Technical Assignment 1 Table of Contents

The Rockville Library

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Executive Summary

This technical report is an overview of the controlling characteristics of The Rockville Library. The project's dynamic site, systems, and management are the features which control the construction process. All of these features are fully analyzed and broken down in order to see the fully magnitude of the project.

Since the summer of 2005 the city of Rockville began a transformation of its town center. A mall and parking lot were the only landmarks for this plaza and the township considered this to be impersonal. It didn't reflect what the people of Rockville wanted; it didn't reflect what the town meant. So a master plan was devised to turn the center into a great plaza with recreation centers, courtyards, administrative buildings, and especially the Rockville Library. This building is to be its centerpiece and drawing power to the plaza. Grimm & Parker designed the building to be an eye opener. It's main feature being a serpentine curtainwall which is the representation of a double helix commemorating the mapping of the human genome which occurred locally.

This building is just the beginning, around the site in every direction there is is phased construction occurring. Demolition of old spaces, removal of parking lots, renovation, and new building construction. Although none of this effects the libraries construction, they can all share the space of the site and create one giant unified project. Although the Rockville Library has an individual site which is fenced, the surrounding area can be completely utilized by the construction crew for storage, parking, and staging. This report will go into the site analysis and talk about the efforts put forward by the general contractor to organize the site.

This report intends to reflect not only the building's importance and place in the community, but also the complexity and coordination in the construction process. Many trades work simultaneously in order to fulfill the project schedule and their successful sequencing will be a result of communication and intense planning. The Rockville Library is not only an eye opener from the exterior, but also the interior. This report breaks down the construction budget and how much emphasis is placed on interior elements such as door, windows, finishing, mechanical systems, and more. So much emphasis was placed on quality that the general contractor made sure to hire a quality specialist to observe the process.

Just one look at the drawings or specifications of this project and you can tell it is a unique building. Lots of planning and engineering went into creating this beautiful environment. However I question the level of thought that went into the functionality and construction sequencing of the project. With all the sequencing and communication necessary for construction success are all of the trades prepared? Are the drawings and specifications more intent on ensuring an aesthetic space rather than a functional construction process? This report intends to dive into these question, but one thing is sure that The Rockville Library is a unique and amazing building.

ID	Task Name	Duration	Start	Finish
1	**Rockville Library**	**587 days**	**Mon 3/8/04**	**Tue 6/27/06**
2	Project Design + Development Phase	167 days	Mon 3/8/04	Fri 10/29/04
3	Contractor Bidding Period	16 days	Mon 11/1/04	Mon 11/22/04
4	Contract Awarded To GC	1 day	Mon 11/22/04	Mon 11/22/04
5	Preconstruction Services	63 days	Mon 11/22/04	Tue 2/22/05
6	Site Mobilization	1 day	Tue 2/22/05	Tue 2/22/05
7	Notice To Proceed	1 day	Tue 2/22/05	Tue 2/22/05
8	Temporary Utilities Tie-Ins	5 days	Wed 2/23/05	Tue 3/1/05
9	Temporary Building Power Achieved	1 day	Tue 3/1/05	Tue 3/1/05
10	Excavation/Soil Retention	15 days	Wed 2/23/05	Tue 3/15/05
11	Foundation Construction	74 days	Tue 3/15/05	Mon 6/27/05
12	Erection of Structural Steel	69 days	Wed 6/8/05	Wed 9/14/05
13	Curtainwall Delivery, Installation	39 days	Wed 6/22/05	Tue 8/16/05
14	Slab On Grade Concrete Pouring	54 days	Thu 7/7/05	Wed 9/21/05
15	Slab On Deck Concrete Pouring	64 days	Thu 7/7/05	Wed 10/5/05
16	Fireproofing	15 days	Thu 9/15/05	Wed 10/5/05
17	Building Exterior Envelope	87 days	Thu 8/4/05	Wed 12/7/05
18	Roofing	68 days	Thu 9/15/05	Wed 12/21/05
19	Building Enclosed	1 day	Wed 12/21/05	Wed 12/21/05
20	Permanent Utilities Tie-In	76 days	Thu 9/22/05	Wed 1/11/06
21	Building Fully Powered	1 day	Wed 1/11/06	Wed 1/11/06
22	MEP Equipment Installation	121 days	Thu 9/29/05	Wed 3/22/06
23	Climate Control Achieved	1 day	Wed 3/22/06	Wed 3/22/06
24	1st Floor MEP Rough-In / Interiors	156 days	Thu 9/22/05	Wed 5/3/06
25	2nd Floor MEP Rough-In / Interiors	156 days	Thu 10/13/05	Wed 5/24/06
26	3rd Floor MEP Rough-In / Interiors	146 days	Thu 10/27/05	Wed 5/24/06
27	Testing, Balancing, Final Inspections	11 days	Wed 5/24/06	Thu 6/8/06
28	Commisioning	14 days	Thu 6/8/06	Tue 6/27/06
29	Final Completion	1 day	Tue 6/27/06	Tue 6/27/06

Project: Rockville Library
Date: Wed 11/2/05

Task
Split
Progress
Milestone
Summary
Project Summary
External Tasks
External Milestone
Deadline

Page 1

Project Schedule Analysis

The Rockville Library Project is a fast paced construction project with a heavy emphasis on coordination and sequencing of activities. Multiple trades are working on site at the same time in order to complete the project within the proposed schedule. This schedule just gives an overview into the different tasks occurring on the project and it is already clear that a high communication level will be required to ensure proper coordination.

The moments leading up to construction are typical for most Design-Bid-Build projects. There is a 6 month design period where Grimm & Parker Architects coordinated with the owner and engineers to create a set of plans for The Rockville Library. After suitable plans and specifications were completed, a bidding process began in order to find a general contractor to begin construction of the building. After a week long bidding process, the project is awarded to Forrester Construction on November 22, 2004. Afterwards, there is a 3 month period where Forrester, Grimm & Parker, Montgomery County, and the entire engineering staff coordinate a final construction blueprint that is launched on February 22, 2005.

Before notice to proceed was given, Forrester subcontracted their work, obtained permits, and communicated the construction plan to all parties involved. On February 22nd they mobilized to site and broke ground. The excavation is a shallow system with soldier beams and lagging which is expected to take 3 weeks to complete and structural work can start. Structural building construction is broken down into three separate zones, the southern third, the northern third, and the building center. This division of work allows the construction to progress to the next stage. Meanwhile tasks behind it in the schedule are still being preformed to parts of the building. Deep footings and foundation walls begin erection in the southern zone and once completed work starts in the northern zone. Steel erection is allowed to commence in the southern zone now that foundation

construction is completed. Steel erection will follow behind the foundation construction until the entire structural system is completed.

This type of construction break down is consistent for the entire structural system. Steel erection is followed by deck placement and slab pouring, followed by exterior masonry construction, and roofing, all the way until the building is enclosed. Other tasks like curtainwall erection and MEP equipment installation also begin during this period which requires extra coordination to make sure that these trades do not interfere with the other structural work taking place. Once the building is sealed, power supplied, and MEP roughed-in and installed, the building is self-sustaining.

After climate control is achieved in the Rockville Library the interior construction can begin. Construction is broken down once again for the three separate floors of the building. A task begins on the first floor and moves up the building. Once a task is completed for a particular floor, the next trade can move in and begin their work. Most of the time multiple trades will work on the same floor at the same time which requires heavy amounts of communication and coordination to ensure that there isn't crowding. The interiors process will continue until the construction process is completed. Afterwards final inspections and testing will begin on all building systems. If everything meets the standards of the owner and the closeout process runs smoothly, the project is scheduled to be completed on June 27, 2006.

Building Systems Summary

Structural Steel Frame

The Rockville Library is supported by a system of structural steel columns, beams, and girders. This steel skeleton consists of beams sizes mainly being W 16x26, 18x35, and 12x16, while girder sizes are mostly W 21x57 and 24x62. Steel columns normally rise through all three building stories and are typically sized at 24”x36” piers with 9’x9’ footings. Lateral bracing is used to support frame columns, connected by full penetration welds. Steel beams are aligned uniformly at 8 feet apart, running east/west along the narrower length of the building. Girders run through along the wider length and are spaced based on the required loading of the area. Where more support is needed like in mechanical rooms and computer labs, girders and beams are spaced closer together to handle the load. For the majority of the library, which are office spaces and reading rooms, less support is needed and more spacing can be given to steel beams and girders. In order to erect the steel a single truck mounted, hydraulic, with a 100 ton capacity crane is used. This type of crane fits the job since the structure is not too tall for a truck crane, there are no overly heavy objects to lift, and the site is small enough for the crane to move and reach every area of the building. The truck crane is affordable and can be moved to neighboring sites to aid in the construction of the entire building complex.

Cast-In-Place Concrete

Cast-in-place concrete is used to form the foundation and floor slabs for the Rockville Library project. The building foundation and roof consists of 3000-psi normal weight concrete reinforced with ASTM A/615A 615M, Grade 60, deformed rebar and W2.1xW2.1 weld wire fabric. Reinforced 3000-psi concrete is used as footings for masonry units and structural steel as well. Lightweight 3000-psi concrete is used for the second and third floor slabs. These slabs are thin measured in ay 5" thick on the 1st and roof levels, and 3" on the second and third floors. They are sized so thin not only because of structural steel reinforcement, but the lack of dead and live loads in most of the areas building space because of open reading areas and conference rooms. The only dead loads that the structure is concerned in supporting are bookshelves and mechanical units on the upper floors. Live loads shouldn't be overwhelming to the structure either since the public library doesn't expect there to be an abundant number of occupants in the space at any one period of time. Concrete is distributed by pump from a mobile unit that easily spreads concrete to all areas of construction. This is a more efficient method of distribution than a crane and bucket since concrete can be placed in specific locations even with a ceiling cover so construction continue upwards before the slabs are finished on the floor below.

Mechanical

The mechanical systems of the Rockville Library are designed to create spaces that are flexible, functional, energy efficient, and respond to the needs of the facility. This system will be controlled by an Automatic Temperature Control/Energy Management System, which will create the appropriate thermal environment for all building spaces. The HVAC system consists of 3 different types of distribution methods selected based on the size and desired noise levels of each building space. In the stack area a constant volume terminal reheating system is used, office areas use a variable air volume system, while in the meeting rooms conditioning units circulate airflow. The building will be heated by means of a Central Heating Water Plant with a heating water circulating system serving hot water heating coils located in air handling units, unit heaters, convectors, and other parts of the HVAC system. The library will be cooled through the use of a central chilled water plant with a chilled water circulating system serving chilled water coils located in air handling units. In total the HVAC system uses 7 air handling units; 2 on the roof with another 5 located around the building. Ductwork is mainly made of galvanized steel rectangular duct that is concealed by a ceiling grid. In general the mechanical system is concealed from view yet is made easily accessible for maintenance through their centralized locations. The majority of mechanical equipment is stored in mechanical closets on the 2nd and 3rd floors including the boilers, hot water generators, pumps, air handling units, and the Automatic Temperature Control/Energy Management System. The remainder of major mechanical units is located on the roof including cooling towers, air handling units, and circulating fans. For fire suppression Viking Microsoft sprinkler heads with recessed excursion panels are placed within the ceiling grid of all areas of the library. These sprinklers distribute water in case of a fire using a basic wet pipe system through most areas of the building. On the lowest building level a quick response system is put into place by integrating smoke detectors with sprinkler heads to prepare the sprinklers for a possible emergency situation. Water is dispersed into the sprinkler pipes where they await for the heads to be activated by heat indication at which point they release onto the fire. Standpipes are also present in the stairwells of the building making this project completely consistent with all local fire codes.

Electrical

The electrical system for the new Rockville Library is suitable for a state-of-the-art learning center. The system is set up to support several lighting and power needs from all the computer labs running through the building. The main transformer is 960 kVa and there are 8 transformers located throughout the building. The power is a mostly 480/277 V with a 3-phase 4-wire system. The lighting voltage primarily being 480/277 V and the receptacles are 208/120 V. In general a lot of power is needed to ensure the lighting and computer loads of this facility are taken care of. Main panelboards are located on every floor in central and isolated utility closets for easy maintenance.

Masonry

The Rockville Library makes use of both load bearing and veneer masonry. Concrete masonry units enclose the building supported by steel reinforcement bars and concrete formwork. 4” interior layers and 12” exterior layers are grouted into the building walls on the western and northern building elevations. Freestanding CMU units are bonded with steel #5 rebar to concrete footings on parts on the southern and western building ends. Brick veneer decorates the building exterior around the southern and eastern curtainwall areas and are placed by steel tubular scaffolding.

Curtainwall

The curtainwall system is being prefabricated and delivered to the site due to the complexity of its design. The curtainwall is made primarily of brick veneer and glass panels with aluminum paneling outlining the windows. It is being fabricated by Kawneer, manufactured in New Hampshire by a company called Galaxy Glass & Aluminum Inc. and is due to be installed in November. Curtainwall erection should be rather complicated due to several curved sections that match the double helix representation of the building's design. However, using a truck crane and having the site prepared and coordinated for delivery of the curtainwall sections should allow for a faster and simpler assembly.

Support of Excavation

Previous to building construction the site was a parking lot for a local mall. The mall was demolished before building construction and the site was prepared for building construction as apart of the town center development. Soil was analyzed and determined that shallow excavation and little to no dewatering was required due to previous development on site. The main concern was realizing where existing utilities were located and how to properly tie-in these resources to the site. Excavation is slopped since it is considered to be shallow enough not to require shoring. There is enough room on site to allow for slope excavation and grouting protects foundation footings from any water that still exists on site.

Rockville Library Budget Breakdown

Base Bid Schedule Of Values:

Owner: Dept. Of Public Works **Project: Rockville Library**

Proposal Date: 10/14/04 **Total S.F. : 102400 ft^2**

Division	Description	Price by Division	Cost Per SF
Division 01:	General Requirements	$1,499,481	X
Division 02:	Site Construction	$256,433	X
Division 03:	Concrete	$1,001,957	$9.78
Division 04:	Masonry	$924,864	$9.03
Division 05:	Metals	$2,316,022	$22.62
Division 06:	Wood & Plastics	$523,734	$5.11
Division 07:	Thermal & Moisture Protection	$448,373	$4.38
Division 08:	Doors & Windows	$3,578,085	$34.94
Division 09:	Finishes	$2,056,658	$20.08
Division 10:	Specialties	$64,528	$0.63
Division 11:	Equipment	$26,471	$0.26
Division 12:	Furnishings	$78,387	$0.77
Division 13:	Special Construction	$0	X
Division 14:	Conveying Systems	$122,000	$1.19
Division 15:	Mechanical	$3,646,169	$35.60
Division 16:	Electrical	$1,953,856	$19.08
Sub-Total; Trades:		$18,497,018	$180.64
Quality Control / Safety:		xxxxxxxx	
Allowances:		xxxxxxxx	
G.C. OH & Profit:		xxxxxxxx	
Payment & Performance Bonds:		xxxxxxxx	
Taxes / Other / Contingency:		xxxxxxxx	
Sub-Total; General Contract:		xxxxxxxx	
Owner's Contingency:		$0	
Design Team Fees:		$0	
Builder's Risk Insurance:		xxxxxxxx	
Sub-Total; Owner / Other:		xxxxxxxx	
Total Bid Proposal:		$19,706,839	$192.45

D4 Cost Estimate

Base Bid Schedule Of Values:

Owner: Dept. Of Public Works **Project: Rockville Library**

Proposal Date: 10/14/04 **Total S.F. : 102400 ft^2**

Division	Description	Price by Division	Percentage Of Estimate
Division 01:	General Requirements	$811,286	4.12
Division 02:	Site Construction	X	X
Division 03:	Concrete	$492,777	2.5
Division 04:	Masonry	$1,172,931	5.95
Division 05:	Metals	$1,979,497	10.04
Division 06:	Wood & Plastics	$2,141,998	10.86
Division 07:	Thermal & Moisture Protection	$886,412	4.5
Division 08:	Doors & Windows	$1,136,257	5.76
Division 09:	Finishes	$2,818,304	14.3
Division 10:	Specialties	$523,445	2.66
Division 11:	Equipment	$1,504,216	7.63
Division 12:	Furnishings	$1,394,277	7.07
Division 13:	Special Construction	$239,843	1.22
Division 14:	Conveying Systems	$155,307	0.79
Division 15:	Mechanical	$1,962,947	9.96
Division 16:	Electrical	$2,495,299	12.66

Sub-Total; Trades:	**$19,714,795**
Quality Control / Safety:	xxxxxxxx
Allowances:	xxxxxxxx
G.C. OH & Profit:	xxxxxxxx
Payment & Performance Bonds:	xxxxxxxx
Taxes / Other / Contingency:	xxxxxxxx
Sub-Total; General Contract:	**xxxxxxxx**
Owner's Contingency:	$0
Design Team Fees:	$0
Builder's Risk Insurance:	xxxxxxxx
Sub-Total; Owner / Other:	**xxxxxxxx**
Total Bid Proposal:	**$19,714,795**

R.S. Means Cost Estimate

Base Bid Schedule Of Values:

R.S. Means: 2005 S.F. Cost Data
Project Type: 3 Story Library
Total S.F. 102400 ft^2

Building Zone	Description	Price Per S.F.	Total
Exteriror Walls	Face Brick w/ Concrete Backup & Steel Framing	$132.00	$1,132,932
Substructure	Slab On Grade, 4" Reinforced Concrete	$6.00	$194,400
Floor Construction	Concrete Slab w/ metal deck and beams, steel columns	$13.46	$1,378,304
Roof Consruction	Metal Deck, open web steel joists, beams, interior columns	$8.91	$288,684
Doors + Windows	Double Aluminum & Glass, Single Leaf Hollow Metal	$4.38	$1,567,422
Roofing	Coverings, Decking	$1.90	$47,500
Interiors	Partitions, Doors, Stair Construction, Fittings	$14.20	$1,454,080
Conveying	One Hydraulic Passenger Elevator	$2.82	$62,040
Plumbing	Fixtures, Distribution	$5.24	$536,576
Fire Protection	Sprinklers, Standpipes	$1.87	$191,488
HVAC	Heating, Cooling Generation & Distribution	$17.45	$3,573,760
Electrical	Lighting, Electrical Service / Distribution	$15.54	$1,591,296
Total Cost	Modified To Fit Building Specs	$181.00	$18,534,400

Total Bid Proposal: $18,534,400

Cost Estimate Breakdown

The construction costs for the actual budget and the estimates are as follows:

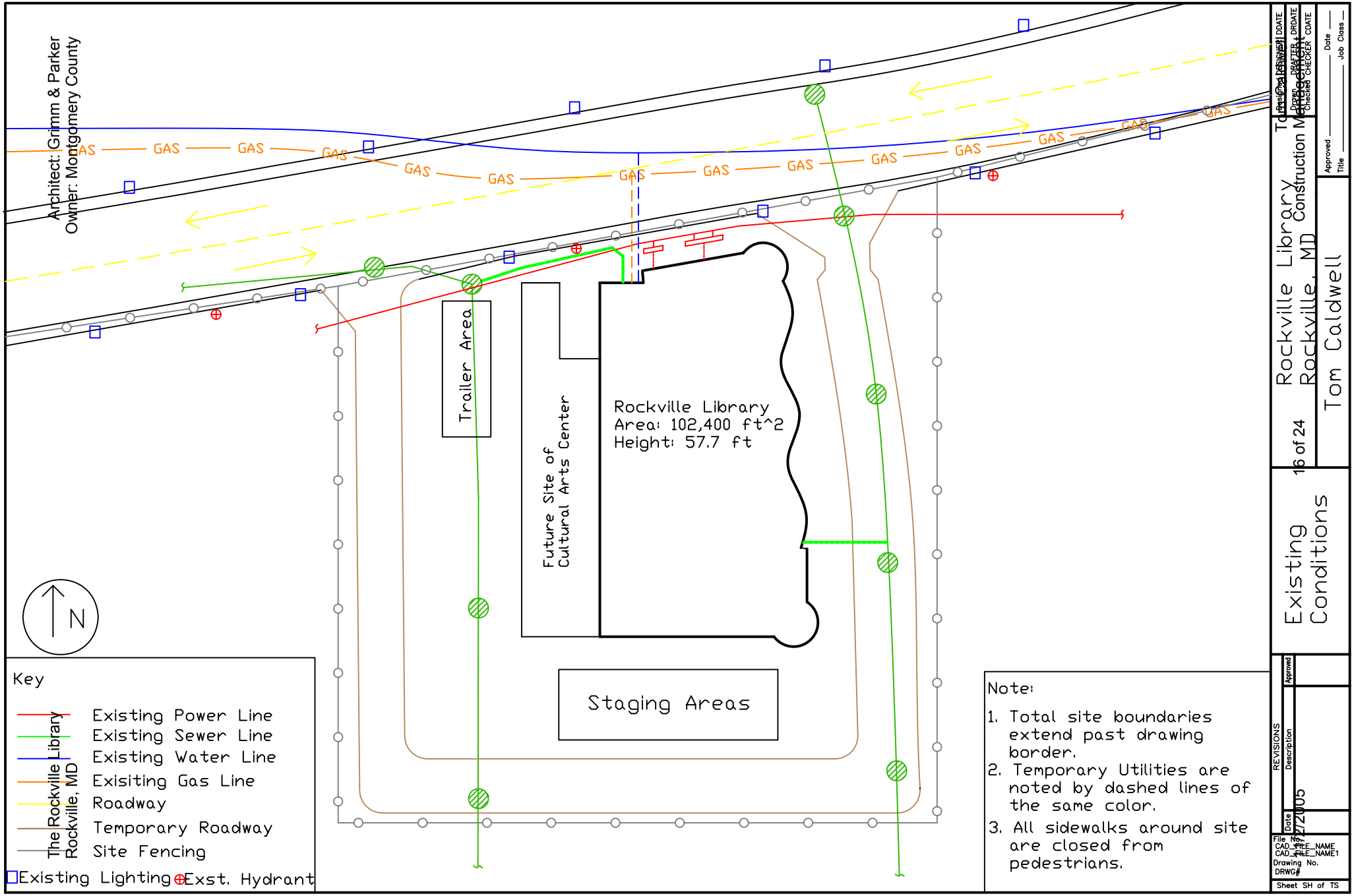
Actual Budget:	**$19,706,839**
D4 Cost Estimate:	**$19,714,795**
R.S. Means S.F. Estimate:	**$18,534,400**

The actual budget set the construction costs at 19.7 million dollars which is a suitable cost for the elaborate design of The Rockville Library. The D4 Cost Data software was able to find a very fitting match and created a very similar estimate for final building construction cost. R.S. Means on the other hand seemed to be off regarding the costs on the Rockville Library with its comparisons to other library projects. The D4 pricing was created by choosing the most similar project in the cost database and modified the square footing, location, and project start date in order to get a more accurate pricing. The R.S. Means estimate was created by taking the price per square foot totals for multiple building systems and modifying their totals to meet the specifications of the Rockville Library.

D4 had a very similar price due to the project selection that was the basis of the cost estimate. I managed to find in the project database a 3 story, high-end, public funded library project based out of Indianapolis. This project was very similar as far as quality, scope of work, and purpose with the Rockville Library. While the final costs were very close the individual project costs are different. First off, the structural system of the Rockville Library is much different than the case study library. Rockville uses more structural steel, concrete footings, and CMUs than the case study. Masonry is also used differently on the project, instead of using lots of load bearing brickwork, Rockville utilizes CMUs and brick veneer, which is slightly less costly to construct. The major cost differences are in the doors and windows category along with the mechanical system. Rockville Library's exterior is made primarily of glass, which raises the cost in this area significantly versus the other library. The mechanical system is also far more advanced and costly on my project since it utilizes an Automatic Temperature Control/Energy Management System. These price increases make up for the lack of furnishings, equipment, and wood & plastics that are present in the D4 estimate, but not a major price factor in the Rockville Library. However, the general principal of the project scope and cost are present in both projects.

Through a lot of modification a reasonable estimate can be created for the construction of The Rockville Library using the R.S. Means S.F. Cost analysis. The general building scope for the library in R.S. Means is a two story library with a 14' story height and 22,000 S.F. of floor area. However this library has an 18' story height with 32,400 S.F. of floor area on three floors. Also the typical building construction is for a concrete building with basic mechanical, electrical, and plumbing systems. Further investigation needed to be done into the guide to find systems to match the types found in Rockville. These systems were found in assemblies estimates in the back which clarified the totals that I should use for the system. After modifying these figures and calculated the appropriate square foot totals for each system the estimate became very reasonable. R.S. Means managed to create a similar building to The Rockville Library by modifying the building size and replacing the building systems.

Overall both estimates did a good job of getting a ballpark figure for the cost of this building. However, further investigation is needed into the complex aesthetic and mechanical building systems in order to get a closer figure.


Architect: Grimm & Parker
Owner: Montgomery County
GAS
Trailer Area
Future Site of
Cultural Arts Center
Rockville Library
Area: 102,400 ft^2
Height: 57.7 ft
Staging Areas
N
Key
Existing Power Line
Existing Sewer Line
Existing Water Line
Exisiting Gas Line
Roadway
Temporary Roadway
Site Fencing
Existing Lighting
Exst. Hydrant
The Rockville Library
Rockville, MD
Note:
1. Total site boundaries extend past drawing border.
2. Temporary Utilities are noted by dashed lines of the same color.
3. All sidewalks around site are closed from pedestrians.
Rockville Library
Rockville, MD
Tom Caldwell
Construction Management
16 of 24
Existing Conditions
REVISIONS
Description
Date
Approved
File No.
CAD_FILE_NAME
CAD_FILE_NAME1
Drawing No.
DRWG#
Sheet SH of TS

Local Conditions

Building construction is taking place in the renovation area of the new Rockville Town Center. This site has already been developed from the previous construction of a mall. The site in which the Rockville Library will be built was once a parking lot so the area is cleared and leveled. Soil boring samples were taken on site and compared to previous boring tests from construction on site years ago. The soil borings went to 30' deep and classified the soil as silty sand and sandy silt with small rock fragments under the layer of asphalt and gravel present from the parking lot. Also, no major site dewatering or leveling would be needed due to previous construction on the site, so excavation was expected to have no delays and take only three weeks to complete.

There is also a lot of room for site parking, crane location, and excavation since the site is very large and encompasses more than just the Rockville Library site. The entire town center is 72 acres large and is completely closed off due to construction on the entire area. Since the construction is phased around the plaza, at any time there are open areas for equipment storage, staging, and parking. This takes a lot of burden off the project manager with all this space to work with. However, there needs to be constant communication with other crews on site to ensure the use of certain spaces. If there isn't a definite plan in place two different crews may try to use the same spot for placing resources which may cause disputes and congestion.

Recycling in the area unfortunately is not very present on this project. Forrester Construction is trying to recycle whatever they can save however; it isn't a major concern in the construction process. Local conditions are favorable for recycling though with gypsum, scrap metal, wood, and general recycling plants within 30 miles of the site. It just isn't in the scope of the project to worry about coordination of recycling. Instead the focus of construction was on producing a quality building.

Typical construction methods in Rockville vary due to the age of the city. Development of the downtown had not taken place since the 1970's and with the construction of this town center there is an opportunity to change the typical building standards. Most surrounding buildings are not large and made of cast-in-place concrete and steel framing. The building of the town center is similar in structure to surrounding building, but place a lot more emphasis on exterior masonry and fixtures which bring a needed aesthetic tone to the downtown. In Rockville there is often not a lot of room for construction due to the crowded urban atmosphere so site management is a must on these construction projects. And as on most urban projects site security and safety is a must due to the amount of pedestrians present at all times. Overall Rockville has a lot of positives for building construction with its flat landscape and conducive soils, yet dealing with the crowded downtown area makes the need for site management more essential.

Client Information

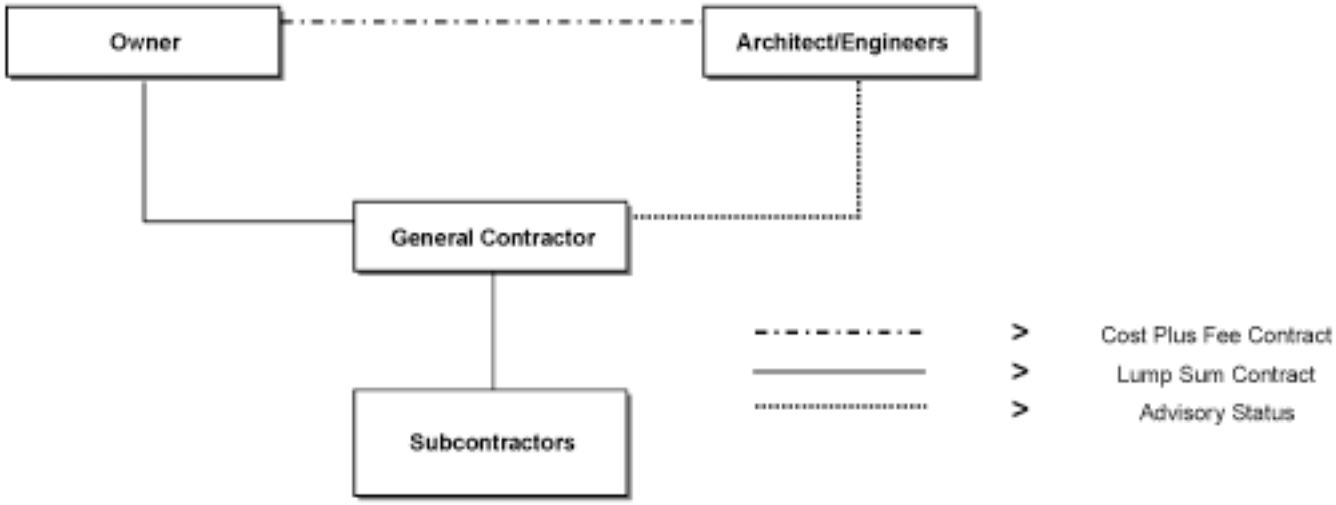
The owner for the Rockville Library project is the Montgomery County Department of Public Works and Transportation. They are in charge of the complete renovation and remodeling of the town center and intend for the Rockville Library to be one of the centerpieces of this transformation. The town center from now until 2007 will be undergoing massive renovation, demolition, and construction and this library is one of the initial steps of the process. The owner hired Grimm+Parker Architects to create a very complex and aesthetic building design, which is exactly what Montgomery County got.

The architect designed a very elaborate building exterior that consists of brick veneer and several glass panels. They employed a curtainwall system and shaped the eastern wall to curve in the shape of a double helix to follow the curvature of one of the main town roads. The building interior is also very detailed with wood paneling, an elliptical staircase, and extravagant front lobby. The Rockville Library also has state-of-the-art mechanical and electrical systems that focus on energy conservation.

Montgomery County is spending a lot of money to make sure the Rockville Library is a top-notch building and their main concern from the construction team is quality. Cost and schedule take a back seat to quality in this construction process due to the lack of limitations on the county's budget and timetable for this project. Since the town center renovation is estimated to take until 2007 for completion, and project completion is expected to be during the summer of 2006, time is not of the essence. Although there are other activities awaiting the completion of Rockville such as roadway construction and landscaping, the most important feature of that area is the completion of this project to its highest quality.

Cost is also not a major factor for this project since the library is funded publicly and they are not working with the financial limitations that a corporation or private owner would deal with. Although it would be in the best interest for Montgomery County to complete the project with minimal extra costs, it wouldn't break the owner to have to add to the project budget to ensure that the quality they desire is achieved. Forrester Construction was awarded this project based on their local knowledge and reputation for high quality in their construction projects. Although safety is always in mind during these projects it is quality that is the driving force in the owner's mind.

Rockville Library Project Organization



Owner	Montgomery County Department of Public Works
Architect	Grimm & Parker Architects
Civil Engineer	A. Morton Thomas + Assoc.
Structural Engineer	CEI Engineering
MEP Engineer	Gipe Associates
General Contractor	Forrester Construction
Subcontractors	Concrete - Geer Construction Co. Masonry - E.G.S. Inc. Structural Steel - Arlington Iron Works Mechanical - Colonial Webb Contractors Electrical - Ellsworth Electrical Inc.

Project Delivery System

From the onset of the Rockville Library project it was clear how the construction project was going to be managed. Due to the elaborate design phase of the project it was clear the construction delivery system was going to be Design-Bid-Build. The architects of Grimm & Parker spent months planning and developing a library that would be a fitting centerpiece to the new town center. They created an intricate interior environment and elaborate curtainwall scheme both that emphasize the importance of this building. The team of engineers for Rockville made these complex systems a reality by putting these designs to construction blueprints. Once the building was put together on paper both to the aesthetic and functional desires of Montgomery County it was time to begin the construction process.

The needs of the owner on this project were clear, to set up a competitive bid to hire the best construction firm to follow the blueprints created by the architect and engineers. Specifically a general contractor was needed to handle the responsibility of assigning, scheduling, and coordinating all the work specified in the contract. Rather than bringing in a construction manager early on the process, Montgomery County let their architect/engineer team handle the building's development. Forrester Construction was awarded the bid and took on the tasks of not only project management but also the high quality control that is needed.

On the Rockville Library Project the owner and architect/engineers are in charge of interpretation and clarification of drawings and specifications. Montgomery County designates representatives to act on their behalf and carry out the owner responsibilities. The Architects/Engineers are not agents of the owner, but will assist in administration of the contract and work. Since Grimm & Parker and the various architects are the most knowledgeable of the intricate building systems it is only fitting that they are on board the entire project to clarify any interpretations. Between the owner representatives, architect, and engineers any conflicts with the contracts and the specifications should be easily solved.

The type of contract awarded was a single prime contract where the owner awards construction of the entire project to a single prime contractor. The contractor coordinates and directs the activities of the various parties and agencies involved with the construction and assume full responsibility to the owner for delivery of the project within specified time. The contractor has to ensure a performance and bid bond, and supply builder's risk and general liability insurances. The general contractor is completely accountable for construction according to the contract and for all payment of costs and performance associated with the subcontractors. The subcontractor reports all payments to the contractor and the owner / architect / engineers evaluate the contractor's applications for payment and certifies amount due to contractor. This type of system is going to be very efficient for analyzing payments since the on site payments will be evaluated by the on site manager and the project designer will analyze the project executers payments.

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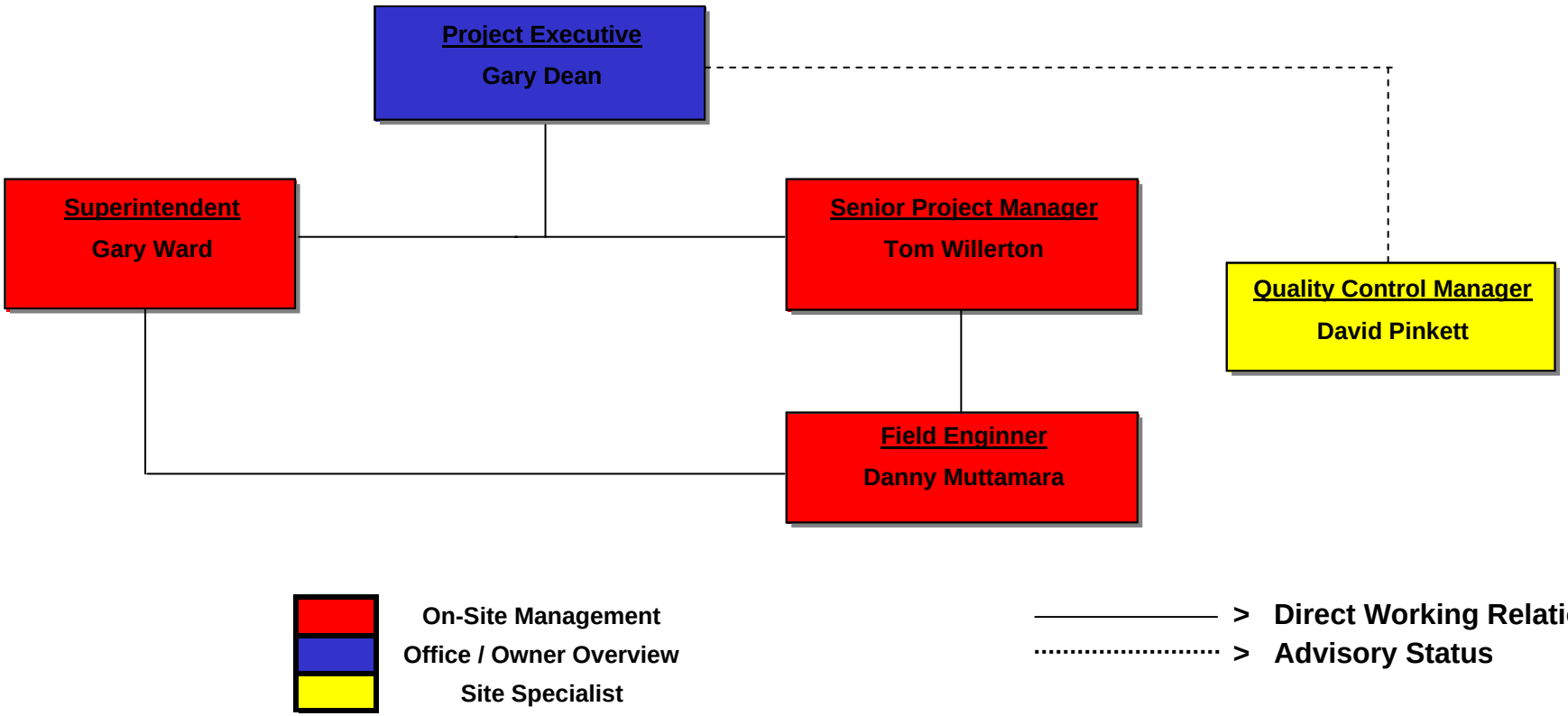
Rockville Library
Rockville, MD
Forrester Construction Company Project Team Organizational Chart



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Staffing Plan

On The Rockville Library project a general contractor was selected through a competitive bid in order to manage the construction process. Forrester Construction Company was awarded the contract and began construction in January 2005. Forrester was the perfect fit for this job due to their local knowledge and reputation for quality work. They are based out of Rockville, so no one could be closer at all times to manage and oversee every aspect of the project. Since The Rockville Library was designed with a lot of emphasis on quality and details, which is where Forrester's staff excels at due to their experience managing hospital, pharmaceutical, and elaborate interior projects. Getting staff onto the project was easy and personnel would that would have all the resources of the main office close at hand.

After Forrester observed the general size, scope, schedule, and quality needed to complete this project they determined their project staff. Gary Dean is the project executive who is in charge of personnel. His role is to make sure the company's resources are being managed properly and communicate with the representatives of Montgomery County. Under the project executive is one superintendent, one project manager, and a quality control manager. The superintendent is Gary Ward and the project manager is Tom Willerton. They both are on site at all times to deal with all construction issues. The quality control specialist is David Pinkett whose role is more of an overview and advisory status. His job is to ensure that the work on site follows the quality and specifications desired by the owner. He is not on site at all times but makes regular trips in order to advise the project staff on issues involving quality control.

The Rockville Library project isn't heavily manned due to its moderate size and work load. Forrester decided having one superintendent managing the site and one project manager taking care of the office dynamics of the job was enough to handle the project demand sufficiently. However, Mr. Dean and Mr. Ward are both senior members of the Forrester team so they are fit to manage the projected work load. They do have assistance in the form of a field engineer by the name of Danny Muttamara. His role on the project is to assist in the roles of all three project coordinators; the superintendent, project manager, and the quality control manager. Mr. Muttamara handles aspects of budget analysis, cost control, field management, quality control, and more. The addition of a quality control manager assures that the complex design of The Rockville Library was created to the owner's and specifications. With the sophisticated interior and exterior design of the library including; a serpentine wall, an elliptical staircase, and elaborate interior finishes it was necessary to make sure there was specialist over viewing these procedures to assure the highest quality.