Technical Assignment Two

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Construction Management - David Riley Ph. D.

Executive Summary

The objective of ***Technical Assignment Two*** is to familiarize the reader to the new Indian Valley High School in Lewistown, Pennsylvania. Within the report contains a detailed project schedule, site layout plans for major phases of construction, a detailed structural systems estimate, a general conditions estimate.

The construction of the high school can be broken down into five major phases (1B, 2A, 3E, 4D and 5C). The rural location of the project, site logistics were not as important in ensuring the successful delivery of the building as with other urban setting structures. Located in rural central, Pennsylvania, the site is not confined by existing overhead electrical lines, surrounding structures, or vehicular and pedestrian traffic flow. Restricting the site were surrounding schools and traffic patterns based on peak hour time frames.

A provided detail structural estimate illustrates the bulk material of construction of the structural components of the school to be masonry load bearing structures. The SOG and footings were primarily cast-in-place concrete, where structural steel gave shape to the interior bays of the school.

General conditions of the project were estimated to be roughly over 1 million dollars showing projected costs of supervision/personnel, construction facilities/equipment, temporary facilities and miscellaneous project costs associated with the school.

After analyzing the information contained within this report and the findings from Technical Assignment One, a major focus for upcoming thesis research will be directed towards schedule acceleration techniques, potential re-sequencing of work and value engineering to better achieve critical turnover dates set forth by the administration of the school and school district.

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Detailed Project Schedule

*** Refer to Appendix A for Detailed Project Schedule**

Performing work on school campuses requires special attention to scheduling throughout the building process. Heavier than normal traffic patterns, increased population density and obstacles requires scheduling for schools to be accurate and precise, without any variance from the schedule. Failing to adhere to scheduling can result in costly damages to the project. The new Indian Valley High School will open in January 2011. A plan used on a prior elementary school within the district, the school district prefers to move into buildings after the Christmas holiday, rather than at the beginning of the school year.

Construction was completed in a phased/area scenario. The schedule addresses five different phases of construction. Phases A and B are the classroom areas of the building. These two together make up what is the front of the school. Phases C, D and E make up the rear wing of the building. Separated from the classrooms, are the gymnasium, wrestling room, fitness center, library, cafeteria, auditorium music suite and wood shops.

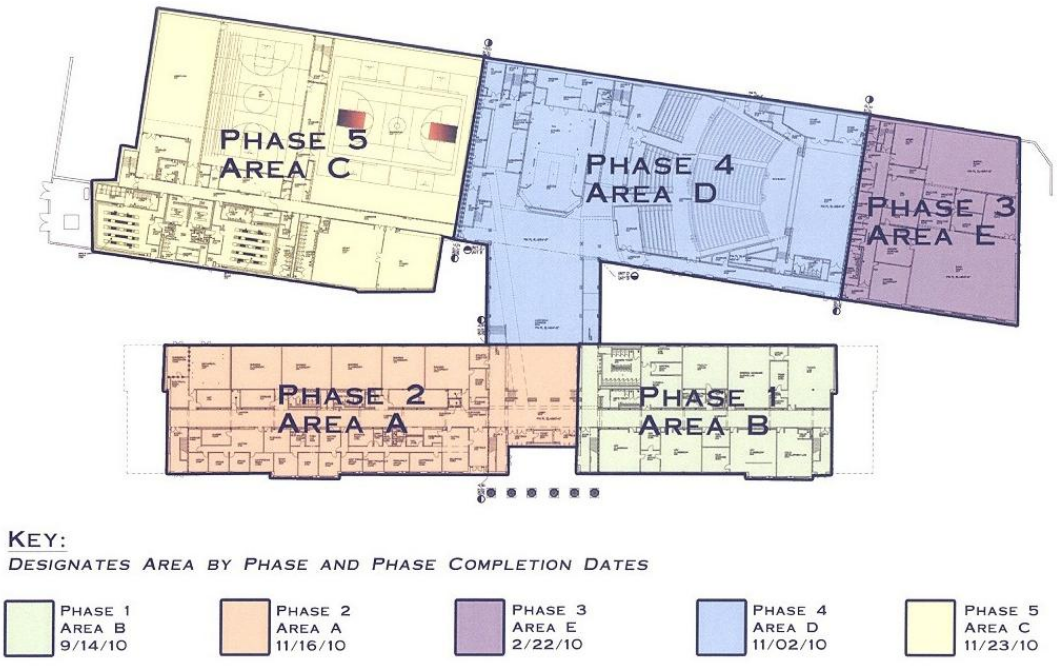


Fig. 1 Phasing Plans Provided by Reynolds Construction

Site Layout Planning

*** Refer to Appendix B for Site Layout Plans**

The site of the New Indian Valley High School is located just to the North of the existing high school. As shown in the figure above, construction traffic flow has little impedance, except for the peak hours of school days. Construction traffic will use Sixth Street to the Southern edge of the site, and Cedar Street along the Southeast edge for the bulk of construction flow off the site. Once on the site construction traffic has a lenient traffic pattern due to the rural-ness of the site. There is plenty of area for job site parking, trailer placement and material storage/layout.

Excavation Site Layout

During the excavation phase of the project the site begins to take shape. A once tree riddled hill is turned into a flat muddy construction site. Two large geothermal well fields are dug along the south and southeast edges of the construction site during this phase. The site is retained by a retention wall placed along the northwest edge of the site. Grading of future driveways, parking lots and bus access is also completed.

Superstructure Site Layout

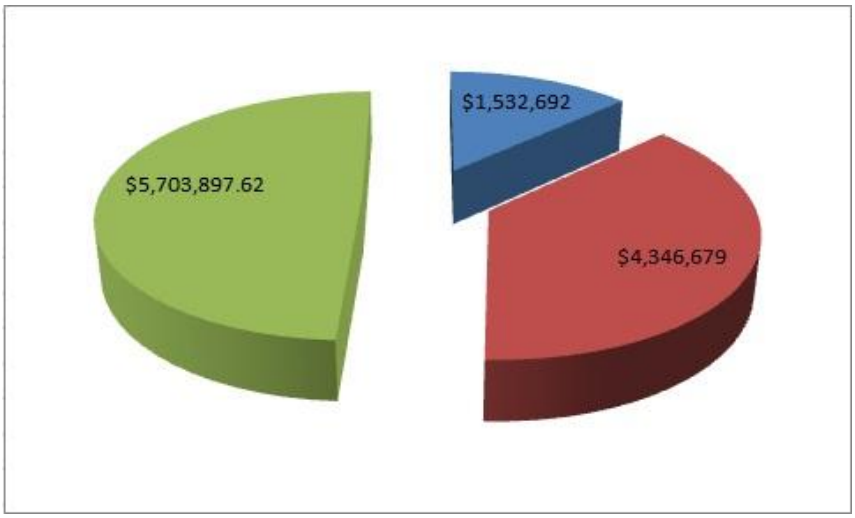
The superstructure of the school is done in five phases. The first two phases, A and B, are the front of the school which holds the classroom areas. Three story typical bays are constructed for both phases A

and B. Phases A and B also take into consideration classroom/subject break down. This puts areas of building closer to related areas of the building so similar classes/subjects are grouped together. Phases C, D and E create the rear of the building and house gymnasium, auditorium, cafeteria, wood shop and music suites of the building. These activities often encompass extra-curricular/after school activities so providing a buffer between educational and after school activities was a concern.

Detailed Structural System Estimate

*** Refer to Appendix C for complete structural systems estimate**

The superstructure for the new Indian Valley High School consists of cast-in-place concrete, steel and CMU/masonry. Cast-in-place concrete is used for footings, SOG and Elevated slabs, steel is used for bay framing and CMU load bearing walls can be found through the entire structure. The total structural system was estimated at approximately 11.583 million dollars. Below is a pie chart showing break downs.



Masonry, green, makes up nearly half the structural estimate. Blue, concrete, and red, steel, account for the other half. The structural system in the school is not overly large, only consisting of three stories, however, the phases are fairly linear and phased connections culminate at the middle of the building. Cast-in-place concrete accounts for little of the buildings structure. The estimate accounts for formwork along with materials with forms and rebar making up a bulk of the takeoff. The bulk of the building structure comes from the CMU masonry back up walls that are covered with an aesthetic brick veneer. Structural steel provides vertical and lateral support through the interior of the skeleton of the school, while load bearing walls are used towards the perimeter.

General Conditions Estimate

*** Refer to Appendix D for the complete General Conditions estimate**

A general Conditions estimate was prepared for the new Indian Valley High School Project. The estimate includes any applicable items that were implemented directly by the project team and construction crews but does not account for home office overhead. The estimate is based on a 28 month construction schedule designed for the project.

Below the table breaks down the major categories of the general conditions estimate and the values for each.

Description	Costs
Staffing	610,400
Administrative Facilities and Supplies	58,589.38
Safety	27,964
Cleanup	124,939
Jobsite Work Requirements	215,440
Permitting	37,800
Bonds and Conditions	50,000
Total	**1,125,132**

Staffing costs account for the majority of the general conditions costs, which can be attributed to key project team personnel assigned full time to this specific job. Durations and costs associated with the entire project team are detailed in the general conditions estimate. Jobsite work requirements and cleanup account for the other two bulk items within the general conditions. Upon comparison to other projects estimates were found to be typical per other projects of similar size and scope.

Critical Industry Issue

Transformation: What are the Innovations that will Transform our Industry?

Moderator: John Messner, Ph.D.

This first breakout session focused on how the usefulness of innovations on new projects could be measured to develop better ways to implement new technologies. Items discussed included the use of robotic technology in the field, the idea of large prefabrication entities in buildings and production of better models for owners to explore their projects.

One of the first topics discussed at the first breakout session was the new robotic layout technology explained by Chuck Tomasco of Truland Systems Corporation. Mr. Tomasco explained how the investment in the new technology has led to more accurate layout with increased efficiency.

John Bechtel of OPP brought up the next interesting topic of discussion with the idea of prefabrication of large building entities. Mr. Bechtel used a corridor example in his explanation that OPP had recently. The main concept was for the MEP components to be able to be prefabricated in long runs off site in a more efficient safer way. This would then limit on site construction times due to long prefab pieces fitting together.

A new concept to the industry could lead to break through simulation technologies. Introduced from the gaming industry this simulation allows a user to virtually explore a finished space. The example presented at the discussion was that of a nurse being able to walk through a model and virtually perform daily tasks. This would provide a way for even more pre-planning and refining of design ideas to make sure the owner's every expectation is met.

This session was very fast flowing and was rarely quiet. There were many ideas expressed from everyone. I particularly enjoyed the discussion with creating less complicated more useful models for the owner. Video game engines could totally change the way we design buildings by providing a way to physically experience our end product before we even start it.

Carrying BIM to the Field

Moderator: Craig Dubler

For the second breakout session I chose to attend Carrying BIM to the field. After the first session's discussions on newer technologies to develop models, I felt the BIM session would be a similar topic. This discussion provided examples of how BIM is being implemented into the field. It's currently incorporated in close-out and commissioning for buildings. This also involves the use of tablet PCs which provides direct access to trailer materials without being in the trailer.

I would like to see if the use of the virtual simulation would change the design ideas of the teachers and faculty that influenced the original design. This new technology would allow them to fully experience their design, and provide suggestions for improvement. A building that needs to be utilized for many years would benefit from this technology because you would be able to achieve exactly what you want to help improve the longevity of the building.

Appendix A – Detailed Project Schedule

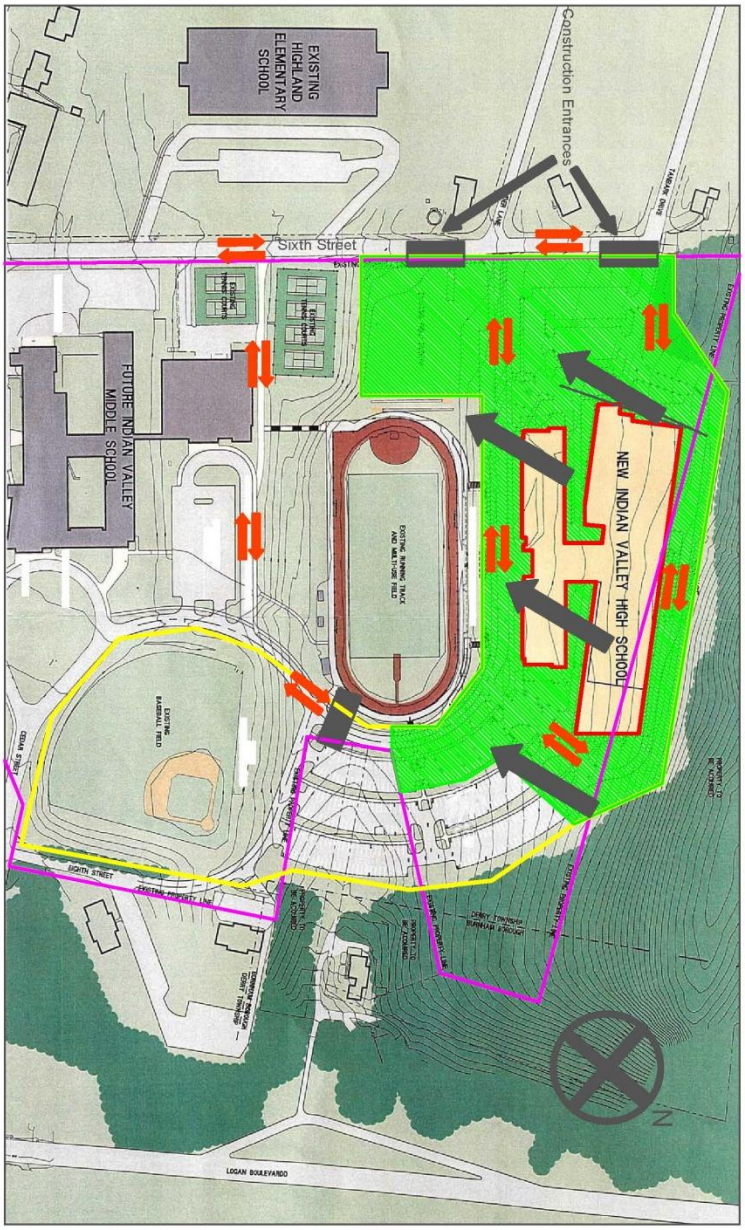
Notice to Procede	8/25/2008	8/25/2008
Site Work		
Geothermal Wellfield 1	1/9/2009	8/28/2009
Geothermal Wellfield 2	2/18/2009	8/28/2009
Stormwater Detention Structures	2/10/2009	8/26/2009
Site Grading	4/1/2009	9/14/2009
Asphalt Paving	10/30/2009	8/3/2010
Site Lighting	11/5/2009	9/14/2010
Site Signage	9/15/2010	9/28/2010
Substantially Complete	9/30/2010	9/30/2010
Concrete		
F/R/P Footings	2/25/2009	9/2/2009
F/R/P SOG Building Phase 1 - Area B	8/1/2009	8/16/2009
F/R/P SOG Building Phase 2 - Area A	8/24/2009	9/8/2009
F/R/P SOG Building Phase 3 - Area E	9/29/2009	10/12/2009
F/R/P SOG Building Phase 4 - Area D	12/10/2009	1/8/2010
F/R/P SOG Building Phase 5 - Area C	2/15/2010	3/12/2010
F/R/P Elevated Slab 1 Building Phase 1 - Area B	8/10/2009	8/24/2009
F/R/P Elevated Slab 1 Building Phase 2 - Area A	9/3/2009	9/17/2009
F/R/P Elevated Slab 1 Building Phase 4 - Area D	10/12/2009	10/16/2009
F/R/P Elevated Slab 1 Building Phase 5 - Area C	3/29/2010	4/2/2010
F/R/P Elevated Slab 2 Building Phase 1 - Area B	9/9/2009	9/14/2009
F/R/P Elevated Slab 2 Building Phase 2 - Area A	9/12/2009	9/18/2009
Precast Auditorium Risers - Area D	9/28/2009	10/2/2009
Structural Steel		
Place W beams Building Phase 1 - Area B	5/10/2009	6/9/2009
Place W beams Building Phase 2 - Area A	6/11/2009	8/18/2009
Place W beams Building Phase 3 - Area E	9/1/2009	9/22/2009
Place W beams Building Phase 5 - Area C	1/11/2010	1/29/2010
Steel Decking/Studs Building Phase 1 - Area B	8/10/2009	8/26/2009
Steel Decking/Studs Building Phase 2 - Area A	8/13/2009	8/24/2009

Steel Decking/Studs Building Phase 4 - Area D	8/26/2009	9/13/2009
Steel Decking/Studs Building Phase 5 - Area C	9/16/2009	9/28/2009
Masonry		
CMU Back-up Building Phase 1 - Area B	7/13/2009	9/3/2009
CMU Back-up Building Phase 2 - Area A	8/5/2009	10/1/2009
CMU Back-up Building Phase 3 - Area E	3/25/2009	8/21/2009
CMU Back-up Building Phase 4 - Area D	3/31/2009	11/7/2009
CMU Back-up Building Phase 5 - Area C	4/5/2009	12/11/2009
Elevator/Stair Tower Building Phase 1 - Area B	7/15/2009	9/3/2009
Elevator/Stair Tower Building Phase 2 - Area A	9/24/2009	10/1/2009
Backfill Ivany block walls Building Phase 3 - Area E	2/25/2009	9/15/2009
Backfill Ivany block walls Building Phase 4 - Area D	3/10/2009	9/11/2009
Backfill Ivany block walls Building Phase 5 - Area C	4/9/2009	10/2/2009
Masonry Veneer Building Phase 1 - Area B	11/11/2009	1/22/2010
Masonry Veneer Building Phase 2 - Area A	11/11/2009	1/15/2010
Masonry Veneer Building Phase 3 - Area E	11/11/2009	12/21/2009
Masonry Veneer Building Phase 4 - Area D	1/29/2010	3/26/2010
Masonry Veneer Building Phase 5 - Area C	3/25/2010	5/20/2010
Mechanical		
Set Roof Top HVAC Building Phase 1 - Area B	10/2/2009	10/8/2009
Set Roof Top HVAC Building Phase 2 - Area A	11/5/2009	11/11/2009
Sprinkler Rough-in Building Phase 1 - Area B Floor 1	10/19/2009	11/20/2009
Sprinkler Rough-in Building Phase 2 - Area A Floor 1	11/16/2009	12/21/2009
Sprinkler Rough-in Building Phase 3 - Area E Floor 1	10/7/2009	11/2/2009
Sprinkler Rough-in Building Phase 4 - Area D Floor 1	4/14/2010	5/12/2010
Sprinkler Rough-in Building Phase 5 - Area C Floor 1	6/21/2010	7/30/2010
Electrical Rough-in Building Phase 1 - Area B Floor 1	7/29/2009	12/4/2009
Electrical Rough-in Building Phase 2 - Area A Floor 1	11/23/2009	1/8/2010
Electrical Rough-in Building Phase 3 - Area E Floor 1	8/17/2009	11/2/2009
Electrical Rough-in Building Phase 4 - Area D Floor 1	1/11/2010	5/18/2010

Electrical Rough-in Building Phase 5 - Area C Floor 1	3/15/2010	7/26/2010
HVAC Rough-in Building Phase 1 - Area B Floor 1	8/3/2009	11/19/2009
HVAC Rough-in Building Phase 2 - Area A Floor 1	12/17/2009	1/29/2010
HVAC Rough-in Building Phase 3 - Area E Floor 1	10/7/2009	11/9/2009
HVAC Rough-in Building Phase 4 - Area D Floor 1	9/1/2009	5/1/2010
HVAC Rough-in Building Phase 5 - Area C Floor 1	11/9/2009	7/2/2010
Electrical Rough-in Building Phase 1 - Area B Floor 2	7/29/2009	12/4/2009
Electrical Rough-in Building Phase 2 - Area A Floor 2	1/25/2010	3/5/2010
Electrical Rough-in Building Phase 4 - Area D Floor 2	4/28/2010	5/18/2010
Electrical Rough-in Building Phase 5 - Area C Floor 2	6/7/2010	7/19/2010
HVAC Rough-in Building Phase 1 - Area B Floor 2	10/19/2009	12/16/2009
HVAC Rough-in Building Phase 2 - Area A Floor 2	1/4/2010	2/12/2010
HVAC Rough-in Building Phase 4 - Area D Floor 2	10/26/2009	5/25/2010
HVAC Rough-in Building Phase 5 - Area C Floor 2	5/19/2010	7/12/2010
Electrical Rough-in Building Phase 1 - Area B Floor 3	11/9/2009	12/23/2009
Electrical Rough-in Building Phase 2 - Area A Floor 3	12/10/2009	1/22/2010
Electrical Rough-in Building Phase 4 - Area D Floor 3	5/12/2010	6/23/2010
HVAC Rough-in Building Phase 1 - Area B Floor 3	11/2/2009	12/31/2009
HVAC Rough-in Building Phase 2 - Area A Floor 3	12/3/2009	2/26/2010
HVAC Rough-in Building Phase 4 - Area D Floor 3	5/12/2010	7/8/2010
HVAC Test and Blanace Building Phase 1 - Area B	6/1/2010	6/21/2010
HVAC Test and Blanace Building Phase 2 - Area A	6/23/2010	7/14/2010
HVAC Test and Blanace Building Phase 3 - Area E	12/28/2009	1/18/2010
HVAC Test and Blanace Building Phase 4 - Area D	9/6/2010	9/24/2010
HVAC Test and Blanace Building Phase 5 - Area C	9/22/2010	10/12/2010
Interior Framing/Drywall		
Metal Studs Building Phase 1 - Area B	7/17/2009	9/17/2009
Metal Studs Building Phase 2 - Area A	8/14/2009	10/21/2009
Drywall Building Phase 1 - Area B	2/15/2010	3/9/2010
Drywall Building Phase 2 - Area A	3/16/2010	4/26/2010

Roof		
Roof Framing Building Phase 1 - Area B	1/25/2010	2/19/2010
Roof Framing Building Phase 2 - Area A	1/18/2010	2/26/2010
Roof Framing Building Phase 4 - Area D	5/10/2010	5/21/2010
Roof Framing Building Phase 5 - Area C	6/14/2010	6/25/2010
Doors/Windows		
Doors/Windows Building Phase 1 - Area B	1/25/2010	4/16/2010
Doors/Windows Building Phase 2 - Area A	1/18/2010	4/9/2010
Doors/Windows Building Phase 3 - Area E	11/5/2009	11/25/2009
Doors/Windows Building Phase 4 - Area D	2/16/2010	4/5/2010
Doors/Windows Building Phase 5 - Area C	4/16/2010	5/20/2010
Painting		
Painting/Casework Building Phase 1 - Area B	4/5/2010	6/14/2010
Painting/Casework Building Phase 2 - Area A	6/2/2010	8/11/2010
Painting/Casework Building Phase 3 - Area E	1/26/2010	3/1/2010
Painting/Casework Building Phase 4 - Area D	6/29/2010	10/15/2010
Painting/Casework Building Phase 5 - Area C	9/15/2010	10/5/2010
Flooring		
Carpet/Resilent Flooring Building Phase 1 - Area B	4/10/2010	6/20/2010
Carpet/Resilent Flooring Building Phase 2 - Area A	6/22/2010	8/18/2010
Carpet/Resilent Flooring Building Phase 3 - Area E	2/23/2010	3/15/2010
Carpet/Resilent Flooring Building Phase 4 - Area D	8/4/2010	11/12/2010
Carpet/Resilent Flooring Building Phase 5 - Area C	10/13/2010	11/2/2010
Closeout		
Punch List/Substantial Completion Building Phase 3 - Area E		3/1/2010
Punch List/Substantial Completion Building Phase 1 - Area B		9/21/2010
Punch List/Substantial Completion Building Phase 4 - Area D		11/9/2010
Punch List/Substantial Completion Building Phase 2 - Area A		11/23/2010
Punch List/Substantial Completion Building Phase 5 - Area C		11/30/2010
Project Substantial Completion		12/22/2010

Appendix B – Site Layout Plans



Legend:

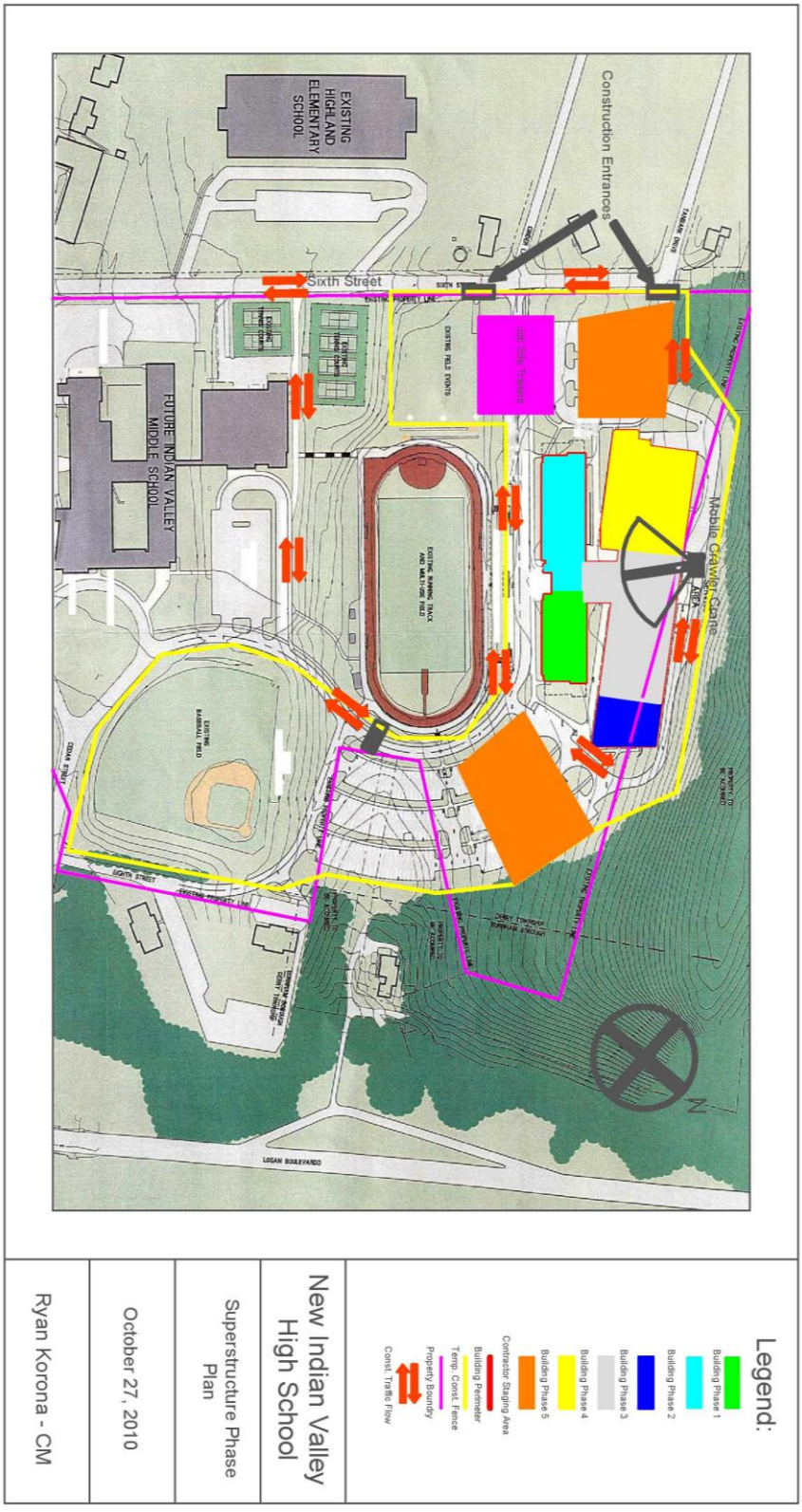
- Building Perimeter
- Temp. Const. Fence
- Property Line
- Site Phase Boundry
- Path of Excavation
- Const. Traffic Flow

New Indian Valley High School

Site Excavation Plan

October 27, 2010

Ryan Korona - CM


EXISTING HIGHLAND ELEMENTARY SCHOOL
Construction Entrances
Sixth Street
FUTURE INDIAN VALLEY MIDDLE SCHOOL
Mobile Crawler Crane
LOGAN BOULEVARD
N
Legend:
Building Phase 1
Building Phase 2
Building Phase 3
Building Phase 4
Building Phase 5
Contractor Staging Area
Building Perimeter
Temp. Const. Fence
Property Boundry
Const. Traffic Flow
New Indian Valley High School
Superstructure Phase Plan
October 27, 2010
Ryan Korona - CM

Appendix C – Detailed Structural Estimate

Description	Take off Qty.		Labor	Material	Equipment	Unit Cost	Amount
Detail Structural System							
Concrete							
Piers	72.00	ea	142.30/ea	100.00/ea	-	242.30 /ea	$17,446
Continuous Footing Forms < 12"	3,884.10	sf	2.85/sf	0.80/sf	-	3.65 /sf	$14,177
Continuous Footing Forms > 12"	9,402.50	sf	2.85/sf	0.84/sf	-	3.69 /sf	$34,695
Pier Footing Forms	7,534.00	sf	2.85/sf	1.37/sf	-	4.21 /sf	$31,726
SOG Forms	917.40	sf	3.842/sf	1.89/sf	-	5.73 /sf	$5,259
Stair Edge Forms	87.75	sf	8.54/sf	0.57/sf	-	9.11 /sf	$799
Rebar	272.87	ton	930/ton	1260.00/ton	-	2,190.00 /ton	$597,590
3000 psi Concrete	3,796.33	cy	-	112.35/cy	-	112.35 /cy	$426,518
3500 psi Concrete	50.35	cy	-	113.40/cy	-	113.40 /cy	$5,710
4000 psi Concrete	1,821.99	cy	-	116.55/cy	-	116.55 /cy	$212,353
Truck place wall footings	1,297.49	cy	22.74/cy	-	-	22.74 /cy	$29,505
Truck place column/pier footings	615.69	cy	26.24/cy	-	-	26.24 /cy	$16,156
Truck place SOG	1,654.40	cy	28.424/cy	-	-	28.42 /cy	$47,025
Crane place slab on metal deck	810.39	cy	39.623/cy	-	12.364/cy	51.99 /cy	$42,130
Pump place slab on metal deck	1,011.60	cy	39.013/cy	-	12.00/cy	51.01 /cy	$51,605
						Concrete Total	**$1,532,692**
Structural Steel							
Steel W-Flange Beams	561.33	ton	852.393/ton	1800.00/ton	285.714/ton	2,938.11 /ton	$1,649,248
Steel Trusses "M & N"	57.36	ton	559.733/ton	2800.00/ton	187.62/ton	3,547.35 /ton	$203,476
Steel Plate Girder "A"	82.83	ton	559.42/ton	2200.00/ton	187.512/ton	2,946.93 /ton	$244,094
Nelson Shear Studs	11,933.00	ea	1.29/ea	1.50/ea	0.24/ea	3.03 /ea	$36,157
Steel Joists K-series	83.89	ton	633.52/ton	1596.51/ton	187.50/ton	2,417.53 /ton	$202,807
Steel Joists LH-series	21.68	ton	633.52/ton	1596.48/ton	187.50/ton	2,417.50 /ton	$52,411
Fire-trol Columns	6,530.00	vf	14.92/vf	190.00/vf	5.00/vf	209.92 /vf	$1,370,778
Steel Roof Deck	130,650.00	sf	0.612/sf	1.61/sf	0.08/sf	2.30 /sf	$300,756
Composite Steel Floor Deck	112,646.00	sf	0.612/sf	1.712/sf	0.08/sf	2.40 /sf	$270,801
Light Gage Metal Gable Roof Framing	3,100.00	sf	2.71/sf	2.50/sf	-	5.21 /sf	$16,151
						Structural Total	**$4,346,679**
Masonry							
Mortar	33,000.00	cf	-	4.484/cf	-	4.48 /cf	$147,972.00
Grout Fill 8" Block Cells	2,115.96	cf	9.652/cf	4.86/cf	0.87/cf	15.38 /cf	$32,547.70
Grout Fill 12" Block Cells	5,932.15	cf	9.652/cf	4.86/cf	0.87/cf	15.38 /cf	$91,248.38
Grout Fill 16" Block Cells	18,326.86	cf	9.652/cf	4.86/cf	0.87/cf	15.38 /cf	$281,903.78
Grout Fill 6" Bond Beam	1,045.21	cf	9.652/cf	4.86/cf	0.87/cf	15.38 /cf	$16,077.42
Grout Fill 8" Bond Beam	558.19	cf	9.652/cf	4.86/cf	0.87/cf	15.38 /cf	$8,586.08
Grout Fill 10" Bond Beam	36.50	cf	9.652/cf	4.86/cf	0.87/cf	15.38 /cf	$561.50
Grout Fill 12" Bond Beam	184.40	cf	9.652/cf	4.86/cf	0.87/cf	15.38 /cf	$2,836.44
Grout Fill 16" Ivany Block	787.54	cf	9.652/cf	4.86/cf	0.87/cf	15.38 /cf	$12,113.94
Dur-O-Wall 4"	5,135.00	lf	-	0.15/lf	-	0.15 /lf	$770.25
Dur-O-Wall 6"	168,505.00	lf	-	0.16/lf	-	0.16 /lf	$26,960.80
Dur-O-Wall 8"	67,284.00	lf	-	0.17/lf	-	0.17 /lf	$11,438.28
Dur-O-Wall 10"	1,951.00	lf	-	0.18/lf	-	0.18 /lf	$351.18
Dur-O-Wall 12"	32,191.00	lf	-	0.19/lf	-	0.19 /lf	$6,116.29
Dur-O-Wall 16"	47,282.00	lf	-	0.21/lf	-	0.21 /lf	$9,929.22
Wall Ties	88,985.52	ea	0.61/ea	0.07/ea	-	0.68 /ea	$60,510.15
Masonry top of wall Anchor	971.46	ea	2.271/ea	4.77/ea	-	7.04 /ea	$6,840.06
Masonry Rebar # 3	10,691.78	lbs	0.702/lbs	0.55/lbs	0.063/lbs	1.32 /lbs	$14,059.69
Masonry Rebar # 4	9,326.62	lbs	0.702/lbs	0.55/lbs	0.063/lbs	1.32 /lbs	$12,264.51
Masonry Rebar # 5	126,745.32	lbs	0.702/lbs	0.55/lbs	0.063/lbs	1.32 /lbs	$166,670.10
Masonry Rebar # 6	2,499.49	lbs	0.702/lbs	0.55/lbs	0.063/lbs	1.32 /lbs	$3,286.83
Masonry Rebar # 7	141,883.51	lbs	0.772/lbs	0.55/lbs	0.07/lbs	1.39 /lbs	$197,501.85
Masonry Rebar # 8	59,696.06	lbs	0.772/lbs	0.55/lbs	0.07/lbs	1.39 /lbs	$83,096.92
Utility Brick	128,154.00	ea	2.29/ea	1.58/ea	0.21/ea	4.08 /ea	$522,868.32

Utility Brick Soldier	5,697.00	ea	2.38/ea	1.58/ea	0.21/ea	4.17 /ea	$23,756.49
Utility Brick Accent Band	7,852.00	ea	2.471/ea	1.58/ea	0.21/ea	4.26 /ea	$33,457.37
Utility Brick Sill	2,370.00	ea	2.38/ea	6.83/ea	0.21/ea	9.42 /ea	$22,325.40
Double Monarch Brick	25,192.00	ea	7.722/ea	5.04/ea	0.694/ea	13.46 /ea	$338,983.55
6" Block Foundation	16,499.00	ea	5.15/ea	1.10/ea	0.463/ea	6.71 /ea	$110,757.79
6" Block Partition	174,132.00	ea	5.15/ea	1.10/ea	0.463/ea	6.71 /ea	$1,168,948.12
6" Block Bond Beam	9,217.00	ea	5.62/ea	1.54/ea	0.51/ea	7.67 /ea	$70,694.39
8" Block Foundation	14,972.00	ea	5.33/ea	1.32/ea	0.48/ea	7.13 /ea	$106,750.36
8" Block Back up	24,364.00	ea	5.33/ea	1.32/ea	0.48/ea	7.13 /ea	$173,715.32
8" Block Partition	57,571.00	ea	5.46/ea	1.32/ea	0.48/ea	7.26 /ea	$417,965.46
8" Block Bond Beam	2,885.00	ea	5.62/ea	1.65/ea	0.51/ea	7.78 /ea	$22,445.30
10" Block Partition	2,450.00	ea	6.18/ea	1.82/ea	0.56/ea	8.56 /ea	$20,972.00
10" Block Bond Beam	130.00	ea	6.18/ea	2.04/ea	0.66/ea	8.88 /ea	$1,154.40
12" Block Foundation	2,415.00	ea	6.18/ea	1.93/ea	0.56/ea	8.67 /ea	$20,938.05
12" Block Partition	39,715.00	ea	6.864/ea	1.93/ea	0.62/ea	9.41 /ea	$373,877.01
12" Block Bond Beam	471.00	ea	7.02/ea	2.20/ea	0.631/ea	9.85 /ea	$4,639.82
16" Ivany Block	29,156.00	ea	11.321/ea	4.73/ea	1.01/ea	17.06 /ea	$497,430.52
16" Block Partition	33,405.00	ea	12.36/ea	3.85/ea	1.11/ea	17.32 /ea	$578,574.60
						Masonry Total	**$5,703,897.62**
						Detail Structural Estimate Total	**$11,583,268.18**

Appendix D – General Conditions Estimate

Description	Take off Qty.		Labor	Material	Subcontract	Equipment	Unit Cost	Amount
General Conditions								
General Liability & Protection	1.00	ls	-	-	50,000.00/ls	-	50,000.00 /ls	50,000
Prints & Specificatons	20.00	set	-	200.00/set	-	-	200.00 /set	4,000
As Built Drawings & Records	1.00	ls	2,500/ls	500.00/ls	-	-	3,000.00 /ls	3,000
Survey Crew	20.00	day	800.00/day	-	-	75.00/day	875.00 /day	17,500
Project Signs	1.00	ea	631.66/ea	550.00/ea	-	-	181.86 /ea	182
Job Site Signage - Safety & Directional	4.00	ea	315.933/ea	200.00/ea	-	-	515.93 /ea	2,064
Project Manger GC (1/2 time)	121.00	wk	1,200.00/wk	-	-	100.00/wk	1,300.00 /wk	157,300
Assisstant Superintendent	121.00	wk	1,200.00/wk	-	-	-	1,200.00 /wk	145,200
Superintendent GC	121.00	wk	2,200.00/wk	-	-	200.00/wk	2,400.00 /wk	290,400
Weekly Travel Subsistence	121.00	wk	-	250.00/wk	-	-	250.00 /wk	30,250
Set up office trailers	1.00	ea	727.52/ea	250.00/ea	-	300.00/ea	1,277.52 /ea	1,278
Office trailer for GC	28.00	mo	-	-	-	325.00/mo	325.00 /mo	9,100
Storage Trailers	28.00	mo	-	-	-	360.00/mo	360.00 /mo	10,080
Drinking Water	28.00	mo	-	25.00/mo	-	-	25.00 /mo	700
Office supply & equipment GC	28.00	mo	-	200.00/mo	-	-	200.00 /mo	5,600
Water Charges	28.00	mo	-	150.00/mo	-	-	150.00 /mo	4,200
Electric Power	28.00	mo	-	1,000.00/mo	-	-	1,000.00 /mo	28,000
Telephone Charges	28.00	mo	-	250.00/mo	-	-	250.00 /mo	7,000
Temporary Toilets	28.00	mo	-	480.00/mo	-	-	480.00 /mo	13,440
Safety Equipment	1.00	ls	-	-	-	10,000.00/ls	10,000.00 /ls	10,000
Perimeter Safety Railings	3,000.00	lf	3.00/lf	2.00/lf	-	-	5.00 /lf	15,000
Fire Extinguishers	20.00	ea	10.00/ea	35.00/ea	-	-	45.00 /ea	900
Rubbish Chute	1.00	ea	500.00/ea	1,500.00/ls	-	-	2,000.00 /ea	2,000
Weekly Cleaning	121.00	wk	268.104/wk	50.00/wk	-	-	318.10 /wk	38,491
Final Cleaning	253,000.00	sf	0.15/sf	0.01/sf	-	-	0.16 /sf	40,480
Final Cleaning of Exterior Windows	23,100.00	sf	0.25/sf	0.03/sf	-	-	0.28 /sf	6,468
Dumpster Rental/Pick up	75.00	pull	-	500.00/pull	-	-	500.00 /pull	37,500
Punch List	1.00	ls	3,500.00/ls	1,500.00/ls	-	-	5,000.00 /ls	5,000
Heating Equipment	6.00	mo	1,500.00/mo	5,000.00/mo	-	-	6,500.00 /mo	39,000
Winter Heat Fuel	6.00	mo	-	15,000.00/mo	-	-	15,000.00 /mo	90,000
Temporary Enclosures	15,000.00	sf	0.70/sf	1.50/sf	-	-	2.20 /sf	33,000
Snow Shovel Building	1,000.00	mh	20.00/mh	-	-	-	20.00 /mh	20,000
Snow Plowing	1.00	ls	5,000/ls	3,000.00/ls	-	-	8,000.00 /ls	8,000
							Total	**1,125,132**