

Case Study Template

Municipality/Nonprofit Organization: Town of Provincetown, MA

Project Title: Permit Level Design of the Ryder Street Outfall Relocation and Drainage Improvements

Grant Award: \$ 70,465.00

Match: \$ 23,551.36

Community Overview:

The Town of Provincetown is a popular tourist destination located at the tip of Cape Cod in Massachusetts. The area surrounding MacMillan Pier and the Municipal Parking Lot, located off Provincetown Harbor, is the center of the Town's commercial activities. The recreational and commercial uses of Provincetown Harbor play a significant role in the economy of Provincetown. Improving the health of this natural resource will contribute to the economic vitality of the community.

Description of Climate Impact:

The intersection of Bradford Street and Ryder Street, adjacent to Town Hall, has seen significant flooding during past storm events where large storm events coincide with high tide events. During these events, the existing outfall becomes submerged and the stormwater runoff is unable to be discharged from the outfall efficiently. During a storm in August 2012, the Town received 1.9 inches of rain over a 2.5-hour period and coincided with the day's high tide, see photos below. The Department of Public Works had to excavate the outfall location to open the passage of stormwater from the outfall into the harbor. With sea levels rising, the need for a stormwater solution in this area is critical as many businesses and Town Hall are at danger of flooding during these storm events, which could start to occur more frequently.

Project Goals:

The goal of the project was to develop permit level designs to alleviate the stormwater drainage issues within the drainage area of the Ryder Street outfall. The project was initiated in 2012 under a Stormwater Mitigation Feasibility Study which developed a conceptual design to relocate the outfall to the headwall of the Municipal Parking lot.

Approach and Result:

The project team reviewed the work completed as part of the 2012 study and looked further into the option of a stormwater pump station. The Town wanted to make sure the solution would be capable of alleviating the flooding issue that has impacted the Town Hall property as well as vehicular traffic using Bradford Street and Commercial Street. Based on the invert elevations of the existing drainage system and the proposed piping, it was determined that a

gravity system on its own could still result in flooding for future storm events occurring at the same time as the day's high tide event.

The Municipal Parking Lot was chosen as the site of the stormwater pump station since the goal was to install the pump station on town-owned land. The area around Town Hall was reviewed, but the size of the pump station was not going to fit in the minimal available space on the Town Hall property. During design of this project, NOAA was developing conceptual designs for a Stellwagen Bank Visitor Center that was proposed to be constructed with alterations to the Municipal Parking Lot. As part of NOAA's design, the section of Ryder Street Extension was proposed to be redesigned with addition of some green space. Within this green space it was determined that a pump station could potentially be installed in this space. Further development of this project and NOAA's visitor center project will need to be coordinated in the future to make sure the green space is kept in the visitor center design and can accommodate the stormwater pump station.

Lessons Learned:

A challenge for this project was to locate the site for the stormwater pump station once it was determined a pump station would be needed for the new drainage system. Provincetown, especially in the downtown Commercial Street area, is a highly developed area with little to no sites available for a pump station. The available space is even less when only looking at the town-owned parcels. At the start of the project, subsurface pump stations were reviewed as a potential to install beneath the Municipal Parking Lot, with the critical equipment installed aboveground in areas that would impact the least amount of parking spaces. However, there were very few locations where this could have a minimal impact on parking in the Municipal Parking Lot. Fortunately, a lesson was learned when the Town brought to the Engineer's attention that NOAA was working on their visitor center design. GHD was able to then reach out to NOAA and discuss the conceptual design of the visitor center and what changes it would be proposing for the parking lot. NOAA's design was able to provide some green space where the pump station could be constructed. This coordination was critical in determining a potential location for pump station.

Partners and Other Support:

- Municipal Vulnerability Preparedness (MVP) Program
- Owner – Town of Provincetown Department of Public Works
 - Richard Waldo, P.E. – Director
 - Robert Capurso, P.E. – Town Engineer
- Engineer – GHD Inc.

Project Photos:

The following photos were taken during previous storm events where flooding was observed on Bradford Street, Ryder Street, Town Hall, and the surrounding areas.



Figure 1 Bradford Street and Ryder Street Intersection August 28, 2012



Figure 2 Required Excavation of Outfall during August 28, 2012 Rain Event



Figure 3 Town Hall during a January 2018 Nor'easter Event



Figure 4 Flooding of Commercial Street January 2018 Nor'easter Event