MIDDLETOWN
Rhode Island

TOWN ADMINISTRATOR
TOWN OF MIDDLETOWN
350 East Main Road, Middletown, RI 02842
(401) 842-6500 | MiddletownRI.com

To: Members of Middletown Town Council

From: Shawn J. Brown, Town Administrator

Date: June 25, 2024

Re: Executive Summary - Purgatory Road Sidewalk 90% Plans

Town Planner Ron Wolanski has provided a detailed response to resident comments on the 90% design plans for the Purgatory Road sidewalk project (see attached memo). Key points include:

1. **Curb Design:** Vertical curb is recommended over beveled for pedestrian safety.
2. **Traffic Calming Measures:** Raised crosswalks and speed humps are feasible; chicanes and narrower lanes are not.
3. **Sidewalk Width:** Reduction to 4 feet is possible but must include 5x5 foot passing areas every 200 feet.
4. **Material Choice:** Concrete is preferred over pervious alternatives due to cost, maintenance, and longevity concerns.
5. **Funding and Scope:** Current funding is secured; reducing the scope is not recommended.
6. **Road Centerline Shift:** Shifting the centerline north is not advisable due to cost and impact concerns.
7. **Landscaping Plan:** While a tree planting plan is not included, collaboration with the Tree Commission and property owners is planned.

We will review these points and discuss how the project progresses from here at our upcoming meeting. Your input will be crucial in finalizing the plans and addressing any remaining concerns.

Please contact me with any questions or for further details.

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PLANNING DEPARTMENT
TOWN OF MIDDLETOWN
350 East Main Road, Middletown, RI 02842
(401) 849-4027 | MiddletownRI.com

Memorandum

Date: January 12, 2024

To: Shawn J. Brown, Town Administrator

From: Ron Wolanski, Town Planner

Cc: Steve Cabral, Town Engineer
Bob Hanley, DPW Director

Re: Purgatory Road Sidewalk 90% plans – response to resident comments

As you requested, town staff, including myself, the Town Engineer and the DPW Director met with the town's design engineer on the Purgatory Road sidewalk project to review requests and suggestions made by residents regarding the 90% design plans. These requests were presented to the Town Council during its December 4, 2023 meeting, and were included in a memo dated November 28, 2023 (attached).

Based on review of the requests and discussion with Jamie Pisano of VHB, the Town's design engineer, staff offers the following response for your consideration:

1. **Requested modification** – Use a beveled curb design in lieu of vertical curb. **Response** – As noted in the Requested Modifications to Purgatory Road Sidewalk Design memo, vertical curb enhances the safety of pedestrians. Use of a beveled or other mountable curb is not advised.
2. **Suggestion** – Consider incorporating traffic calming measures such as lateral shifts, chicanes, raised crosswalks, or narrower travel lanes. **Response** – Use of raised crosswalks, speed humps, and signage could be considered. Due to the classification of the roadway as an arterial, travel lane width of less than 10 feet and geometric modifications, such as chicanes, would not be appropriate.
3. **Requested modification** – Reduce sidewalk from 5-feet wide to 4-feet wide. **Response** – This could be considered, but based on current guidelines the design must include an area 5 feet x 5 feet every 200 feet along the length of the sidewalk to allow for two wheelchairs to pass each other.
4. **Requested modification** – Replace concrete with an ADA-compliant pervious alternative. **Response** – This is not recommended. The current design meets requirements for stormwater management and treatment. Adverse impacts on flooding, erosion, and water quality are not anticipated to result from the current design. If desired to provide additional treatment, an additional catch basin could be added in the area of the intersection of the east end of Tuckerman and Purgatory. This would provide additional sediment removal beyond regulatory requirements. As previously explored and discussed, pervious materials are more costly to install and maintain, and have a shorter lifespan. It is not clear that there would be significant benefits resulting from using pervious materials in this situation.

5. **Suggestion** – If the up-front cost of pervious pavement cannot be covered under the existing budget, consider a grant application to the Rhode Island Infrastructure Bank's Municipal Resilience Program, or limit the scope of the sidewalk to the area from Aquidneck Ave. to Wolcott Ave. **Response** – The Town has secured funding for this project and continues to explore grant opportunities for future projects. Based on the response to Suggestion 4 above, the cost of initial installation is not the only concern with using pervious materials. Limiting the scope of the sidewalk is not recommended. The intent of the project is to provide an accessible pedestrian connection between Aquidneck Ave. and Second Beach.
6. **Suggestion** – Consider shifting the road centerline 1-3 feet to the north (to save trees on the south side of the roadway). **Response** – This is not recommended. This would result in additional project costs, impacts on the north side of the road, and would not result in the subject trees being saved.
7. **Suggestion** – If it is not possible to preserve trees (and hedges) along the route, a detailed Landscaping Plan should be developed to mitigate their loss. **Response** – The project plan includes loam and seeding of disturbed areas. A tree planting plan is not part of the current project scope, however the intent is to work with the Middletown Tree Commission and abutting property owners to identify appropriate locations for future tree planting along the roadway. If desired, a landscape architect could be engaged to develop a formal landscape plan.

Please contact me with any questions.

November 28, 2023

Communication on behalf of the 220 Middletown signees to Letter to the Town Council, dtd July 4, 2023.

RE: Requested Modifications to Purgatory Road Sidewalk Design

Esteemed Council Members,

On behalf of the Easton's Point community, we are requesting modifications to the design of the Purgatory Road Sidewalk, to better align the project with a Green & Complete Streets approach, and with statewide climate resiliency planning efforts.

The community has engaged Narragansett Engineering to survey the area, evaluate the 90% design, and recommend improvements that are feasible within the scope of the project's budget and timeline (see attached report). Each of these requested modifications address one or more of the following neighborhood goals:

- Improve the safety of cyclists and other users
- Mitigate stormwater runoff and other environmental impacts
- Preserve trees and green space wherever possible

Safety

The current project design calls for two 10-foot travel lanes, two 4-foot shoulders, and a vertical curb on each side of the road. While resurfacing is a necessary and much-needed aspect of the project, the combined effect of resurfacing and widening the road will likely lead to increased vehicle speeds, raising the risk level for cyclists and other users. The addition of a vertical curb will further compound the risk for cyclists, posing both a pedal strike hazard, and a potential barrier to riders seeking to exit the road in an emergency.

REQUESTED MODIFICATION(S):

- Use a beviled curb design in lieu of vertical curb.

Use of a **beviled curb** design will reduce the risk of pedal strike, with minimal impact to the project budget or timeline. We understand that the rationale for a vertical curb is to enhance the safety of pedestrians (by making it harder for cars to swerve off the road). However, given that bicycles must travel within the shoulder, we believe the likelihood of a cyclist being struck is greater than that of a pedestrian. In this context it is worth noting that while there have been no documented incidents of vehicles hitting pedestrians along Purgatory Road, a cyclist (Michael Strickland) was struck and killed in 2012.[1]

The risk of increased driving speeds along Purgatory could be further mitigated by the inclusion of **traffic calming measures**. A recent study from the Johns Hopkins School of Public Health indicates that traffic lanes with 10-, 11-, and 12-foot lane widths have significantly higher crashes than lanes that are 9 feet

wide in zones that are 30–35 miles per hour.[2] Narrowing the lane width from 10 to 9 feet would likely produce a neutral to positive impact on traffic speed and public safety, while freeing up an additional two feet of width that could be returned to cyclists (or retained as green space).

ADDITIONAL SUGGESTIONS:

- Consider incorporating traffic calming measures such as lateral shifts, chicanes, raised crosswalks, or narrower traffic lanes.

Stormwater Runoff & Other Environmental Impacts

The 90% design calls for increasing the total width of Purgatory Road by two to four feet. When we include the 5-foot wide sidewalk, the project adds a combined seven to nine feet of hardened surface along an almost 1-mile stretch of road that drains to First Beach on the west, and Second Beach on the east. At a time when extreme precipitation events are increasing in both frequency and intensity[3], is it wise to add almost an acre of impervious surface above two natural sites that are vital to the town's tourist economy and reputation?

Stormwater runoff is largely a function of the amount of impervious cover in a watershed[4], which we already know to be a significant challenge on Aquidneck Island. According to the Rhode Island Climate Resilience Action Strategy, "most water quality impairments are known or suspected to be caused in part by stormwater, including pathogen contamination resulting in beach closures, algal blooms, and elevated levels of other pollutants."[5] While it is clear that concrete is less expensive than permeable alternatives, its true costs are not reflected in the project budget because they are *future costs* (i.e. increased risk of flooding & associated property damage, water contamination, and lost revenues from beach closures).

New development that significantly increases the amount of impervious cover abutting natural coastal areas is not only risky, it also runs directly counter to both state and municipal guidelines, including the Middletown Comprehensive Community Plan[6], the Rhode Island Stormwater Design and Installation Manual[7], and the Rhode Island Coastal Resources Management Program[8] (see references for specific citations). This is particularly relevant for the stretch from the east side of Tuckerman down to Surfer's End, which abuts both Second Beach and Purgatory Chasm.

REQUESTED MODIFICATION(S):

- Reduce the width of the sidewalk from 5 to 4 feet: the minimum continuous clear width specified by Federal Public Right-of-Way Accessibility Guidelines (PROWAG).[9]
- Replace concrete with an ADA-compliant pervious alternative such as permeable concrete, crushed stone, or geogrid backed grass.

ADDITIONAL SUGGESTIONS

- If the up-front cost of pervious pavement cannot be covered under the existing budget, consider a grant application to the Rhode Island Infrastructure Bank's Municipal Resilience Program, or
- Limit the scope of the sidewalk to the area from Aquidneck Ave. to Wolcott.

Preserving Trees and Green Space

While reducing the sidewalk width from 5 to 4 feet will result in the preservation of some green space, it will likely be insufficient to save the seven or more mature trees currently slated for destruction. Given that these trees provide much needed shade, cooling, and scenic value along the proposed walkway, we would ask that the Town explore whether additional measures could be taken along this stretch of the road. For example, could the road centerline be shifted one to two feet toward the north in this section? If it is not possible to preserve the trees, we would ask that a detailed landscaping plan be developed (and made publicly available) to mitigate their loss, as is required by Town Ordinance.[10]

ADDITIONAL SUGGESTIONS:

- Consider shifting road centerline 1-3 feet to the North along Sections 73+00 and 85+00.
- If it is not possible to preserve trees (and hedges) along the route, a detailed Landscaping Plan should be developed to mitigate their loss.

Conclusion

Because the above modifications primarily impact the sidewalk design, versus the road itself, we believe they can be executed with minimal disruption to project timelines (estimated one to three months delay). Given that the earmarked funds for this project do not need to be obligated until September 30, **2025,** this leaves us a considerable runway to recover any time lost in the design process. And, as noted in a January 6th Memorandum from the Town Planner, reductions to the project scope are permissible, and will not negatively impact the RIDOT funding allocated for this project.[11]

We take this opportunity to thank the Council, Town Administrator, and Town Planner for their efforts to improve accessibility and safety on Purgatory Road. With only a few changes, we believe that this project can achieve its stated goals of creating a safe and accessible pathway between First and Second Beaches, while also establishing Middletown as a leader in green, eco-friendly civic projects.

Signed,

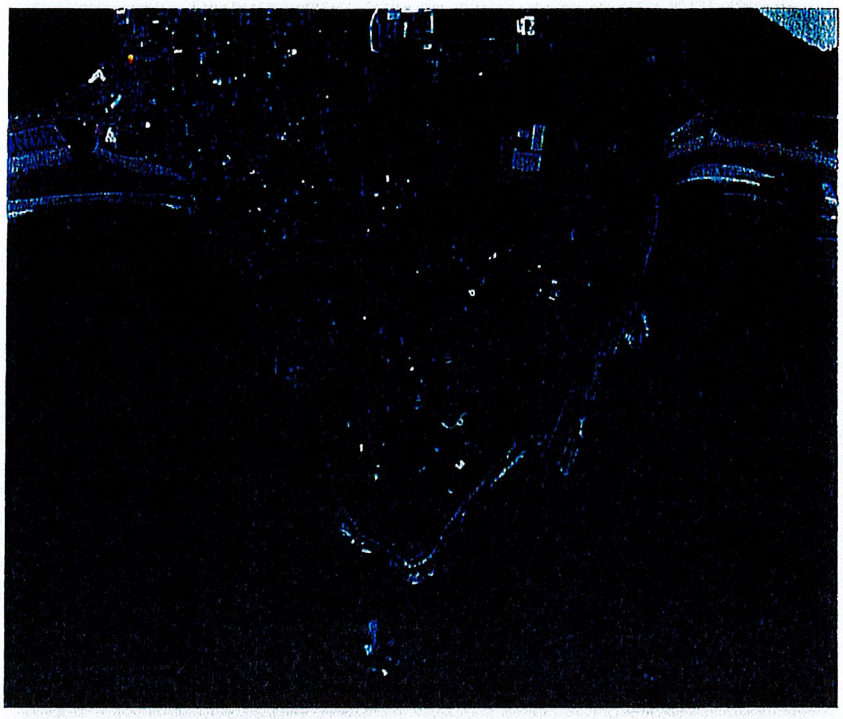
Margaret Ceres/ Taylor Rock/ Matt Kirby/ Beverly Cloutier

References:

1) Reflecting on Safety in the Wake of a Tragedy, Apr 1, 2012
2) Narrower Traffic Lanes in Cities Could Help Lower Risk of Traffic-Related Collisions, Johns Hopkins Bloomberg School of Public Health, Nov 1, 2023
3) State of Rhode Island, Climate Change (ClimateChange.ri.gov)
4) RESILIENT RHODY: AN ACTIONABLE VISION FOR ADDRESSING THE IMPACTS OF CLIMATE CHANGE IN RHODE ISLAND, (ClimateChange.ri.gov), Jul 2, 2018
5) RESILIENT RHODY: AN ACTIONABLE VISION FOR ADDRESSING THE IMPACTS OF CLIMATE CHANGE IN RHODE ISLAND, (ClimateChange.ri.gov), Jul 2, 2018
6) Middletown Comprehensive Plan: Stormwater Management, Page III-17: "Proper management of stormwater runoff will minimize damage to public and private property, reduce the effects of development on land, control stream channel erosion, reduce local flooding, minimize adverse water quality impacts and maintain after development, as nearly as possible, pre-development runoff characteristics. This ordinance requires stormwater management controls that are consistent with the State of Rhode Island Stormwater Design and Installation Manual..."
7) Stormwater Management, Design, and Installation Rules (250-RICR-150-10-8); 8.7
8) State of Rhode Island Coastal Resources Management Program - Red Book (650-RICR-20-00-1); 1.2.2D
9) Public Right-of-Way Accessibility Guidelines; R302.2
10) Town of Middletown RI, Code of Ordinances, Chapter 96: Tree Preservation and Protection, , 96.05 (D)(1)
11) Memorandum of Town Planner, re: Purgatory Road Sidewalk – options for reducing project scope; January 6, 2023.

Narragansett Engineering Inc.
Civil · Survey · Structural · Environmental · Design
3102 East Main Road, Portsmouth RI 02871
[redacted]

11.13.23
Rev 11.27.23



Purgatory Road Neighborhood
In care of:
Margaret Ceres
[redacted]
+
Matt Kirby
[redacted]

Dear Residents,

NEI is pleased to provide you with the following report, re:

Purgatory Road, Sidewalk Improvements, 30% Submission, October 2023
Town of Middletown RI, Prepared by VHB

Neighborhood Goals:

The neighborhood asks Middletown Town Council to approve updates to the design for the Purgatory Road Sidewalk, to better align the project with a Green & Complete Streets approach while also keeping the project on schedule and within a reasonable budget. Specifically, we are proposing modificiations that will:

- Improve the saftey of cyclists and other users.
- Mitigate stormwater runoff and other environmental impacts of the project.
- Preserve green space & trees wherever possible.

NEI has been retained to provide technical expertise to a group of local residents and consult on specific design elements and their impacts to the neighborhood. NEI has walked the area of concern with concerned residents and conducted a review of the 30% and 90% plans. We have had multiple zoom and telephone calls with residents and organizers.

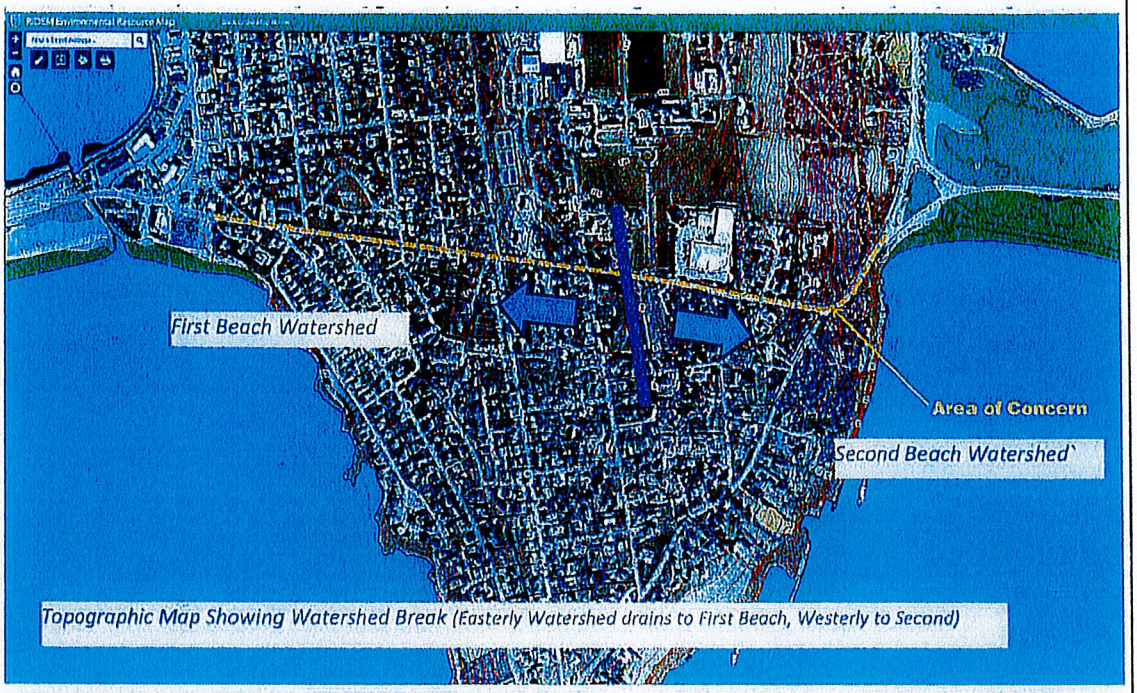
The following is a summary of our opinion:

Background:

The affected neighborhoods are high end residential, most of the ROW is well landscaped with trees, and hedges. St George's School is located on the north side of Purgatory Rd, and given that the project area is bookended by a commercial corridor along Aquidneck Ave. as well as First Beach (Easton's) to the west, and Second Beach (Sachuest), to the east, is subject to pedestrian foot traffic, and cyclists from the user base. Traffic is considerably higher in the summer months.

Second Beach + First Beach are areas with high recreation and tourism value, and as such, water quality is paramount. These areas are not 303D listed with impairments, however, as illustrated in the Appendix data, based on RIDOH and Partner data, water quality exceedances are common. Water quality is tied directly to the amount of impervious cover in a watershed. The length of the project is substantial, 4,300' approx; as such, the fact that the increased shoulder paving and sidewalk will incur a substantial amount (over an acre) of impervious area is significant and residents are concerned about the effect to the environment and water quality, considering the fact that this sidewalk drains to both First and Second. Water quality at these beaches is critical to the local economy and important to residents.

Soils in the area are typically glacial till. (NeA, NeB, NeC, PmB, CeC, etc.), and in this writer's experience, encounter a densic till horizion typically 24" +/- from original grade. These soils do require attention. Stormwater facilities, that are best suited are "surface" stormwater features, such as vegetated swales, or bioretention area with underdrains, as the capability of these soils to infiltrate stormwater is limited. Lined systems may also be viable where space is limited and a downstream pipe connection is feasible.



Topographic Map Showing Watershed Break (Easterly Watershed drains to First Beach, Westerly to Second)

Some wetlands exist in the area, and appear to have been flagged as part of the plans, however, a biologist report and data forms should be provided to verify appropriate edges are flagged and that appropriate buffers and buffer zones are shown on the plans.

Grades appear to peak at elevation 97 (approx. STA 79+25), which forms two broad watersheds, one to the west of this station, draining towards First Beach, and another, sloping to the east, draining toward Second Beach.

The neighborhood believes there has been insufficient stakeholder engagement and a lack of attention to the following impacts:

Sidewalk Dimensions + Construction:

The current walk is proposed at 5' width, with a grassed strip (2'-3') in certain areas along the corridor. The neighborhood does not believe that the amount of pedestrian traffic in the area is significant enough to merit this width, particularly given the increased amount of impervious area associated.

The neighborhood proposes a narrowing of the sidewalk to 4' wide, which is the minimum continuous clear width specified by Federal Public Right-of-Way Accessibility Guidelines (PROWAG). This would reduce impervious area, and also limit the impacts to abutting properties, hedges, grading, trees, and the overall streetscape of the neighborhood.

Additionaly, the neighborhood proposes the use of a permeable surface, to minimize the impacts to the watershed and environment. We understand, given the high water table constraints, these would need to be underdrained, but local residents association believe that any increased construction and maintenance costs would be more than offset by the environmental benefits of this approach. Additionally, a permeable or alternative surface may offer a "softer" aesthetic and be more in line with the scenic nature of the area than a standard concrete sidewalk.


Stamped Concrete Example (Various, Patterns are available)

We have investigated a handful of alternatives that may be suitable:

- Geogrid backed grass or crushed stone (e.g. gravel pave 2 or similar)
- Organic Lock (https://www.organic-lock.com/) bound aggregate.
- Permeable Concrete, particularly a "stamped" version.

We understand that each of these have maintenance considerations. though. much of this sidewalk occurs on residents' frontage and it is our understanding residents would already be responsible for mowing and snow removal along the route. As such. the residents are capable of maintaining these. and ..d offer to create a fund that could be tapped for standard maintenance requirements or if a resident fails to properly maintain their section.

There also appear to be some areas of the sidewalk that are proposed on private property (ref. STA 56+50). although marginal, if permanant taking(s) are proposed, these should be outlined on the plans. Additionally. a majority of the impacts of the project are being felt by abutters to the south side of Purgatory Rd. Given the amount of disturbance, we would ask if any consideration was made to either:

a. Locating the sidewalk on the North side of Purgatory. We understand a crosswalk will be necessary regardless of this choice. but it appears impacts to neighborhing property may be less than on the south side.
b. Modifying the Roadway Centerline to better balance the location of the Road. shoulders. and sidewalk within the ROW.

Curbing & Safety:

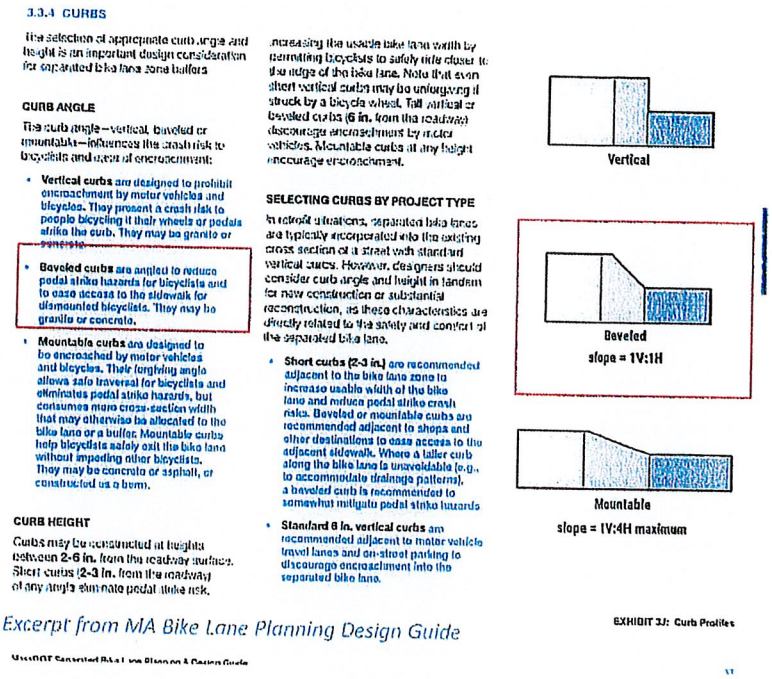
Given that the 90% of the design calls for 10-ft travel lanes and 4-ft shoulders, it appears the design goal is to increase the width of the shoulders to allow for cyclists to ride. Given the limited widths available, the neighborhood wants to ensure these curbs are safe, and are currently coordinating with bicycle safety advocates to determine the ideal curbing profile given the design.

While we understand that a curb is necessary design element to preserve the structural integrity of the sidewalk and associated drainage. It would appear that a beveled curb design may be a more appropriate choice here. given the limited shoulder width available (Ref. : https://www.mass.gov/lists/separated-bike-lane-planning-design-guide), a beveled curb minimizes pedal strike risk and provides a less imposing barrier, allowing cyclists to ride more closely to the curb, thus maximizing use of the lane width.

The neighborhood group has asked bicycle saftey advocates and the Bicycle & Pedestrian Advisory Committee-(BPAC) to weigh in on this by recommending a safer design and/or additional traffic calming measures.

These concerns must be balanced with pedestrian safety and a deeper discussion on the topic may be prudent.

..own should also consider traffic calming measures such as those refernced in: https://publichealth.jhu.edu/2023/narrower-traffic-lanes-in-cities-could-help-lower-risk-of-traffic-related-collisions.



3.3.4 CURBS

The selection of appropriate curb angle and height is an important design consideration for separated bike lane zone buffers

CURB ANGLE

The curb angle—vertical, beveled or mountable—influences the crash risk to bicyclists and level of encroachment:

- **Vertical curbs** are designed to prohibit encroachment by motor vehicles and bicycles. They present a crash risk to people bicycling if their wheels or pedals strike the curb. They may be granite or concrete.
- **Beveled curbs** are angled to reduce pedal strike hazards for bicyclists and to ease access to the sidewalk for dismounted bicyclists. They may be granite or concrete.
- **Mountable curbs** are designed to be encroached by motor vehicles and bicycles. Their angled angle allows safe traversal for bicyclists and eliminates pedal strike hazards, but consumes more cross-section width that may otherwise be allocated to the bike lane or a buffer. Mountable curbs help bicyclists safely exit the bike lane without impeding other bicyclists. They may be concrete or asphalt, or constructed as a berm.

CURB HEIGHT

Curbs may be constructed at heights between 2-6 in. from the roadway surface. Short curbs (2-3 in. from the roadway) of any angle eliminate pedal strike risk.

Increasing the usable bike lane width by permitting bicyclists to safely ride closer to the edge of the bike lane. Note that even short vertical curbs may be unforgiving if struck by a bicycle wheel. Tall vertical or beveled curbs (6 in. from the roadway) discourage encroachment by motor vehicles. Mountable curbs at any height encourage encroachment.

SELECTING CURBS BY PROJECT TYPE

In retrofit situations, separated bike lanes are typically incorporated into the existing cross section of a street with standard vertical curbs. However, designers should consider curb angle and height in tandem for new construction or substantial reconstruction, as these characteristics are directly related to the safety and comfort of the separated bike lane.

- **Short curbs (2-3 in.)** are recommended adjacent to the bike lane zone to increase usable width of the bike lane and reduce pedal strike crash risks. Beveled or mountable curbs are recommended adjacent to shops and other destinations to ease access to the adjacent sidewalk. Where a taller curb along the bike lane is unavoidable (e.g., to accommodate drainage patterns), a beveled curb is recommended to somewhat mitigate pedal strike hazards
- **Standard 6 in. vertical curbs** are recommended adjacent to motor vehicle travel lanes and on-street parking to discourage encroachment into the separated bike lane.

Excerpt from MA Bike Lane Planning Design Guide

EXHIBIT 3J: Curb Profiles

Trees and Landscaping:

The current design reqiures the removal of at least 7 mature trees. due to grading and impacts imposed by construction. These trees provide shading and aesthetic benefits to the neighborhood. The residents believe that through some combination of the measures proposed above (e.g. reduction in sidewalk width, plus replacing concrete with a pervious alternative, etc.) it may be possible to preserve these trees. If these measure alone were not sufficient, it might also be possible to shift the road centerline a few feet north in the relevant sections (73+00 and 85+00). Accordingly. local residents either request that:

a. The project design be modified to better mitigate impacts to these trees. with the use of tree wells, as required. to preserve the trees. or
b. In kind mature trees be planted to offset the loss of these trees. following a specifed landscaping plan. with aspects sumarized below.

Additionally. a more detailed landscape plan should be provided detailing specific plantings. species. height, and size to be planted. as well as any hedges that will be trimmed or lost as part of this construction. These hedges provide privacy screening for residents along what is already a busy road. the installation of sidewalks will only increase traffic and noise, never mind impacts during construction itself. These hedges can take many years to grow. and residents need to understand impacts more granularly to make educated decisions about the proposal and impacts to their property.

Finally. It would appear Town Ordinance would require in kind planting of Trees. per the Tree Commission.

Notes re: Tree Ordinance 96.05 (D) (1)

(1) Any person, firm, corporation, or agency that in the course of a site plan review, construction, or subdivision development wishes to remove any living public shade tree with caliper 2½ or greater in diameter measured at six inches above grade level shall obtain a permit from the Tree Commission; and, if removal is permitted, shall at no cost to the town, within the spring or fall months immediately following completion of construction, replace in locations specified by the Tree Commission a number of smaller replacement trees determined to be equivalent on the following basis: The total caliper of all replacement trees shall be at the discretion of the Tree Commission up to the original caliper. Replacement trees shall be balled and burlapped and of caliper not less than 2½" in diameter measured at six inches above grade level. Species, caliper and location shall be identified at time of issuance of the permit.

https://codelibrary.amlegal.com/codes/middletown/latest/middletown_ri/0-0-0-6285

Stormwater Mitigation:

Residents would like to see more attention paid to stormwater treatment, and would like to understand what the design criteria and goals are, with respect to peak flows, volumes, and water quality improvement.

There appears to be a number of existing vegetated swales in the ROW that will be demolished as part of the proposed project. The 90% plans do provide a provision for a Jellyfish stormwater treatment unit, for storm runoff from the "1st Beach" watershed, but no provisions have been made for stormwater flows draining in the "2nd Beach" direction. While these swales appear to serve as conveyance elements, they do provide for some level of stormwater infiltration and treatment, and should be considered in the area. In addition to increased stormwater impervious associated with the shoulders and sidewalk. Residents do wish for permeable concrete (or another pervious alternative) to be used, but would also like the stormwater treatment design criteria be provided for analysis, given the sensitivity of the area. An existing and proposed Pollution Prevention Analysis should be considered for this project, one that specifically reports the differential in pollutants (bacteria, nitrogen, phosphorus, total suspended solids (TSS) etc.) to both the "First Beach" and "Second Beach" watersheds. Permeable surfaces can have higher installation costs than traditional surfaces, however these costs are offset by reduced stormwater mitigation infrastructure costs and environmental benefits.

UNH Study Summary Re: Permeable Costs vs. Traditional Surfaces

General

Porous Asphalt Pavements in Minnesota, Jill Thomas, *Hot Mix Asphalt Technology*, November/December 2010.
http://www.asphaltisbest.com/PDFs/Porous%20Pavement%20Article%20HMAT%20Nov-Dec%202010.pdf
This article discusses the use of porous asphalt for several permeable pavements in Minnesota, including use of porous asphalt for the Ramsey-Washington Metro Watershed District Building. Water depth monitoring shows that there has never been discharge into the storm sewer; the greatest water depth was 3 inches after a 5-inch rainfall. The project cost $60,000; maintenance involves two vacuum sweepings a year. After two years, there are signs of clogging, but this has not affected infiltration rates, and there has never been runoff from the parking lot.

Porous Asphalt for Stormwater Management, Robert Roseen, University of New Hampshire Stormwater Center, March 2010.
http://www.unh.edu/unhsc/sites/unh.edu.unhsc/files/presentations/Porous%20Asphalt%20for%20Stormwater%20Management%20From%20the%20Rooftop%20to%20the%20Bay.pdf
This presentation includes information about the hydrology, pollutant removal, design and costs of permeable pavements. Costs are generally 10 percent to 20 percent more ($2.80 per square foot for porous asphalt, $4 to $5 for pervious concrete) but are offset by eliminating stormwater infrastructure installation.

Porous Asphalt Pavements for Stormwater Management: Design, Construction and Maintenance Guide, Information Series 131, National Asphalt Pavement Association, November 2008.
Available for purchase at http://store.asphaltpavement.org/index.php?productID=179
Topics covered include water quality, structural design, soil investigation, hydrologic design, materials,

Stormwater is not only important for environmental reasons and water quality, but for toursim and economics. Considering that a single day of beach closure at Second Beach could cost the Town an estimated $30,000 plus in lost revenue if it occurs on a peak Summer weekend.

Supporting Evidence, Stormwater Mitigation.

In order to implement proper stormwater mitigation treatments, water standards at multiple beaches on Aquidneck Island have been monitored for *Enterococci*, a strong indicator of water quality for over a decade. "The federal Beaches Environmental Assessment and Coastal Health (BEACH) Act requires that water from designated swimming beaches be tested for *Enterococci*. Extensive EPA studies have shown that *Enterococci* are the most efficient bacterial indicator of water quality" (Pagliaro, Touhey & McLaughlin, 2020, p. 13).

Easton's Beach, or "First Beach" in Newport, Rhode Island has encountered a plethora of exceedances of *Enterococci* that is well above the action standard set-in place by the EPA, RIDEM, and RIDOH." Rhode Island bathing water standards are monitored by the RIDOH based on water quality standards set by Rhode Island Department of Environmental Management (RIDEM) and the United States Environmental Protection Agency (EPA). Saltwater bathing waters must not exceed a single sample standard of 60 *Enterococci* (colony forming units) per 100 milliliters (ML); this is commonly referred to as a single sample maximum (SSM) or action standard. More recently, since 2014 this is referred to as the Beach Action Value (BAV). The action standard is 60 CFU per 100ML for a BAV" (Pagliaro, Touhey & McLaughlin, 2020, p. 13). For over a decade, exceedances of the action standard of 60 CFU per 100ML for a BAV have been evident at Easton's Beach (First Beach), shown in figure 4.0 below. (Pagliaro, Touhey & McLaughlin, 2020, p. 26).

Throughout the years, Second Beach has not been monitored as closely, but according to the *Clean Ocean Access 2008 - 2020 Water Quality Monitoring Report*, "there have been concerning spikes during the summers over the acceptable limit... "time frame is not enough for predicting year-round water quality patterns" (Pagliaro, Touhey & McLaughlin, 2020, p. 46). With the lack of knowledge on the water quality of second beach, implementation of structures that most likely will negatively impact or increase the amount of (potentially contaminated) stormwater runoff is not feasible without mitigation of the potential risks. Figure 10.0, (Pagliaro, Touhey & McLaughlin, 2020, p. 45) shown below Figure 4.0, reflects the lack of information on the water quality of this beach, making the feasiblity and overall risk of this project to the natural environment and its waterways unknown. Given these "concerning spikes," of water quality levels, implementation of new construction with little to no stormwater mitigation efforts, can be assumed detrimental to both First and Second Beaches.

Please refer to the following Addenda for excerpts from the Clean Ocean Access (COA) report and RIDOH Monitoring Data.

Summary of Recommendations & Projected Impact

Proposed Design Modification	Benefits of Proposed Change	Projected Financial Impact	Projected Timeline Impact
1) Replace vertical curb with beveled and/or short curb	-Improved safety for cyclists	Low	Combined timeline impact of all proposed changes is 1-3 months
2) Reduce sidewalk width from 5 ft to 4 ft	-Reduce stormwater runoff & preserve green space	High-cost reduction	
3) Consider shifting road centerline 1-2 feet north in sections 73+00 and 85+00	-Potential preservation of mature trees & shade -Improved aesthetics	Medium	
4) Use pervious concrete or alternative pervious surface in lieu of standard concrete	-Reduce stormwater runoff -Improved aesthetics	High cost - long term impacts include intrinsic environmental benefits and preservation of beach revenues that are directly linked to water quality	
5) Preserve trees currently slated for destruction, or provide detailed landscaping plan to offset their loss	-Preservation of trees/shade -Improved aesthetics	Neutral + Required, due to: Regulatory Requirements	

Estimated Impacts (Order of Magnitude)

Low: less than $10,000
Medium: $10,000 to $100,000
High: Greater than $100,000

Sincerely,

Neal Hingbrany, MS, PLS
Principal

Joe Malo, PE
Vice President

Addenda:

Clean Ocean Access, Selected Data:

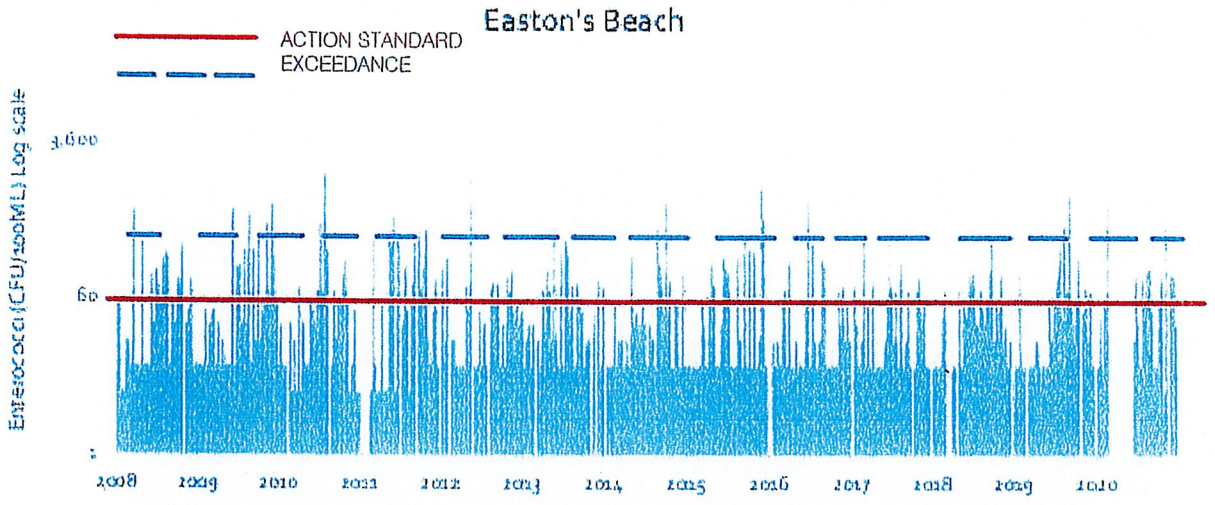


Figure 4.0 | 2008 – 2020: Easton's Beach (East) Weekly *Enterococci*.

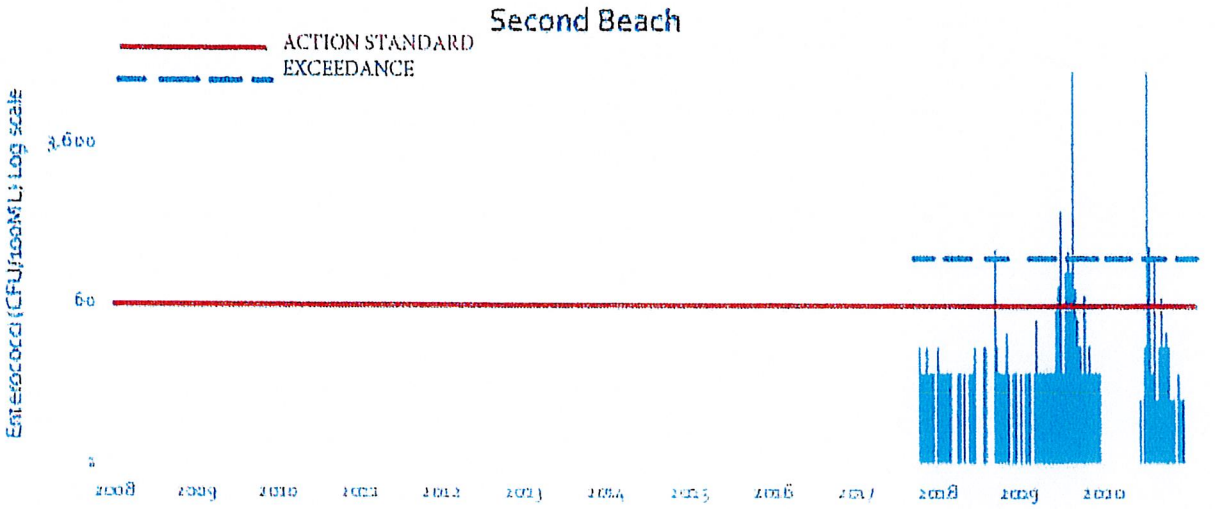


Figure 10.0 | 2017 – 2020: Second Beach Weekly *Enterococci*.

Figure 4.0. (Pagliaro. Touhey & McLaughlin. 2020. p. 26).
Figure 10.0. (Pagliaro, Touhey & McLaughlin. 2020. p. 45).

Pagliaro, Sustainability Coordinator, Zoe. et al. "Clean Ocean Access 2008 - 2020 Water Quality Monitoring Report Improving Coastal Water Quality Monitoring Report." *Clean Ocean Access*, www.cleanoceanaccess.org/about/reports/ Accessed 09 Nov 2023

First Beach + Second Beach, Bacteria Exceedances 2021-2023 (RIDOH, BOH)

COA Published Data period runs to 2021. The following are a list of bacteria exceedances, specific values have not been published for this time period.

Ref: https://health.ri.gov/data/beaches/volunteergroups/

First Beach (aka Easton's Beach)

9/14/2023	First Beach, Newport	Bacteria greatly exceeded advisory level for swimming	Clean Ocean Access; data@cleanoceanaccess.org	Monitored weekly
8/31/2023	First Beach, Newport	Bacteria greatly exceeded advisory level for swimming	Clean Ocean Access: data@cleanoceanaccess.org	Monitored weekly
8/17/2023	First Beach, Newport	Bacteria greatly exceeded advisory level for swimming	Clean Ocean Access: data@cleanoceanaccess.org	Monitored weekly
8/10/2023	First Beach, Newport	Bacteria exceeded advisory level for swimming	Clean Ocean Access; data@cleanoceanaccess.org	Monitored weekly
8/3/2023	First Beach, Newport	Bacteria exceeded advisory level for swimming	Clean Ocean Access: data@cleanoceanaccess.org	Monitored weekly
7/20/2023	First Beach, Newport	Bacteria exceeded advisory level for swimming	Clean Ocean Access: data@cleanoceanaccess org	Monitored weekly
2023	First Beach, Newport	Bacteria greatly exceeded advisory level for swimming	Clean Ocean Access; data@cleanoceanaccess.org	Monitored weekly
9/14/2022	First Beach, Newport	Bacteria exceeded advisory level for swimming	URI Watershed Watch; eherron@uri.edu	Monitored monthly
8/25/2022	First Beach, Newport	Bacteria greatly exceeded advisory level for swimming	Clean Ocean Access; data@cleanoceanaccess.org	
8/11/2022	First Beach, Newport	Bacteria exceeded advisory level for swimming	Clean Ocean Access: data@cleanoceanaccess.org	
7/28/2022	First Beach, Newport	Bacteria exceeded advisory level for swimming	Clean Ocean Access: data@cleanoceanaccess.org	
6/16/2022	First Beach, Newport	Bacteria exceeded advisory level for swimming	Clean Ocean Access. data@cleanoceanaccess org	
3/3/2022	First Beach, Newport	Bacteria exceeded advisory level for swimming	Clean Ocean Access: data@cleanoceanaccess org	
2/21/2022	First Beach, Middletown	Bacteria exceeded advisory level for swimming	URI Watershed Watch: eherron@uri edu	Monitored month year round
8/26/2021	First Beach, Newport	Bacteria exceeded advisory level for swimming	Clean Ocean Access. data@cleanoceanaccess org	Sample taken during storm
8/19/2021	First Beach, Newport	Bacteria exceeded advisory level for swimming	Clean Ocean Access data@cleanoceanaccess.org	
7/10/2021	First Beach, Newport	Bacteria exceeded advisory level for swimming	URI Watershed Watch. eherron@uri.edu	Monitored monthly

Second Beach (aka Sachuest Beach)

7/20/2023	Second Beach, Middletown	Bacteria greatly exceeded advisory level for swimming	Clean Ocean Access; data@cleanoceanaccess.org	Monitored weekly Memorial-Labor Day
7/6/2023	Second Beach, Middletown	Bacteria exceeded advisory level for swimming	Clean Ocean Access; data@cleanoceanaccess.org	Monitored weekly Memorial-Labor Day
7/28/2022	Second Beach, Middletown	Bacteria exceeded advisory level for swimming	Clean Ocean Access; data@cleanoceanaccess.org	
7/21/2022	Second Beach, Middletown	Bacteria exceeded advisory level for swimming	Clean Ocean Access; data@cleanoceanaccess.org	
7/15/2022	Second Beach, Middletown	Bacteria exceeded advisory level for swimming	Clean Ocean Access; data@cleanoceanaccess.org	
9/2/2021	Second Beach, Middletown	Bacteria exceeded advisory level for swimming	Clean Ocean Access; data@cleanoceanaccess.org	Sample taken during storm
8/19/2021	Surfers End, Second Beach, Middletown	Bacteria exceeded advisory level for swimming	Clean Ocean Access; data@cleanoceanaccess.org	
8/12/2021	Surfers End, Second Beach, Middletown	Bacteria exceeded advisory level for swimming	Clean Ocean Access; data@cleanoceanaccess.org	
8/5/2021	Surfers End, Second Beach, Middletown	Bacteria exceeded advisory level for swimming	Clean Ocean Access; data@cleanoceanaccess.org	
7/22/2021	Second Beach, Middletown	Bacteria exceeded advisory level for swimming	Clean Ocean Access; data@cleanoceanaccess.org	
7/10/2021	Second Beach, Middletown	Bacteria exceeded advisory level for swimming	URI Watershed Watch; eherron@uri.edu	Monitored monthly