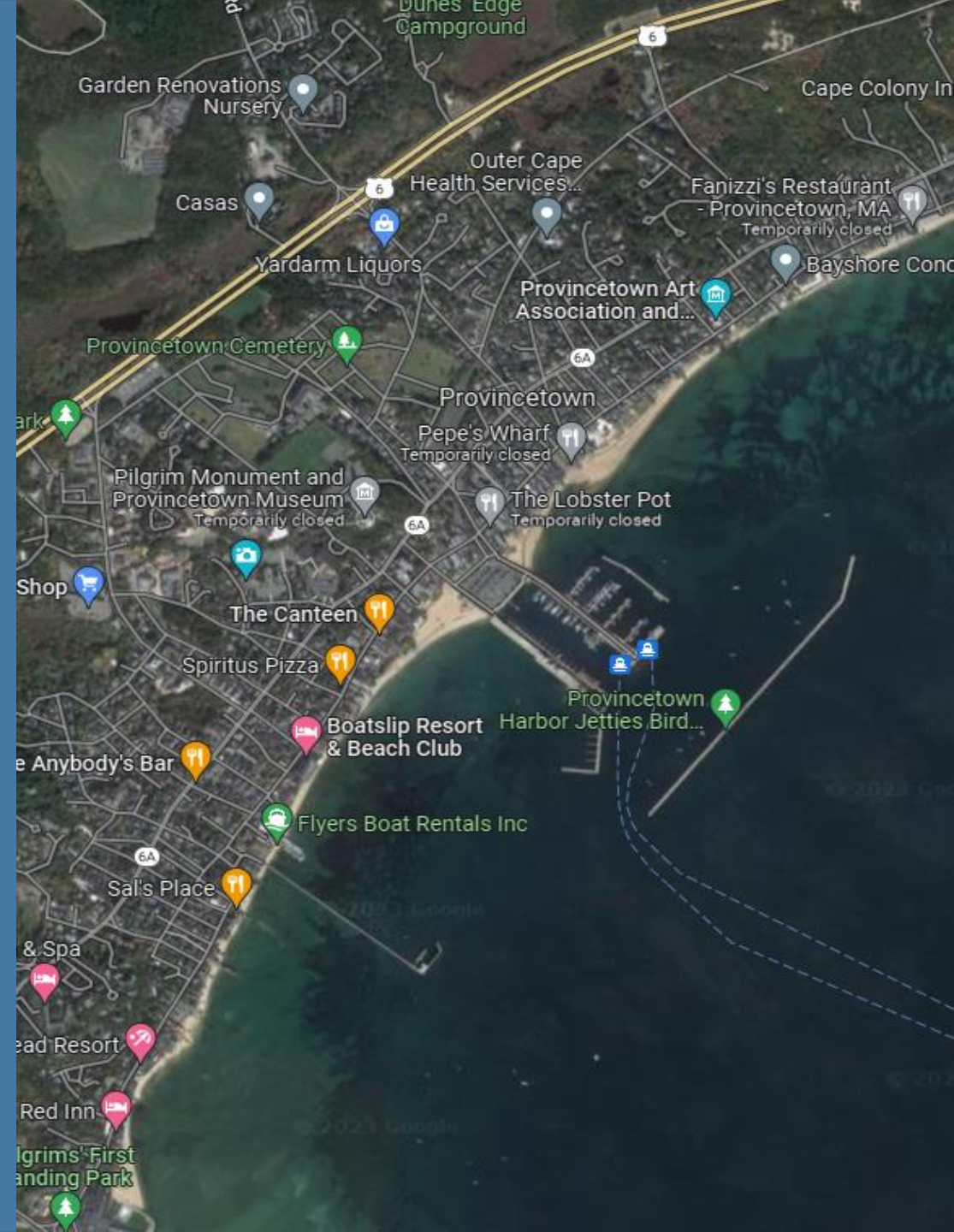


Over \$60M in past 20 years



TOWN FACTORS

- Downtown Area
 - Businesses and Homes that “wanted” to Connect
- Small Lots
 - Space challenges even for I/A system
- Tourist Town
 - Limited construction window
- Voluntary Connections
 - not mandatory to Abutters
- Resulted in “Checkerboard” Approach
 - Maintained as system expanded
- Sensitivity to Community
- Costs: No General Fund/taxpayer funding
- High User rates



CHRONOLOGY

2000 Goal: 350 properties; 500,000 gpd Title 5 Design Flow *No plans to expand!

2001 Town Meeting approval

2002 500 properties in Phase 1; Total = 1,000 properties and over 1 MG Title 5 flow

2003 Phase 1 On-Line *interest to connect grew

———— Evolved: No Growth Plan to a Managed Growth Plan —————

2005-7 Phase 2 Planning. Shank Painter & Manor Area; Added 200 users/150,000 GPD

2008 Financial Review; Rate Reduction: \$18.5 to \$13.85/1000 gal for 10 years

2008-9 Phase 3 Planning – Expand WWTF; Serve West & East End (toward Truro)

2010-13 Actual Construction - USDA grant/loan

- Improve CVS and vac system
- Added 250 properties and 240,000 GPD

2013-14 Phase 4 Campground Area and section of Bradford Street

- + 60 properties; 60,000 GPD



CHRONOLOGY (CONTINUED)

2011-15 WWTF: Additional Capacity

- Increase from 500,000 to 750,000 gpd
- Pre-Eq Tank + Process Improvements
- Amend GW Discharge Permit to 650,000 GPD and later to 750,000 GPD
- Limited remaining capacity
- Flow Correlation: Max flow at plant ~ approx. 60% of Title % flow
- Plant Capacity = 1.12MGD

2015 Policy: "State of Limited Capacity"

- Feb. 2015 Water & Sewer Board Regs.
- 4 Priority Groups:
 - Failed system/Emergencies: 15,000 GPD
 - Affordable Housing: 17,500 GPD
 - Economical Development: 12,500 GPD
 - Municipal Services: 5,000 GPD

2020 January stats

- 1.08 MGD Committed to 1050 properties
- Reserve Available: 13,000 GPD or <1%



CHRONOLOGY (CONTINUED)

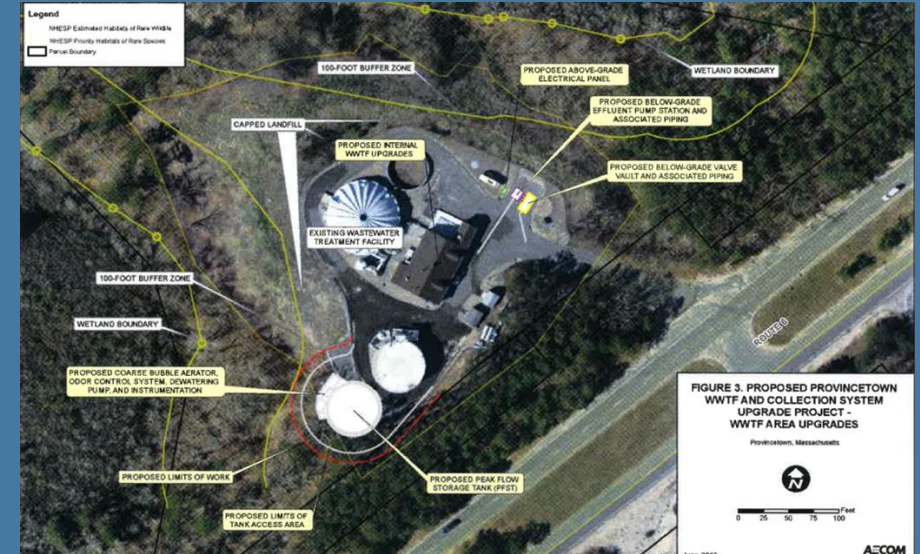
2022 System is at Capacity

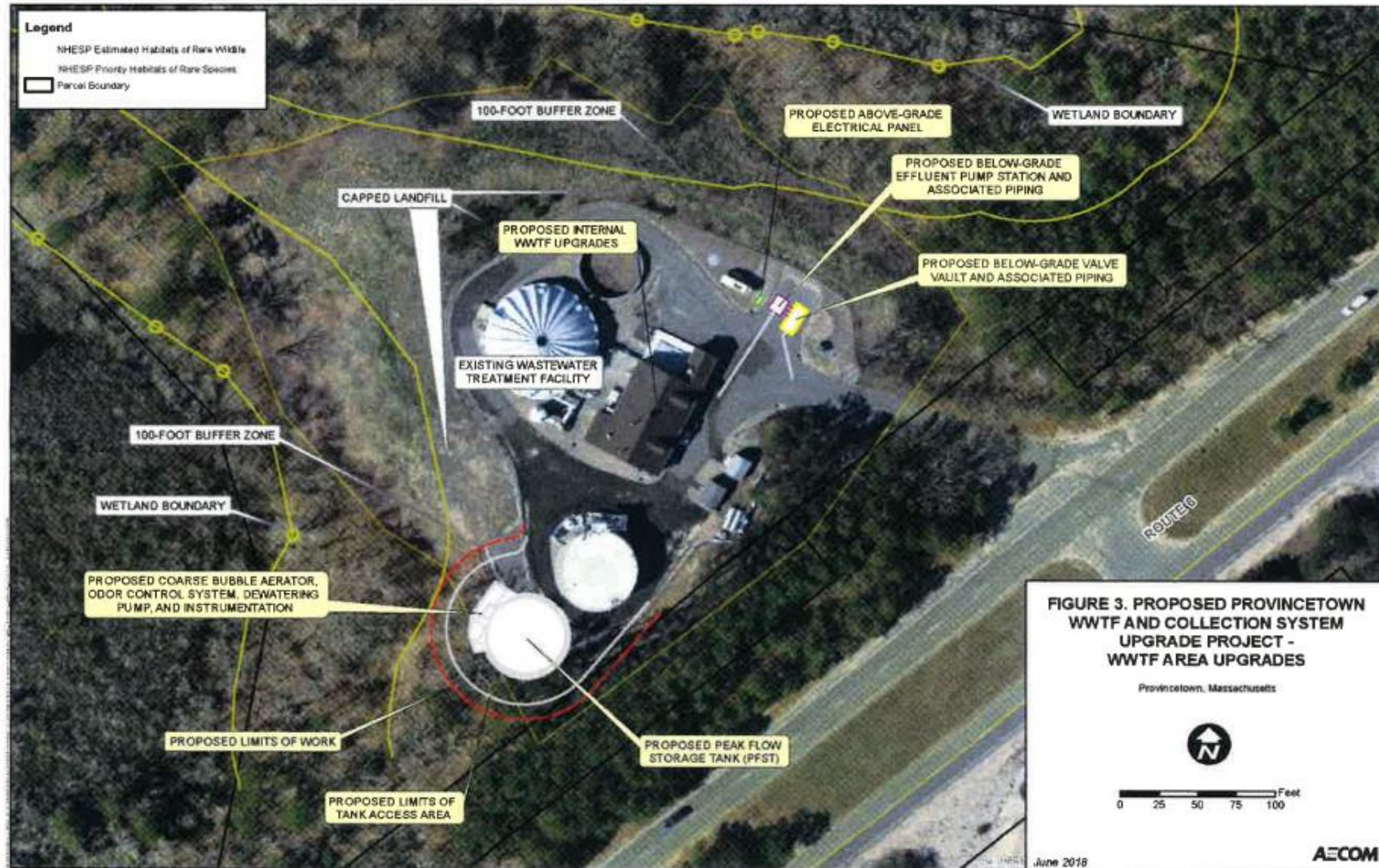
- Drivers in Town
 - Economic Development
 - Affordable Housing
 - Condo Conversions
- Planning for further Expansion
 - Started in 2015
 - Public Outreach - 2018 Presentations
 - Plant Expansion
 - Challenges at Existing Site/Capped Landfill, Topography, Wetlands
 - Interim Improvement: Peak Flow storage, rain events
 - Peak Flow Storage Tank and Other WWTF Improvements (UV, Filters Replacement)
 - \$6.2M



DESIGN ELEMENTS

- WWTF
 - SBR. 0.75 mgd
 - Headworks/SBR/Filters/UV
 - Effluent: GW Disposal Beds.
- Collection System
 - LP Sewer
 - Vacuum System: 1 Central station; Pump to WWTF
 - 350 Properties+-
 - Construction: Seasonal; Narrow streets; Limited traffic detours; Dewatering





VARIABLES

- Great location on the right day!
- Major Swings in Population and Weather
 - Summer: 40,000 - 60,000 people/tourists in Town vs. Winter: 1500-2,000
 - Vulnerable to Street and Property Flooding
- Community: Active; Vocal; Loud democracy
- Balance
 - Environmental Needs
 - Economic Development
 - Managed Growth
 - Affordability



COSTS

- General: Costs are high; limited user base;
- Grants/loans have been key.
- Betterments
 - Phase 1: \$33.68/GPD; and delay with collections
 - Phase 2: \$44.84;
 - Phase 3 and 4: \$45.00 since 2007
- Jan 2019...\$55.
 - Pay over 20 years: Rate: 2.25-2.87% blended rate
- Sewer Rate:
 - Off Peak: \$13.85/1000 gal
 - Peak: (April-Oct): \$16.14/1000 gal



DBO PROCESS

- One stop shopping!
- Simplified Procurement Process for Future Work
 - Allowed Phase 2-5 to be implemented over 18 years
- Team Continuity – System Knowledge
- Continuous Improvement
- Effectively done with USDA and SRF funding
- Quick Decision Making/Progress Maintained
- Faster Response to O&M issues



COLLECTION SYSTEM

- Gravity
- Low Pressure
- Vacuum (~550 properties)
- 11 Pump Stations (2 Grinder stations)
- Overall Reliability: Good; with some intermitted Vacuum system events
- Future Phase: Town – wide coverage
- As of 2022: 1083 users: 588 to be served.



CONSTRUCTION 2002-2003 VAC SYSTEM CONSTRUCTION

- Commercial and Bradford Street; Pier
- CVS station



CONSTRUCTION 2011 PUMP STATIONS



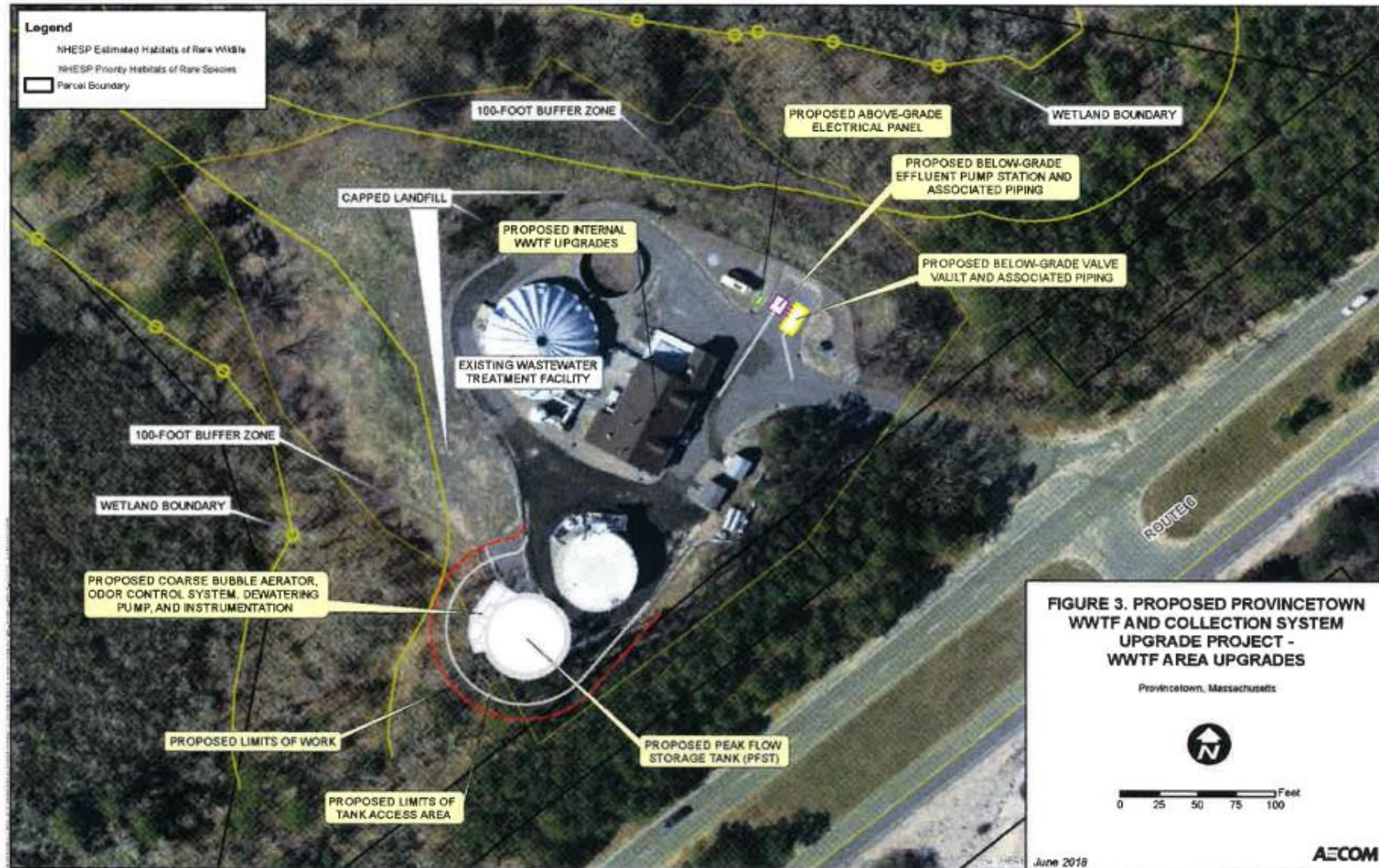
CONSTRUCTION 2011-12 GRAVITY SEWER

- Dewatering/narrow streets



CONSTRUCTION 2020 PEAK FLOW STORAGE TANK





DBO BENEFIT

- Faster Implementation in 2001 and up to 2022
- One-stop shopping...sole source responsibility
- Team Continuity: Dedicated personnel for 20 years
- Reliable Team Partners throughout
- Swift Response to any O&M issues



SEWER EMERGENCY 2022



OBSERVATIONS

20 YEARS LATER - DID IT WORK?

- Adaptive Management
- Users have grown by 300%. Flow by 200%.
- The Core Team is still intact
 - Survived/outlasted 5 Town Managers/3 DPW Directors/Numerous Boards
- Despite all the challenges (Community/Political/Econ Dev)
- 2022: The people have spoken – Oct TM- Town wide Sewer approved
 - Phase 6 planning
- See you in 2040 with the next update!



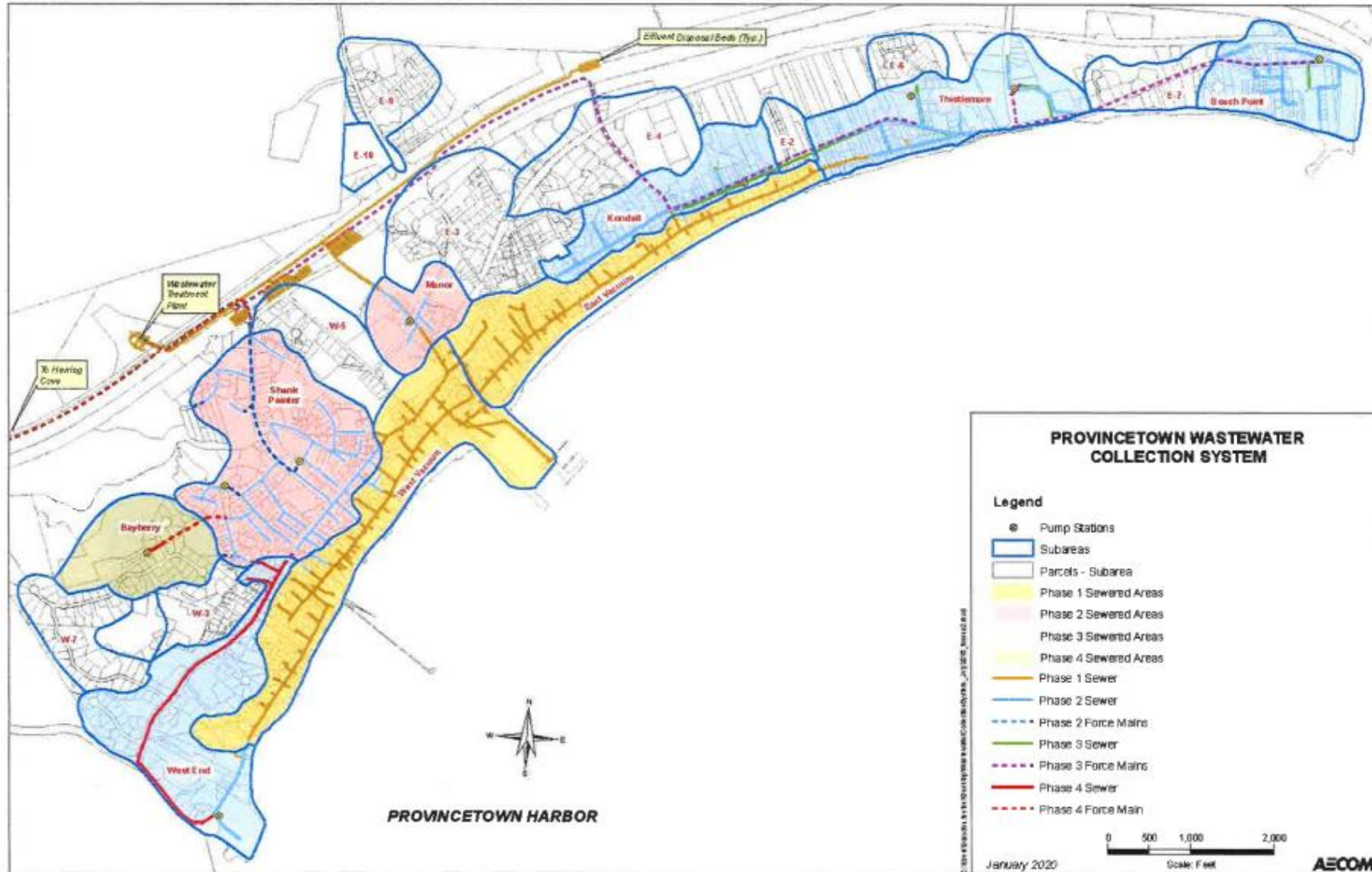
TEAM RECOGNITION

- Town and DPW: Alex Morse, Town Manager & Jim Vincent, Sherry Prada
- Former DPW Directors: David Guertin, Richard Waldo
- AECOM: Rob Adams
- Robert B. Our Construction
- Woodard & Curran
- Environmental Partners: Mark White, Wes Stinson
- DPW Advisor: John Goodrich
- Water & Sewer Board
- DEP and USDA



FUTURE SEWER MAP 2022

History of the Provincetown Municipal Sewer System



Q&A

THANK YOU

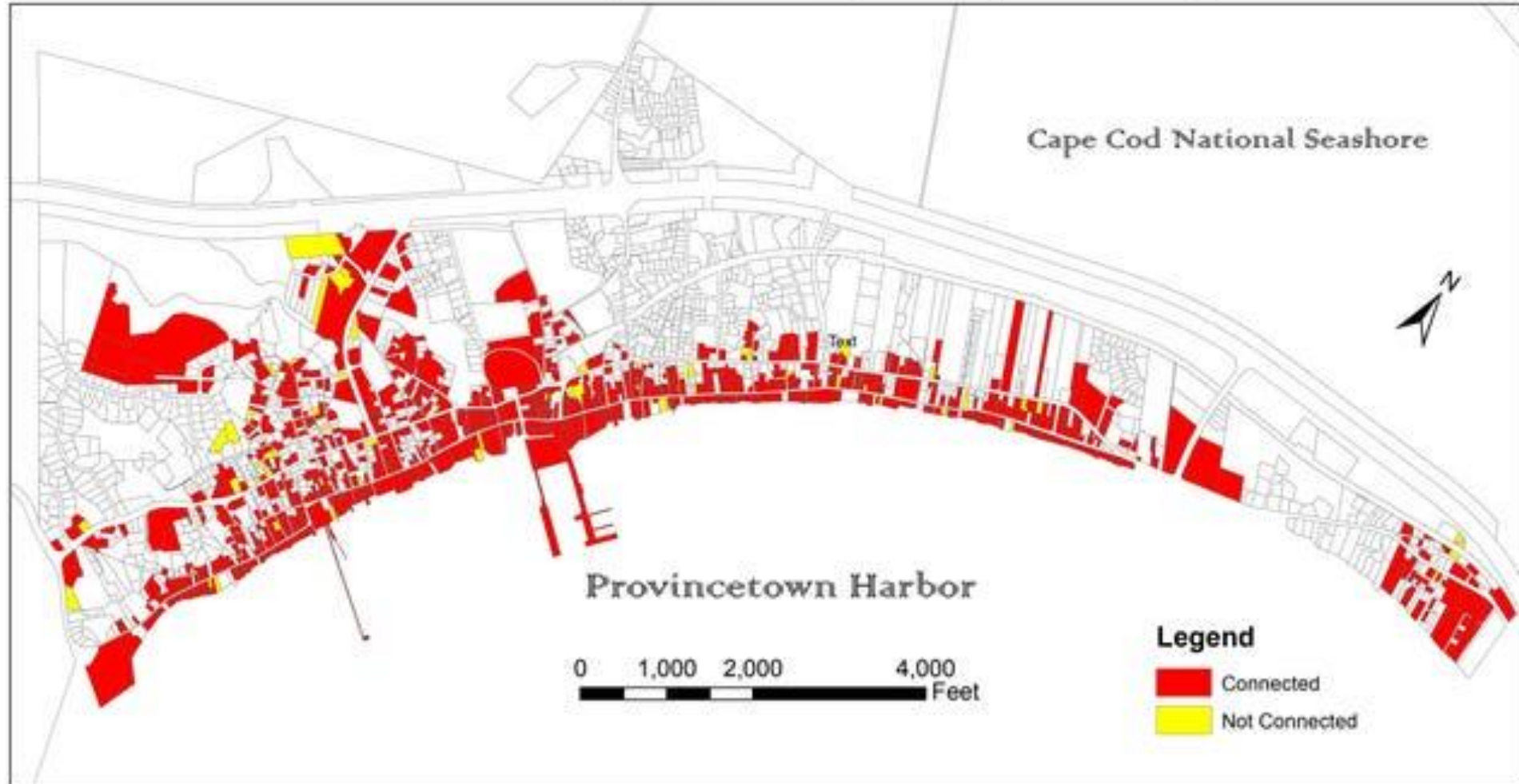
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CONNECTED PROPERTIES 2022

Plan of Provincetown, MA, Showing Municipal Sewer System

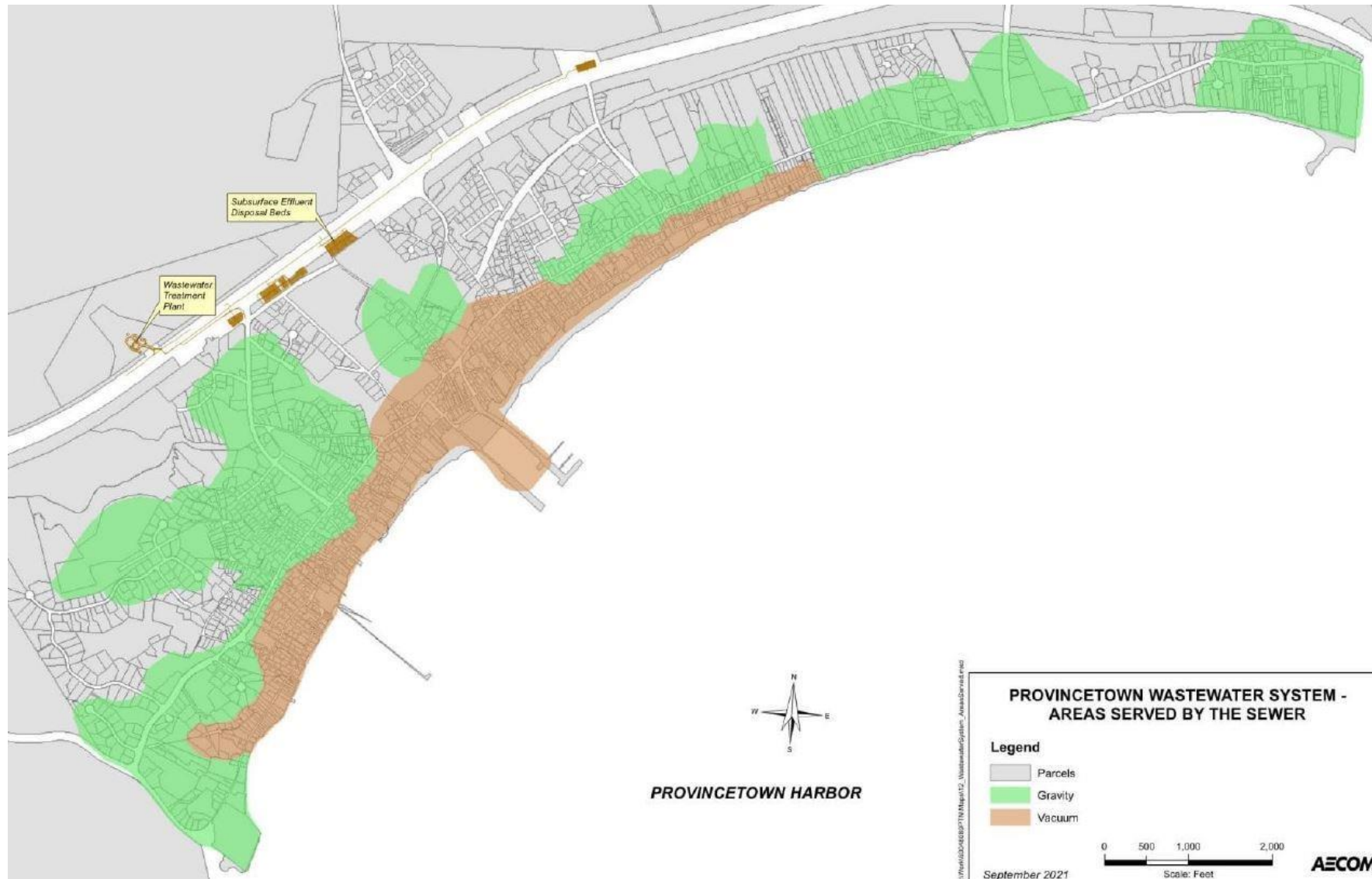


Updated: December 1, 2020

Provincetown Department of Public Works
Richard J. Waldo, P.E., Director



SEWER MAP 2022



PROVINCETOWN WASTEWATER SYSTEM - AREAS SERVED BY THE SEWER

Legend

- Parcels
- Gravity
- Vacuum

0 500 1,000 2,000
Scale: Feet

September 2021

AECOM

