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Project

425 Park Avenue

COMPREHENSIVE SCHEDULE REVIEW REPORT

Report Date: December 14, 2020

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Introduction

- 1.1. HSE conducted a schedule review for 425 PARK AVENUE **COVID-19 TIA Revised Sequence as of 12/01/2020**, updated on 01-December-2020.
- 1.2. This schedule was compared with the 425 PARK AVENUE **COVID-19 TIA Revised Sequence as of 8/31/2020**, updated on 31-August-2020.
- 1.3. This report concludes HSE findings and recommendations in the following areas

- **Overall Schedule Review**

This section is a high-level schedule review summary.

- **Variance Analysis**

This section highlights the major changes between the current schedule and the previous version received by HSE.

Some Milestones & activities has enhancement in their start/finish dates.

These activities & milestones are highlighted & discussed in the report.

- **Current Schedule critique**

This section talks about the current schedule deficiencies with recommendations on how to fix them

- **Conclusion and Recommendations**

This section talks about HSE recommendation on how to improve the schedule quality and some schedule optimizations ideas which need to be discussed further among the team

Section 1: Overall Schedule Review

1. Introduction

- The current forecasted “TCO Filing / Signoff” is 07-Jan-21 which is behind the date of last update (10-Dec-20) by 28 calendar days.

2. Construction Time Line

The below figure represents the construction packages timeline:

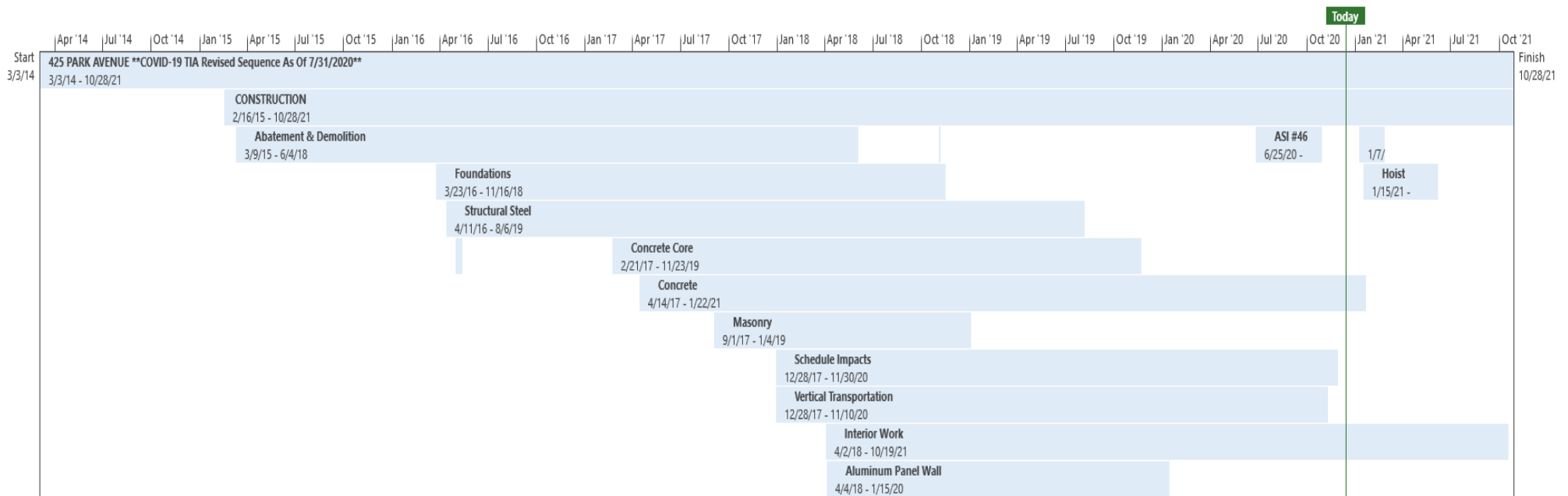


Figure 1: Project Time Line

3. Critical Path analysis

- The critical path in the current update starts by Inspections in Typical Level (Level 31) to (Level 37) with 95% complete followed by System Start-up/ Testing (FA Horn/Strobe) with 75% complete then FDNY Inspection / Issue LOD till TCO filing and sign off.
- The critical path in the current update starts by Generator Pre-startup / ATS / Paralleling Gear with 80% complete followed by Generator / ATS / Paralleling Gear Commissioning that finishes on Dec-30-20 followed by Generator Sign-off finishing on Jan-07-21 followed by TCO filing and sign off.

Activity ID	Activity Name	Original Duration	Start	Finish	Total Float	Activity % Complete
1		124d	14-Jul-20 A	07-Jan-21	-16d	
MILESTONES		30d	27-Oct-20 A	07-Jan-21	-16d	
M - 360	TCO Filing / Signoff	30d	27-Oct-20 A	07-Jan-21	-16d	0%
EMERGENCY POWER: FUEL OIL / GENERATOR		124d	14-Jul-20 A	07-Jan-21	-16d	
T-1120	Generator Pre-startup / ATS / Paralleling Gear	25d	14-Jul-20 A	08-Dec-20	-15d	80%
T-1130	Generator / ATS / Paralleling Gear Commissioning	15d	08-Dec-20	30-Dec-20	-17d	0%
T-2530	Generator Sign-off	5d	30-Dec-20	07-Jan-21	-17d	0%

Figure 2: The critical path driving the TCO filling

4. Secondary Critical Path Analysis:

- The secondary critical path driving the TCO is the second driving activity to the Generator / ATS / Paralleling Gear Commissioning which is Fuel Oil Commissioning followed by the TCO Filing / Signoff.
- The Contractor should work in both activities (T-1120) and (T-1110) concurrently to avoid any delays in starting the activity (T-1130) that drives the TCO filing.

2		77d	20-Aug-20 A	09-Dec-20	-13d	
EMERGENCY POWER: FUEL OIL / GENERATOR		77d	20-Aug-20 A	09-Dec-20	-13d	
T-2560	Fuel Oil System Start-up Testing	8d	20-Aug-20 A	02-Dec-20	-13d	80%
T-1110	Fuel Oil Commissioning	5d	03-Dec-20	09-Dec-20	-13d	0%

Figure 3: Secondary Critical path driving the TCO filling

5. All Critical Activities Driving the TCO

The contractor should focus on all the below activities to mitigate any slippage on the TCO date.

Critical Tasks						
Activity ID	Activity Name	Original Duration	Start	Finish	Total Float	Activity % Complete
FA - 130	FA Signoff	0d		4-Dec-20	5d	0%
FA - 110.1	FDNY Re-inspection	1d	4-Dec-20	4-Dec-20	5d	0%
T-1420.1	FDNY LOD Re-Inspection	2d	03-Dec-20*	4-Dec-20	5d	0%
T-1120	Generator Pre-startup / ATS / Parallelling Gear	25d	14-Jul-20 A	8-Dec-20	-15d	80%
T-1130	Generator / ATS / Parallelling Gear Commissioning	15d	8-Dec-20	30-Dec-20	-17d	0%
T-2530	Generator Sign-off	5d	30-Dec-20	7-Jan-21	-17d	0%
T-2560	Fuel Oil System Start-up Testing	8d	20-Aug-20 A	2-Dec-20	-13d	80%
T-1110	Fuel Oil Commissioning	5d	3-Dec-20	9-Dec-20	-13d	0%

Section 2: Variance Analysis

1. Milestones:

- The current forecasted “TCO Filing / Signoff” is 07-Jan-21, while the previous update was showing the TCO date on 10-Dec-20, this means that the TCO date has slipped by 28 calendar days between the two updates.
- Project completion finish date changed from 29-Oct-21 to 28-Oct-21 which is 1 day ahead compared with the finish date of last update.
- Some of the milestones in the new updated schedule have slipped and their total float have decreased compared to the previous schedule.
- A full list of milestones variance is attached in this report (appendix #1)

2. Review of the critical work packages:

The below section focuses on the top critical and most important packages in the schedule. The aim of this section is to closely monitor those packages and highlight any improvement or slippage

a) Interior works package:

The Interior works package expected finish date changed during this update from 27-May-21 to 19-Oct-21 which means that the interior work package slipped by 145 Calendar Days, (100 Working Days).

Activity ID	Activity Name	Original Duration	Start	Finish	Total Float	Activity % Complete	BL Project Duration	BL Project Start	BL Project Finish	Variance - BL Project Start	Variance - BL Project Finish
■ Interior Work		891	02-Apr-18 A	19-Oct-21	6		791	19-Apr-18	27-May-21	13	-100
⊕ Typical Level (Level 3) (Tenant 8)		773	02-Apr-18 A	03-Jun-21	103		766	17-May-18	21-May-21	34	-7
⊕ Typical Level (Level 4) (Tenant 9)		770	02-Apr-18 A	03-Jun-21	103		763	23-May-18	24-May-21	38	-7
⊕ Typical Level (Level 5) (Tenant 10)		795	19-Apr-18 A	04-Jun-21	102		789	19-Apr-18	25-May-21	0	-7
⊕ Typical Level (Level 6) (Tenant 11)		796	19-Apr-18 A	07-Jun-21	101		789	19-Apr-18	26-May-21	0	-7
⊕ Typical Level (Level 7) (Amenity Floor) (Tenant 12)		794	19-Apr-18 A	03-Jun-21	103		787	19-Apr-18	24-May-21	0	-7
⊕ Typical Level (Level 8) (Amenity Floor) (Tenant 14)		745	26-Apr-18 A	03-Jun-21	103		737	28-Jun-18	24-May-21	45	-7
⊕ Typical Level (Level 9) (Tenant 15)		715	03-May-18 A	26-May-21	108		708	03-Aug-18	17-May-21	65	-7
⊕ Typical Level (Level 10) (Tenant 16)		707	03-May-18 A	27-May-21	107		700	16-Aug-18	18-May-21	74	-7
⊕ Typical Level (Level 11) (Tenant 17)		703	03-May-18 A	28-May-21	106		695	23-Aug-18	19-May-21	79	-7
⊕ Typical Level (Level 12) (Tenant 18)		671	10-May-18 A	01-Jun-21	105		664	10-Oct-18	19-May-21	106	-8
⊕ Typical Level (Level 13) (Tenant 19)		661	10-May-18 A	02-Jun-21	104		654	25-Oct-18	20-May-21	117	-8
⊕ Typical Level (Level 14) (Tenant 20)		662	10-May-18 A	03-Jun-21	103		655	25-Oct-18	21-May-21	117	-7
⊕ Typical Level (Level 15) (Tenant 21)		662	17-May-18 A	03-Jun-21	103		656	25-Oct-18	24-May-21	112	-7
⊕ Typical Level (Level 16) (Tenant 22)		659	17-May-18 A	04-Jun-21	102		653	31-Oct-18	25-May-21	116	-7
⊕ Typical Level (Level 17) (Tenant 23)		655	31-May-18 A	07-Jun-21	101		648	07-Nov-18	26-May-21	112	-7
⊕ Typical Level (Level 18) (Tenant 24)		641	09-Jul-18 A	08-Jun-21	100		634	29-Nov-18	26-May-21	101	-8
■ Typical Level (Level 19) (Tenant 25)		661	10-Dec-18 A	06-Aug-21	57		612	03-Jan-19	27-May-21	16	-49
IW-CR-F19	Substantial Completion of Interiors at Crane Leaveout Floor 19 (Tenant 25)	30	24-Jun-21	06-Aug-21	57	0%	30	16-Oct-20	30-Nov-20	-174	-174
IW-TH-F19	Substantial Completion of Interiors at Tower Hoist Entries @ Floor 19	0	09-Jun-21	09-Jun-21	99	0%	0	27-May-21	27-May-21	-7	-7
IW - 5095	Substantial Completion Floor 19 (Tenant 25)	0		20-Oct-20 A		100%	0	04-Nov-20	04-Nov-20	10	10
IW - 5085	Construction Punchlist	10	05-Oct-20 A	20-Oct-20 A		100%	10	20-Oct-20	04-Nov-20	10	10
IW - 5055	Identifying Devices (Temporary for TCO)	10	05-Oct-20 A	20-Oct-20 A		100%	10	05-Oct-20	20-Oct-20	0	0

b) Concrete work package:

Concrete slab overbuild package expected finish date changed during this update from 19-Jan-21 to 22-Jan-21. Which means that there are 3 calendar days slippage in concrete slab overbuild package during this update.

Activity ID	Activity Name	Original Duration	Start	Finish	Total Float	Activity % Complete	BL Project Duration	BL Project Start	BL Project Finish	Variance - BL Project Start	Variance - BL Project Finish
Concrete		928	14-Apr-17 A	22-Jan-21	-22		925	01-Jun-17	19-Jan-21	33	-3
Slab Overbuild		928	14-Apr-17 A	22-Jan-21	-22		925	01-Jun-17	19-Jan-21	33	-3
Top of House Fin/Crane Stages		108	18-May-20 A	21-Dec-20	0		103	06-Jul-20	30-Nov-20	33	-15
Level 2		19	19-May-17 A	10-Jul-17 A			19	07-Jul-17	02-Aug-17	33	17
Level B2		12	21-Sep-20 A	30-Oct-20 A			12	28-Oct-20	12-Nov-20	32	11
Level B1		3	12-Nov-20 A	14-Nov-20 A			10	12-Nov-20	24-Nov-20	1	8
Ground Floor		10	17-Nov-20 A	10-Dec-20	-101		10	24-Nov-20	07-Dec-20	7	-3
Level 3		884	03-Jul-17 A	18-Dec-20	-86		881	03-Jul-17	15-Dec-20	0	-3
Level 4		911	01-Jun-17 A	28-Dec-20	-85		909	01-Jun-17	23-Dec-20	0	-2
Level 5		894	14-Apr-17 A	06-Jan-21	-84		891	03-Jul-17	02-Jan-21	55	-3
Level 6		900	17-May-17 A	14-Jan-21	-85		897	03-Jul-17	11-Jan-21	32	-3
Level 7		906	05-Jul-17 A	22-Jan-21	-85		903	03-Jul-17	19-Jan-21	-1	-3
SOB - 830	Infill Crane Opening on Level 7 (Require Steel) **ON OT**	7	15-Jan-21	22-Jan-21	-101	0%	7	11-Jan-21	19-Jan-21	-3	-3
SOB - 190	Install OSHA Post Above Floor for Safety Cables	12	17-Oct-17 A	30-Oct-17 A		100%	12	18-Oct-17	03-Nov-17	1	3
SOB - 125	Install Rebar & Styrofoam / Pour Overbuild Floor with OT	20	09-Oct-17 A	30-Oct-17 A		100%	20	10-Oct-17	01-Nov-17	0	2
SOB - 300	Install HIS Slab Shoring & Relieving Shoring	11	10-Oct-17 A	24-Oct-17 A		100%	11	18-Oct-17	01-Nov-17	6	6

Figure 4: Concrete slab overbuild package Variance analysis

c) Curtain wall work package:

The curtain wall package expected finish date changed during this update from 27-Sep-21 to 30-Sep-21.
There are 3 calendar days slippage in curtain wall package during this update.

Activity ID	Activity Name	Original Duration	Start	Finish	Total Float	Activity % Complete	BL Project Duration	BL Project Start	BL Project Finish	Variance - BL Project Start	Variance - BL Project Finish
Curtain Wall		826	20-Jun-18 A	30-Sep-21	19		823	02-Jul-18	27-Sep-21	9	-3
CW-320-F35	Glass Infill & SS Leaveout @ Floor 35	17	11-Sep-21	30-Sep-21	7	0%	17	07-Sep-21	27-Sep-21	-3	-3
CW-320-F29	Glass Infill & SS Leaveout @ Floor 29	17	21-Aug-21	10-Sep-21	7	0%	17	17-Aug-21	07-Sep-21	-3	-3
CW-320-F24	Glass Infill & SS Leaveout @ Floor 24	5	16-Aug-21	20-Aug-21	7	0%	5	11-Aug-21	17-Aug-21	-3	-3
CW-320-F23	Glass Infill @ Floor 23 (11 Lites) **WI	22	21-Jul-21	14-Aug-21	7	0%	22	16-Jul-21	11-Aug-21	-3	-3
CW-320-F19	Glass Infill & SS Leaveout @ Floor 19	10	09-Jul-21	20-Jul-21	7	0%	10	03-Jul-21	16-Jul-21	-3	-3
CW-320-F15	SS Leaveout @ Floor 15 (4 Crane Ties	3	06-Jul-21	08-Jul-21	7	0%	3	30-Jun-21	03-Jul-21	-3	-3
CW-320-F10	Glass Infill & SS Leaveout @ Floor 10	32	27-May-21	03-Jul-21	7	0%	32	22-May-21	30-Jun-21	-3	-3

Figure 5: curtain wall package Variance Analysis

d) **Aluminum panel wall package:**

- Aluminum panel wall WBS is still holding the same date, finishing on 15-Jan-20.

Activity ID	Activity Name	Original Duration	Start	Finish	BL Project Start	BL Project Finish	Variance - BL Project Start	Variance - BL Project Finish
▣	Aluminum Panel Wall	443	04-Apr-18 A	15-Jan-20 A	19-Apr-18	15-Jan-20	11	0
⊕	Northside Aluminum Panel Wall Level 1 to 8	93	14-Apr-18 A	31-Aug-18 A	23-Apr-18	31-Aug-18	5	0
⊕	Eastside Aluminum Panel Wall Level 1 to 8	92	04-Apr-18 A	28-Aug-18 A	19-Apr-18	28-Aug-18	11	1
⊕	Southside Aluminum Panel Wall Level 1 to 8	83	20-Apr-18 A	20-Aug-18 A	30-Apr-18	24-Aug-18	6	5
⊕	Aluminum Panel Wall Level 9 to 19	100	25-Jul-18 A	11-Jan-19 A	16-Aug-18	09-Jan-19	17	-2
⊕	Aluminum Panel Wall Level 20 to 37	200	23-Nov-18 A	26-Aug-19 A	26-Nov-18	06-Sep-19	1	8
▣	Aluminum Panels Wall Level 38 to Top of House	106	22-Aug-19 A	15-Jan-20 A	15-Aug-19	15-Jan-20	-5	0

Figure 6: Aluminum Panel wall work package Variance Analysis

e) **Concrete Core package:**

- Concrete Core WBS had been finished on 23-Nov-19

Activity ID	Activity Name	Original Duration	Start	Finish	Total Float	BL Project Duration	BL Project Start	BL Project Finish
	Concrete Core	714	21-Feb-17 A	23-Nov-19 A		714	21-Feb-17	09-Dec-19
	Core - Shear Walls	384	21-Feb-17 A	21-Aug-18 A		384	21-Feb-17	22-Aug-18
	Top of House Stages	330	22-Aug-18 A	23-Nov-19 A		330	23-Aug-18	09-Dec-19
	Core - Deck/Slab	455	12-Jun-17 A	29-Mar-19 A		455	12-Jun-17	25-Mar-19
	Core - Stairs	519	24-Jul-17 A	14-May-19 A		519	24-Jul-17	05-Aug-19

Figure 7 Concrete Core work package Variance Analysis

f) Fire Alarm package:

Fire Alarm expected finish date has slipped from 28-Oct-20 to 04-Dec-20.

Activity ID	Activity Name	Original Duration	Start	Finish	BL Project Start	BL Project Finish	Variance - BL Project Start	Variance - BL Project Finish
425 PARK AVENUE **COVID-19 TIA Revised Sequence As Of		120	18-Nov-19 A	04-Dec-20	17-Jun-20	28-Oct-20	148	-26
CONSTRUCTION		120	18-Nov-19 A	04-Dec-20	17-Jun-20	28-Oct-20	148	-26
Fire Alarm		120	18-Nov-19 A	04-Dec-20	17-Jun-20	28-Oct-20	148	-26
FA - 110.1	FDNY Re-inspection	1	04-Dec-20	04-Dec-20				
FA - 130	FA Signoff	0		04-Dec-20		28-Oct-20	-26	-26
FA - 120	LOD Corrective Action	20	01-Oct-20 A	27-Nov-20 A	30-Sep-20	28-Oct-20	0	-20
FA - 110	FDNY Inspections / Issue LOD	5	22-Sep-20 A	01-Oct-20 A	22-Sep-20	29-Sep-20	0	-1
FA - 100	FA Internal Pre-Test PTP Only	20	18-Nov-19 A	21-Jul-20 A	17-Jun-20	21-Jul-20	104	0

Figure 8 : Fire Alarm work package Variance Analysis

g) Storefronts & Lobby package:

Storefronts & Lobby WBS expected finish date changed from 29-Oct-21 to 25-Oct-21. Which means that Storefronts & Lobby Package is ahead by 4 calendar days during this update.

Activity ID	Activity Name	Original Duration	Start	Finish	BL Project Start	BL Project Finish	Variance - BL Project Start	Variance - BL Project Finish
▣ Storefronts & Lobby		823	01-Aug-18 A	25-Oct-21	01-Aug-18	29-Oct-21	0	4
L - 125	Phase 2 - Storefront / Canopy / Car Reservoir / Retail Completion After H	50	07-Jun-21	16-Aug-21	25-May-21	05-Aug-21	-7	-7
L - 120	Phase 2 - Storefront / Lobby Completion after Crane Removal with OT	50	21-May-21	20-Jul-21	17-May-21	16-Jul-21	-3	-3
⊕ PHASE 1 RESTAURANT		669	01-Aug-18 A	18-Mar-21	01-Aug-18	24-Mar-21	0	4
⊕ MAIN LOBBY		799	04-Sep-18 A	22-Oct-21	04-Sep-18	20-Oct-21	0	-2
▣ RETAIL		526	01-Oct-19 A	25-Oct-21	01-Oct-19	29-Oct-21	0	4
▣ Construction		526	01-Oct-19 A	25-Oct-21	01-Oct-19	29-Oct-21	0	4
GR-R-1010	Chop Remanining Pockets for Pedestals	15	17-Feb-20 A	28-Feb-20 A	01-May-20	21-May-20	54	60
GR-R-3100	Layout & Install Corrugated Wall Framing	20	01-Oct-19 A	01-Nov-19 A	01-Oct-19	28-Oct-19	0	-3
⊕ Retail / 55th Street		219	03-Feb-20 A	23-Mar-21	11-May-20	05-Feb-21	70	-31
⊕ 2nd Floor Retail Ceiling Work (Underside of 3rd Fl.)		244	12-Mar-20 A	28-May-21	12-Jun-20	22-Apr-21	65	-27
▣ Hoist Leaveout Phase 2 Work		112	17-May-21	25-Oct-21	06-May-21	29-Oct-21	-7	4
H-PH2-1040	Fin Tube Trench Grilles	5	18-Oct-21	25-Oct-21	21-Oct-21	28-Oct-21	3	3
GR-R-1140	Install Storefront Door 01-23A	5	18-Oct-21	25-Oct-21	21-Oct-21	29-Oct-21	3	4
H-PH2-1030	Fin Tube Pipe Installation	10	04-Oct-21	18-Oct-21	07-Oct-21	21-Oct-21	3	3
H-PH2-1150	Newmat Install Insulation & Fabric Wrap Ceiling	12	29-Sep-21	15-Oct-21	06-Oct-21	22-Oct-21	5	5
H-PH2-3280	Gammalux Light Fixtures Installation	10	29-Sep-21	13-Oct-21	06-Oct-21	21-Oct-21	5	6

Figure 9: Storefronts & Lobby package Variance Analysis

3. Changes in original duration:

- Some activities have extended duration and some have reduced durations compared to the previous update.
- None of these activities is on the critical path but we need explanation for this change.

Original Duration			
Activity ID	Activity Name	New Original Duration	Old Original Duration
T-2600	Con Ed Gas Inspection & Authorization	1d	10d
T-2200	Commissioning	10d	30d
MR-B2-85-150	DOB Gas Inspection	1d	10d
MR-B2-85-160	Con Ed Gas Inspection	1d	5d
IW - 11465	Construction Punchlist	16d	10d
SOB - 850	Infill Crane Opening on Level B1 (Require Steel) **ON OT**	3d	10d
S-215-F14	Crane Removal (Level 14 - 16) **ON OT**	2d	2d
SW - 105	Waterproof Existing Sidewalk Structure	10d	40d
SW - 110	55th Street Set Curbs	10d	40d
GR-R-3390	Form & Pour Curbs Between Mullions	20d	10d
GR-R-3400	Install Glass Shoe	25d	5d
GR-R-3410	Install Retail West Glass & Caulking	30d	25d
VT - 230.a	LR Elevators: Inspection A4-A6	3d	5d

4. Changes in activities relationships:

- There are 304 added and 68 deleted relationships in the current schedule.
- It is noticed that there are lots of logic change during this update; probably to solve the out of sequence activities, however there are still 20 out of sequence activities need to be solved. There is no explanation by the contractor for logic change which is one of the repetitive comments by HSE
- A full list of added and deleted relationships is attached in this report (Appendix #4)

Section 3: Schedule Critique

1. Activities Constraints

- There are 15 activities with constraints in the current schedule compared to 9 activities in the previous update.
- The contractor did some enhancement in removing some constraints.
- Activities should flow normally without any impact from the constraints, unless constraints are approved.

Recommendation:

It is recommended to re-evaluate the need of constraints in the schedule and remove all the unnecessary ones.

2. Negative Lag

- The use of negative lags (leads) is not considered a good scheduling practice and is prohibited in most of the scheduling guidelines and specs. Using negative lag breaks the whole idea of using the logic. Logic is specifically designed to allow a forward and backward path calculation in order to determine early and late dates followed by subsequent free and total float.
- The current schedule has 2 activities relations with negative lags. This number is low but the contractor should consider reviewing this logic and eliminate the negative lags where possible.
- A full list of activities with negative lags is attached to this report (appendix #5)

Recommendation:

It is recommended to evaluate the need of using negative lags in the activities relationships and change the relationship type to FS or SS/FF with lag to maintain the same logic.

3. Lags

- Relationship lags tend to hide details in the schedule and cannot be tracked like normal activities.
- Limited use of positive lag is preferable in the most scheduling guidelines and specs, the excessive use of lags makes the schedule not very transparent which affects its overall quality.
- The current updated schedule has 26 activities with lags which is less than 1% of the activities. Ideally, the percentage of lags in a schedule should not exceed 5% of the total relationships.
- Lags should typically be replaced with activities unless it is pause in time.
- A full list of activities with lags is attached to this report (appendix #6)

4. High Float

- Large number of activities with high amounts of float typically indicates missing relationships in the schedule.
- Unless high float is legitimate, it is recommended to have less than 5% of the overall activities with float value greater than 40 days. The current schedule has 8% of activities with total float greater than 40 days.

- Recommendation:

It is recommended to review the activities with higher float and adjust their logic.

A list of activities with high float is included in (appendix #7).

5. Open end activities

- Typically, there should be only one activity without a predecessor which is the “NTP” and one activity without a successor which is “project completion” in a schedule.
- The current schedule has 74 activities with no successors and 232 without a predecessor. It is recommended to tie all construction activities to their related activities for example:

A full list of open-ended activities in the schedule is attached in this report (appendix #8).

Recommendation:

Activities without predecessor or successor are impacting the schedule directly and should be fixed.

6. Negative Float

- 8 activities have negative float, the TCO date delayed by 16 working days.
- The completion date should have a finish constraint on its contractual date to determine the overall delay of the project.

7. Start-to-Finish Relationships

- There are no Start-to-Finish relationships in the current schedule.

8. Activities with Actual Dates greater than the Data Date:

- There are no actual dates greater than the data date during this update.

9. Out of Sequence

- An out-of-sequence activity is an activity which is in-progress or has completed before one or more of its predecessor's completion.
- Having out of sequence activities means; either the logic was incorrect in the first place or it was implemented in a different order on site.
- Out of sequence may give a wrong indication about the total float amount and the finish date of the project.
- Having out of sequence activities will result in a misleading schedule, and solving the out of sequence may change of the critical path and schedule dates.
- The current schedule has 20 out of sequence activities. To test the impact of solving the out of sequence, the scheduling option changed from "Retained Logic" to "Progress over ride" and the schedule was "run".
- After changing the scheduling options from retained logic to progress override, the TCO filling completion date changed from 07-Jan-21 to 11-Dec-20, this indicates that the out of sequence started to impact the TCO directly and must be solved to have an accurate TCO forecasted date.
- The float on the current schedule for "Concrete" WBS is 194 days, but after changing the scheduling options to progress override the float dripped to 2 days.

Recommendation:

It is recommended to fix the out of sequence relationships by adjusting the logic to have a more realistic schedule that reflects the logic at the site.

- A full list of out of sequence activities is attached to this report in (appendix #9)

10. Activities with actual duration higher than the original duration

- High actual duration compared to the original duration means either the original duration is mis-forecasted or the presence of a delay or suspension in the activity.

For example:

Activity “IW - 120 [Sheet Metal Branches/Toilet Exhausts]” started on 09-Aug-18 and finished on 02-Sep-20. Its actual duration is 435 working days compared to its the original duration that was 12 working days.

Same for “T-2100 [System Start-up & Testing]” started on 21-Aug-20 with a current percentage of 60%. Its actual duration is 61 working days compared to its the original duration that was 15 working days.

- A full list of activities with actual duration bigger than original duration is attached in this report (appendix #10)

Recommendation:

It is recommended to check the in-progress activities with high actual duration as they may have been already finished, especially for the ones started in 2017, 2018, and 2019.

It is also recommended to control the progress rate to avoid any further delays in the future.

Section 4: Conclusion

Conclusion and Recommendations

- The critical path in the current update starts by Generator Pre-startup / ATS / Paralleling Gear with 80% complete followed by Generator / ATS / Paralleling Gear Commissioning that finishes on Dec-30-20 followed by Generator Sign-off finishing on Jan-07-21 followed by TCO filing and sign off.
- The secondary critical path driving the TCO is the second driving activity to the Generator / ATS / Paralleling Gear Commissioning which is Fuel Oil Commissioning followed by the TCO Filling / Signoff. The Contractor should work in both activities (T-1120) and (T-1110) concurrently to avoid any delays in starting the activity (T-1130) that drives the TCO filing.
- There was continuous slippage in almost all the critical packages in this current update with exception to Aluminum panel wall package and store fronts & lobby package and the concrete package which had been already finished.
- The current schedule still has lots of deficiencies which are affecting the schedule quality and impacting the completion date. The major deficiency in the schedule is the presence of 20 out of sequence activities. Solving the out of sequence activities would advance the TCO date by roughly 27 calendar days. This is a repeated comment by HSE and it has been around in the schedule for many weeks now.
- The use of lags and leads (negative lags) must be restricted. Hidden logic or activities are not a good scheduling practice.
- The contractor did some enhancement in the schedule compared to the previous update but there are still further enhancements needed in the schedule as mentioned in the report.

Section 5 Appendix:

- Appendix # 1 milestones variance
- Appendix # 2 added and deleted activities
- Appendix # 3 changes in original durations
- Appendix # 4 changes in relationships
- Appendix # 5 activities with negative lags
- Appendix # 6 activities with lags
- Appendix # 7 list of activities with high Float

- Appendix # 8 list of open-ended activities
- Appendix # 9 list of out of sequence activities.
- Appendix # 10 list of activities with actual duration bigger than original duration.