2.0 NATURAL RESOURCES

2.1 Vision

TO BE DEVELOPED

2.2 Introduction

Natural resources are the city's environmental and ecological assets; the land, water, plants, and animals that sustain and enhance the community. Planning for natural resources includes planning for protection, preservation, restoration, and improvement of different types of resources. It also requires balancing natural resource preservation with development practices and human activities. Natural resources and a beautiful environment help to support a healthy and prosperous community. When natural resources are degraded, it threatens the safety and well-being of the city, as well as the economy, its visitors, and its neighbors.

Cranston's lands and waters support a variety of public benefits, recreational and economic activities, and many important species and habitats. This chapter describes the extent and condition of the city's natural resources, as well as the issues and opportunities associated with them. It ultimately articulates goals and actions for their protection and improvement that align with the city's broader vision for its future.

2.3 Existing Conditions

Surface Water

Surface waters, or bodies of water above ground, cover approximately 356 acres (1.9% of the City) within the City. Surface water includes streams, rivers, lakes, wetlands, reservoirs, and creeks. Surface water is critical to both human health and ecosystem health, as most organisms rely on surface waters for drinking water and habitat.

Cranston's drinking water comes from three suppliers: the Providence Water Supply Board, the Warwick Water Department, and the Kent County Water Authority. Most drinking water comes from the Providence Water Supply Board, which comes from the Scituate Reservoir, which is fed by five smaller tributary reservoirs: Barden, Moswansicut, Ponaganset, Regulating, and Westconnaug (Providence Water). Chapter X, *Water Supply*, provides further details on the City's water systems and supply.

The City is located within five watersheds: The Woonasquatucket River Watershed, The Pawtuxet River Watershed, the North Branch Pawtuxet River Watershed, the Scituate Reservoir Watershed, and the Pocassett River Watershed. See Figure 2-1, Surface Water and Watershed Map, for the watershed boundaries and location of surface water bodies. The Woonasquatucket River Watershed and the Scituate Reservoir Watershed cover only small portions of the City.

Surface waters found within Cranston include:

- Dyer Pond
- Randall Pond
- Cranston Print Works Pond
- Tongue Pond
- Spectacle Pond
- Fenner Pond

- Bellfont Pond
- Ralph's Pond
- J.L. Curran Reservoir
- Blackamore Pond
- Meshanticut State Park
- Clarke Brook
- Lippitt Brook
- Furnace Hill Brook
- Meshanticut Brook
- Pawtuxet River
- Pocasset River

The quality of the state's freshwater supplies has been classified by RIDEM. See Figure 2-2 Water Quality Map for the locations of each water body classified by RIDEM. Table 2-2 lists the classifications and impairments for each major waterbody in the City.

When classifying a water body, RIDEM evaluates the potential of that water body to serve seven designated uses (RIDEM 2021) :

- Fish and Wildlife Habitat
- Drinking Water Supply
- Shellfish Consumption
- Shellfish Controlled Relay and Depuration
- Fish Consumption
- Primary Contact Recreation
- Secondary Contact Recreation

The highest quality surface waters in the City (of those that have been evaluated by RIDEM) are:

1. Furnace Hill Brook
2. Randall Pond
3. Several unnamed brooks

The waters listed above are designated category 2, meaning that some, but not all of the designated uses are supported.

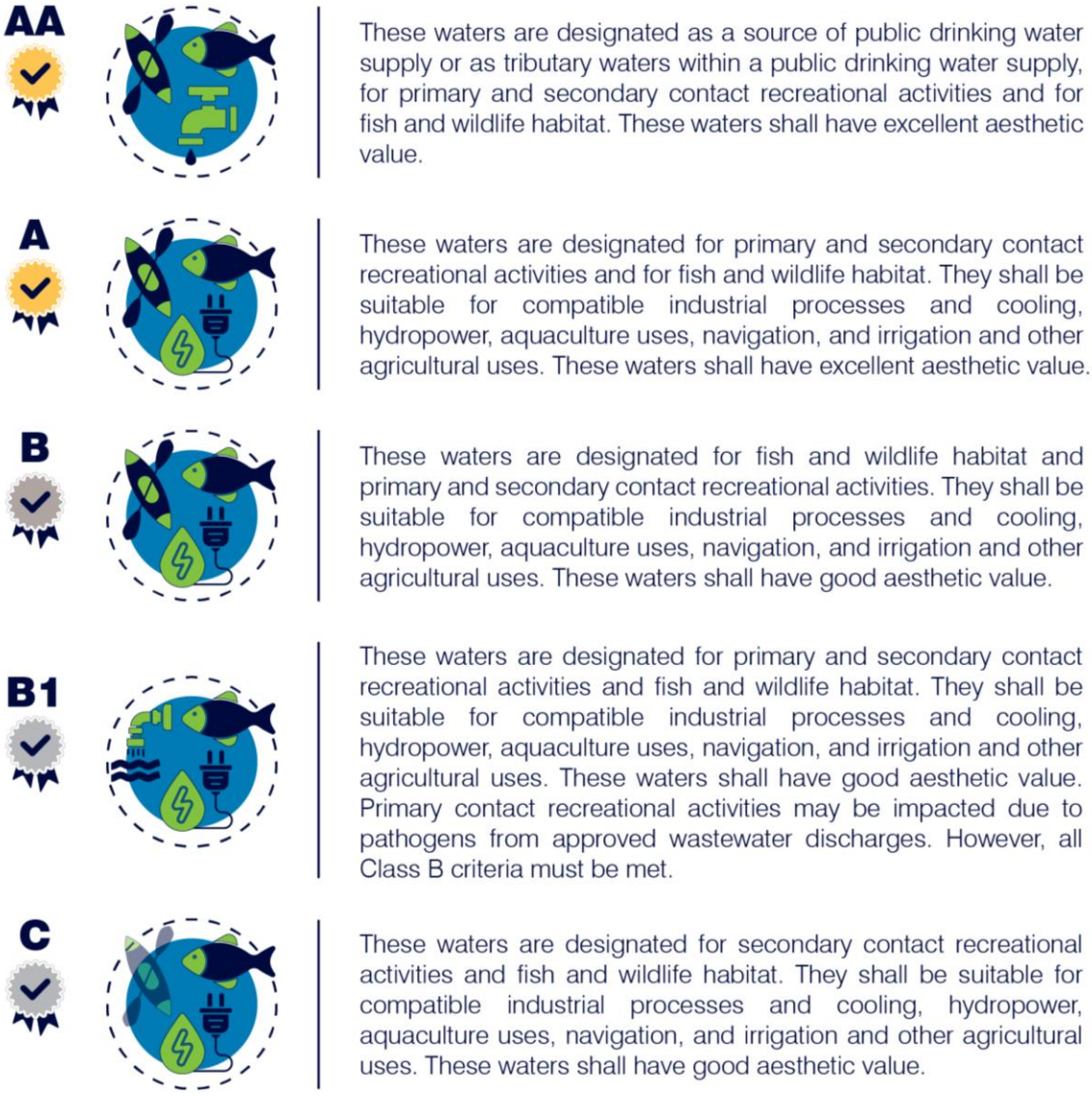
The category representing highest impairment is category 5, which indicates that at least one designated use is not being supported or is threatened, and a TMDL is needed. A TMDL assessment describes impairments and identifies measures needed to restore water quality. It is required by the Clean Water Act for all waters in this category. The category 5 water bodies and their impairments are listed in Table 2-1.

Table 2-2. Water Quality Classification

Water Body	Impairment
Blackamore Pont	Total phosphorus
Fenner Pond	Total phosphorus
Pawtuxet River	Lead Mercury in fish tissue

Table 2-2. Water Quality Classification	
Water Body	**Impairment**
Pocasset River	Benthic macroinvertebrates Chloride Copper Non-native aquatic plants Enterococcus
Print Works Pond	Chloride Lead Total suspended solids Fecal coliform

Impairments can occur for a variety of reasons. Impairments commonly come from stormwater runoff that contains pollutants. The most common pollutants coming from stormwater sources include sediment, pathogens, nutrients, and metals such as copper or lead (EPA). Stormwater runoff increases as impervious cover increases. Other impairments can include biodiversity impairments such as invasive species, nutrient impairments most commonly from phosphorus and nitrogen, pathogen impairments such as *Enterococcus* or *fecal coliform*, mercury impairments, or total toxics and unknown toxicity impairments (RIDEM 2021).



Source: RIDEM, Water Quality Regulations, 2009.

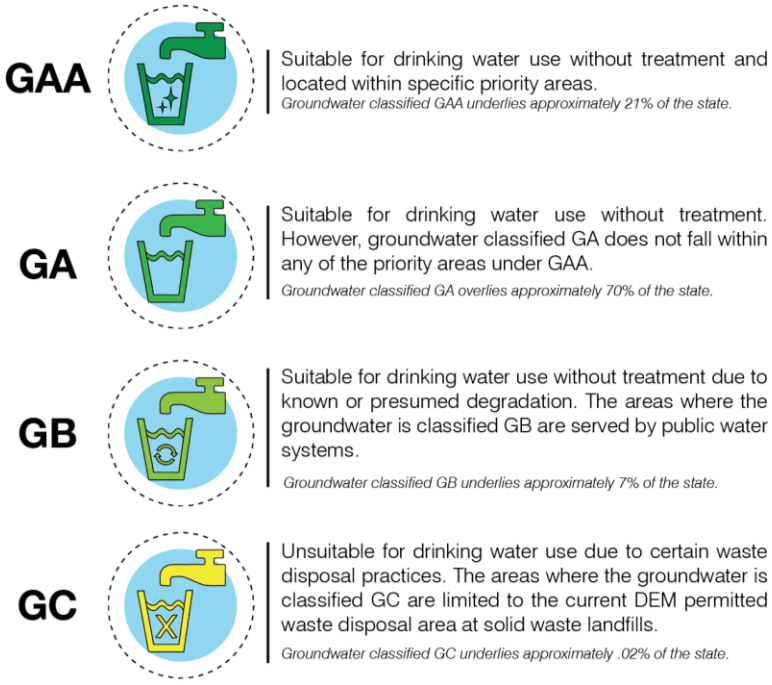
Table 2-2. Water Quality Classification

Waterbody	Classification	Impairment
Blackamore Pond	B	5
Clarke Brooke	B	3
Cranston Print Works Pond	B	5
Dyer Pond	B	3
Fenner Pond	B	5
Furnace Hill Brook	B	2
J.L. Curran Reservoir	B	4A

Table 2-2. Water Quality Classification		
Lippitt Brook	B	3
Meshanticut Brook	B	4A
Meshanticut State Park	B	3
Pawtuxet River	B1	5
Pocasset River	B	5
Randall Pond	B	2
Spectacle Pond	B	4A
Tongue Pond	B	3

Groundwater

The Rhode Island Department of Environmental Management identifies and maps the state's groundwater reservoirs and groundwater reservoir recharge areas. See Figure 2-3 for the location of groundwater reservoirs and recharge areas. RIDEM classifies the state's groundwater as GAA, GA, GB, or GC, as defined below. The City of Cranston does not contain any groundwater recharge areas. It does contain two groundwater reservoirs, both classified as GB, not suitable for drinking water use without treatment. The City of Cranston has no sole source aquifers and does not rely on groundwater for its water supply.



Fortunately, the City of Cranston does not have any Superfund Sites within its boundaries. Superfund Sites are areas that have been contaminated by hazardous waste or pollutants that were improperly managed or disposed of (US EPA). These sites include manufacturing facilities, processing plants,

landfills, or mining sites. Pollutants or hazardous waste that was disposed of improperly often ends up in waterways or seeping into the groundwater table. The Environmental Protection Agency aims to clean up these sites, hold the responsible parties accountable, and return the Superfund Sites to productive uses (US EPA). There are 13 Superfund Sites in Rhode Island (US EPA).

Soils

Cranston has a variety of soils that vary in their physical and chemical properties. Soils are classified in the NRCS National Engineering Handbook based on their infiltration rates and runoff potentials, as seen in Figure 2-4 (University of Rhode Island, 2016).

Group	Description
A	• Contains soils having a high infiltration rate when thoroughly wet and therefore have a low runoff potential.
B	• Has moderate infiltration a low runoff potential.
C	• Has slow infiltration and higher runoff potential.
D	• Lists soils having a very slow infiltration rate and thus the highest runoff

Soils with slower infiltration rates (Groups C and D) attenuate pollutants better than those with rapid infiltration rates. These groups comprise about 44% of the City's soils. However, soils in Groups C and D also have the highest runoff potential and may contribute more to stormwater runoff in areas where impervious surfaces are prevalent. Soils in Groups A and B have high infiltration rates and therefore contribute less to stormwater runoff because they are superior at percolation and absorption. These soils comprise about 49% of the soils in the City. The remaining 7% of soils were not classified. Table 2-3 and Figure 2-5 Soil Hydrologic Group Table and Map provide additional information on the extent of the soil hydrological groups found in Cranston.

Table 2-3. Hydrologic Group

Group	Acres	Percentage of Town
D	6,322	34%
A	5,750	31%
B	3,257	18%
C	1,768	10%

Soil Constraints

Soil constraints, shown in Table 2-4, are grouped by category. The Soil Constraints Map, Figure 2-6, depicts areas throughout the City where existing soil on specific sites would present a constraint to development. Approximately 50% of the City has moderate constraints to development due to soils, and over 1,127 acres (6%) within the City has constraints to development due to slopes of over 15% or bedrock. The seasonal high-water table covers a significant portion of the town. It occurs within a variety of developed areas, agricultural areas, and forested areas of the City. This seasonal high-water table could have a significant impact on development and agriculture.

Table 2-4. Soil Constraints		
Category	**Acres**	**Percentage of Town**
Moderate constraints to development	9,253	50%
Constraints due to seasonal high water table (19" to 42" depth)	4,723	26%
Hydric soils- severe constraints (0" to 18" water table)	2,789	15%
Bedrock and/or slope constraints (>15% slope)	1,127	6%
All other severe constraints (rock, sand, etc.)	261	1%

Agricultural soils

Approximately 4,241 acres, or 23%, of Cranston are in the prime farmland soil unit. In addition to the soils identified as prime farmland, the National Cooperative Soil Survey (NCSS) has designated 1,298 acres or 7% of Cranston's farmland as farmland of statewide importance. Chapter X, Agriculture, details information on prime farmland and soils of statewide importance, agriculturally valuable undeveloped soils, and active and protected farmlands.

Geology

According to RIDEM and Rhode Island Geographic Information System (RIGIS), most of the surficial geology of Cranston is characterized as till and outwash plain soil. Figure 2-7 Surficial Geology Map depicts the parts of the City characterized as till and outwash.

Floodplains

A floodplain is defined as any land area that is susceptible to being inundated by floodwaters from any source. The Federal Emergency Management Agency (FEMA) designates the floodplain into three main zones: AE, VE, and X. Zones AE and VE are within the Special Flood Hazard Area (SFHA). The SFHA is defined as the area that will be inundated by the flood having a 1% chance of being equaled or exceeded in any given year (FEMA). These areas have a higher risk of flooding. VE zones have a higher risk than AE zones. X zones have a more moderate risk and are outside the SFHA. Most of the City is located outside the SFHA in an X zone, as shown in Table 2-5. Less than 7% of the City is located in an AE or VE zone. Figure 2-8 shows the FEMA designated flood hazard areas in Cranston.

Table 2-5. Flood Zones		
Zone	**Acres**	**Percentage of Town**
AE	1,198	6.5%
VE	48	0.2%
X	17,267	93.3%

Most of Cranston is prone to riverine flooding, especially the far east portion of Cranston which is located directly on the banks of the Providence River. Riverine flooding poses a risk to major highways such as Interstate 295 and Route 37, as well as to residences and businesses. Eastern Cranston is more densely developed than Western Cranston and contains a majority of the city's economic development. Riverine flooding could have major impacts both to the City's built environment and the City's economy. Major flooding events can disrupt daily life, paralyze transportation systems, and close or damage businesses.

Habitat

The City consists of deciduous woodlands, ruderal forests, fresh water, and forested wetlands, all of which provide habitat for a variety of terrestrial and aquatic plants and animals.

The Rhode Island Natural Heritage Program indicates that Cranston contains 1,026 acres of natural heritage areas (5.5% of the City), or important habitat areas for rare species and natural communities (RIGIS). Figure 2-9 Ecological Communities and Habitat Areas shows the locations of these natural heritage areas. The program collects data to help identify and protect plan and animal species but does not provide details about protected species locations in public data sets.

The Rhode Island Ecological Community Classification (RIECC) was created in 2011 to support the development of a detailed ecological community map and database for the state (Enser 2011). The most common ecological community, other than developed land, in Cranston is Plantation and Ruderal Forest. Table 2-6 and Figure 2-9 provide information on ecological communities in Cranston.

Table 2-6. Ecological Communities

Description	Acres	Percentage of Town
Plantation and Ruderal Forest	2,427	13.1%
Open Uplands (Grassland and Shrubland)	666	3.6%
Open Mineral Soil Wetlands	138	0.75%
Mixed Deciduous/Coniferous Forests	35	0.19%
Fresh Water	351	1.9%
Forested Wetlands (Mineral and Peat Soils)	947	5.1%
Estuarine Intertidal	4	<0.1%
Deciduous Woodlands and Forests	1879	10.1%
Agricultural	728	3.9%
Developed Land	11,338	61.2%

Rhode Island has almost 112,000 acres of freshwater wetlands, covering approximately 16% of state surface area (RIEMC). Wetlands account for a small percentage of Cranston's land area (about 5.95%), but they provide a variety of community benefits. Cranston contains three types of wetlands: open mineral soil wetlands, forested wetlands, and estuarine intertidal wetlands. First and foremost, they provide essential fish and wildlife habitat and promote biodiversity. Wetlands are notoriously productive ecosystems. Their high capacity to hold water is beneficial in that they can soak up rainwater that might otherwise cause flooding (RIEMC). Water held in wetlands can seep into the ground and recharge streams and groundwater aquifers (RIEMC). Wetland vegetation filters out pollutants from the water as it flows through the wetland, resulting in improved water quality. Wetlands also support activities such as fishing, nature walks, photography, and bird watching. Wetlands are disappearing across the coastal United States

due to development, coastal erosion, major storms, and sea level rise, making wetland conservation a task of the utmost importance. The remaining wetlands in the City should be conserved for their habitat, stormwater recharge and filtration, and recreational benefits.

Existing conservation lands in the City of Cranston cover 1,735 acres and are represented in green in Figure 2-10. There are approximately 1,088 acres (5.9% of City) preserved by the State of Rhode Island within the City. There are two state parks located within Cranston: Meshanticut State Park and John L. Curran State Park. Meshanticut Lake is a 12-acre lake that allows for activities such as paddling or canoeing. The John L. Curran Management Area is 332 acres and largely forested with deciduous hardwood trees, oaks, maples, and beeches. It has two ponds as well as agricultural land for public gardening.

There are an additional 647 acres that have been preserved either by the City or by a non-governmental organization, such as the Audubon Society of Rhode Island. Most of the conserved areas are concentrated in the western portion of the City of Cranston. In the more developed eastern portion of the City, conservation areas are concentrated around rivers and smaller bodies of water. These undeveloped lands are valued and part of economic, recreational, and cultural activities.

Cranston has a robust parks and recreation department that maintains outdoor facilities for citizens to enjoy. Facilities include trails, a botanical center, parks, playgrounds, and sports fields. These facilities allow for hiking, biking, walking, and many other outdoor activities. Such activities are socially and culturally important in Cranston. More information about these areas can be found in the Open Space and Recreation chapter.

2.4 Issues and Opportunities

2.4.1 Issues

- Wetland Protection/Conservation
- Conserve the open and green space in Western Cranston
- Limit development in Western Cranston
- Consider flood mitigation strategies to protect Eastern Cranston from riverine flooding
- Limit development in the floodplain
- Seasonal high groundwater table covers a large portion of Cranston and should be considered when reviewing proposed development
- Protect rivers from contamination
- Work to improve water quality in impaired waters
- More intense and frequent storms from climate change may exacerbate riverine or flash flooding
- Invasive species in the Pocasset River

Opportunities

- ~~Work with local land trusts~~Develop a Municipal Land Trust to continue to conserve open and green space in Western Cranston
- Consider joining FEMA's Community Rating System to improve floodplain management efforts
- Continue work with the Pawtuxet River Authority
- Work with the Parks and Recreation Advisory to conserve greenspace
- Coordinate efforts to protect natural resources with mitigation actions in the Hazard Mitigation Plan

2.5 Current Measures/Practices

Existing Regulations

- Strong subdivision Regulations promote smart growth and protection of natural resources
- City of Cranston Adopt-a-Spot program
- Tree/vegetation planting requirements in the Development Plan Review
- Special Flood Hazard Districts ordinance- complies with NFIP regulations
- Issuance of SFHA permits
- Open space zoning district
- Industrial Performance Commission reviews proposed industrial development

Existing Policy

- Encourage native vegetation and landscaping

2.6 Community Engagement

Public Meetings/Workshops/Events

Survey

2.7 Goals and Policies

References

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Figure 2-1 Surface Water and Watersheds

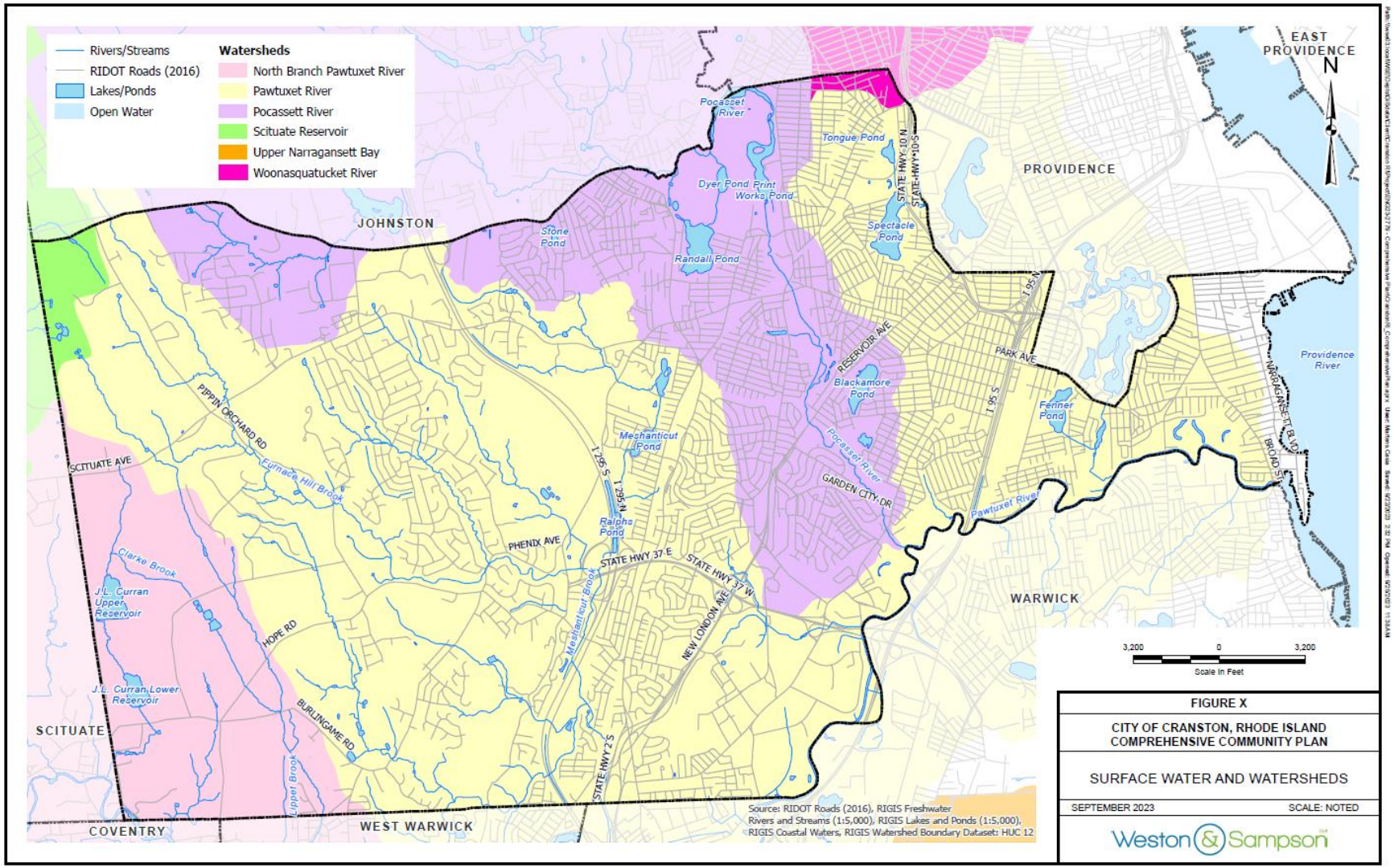

Figure 2-2 Water Quality

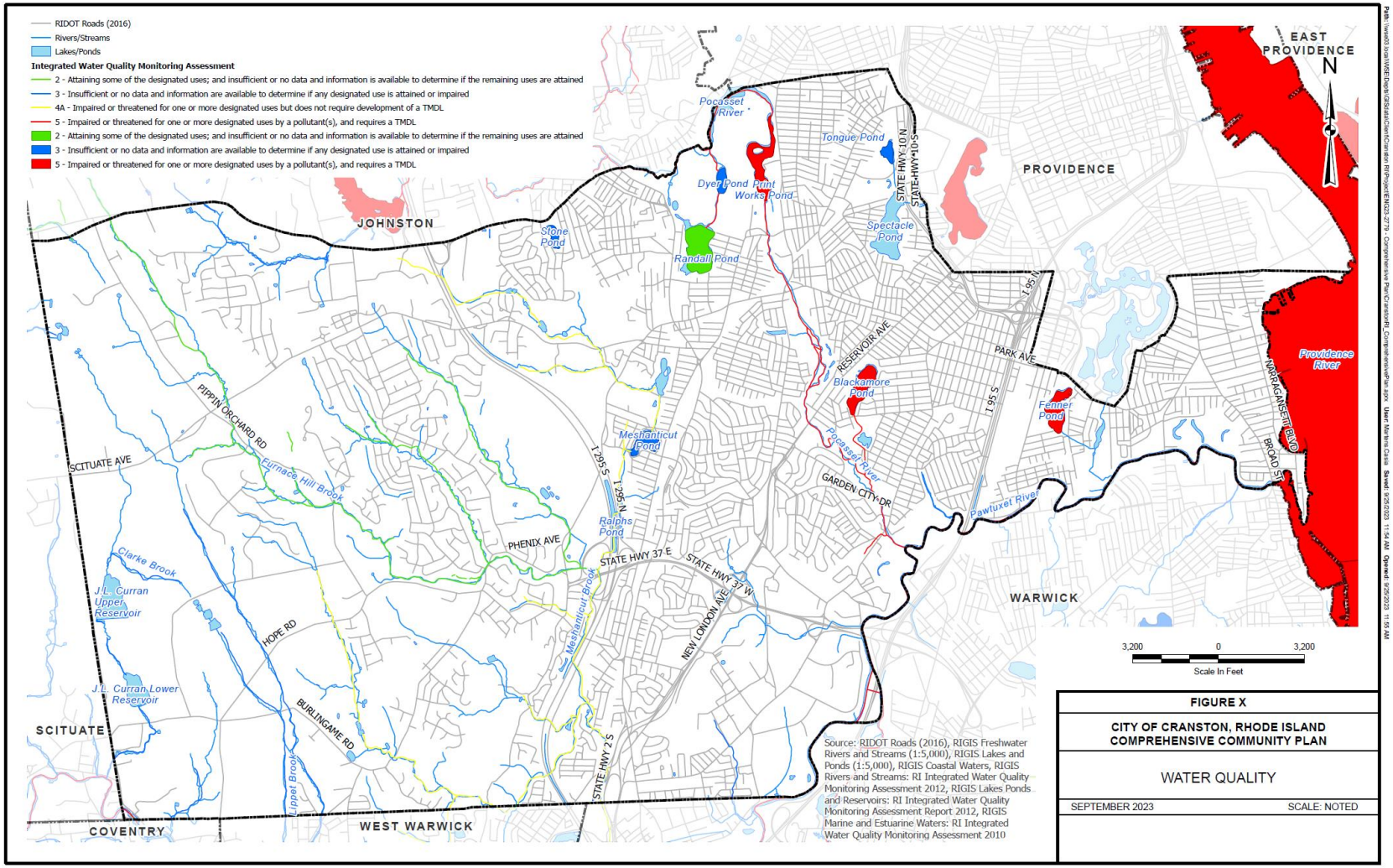

Figure 2-3 Groundwater Supply and Protection

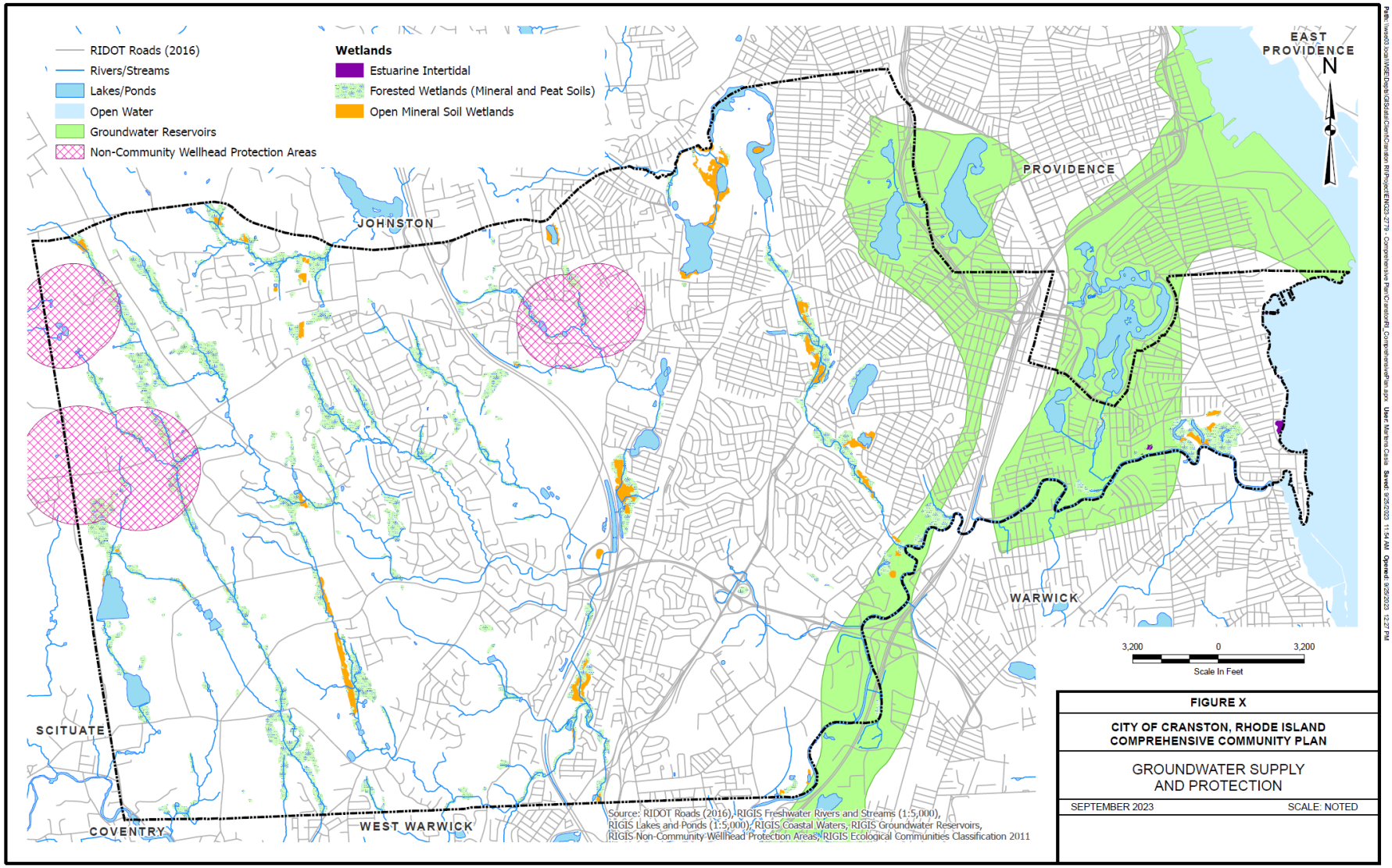
RIDOT Roads (2016)
Rivers/Streams
Lakes/Ponds
Open Water
Groundwater Reservoirs
Non-Community Wellhead Protection Areas
Wetlands
Estuarine Intertidal
Forested Wetlands (Mineral and Peat Soils)
Open Mineral Soil Wetlands
EAST PROVIDENCE
N
PROVIDENCE
JOHNSTON
WARWICK
SCITUATE
COVENTRY
WEST WARWICK
3,200
0
3,200
Scale In Feet
Source: RIDOT Roads (2016), RIGIS Freshwater Rivers and Streams (1:5,000), RIGIS Lakes and Ponds (1:5,000), RIGIS Coastal Waters, RIGIS Groundwater Reservoirs, RIGIS Non-Community Wellhead Protection Areas, RIGIS Ecological Communities Classification 2011
FIGURE X
CITY OF CRANSTON, RHODE ISLAND
COMPREHENSIVE COMMUNITY PLAN
GROUNDWATER SUPPLY
AND PROTECTION
SEPTEMBER 2023
SCALE: NOTED

Figure 2-5 Soil Hydrologic Groups

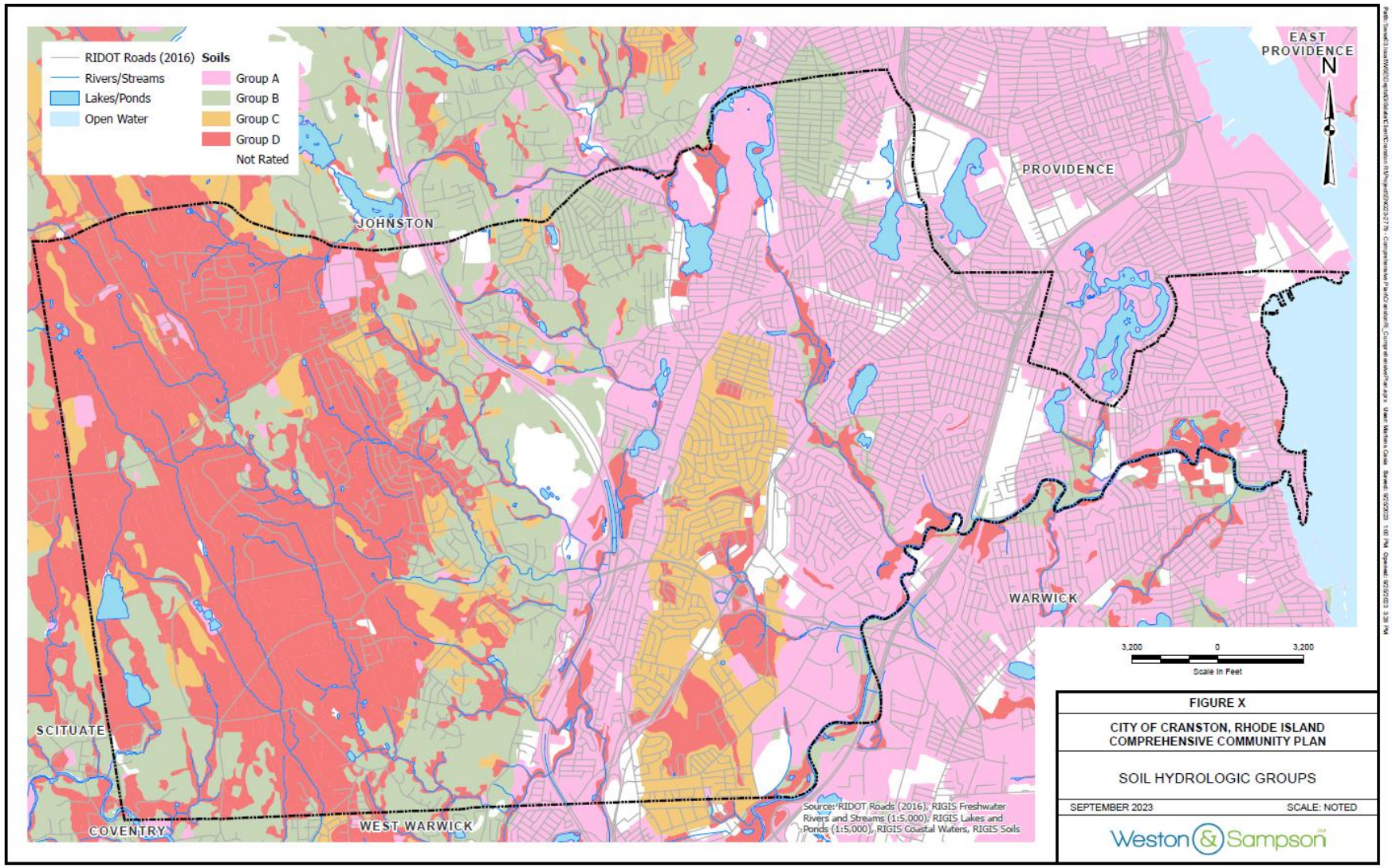

Figure 2-6 Soil Constraints

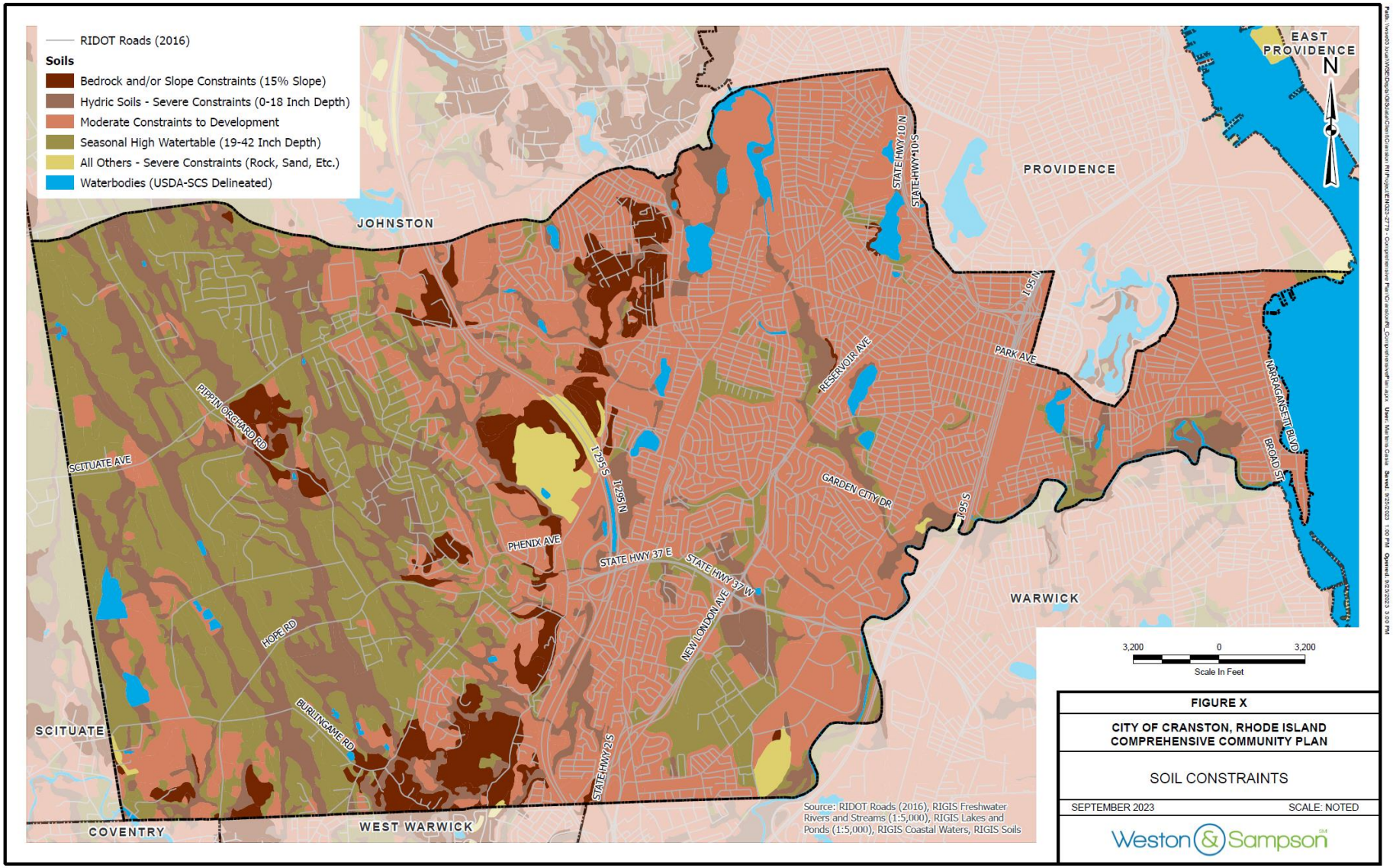

Figure 2-7 Surficial Geology

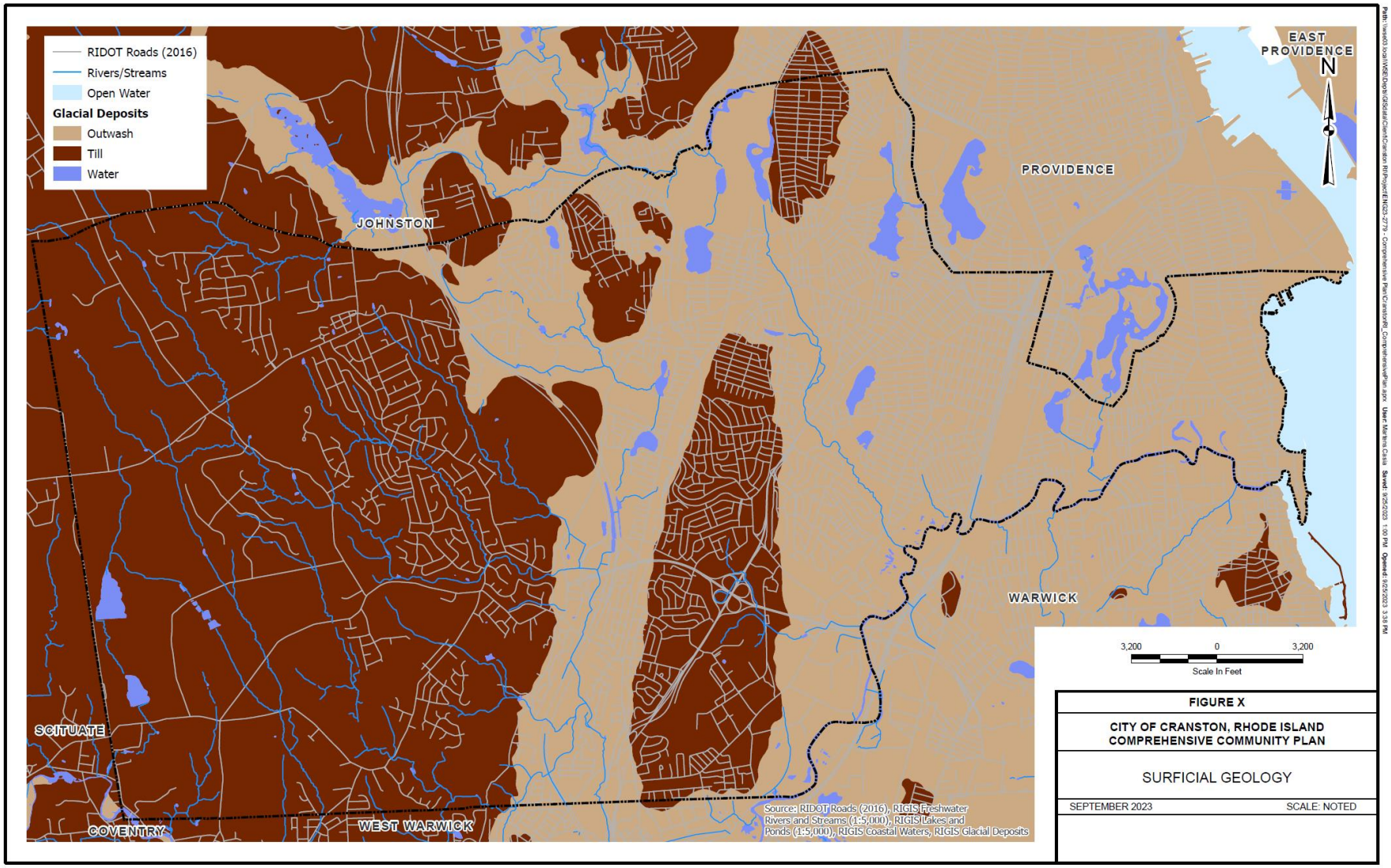

Figure 2-8 Flood Hazard Areas

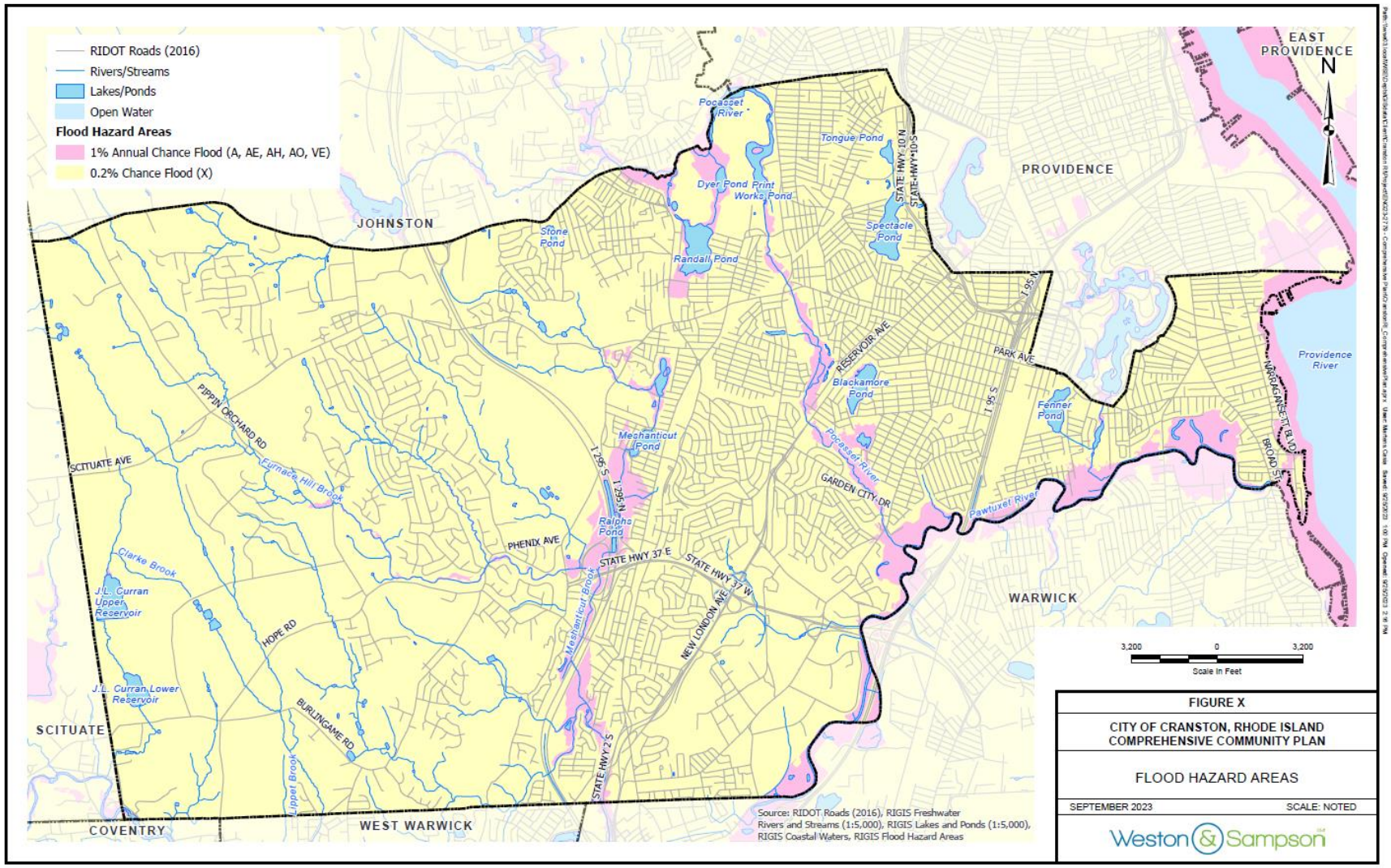

Figure 2-9 Ecological Communities and Habitat Areas

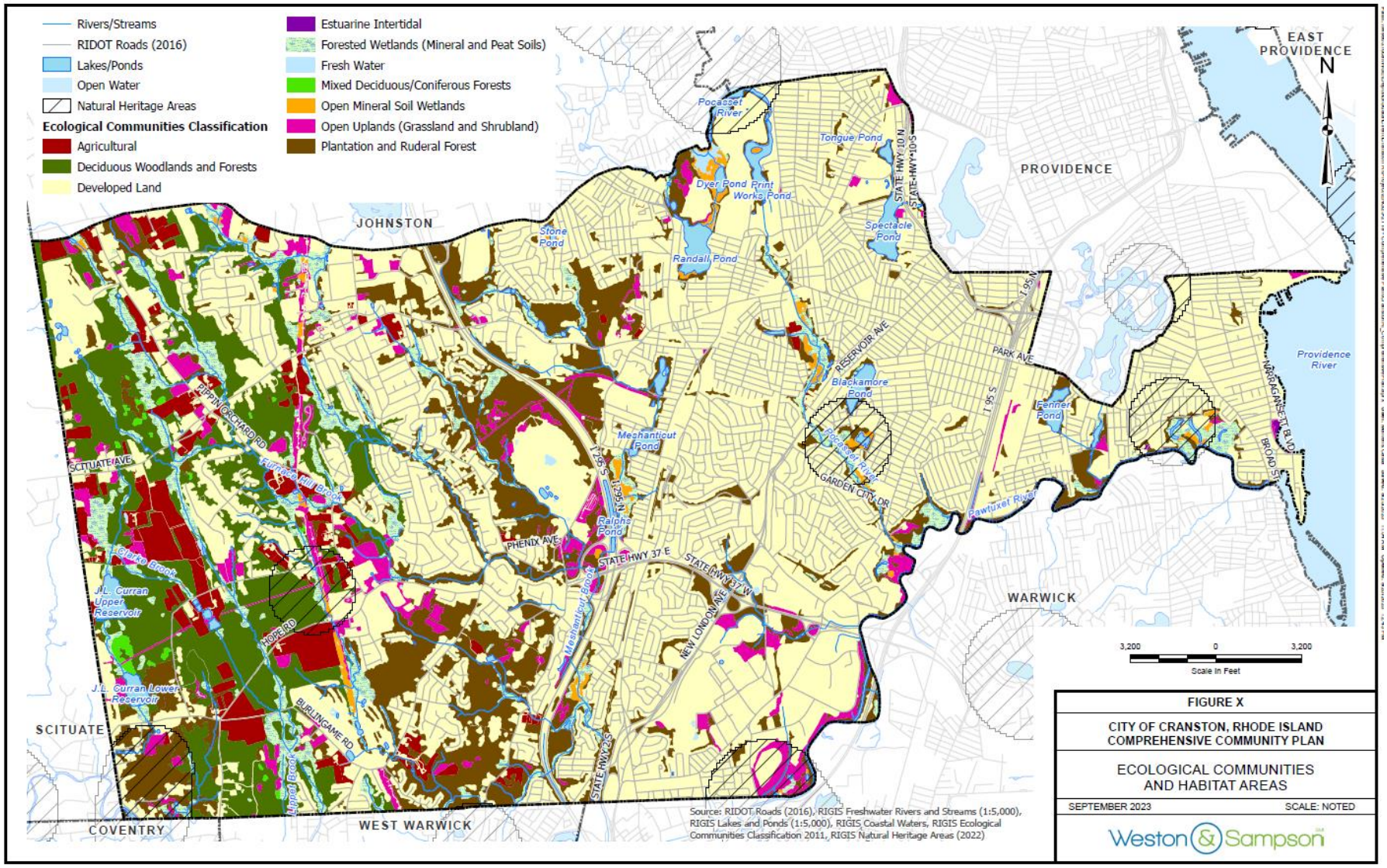

Figure 2-10 Outdoor Recreational and Conservation Areas Map