

1. Existing Construction Conditions

1.1. *Executive Summary*

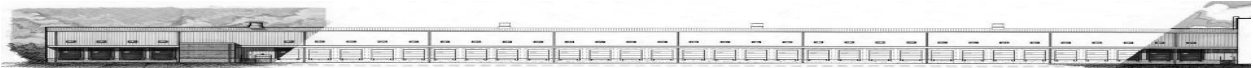
FedEx Ground Distribution Hub is a small piece of a billion dollar network of distribution hubs to be built across the United States. The Hagerstown Hub is a 475,000 sq. ft. distribution center which will cost approximately \$100 million to complete. The site is located at 16730 Halfway Boulevard, Hagerstown, MD. Hagerstown was chosen for its accessibility to contractors, local labor, and major shipping routes. Local site conditions are going to be very challenging, requiring about 1,000,000 cubic yards of excavation through various types of clays and rock.

FedEx chose Osborn Architects/Engineers as the primary architects and engineers. In order for FedEx to receive the best price for construction, the project has been divided into 3 separate bid packages which include: Sitework and General Trades, Structure and Enclosure, and Conveying Systems. FedEx prefers a multiple prime organizational structure with a minimum of three bidders per work package. This project will take approximately 20 months to complete, starting with ground breaking in October of 2003 and full operation by 2006. There are 7 milestone dates, some with liquidated damages and incentives, associated with the schedule to support in the completion of the project on time.

The structural system chosen for this project is a pre-engineered steel structure and enclosure developed and installed by Butler Construction. Gilbane Building Company is responsible for the general trades and sitework package, while HK Systems is responsible for the conveying systems.

The major building systems are basic in nature except for electrical and telecommunications systems. These systems are the backbone of a highly efficient distribution hub. In order to prevent potential complications with these systems there have been redundant systems built into the design of each. Over specified/engineered systems have been designed and installed in the main building for future expansion.

After utilizing several resources, the estimated building cost ranges from approximately \$17 - \$20 million which is lower than the actual building cost of \$22 million. Internal and external factors are contributors in the difference between these costs.



1.2. Project Delivery System

The project delivery method for the project is intricate and complex. FedEx Ground is in the process of building two identical structures as part of a pilot program for their future network of distribution hubs. The intentions of FedEx are to construct the two buildings simultaneously while utilizing the same set of plans, drawings, and specifications. This strategic approach is intended to increase the number of people whom review and correct the drawings ultimately yielding a master set of plans and specifications that will be used to streamline the construct the remainder of the distribution facilities.

FedEx Ground has developed a competitive bidding process used on the majority of construction projects. FedEx requires a minimum of three bidders for each bid package developed within a project. The Hagerstown Distribution Center was divided into three separate bid packages: site development and general trades, building structure / enclosure, and conveying systems. The building structure / enclosure and conveying system contracts are lump sum. The general trades and site development bid package is cost plus a fee with lump sum general conditions.

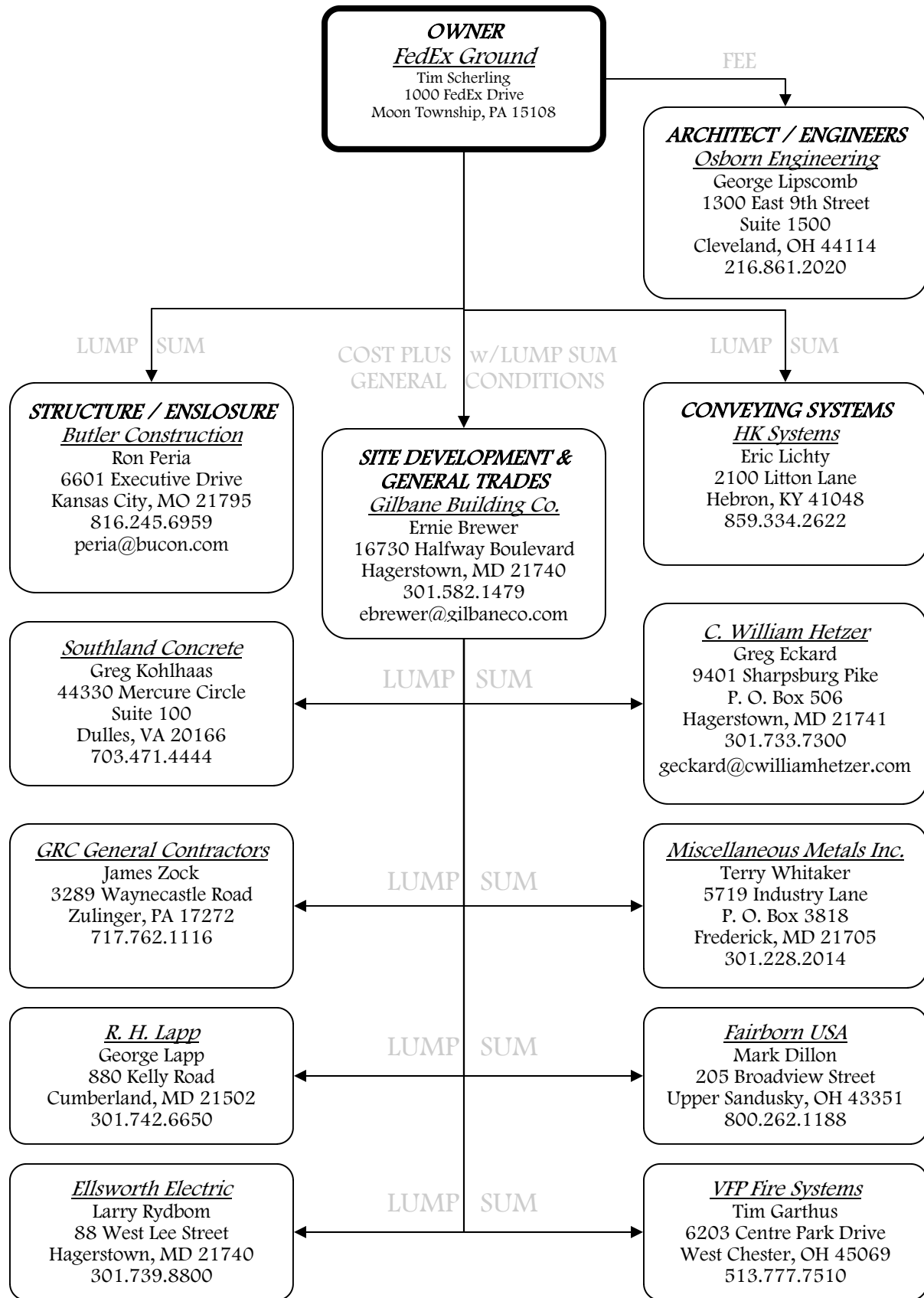
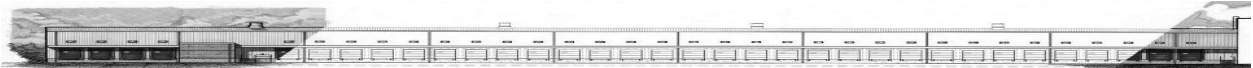


Figure 1: Project Organizational Chart



1.3. Project Schedule

The construction schedule for this project is unique due to the massive area the building covers. The building is broke up into several smaller more manageable areas. For each of the areas the flow of activities is similar. A strict general trades schedule is revised and updated weekly. The flow of work areas throughout the building are as follows: Loadwing B, Local City, Corridor A, Loadwing A, and Transition A. Contractors rotate through the designated areas as quickly and efficiently as possible.

STRUCTURE

Initially, mass excavation takes place first followed by the concrete contractor. Within the building structure, all of the column footings are formed and placed while simultaneously other contractors are preparing all of the conduits and underground work. Once the column footings reached the target strength, the steel erectors begin erecting the superstructure. When all of the underground work is completed in an area, the concrete contractor prepares for installation of the concrete floors or walls. After completing the superstructure in each area the steel erectors had a roofing crew that installed the Skyweb, insulation, and metal roofing. A finishing crew followed behind them installing roof curbs, gutters, and downspouts.

GENERAL TRADES

The main areas of the building were finished as areas became available to contractors, but the office areas were closely monitored due to the compression of the schedule and the lack of work space within each of the office areas. The office areas were enclosed on four sides by brick, so initially the masons were in the area first and laid the necessary block. If the office was on the exterior of the building, a roofing crew installed the steel joists and bituminous roofing. Once the roof was water tight, the general trades contractor followed the masons, installing all of the electrical and HVAC distribution equipment, plumbing, metal studs and framing, and drywall. Prior to wall enclosure an enclosure inspection was completed and photographs were taken in order to document that all of the specified systems and equipment were installed as per project specifications. Upon completion of the walls, the general trades contractor would paint, install flooring materials, install all lighting and electrical outlets/fixtures, and plumbing fixtures.

1.3.1. Milestone Dates

Milestone	Definition	Date
I	Local City / Unload Wings - Ready for Butler Column Lines 4 to 10 and E to N	1/12/04
II **	Local City / Unload Wings - Ready for MH Column Lines 4 to 10 and E to N	5/14/04
III A	Corridor - Ready for Butler Column Lines 10 to 15 and E to N	2/2/04
III B	Loadwing B - Ready for Butler Column lines 15 to 34 and K.2 to H.6	3/15/04
IV A	Corridor - Ready for Material Handling Column Lines 10 to 15 and E to N	6/15/04
IV B **	Loadwing B - Ready for Material Handling Column lines 15 to 34 and K.2 to H.6	7/14/04
V	Loadwing A - Ready for Butler Column lines 12 to 34 and A to E	3/24/04
VI **	Loadwing A - Ready for Material Handling Column lines 12 to 34 and A to E	9/1/04
VII	Project Completion except for Conveying Systems	12/31/04

** Liquidated Damages and Incentives are associated with these Milestone Dates.

1.4. *Building Systems Summary*

Demolition Required: No

Structural Steel Frame: Yes

Type of Bracing – All connections are moment connections. Girders have been installed for horizontal bracing and diagonal braces have designed into the system as wind braces.

Composite Slab – None

Type/Size of Crane – (2) 100 ton mobile cranes and (1) 200 ton mobile crane

Location of Crane – varies

Cast in Place Concrete: Yes

Horizontal Formwork Type – stick built formwork, metal deck/grade

Vertical Formwork Type – stick built formwork

Placement Method – direct chute, pump, crane and bucket, power buggy

Precast Concrete: No

Mechanical System: Yes

Mechanical Room Location – None

System Type – Co-Ray-Vac

Types of Distribution Systems – Radiant heat

Types of Fire Suppression – dry pipe system with pre-action sprinkler heads

Electrical System: Yes

Size – Main distribution, 480/277V, 3Ø, 4W

Capacity – 4000A

Redundancy – Two redundancy systems will be installed in the main building: a diesel generator and two uninterrupted power supply systems. Also, future plans are designed for two service independent service feeds to the site.

Masonry: Yes

Load Bearing – varies

Veneer – Trendwyth Trendstone Plus, Colors: Manchester and Ravenstone

Connection Details – free standing with masonry ties

Scaffolding – hand built and jack scaffolds

Curtain Wall: No

Support of Excavation: No

1.5. Project Cost Evaluation

1.5.1. Construction Costs

Projected Building Cost z \$22,000,000 Cost / SF z \$46.32

* excludes mechanization equipment, distribution equipment, land costs, sitework, permitting, etc.*

* Actual Building Cost does not represent the actual building cost for this project *

1.5.2. Total Project Costs

Total Project Cost z \$32,000,000 Cost / SF z \$67.36

* excludes mechanization and distribution equipment*

1.5.3. Building System Costs

Building systems costs are confidential as per Gilbane Building Company's request.

1.5.4. Parametric Estimate

	<i>CSI Division</i>	<i>%</i>	<i>Sq. Ft. Cost</i>	<i>Projected Cost</i>
00	Bidding Requirements	0.00	0	0
01	General Requirements	8.07	4.05	1,923,918
02	Site Work	0.00	0	0
03	Concrete	13.41	6.73	3,195,536
04	Masonry	1.45	0.73	345,264
05	Metals	15.16	7.61	3,613,092
06	Wood & Plastics	0.14	0.07	33,524
07	Thermal & Moisture Protection	4.35	2.18	1,037,250
08	Doors & Windows	2.40	1.2	572,059
09	Finishes	9.06	4.55	2,160,128
10	Specialties	0.99	0.49	234,922
11	Equipment	0.97	0.49	230,676
12	Furnishings	0.16	0.81	40,213
13	Special Construction	0.00	0	0
14	Conveying Systems	0.00	0	0
15	Mechanical	16.59	8.33	3,955,324
16	Electrical	11.25	5.65	2,682,385
D4 Total Building Costs		84.00	\$42.24	\$20,062,351

1.5.5. Design Costs

Due to the nature of the project, design costs are not able to be determined. Typically the design cost is approximately 8% of the total project cost.

Total Project Cost z \$32,000,000 Design Cost z \$2,560,000

* Design Cost shown above does not represent the actual design cost for this project *

1.5.6. Square Foot Estimate Using R.S. Means

Reference: R.S. Means Construction Cost Data (2004), 62nd Annual Edition

- Assumptions:
1. Building Type: Warehouse and Office combination
 2. Median unit cost data was used: \$47.00/sf
 3. Size Modifier: 15.00 ∴ Cost Multiplier = 0.90
 4. Location Adjustment = 0.881 (weighted average)
 5. No adjustment was taken for time

Calculation:

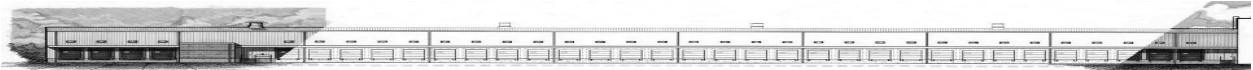
Building Size		475,000 sf
Cost per Square Foot	x	\$ 47.00 /sf
Unadjusted Total		\$22,325,000
Location Adjustment	-	\$2,232,500
Size Adjustment	-	\$2,656,675
R.S. Means Total		\$17,435,825

1.5.7. Estimate Comparison

	Sq. Ft. Cost	Projected Cost	Variation From Projected	Deviation
D4 Cost Estimate	\$42.24	\$20,062,351	\$1,937,649	8.81%
R.S. Means Estimate	\$36.71	\$17,435,825	\$4,564,175	20.75%
Projected Building Cost	\$46.32	\$22,000,000		

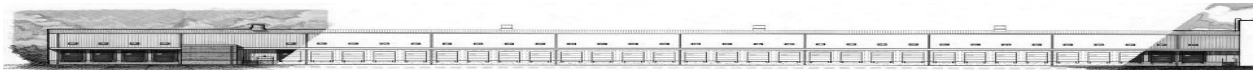
Several estimates of the FedEx Ground Distribution Hub were compiled using various available resources which include: D4 Cost estimating software and R.S. Means Construction Cost Data. Differences in the building cost estimates can be significantly affected by many factors such as environmental conditions, economic factors and owner specified constraints.

D4 Cost estimating software used the smart average of three warehouse and distribution projects. These projects were chosen for their simplicity in structure, electrical and mechanical systems. The estimated square footage was adjusted to 475,000 resulting in an approximate project cost of \$20,062,351. This estimated cost was within approximately 9 % of the projected building cost. The difference between costs cannot be attributed to sitework because sitework was taken out of the D4



estimate. This difference could be a resultant of economic conditions such as the current increase in steel and concrete costs. Also, this project is fast-tracked and the structure is to be turned over to the owner within 12 months. Fast-tracking a project such as this can attribute to the increased projected building cost.

R.S. Means Construction Cost Data for 2004 was used to perform another estimate which yielded a deviation of over 20 %. This method of estimating a project is only applicable for the building itself. Specialty systems within the building such as redundant electrical systems and fiber optic data communication systems are not included. Also, economic factors and owner constraints are not accountable. The same factors that affected the D4 estimate are also viable reasons for the difference between the R.S. Means value and the actual projected cost.



1.6. Site Plan of Existing Conditions

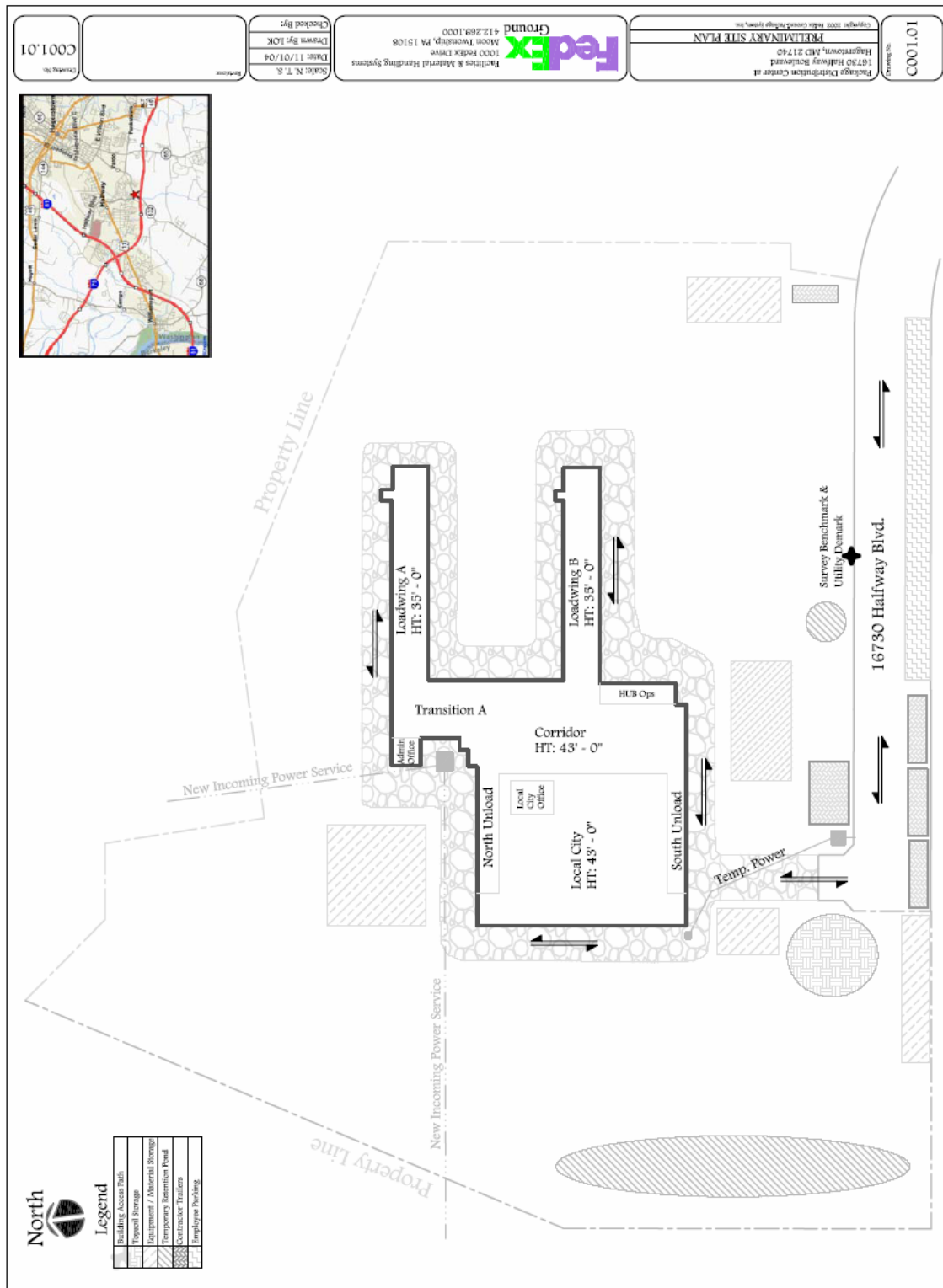


Figure 3 Initial Site Utilization Plan

1.7. Local Conditions

The future site for the distribution center is located at the I-70 / I-81 interchange in Hagerstown, MD. This is a typical trucking route for commercial vehicles. Initially there was access to the site via Halfway Boulevard due to future planning of the city has a 4 lane divided road to the site. The 114 acre plot was obtained from Tiger Developers. Initially the site was zoned as agricultural and is currently in the process of being rezoned to commercial.

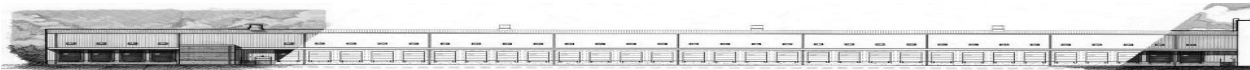
Along Halfway Boulevard, parallel to the site, there is ample parking. The road currently is a dead end until New Gate Road is constructed. Within a half mile of the site is an AC&T truck stop with waste removal and recycling capabilities large enough to service the construction site during full operation.

The labor conditions in the Hagerstown area are very rich resulting in a surplus of available contractors, laborers and materials. The majority of the subcontractors are within 50 miles of the jobsite and the construction equipment and materials are readily accessible.



Figure 4: Initial Site Conditions

An initial geotechnical engineering study was conducted by Hillis-Carnes Engineering Associates. The exploration principal exploration method consisted of 83 Standard Penetration Test (SPT) borings.



General site geology in Hagerstown consists of a parent bedrock formation which includes limestones of the Rockdale Run Formation. The topsoil generally ranged from 4± to 12± inches in thickness. The majority of the borings identified decomposed rock which as determined by the depth of augur refusal. The average depth of refusal was determined to be approximately 6 feet below the existing surface. Between the rock and topsoil layers, the soils identified ranged from low-plasticity clays to sandy silt materials of varying densities. The existing groundwater table was approximately 18 feet below the surface.

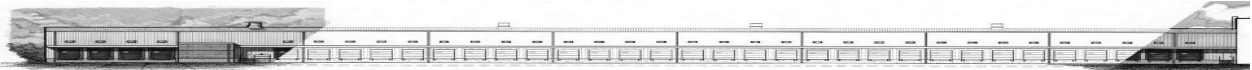
1.8. *Client Information*

FedEx Ground is a subsidiary company of FedEx Corporation, comprised of FedEx Ground US, International and FedEx Home Delivery. FedEx Ground is currently North America's second largest small-package carrier, with an extensive network of pick-up and delivery terminals located throughout providing business-to-business and residential deliveries within the United States, Mexico and Canada.

As part of a \$1.8 billion network expansion plan, the Mid-Atlantic region was targeted by FedEx for its rich concentration of manufacturers and businesses. FedEx Ground has chosen the 114-acre site in Hagerstown, MD for its accessibility to major interstates as well as access to a strong local workforce. The facility will initially process about 30,000 packages an hour and is expected to employ more than 400 employees in 2006. At full capacity, the new hub will process up to 45,000 packages per hour and will possibly employ over 1,000 workers. The new 475,000 square-foot distribution hub is scheduled to be opened by 2006.



The fully operational distribution hub will cost approximately \$100 million and will take about 20 months to complete. The skeleton of the building is pre-engineered metal structure which is a low cost alternative to a design build system. In order to reach the 20 month, fully operational, goal, the building will have to be completed in 12 months



including all major sitework. To ensure the building is constructed in a timely manor there are seven major milestone dates, three with liquidated damages equal to \$5000 per day. Quality is not a major concern for the main distribution center due to the nature of the operations which will be taking place within the facility but the office and customer service areas require higher standards. In order to maintain quality standards initially set by FedEx Ground, a full time representative is onsite, continuously observing daily operations.