Item	Description
Vapor barrier	Project Specific. [1]
Structural considerations	Floor slabs should be structurally independent of building. [2]

1. The use of a vapor retarder should be considered beneath concrete slabs on grade that will be covered with wood, tile, carpet or other moisture sensitive or impervious coverings, or when the slab will support equipment sensitive to moisture. When conditions warrant the use of a vapor retarder, the slab designer should refer to ACI 302 and/or ACI 360 for procedures and cautions regarding the use and placement of a vapor retarder.
2. Floor slabs should be structurally independent of any building footings or walls to reduce the possibility of floor slab cracking caused by differential movements between the slab and foundation. Where floor slabs are tied to perimeter walls or turn-down slabs to meet structural or other construction objectives, our experience indicates that differential movement between the walls and slabs will likely be observed in adjacent slab expansion joints or floor slab cracks that occur beyond the length of the structural dowels. The structural engineer should account for this potential differential settlement through use of sufficient control joints, appropriate reinforcing or other means.

For additional recommendations concerning jointing, reinforcing, etc, refer to the latest edition of ACI302 *"Guide for Concrete Floor and Slab Construction".*

4.5 Pavements

Based on experience with similar projects and these soil conditions, a Portland cement concrete (rigid) pavement system is recommended for the proposed project.

The provisions of **SECTION 4.2** for subgrade preparation are critical to the performance of the pavement system. Subgrade suitability within planned pavement areas is a transient condition affected by precipitation and disturbance from construction activities. A proof-roll should be performed and documented by a representative of our geotechnical engineer within a maximum of 48 hours of the planned concrete placement to confirm that stability is present.

Anticipated traffic volumes and loading conditions for this facility were not provided, but were assumed based on experience with similar projects. The pavements within the facility may likely be a combination of standard duty (passenger vehicles only) and medium duty (passenger vehicles with relatively light delivery trucks) traffic areas. Traffic estimates used in the determination of required pavement thicknesses assume a 20-year design period and are summarized in the following insert table:

Traffic Volumes Assumed for Analysis		
Traffic Type	**Estimated Traffic (vehicles/lane/day) Standard Duty**	**Estimated Traffic (vehicles/lane/day) Medium Duty**
Automobiles	400	400
2-axle and 3-axle trucks	None	2
4-axle delivery trucks	None	2
5-axle semi-trailer trucks	None	None

The architect or engineer responsible for the final pavement design should review this traffic information for accuracy. If these traffic assumptions are not correct, please advise this office so that the pavement designs can be re-analyzed and revised thickness designs developed.

Rigid pavements (concrete) should be designed based on a subgrade resilient modulus (M_r) of 5,000 pounds per square inch (psi) and modulus of subgrade reaction (k) equal to about 125 pci for stable in-place soils or compacted engineering fill. Rigid pavements should be designed and constructed using a minimum 6-inch plain (non-reinforced) concrete pavement thickness over a compacted and stable subgrade for light duty areas. A minimum 7-inch plain concrete pavement thickness over a compacted and stable subgrade is recommended for medium duty areas. The concrete used for the pavement should consist of a pavement mix with a minimum 28-day compressive strength of 4,000 pounds per square inch or a minimum 28-day flexural strength of 600 pounds per square inch.

Standard design and construction details for rigid pavements are contained in ACI330R-01. It is recommended that the design engineer refer to this document for more detailed information. A critical aspect of concrete pavements for facilities of this nature is joint spacing and related details. ACI330R-01 addresses these important details.

4.5.1 Garbage Dumpster Pad

A garbage dumpster pad may be constructed at this site. The garbage dumpster pad should be large enough to hold the largest expected container with approximately 3 to 5 feet of extra space on each side. Additionally, the pad should contain an approach apron on the loading side of the pad that is large enough to accommodate half the length of the anticipated collection vehicle. Additional apron area should be provided if the waste vehicles will be making turning movements in the vicinity of the pad. The pad for garbage dumpsters should be designed as a structural slab for the anticipated loading conditions.

4.5.2 Pavement Drainage

Pavements should be sloped to provide rapid drainage of surface water. Water allowed to pond on or adjacent to the pavements could saturate the subgrade and contribute to premature pavement deterioration.

4.5.3 Pavement Maintenance

The pavement sections provided in this report represent minimum recommended thicknesses and, as such, periodic maintenance should be anticipated. Preventive maintenance should be planned and provided for through an on-going pavement management program. Preventive maintenance activities are intended to slow the rate of pavement deterioration, and to preserve the pavement investment. Preventive maintenance consists of crack and joint sealing, and patching as necessary. Preventive maintenance is usually the first priority when implementing a planned pavement maintenance program and provides the highest return on investment for pavements. Prior to implementing any maintenance, additional engineering observation is recommended to determine the type and extent of preventive maintenance. Even with periodic maintenance, some movements and related cracking may still occur and repairs may be required.

5.0 QUALITY CONSIDERATIONS

Terracon should be retained to review the final design plans and specifications so comments can be made regarding interpretation and implementation of our geotechnical recommendations in the design and specifications. Terracon also should be retained to provide observation and testing services during grading, excavation, foundation construction and other earth-related construction phases of the project.

The analysis and recommendations presented in this report are based upon the data obtained from the borings performed at the indicated locations and from other information discussed in this report. This report does not reflect variations that may occur between borings, across the site, or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until during or after construction. If variations appear, we should be immediately notified so that further evaluation and supplemental recommendations can be provided.

The scope of services for this project does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

This report has been prepared for the exclusive use of our client for specific application to the project discussed and has been prepared in accordance with generally accepted geotechnical