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# CONSTRUCTION SITE SUPERVISION AND MONITORING IN AFGHANISTAN

AFGHANISTAN LOCAL GOVERNANCE ASSISTANCE PROJECT  
(ALGAP)

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## Introduction

What is expected of the site supervisor/monitor? S/he is supposed to be a Jack of all Trades as the success or failure of a project depends largely on his/her knowledge and experiences. It is therefore important that the site supervisor/monitor should have sufficient relevant knowledge and experience of the different trades within the built environment as well engineering, architecture, mechanical and electrical service and quantity surveying. S/he must also have been exposed to different aspects of construction and therefore have acquired the experience and confidence to make certain decisions at site. This is what is expected of site supervisors/monitors. One must not delay the work or make elementary mistakes that would facilitate the contractor to claim for extension of time and additional cost to the project.

It is important that before visiting the site, the site supervisors/monitors must obtain from the Project Manager/Engineer all information of the project including those of Mechanical and Electrical services. S/he is the eyes and ears of the Project Manager/Engineer and should perform their duties and tasks with due diligence. Actual events of the site should be recorded in the site journal and report of the same be submitted to the Project Manager/Engineer to avoid any future problems and disputes. It is easy to say that everything is fine at site but to be found out later by others that it is not as reported, which will not only destroy the reputation of themselves but the trust placed on them by the Project Manager/Engineer. Therefore, it is important that reports should reflect the actual conditions and qualities of the works inspected.

Quite often the site supervisor/monitor only visit the site when is requested by the contractor to check on some work or to resolve some site problems. During the visit the site supervisor/monitor usually dealt with what had been requested by the contractor and not taking into consideration of other contractual matters. It is therefore important site meeting be held with the contractor to iron out any site and construction problems and contractual obligations prior to carry out site inspection. It is important that the site supervisor/monitors should visit the site at regular intervals base on the approved programme submitted by the contractor. This will enable the site supervisor/monitor to closely monitor the quality, quantity and progress of the work according to the approved programme and the contract documentation. If any part of the works are delay and not up to standard, these could be detected and can be resolved at the earliest possible time, which would avoid costly and time consuming resolution of the same at a later date.

## **Site Supervision/Monitoring Procedures and Check List**

<i>Subject</i>	<i>Description</i>	<i>Remarks</i>
Site security and health & safety arrangement	Fencing/hogging of the site, day and/or night guards, communication arrangement and First Aid box.	<ul style="list-style-type: none"> <li>This arrangement is to protect the site and that of the workers and the general public.</li> </ul>
Project sign board	Size, type and locations.	<ul style="list-style-type: none"> <li>Ensure that the sign board is in accordance to the specification given by the Project Engineer and the contents of the sign board should be check and verified for correctness.</li> <li>Sign board should be erected at location where it can be easily viewed by the public.</li> </ul>
Site personnel	Site engineer, trade supervisors, skill workers and unskilled workers	<ul style="list-style-type: none"> <li>The number and their trades should be recorded by the contractor everyday and produce for verification by the site supervisor/monitor during his/her visit.</li> </ul>
Equipment, instruments and tools	Excavator, concrete mixer, compactor, concrete vibrator dumpy level (theodolite) and staff, spirit level, tape measures, plumb bob steel bender and cutter, etc	<ul style="list-style-type: none"> <li>The type, size and number of the equipment, instruments and tools employed for the work should be recorded by the contractor daily and produce for verification by the site supervisor/monitor during his/her visit.</li> </ul>
Construction programme	Construction programme display at site office and marked up to date	<ul style="list-style-type: none"> <li>The construction programme and any other revised programme should be approved by the engineer and be marked up to show the actual progress of the works. Any delays of the work must be accompanied with reasonable reasons and evidence.</li> </ul>
Construction drawings	A set of up-to-date drawings and copies of specification and contract document should be kept at the site office	<ul style="list-style-type: none"> <li>This is to enable the site supervisor/monitor to refer to them if there is any doubt of the contractor's work.</li> <li>Any changes made at site should be recorded and the document revised and issued to the contractor.</li> </ul>
Site facilities	Storage shed and yard, site office, toilet and washroom, workers camp, etc.	<ul style="list-style-type: none"> <li>This is to ensure that the equipment, tools and material are not lost or damage by weather, etc.</li> </ul>
Materials on site	Cement, sand, gravel, stone, bricks, timber, steel, etc., when were they order, its sources and when delivered to site.	<ul style="list-style-type: none"> <li>The quality and quantity of each type of material at site and where are they kept. Contractor to provide inventory for supervisor/monitor to verify.</li> </ul>
Problems encountered at site	What are the problems encountered by the contractor at site that would result to delays and addition cost to the project. The contractor should also record any adverse weather condition experience at site in the event of claiming for extension of time.	<ul style="list-style-type: none"> <li>This should be resolve at site if possible and recorded in the day journal and confirm in writing stating the cause of the problems and resolution of the same from head office.</li> <li>Reasons for shortage of material, equipment and personnel due to contractor not providing same on time.</li> </ul>
Information required	Technical construction details and other additional information required by the contractor to carry out their works. This should include the time that the information is required by the contractor.	<ul style="list-style-type: none"> <li>The supervisor/monitor should convey them back to head office and have the information provided to the contractor as soon as possible or by the date that they are required to avoid any claims by the contractor for lack of information. Simple technical details that can be resolved at site should be recorded in the day journal and confirm in writing by the head office.</li> </ul>
Progress of work	Measurement of the progress of the work should be base on the Bills of Quantities and also the programme. The calculation must be for the total project as a whole. This should be carried out by the contractor in conjunction with the site supervisor/monitor.	<ul style="list-style-type: none"> <li>The supervisor/monitor must verify the true quantity and the progress at site. This is <b>SITE SUPERVISION AND MONITORING</b> and the actual stages of progress. If it is found that the works are being delayed the site supervisor/monitor must obtain reasonable answers to the cause of the delays in writing from the contractor and in turn report the same to Project Engineer in</li> </ul>

Site observation and meeting note:

The above site observation and meeting should be recorded as minutes of the site visit with clear instruction of what action should be taken, when and by which party. This is very important as this would support any future dispute between the contractor and the client. This will also assist the Project Manager/Engineer with his/her decision to award any extension of time and/or addition cost which the contractor might submit a claims for the same.

### Stages of work Check List

<i>Stages</i>	<i>Description of the works</i>	<i>Remarks</i>
Preliminary and general	Contractor mobilisation at site to include workers, equipment, tools and the necessary site facilities including clean water and power supply.	<ul style="list-style-type: none"> <li>• This is not necessary to be inspected. However, the supervisor/monitor has to ensure that the contractor is at the right location and that the mobilisation of the labours and equipment together with other site facilities and services be carried out at minimum time.</li> <li>• Equipment type and number mobilised must be recorded together with means of water and power supply.</li> <li>• Ensure that the area to be built-on is cleared of vegetation, clean and level.</li> </ul>
Setting out of the buildings	How the buildings are being set out, with what instrument and from which bench mark together with the determination of the levels of each buildings.	<ul style="list-style-type: none"> <li>• Check the setting out and the final floor levels of all the building in accordance to the site plan and other design documents and to certify the same prior to excavation to commence. This to be performed with proper instrument such as theodolite and dumpy level.</li> </ul>
<b><i>Sub-structure</i></b>		
Excavation	The contractor might carry out this task by hand or with a mechanical excavator in accordance to the contract drawings or any amendments approved by the Project Manager/Engineer or his/her authorise representative.	<ul style="list-style-type: none"> <li>• Ensure that the width and depth of the excavation is in accordance to the latest information.</li> <li>• Depending on the soil condition the supervisor/monitor could varied the depth of the foundation and this to be recorded in the site journal and confirm by writing.</li> <li>• The volume of excavation, measured net, to be recorded and note the area that the excess soil is being disposed off, less the volume for back filling.</li> <li>• If soil condition is such that require shoring to the sides of the excavation and water table level too high the supervi-</li> </ul>

		<p>sor/monitor is to ensure that the contractor provide proper method of shoring and dewatering system.</p> <ul style="list-style-type: none"> <li>• The supervisor/monitor is to record/verify any rocks encountered during excavation and the volume.</li> <li>• Instruct contractor to take soil sample for testing of bearing capacity if deem necessary.</li> </ul>
<p>Foundation work and plinth walls. (Internal drainage system might be required in some cases depending on the drainage design)</p>	<p>The foundations are of rc concrete and/or stone work and the plinth wall in burned bricks, stone work or solid concrete blocks. Reinforced concrete with the required shuttering and steel reinforcement as per the structure drawings.</p>	<ul style="list-style-type: none"> <li>• Blinding concrete of the specified mix and thickness (in any case not less then 50mm) to be laid to trenches and with proper curing.</li> <li>• Check all steel work for type, quality and sizes in relation with the structure drawings and bending schedule.</li> <li>• Ensure formworks are constructed with good quality timber, true to line and angle, plumb, level and dimension as per the structure drawings. Removal of formwork to be at least 14 days.</li> <li>• Check that reinforcements are laid in accordance with the structure design and concrete spacer blocks to be placed at regular intervals.</li> <li>• The quality and size of bricks and concrete blocks to be checked to ensure that the same is hard, sound, square and clean with sharp and well defined arrises. Bricks and blocks to wetted sufficiently to prevent undue absorption of water from the mortar.</li> <li>• The stone should be of hard granite/lime stone rock with an average size of 0.03 cu.m or as specified in the contract document. No river corbels to be used at anytime.</li> <li>• Ensure that the contractor to take care not to load walls before they have gained sufficient strength. Therefore the maximum height on laying masonry should not exceed 600mm at any one operation.</li> <li>• Quality and quantity of mortar used to be as specified and should be used within one hour of mixing or discarded and not be re-tempered after initial set.</li> <li>• All masonry should be properly spread with mortar before being laid and all joints should be thoroughly flush solid through the full thickness of the wall at each course as the work proceeds.</li> </ul>

		<ul style="list-style-type: none"> <li>• Check water and power ducts and drainage pipes being placed in the right position.</li> </ul>
Back filling, hardcore filling, compaction, sand bed, and under slab damp proof membrane.	Back filling to the foundation and trenches usually with the excavated soil and compacted or imported materials. Hardcore filling under slab usually of gravel, stones or broken bricks and compacted and a layer of 50mm sand bed on the hardcore filling after attaining the required level to receive the damp proof membrane all in accordance to the specification of the works.	<ul style="list-style-type: none"> <li>• The supervisor/monitor must take decision in approving the material used for back filling and hardcore filling. If the material is not suitable s/he should request the contractor to provide the proper material from other sources for approval.</li> <li>• Back filling to trenches should be in layers of not more than 150mm and compacted properly.</li> <li>• Hardcore filling usually of gravel or broken bricks of 75mm size lay in layers of 150mm thick, watered and compacted between layers.</li> <li>• Ensure that all filling material does not contain clay, vegetation and other debris.</li> </ul>
Ground beam and floor slab	Works required shuttering to the ground beam, stub column constructed in timber and steel work placed into position with spacer blocks to received concrete all in accordance with the structure design.	<ul style="list-style-type: none"> <li>• Ensure that all under floor piping are placed to the required position prior to concreting being carried out.</li> <li>• Check for level of the shuttering, material used and the proper laying of the reinforcement and ensure that sufficient covering of the steel by using spacer blocks and proper curing of the concrete both before and after formwork has been removed.</li> <li>• Formwork should only be removed after fourteen days.</li> <li>• Check all steel work for type, quality and sizes in relation with the structure drawings and bending schedule.</li> <li>• Concrete should be properly vibrated to avoid any honeycomb in the concrete.</li> </ul>
<i>Super-structure</i>		
Columns, beams, lintels, slab and other features.	All works as sub-structure beam and floor slab but needs proper props to support the shuttering of the columns, beams, lintels and slab to ensure that the columns are plumb and the beams, lintels and slab are level and in true line. Placing of reinforcement and concreting.	<ul style="list-style-type: none"> <li>• The supervisor/monitor must carry out proper checks of all the shuttering for plumbness, levels, alignment and water tightness and the stability of props supporting the formwork in place.</li> <li>• Check all steel work for type, quality and sizes in relation with the structure drawings and bending schedule.</li> <li>• Check on the concrete mixture to ensure the grade of concrete used is in accordance with those specified.</li> <li>• Ensure that the contractor carry out proper curing of the concrete work before and after the formwork have been removed.</li> </ul>

		<ul style="list-style-type: none"> <li>• Check material used in concrete mix such as aggregate must be crushed stone of the size and quality specified and sand must be clean and sharp.</li> <li>• Slump test and/or cube test to be taken at random.</li> </ul>
External and internal walls including door and window openings	Setting out of internal and external walls together with opening for doors by steel tape supported throughout the whole of its length. Angles set out by builders' squares to be checked by theodolite if they govern lines over 15m long. Setting out gauge height of the courses of the different material to be used for the wall.	<ul style="list-style-type: none"> <li>• All bricks, stone or concrete blocks must be that approved by the Project Engineer.</li> <li>• The quality and size of bricks and concrete blocks to be checked to ensure that the same is hard, sound, square and clean with sharp and well defined arrises. Bricks and blocks to be wetted sufficiently to prevent undue absorption of water from the mortar.</li> <li>• Quality and quantity of mortar used to be as specified and should be used within one hour of mixing or discarded and not be re-tempered after initial set.</li> <li>• The bricks, stones and concrete blocks must have wall ties to the concrete columns and damp proof course under external wall between the slabs.</li> <li>• All bricks and concrete blocks should be built plumb and true to line and levels with a tolerance of <math>\pm 5</math>mm in any storey height or 5m in lengths; and <math>\pm 10</math>mm in any 50m overall building height or length. The bricks stones and blocks members are to be built to lines, levels and thickness shown on the drawings.</li> <li>• Window sill and lintel height and level must be in accordance to the dimensions stated in the contract documents.</li> <li>• Ensure that the contractor to take care not to load walls before they have gained sufficient strength. Therefore the maximum height on laying masonry should not exceed 600mm at any one operation.</li> <li>• Walls to be plastered shall have horizontal joints raked out to a depth of 15mm to form a key.</li> <li>• All masonry should be properly spread with mortar before being laid and all joints should be thoroughly flush solid through the full thickness of the wall at each course as the work proceeds.</li> </ul>
Mechanical and electrical first fix	Conduits and boxes chased into walls or fixing of insulated cables for use directly under plaster. Water and	<ul style="list-style-type: none"> <li>• Check the location of all switches, sockets and lighting outlet location against the electrical drawings and specification.</li> </ul>

	<p>drainage pipe to chase into walls</p>	<ul style="list-style-type: none"> <li>• The same is to apply to the mechanical works. All holes and chasing made to the walls and floors to be made good prior to plastering and or screed work.</li> <li>• Type of electrical installation (conduit, trunking, surface or under plaster insulated wiring system), proper bends, junctions, switch and socket boxes should be used.</li> <li>• Ensure the level of all switches, sockets and lighting outlet boxes are of the required height, level and in alignment.</li> <li>• All the electrical boxes must be protected for plastering.</li> <li>• Water and drainage pipe must be checked for size and quality. All elbow, T junction, joints and reducer sections to be of the same material as the pipes.</li> <li>• All conduits and pipes to be chased into wall neatly, straight and level.</li> </ul>
<p>Window and door frames first fix</p>	<p>Timber sub-frame for installation of proprietor timber, steel, aluminium or upvc frames. But pressed steel door frames needs no sub-frames. The timber sub-frames are usually the thickness of the finished plaster and depth of the window and door frames.</p>	<ul style="list-style-type: none"> <li>• The site supervisor/monitor must ensure that all sub-frame for proprietor door and window frame are those recommended by the approved manufacturer.</li> <li>• Sub-frames for contractor's own frames should be of good quality timber with low moisture content. Newly sawn timber should be left out to air dry to reduce the moisture content before being use on site</li> </ul>
<p>External and internal plastering and screed</p>	<p>Walls to have first splash coat follow with a second coat of 10mm thick plaster and a finishing coat of either cement/sand or gypsum plaster. Scorched to roughen the surface to act as key for the adhesive to the tiles especially when using cement/sand mortar for areas to receive tiling.</p>	<ul style="list-style-type: none"> <li>• The supervisor/monitor much be checked for quality of cement, sand and the right mix of the plaster. Sand shall be clear fine sand free of organic material.</li> <li>• Walls should be wet prior to applying the splash coat and second coat after the splash coat is sufficiently dry and final coat after the second coat has dry properly.</li> <li>• All piping, conduit, fixing clips and other metallic objects shall be covered with metal lathing before plastering to avoid cracks.</li> <li>• The level of the plaster and screed should be check for level +/- 1.5mm variation between planes of abutting edges and ends and 3mm in 2m variation from plumb or level in any exposed line or surface.</li> <li>• All plasterwork shall be protected from drying out too quickly.</li> <li>• Floor screed to be laid in accordance to the specification but</li> </ul>

		not more than 16 sq.m. at the most and expansion joints to be provided on the floor for area in excess or the said.
Roofing work, roof covering and guttering	Constructing timber and/or steel trusses, fixing of purlins, timbering boarding/lining and insulation.	<ul style="list-style-type: none"> <li>• Check that the trusses are properly construct and the spacing to be in accordance to the detailed drawing.</li> <li>• Galvanised iron sheets gauge and quality to be checked.</li> <li>• Size of gutter and fixing of down pipes together with overlapping of roof covering and flashing. Check on water tightness.</li> <li>• Ensure the degree of pitch is in accordance to the details provided in contract drawings.</li> </ul>
Window and door frame second fix	Hanging of doors and windows and fitting doors and window lockset and furniture.	<ul style="list-style-type: none"> <li>• Door and windows leaves should be fixed with the proper type and size of hinges as specified or approved.</li> <li>• Test to be carried out to ensure that it is hung properly and closes and open easily and to the degrees of opening as specified.</li> <li>• The site supervisor/monitor must pay specially attention for water tightness to all windows and doors that are opening inwards and if required the details of the said must be revised.</li> <li>• If the doors and windows are proprietor type, approval by the Project Engineer must first be obtained and the contractor should obtained the necessary guarantee from the manufacturer for the same.</li> <li>• All fittings, furniture and ironmongery to be in accordance to the approved samples.</li> <li>• All timber used in the joinery works should be of the type and quality approved by the Project Engineer.</li> <li>• Ensure that the contractor air dried the timber in proper enclosure to reduce the moisture content before being used.</li> </ul>
Floor and wall finishes	The contractor must submit samples, specification and fixing recommendation from the manufacturer of both wall and floor tiles for approval by the Project Manager/Engineer before procuring the same for the works. Approved samples to be kept at the site office for reference.	<ul style="list-style-type: none"> <li>• When tilling are fix with cement mortar the tiles has to be soak in water prior to fixing and proper spacer should be use in all cases. In no cases should the wall tile to be less then 4mm thick.</li> <li>• Grouting or pointing should be of the proper material and clean before it is fully dried. Arises or corner tiles to be use.</li> <li>• Floor tiling to be minimum 10mm thick and to have expansion strip when area exceed 16 sq. m. in area to prevent cracking and lifting of the tiles. Reject all chipped and cracked tiles.</li> </ul>

		<ul style="list-style-type: none"> <li>• Marbles or natural stones shall be obtained from source proposed by the contractor and approved by the Project Engineer. Contractor to confirm that the required quantity, to the dimensions and quality stated on the drawings can be supplied by the same source. The permitted tolerance for length, width and thickness shall be <math>\pm 1.5</math>mm from the sizes required.</li> </ul>
Mechanical and electrical second fix	Drawing of wires, fixing of switches, power points and lighting points. Fixing of sinks, wash hand basin, toilets basin, etc.	<ul style="list-style-type: none"> <li>• Supervisor/monitor to check the sizes and the quality of wires against the electrical drawings and specification.</li> <li>• In mechanical works such as the type of sinks, whb, toilets, etc are all in accordance to the approval samples.</li> <li>• Taps, traps, stop valves, etc for hot and cold water supply and drainage to be in accordance with the approved samples.</li> <li>• Isolation valve to hot and cold water outlets.</li> <li>• Ensure that no electrical switches and sockets are less than a meter away from any water outlet.</li> </ul>
Painting – first and second coat	Clean down surfaces of all area that are to be painted.	<ul style="list-style-type: none"> <li>• Ensure that the surface are free from oil, grease and wax by cleaning with mineral spirits then water rinsed. Depending on the surface material preparation should be carried out in accordance to the specification prior to commencement of painting.</li> <li>• All doors and window should be removed before commencement of painting and re-hung when completed.</li> <li>• Second coat should only be applied after the first coat is completely dried.</li> <li>• Timber work must be properly sanded and any cracks gaps and splits must be filled prior to painting.</li> <li>• All paint used to be of approved type, colour and source.</li> <li>• Ensure that all paint provided are ready for use and in no case shall thinner exceed 5% by volume.</li> <li>• Check that all surfaces not to be painted are protected against spillage, over spray etc.</li> <li>• All doors and windows furniture and fitting, switch, socket and cover plates to be removed before painting.</li> </ul>
Glazing and fitting of windows and doors	Fixing of glass to glazed section of windows and doors with glazing beads either with timber or proprietary material from the manufacturer.	<ul style="list-style-type: none"> <li>• Glass to be of high quality (float glass) and thickness to be as specified.</li> <li>• Protect glass and glazing materials during delivery, storage and</li> </ul>

		<p>handling to manufacturer's directions.</p> <ul style="list-style-type: none"> <li>• Timber glazing beads to be of same timber as the frame and shape and size as specified.</li> <li>• Foam tape or mastic to be used between glass and timber beading.</li> <li>• Obscure or pattern glass to be used in bathroom and toilet.</li> <li>• Protect exterior glazing from breakage immediately upon installation by use of crossed streamers attached to framing and held away from glass.</li> <li>• No markers should be applied on surface of glass and remove non-permanent labels and clean surface.</li> </ul>
Mechanical and electrical fittings	Fixing electrical fittings into place and taps, traps, etc to the sinks, wash hand basin, toilets seats. Installation of hot water system and testing and commission the both hot and cold water and electrical reticulation.	<ul style="list-style-type: none"> <li>• All electrical fitting should be fixed after the final coat of paint had been complete.</li> <li>• Check for level, straightness and plumbness of all electrical fittings.</li> <li>• Ensure that all sanitary and sink fittings are connected to hot and cold water supply with flexible connections.</li> <li>• Hot water geysers must be of the capacity and type specified and approved by the Project Engineer.</li> <li>• Check for correct ampere power supply to hot water geyser</li> </ul>
Painting final coat	Colour, quality, type and source of paint to be that approved by the Project Engineer.	<ul style="list-style-type: none"> <li>• Check for any defects of the previously painted area and make good and clean prior to applying finishing coat of paint.</li> <li>• All spillage on other surfaces must be clean at once.</li> </ul>
<b><i>External Works</i></b>		
Storm water and waste drainage system	Construction of drains, manholes, septic tank, soakaway and laying of drainage pipes. Connection to main sewer system if available.	<ul style="list-style-type: none"> <li>• Check setting out of all storm water and waste drainage to be in accordance with the site plan.</li> <li>• Alignment, level, depth and gradient of the excavations to be check prior to constructing storm drains and the laying of waste drainage pipes.</li> <li>• Ensure that the size, type and construction method of the storm drains, manholes and septic tank and soakaway are in accordance with the specification and drawings.</li> <li>• Make sure that all drainage pipes under road work to have 150mm plain concrete all round.</li> </ul>

		<ul style="list-style-type: none"> <li>• Ensure that culverts are provided for crossing over storm water drains.</li> </ul>
Water supply system	Connection to main water supply if available and meter and meter chamber. Otherwise drilling of borehole, supply and install pumps and water storage tanks together with the laying of water supply pipes and valves chambers.	<ul style="list-style-type: none"> <li>• Main water supply pipe to be minimum 50mm diameter or the size and quality as specified in the contract document and lay below ground to a minimum depth of 600mm or as approved by the Project Engineer.</li> <li>• All underground and external water pipes shall be insulated with polyurethane pipe insulation to protect it from bursting during winter.</li> <li>• Water tank shall be the capacity and type specified and lagged with minimum 50mm thick aluminium foil faced fibre blanket to prevent water from freezing up.</li> <li>• Determine the location of the well or borehole to ensure that it is far enough from any source of contamination and check quality of the water and its quantity.</li> <li>• Pumps should be of the capacity to transport the water from its source to the tanks and of the type and quality approved by the Project Engineer.</li> <li>• Ensure that external stand pipes are available for gardening, car washing and other uses.</li> </ul>
Power Supply Connection	Connection to main power supply or to generator. Supply, install and commission standby power generator including shelter and fuel tank.	<ul style="list-style-type: none"> <li>• Ensure type, size and quality of cable for connection to national power supply or to generator are in accordance with specification and loading required.</li> <li>• Check construction of concrete platform and shelter for generator and fuel tank.</li> <li>• Generator to conform to the electrical design capacity. Quality and type to the approval of the Engineer.</li> </ul>
Boundary walls and gates	Excavation, placing of concrete foundation, construction of wall with stones, bricks or concrete blocks either in fair faced or plastered finish with concrete coping. Installation of steel or timber gate and painting.	<ul style="list-style-type: none"> <li>• Check setting out and excavation of the foundation for the boundary wall/fence.</li> <li>• Ensure that expansion joints are provided at intervals as agreed with the Project Engineer.</li> <li>• Stones, bricks and concrete blocks to be of the quality and type specified and/or approved by the Project Engineer.</li> <li>• Sample of pointing for fair faced finishes must be approved by the Project Engineer prior to having the work carried out.</li> </ul>

		<ul style="list-style-type: none"> <li>• Ensure that no stones, bricks or blocks are laid more than 600mm in height at any one operation.</li> <li>• Coping to wall to be plain concrete, pre-cast or cast in-situ type with water drip groove on the underside of both sides of the wall.</li> <li>• Gate to be of the height, width and quality as specified.</li> </ul>
Driveway, parking area and Kerbs	Setting out of driveway and parking area in accordance to the design drawings. Removal of top soil and excavate to reduce level of area for driveway. Import quality soil for base course and compact to specify density. Paving either in concrete or loose aggregate. Pre-cast or cast in situ concrete kerb laid on plain concrete foundation.	<ul style="list-style-type: none"> <li>• Check setting out, alignment and level of driveway and parking area.</li> <li>• Ensure that roots of all vegetation are removed properly.</li> <li>• Top soil to be stock pile at site for other uses and excess to be remove to location approved by the Project Engineer.</li> <li>• Check that the areas for driveway and parking are compacted to the required density with mechanical roller or compacter and to carry out the necessary test.</li> <li>• Ensure that the materials for paving shall be those specified.</li> <li>• Check size, profile and mix of concrete use for driveway, hard standing and kerbs.</li> <li>• Check type and grade of reinforcement for concrete paving.</li> <li>• Ensure that expansion joints to be introduced for concrete paving for an area exceeding 20 sq.m.</li> <li>• Aggregate for paving shall be of quality crushed stone of quality and size lay to a depth approved by the Project Engineer.</li> </ul>
Landscaping work	Clearance of the area earmark for landscaping works. Import top soil and composts for flower bed and/or planters. Set out the layout in accordance with the landscape design and construct planters and other features as per the drawing and specification.	<ul style="list-style-type: none"> <li>• Layout of landscaping to conform to the design drawing.</li> <li>• Clear area of any vegetation, debris, stones, etc and top soiled the area to level as specified.</li> <li>• Area for grass planting to be level or terrace as per the design.</li> <li>• Planters to have drainage outlet and fill with top soil and composts.</li> <li>• Ensure that there is sufficient water supply outlet in the area for irrigation/watering purpose.</li> <li>• Check that all the plants are healthy and planted at location as per the landscape design drawings.</li> </ul>

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