REPORT WRITTEN BY: Anil Yazici, Elizabeth Hewitt, Mohammad Pourmatin, Samuel Osei Poku **DATE:** 03/23/2026

A. PROJECT NUMBER AND TITLE:

R/CHD-18-NYCT: Equitable Access to Long Island Sound Waterfront and Beaches through On-demand Mobility

B. PROJECT PERSONNEL:

Table 1: Senior Personnel

Name	Role (PI, CO-PI, or AI)	Institution	Note
Anil Yazici	PI	Stony Brook University	
Elizabeth Hewitt	Co-PI	Stony Brook University	

Table 2: Postdocs

No post-doctoral researchers worked on this project

Table 3: Research Support Specialists

No research support specialist worked on this project

Table 4: Sea Grant Scholar Fellows and Research Assistants

Student Name	New or Continuing?	Degree Program	Type (choose from list)	Graduation Date	Anticipated or Confirmed?
Hojjat Barati	New	Ph.D.	GRA	5/22/2024	Confirmed
Mahsa Bargahi	New	Ph.D.	GRA	5/22/2024	Confirmed
Amir Hossein Ali Khan	New	Ph.D.	GRA	May 2029	Anticipated
Saba Sohrabi	New	Ph.D.	GRA	May 2030	Anticipated
Mohammad Pourmatin	New	Ph.D.	GRA	May 2026	Anticipated
David Xiedeng	New	B.E.	RA	May 2025	Confirmed
Andres Cuesta Eurea	New	B.E.	RA	May 2027	Anticipated
Nicole Mora	New	B.E.	RA	May 2027	Anticipated
Keidy Munoz	New	B.E.	RA	May 2027	Anticipated

Table 5: Student Volunteers

Student Name	New or Continuing?*	Degree Program	Graduation Date	Anticipated or Confirmed?+
Samuel Osei Poku	New	Ph.D.	May 2029	Confirmed

Table 6: Public Volunteers

No public volunteers worked on this project

C. PROJECT RESULTS:

The objectives of this study were:

1) To design on-demand mobility options that facilitated equitable public access to Long Island Sound (LIS) waterfront, and collect data on riders' demographics and environmental attitudes

2) To test Hypothesis #1: Improved mobility options would increase the use and appreciation of LIS waterfront

3) To test Hypothesis #2: People who utilized the LIS waterfront would be more aware of the environmental issues and climate change concerns for LIS, and more likely to take environmentally conscious actions

To meet these objectives, a beach shuttle pilot was conducted on weekends during Summer 2024 and Summer 2025. The pilot was widely advertised through multiple channels, including media coverage, weekly tabling at libraries to interact with patrons and provide information to potential riders, distribution of informational flyers at transit stops, grocery stores and other venues, and outreach to university and community groups - please see APPENDIX-A for details. Riders were given the option to use a mobile app to request rides to West Meadow Beach in Stony Brook. West Meadow was selected as the study site following due diligence across all potential North Shore beaches, considering available amenities and facilities, ease of accessibility, and beach crowdedness. The shuttle picked up riders from their preferred locations during their chosen travel window (e.g., pick-up 11AM-12PM or 12:30PM-1:30PM), transported them to West Meadow Beach, and returned them to their preferred locations at the corresponding return time (e.g., 11AM-12PM pick-up corresponding to 3PM-4PM return from the beach). Each shuttle rider completed a survey to gather data related to the hypotheses; these riders served as the experimental sample. The survey was also distributed to the general public to generate a control group sample.

C.1. Meeting the Objectives

> **Objective 1:** To design on-demand mobility options that would facilitate equitable public access to the Long Island Sound (LIS) waterfront, and collect data on riders' demographics and environmental attitudes

For this objective, LIS beaches on Long Island were first surveyed for access options, site amenities, and general suitability as the target beach location (e.g., already crowded beaches were not preferred). The list of surveyed beaches can be found in APPENDIX-A. West Meadow Beach (Figure 1 and Figure 2) was selected for the shuttle pilot based on its infrastructure (e.g., key amenities such as restrooms, playgrounds, and seating areas with tables and chairs), accessibility (e.g., no admission charge, no residential or otherwise restrictions, and sufficient space for rider drop-off and pick-up), and other advantages (e.g., central location on Long Island in proximity to disadvantaged communities as designated by New York State, and no observed overcrowding).

For shuttle operations, the project team partnered with Flexigo Inc., a transportation technology company specializing in corporate mobility solutions including on-demand shuttles for large employers. Flexigo customized their mobile application – originally designed for corporate-employers – for the beach shuttle project (including creating a Spanish version) so that interested riders could request rides to West Meadow Beach with pick-up and drop-off at their preferred locations. Flexigo's back-end platform processed ride requests to generate the shortest route, and pick-up and drop-off itineraries were communicated to the vehicle driver(s) through Flexigo's driver application. Each vehicle was also equipped with a telematics device to track the shuttle in real time, allowing riders to receive status updates (e.g., arriving in 10 minutes, delayed by 5

minutes etc.). Prior to operations, shuttle drivers and project team members completed training on Flexigo's tools. At least one project team member rode each shuttle to address any issues as they arose.

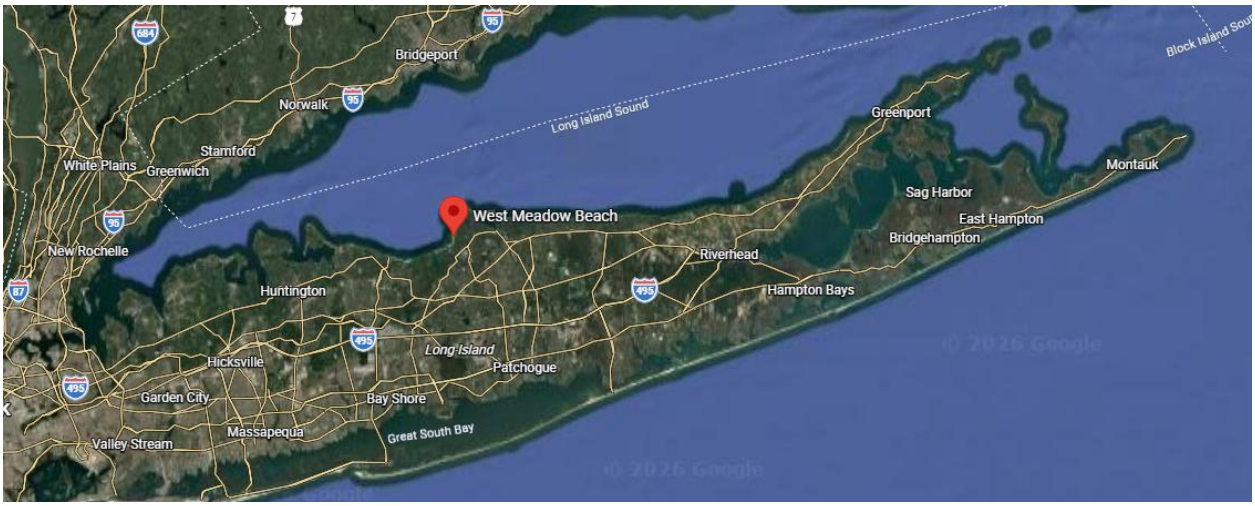


Figure 1 Location of West Meadow Beach in Long Island

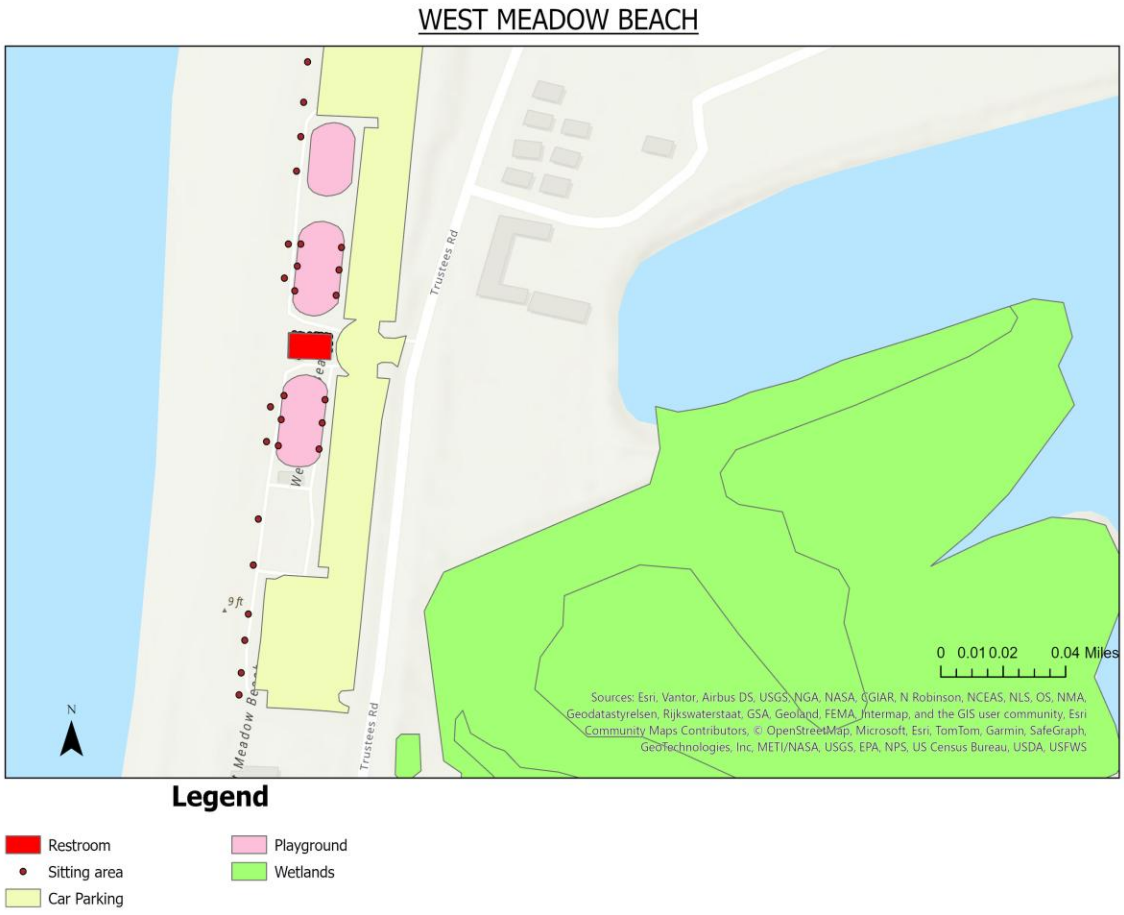


Figure 2 Facilities and amenities at West Meadow Beach

After West Meadow beach was selected, the project team initiated public outreach to advertise the shuttle pilot. Flyers (in both English and Spanish) were distributed through community organizations and in-person at public libraries and churches, and posted in library and church bulletins, at public transit stops, and at points of interest such as supermarkets and convenience stores. The flyer (Figure *3*) included all information necessary to reserve a ride, including links and instructions for downloading the Flexigo app.

Prior to the Summer 2024 pilot, a trial run was conducted on the weekend of May 18-19, 2024. The trial allowed the team to identify potential technical issues and user difficulties with the Flexigo app reservation process before the service opened to the general public. Participants were recruited primarily from Stony Brook University to create a limited test group. A total of 13 riders were served during the trial run, which helped the project team streamline the reservation process and resulted in fewer issues during regular shuttle operations. The rider survey was also piloted during this trial run.



Figure 3 Flier (in English) for advertisement of beach shuttle in summer 2025

The West Meadow Beach shuttle operated during the summers of 2024 and 2025. In 2024, service ran from June 1 through August 31. In 2025 service ran from July 4 (Independence Day weekend) through September 1 (Labor Day weekend). The pilot was originally planned for Summer 2024 only and was extended into 2025 using remaining available funds. Flexigo arranged shuttle vehicles through Beach Limo, a local shuttle rental company selected for its competitive pricing and existing service history with Stony Brook University. Vehicles had a capacity of 10-12 passengers per vehicle, including the GRAs and RAs who distributed rider surveys and assisted with Flexigo app troubleshooting. Riders made reservations through the Flexigo mobile app for one of two round trip windows on Saturdays and Sundays. In 2024, the shuttle received a total of 72 reservations. Of these, 32 riders successfully visited the beach, 28

canceled or did not appear at their scheduled time, and 12 reservations were canceled due to weather. In 2025, 87 reservations were made, of which 15 were canceled due to weather conditions. Of the remaining 72 riders, 45 completed the survey; 18 were excluded as they were under 18 years of age, and 9 had used the shuttle multiple times. Riders reported generally favorable impressions of the service and reported that it met a meaningful need, while suggesting shorter beach stays (approximately 3 hours rather than the initially offered 4 hours) and greater flexibility in pick-up and drop-off times.

Figure 4 and Figure 5 show the weekly reservations and ridership during the summer 2024 and summer 2025 weekends, and Figure *6* shows the reservation and ridership summaries for the same periods.

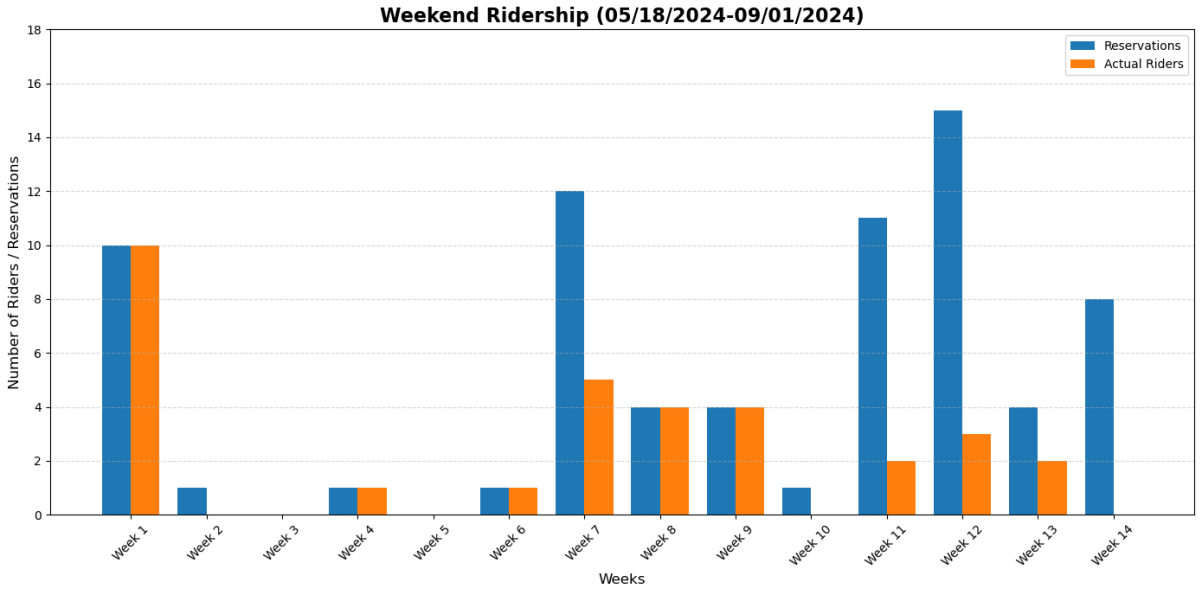


Figure 4 Weekend ridership 2024

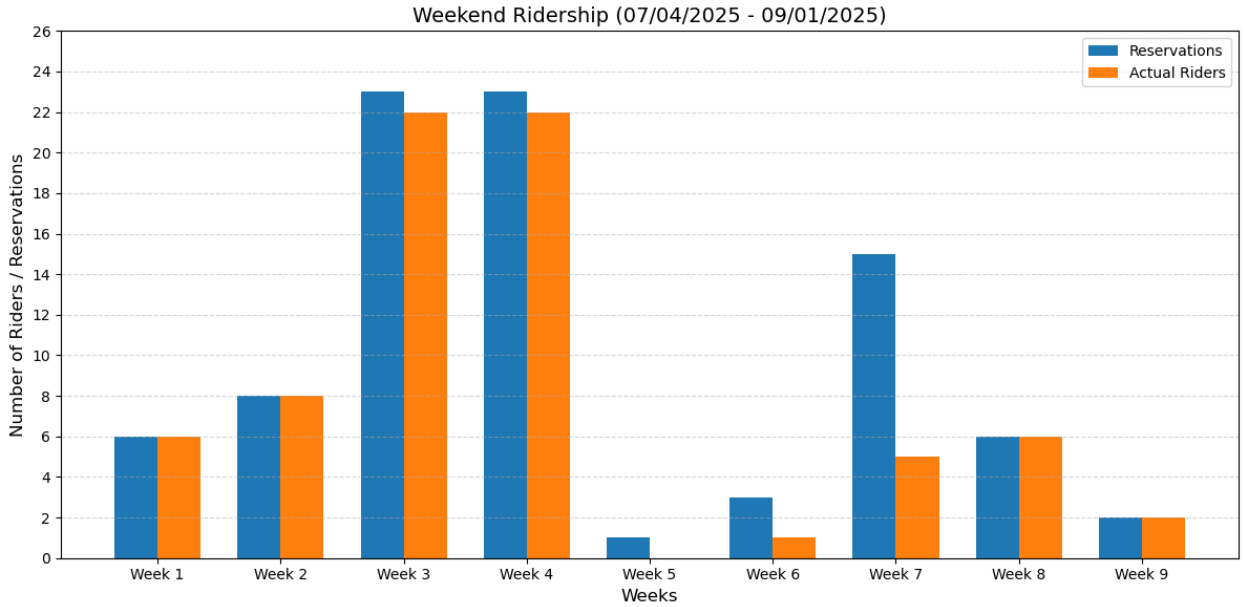


Figure 5 Weekend ridership 2025

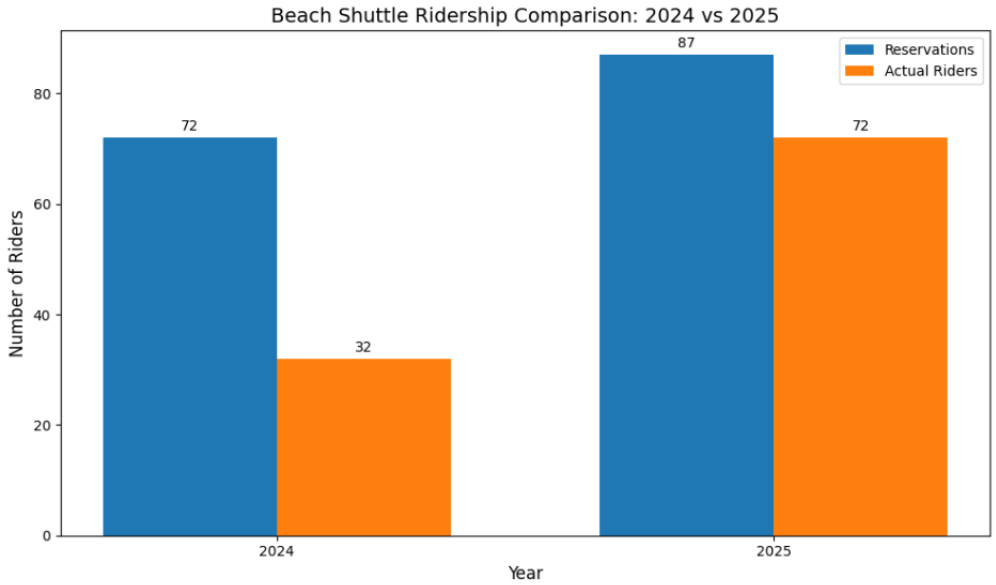


Figure 6 Summary of reservations and ridership statistics for the beach shuttle

Overall, the project team successfully designed, arranged and managed the beach shuttle pilot across both summers, meeting Objective 1.

> **Objective 2:** Test the hypothesis #1: Improved mobility options will increase the use and appreciation of LIS waterfront

To address this objective, two surveys were used to assess the impacts of the on-demand waterfront shuttle pilot and to examine patterns of access, mobility constraints, and environmental attitudes related to the Long Island Sound. The survey instruments were organized around three common components: (1) beach utilization and access patterns, (2) transportation availability and mobility constraints, and (3) environmental attitudes and behavioral intentions related to the LIS. One survey targeted shuttle rider and was administered in person during shuttle operations, while the second survey targeted non-riders and was administered online via Qualtrics. The rider survey focused on respondents' actual experience using the shuttle service, including beach visitation enabled by the service, transportation constraints, and environmental perceptions following direct waterfront access. The non-rider survey captured baseline patterns of beach use, mobility limitations, and environmental attitudes among individuals who did not participate in the shuttle pilot. While the two surveys were tailored to their respective populations, they shared a core set of questions to enable direct comparison between riders and non-riders, providing insight into both realized and unmet demand for waterfront access. Figure *7* shows the flyer used to recruit non-rider respondents from the general public.



Figure 7 Information flier for public survey

To investigate whether improved mobility options increased the use and appreciation of the LIS waterfront, the study examined differences between riders and non-riders in terms of transportation access, beach visitation patterns, and environmental attitudes. The analysis revealed clear structural differences between the two groups. Non-riders reported substantially higher access to private vehicles and transportation resources, while riders had significantly more limited access to private mobility options. For example, 95% of non-riders reported owning a car compared to only 36% of riders, and 97% of non-riders reported having access to a vehicle suitable for a beach trip compared to 40% of riders. These results indicate that many shuttle users faced meaningful transportation constraints prior to the pilot. At the same time, riders reported slightly higher levels of engagement with beach activities than the broader non-rider population, suggesting that the shuttle attracted individuals who were already interested in visiting the beach but faced access barriers. Environmental attitudes were consistently strong across both groups, with respondents expressing high levels of concern about marine ecosystems, community well-being, and environmental protection. Taken together, these findings support Hypothesis 1: the shuttle pilot reduced transportation barriers and enabled waterfront access for individuals with limited mobility options, facilitating greater use and appreciation of the Long Island Sound waterfront.

> **Objective 3:** To test Hypothesis #2: People who utilize the LIS waterfront would be more aware of environmental issues and climate change concerns for LIS, and more likely to take environmentally conscious actions

To meet this objective, this study examined survey responses related to environmental concern, perceived social norms, and personal environmental actions. These questions captured respondents' views on the importance of protecting marine ecosystems and coastal environments, their perceived responsibility toward environmental protection, and their likelihood of engaging in environmentally conscious behaviors such as recycling and energy conservation. Both riders and non-riders expressed generally high levels of concern for environmental

protection and coastal ecosystems. Responses regarding the importance of marine life, ecosystems, community well-being, and environmental stewardship were consistently high across both groups. Statistical comparison revealed no significant difference in overall environmental concern between riders and non-riders (Mann–Whitney $U = 34{,}682$, $p \approx 0.26$). Median values for environmental concern fell within the upper range of the response scale for both groups, indicating that environmental awareness was broadly shared among participants regardless of shuttle use. Although overall environmental concern was similar across groups, the internal structure of environmental attitudes differed. Among riders, environmental beliefs, social norms, and personal action intentions appeared to form a more coherent and integrated pattern, with concerns related to ecosystems, community well-being, and personal responsibility aligning closely with intentions to take environmentally conscious actions. Among non-riders, this pattern was more dispersed, with beliefs, norms, and behavioral intentions less tightly connected. This suggests that while environmental concern existed broadly in both groups, individuals who accessed the waterfront through the shuttle demonstrated a more internally consistent relationship between environmental values and behavioral intentions.

Demographic analyses further highlighted differences in how environmental attitudes were distributed across the two populations. Among non-riders, environmental concern varied significantly across several socio-demographic factors. Political affiliation showed the strongest variation ($H = 52.24$, $p < 0.001$), with respondents identifying as liberal reporting higher levels of environmental concern than those identifying as conservative. Age and education also showed statistically significant differences (Age: $H = 30.63$, $p < 0.001$; Education: $H = 25.47$, $p < 0.001$), with older and more highly educated respondents generally reporting stronger environmental concern. Among riders, far fewer demographic differences emerged. Environmental attitudes remained relatively consistent across education, gender, income, and political affiliation, with age being the only variable showing a statistically significant difference ($H = 16.66$, $p \approx 0.02$), where older riders reported slightly higher environmental concern.

Finally, the analysis of stated willingness to use the shuttle among non-riders provided additional insight into the relationship between environmental attitudes and potential waterfront engagement. Respondents who expressed stronger pro-environmental values were significantly more likely to indicate they would have used the shuttle had they known about it ($\beta = 1.34$, $p = 0.026$). However, transportation access remained the dominant factor influencing willingness to participate, suggesting that environmental concern alone does not drive engagement. Rather, environmental awareness may increase interest in waterfront access opportunities when mobility barriers are reduced. Taken together, these findings provide partial support for Hypothesis 2: individuals who utilized the LIS waterfront demonstrated strong environmental awareness and environmental intentions. The results further suggest that improving physical access to coastal environments can strengthen the connection between environmental awareness and pro-environmental behavior by enabling more direct engagement with the LIS waterfront.

C2. Scientific Abstract

Access to public beaches promotes physical and psychological health, fosters a sense of community, offers cooling opportunities during heat waves, and advances the goals of environmental justice. Lack of public transportation options and the overreliance on personal vehicles are major hurdles for equitable access to waterfront and beaches on Long Island, and a reflection of larger mobility issues throughout the U.S. To mitigate access issues to the Long Island Sound (LIS), the objectives of this project were to: 1) design and pilot on-demand shuttles that would facilitate equitable public access to LIS waterfront and 2) assess opinions of the pilot and pro-environmental attitudes towards the LIS to determine project impacts. The project targeted underserved communities on Long Island who did not have the mobility means to use and appreciate LIS waterfront. This research hypothesized that LIS access among underserved

populations would increase as a result of the pilot shuttle and that respondents would report an increased sense of belonging, awareness, and pro-environmental attitudes towards the LIS after using the shuttle. To achieve these objectives, our research team launched a free shuttle during Summer of 2024 and Summer of 2025 in partnership with private sector partner Flexigo and local shuttle operator Beach Limo NYC. A survey was administered to all riders on the shuttles (n=73) and a control group survey was administered to non-riders (n=1388). Findings indicate that the shuttle pilot successfully reached individuals with more limited transportation access, particularly younger and lower-income residents who reported significantly lower levels of private vehicle ownership compared to the broader population. The results further show that interest in waterfront access is not limited by environmental concern, as both riders and non-riders expressed similarly strong pro-environmental attitudes toward the Long Island Sound. Instead, participation in the shuttle and willingness to use the service are primarily shaped by mobility constraints and transportation access rather than differences in environmental values. The findings also suggest that individuals who utilized the shuttle demonstrate a more coherent relationship between environmental concern and environmentally conscious behavioral intentions, indicating that direct engagement with the waterfront may strengthen the connection between environmental awareness and action. Outcomes of this work include contributions to research gaps, proof of viability and financial feasibility of the shuttle, and increased access to and awareness of the LIS among community members and end users.

C3. Problems Encountered

Several challenges arose during the course of the project that proved difficult to fully resolve within the scope of this project but provide valuable takeaways for future work.

First, establishing trust within underserved communities for participating in the shuttle pilot proved more difficult and time-intensive than anticipated. Many target populations had limited prior engagement with university-led initiatives, and outreach efforts required sustained relationship-building with local community organizations and faith-based groups before meaningful ridership could be cultivated. The significant increase in shuttle ridership between Summer 2024 and Summer 2025 is largely attributable to the community trust and connections that project team established during the first pilot year. In future iterations, this challenge could be mitigated by allocating a dedicated budget to hire community liaisons familiar with the populations served and to prioritize in-person engagement.

Second, identifying effective advertising venues presented an ongoing challenge, as traditional channels (social media, emails, web traffic) yielded limited reach among our target car-free and/or underprivileged populations, many of whom did not have social media accounts or regular access to the internet. One way we mitigated this challenge was through regular in-person outreach at local venues and hard-copy (vs. digital) advertising.

Third, the no-cost structure of the shuttle, while essential to the project's mission, contributed to a higher-than-expected rate of reservation cancellations, as riders faced no financial disincentive to forgo a reserved seat on the day or weekend of the trip. Although we did not have a way to address this during the project, one potential mitigation strategy (if the shuttle is to be kept free of charge) would be to implement rules on reservation cancellations (e.g., one cannot reserve a ride for 2 weeks if the trip is cancelled within 24 hours of the beach visit). Such rules can help utilize vacant seats in a more efficient manner.

C4. New Research Directions

No additional or new research directions were pursued during the project. However, the shuttle pilot period was extended from summer 2024 only (as initially proposed) to the summers of both 2024 and 2025. Such an extension was considered during the initial proposal stage but discussed

as contingent upon available funding. Since the summer 2024 shuttle pilot costs were lower than anticipated, the project team was able to allocate sufficient funds for the summer 2025 continuation. This extension proved valuable as ridership – and consequently the survey sample – increased substantially in the second year.

C5. Outreach & Interactions

Other than presentations, publications and media coverages that are discussed under *"C6. Presentations and Publications"* section of the report, the outreach activities during the project duration can be described under three categories: 1) PI meetings and interactions with community organizations and NYSG Extension 2) Dissemination of beach shuttle information, and 3) Activities related to the distribution of public survey

C5.1 PI meetings and interactions with community organizations and NYSG extension

PIs Yazici and Hewitt met regularly with local organizations and New York Sea Grant staff and contacts throughout the project period to build relationships, conduct outreach and strengthen community ties. Outreach, meetings, and events included:

- OLA of Eastern Long Island, Inc. (Organización Latino Americana), a Latino-focused non-profit advocacy organization
- Local public libraries throughout the North Shore
- NYSG Extension and NYSG staff including Communications Manager Paul Focazio and Long Island Sound Partnership Outreach Coordinator Jimena Perez-Viscasillas
- Attendance by PI Yazici at library events hosted by the NYSG Extension
- Dare2Dream Community Outreach, a local non-profit group that hosts events and provides resources for members

C5.2 Dissemination of beach shuttle information

The project team disseminated information about the beach shuttle pilot through multiple channels to reach as broad an audience as possible. Outreach and dissemination activities included:

- Physical flyer distribution and posting at locations throughout the North Shore, including bus and train stops, public libraries, markets, and churches.
- Online dissemination through multiple channels, including OLA of Eastern Long Island, Stony Brook University postdoctoral and graduate student networks, and NYSG Communications Manager Paul Focazio's channels including social media
- Weekly information tables at public libraries, where project team members engaged directly with patrons and provided information to potential riders about the shuttle service and how to make reservations

For details of the outreach activities, please see APPENDIX – A: List of Outreach Activities and Locations for Shuttle Pilot Information Dissemination.

C5.3 Activities related to the distribution of the public survey to the non-rider control group:

To build a robust non-rider control group, the project team distributed the public survey through a range of in-person and digital channels over the course of the project period. Outreach and distribution activities included:

- Weekly in-person visits to local public libraries over approximately two months during Fall 2025, where team members distributed hard copy surveys directly to patrons
- Distribution through the environmental justice e-blast newsletter of LIS Outreach Coordinator Jimena Perez-Viscasillas
- Two distributions through the Stony Brook University College of Engineering and Applied

Sciences (CEAS) weekly newsletter
- In-person survey distribution at West Meadow Beach in Fall 2025
- Distribution through Stony Brook University's Collegiate Science and Technology Entry Program (CSTEP)
- University-wide e-blast to Stony Brook University students, faculty, and staff

C6. Presentations and Publications

C6.1. Presentations

- Yazici, M. 2025. Equitable Access to Long Island Sound Waterfront and Beaches through On-Demand Mobility. Long Island Sound Science and Technical Advisory Committee (STAC) meeting. Virtual. June 27. Talk.
- Yazici, M., and Hewitt, E. 2024. Equitable Access to Long Island Sound Waterfront and Beaches through On-Demand Mobility. Long Island Sound Research Conference 2024, New York Sea Grant. Port Jefferson, NY. 15th May. Presentation type: Talk.
- Hewitt, E. 2024. Equitable Access to Long Island Sound Waterfront and Beaches through On-Demand Mobility. LISS Environmental Justice Working Group Meeting. Virtual. 7th November. Talk.

C6.2. Media Interactions and Coverage

PIs Yazici and Hewitt had regular interactions with Paul C. Focazio, Communications Manager/ Associate Director of Community Relations, New York Sea Grant. Paul set up a number of interviews and press engagements, which resulted in the following articles and media coverage for the project:

- *Carl MacGowan, April 9 2023, Newsday.* Free Shuttle to Offer Trips to Long Island Sound Beaches for Those Lacking Rides. Available at: https://www.newsday.com/long-island/towns/stony-brook-university-long-island-sound-study-beach-shuttle-v3tfw0n8
- Sandra Bookman, May 27, 2023. Kickoff to a Long Island Summer. Available at: https://youtu.be/pVfosUuYKxg?si=VyZIrNsBsrZn2-bP
- Stony Brook News. SBU Faculty Project Expands North Shore Beach Access. Available at: https://news.stonybrook.edu/university/sbu-faculty-project-expands-north-shore-beach-access/

D. ACCOMPLISHMENTS:

D1. Impacts & Effects

D.1.1. Impacts on similar beach access shuttle implementations

The beach shuttle pilot generated practical insights into the costs, challenges, and conditions necessary for sustained on-demand waterfront access programs. While the pilot operated at a scale that made per-rider costs high, the experience yielded concrete recommendations for making similar services financially and operationally feasible for local governments and organizations considering similar initiatives. Cost transparency and community trust emerged as the two most critical factors for long-term viability.

The total cost of shuttle operations over the project period was $90,900, including the shuttle vehicle rental costs, and the customization, training and monthly utilization costs for transportation technology partner Flexigo's ride request and routing platform. The shuttle operated for a total of 48 days across 24 weekends, corresponding to an average daily cost of approximately $1,900. Despite this investment, ridership remained modest: 45 riders across 14 weekends in Summer 2024, and 72 riders across 9 weekends in Summer 2025, resulting in a

high per-rider cost. It should be noted that not all reservations resulted in completed rides – cancellations occurred for a variety of reasons, and multiple rainy days across both summers resulted in zero ridership on certain operating days for which the rental costs were still incurred due to contractual obligations with the shuttle vendor. The primary driver of sub-optimal utilization, however, was the challenge of building public trust (discussed further under "C3. Problems Encountered" section). Notably, the Summer 2025 pilot attracted 60% more riders than Summer 2024 despite operating across fewer weekends (9 *vs.* 14), reflecting the community connections and trust that the project team established during the first year. Assessed on financial terms alone, the overall cost structure makes it challenging to establish a beach shuttle as a sustainable long-term service. Nevertheless, the project team's hands-on experience supports the following recommendations for improving feasibility:

- **Non-monetary social benefits**: The financial cost of the shuttle should not be evaluated in isolation. The pilot demonstrated meaningful social value that is not captured in per-rider cost calculations. Survey findings indicated that shuttle riders had significantly lower access to private vehicles than the general public (36% car ownership among riders vs. 95% among non-riders), confirming that the shuttle reached populations with mobility constraints. Riders reported high satisfaction with the service and noted that it provided access to the waterfront they would not otherwise have had. Environmental attitude data further suggested that waterfront access through the shuttle was associated with stronger alignment between environmental values and pro-environmental behavioral intentions. These social and environmental benefits represent tangible public value that local governments and agencies should weigh alongside direct costs when evaluating similar programs.
- **Increased utilization through community trust**: Community trust was one of the key determinants of shuttle utilization. Although the project team conducted comparable outreach activities in both summers, ridership in Summer 2025 was significantly higher than in Summer 2024. This increase reflected two reinforcing dynamics: returning riders from Summer 2024 who were already familiar with the shuttle continued making reservations and spread the word within their networks, while the community connections the project team had established during the first year generated new ridership in the second. For example, with the help of NYSG Outreach Coordinator Jimena Perez-Viscasillas, the project team connected with the community organization Dare2Dream Community Outreach. With the assistance of Dare2Dream director Carmetta Freeman the project team was able to disseminate shuttle information through Dare2Dream's network, resulting in two fully booked shuttle trips during Summer 2024 (one of which was unfortunately cancelled due to weather). In Summer 2025, ridership from the Dare2Dream community grew substantially. This pattern highlights a broader dynamic relevant to equitable transit programming. Many individuals from underserved groups – including immigrant populations who are often among those most in need of alternative transportation options – require peer-level assurance before sharing personal information or using an unfamiliar transportation service. Community organizations serve as a critical bridge or missing between program operators and these populations, providing the trusted endorsement that the project team alone cannot replicate.

  That said, increased utilization does not fully resolve the financial feasibility problem. Even assuming full capacity utilization within the existing service structure (24 weekends of service, two shuttles per day, and 10 riders per shuttle), the cost per rider would be approximately $95. While this represents a meaningful improvement over the per-rider costs observed during the pilot, it remains a steep figure for a publicly funded service. Opportunities to reduce this further are discussed in the sections below.
- **Charging user fees**: Introducing a nominal user fee, comparable in scale to a local bus fare, could offset a portion of operating costs without creating a significant barrier to access, particularly if low or no-cost subsidies could be provided for low-income riders. A modest fare would also

signal the service's legitimacy and permanence to potential riders, which might itself support higher utilization. The public survey indicates that more than 80% of the respondents find the charge of a public bus fare or even up to $5 per person (one way) as a reasonable charge for the service. The rider survey indicates a similar trend where 80% of the respondents find public bus fare as a reasonable charge, and 78% of the respondent also find $5 one-way charge as reasonable.

- **Economies of scope and longer-term contracts**: The shuttle costs in this project do not represent the costs a local government or organization with dedicated transportation infrastructure would face. The rental costs in this project reflect rates typical of one-off or short-term event rentals, which include vendor profit margins not present in municipal operations. Of the total $90,900 in project costs, $60,400 was spent on vehicle rentals. Local governments and/or organizations with existing vehicle fleets and commercial driver workforces would face significantly lower marginal costs for weekend beach shuttle operations, as the incremental cost of deploying available vehicles and drivers for this purpose would be significantly less than market rental rates. Even agencies without existing fleets could negotiate substantially better rates through longer-term service agreements.

In addition, most local governments already maintain relationships with transportation technology companies to manage their fleet more efficiently, such as Suffolk County Transit's collaboration with the company Via to arrange their on-demand bus lines. Hence, the technology costs for an on-demand beach shuttle similar to the one in this project would be negligible for local transit agencies with existing technology tools. This project spent $30,500 on customization of Flexigo's ride request and routing platform for the beach shuttle application, as well as the training of shuttle drivers and project team members to utilize the platform. Such costs would be largely avoidable for an agency that could incorporate beach shuttle service into an existing list of on-demand services, using the existing technology infrastructure.

In short, while the per-rider costs of the pilot as structured are not conducive to long-term standalone operation, the financial picture changes substantially when the service is embedded within the context of existing municipal transportation infrastructure. When social benefits are weighed alongside operational costs, and when economies of scale and scope are applied, an on-demand beach shuttle modeled on this pilot represents a viable and meaningful public service for local governments to consider.

D.1.2. Impacts on local businesses

The beach shuttle pilot created new professional experience and expanded service capacity for both of the project's operational partners. For Beach Limo, this project represented the first time the company provided shuttle services for an on-demand, app-based public access program, which was a divergence from their typical event-based rental model. For Flexigo, the project constituted the first non-corporate application of their platform, which had previously been deployed exclusively in large employer and corporate mobility contexts. Over the course of the two-year pilot, all three parties (the project team, Beach Limo, and Flexigo) engaged in an ongoing feedback loop that iteratively refined the reservation process, driver communication protocols, and real-time rider updates. Both partner companies are now better positioned to support similar public or municipal mobility options in the future. For additional info, Dave Gallon from Flexigo can be reached at dave.gallon@flexigo.com and Chris Pinto from Beach Limo at reservations@beachlimony.com

D2. Patents

No patents were filed based on the project research.

D3. Leveraged Funding

No additional funding has been received by the project team with the help of the work or results

from this project.

E. Stakeholder Summary

Access to public beaches promotes physical and psychological well-being, fosters a sense of community, and offers cooling opportunities during heat waves. Yet on Long Island – as in much of the United States – overreliance on personal vehicles and limited public transportation options create major hurdles to equitable waterfront access. This project addressed those barriers directly by piloting a free, app-based on-demand beach shuttle open to anyone from the public. West Meadow Beach in Stony Brook was selected as the destination due to its central location on Long Island Sound and its accessible amenities, including free admission, restrooms, and food options. Riders reserved trips through a mobile app, were picked-up at their preferred locations, and were transported to and from the beach during set time windows on Sundays and Saturdays. Each rider was also asked to complete a survey; a similar survey was also distributed among the public to compare the perspectives of shuttle riders with the non-riders. The pilot ran for 24 weekends during summers of 2024 and 2025.

- **Findings:**

The shuttle pilot successfully reached the people it was designed to serve. Riders reported significantly lower rates of private vehicle ownership than the general public – 36% among riders compared to 95% among non-riders – confirming that the service reached individuals with transportation constraints, particularly younger and lower-income residents. Riders expressed high satisfaction and reported that the shuttle provided waterfront access they would not have had otherwise. Both riders and non-riders expressed similarly strong pro-environmental concern for the Long Island Sound. However, shuttle riders demonstrated a more coherent relationship between their environmental concern and intentions to act on them, suggesting that direct engagement with the waterfront may help translate environmental awareness into environmentally conscious behavior.

Community ties and public trust proved to be very important to the shuttle's success. Ridership increased considerably in Summer 2025, compared to summer 2024, despite fewer operating weekends, largely because of community connections the project team built during summer 2024. Partnerships with local community organizations were essential in reaching underserved populations, particularly immigrant communities, for whom peer-level trust and endorsement are critical before engaging with an unfamiliar service.

- **Take-home Messages:**
    - **Equitable waterfront access is achievable with the right tools.** A free, app-based on demand shuttle can effectively reach populations with limited transportation access, but only if the program is paired with sustained, community-based outreach
    - **Community trust takes time and investment, but is crucial to success**. Programs like this should plan for a trust-building period, particularly when serving immigrant and underserved communities. Ridership grew significantly once those relationships were established.
    - **Cost is a manageable barrier.** While the operational cost of the pilot was $90,900 across two summers, much of that reflects one-off vendor rates and technology customization costs that would be substantially lower for transportation agencies with existing fleets and on-demand technology infrastructure to support ride requests. Riders also expressed a willingness to pay reasonable fares (about 80% found a standard bus far or even $5 one-way reasonable), which could further offset costs.

- **The non-monetary benefits are tangible and significant.** Equitable access to the waterfront, improved community well-being, and strengthened environmental stewardship are public goods that should be weighed alongside direct costs when local governments and agencies evaluate programs of this kind.

F. Pictorial



Figure 8 Summer 2024 Beach Shuttle Flier in Spanish



Figure 9 Samuel Osei Poku from the project team at Hauppauge Library for advertisement of the beach shuttle on 07/19/2024



Figure 10 Andres Cuesta Eurea (RA) from the project team at West Meadow Beach as a part of advertisement of the beach shuttle 08/07/2025



Figure 11 Samuel Osei Poku from the project team with the community members of Dare2Dream to advertise the beach shuttle during one of Dare2Dream outreach on 07/20/2024



Figure 12 Samuel Osei Poku and Mohammad Pormatin from the project team with a group of riders at West Meadow Beach on 07/13/2024



Figure 13 Samuel Osei Poku from the project team posting fliers at Centereach Square on 06/01/2024

APPENDIX – A

LIST OF OUTREACH ACTIVITIES AND LOCATIONS FOR SHUTTLE PILOT INFORMATION DISSEMINATION

OUTREACH VENUE CATEGORY	NAME	ADDRESS	OUTREACH ACTIVITY
CHURCHES	The church of Jesus Christ of Latter-day Saints	372 Terryville Road, Port Jefferson Station, New-York, 11776	Paid visit to church service, office hours and pantry hours about beach shuttle services
	Full Gospel Christian Center	415 Old Town Road, Port Jefferson Station, New York, 11776	Paid visit to church service, office hours and pantry hours about beach shuttle services
	Christ Church United Methodist	545 Old Town Road, Port Jefferson	Paid visit to church service, office hours and pantry hours about beach shuttle services
	Cornerstone Bible church	324 Jayne Blvd, Port Jefferson Station, New-York, 11776	Paid visit to church service, office hours and pantry hours about beach shuttle services
	St. Paul's Evangelical Lutheran	309 Patchogue Road, Port Jefferson Station	Paid visit to church service, office hours and pantry hours about beach shuttle services
	Infant Jesus Chapel	200 Belle Terre Road, Port Jefferson	Paid visit to church service, office hours and pantry hours about beach shuttle services
	Crossover Christian Church	633 Mount Sinai-Coram Road	Paid visit to church service, office hours and pantry hours about beach shuttle services
	Assembly of God	24 N Country Road, Port Jefferson Station	Paid visit to church service, office hours and pantry hours about beach shuttle services
	Terryville Ward Chapel	372 Terryville Road, Port Jefferson Station, New-York, 11776	Paid visit to church service, office hours and pantry hours about beach shuttle services
	First United Methodist Church	603 Main Street, Port Jefferson, New-York, 11777	Paid visit to church service, office hours and pantry hours about beach shuttle services
	First Presbyterian Church	Main street and 107 south Street, Port Jefferson, New-York 11777	Paid visit to church service, office hours and pantry hours about beach shuttle services
	Hope House Ministries	1 High Street, Port Jefferson, New-York 11777	Paid visit to church service, office hours and pantry hours about shuttle services
	Donación de comida iglesia catolica	320 Patchogue Road, Port Jefferson Station, New-York,11776	Paid visit to church service, office hours and pantry hours about beach shuttle services
	St Gerard Majella CCD	300 Terryville Road, Port Jefferson Station, New-York, 11776	Paid visit to church service, office hours and pantry hours about beach shuttle services
	Presbyterian Church-Setauket	5 Caroline Avenue, Setauket - East Setauket, New-York 11733	Paid visit to church service, office hours and pantry hours about beach shuttle services
	Ministerio El Dios Viviente	400 Jayne Blvd, Port Jefferson Station, New-York 11776	Paid visit to church service, office hours and pantry hours about beach shuttle services

	Church Revitalize Center	324 Jayne Blvd, Port Jefferson Station, New-York, 11776	Paid visit to church service, office hours and pantry hours about beach shuttle services
	Grace Church	450 Edgewood Avenue, Smithtown, New-York 11787	Paid visit to church service, office hours and pantry hours about beach shuttle services
	Welcome INN- Saint Paul's Lutheran Church- food distribution center	309 NY-112, Port Jefferson Station, New York, 11776	Paid visit to church service, office hours and pantry hours about beach shuttle services
	First Presbyterian Church of Smithtown	175 E Main St, Smithtown, New-York 11787	Paid visit to church service, office hours and pantry hours about beach shuttle services
	Mt. Sinai Congregational Church	233 N Country Road, Mt. Sinai, New York, 11766	Paid visit to church service, office hours and pantry hours about beach shuttle services
	Three village church	322 Main Street, Setauket- East Setauket, New-York 11733	Paid visit to church service, office hours and pantry hours about beach shuttle services
	Parish of the Holy Cross	95 Nichols Road, Nesconset, New-York, 11767	Paid visit to church service, office hours and pantry hours about beach shuttle services
	Hope Lutheran Church	46 Dare Road, Selden, New-York, 11784	Paid visit to church service, office hours and pantry hours about beach shuttle services
LIBRARIES	Smithtown Library	1 Church St, Kings Park, NY 11754	Posted flyers at the library bulletin; The flyer was posted on library newsletter; The flier was sent to electronically to library's public list
	Smithtown Library - Commack Building	3 Indian Head Rd, Commack, NY 11725	Posted flyers at the library bulletin; The flyer was posted on library newsletter; The flier was sent to electronically to library's public list
	Commack Public Library	18 Hauppauge Rd, Commack, NY 11725	Posted flyers at the library bulletin; The flyer was posted on library newsletter; The flier was sent to electronically to library's public list
	Hauppauge Public Library	1373 Veterans Memorial Hwy Ste. 1, Hauppauge, NY 11788	Posted flyers at the library bulletin; The flyer was posted on library newsletter; The flier was sent to electronically to library's public list
	Central Islip Public Library	33 Hawthorne Ave, Central Islip, NY 11722	Posted flyers at the library bulletin; The flyer was posted on library newsletter; The flier was sent to electronically to library's public list
	Sachem Public Library	150 Holbrook Rd, Holbrook, NY 11741	Posted flyers at the library bulletin; The flyer was posted on library newsletter; The flier was sent to electronically to library's public list
	Middle Country Public Library	101 Eastwood Blvd, Centereach, NY 11720	Posted flyers at the library bulletin; The flyer was posted on library newsletter; The flier was sent to electronically to library's public list
	Emma S. Clark Memorial Library	120 Main St, Setauket-East Setauket, NY 11733	Posted flyers at the library bulletin; The flyer was posted on library newsletter; The flier was sent to electronically to library's public list
	Comsewogue Public	170 Terryville Rd, Port	Posted flyers at the library bulletin; The

	Library	Jefferson Station, NY 11776	flyer was posted on library newsletter; The flier was sent to electronically to library's public list
	Longwood Public Library	800 Middle Country Rd, Middle Island, NY 11953	Posed flyers at the library bulletin; The flyer was posted on library newsletter; The flier was sent to electronically to library's public list
BUS STOPS	Middle Country Rd/Boyle Rd	Selden, College Plaza	Posted beach shuttle fliers both in Spanish and English
	Smith Haven Mall Bus Stop	Smith Haven Mall	
	Portion Rd/Cenacle Rd	Lake Ronkonkoma, NY 11779	
	Horseblock Rd/Woodmont Pl	Farmingville, NY 11738	
	Portion Rd/Ave D	Farmingville, NY 11779	
	Hawkins Ave/Portion Rd	Lake Ronkonkoma, NY 11779	
	NYS 347/Wireless Rd	Setauket- East Setauket, NY 11733	
	NYS 347/Belle Mead Rd	Centereach, NY 11720	
	NYS 347/Willow Wood Dr	Setauket- East Setauket, NY 11733	
	NYS 347/Wireless Rd	Centereach, NY 11720	
	Nesconset Shopping Center	Port Jefferson Station, NY 11776	
	NYS 25A/Mt Sinai Coram Rd	Mt Sinai, NY 11766	
	NYS 112/Rose Ln	Terryville, NY 11776	
	NYS 347/Arrowhead Ln	Terryville, NY 11720	
	NYS 347/Arrowhead Ln	Setauket- East Setauket, NY 11733	
	NYS 25A/Miller Place Rd	Miller Place, NY 11764	
	NYS 25A/Pipe Stave Hollow Rd	Miller Place, NY 11764	
	NYS 25A/Patchogue-Mt Sinai Rd	Mt Sinai, NY 11766	
	NYS 25A/Fairway Dr	Sound Beach, NY 11778	
	Middle Country Rd/Holbrook Rd	Centereach, NY 11720	
	NYS 112/Central Ave	Coram, NY 11776	
	NYS 112/Wedgewood Dr	Coram, NY 11727	
	NYS 112/Hawkins Path	Coram, NY 11727	
	NYS 112/Greenport Ave	Medford, NY 11763	
PUBLIC POINTS OF INTERESTS	7 ELEVEN	311 Pond Path, Setauket East, NY, 11733	Communicated with customer service and posted flyers in the bulletin of shops
	Bello Poultry Market	411 Union Ave, Holbrook, NY 11741	
	Ronkonkoma station railroad	90 Railroad Ave, Ronkonkoma, NY 11779	
	Shoprite	71 College Plaza,	

		Selden, NY, 11784	
	Halal Hut	1327 Middle Country Rd Suite B, Centereach, NY 11720	
	Dunkin Donuts	1327 Middle Country Rd, Centereach, NY 11720	
	Shoprite	5145 Nesconset Hwy Unit 10, Port Jefferson Station, NY 11776	
	Shoprite	601 Portion Rd, Lake Ronkonkoma, NY 11779	
	7 eleven	408 NY-112, Port Jefferson Station, NY 11776	
	Planet fitness	2162 Nesconset Hwy, Stony Brook, NY 11790	
	Walgreens	655 middle country road, Selden	
	Burlington	2199 Nesconset Hwy, Stony Brook, NY 11790	
	Theatre three	412 Main St, Port Jefferson, NY 11777	

APPENDIX – B
SURVEYED LONG ISLAND SOUND BEACHES

WILDWOOD STATE PARK BEACH

- **Street Address**

790 Hulse Landing Rd, Wading River, NY 11792

- **Village**

Wading River

- **Town**

Riverhead

- **County**

Suffolk

- **Owner (e.g., Federal, State, County, Town, etc.)**

- **Owner name**

- **Are there municipal residency requirements? When? (e.g., Yes, from May to August)**

No, the beach is accessible to the public during the year.

- **Is there a fee for beach access?**

Yes, the parking fees are as follows:
Vehicle Entrance Fee:

- $8, 4/1/23 to 5/29/23: Weekends/Holidays, 8:00 am - 4:00 pm
- $10, 5/30/23 to 9/4/23: Daily, 8:00 am - 4:00 pm
- $8, 9/9/23 to 10/9/23: Weekends/Holidays only, 8:00 am - 4:00 pm

Per Bus:

- Non-Profit Buses (By permit only) $35
- Commercial Buses $75
- No buses on weekends or holidays

- **Beach utilization**

The approximate number of people (including kids) will be counted (to the extent possible with naked eye) within approximately 100 yards of each beach access point. The counts will be taken at 11AM, 1PM and 4PM. If there are more than one person to count, the average of each person's count will be recorded. If there is only one person to count, then the average of at least two separate counts will be recorded. The beach utilization counts do not need to be 100% accurate since they will be used as one of the soft criteria to select the shuttle beach destinations that are not already overcrowded.

Time	Beach Capacity	Count of People
11 am	1600	47
1 pm	1600	63
4:30 pm	1600	75

- **Type of Parking (e.g., parking lot, metered street parking, free street parking)**

Public parking

- **How many parking spaces are available?**

The number of parking spots will be collected for each waterfront location. The parking spots that are within approximately 1 minute walking distance (i.e., 0.05 miles = 264 feet = average walking speed of 3 mph x 1 minute) will be considered as potential beach parking location,

unless the parking space(s) is dedicated for beachgoers (then the walking time constraints will not be considered).

Time	Total	Available Space
11:30 am	460	48
1:30 pm	460	80
4:30 pm	460	87

- **Are there restrictions for parking here? (e.g., resident parking)**

No.

- **Parking utilization**

The parking availability (i.e., the number of parking spots available to park) will be recorded at 11:30AM, 1:30PM and 4:30PM (following the beach utilization counts) to gain a general sense of when people arrive and leave.

- **What accessible facilities are available? (e.g., accessible parking, accessible bathroom)**

- **Facilities (e.g., restroom, water fountain, garbage cans, paved trails, nature center/museum, unpaved trails, gift shop)**

Biking, Camper Assistance Program, Campsites, Cabins & Lodging (Accessible), Showers (Accessible), garbage cans.

- **Activities (e.g., hiking, swimming, fishing, biking, horseback riding, bird wildlife watching, scuba diving, kayaking)**

Snowshoeing/X-Country Skiing, Stand-up Paddle Boarding, Swimming Beach (Accessible), Fishing, Food (Accessible), Hiking, Hunting, Playgrounds (Accessible).

- **Notes**

The capacity of the beach is calculated based on the number of cars allowed to park in the parking lot. They multiply the parking capacity by 3.5. Considering that the nearest parking lot to the beach has a capacity of 460 cars, and multiplying this by 3.5, the calculated capacity is 1,600 people. Additionally, there is a campground at this location with a parking lot that can accommodate 300 cars. To determine the campground's capacity, this number is multiplied by 6, resulting in a capacity of 1,800 people. Therefore, the total capacity of Wildwood State Park is approximately 3000 people. However, the manager mentioned that only during specific holidays do they see such crowds; otherwise, it's rare for the site to have 3,000 people.

WEST MEADOW BEACH

- **Street Address**

100 Trustees Road, Stony Brook, NY 11790

- **Village**

Setauket

- **Town**

Brookhaven

- **County**

Suffolk

- **Owner (e.g., Federal, State, County, Town, etc.)**

- **Owner name**

- **Are there municipal residency requirements? When? (e.g., Yes, from May to August)**

No, the beach is accessible to the public during the year.

- **Is there a fee for beach access?**

Yes, the parking fees are as following:

- Mon-Thu: $4 per hour
- Fri, Sat, Sun, Holidays: $5 per hour

Daily Rates:

- Mon-Thu: $20
- Fri, Sat, Sun, Holidays: $25

- **Beach utilization**

The approximate number of people (including kids) will be counted (to the extent possible with naked eye) within approximately 100 yards of each beach access point. The counts will be taken at 11AM, 1PM and 4PM. If there are more than one person to count, the average of each person's count will be recorded. If there is only one person to count, then the average of at least two separate counts will be recorded. The beach utilization counts do not need to be 100% accurate since they will be used as one of the soft criteria to select the shuttle beach destinations that are not already overcrowded.

Time	Beach Capacity	Count of People
11 am	1250	109
1 pm	1250	197
4:30 pm	1250	239

- **Type of Parking (e.g., parking lot, metered street parking, free street parking)**

Metered Parking Lot

- **How many parking spaces are available?**

The number of parking spots will be collected for each waterfront location. The parking spots that are within approximately 1 minute walking distance (i.e., 0.05 miles = 264 feet = average walking speed of 3 mph x 1 minute) will be considered as potential beach parking location, unless the parking space(s) is dedicated for beachgoers (then the walking time constraints will not be considered).

Time	Total	Available Space
11:30 am	300	173
1:30 pm	300	150
4:30 pm	300	115

- **Are there restrictions for parking here? (e.g., resident parking)**

No.

- **Parking utilization**

The parking availability (i.e., the number of parking spots available to park) will be recorded at 11:30AM, 1:30PM and 4:30PM (following the beach utilization counts) to gain a general sense of when people arrive and leave.

- **What accessible facilities are available? (e.g., accessible parking, accessible bathroom)**

- **Facilities (e.g., restroom, water fountain, garbage cans, paved trails, nature center/museum, unpaved trails, gift shop)**

Parking, Restroom, Water fountain, Garbage cans, Paved trails, Vending Machine, Sprinkle Park, Food Truck.

- **Activities (e.g., hiking, swimming, fishing, biking, horseback riding, bird wildlife watching, scuba diving, kayaking)**
  Swimming, Biking, Fishing, Bird Wildlife Watching, Playground, Volleyball Court
- **Notes**