Settlement

Settlement of spread footings, designed for the recommended bearing pressure, is estimated to be less than one (1) inch. Differential settlement will be about 50 percent of the total settlement. While settlement of this magnitude is generally considered tolerable for structures of the type proposed, the design of masonry walls should include provisions for liberally spaced, vertical control joints to minimize the affects of cosmetic cracking.

Floor Slab

The soil supported floor slab for the proposed facility should bear on a minimum of two (2) feet of compacted structural fill. Placement of the new fill and preparation of the subgrade should be performed in accordance with the Site Preparation section of the report to identify any soft or unstable soils which should be removed from the floor slab area prior to additional fill placement and/or floor slab construction. Polyethylene sheeting should be placed between the fill and the floor slab, particularly in areas with floor covering, to act as a vapor barrier. The floor slab should have an adequate number of joints to reduce cracking resulting from any differential movement and shrinkage.

Pavement Recommendations

The performance of pavements depends upon several factors including (1) the characteristics of the supporting soils; (2) the magnitude and frequency of wheel load applications; (3) the quality of construction materials; (4) the contractor's placement and workmanship abilities; and (5) the desired period of design life. SE has evaluated a rigid pavement section for your consideration.

Based on the building finished floor elevation of +24 feet, it is anticipated that up to 3 ½ feet of fill will be required in the parking areas to achieve the design grades. Typical fire station traffic is expected to consist of heavy fire trucks, light passenger vehicles, and occasional solid waste and delivery trucks.

The recommended pavement sections presented are considered typical and minimum for the assumed parameters in the general site area and anticipated traffic condition. We understand that budgetary considerations sometimes warrant thinner pavement sections than those presented. However, the owner and the project designers should be aware that thinner pavement sections may result in increased maintenance cost and lower than anticipated pavement life.

Our scope of services did not include extensive sampling for determination of Modulus of Subgrade Reaction (k) of the existing subgrade or potential sources of imported fill for the specific purpose of a detailed pavement analysis. Instead, we have assumed pavement related design parameters that are considered to be typical for the area soil types. We have assumed the subgrade soils will be prepared to achieve a Modulus of Subgrade Reaction (k) of 100 psi per inch which could be used for rigid pavement design. These pavement sections should be evaluated to ensure conformance with the minimum pavement section requirements of the local jurisdiction.

The general pavement design presented in this report is based on information published by AASHTO and the Portland Cement Association as well as past experience in the area. The published information was utilized in conjunction with the available field data and laboratory test results to develop general pavement recommendations.

The recommended light and heavy duty rigid pavements are as follows:

RIGID PAVEMENT RECOMMENDED MINIMUM THICKNESS		
Pavement Materials	**Light Duty (Parking Areas)**	**Heavy Duty (Drives & Apron Area)**
Portland Cement Concrete	6”	8”
Compacted Granular Fill (Sand) Underlain by Geotextile Fabric	12”	12”

Portland Cement Concrete pavement should be utilized for trash enclosures. The area should be sufficiently large so that the front wheels of the collection truck are supported on the rigid pavement. In this area, and in areas which will be accessed by heavy trucks (solid waste trucks and delivery trucks), a minimum concrete pavement thickness of eight (8) inches is recommended underlain by 12 inches of compacted granular fill.

Proper finishing of concrete pavement requires the use of appropriate construction joints to reduce the potential for cracking. Construction joints should be designed in accordance with current Portland Cement Association guidelines. Joints should be connected with smooth, greased or sleeved dowels and should be sealed to reduce the potential for water infiltration into pavement joints and subsequent infiltration into the supporting soils. The design of steel reinforcement should be in accordance with accepted codes. The concrete should have a minimum compressive strength of 4,000 psi at 28 days. The concrete should also be designed with 5 ± 1 percent entrained air to improve workability and durability.

The sand base under the rigid pavement shall meet the requirements of LSSRB, Section 1003.07. The sand base should be compacted to at least 95 percent of the maximum dry density determined by ASTM D698 (Standard Proctor) within 3 percent of the optimum moisture content.

Geotextile Fabric

Should soft conditions be encountered at the site, a woven geotextile consisting of MIRAFI 600X or equivalent is recommended to improve the subgrade condition prior to fill placement. The geotextile, which is sold in rolls of various sizes, should be installed per the manufacturer's recommendations and be overlapped a minimum of two (2) feet. The geotextile fabric should meet or exceed the following properties:

Property	Test Method	Minimum Average Roll Values
Grab tensile strength, lbs.	ASTM D4632	315
Grab tensile elongation, %	ASTM D4632	15
Mullen burst strength, psi	ASTM D4632	600
Puncture resistance, lbs.	ASTM D4632	120
Trapezoid tear strength, lbs.	ASTM D4632	120
UV resistance after 500 hrs, % strength resistance	ASTM D4632	70

CONSTRUCTION CONSIDERATIONS

It is recommended that SE be retained to provide observation and testing of construction activities involved in the foundations and related activities of this project. SE cannot accept any responsibility for any conditions which deviate from those described in this report, nor for the performance of the foundations, if not engaged to also provide construction observation and testing for this project.

Moisture Sensitive Soils/Weather Related Concerns

The upper soils encountered at this site are extremely sensitive to disturbances caused by construction traffic and changes in moisture content. During wet weather periods, an increase in the moisture content of the soil can cause significant reduction in the soil strength and support capabilities. In addition, soils that become wet may be slow to dry and thus significantly retard the progress of grading and compaction activities. It will, therefore, be advantageous to perform earthwork and foundation construction activities during dry weather.

Drainage and Groundwater Concerns

Water should not be allowed to collect in the foundation excavations, floor slab area, or on the prepared subgrade in the construction area either during or after construction. Undercut or excavated areas should be sloped toward one corner to facilitate removal of any collected rainwater, groundwater, or surface runoff. Positive site surface drainage should be provided to reduce infiltration of surface water around the building.