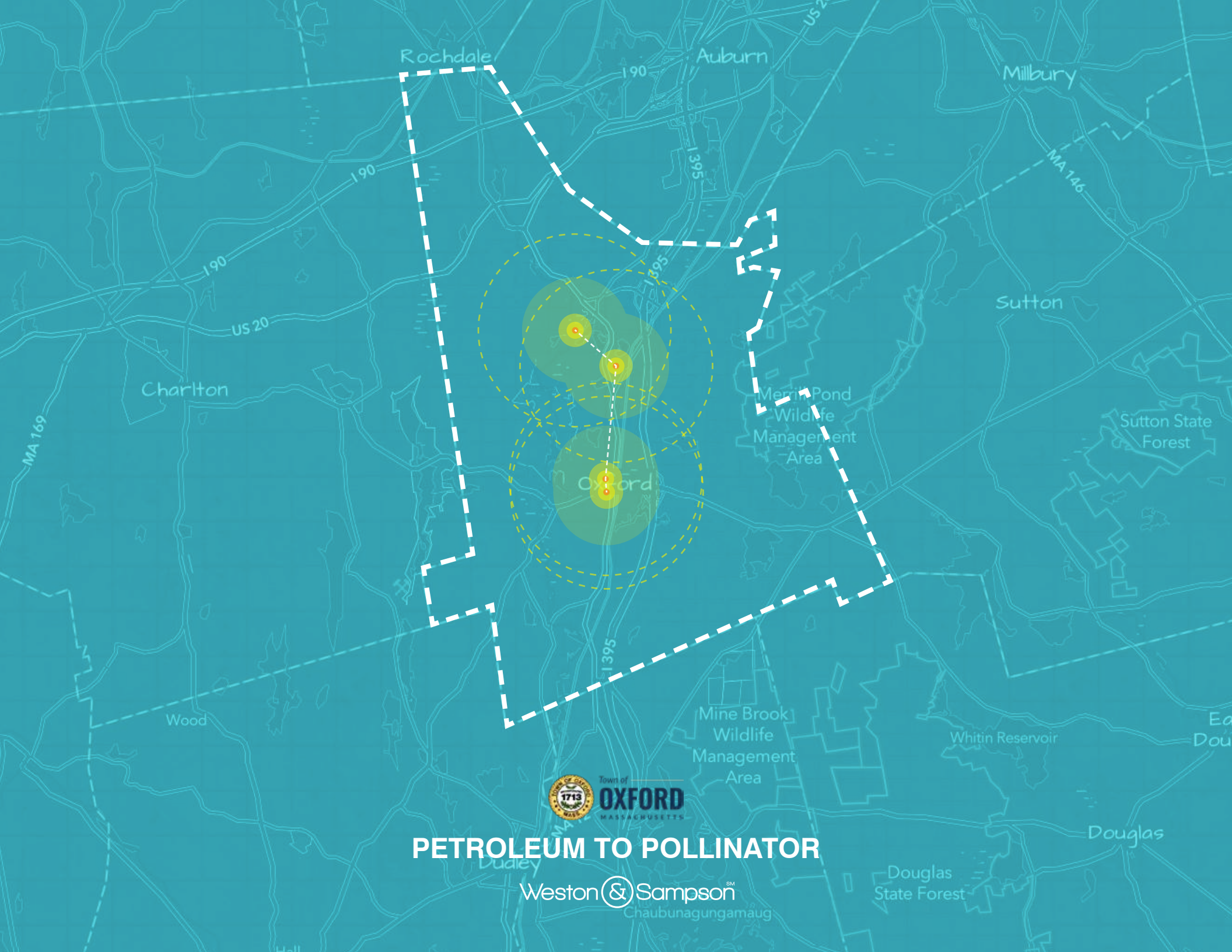

Town of OXFORD MASSACHUSETTS

PETROLEUM TO POLLINATOR

Weston & Sampson℠

PROJECT TEAM

Town of Oxford

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Director of Public Works

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Conservation Commission

Weston & Sampson

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Team Leader

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Project Manager

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Landscape Project Designer

POLLINATOR GARDEN AT OXFORD SENIOR CENTER
PHOTO CREDIT: WESTON & SAMPSON

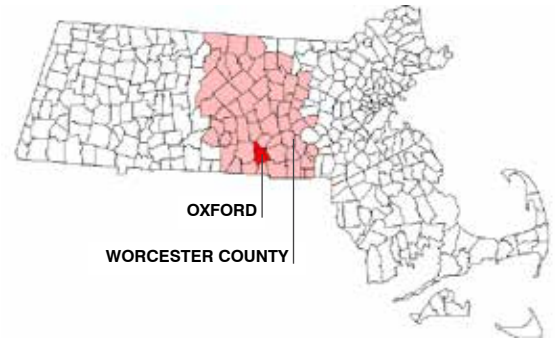
TABLE OF CONTENTS

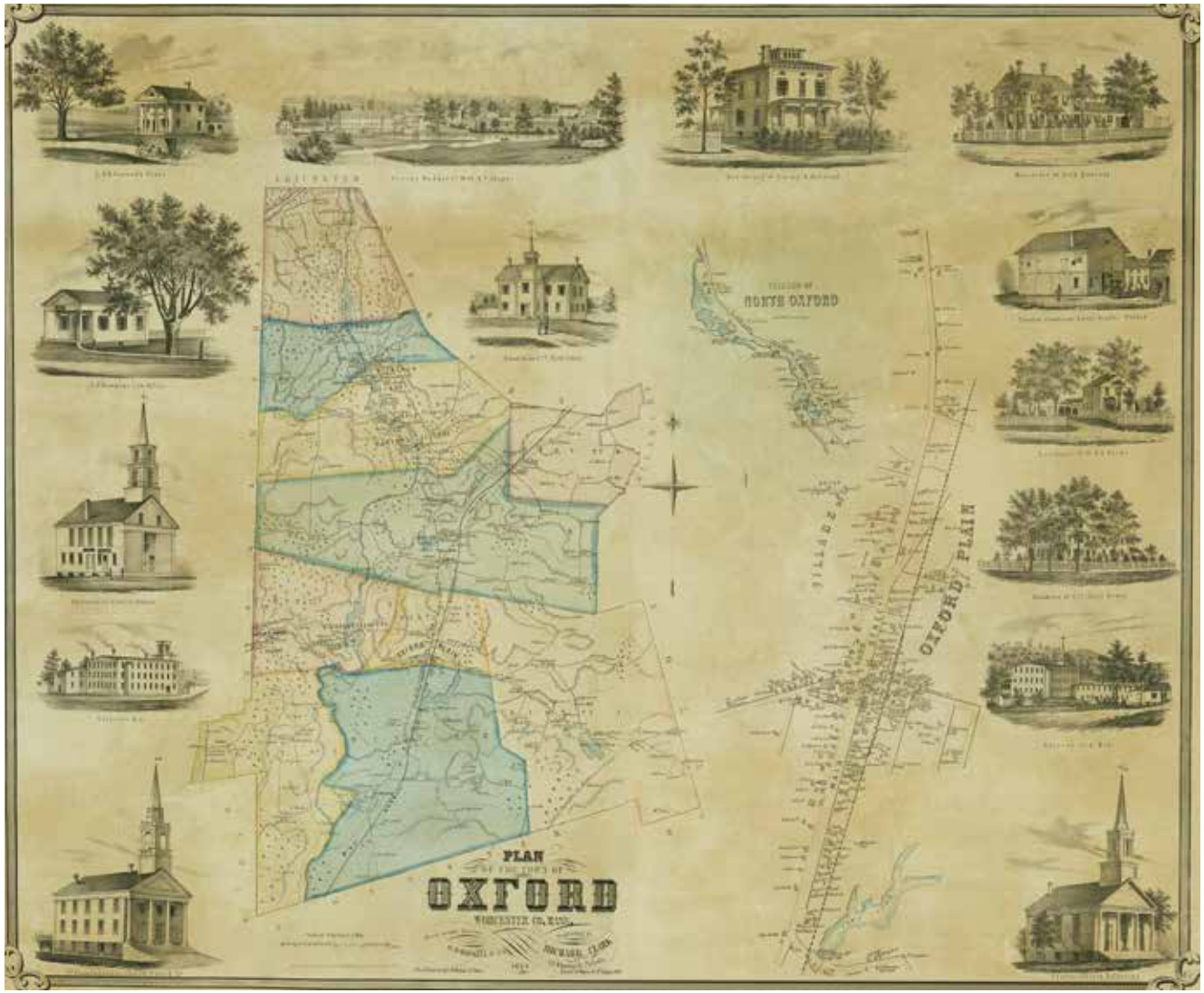
PROJECT SITE & INTRODUCTION

TOWN OF OXFORD

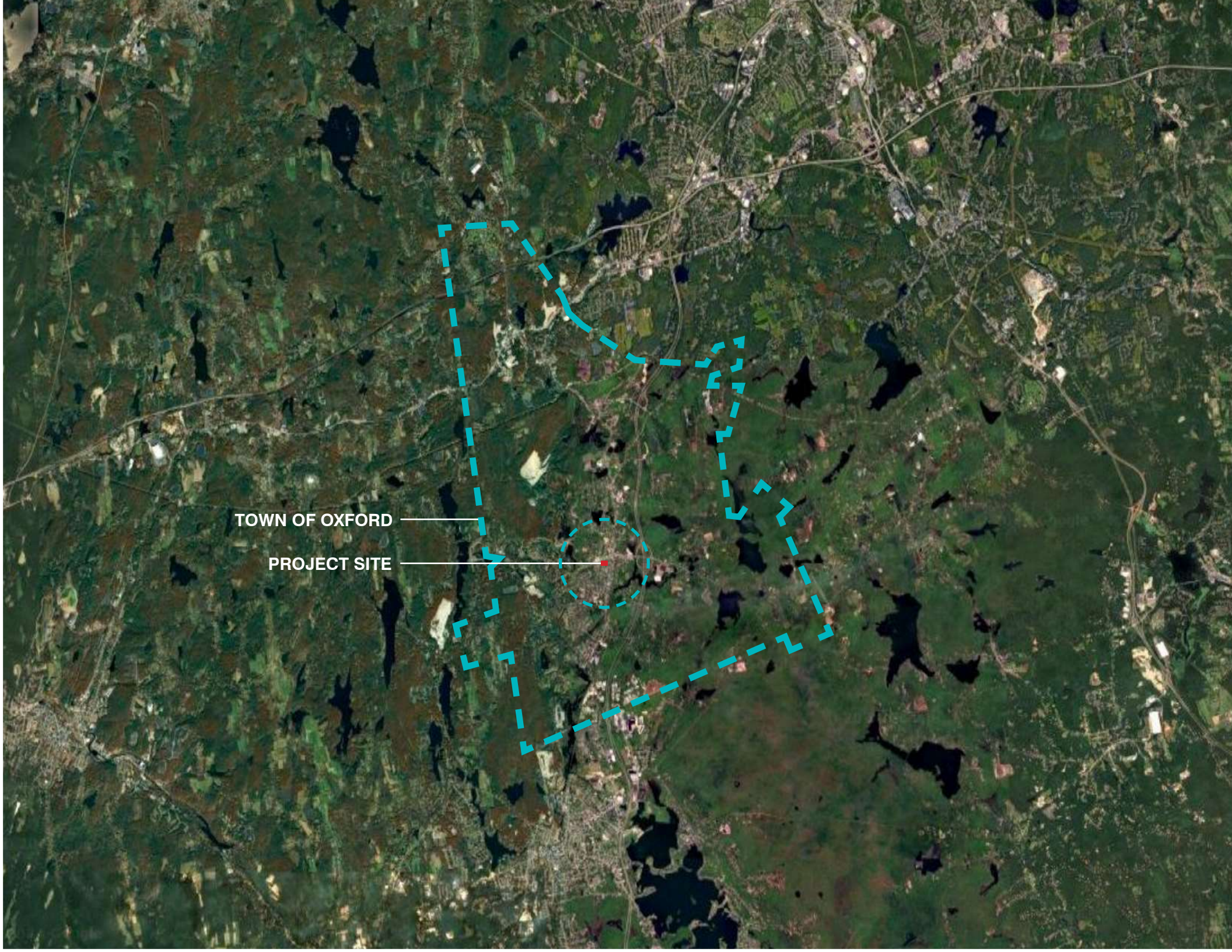
Oxford, Massachusetts, located in Worcester County, is a town that combines its historic charm with a commitment to environmental responsibility. Oxford has recently gained attention for its efforts to protect pollinator species, such as bees and butterflies, which are vital for healthy ecosystems and agriculture.

The town has taken meaningful steps to establish and preserve habitats that meet the needs of pollinators. Through pollinator-friendly landscaping, community education, and partnerships with local organizations, Oxford is fostering a healthier environment while enhancing its natural spaces for residents and wildlife alike. These initiatives demonstrate the town's dedication to sustainability and its recognition of the critical role pollinators play in maintaining both ecological balance and agricultural productivity.



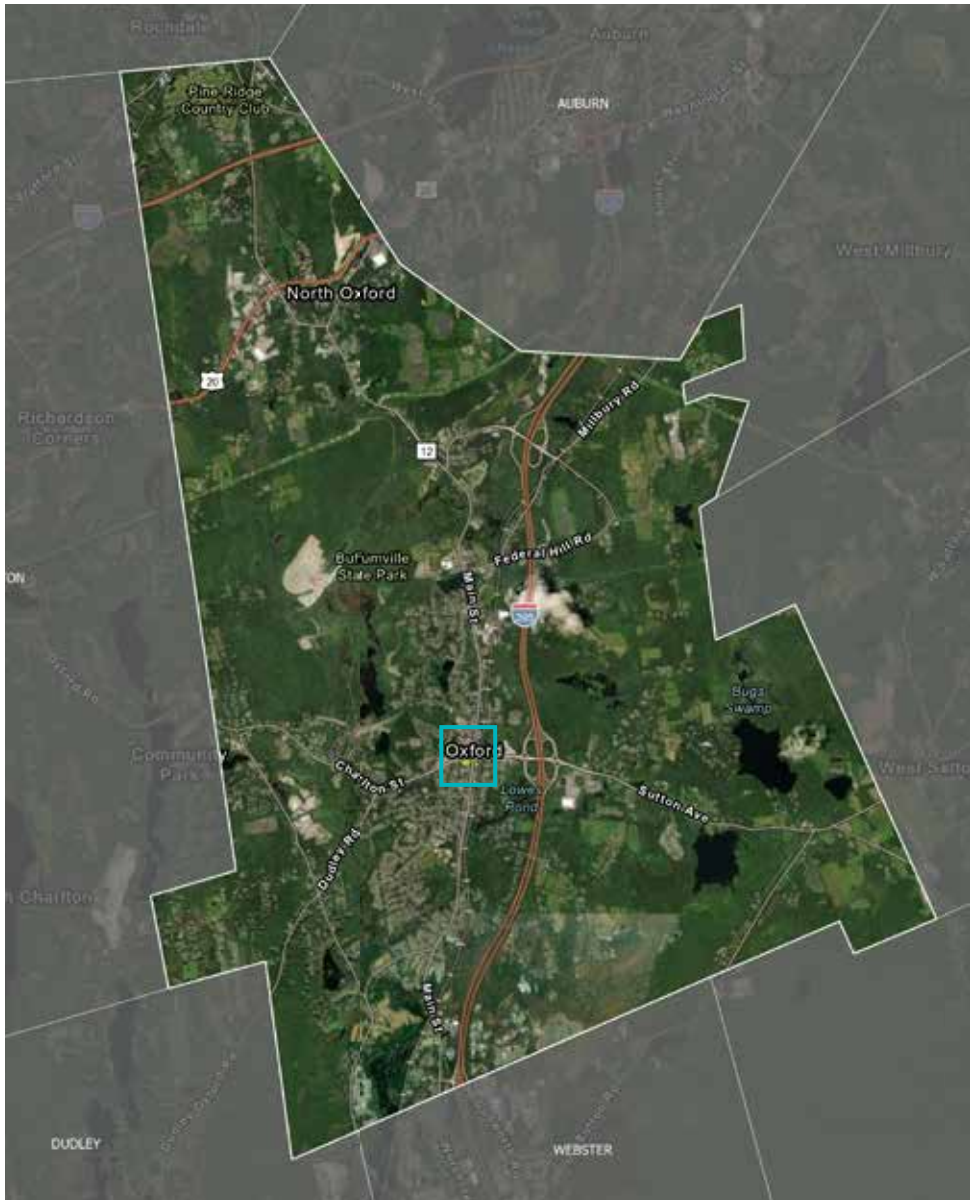


1855 OXFORD MAP. CREDIT: OXFORD PUBLIC LIBRARY
DIGITAL COPY OF THE ORIGINAL MAP HUNG IN THE LOCAL HISTORY ROOM OF OXFORD


TOWN OF OXFORD
PROJECT SITE

PROJECT INTRODUCTION

- **Project Name:** Petroleum to Pollinator
- **Project Description:** Funded by the Massachusetts Municipal Vulnerability Preparedness (MVP) Program, this project is designing a pollinator park that could potentially transform the former fueling station and town maintenance facility office site on Barton Street. The proposed pollinator park will feature nature-based solutions for stormwater management and heat mitigation, provide community gathering spaces, and create pollinator habitat.
- **Project Goals:** Establish a new pollinator park that enhances and strengthens Oxford's existing pollinator network while providing community space.
- **Location:** 3 Barton Street, Oxford
- **Current Status:** Site Investigation and Concept Design



PROJECT SITE & HISTORY

FORMER TOWN FACILITIES MAINTENANCE OFFICE
(BUILDING HAS BEEN REMOVED AS OF DECEMBER 2024)

The project site at **3 Barton Street** in Oxford covers 11,761 square feet, or 0.27 acres. The site has a long history of varied use dating back to the early 1900s, including serving as a garage, auto storage building, and Oxford fire department fueling station with underground gasoline storage tanks. Most recently, the structure at 3 Barton St. served as the Town facility maintenance division office. The structure was demolished in December 2024 due to deteriorating conditions.

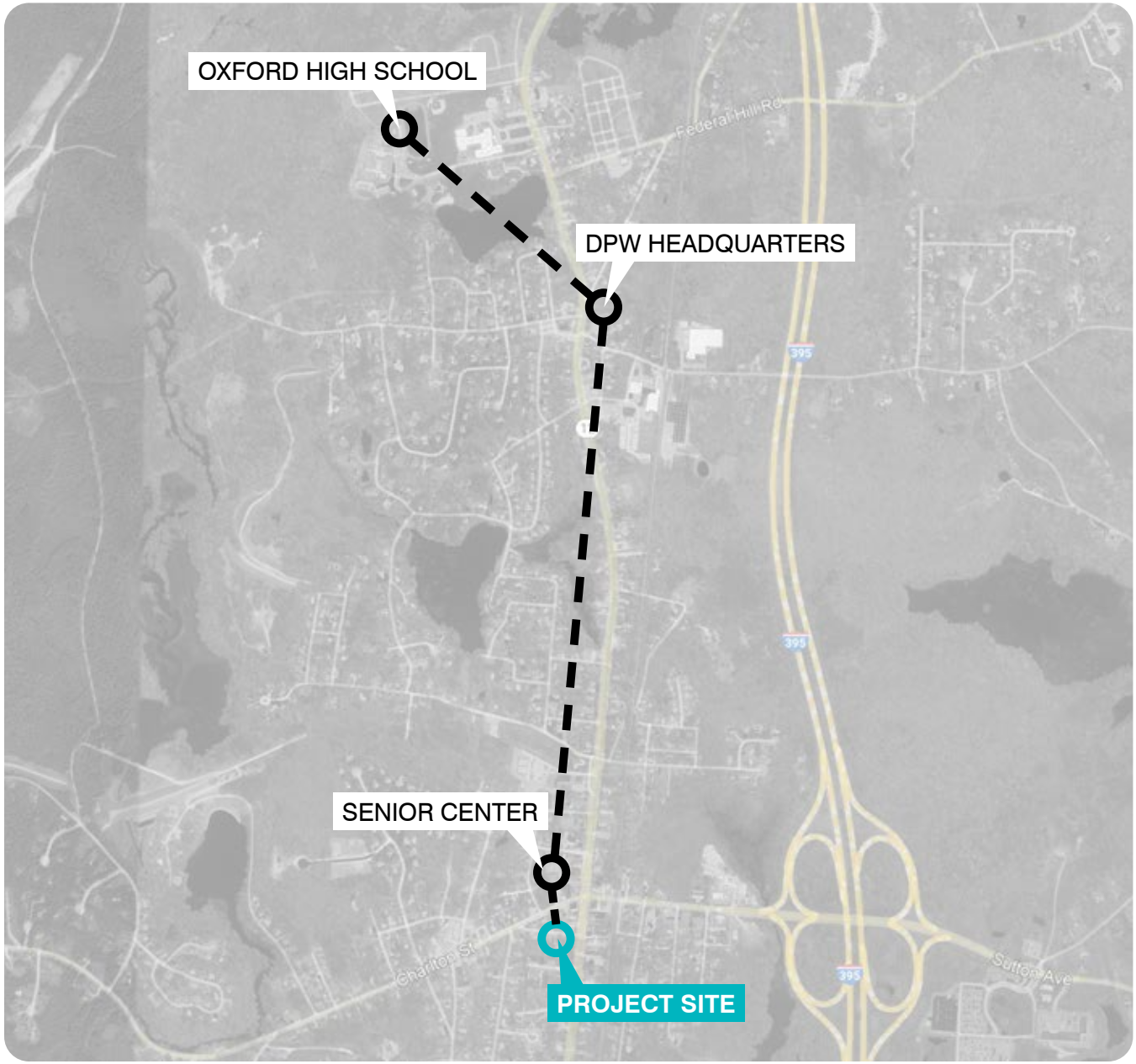
With the site now cleared, it presents an opportunity for a new purpose. Funded by the Massachusetts Municipal Vulnerability Preparedness (MVP) program, the project team is assessing the potential to transform the site into a pollinator park at the center of town. The project supports ecological restoration, enhances pollinator habitats, and provides valuable community space. This redevelopment marks a shift from its industrial past to a use that supports ecological and community needs.

SITE CONNECTIVITY

POLLINATOR GARDEN CONNECTIVITY

POLLINATOR GARDEN TYPE

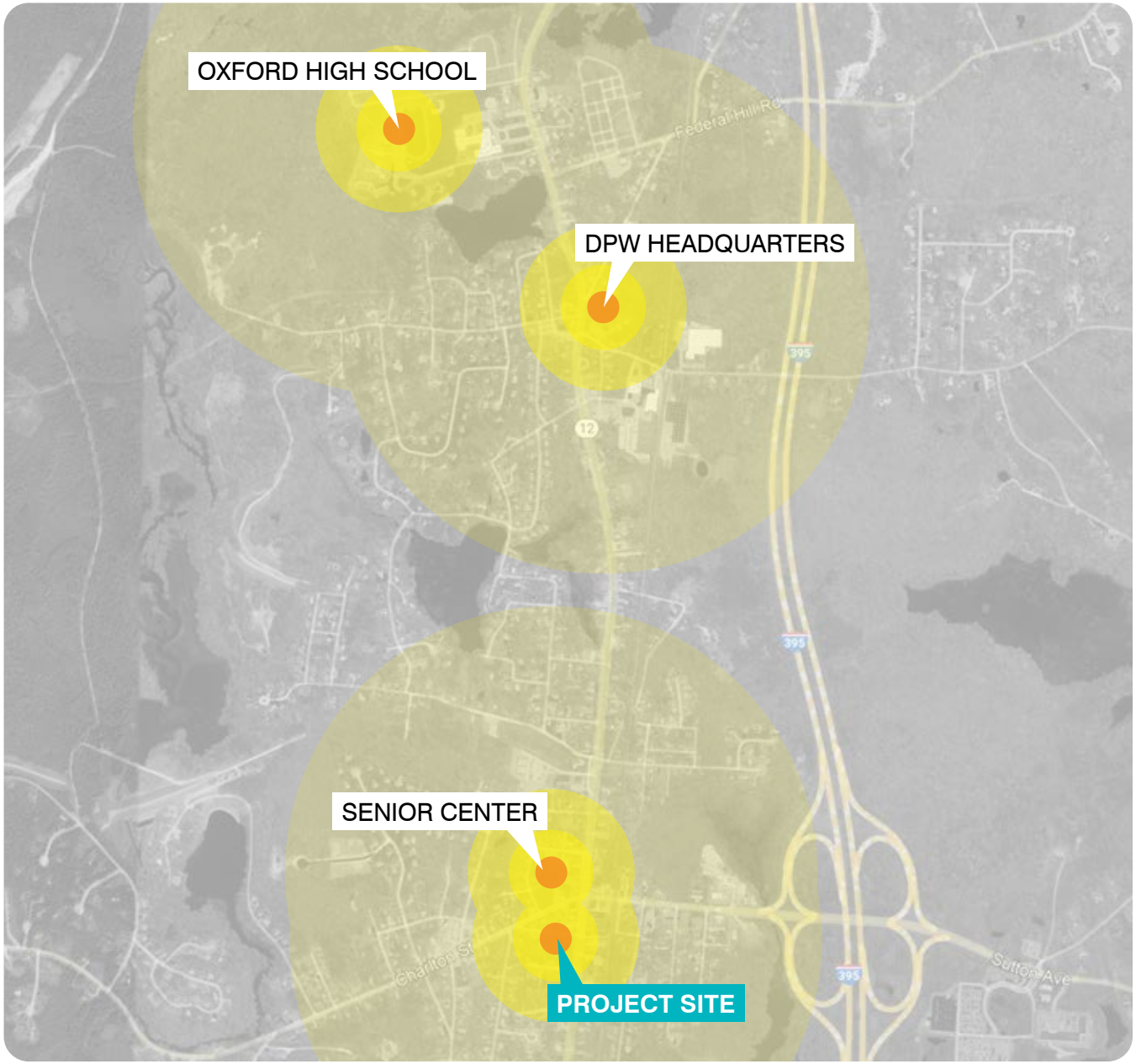
- Existing
- Future



POLLINATOR GARDEN CONNECTIVITY

AVERAGE POLLINATOR RANGES

- Tiny Pollinators (e.g. perdita bee) - 300 feet
- Small Pollinators (e.g. sweat bee, carpenter bee) - 820 feet
- Medium Pollinators (e.g. mining bee, leaf cutter bee) - 1,640 feet
- Large Pollinators (e.g. bumble bee, carpenter bee, monarch butterfly) - 5,280 + feet



NEIGHBORHOOD CONNECTIONS | WALKABLE AMENITIES

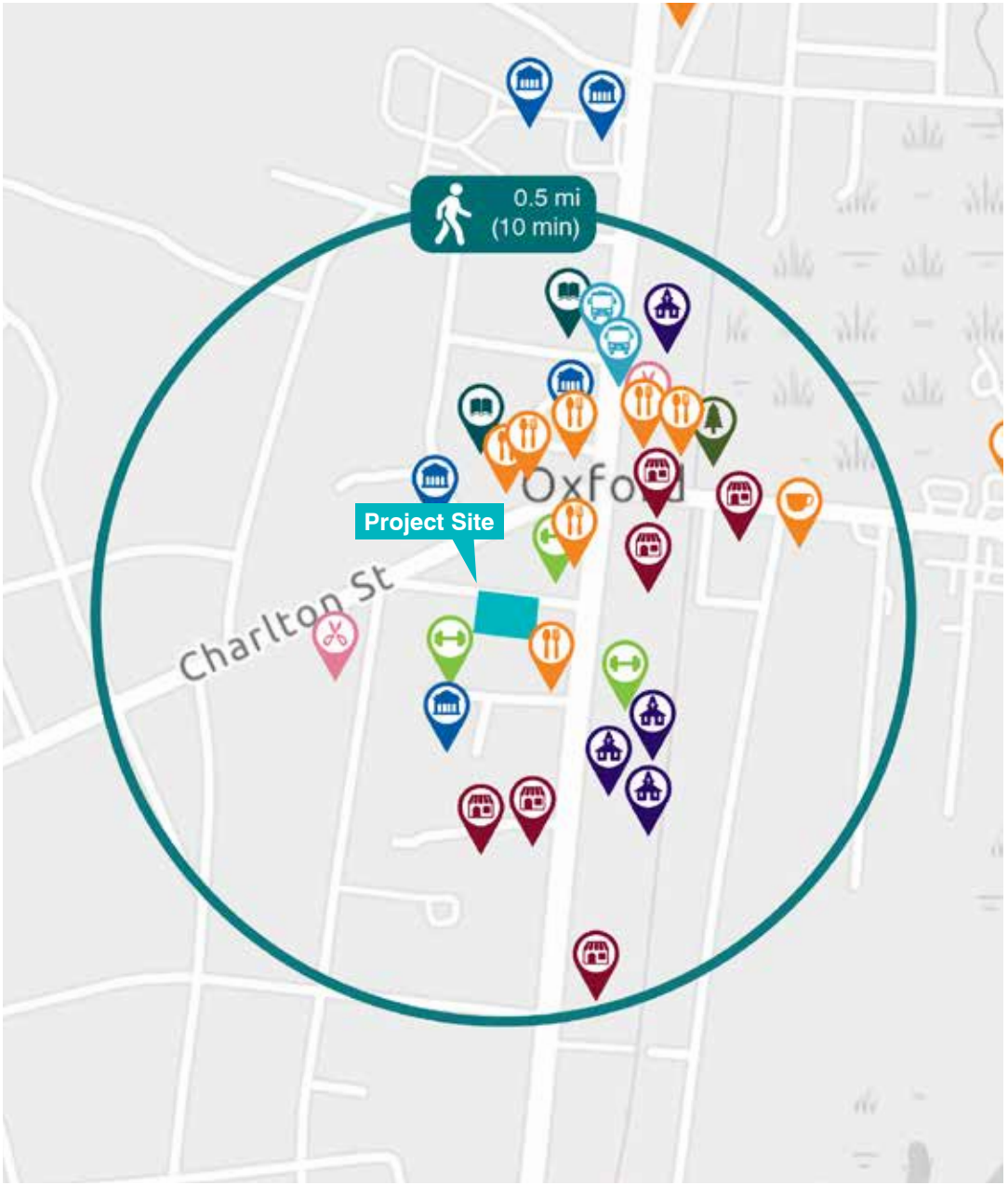
Nature / Recreation Park

Mountain Bike Trails

Hiking / Bike Trails

NEIGHBORHOOD CONNECTIONS | WALKABLE AMENITIES

- Nature / Recreation Park
- Mountain Bike Trails
- Health, Fitness & Wellness
- Coffee Shop
- Restaurant
- Salon / Barber
- Shopping
- Places of Worship
- Community Center
- Municipality
- Bus Stop



NEIGHBORHOOD CONNECTIONS | WALKABLE AMENITIES

- Nature / Recreation Park
- Mountain Bike Trails
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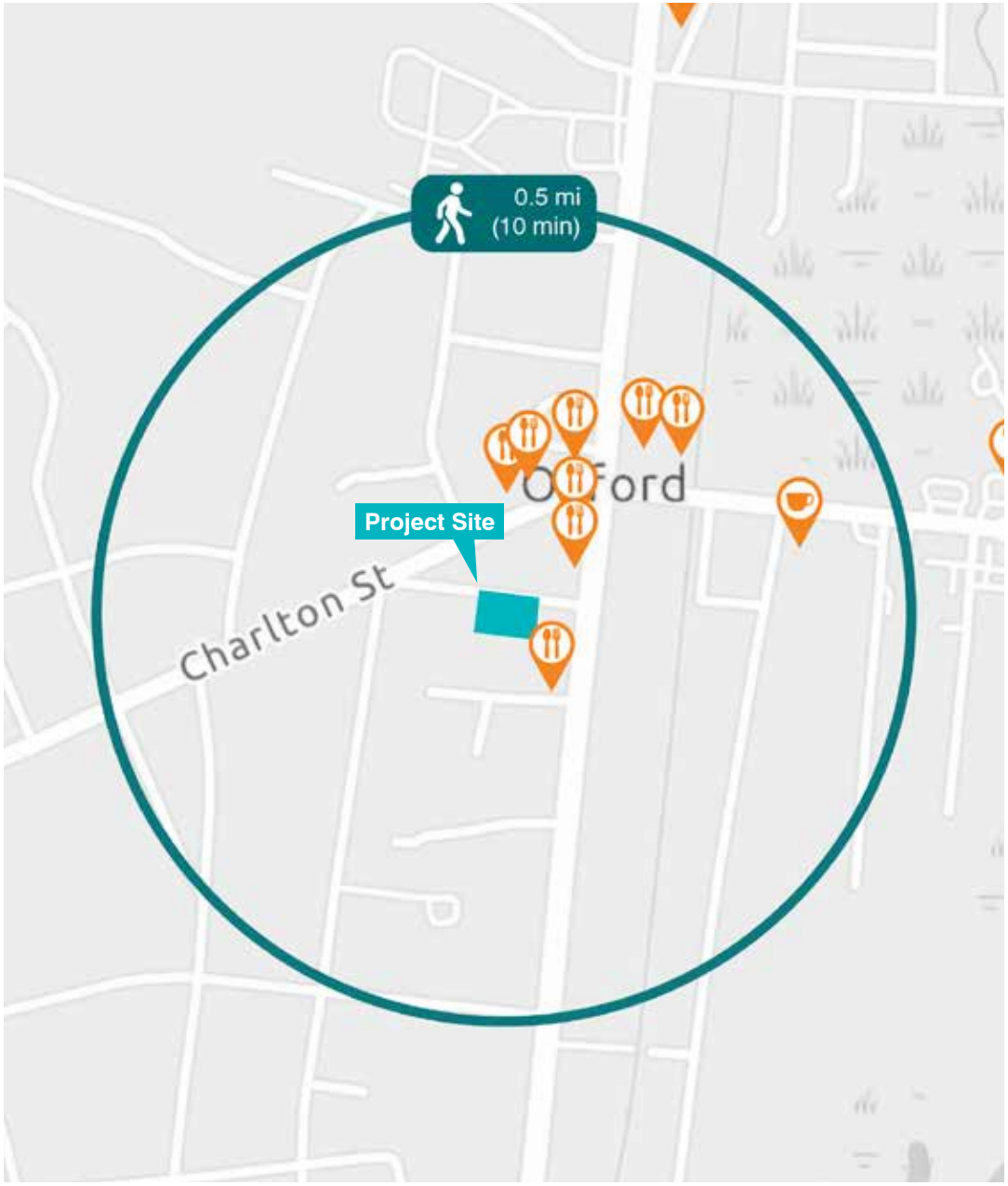

NEIGHBORHOOD CONNECTIONS | WALKABLE AMENITIES

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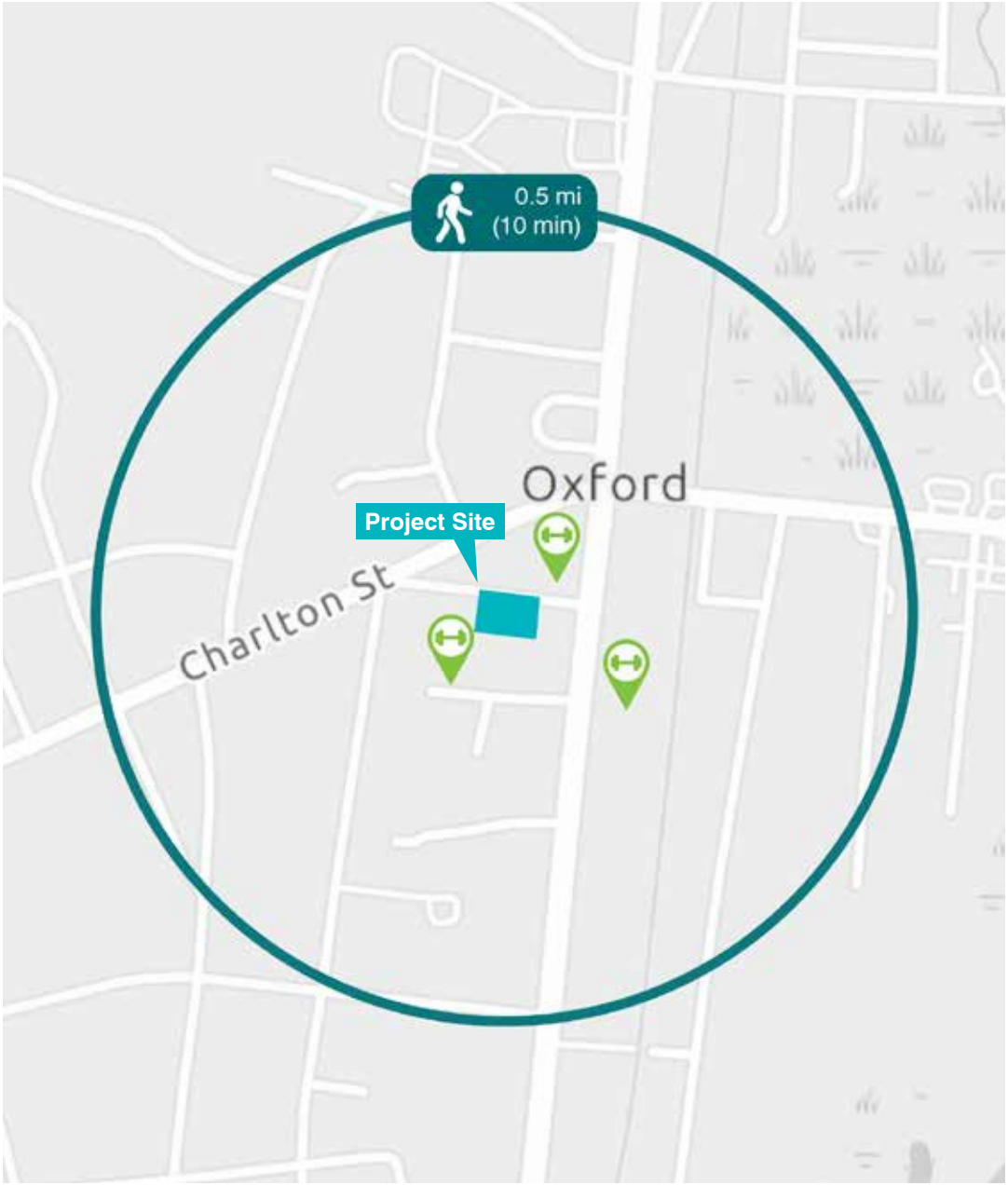


STORMWATER & HEAT ASSESSMENT

Analysis

Although the project site is not located within FEMA-designated flood zones, its adjacency to local flooding areas at the intersection of Main Street and Jackson Court and at the intersection of Sutton Avenue and Lind Street (locations identified by the Town of Oxford) presents a vulnerability to localized inundation during storm events. Excessive impervious surfaces, outdated or undersized stormwater infrastructure, and poor maintenance of existing drainage systems all contribute to localized flooding issues. This is particularly relevant in the context of climate change, which is expected to increase the frequency and intensity of heavy precipitation events.

Legend

FEMA National Flood Hazard

- 1% Annual Chance Flood Hazard
- Regulatory Floodway
- Area of Undetermined Flood Hazard
- 0.2% Annual Chance Flood Hazard
- Area with Reduced Risk Due to Levee
- Area Not Included

Data Sources

FEMA National Flood Hazard: FEMA
Local Flooding Data: Town of Oxford

Possible Concept Design Implications

- Reduce impervious surfaces on site to minimize surface runoff and alleviate pressure on downstream drainage systems.
- Localize Stormwater Management: Integrate green infrastructure such as bioswales and rain gardens on site to intercept runoff from adjacent streets, reducing the risk of pooling in surrounding areas.
- Use signage to educate residents about how these interventions reduce flooding and improve climate resilience.

Legend

FEMA National Flood Hazard

- 1% Annual Chance Flood Hazard
- Regulatory Floodway
- Area of Undetermined Flood Hazard
- 0.2% Annual Chance Flood Hazard
- Area with Reduced Risk Due to Levee
- Area Not Included

Local Flooding

- Area of reported local flooding

Data Sources

FEMA National Flood Hazard: FEMA
Local Flooding Data: Town of Oxford

Analysis

The project site is within a regional heat hotspot area identified by the MA Executive Office of Energy and Environmental Affairs (EOEEA). Hot spots are areas with the 5% highest Land Surface Temperature Index values in each Regional Planning Agency (RPA) region. The project site's inclusion as a hotspot reflects a combination of urban density, impervious surfaces, and minimal vegetation. Elevated temperatures negatively impact public health, especially for vulnerable populations with limited access to cooling infrastructure.

Possible Concept Design Implications

- Add thermal comfort features such as shade structures, water features, and shaded seating areas to provide relief from direct sun exposure and heat.

Legend

High Land Surface Temperature

Hotspots

Data Sources

Hotspots Data:
MA Executive Office of Energy and Environmental Affairs

Analysis

Nearby water bodies, including streams, marshes, and ponds, are sensitive to changes in urban hydrology. Runoff from impervious surfaces in the area likely carries pollutants such as oils, sediments, and nutrients int these ecosystems. Lack of natural filtration mechanisms contributes to water quality degradation, disrupting aquatic habitats and increasing maintenance costs for municipal stormwater systems. Although there are no direct stream flow paths through or immediately adjacent to the project site, runoff from the site still feeds into the regional watershed and could contribute to nutrient pollution downstream if runoff is not treated or mitigated.

Possible Concept Design Implications

- Install green infrastructure such as vegetated buffers or biofiltration zones near site edges to treat runoff and reduce nutrient loads before water exits the property.
- Use green infrastructure as an opportunity to strengthen connections to nearby natural water systems, contributing to ecosystem connectivity.

Legend

Flow line and Direction

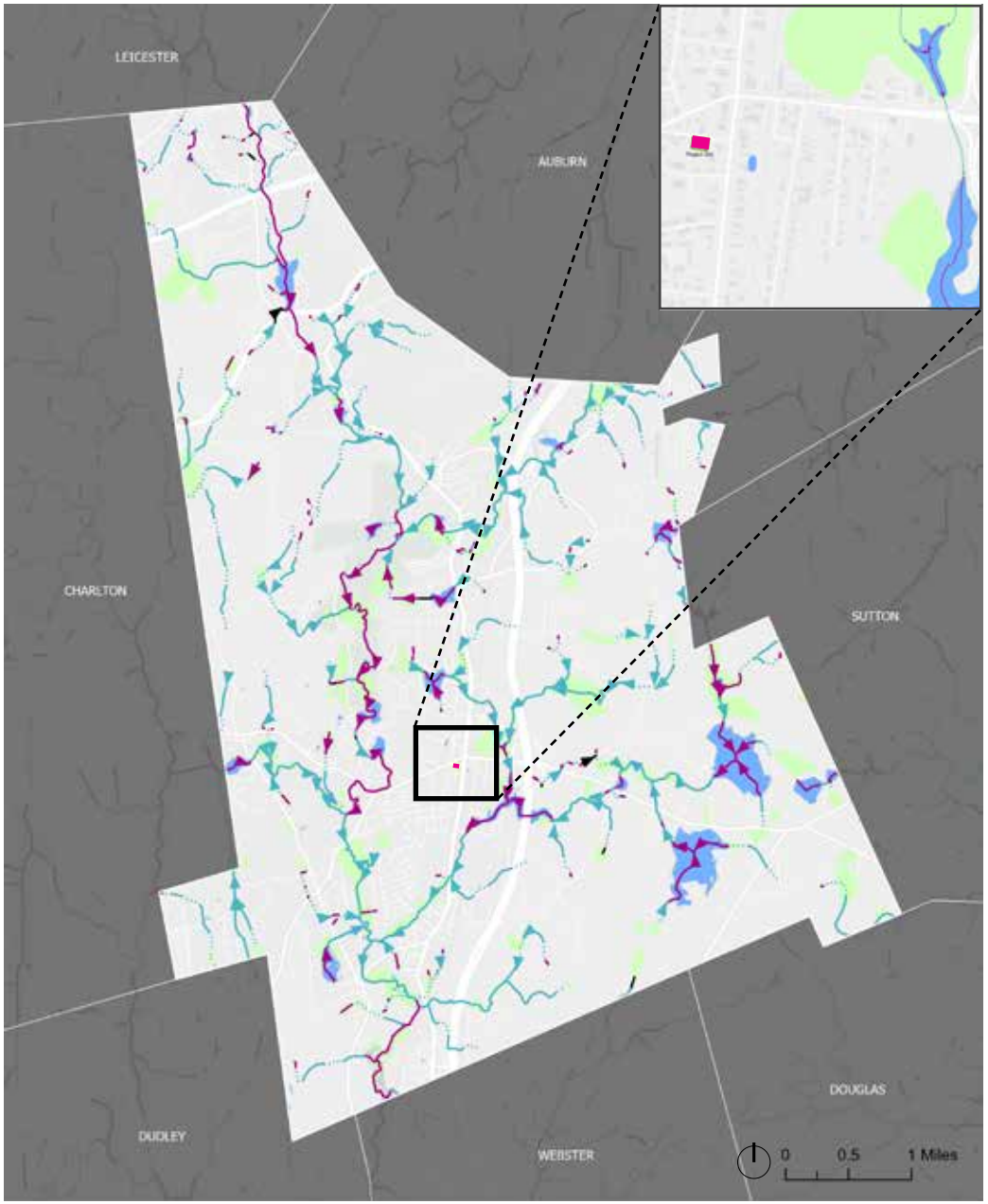
- Perennial Stream
- Intermittent Stream
- Artificial Path

Water bodies

- Lake/Pond
- Swamp/Marsh

Data Sources

Hydrology Layers: USGS



Analysis

Located at the center of town, the site's medium- to high-intensity developed land classification reflects extensive impervious surfaces and limited natural vegetation. This land use type limits ecological functionality, increases runoff, reduces habitat availability, and intensifies heat effects, making the area less resilient to climate impacts.

Possible Concept Design Implications

- Focus on habitat restoration. Use portions of the site for pollinator gardens and native vegetation to increase biodiversity.
- Link site vegetation with nearby green spaces to improve habitat corridors and support local wildlife to achieve ecological connectivity.

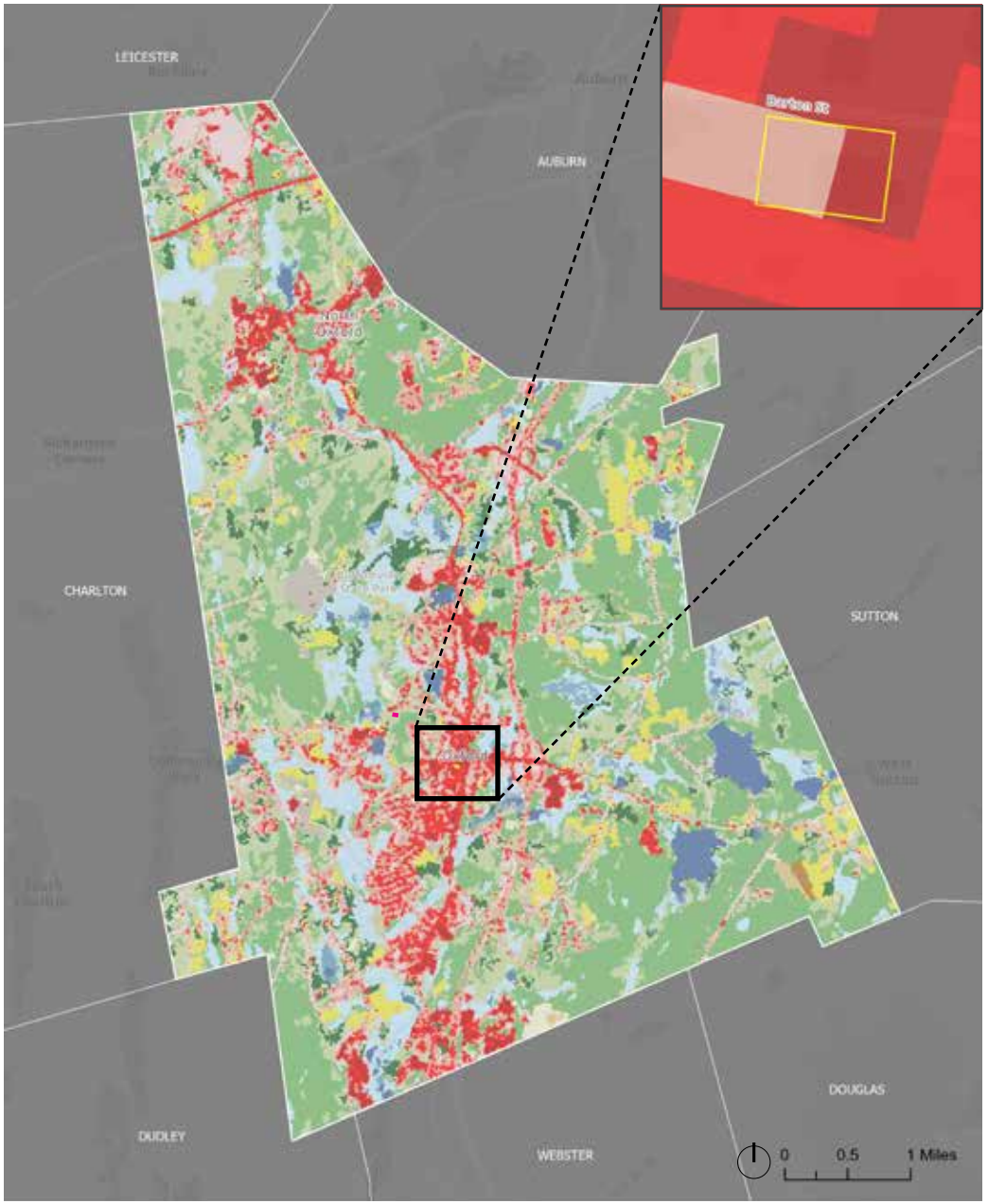
Legend

Land Cover

- Open Water
- Developed, Open Space
- Developed, Low Intensity
- Developed, Medium Intensity
- Developed, High Intensity
- Barren Land
- Deciduous Forest
- Evergreen Forest
- Mixed Forest
- Shrub/Scrub
- Herbaceous
- Hay/Pasture
- Cultivated Crops
- Woody Wetlands
- Emergent Herbaceous Wetlands

Data Sources

National Land Cover Data - Land Cover 2021: USGS



Analysis

Based on United States Department of Agriculture (USDA) and Natural Resources Conservation Service (NRCS)'s soil drainage class data, the entire site is categorized as having "somewhat excessively drained soil". The soils provide good infiltration potential but may struggle to retain sufficient water for vegetation, particularly during drought periods. This poses challenges for maintaining healthy vegetation and could reduce the efficacy of runoff treatment.

Possible Concept Design Implications

- Add organic matter to the soil to improve water retention and nutrient availability for plant growth.
- Select native plants and drought-tolerant species to establish sustainable vegetation cover that supports pollinators.
- Potentially integrate rainwater harvesting systems to provide supplementary irrigation during dry periods, ensuring vegetation health.

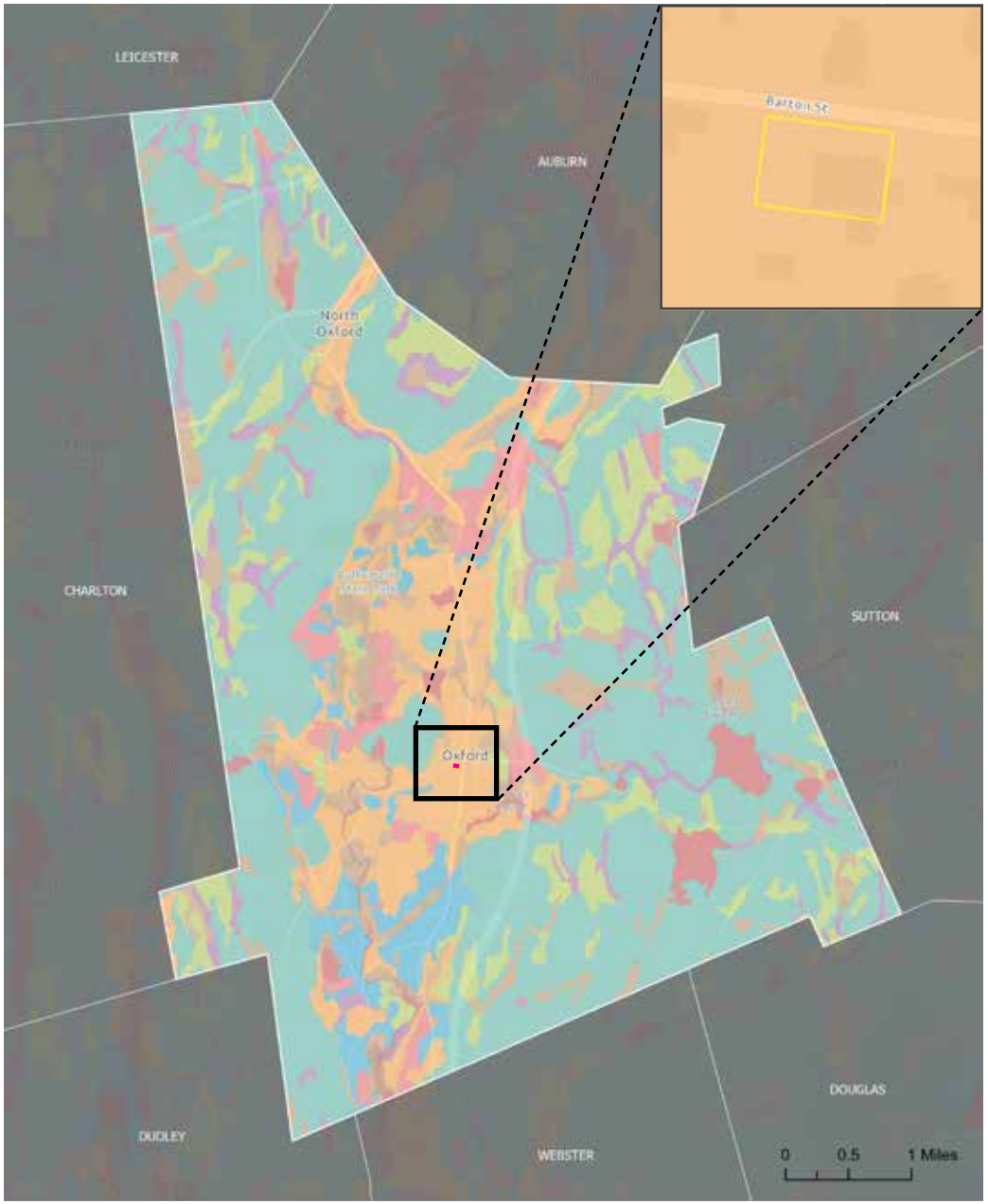
Legend

Soil Drainage Class

- Somewhat poorly drained
- Subaqueous
- Very poorly drained
- Well drained
- <all other values>
- <Null>
- Excessively drained
- Moderately well drained
- Poorly drained
- Somewhat excessively drained

Data Sources

Soil Drainage Class: United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) MassGIS.



Analysis

The project site and surrounding areas lack sufficient tree canopy. Minimal tree canopy coverage is a direct result of historical land use changes and urban development. This lack of vegetation and limited shading exacerbates the urban heat island effect, leading to higher surface temperatures, increased cooling energy demands, and greater risks of heat-related health impacts, particularly for vulnerable populations.

Possible Concept Design Implications

- Plant native shade trees in high-exposure areas to provide natural cooling. Prioritize areas along pathways and seating zones for maximum impact.
- Include shrubs and ground cover under tree canopies to maximize cooling through evapotranspiration.

Legend

Tree Canopy Cover

LOW  HIGH

Data Sources

National Land Cover Data - Tree Canopy 2021: USGS

Analysis

The team observed that the area around the project site consists of mostly impervious surfaces which absorb and retain heat, contributing to higher land surface temperatures. These surfaces put a strain on local cooling infrastructure. Impervious surfaces also reduce infiltration ability and increase stormwater runoff.

Possible Concept Design Implications

- Transform impervious areas into green spaces with pollinator gardens and stormwater treatment features.

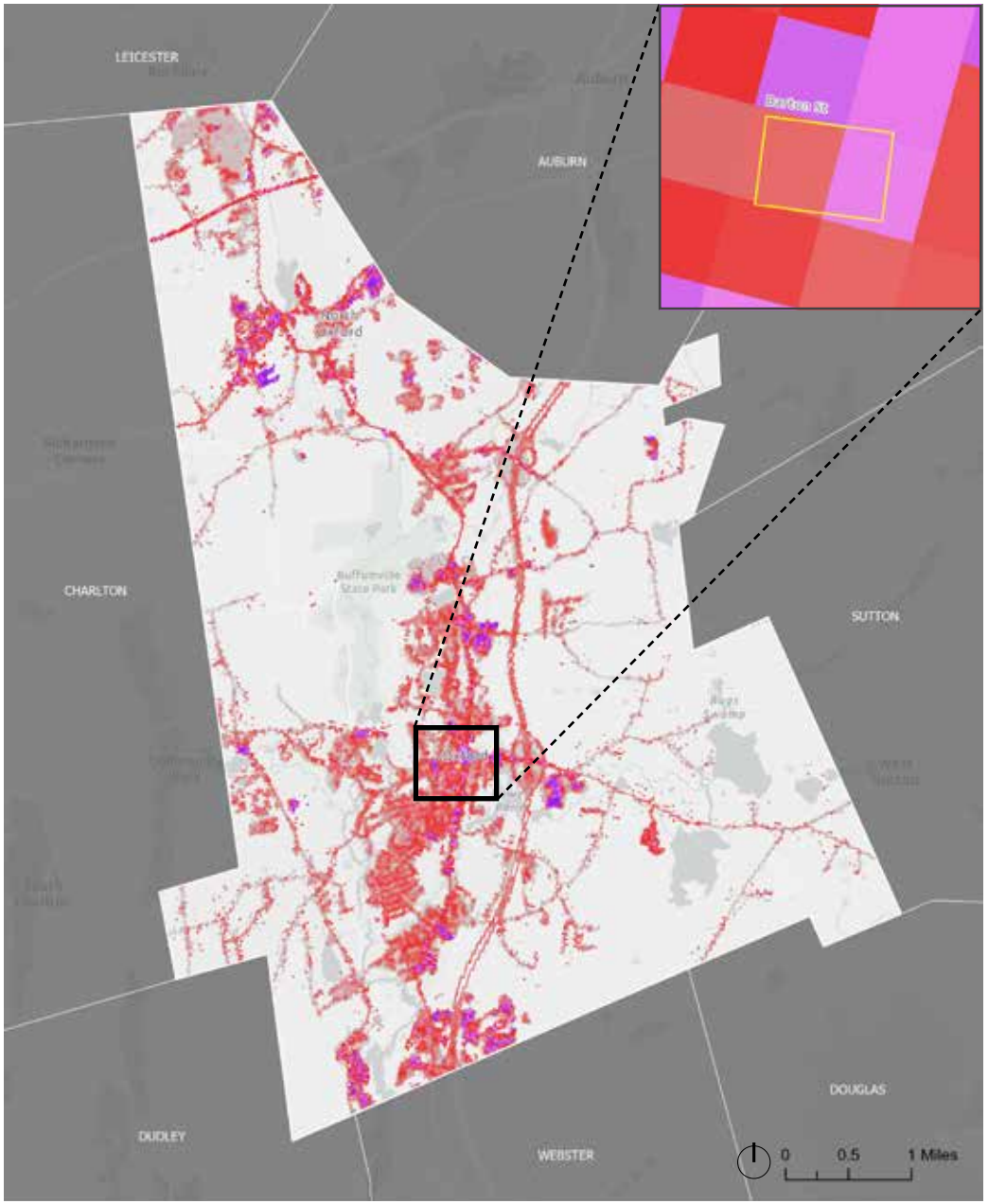
Legend

Impervious Surface

LOW  HIGH

Data Sources

National Land Cover Data - Impervious Surfaces 2021: USGS



Analysis

The project site is located within an Environmental Justice (EJ) block group that meets the Low Income EJ criteria. EJ populations often face heightened vulnerability to climate and environmental stressors, such as urban heat islands and localized flooding, and lack resources to deal with these stressors. This project could serve EJ populations by providing stormwater and heat mitigation benefits as well as additional green community space by transforming the site into a multifunctional free public space for all. A thoughtfully designed green community space offers numerous co-benefits, such as opportunities for recreation, improved mental and physical health, and a venue for social interaction and community-building.

Possible Concept Design Implications

- Create pathways, seating, and amenities that accommodate diverse community needs.
- Engage and involve local residents in co-designing, planting, and maintaining the site
- Include signage and programming that inform residents about the environmental benefits of the site's features.

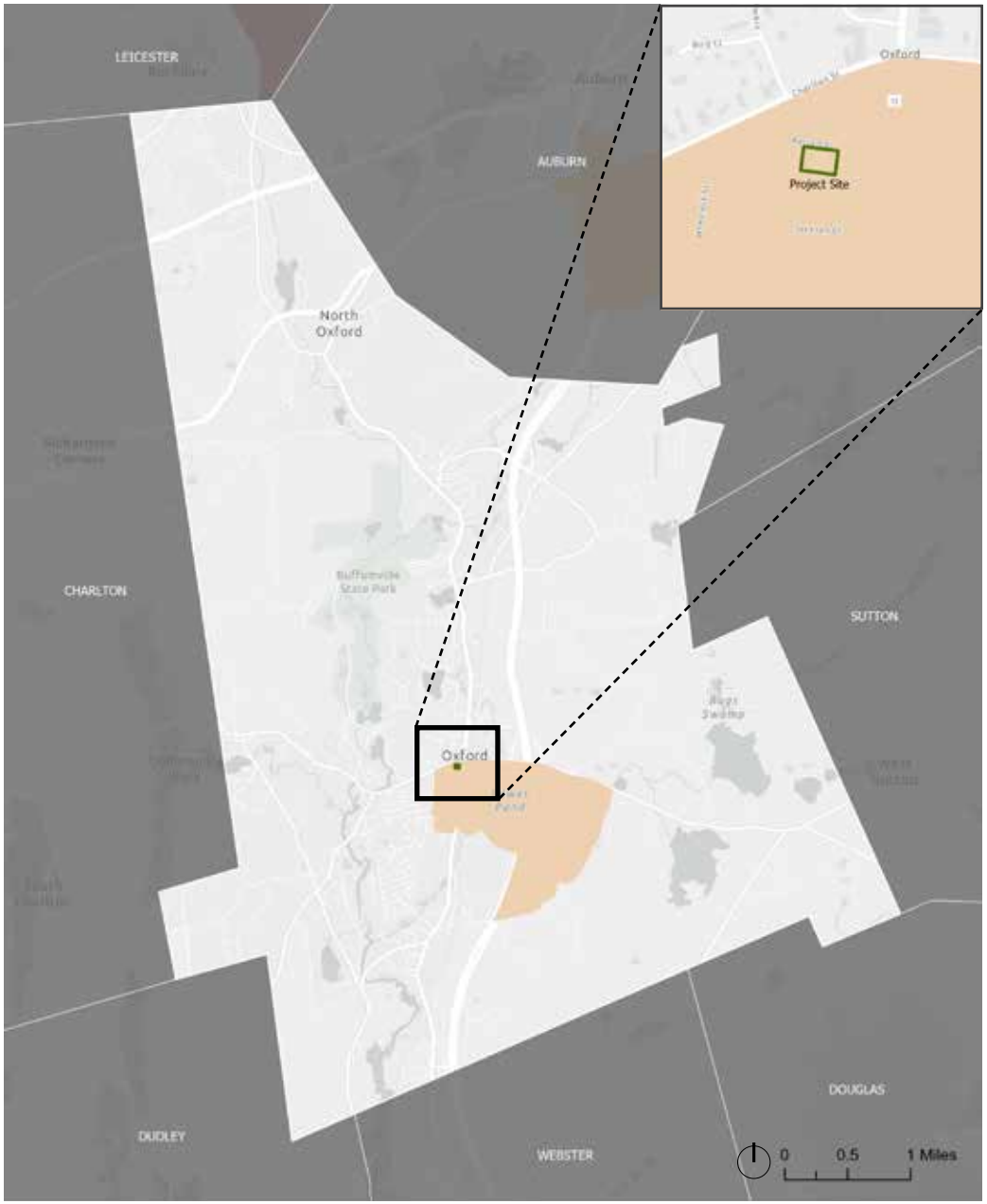
Legend

Environmental Justice Criteria

Low Income Block Group

Data Sources

Environmental Justice Block Group Data:
MA Executive Office of Energy and Environmental Affairs



Analysis

Of the 6 Phosphorous impacted lakes in or near Oxford (identified by the Town of Oxford), Lowes Pond is within a 0.5-mile radius of the project site, and Mckinstry Pond is within a 1-mile radius of the project site. Proximity to phosphorus-impacted lakes suggests a history of nutrient-rich runoff entering these water bodies. Primary contributors include stormwater from urban areas, agricultural runoff, and atmospheric deposition. The excess phosphorus promotes eutrophication, leading to algal blooms, oxygen depletion, and harm to aquatic life. These effects reduce the ecological health and recreational value of the lakes.

Possible Concept Design Implications

- Incorporate phosphorus-absorbing vegetation in rain gardens and retention areas to mitigate nutrient runoff.
- Integrate educational components that explain the role of urban runoff in lake degradation and how nature-based solutions can address this.

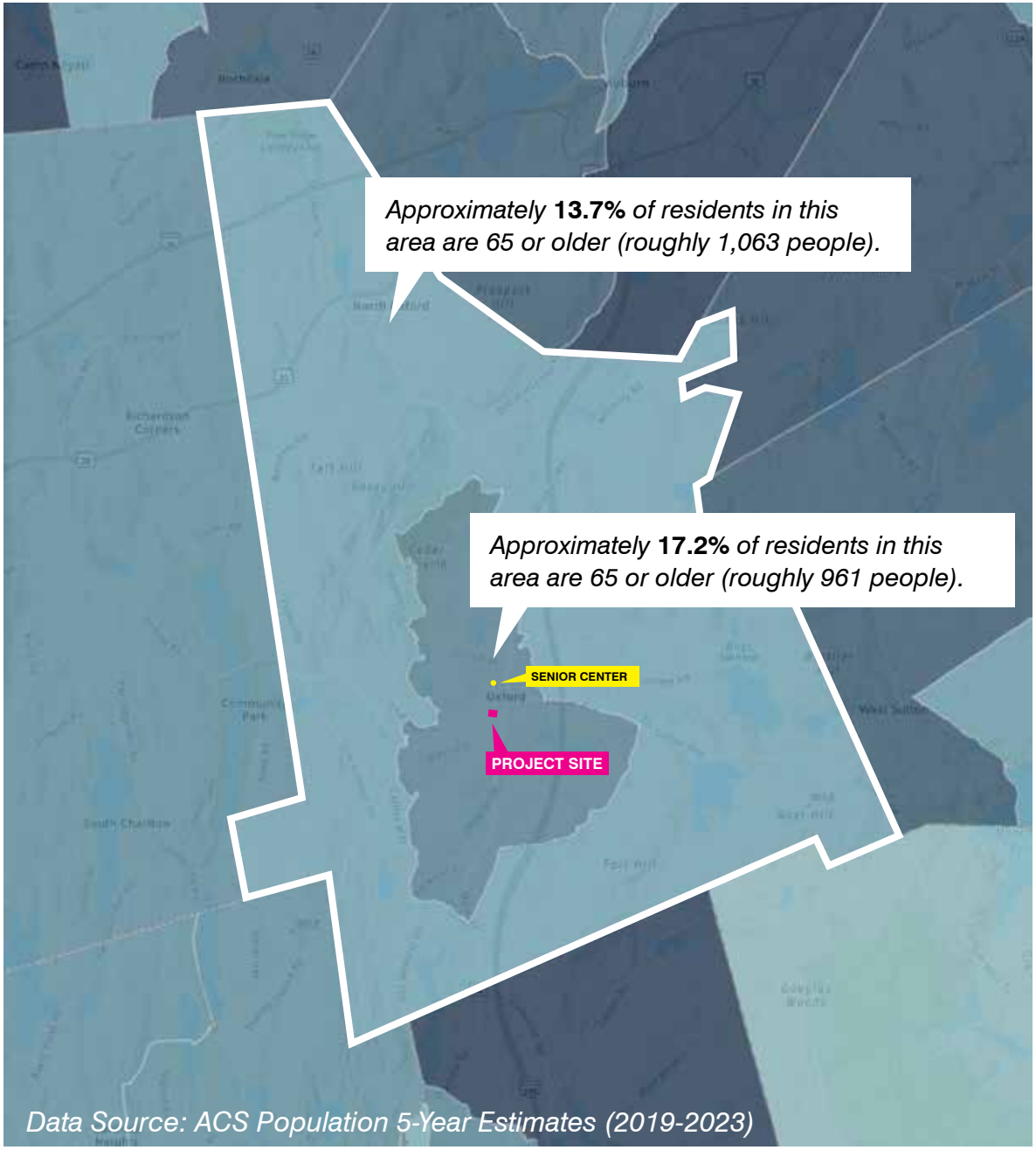
Legend

Phosphorous Impacted Ponds and Lakes

Data Sources

Phosphorous impacted lakes data provided by the Town of Oxford

USER DEMOGRAPHICS

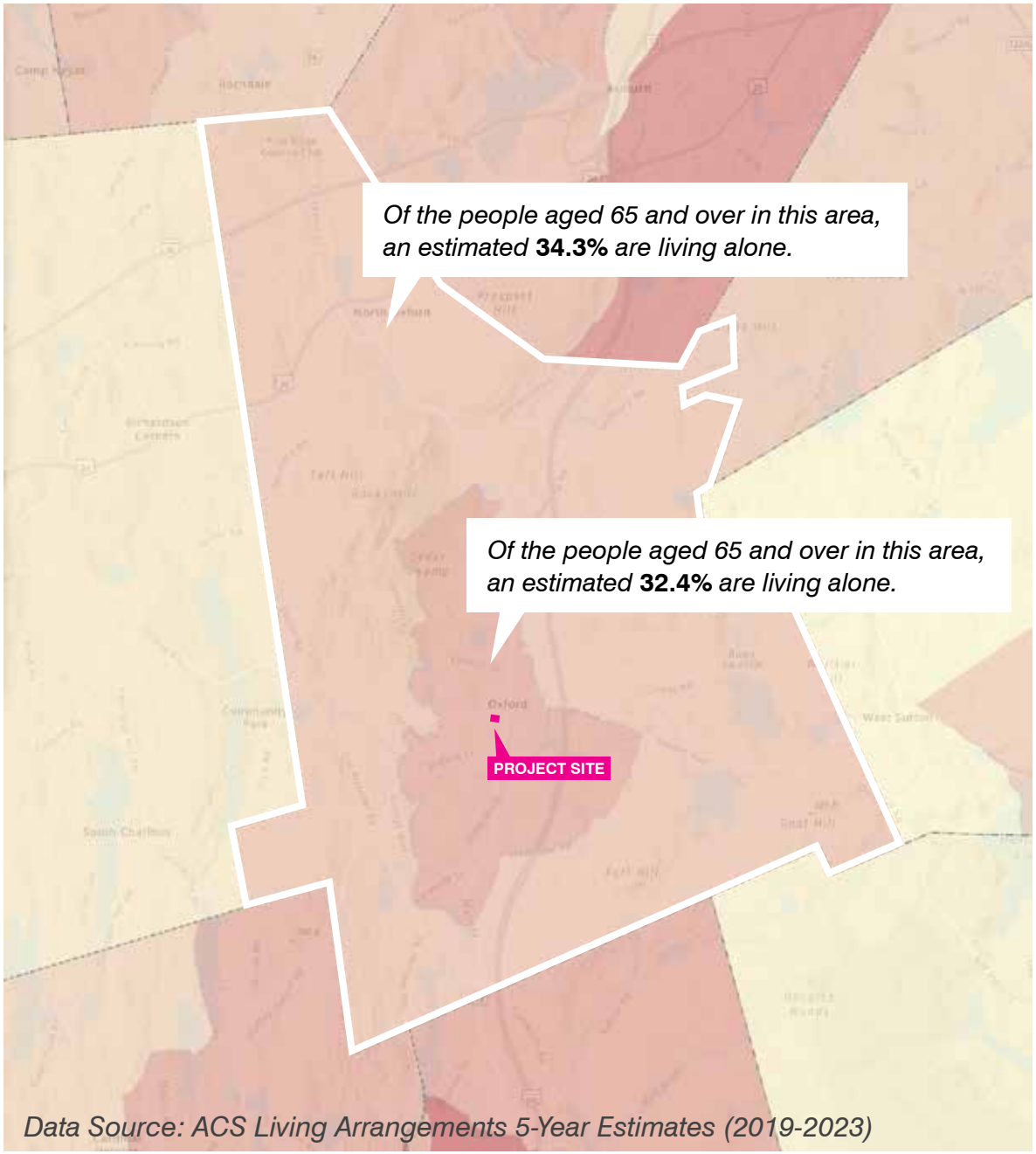


Population Over 65 Years Old

Design Implications Based on User Group:

- Park design should consider that there is a high percentage of senior residents in the census tract, in addition to the nearby senior center residents that will be visiting the site. Provide rest areas, accessible pathways, and shading.

% Population Over 65



Data Source: ACS Living Arrangements 5-Year Estimates (2019-2023)

Population Over 65 Years Old Living Alone

Design Implications Based on User Group:

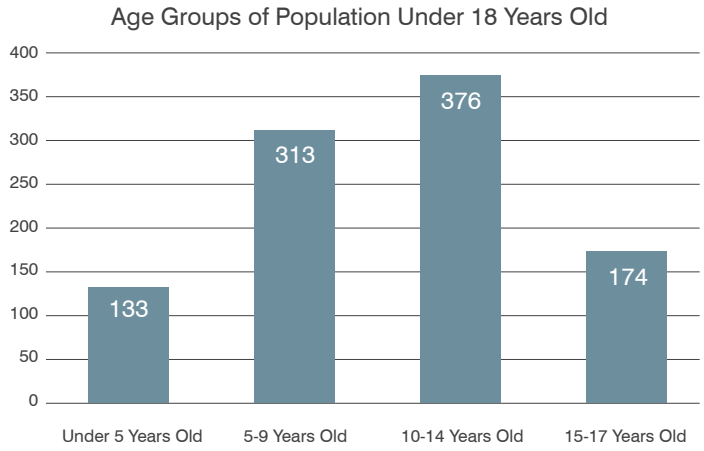
- A significant percentage of seniors in the area are living alone. Consider creating places for gathering and building a sense of community for residents.

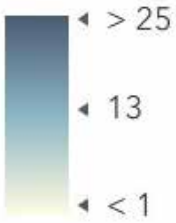
% Population Over 65 Living Alone

Population Under 18 Years Old

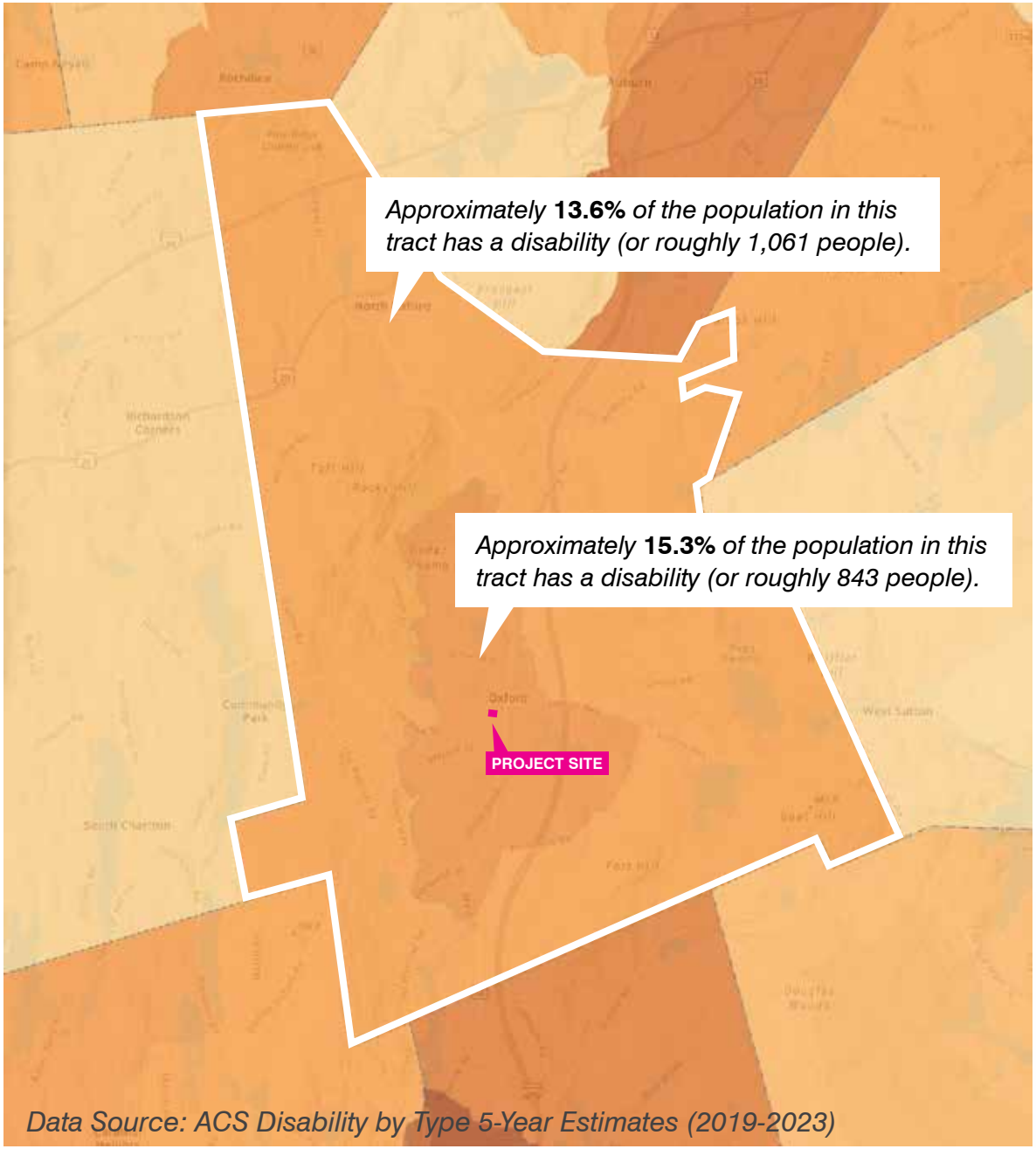
Design Implications Based on User Group:

- Of the 17.8% of population under 18 years old in the census tract that the project site is within, the majority of youth is between the age of 5 and 14. Informal play structure and exploration spaces can be tailored to this age group, welcoming youth to use this park.





% Population Under 18

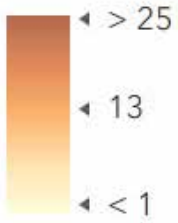


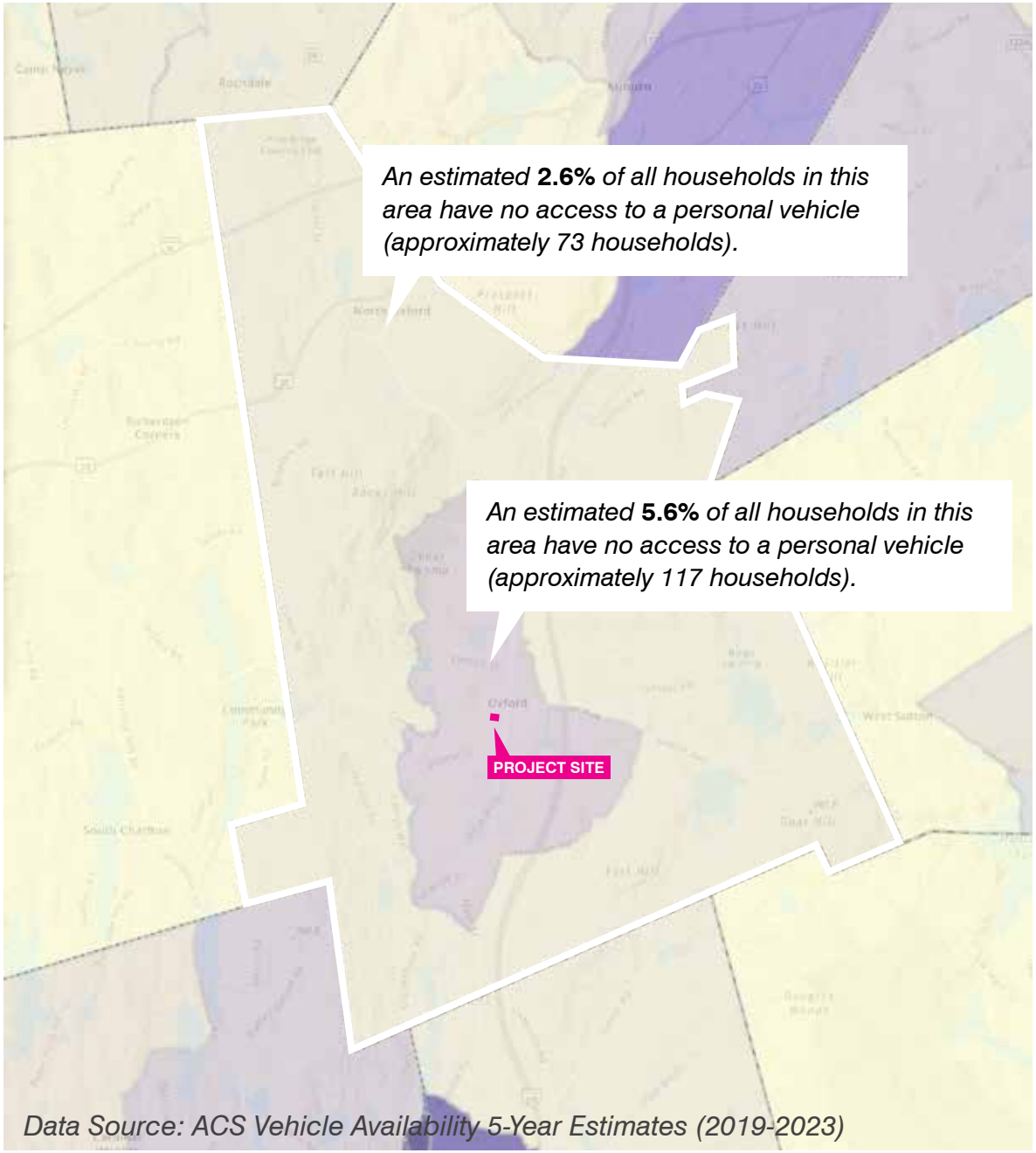
Population Living with a Disability

Design Implications Based on User Group:

- Alongside ADA-accessible pathways, the park strives to incorporate additional features that create an inclusive environment for individuals with diverse needs.

% Population with a Disability





Household without Vehicle Access

Design Implications Based on User Group:

- The majority of households in Oxford has vehicle access, indicating that residents can be traveling from a further distance to visit the site or nearby amenities.

% of Households with

No Vehicle Access

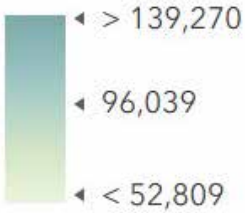
Data Source: ACS Median Household Income 5-Year Estimates (2019-2023)

Median Household Income

Design Implications Based on User Group:

- Massachusetts Median Household Income is $101,341 based on ACS 5-year estimates (2019-2023). The census tract that the project site is in has lower median household income compared to surrounding areas, stressing the need for free open space and recreational opportunities for the community.

Median Household Income (dollars)



Low Income Households

Design Implications Based on User Group:

- Low Income Households: where the household income in the past 12 months is at or below 200% of the Federal poverty level. Public spaces in lower-income areas provide affordable recreation, improve health, and foster sense of community.

% of individuals below 200% Federal Poverty Line (percentile)

COMMUNITY ENGAGEMENT

COMMUNITY ENGAGEMENT

On November 20, 2024, the Weston & Sampson team conducted a site visit in Oxford as part of the Petroleum to Pollinator Project. The primary objectives were to assess existing pollinator sites and present key aspects of the project to the Oxford Pollinator Group to gather their feedback.

Site Evaluations

The visit included detailed evaluations of 3 established pollinator sites:

- Oxford Senior Center

- DPW Headquarters

- Oxford High School

These assessments focused on site conditions, the health of existing pollinator habitats, and opportunities for enhancement.

MEETING WITH OXFORD POLLINATOR GROUP

Presentation to the Oxford Pollinator Group

Following the site evaluations, the Weston & Sampson team delivered a comprehensive presentation to the Oxford Pollinator Group. Key topics covered included:

Project Overview: An introduction to the Petroleum to Pollinator Project and its overarching goals.

Existing Conditions: Analysis of current pollinator habitat conditions and opportunities for growth.

Stormwater and Heat Assessment Maps: Data-driven insights illustrating environmental challenges and opportunities for nature-based solutions.

Nature-Based Solutions: Strategies for integrating sustainable, resilient practices to support pollinator populations and improve overall ecological health.

Outcomes and Feedback

The meeting provided an opportunity to gather valuable input from the Oxford Pollinator Group, helping to refine the project and align it with local priorities and community needs. This collaborative exchange marked an important milestone in the Petroleum to Pollinator Project, establishing a strong foundation for concept design and future project implementation.

COMMUNITY ENGAGEMENT

Community Suggestions

- **Accessibility:** Concerns about accessibility were raised, and the project team confirmed that the park will be ADA accessible.
- **Neighborhood Integration:** Residents emphasized the need for designs that align with community priorities, such as picnic areas, safer sidewalks, and bike trail connections. Further analysis on user groups is needed to accommodate the appropriate demographics.
- **Garden Expansion:** Suggestions included expanding the pollinator garden map to include additional town-owned fields.
- **Connectivity:** Broad support was expressed for improving access, usability, and overall connectivity of the site within the town.
- **Educational Space:** Suggestions included using the park as an outdoor laboratory to implement pollinator gardens and experiment with remediation. Residents would like to see educational signage and connections to other sites.

MEETING WITH OXFORD POLLINATOR GROUP

COMMUNITY ENGAGEMENT

POLLINATOR GARDEN AT DPW HEADQUARTERS

SIGNAGE AT DPW HEADQUARTERS

SIGNAGE AT SENIOR CENTER POLLINATOR GARDEN

POLLINATOR GARDEN AT SENIOR CENTER

OXFORD HIGH SCHOOL POLLINATOR MEADOW

SIGNAGE AT HIGH SCHOOL MEADOW

Town of OXFORD MASSACHUSETTS

PETROLEUM TO POLLINATOR

OXFORD, MA

Weston & Sampson℠