Washington DC Area

# Multi-Use High Rise

## Technical Report 3


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## Multi-Use High Rise

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## Section I: Executive Summary

In this Technical assignment three, I will be discussing schedule acceleration scenarios and value engineering topics of the Multi-Use High Rise project. I will also be discussion my day at the PACE roundtable, including critical industry issues and feedback from the industry.

The Multi-Use High Rise critical path schedule will be described, as well as risks to the project completion date. Key schedule acceleration areas will also be discussed, describing the key costs and techniques. The project utilizes value engineering in areas inside and outside the building. These items help the owner reach their goals in construction, however not all topics were implemented.

The PACE roundtable was a very rewarding day. The sessions I attended included safety – prevention in design and multi-trade prefabrication. Both sessions gave me great insight in new industry issues I had little knowledge about and gave me a great starting point into how my project uses safety prevention in design and prefabrication.

## SECTION II: SCHEDULE ACCELERATION

***Project Critical Path***

The critical path schedule is a detailed schedule of all events that are required to be completed in succession, calculating the longest path of planned activates to the end of the project. In the Multi-Use High Rise project, the critical path schedule is used to present to the owner the longest possible duration of construction, showing all required activities. This critical path schedule can be seen in its entirety in ***Appendix A: Critical Path Schedule.***

The critical path for this project begins with preconstruction. There are critical meetings to be completed, and sheeting, shoring, and overhead protection permits required to be obtained prior to construction efforts. Once completed, initial site work can be performed. The required initial site work includes mobilization, demolition, and excavation. First, mobilization must occur, as well as installing sediment and erosion control, demolishing existing buildings, and installing overhead protection. As soon as these specific activities are completed, excavation may begin. Once soldier beams, bracket piles, and caissons are installed, cutting and lagging begins. This occurs on tier one and tier two, up to subgrade level. As initial site work is completed, the garage foundation and structure construction can begin. This includes erection of the tower crane, slabs-on-deck, slabs-on-grade, and structural concrete columns. As soon as the foundation and structure of the garage is complete, Building A construction begins. This construction includes foundations and structure, which is concrete slabs and columns on each floor. Next, the critical path schedule shows the fourth floor skin the next required item in order to show the longest construction duration. Once the skin is complete to all floors, finishes are begun. As each unit on Building 1 come to a close, the critical path schedule comes to a final ending point, showing owner 2$^{nd}$ walk and turnover of Building 1's tenth floor on June 24, 2012, which is the projects substantial completion.

The critical path of the Multi-Use High Rise project is one that really fell into place. The software used to schedule is a big math equation, linking all activities through predecessors and successors. Because of this, the critical path is based on the durations of all the activities and the successors that follow the activities. In this project, all of the high rise apartments will have the same items on the critical path because the buildings and durations of activities are similar.

The general plan in this project, when coming up with the critical path, is to begin with excavation and getting to the bottom of the hole, then concrete, then exterior framing, exterior masonry, windows, and transitioning to the interiors and all of the finishes. Items, such as installing the appliances, will not appear on the critical path because installation of the appliances will not hold up many other schedule items if it is behind schedule. However, no activity can start before excavation is finished, which is why it comes up on the critical path, every other activity is linked to the completion of the excavation.

***Risks to Project Completion***

There is countless number of risks to completing a project as large as the Multi-Use High Rise close to the estimated completion date. These risks include everything from material lead times to weather, to performance of subcontractors. The biggest risk, in this project, has to be the performance of subcontractors. Specifically, manpower issues of the subcontractors greatly affect the project schedule. If subcontractors do not have adequate manpower, it is simply impossible to keep up with the project schedule of the Multi-Use High Rise project, due to the speed and complexity of the schedule, and the project will fall behind schedule. The construction market in the Washington DC area is forever booming, and manpower problems have been evident across the board. For example, if framing and drywall subcontractors do not have enough manpower to complete the framing and drywall inside the building, this holds up the MEP and sprinkler rough-ins and close-ins and from installing the finishes, which all overall greatly sets the project schedule back. Although manpower issues are a huge factor in affecting project completion, material lead times also lend a hand in this risk.

The delivery of any material that has a long lead time results in a risk to the project schedule. In the Multi-Use High Rise project, the originally selected granite color is no longer available, so it took a long process with the owner in selecting a new color for the unit countertops. This delay prevented the release of material earlier, affecting the overall schedule of the building. Not only did the lack of preference cause a risk, but the granite is also coming from overseas, which only adds to the risk. The owner also took time selecting the cabinets to use within each unit, along with that they are coming from Italy, so risk is added. The cast stone is being made in Georgia, so that has a long lead time and requires specific coordination to have them ship the correct pieces. Also, the windows have a long lead time so getting shop drawings reviewed and approved on time so the material can be released was a big risk to the completion date.

***Schedule Acceleration***

At this stage in the Multi-Use High Rise project, with all of the concrete work finished, all of the focus to accelerate the project is on finishing the units. This includes finishing framing the units and all of the MEP and sprinkler work. Following this, hanging drywall and installing all of the finishes will follow. This includes cabinets, granite, flooring, painting, appliances, fixtures, etc. Another main concern in project acceleration right now is finishing the exterior of the building. Other items that have previously had the potential to speed up the project are the excavation and concrete work. Since excavation and concrete work are such large areas of construction, completing these activities quicker will greatly accelerate the project.

In the Multi-Use High Rise, the costs and techniques in finishing the framing quicker will be to pay the drywall/framing subcontractor and mason to work overtime. Expediting the delivery of the granite and cabinets will also potentially accelerate the project, however it comes with

additional costs. Speeding up the production and delivery of the cast stone also has potential to accelerate, however additional cost is included in that technique.

Techniques previously used to speed up the excavation and concrete work include having concrete subcontractors to bring in a conveyer that is placed in the hole to remove remaining dirt. Temporary power was also inadequate prior to the installation of tower cranes, so in order to reduce lag, diesel fuel generators were delivered regularly.

## SECTION III: VALUE ENGINEERING

Value engineering is used in the Multi-Use High Rise project to improve the value of the products and services used throughout construction. Value engineering is exemplified during all components of construction; this includes structure, interiors, and finishes of Building 1, Building 2 and the parking garage.

**Key Areas of Value Engineering:**

- Exterior Changes
  - Most of the exterior steel fabrications such as railings, balcony railings, terrace dividers, roof trellis, fences and gate on the pool deck, etc. were changed from steel to aluminum
  - Concrete sealer is used at the balconies instead of the traffic coating
  - The entire window system is altered, changing the windows to be manufactured by Thermal. The operable windows also changed from sliders to casement and used receptors instead of fins.
  - Deleting lipped brick
  - Changing the Bentonite waterproofing from the specified Ultra-seal product to Voltex
  - Changing the flashing from copper to prefinished metal
- Interior Changes
  - Use 6'- 8" doors instead of 7'- 0" doors within the units
  - Two panel hollow core pre-hung doors are used within the units instead of solid core doors
  - Changing finishes – using vinyl plank flooring instead of wood in the units, using a less expensive tile at the unit bathrooms, using 1 coat primer and 1 cost finish for paint within the units,
  - Using tile base at elevator lobbies instead of stainless steel base
  - Changing the apartment closet shelving from wood to wire shelves
  - Changing the unit appliances to less expensive models
- Plumbing Changes
  - All of the plumbing fixtures, tubs, toilets, sinks, etc. are substituted for less expensive models
- Electrical Changes
  - The most significant changes in value engineering occur with the project's electrical system. See ***Appendix B: Electrical Value Engineering***

In the Multi-Use High Rise project, a few value-engineering ideas were considered, but not implemented. These ideas include using non-pigmented mortar in lieu of colored mortar, using a different patterned glass block instead of what is specified, deleting the steel framing at the upper

roof, and deleting the resin panels that hand from the fitness room. These ideas were conversed amongst the project manager, owner and superintendents, but collectively they felt the implementation of these ideas were a waste of cost and time.

## SECTION IV: PACE ROUNDTABLE

***Critical Industry Issues***

During the PACE Roundtable event, I attended two session, both in which I found extremely insightful. The morning session was about Safety – Prevention through design and the afternoon session was about Criteria and Drivers for Effective Multi-trade prefabrication and Modularization. I selected to attend the first session because, as an EMT, I find a great interest in safety and feel it is easily the most important aspect of every project. I decided to attend the second session because my thesis project wants to utilize time efficiency, so what better way to do so than to use prefabrication.

The prevention through design session was about implementing safety practices in the design phase of construction, to further protect the project and its personnel throughout the entire process and even its entire lifespan. It is evident that safety is considered the number one focus by all industry personnel. It is thought about and plans are created all throughout the construction phase of a project. However, it has been found out that the design community lack knowledge when it comes to safety. They feel it is something that needs to be dealt with by the contractor, after the design is created and will occur on its own. To become a designer, there are no safety certifications or coursework required, which is causing this lack of knowledge. This is why safety is not the slightest bit thought about when the building is being designed. In order to solve this issue, safety training courses should be made available for designers, which will give designers the knowledge they need. A safety certification program, similar to the LEED Credibility program, should be utilized, forcing and a safety rating. Finally, a 3$^{rd}$ party safety team should also be utilized in the design of a building. Some surprises about this meeting was the lack of knowledge designers have, I thought it was incredible that designers are not required to learn about safety in design. Also, it is surprising that construction safety professionals have little influence on the design aspect of the project. Finally, the fact that a safety factor is not included in the construction contract makes it difficult for the designer to take safety serous when designing. When looking at the Multi-Use High Rise, it is evident safety hasn't been implemented until the construction process started. It is definitely a safe project, however there are no significant factors showing safety has been implemented in design. For further advise, I can reach out to the safety coordinator of the project, and a 3$^{rd}$ party safety coordination companies to see how safety had been tied into the project, when it began a focal point, and what would be different if safety was implemented in design.

The multi-trade prefabrication session was about using more prefabrication in project throughout the industry. Prefabrication is used a lot, but it is either something the company loves, or hates. Usually, prefabrication is generally used for large-scale healthcare projects, pedestrian bridges, parking garages, or large apartments with similar units. Usually, the general contractor is responsible for supporting the use of prefabrication, and the designer is responsible for designing to work around prefabrication. Prefabrication is known to be safer, have better quality, and allow

for higher productivity. Some concerns regarding prefabrication include crane/hoisting upsizing, trucking/transfer issues, staging issues, special permits required, shipping costs, and transit protection issues. Some surprising features about this discussion include how many industry members do not like using prefabrication or have never used prefabrication. I also found it surprising how much more cost, labor and time efficient prefabrication can be, it is almost silly why more of the industry doesn't use it. When looking at my thesis project, I wonder why prefabrication isn't utilized. It is mostly concrete construction, the units are relatively similar, and the MEP work is not too complex, all factors that should lead to prefabrication. It could be that the general contractor or design team does not believe prefabrication is worth it, but following this discussion, it is hard to understand why it is not being used. To get to the bottom of this, I can contact the general contractor and find out their thoughts on prefabrication. It could be that they wanted to use it but the owner did not. Also, I could contact a general contractor that does use prefabrication in most projects, getting advice to weigh the positives and negatives.

Overall, much was learned from the PACE roundtable, information I will take with me for the rest of my life. I greatly enjoyed the entire day and was delighted to have been a part of it.

***Industry Feedback***

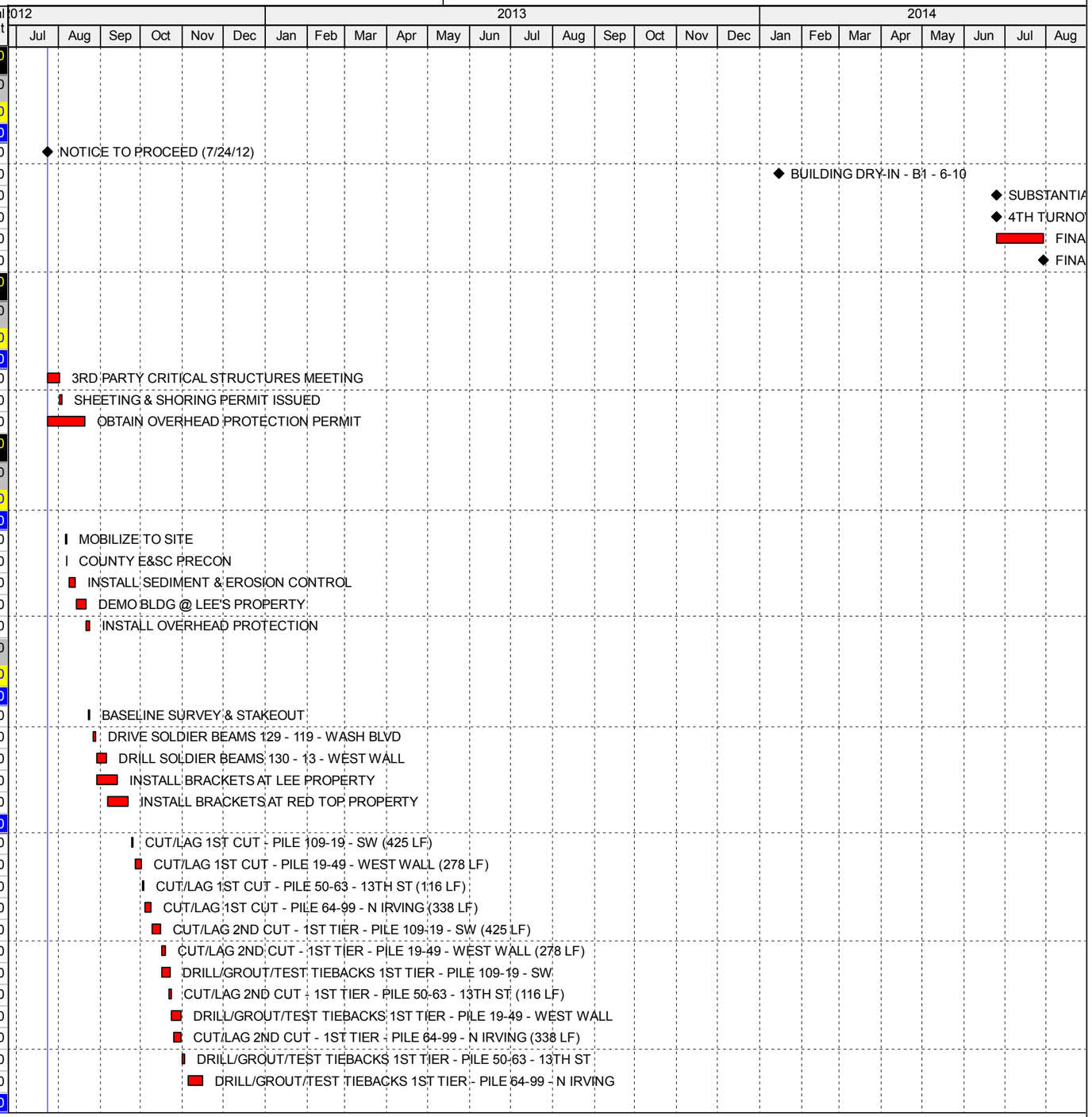
At the end of the PACE roundtable meeting, I met with Forrester Construction Company's Seth Glanski. Mr. Glanski has been working with Forrester for about ten years and is currently a senior project manager. His feedback and insight was very helpful, given his experience with similar projects in a similar region. I had questions regarding switching concrete practices from cast-in-place to prefabrication. On this topic, he stated prefabrication is mainly only effective on large-scale project. Given this information, prefabrication would likely help the effectiveness of my project, but in the overall industry, when the median cost for a project is roughly $1 million, it has little benefit. Also, he stated while prefabrication is a safer way of concrete construction, the quality and productivity greatly depends on the project, as some projects there is significantly less. I also spoke to Mr. Glanski about implementing more safety involved in the project earlier and more often. He noted many projects he is on uses a 3$^{rd}$ party safety service to perform random inspections and regular safety trainings. These inspections are similar to OSHA inspections, which is very useful in preparing for the real OSHA inspections that do happen and could be costly. The PACE roundtable was a very useful event that will help me throughout thesis, as well as my future career in the industry.

## Appendix A: Critical Path Schedule

The following items are found in Appendix A: Critical Path Schedule

- Critical Path Schedule

| Activity ID | Activity Name | Original Duration | Start | Finish | Total Float |
|---|---|---|---|---|---|
| **MILESTONES** | | 512 | 24-Jul-12 | 29-Jul-14 | 0 |
| **MILESTONES** | | 512 | 24-Jul-12 | 29-Jul-14 | 0 |
| | | 512 | 24-Jul-12 | 29-Jul-14 | 0 |
| | | 512 | 24-Jul-12 | 29-Jul-14 | 0 |
| MILE-1 | NOTICE TO PROCEED (7/24/12) | 0 | 24-Jul-12 | | 0 |
| MILE-9 | BUILDING DRY-IN - B1 - 6-10 | 0 | | 15-Jan-14 | 0 |
| MILE-20 | SUBSTANTIAL COMPLETION - BLDG 1 (10 STORY) | 0 | | 24-Jun-14* | 0 |
| MILE-21 | 4TH TURNOVER - BLDG 1 FLRS 8-10 | 0 | | 24-Jun-14* | 0 |
| MILE-22 | FINAL PUNCHLIST | 35 | 25-Jun-14 | 29-Jul-14 | 0 |
| MILE-99 | FINAL COMPLETION | 0 | | 29-Jul-14 | 0 |
| **PRECONSTRUCTION** | | 20 | 24-Jul-12 | 20-Aug-12 | 0 |
| **PRECONSTRUCTION** | | 20 | 24-Jul-12 | 20-Aug-12 | 0 |
| | | 20 | 24-Jul-12 | 20-Aug-12 | 0 |
| | | 20 | 24-Jul-12 | 20-Aug-12 | 0 |
| 10 | 3RD PARTY CRITICAL STRUCTURES MEETING | 7 | 24-Jul-12 | 01-Aug-12 | 0 |
| 20 | SHEETING & SHORING PERMIT ISSUED | 2 | 02-Aug-12 | 03-Aug-12 | 0 |
| 50 | OBTAIN OVERHEAD PROTECTION PERMIT | 20 | 24-Jul-12 | 20-Aug-12 | 0 |
| **INITIAL SITEWORK** | | 100 | 06-Aug-12 | 27-Dec-12 | 0 |
| **MOBILIZATION/DEMO** | | 15 | 06-Aug-12 | 24-Aug-12 | 0 |
| | | 15 | 06-Aug-12 | 24-Aug-12 | 0 |
| | | 15 | 06-Aug-12 | 24-Aug-12 | 0 |
| MOB-1000 | MOBILIZE TO SITE | 2 | 06-Aug-12 | 07-Aug-12 | 0 |
| MOB-1010 | COUNTY E&SC PRECON | 1 | 07-Aug-12 | 07-Aug-12 | 0 |
| MOB-1030 | INSTALL SEDIMENT & EROSION CONTROL | 3 | 09-Aug-12 | 13-Aug-12 | 0 |
| MOB-1050 | DEMO BLDG @ LEE'S PROPERTY | 5 | 14-Aug-12 | 21-Aug-12 | 0 |
| MOB-1060 | INSTALL OVERHEAD PROTECTION | 3 | 21-Aug-12 | 24-Aug-12 | 0 |
| **EXCAVATION** | | 74 | 23-Aug-12 | 27-Dec-12 | 0 |
| | | 74 | 23-Aug-12 | 27-Dec-12 | 0 |
| **SOLDIER BEAMS/BRACKET PILES/CAISSONS** | | 19 | 23-Aug-12 | 21-Sep-12 | 0 |
| EX-1000 | BASELINE SURVEY & STAKEOUT | 2 | 23-Aug-12 | 24-Aug-12 | 0 |
| EX-1010 | DRIVE SOLDIER BEAMS 129 - 119 - WASH BLVD | 2 | 27-Aug-12 | 28-Aug-12 | 0 |
| EX-1030 | DRILL SOLDIER BEAMS 130 - 13 - WEST WALL | 5 | 29-Aug-12 | 05-Sep-12 | 0 |
| EX-1050 | INSTALL BRACKETS AT LEE PROPERTY | 10 | 29-Aug-12 | 13-Sep-12 | 0 |
| EX-1090 | INSTALL BRACKETS AT RED TOP PROPERTY | 10 | 06-Sep-12 | 21-Sep-12 | 0 |
| **CUT/LAG TO 1ST TIER** | | 33 | 24-Sep-12 | 15-Nov-12 | 0 |
| EX-1110 | CUT/LAG 1ST CUT - PILE 109-19 - SW (425 LF) | 2 | 24-Sep-12 | 25-Sep-12 | 0 |
| EX-1120 | CUT/LAG 1ST CUT - PILE 19-49 - WEST WALL (278 LF) | 3 | 27-Sep-12 | 01-Oct-12 | 0 |
| EX-1130 | CUT/LAG 1ST CUT - PILE 50-63 - 13TH ST (116 LF) | 2 | 02-Oct-12 | 03-Oct-12 | 0 |
| EX-1150 | CUT/LAG 1ST CUT - PILE 64-99 - N IRVING (338 LF) | 3 | 04-Oct-12 | 08-Oct-12 | 0 |
| EX-1170 | CUT/LAG 2ND CUT - 1ST TIER - PILE 109-19 - SW (425 LF) | 4 | 09-Oct-12 | 15-Oct-12 | 0 |
| EX-1180 | CUT/LAG 2ND CUT - 1ST TIER - PILE 19-49 - WEST WALL (278 LF) | 3 | 16-Oct-12 | 19-Oct-12 | 0 |
| EX-1190 | DRILL/GROUT/TEST TIEBACKS 1ST TIER - PILE 109-19 - SW | 4 | 16-Oct-12 | 22-Oct-12 | 0 |
| EX-1200 | CUT/LAG 2ND CUT - 1ST TIER - PILE 50-63 - 13TH ST (116 LF) | 2 | 22-Oct-12 | 23-Oct-12 | 0 |
| EX-1230 | DRILL/GROUT/TEST TIEBACKS 1ST TIER - PILE 19-49 - WEST WA | 5 | 23-Oct-12 | 30-Oct-12 | 0 |
| EX-1220 | CUT/LAG 2ND CUT - 1ST TIER - PILE 64-99 - N IRVING (338 LF) | 4 | 25-Oct-12 | 30-Oct-12 | 0 |
| EX-1250 | DRILL/GROUT/TEST TIEBACKS 1ST TIER - PILE 50-63 - 13TH ST | 3 | 31-Oct-12 | 02-Nov-12 | 0 |
| EX-1300 | DRILL/GROUT/TEST TIEBACKS 1ST TIER - PILE 64-99 - N IRVING | 7 | 05-Nov-12 | 15-Nov-12 | 0 |
| **CUT/LAG TO 2ND TIER** | | 26 | 31-Oct-12 | 14-Dec-12 | 0 |






DONOHOE CONSTRUCTION COMPANY
DATA DATE: 24-Jul-12

| Activity ID | Activity Name | Original Duration | Start | Finish | Total Float |
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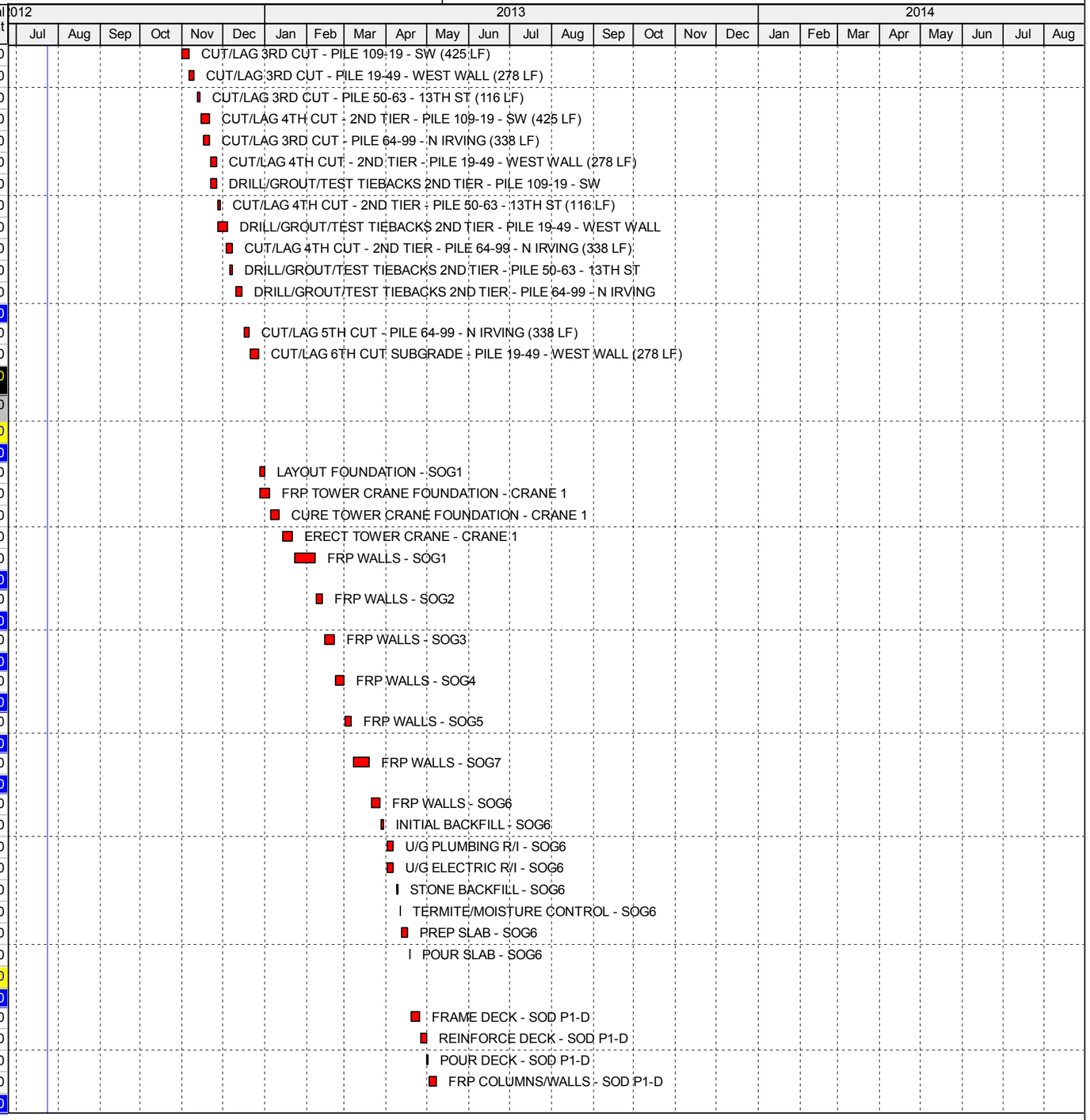
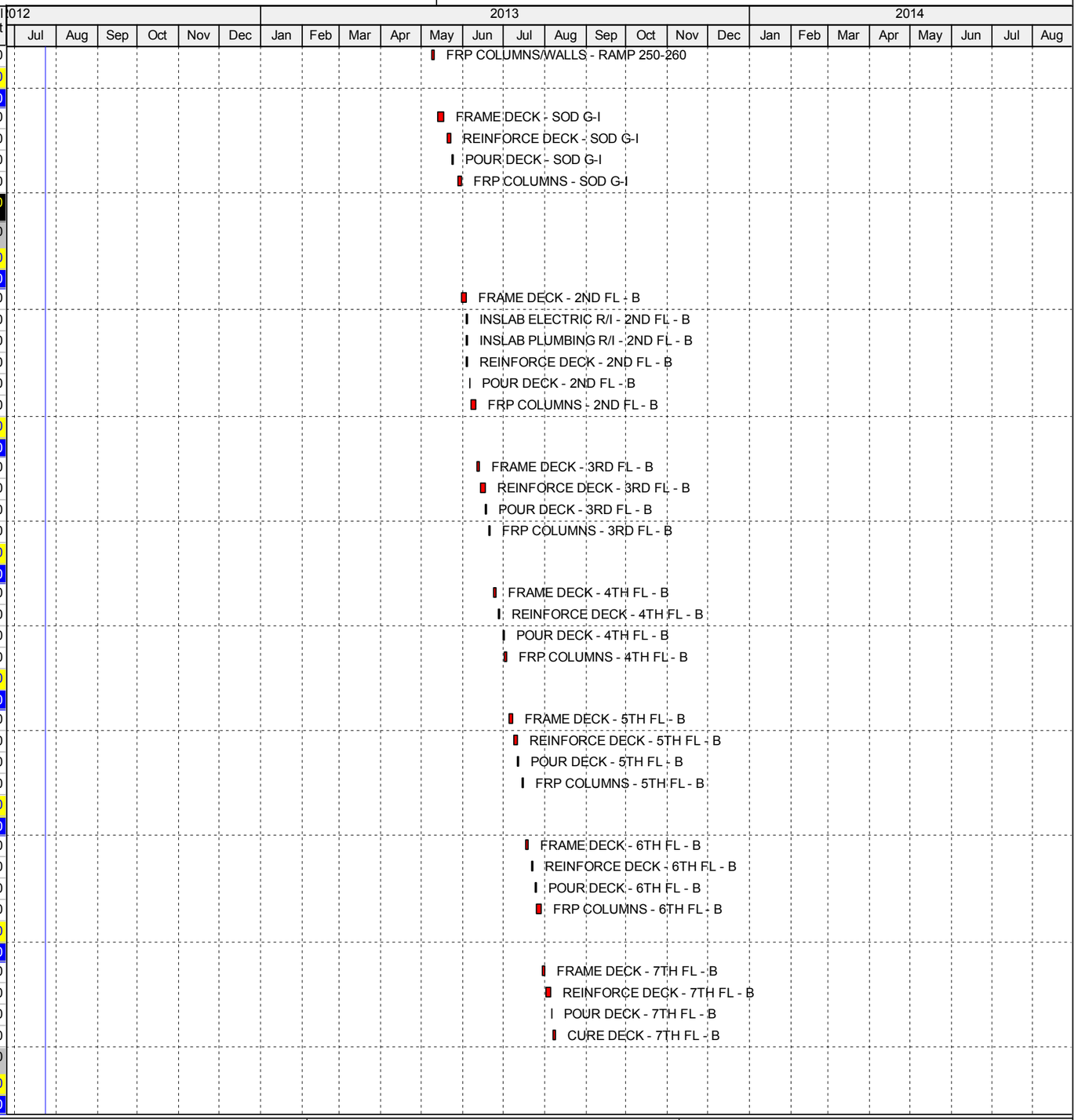
| EX-1260 | CUT/LAG 3RD CUT - PILE 109-19 - SW (425 LF) | 4 | 31-Oct-12 | 05-Nov-12 | 0 |
| EX-1270 | CUT/LAG 3RD CUT - PILE 19-49 - WEST WALL (278 LF) | 3 | 06-Nov-12 | 09-Nov-12 | 0 |
| EX-1290 | CUT/LAG 3RD CUT - PILE 50-63 - 13TH ST (116 LF) | 2 | 12-Nov-12 | 13-Nov-12 | 0 |
| EX-1320 | CUT/LAG 4TH CUT - 2ND TIER - PILE 109-19 - SW (425 LF) | 4 | 15-Nov-12 | 20-Nov-12 | 0 |
| EX-1310 | CUT/LAG 3RD CUT - PILE 64-99 - N IRVING (338 LF) | 3 | 16-Nov-12 | 20-Nov-12 | 0 |
| EX-1340 | CUT/LAG 4TH CUT - 2ND TIER - PILE 19-49 - WEST WALL (278 LF) | 3 | 22-Nov-12 | 26-Nov-12 | 0 |
| EX-1350 | DRILL/GROUT/TEST TIEBACKS 2ND TIER - PILE 109-19 - SW | 3 | 22-Nov-12 | 26-Nov-12 | 0 |
| EX-1360 | CUT/LAG 4TH CUT - 2ND TIER - PILE 50-63 - 13TH ST (116 LF) | 2 | 27-Nov-12 | 28-Nov-12 | 0 |
| EX-1390 | DRILL/GROUT/TEST TIEBACKS 2ND TIER - PILE 19-49 - WEST W/ | 4 | 27-Nov-12 | 04-Dec-12 | 0 |
| EX-1400 | CUT/LAG 4TH CUT - 2ND TIER - PILE 64-99 - N IRVING (338 LF) | 4 | 03-Dec-12 | 07-Dec-12 | 0 |
| EX-1410 | DRILL/GROUT/TEST TIEBACKS 2ND TIER - PILE 50-63 - 13TH ST | 2 | 06-Dec-12 | 07-Dec-12 | 0 |
| EX-1450 | DRILL/GROUT/TEST TIEBACKS 2ND TIER - PILE 64-99 - N IRVING | 4 | 10-Dec-12 | 14-Dec-12 | 0 |
| **CUT/LAG TO SUBGRADE** | | 6 | 17-Dec-12 | 27-Dec-12 | 0 |
| EX-1460 | CUT/LAG 5TH CUT - PILE 64-99 - N IRVING (338 LF) | 3 | 17-Dec-12 | 20-Dec-12 | 0 |
| EX-1480 | CUT/LAG 6TH CUT SUBGRADE - PILE 19-49 - WEST WALL (278 LI | 3 | 21-Dec-12 | 27-Dec-12 | 0 |
| **GARAGE** | | 108 | 28-Dec-12 | 30-May-13 | 0 |
| **FOUNDATIONS & STRUCTURE** | | 108 | 28-Dec-12 | 30-May-13 | 0 |
| **LEVEL P2** | | 79 | 28-Dec-12 | 18-Apr-13 | 0 |
| **SLAB ON GRADE 1** | | 29 | 28-Dec-12 | 07-Feb-13 | 0 |
| GS-1000 | LAYOUT FOUNDATION - SOG1 | 2 | 28-Dec-12 | 31-Dec-12 | 0 |
| GS-1020 | FRP TOWER CRANE FOUNDATION - CRANE 1 | 5 | 28-Dec-12 | 04-Jan-13 | 0 |
| GS-1040 | CURE TOWER CRANE FOUNDATION - CRANE 1 | 7 | 05-Jan-13 | 11-Jan-13 | 0 |
| GS-1070 | ERECT TOWER CRANE - CRANE 1 | 5 | 14-Jan-13 | 21-Jan-13 | 0 |
| GS-1180 | FRP WALLS - SOG1 | 10 | 23-Jan-13 | 07-Feb-13 | 0 |
| **SLAB ON GRADE 2** | | 3 | 08-Feb-13 | 12-Feb-13 | 0 |
| GS-1250 | FRP WALLS - SOG2 | 3 | 08-Feb-13 | 12-Feb-13 | 0 |
| **SLAB ON GRADE 3** | | 5 | 14-Feb-13 | 21-Feb-13 | 0 |
| GS-1350 | FRP WALLS - SOG3 | 5 | 14-Feb-13 | 21-Feb-13 | 0 |
| **SLAB ON GRADE 4** | | 5 | 22-Feb-13 | 28-Feb-13 | 0 |
| GS-1500 | FRP WALLS - SOG4 | 5 | 22-Feb-13 | 28-Feb-13 | 0 |
| **SLAB ON GRADE 5** | | 3 | 01-Mar-13 | 05-Mar-13 | 0 |
| GS-1590 | FRP WALLS - SOG5 | 3 | 01-Mar-13 | 05-Mar-13 | 0 |
| **SLAB ON GRADE 7** | | 7 | 07-Mar-13 | 19-Mar-13 | 0 |
| GS-1810 | FRP WALLS - SOG7 | 7 | 07-Mar-13 | 19-Mar-13 | 0 |
| **SLAB ON GRADE 6** | | 18 | 21-Mar-13 | 18-Apr-13 | 0 |
| GS-1960 | FRP WALLS - SOG6 | 5 | 21-Mar-13 | 27-Mar-13 | 0 |
| GS-2040 | INITIAL BACKFILL - SOG6 | 2 | 28-Mar-13 | 29-Mar-13 | 0 |
| GS-2140 | U/G PLUMBING R/I - SOG6 | 4 | 01-Apr-13 | 05-Apr-13 | 0 |
| GS-2150 | U/G ELECTRIC R/I - SOG6 | 4 | 01-Apr-13 | 05-Apr-13 | 0 |
| GS-2180 | STONE BACKFILL - SOG6 | 2 | 08-Apr-13 | 09-Apr-13 | 0 |
| GS-2200 | TERMITE/MOISTURE CONTROL - SOG6 | 1 | 11-Apr-13 | 11-Apr-13 | 0 |
| GS-2230 | PREP SLAB - SOG6 | 3 | 12-Apr-13 | 16-Apr-13 | 0 |
| GS-2260 | POUR SLAB - SOG6 | 1 | 18-Apr-13 | 18-Apr-13 | 0 |
| **LEVEL P1** | | 14 | 19-Apr-13 | 10-May-13 | 0 |
| **SLAB ON DECK - P1-D** | | 12 | 19-Apr-13 | 07-May-13 | 0 |
| GS-2330 | FRAME DECK - SOD P1-D | 4 | 19-Apr-13 | 25-Apr-13 | 0 |
| GS-2420 | REINFORCE DECK - SOD P1-D | 3 | 26-Apr-13 | 30-Apr-13 | 0 |
| GS-2470 | POUR DECK - SOD P1-D | 1 | 01-May-13 | 01-May-13 | 0 |
| GS-2660 | FRP COLUMNS/WALLS - SOD P1-D | 4 | 02-May-13 | 07-May-13 | 0 |
| **RAMP 250-260** | | 2 | 09-May-13 | 10-May-13 | 0 |



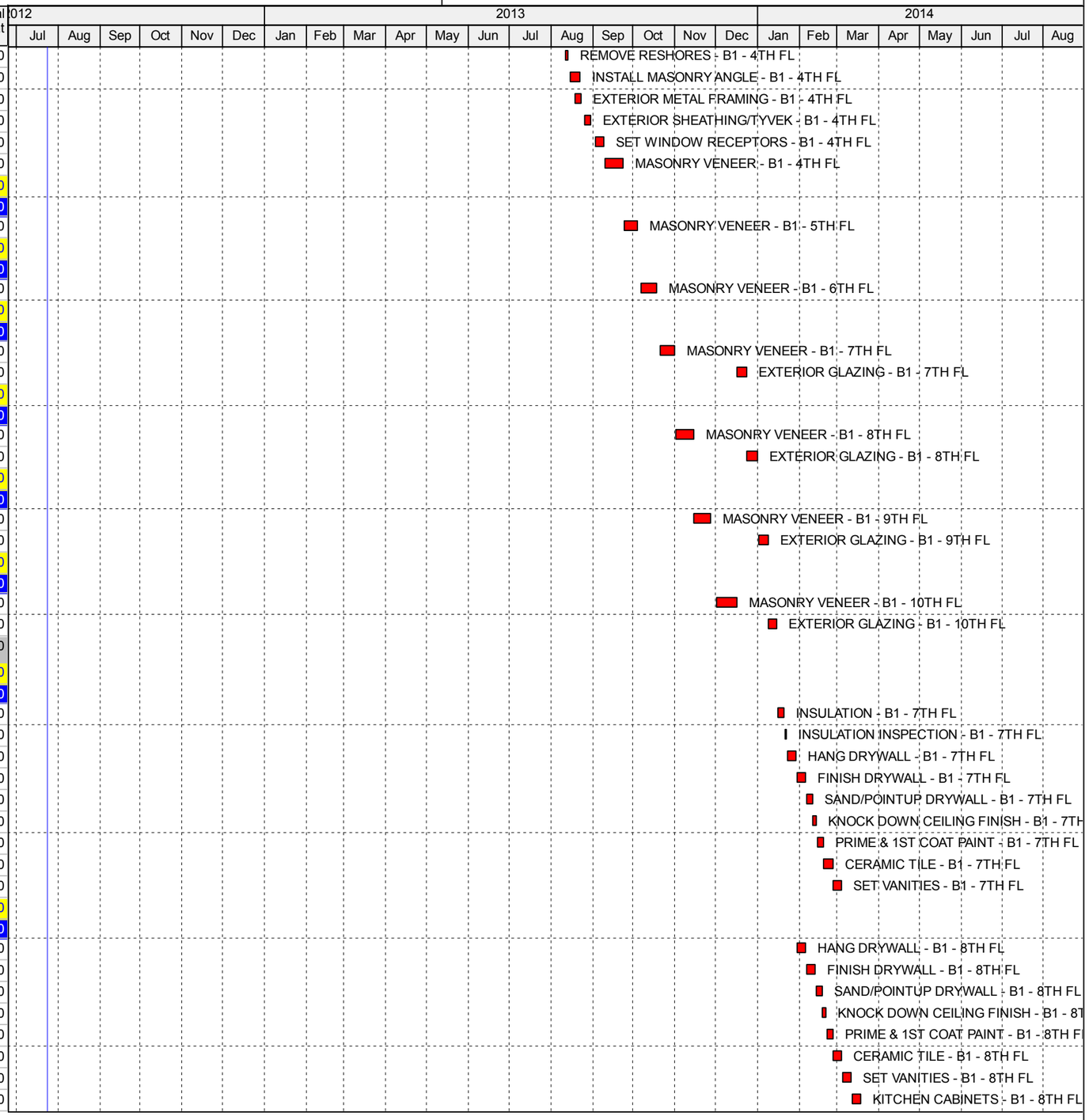
| Activity ID | Activity Name | Original Duration | Start | Finish | Total Float |
|---|---|---|---|---|---|
| GS-2780 | FRP COLUMNS/WALLS - RAMP 250-260 | 2 | 09-May-13 | 10-May-13 | 0 |
| **GROUND FL** | | 10 | 13-May-13 | 30-May-13 | 0 |
| **SLAB ON DECK - G-I** | | 10 | 13-May-13 | 30-May-13 | 0 |
| GS-2900 | FRAME DECK - SOD G-I | 4 | 13-May-13 | 17-May-13 | 0 |
| GS-2960 | REINFORCE DECK - SOD G-I | 2 | 20-May-13 | 22-May-13 | 0 |
| GS-3000 | POUR DECK - SOD G-I | 1 | 24-May-13 | 24-May-13 | 0 |
| GS-3050 | FRP COLUMNS - SOD G-I | 3 | 28-May-13 | 30-May-13 | 0 |
| **BUILDING 1 - 10 STORY** | | 271 | 31-May-13 | 24-Jun-14 | 0 |
| **FOUNDATIONS & STRUCTURE** | | 50 | 31-May-13 | 09-Aug-13 | 0 |
| **2ND FL** | | 6 | 31-May-13 | 10-Jun-13 | 0 |
| **SLAB ON DECK B** | | 6 | 31-May-13 | 10-Jun-13 | 0 |
| B1S-1130 | FRAME DECK - 2ND FL - B | 2 | 31-May-13 | 03-Jun-13 | 0 |
| B1S-1150 | INSLAB ELECTRIC R/I - 2ND FL - B | 2 | 03-Jun-13 | 04-Jun-13 | 0 |
| B1S-1160 | INSLAB PLUMBING R/I - 2ND FL - B | 2 | 03-Jun-13 | 04-Jun-13 | 0 |
| B1S-1170 | REINFORCE DECK - 2ND FL - B | 2 | 03-Jun-13 | 04-Jun-13 | 0 |
| B1S-1180 | POUR DECK - 2ND FL - B | 1 | 06-Jun-13 | 06-Jun-13 | 0 |
| B1S-1230 | FRP COLUMNS - 2ND FL - B | 2 | 07-Jun-13 | 10-Jun-13 | 0 |
| **3RD FL** | | 7 | 11-Jun-13 | 21-Jun-13 | 0 |
| **SLAB ON DECK B** | | 7 | 11-Jun-13 | 21-Jun-13 | 0 |
| B1S-1260 | FRAME DECK - 3RD FL - B | 2 | 11-Jun-13 | 13-Jun-13 | 0 |
| B1S-1310 | REINFORCE DECK - 3RD FL - B | 2 | 14-Jun-13 | 17-Jun-13 | 0 |
| B1S-1320 | POUR DECK - 3RD FL - B | 1 | 18-Jun-13 | 18-Jun-13 | 0 |
| B1S-1370 | FRP COLUMNS - 3RD FL - B | 2 | 20-Jun-13 | 21-Jun-13 | 0 |
| **4TH FL** | | 7 | 24-Jun-13 | 03-Jul-13 | 0 |
| **SLAB ON DECK B** | | 7 | 24-Jun-13 | 03-Jul-13 | 0 |
| B1S-1400 | FRAME DECK - 4TH FL - B | 2 | 24-Jun-13 | 25-Jun-13 | 0 |
| B1S-1450 | REINFORCE DECK - 4TH FL - B | 2 | 27-Jun-13 | 28-Jun-13 | 0 |
| B1S-1460 | POUR DECK - 4TH FL - B | 1 | 01-Jul-13 | 01-Jul-13 | 0 |
| B1S-1500 | FRP COLUMNS - 4TH FL - B | 2 | 02-Jul-13 | 03-Jul-13 | 0 |
| **5TH FL** | | 7 | 05-Jul-13 | 16-Jul-13 | 0 |
| **SLAB ON DECK B** | | 7 | 05-Jul-13 | 16-Jul-13 | 0 |
| B1S-1550 | FRAME DECK - 5TH FL - B | 2 | 05-Jul-13 | 08-Jul-13 | 0 |
| B1S-1590 | REINFORCE DECK - 5TH FL - B | 2 | 09-Jul-13 | 11-Jul-13 | 0 |
| B1S-1600 | POUR DECK - 5TH FL - B | 1 | 12-Jul-13 | 12-Jul-13 | 0 |
| B1S-1650 | FRP COLUMNS - 5TH FL - B | 2 | 15-Jul-13 | 16-Jul-13 | 0 |
| **6TH FL** | | 7 | 18-Jul-13 | 29-Jul-13 | 0 |
| **SLAB ON DECK B** | | 7 | 18-Jul-13 | 29-Jul-13 | 0 |
| B1S-1680 | FRAME DECK - 6TH FL - B | 2 | 18-Jul-13 | 19-Jul-13 | 0 |
| B1S-1730 | REINFORCE DECK - 6TH FL - B | 2 | 22-Jul-13 | 23-Jul-13 | 0 |
| B1S-1740 | POUR DECK - 6TH FL - B | 1 | 25-Jul-13 | 25-Jul-13 | 0 |
| B1S-1790 | FRP COLUMNS - 6TH FL - B | 2 | 26-Jul-13 | 29-Jul-13 | 0 |
| **7TH FL** | | 9 | 30-Jul-13 | 09-Aug-13 | 0 |
| **SLAB ON DECK B** | | 9 | 30-Jul-13 | 09-Aug-13 | 0 |
| B1S-1820 | FRAME DECK - 7TH FL - B | 2 | 30-Jul-13 | 01-Aug-13 | 0 |
| B1S-1870 | REINFORCE DECK - 7TH FL - B | 2 | 02-Aug-13 | 05-Aug-13 | 0 |
| B1S-1880 | POUR DECK - 7TH FL - B | 1 | 06-Aug-13 | 06-Aug-13 | 0 |
| B1S-1920 | CURE DECK - 7TH FL - B | 3 | 07-Aug-13 | 09-Aug-13 | 0 |
| **SKIN** | | 108 | 12-Aug-13 | 15-Jan-14 | 0 |
| **4TH FL** | | 30 | 12-Aug-13 | 23-Sep-13 | 0 |
| | | 30 | 12-Aug-13 | 23-Sep-13 | 0 |






DONOHOE CONSTRUCTION COMPANY
DATA DATE: 24-Jul-12

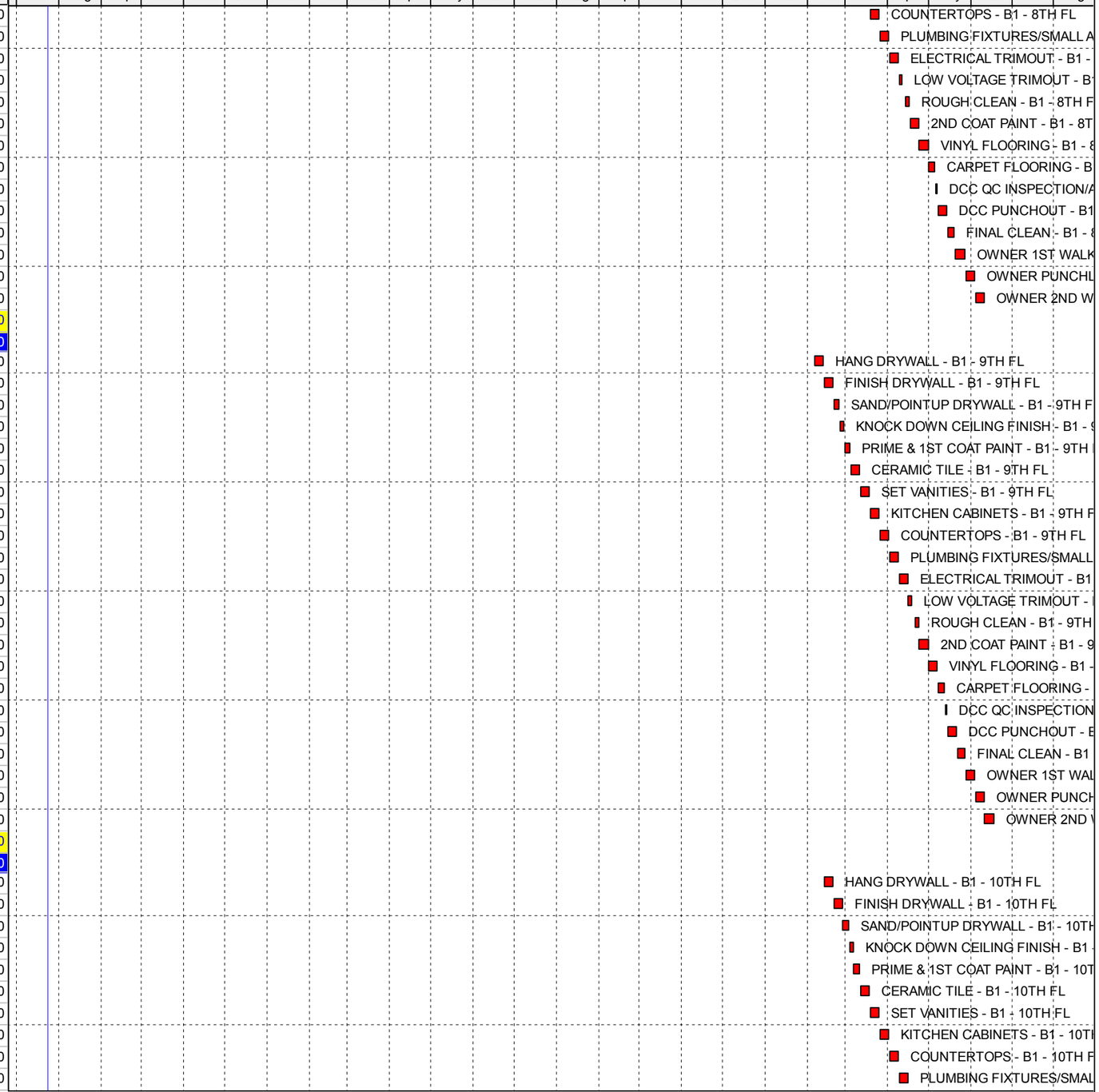
| Activity ID | Activity Name | Original Duration | Start | Finish | Total Float |
|---|---|---|---|---|---|
| B1E-1140 | REMOVE RESHORES - B1 - 4TH FL | 2 | 12-Aug-13 | 13-Aug-13 | 0 |
| B1E-1180 | INSTALL MASONRY ANGLE - B1 - 4TH FL | 5 | 15-Aug-13 | 22-Aug-13 | 0 |
| B1E-1190 | EXTERIOR METAL FRAMING - B1 - 4TH FL | 5 | 19-Aug-13 | 23-Aug-13 | 0 |
| B1E-1240 | EXTERIOR SHEATHING/TYVEK - B1 - 4TH FL | 5 | 26-Aug-13 | 30-Aug-13 | 0 |
| B1E-1290 | SET WINDOW RECEPTORS - B1 - 4TH FL | 5 | 03-Sep-13 | 09-Sep-13 | 0 |
| B1E-1360 | MASONRY VENEER - B1 - 4TH FL | 8 | 10-Sep-13 | 23-Sep-13 | 0 |
| **5TH FL** | | 8 | 24-Sep-13 | 04-Oct-13 | 0 |
| | | 8 | 24-Sep-13 | 04-Oct-13 | 0 |
| B1E-1500 | MASONRY VENEER - B1 - 5TH FL | 8 | 24-Sep-13 | 04-Oct-13 | 0 |
| **6TH FL** | | 8 | 07-Oct-13 | 18-Oct-13 | 0 |
| | | 8 | 07-Oct-13 | 18-Oct-13 | 0 |
| B1E-1590 | MASONRY VENEER - B1 - 6TH FL | 8 | 07-Oct-13 | 18-Oct-13 | 0 |
| **7TH FL** | | 44 | 21-Oct-13 | 23-Dec-13 | 0 |
| | | 44 | 21-Oct-13 | 23-Dec-13 | 0 |
| B1E-1690 | MASONRY VENEER - B1 - 7TH FL | 8 | 21-Oct-13 | 31-Oct-13 | 0 |
| B1E-1990 | EXTERIOR GLAZING - B1 - 7TH FL | 5 | 17-Dec-13 | 23-Dec-13 | 0 |
| **8TH FL** | | 40 | 01-Nov-13 | 31-Dec-13 | 0 |
| | | 40 | 01-Nov-13 | 31-Dec-13 | 0 |
| B1E-1780 | MASONRY VENEER - B1 - 8TH FL | 8 | 01-Nov-13 | 14-Nov-13 | 0 |
| B1E-2020 | EXTERIOR GLAZING - B1 - 8TH FL | 5 | 24-Dec-13 | 31-Dec-13 | 0 |
| **9TH FL** | | 35 | 15-Nov-13 | 08-Jan-14 | 0 |
| | | 35 | 15-Nov-13 | 08-Jan-14 | 0 |
| B1E-1850 | MASONRY VENEER - B1 - 9TH FL | 8 | 15-Nov-13 | 27-Nov-13 | 0 |
| B1E-2050 | EXTERIOR GLAZING - B1 - 9TH FL | 5 | 02-Jan-14 | 08-Jan-14 | 0 |
| **10TH FL** | | 31 | 02-Dec-13 | 15-Jan-14 | 0 |
| | | 31 | 02-Dec-13 | 15-Jan-14 | 0 |
| B1E-1950 | MASONRY VENEER - B1 - 10TH FL | 8 | 02-Dec-13 | 16-Dec-13 | 0 |
| B1E-2070 | EXTERIOR GLAZING - B1 - 10TH FL | 5 | 09-Jan-14 | 15-Jan-14 | 0 |
| **FINISHES** | | 113 | 16-Jan-14 | 24-Jun-14 | 0 |
| **7TH FL** | | 34 | 16-Jan-14 | 04-Mar-14 | 0 |
| **UNITS** | | 34 | 16-Jan-14 | 04-Mar-14 | 0 |
| B17-2000 | INSULATION - B1 - 7TH FL | 3 | 16-Jan-14 | 20-Jan-14 | 0 |
| B17-2010 | INSULATION INSPECTION - B1 - 7TH FL | 2 | 21-Jan-14 | 22-Jan-14 | 0 |
| B17-2030 | HANG DRYWALL - B1 - 7TH FL | 5 | 23-Jan-14 | 29-Jan-14 | 0 |
| B17-2060 | FINISH DRYWALL - B1 - 7TH FL | 5 | 30-Jan-14 | 05-Feb-14 | 0 |
| B17-2080 | SAND/POINTUP DRYWALL - B1 - 7TH FL | 3 | 06-Feb-14 | 10-Feb-14 | 0 |
| B17-2100 | KNOCK DOWN CEILING FINISH - B1 - 7TH FL | 3 | 11-Feb-14 | 13-Feb-14 | 0 |
| B17-2120 | PRIME & 1ST COAT PAINT - B1 - 7TH FL | 3 | 14-Feb-14 | 18-Feb-14 | 0 |
| B17-2130 | CERAMIC TILE - B1 - 7TH FL | 5 | 19-Feb-14 | 25-Feb-14 | 0 |
| B17-2160 | SET VANITIES - B1 - 7TH FL | 5 | 26-Feb-14 | 04-Mar-14 | 0 |
| **8TH FL** | | 93 | 30-Jan-14 | 10-Jun-14 | 0 |
| **UNITS** | | 93 | 30-Jan-14 | 10-Jun-14 | 0 |
| B18-2040 | HANG DRYWALL - B1 - 8TH FL | 5 | 30-Jan-14 | 05-Feb-14 | 0 |
| B18-2070 | FINISH DRYWALL - B1 - 8TH FL | 5 | 06-Feb-14 | 12-Feb-14 | 0 |
| B18-2090 | SAND/POINTUP DRYWALL - B1 - 8TH FL | 3 | 13-Feb-14 | 17-Feb-14 | 0 |
| B18-2110 | KNOCK DOWN CEILING FINISH - B1 - 8TH FL | 3 | 18-Feb-14 | 20-Feb-14 | 0 |
| B18-2120 | PRIME & 1ST COAT PAINT - B1 - 8TH FL | 3 | 21-Feb-14 | 25-Feb-14 | 0 |
| B18-2130 | CERAMIC TILE - B1 - 8TH FL | 5 | 26-Feb-14 | 04-Mar-14 | 0 |
| B18-2160 | SET VANITIES - B1 - 8TH FL | 5 | 05-Mar-14 | 11-Mar-14 | 0 |
| B18-2170 | KITCHEN CABINETS - B1 - 8TH FL | 5 | 12-Mar-14 | 18-Mar-14 | 0 |



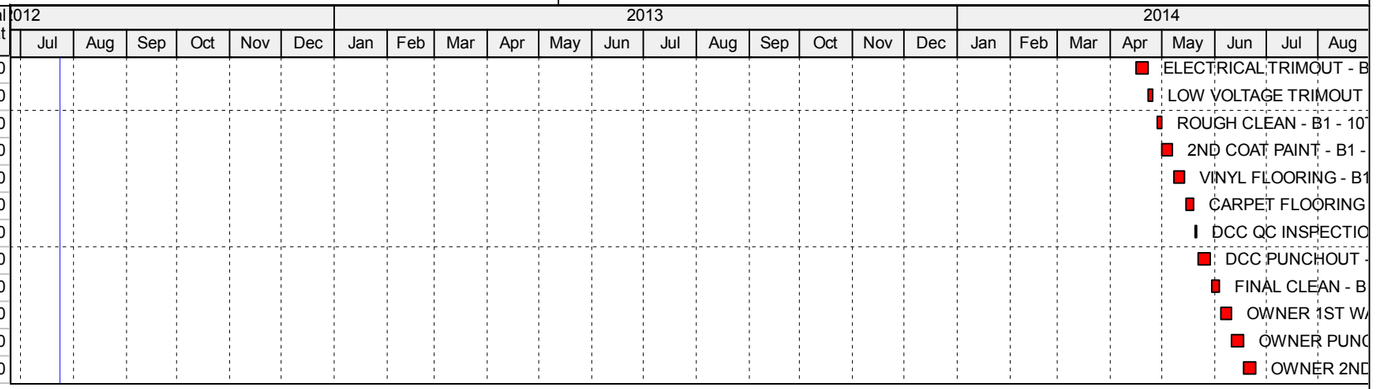



DONOHOE CONSTRUCTION COMPANY
DATA DATE: 24-Jul-12

| Activity ID | Activity Name | Original Duration | Start | Finish | Total Float |
|---|---|---|---|---|---|
| B18-2180 | COUNTERTOPS - B1 - 8TH FL | 5 | 19-Mar-14 | 25-Mar-14 | 0 |
| B18-2190 | PLUMBING FIXTURES/SMALL APPLIANCES - B1 - 8TH FL | 5 | 26-Mar-14 | 01-Apr-14 | 0 |
| B18-2230 | ELECTRICAL TRIMOUT - B1 - 8TH FL | 5 | 02-Apr-14 | 08-Apr-14 | 0 |
| B18-2260 | LOW VOLTAGE TRIMOUT - B1 - 8TH FL | 3 | 09-Apr-14 | 11-Apr-14 | 0 |
| B18-2280 | ROUGH CLEAN - B1 - 8TH FL | 3 | 14-Apr-14 | 16-Apr-14 | 0 |
| B18-2300 | 2ND COAT PAINT - B1 - 8TH FL | 5 | 17-Apr-14 | 23-Apr-14 | 0 |
| B18-2320 | VINYL FLOORING - B1 - 8TH FL | 5 | 24-Apr-14 | 30-Apr-14 | 0 |
| B18-2330 | CARPET FLOORING - B1 - 8TH FL | 3 | 01-May-14 | 05-May-14 | 0 |
| B18-2340 | DCC QC INSPECTION/APPLIANCES - B1 - 8TH FL | 2 | 06-May-14 | 07-May-14 | 0 |
| B18-2370 | DCC PUNCHOUT - B1 - 8TH FL | 5 | 08-May-14 | 14-May-14 | 0 |
| B18-2400 | FINAL CLEAN - B1 - 8TH FL | 3 | 15-May-14 | 19-May-14 | 0 |
| B18-2420 | OWNER 1ST WALK - B1 - 8TH FL | 5 | 20-May-14 | 27-May-14 | 0 |
| B18-2450 | OWNER PUNCHLIST - B1 - 8TH FL | 5 | 28-May-14 | 03-Jun-14 | 0 |
| B18-2460 | OWNER 2ND WALK & TURNOVER - B1 - 8TH FL | 5 | 04-Jun-14 | 10-Jun-14 | 0 |
| **9TH FL** | | 93 | 06-Feb-14 | 17-Jun-14 | 0 |
| **UNITS** | | 93 | 06-Feb-14 | 17-Jun-14 | 0 |
| B19-2050 | HANG DRYWALL - B1 - 9TH FL | 5 | 06-Feb-14 | 12-Feb-14 | 0 |
| B19-2070 | FINISH DRYWALL - B1 - 9TH FL | 5 | 13-Feb-14 | 19-Feb-14 | 0 |
| B19-2090 | SAND/POINTUP DRYWALL - B1 - 9TH FL | 3 | 20-Feb-14 | 24-Feb-14 | 0 |
| B19-2110 | KNOCK DOWN CEILING FINISH - B1 - 9TH FL | 3 | 25-Feb-14 | 27-Feb-14 | 0 |
| B19-2120 | PRIME & 1ST COAT PAINT - B1 - 9TH FL | 3 | 28-Feb-14 | 04-Mar-14 | 0 |
| B19-2130 | CERAMIC TILE - B1 - 9TH FL | 5 | 05-Mar-14 | 11-Mar-14 | 0 |
| B19-2160 | SET VANITIES - B1 - 9TH FL | 5 | 12-Mar-14 | 18-Mar-14 | 0 |
| B19-2170 | KITCHEN CABINETS - B1 - 9TH FL | 5 | 19-Mar-14 | 25-Mar-14 | 0 |
| B19-2180 | COUNTERTOPS - B1 - 9TH FL | 5 | 26-Mar-14 | 01-Apr-14 | 0 |
| B19-2190 | PLUMBING FIXTURES/SMALL APPLIANCES - B1 - 9TH FL | 5 | 02-Apr-14 | 08-Apr-14 | 0 |
| B19-2230 | ELECTRICAL TRIMOUT - B1 - 9TH FL | 5 | 09-Apr-14 | 15-Apr-14 | 0 |
| B19-2260 | LOW VOLTAGE TRIMOUT - B1 - 9TH FL | 3 | 16-Apr-14 | 18-Apr-14 | 0 |
| B19-2280 | ROUGH CLEAN - B1 - 9TH FL | 3 | 21-Apr-14 | 23-Apr-14 | 0 |
| B19-2300 | 2ND COAT PAINT - B1 - 9TH FL | 5 | 24-Apr-14 | 30-Apr-14 | 0 |
| B19-2320 | VINYL FLOORING - B1 - 9TH FL | 5 | 01-May-14 | 07-May-14 | 0 |
| B19-2330 | CARPET FLOORING - B1 - 9TH FL | 3 | 08-May-14 | 12-May-14 | 0 |
| B19-2340 | DCC QC INSPECTION/APPLIANCES - B1 - 9TH FL | 2 | 13-May-14 | 14-May-14 | 0 |
| B19-2370 | DCC PUNCHOUT - B1 - 9TH FL | 5 | 15-May-14 | 21-May-14 | 0 |
| B19-2400 | FINAL CLEAN - B1 - 9TH FL | 3 | 22-May-14 | 27-May-14 | 0 |
| B19-2420 | OWNER 1ST WALK - B1 - 9TH FL | 5 | 28-May-14 | 03-Jun-14 | 0 |
| B19-2450 | OWNER PUNCHLIST - B1 - 9TH FL | 5 | 04-Jun-14 | 10-Jun-14 | 0 |
| B19-2460 | OWNER 2ND WALK & TURNOVER - B1 - 9TH FL | 5 | 11-Jun-14 | 17-Jun-14 | 0 |
| **10TH FL** | | 93 | 13-Feb-14 | 24-Jun-14 | 0 |
| **UNITS** | | 93 | 13-Feb-14 | 24-Jun-14 | 0 |
| B110-2050 | HANG DRYWALL - B1 - 10TH FL | 5 | 13-Feb-14 | 19-Feb-14 | 0 |
| B110-2080 | FINISH DRYWALL - B1 - 10TH FL | 5 | 20-Feb-14 | 26-Feb-14 | 0 |
| B110-2100 | SAND/POINTUP DRYWALL - B1 - 10TH FL | 3 | 27-Feb-14 | 03-Mar-14 | 0 |
| B110-2110 | KNOCK DOWN CEILING FINISH - B1 - 10TH FL | 3 | 04-Mar-14 | 06-Mar-14 | 0 |
| B110-2120 | PRIME & 1ST COAT PAINT - B1 - 10TH FL | 3 | 07-Mar-14 | 11-Mar-14 | 0 |
| B110-2130 | CERAMIC TILE - B1 - 10TH FL | 5 | 12-Mar-14 | 18-Mar-14 | 0 |
| B110-2160 | SET VANITIES - B1 - 10TH FL | 5 | 19-Mar-14 | 25-Mar-14 | 0 |
| B110-2170 | KITCHEN CABINETS - B1 - 10TH FL | 5 | 26-Mar-14 | 01-Apr-14 | 0 |
| B110-2180 | COUNTERTOPS - B1 - 10TH FL | 5 | 02-Apr-14 | 08-Apr-14 | 0 |
| B110-2190 | PLUMBING FIXTURES/SMALL APPLIANCES - B1 - 10TH FL | 5 | 09-Apr-14 | 15-Apr-14 | 0 |



| Activity ID | Activity Name | Original Duration | Start | Finish | Total Float |
|---|---|---|---|---|---|
| B110-2230 | ELECTRICAL TRIMOUT - B1 - 10TH FL | 5 | 16-Apr-14 | 22-Apr-14 | 0 |
| B110-2260 | LOW VOLTAGE TRIMOUT - B1 - 10TH FL | 3 | 23-Apr-14 | 25-Apr-14 | 0 |
| B110-2280 | ROUGH CLEAN - B1 - 10TH FL | 3 | 28-Apr-14 | 30-Apr-14 | 0 |
| B110-2300 | 2ND COAT PAINT - B1 - 10TH FL | 5 | 01-May-14 | 07-May-14 | 0 |
| B110-2320 | VINYL FLOORING - B1 - 10TH FL | 5 | 08-May-14 | 14-May-14 | 0 |
| B110-2330 | CARPET FLOORING - B1 - 10TH FL | 3 | 15-May-14 | 19-May-14 | 0 |
| B110-2340 | DCC QC INSPECTION/APPLIANCES - B1 - 10TH FL | 2 | 20-May-14 | 21-May-14 | 0 |
| B110-2370 | DCC PUNCHOUT - B1 - 10TH FL | 5 | 22-May-14 | 29-May-14 | 0 |
| B110-2400 | FINAL CLEAN - B1 - 10TH FL | 3 | 30-May-14 | 03-Jun-14 | 0 |
| B110-2420 | OWNER 1ST WALK - B1 - 10TH FL | 5 | 04-Jun-14 | 10-Jun-14 | 0 |
| B110-2450 | OWNER PUNCHLIST - B1 - 10TH FL | 5 | 11-Jun-14 | 17-Jun-14 | 0 |
| B110-2460 | OWNER 2ND WALK & TURNOVER - B1 - 10TH FL | 5 | 18-Jun-14 | 24-Jun-14 | 0 |



## APPENDIX B: ELECTRICAL VALUE ENGINEERING

The following items are found in Appendix B: Electrical Value Engineering

- ZOM Accepted Electrical VE Items

# ZOM Accepted Electrical VE Items
# 7/5/12

## Misc. VE Changes

- Delete the Decora style switches and receptacles in the apartment units and public spaces and use standard style.

- Delete the 20 amp rated receptacles and switches in the apartment units where allowed by code and replace with 15 amp residential grade. Kitchen, Dining Room, and Bathroom receptacle circuits to remain 20 amp rated with # 12 AWG conductors.

- Delete the TVSS receptacles in the apartment units.

- Delete the closet door switches in the apartment units and provide a standard wall switch. This is based on the most recent drawings which have deleted all closet switches in the units and use a pullchain fixture in the closet.

- Change #12 AWG wiring and 20 amp circuit breakers in the apartment units to #14 AWG wiring and 15 amp circuit breakers where allowed by NEC and local jurisdiction. This is for lighting and general receptacle circuits only.

- Delete the disconnects at the indoor HVAC units in the apartments and have the unit provided with an integral breaker.

- Delete the disconnects at the hot water heater in the apartment units and provide a breaker lock in the apartment panel.

- Reduce circuits in the apartments to code required.

- Combine dishwasher and disposal in the apartment units on one circuit and one receptacle under the kitchen cabinets Note:

The combined load of the dishwasher and disposal can not exceed 1920 watts or 16 amps.

- Delete the note concerning voltage drop on feeder and branch circuit conductors and size to NEC requirements.

**Distribution VE Changes**

- Reduce Switchboard #1 current rating from 3000A to 2500A.
- Change Switchboard #2 to (1) 3000A feeder switch with MLO pull section, and (1) 1600 switchboard with MLO pull section and (1)1200A feeder and (1) 800A feeder.
- Reduce meter stack 6A Main Breaker to 600 amp.
- Reduce meter stack 7A Main Breaker to 600 amp.
- Change all Switchboard Bus and Panel board Bus to Aluminum.
- Change all load centers to 125A 24 Space MLO
- Change the apartment units that are rated 150 amp to 125 amp
- Delete SPD from Switchboard #1. TVSS to remain on Switchboard # 1
- Delete IQ meter (Customer Metering) from Switchboard # 1. Manufacturer to provide pulse meter outputs on the switchboard.
- Change fault current ratings to 65kAIC on Switchboard #1 and 42kAIC on Switchboard # 2. Ratings are based on the final fault current levels provided by Dominion Virginia Power.

**Fire Alarm VE Changes**

- Provide a code approved minimum design build system for each building and the parking garage.

**Generator VE Changes**

- Provide three pole transfer switches in lieu of four pole.

## APPENDIX C: PACE ROUNDTABLE WORKSHEETS

The following items are found in Appendix C: PACE Roundtable Worksheets

- Worksheet 1
- Worksheet 2