

Memorandum

To George Meservey, Director of Planning & Community Development
Michael Domenica, PE, Program Manager

CC Betsy Shreve, AICP, AECOM Project Director
Mark Owen, PG, AECOM

Subject **Town of Orleans, MA**
Water Quality and Wastewater Planning
Task Number 01 – Facilities Engineering
Preliminary Effluent Disposal Evaluation – Proposed Orleans Market Place

Project Number 60476644

From Thomas Parece, P.E., AECOM Project Manager

Date 03/09/16

1. Introduction

The purpose of this Technical Memorandum is to develop an estimated groundwater discharge volume under the parking lot of the proposed Orleans Market Place located between Route 6A and Old Colony Way.

2. Records

The following Board of Health records/information was reviewed for the location having a proposed business know as Orleans Market Place:

- Test pit data at four locations in the northwest corner of the parking lot behind staples along Old Colony Way;
- No test/soil boring data available;
- The soils to a depth of 11 to 12 feet to are described as a sandy loam (silty sand). Below 12 feet is a primarily a loose, fine, clean sand. These soils as well as those to and below the water table will need to be further investigated and evaluated across the site;
- There was no percolation test data to review; and
- No groundwater was incurred at the test pit locations. The elevation of the site is around 65 feet msl. Based on the site elevation of approximately. 65 feet and an approximate the water table elevation of 10 feet (Cape Cod Commission data), the water table is estimated at around 55 feet below the ground surface.

3. Assumptions

The following assumptions have been made in order to develop and estimate of groundwater discharge under the parking lot:

- Finer materials near surface are removed and replaced by Title 5 sands;
- Soils below soils removed percolate at 2 inches per minute or faster;
- Any finer soils at depth are not contiguous across the site;
- The sandy soils described are approved by MassDEP for 3 gpm/sq.ft.;
- The discharge is designed for 2 gpm/sq.ft over the estimated discharge area;
- Reserve discharge area is located between laterals of primary discharge;
- Groundwater discharge area is approximately 67,500 sq.ft. Additional parking area could potentially be used for discharge but would be dependent on the local requirements for the discharge offset from the buildings and potentially if a variance could be obtained from that offset if it is too limiting.
- Only the parking area located between Route 6A and Staples and Staples and Old Colony Way was considered for discharge;
- No new site evaluations were completed (ie test pits, boring, monitoring wells, loading tests, etc.); and
- The wastewater effluent discharged would be high quality (30 mg/L BOD, 30 mg/L TSS and 10 mg/L TN) as compared to a septic system discharge (50 mg/L BOD, 45 mg/L TSS and 25 mg/L TN).

4. Proposed Discharge Evaluation

a. Subsurface Discharge

- Area for discharge:
 - Between Staples and Route 6A: 200 feet x 200 feet = 40,000 sq.ft. and 100 feet x 75 feet = 7,500 sq.ft.
 - Between Staples and Old Colony Way: 200 feet x 100 feet = 20,000 sq.ft.
 - Total area: 40,000 + 7,500 + 20,000 = 67,500 sq.ft.
- The above is an estimate including the reserve discharge area located between the laterals of the primary discharge;
- The size of the discharge area could be reduced if sufficient test pit, soil boring, monitoring well, double ring infiltrometer, and detailed hydrogeologic evaluation data is provided to MassDEP to justify a percolation rate over 3 gal/day/sq.ft. Based on the existing data, this does not appear to be likely; and

- The proposed discharge area could be phased.
- b. Wick Discharge
- Area for Discharge (3 wicks): 50 feet x 275 feet = 13,750 sq.ft. An additional area should be set aside for additional wicks and in general results in a doubling the area required (total area of 27,500 sq.ft.); and
 - As per MassDEP, the proposed effluent wick discharge would require identification of a traditional discharge reserve area and could be identified as the area proposed for a subsurface discharge. The reserve discharge area would not require the development of Contract Documents (drawings and specifications) nor require site clearing.

5. Conclusions

- Based on available information (ie. test pit logs, ground elevation, and square footage of existing parking lot) it is estimated that the location has the potential to be suitable for a 135,000 gpd groundwater discharge site;
- Based on the proposed discharge location, a significant portion of the discharge would flow into Rock Harbor;
- Poor soils located below the available records of 11 to 12 feet could greatly reduce the discharge estimate; and
- Offsets and/or underground utilities could also reduce the estimated discharge rate.