



**REMINGTON  
& VERNICK  
ENGINEERS**

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October 18, 2023

Bill Zolper, Town Manager  
Town of Dewey Beach  
105 Rodney Avenue  
Dewey Beach, DE 19971

**Recommended by**  
**Infrastructure**  
**Committee**  
**11/8/23**

**RE: Read Avenue Flood Mitigation Review and Proposal for Engineer Services**

Dear Mr. Zolper:

We understand that the Town continues to explore options to mitigate flooding on Read Avenue at its ending point at the bay. Over the past two-plus years, the Town has experimented with several modifications to the existing drainage piping and structures in an attempt to reduce flooding, which occurs during high tide events in the bay that subsequently affect Read Avenue and has gone as far as Coastal Highway in extreme conditions. It is our opinion that there is no drainage pipe or structure modification that will adequately mitigate flooding to a great enough extent that both the Town and the local community will be satisfied with the flooding reduction effect. We believe that mechanical means, namely a pump station, is the only long-term viable solution that will effectively mitigate flooding to a great enough extent that significant flood mitigation can be achieved long term.

While we strongly recommend exploration of the pumping option, we understand that the implementation of that option will require significant funding and time to assemble a bid package suitable for public bidding. We will discuss those elements later in this letter. We would like to present one short-term option that will not significantly solve the issue but can reduce some of the flooding. The Town could consider placing flap valves at the end of each of the three (3) outfalls on Read Avenue and potentially installing additional gabions/rip-rap. The flap valves would remain open during low tide events allowing storm water to exit Read Avenue. During high tide events, the valves would close and prevent additional bay water from entering Read Avenue.

We can also investigate closing off two (2) of the existing outfalls and leaving one (1), of the outfalls open with a flap valve as we believe the three (3) original outfalls were installed for redundancy purposes, which was observed to be allowing water flow and this could potentially save the Town additional expense as this is a short-term fix. The effectiveness of the valves will significantly diminish during moderate to major storm events, flood events, high tides, and periods where lunar effects are prevalent with the "worst case scenario" occurring when two or more of these conditions occur simultaneously. We are suggesting the addition of additional gabions/rip-rap in an attempt to restrain some of the sand and bay material that tends to wash onto Read Avenue. Again, this measure will not prevent this from occurring but will provide the Town Public Works Department with time to clean and maintain the area immediately after a significant tidal or storm event occurs.

We estimate the costs to implement these two measures is approximately \$60,000.00. We would like to stress again that these measures will not mitigate flooding to a great enough extent that both the Town and the local community will be satisfied with the flooding reduction effect but will improve that situation to better enable the Town Public Works Department to maintain this area of Read Avenue.

We would like to discuss the measures and costs associated with our recommended long-term flooding solution which is the implementation of a pumping station at the end of Read Avenue.

To complete the design of the pump station, the following scope of work is proposed:

### **SCOPE OF SERVICES**

#### **Task 1 – Site Survey & Base Plan Generation**

RVE will survey the end of Read Avenue as a potential location for the submersible pump station. There appears to be a large right of way (ROW) at the end of Read Avenue that may be suitable to capture stormwater and pump into the bay during rain events and high tide. From the site survey, base plans will be developed to support the design and permitting.

In addition, a member of our Design Team will accompany the survey crew and walk the area to be surveyed that day. The Design Engineer will highlight specific data to be collected by the survey crew that is out of the ordinary. This approach will allow pertinent information to be collected in the field without the survey crew needing to revisit the area.

Base plans for existing conditions will be prepared, reviewed, and signed and sealed by our DE Licensed Surveyor.

#### **Task 2 – Geotechnical Services**

To properly design the stormwater pump station, one geotechnical boring will be performed to ascertain the soils and design the support structure for the pump station wet well. RVE's in house geotechnical team will oversee the boring and develop recommendations for the design of the pump station wet well foundation.

To complete the above boring, we have proposed using a subconsultant, Boring Brothers Inc., to complete the soil borings. The SPT boring will be performed in accordance with ASTM D-1586 using a WBE/SBE certified drilling subcontractor. RVE's Geotechnical Engineer will be onsite to log the boring and classify the soils. Information regarding soil types, seasonal high groundwater depth, groundwater depth and blow counts will be recorded. Our geotechnical engineer will collect soil samples from each boring for analysis. Soil boring logs will be developed to be included in the bid documents for the contractors.

During the SPT borings, normal sampling in the soil overburden in the test borings will be done at intervals of two feet for the first 10 feet and at five-foot intervals thereafter with a two-inch O.D. split-spoon sampler. Observations for ground water level will be made during drilling and after completion of each test boring. Any spoils from the drilling operation not returned to the bore hole will be placed in drums and legally disposed of off-site.

Geotechnical samples will be completed by our subconsultant, TRC Companies, Inc.

The geotechnical information will be provided to the Design Team, including our in-house structural engineers. This information will be utilized to design the pump station foundation and wet well.

### **Task 3 – Basis of Design Report & Pump Station Design**

The pump station must begin with a Basis of Design which develops the design flows including peak flows which will dictate the size and orientation of the pump station and pumps. RVE will work with the Town staff to develop a conceptual design concept for the new pump station improvements that will be the most advantageous for the Town for both sustainability and reliability and to ensure that all Federal and State permitting requirements. The conceptual design will also include keeping the existing outfalls operational until the new stations is designed and constructed.

During the preliminary design phase, our Project Managers and Project Engineers will meet with the Town to review and confirm the project scope of work. Subsequent to the project's preliminary design review and project kickoff meeting, RVE will complete the following tasks:

- Prepare a project schedule.
- Identify and confirm all required permit and approvals.
- Prepare stormwater pump station design.
- Prepare structural design.
- Prepare mechanical equipment design.
- Prepare electrical, instrumentation and control design.
- Prepare preliminary and final cost estimates.
- Attend 30%, 60% and 90% design update meetings.
- Prepare final design for bidding and construction.

It is anticipated that the following drawings will be developed during the design phase for both the Stormwater Pump Station:

1. **Title Sheet**
2. **Notes, Legends & Quantities** – provide general notes associated with the project. An overall quantities table will be provided on this sheet for use during inspection to track the quantities being installed in comparison to the planned quantities.
3. **Existing Conditions Site Plan** – All existing features of the site will be shown on this plan including but not limited to the existing outfalls, all inverts, any water main valves, stormwater inlets, utility poles, location of asphalt/stone/ grass, building locations, and any additional features noted at the time of the Site Work.
4. **Staging and Demolition Plan** – the work area will be designated on the plans along with areas to stage the equipment and ultimate demolition of the outfalls and vault.
5. **Proposed Improvements Site Plan** – the proposed site improvements will be shown on the plan which will depict the location of the new structures, wet well locations, the relocation of any underground piping (if required), reference to any electrical which will be referenced on the electrical plan,
6. **Tie down Plan** – this plan will depict the location of the pump station and wet well for construction purposes and will depict the location relative to set features on the site which will not be impacted during construction.
7. **Grading Plan** – a grading plan will be developed for achieving final grades after construction. The grading plan will include finished grade for the top slabs associated with the new pump station. Proposed grades will meet existing grades within 5 feet of the property line, so we are not impacting current drainage onto the adjacent properties.

8. **Electrical Plan** – during the design of the station, the local electrical system will be evaluated. We will ascertain the need to upgrade the service to the site as soon as the conceptual layouts and pumps / equipment are selected. The station will be constructed with new control panels, level sensing devices and service panel. The electrical plans will show the proposed location of the pumps, motor controllers, breakers, electrical panel and all wiring including air gaps, etc.
9. **Electrical Details** – details for the electrical will include single line diagram for wiring and control diagrams. The electrical plan will incorporate not only the pump station equipment but generator.
10. **Structural Plan and Details** –Foundation plans and structural plans for the below grade wet well and pump vault will be detailed for construction.
11. **Pump Station Detail Plan** – details of the pump station design will be provided including wet well profile including piping, pump installation, trash rack, piping schematics, valve layout, etc.
12. **Construction Details** – non-pump station construction details will be provided which include but are not limited to roadway restoration, sidewalk restoration, etc. and will be included under the general construction details. All specified equipment shall be in accordance with Town standards and requirements.
13. **Soil Erosion / Sediment Control Plan & Details** – We will be incorporating SE/SC control elements into the project plans. Specifically, inlet protection will be added to the inlets, construction entrance will be shown and we will recommend that silt fence be installed along the downgradient perimeter of the site to be protective of any runoff to the street and/or adjacent private properties. Details for the SE/SC measure will be included in the plans.

Project specifications will also be included as part of the bid documents. RVEs specifications follow CSI format. Our contract specifications typically include a robust Scope of Work which details not only the work required under the contract but any sequencing which may be required. Construction sequencing may be included in the project specifications particularly if there are seasonal considerations.

#### **Task 4 – Permitting Services**

RVE will provide permitting services for the project. Permitting services will include preparation of application forms, plans and specification, engineer’s report and other pertinent documentation and material as required to complete the applications for permit acquisitions. Permit application fees are not included in RVE’s cost for services and is assumed will be borne by the Town. Once the layout of the pump station has been developed, it is anticipated that the following permits may be required:

- US Army Corps of Engineers Permit
- NPDES Construction Permit
- Coastal Zone Permit
- Erosion and Sediment Control

#### **COST OF SERVICES**

RVE will complete the above outlined tasks for a not to exceed fee as follows:

Task 1 – Site Survey & Base Plan Generation	\$9,800.00
Task 2 – Geotechnical Investigation	\$12,500.00
Task 3 – Basis of Design & Pump Station Design	\$266,300.00
Task 4 – Permitting Services	\$81,200.00


**TOTAL ESTIMATED NOT TO EXCEED FEES: \$368,800.00**

Town of Dewey Beach  
Read Avenue Stormwater Pump Station  
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Note that our proposal excludes services associated with project bidding and construction inspection/management. We would be happy to provide those under separate cover.

Thank you for this opportunity to work with the Town. Should you have any questions or require additional information, please feel free to contact me directly at (302) 266-0212 or [christopher.fazio@rve.com](mailto:christopher.fazio@rve.com).

Sincerely,  
**REMINGTON & VERNICK ENGINEERS, INC.**

A handwritten signature in black ink, appearing to read "Chris J.", written over a horizontal line.

Christopher J. Fazio, P.E., C.M.E.  
Executive Vice President

CJF/lgh

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## NJDEP FHRRRGF – Pacific Avenue Drainage Improvements Stormwater Pump Station and Outfall Wildwood City, NJ

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**Client:**  
Wildwood City

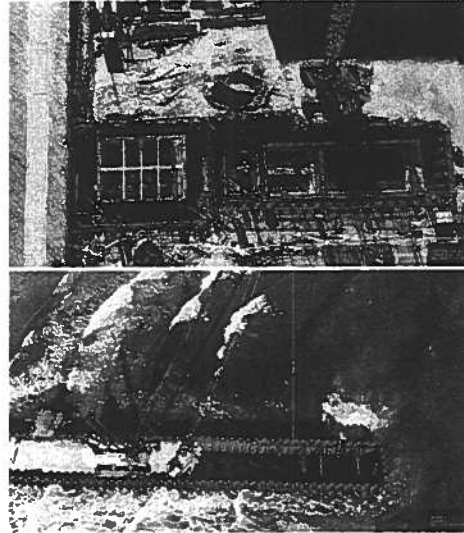
**Reference:**  
Ernst Troiano, Jr., Mayor,  
609-522-2444

**Duration:**  
July 2017 to July 2021

**Construction Cost:**  
\$12.3 million

**Size:**  
126.68 MGD

**Pumps:**  
4 (87,971 gpm)



In 2017, the City of Wildwood received \$12.3 million in grant funding through the NJDEP Flood Hazard Risk Reduction and Resiliency Grant Program (FHRRRGF) to eliminate several beach outfall pipes and install various storm drainage improvements on Pacific Avenue. RVE was retained by the City to provide design, engineering and construction management and inspection services for the elimination of the existing storm drain outfalls, installation of storm drainage pipes and the construction of a storm water pump station with force main. In general, the work on this project consisted of the construction of a new pile supported 60" Ductile Iron Stormwater Force Main Outfall and a Stormwater Management Pump Station with Pumps, Controls and Diesel Backup Power Generator. The proposed improvements will be located generally at the Learning Avenue beach street end in the City of Wildwood, New Jersey.

The work of this project consists of the following:

- Stormwater Flow Control as required to de-water construction area.
- Approximately 1,800 Linear Feet of 60" Ductile Iron Pipe to function as a new stormwater management force main outfall discharging into the ocean.
- New steel encased piles and reinforced concrete pile caps with stainless steel pipe restraints.
- New steel encased foundation piles for the proposed pump station.
- Pre-cast concrete box culvert.
- Cast in place pump station, including submersible pumps and associated intake structure.
- New 6,000-gallon Con-Vault fuel storage tank and associated fuel pump system.
- New generator, control panels, electrical service and general wiring.
- An elevated platform connection from the proposed pump station structure to the existing Boardwalk.
- The removal and replacement of concrete vertical curb, concrete sidewalk, concrete handicap ramps, concrete driveway aprons, and related striping disturbed during construction.
- All related incidental work including soil erosion and sediment control measures, traffic control, dust control, cleaning, and restorations.
- RVE provided extensive geotechnical investigation & design, Land Use Permitting, Structural Design, Mechanical, Electrical, Controls and Wastewater Engineering. RVE provided all engineering services in-house.
- Provided full-service contract administration, construction inspection and start-up services

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## Baltic Avenue Drainage Canal Improvements

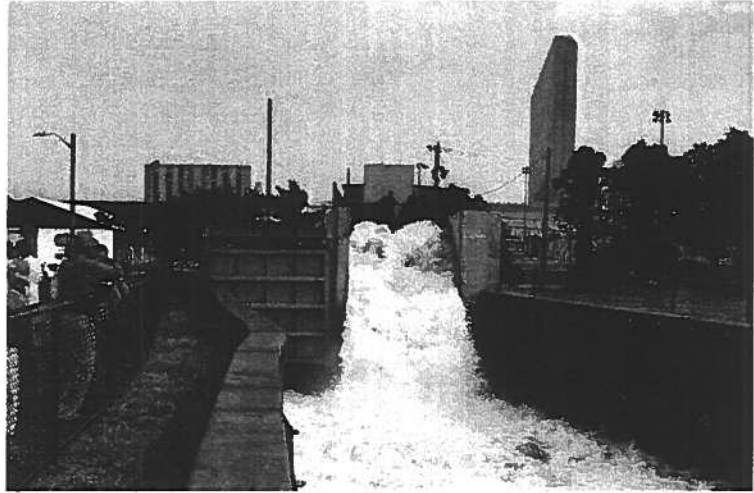
### City of Atlantic City, NJ

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**Client:**  
City of Atlantic City, NJ

**Construction Cost:**  
\$6.58 million

**Reference:**  
Russell D. Cipolla, PE, CME, City Engineer,  
609-347-5360



The City of Atlantic City recently completed major upgrades to the Baltic Avenue Drainage Canal. The existing canal is 1.8 miles long and runs under Baltic Avenue from Georgia Avenue to Rhode Island Avenue. The canal has a storage capacity of 1.1 million cubic feet and drains approximately 775 acres of Atlantic City into the back bays. The original canal was constructed from March 1911 to August 1912 for a cost of \$840,000 (\$20 million in 2018's dollars). There are two outlets into the bay; one at Atlantis Avenue and one at Fisherman's Park. The original flood gates at both ends stopped functioning decades ago, allowing bay water to flow freely in and out of the canal. This caused tidal flooding through street drains during high tides. Furthermore, with bay water in the canal during storm events, there was limited storage for runoff from the street drains, resulting in significant stormwater flooding.

The system designed by RVE includes new flood gates at both ends of the canal and a new pump station at Fisherman's Park to increase drainage flow during flood conditions. By operating the flood gates, the City can keep high tides out of the canal and help lower the water level in the canal prior to storm events. The pump station at Fisherman's Park includes two 250 HP pumps capable of discharging over 58,000 gallons per minute. The facility is powered by a 500kW diesel generator to allow for operation during power outages.

The total construction cost for this project was \$6.2 million and was entirely funded through outside grants. RVE completed the Land Use permitting, hydraulic analysis, geotechnical investigation, structural design, electrical / controls design and pump station design. All design was completed without the need for an engineering subconsultant.

**Highlight:**

- First Place Award, 2018 New Jersey Society of Municipal Engineers Project of the Year Award, Category C. Municipal Construction Projects (Populations over 20,000)