Steel City High-Rise

Pittsburgh, PA

Ashley N. Bistline

Construction Option

Advisor: Somayeh Asadi

Analysis 1:

Steel Fabrication Efficiency

Analysis 2:

Unique Structural Members

Breadths:

Structural and Mechanical

Analysis 3:

Collocation in the Construction Industry

Analysis 4:

Vertical MEP Acceleration

Steel City High-Rise

Presentation Outline

- ***Size:*** 440,000 SF, 18 stories
- ***Building Height:*** 220 LF
- ***Project Delivery:*** GMP with CM at Risk
- ***Cost:***
  - Overall Project: $100,000,000
  - Construction: $67,000,000
- ***Construction Dates:***
  - 1/13/14 – 12/10/15

Statistics and Team

Project Background

MILLCRAFT INVESTMENTS

ARQUITECTONICA

JEZERINAC GEERS

tda thendesignarchitecture

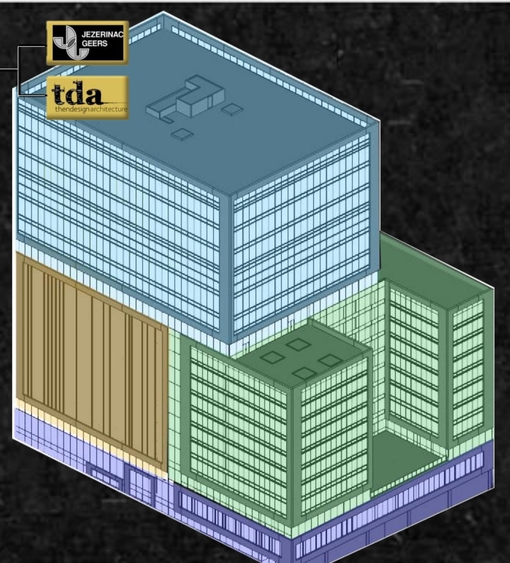
Turner

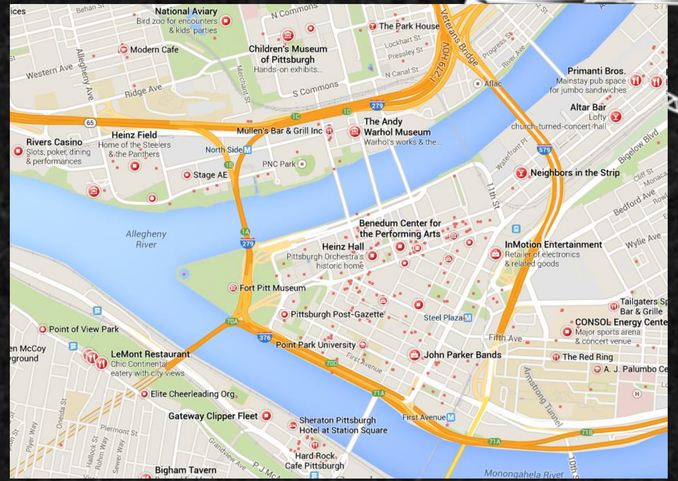
SCALISE INDUSTRIES

Subcontractors

Occupancy Breakdown

- Offices
- Hotel
- Parking Garage
- Retail





Steel City High-Rise

Presentation Outline

Problem and Goals

Background

Progress Tracker

Structural Steel - Amthor/ AI

3300 pieces

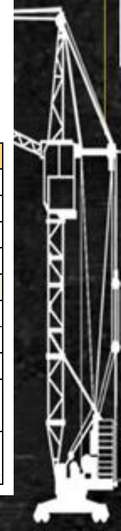
	2014				
Project Schedule	7/15 start	wk 1	wk 2	wk 3	wk 4
avg = 97 pcs/ wk	15-Jul	21-Jul	28-Jul	4-Aug	11-Aug
(34 wks)	0	100	100	100	100
Target Schedule A					
avg = 107 pcs/ wk				8/6 start	wk 1
(31 wks)				0	110
Actual Production					
				8/6 start	wk 1
actual pieces/ week	0	0	0	73	30
plus/ minus by week	0	-100	-100	-27	-70
plus/ minus aggregate	0	-100	-200	-227	-297
plus/ minus by week				73	-80
plus/ minus aggregate				73	-7

Progress Tracker

Structural Steel - Amthor/ AI

3300 pieces

	2014				
Project Schedule	7/15 start	wk 1	wk 2	wk 3	wk 4
avg = 97 pcs/ wk	15-Jul	21-Jul	28-Jul	4-Aug	11-Aug
(34 wks)	0	79	80	79	80
Target Schedule A					
avg = 107 pcs/ wk				8/6 start	wk 1
(31 wks)				0	87
Actual Production					
				8/6 start	wk 1
actual pieces/ week	0	0	0	74	167
plus/ minus by week	0	-79	-80	-5	87
plus/ minus aggregate	0	-79	-159	-164	-77
plus/ minus by week				74	80
plus/ minus aggregate				74	154

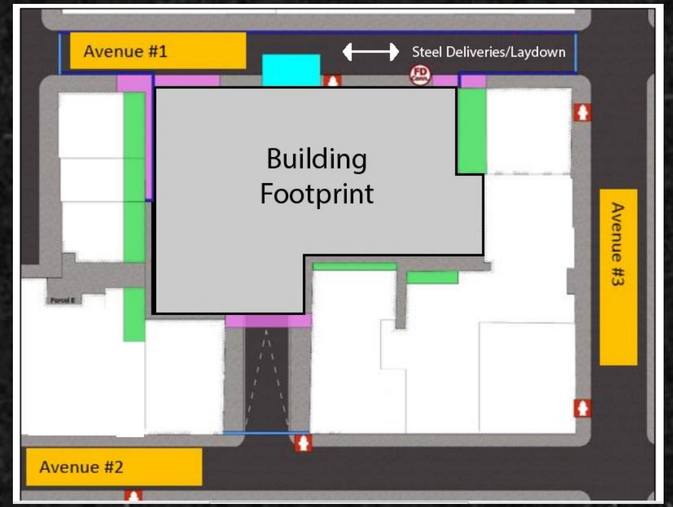


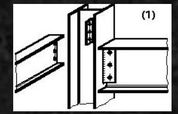
Steel City High-Rise

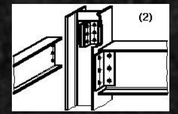
Presentation Outline

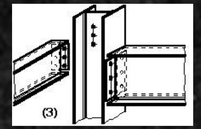
Fabricator Expertise

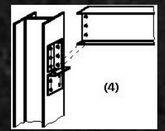
Fabrication Drivers

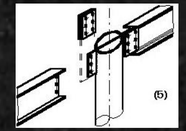


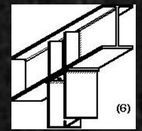


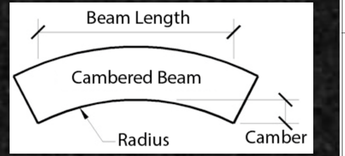












#	Case Description	Savings due to Camber $/ft ($/sf)	Savings due to H.S.Steel $/ft ($/sf)	Overall Savings $/ft ($/sf)
1	30'-0 beam @10'-0 o.c.	0.22 (0.022)	1.43 (0.143)	1.65 (0.165)
2	38'-0 beam @10'-0 o.c.	0.49 (0.049)	1.21 (0.121)	1.70 (0.170)
3	45'-0 beam @10'-0 o.c.	0.45 (0.045)	1.76 (0.176)	2.21 (0.221)
4	30'-0 girder @30'-0 o.c.	1.05 (0.035)	1.86 (0.062)	2.91 (0.097)

Steel City High-Rise

Presentation Outline

Sequencing and Erection

Fabrication Drivers

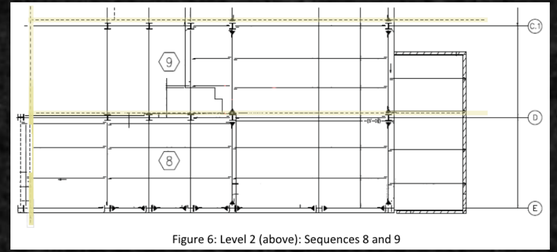


Figure 6: Level 2 (above): Sequences 8 and 9

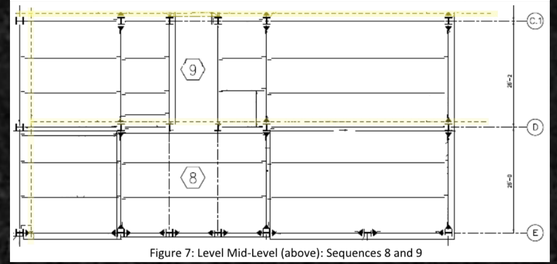


Figure 7: Level Mid-Level (above): Sequences 8 and 9

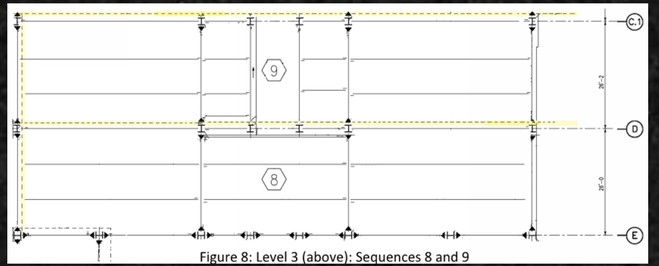
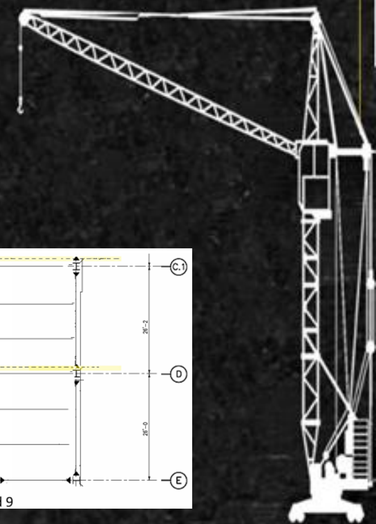


Figure 8: Level 3 (above): Sequences 8 and 9

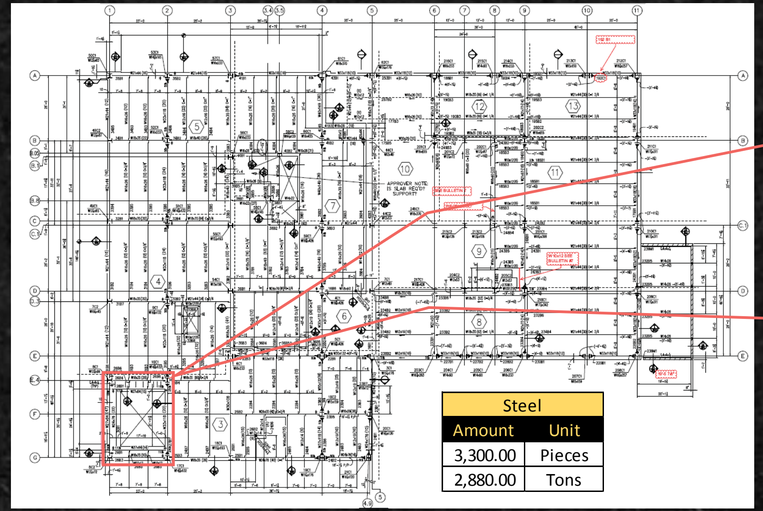


Steel City High-Rise

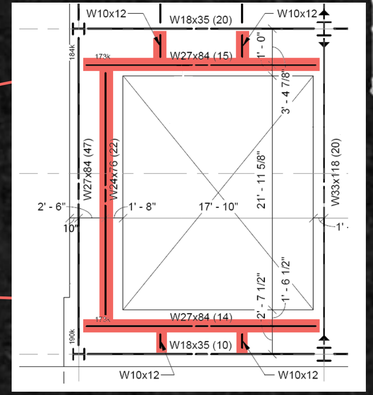
Presentation Outline

Uniqueness vs Uniformity

Structural Breadth



Steel	
Amount	Unit
3,300.00	Pieces
2,880.00	Tons



Deck Requirements:

3 – ¼" LW Concrete Slab

2" x 20 GA Composite Metal Deck

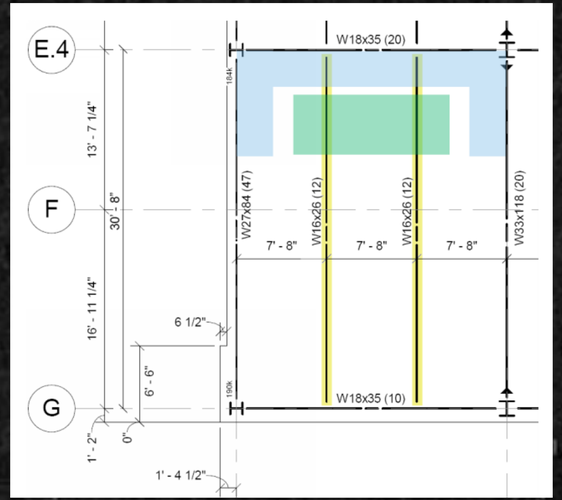
W/ 6X6- W2.9/W2.9 WWF

Steel City High-Rise

Presentation Outline

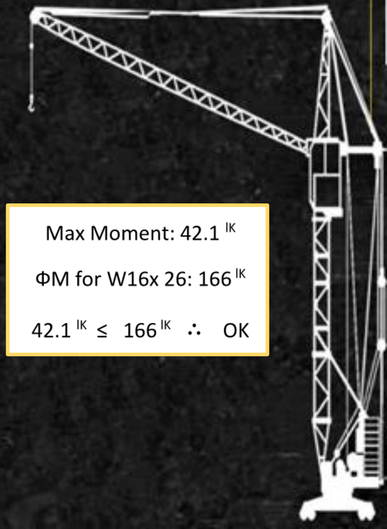
Structural Integrity Checks

Structural Breadth



Old Floor System	
Item	Weight (lbs)
Deck (2VLI20)	55
Concrete (LW 3.25")	10,376
Beams (2 - W16x26)	5,702
Pool Water	74,358
Pool Bowl	93,938
Total	**184,429**

New Floor System	
Item	Weight (lbs)
Deck (2VLI20)	1,408
Concrete (LW 3.25")	22,267
Beams (2 - W16x26)	1,575
Total	**25,250**



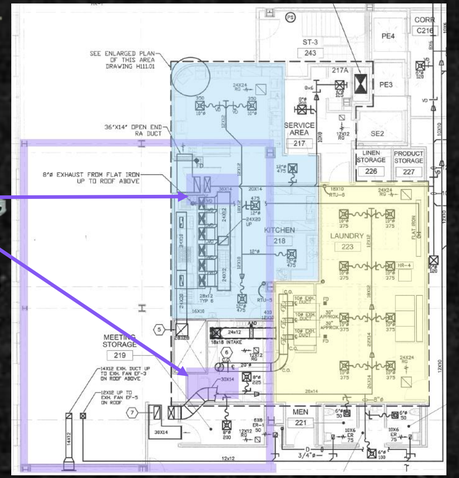
Max Moment: 42.1 ^{IK}

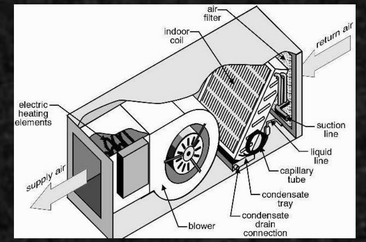
ΦM for W16x 26: 166 ^{IK}

42.1 ^{IK} ≤ 166 ^{IK} ∴ OK

Mechanical Breadth

RTU Package Includes:
- Condenser/Refrigerant Cooling
- Gas Heating
- 3 HP





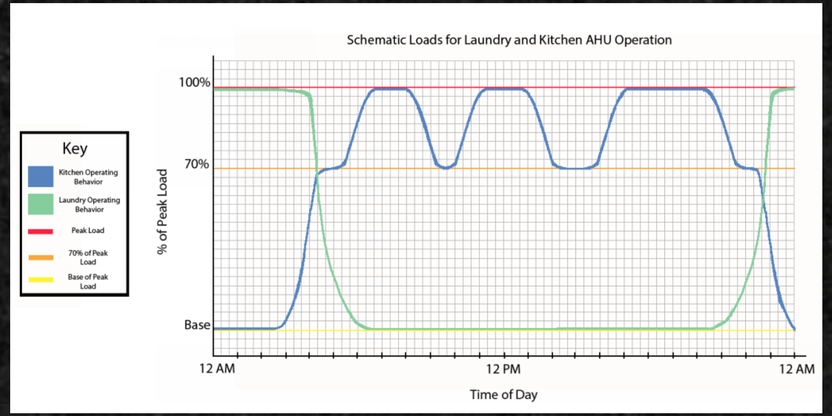
Unit Comparison			
Component	RTU-5	RTU-6	New AHU
Cooling Performance			
AirFlow (CFM)	4000	3600	5000
Refrigerant Type	R-41	R-41	R-41
Tonnage	10	7.5	13
Capacity (MBH)	123.4	93.1	154.3
Supply Air Blower Performance			
Motor Rating (HP)	3	3	5
Static Pressure	1.44	0.92	2.6
Drive Type	Belt	Belt	Belt
Total Unit			
Weight (lbs)	1205	1005	2393

Steel City High-Rise

Presentation Outline

Air Handling Reconfiguration

Mechanical Breadth

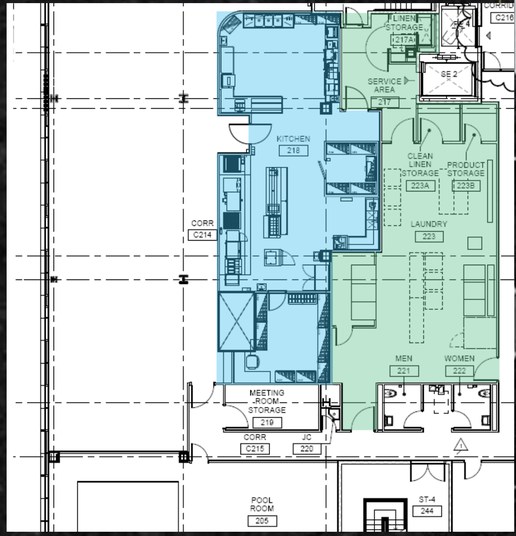


Laundry 100%	11:05 PM	5:00 AM
Kitchen 100%	5:05 AM	11:00 PM

Cost Comparison	
Item	Weight (lbs)
3 HP (2 units)	$ 3,878.94
5 HP (1 unit)	$ 3,232.45
Old RTU	$11,300.00
New AHU and Condenser	$13,500.00

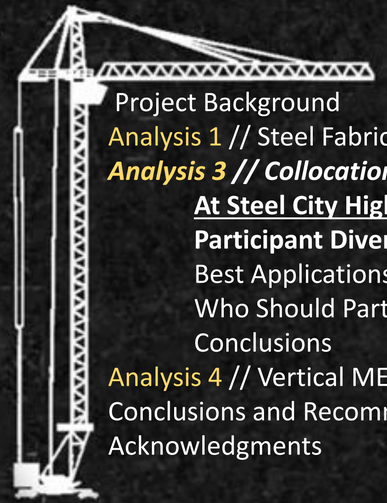
- Rooftop vs Indoor AHU
- 2 Units vs 1 Unit

Operational Costs	
Unit	$/year
Old	$3,878.94
New	$3,232.45
Savings	$ 646.49



Steel City High-Rise

Presentation Outline



- Project Background
- Analysis 1 // Steel Fabrication Efficiency
- ***Analysis 3 // Collocation in the Construction Industry***
  - **At Steel City High-Rise**
  - **Participant Diversity**
  - Best Applications
  - Who Should Participate
  - Conclusions
- Analysis 4 // Vertical MEP Acceleration
- Conclusions and Recommendations
- Acknowledgments

Collocation at Steel City

Collocation in Construction

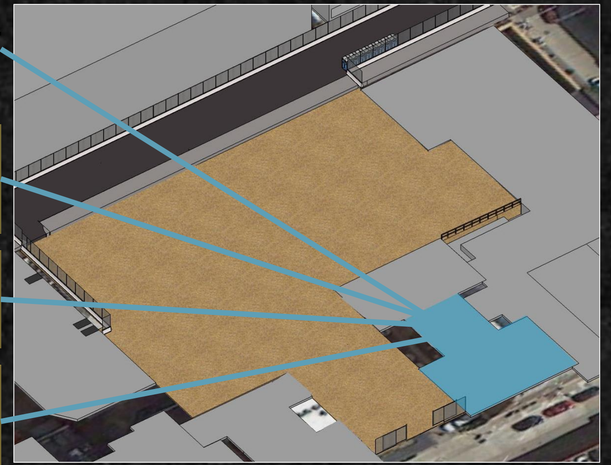
Analysis 3: Collocation in the Construction Industry

MILLCRAFT INVESTMENTS

Turner

SCALISE INDUSTRIES

Subcontractors



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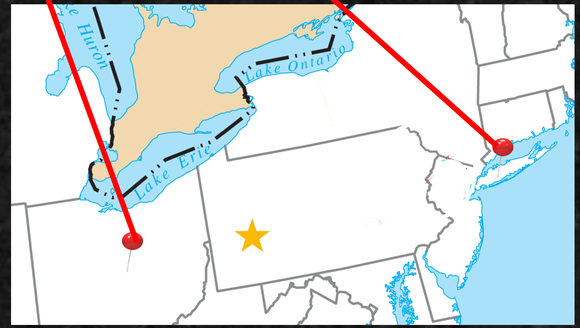
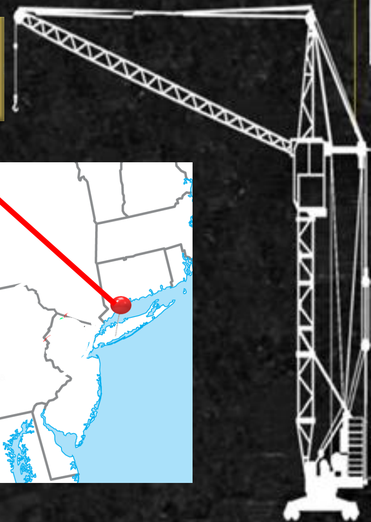




Steel City High-Rise

Presentation Outline

Collocated Projects

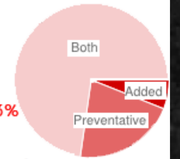
Participant Diversity

Participant Experience:

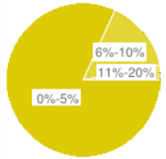
- 3% : < 1 Year
- 3%: 1-3 Years
- 6%: 3-5 Years
- 18%: 5-10 Years
- 25%: 10-15 Years
- 9%: 15-20 Years
- 36%: 20+ Years

Do you view collocation as an added cost to the project or as a preventative measure for avoiding future incurred costs and conflicts?

Added Cost 6%
Preventative Measure 21%
Both - upfront cost that benefits the life of the project 73%

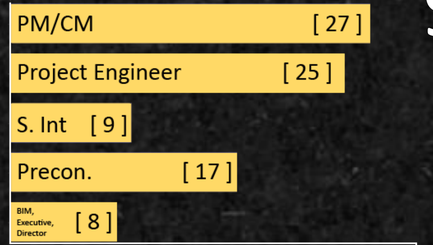


What scale of added costs they have witnessed, as a percentage of project costs?



0%-5%	82%
6%-10%	15%
11%-20%	3%
21%-30%	0%
>30%	0%

83% have worked on a collocated project before



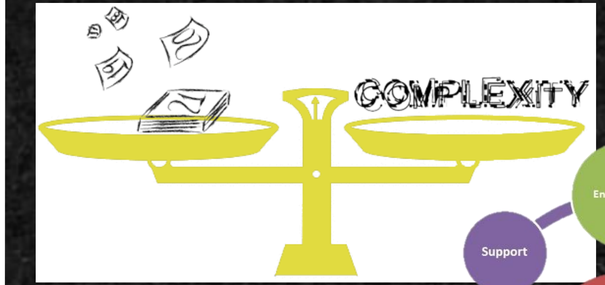
97% say that working in a collocated space was a **positive** experience

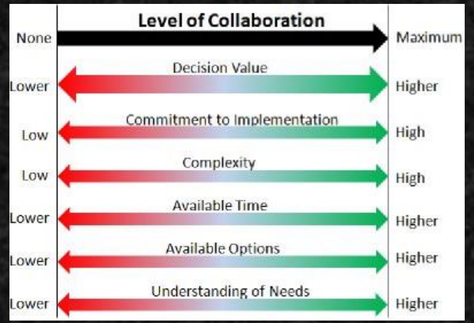
Steel City High-Rise

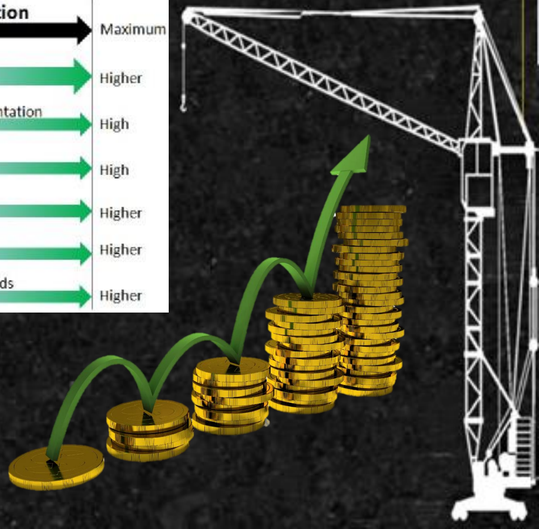
Presentation Outline

Collocated Projects

Best Applications







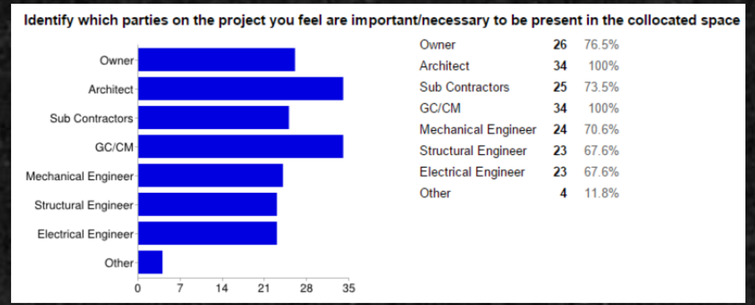
Steel City High-Rise

Presentation Outline

Project Background
Analysis 1 // Steel Fabrication Efficiency
Analysis 3 // Collocation in the Construction Industry
At Steel City High-Rise
Participant Diversity
Best Applications
Who Should Participate
Conclusions
Analysis 4 // Vertical MEP Acceleration
Conclusions and Recommendations
Acknowledgments

Choosing Partakers

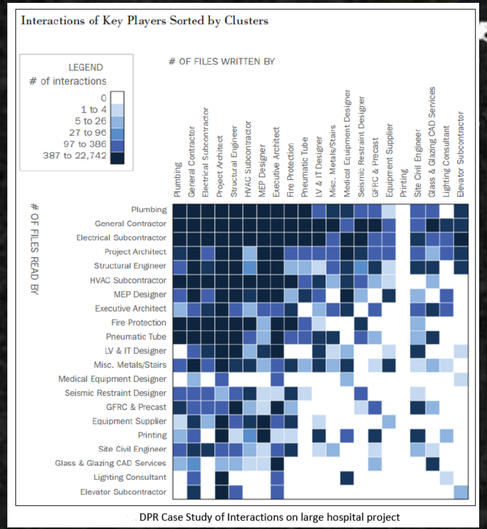
Who Should Participate?



Consider:

- Risk
- Duration
- Package Value
- Complexity

71% say that value is lost without full cooperation

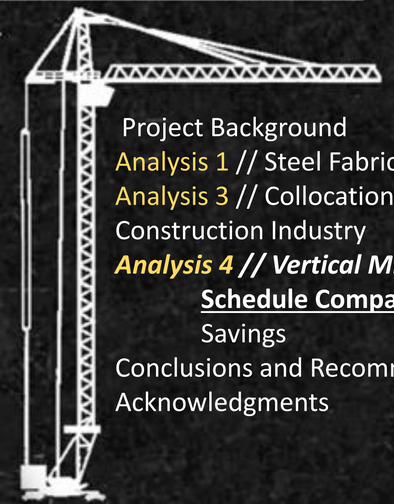


DPR Case Study of Interactions on large hospital project

94% say that productivity and reliability increase with collocation

Steel City High-Rise

Presentation Outline



Schedule Rework

Schedule Comparison

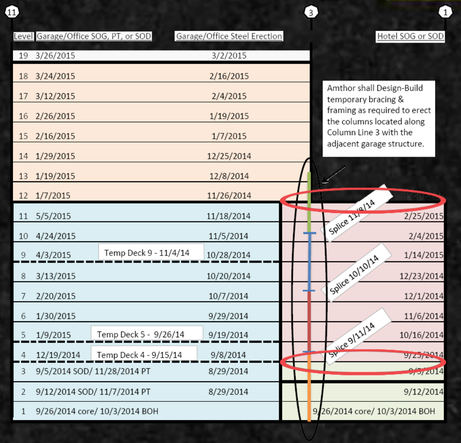
Analysis 4: Vertical MEP

Accelerated Roof:

MEP September.xml.2.2.7.2.7.2 Hotel Exter		**164**	**17-Oct-14**	**03-Jun-15**	**113**
294	Structural Stud Framing, Sheathi	40	10-Nov-14	02-Jan-15	110
295	Metal Panels	65	19-Feb-15*	20-May-15	110
296	Curtainwall & Storefront	40	09-Apr-15*	03-Jun-15	113
297	Level 3 Roof	10	17-Oct-14*	30-Oct-14	229
298	Level 12 Roof	15	02-Apr-15*	22-Apr-15	105

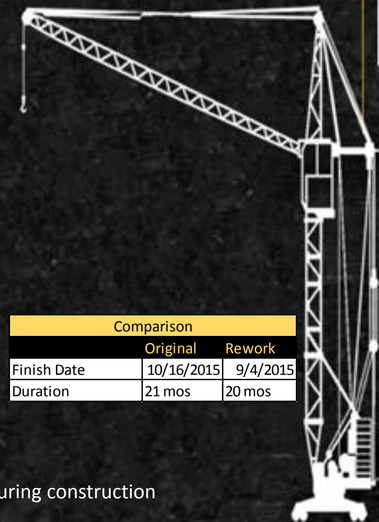
Original Roof:

The Gardens 7.2.2014.2.2.7.2.7.	**99**	**15-Jan-15**	**02-Jun-15**	**0**
Structural Stud Framing, Sheat	40	15-Jan-15	11-Mar-15	
Metal Panels	65	18-Feb-15	19-May-15	
Level 3 Roof	10	01-Apr-15	14-Apr-15	
Level 12 Roof	15	01-Apr-15	21-Apr-15	
Curtainwall & Storefront	40	08-Apr-15	02-Jun-15	



Comparison		
	Original	Rework
Finish Date	10/16/2015	9/4/2015
Duration	21 mos	20 mos

Does not impact: crew, durations, or equipment during construction



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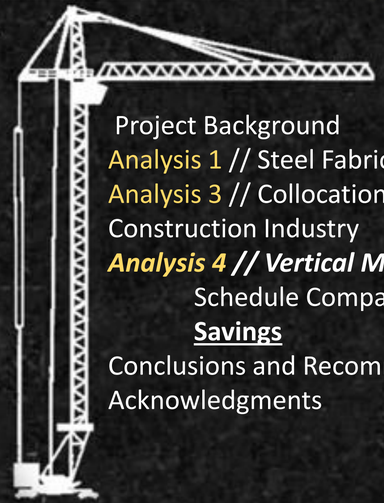
Presentation Outline



Project Background
Analysis 1 // Steel Fabrication Efficiency
Analysis 3 // Collocation in the Construction Industry
Analysis 4 // Vertical MEP Acceleration
Schedule Comparison
Savings
Conclusions and Recommendations
Acknowledgments

Schedule and Cost Impact

Savings

Analysis 4: Vertical MEP

Steel City High-Rise // Pittsburgh, PA
GMP - General Conditions

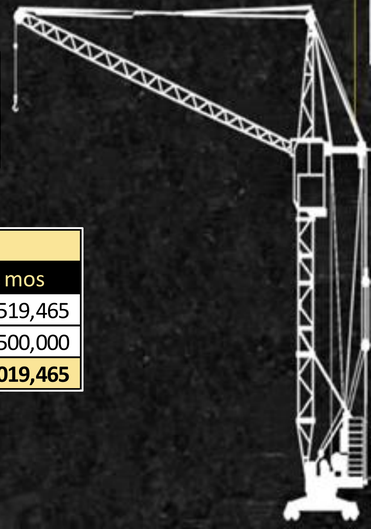
Code	Section	Total	$/Month
0110	TEMPORARY FACILITIES		
	Job Office	$ 83,600.00	$ 3,344.00
	Tools and Supplies for Turner Staff	$ 10,100.00	$ 404.00
	TOTAL: TEMPORARY FACILITIES	**$ 93,700.00**	**$ 3,748.00**
0160	GENERAL EXPENSE		
	Office Equipment & Supplies	$ 44,600.00	$ 1,784.00
	Telephone & Internet	$ 56,300.00	$ 2,252.00
	Blueprints & Copier	$ 59,400.00	$ 2,376.00
	Computer /Software License/Quality Control Infrastructure	$ 70,200.00	$ 2,808.00
	Account Payable	$ 40,300.00	$ 1,612.00
	Living / Travel Allowance & Relocation Expenses	$ 20,800.00	$ 832.00
	Progress Photos	$ 8,600.00	$ 344.00
	Miscellaneous General Expenses	$ 22,800.00	$ 912.00
	TOTAL: GENERAL EXPENSE	**$ 323,000.00**	**$ 12,920.00**
0170	PROJECT STAFF		
	Preconstruction	$ 281,787.00	$ 11,271.48
	Superintendence	$ 1,309,789.00	$ 52,391.56
	Engineering	$ 438,267.00	$ 17,530.68
	Accounting & Direct Purchase Procurement	$ 183,750.00	$ 7,350.00
	Safety	$ 39,317.00	$ 1,572.68
	Purchasing	$ 25,006.00	$ 1,000.24
	Management	$ 283,701.00	$ 11,348.04
	IT & Onsite Field Secretary	$ 64,037.00	$ 2,561.48
	TOTAL: PROJECT STAFF	**$ 2,625,654.00**	**$ 105,026.16**
0180	FRINGES/TAXES/INS./BONDS		
	General Liability Insurance	749,110	$29,964
	Payment and Performance Bond	537,405	$21,496
	TOTAL: PROJECT STAFF	**$ 1,286,515.00**	**$51,461**
	TOTAL: GENERAL CONDITIONS	**$ 4,328,869.00**	**$ 173,154.76**

$/Month
$ 173,154.76

Project Schedule		
Preconstruction	10	Mos
Construction	23	Mos
Close-Out	2	Mos
On-site Duration	24	Mos

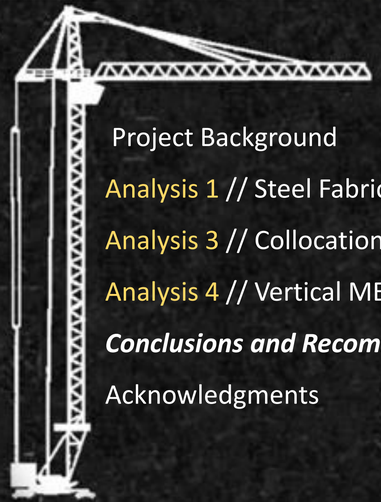
Comparison	Original	Rework
Finish Date	10/16/2015	9/4/2015
Duration	21 mos	20 mos

Acceleration Produces:	1 mos	3 mos
General Conditions	$ 173,155	$ 519,465
Revenue	$ 167,000	$ 500,000
Total Savings	**$ 340,155**	**$1,019,465**



Conclusions and Recommendations

Ashley N. Bistline // Construction Management



[[Analyses 1 & 2]] Steel Fabrication/Breadths

More efficient units, prevents short cycling, extends life of units

RECOMMEND

[[Analysis 3]] Collocation in Construction

Prevents issues/swift conflict resolution, improves communication, establishing long-term relationships, increases innovation

RECOMMEND

[[Analysis 4]] Vertical MEP Acceleration

Can save the project schedule an additional month and save between $340,000 and $1,020,000.

RECOMMEND

Acknowledgments

Academic:

- Dr. Somayeh Asadi
- Dr. Rob Leicht
- Professor Parfitt
- Dr. Charles Cox
- Professor Jim Faust
- Penn State Architectural Engineering Faculty

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- Turner Construction Company
- Millcraft Investments
- Amthor Steel
- Johnson Controls

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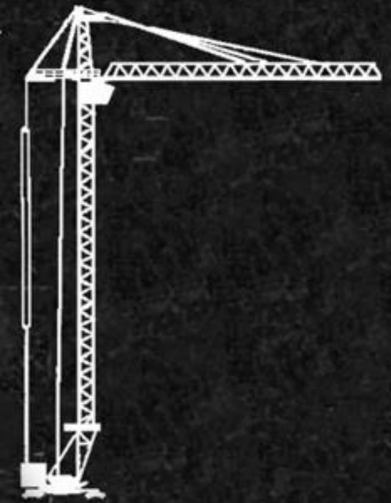
- PACE Industry Members
- Family and Friends
- God
- AE Power Players
- OPP 2015 Captains
- AE Class 2015



Questions?

Appendix A: Structural Breadth

Ashley N. Bistline // Construction Management

Old Design

Pool Criteria	
Area	400 SF
Gallonage	8910
Cement	140 PCF
Length	22'
Width	18'
Depth	3'

Pool Structural Members		
Members	Quantity	Length
W27x84	2	23.25'
W10x12	4	2.625'
W24x76	1	21.97'

Concrete Pool Shell				
Location	Thickness	Width	Length	CF
N Side	10.5"	4'2	18'	65.625
S Side	10.5"	4'2	18'	65.625
E Side	10.5"	4'2	24'	87.5
W Side	10.5"	4'2	24'	87.5
Base	8"	20'	24'	320
			Total CF	626.25

Weight of Concrete for Pool:
$626.25\ CF \times (150\ lbs/1\ CF) = 93{,}937.5\ lbs$

Weight of Deck: Area: 28 SF
$1.97\ PSF \times 28\ SF = 55.16\ lbs$

Weight of Water:
$8910\ Gallons \times (8.3454\ lbs/1\ Gallon) = 74{,}357.514\ lbs$

Weight of Concrete on Deck: Area: 28 SF
$28\ SF \times 3.25' = 90.22\ CF$
$90.22\ CF \times (115\ lbs/CF) = 10{,}375.5\ lbs$

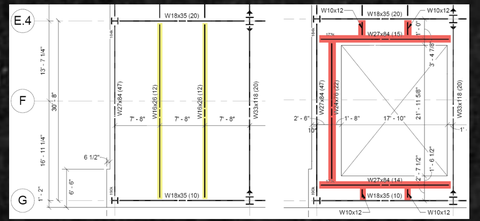
Weight of Steel Members
$(84\ lbs/LF) \times 23.25' = 1953\ lbs \times 2\ beams = 3{,}906\ lbs$
$(12\ lbs/LF) \times 2.625' = 31.5\ lbs \times 4\ beams = 126\ lbs$
$(76\ lbs/LF) \times 21.97' = 1{,}670\ lbs$
Total: 5,702 lbs

Total Weight of Pool Design: $184{,}428\ lbs = 184.4\ kips$

Appendix A: Structural Breadth

Ashley N. Bistline // Construction Management

New Design



Deck Type	Design Thickness	Weight PSF
2VLI22	0.0295	1.62
2VLI20	0.0358	1.97

Total Slab Depth	Deck Type	SDI Max. Unshored Clear Span			Superimposed Live Load, PSF Clear Span (ft.-in.)						
		1 Span	2 Span	3 Span	6'-0	6'-6	7'-0	7'-6	8'-0	8'-6	9'-0
5 1/4" (t=3 1/4") 42 PSF	2VLI22	7'-2	9'-3	9'-7	334	294	262	209	187	168	152
	2VLI20	8'-5	10--7	10'-11	377	331	293	263	237	190	171
	2VLI19	9'-6	11'-8	12'-1	400	366	324	289	260	236	216
	2VLI18	10'-6	12'-7	12'-7	400	400	355	319	288	263	241
	2VLI16	10'-9	12'-10	13'-3	400	400	400	367	330	300	274

Table 1: Vulcraft 2 VLI Composite Metal Deck Loads

Weight of 2VLI20 deck:
1.97 PSF × 714.9375 SF = 1,408.4269 lbs

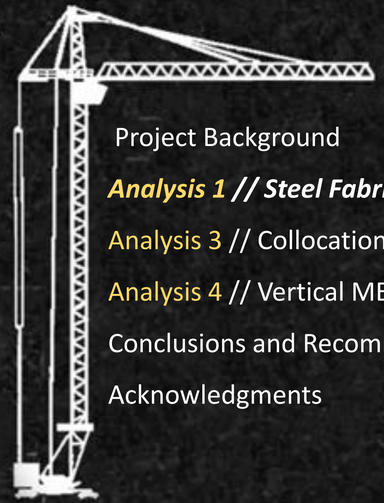
Weight of LW Concrete:
115 PCF × (3.25 $in/12\ in$) (1 ft) = 31.1458 PSF
31.1458 PSF × 714.9375 SF = 22,267.3242 lbs

Weight of the W16x26 Beams:
$26 * 30.75" = 799.5\ lbs$
$799.5\ lbs \times 2\ beams = 1{,}599\ lbs$

Total weight of the slab system:
$W_{tot} = W_{deck} + W_{concrete} + W_{beams}$
$= 1{,}408.4269\ lbs + 22{,}267.3242\ lbs + 1599\ lbs$
$= 25{,}274.7511\ lbs$
$= 25.27\ kips$

Steel City High-Rise

Presentation Outline

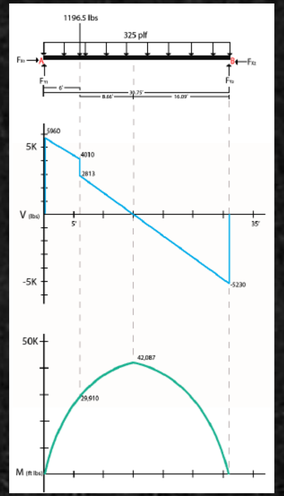


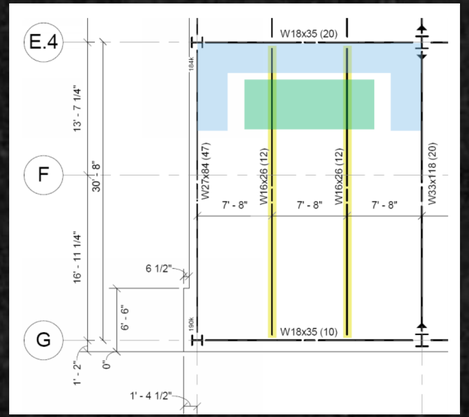
- Project Background
- ***Analysis 1 // Steel Fabrication Efficiency***
- Analysis 3 // Collocation in the Construction Industry
- Analysis 4 // Vertical MEP Acceleration
- Conclusions and Recommendations
- Acknowledgments

Loading of AHU

Appendix A: Structural Breadth

Ashley N. Bistline // Construction Management





Distributed Load:

$A_T \times 42\ PSF = 7.75' \times 42 = 325\ PLF$

$\Sigma F_X = -F_{X1} = F_{X2}$

$\Sigma F_Y = -1196.5 - (325\ PLF \times 30.75') + F_{Y1} + F_{Y2}$

$\Sigma M_A = (-1196.5 \times 6') - (9993.75 \times 15.375') + F_{Y2}(30.75') = 0$

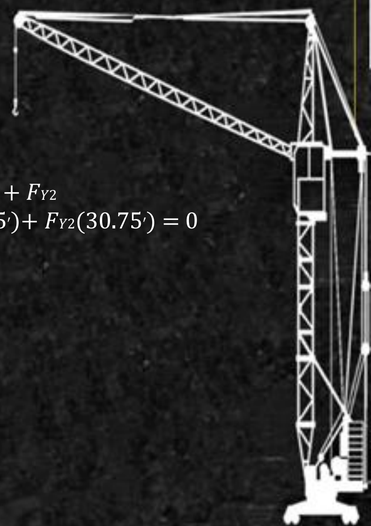
$F_{Y2} = 5{,}230\ lbs$

$F_{Y1} = 5{,}960\ lbs$

Max Moment: 42.1 $_{IK}$

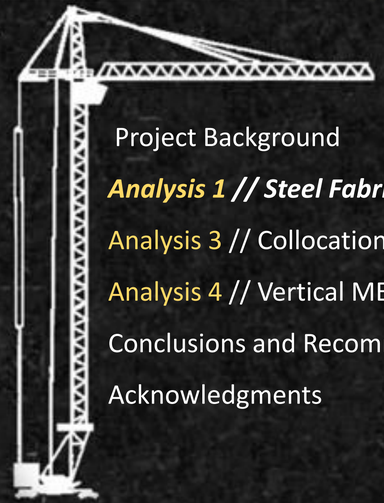
ΦM for W16x 26: 166 $_{IK}$

42.1 $_{IK} \leq$ 166 $_{IK} \therefore$ OK



Appendix B: Mechanical Breadth

Ashley N. Bistline // Construction Management



Schedule and Cost Impact

Converting HP to kW:

$HP \times .7457\ kW/HP$

$kW \times (8766\ hours/year)$

$kW(hrs) \times (\$00.0989/kW)$

OLD UNITS

Cooling Power Yearly Cost of RTU-5 and RTU-6:

$3\ HP \times .7457\ kW/HP = 2.2371\ kW$

$2.2371\ kW \times (8766\ hours/year)$

$= 19{,}610.4186\ kWhrs/year$

$19{,}610.4186\ kW(hr) \times (\$00.0989/(kW(hr)))$

$= \$1{,}939.47/year \times 2$ units

$= \$3{,}878.94$

NEW UNITS

Cooling Power Yearly Cost of New Indoor AHU:

$5\ HP \times .7457\ kW/HP = 3.7285\ kW$

$3.7285\ kW \times (8766\ hours/year) = 32{,}684.031\ kWhrs/year$

$32{,}684.031\ kW(hr) \times (\$00.0989kW(hr))$

$= \$3{,}232.45/year$

Annual Savings Comparison:

OLD Cost: $3,878.94

New Cost: $3,232.45

Total Savings: $636.49

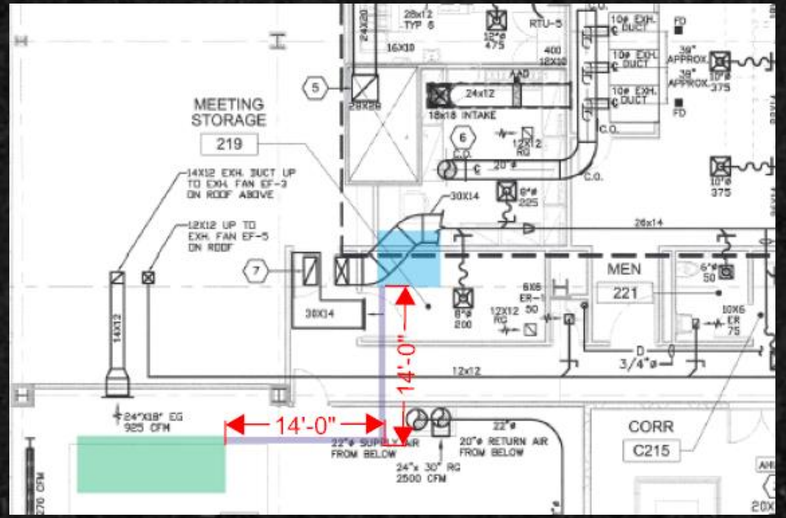
Steel City High-Rise

Presentation Outline

Appendix B: Mechanical Breadth

Ashley N. Bistline // Construction Management

Refrigerant Lines



Item	Amount	Unit	Cost	Unit	Total Cost
1/2" refrigerant piping	53.833	LF	$ 10.37	/LF	$ 558.25
90° Elbow	4	Ea	$ 26.08	Ea	$ 104.32
			Piping Total		**$ 662.57**

Screwed Fittings - equivalent length in feet

Equivalent length (in feet) of straight pipe for fittings like bends, returns, tees and valves. (Pipe size in inches)

Equivalent Length of Straight Pipe for Valves and Fittings (feet)												
Screwed Fittings		Pipe Size										
		1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4
Elbows	Regular 90 deg	2.3	3.1	3.6	4.4	5.2	6.6	7.4	8.5	9.3	11.0	13.0
	Long radius 90 deg	1.5	2.0	2.2	2.3	2.7	3.2	3.4	3.6	3.6	4.0	4.6
	Regular 45 deg	0.3	0.5	0.7	0.9	1.3	1.7	2.1	2.7	3.2	4.0	5.5
Tees	Line flow	0.8	1.2	1.7	2.4	3.2	4.6	5.6	7.7	9.3	12.0	17.0
	Branch flow	2.4	3.5	4.2	5.3	6.6	8.7	9.9	12.0	13.0	17.0	21.0
Return Bends	Regular 180 deg	2.3	3.1	3.6	4.4	5.2	6.6	7.4	8.5	9.3	11.0	13.0
Valves	Globe	21.0	22.0	22.0	24.0	29.0	37.0	42.0	54.0	62.0	79.0	110.0
	Gate	0.3	0.5	0.6	0.7	0.8	1.1	1.2	1.5	1.7	1.9	2.5
	Angle	12.8	15.0	15.0	15.0	17.0	18.0	18.0	18.0	18.0	18.0	18.0
	Swing Check	7.2	7.3	8.0	8.8	11.0	13.0	15.0	19.0	22.0	27.0	38.0
Strainer			4.6	5.0	6.6	7.7	18.0	20.0	27.0	29.0	34.0	42.0

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Appendix C: Vertical MEP Logic

Ashley N. Bistline // Construction Management

81	Podium Fit-Out	283 days	Mon 7/7/14	Wed 8/5/15	
82	Level 1 - Lobby	283 days	Mon 7/7/14	Wed 8/5/15	
83	MEP Underslab (BOH)	2 wks	Mon 9/15/14	Fri 9/26/14	66
84	MEP Underslab (Core)	2 wks	Mon 7/7/14	Fri 9/19/14	51FS+2 days
85	MEP Rough-In	4 wks	Mon 11/17/14	Fri 12/12/14	74
86	Framing	3 wks	Thu 12/4/14	Thu 12/25/14	73,74
87	Drywall	4 wks	Thu 4/23/15	Wed 5/20/15	86,85,297,298,77,78
88	Wall Finishes	6 wks	Thu 5/21/15	Wed 7/1/15	87
89	Millwork & Casework	5 wks	Thu 7/2/15	Wed 8/5/15	88
90	Finish MEPs	2 wks	Thu 5/21/15	Wed 6/3/15	87
91	Flooring	4 wks	Thu 6/4/15	Wed 7/1/15	90
92	Hotel FF&E	3 wks	Thu 7/2/15	Wed 7/22/15	91,90

293	Hotel Exterior Envelope	164 days	Fri 10/17/14	Wed 6/3/15	
294	Structural Stud Framing, Sheathing, at Metal Panels	8 wks	Fri 1/16/15	Wed 4/15/15	289FF+2 wks,254
295	Metal Panels	13 wks	Thu 2/19/15	Wed 5/20/15	294FS-8 wks
296	Curtainwall & Storefront	8 wks	Thu 4/9/15	Wed 6/3/15	269,295FS-6 wks
297	Level 3 Roof	2 wks	Fri 10/17/14	Thu 10/30/14	254
298	Level 12 Roof	3 wks	Thu 4/2/15	Wed 4/22/15	289

Task Information

General | Predecessors | Resources | Advanced | Notes | Custom Fields

Name: Level 3 Roof Duration: 2 wks

Predecessors:

ID	Task Name	Type
254	Concrete SOD	Finish-to-Start (FS)

SOD @ Level 5

Task Information

General | Predecessors | Resources | Advanced | Notes | Custom Fields

Name: Drywall Duration: 4 wks

Predecessors:

ID	Task Name	Type
86	Framing	Finish-to-Start (FS)
85	MEP Rough-In	Finish-to-Start (FS)
297	Level 3 Roof	Finish-to-Start (FS)
298	Level 12 Roof	Finish-to-Start (FS)
77	Metal Panels	Finish-to-Start (FS)
78	Curtainwall & Storefront	Finish-to-Start (FS)