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**AE Faculty Consultant:** Dr. David Riley

**Date of Submission:** 9/29/2008

**Title of Report:** Technical Assignment 1

## **Executive Summary**

### Key Findings:

The project schedule shows a steady clock-wise progression of work throughout the footprint, which starts with the south-west wing of the building. The Post-Tension structural system lies on the critical path for completion.

Building systems include a 750 KW emergency generator. The living units contain their own Water Source Heatpumps. The structure is made of cast-in-place concrete with Post-Tension tendons.

Project costs were estimated using R.S. Means data and D4Cost 2002 software. Each method used showed discrepancies between the actual project cost and the estimated cost. Soft costs are also shown. The actual total current indicated cost is \$101,900,000.

A site plan of existing conditions shows locations of water, sewer, electric, communications, and gas. Proposed site access, site trailers, batch plant area, and tower crane locations are also shown.

Local conditions are summarized and provide potential weather impacts, traffic conditions, and available construction recycling companies. Geotech data is provided to show suggested foundation support and variation in the soils at each half of the building.

Client information tells about the owner's other properties and connects with their marketing strategies for this new LEED Certified project. Timely completion is important to ensure new depositors can move into their living units after selling their current homes.

The project is delivered as a Construction Management Agency via a joint venture between Turner and Konover. There is a \$97,000,000 Guaranteed Maximum Price contract on the project. Contracts are held by the owner.

An organization chart staffing plan is shown for the construction manager. It shows the lines of communication for the project. Project members oversee the superintendents and report to the project executive.

### Questions:

1. What type of agreement does Turner have with Konover and how is the CM fee divided?
2. What are the impacts of LEED tracking as far as schedule and budget are concerned?

### Distinguishing Requirements:

- LEED Certified-1<sup>st</sup> Continuing Care Retirement Community to achieve certification
- Power fed from both ends of the building

## **Project Schedule Summary**

The site plans in the Construction Documents (CD's) show multiple phases for this project, but this thesis will focus on Phase 1 as there is not sufficient information available for the future phases; there are no phase relationships to consider. The scope of work for each sequence is assumed to start in the south-west corner of the building and the work path is to move clockwise and east through the footprint unless otherwise noted. See attached Project Schedule Summary for more information.

### Foundation Sequence:

The schedule shows the foundations starting with the perimeter and interior foundations and walls. This is a two-step process. Step one is to prep and pour the perimeter footings. Five days later the perimeter walls are prepped and poured.

Less than 30 days after the continuous footings were started, the interior footings, columns, and slab on grade (SOG) began. The continuous footing sequence was continued around the perimeter of the building. The interior spread footings for the columns were prepped and poured first and then the columns were poured approximately 14 days later. Then, the site was prepped to subgrade and all the underground plumbing, sump and ejector basins, sleeves and inserts, and underground feeder conduit are installed before the SOG is poured. Three days after the SOG is poured, the floor drains and cleanouts (CO's) are set.

### Structural Sequence:

The structural sequence is broken up into 11 separate pours for the first floor and 8 separate pours for the remaining floors. Each section starts by framing the deck with the formwork. Then they place the mechanical/plumbing embeds, install electrical deck rough-in, and place the miscellaneous iron embeds.

After these are in place, they lay the rebar and post-tension tendons (PT) and then pour the deck slab. The slab cures for 5 days and then they stress the PT's. Once the PT's are stressed, there needs to be an SER Review of the stresses during the concrete cure process. When the review results come back, they must have a Stripping Letter, which is the approval to remove the formwork. Then, the formwork can be stripped and reshored.

### Finish Sequence:

The interior finishes vary slightly by area and living unit, but the same basic sequence is followed throughout. None of the finishes begin until there is an above ceiling inspection of any MEP components that will be covered up. Then, the gypsum wall board (GWB) ceilings are hung; wall to follow. Taping, sanding, and finishing of the walls begins after the GWB is hung. Then the GWB is primed for painting. Next is the installation of the ceramic tile. Plumbing fixtures, toilet accessories, and plumbing trim come next. The hardwood flooring is followed by the hardwood subfloor. Then the base layer and carpet where applicable. Now, the entry doors and door hardware are installed; followed by the interior doors and hardware. Final painting must be done before the sprinkler trim, signage, unit trim-out, light fixture trim-out, and thermostats are in place. Then the mechanical/HVAC trim goes in as the cabinets and millwork are starting. Then, the window treatments go on as the touch-up paint is applied and appliances installed start.

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The most important piece, the punchlist, is right after final cleaning and Turner's pre-punchlist.

## Building Systems Summary

Yes	No	Work Scope	Description
	X	Demolition	N/A
	X	Structural Steel Frame	N/A
X		Cast in Place Concrete	Horizontal/Vertical Formwork: engineered formwork system for the columns / steel frame vertical table form system with plywood for the elevated slabs, post-tensioned flat plate floors and drop panels on top floor
	X	Precast Concrete	N/A
X		Mechanical System	Mechanical Room & Boiler Room at Northwest end of Garage. Gas-Fired Rooftop Units provide Constant Volume Air System throughout and maintain a positive pressure in the corridors to prevent cross-contamination between living units. Induced Draft Cooling Towers on roof with Plate and Frame Heat Exchanger in Garage to serve Heatpump Loop. Water Source Heatpump Units in each of the living units for individual control. Gas-Fired Forced Draft Hot Water Boilers in the basement provide hot water for the Water Source Heatpump Units. Electric baseboard used to provide an additional stage of heat. Ductless Split Systems serve the memory assist living units. Fully sprinklered building using automatic wet pipe system and dry system in areas prone to freezing such as the garage. Additional fire suppression design under development at time of this report.
X		Electrical System	Fed from 2 locations Service #1 & #2 are each: 4000 Amp Main 480/277 V, 3 $\phi$ , 4W. 750 KW Emergency Generator
X		Masonry	Split face masonry and ground face masonry veneer laid using masonry ties. Constructed using pole-type scaffolding.
	X	Curtain Wall	N/A
X		Support of Excavation	Excavation sloped at maximum steepness of 1.5H:1V and 3H:1V for long-term stability. Maintain good site drainage to maintain integrity of soil; conventional dewatering with sump pit and pumping operations if necessary.

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## Project Cost Evaluation

### Actual Building Construction Cost (CC) and CC/ SF:

\$97,000,000 - GMP Contract Value

Cost per SF:

$$\$97,000,000 / (119,434 \text{ SF} + 558,125 \text{ SF}) = \$143.16 \text{ per SF}$$

\$101,900,000 - Current Indicated Cost

\$1,500,000-Upgrades (counters, finishes, etc.)

\$3,400,000-Change Orders

Sitework: % of CC 15%

$$15\% \times \$101,900,000 = \$15,285,000.00$$

$$\$101,900,000 - \$15,285,000.00 = \$86,615,000.00$$

$$\$86,615,000.00 / (119,434 \text{ SF} + 558,125 \text{ SF}) = \$127.83 \text{ per SF}$$

**Total CC:                   \$86,615,000.00**

**Total CC/SF:               \$127.83 per SF**

### Total Project Cost (TC) and TC/SF:

Land Cost: average cost per acre \$500,000.00

$$\$500,000.00 \times 11.5 \text{ acres} = \$5,750,000.00$$

### Permitting:

New Construction: \$.20 per SF x 677,559 SF = \$135,511.80

Filing Fee: \$2,000.00

Fire Alarm and Detection Systems: \$345 per story x 8 stories = \$2760.00

Sprinklers: \$4.00 per head x estimated 6,000 heads = \$24,000.00

Occupancy (non-profit) [ $\$100.00 + (677,559 \text{ SF} / 5,000)$ ] / 2 = \$117.76

Temporary Use (trailers) \$1,400.00

Total Estimated Permitting Costs: \$165,789.56

$$\text{Total Cost: } \$101,900,000 + \$5,750,000.00 + \$165,789.56 = \$107,815,789.56$$

$$\text{TC/SF: } \$107,815,789.56 / (119,434 \text{ SF} + 558,125 \text{ SF}) = \$159.12$$

**TC:                           \$107,815,789.56**

**TC/SF:                      \$159.12 per SF**

### Building Systems Costs and Cost/SF:

Mechanical System: \$18,998,733.47                   approximately 19% of the CC

Electrical System: \$ 8,660,319.39                   approximately 9% of the CC

Structural System: \$10,429,830.00                   approximately 10% of the CC

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Parametric Estimate:

D4Cost 2002:

**CC: \$81,711,173.00**

**CC/SF: \$120.60 per SF**

See attached D4 printout.

The parametric estimate is based on the projects listed below:

• Minnesota Veterans Home Nursing Facility	\$6,470,929.00	56,547 SF
• WC Assisted Living Community	\$1,741,139.00	20,975 SF
• Oak Terrace Assisted Living Facility	\$2,780,491.00	48,514 SF
• Autumn Woods Assisted Living	\$7,624,639.00	69,402 SF
• Cameron Woods Assisted Living	\$3,128,100.00	50,528 SF
• Parkway Place	\$17,433,269.00	114,789 SF
• Senior Living Community	\$7,267,684.00	109,767 SF

R.S. Means:

Underground Garage Area: 119,434 SF

Underground Garage Perimeter: 2,086 LF

Use 100,000 SF with 900 LF; contractor/architect fees included  
 $119,434 \text{ SF} \times \$64.65/\text{SF} = \$7,721,408.10$

Perimeter Adjustment:

Add \$.95 per 100 LF  $\rightarrow 2,086 \text{ LF} - 900 \text{ LF} = 1,186 \text{ LF}$

$1,186 \text{ LF} / 100 \times \$0.95 = \text{add } \$11.27 \text{ per SF}$

$\$11.27 \text{ per SF} \times 119,434 \text{ SF} = \$1,346,021.18$

Additives:

2500 # Capacity Elevators:  $\$57,800 \times 6 \text{ elevators} = \$346,800$

Painting Parking Stalls:  $\$9.75 \times 254 \text{ stalls} = \$2,476.50$

**Total Garage Cost: \$9,416,705.78**

Building Area:

First Floor: 89,027 SF

Second through Seventh Floors:  $78,183 \times 6 \text{ floors} = 469,098 \text{ SF}$

Total Area: 558,125 SF

Building Perimeter: 3,400 LF

Use 50,000 SF with 1,200 LF, brick veneer and wood frame  
 $558,125 \text{ SF} \times \$123.25 \text{ per SF} = \$68,788,906.25$

Perimeter Adjustment:

Add \$1.15 per 100 LF  $\rightarrow 3,400 \text{ LF} - 1,200 \text{ LF} = 2,200 \text{ LF}$

$2,200 \text{ LF} / 100 = 22 \text{ LF} \times \$1.15 = \text{add } \$25.30 \text{ per SF}$

$\$25.30 \text{ per SF} \times 558,125 \text{ SF} = \$14,120,562.50$

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**Story Height Adjustment:**

Add \$.90 per 1 foot → 6 stories x 10 FT per Story = 60 FT

60 FT x \$.90 = add \$54.00 per SF

\$54.00 per SF x 558,125 SF = \$30,138,750.00

**Additives:**

Cooking Range	\$375.00 x 330 units =	\$123,750.00
Microwave	\$230.00 x 330 units =	\$75,900.00
Dishwasher	\$570.00 x 330 units =	\$188,100.00
Garbage Disposer	\$179.00 x 330 units =	\$59,070.00
Hood for Range	\$259.00 x 330 units =	\$85,470.00
Refrigerator	\$610.00 x 330 units =	\$201,300.00
Dryer	\$860.00 x 330 units =	\$283,800.00
Washer	\$1,050.00 x 330 units =	\$346,500.00

**Total Building Cost= \$114,412,108.75**

Location Factor: .92 for Maryland with zip code 207-208

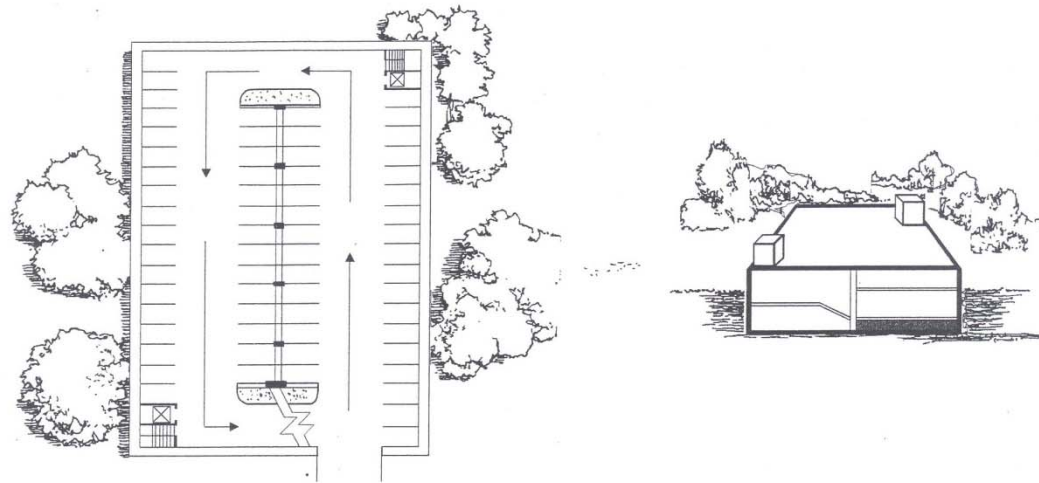
Total Project Cost: \$114,412,108.75 + \$9,416,705.78 = \$123,828,814.53

\$123,828,814.53 x .92 = \$113,922,509.37

**Total Project Cost = \$113,922,509.37**

See reference tables below.

<b>COMMERCIAL/INDUSTRIAL/ INSTITUTIONAL</b>	<b>M.280</b>	<b>Garage, Underground Parking</b>
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**Costs per square foot of floor area**

Exterior Wall	S.F. Area	20000	30000	40000	50000	75000	100000	125000	150000	175000
	L.F. Perimeter	400	500	600	650	775	900	1000	1100	1185
Reinforced Concrete	R/Conc. Frame	81.90	75.95	73.00	70.15	66.45	64.65	63.30	62.35	61.70
Perimeter Adj., Add or Deduct	Per 100 L.F.	5.05	3.35	2.45	2.05	1.35	0.95	0.75	0.70	0.55
Story Hgt. Adj., Add or Deduct	Per 1 Ft.	1.95	1.60	1.45	1.25	1.00	0.80	0.70	0.70	0.65
Basement—Not Applicable										

The above costs were calculated using the basic specifications shown on the facing page. These costs should be adjusted where necessary for design alternatives and owner's requirements. Reported completed project costs, for this type of structure, range from \$42.85 to \$102.15 per S.F.

**Common additives**

Description	Unit	\$ Cost
Elevators, Hydraulic passenger, 2 stops		
1500# capacity	Each	55,100
2500# capacity	Each	57,800
3500# capacity	Each	62,100
Barrier gate w/programmable controller	Each	3950
Booth for attendant, average	Each	12,300
Fee computer	Each	14,900
Ticket splitter with time/date stamp	Each	7450
Mag strip encoding	Each	20,900
Collection station, pay on foot	Each	126,000
Parking control software	Each	25,200 - 103,000
Painting, Parking stalls	Stall	9.75
Parking Barriers		
Timber with saddles, 4" x 4"	L.F.	6.70
Precast concrete, 6" x 10" x 6'	Each	69.50
Traffic Signs, directional, 12" x 18"	Each	79.50



**COMMERCIAL/INDUSTRIAL/  
 INSTITUTIONAL**

**M.035**

**Assisted - Senior Living**



**Costs per square foot of floor area**

Exterior Wall	S.F. Area	2000	3000	4000	5000	7500	10000	15000	25000	50000
	L.F. Perimeter	188	224	260	300	356	400	504	700	1200
Brick Veneer	Wood Frame	220.65	189.60	174.05	165.25	150.10	<b>141.95</b>	134.35	127.90	123.25
	Steel Frame	243.10	212.35	197.00	188.30	173.30	165.30	157.75	151.40	146.85
Brick Veneer on Block	Wood Truss	211.85	184.50	170.80	163.15	149.25	141.60	134.50	128.50	124.20
	Bearing Wall	253.75	221.35	205.15	196.00	180.00	171.40	163.25	156.55	151.60
Wood Siding	Wood Frame	205.15	177.10	163.00	155.00	141.75	134.65	127.95	122.40	118.30
Vinyl Siding	Wood Frame	204.90	177.10	163.15	155.15	142.15	135.25	128.70	123.20	119.25
Perimeter Adj., Add or Deduct	Per 100 L.F.	27.85	18.55	13.95	11.10	7.40	5.60	3.70	2.25	1.15
Story Hgt. Adj., Add or Deduct	Per 1 Ft.	3.60	2.80	2.50	2.25	1.75	1.50	1.20	1.10	0.90

*For Basement, add \$27.40 per square foot of basement area*

The above costs were calculated using the basic specifications shown on the facing page. These costs should be adjusted where necessary for design alternatives and owner's requirements. Reported completed project costs, for this type of structure, range from \$76.30 to \$191.40 per S.F.

**Common additives**

Description	Unit	\$ Cost	Description	Unit	\$ Cost
<b>Appliances</b>			<b>Appliances, cont.</b>		
Cooking range, 30" free standing			Refrigerator, no frost 10-12 C.F.	Each	610-840
1 oven	Each	375-2175	14-16 C.F.	Each	650-810
2 oven	Each	1750-2025	18-20 C.F.	Each	765-1175
30" built-in			<b>Laundry Equipment</b>		
1 oven	Each	620-2100	Driver, aas, 16 lb. capacity	Each	860
2 oven	Each	1700-2300	30 lb. capacity	Each	3525
Counter top cook tops, 4 burner	Each	330-860	Washer, 4 cycle	Each	1050
Microwave oven	Each	230-740	Commercial	Each	1400
Combination range, refig., & sink, 30" wide	Each	1550-4050	<b>Sound System</b>		
60" wide	Each	3225	Amplifier, 250 watts	Each	2225
72" wide	Each	4450	Speaker, ceiling or wall	Each	181
Combination range, refrigerator, sink, microwave oven & icemaker	Each	5175	Trumpet	Each	345
Compactor, residential, 4-1 compaction	Each	615-775			
Dishwasher, built-in, 2 cycles	Each	570-890			
4 cycles	Each	600-1300			
Garbage disposer, sink type	Each	179-325			
Hood for range, 2 speed, vented, 30" wide	Each	259-1325			
42" wide	Each	480-2225			

### Location Factors

STATE/ZIP	CITY	Residential	Commercial	STATE/ZIP	CITY	Residential	Commercial
<b>STATES &amp; POSS.</b>				<b>KENTUCKY (CONT'D)</b>			
969	Guam	.99	1.08	406	Frankfort	.86	.90
<b>IDAHO</b>				407-409	Corbin	.77	.82
832	Pocatello	.86	.90	410	Covington	.99	.97
833	Twin Falls	.73	.82	411-412	Ashland	.92	.95
834	Idaho Falls	.75	.83	413-414	Campton	.78	.83
835	Lewiston	.97	.97	415-416	Pikeville	.84	.90
836-837	Boise	.87	.90	417-418	Hazard	.73	.79
838	Coeur d'Alene	.95	.96	420	Paducah	.89	.90
<b>ILLINOIS</b>				421-422	Bowling Green	.89	.91
600-603	North Suburban	1.10	1.08	423	Owensboro	.88	.90
604	Joliet	1.11	1.06	424	Henderson	.90	.90
605	South Suburban	1.10	1.08	425-426	Somerset	.77	.83
606-608	Chicago	1.19	1.15	427	Elizabethtown	.86	.87
609	Kankakee	.99	1.00	<b>LOUISIANA</b>			
610-611	Rockford	1.06	1.05	700-701	New Orleans	.87	.87
612	Rock Island	.97	.96	703	Thibodaux	.84	.85
613	La Salle	1.06	1.02	704	Hammond	.79	.81
614	Galesburg	1.00	.98	705	Lafayette	.82	.82
615-616	Peoria	.99	1.00	706	Lake Charles	.83	.83
617	Bloomington	.98	.98	707-708	Baton Rouge	.85	.84
618-619	Champaign	1.00	1.00	710-711	Shreveport	.78	.80
620-622	East St. Louis	.99	.98	712	Monroe	.74	.79
623	Quincy	.99	.96	713-714	Alexandria	.74	.79
624	Effingham	.99	.97	<b>MAINE</b>			
625	Decatur	.97	.96	039	Kittery	.87	.86
626-627	Springfield	.96	.95	040-041	Portland	.89	.89
628	Centralia	1.00	.97	042	Lewiston	.88	.88
629	Carbondale	.96	.94	043	Augusta	.89	.87
<b>INDIANA</b>				044	Bangor	.87	.87
460	Anderson	.91	.89	045	Bath	.87	.87
461-462	Indianapolis	.94	.93	046	Machias	.88	.86
463-464	Gary	1.03	.99	047	Houlton	.89	.87
465-466	South Bend	.91	.90	048	Rockland	.88	.86
467-468	Fort Wayne	.90	.89	049	Waterville	.87	.87
469	Kokomo	.92	.88	<b>MARYLAND</b>			
470	Lawrenceburg	.87	.87	206	Waldorf	.86	.88
471	New Albany	.87	.86	207-208	College Park	.88	.92
472	Columbus	.92	.90	209	Silver Spring	.96	.90
473	Muncie	.91	.90	210-212	Baltimore	.90	.92
474	Bloomington	.94	.90	214	Annapolis	.84	.90
475	Washington	.91	.90	215	Cumberland	.85	.87
476-477	Evansville	.90	.92	216	Easton	.68	.73
478	Terre Haute	.90	.92	217	Hagerstown	.85	.88
479	Lafayette	.92	.89	218	Salisbury	.74	.77
<b>IOWA</b>				219	Elkton	.80	.80
502-503, 509	Des Moines	.89	.90	<b>MASSACHUSETTS</b>			
504	Mason City	.77	.82	010-011	Springfield	1.04	1.01
505	Fort Dodge	.76	.80	012	Pittsfield	1.02	1.00
506-507	Waterloo	.78	.82	013	Greenfield	1.01	.99
508	Creston	.80	.82	014	Fitchburg	1.12	1.06
509-511	Sioux City	.85	.87	015-016	Worcester	1.13	1.08
512	Sibley	.72	.77	017	Frammingham	1.13	1.08
513	Spencer	.74	.77	018	Lowell	1.13	1.09
514	Carroll	.74	.77	019	Lawrence	1.13	1.09
515	Council Bluffs	.82	.90	020-022, 024	Boston	1.21	1.16
516	Shenandoah	.74	.77	023	Brockton	1.12	1.08
517	Dubuque	.85	.89	025	Buzzards Bay	1.10	1.04
518	Decorah	.75	.77	026	Hyannis	1.10	1.06
519-524	Cedar Rapids	.93	.92	027	New Bedford	1.12	1.07
525	Ottumwa	.83	.86	<b>MICHIGAN</b>			
526	Burlington	.86	.86	480-483	Royal Oak	1.02	.99
527-528	Davenport	.97	.96	481	Ann Arbor	1.03	1.00
<b>KANSAS</b>				482	Detroit	1.06	1.04
662	Kansas City	.98	.97	484-485	Flint	.97	.97
663-666	Topeka	.79	.85	486	Saginaw	.93	.93
667	Fort Scott	.88	.87	487	Bay City	.94	.94
668	Emporia	.74	.82	488-489	Lansing	.95	.95
669	Belleville	.79	.83	490	Battle Creek	.92	.92
670-672	Wichita	.79	.84	491	Kalamazoo	.91	.92
673	Independence	.84	.84	492	Jackson	.93	.94
674	Salina	.77	.83	493-495	Grand Rapids	.80	.82
675	Hutchinson	.79	.81	496	Muskegan	.88	.89
676	Hays	.82	.83	497	Traverse City	.79	.83
677	Colby	.83	.84	498-499	Gaylord	.82	.85
678	Dodge City	.81	.85		Iron Mountain	.89	.92
679	Liberal	.80	.83	<b>MINNESOTA</b>			
<b>KENTUCKY</b>				550-551	Saint Paul	1.12	1.09
403-02	Louisville	.90	.91	552-555	Minneapolis	1.16	1.11
404-05	Lexington	.86	.89	556-558	Duluth	1.08	1.04

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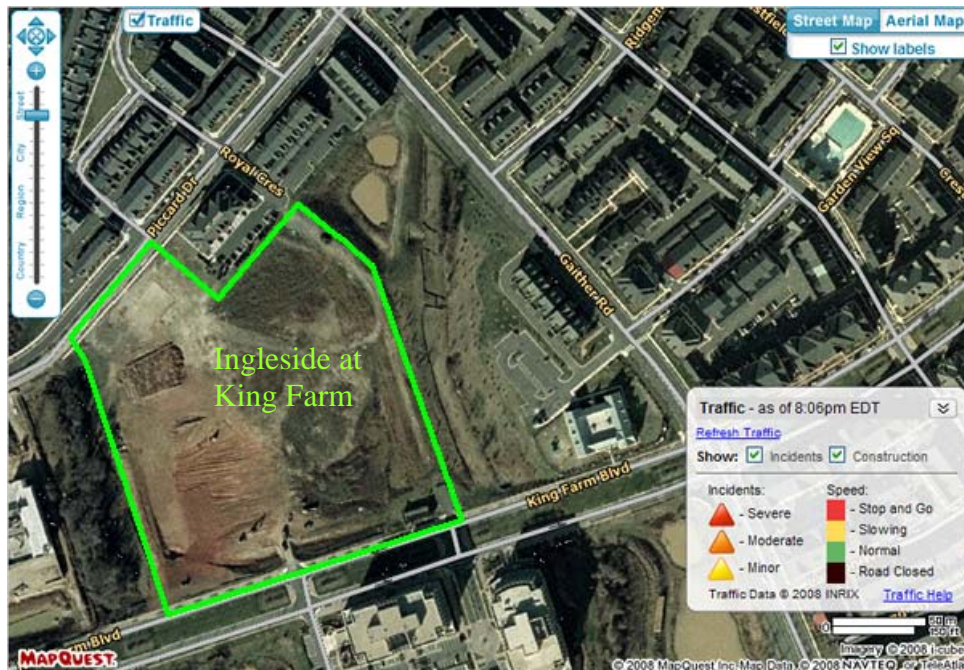
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The R.S. Means Estimate is based on approximate square footages and gave a value of \$113,922,509.37. This is not much higher than the GMP contract amount of \$97,000,000 or the current indicated cost of \$101,900,000. The current indicated cost and the R.S. Means estimate is an apples-to-apples comparison in that they both exclude soft costs. One reason for the discrepancy in cost is the use of the 2008 R.S. Means data, which is newer than the data available when the project was estimated. The estimate does not account for site work and excavation. Another reason for the discrepancy is that the R.S. Means data used was based solely on the construction of an Assisted-Senior Living facility. This project actually contains more amenities than a standard Assisted-Senior Living facility, so it is possible that the R.S. Means estimate is lower than what would be expected.

The D4Cost estimate is significantly lower than the actual cost. The reasons for this are similar to the reasons for discrepancy in the R.S. Means data. Both estimating methods are difficult to perform because the types of building and exact construction types for the reference projects must be the same to get an accurate estimate.

## Site Plan of Existing Conditions

The project site is not located on a heavily traveled road and ambulance paths should not be an issue for construction. Washington Adventis Hospital is, however; located approximately 1.6 miles away from the site. See attached Site Plans for additional information.



## Local Conditions

### Preferred Construction Methods:

The preferred construction method in the D.C. metropolitan area is concrete structure. It's estimated that 90% of the structures in the region are of concrete frame because they allow for smaller floor-to-floor heights that will house the above ceiling MEP services.

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Another reason for concrete being preferred is based primarily on the labor force for the area. A steel structure would not make sense for this project due to the labor force and it would elevate the cost of the project.

#### Construction Parking:

The site is fairly large, but construction parking is still limited. Workers can utilize on-street parking along Piccard Drive; there's space for approximately 100 to 150 passenger vehicles. Piccard Drive, however; is lined with existing town homes whose residents also use the street for parking. The actual availability of parking to the workers will also vary depending on other nearby construction and the amount of workers using on-street parking from those sites. Some additional temporary parking is available on the site in various locations for off loading. There is also some space near the job trailers to accommodate the office staff.

#### Available Recycling:

There are several recycling companies within a 60 mile radius of Rockville, MD. They can be found by searching the [Construction Waste Management Database](#) on the Whole Building Design Guide website. Tipping fees to follow.



Percontee, Inc. (*10 miles from Rockville*)

11700 Cherry Hill Road  
Silver Spring, MD 20904

Services:

- pickup
- drop off
- stationary plant
- hauling

Materials Recycled:

- asphalt
- concrete
- masonry
- brick
- blocks
- aggregate material

Environmental Alternatives, Inc. (*13 miles from Rockville*)

24024 Frederick Road  
Clarksburg, MD 20871

Services:

- container rental
- hauling
- landfill for non-recyclable materials

Materials Recycled:

- appliances

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- asphalt
- cardboard
- concrete
- gypsum drywall
- land clearing/soil
- masonry
- metals: ferrous and non-ferrous
- mixed/co-mingled waste
- roofing: asphalt-based
- wood: land clearing debris and scrap lumber

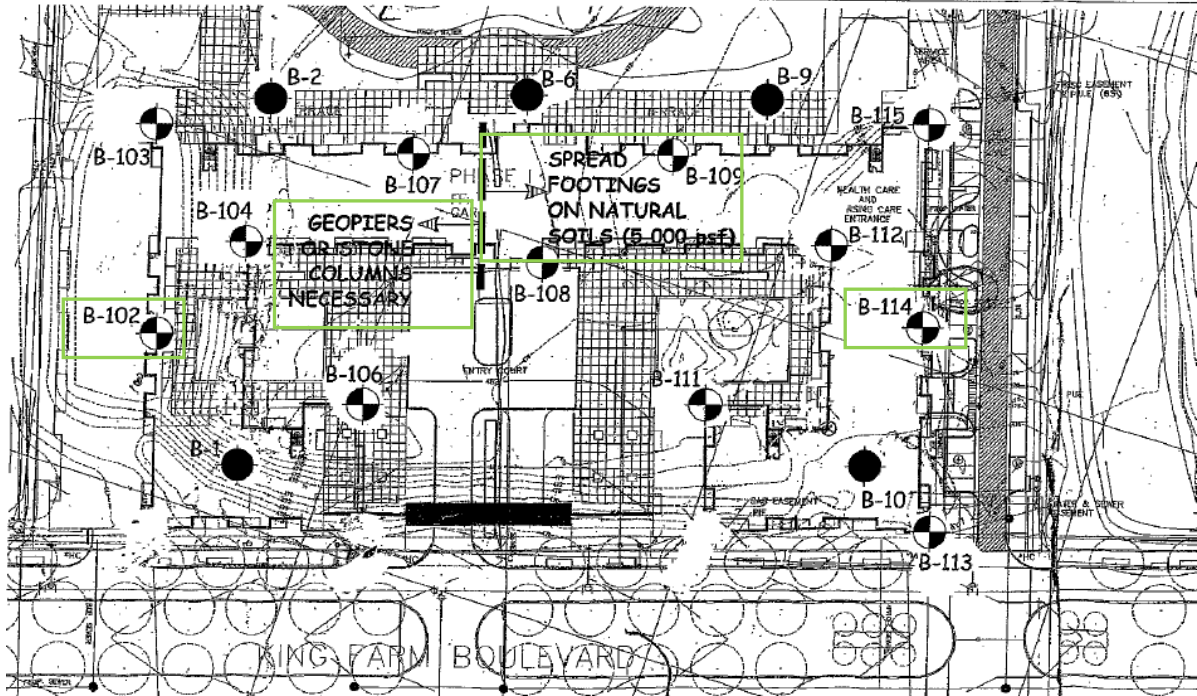
### Soil Conditions:

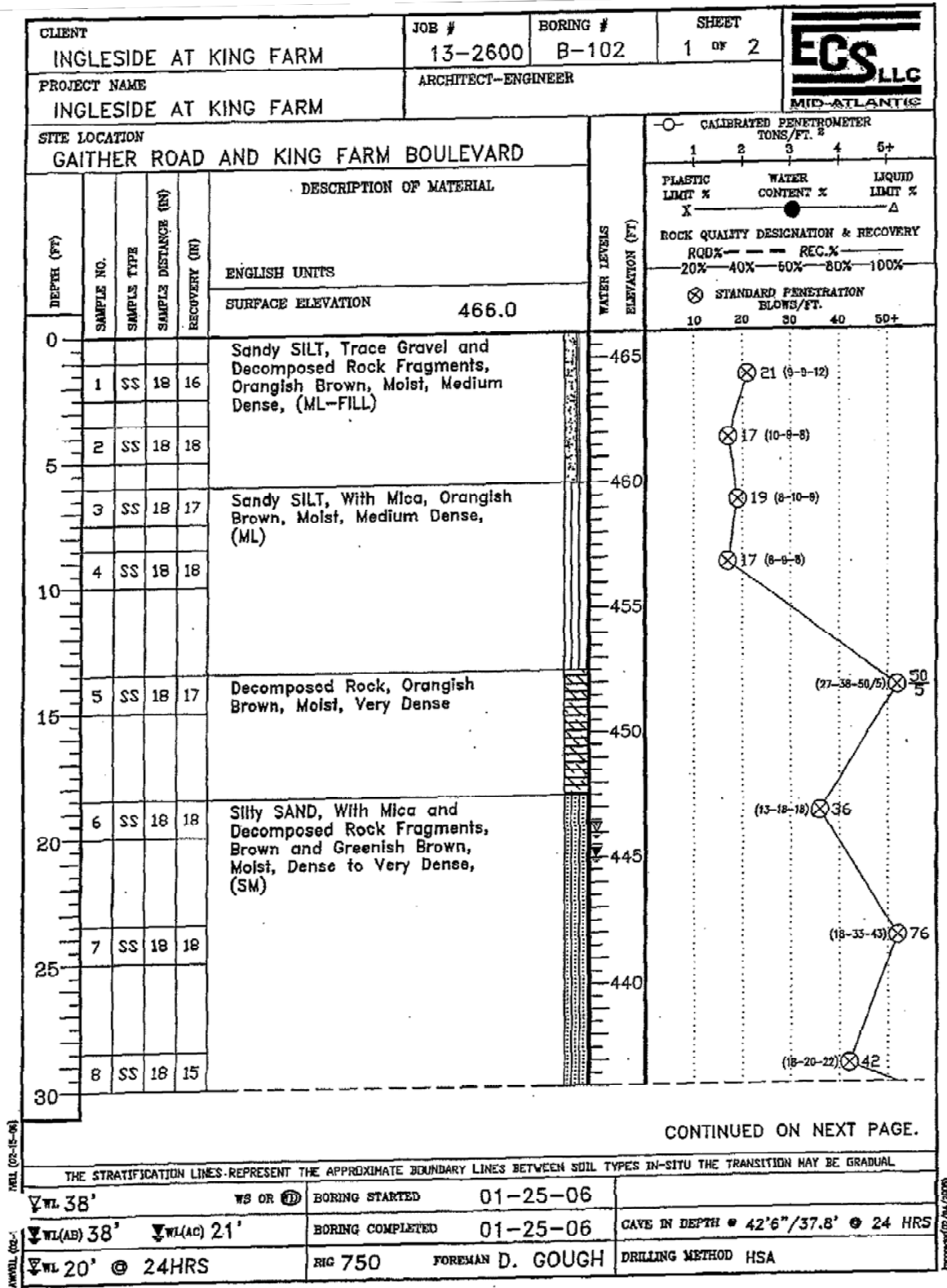
Twenty Soil Borings were drilled 15 to 83 feet deep. Sixteen of the borings were drilled within the proposed structure's footprint. The others were drilled in the proposed site pond area. Varying soil conditions were found across the site with varying recommendations called out in the geotech report.

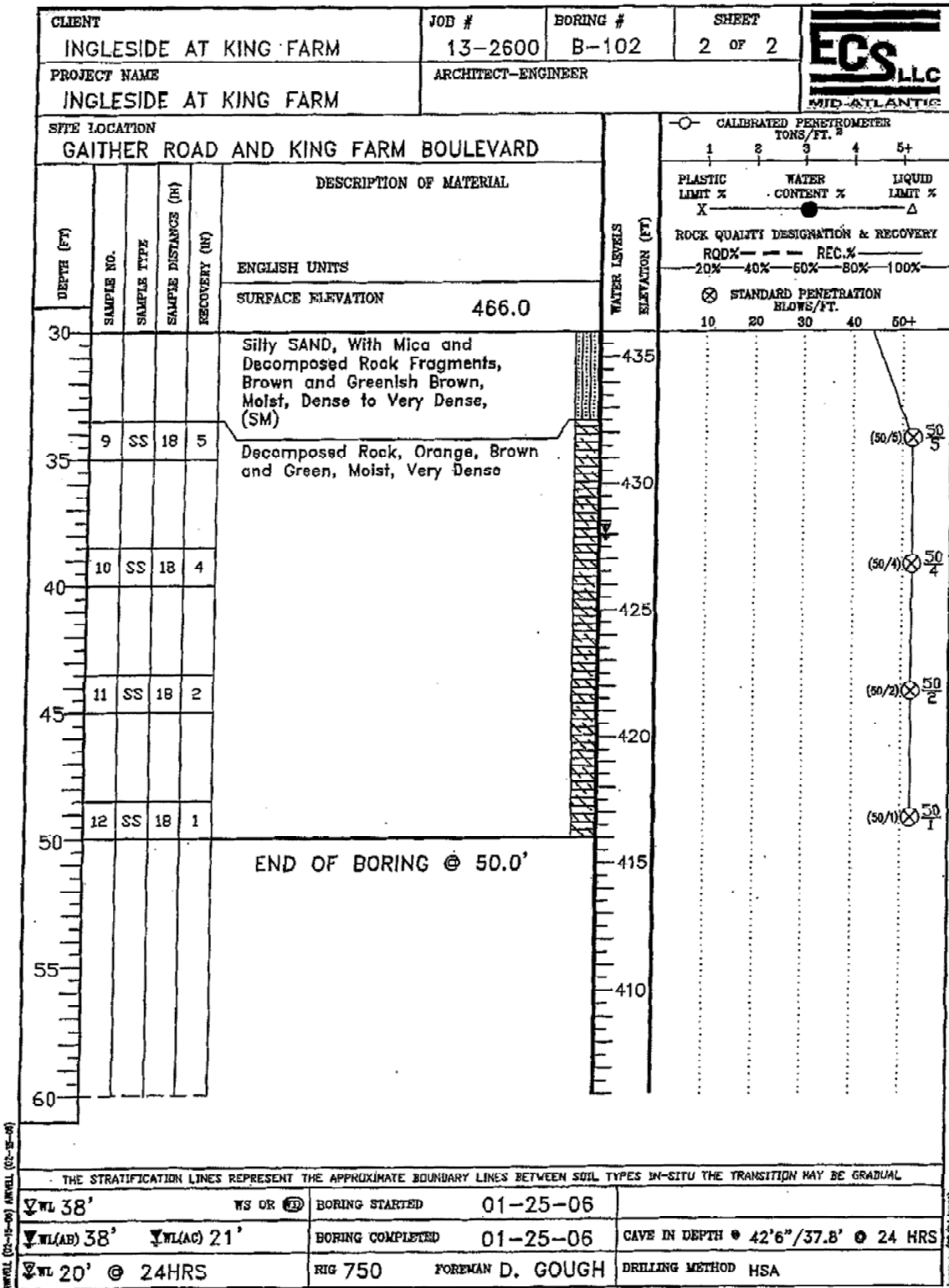
The surface conditions are stated to contain highly erodible fines when wet. Some of the subsurface conditions also contain soils that may be unstable if exposed to the environment and it is recommended that footings be poured on the same day as excavation. Groundwater conditions are not expected to be a problem during design and construction given the relatively low depth of the footings, but it is recommended to maintain good site drainage and dewater the site with a sump pit and pumping operations if necessary.

According to the geotech report the structure should be supported using geopiers and stone columns. This is based on a maximum column load of 1050 kips (average between 700 and 900 kips). Wall loads are approximately 10 kips/foot. The west portion of the site contains new compacted structural fill that is believed to be left over from a previous site grading project. It also contains softer natural soils so the geotech report recommends the use of Geopiers or stone columns to support the spread footings. The east portion of the site contains natural firm to dense Sandy Silt (ML) or Silty Sand (SM) or new compacted fill. The building may be supported using just the spread footings.

Additional findings show subsurface conditions to contain decomposed rock that will be difficult to excavate and may require blasting or the use of additional earthwork equipment. See the Boring Location plan and Sample Boring Logs B-102 and B-114 below for additional information.





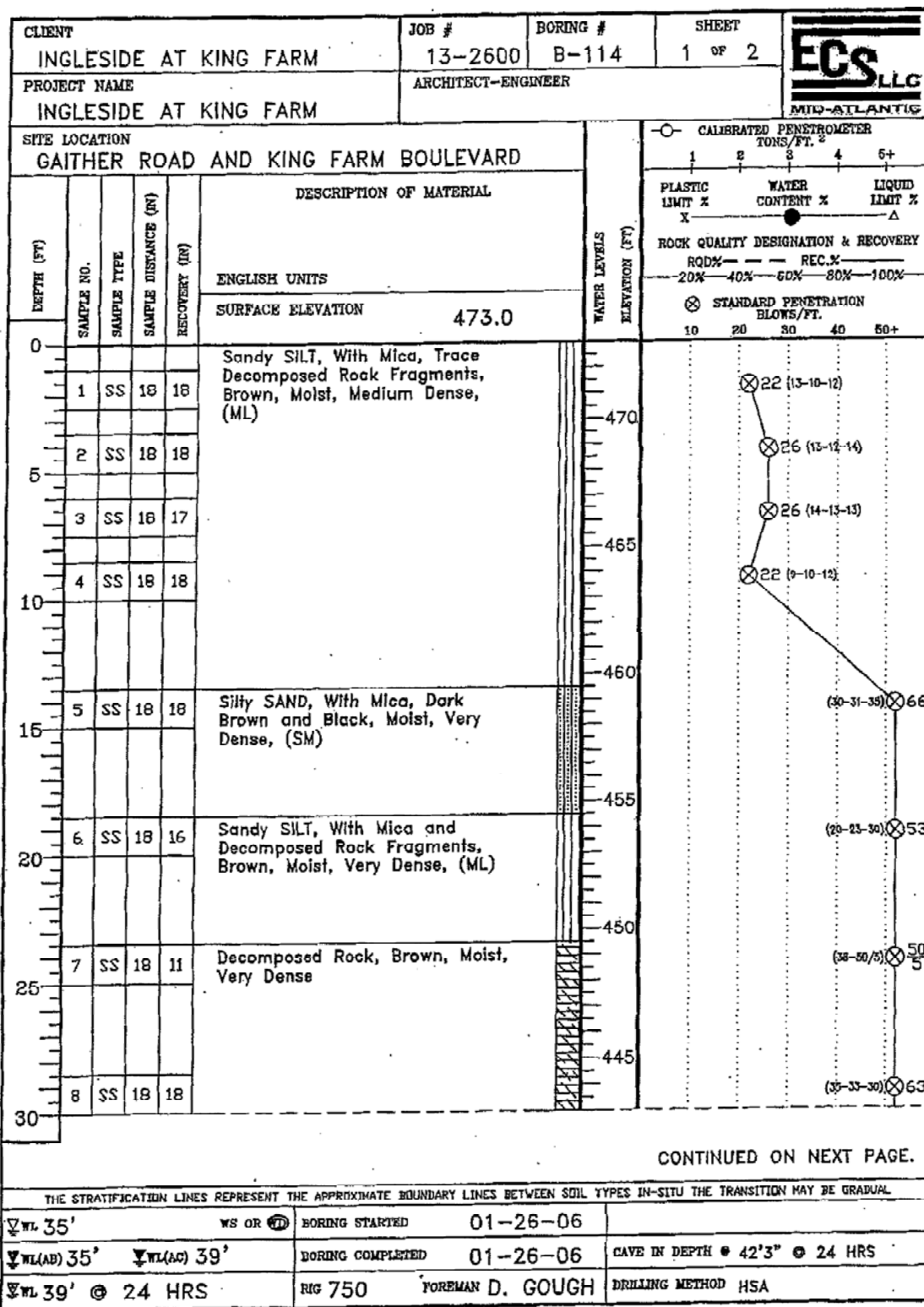


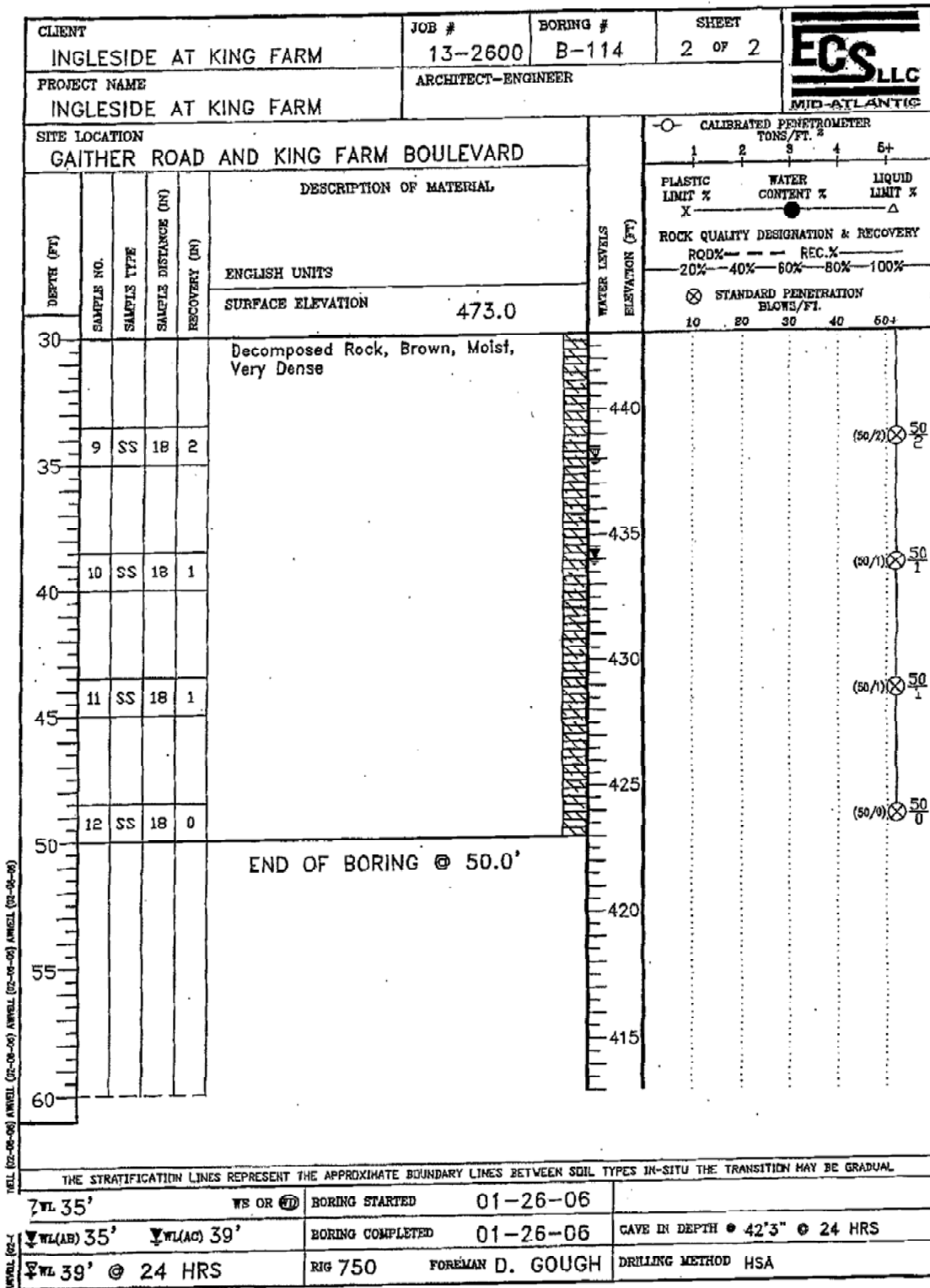


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Weather:

The weather history for the D.C. region for 2007/2008 gives a good indication of the complexities involved with bringing this project out of the ground. The main weather related items that could negatively impact a project are temperature, wind, rain, thunder storms, and snow. Starting in March 2007 when construction of the building began the average temperature was 49° F with a highest daily average wind speed of 17 mph. There were 10 days with rain and 2 days with snow. See the table below for the weather data for more information.

The weather data below shows that the average temperatures for the D.C. area were relatively moderate and would not have had a large impact on worker productivity while the project progressed toward enclosure. The wind data shown is the highest daily average wind speed recorded for the month. Some of the tables showed daily wind speeds that reached over 30 mph. The surrounding area is not heavily guarded by other structures to act as wind breakers. This would require more caution and guidance while operating the tower cranes and could potentially postpone making any lifts with the crane until the wind slowed down.

Rain could be detrimental to this project due to the soil conditions mentioned earlier. The weather data indicates several months with rain occurring on approximately 50% of the total days in that month. Thunder storms are another concern, especially with the tower cranes being the tallest structures on the site. They are prone to lightning strikes and would not be uncommon for this to happen given the relatively high number of thunderstorms during the summer months.

Snow could be a nuisance for a project. It can cause slippery work/road conditions, which could cause injuries or accidents. Fog is another nuisance. Depending on visibility, it could be difficult to see other workers from the top of the tower crane and be difficult to see the crane swing of other on site cranes, but fog of this severity would be rare.

<b>2007 Weather Data</b> <a href="http://www.wunderground.com">www.wunderground.com</a>		
<u>January:</u> 40° F, 17 mph Rain: 13 Thunder: 0 Snow: 6 Fog: 1	<u>February:</u> 41° F, 21 mph Rain: 6 Thunder: 1 Snow: 9 Fog: 2	<u>March:</u> 49° F, 17 mph Rain: 10 Thunder: 0 Snow: 2 Fog: 0
<u>April:</u> 59° F, 23 mph Rain: 11 Thunder: 3 Snow: 2 Fog: 2	<u>May:</u> 65° F, 16 mph Rain: 6 Thunder: 3 Snow: 0 Fog: 2	<u>June:</u> 78° F, 13 mph Rain: 15 Thunder: 7 Snow: 0 Fog: 0
<u>July:</u> 81° F, 13 mph Rain: 16 Thunder: 6 Snow: 0 Fog: 0	<u>August:</u> 78° F, 10 mph Rain: 11 Thunder: 5 Snow: 0 Fog: 0	<u>September:</u> 76° F, 12 mph Rain: 7 Thunder: 2 Snow: 0 Fog: 0
<u>October:</u> 67° F, 15 mph Rain: 8 Thunder: 1 Snow: 0 Fog: 2	<u>November:</u> 50° F, 15 mph Rain: 9 Thunder: 0 Snow: 0 Fog: 1	<u>December:</u> 42° F, 18 mph Rain: 16 Thunder: 0 Snow: 5 Fog: 4

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<b>2008 Weather Data</b> <a href="http://www.wunderground.com">www.wunderground.com</a>		
<u>January:</u> 40° F, 18 mph Rain: 10 Thunder: 0 Snow: 4 Fog: 1	<u>February:</u> 41° F, 16 mph Rain: 9 Thunder: 1 Snow: 4 Fog: 2	<u>March:</u> 49° F, 21 mph Rain: 14 Thunder: 1 Snow: 0 Fog: 0
<u>April:</u> 59° F, 14 mph Rain: 16 Thunder: 4 Snow: 0 Fog: 2	<u>May:</u> 65° F, 20 mph Rain: 15 Thunder: 2 Snow: 0 Fog: 2	<u>June:</u> 78° F, 11 mph Rain: 15 Thunder: 14 Hail: 1 Snow: 0 Fog: 2
<u>July:</u> 81° F, 11 mph Rain: 14 Thunder: 8 Snow: 0 Fog: 1	<u>August:</u> 78° F, 11 mph Rain: 9 Thunder: 3 Snow: 0 Fog: 0	<u>September 9/21:</u> 76° F, 12 mph Rain: 5 Thunder: 0 Snow: 0 Fog: 0
<u>October:</u> N/A	<u>November:</u> N/A	<u>December:</u> N/A

The Rockville Economic Development, Inc. website lists six major projects currently underway in the community. These could potentially affect the labor force for the Ingleside at King Farm project.

#### Rockville Town Square

- 15 acres
- 180,000 square feet of retail and restaurant
- 644 residential units
- Rockville Regional Library
- Rockville Arts and Innovation Center
- three public parking garages
- new town square

#### Rockville Town Center

- 3.2 acres
- two mixed-use towers
- 485 multifamily residential units
- 40,000 square feet of street level retail
- 1,400 parking spaces
- 175 room hotel
- Tower Oaks
- 200-acre site, 2.5 million square foot wooded campus of commercial, residential, retail and hotel space
- The Tower Building
- Tower II; expected completion in 2008
- The Renaissance ClubSport; expected completion in 2008

#### The Preserve at Tower Oaks

- 34-acre site, capacity for 1.2 million square feet of Class A office space
- One Preserve Parkway: 175,183 square feet of office space, awaiting construction
- Additional 900,000 square feet of office space

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#### Redland Corporate Center

- 28-acre campus to be built out with a mix of office, residential, retail and forestland
- Two buildings under construction, expected to be completed mid-2009
  - 210,240 square feet on nine floors
  - 136,430 square feet on six floors

#### Twinbrook Commons

- 26-acre site surrounding the Twinbrook Metro station
- Broke ground November 2007; full project completion expected 2015
- 325,000 square feet of office space
- 220,000 square feet of ground floor retail
- 1,595 multi-family residential units
- Phase 1: 279 luxury apartments and 15,000 square feet of retail

## Client Information

The owner, Ingleside Presbyterian Retirement Community, Inc. (IPRC), currently owns two continuing care retirement communities (CCRC) at other locations. They are named Ingleside at Rock Creek and Westminster at Lake Ridge. IPRC is looking to expand with a new community. Rock Creek and Westminster are both accredited by the Continuing Care Accreditation Commission (CCAC). They are not-for-profit life care communities. Rock Creek is located in NW Washington, D.C. and Westminster is located in Lake Ridge, VA. They offer housing and health care services primarily to Presbyterian Church members age 65 and up. The members are capable of independent and limited assisted living. Residents have access to a Medicare certified Health Care Center since health is one of IPRC's primary considerations.

The new community is dedicated to providing its senior residents with an active, comfortable lifestyle and high-quality, long-term health care. The new location will have many of the same amenities as the other communities such as a swimming pool and restaurants in addition to some new features like the theater and market place.

It is located in the heart of an intergenerational planned community, King Farm; hence the name Ingleside at King Farm. The residents of the new community will also have access to full healthcare services that range from temporary rehabilitation to long term care. The owner wants residents to enjoy a stress free lifestyle with the convenience of a small town and atmosphere of a metropolitan area.

As a not-for-profit, maintaining a tight budget will be very important in order to keep costs to a minimum while still promoting a quality image for prospective residents. IPRC promotes the quality of senior living at their other facilities and this facility is no different from that aspect and this project is expected to present the same positive image of senior living. There were \$1.5 million in upgrades on this project that were primarily related to improving the quality of the counters and other finishes. Another important part of the Ingleside at King Farm project is the desire to achieve the U.S. Green Building Council's (USGBC) LEED Certification and marketing the benefits of the sustainability movement to prospective residents.

The schedule is important with this project as it is in any project that involves residencies. Ingleside anticipated holding an open house for current depositors on

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9/21/2008 to show them how their particular living units would look. In a note from the Ingleside at King Farm website, it mentions that the open house will unfortunately be postponed until the life safety systems are in place. Currently the life safety systems are not in place since the building is still under construction. The City of Rockville will not approve of the open house event until the life safety code requirements have been met. This open house is very important to the owner to be able to showcase the new living units and potentially use the open house to attract more residents.

According to the Ingleside at King Farm website, the tentative opening date will be by the end of the first quarter in 2009. As the project nears closing, this date will become more crucial since they given current depositors the word to begin selling their personal homes and scheduling settlement (move-in) beginning 3/15/2008. There is no phased occupancy on the calendar for this project, but the site plan shows the addition of two additional assisted living facilities for the second phase of construction. There are no plans to construct Phase 2 at this time due to the current condition of the housing market.

During the construction process, the owner is interested in the life safety systems sequence as mentioned in order to get occupancy. Another sequencing issue that the owner is interested in is completing the SER Review and receiving the Stripping Letter for the PT concrete slabs, which gives the OK to remove the forms on the slab and reshore the structure. Without the approval to do this, the project cannot move forward and will cause delays in scheduling tenant settlement. Another sequencing issue is the timely delivery and installation of major mechanical equipment and appliances for the living units. The major equipment ties into the localized heatpumps in the living units to insure optimum comfort of each resident while the appliances add the final touch to the units and make the residents feel like they've got a place to call their own.

The keys to completing the project to the owner's satisfaction are to bring the project to a timely completion of a facility that will withhold the reputation of the IPRC name and meet the owner's USGBC LEED certification expectations. The environment is an important thing to protect and will uphold the quality of the residents and surrounding community. They are well known in the D.C. metropolitan area for their CCAC accredited continuing care retirement communities, so they certainly want to keep the good faith in the area.

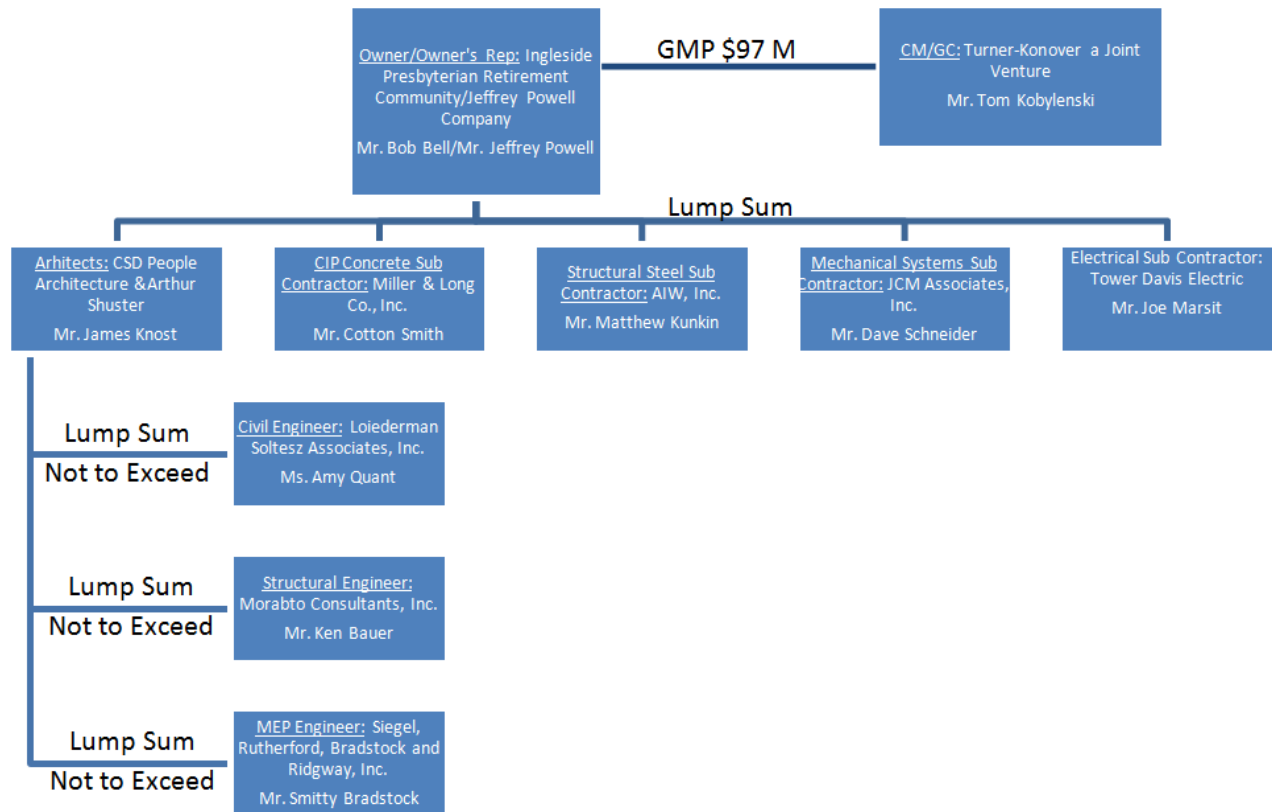


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## Project Delivery System



This project is being delivered using the Construction Management Agent (CM) delivery method because it allows the owner to maintain administrative authority of the project and stay informed throughout the construction process. Delivering the project using CM ensures that the owner will receive what he is paying for on time and within the budget. The project will be reviewed for constructability and feasibility because the CM is experienced with this type of construction. The CM will insure that proper communication is maintained throughout the project.

The contracts are all held by the owner as opposed to a CM at Risk delivery method in which case, the CM would hold the contracts. Since the CM is also acting as the GC on the project with a \$97 million Guaranteed Maximum Price (GMP) contract, they submit their pencil copies to the A/E for review. The owner holds Lump Sum contracts with the Sub Contractors and pencil copies are submitted to the A/E. The architect holds a Lump Sum Not to Exceed agreement with his engineers/consultants in which they send monthly invoices to directly to the architect for their services.

Sub Contractors were selected on a low bid with a bid bond. They were required to submit a certificate of liability insurance. The GC holds liability insurance and builder's risk insurance. The GC also has a performance bond and surety bond.

The contract types and delivery method are appropriate for this project since it is being constructed for a non-profit organization. The budget is tight and, therefore, a CM delivery method allows the owner to assume the majority of the risk, which keeps costs down. The owner also gets the benefit of having the CM's experience. Lump Sum, or

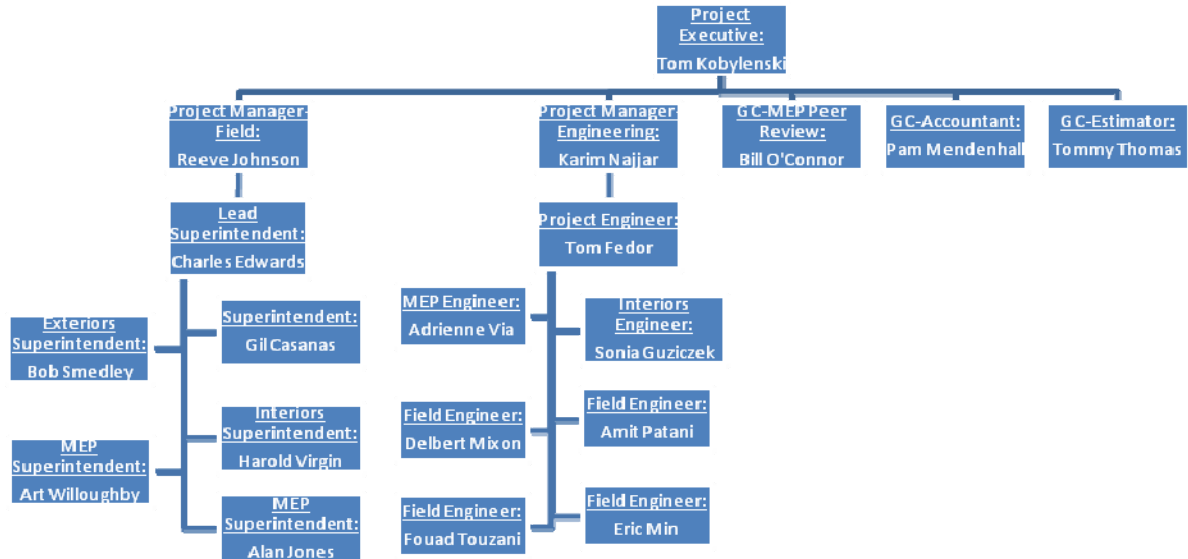
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Fixed Price, is appropriate, but there is more chance that Change Orders (CO's) will be incurred. This project did see CO's totaling \$3.4 million, which is approximately 3.5% of the total GMP contract.

## Staffing Plan



The project executive oversees the whole project, but does not spend all his time on the project. The project managers are on site every day and are a direct contact for the superintendents and field engineers. The on site peer review, accountant, and estimator report directly to the project executive also.