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ACKNOWLEDGMENT:

We would like to thank the Town of Goshen, especially Angela Otis of the Town Select Board and Joan Griswold of the Complete Streets Committee, for providing helpful guidance and feedback throughout the process of developing this report. Special thanks to community and Town committee members who attended public meetings and shared their visions for Goshen. We also appreciate the support of Goshen's Highway Department, Healthy Hampshire, and Hilltown CDC.

INTRODUCTION & GOALS

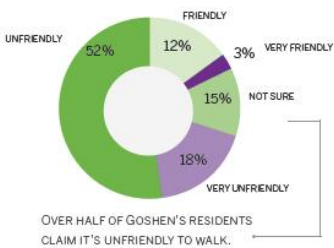
PROJECT OVERVIEW

Goshen is blessed with a stunning natural landscape of rolling hills, a variety of wetlands, ponds, and lakes, and views of the Holyoke Mountain Range. The largely forested and minimally developed landscape is treasured by local residents and draws outdoor enthusiasts to the D.A.R. State Forest, Lily Pond Wildlife Management Area, and Tilton Farm. Goshen's Town Center, however, doesn't align with its surrounding beautiful landscape. Many people who travel through the Town Center don't realize they're entering a town because vegetation is sparse, the speed limit remains 40 mph, there are no signs or other visual cues indicating entrance into a town, and the density of buildings is not significantly different from areas outside of the Town Center along Route 9. Community members are displeased with the current landscape of the Town Center and perceive it as being ambiguous with large swaths of undefined space that feels un-enjoyable and unsafe to walk through. Currently, a sidewalk extends a quarter mile through the center of town, but there are no designated sidewalks or paths between the Town Center and any of the popular recreation areas, and there is no signage informing and directing visitors to these destinations. Reaching these destinations on foot requires walking within roadways, where many rural town roads experience drainage problems and create unpleasant walking conditions, which deters many people from walking.

The Town Center is bisected by a heavily trafficked State highway, Route 9, that contributes to the uncomfortable pedestrian experience and feeling of unsafe walking conditions. In 2003, the Massachusetts Department of Transportation calculated the average daily traffic on Route 9 to be 3,861 vehicles, which has since increased 8% to approximately 4,200 vehicles. With traffic volumes expected to increase, there is a pressing need to implement traffic slowing techniques like street trees, raised crosswalks, increased vegetation, and signs to improve the pedestrian experience in town. In 2017, Goshen launched a Complete Streets Initiative, which helped identify and focus design efforts based on residents' opinions as to why Goshen is unfriendly to walk within. Most residents believe there needs to be more sidewalks, ways of slowing traffic, safe pedestrian corridors, and more Town Center attractions or destinations.

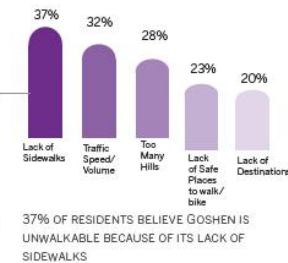
Goshen's Complete Streets Policy emphasizes safe walking, signage, streetscape design, and walking trails that connect the Town Center to the DAR State Forest and other recreational areas. This project applies this policy to the redesign of the Town Center, creating a sense of place, encouraging pedestrian activity, calming traffic, and contributing to a sense of community.

HOW FRIENDLY IS GOSHEN TO WALK?



FROM 2017 COMPLETE STREETS WALK AUDIT

REASONS IT'S UNFRIENDLY TO WALK:



COMMUNITY MEETING FEEDBACK

A community meeting held in the beginning of Spring 2019 brought together residents, committee members, and representatives from Hilltown Community Development to share their vision for Goshen's Town Center. Residents would like the Town Center to be a destination for visitors and local residents of all ages and abilities with improved pedestrian infrastructure to encourage pedestrians to walk to Goshen's natural assets and destinations. Community members believe they would spend more time in the Town Center if it had purposeful destinations and an attractive landscape, and provided safe walking connections to recreational destinations. With unanimous agreement, residents believe the Town Center should adopt traffic calming techniques.



Community members brainstorm ideas for their Town Center at a community meeting held in Spring 2019.

COMMUNITY IDENTIFIED ATTRIBUTES & ELEMENTS

community gathering spaces

gazebo
picnic tables/benches
space for lawn games
community garden
basketball court for kids
space for performances (music concerts)
space for events (farmers markets, food trucks, festivals)

scenery

street trees
pollinator gardens
more green!

amenities

bathrooms
cafe
snack bar
bike pump station
electric car charging port
adequate parking
ADA accessible pathways
sidewalk extensions

wayfinding

kiosk
welcome sign
street lamps

COMMUNITY VISION FOR GOSHEN'S TOWN CENTER



A walkable and connected Town Center that is safe, accessible, and enjoyable



An attractive Town Center landscape



Wayfinding that helps direct visitors to and inform them of Goshen's natural assets

The project focuses on the redesign of the Town Center, and additionally considers streetscape interventions for town roads throughout Goshen that address pedestrian safety, drainage issues, wayfinding, and traffic calming techniques.

GOALS FOR GOSHEN'S ROADS



Establish safe pedestrian pathways buffered from vehicular traffic



Slow traffic by implementing traffic calming techniques



Address drainage issues



Create wayfinding

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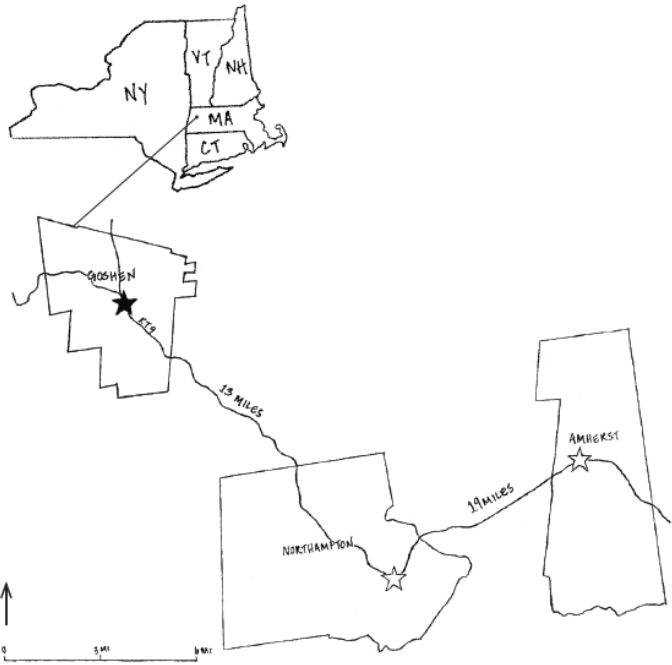
HISTORY AND REGIONAL CONTEXT

Goshen is a rural hilltown composed of about 17.7 square miles of dense forest, rolling hills, wetlands, ponds, and lakes within Hampshire County in the foothills of the Berkshires. Goshen's fairly remote location and large expanses of forest enable the town to maintain a quiet, country character.

Goshen is located approximately 13 and 20 miles northwest of Northampton and Amherst respectively. Interestingly, it is also within 30 miles of Vermont, Connecticut, New York, and New Hampshire. It has historically been and presently is perceived as a recreation and vacation destination within the Pioneer Valley by virtue of the D.A.R. State Forest drawing many visitors from these surrounding areas. Goshen has a much larger summer population with over 200 seasonal homes situated around the town's lakes and ponds, Lower Highland Lake in particular.

Goshen is considered a bedroom community due to relatively minimal industrial and commercial development and its proximity to larger cities and Interstate-91. According to the Pioneer Valley Planning Commission, 81% of Goshen's residents commute outside of Goshen for work.

The Town Center is situated along Massachusetts state highway Route 9 that spans the entire length of the State, bringing in large numbers of vehicle traffic. Route 9 bisects Town Center and the high volume of vehicle traffic negatively affects the pedestrian experience. Residents are interested in redesigning Town Center to entice more residents and visitors to stop and explore Goshen rather than treating it as a "pass through" town. The community is aging and widely dispersed throughout Town. Considering Goshen's aging population, there is a piqued interest in revitalizing Goshen's Town Center to encourage visitors and residents to gather and be able to walk safely and comfortably between destinations for health maintenance.



WHO'S IN GOSHEN?

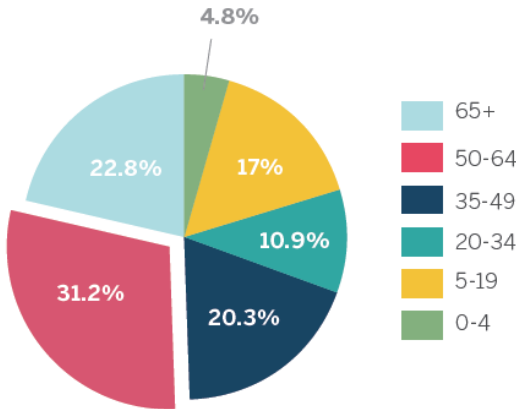
TOTAL POPULATION: 1,096

RACIAL MAKEUP: 98% WHITE, 1.5% ASIAN, 1.7% LATINO

WHERE RESIDENTS WORK: 81.2% OUTSIDE OF GOSHEN

MEDIAN AGE: 48.2 YEARS OLD

GOSHEN'S AGE DISTRIBUTION



SOURCE: 2017 U.S. CENSUS BUREAU, AMERICAN COMMUNITY SURVEY

<p>MAY 14, 1781</p> <p>Goshen incorporated by residents of Chesterfield</p>	<p>1867</p> <p>Highland House Inn constructed in Town Center, south of the Church, to accommodate Goshen's many seasonal visitors.</p>	<p>1909 AND 1923</p> <p>Town Hall and Goshen Center School constructed in Town Center.</p>	<p>1950's</p> <p>Improvements to town roads, especially Route 9, made Goshen a thoroughfare for surrounding towns and nearby businesses.</p>	<p>2017</p> <p>Highland Village Senior Housing construction completed in Town Center. Complete Streets initiative launched.</p>
<p>PRIOR TO 18TH CENTURY</p> <p>Native Americans used the Goshen area as part of their hunting ground and for sugar procurement from the abundant maple forests.</p>	<p>1782</p> <p>Congregational Church constructed as a meeting house, effectively fixing the location of Goshen's Town Center.</p>	<p>1918</p> <p>Sam Tilton donates Tilton Farm to the Town. Tilton Farm is open to the public and is located a mile from Town Center.</p>	<p>1928</p> <p>Daughters of the American Revolution State Park established. The D.A.R.'s outdoor recreation opportunities draw thousands of visitors to Goshen every year.</p>	<p>1976</p> <p>Highland House demolished and replaced by tennis court, Veteran's Memorial Garden, and large parking lot.</p>

Not for construction. Part of a student project and not based on a legal survey.

PROMISING RECREATION CONNECTIONS

Many people travel through Goshen's Town Center on the way to Goshen's plentiful outdoor recreation opportunities. The residents of Goshen wish to encourage use of these areas while preserving their ecological and scenic integrity by promoting conservation education and efforts.

Improving pedestrian infrastructure and wayfinding along busier roads like Route 9 and East Street within even a mile of Goshen Town Center could provide safe and convenient access to many of these areas from Town Center by foot or by bike for residents and visitors.

D.A.R. STATE PARK

The D.A.R. State Park was established in 1929 when John Tomlinson donated approximately 1,020 acres to the Daughters of the American Revolution. The Park has since grown to be 1,728 acres and is managed by the Massachusetts Department of Conservation and Recreation.

Drawing thousands of visitors each year, the D.A.R. contains 15 miles of recreation trails that host hikers, bicyclists, and horseback riders. In winter months these trails are open for snowshoeing, snowmobiling, and cross country skiing. While Lower Highland Lake is privately managed and its use reserved for adjacent homeowners, Upper Highland Lake allows public access for swimming, non-motorized boating, and ice fishing. Camping is also permitted within the park in four designated campground areas with 51 campsites.

The main entrance to the D.A.R. is one mile from Town Center on Route 112, also known as Cape Street. Alternatively, D.A.R. trails can be accessed via Tilton Farm on Wing Hill Road and from East Street past the D.A.R. Headquarters.

TILTON FARM

Tilton Farm, which spans 74 acres, is nestled at the southern edge of the D.A.R. and has 1.2 miles of public hiking trails, some of which connect directly to D.A.R. trails. There are also baseball fields and a basketball court that are open to the public, and the park has hosted community events in the past. Tilton Farm offers expansive views of the Pioneer Valley's rolling hills and the Holyoke Range. Tilton Farm is one mile east of the village center and can be accessed via East Street and Wing Hill Road.

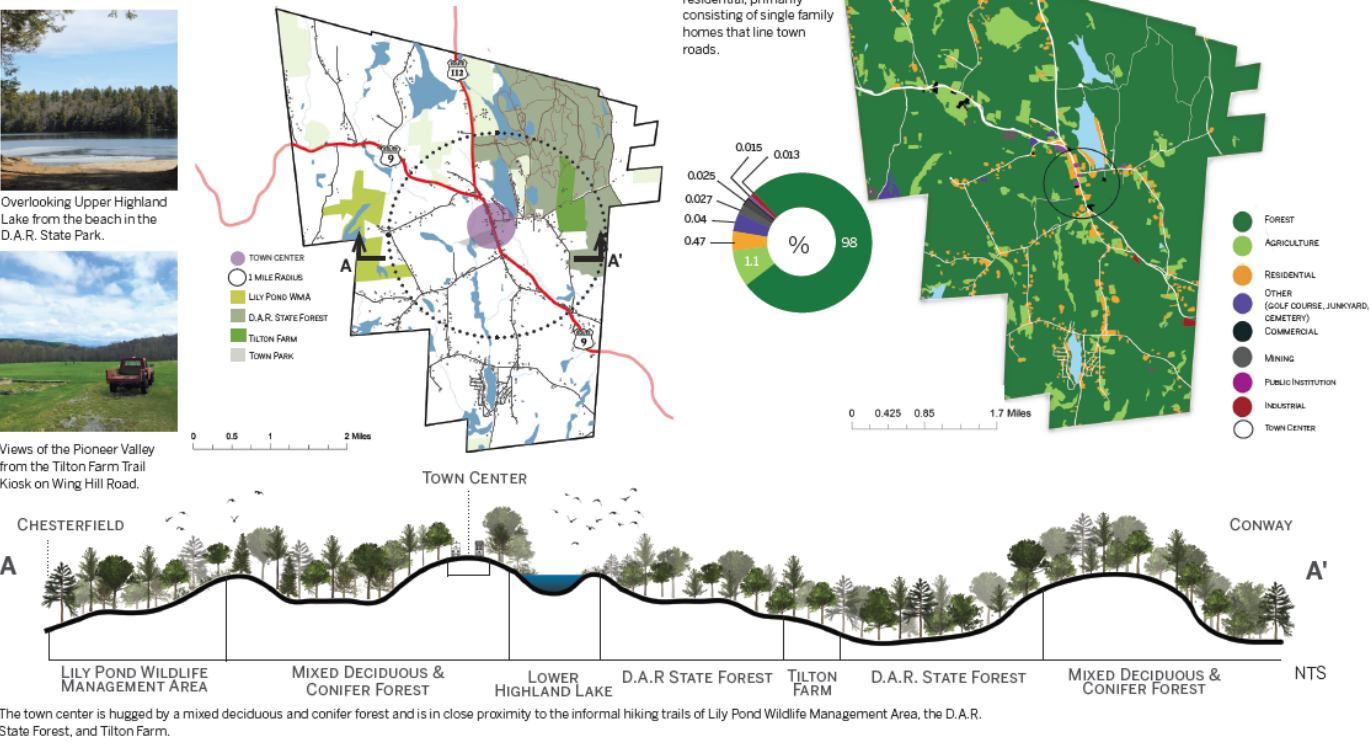
LILY POND WILDLIFE MANAGEMENT AREA

Lily Pond W.M.A. consists of 281.7 acres of gently rolling woodland located only half a mile east of 2,700 acres of state-owned protected open space and a quarter mile west of the D.A.R. There are no formal parking areas or trail systems, but the area can be accessed via Loomis Road and Ball Road and there are informal trail networks that pedestrians use. Visitors coming from the south need to drive through Town Center to access Ball Road.

Lily Pond Bog is considered a high quality level bog by MassWildlife and was identified as a priority natural community for protection in 2001. The site was previously owned by Five College's Inc. for ecological research purposes, but was donated to Massachusetts Department of Fish and Wildlife in 2004.

The bog is approximately 20 acres in size, surrounded by intact hemlock-red maple-yellow birch-red oak woods, with floating mats of leatherleaf, sweet gale, bog rosemary, and bog laurel. The southern portion of the bog abuts a healthy example of a spruce-fir forest, and a red maple shrub swamp further to the east. Herbaceous species like pitcher plant, round-

leaved sundew, virginia cottongrass, and rose pagonia can be found here. The site is frequented by a wide array of wildlife including Great Blue Heron, waterfowl, bats, moose, deer, coyotes, beaver, otter, fishers, and bears.

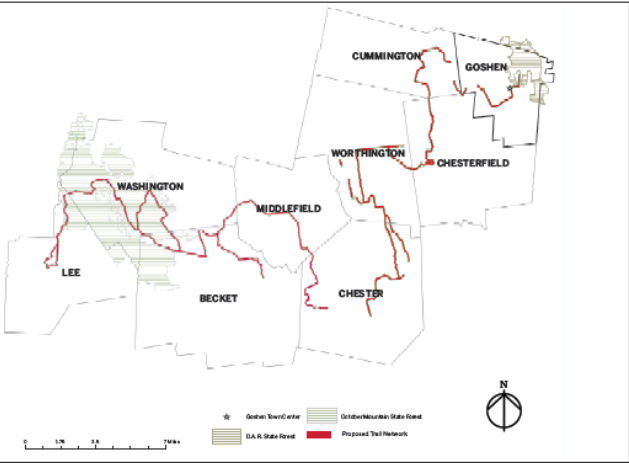


The town center is hugged by a mixed deciduous and conifer forest and is in close proximity to the informal hiking trails of Lily Pond Wildlife Management Area, the D.A.R. State Forest, and Tilton Farm.

PROPOSED HIGHLANDS FOOTPATH

In July 2016 the Pioneer Valley Planning Commission issued a report proposing a 40-mile long distance trail network connecting October Mountain State Park in Lee, Massachusetts, to D.A.R. State Park in Goshen, Massachusetts, calling it the Highlands Footpath.

According to the PVPC, the long distance trail is intended to connect existing local trail networks and provide support to smaller communities by drawing more visitors to these towns while maintaining their rural character. This trail network stands to benefit local community members, avid day hikers, and travelers seeking a longer journey by supporting the possibility of multi-day trips from town to town. If completed, with its proposed eastern terminus in the D.A.R. State Park, the Highlands Footpath could bring many more visitors through Goshen's Town Center.



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ECOLOGICAL CONNECTIONS

Goshen is nestled between the Berkshire Highlands/Southern Green Mountains and the Berkshire Transition ecoregions supporting a variety of coniferous and northern, central, and transition hardwood forests, grasslands, wetlands, riparian vegetation, and potential vernal pools; all important ecosystems that support a variety of rare and endangered species. Goshen's northern half is situated within a large contiguous tract of forested land that is not fragmented by development, which supports species highly sensitive to disturbance, and serves as a wildlife corridor. These ecosystems and associated flora and fauna are important resources for wildlife and humans as they provide many ecosystem services like flood control and improved air quality, and are part of what makes Goshen's recreational spaces and trails so appealing.

The redesign of the Town Center could seek to create direct pedestrian connections to and from recreational destinations that house many of these beautiful, rare and endangered species. With the potential increase in pedestrian traffic, it's important to provide educational signs in the Town Center as well as at the entrance of sensitive habitats to discourage potential environmentally harmful behaviors.

LILY POND LEVEL BOG

Acidic, peat covered wetlands (dwarf shrub peatlands) with distinct depressions and mounds of swamp moss within ~3000 acres of forested land support various rare and endangered species.



Bog Laurel



Sundew



Purple Fringed Orchid

POTENTIAL VERNAL POOLS

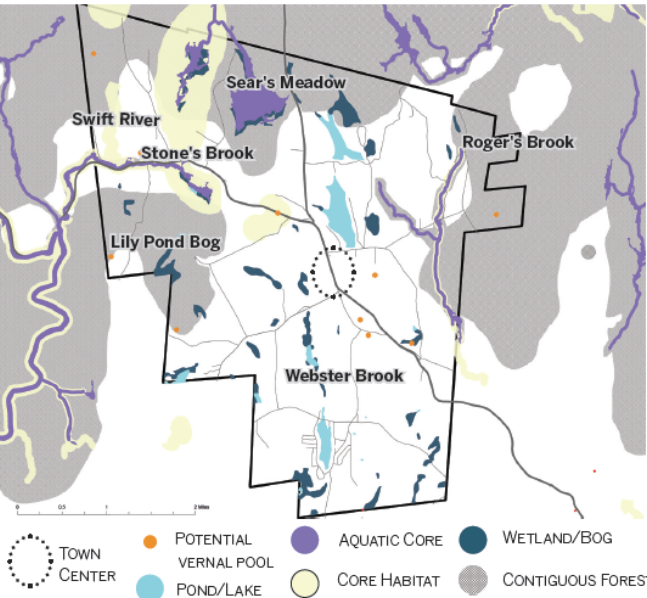
Vernal pools are seasonal pools of water that support a host of rare species. There are no certified vernal pools in Goshen, but there are 11 potential vernal pools located throughout the Town.



Wood Frog



Mole Salamander



THE SURROUNDING FOREST

comprises the following forest communities:

Hickory-Hop Hornbeam Forest/Woodland

Hardwood forests dominated by hickory species and hop hornbeam in the midstory with a contiguous cover of grasses and sedges.

Rich Mesic Forest

Hardwood forest, dominated by sugar maple. These moist, nutrient-rich environments support a diverse herbaceous layer with many rare wildflowers.

Hemlock Ravine Community

Evergreen forests, primarily consisting of hemlocks with dense closed canopies in moist north-facing slopes.

BERKSHIRE HIGHLANDS/SOUTHERN GREEN MOUNTAINS ECOREGION

GOSHEN

BERKSHIRE TRANSITION ECOREGION

SWIFT RIVER

A free-flowing river that meets the East Branch of the Westfield River, a National Wild and Scenic River, and supports approximately 22 rare and uncommon species, like the Endangered and endemic Lake Chub and Harpoon Club dragonfly.



Harpoon Club Dragonfly



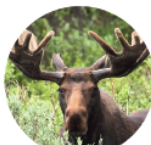
Lake Chub

WEBSTER BROOK

A sub-basin formed by several intermittent streams supports a variety of interesting wildlife like black bear and moose.



Black Bear



Moose

ROGER'S BROOK

A small stream within the West Branch of the Mill River provides core habitat that supports native trout species and endangered aquatic species like the Spring Salamander.



Spring Salamander

Not for construction. Part of a student project and not based on a legal survey.

TOWN CENTER



EXISTING CONDITIONS

ROADS

Massachusetts Route 9, also called Main Street, bisects Goshen's town center running north to south. Route 9 measures 24 feet wide, with two travel lanes, and a 10 foot state right-of-way on either side. This road experiences high volumes of commuter and truck traffic. East Street intersects Route 9 north of Town Hall, across from the Congregational Church. There are no traffic lights in Town, nor is there designated on-street parking on Route 9 or East Street. Visitors often informally parallel park their cars on East Street for events as an alternative to the large parking lot to the south of Memorial Park.

BUILDINGS

Within Town there is a general store, a post office, a large and seldom filled parking lot, a tennis court in disrepair, a new senior housing development, a Congregational Church, two municipal buildings that include the historic Town Hall and the former Goshen Center School, and a few private residences.

PEDESTRIAN INFRASTRUCTURE

The only sidewalk in Goshen parallels Route 9. The southern extent of the western sidewalk is located by Goshen's General Store, and the northern extent is by the Congregational Church.

A single painted crosswalk at the northern end of Town Center connects pedestrians from the west side of Route 9 to the east side and the town's

municipal buildings, where it connects to a shorter section of sidewalk that ends at East Street. There are signs along Route 9 to the north and south of the crosswalk that help signal to drivers that they are approaching a crosswalk where pedestrians might be present. According to residents, the high 40 mph speed limit on Route 9 makes these signs less noticeable and ineffective.

AMENITIES

Behind the municipal buildings is a playground and open field. The septic tanks, leach field, generators, and buried propane tank that service the municipal buildings are also located in this area. On the west side of Route 9 there is a tennis court that was donated to the town by Neil Damon in 1976. It is now in disrepair and unused.

Veteran's Memorial Park was erected in 1948 and pays homage to Goshen's history. Within the park are stone steps belonging to the former Highlands Hotel that used to stand where the large parking lot is now. There is also a Veteran's memorial stone, a 9/11 memorial stone, a historic well, two stone benches, and two flag poles.

VEGETATION

Mixed deciduous and conifer forest hugs the eastern and western edges of Town Center, but the Center itself is sparsely vegetated and lacks a cohesive landscape. The lack of vegetation contributes to a less welcoming atmosphere and a hot summer landscape. Existing vegetation does little to define spaces, signal a town center, or reinforce circulation patterns.

WETLANDS

North of senior housing and church parking lot is a wetland that has been delineated. Land within 100 feet of the wetland is regulated through the Wetlands Protection Act. To the east of the playground is an area that the D.E.P. mapped as likely a wetland. South of the playground and west of the post office are two potential wetland areas. Activities within and around these three potential wetlands may also be regulated.



1 A semi truck heads south on Route 9 toward the pedestrian crosswalk.



2 The sidewalk ends at Goshen's General Store to the south of the Town Center.



3 The U.S. Post Office is one of a few businesses in the Town Center.



4 A large, often vacant parking lot is abutted to the west by a defunct tennis court, and the new senior housing development to the North.



5 The tennis court would cost approximately \$30,000 to refurbish and is rarely used.



6 It is difficult to distinguish Memorial Park from its surrounding landscape aside from the telltale features like flagpoles and memorial stones.



7 The sidewalk ends at the Congregational Church to the north of Town Center.



8 Town Hall and Goshen Center School appear stark in the sparsely vegetated landscape.



9 The new playground is seldom used because it is tucked out of sight behind the municipal buildings.



Not for construction. Part of a student project and not based on a legal survey.

THE PEDESTRIAN EXPERIENCE

TOWN CENTER

Many people pass through Goshen Town Center on their way to or from work, to get to nearby towns, or to reach Goshen's outdoor recreation areas. Not very many people stop to spend time in the center. Those who do are usually attending an event at Town Hall, heading to work at the municipal buildings, picking up a few items at the General Store, or grabbing their mail at the post office. A lack of gathering spaces, high speed vehicle traffic, and very little pedestrian infrastructure combine to create an unpleasant pedestrian experience in Town.

PEDESTRIAN INFRASTRUCTURE AND UNDER-USED SPACE

The only sidewalks in Goshen are in the Town Center, closely paralleling Route 9. On the west side of Route 9 a segment of sidewalk extends from the south at Goshen's General Store northward to the Congregational Church passing the post office, a large parking lot, a tennis court in disrepair, the Highland Village Senior Housing development, and the Veteran's Memorial Park along the way.

A painted crosswalk connects the west side of Town to the municipal buildings on the east side. This crosswalk connects to a short sidewalk extension that briefly leads north, past Town Hall, to East Street. Occasionally the Town places a movable crosswalk sign in the middle of Route 9, but it often gets run over and dragged away by cars.

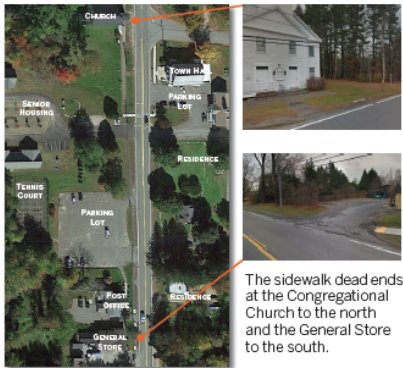
This lack of pedestrian infrastructure has led to the creation of desire paths, or convoluted patterns of pedestrian circulation that, though they are direct, are not necessarily pleasant to travel on or accessible, and cause soil compaction. Additionally, this lack of pedestrian pathways causes many areas within the existing landscape to go unvisited. Town Center also lacks amenities like public restrooms, restaurants, or public information kiosks.

VEHICLE TRAFFIC

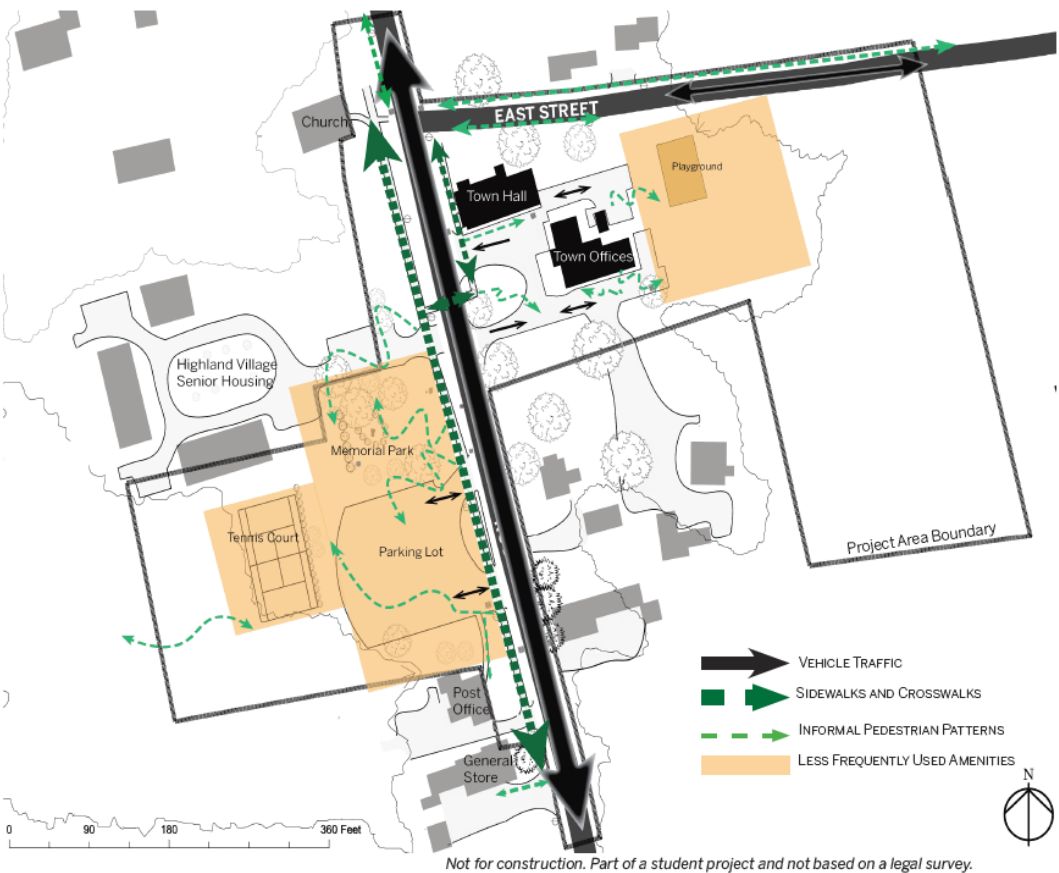
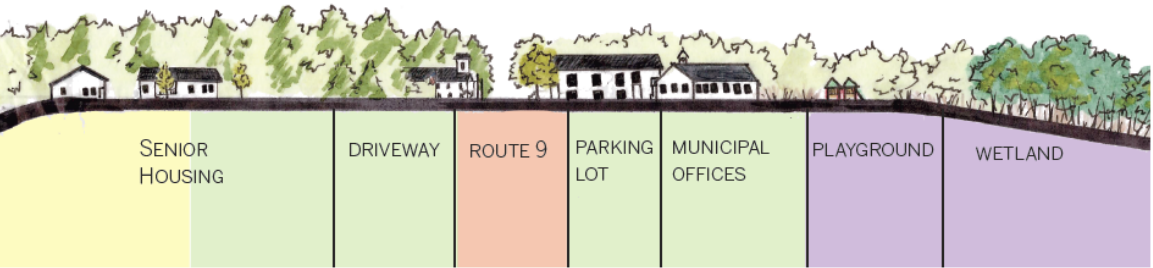
Route 9 is a main thoroughfare for high volumes of commuter traffic to nearby towns and truck traffic servicing local industries with a posted speed limit of 40 mph. Unfortunately, many drivers who enter Goshen do not realize that they are entering a zone where pedestrians might be present due to a lack of visual cues and traffic slowing measures.

Vehicle traffic speed and noise volume strongly contribute to pedestrians feeling unsafe and uninterested in spending time in Town. According to decibel (DB) data gathered during a weekday, the noise along Route 9 is equivalent to that of a vacuum cleaner running continuously, and at its loudest reaches noise levels equivalent to that of a rock band. (See graphic at top right.)

Improving pedestrian infrastructure, employing traffic calming techniques, and creating more gathering spaces away from Route 9 can improve the pedestrian experience of Town Center. Adding vegetation can create a more intimate landscape and a sense of being buffered from the roadway.



SOUND IN TOWN



Not for construction. Part of a student project and not based on a legal survey.

VEGETATION AND MICROCLIMATE

VEGETATION



Plant species in italics are considered invasive in the State of Massachusetts

SURROUNDING FOREST
Mixed Deciduous & Conifer

- White Pine
- Red & Silver Maple
- Beech
- Oak
- Ash
- Birch
- Spruce

The majority of the surrounding canopy is deciduous, exposing much of the Town Center to harsh winter winds.

STREET TREES

- Norway Spruce
- Oak
- American Linden

The area along Route 9 is sparsely vegetated and existing vegetation lacks diversity. Increasing street tree abundance may help to slow traffic.

VETERAN'S MEMORIAL PARK

- Hydrangea
- Burning Bush
- Arborvitae
- Mtn. Laurel
- Daylily
- Norway Maple
- Red Maple
- American Linden
- Ash
- Yew
- Dogwood

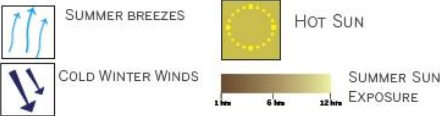
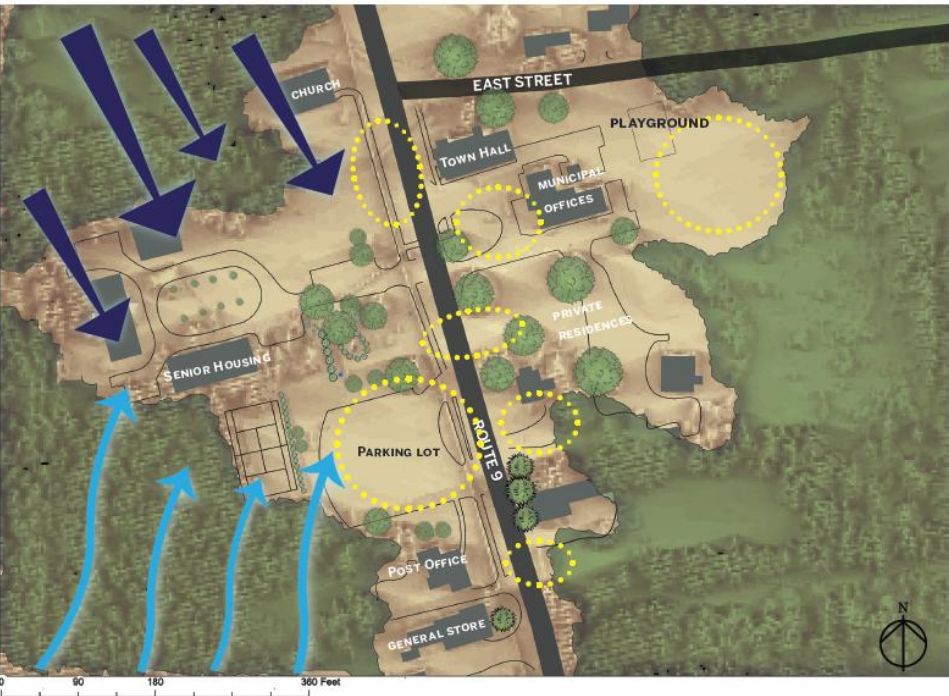
The red maple tree was planted by the Women's Club in memory of 9/11 victims. The two hydrangeas near the parking lot are remnants of the historic hotel yard that used to exist in the parking lot's place and community members would like them to remain.

TENNIS COURT & PARKING AREAS

- Yew
- Japanese Knotweed
- Burning Bush
- Sugar Maple

The area around the tennis court and parking lot has limited species diversity. Removal of invasive species and planting diverse native species can increase biodiversity and resilience to blights that affect single species.

SUN, SHADE & MICROCLIMATES



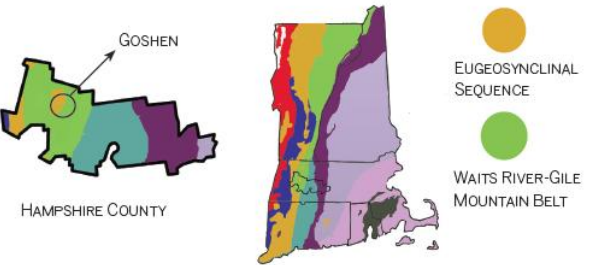
The high elevation, approximately 1450 feet, of Goshen's Town Center exposes it to cold winter winds from the north and refreshing summer breezes from the south. The Town Center is hugged by a mixed deciduous and conifer forest, providing partial shade along the outer edges of town and some protection against harsh winter winds. While the Town of Goshen is heavily forested, the Town Center is sparsely vegetated with only a few street trees along Route 9. Large gaps between street trees and very little canopy cover throughout the Town Center creates large areas of full sun exposure and high heat during summer months, creating uncomfortable conditions for pedestrians. *Reducing gaps in canopy along Route 9 by planting street trees can serve as a traffic-calming tool and provide a more comfortable and enjoyable walking experience.*

Adding shade structures and/or vegetation throughout the Town Center can protect pedestrians from the hot summer sun and help reduce high wind speeds to provide a more comfortable environment. Paved surfaces like the large parking lot, sidewalks along Route 9, and the parking lot in front of Town hall, are exposed to sun and these surfaces absorb the sun's energy and contribute to hotter microclimates during the summer. *Reducing impervious surfaces throughout town and increasing vegetation can help cool the landscape and stormwater runoff, which helps keep nearby waterbodies at lower temperatures in the summer, and provide pedestrians with a shady reprieve from hot summer sun.*

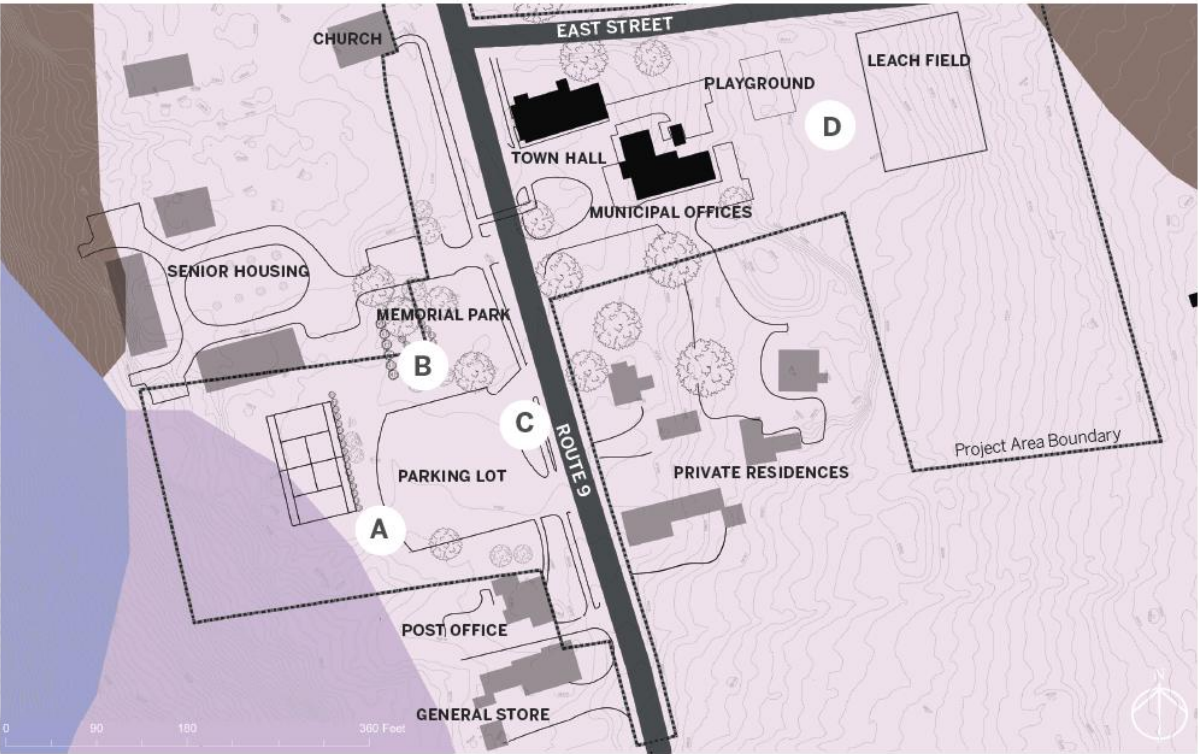
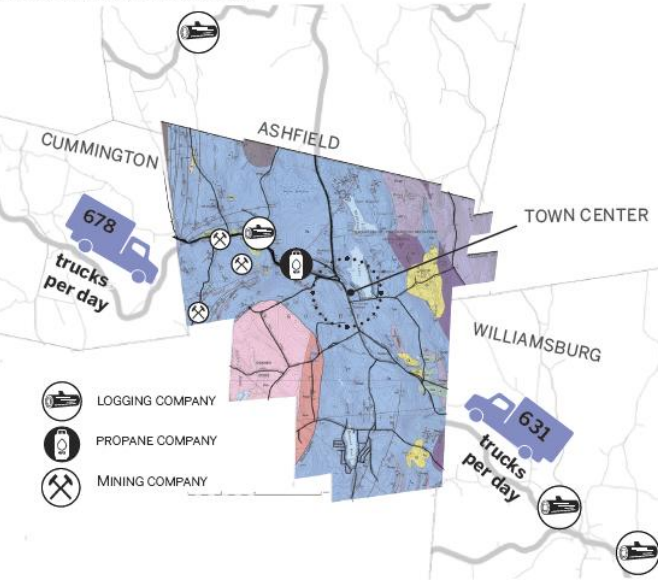
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GEOLOGY AND SOILS

The bedrock of Goshen is part of an eroded core of ancient mountains formed over half a billion years ago and extends from Long Island Sound, through western Massachusetts, up to Vermont and into Quebec. Under extreme heat and pressure, these mountain sediments metamorphosed into the Eugeosynclinal Sequence and the Waits River-Gile Mountain Belt that form the bedrock of Goshen today. These formations constitute large abundances of schists and phyllites (lustrous slaty rocks), and marble.



Goshen is most predominately known as the birthplace of Goshen Stone, a highly valuable stone often used in landscaping and patio design, due to the large abundances of schist and quartz rock found throughout its below-ground landscape. There are several quarries located in the northwestern area of Goshen that contribute to high levels of truck traffic. Goshen is also sandwiched between three large logging operations in Ashfield and Williamsburg, and an in-town gas and logging company. These factors contribute to the high truck traffic volumes traversing through Town Center. Mass DOT estimates that approximately 678 trucks enter Goshen daily from the Cummington direction and 631 from the Williamsburg direction. These trucks contribute to high noise levels, high speeds, and poor air quality, all factors creating an unpleasant and unsafe walking experience.



Over the last million years, glaciers have repeatedly advanced and retreated across the northeast, with the most recent reaching its maximum about 20,000 years ago. As the glaciers retreated, the Laurentide ice sheet shed its rocks and sediments, leaving a 10-15 foot thick blanket of glacial till. This heterogeneous mix of sand, gravel, boulders, and clay now drapes the glacially polished and scratched bedrock of the Berkshires and is what determines the underlying soil structure of Goshen. The Town Center is dominated by a tunbridge-lyman soil complex, a well drained loamy soil that may be shallow to bedrock in certain areas. There may be a need to build up soil before planting large street trees to prevent windblown trees and ensure long-term viability of trees. Soil tests were conducted for four different areas within the Town Center; the tennis court area, Memorial Park, the right of way where street trees would be planted, and the playground area. All sites contain low to very low nutrient levels, and soils within the right of way were slightly acidic. Strategies for soil nourishment may be necessary, specifically in areas proposed for growing food, which may include applying compost, organic fertilizer, and cover crops.

SOIL TESTS

A TENNIS COURT AREA pH: 5.8 very low P, K, Ca, Mg nutrients high aluminum levels 144 (optimum range: <75) high iron levels 16.8 (optimum range: 2.7-9.4) very low lead levels 0.7 (optimum range: <22)	B MEMORIAL PARK pH: 5.5 very low P & low K, Ca levels optimum Mg levels high aluminum levels 109 (optimum range: <75) very low lead levels 1.2 (optimum range: <22)	C RIGHT OF WAY pH: 7.3 (slightly acidic) very low K, Ca, Mg & low P levels low lead level 8.1 (optimum range: <22)	D PLAYGROUND AREA pH: 5.4 very low P, Ca nutrient levels optimum K & Mg levels low lead level 1.9 (optimum range: <22) high aluminum 115 (optimum <75)
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SOIL TYPES

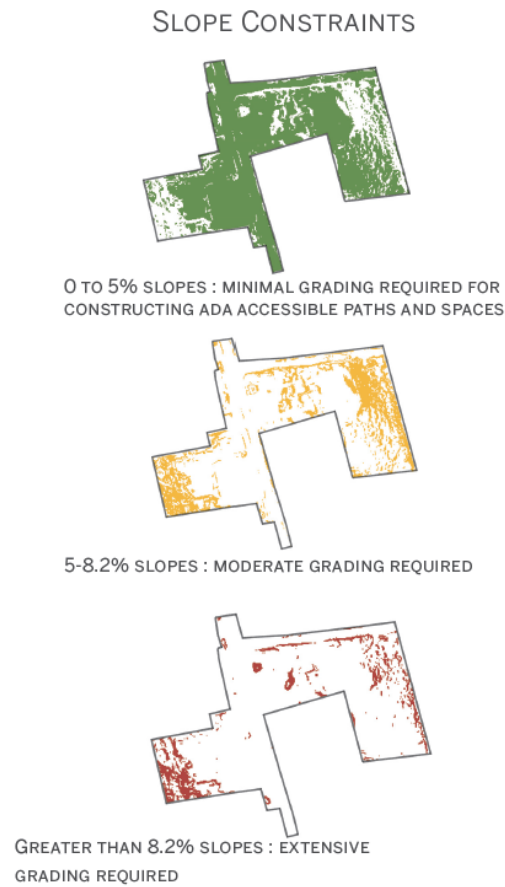
- TUNBRIDGE-LYMAN COMPLEX**
shallow to moderately deep, well drained to excessively drained
loam/fine sandy loam, shallow to bedrock in some areas
- MARLOW-BERKSHIRE COMPLEX**
deep, well drained
loam with moderate permeability
- PERU-MARLOW ASSOCIATION**
moderately well drained, deep loam, slowly permeable to wet conditions
- TUNBRIDGE-LYMAN ASSOCIATION**
extremely stony, excessively drained
moderately rapid permeability
loam/fine sandy loam
shallow to bedrock in some areas

SLOPE & DRAINAGE

Goshen is situated approximately 1,450 feet in elevation, the highest of its neighboring hilltowns, and comprises part of the Eastern foothills of Vermont's Green Mountains. Goshen's topography is characterized by undulating moderate uplands broken up by wetland and swamp intervals.

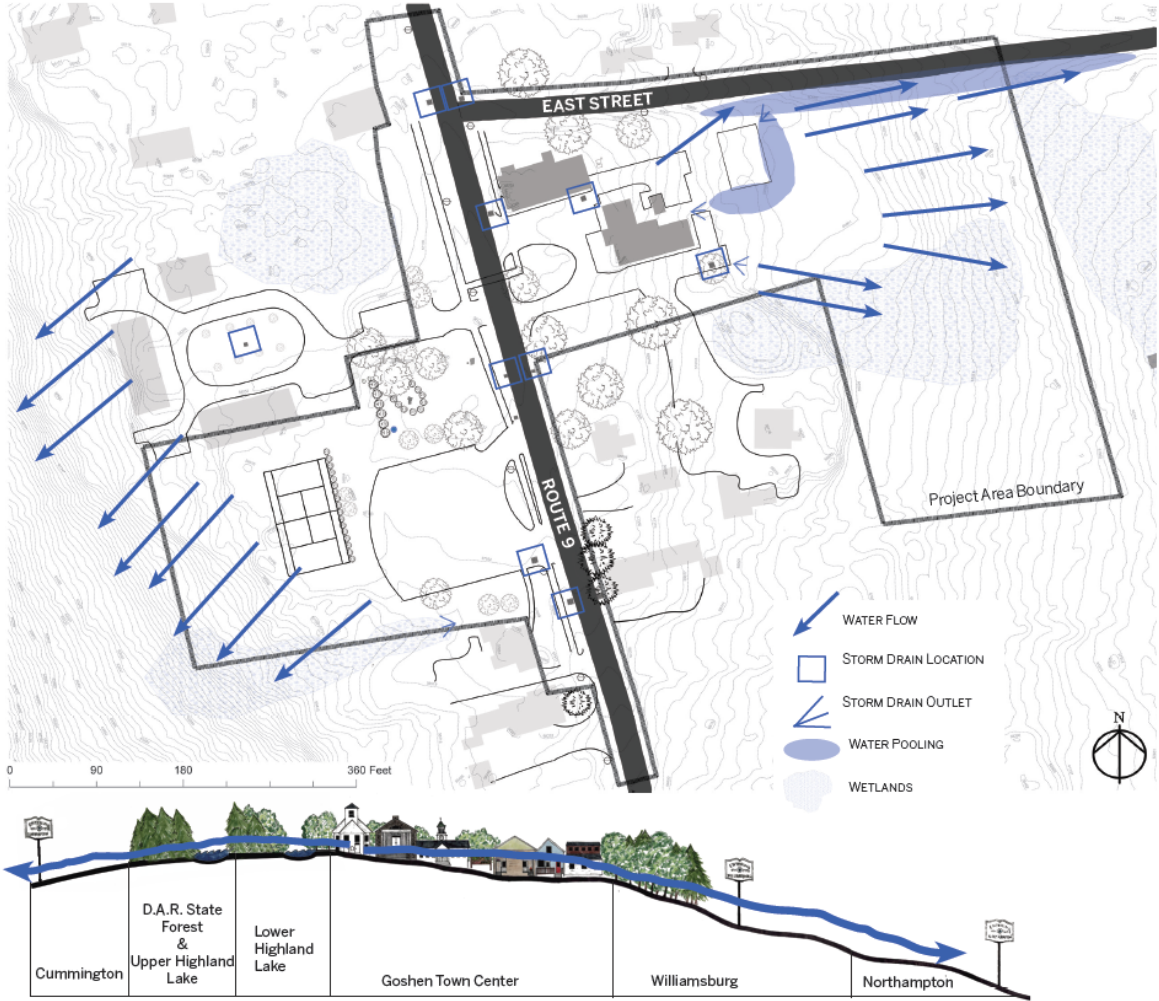
The majority of Goshen's Town Center is dominated by gently sloping (0-5%) topography, located along Route 9 and expanding outward until the eastern and western edges of town transition into moderate (5-8.2%) and steep slopes (greater than 8.2%).

The predominately flat nature of Town Center is conducive to creating ADA accessible pathways to areas of use, but along the border of Town Center, moderate to significant grading may be required to create accessible pathways and spaces on slopes above 5%.



Goshen is part of the Deerfield, Westfield, and Connecticut River watersheds and the Town Center's topography means that all water flowing off the Town Center drains downhill into observed wetlands, surrounding woodlands, and eventually into the three rivers that the watersheds are named after. Stormwater follows the path of least resistance from Route 9, down steep slopes that border the eastern and western edges of the Town Center. Impervious surfaces like East Street, Route 9, the tennis court, and parking lots prevent infiltration into soil and result in an increase in runoff that is of high velocity during rain events. There are storm drains along Route 9 that collect runoff which feeds into storm drain pipes where water is discharged into areas of wooded scrub-like vegetation creating wetland-like conditions. There is also a storm drain outlet behind municipal buildings that directs water directly along East Street, creating unpleasant walking conditions, and ultimately into a DEP mapped wetland.

Slowing, treating, and infiltrating stormwater runoff on-site can reduce the amount of runoff entering the stormwater system. Increased vegetation, rain gardens, and bioswales can help slow the rate and volume of runoff and reduce pressures on the storm sewer system, while improving water quality by filtering and absorbing pollutants.



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ZONING AND REGULATIONS

WETLANDS

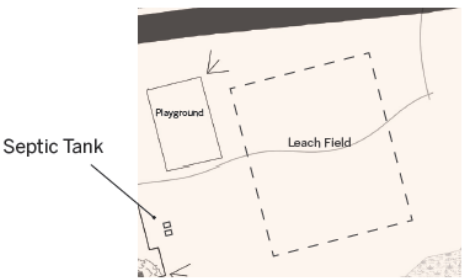
There is a delineated wetland near the senior housing complex and the Congregational Church. The Massachusetts Department of Environmental Protection (MassDEP) regulates this wetland and prohibits any activity within the wetland itself. Certain activities are also restricted within a 100-foot protective buffer around the wetland. Any alterations or work performed within 100 feet of the wetland would require permission and guidance by Goshen's Conservation Commission. There are three observed wetlands within the Town Center. Pending professional delineation, it is recommended that a 100-foot buffer be applied to each for planning purposes to help preserve the ecological integrity of these potentially sensitive habitats.

WELLHEAD

There is a 207-foot deep well on the north side of the town office building. The well is currently inactive and unused as a public water system source. However, there are still protective regulations in place by MassDEP to help ensure the safety and purity of the well. There is a primary protection area around the well, known as Zone 1, which is a 100-foot protective radius around the wellhead that advises against the placement of septic systems, chemical storage, and certain uses including the application of pesticides and herbicides, and parking and vehicle use (MassDEP). Reducing impervious surfaces and increasing vegetation within Zone 1 can help reduce pollutant loadings in runoff produced within this area and filter runoff from Route 9 and nearby parking areas. Additionally, there is an interim wellhead protection area (406' buffer) around the wellhead that prohibits certain harmful land uses such as landfills, storage of hazardous materials, or creating impervious surfaces of more than 15% or 2,500 square feet of any lot, whichever is greater.

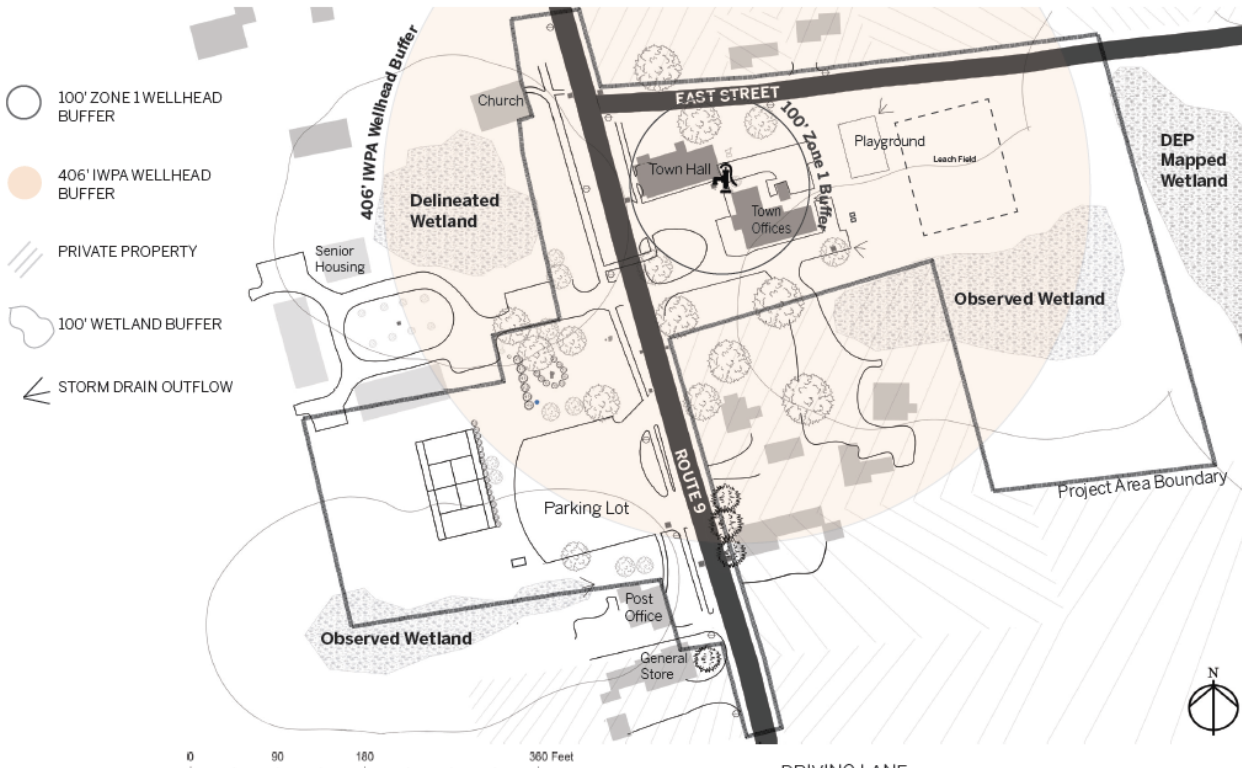
SEPTIC

Goshen does not have public sewer service so individual homes, businesses, and government facilities are responsible for the creation and use of septic systems. Town Hall and the town's municipal offices have buried septic tanks to the northeast of their buildings that flow into a leach field, located along the eastern border of the property. Any slab foundation or impervious surface additions behind town hall should be located at least 10 feet away from the septic tanks and leach field.



LAND OWNERSHIP

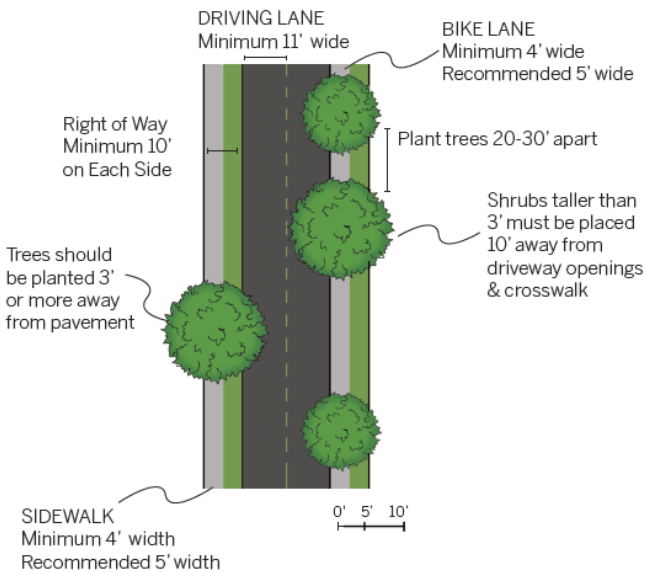
The project area comprises town-owned property and state-owned rights of way. If tree plantings or sidewalks are proposed outside this area, on private property, easements would be needed.



STREET DESIGN GUIDELINES

All roads in Goshen, including state-owned Route 9, must have a minimum 11-foot-wide driving lane and at least a 20-foot wide right-of-way (10' on each side of the road). Any proposed designs within the right-of-way of Route 9 must be approved by the Massachusetts Department of Transportation.

Currently, Route 9 is 24 feet wide, leaving only 2 feet of room to implement on street traffic slowing techniques that do not interfere with the driving lanes. Techniques like vegetated medians within this narrow space may instead pose a safety risk to drivers when their size is only two feet in width. Utilizing the right-of-way on Route 9 for traffic slowing techniques may be a more feasible option. Goshen's arterial, municipally-owned roads have lower traffic volumes; alterations to town roads are more flexible as long as 11-foot driving lanes are maintained.



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SUMMARY ANALYSIS

Though many people travel through Goshen's Town Center in vehicles, very few stop to visit or spend time in Town. Multiple factors contribute to an uninviting atmosphere that feels unsafe and unpleasant for pedestrian visitors. Pedestrian infrastructure does not extend beyond Town Center and Goshen's residents feel unsafe walking on Town roads.

VEHICLE TRAFFIC

State road Route 9 bisects Goshen Town Center and is a main thoroughfare for truck and commuter traffic. The speed limit is posted at 40 miles per hour, which feels considerably high to many Goshen residents. The high volumes of high speed traffic create a loud, busy environment that feels unsafe and is unpleasant for pedestrians.

Implementing more pedestrian infrastructure, traffic slowing techniques, and pedestrian signage, adding vegetation, and creating gathering spaces further away from Route 9 could help signal to drivers that they are entering a pedestrian friendly zone and engender a more pleasant and safe pedestrian experience.

Any trees within the right-of-way would need to be limbed up 8 feet from the ground and any shrubs could not exceed 3 feet in height to preserve line of sight.

LACK OF PEDESTRIAN INFRASTRUCTURE

When residents do visit Town Center, they are often visiting the municipal buildings, stopping by the General Store, or going to the Post Office. Currently there is a small segment of sidewalk that parallels Route 9 from Goshen's General Store to the Congregational Church on the west side. A pedestrian crosswalk connects walkers from this western portion of sidewalk across Route 9 to the municipal buildings. From the crosswalk a short segment of sidewalk passes in front of Town Hall and dead ends at East Street.

Aside from this, there are no other pathways drawing people further into the landscape causing many spaces to go unused and subsequently unmaintained. Goshen's residential population is widely dispersed across town and few events draw many people to town at the same time. The large parking lot is rarely used. Additionally, many residents agree that the space occupied by the dilapidated tennis court could be repurposed to better serve the needs of Goshen's senior community. Furthermore, because the sidewalk dead ends at the northern and southern extents of Town Center, walking to other destinations, such as Tilton Farm or Lower Highland Lake, from this area does not feel especially safe or convenient.

With the new senior housing development, there is renewed interest amongst Goshen residents in creating more structured outdoor gathering spaces for community events and socializing and improving pedestrian infrastructure to make these spaces accessible to people of all ages and abilities.

Improving pedestrian infrastructure by adding paths that extend into the landscape and to other destinations, crosswalks, and signs in Town Center could help guide visitors further into the landscape. Downsizing and reconfiguring the parking lots, and renovating the currently unused spaces into gathering spaces with amenities will allow residents and visitors to have a more enjoyable and meaningful experience in Town. Ensuring that pathways are compliant with ADA standards will make them accessible to all of Goshen's residents.

HOT MICROCLIMATES

Currently, downtown Goshen is sparsely vegetated leaving large areas of Town exposed to full summer sun and creating hot microclimates within these zones.

Adding vegetation and/or shade structures can help ameliorate these hot conditions while also contributing to the scenery.

DRAINAGE ISSUES

The large parking lots and roadways amount to a large area of impervious surface in the Town Center. Any precipitation that falls within the project area flows off of Town Center and into the surrounding lowlands. This runoff is contaminated by road level particulates from Route 9.

Much of this runoff is funneled into drainage pipes that have outflows to the east and west of Route 9, or travels down the edges of East Street toward the DEP mapped wetland. These outflows create wet conditions, most notably in

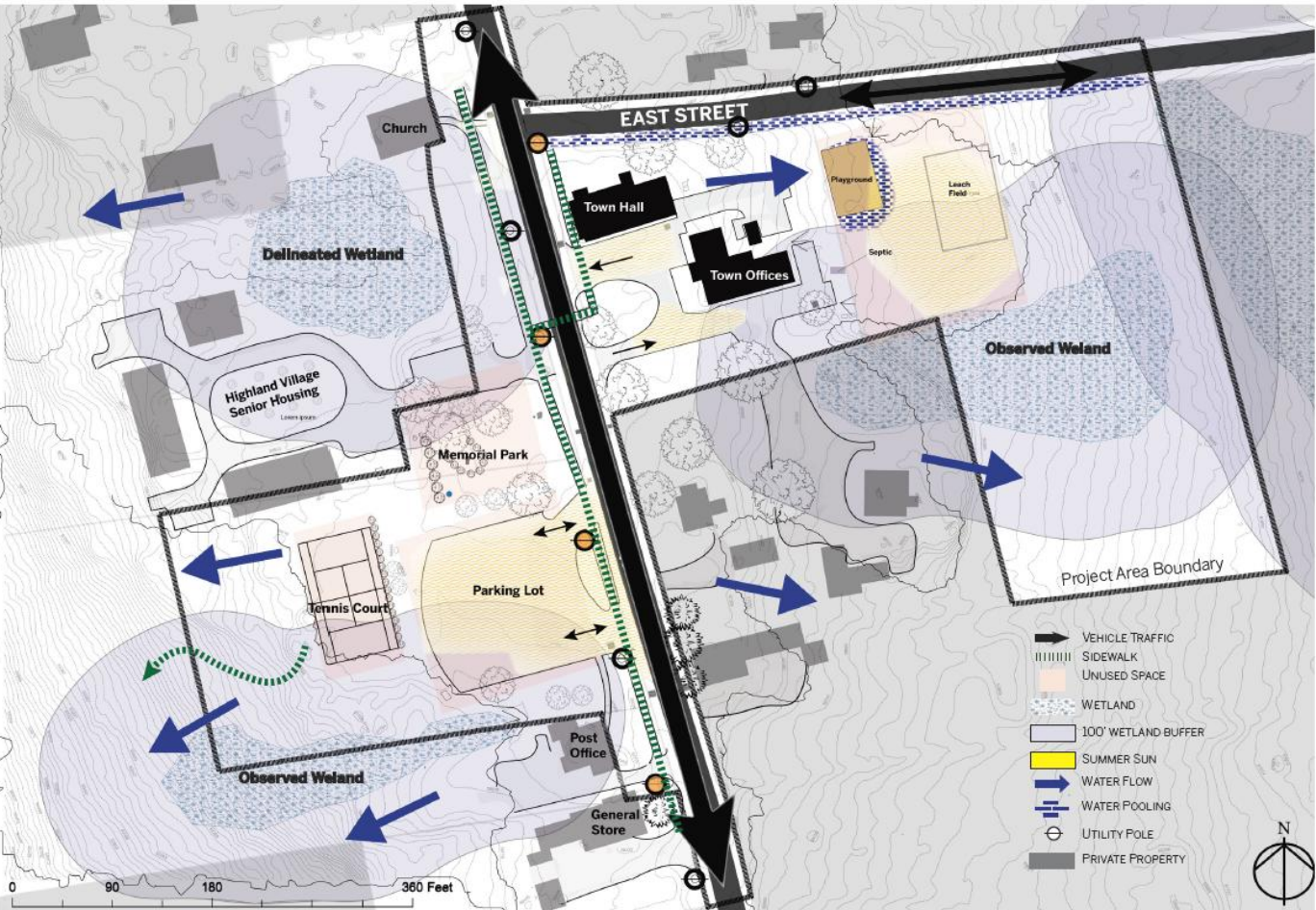
the field by the playground. These soggy areas are unpleasant to walk and spend time in.

By implementing green infrastructure and adding vegetation, a large amount of runoff can be absorbed and filtered before reaching wetland resource areas and creating soggy conditions. Wetland buffers may also constrain design interventions.

UTILITIES

Utility poles with overhead wires line the western sidewalk and Route 9.

Any proposed structures or vegetation would need to be a certain height to avoid interfering with the wires.



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PRELIMINARY DESIGN ALTERNATIVES

The following two design alternatives were informed by site analysis of Goshen Town Center, previous community efforts, and community participation. Each design alternative creates a buffer between vehicle and pedestrian thoroughfares, enhances areas of use and creates gathering spaces, extends sidewalks past Town Center, enhances the ecological integrity of the site, and incorporates traffic slowing techniques.

ALTERNATIVE 1: A WOVEN LANDSCAPE

This alternative, connected by sinuous pathways between the Town Center and surrounding landscape, invites visitors to enjoy the Town Center in a variety of ways: sensory, commemorative, educational, and social.

AXONOMETRIC VIEW



DESIGN DETAILS



A coffee hut, informational kiosk, and pollinator gardens replace a portion of the former parking lot on the west side of Route 9. Meandering pathways guide visitors away from the road and into the landscape.



The municipal parking lot has been relocated behind Town Hall and replaced by a courtyard garden. Municipal employees can enjoy some time outdoors or visitors can stop for a picnic lunch and children can visit the playground down the pedestrian path to the northeast. A colorful, raised crosswalk and a flashing crosswalk sign are eye catching and signal to drivers to slow down.



ATTRIBUTES

- (+) Traffic slowing techniques include a raised and colorful crosswalk, a rapid flashing beacon, street trees, and pollinator plantings that are visual cues for drivers to slow down and pay attention to pedestrians.
- (+) Wayfinding such as an information kiosk help direct visitors to destinations outside of the Town Center and inform them of Goshen's history.
- (+) Pathways bring visitors away from Route 9 and into the woodland and wetland edges of Town Center.
- (+) Lawn space retained and modified with reinforced turf to accommodate pop up events like a farmer's or artisan's market and emergency vehicles who may need to access the fire pit area.
- (+) Enhances the ecological integrity of the site by adding vegetation and treating stormwater runoff

LIMITATIONS

- (-) Moving the municipal parking lot behind Town Hall would require moving the buried propane tank and generators to another location. Additionally, relocation may be limited within the wellhead protection area.
- (-) Grading will be required to create ADA accessible pathways and the woodland amphitheater.
- (-) Maintenance of the pollinator gardens may be time consuming and cost prohibitive.

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PRELIMINARY DESIGN ALTERNATIVES

ALTERNATIVE 2: TRADITIONAL TEMPLATE

Compared with the sinuous patterns of Alternative 1, Traditional Template follows the existing, rectilinear structure that is typical of colonial New England landscapes. It creates formal, designated zones of use for people to gather and engage with each other and the landscape. Street trees create starker separation between pedestrian and vehicle traffic.

AXONOMETRIC VIEW



DESIGN DETAILS



Short stature street trees provide visual cues to drivers to slow down and do not interfere with the existing overhead utility wires. Street lamps hold banners welcoming visitors to Goshen and improve safety for walking at night. A modified parking lot accommodates 22 vehicles with pathways leading to gathering spaces further in the landscape. Rain gardens provide scenery and help treat stormwater runoff.



The municipal building parking lot remains and is modified to accommodate 14 vehicles, but does not extend past Town Hall's eastern edge. The lot is designed for one way entry and exit but allows for two way traffic on its southern edge to serve the needs of the police station and the private residents whose property abuts the parking lot. Rain gardens with shade trees help to frame the two historic buildings and to treat stormwater runoff.



ATTRIBUTES

- (+) Traffic mitigation techniques include a double allée of street trees along Route 9, and an added crosswalk in front of the post office to an eastern sidewalk addition along Route 9. There is also a crosswalk from Town Hall to a sidewalk addition along Route 9 that extends to Tilton Farm.
- (+) A walled, courtyard Memorial Garden provides a more intimate visitor experience, while a new green-roof pavilion, community garden, and woodland overlook boardwalk provide for gathering and event space.
- (+) A pedestrian path along the southern edge of Town Hall leads visitors to the playground and on street parking along East Street.
- (+) Enhances the ecological integrity of the site by reducing the amount of impervious surface by minimizing the size of the parking lots and adding vegetation to absorb stormwater runoff.

LIMITATIONS

- (-) Cuts down on the number of parking spaces in both parking areas which may be needed to accommodate attendees of a few larger community meetings or events at Town Hall.
- (-) Residents with properties along Route 9 and East Street may be resistant to sidewalk additions due to winter maintenance concerns.

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FINAL DESIGN

THE CENTER

The Center is the primary gathering area for community events and is a destination in itself. Open lawn space accommodates games, picnics, and pop-up events. Landscape features including a pavilion, woodland amphitheater, fire pit, and café seating area create destination points for visitors and are accessible via ADA pathways. Additional features within the redesigned Center include restrooms, electric car charging stations, and a coffee shop.

MEMORIAL GARDEN

Just north of the Center, the Memorial Garden is enclosed by a Goshen stone wall that creates a more intimate experience of the landscape. Rectilinear pathways divide the space into quadrants. A pergola shades the northwest corner. Memorial stones and steps, mementos of Goshen's history, remain commemorated within this space.

THE PARK

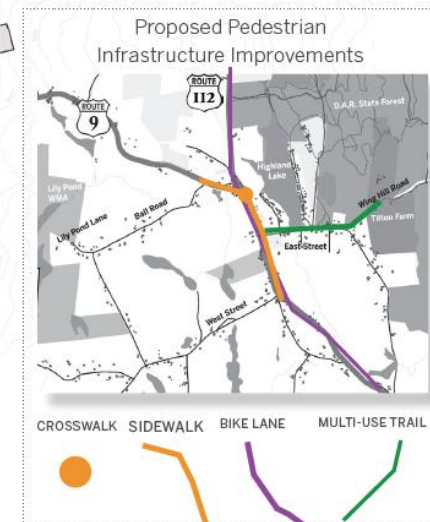
Visitors to this area can park along East Street or within the Municipal Offices parking lot and walk on ADA accessible pathways that are surrounded by a tiered community garden to the west and a sensory garden to the east. The redesign of this area includes a fence surrounding the playground, a versatile half court that can be used for basketball, pickle ball, or four square, and a seating area sheltered by a pergola. Trees provide shade from hot summer sun. A wildflower meadow and vegetated swale with check dams make an entry way to a wetland boardwalk that invites visitors on an educational journey into the woodland edge.

PEDESTRIAN CIRCULATION & PARKING

Pedestrian safety and comfort is improved by implementing traffic slowing techniques and expanding pedestrian infrastructure. Connected pedestrian pathways allow for a more fluid pedestrian experience within Town Center and draw visitors away from Route 9 and into the further extents of the landscape. Extended sidewalks and multi-use trail systems connect pedestrians from Town Center to more distant destinations such as Tilton Town Farm and the D.A.R. State Forest.

Reconfigured parking lots and added vegetation parallel to Route 9 and the sidewalk and along East Street allow for more separation between pedestrians and vehicle traffic and help define gathering areas. Crosswalks lead pedestrians safely across roads and parking lot entrances. A raised crosswalk connects pedestrians from the west side of Route 9 to a pedestrian path that parallels the south side of Town Hall and leads to the playground area. A rapid flashing beacon at this crosswalk signals to drivers when pedestrians are present at this commonly used juncture.

A crosswalk leads pedestrians safely across East Street to the multi-use trail that extends to Tilton Farm. Additionally, a sidewalk extension parallels the east side of Route 9 and extends from the municipal parking lot to a crosswalk that leads pedestrians to the General Store.



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DESIGN DETAILS: THE PARK

Pedestrian Pathways

A raised crosswalk, where walkers can push a button to trigger the rapid flashing beacon signaling to cars to stop, leads pedestrians across Route 9 to the east side of Town Center. Walkers can veer left toward the crosswalk on East Street that connects to a multi-use path that extends 1 mile to Tilton Farm on Wing Hill Road. Alternatively, walkers can continue straight down a pedestrian path that parallels the southern edge of Town Hall, travels past terraced community garden beds, and leads toward a sensory garden that is a gateway to the playground area.

Parking

The municipal parking lot accommodates 14 vehicles with two ADA accessible spaces. Trees provide shade and added vegetation surrounding the municipal buildings helps to frame them within the landscape. Traffic enters from the south end of the lot. The drive extending from the southwestern edge of Goshen Center School down toward the police station accommodates two way vehicle traffic to suit the needs of the police department and the homeowners whose driveway connects to this portion of the parking lot. All vehicle traffic traveling through the parking lot in front of Goshen Center School is one way and must exit from the northern access point.

Seven pull in parking spaces accommodate for overflow when there are larger events at Town Hall and provide more direct access to the play area. Adding plants with deep root systems within the existing grass swale to the east of this parking area helps to slow, direct, and treat stormwater runoff before it reaches the wetland resource area below.

The Woodland Edge

The meadow and a bioretention basin thrive in wet conditions. These two landscape features form the gateway to a raised wetland boardwalk that sinuously guides visitors on an educational tour through the forested wetland.

The Play Area

Directly south of the sensory garden is a shaded picnic area. This area overlooks the Playground which has been fenced to provide for children's safety considering the area's proximity to East Street. Adjacent to the playground, a versatile half court can accommodate the interests of older children and adolescents and can be used for basketball, pickle ball, or four square. Open lawn has been preserved for play and a wildflower meadow buffers the woodland edge.



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DESIGN DETAILS: PATHS & PARKING

1. East Street Parking

A secondary parking lot parallels East Street, providing space for seven vehicles, allowing visitors an alternative access route to the Town Hall and Municipal Offices, and a more direct access point to the Park. The lot may function as an overflow parking area for Town Hall events. Pathways from the parking lot lead directly to Town Hall either along an ADA accessible ramp or up a flight of stairs and through the raised community garden beds. Water is captured from the storm drain outflow into a vegetated swale where water is filtered and conveyed into the downslope wetland. The vegetated swale next to the parking lot is the first thing pedestrians see when they get out of their cars. Educational signage at this juncture imparts awareness of the ecological services that bioswales provide and their function in the landscape.



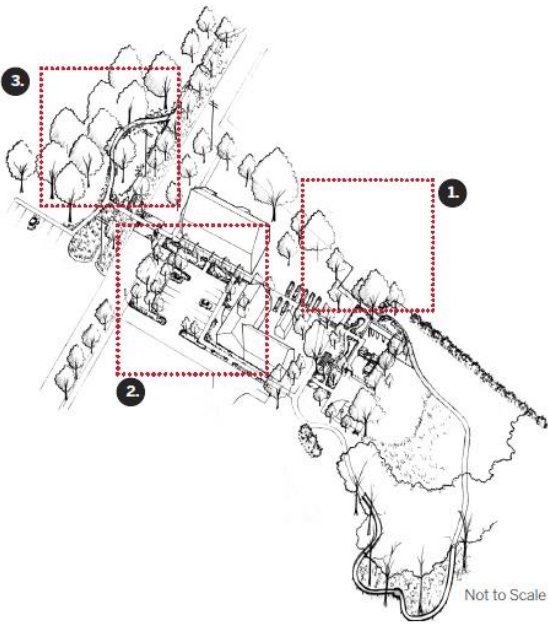
2. Town Hall Parking

The reconfiguration of Town Hall's parking lot accommodates 15 parking spaces, which include two ADA accessible parking spots. This reconfiguration creates more structure for vehicles and space for more vegetation. A raised crosswalk connects to a pedestrian pathway that travels along Town Hall and directly leads to the Park. Increased vegetation around the parking lot and sidewalks creates a pleasant walking experience and draws attention to the Town Hall.



3. Pollinator Pathway

Pollinator gardens and street trees hug the pedestrian pathway that leads directly from the church parking lot to the Congregational Church and the northern sidewalk extension. This pathway also creates an opportunity for other Town visitors to divert away from the sidewalk and the busy road.



DESIGN DETAILS: THE GARDENS, PLAY AREA & BOARDWALK

4. The Sensory Garden

The sensory gardens are the gateway into the fenced in playground, and serve as a space for children and others to use their five senses and discover the joys and intricacies plants have to offer. Amidst the gardens, a pergola sheltered seating area creates a relaxing atmosphere for parents to enjoy, whilst watching their children play.



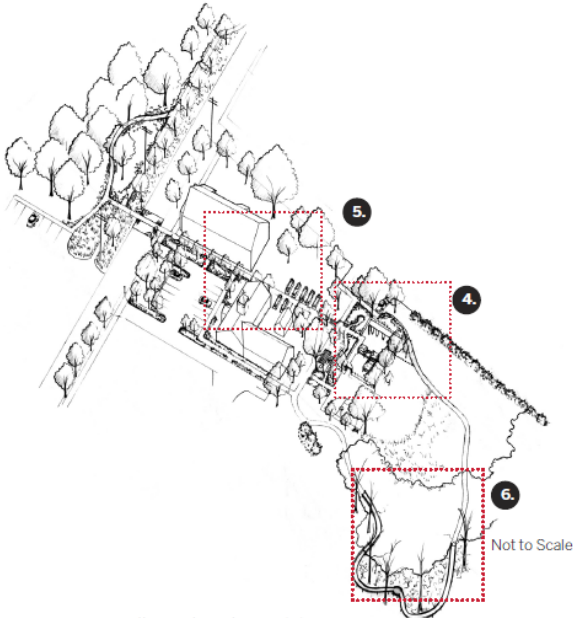
5. Terraced Community Garden

Raised garden beds surround the pedestrian pathway leading into the play area and sensory gardens in an area that receives full sun in the summer months. Seven fifteen-foot garden beds spaced five feet apart and 2.5 feet tall ensure community members of all abilities have the opportunity to engage with the community garden.



6. Wetland Boardwalk

Pedestrian pathways originating from Town Hall's parking lot and the ADA accessible ramp merge together to join with a raised wetland boardwalk. The boardwalk meanders along an existing swale, through the woodland wetland. Educational signs inform visitors of the many ecological services wetlands provide, and a circular viewing platform located midway along the path invites visitors to rest and enjoy the surrounding landscape. The boardwalk transitions into a gravel trail that is surrounded by a wildflower meadow and the woodland edge, and links back up with the sidewalk.



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DESIGN DETAILS: THE CENTER

Woodland Edge

Beyond the bocce and shuffle board courts is a pavilion with a green roof that will help to capture stormwater runoff and create a stunning visual. A stone patio extends from the northeast portion of the pavilion where a woodland garden extends from the forest edge. Within this space there are picnic tables, a fire pit, and two grills that can be used and enjoyed during casual get-togethers.

An elevated woodland boardwalk extends from the western edge of the pavilion, drawing people into the treetops with views onto the forested landscape below.

Two pathways lead visitors from the pavilion down to the forest floor and to an amphitheater that will host music and theater productions. The path leading into the woodland from the north side of the pavilion is ADA accessible and meanders to the amphitheater. The path to the south of the pavilion is a dirt hiking trail that approaches the amphitheater more directly.

Memorial Garden

Maintaining the original footprint of the original memorial garden, the redesign encloses the garden within a 3-foot-tall Goshen stone wall that offers a more intimate and commemorative experience of the space. There are four entrances to the garden allowing visitors to access it from the north, south, east, and west.

The landscape within is separated into quadrants by crushed aggregate paths, each with varying seating options. A pergola shades the northwest corner of the garden and is adjacent to a small area of café seating. Mementos from Goshen's past, including the steps of the former Highland House Inn, are situated in the southwest portion of the garden.

Garden beds line the inner walls of the east half of Memorial Garden which help guide visitors into the space. Park benches sit in front of these garden beds offering pleasant views of the inner landscape. The flagpole is relocated between two park benches in the northeast quadrant of the park.

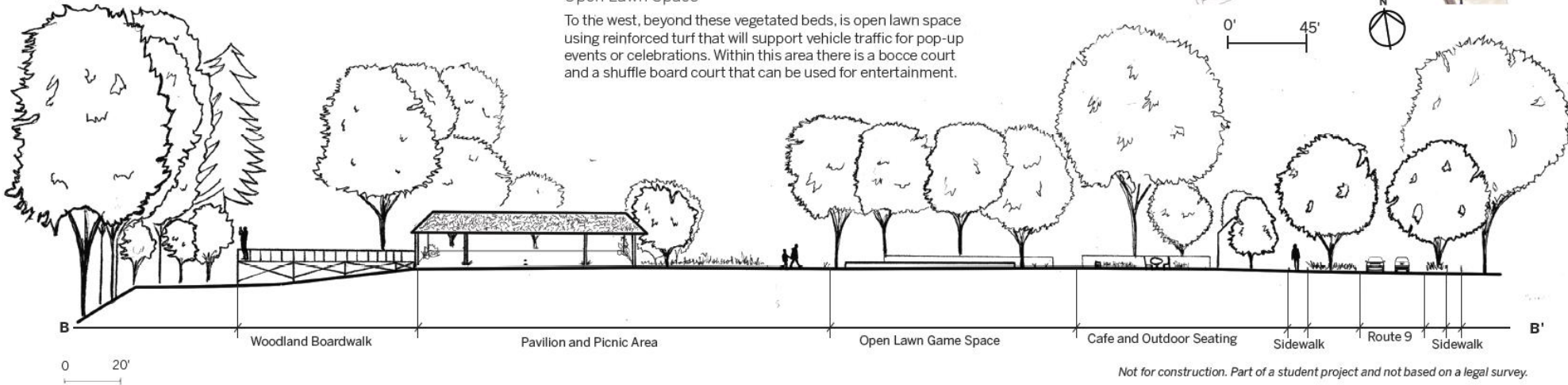


Café Seating

North of the parking lot, pedestrian paths guide visitors to a small coffee shop with nearby café seating that is nestled underneath trees and surrounded by beds of perennials and shrubs.

Open Lawn Space

To the west, beyond these vegetated beds, is open lawn space using reinforced turf that will support vehicle traffic for pop-up events or celebrations. Within this area there is a bocce court and a shuffle board court that can be used for entertainment.

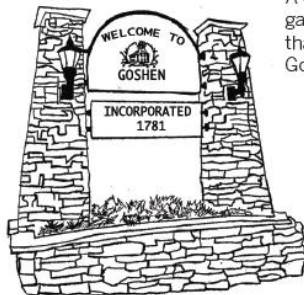


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DESIGN DETAILS: INVITING SPACES

Extending west from Route 9, this portion of the landscape reinvents the parking area to be a less dominant landscape feature. Pockets of gathering spaces dot the landscape and are joined by pedestrian pathway networks that draw visitors away from the road. Added trees and garden beds create shaded, more intimate spaces. Open space is maintained to support larger community events.

7. Welcome Sign



A welcome sign serves as a gateway symbol to visitors that they are entering Goshen's Town Center.

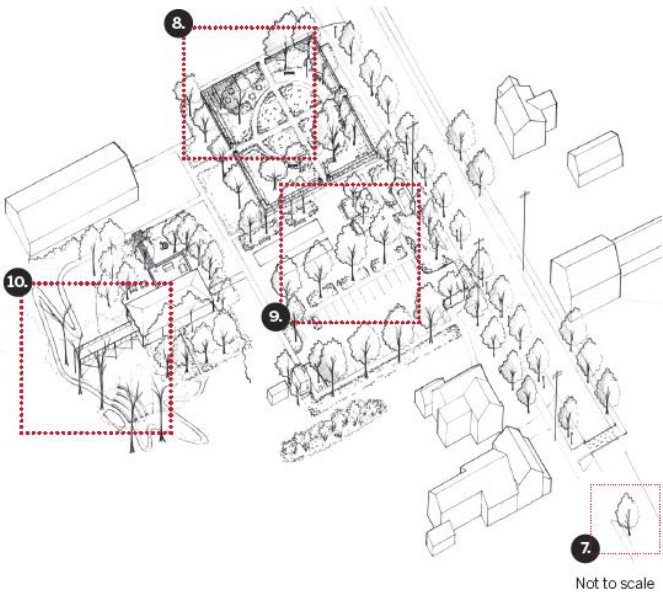
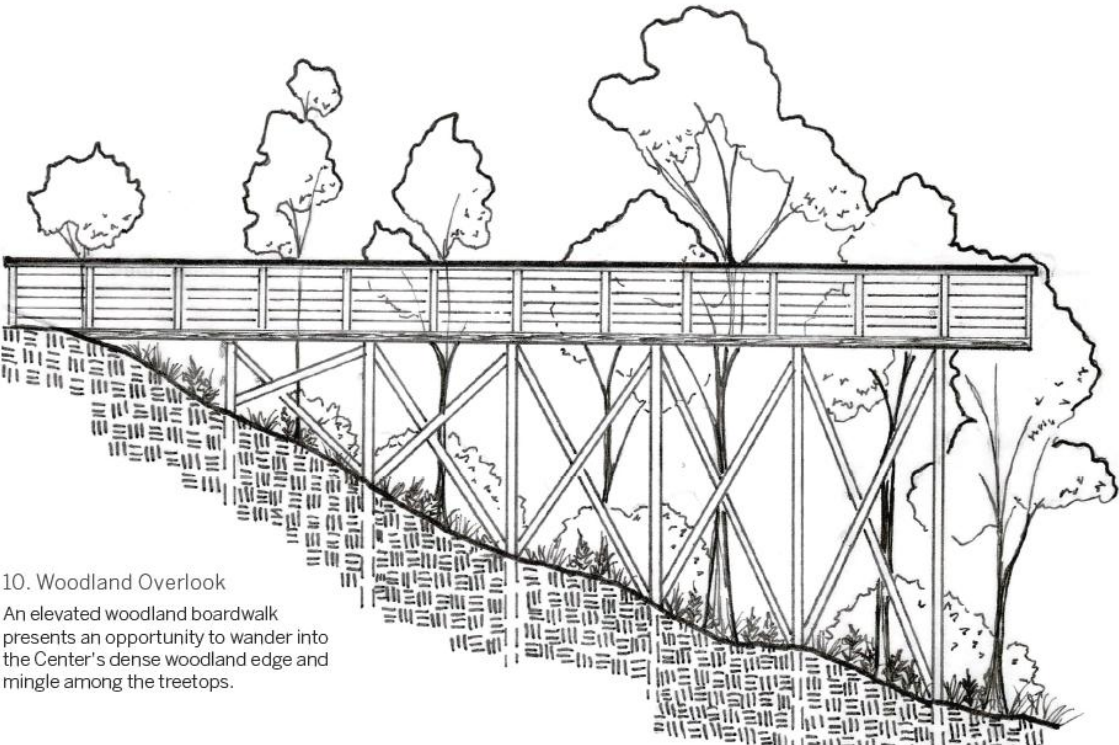
8. Memorial Park

The walled Memorial Park imparts a more intimate experience with the landscape. Café seating is nestled under a vegetated pergola in the northwest corner providing shade and scenery.



10. Woodland Overlook

An elevated woodland boardwalk presents an opportunity to wander into the Center's dense woodland edge and mingle among the treetops.



9. Reinforced Turf Area

Retaining open lawn space in the Center using reinforced turf maintains enough space for pop-up events like a farmer's market or food truck community dinner.

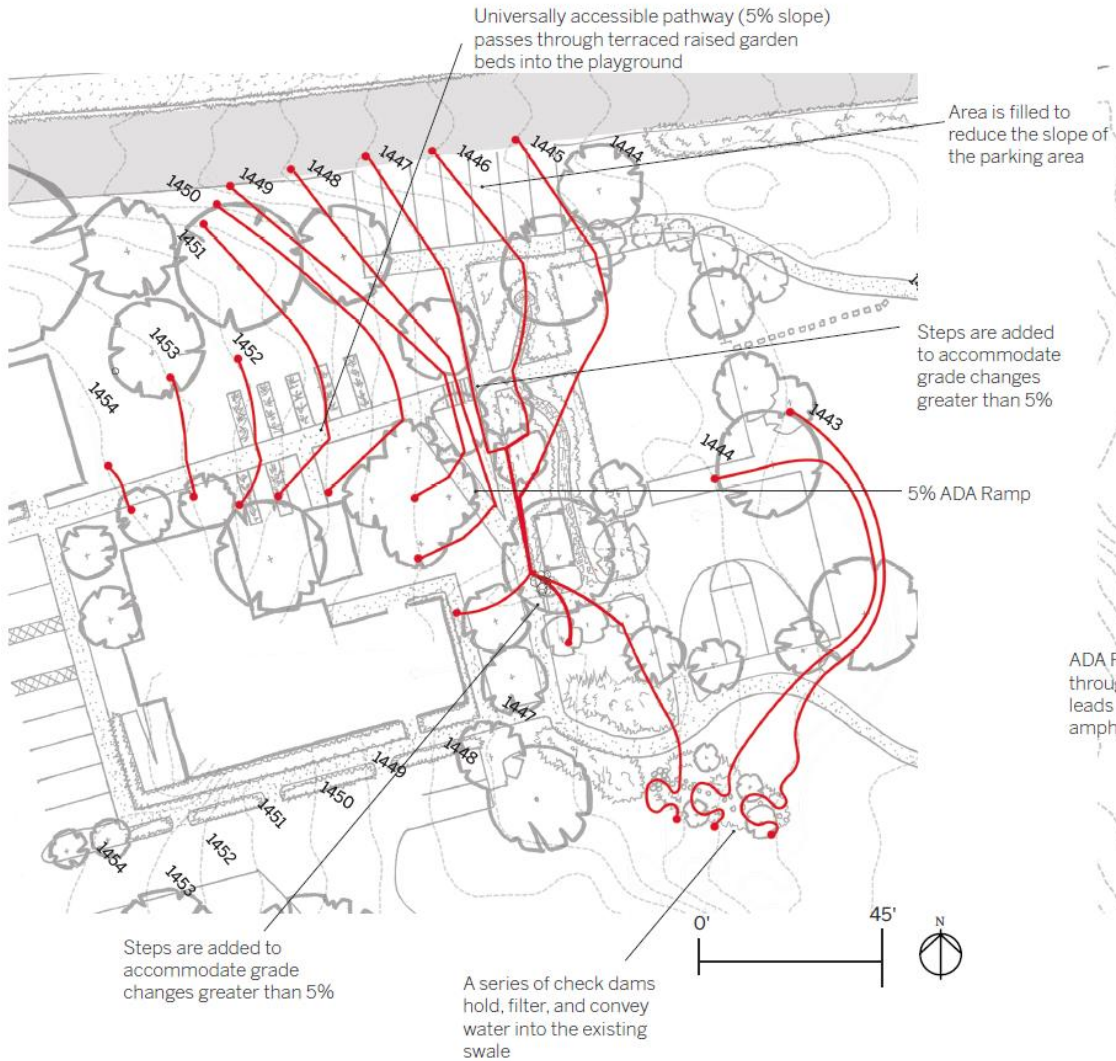
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GRADING

The following conceptual grading plans illustrate earthwork changes required to implement the proposed designs.

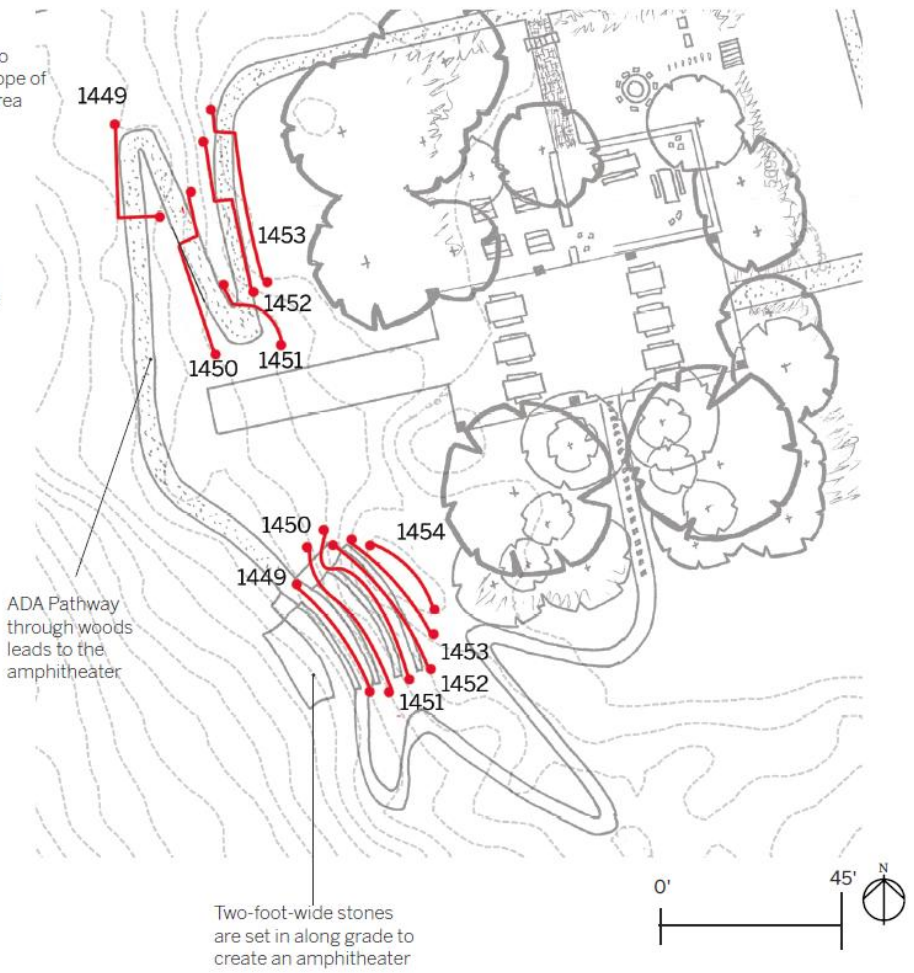
THE PARK

Universally accessible pathways are created throughout the entire park.



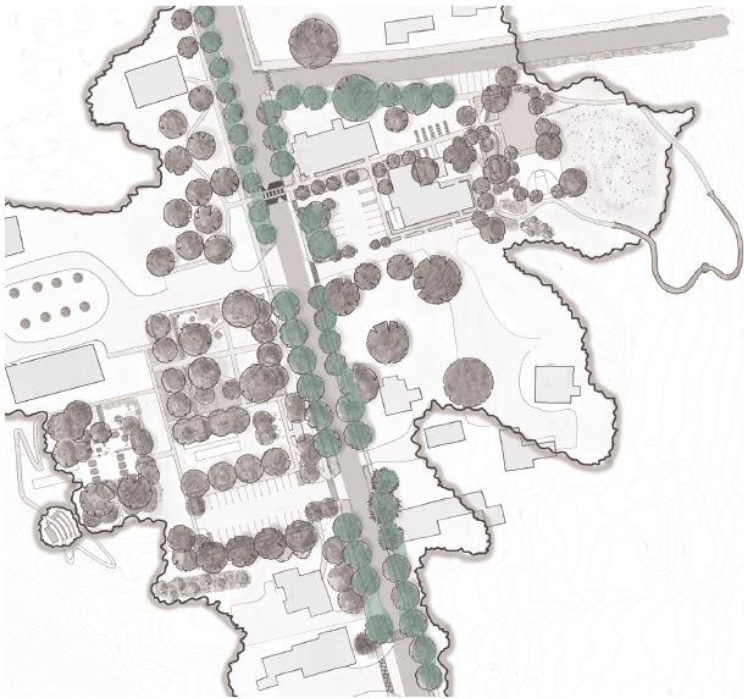
THE CENTER

The woodland amphitheater is graded along the existing slope and a universally accessible pathway brings people of all ages and abilities to enjoy it.



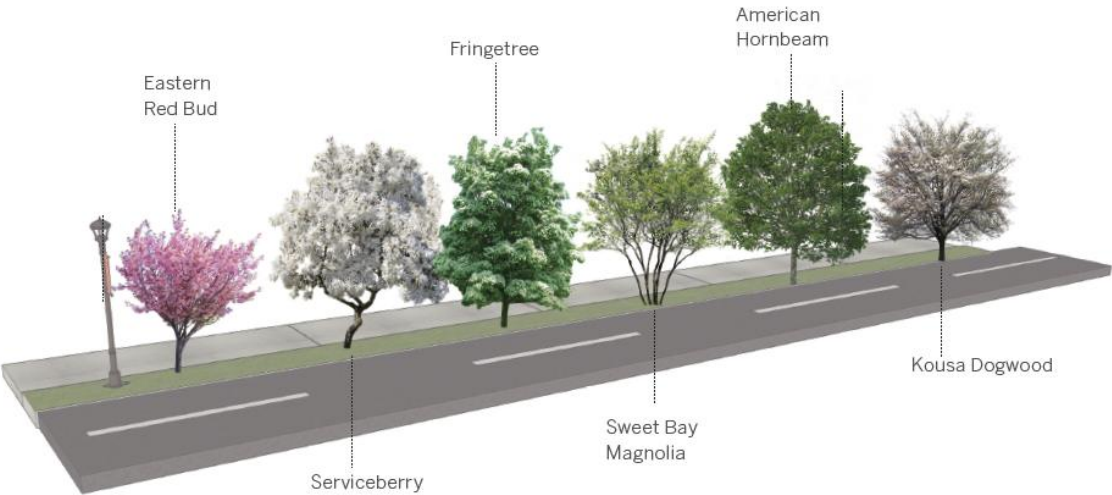
PLANT PALETTE: STREET TREES

The street tree palette includes low-maintenance trees adapted to conditions typically found along roadways such as confined space for root growth and exposure to road salt and other pollutants. Street trees, both large and small, contribute to a reduced apparent width of the road. Arranging them in formal patterns along existing roadways communicates intention, signaling to drivers the entrance of a town, and causing drivers to slow down. They also reduce runoff. Removing lower limbs to the height of 8' will preserve sight lines for safety.



Smaller Trees: Appropriate for planting near overhead wires and in small spaces

COMMON NAME	BOTANICAL NAME	SPREAD	HEIGHT	BLOOM TIME	SUN/SHADE
SERVICEBERRY	AMELANCHIER ARBOREA	15-20	20-30'	APRIL TO MAY	FULL SUN TO PART SHADE
AMERICAN HORNBEAM	CARPINUS CAROLINIANA	20-35	20-35'	FEBRUARY	PART SHADE TO FULL SHADE
EASTERN REDBUD	CERCIS CANADENSIS	25-35'	20-30'	APRIL	FULL SUN TO PART SHADE
FRINGETREE	CHIONANTHUS VIRGINICUS	12-20'	12-20'	MAY TO JUNE	FULL SUN TO PART SHADE
KOUSA DOGWOOD	CORNUS KOUSA	15-30'	15-30'	MAY TO JUNE	FULL SUN TO PART SHADE
SWEET BAY MAGNOLIA	MANGOLIA VIRGINIANA	10-35'	10-35'	MAY TO JUNE	FULL SUN TO PART SHADE



Taller Trees: Consider in areas with adequate rooting space and no overhead wires or obstructions




































COMMON NAME	BOTANICAL NAME	SPREAD	HEIGHT	BLOOM TIME	SUN/SHADE
RED MAPLE	ACER RUBRUM	30-50	40-70'	MARCH TO APRIL	FULL SUN TO PART SHADE
MAIDENHAIR TREE	GINGKO BILOBA	30-40'	50-80'	APRIL	FULL SUN
HONEY LOCUST	GLEDITSIA TRIACANTHOS	60-80'	60-80'	MAY TO JUNE	FULL SUN
SWEETGUM	LIQUIDAMBAR STYRACIFLUA	40-60'	60-80'	APRIL TO MAY	FULL SUN
TULIP TREE	LIRIODENDRON TULIPIFERA	30-50'	60-90'	MAY TO JUNE	FULL SUN
CUCUMBER TREE	MAGNOLIA ACUMINATA	20-35'	40-70'	APRIL-MAY	FULL SUN TO PART SHADE
BLACK GUM	NYSSA SYLVATICA	20-30'	30-50'	MAY-JUNE	FULL SUN TO PART SHADE
AMERICAN HOPHORNBEAM	OSTRYA VIRGINIANA	20-30'	25-40'	APRIL	FULL SUN TO PART SHADE
SCARLET OAK	QUERCUS COCCINEA	40-50'	70-75'	MARCH-MAY	FULL SUN
NORTHERN RED OAK	QUERCUS RUBRA	50-75'	50-75'	MAY	FULL SUN
BALD CYPRESS	TAXODIUM DISTICHUM	25-30'	50-75'	APRIL	FULL SUN
AMERICAN LINDEN	TILIA AMERICANA	30-50'	50-80'	JUNE	FULL SUN TO PART SHADE
HONEY LOCUST	GLEDITSIA TRIACANTHOS	60-80	60-80	MAY TO JUNE	FULL SUN
HACKBERRY	CELTIS OCCIDENTALIS	40-60'	40-60'	APRIL TO MAY	FULL SUN TO PART SHADE

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PLANT PALETTE: WILDFLOWER POLLINATOR MEADOW

The wildflower pollinator meadow replaces the mowed lawn space behind Town Hall and the Municipal Offices where the Park is situated. Plants on the meadow list are perennial and native to the U.S. and will only need to be mowed once a year. The meadow will provide habitat for many beneficial insects and birds, and will create a colorful backdrop when flowers are in bloom. The same species can be used in the pollinator gardens throughout Town Center and along pathways. Yearly management of invasive species will be required to maintain the meadow. Northeast Wildflower Seed Mixes can be purchased that may include many of the following species.



COMMON NAME	BOTANICAL NAME	SPREAD	HEIGHT	BLOOM TIME	ATTRACT	SUN/SHADE
ANISE HYSSOP	AGASTACHE FOENICULUM	1.5-3'	2-4'	JUNE TO SEPTEMBER	 	FULL SUN
COMMON MILKWEED	ASCLEPIAS SYRIACA	0.75-1'	2-3'	JUNE TO AUGUST	 	FULL SUN
SKY BLUE ASTER	ASTER AZUREUS	1'	2-3'	AUGUST TO OROBER	 	FULL SUN TO PART SHADE
LANCELEAF COREOPSIS	COREOPSIS LANCEOLATA	1'	1-2'	MAY TO JULY		FULL SUN
PURPLE PRAIRIE CLOVER	DALEA PURPUREA	1'	1-2'	JUNE TO AUGUST		FULL SUN
PURPLE CONEFLOWER	ECHINACEA PURPUREA	1.5-2'	2-5'	JUNE TO AUGUST	 	FULL SUN TO PART SHADE
CANADA WILD RYE	ELYMUS CANADENSIS	1'	4-5'	JULY TO SEPTEMBER		FULL SUN
JOE PYE WEED	EUPATORIUM PURPUREUM	2-4'	5-7'	JULY TO SEPTEMBER		FULL SUN TO PART SHADE
QUEEN OF THE PRAIRIE	FILIPENDULA RUBRA	3-4'	6-8'	JUNE TO AUGUST		FULL SUN TO PART SHADE
ROUGH BLAZING STAR	LIATRIS ASPERA	0.5-1'	2-5'	AUGUST TO OCTOBER	  	FULL SUN
PRAIRIE BLAZING STAR	LIATRIS PYCNOSTACHYA	0.5-1'	3-5'	JULY TO AUGUST	 	FULL SUN
DENSE BLAZING STAR	LIATRIS SPICATA	0.75-1.50'	2-4'	JULY TO AUGUST	 	FULL SUN
CARDINAL FLOWER	LOBELIA CARDINALIS	1-2'	2-4'	JULY TO SEPTEMBER	 	FULL SUN TO PART SHADE
GREAT BLUE LOBELIA	LOBELIA SIPHILITICA	1-1.5'	2-3'	JULY TO SEPTEMBER		FULL SUN TO PART SHADE
WILD BERGAMOT (BEEBALM)	MONARDA FISTULOSA	2-3'	2-4'	JULY TO SEPTEMBER	 	FULL SUN TO PART SHADE
FOXGLOVE BEARDTONGUE	PENSTEMON DIGITALIS	1.5-2'	3-5'	APRIL TO JUNE	 	FULL SUN TO PART SHADE
MOSS PHLOX	PHLOX SUBULATA	0.25-0.5'	1-2'	MARCH-MAY		FULL SUN
MOUNTAIN MINT	PYCNANTHEMUM MUTICUM	1-3'	3'	JULY TO SEPTEMBER		FULL SUN TO PART SHADE
BLACK-EYED SUSAN	RUDBECKIA HIRTA	1-2'	2-3'	JUNE TO SEPTEMBER		FULL SUN
LITTLE BLUESTEM	SCHIZACHYRIUM SCOPARIUM	1.5-2'	2-4'	AUGUST TO FEBRUARY		FULL SUN
OHIO GOLDENROD	SOLIDAGO OHIOENSIS	1.5'	3-4'	AUGUST TO SEPTEMBER		FULL SUN
STIFF GOLDENROD	SOLIDAGO RIGIDA	1.5	3-5'	AUGUST TO SEPTEMBER		FULL SUN
INDIAN GRASS	SORGHASTRUM NUTANS	1-2'	3-5'	SEPTEMBER TO FEBRUARY		FULL SUN
NEW ENGLAND ASTER	SYMPHOTRICHUM NOVAE-ANGILAE	2-3'	3-6'	AUGUST TO SEPTEMBER		FULL SUN
BLUE VERVAIN	VERBENA HASTATA	1-2.5'	2-6'	JULY TO SEPTEMBER		FULL SUN
IRONWEED	VERNONIA FASCICULATA	1.5'	4-6'	JULY TO SEPTEMBER		FULL SUN
GOLDEN ALEXANDERS	ZIZIA AUREA	1.5'	1-2'	MAY TO JUNE		FULL SUN

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PLANT PALETTE: RAIN GARDENS & BIOSWALES

The rain gardens and bioswales help manage stormwater runoff during rain events by capturing, holding, conveying, and filtering water. Plants within these areas are tolerant of wet and drought conditions.



Buttonbush



Blazing Star



Common Sneezeweed



Giant Solomon's Seal



Blueflag Iris



Ostrich Fern

Grasses, Sedges, Rushes & Ferns

COMMON NAME	BOTANICAL NAME	SPREAD	HEIGHT	BLOOM TIME	SUN/SHADE
TUSsock SEDGE	CAREX STRICTA	5-8'	3-6'		FULL SHADE TO PART SHADE
OSTRICH FERN (FIDDLEHEAD)	MATTEUCCIA STRUTHIOPTERIS	2'	3-6'	JULY TO FEBRAURY	PART SHADE TO FULL SHADE
CINNAMON FERN	OSMUNDASTRUM CINNAMOMEUM	2-3'	2-3'		FULL SHADE TO PART SHADE
SWITCHGRASS	PANICUM VIRGATUM	4-6'	5-8'	AUGUST-FEBRUARY	FULL SUN TO PART SHADE

Shrubs

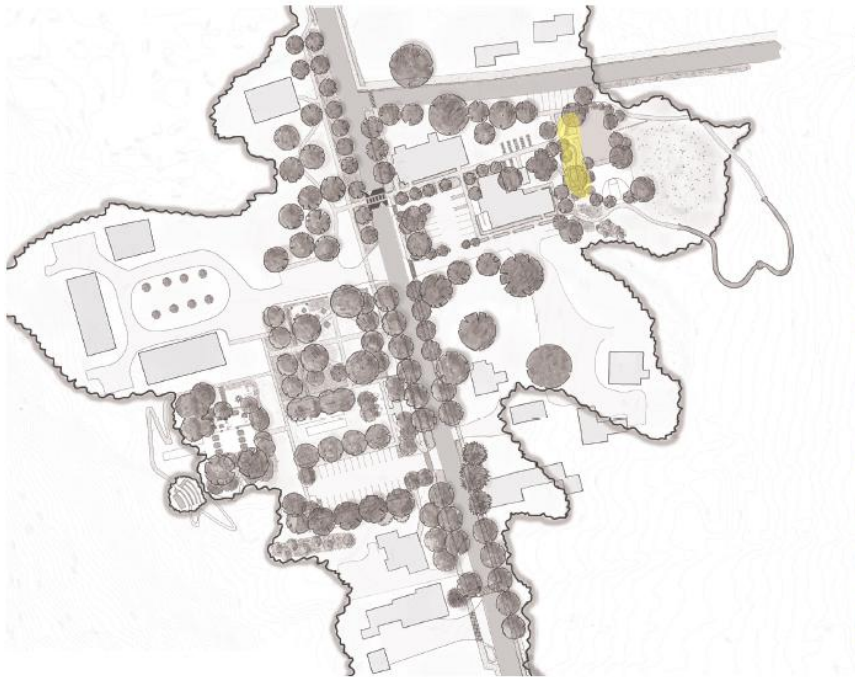
COMMON NAME	BOTANICAL NAME	SPREAD	HEIGHT	BLOOM TIME	SUN/SHADE
BLACK CHOKEBERRY	ARONIA MELANOCARPA	5-12'	5-12'	JUNE TO JULY	FULL SUN TO PART SHADE
BUTTONBUSH	CEPHALANTHUS OCCIDENTALIS	2'	3-7'	MAY TO JUNE	FULL SUN TO PART SHADE
GOLDEN-TWIG DOGWOOD	CORNUS FLAVIRAMEA	5-8'	5-8'	MAY TO JUNE	FULL SUN TO PART SHADE
RED OSIER DOGWOOD	CORNUS SERICEA	10-15'	8-12'	MAY TO JUNE	FULL SUN TO PART SHADE
INKBERRY	ILEX GLABRA	6-12'	14-16'	MAY	FULL SUN TO PART SHADE
GIANT SOLOMON'S SEAL	POLYGONATUM COMMUTATUM	6-10'	6-10'	MAY TO JUNE	FULL SUN TO PART SHADE
ELDERBERRY	SAMBUCUS CANADENSIS	3-5'	6-10'	MAY	FULL SUN TO PART SHADE
NANNYBERRY	VIBURNUM LENTAGO	5-6'	5-6'	MAY TO JUNE	FULL SUN TO PART SHADE
HIGH BUSH CRANBERRY	VIBURNUM TRILOBUM	4-8'	5-12'	JUNE	FULL SUN TO PART SHADE

Herbaceous Perennials

COMMON NAME	BOTANICAL NAME	SPREAD	HEIGHT	BLOOM TIME	SUN/SHADE
MARSH MARIGOLD	CALTHA PALUSTRIS	1-1.5'	1-1.5'	APRIL TO JUNE	FULL SUN TO PART SHADE
CONEFLOWER	ECHINACEA PURPUREA	3'	2-5'	AUGUST TO OCTOBER	FULL SUN
COMMON SNEEZEWEED	HELENIUM AUTUMNALE	3-4'	4-6'	AUGUST TO SEPTEMBER	FULL SUN
BLUEFLAG IRIS	IRIS VERSICOLOR	2-4'	4-7'	JUNE TO AUGUST	FULL SUN
BLAZING STAR	LAITRIS SPICATA	2-2.5'	2-2.5'	MAY TO JUNE	FULL SUN TO PART SHADE
NEW YORK IRONWEED	VERNONIA NOVEBORACENSIS	1-2'	2-5'	JUNE TO AUGUST	FULL SUN TO PART SHADE
CULVER'S ROOT	VERONICASTRUM VIRGINICUM	0.5-1.5'	2-4'	JULY TO AUGUST	FULL SUN

PLANT PALETTE: THE SENSORY GARDEN

The sensory garden forms the entrance into the playground and the plant species in this area encourage and invite children and others to use and explore their five senses. All sensory garden plants are low maintenance and perennial, and were selected based on how they smell, taste, feel, and look, and the sounds they make in the wind.



COMMON NAME	BOTANICAL NAME	SPREAD	HEIGHT	BLOOM TIME	SENSE	SUN/SHADE
YARROW	ACHILLEA MILLEFOLIUM	2-3'	2-3'	JUNE TO SEPTEMBER	SIGHT	FULL SUN
RED COLUMBINE	AQUILEGIA CANADENSIS	1-1.5'	2-3'	APRIL TO MAY	SIGHT	FULL SHADE TO PART SHADE
NORTHERN SEA OATS	CHASMANTHIUM LATIFOLIUM	1-2.5'	2-5'	AUGUST TO SEPTEMBER	SIGHT	FULL SUN TO PART SHADE
PURPLE LOVEGRASS	ERAGROSTIS SPECTABILIS	1-2'	1-2'	JULY TO AUGUST	SIGHT	FULL SUN
BUTTERFLY WEED	ASCLEPIAS TUBEROSA	1-1.5'	2-3'	MAY TO SEPTEMBER	SIGHT	FULL SUN
WOODBINE	CLEMATIS VIRGINIANA	3-6'	12-20'	AUGUST TO OCTOBER	SMELL	FULL SUN TO PART SHADE
LEMON BALM	MELISSA OFFICINALIS	1.5-3'	1.5-2'	JUNE TO AUGUST	SMELL/TASTE	FULL SUN TO PART SHADE
PASSIONFLOWER	PASSIFLORA INCARNATA	3-6'	6-8'	JULY TO SEPTEMBER	SMELL	FULL SUN TO PART SHADE
PEONY	PAEONIA LACTIFLORA	2.5-3'	2.5-3'	MAY	SMELL	FULL SUN TO PART SHADE
LILAC	SYRINGA VULGARIS	6-12'	8-15'	APRIL TO MAY	SMELL	FULL SUN
NODDING ONION	ALLIUM CERNUUM	0.5'	1-1.5'	JUNE TO AUGUST	SOUND	FULL SUN TO PART SHADE
WAVY HAIR GRASS	DESCHAMPSIA FLEXUOSA	1-2'	2-3'	JULY TO SEPTEMBER	SOUND	FULL SUN TO PART SHADE
MOUNTAIN MINT	PYCNANTHEMUM INCANUM	3-4'	2-3'	JULY TO SEPTEMBER	TASTE/SMELL	FULL SUN TO PART SHADE
WINTERGREEN	GAULTHERIA PROCUMBENS	0.5-1'	1-4"	JUNE TO JULY	TASTE	FULL SHADE TO PART SHADE
CHICKORY	CICHORIUM INTYBUS	1.5-2'	2-4"	JUNE TO AUGUST	TASTE	FULL SUN
WILD STRAWBERRY	FRAGARIA VESCA	0.5-1'	0.5-1'	MAY TO AUGUST	TASTE	FULL SUN TO PART SHADE
PUSSY WILLOW	SALIX DISCOLOR	4-12'	6-15'	MARCH TO APRIL	TOUCH	FULL SUN TO PART SHADE
BLUE GLOBE THISTLE	ECHINOPS BANNATICUS	1-2'	2-4'	JULY TO AUGUST	TOUCH	FULL SUN
JAPANESE MAPLE	ACER PALMATUM	10-25'	10-25'	APRIL	TOUCH/SIGHT	FULL SUN TO PART SHADE
LAMBS EAR	STACHYZ BYZANTINA	1-1.5'	1-1.5'	MAY TO JULY	TOUCH	FULL SUN



PLANT PALETTE: THE CENTER & WOODLAND EDGE

The Center plant palette consists of very low maintenance large shade trees, and shade tolerant shrubs and herbaceous perennials. The Woodland Edge palette offers an extension from surrounding woodlands, emerging from the ends of the woodland trail and into the picnic area .



WOODLAND EDGE

COMMON NAME	BOTANICAL NAME	SPREAD	HEIGHT	BLOOM TIME	SUN/SHADE
SERVICEBERRY	AMELANCHIER ARBOREA	15-25'	15-25'	MARCH TO APRIL	FULL SUN TO PART SHADE
JACK IN THE PULPIT	ARISAEMA TRIPHYLLUM	0.5-1'	0.5-1'	APRIL TO MAY	PART SHADE TO FULL SHADE
WOODLAND PHLOX	PHLOX DIVARICATA	1-1.5'	1-2'	APRIL TO MAY	PART SHADE TO FULL SHADE
SOLOMON SEAL	POLYGONATUM ODORATUM	1-2'	0.5-1'	MAY	PART SHADE TO FULL SHADE
WOODLAND GOLDENROD	SOLIDAGO CAESIA	5-15'	5-15'	MAY	PART SHADE
FOAMFLOWER	TIARELLA CORDIFOLIA	1.5-3'	1.5-3'	AUGUST TO SEPTEMBER	FULL SUN TO PART SHADE



THE CENTER

Trees

COMMON NAME	BOTANICAL NAME	SPREAD	HEIGHT	BLOOM TIME	SUN/SHADE
SUGAR MAPLE	ACER SACCHARUM	30-60'	40-80'	APRIL	FULL SUN TO PART SHADE
RIVER BIRCH	BETULA NIGRA	40-60'	40-70'	APRIL TO MAY	FULL SUN TO PART SHADE
AMERICAN CHESTNUT	CASTANEA DENTATA	50-75'	50-75'	JUNE	FULL SUN
AMERICAN HOLLY	ILEX OPACA	10-20'	15-30'	MAY	FULL SUN TO PART SHADE
STAR MAGNOLIA	MAGNOLIA STELLATA	8-15'	10-20'	MARCH	FULL SUN TO PART SHADE
COTTONWOOD	POPULUS DELTOIDES	35-60'	50-80'	MARCH TO APRIL	FULL SUN
WHITE OAK	QUERCUS ALBA	50-80'	50-80'	MAY	FULL SUN
ACCOLADE ELM	ULMUS ACCOLADE	25-40'	50-60'	MARCH TO APRIL	FULL SUN

Shrubs

COMMON NAME	BOTANICAL NAME	SPREAD	HEIGHT	BLOOM TIME	SUN/SHADE
COMMON WITCHHAZEL	HAMAMELIS VIRGINIANA	15-20'	15-20'	OCTOBER TO DECEMBER	FULL SUN TO PART SHADE
MOUNTAIN LAUREL	KALMIA LATIFOLIA	5-15'	5-15'	MAY	PART SHADE
SPICEBUSH	LINDERA BENZOIN	6-12'	6-12'	MARCH	FULL SUN TO PART SHADE
RED ELDERBERRY	SAMBUCA RACEMOSA	8-15'	8-12'	MAY TO JUNE	FULL SUN TO PART SHADE
BLUEBERRY	VACCINIUM CORYMBOSUM	8-12'	6-12'	MAY	FULL SUN TO PART SHADE

Herbaceous Perennials

COMMON NAME	BOTANICAL NAME	SPREAD	HEIGHT	BLOOM TIME	SUN/SHADE
BUNCHBERRY	CORNUS CANADENSIS	0.5-1'	0.5'	MAY TO JULY	PART SHADE
BLEEDING HEART	LAMPROCAPNOS SPECTABILIS	1.5-2.5'	2-3'	APRIL TO MAY	PART SHADE TO FULL SHADE
WOOD LILY	TRILLIUM LUTEUM	1-1.5'	1-1.5'	APRIL TO MAY	PART TO FULL SHADE
VIOLET	VIOLA SORORIA	0.5'	0.5'	APRIL TO AUGUST	FULL SUN TO PART SHADE



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TOWN ROADS



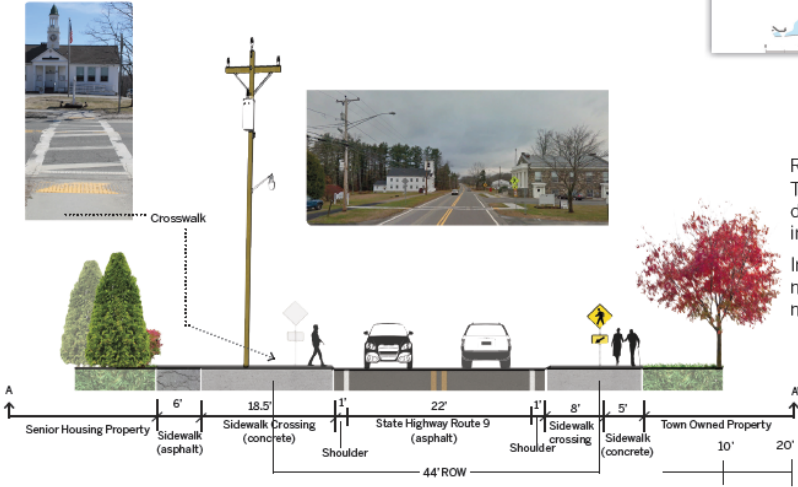
TOWN-WIDE STREETSCAPE INTERVENTIONS

The streetscape intervention templates are conceptual designs that utilize different principles and techniques that promote safe pedestrian travel, may accommodate multi-modal transportation, address drainage issues, and manage stormwater. Based on significant physical characteristics, land use, slope, and speed limit, three street templates have been established. These include paved and high traffic, paved and rural arterial, and dirt, rural arterial. These templates serve as basic references or tools that can be applied to streets with similar characteristics. All templates were designed to prioritize traffic calming strategies, pedestrian amenities, and stormwater infiltration.

EXISTING CONDITIONS: MAIN STREET (ROUTE 9)

Route 9 is a major highway that runs the entire length of Goshen in a south to northwest direction, and bisects Goshen's Town Center. Route 9 conveys high volumes of high speed traffic that creates an unpleasant and unsafe pedestrian experience within the Town Center. Route 9 being a state highway means that any proposed interventions within the right of way (ROW) would need approval by the state, and certain interventions like on-street parking aren't feasible. The portion of Route 9 that passes through the Town Center is sandwiched between mostly town-owned property and two private residences. Interventions could extend into town-owned property, but must not extend past the ROW into private property. The road is 24' wide with 20' ROW width, which only leaves 2' of space to implement on-street interventions. Many interventions must be placed within the ROW. Currently, there is a crosswalk with fading paint lines that connect pedestrians to the eastern side of town where Town Hall, municipal offices, and a playground are located. There is a large amount of impervious surface and minimal tree canopy cover through Town Center and along route 9.

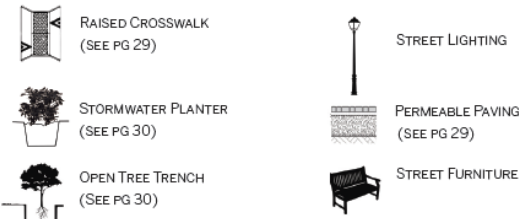
EXISTING ROUTE 9



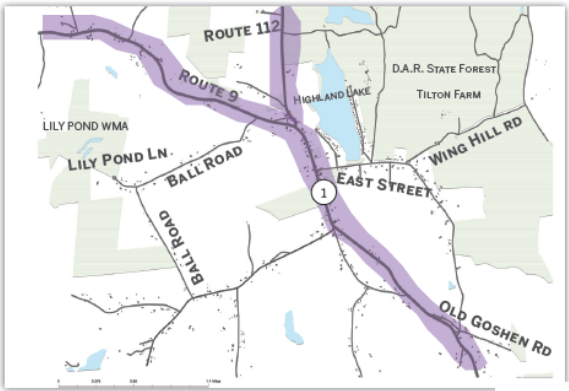
TEMPLATE 1: PAVED & HIGH TRAFFIC

ROW WIDTH	TYPICAL SLOPE	TYPICAL SPEED LIMIT	ROAD CLASSIFICATION & SURFACE TYPE	ADJACENT LAND USE	OTHER ROADS TO BE APPLIED TO
44	2-15%	40-55	Major Highway Paved Asphalt	Residential, Municipal, Public Institution	Cape Street (Rt 112)

TOOLS

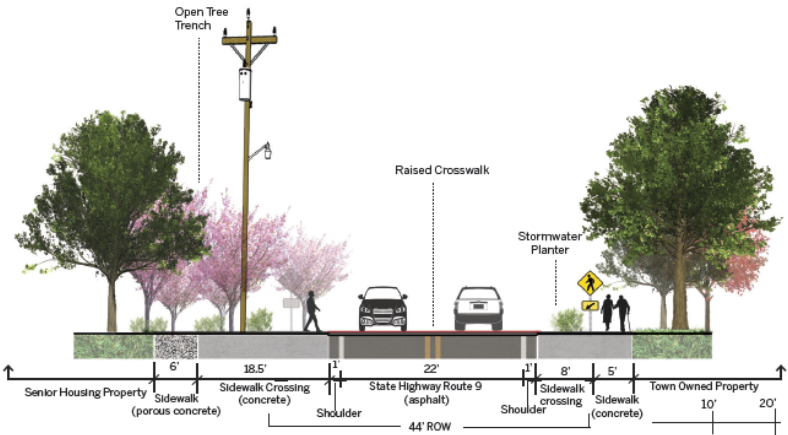


KEY PLAN



ADDITIONAL CONSIDERATIONS

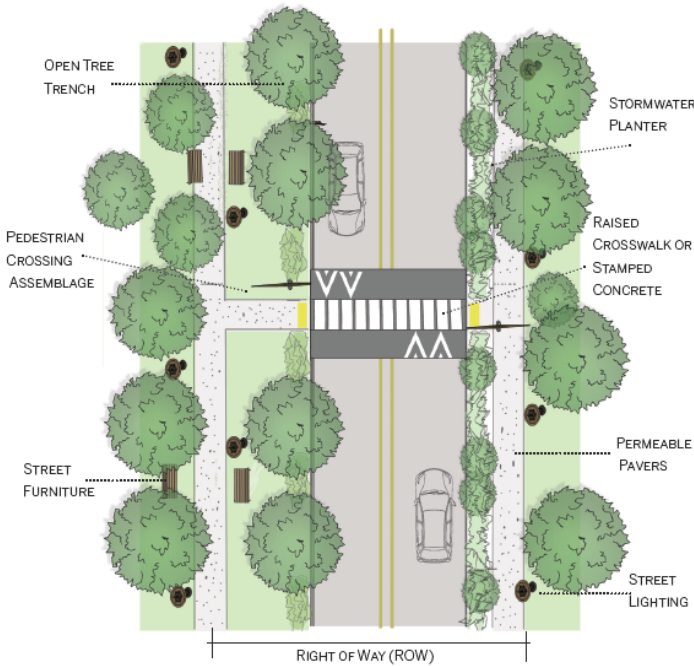
Route 9 is managed by MA Department of Transportation. Standards for maintenance may differ on the state level, so coordination and investigation of design standards is needed. Installing a raised crosswalk on State-owned road may be difficult. A textured or painted crosswalk may be more feasible.



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PROPOSED ROUTE 9

The redesign of Town Center will potentially attract more visitors and residents and implementing shaded pedestrian seating areas and traffic calming techniques can create a safe and inviting space for people to linger in town. Increasing vegetation along Route 9 in the form of stormwater planters and street trees can create an aesthetically pleasing and welcoming transition into Goshen for drivers and pedestrians, while reducing stormwater runoff. Pervious paved sidewalks along both sides of Route 9 can help maximize stormwater infiltration while maintaining safe pedestrian circulation.



Graduate Program in Sustainable
Landscape Planning + Design
the
Conway School
88 Village Hill Rd, Northampton, MA 01060

REJUVENATING THE HEART OF GOSHEN
A TOWN CENTER MASTER PLAN FOR GOSHEN, MA
Caitlin Broman and Kristen Gessinger
Spring 2019

STREETSCAPE
INTERVENTIONS

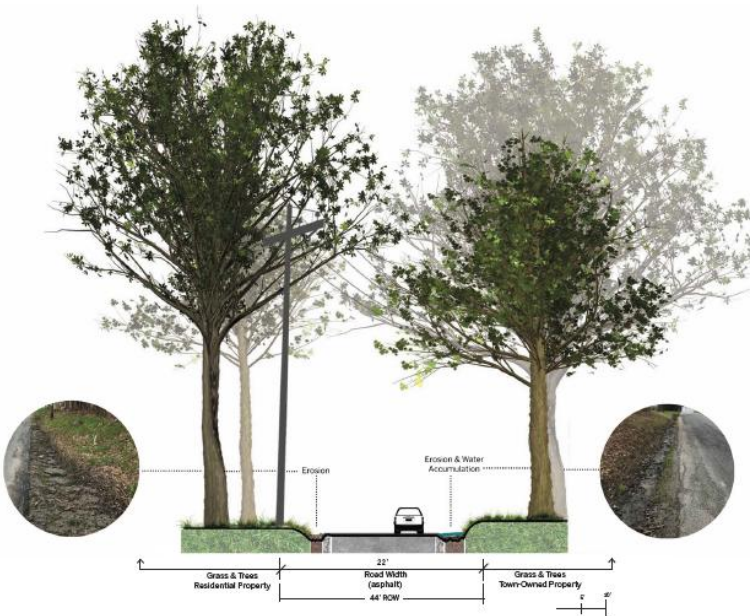
TOWN-WIDE STREETSCAPE INTERVENTIONS

The Paved, Rural Arterial Road Template can be applied to low traffic neighboring streets in Goshen. Low-maintenance stormwater planters, rain gardens or bioswales that connect to existing grey infrastructure systems, and permeable paths wide enough to accommodate multiple user groups can significantly improve stormwater drainage and make for a pleasant traveling experience.

EXISTING CONDITIONS: EAST STREET

East Street, an offshoot of Route 9, is a paved arterial town road that runs through forest and low density residential areas. East Street passes along Lower Highland Lake and connects to Wing Hill Road, which leads into the D.A.R. State Forest. Like most roads in Goshen, East Street experiences drainage issues and erosion along the edges of its asphalt paving. There are no road markings for cars or designated shoulders for pedestrians, but many residents have been seen walking in the street.

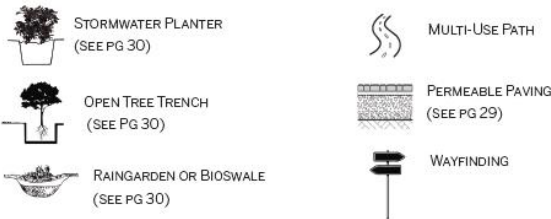
EXISTING EAST STREET



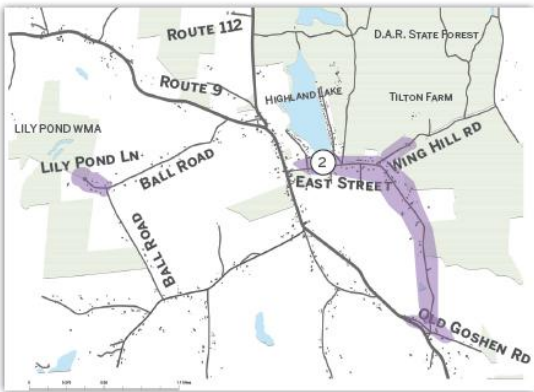
TEMPLATE 2: PAVED, RURAL ARTERIAL ROAD

ROW WIDTH	TYPICAL SLOPE	TYPICAL SPEED LIMIT	ROAD CLASSIFICATION & SURFACE TYPE	ADJACENT LAND USE	OTHER ROADS TO BE APPLIED TO
44	2-15%	45	Arterial Town Road Asphalt	Residential	Lily Pond Ln Part of Wing Hill Rd Part of Old Goshen Rd

TOOLS



KEY PLAN



ADDITIONAL CONSIDERATIONS

ADA accessibility may be compromised in areas sloped greater than 5%.

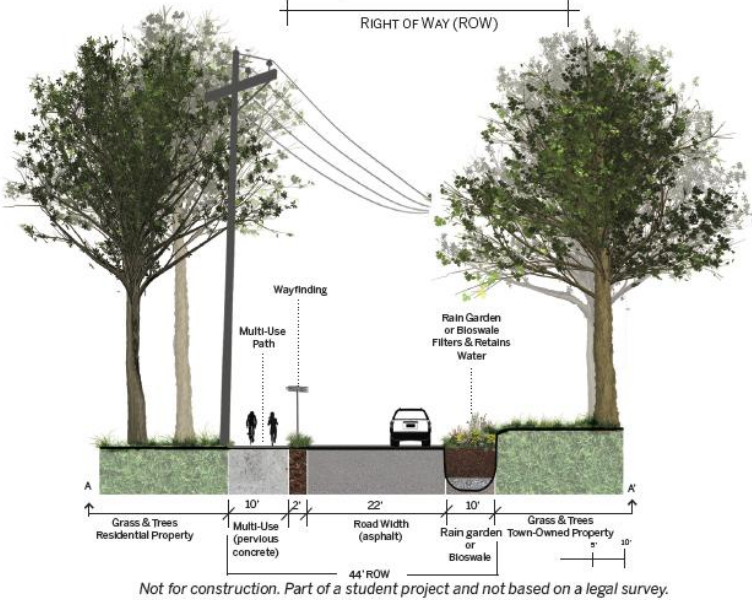
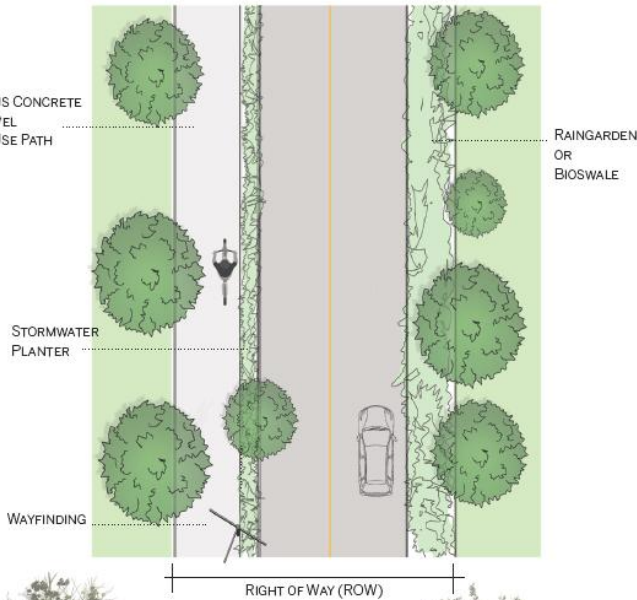
Encourage neighboring residents to volunteer to help maintain gardens or bioswales and to install additional green infrastructure on their own properties

Rain gardens with inlets placed before storm drains can infiltrate water and overflow into existing storm drains.

Permeable pavers should be maintained with a vacuuming regimen to increase longevity.

PROPOSED EAST STREET

Implementing rain gardens with outflows into bioswales can provide stormwater infiltration without connecting to existing grey infrastructure or these vegetated infiltration systems can strategically place outflows into existing grey infrastructure. Creating a multi-use path allows for a variety of users to access the Town Center and can help connect visitors to recreational destinations. Wayfinding and safety signage throughout Goshen alters pedestrians and drivers of potential hazards and helps orient, direct, and highlight Goshen's beautiful destinations.



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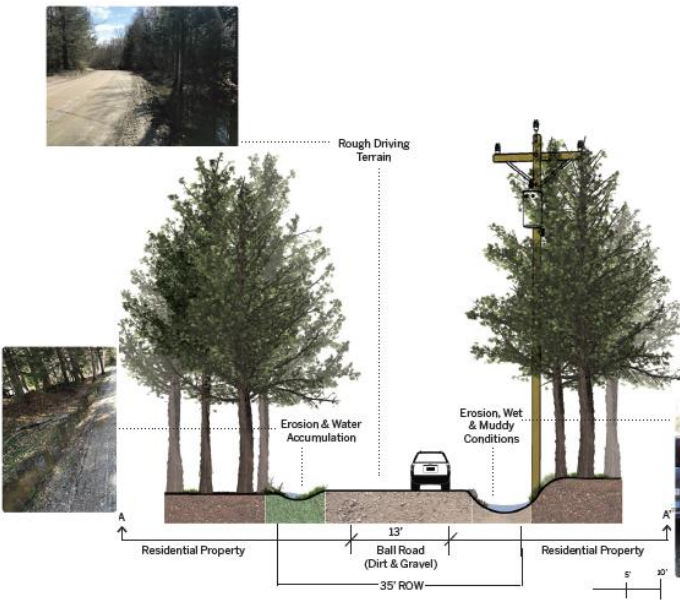
TOWN-WIDE STREETSCAPE INTERVENTIONS

The Dirt, Rural Arterial Road Template can be applied low traffic, rural neighboring streets in Goshen. To maintain rural character of these rural roads, paving is not recommended, but replacing dirt roads with gravel would significantly reduce drainage issues. Installing an unpaved pedestrian lane with a porous material like crushed aggregate creates a designated space for pedestrians to walk away from the road, and also reduces wet and muddy conditions making the walking experience much more enjoyable. These roads are generally absent of storm drains, so rain gardens along the side of the road, placed at the bottom of slopes to maximize water collection, can retain and infiltrate stormwater without connecting to storm drains.

EXISTING CONDITIONS: BALL ROAD

Ball Road, an offshoot of Route 9, is an unpaved, rural arterial town road that runs through forest and low density residential areas and connects to Lily Pond Lane where a trail to Lily Pond Wildlife Management Area exists. Most of Goshen's arterial roads are rural and made of dirt and gravel. Many community members desire to keep these roads unpaved so as not to take away from their rural character, but hope to improve the walking experience by addressing the wet and muddy conditions due to poor drainage.

EXISTING BALL ROAD



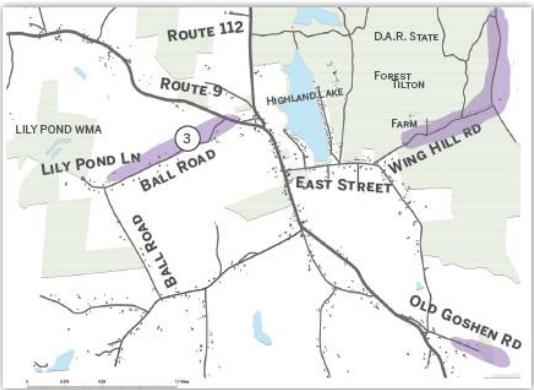
TEMPLATE 3: DIRT, RURAL ARTERIAL ROAD

ROW WIDTH	TYPICAL SLOPE	TYPICAL SPEED LIMIT	ROAD CLASSIFICATION & SURFACE TYPE	ADJACENT LAND USE	OTHER ROADS TO BE APPLIED TO
35	>15%	45	Arterial Town Road Dirt & Gravel	Residential & Open-Space	Part of Wing Hill Rd Part of Old Goshen Rd

TOOLS



KEY PLAN

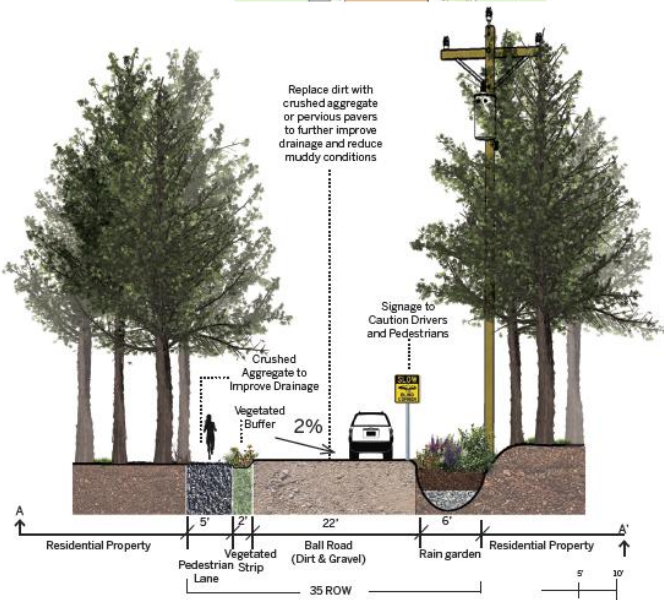
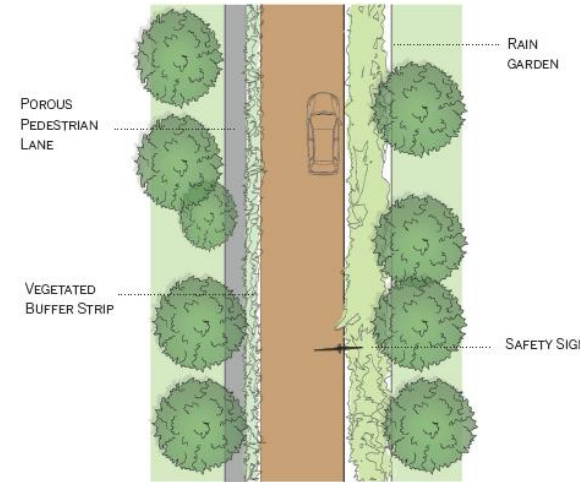


ADDITIONAL CONSIDERATIONS

To maximize stormwater draining capacity, replace the entire dirt road with gravel.
ADA accessibility may be compromised in areas sloped greater than 5%.

PROPOSED BALL ROAD

To address drainage issues, implementing rain gardens along these roads will reduce water pooling, and creating pedestrian pathways using porous material like permeable concrete or gravel establishes a designated walkway that allows water to infiltrate. To further reduce wet and muddy conditions while maintaining rural character, the entire road can be replaced with gravel. Like many of Goshen's rural roads, there are safety issues such as blind shoulders, substantially large potholes and very steeply sloped sections that drivers and pedestrians need to be made aware of so placing safety signs along these roads can help increase safety.

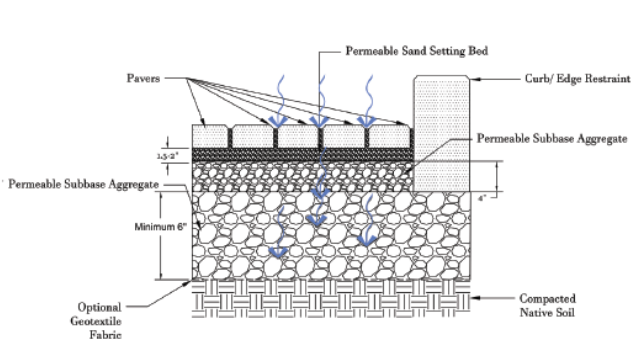


Not for construction. Part of a student project and not based on a legal survey.

STREETSCAPE CONSTRUCTION DETAILS

PERMEABLE PAVERS

Pavers laid on permeable gravel with a sand levelling layer allows water to flow through pavers into an infiltration area below and create texture to help slow traffic.



How It Works: Stormwater runoff flows into gaps between pavers down to the porous aggregate base, and eventually into the soil or into a perforated overflow drain pipe connected to the storm sewer system.

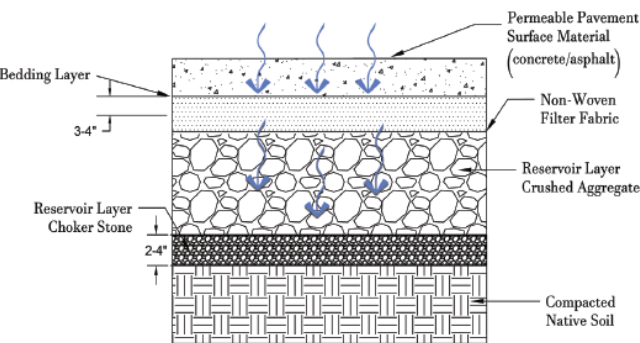
Benefits: Permeable pavers reduce impervious surfaces without reducing hardscape. Replacing conventional pavers with permeable pavers can prevent water accumulation by allowing water to infiltrate directly into the ground, which can reduce ice accumulation and the need to plow or apply icemelt. By filtering stormwater, permeable pavers can improve groundwater quality and can reduce the amount of water entering the municipal storm sewer system. Pavers create texture which can be felt by drivers to alert them of being in a pedestrian friendly area.

Considerations: Pavers may be dislodged after repeated freeze and thaw events, but they are easily replaced.

Application: Sidewalks or patios.

POROUS CONCRETE OR ASPHALT

Concrete or other paving material with voids to allow water infiltration through its material and into layers of base aggregate.



How It Works: Water drains through surface material and into a series of aggregate layers, eventually meeting soil.

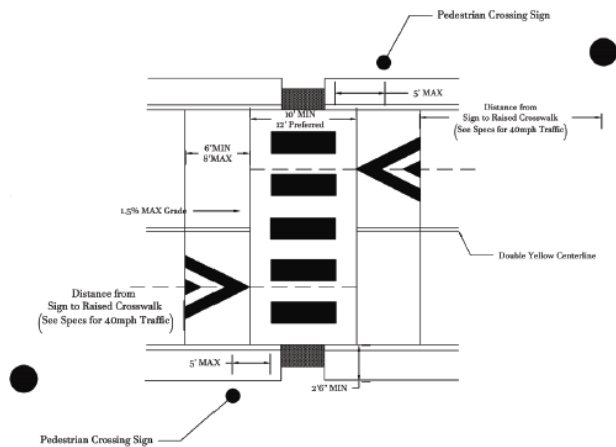
Benefits: Permeable paving reduce impervious surfaces without reducing hardscape and allow for ADA accessibility in appropriately sloped areas. Stormwater directly infiltrates into the ground reducing stormwater runoff and ice accumulation. Water can be channeled into nearby landscaping to reduce irrigation needs.

Considerations: Periodic vacuuming of the surface is required to prevent accumulation of sediments and to maintain ability for infiltration. Do not use sand when deicing to prevent blockage of permeable zones.

Application: Sidewalks, parking lots, or driveways.

RAISED CROSSWALK

Crosswalks that are gradually elevated above the roadway pavement in the form of an elongated speed hump with a flat section in the middle and at grade with adjacent sidewalks to help slow traffic.



How It Works: Serves as a traffic calming tool by extending the sidewalk across the road and forcing vehicles to slow down before driving over the hump.

Benefits: Improves accessibility by allowing pedestrians to cross at a consistent grade and removes the need for a curbed ramp. Improves drivers visibility of pedestrians. Raised Crosswalks force drivers to slow down and become aware of pedestrians.

Considerations: May be challenging to implement on State highway, and may impact emergency vehicle response time. Snow plows can still pass over raised crosswalks, but at slower speeds and with caution.

Application: Streets and Parking Lots

STAMPED & PAINTED CROSSWALKS

Stamping texture or striking paint patterns provides safer crosswalks by slowing vehicular traffic.

Stamped Asphalt/Concrete



Creates pattern and texture flush with the street that is noticeable to vehicles. Stamped surfaces require less maintenance than traditionally painted streets or pre-formed concrete pavers. May be more feasible on Mass State Highway.

Thermoplastic Paintings

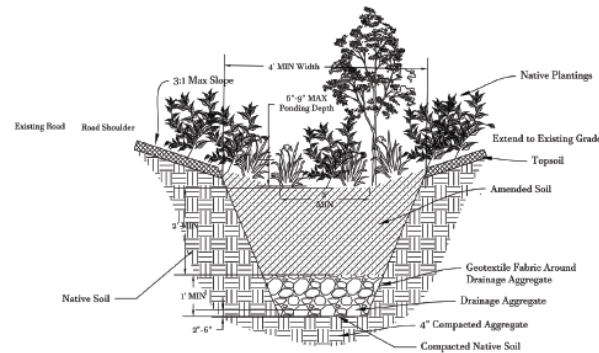


Creates striking patterns that are skid resistant and can be reflective for increased visibility. Thermoplastics have a very fast installation process and are extremely durable, and can last six times longer than a traditional painted street. May be more feasible for the Massachusetts State Highway.

STREETSCAPE CONSTRUCTION DETAILS

BIOSWALE

Linear landscaped depressions designed to capture, slow, and infiltrate stormwater runoff using native vegetation and soils.



How It Works: Bioswales behave like a traditional gutter except with many added benefits. Bioswales convey and collect stormwater, where vegetation slows its velocity and filters suspended solids and soils filter out pollutants. Water can then infiltrate into the ground below, recharging groundwater, or excess stormwater flows can be directed into existing grey infrastructure system

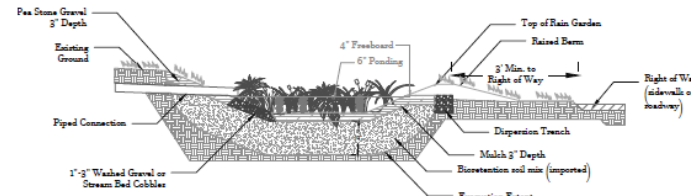
Benefits: Bioswales are designed to handle quantities of water created by large impervious surfaces like roadways and parking lots. Can be planted with low-maintenance native plants that can withstand extreme conditions like heavy road salt or extremely cold temperatures. Bioswales are an aesthetically pleasing alternative to gutters and storm drains, provide wildlife habitat, and remove harmful pollutants from stormwater.

Considerations: Dense, deep rooted vegetation are best for infiltration and should be wet and drought tolerant, and hardy to salt, snow piles, and high sediment flows. Swales should be sized to convey at least a 10-year storm (4.3 in per 24 hours)

Application: Alongside streets, sidewalks, and parking lots. They can be integrated into medians, public spaces, or curb extensions.

RAIN GARDEN

Landscaped depressions designed to capture, accumulate, and gradually infiltrate stormwater runoff using native vegetation and soils.



How It Works: Rain gardens receive water from impervious surfaces, and hold the water temporarily so it can slowly infiltrate back into the soil. Vegetation and soil remove and filter out pollutants.

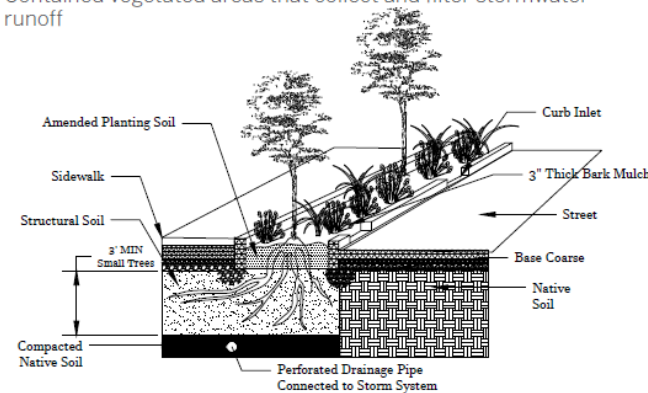
Benefits: Rain gardens reduce runoff and flooding, and provide habitat for wildlife like birds and pollinator species. These gardens are aesthetically pleasing.

Considerations: Plants must be wetland tolerant and able to withstand heavy salt and snow loading.

Application: Alongside streets, sidewalks, and parking lots. They can be integrated into medians, public spaces, or curb extensions.

STORMWATER PLANTER

Contained vegetated areas that collect and filter stormwater runoff



How It Works: Rainwater runoff enters the planter through curb cuts where it is filtered through a layer of mulch and soil. Water can infiltrate into the ground below, recharging groundwater, or excess stormwater flows can travel to existing grey infrastructure system.

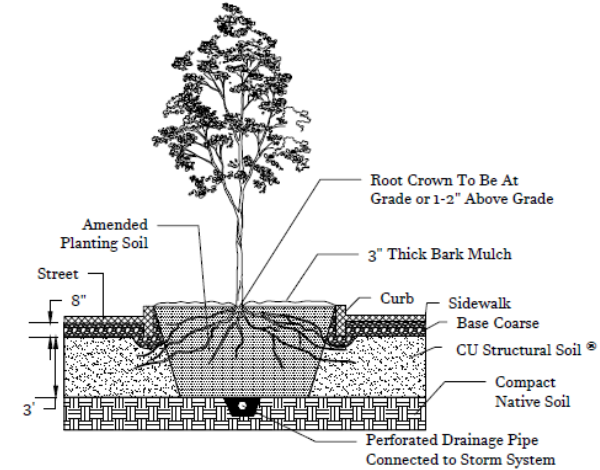
Benefits: Stormwater planters effectively buffers pedestrians from vehicular traffic, reduce the amount of stormwater flow, improve aesthetic appeal of sidewalks and streets, and can help grab the attention of drivers and slow vehicular traffic.

Considerations: Plants must be wet tolerant and able to withstand salt and snow loads.

Application: Along roads and sidewalks, and parking lots.

OPEN TREE TRENCH

Linear system of trees connected by structural soil underground, and filled with vegetation. Stormwater flows into the trench via curb cuts or inlets where it infiltrates into the soil.



How It Works: Open tree trenches create a space for large trees and other vegetation to grow and filter stormwater runoff. Stormwater can infiltrate into the soil and recharge groundwater or connect into existing grey infrastructure.

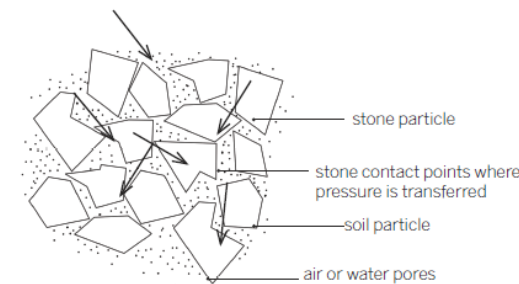
Benefits: Open tree trenches provide enough space to accommodate large street trees, allow for stormwater infiltration, provide habitat for wildlife, and help to slow traffic.

Considerations: Plants must be wet and drought tolerant and able to withstand heavy salt and snow loading.

Application: Alongside streets, sidewalks, and parking lots.

STRUCTURAL SOIL

Structural soil is a mixture of gravel and loamy soil. Gravel provides large void space and the soil fills the large gaps created by the stone. The stone-on-stone interaction creates a skeleton or lattice like structure so when compacted, weight is distributed from stone to stone rather than compacting the soil. Structural soil allow tree roots to expand under pavement and have deeper growth.



Not for construction. Part of a student project and not based on a legal survey.

MATERIALS AND COST

This conceptual cost estimate will provide the Town with a rough idea of the cost of materials and installation for the Town Center redesign. The chart reflects a range of estimates from low to high, and some costs are yet to be determined.

Demolition

Product/Material	Quantity	Unit of Measure	Low Cost/Unit	High Cost/Unit	Total Low	Total High
Asphalt Removal	9,600	SY	\$5	\$7	\$48,000	\$67,200
Tree Removal	4	Each	\$400	\$600	\$1,600	\$2,400

Site Preparation & Improvements

Product/Material	Quantity	Unit of Measure	Low Cost/Unit	High Cost/Unit	Total Low	Total High
Asphalt Parking (2" depth)	16,200	SF	\$4.50	\$6	\$72,900	\$97,200
Concrete Paths & Sidewalks (4" depth)	1,375	SF	\$8	\$10	\$11,000	\$13,750
Concrete Steps (7 step)	1	Lump sum	\$1,500	\$2,000	\$1,500	\$2,000
Crushed Aggregate Paths (5' width)	915	LF	\$10		\$9,150	\$9,150
Flagstone Patio	900	SF	\$4	\$7	\$3,600	\$6,300
Grading	8,500	SF	\$0.20	\$0.25	\$1,700	\$2,125
Imported Topsoil (3" depth)	833	CY	\$40	\$60	\$33,320	\$49,980
Paved Multi-Use Path (10' width)	1	Mile	\$481,000		\$481,000	\$481,000
Rain Garden	450	SF	\$30	\$50	\$13,500	\$22,500
Raised Crosswalk	1	Lump sum	\$7,500	\$10,000	\$7,500	\$10,000
Reinforced Turf	13,000	SF	\$12	\$16	\$156,000	\$208,000
Stamped Concrete Crosswalk	1,200	SF	\$14	\$18	\$16,800	\$21,600

Landscaping

Product/Material	Quantity	Unit of Measure	Low Cost/Unit	High Cost/Unit	Total Low	Total High
Large Trees (2- 2.5" caliper)	16	Each	\$400	\$600	\$6,400	\$9,600
Meadow Seeding	0.27	Acre	\$3,000	\$4,000	\$810	\$1,080
1 Gallon Shrubs	100	Each	\$10	\$15	\$1,000	\$1,500
Understory Trees (1" caliper)	20	Each	\$150	\$250	\$3,000	\$5,000
1 Quart Herbaceous Plants (wholesale)	500	Each	\$3.50	\$6.00	\$1,750	\$3,000

Amenities & Landscape Features

Product/Material	Quantity	Unit of Measure	Low Cost/Unit	High Cost/Unit	Total Low	Total High
Amphitheater	1	Lump sum	\$20,000	\$25,000	\$20,000	\$25,000
Benches	6	Each	\$500	\$600	\$3,000	\$3,600
Bike Rack	1	Each	\$800	\$1,500	\$800	\$1,500
Bleachers	1	Lump sum	\$1,200		\$1,200	\$1,200
Bocce Court	1	Lump sum	\$6,000		\$6,000	\$6,000
Café Seating (4' diameter table, 4 chairs)	10	Each	\$500	\$700	\$5,000	\$7,000
Wood Fence (3' height)	218	LF	\$15	\$35	\$3,270	\$7,630
Goshen Stone Wall	18,000	SFF	\$30	\$60	\$540,000	\$1,080,000
Grill	2	Each	\$300	\$800	\$600	\$1,600
Half Court (basketball)	260	SY	\$35	\$35	\$9,100	\$9,100
Pavilion	1	Lump sum	\$45,000	\$90,000	\$45,000	\$90,000
Pergola	450	SF	\$20	\$25	\$9,000	\$11,250
Picnic Table	12	Each	\$400	\$1,000	\$4,800	\$12,000
Raised Beds	7	Each	\$250	\$300	\$1,750	\$2,100
Restroom Facility	1	Lump sum	\$50,000	\$80,000	\$50,000	\$80,000
Rapid Flashing Beacon Sign	2	Each	\$2,000	\$3,000	\$4,000	\$6,000
Shuffle Board Court	1	Lump sum	\$1,500	\$2,000	\$1,500	\$2,000
Street Lamps (8' height)	16	Each	\$250	\$300	\$4,000	\$4,800
Trash Receptacle	4	Each	\$100	\$500	\$400	\$2,000
Wayfinding Sign	2	Each	\$50	\$75	\$100	\$150
Welcome Sign (wood and stone)	2	Each	\$6,000	\$9,000	\$12,000	\$18,000
Wetland Boardwalk	1,500	SF	\$35	\$75	\$52,500	\$112,500
Wood Frame Information Kiosk	1	Lump sum	\$2,500	\$3,000	\$2,500	\$3,000
Woodland overlook boardwalk	530	SF	\$60	\$80	\$31,800	\$42,400

The coffee shop could be a truck or a full building with plumbing, septic, and electric. This should be priced by others as plans are developed.

Total	\$1,678,850	\$2,542,215
Mobilization (1.5%)	\$25,183	\$38,133
Construction Surveying (2%)	\$33,577	\$50,844
Taxes 6.25%	\$104,928	\$158,888
Contingency (15%)	\$251,828	\$381,332
Grand Total	\$2,094,366	\$3,171,412

Not for construction. Part of a student project and not based on a legal survey.

PHASING

To accommodate the Town's limited budget this plan may be constructed in phases. The town will seek funding from varying sources including Complete Streets and will possibly use Community Preservation Act funds to complete portions of the plan.

Phase One

Pedestrian safety, walkability, and slowing vehicle traffic are a Town priority and should be addressed first.

- Plant street trees along Route 9
- Extend sidewalk to north and south of Route 9
- Establish more crosswalks at driveway and sidewalk intersections, across Route 9, and across East Street
- Move the existing crosswalk further north and reconstruct it as a raised crosswalk
- Install a rapid flashing beacon at the Route 9 crosswalk by Town Hall
- Install wayfinding signs
- Install street lamps
- Install curbs along Route 9 and in parking lots
- Build a multi-use path extending along East Street and Wing Hill Road from Route 9 to Tilton Farm.

Phase 2

The Town is interested in establishing gathering spaces in the further extents of Town Center's landscape and establishing more vegetation.

- Renovate both town parking lots and reduce them in size
- Create pedestrian pathways that guide visitors away from Route 9 and into the landscape
- Establish picnic areas
- Build a public restroom
- Install an informational kiosk
- Renovate Memorial Park
- Plant vegetation to help create more definition of spaces
- Establish reinforced turf to support vehicle traffic for pop up events
- Build half court next to the playground
- Build a pavilion and outdoor picnic area

Phase 3

Larger landscape features may require more targeted funding and can be implemented as opportunities arise.

- Wetland boardwalk
- Woodland overlook boardwalk
- Woodland amphitheater
- Fire pit
- Coffee shop
- Shuffle board and bocce courts

REFERENCES

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