



**MADE TO
ORDER
SUCCESS!**

**McDonald's New
Global Headquarters**

INNOVATION

“For an industry founded upon solving problems, creativity is a quality that may well be as fundamental to projects as the laws of physics.”

Jim Parsons, ENR 2016



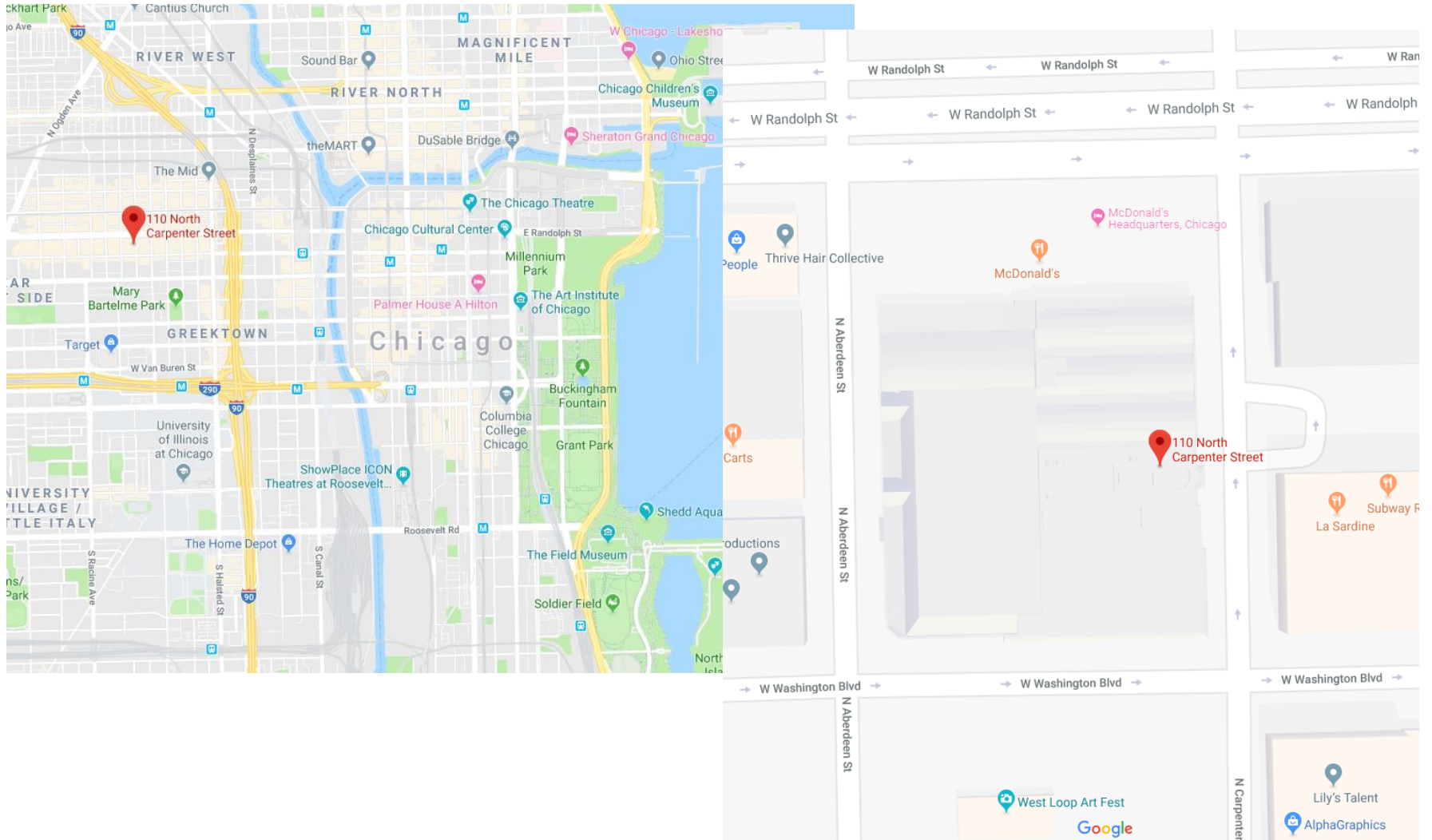
INNOVATION

Why innovate in design and construction?

- Safer
- Better
- Faster



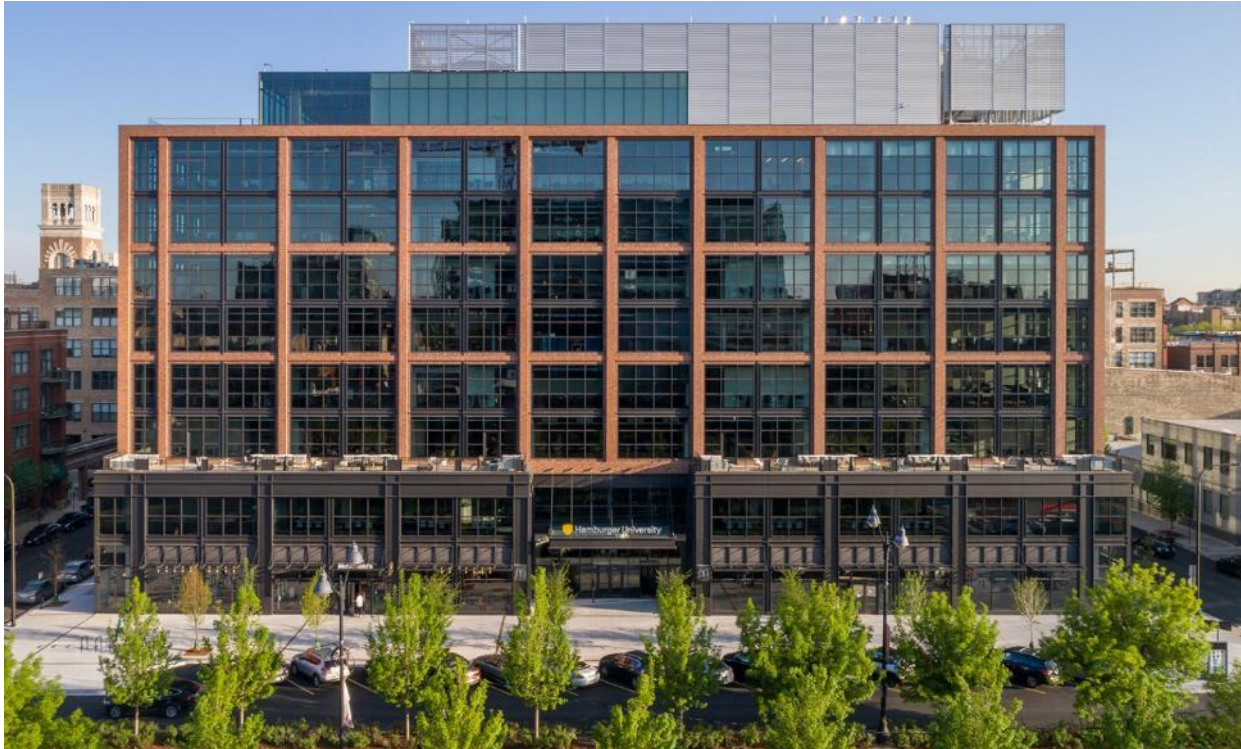
PROJECT LOCATION:



OPRAH'S HARPO STUDIO



CLIENT'S VISION:



New ground-up, nine-story build to suit HQ
720,000 square foot building on city block site
Retail along Randolph Street
2 levels of underground indoor parking.



HQ Building designed to reflect West Loop Location with brick warehouse style and large windows





Work Café Collaboration Space on 6th Floor



Central staircase to prompt pass-by interactions and conversations



McDonald's Headquarters Cityview Bar



McDonald's Headquarters Cityview Wall



McDonald's Headquarters Museum-Quality Happy Meal Toy Wall Archive



**McDonald's Headquarters Work Neighborhoods with open floor plans
with 327 meeting and phone rooms**

PROJECT STATISTICS

Owner/Developer: Sterling Bay

Primary Tenant: McDonalds Headquarters (2 thru 9)

Previous Occupant: Old Oprah Studio

Project Duration: 18 months

Sq. Feet: 720,000 sq feet - 9 Stories

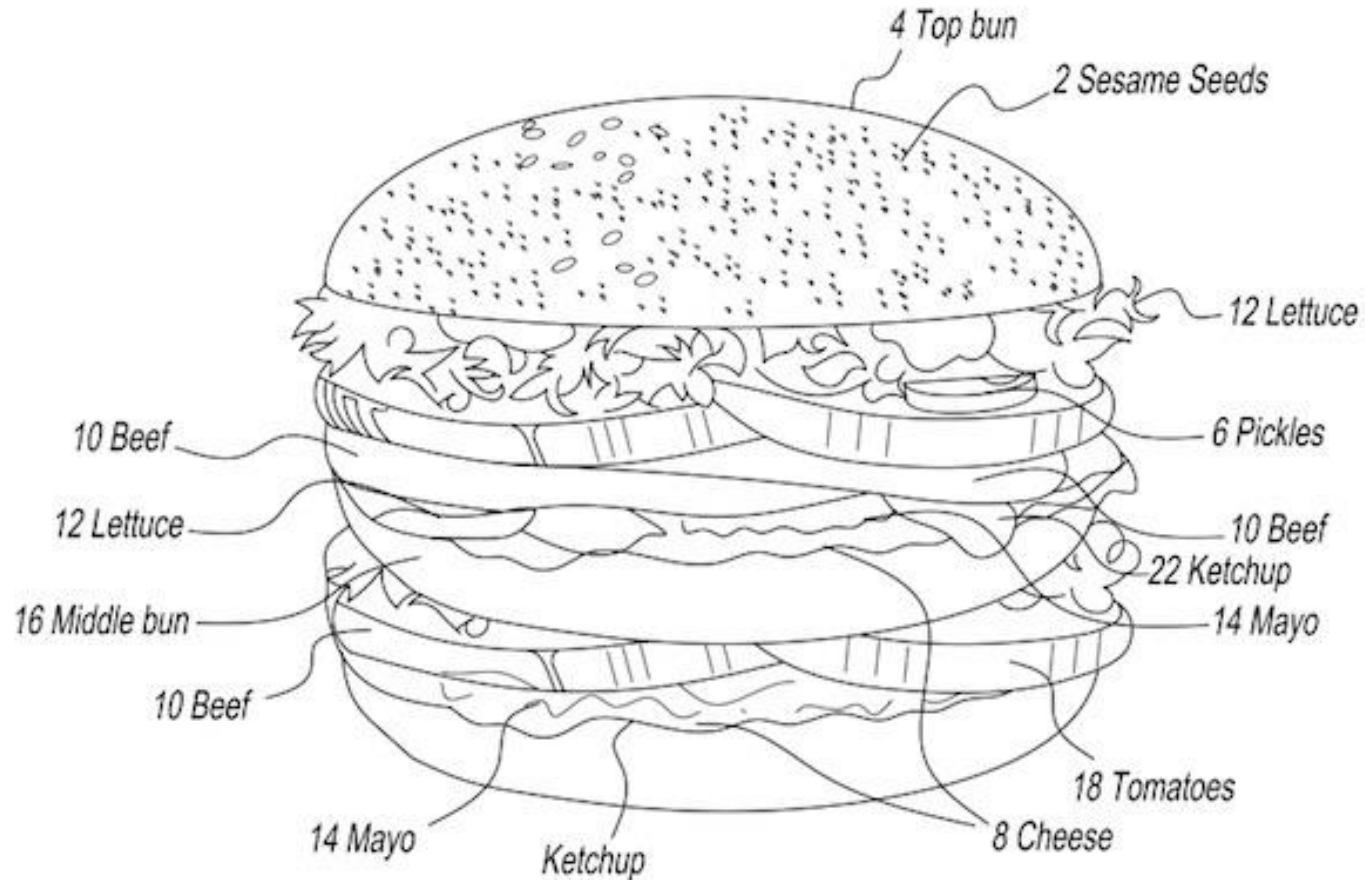
Cost: \$146 million (\$2.0 million per week!)

Scope of Work:

- Core and Shell
- Elevators with Destination Dispatch
- 9th Floor Build-out including bar
- Bathroom Construction
- Underground Parking Garage
- Terrace and Rooftop Landscaping

Top Down Construction implemented

How to build a burger...?



“two all beef patties, special sauce, lettuce, cheese...”

How to build a world class HQ in 18 months?



shutterstock.com · 262169879

- DESIGN TEAM AND CONTRACTOR ASSIGNED EARLY
- ALL DECISIONS BASED UPON SCHEDULE
- PLAN THE WORK, WORK THE PLAN!

KEYS TO SUCCESS: OWNER PRIORITIES



Complete the project on-time.

Keep McDonalds happy.

Keep the neighborhood happy.



KEYS TO SUCCESS: Focus on End Goal

Milestones inform all decision-making.

Remind Owner & Architect when design decisions were needed to keep project on schedule.

Remind Subcontractors of upcoming milestones, inspection dates, etc.

Always work with, not against.

PROJECT TEAM

CLIENT



DESIGN TEAM



WOLFF LANDSCAPE ARCHITECTURE
Wolff Landscape Architecture Inc.
307 N. Michigan Avenue, Suite 601
Chicago, Illinois 60601

CONTRACTOR TEAM (TOP DOWN ONLY)

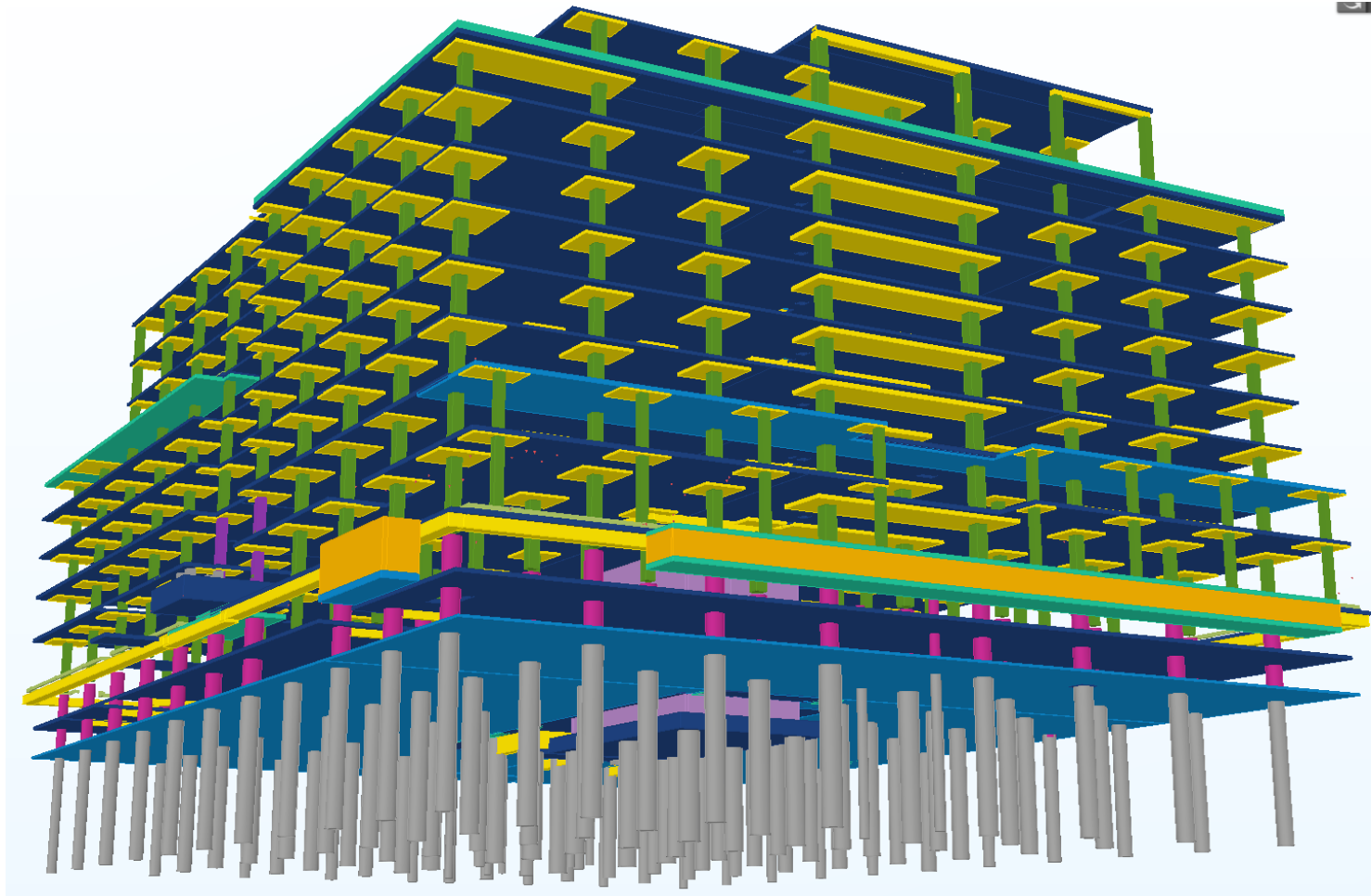


James McHugh Construction Co.



Structural System Selection:

CIP Concrete structure w/ 2-way RC flat slab with concrete core wall MWFRS



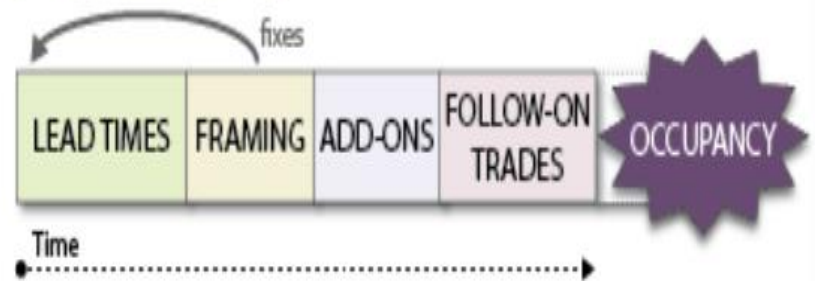
Structural System selection:

CIP Advantages:

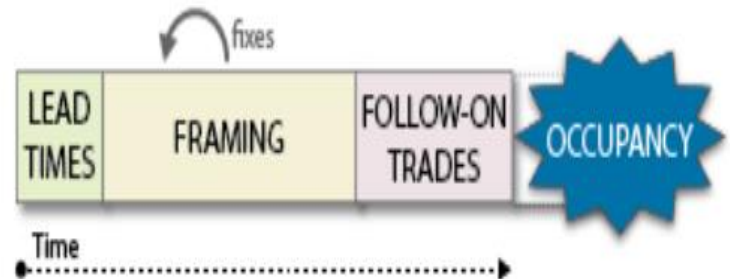
- **Fast start & completion of construction (est. 2 months quicker start and 6 months faster to completion)**
- **Economical structural system**
- **Minimal lead time for materials**
- **Matched design esthetic**
RC flat slab adaptable for future tenant renovation
- **Superior Sound/Vibration Control**

TYPICAL SPEED OF CONSTRUCTION

Other Structural Systems



Reinforced Concrete Systems



TYPICAL FLOOR CONSTRUCTION

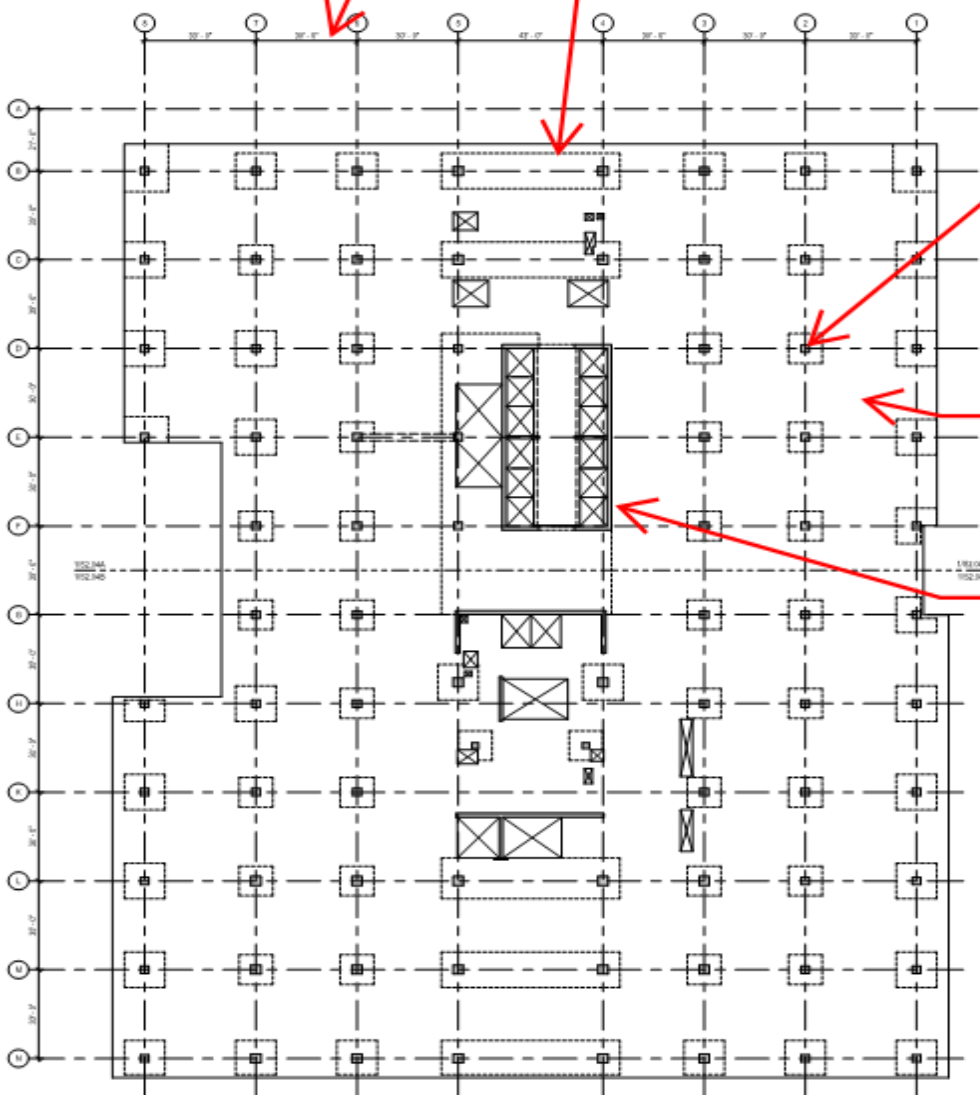
30X'30' TYPICAL BAY DIM

20" THICK X 12' WIDE SHALLOW BEAMS FOR 43'-0" LONG SPAN

30"X30" COLUMNS TYP.

8" RC FLAT SLAB WITH 14'X14'X16" DROP PANELS
f'c=5500PSI
6 PSF AVG REBAR

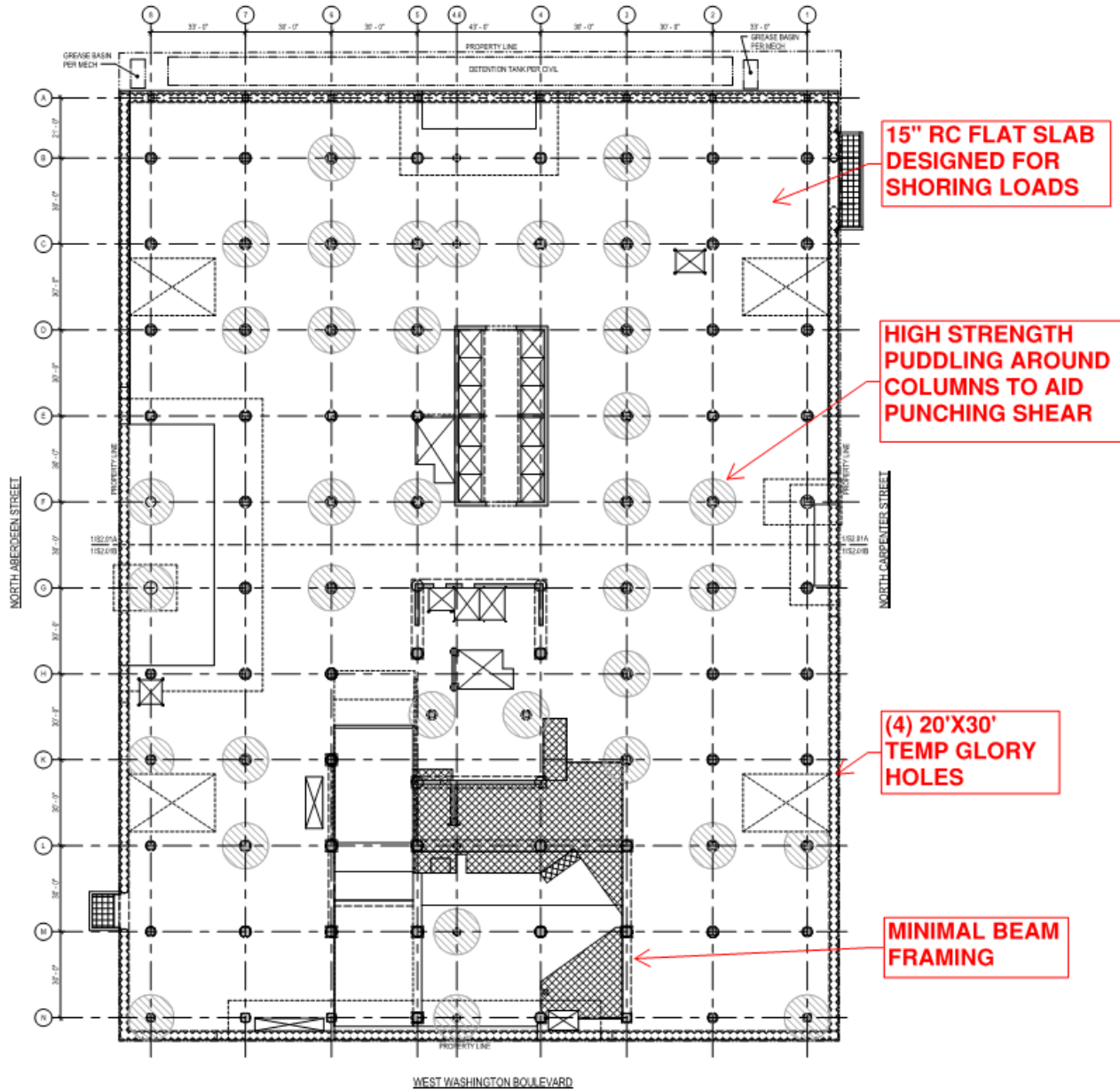
16" THICK CORE WALLS



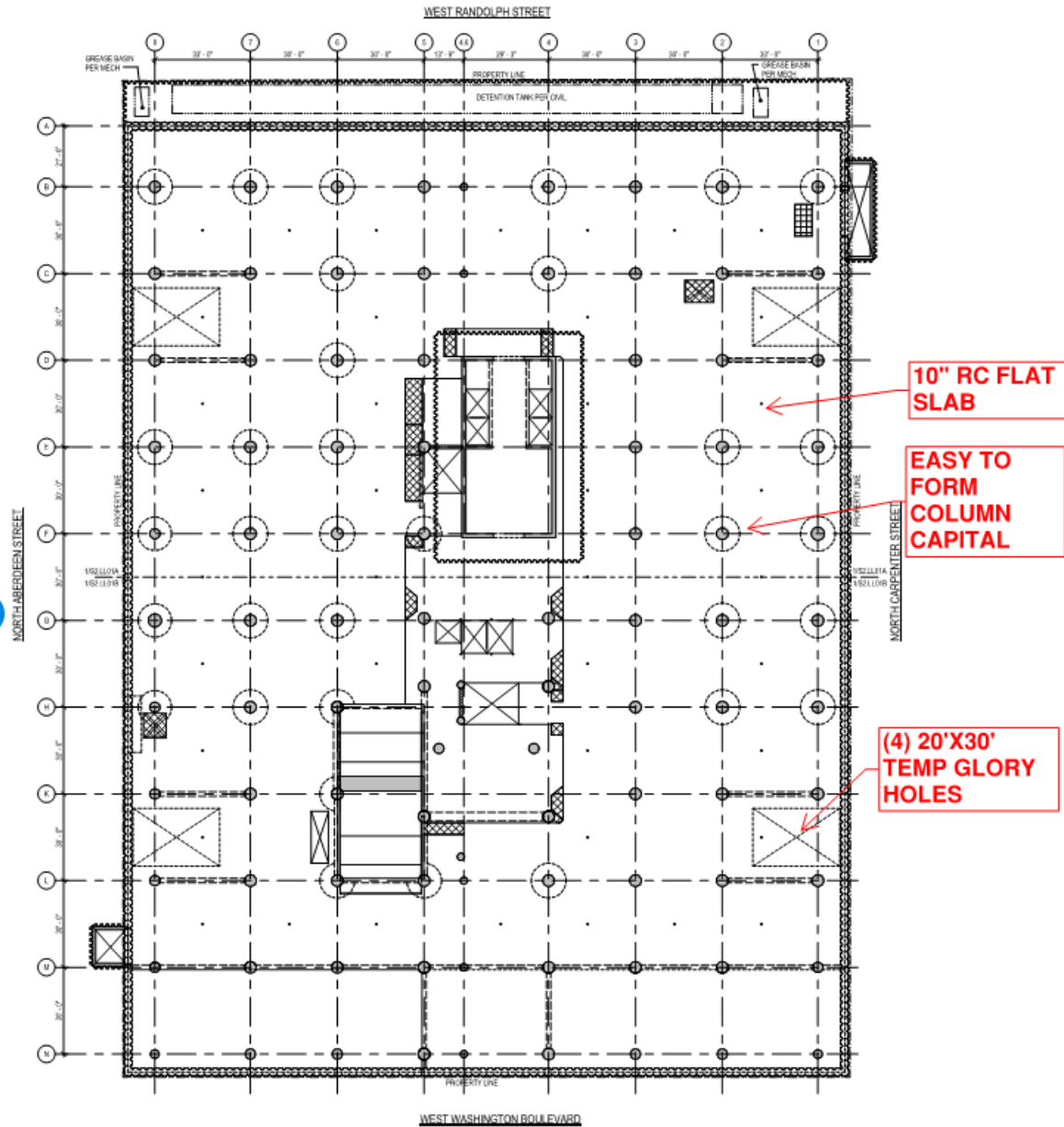
- REVISIONS**
- 01 XX AMENDMENTS, DRAWING SYMBOLS, GENERAL NOTES
 - 02 XX LOAD MAPS
 - 03 XX SLABS
 - 04 XX ELEVATIONS
 - 05 XX TYPICAL DETAILS AND SCHEDULES
 - 06 XX CONCRETE SECTIONS AND DETAILS
 - 07 XX STEEL SECTIONS AND DETAILS

- NOTES**
1. REFERENCE FLOOR ELEVATION IS 0'-0" TOP OF SLAB IS AT THE REFERENCE ELEVATION UNLESS NOTED OTHERWISE. VERIFY ALL SLAB EDGE LOCATIONS WITH ARCHITECTURAL DRAWINGS.
 2. STRUCTURAL SLAB IS A 8 INCH THICK REINFORCED FLAT SLAB UNLESS NOTED OTHERWISE. SEE THE TYPICAL CONCRETE SLAB DETAILS ON SHEET SA-05 AND SA-06.
 3. COORDINATE LOCATION OF ALL MEMENTS WITH MECHANICAL, ELECTRICAL, PLUMBING, AND EXTERIOR WALL SYSTEMS PRIOR TO CASTING THE SLAB.
 4. EPOXY-COATED REBAR IS REQUIRED AT ALL TOP REBAR IN THE PARKING SLAB AND AT ALL EXPOSED SLABS, SLAB EDGES, AND COLUMN FACES.
 5. AIR-ENRICHED CONCRETE IS REQUIRED AT ALL PARKING SLABS AND AT ALL EXTERIOR EXPOSED SLABS AND COLUMNS.

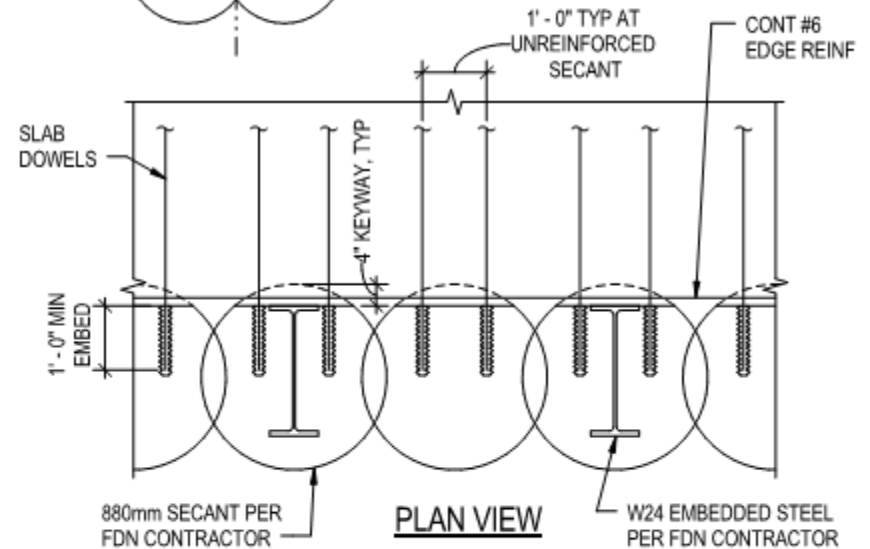
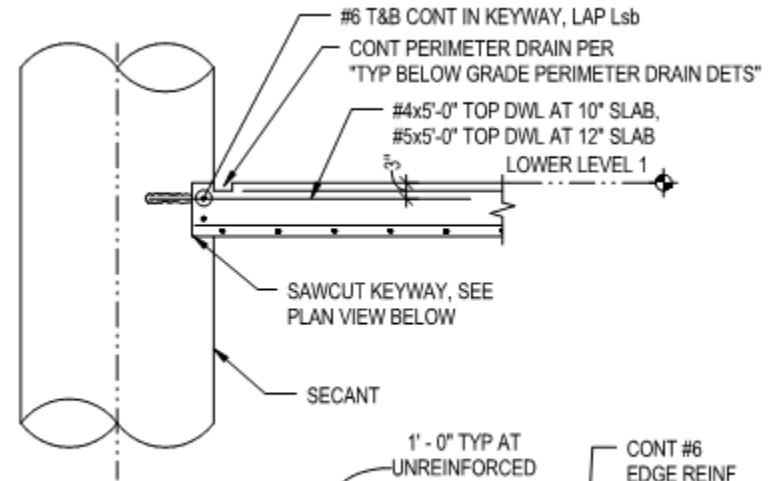
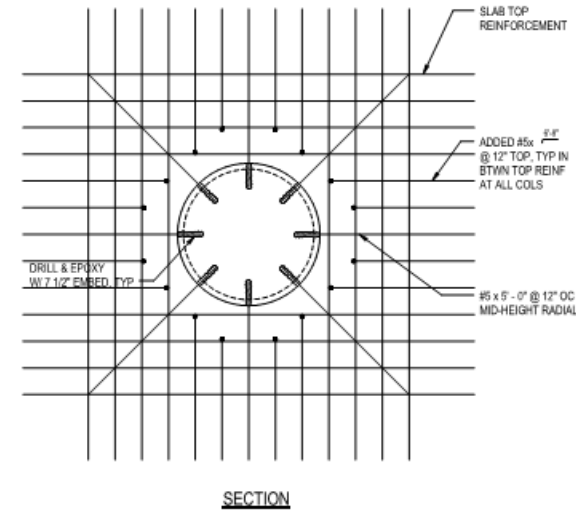
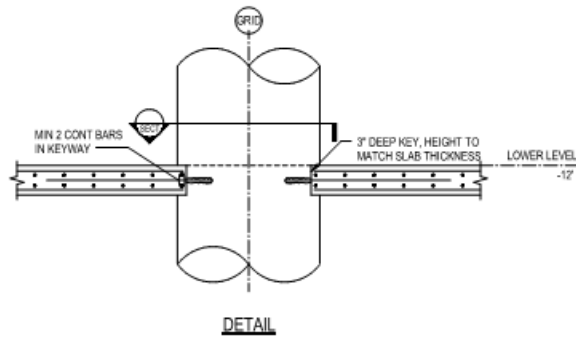
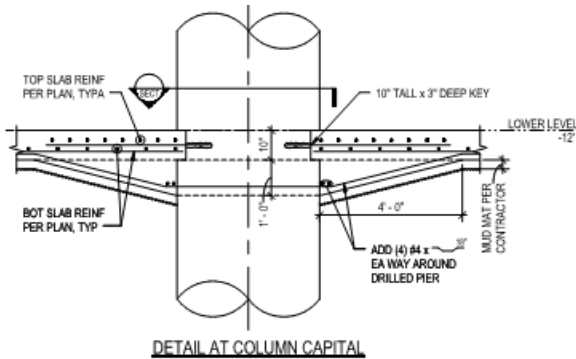
L1 DESIGNED FOR TOP DOWN CONST



LL1 DESIGNED FOR TOP DOWN CONST



DETAILS FOR TOP DOWN DESIGNED IN



3 MILD SLAB TO SECANT CONNECTION

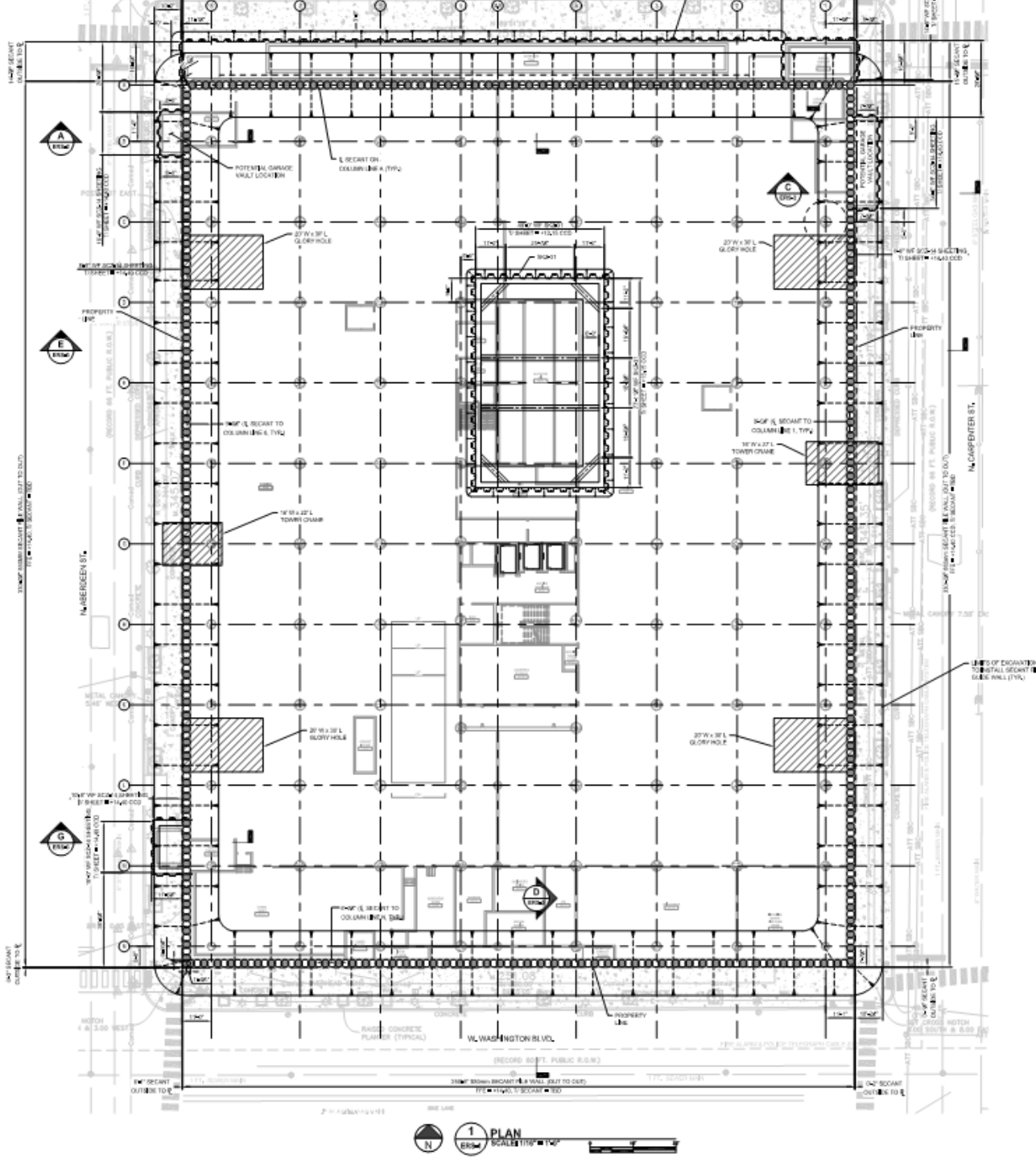
FOUNDATIONS & ERS:

- 458 secant piles and 100 caissons in 90 days
- Secant pile – 34” diameter; drilled to 40’-100’
- Utilized as exposed basement wall for a two-story underground parking structure
- Tremie pouring for shafts >60’
- Sheet piling in the middle of the site for core and mat



FOUNDATIONS

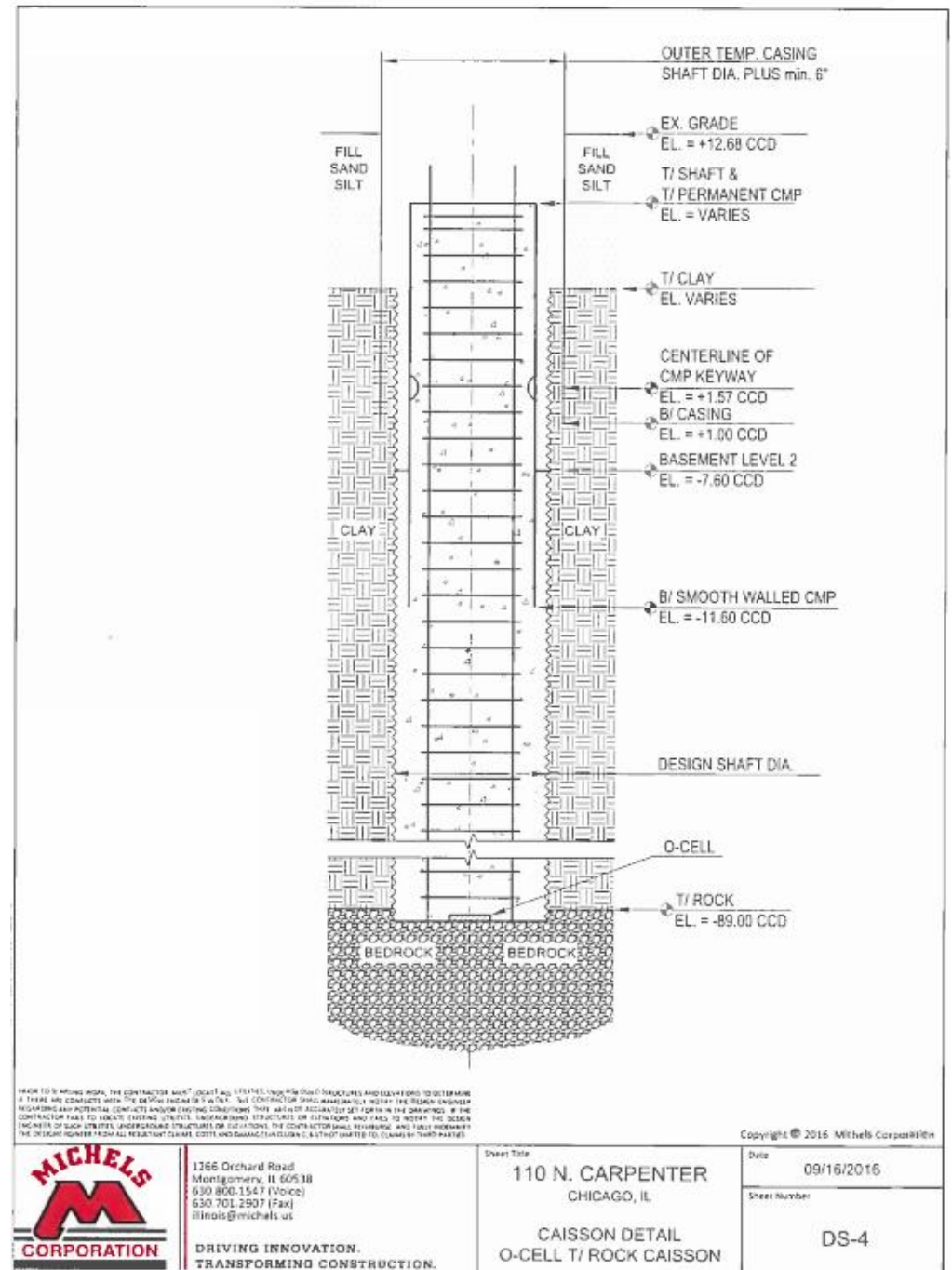
- 458 secant piles
- 100 caissons



1 PLAN
 SCALE: 1/8" = 1'-0"

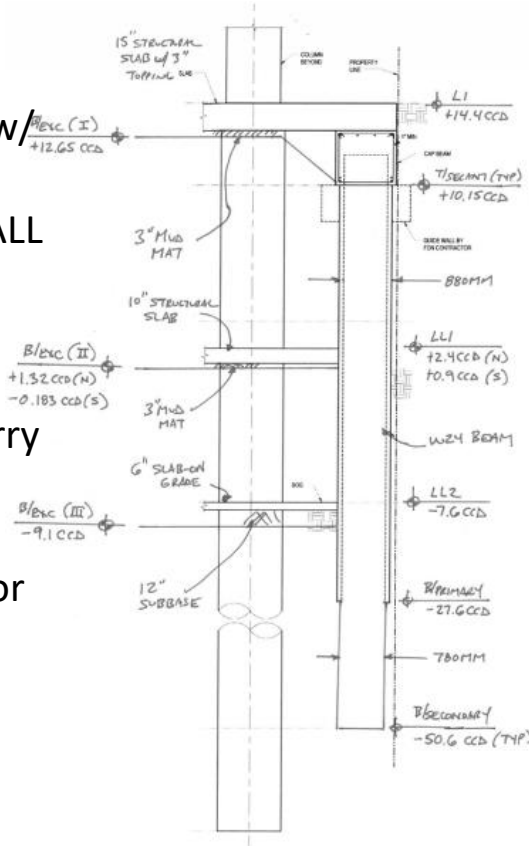
FOUNDATIONS

- Straight Shaft top of rock caissons
- Vary in diameter from 2.5' to 5'-6"
- 180 ksf allowable bearing pressure
- O-cell testing
- Shaft drilled under polymer slurry
- $f'c=6$ ksi concrete placed by tremie
- Keyway installed at LL1 for top down construction
- For Caissons larger than 4.5' diameter, reduced shaft above LL2 for parking

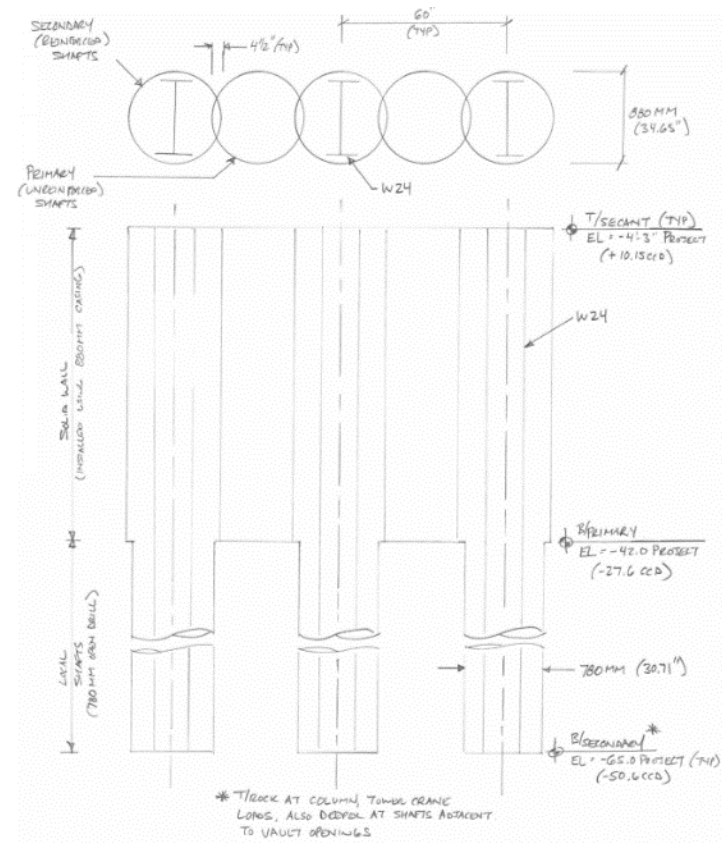


SECANT PILE WALL

- 880mm (34.65") DIA
- Unreinforced primary w/ b/pile@ EL-27.6' CCD
- W24X94 reinforced secondary w/ b/pile@ EL-50.6' CCD
- @ TOWER CRANE & NORTH WALL COL's b/pile @ EL-89' (TOP OF ROCK) w/ W24x162
- Shaft drilled under polymer slurry W/ f'c=4ksi place by tremmie
- Keyway cut into Secant at LL1 for top down construction
- At glory holes, at L1 cap beam and at LL1 temp steel wale provided to span opening



TYPICAL WALL SECTION



TYPICAL SECANT PILE WALL

* T/BACK AT COLUMN, TOWER CRANE LOOPS, ALSO DECOR AT SHIFTS ADJACENT TO VAULT OPENINGS

Top-Down Construction:

Bottom-Up

1. Construction deep foundations
2. ERS
3. Excavate
4. Concrete from foundations to top

Top-Down

1. Construct ERS/caissons concurrently
2. Installation of Elevator Core cofferdam
3. Construction Elevator Core LL2 – LL1 and Level 1 supported slab concurrently
4. Construct vertical tower concrete & LL1-LL2 excavate/slabs/foundation concurrently



Top-Down Construction:

WHY DO IT?

- Schedule impact – 4 months
- Reduces carry cost on financing debt
- Faster on to the market



WHY DO IT?

Top-Down Construction:

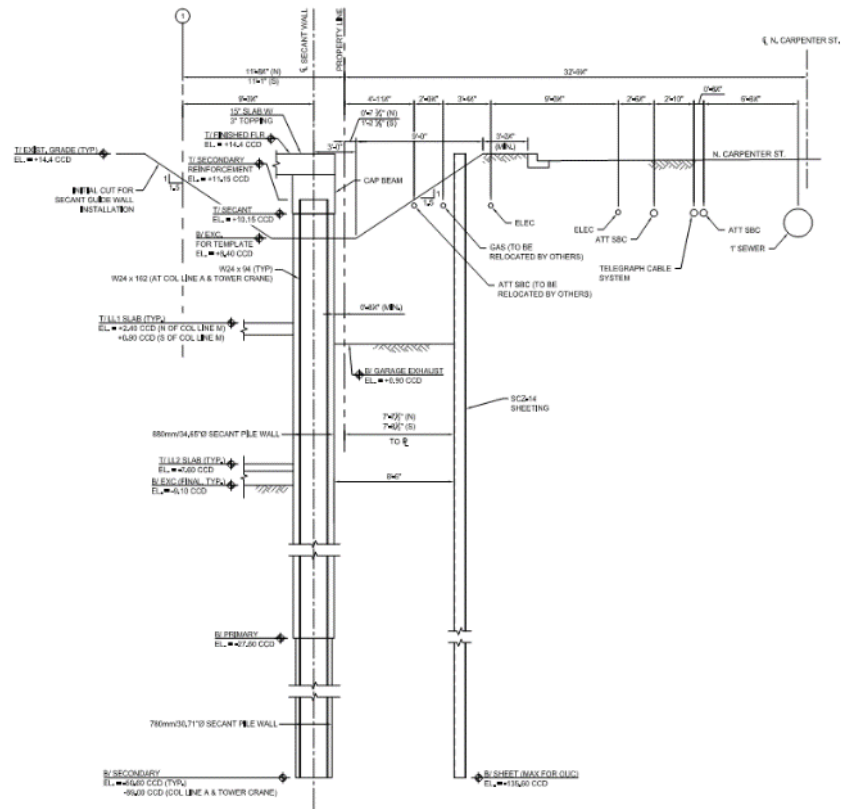
WHAT'S DIFFERENT?

- Construction sequence
- Foundation & ERS systems
 - Perimeter secant piles in lieu of sheet piles
 - Use caissons as columns where possible
 - Reduced diameter shafts through LL2 AND LL1
 - Core cofferdam from LL1 to LL2
- Aesthetics
 - Exposed secant pile walls in basement
 - Scraped soffits – mud slab removal
 - Some caissons as columns in garage

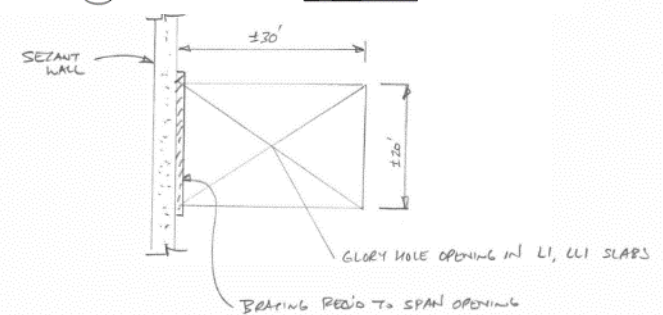
Top-Down Const:

CHALLENGES

- Complex sequencing
- Secant pile walls retain earth during excavation and in final condition
- Some structural redesign is required
 - Modifications to structural slabs at LL1, 1 & 2 for glory hole
 - Level 1 slab increase in strength to accept shoring loads of concrete construction and logistics
- Secant piles checked to transfer MWFRS base shear to subgrade.
- Water – chance of water seepage through secant piles
- Ventilation



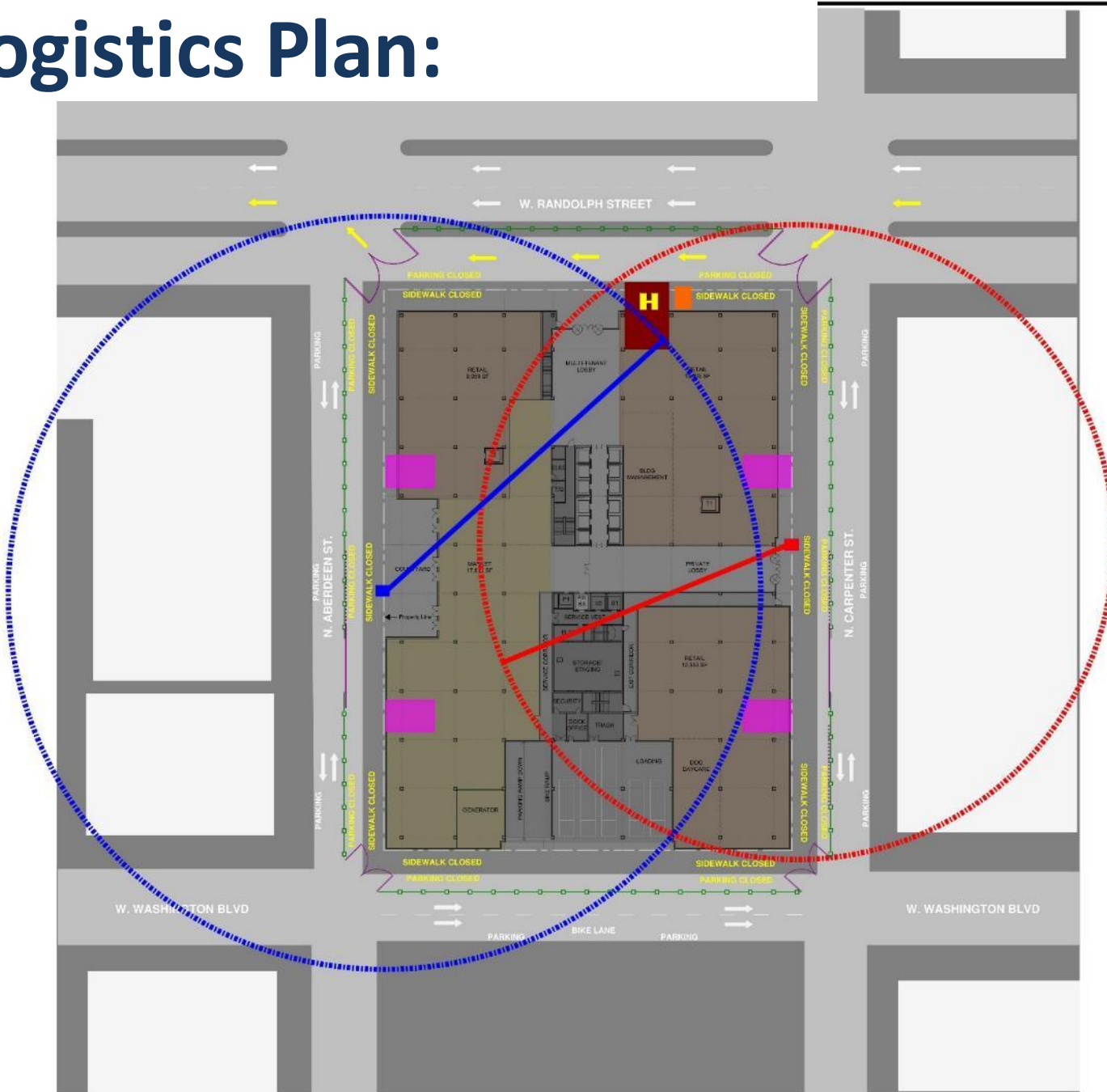
C SECTION - EAST PROPERTY LINE (TYP.)
ERS-2 SCALE: 1/4" = 1'-0"



AT L1 : USE CONCRETE CAP BEAM TO ACT AS WALL.

AT LL1 : USE TEMP STEEL WALE TO SPAN

Logistics Plan:



LEGEND

- LOADING DOCK
- CONCRETE PUMP
- 20'x30' GLORY HOLE
- BARRIER WALL and CONSTRUCTION FENCE
- SWING GATE
- ROLLING GATE
- ← CONSTRUCTION TRAFFIC
- TOWER CRANE 1
- TOWER CRANE 2

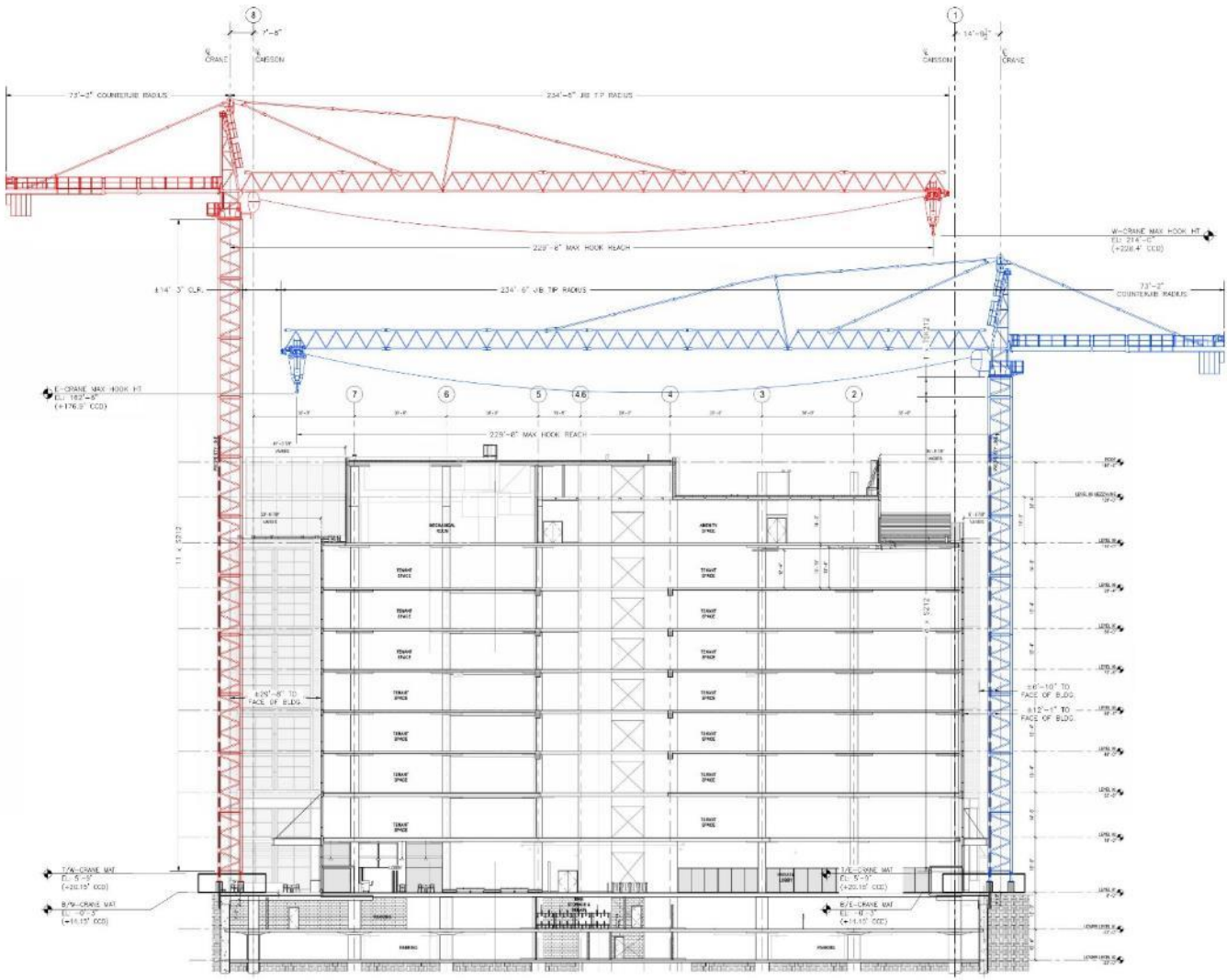
STERLING BAY
110 N. CARPENTER
CHICAGO, IL

CONSTRUCTION SITE LOGISTICS PLAN

#	DATE	DESCRIPTION
0	05/19/16	
1	08/09/16	Internal Review
2	08/09/16	Issued for Foundation Permit

SLOG-01

Logistics: 2 Tower Cranes

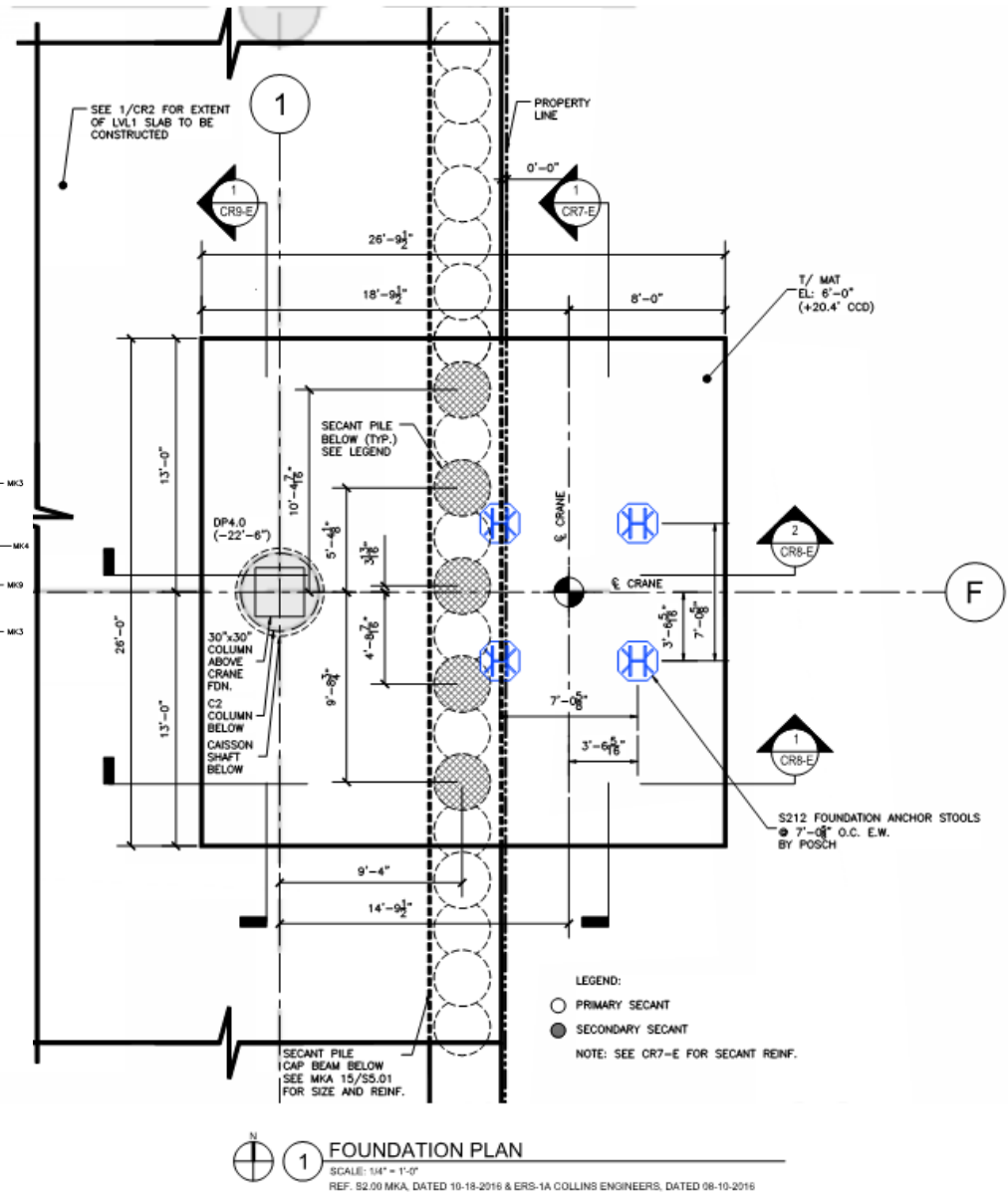
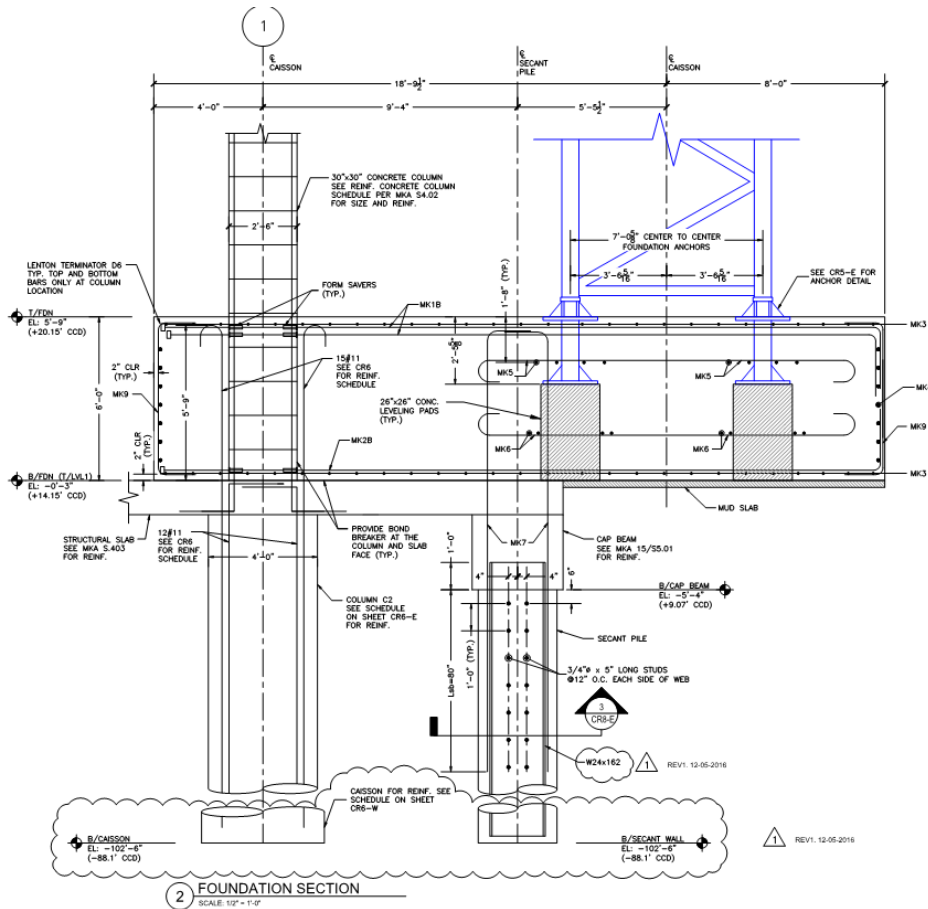


1 BUILDING SECTION
 SCALE: 1" = 16'-0"
 REF. A3.261 GENERAL DATED 10-19-2016



McHUGH 1727 S. MICHIGAN AVE. CHICAGO, IL 60616 PH: 312.686.5500	TEMPORARY CONSTRUCTION TOWER CRANE ELEVATION AND BUILDING SECTION 110 N. CARPENTER, CHICAGO, IL	
	SHEET NO. CR3-E	DATE 11/04/2016
	DRAWN BY J. J. JONES	

Logistics: Tower Crane





CONSTRUCTION FACTS & CHALLENGES (GC SIDE)

FOUNDATIONS & ERS

Straight Shaft top of rock caissons

Perimeter Secant Pile ERS/Foundation

Sheet pile coffer dam ERS around core



**GUIDEWALL FOR SECANTS
WITH FOAM TEMPLATES**





**INSTALLING SECANT PILE
WALL THRU GUIDE WALL**



CORE WALL AND MAT ERS

EXCAVATION:

Up to 1,600 cubic yards of spoils removed per day (that's 160 dump truck loads!)

Spoils removal/recyclable material expectations vs reality

Challenges & safety hazards of underground/confined space work

Maintaining schedule with equipment breakdowns and hauling/dump hours



EXCAVATION SAFETY:

OSHA Tunneling standard applies;

The OSHA tunneling standard (29 CFR 1926.800) states that it applies to underground tunnels, shafts, chambers and passageways.

It also applies to cut-and cover excavations connected to ongoing underground construction as well as those that create conditions characteristic of underground construction.

EXCAVATION SAFETY

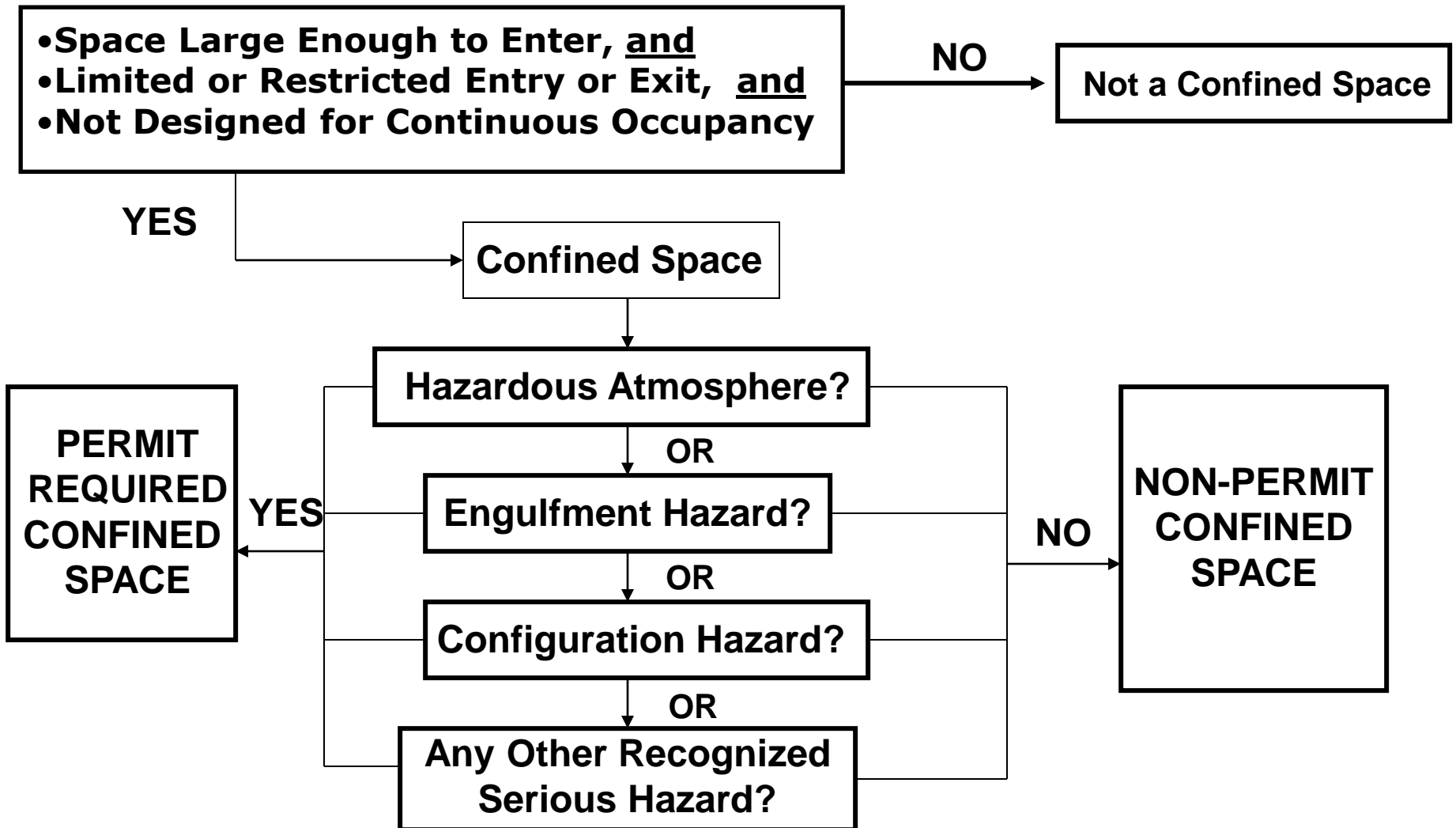
All employees involved in underground construction must be trained to recognize and respond to hazards associated with this type of work.

Training should be tailored to the specific requirements of the jobsite and include any unique issues or requirements

HAZARDS:

- Reduced natural ventilation and Light
- Difficult and limited access and egress
- Exposure to air contaminants
- Fire, flooding and explosion
- Air Monitoring-BW XTII 4 gas meters
- Ventilation-Engineered fan system from AMS Mechanical
- Hanging portions of mud-slab overhead on the ceiling

CATEGORIZING WORK SPACES



EXCAVATION SAFETY

CONFINED SPACE–

Area that has one or more of the following characteristics:

Contains, OR HAS THE POTENTIAL to contain a hazardous atmosphere;

Less than 19.5% Oxygen, or greater than 23.5% Oxygen.

Flammable/Combustible/Explosive atmosphere present or

BE able to be generated or introduced into the area.

PERMIT ONLY ACCESS-

Atmospheric Testing:

Evaluation Testing:

Testing the Confined Space atmosphere for what is normally contained.

Done to assist in developing safe entry procedures and acceptable entry conditions.

Conducted prior to entry.

These should be done by a technically qualified professional.

All personnel will be issued training stickers as well as accountability cards.

ATMOSPHERIC MONITORING:

Testing and Monitoring should identify, and alarm, at the following levels:

- Less than 19.5% or more than 23.5% Oxygen.

- 10% of the LEL

- Carbon Monoxide 35 ppm or greater

- Hydrogen Sulfide 10 ppm or greater

- Other contaminants monitored at PEL or TLV.

Monitoring must be continuous during the entire entry.

Employees CANNOT enter a Confined Space until Atmospheric levels are within an acceptable range or other controls have been established.

VENTILATION:

Dilution Ventilation:

Large quantities of air introduced to dilute contaminant levels. Caution must be exercised to prevent short circuiting the ventilation. Short circuiting occurs when “gaps” or pockets of gas concentrations are missed or left undisturbed by the ventilation method.

The formula for air movement is $Q=AV$

$Q = \text{CFM}$

$A = \text{Area}$

$V = \text{Feet Per Minute of Air}$

Required air:

100 CFM per 1 HP and 200 CFM per person underground.

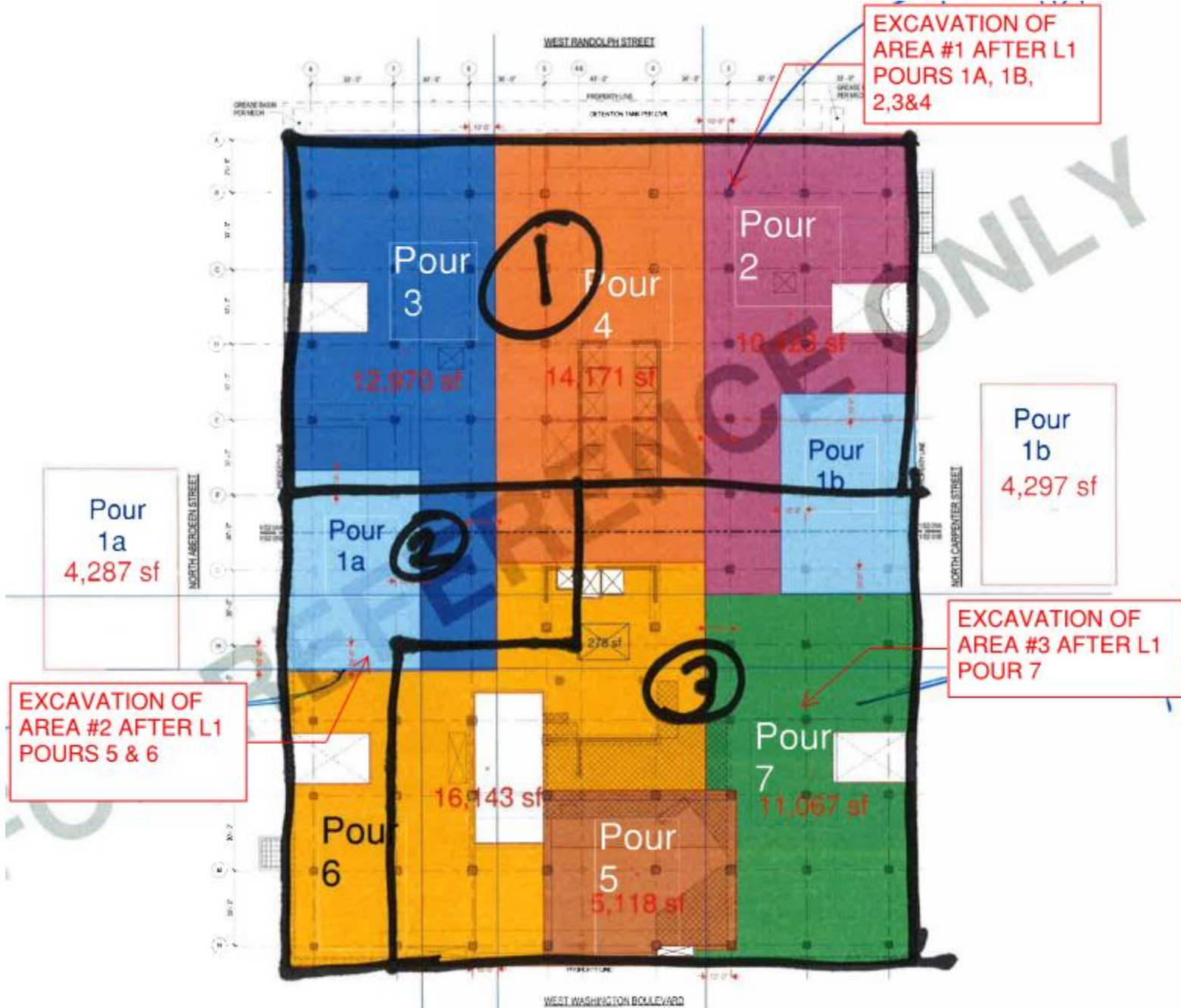
EXCAVATION EQUIPMENT:

Roy Strom Co.
110 N. Carpenter Project

Below Grade Equipment and Manpower

Equipment	HP (Ea)	Qty (Ea)	HP (Total)
Cat 939 (CRAWLER LOADER)	100	2	200
Morooka MST-800 (TRACKED DUMPER)	99	2	198
Takeuchi TL140 (SKID STEER)	81	2	162
Gradall XL2200 (ARTICULATING EXCAVATOR)	95	3	285
IHI 30VX (COMPACT EXCAVATOR)	24	2	48
Wacker 6555HE (COMPACTOR)	10	2	20
Total HP			913

Manpower	Ea
Operators	11
Laborers	4
Other (Foreman, etc)	2
Total Manpower	17



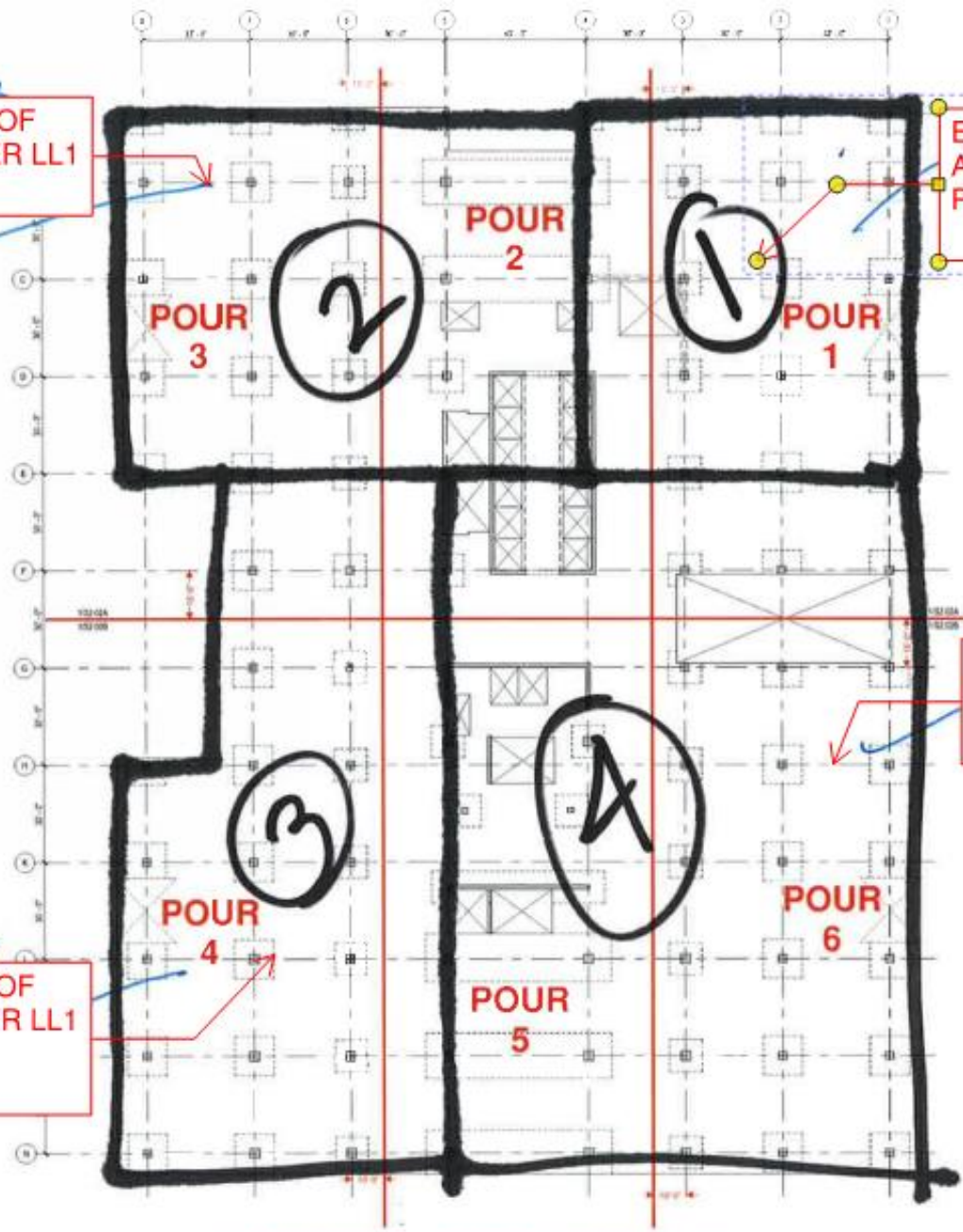
LOWER LEVEL 1 EXCAVATION PLAN

EXCAVATION OF AREA #2 AFTER LL1 POUR 3

After

EXCAVATION OF AREA #1 AFTER LL1 POURS 1&2

2 are



EXCAVATION OF AREA #3 AFTER LL1 POURS 3 & 4

found 5

EXCAVATION OF AREA #4 AFTER LL1 POURS 5&6

Lo

LOWER LEVEL 2 EXCAVATION PLAN









SCHEDULING CHALLENGES:

18 month schedule; completion date remained the same despite scope changes

Delays due to subs falling behind and lead times

OT hours, Sunday hours, holiday hours; balancing budget & keeping on schedule

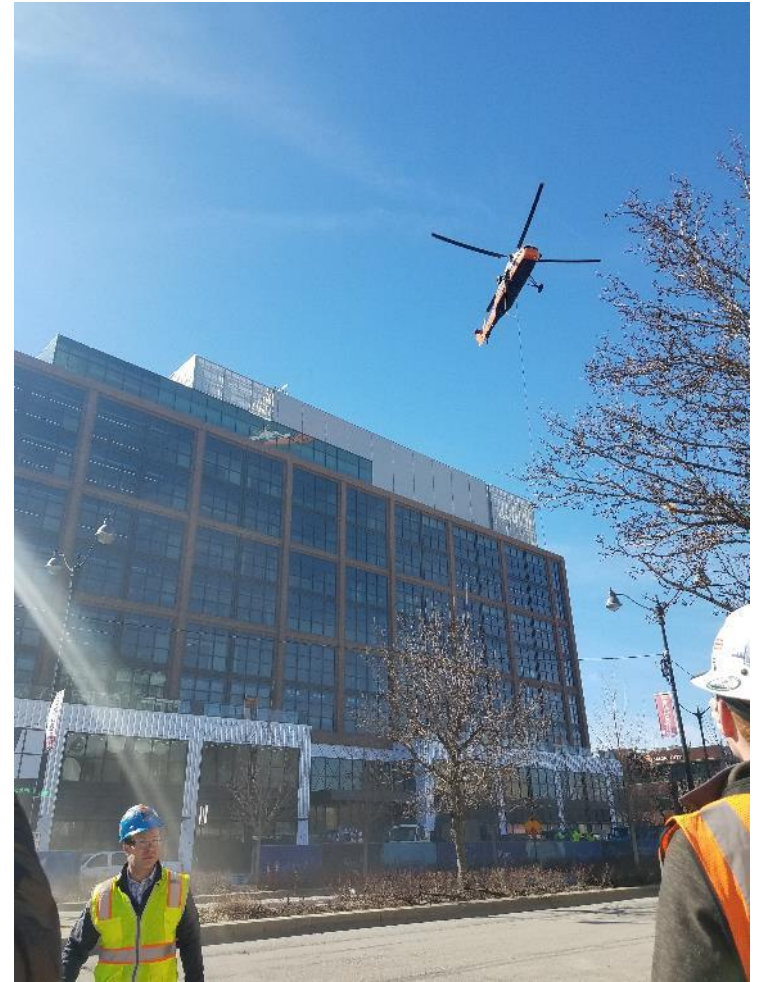
Carpenter/ Sterling/ MCD - GMP			Carp -Standard				
Activity ID	Activity Name	Original Duration	Remaining Duration	Schedule % Complete	Start	Finish	
115	Concrete - Fabricate & Ship	13	0	0%	28-Dec-16 A	06-Feb-17 A	
Interior Structure/ Partitions							
03000-MD-0110	Concrete - L1S - Fabricate & Ship	15	0	0%	01-Feb-17 A	10-Feb-17 A	
Level 2							
Interior Structure/ Partitions							
03000-MD-0210	Concrete - L2 - Fabricate & Ship	15	10	0%	16-Feb-17 A	09-Mar-17	
Level 3							
Interior Structure/ Partitions							
03000-MD-0310	Concrete - Fabricate & Ship	15	15	0%	31-Mar-17	20-Apr-17	
Level 4							
Interior Structure/ Partitions							
03000-MD-0410	Concrete - Fabricate & Ship	15	15	0%	31-Mar-17	20-Apr-17	
Level 5							
Interior Structure/ Partitions							
03000-MD-0510	Fabricate & Ship	15	15	0%	14-Apr-17	04-May-17	
Level 6							
Interior Structure/ Partitions							
03000-MD-0610	Fabricate & Ship	15	15	0%	28-Apr-17	18-May-17	
Level 7							
Interior Structure/ Partitions							
03000-MD-0710	Fabricate & Ship	15	15	0%	12-May-17	02-Jun-17	
Level 8							
Interior Structure/ Partitions							
03000-MD-0810	Fabricate & Ship	15	15	0%	26-May-17	16-Jun-17	
Level 9							
Interior Structure/ Partitions							
03000-MD-0910	Fabricate & Ship	15	15	0%	26-May-17	16-Jun-17	
Level 10							
Interior Structure/ Partitions							
03000-MD-1010	Fabricate & Ship	15	15	0%	12-Jun-17	30-Jun-17	
Level 11							
Interior Structure/ Partitions							
03000-MD-1110	Fabricate & Ship	15	15	0%	26-Jun-17	18-Jul-17	
Mock-Ups							
Common							
Exterior Structure/ Partitions							
08000-MD-0080	Mfr & Del - Glazing Performance Mock-Up Materials	109	25	0%	21-Dec-16 A	30-Mar-17	
03450-MD-0020	Mfr & Del - Pre-Cast Visual Mock-Up Materials	109	25	0%	21-Dec-16 A	30-Mar-17	
08000-MD-0080	Mfr & Del - Glazing Visual Mock-Up Materials	65	0	0%	04-Jan-17 A	24-Feb-17 A	
08000-MU-0080	Glazing Visual Mock-Up Construction and Testing	65	0	0%	04-Jan-17 A	03-Feb-17 A	
08000-MU-0080	Glazing Performance Mock-Up Construction and Testing	8	0	100%	06-Feb-17 A	15-Feb-17 A	
03450-MU-010	Pre-Cast Visual Mock-Up Construction and Testing	15	15	0%	24-Feb-17	16-Mar-17	
08000-MU-0080	Glazing Performance Mock-Up Construction and Testing	30	25	0%	27-Feb-17 A	30-Mar-17	
Construction							
General							
Common							
General							
00000-MB-0020	Mobilize for Foundations Construction	311	248	0%	18-Oct-16 A	14-Feb-18	
00000-MB-0010	Mobilize for Building Construction	266	192	0%	18-Oct-16 A	14-Feb-18	
		0	0	100%	18-Oct-16 A		
		0	0	0%		24-Oct-16 A	

█ Actual Work
 █ Critical Remaining Work
 ▼ Summary
█ Remaining Work
 ◆ Milestone

NEIGHBORHOOD CHALLENGES

Must keep not only the owner happy, but also West Loop neighbors

Informing neighbors of any potential disturbances





CONSTRUCTION FACTS & CHALLENGES

CONCRETE BY THE NUMBERS



38,050 – CY

3,100 – Tons Rebar

1.1 Million – SF

**Finished – 120,000 Man Hours
Worked**

CONCRETE KEYS TO SUCCESS

Communication

Direct line to the Architect & Engineer

Daily communication with GC & other trades

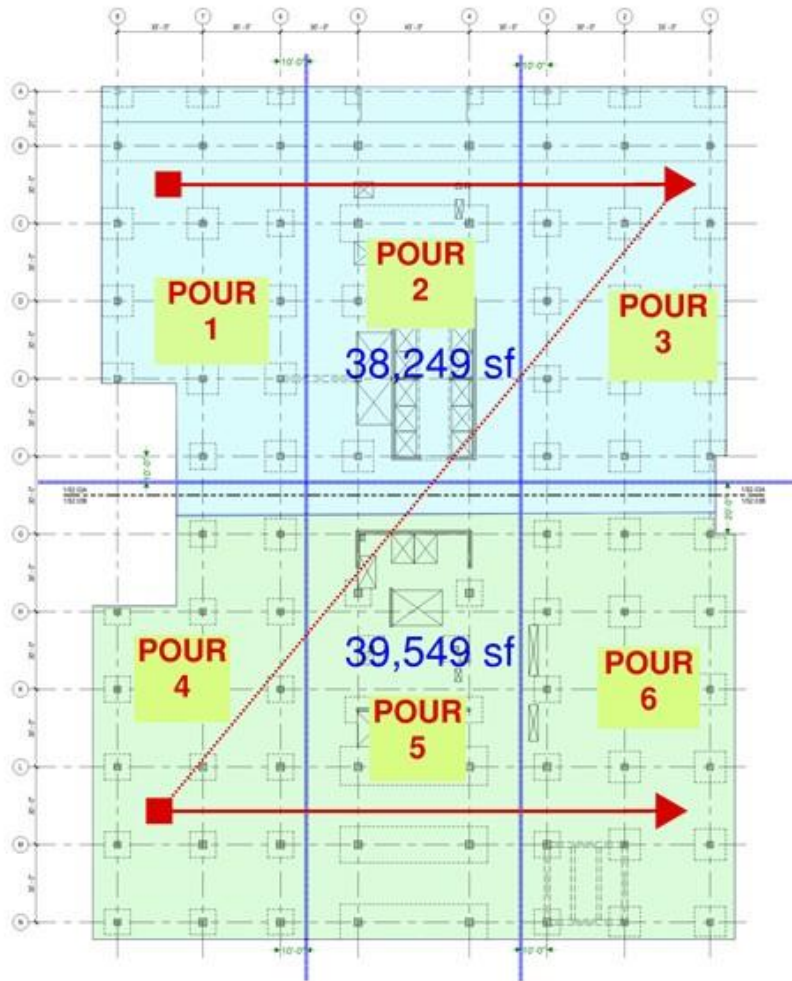
Site Logistics & Sequence

Decking one half of Building while installing rebar, MEPs, and pouring the other half

Mild Reinforcing in Decks

Minimal In-Slab MEP

ELEVATED STRUCTURE



SEQUENCE

Levels 1 to 6 – 6 Pours
2 day cycle

Levels 7 to 9 – 5 Pours
4x 2-Days, 1x 1-Day



PEAK PRODUCTION (WEEKLY)

323,900 lbs Rebar
2044 cy Concrete
61,475 sf Finishing

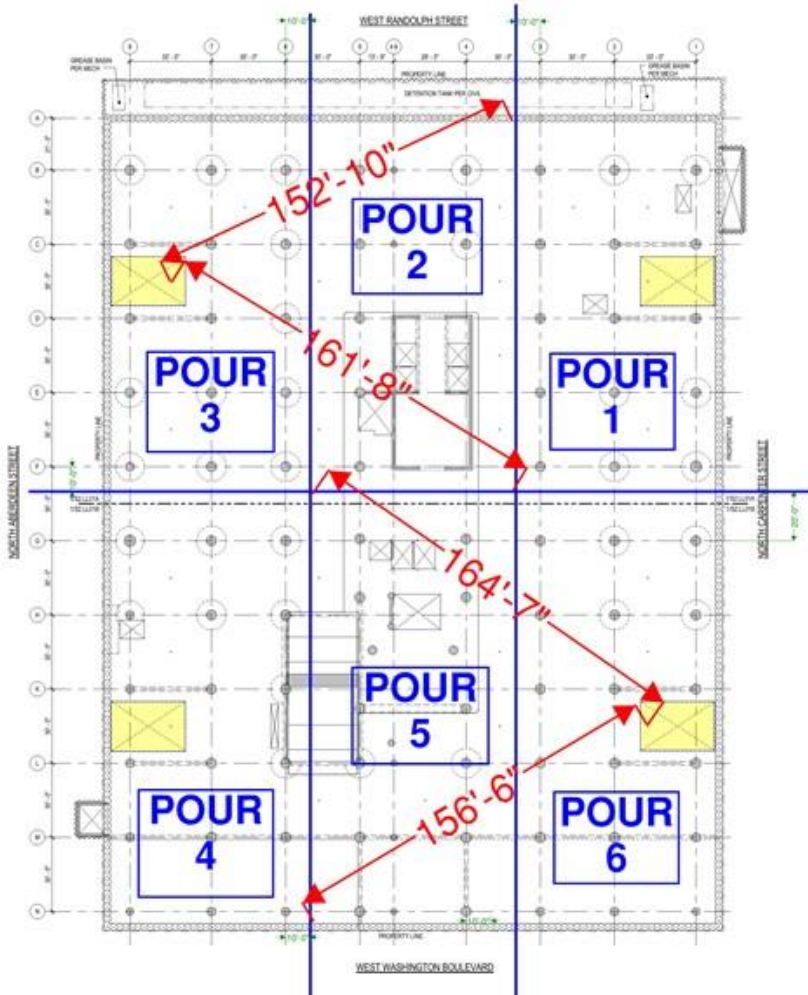


OTHER TRADES FOLLOWING CLOSELY
BEHIND!

**OPTIMIZED SHORING &
RESHORING ALLOWED OTHER
TRADES TO QUICKLY FOLLOW
CONCRETE OPERATION**



TOP DOWN POUR SEQUENCE



TOP DOWN CHALLENGES



Limited Access/Egress

All materials had to be landed down through 30'x20' glory holes

From stockpiles at glory hole, all materials had to be carried by hand to work area

TOP DOWN CHALLENGES



Pumping concrete

Unable to use placing boom due to slab situated above

Pump located at ground level, and boomed down to below grade slab



Longest pours 150'-160' from glory hole

Utilising hard pipe and slick lines to reach pour areas

TOP DOWN CHALLENGES



CONNECTING TO CORE

RQD CUTTING OUT COFFERERS
WALERS, STRUTS & SHEETING

ONCE ERS REMOVED FOR A LEVEL,
SLAB FORMWORK SUPPORTED ON
SHORING FROM BOTTOM OF MAT UP

TOP DOWN DETAILS



Demo plus 18 months of construction in a 30 second video!

<https://www.youtube.com/watch?v=bnfLh1QVmHA&feature=youtu.be>



Thank you!