18.3.15

Site setup and Logistics Learnings

1. Equipment
    a. Ensure that the man material hoist is located in such a way that it opens inside the core area (preferably service part of the core – see b. below for suggestions) or where not possible, the servant's room (if applicable) and not in any other part of the unit. This will help us ensure that the units are completed and finished in a timely manner, even if the demobilization of the man material hoist is delayed.
    b. The tower crane is to be located in (order of preference):
        i. One of the two staircases (if there are two or more staircases) viz. the stair flights shall be cast later / installed precast.
        ii. a lift shaft other than the lift earmarked as fire lift (since fire lift is required to be ready for OC).
        Use of external cranes can also be considered but should be limited as per the provisions of 'Equipment & Formwork guidelines'.
    c. Weigh bridge is to be installed at all sites having land area > 5 acres. This installation is to be completed within 3 months of takeover of site by const mgmt.
2. Logistics considerations:
    a. Prior to start of any activity on site, Project incharge should understand entire masterplan and thereafter demarcate the areas where temporary works can be put up viz. outside building footprint and outside any NDZ/other area prohibited for use as per regulation.
    b. Thereafter, earmark clear space for following which will not be needed to be moved during construction (or atleast 2 years):
        i. Site office
        ii. Stores and Quality Enhancement lab
        iii. Space for steel yard.
        iv. Space for RMC plant (if applicable)
        v. Labour Camp (located in a manner that fire tender can reach it in case of emergency). The labour camp should be constructed using good quality material and should be provided with proper sanitation and water supply. Electricity supply to labour camp should be metered and restricted/cut during day hours (9 am – 5 pm).
    c. Space for storage by MEP, Façade and Finishing contractors – this can be within building footprint / constructed parking areas, provided same is likely to be available for this use within 18 months from construction start of project. However, in case of storage of those trades which are likely to store flammable material eg. Plumbing, the said stores should be provided outside the tower footprint (can be in temporary store structure or if not feasible, in parking structure at locations which are well ventilated and are possible to reach by fire tender. Further, it is to be ensured that

the stores are only used for material storage purposes and not for cooking or any other activity which can give rise to fire.

d. Location of the Stores should be at a central space in the site and min. 10 m away from any external boundary wall of the site. As far as possible, the structure of the Stores should build with brickwork/blockwork/equivalent difficult to penetrate material upto a height of atleast 6 feet above ground (thereafter can be metal sheets) so that it is not easily penetrable. Also PCC of the Stores should be done properly.

3. Construction sequencing:
    a. Any basement immediately adjacent to a building (within 12 m of building line) should be constructed along with the building. It becomes very difficult to access the building later if basement is not completed and brought back upto ground / final level above ground. Further, there can be structural stability issues if excavation for basement is done very close to building line after building has gone up vertically.
    b. Efforts should be made to ensure that the core (lift shafts and staircases) can be pushed ahead as much as feasible to enable services, lift installation and access to floors.
4. Reduction in Temporary works:
    a. Try to do final works earlier and use them during construction phase, rather than doing temporary works e.g. roads (without top coat), UG tanks, STP, , power distribution lines, water distribution lines, drainage, sewage - this will require a lot of upfront effort with and by the design team but will save a lot of costs later.
5. Site office:
    a. Site office should be established in a location which will not require relocation for atleast 2 years.
    b. Seating capacity should be determined as per the likely no. needed over next 2 years, based on company office space allocation policy for Const Mgmt:

Level	Type of Office Space
0 (including C-level and Directors)	Cabin
1	1A, 1B – Cabin; 1C – Cubicle
2	2A, 2B – Cubicle; 2 C –workstation.
3	Workstation @ 50% of total no with usage on rotational / shared seating basis
4	Workstation @ 50% of total no with usage on rotational / shared seating basis
5	No seating provision

Total area of site office should not exceed 70 (max. 80) sq. ft. carpet area per person who is supposed to be provided seating facilities (as per table above).

    c. Site office should be finished in a reasonable manner and provide good work environment for site associates, as well as associates from corporate teams.

d. For large and very large projects, site office should have one conference room with seating capacity of 8-12 pax., along with whiteboard.
e. Site office should be equipped with airconditioning, phone line (1 if small or medium site, 2 if large or 3 if very large), intercom (for large or very large site), fax, printer and web connectivity.
f. Appropriate provision for filtered drinking water should be available.
g. Appropriate toilet facilities (min. one unisex toilet w/ basin if small site, else more as needed) should be provided for associates.
h.

6. Water:
    a. Minimise/completely avoid use of tanker water from outside by using municipal water connection (to max extent possible), river water (if applicable) and bore wells. If bore well is salty/brackish, consider installing RO plant which can be used during post-construction too.
    b. For tankers, it is essential to install flow meter and note the actual amount of water delivered through each tanker.
    c. MEP contractor should be awarded as soon as feasible to ensure that vertical water distribution within a building can be done using a final line, rather than laying temporary lines.
    d. Implement other measures as outlined in '**Steps to be taken for electricity and water cost containment'** policy**.**
7. Electricity
    a. Temporary electrical distribution plan should be prepared by PM, along with MEP design team, prior to start of works.
    b. MEP contractor should be awarded as soon as feasible to ensure that vertical electricity distribution within a building can be done using a final line, rather than laying temporary lines.
    c. Usage of diesel for DG sets should be closed monitored. See '**Diesel Usage Guidelines**
    d. Implement other measures as outlined in '**Steps to be taken for electricity and water cost containment'** policy**.**
8. Plan temporary utilities requirement. This needs following inputs :

    a. Max no of office staff . "n"
    b. Max no of labour . "l:"
    c. Area under construction that will be completed in 14 days during peak working season."A"
    d. Electrical load of all planned construction equipment. "W1"
    e. Construction load for building and area lighting "W2"
    f. The utility requirements can be worked out on following basis :
        1. Project office area : 75*n sft

2. Electrical load for the office 7.5*75*n watts.
3. Water requirement per day: Domestic 15*n litres. Flushing 30 litres*n
4. Area for labour camp G+1 configuration : 50*l sft
5. Water requirement for labour camp per day : 40 litres *l domestic + 20litres*l flushing
6. Capacity of storage tanks : one day's requirement maximum.
7. Construction water requirement : 2*A litres.
8. Construction water storage capacity : 2*A litres.
9. Electrical load for labour camp : 20*l watts
10. Area of stores : Approximately same as office.i.e."N"
11. Power requirement : 2*N watts
12. Hence total power requirement :
    a. initial : 149 kw
    b. 1st enhancement :{7.5*75*n/1000 + 0.5*20*l/1000 + 0.5 (W1+W2) + 0.5*2*N }kw
    c. 2nd enhancement : Total of sr nos 2, 9, 11 above + w1+W2.
13. Capacity of sewage treatment plant (in absence of any other disposal alternative) : 30*n + 40*l litres per 24 hrs.

9. Calculation of man material hoist and cranage requirement :
    a. From the construction schedule determine the peak take off of various material to be lifted up for unloading "into" individual floor and its weight and from average round trip time taking into account time for loading / unloading , and time lost in labour movement (unless separate hoist is planned for labour) determine load carrying capacity and speed of the hoist.
    b. Capacity of tower crane is normally calculated by multiplying its average lifting capacity at the centre of loading boom by a factor of 1.25 which should be > maximum load that will be required to be lifted during the period while crane is being used at site. This has to be confirmed from crane manufacturer . Height and jib length will depend on material logistic plan and type of crane proposed.In very tall structures where multiple cranes will have to be used (sometimes at different levels) sequence of dismantling the cranes needs to be planned taking into account which crane can be used to remove other(s).
10. Safety:
    a. EHS plan should be discussed with EHS team within 1st month of commencement of site works.
    b. Site level medical facility / first aid shall be provided by Lodha. List of nearby hospitals, fire station and ambulance providers should be provided at site office and the medical facility. In case of very large sites, a dedicated ambulance shall be provided on site by Lodha.

c. Wherever there is a need to have access roads or heavy machinery mounting on built up spaces , the structure affected has to be designed for the incidental construction loading . This has to be clearly marked in structural drawings . Advance information in thisd regard needs to be given to Consultants and Engineering.

d. Gas cylinders or kerosene cooking devices are NOT permitted in the residential area of labour camp. For cooking facilities, a separate cooking area has to be earmarked which is located on ground level, is easily accessible, well ventilated and fire extinguishers are available close to its entry point. This cooking area should preferably be physically separated from the residential areas of the labour camp.

e. Similarly, Gas cylinders or other flammable fuels are not permitted inside the permanent structure's footprint under any circumstances. This applies in case of welding too.

f. If labour camp is located within permanent structure, no gas cylinder or kerosene cooking devices is allowed inside the permanent structure and separate temporary shed, outside permanent structure, is to be earmarked for cooking facilities. In case, temporary cooking area is not feasible due to space constraints, it is to be ensured that the cooking area is located on ground floor of the permanent structure in well-ventilated area and all cooking occurs at that location only. Fire extinguishers should be provided close to this cooking area.

g. Site EHS incharge/rep shall conduct inspection of labour camp, stores and other 'high risk' areas in the site atleast once a quarter and report findings to COO. This inspection shall be carried out along with level 1 associate of CM, who is incharge of that sector/site (if no level 1 associate on the site, then highest ranking CM associate).

11. Security:
    a. Implement steps stated in '**Security Guidelines for Const Mgmt'**
    b. Entire site to be fenced/barricaded, preferably with final compound wall (as per policy) for all sides which are road facing/highly visible. For road facing/highly visible sides, use only pre-coated sheets (not regular GI) upto a height of 8 feet above ground.
    c. No of entries to be restricted, preferably to 1.
    d. Adequate space to be earmarked for labour camp at a location which can be demarcated from the construction area with a secured access.
    e. If CCTV cameras are planned for the final project, they (along with monitoring equipment) should be installed at all entries of the site at start of construction (and can be re used for final project).

Construction Management can seek the assistance of the Planning team wrt the logitistics setup/planning, if so desired.