EtihadWE
الاتحاد للماء والكهرباء

No Objection Certificates Regulations

EtihadWE - Connections

CC-CN-DA&NOC-WG01-VR#01-Date MAR 2026

No Objection Certificates Regulations

EtihadWE - Connections

All Rights Reserved

Copyrights© by EtihadWE

First Edition: June 2025

Contents

Introduction 5

Definitions: 6

Building NOC 9

Demolishing NOC 11

Infrastructure NOC 12

- Utilities 12
  - Electricity LV services 14
  - Electricity HV services – 11 KV cable 16
  - Electricity HV services – 33 KV cable 21
  - Electricity HV services –132 KV Power / Pilot / F.O. Cable trough 25
  - Electricity HV services –11 KV OHL 28
  - Electricity HV services – 33 KV OHL 29
  - Electricity services - 132 KV OHL 30
  - Water Distribution Services 32
  - Water Transmission Services 34
  - Conditions new GAS line 35
  - Conditions for sewerage/irrigation/ Drainage line 37
  - Conditions for communication line 38
- General Project 39
  - Utility Manhole 39
  - septic tank 40
  - removal of tree plant 41
  - Blasting 41
- Roads 49
  - Asphalt Road 49
  - Interlock Road 55
  - Future Ducts 57
  - streetlight 60
  - sign board 62
  - Rail 63

Prepared by	NOC regulation committee	
	NOC Manager	Signature
	Sr. Mgr. Drawing Approvals & NOC	Signature
Reviewed by	Vice President Connections	Signature
	Vice President O&M	Signature
	Vice President Project Management	Signature
	Vice President Asset Management	Signature
Approved by	Chief Commercial Officer	Signature 04 - 02 -2026
	Chief Operations Officer	Signature

Introduction

The No Objection Certificate (NOC) Guideline issued by **Etihad Water and Electricity** serves as a comprehensive reference for all parties engaged in planning, designing, and executing works in proximity to EtihadWE utility infrastructure.

This document outlines the regulatory and technical requirements necessary to obtain NOCs related to **electricity and water networks**.

The primary objectives of this guideline are to:

- Ensure the protection and operational continuity of EtihadWE' s electricity and water networks.
- Standardize NOC processes across all regions and project types.
- Minimize risk to public safety and utility infrastructure from uncoordinated or unsafe construction activities.
- Provide clear technical criteria and clearance standards for contractors and consultants when planning their work.
- Facilitate effective coordination between EtihadWE and external entities including municipalities, developers, and other service providers.

EtihadWE requires that all works near its assets be carried out only after obtaining the necessary NOC approvals. This guideline defines the applicable clearance distances, protection methods, submission procedures, review stages, and compliance obligations.

It is the responsibility of all applicants and stakeholders to ensure that the specifications, approvals, and safety measures detailed herein are implemented in full. EtihadWE reserves the right to reject any application that does not meet these standards or poses a risk to its assets.

Definitions:

Term	Definition
Applicant	Any individual, company, consultant, contractor, Local /Federal authority ,local depratment or entity applying for a No Objection Certificate (NOC) from Etihad Water and Electricity (EtihadWE) to carry out works near or affecting EtihadWE assets.
Asset	Any infrastructure, equipment, or property owned, operated, or maintained by EtihadWE, including cables, pipelines,Tanks, pump stations, RO, substations, feeders, transformers, and joint boxes.
Building NOC	A NOC required for new building construction, ensuring all EtihadWE services are outside the plot boundary and no construction occurs above EtihadWE services.
Clearance	The minimum required distance (horizontal or vertical) to be maintained between EtihadWE assets and any structure, utility, or construction activity.
Contractor	A party engaged in construction, demolition, or utility works that may impact EtihadWE assets, responsible for adhering to NOC requirements and safety.
Corridor	A designated area protecting EtihadWE infrastructure where construction, landscaping, and other activities are restricted.
Demolishing NOC	A NOC required before any demolition works to ensure the safety of existing EtihadWE assets and prevent service disruptions.
Duct	A conduit or pipe installed underground to house and protect electricity or communication cables, with spare ducts for future use.
EtihadWE	Etihad Water and Electricity, the authority for regulating, maintaining, and protecting water and electricity networks in the region.
Feeder Pillar	An outdoor electrical cabinet housing circuit breakers, switches, and distribution equipment to manage electricity supply.
GRP (Glass Reinforced Plastic) Kiosk	A prefabricated enclosure made of GRP to house electrical equipment like transformers or switchgear.

Horizontal Clearance	The edge-to-edge horizontal distance required between EtihadWE assets and other utilities, structures, or roads.
HV (High Voltage)	Electrical services or cables operating at high voltage levels (e.g., 11 kV, 33 kV, 132 kV) with specific protection standards.
Infrastructure NOC	A NOC required for infrastructure works (roads, pipelines, cables) that may affect EtihadWE assets.
Joint Box	An enclosure for joining and protecting cable connections, typically underground or within utility corridors.
LV (Low Voltage)	Electrical services or cables operating at low voltage levels for distribution to residential or commercial areas.
Manhole	An underground access point for inspection, maintenance, or repair of utilities like cables or pipelines.
Meter	A device for measuring electricity or water consumption for billing and monitoring.
NOC (No Objection Certificate)	An official document from EtihadWE granting permission for works near EtihadWE assets, subject to safety and technical compliance.
NDRC (Non-Destructive Road Crossing)	A procedure for crossing roads or corridors with utilities without damaging road surfaces, needing EtihadWE approval.
Plot Boundary	The legal boundary of a property within which construction is allowed; EtihadWE services must remain outside this area.
Protective Concrete Encasement	A concrete layer installed around pipelines or cables at crossings for added protection.
Septic Tank	An underground sewage treatment chamber that must not be installed above or near EtihadWE assets.
Site Plan	A detailed drawing showing property layout, proposed works, and location of EtihadWE assets/utilities.
Spare Duct	An unused duct laid alongside active ones for future upgrades or maintenance.

Substation	A facility where electricity is transformed between voltage levels for distribution, requiring strict protections.
Trial Pit/Trench	An excavation to locate and verify depth of existing utilities before construction near /over EtihadWE assets.(Required permits shall be obtained)
Utility	Infrastructure for services like water, electricity, gas, sewerage, or communications that interact with EtihadWE assets.
Vertical Clearance	The vertical distance from the top of a lower utility to the bottom of a crossing pipeline, cable, or structure.

Building NOC

For any new building NOC, a site plan is required to confirm that all EtihadWE services are located outside the plot boundary. No construction is allowed above EtihadWE services

A minimum horizontal clearance must be maintained between the new building and Existing EtihadWE services as follows:

Existing Utility	Horizontal Clearance (m)
11 KV cable	1
33 KV cable	2
132 KV Power / Pilot / F.O. Cable trough	2 to 3
11 KV OHL	3
33 KV OHL	20
132 KV OHL	30
Distribution Water pipelines	1 to 2
Transmission Water pipelines	4 to 5
Water chamber	1.5

Table 1

- A trial pit must be carried out at critical points to confirm the exact location and depth of existing services. Manual excavation is mandatory near EtihadWE services.
- In case if the plot is affected with EtihadWE services. A shifting case is required to shift the services.
- The construction of any structures outside the approved plot boundaries or excavation is strictly prohibited. If there is a need to establish temporary structures or offices, NOC must be obtained from EtihadWE. Additionally, no concrete works or marble installations are allowed outside the plot limits to avoid encroachment upon or obstruction of EtihadWE's corridor.
- If trees are planted or landscaping is carried out outside the plot boundaries, EtihadWE reserves the right to perform maintenance or excavation works related to its network lines

within the approved corridors, without requiring prior approval or being responsible for any resulting costs, and without responsibility for reinstating the landscaping.

- No meter or service belonging to another plot is allowed within the new plot boundary.
- Electricity GRP enclosure clearance standard area allocated is 6 meters by 8 meters as shown in image1 below.

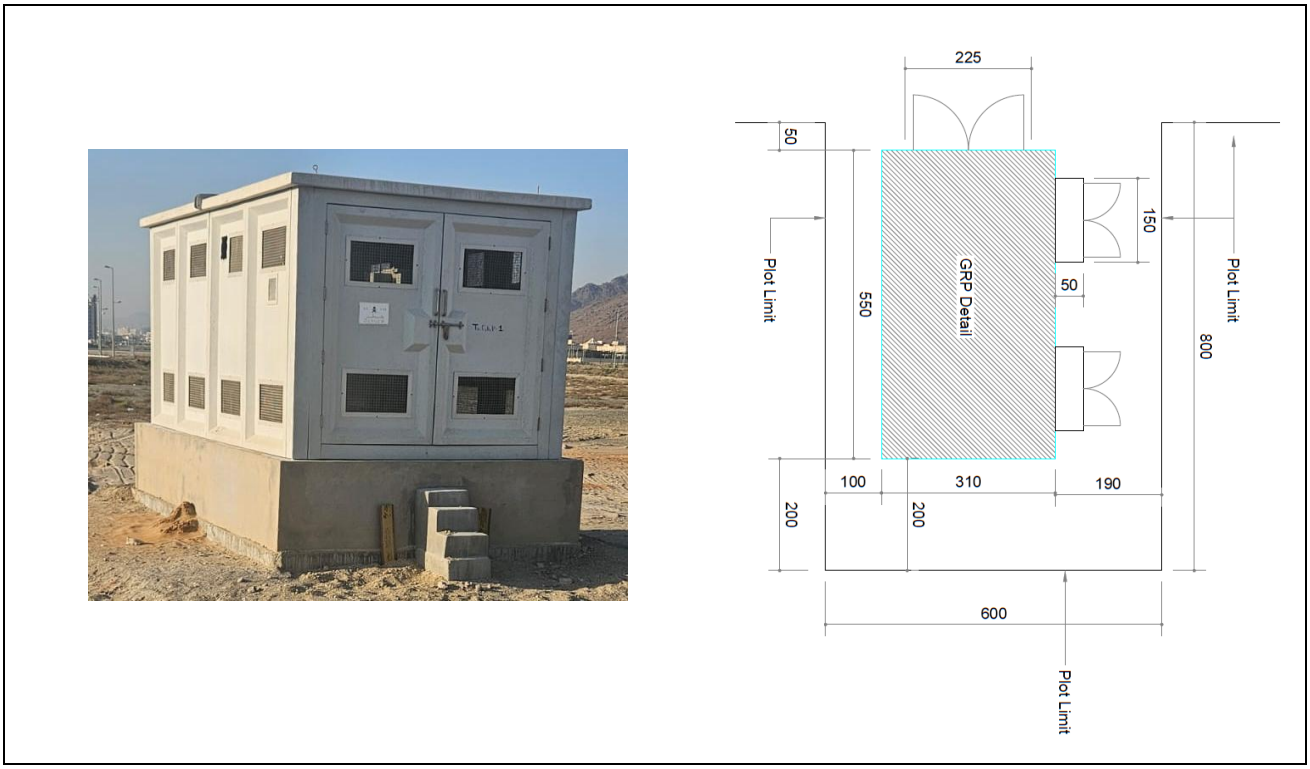


Image 1: GRP enclosure picture and clearance from Plot limit

Demolishing NOC

To ensure the safety of existing EtihadWE assets and avoid service disruptions, the following conditions must be met before and during any demolition work:

- Site Clearance Confirmation: A site plan must be submitted showing the building location and confirming that EtihadWE utilities (electricity and water) are not located within or beneath the structure to be demolished.
- All EtihadWE services (electricity and water connections) must be officially disconnected and dismantled before full demolition starts.
- In case of partial demolition, it must be ensured that the meters are not affected. If required, meter shifting should be carried out accordingly.

Image 2: Demolishing

Infrastructure NOC

Utilities

EtihadWE underground cables corridor. The depth should be from the Ground design level:

S.No	Voltage Level	Excavation Requirement	Corridor Requirement
1	132KV Single circuit	100cm wide & 120cm deep	50cm either side of excavation (50+100+50)=200cm
2	132KV Double circuit	200cm wide & 120cm deep	50cm either side of excavation (50+200+50)=300cm
3	132KV Single circuit-Duct bank	85cm wide & 140cm deep	85cm
4	132KV Double circuit-Duct bank	170cm wide & 140cm deep	170cm
5	132KV Double circuit-Thrust boring	300cm wide	300cm
6	132KV Double circuit-HDD	300cm wide	300cm
7	132KV Double circuit-Micro Tunnelling	300cm wide	300cm
8	33KV Single circuit	60cm wide & 120cm deep	50cm either side of excavation (50+60+50)=160cm
9	33KV Double circuit	90cm wide & 120cm deep	50cm either side of excavation (50+90+50)=190cm
10	33KV Three circuit	120cm wide & 120cm deep	50cm either side of excavation (50+120+50)=220cm
11	33KV Single circuit-Duct bank	60cm wide & 120cm deep	60cm
12	33KV Double circuit-Duct bank	80cm wide & 120cm deep	80cm
13	33KV Three circuit-Duct bank	120cm wide & 120cm deep	120cm
14	33KV Single circuit-Thrust boring	150cm wide	150cm
15	33KV Double circuit-Thrust boring	200cm wide	200cm
16	33KV Three circuit-Thrust boring	350cm wide	350cm
17	33KV Single circuit-HDD	80cm wide	100cm
18	33KV Double circuit-HDD	300cm wide	300cm
19	33KV Three circuit-HDD	350cm wide	350cm
20	33KV Single circuit-Micro Tunnelling	80cm wide	100cm
21	33KV Double circuit-Micro Tunnelling	300cm wide	300cm
22	33KV Three circuit-Micro Tunnelling	350cm wide	350cm
23	11KV Single circuit	60cm wide & 100cm deep	50cm either side of excavation (50+60+50)=160cm
24	11KV Double circuit	90cm wide & 100cm deep	50cm either side of excavation (50+90+50)=190cm
25	11KV Six circuit	180cm wide & 100cm deep	50cm either side of excavation (50+180+50)=280cm
26	LV Single cable	60cm wide & 75cm deep	50cm either side of excavation (50+60+50)=160cm

27	LV Double cable	90cm wide & 75cm deep	50cm either side of excavation (50+90+50)=190cm
28	LV Six circuit	150cm wide & 75cm deep	50cm either side of excavation (50+150+50)=250cm
29	FOC	50cm wide & 75cm deep	50cm either side of excavation (50+50+50)=150cm

Table 2 EtihadWE corridor

Electricity LV services

Minimum clearances from existing utilities must be maintained as per the approved clearance table. Clearances shall be measured horizontally (edge to edge) and vertically for crossing cases (top to bottom). Trial trenches must be conducted in congested areas or where utility data is unconfirmed.

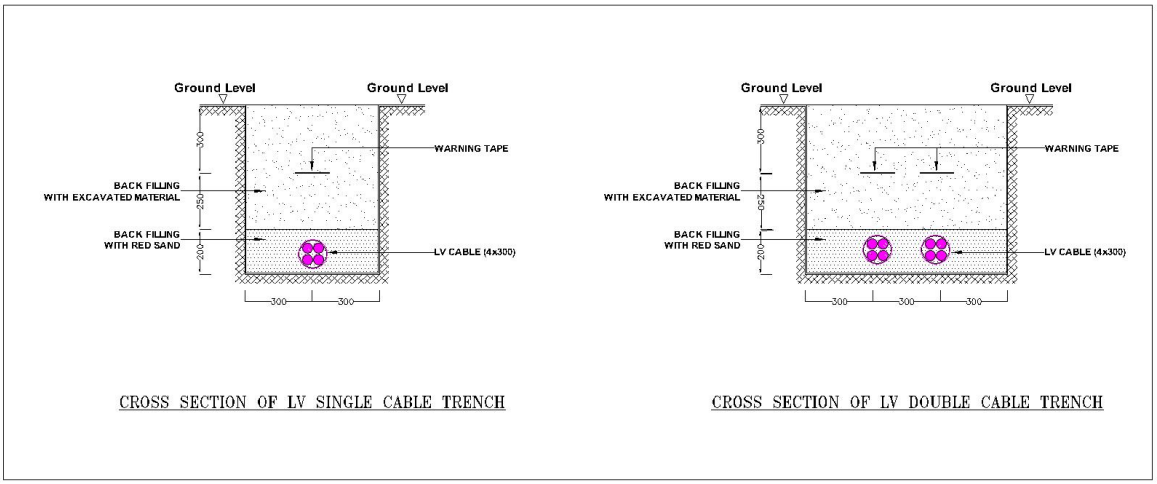


Image 3: cross section of single & Double LV cable

Proposed Electricity LV Services			
Existing Utility	Clearance (m)		Conditions
	Horizontal	Vertical	
LV cable	0.20	0.20	- Protection may be required based on site and soil conditions. In the case of FP/GRP outgoing, vertical crossing is permitted if there is insufficient corridor space. Refer to image4.
11 KV cable	0.30	0.30	- LV cables may cross above or below HV cables, provided EtihadWE standards are maintained. - If HV cables are relocated during work, they must be restored to their original position. - Protection may be required based on site and soil conditions.
33 KV cable	0.5	0.50	- LV cables may cross above or below HV cables, provided EtihadWE standards are maintained. - If HV cables are relocated during work, they must be restored to their original position. - Protection may be required based on site and soil conditions.
132 KV Power / Pilot / F.O. Cable trough	0.5		- Protection may be required based on site and soil conditions. - Only vertical crossings using NDRC are permitted beneath the trough, subject to site conditions and EtihadWE approval.

Distribution Water pipelines	0.5	0.40	- Water Pipelines must be restored to their original position if relocated during the work. Protection may be required based on site and soil conditions. The LV cable should cross above the water pipeline, with cable tiles proposed above the pipeline for additional protection.
Transmission Water pipelines	1	1	- Water Pipelines must be restored to their original position if relocated during the work. Protection may be required based on site and soil conditions. The LV cable should cross above the water pipeline, with cable tiles proposed above the pipeline for additional protection.
SCADA F.O. PVC / HDPE Duct	1	1	- Horizontal clearances are from proposed LV Cable edge to existing Transmission water services edge. - Vertical clearances are from the top of the proposed LV Cable to the bottom of existing Transmission water services. - LV Cable should cross above the water pipeline.

Table 2

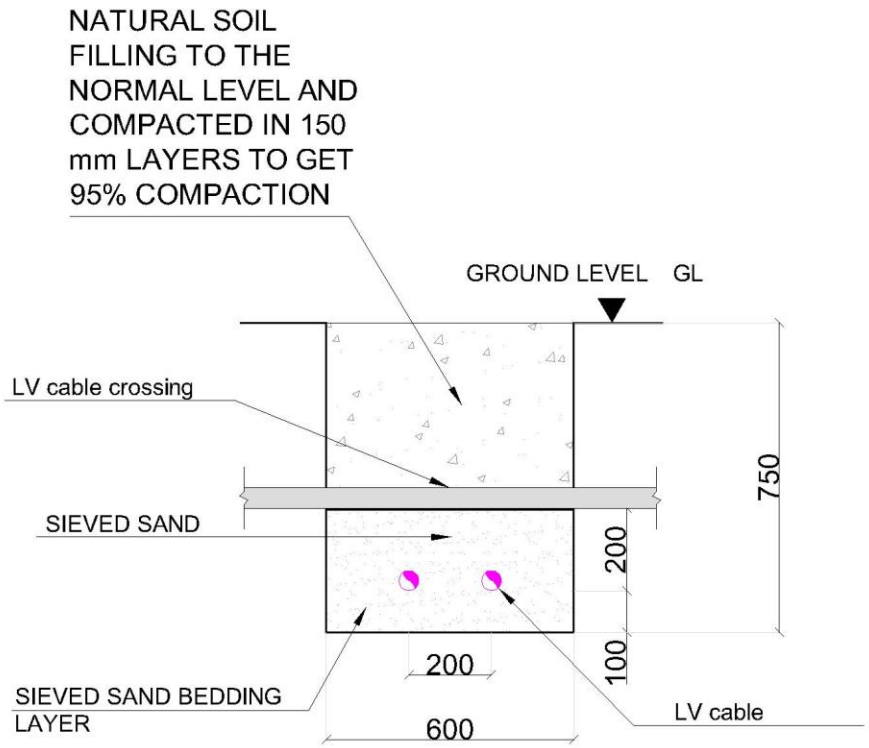


Image 4: vertical and horizontal clearance between LV cables

Electricity HV services – 11 KV cable

Minimum clearances from existing utilities must be maintained as per the approved clearance table. Clearances shall be measured horizontally (edge to edge) and vertically (top to bottom). Trial trenches must be conducted in congested areas or where utility data is unconfirmed.

Image 5: 11KV cables laying arrangements

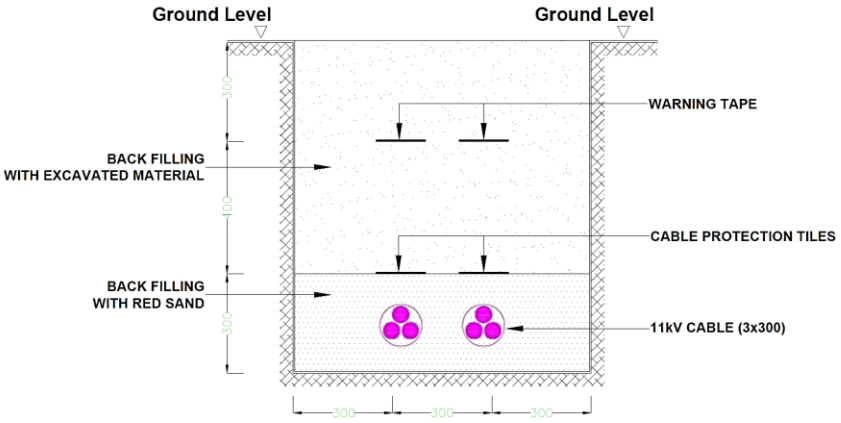


Image 6: cross section for double 11 KV cable

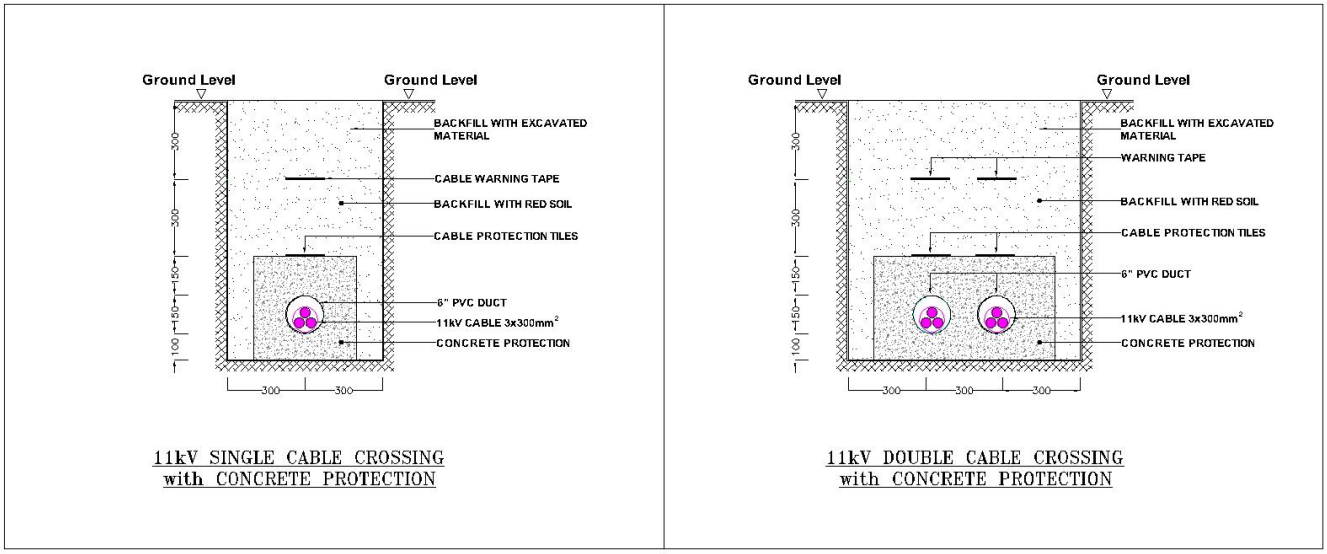


Image 7: 11KV Single and double cable with concrete protection

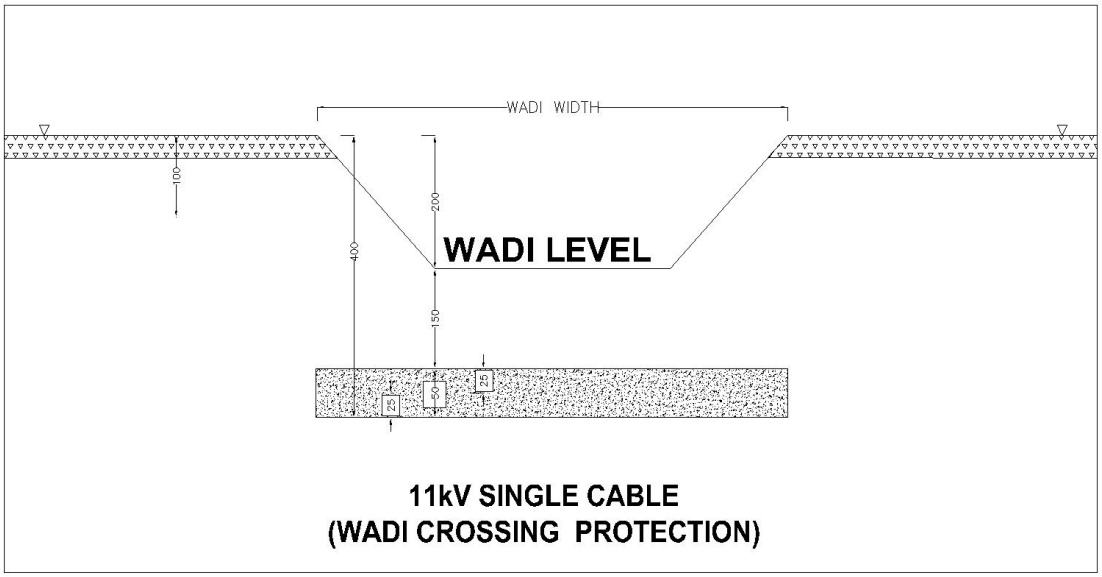


Image 8: Wadi crossing protection for 11 KV cable - Reinstatement works shall be properly completed following the installation of 11 kV, 33 kV, or 132 kV cables across the wadi crossing as per Municipality requirement.

Proposed Electricity HV Services – 11 KV			
Existing Utility	Clearance (m)		Conditions
	Horizontal	Vertical	
LV cable	0.30	0.30	- LV cables must be restored to their original position if relocated during the work.
11 KV cable	0.20	0.20	- HV cables must be restored to their original position if relocated during the work. - Protection measures may be required based on site and soil conditions as per image 6. - The proposed crossing cable should be installed in a PVC pipe.
33 KV cable	0.5	0.30	- HV cables must be restored to their original position if relocated during the work. - Protection measures may be required based on site and soil conditions. - The proposed crossing cable should be installed in a PVC pipe.
132 KV Power / Pilot / F.O. Cable trough	0.5		- Protection measures may be required based on site and soil conditions. - Only vertical crossings using NDRC are permitted beneath the trough, subject to site conditions and EtihadWE approval.
Distribution Water pipelines	0.5 to 1	0.50	- Horizontal clearance: edge to edge. - Vertical clearance: top to bottom. - Protection may be required based on site and soil conditions.
Transmission Water pipelines	1	1	- Horizontal clearance: edge to edge. - Vertical clearance: top to bottom. - Protection may be required based on site and soil conditions.
SCADA F.O. PVC / HDPE Duct	1	1	- Horizontal clearance: edge to edge. - Vertical clearance: top to bottom. - Protection may be required based on site and soil conditions.

Table 3

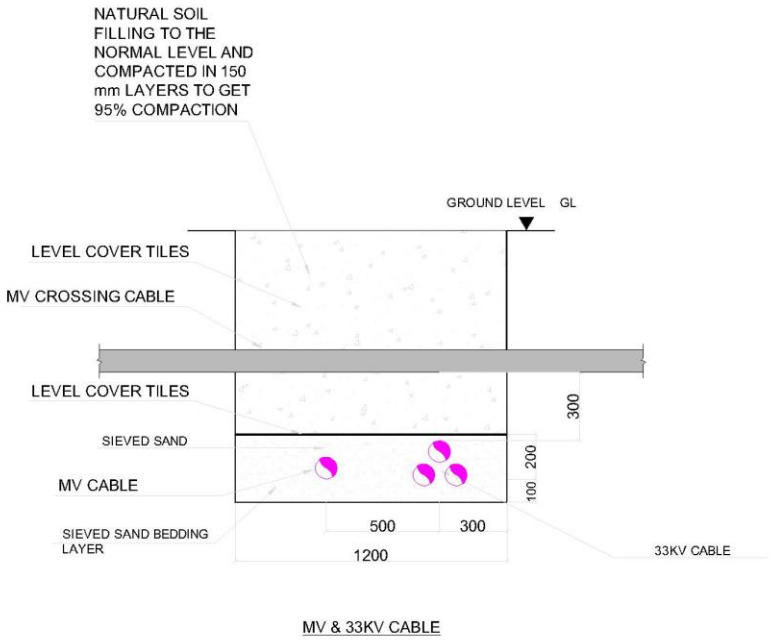


Image 9: 11 KV cable crossing Existing 11 KV cable & 33 KV cable

Electricity HV services – 33 KV cable

Minimum clearances from existing utilities must be maintained as per the approved clearance table. Clearances shall be measured horizontally (edge to edge) and vertically (top to bottom). Trial trenches must be conducted in congested areas or where utility data is unconfirmed.

Image 10: 33 KV laying

Proposed Electricity HV Services – 33 KV			
Existing Utility	Clearance (m)		Conditions
	Horizontal	Vertical	
LV cable	0.5	0.50	- Cables must be restored to their original position if relocated during work. - Protection measures may be required based on site and soil conditions. - The proposed crossing cable should be installed in a PVC pipe.
11 KV cable	0.5	0.30	- Cables must be restored to their original position if relocated during work. - Protection measures may be required based on site and soil conditions. - The proposed crossing cable should be installed in a PVC pipe.
33 KV cable	0.30	0.30	- Cables must be restored to their original position if relocated during work. - Protection measures may be required based on site and soil conditions. - The proposed crossing cable should be installed in a PVC pipe.
132 KV Power / Pilot / F.O. Cable trough	0.5		- Protection measures may be required based on site and soil conditions. - Only vertical crossings using NDRC are permitted beneath the trough, subject to site conditions and EtihadWE approval.
Distribution Water pipelines	1	0.50	- Pipelines must be restored to their original position if relocated during work. - Protection measures may be required based on site and soil conditions. - The proposed crossing cable should be installed in a PVC pipe.
Transmission Water pipelines	1	1	- Pipelines must be restored to their original position if relocated during work. - Protection measures may be required based on site and soil conditions. - The proposed crossing cable should be installed in a PVC pipe.
SCADA F.O. PVC / HDPE Duct	1	1	- Pipelines must be restored to their original position if relocated during work. - Protection measures may be required based on site and soil conditions. - The proposed crossing cable should be installed in a PVC pipe.

Table 4

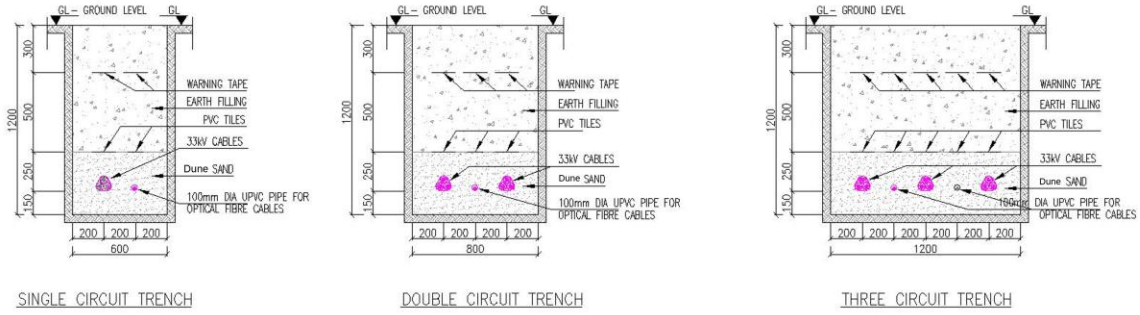


Image 11: cross section of 33KV cable laying. PVC pipe used for FOC cable protection is of C Class specification to meet the required durability and strength standards

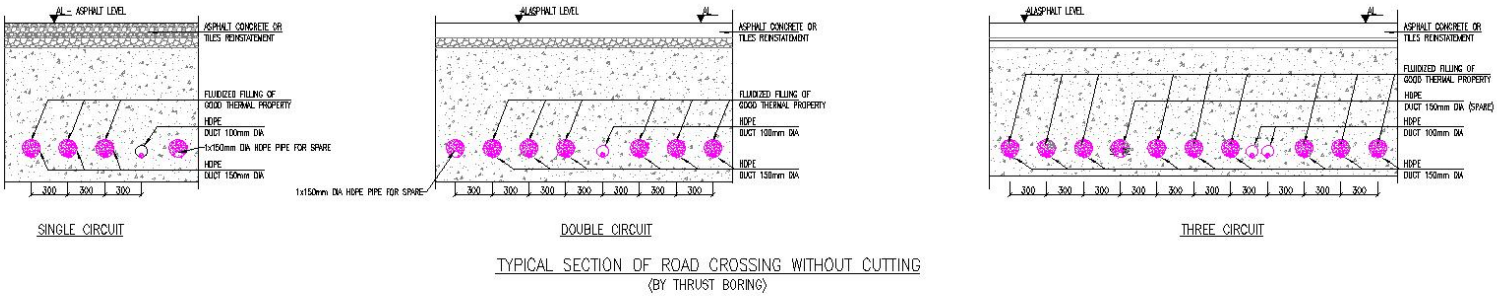


Image 12: 33 KV road crossing by thrust boring

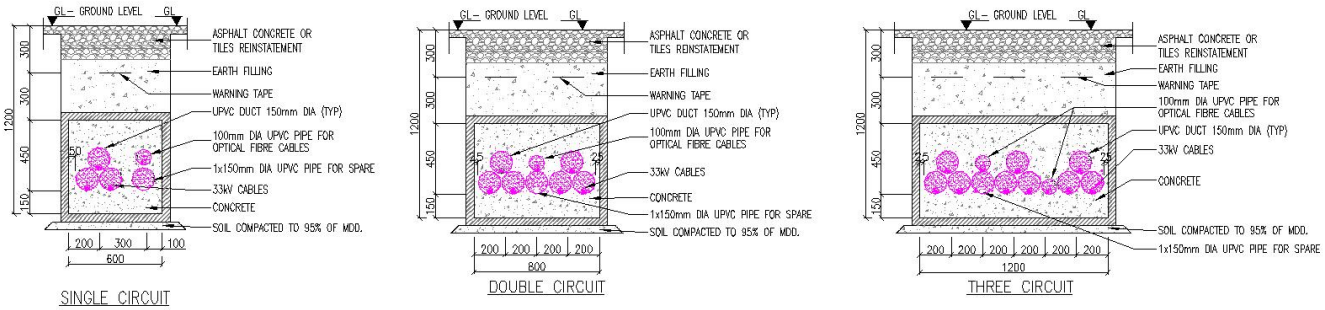


Image 13: 33 KV cables Duct bank

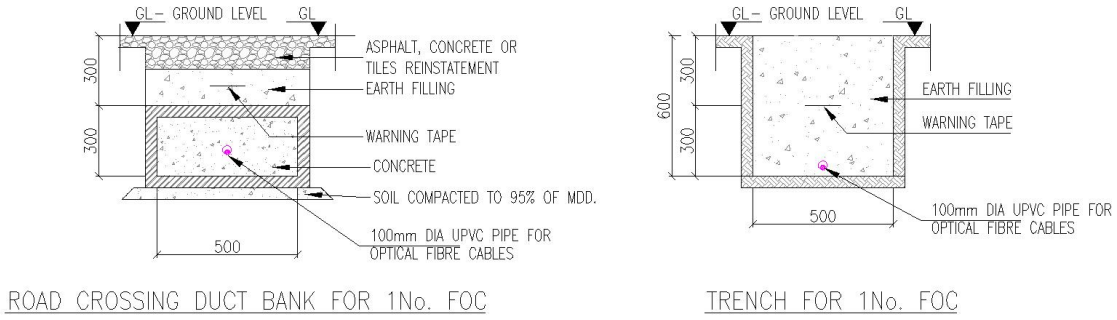


Image 14: cross section of single FOC

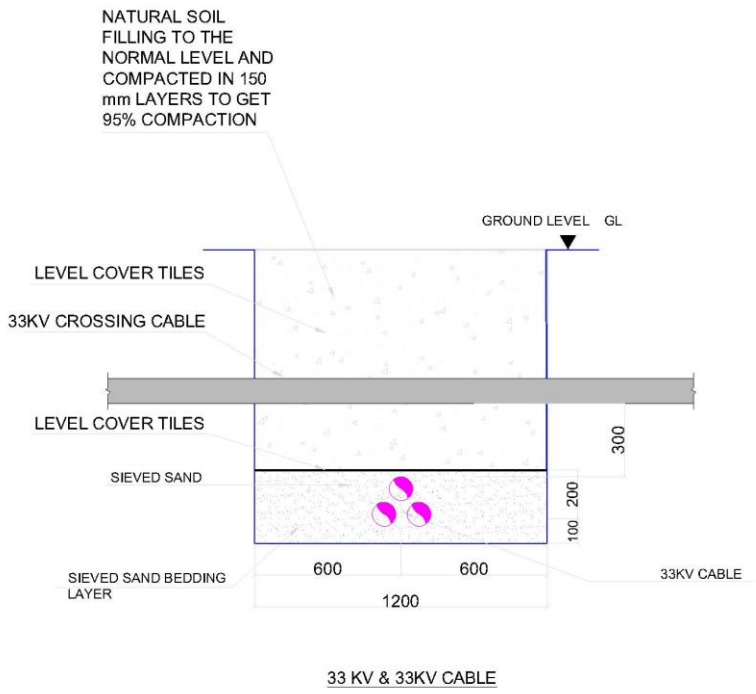


Image 15: vertical crossing between Existing and proposed 33 KV CKT.

Electricity HV services –132 KV Power / Pilot / F.O. Cable trough

Image 16: 132 KV trough

1. Minimum Clearance from Existing Services:
    - When trenches run parallel to existing services or cables, a minimum horizontal clearance of 0.5 meters must be maintained between the edge of the new trench and the existing service.
2. Crossing Existing Services:
    - Crossing of existing utilities must be done with utmost care.
    - A minimum vertical clearance of 1.0 meter must be maintained to allow safe maintenance access.
    - Prior approval from ETIHADWE/Engineer is required for the crossing method.
3. Sand Dune Clearance:
    - In areas with sand dunes, the dunes shall be cleared down to normal ground level before cable laying.
4. Wadi Crossings:
    - Where the cable route crosses wadis (subject to flooding by rain or underground water), a reinforced concrete (RCC) duct bank shall be constructed to protect the cables.

- The location of RCC duct banks must be clearly shown in the cable route drawings for all affected segments.
- Proper embankment protection shall be provided for cable troughs located in low-lying areas, wadi crossings, and sand dune regions to ensure structural stability and prevent exposure.
- Cable joints shall not be proposed within wadi crossing areas to ensure long-term integrity and minimize risk of damage due to environmental conditions.

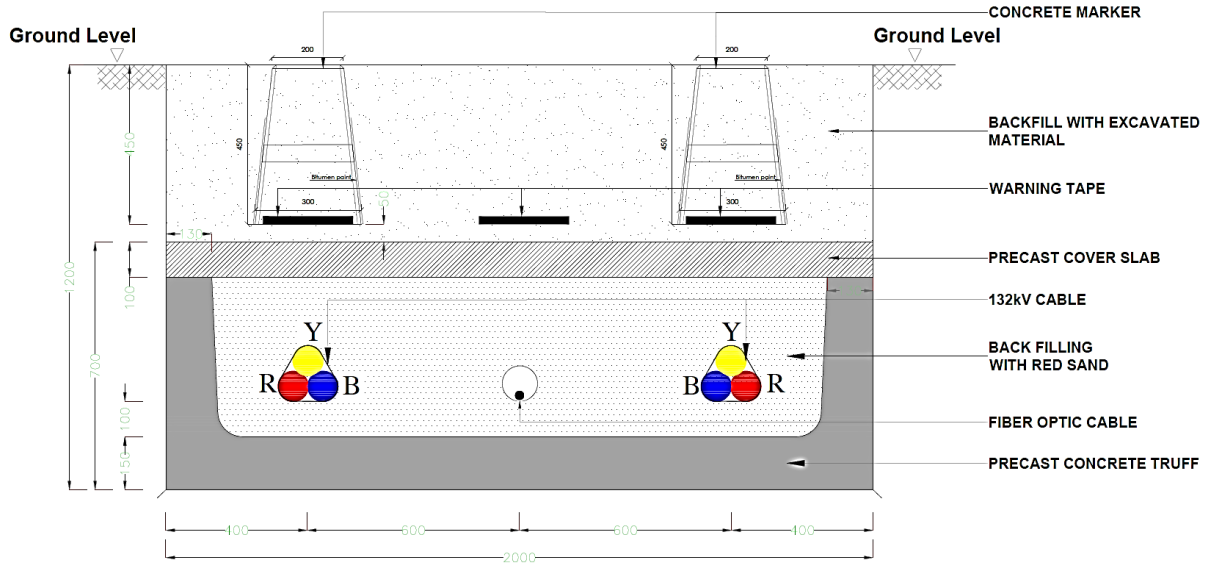


Image 17: Typical installation of precast concrete Trough and cover slab for 132 KV. Pilot/FO cable

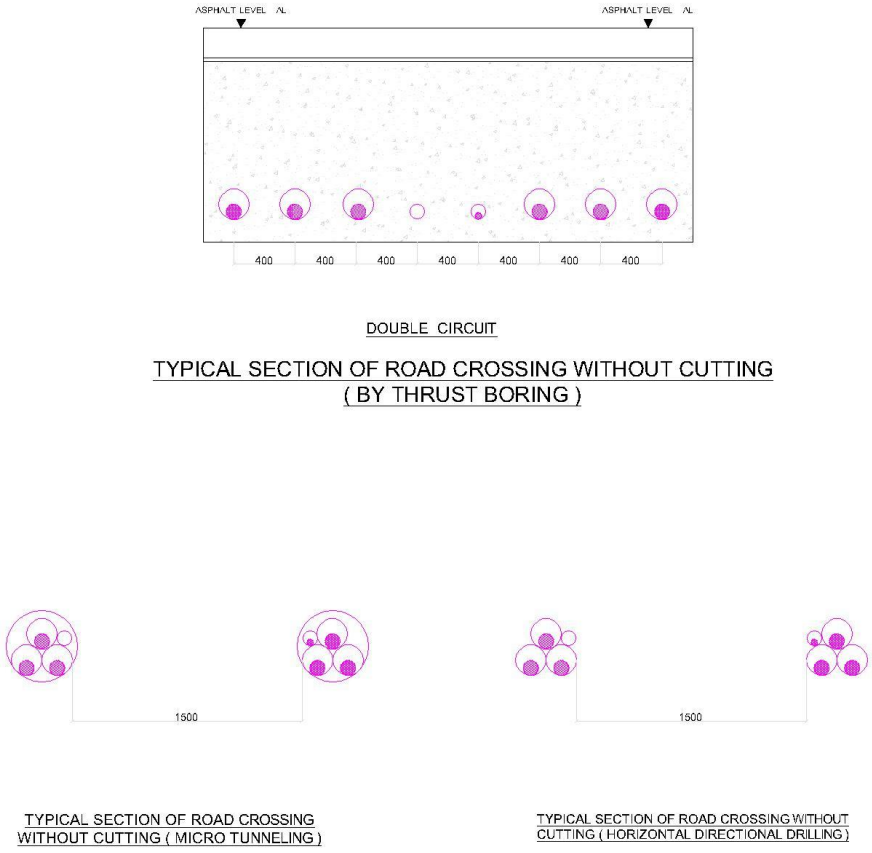


Image 18: crossing of existing Road additional cable corridor for the Flat formation and to achieve current rating calculations as required

Electricity HV services –11 KV OHL

Clearance and Spacing

Minimum clearances to objects shall be kept after final settling of conductors, i.e., including 10-year-old creep.

Minimum clearances between live metal and earth steelwork shall be calculated in accordance with DIN VDE 0210.

These clearances shall be checked on the assumption that the conductor may attain a position at any angle between 5° above and 20° below the horizontal for all types of towers.

Overhead lines crossing over highways, asphalt roads, railways, houses, huts, and other objects of a permanent nature with soft roofing are not permitted and shall be done by underground cabling, unless with adequate vertical clearance.

Recommended clearances for 11KV overhead lines:

- To Ground (Above rail tracks/ parking lot): 8.5 m
- To Ground (Above highways): 12.0 m
- Vertical clearance at crossing with other power lines: 2.5 m

Minimum Clearance Between Line Conductors and Objects (Max Sag Condition)

Description	Clearance
Buildings, structures, wireless, T.V. aerials	3.0 m
Fencing and scaffolding	3.0 m
Trees	2.0 m
Telephone lines	2.0 m
Power line supports	3.5 m
Railway (from rail level)	7.0 m
Horizontal clearance between power lines	7.5 m
Phase to phase clearance	1.6 m
Phase to earth clearance	0.5 m
Live to earthed metal – suspension insulators	0.68 m (10° swing), 0.30 m (45° swing)
Live to earthed metal – tension structures	0.46 m
Earth wire shade angle	Not more than 30°
Minimum ground clearance	7.5 m

Table 5

Electricity HV services – 33 KV OHL

The following are minimum clearance distances to ensure safety and performance under maximum conductor sag conditions.

Vertical Clearances

Description	Minimum Clearance (m)
Normal ground for pedestrians only	7.0
Roads and streets	8.0
Highways	10.0
Over pipelines – from top of pipe	8.0
To metal-clad or roofed buildings, or structures which a man may stand on	4.5
Power lines (above or below)	5.0
Telecommunication lines	3.5
Areas of moving sand – to be decided by authority on site	—

Table 6

Horizontal Clearances

Description	Minimum Clearance (m)
From tower structure to nearest conductor of any line being crossed (Parallel but not crossing)	15.0
Gas, oil, and water pipeline – nominal diameter < 150 mm	25.0
Ditto – diameter 180 to 450 mm	50.0
Ditto – diameter over 450 mm	100.0
Main roads, railways, and canals	40.0
Secondary roads	25.0
Outside conductors of power supply circuits (any voltage)	20.0
Communication circuits	20.0

Table 7

Electricity services - 132 KV OHL

Image 19: 132 KV OHL

Minimum vertical clearances (with conductor at 80°C or deflected up to 45° from vertical) Clearances account for permanent sag or inelastic stretch, apply only to metallic pipelines, and in desert terrain, the 7.5m pedestrian clearance must be increased to 8.0m to accommodate off-road vehicle traffic.

Vertical Clearances

Description	Clearance (m)
Railways / electrified coaches (from top of rail)	14.00
Terrain accessible to pedestrians only	7.50
Roads and land accessible to vehicles	8.00
Main dual carriageways (existing/proposed)	15.00
Power supply or communication circuits (irrespective of voltage)	3.40
Communication circuits	4.25
Power supply circuits	—
Up to 132KV voltage level	4.25
Above 132KV voltage level	5.00
Upper line to support structure or area accessible by ladder	4.75
Major navigable waterways	60.00
Minor navigable waterways	25.00

Table 8 | Clearances to ground assume final asphalt level.

Horizontal Clearances – 132KV OHL

Description	Clearance (m)
From tower to nearest conductor of any crossing line (not intersecting)	15.0
Gas, oil, and water pipelines < 150 mm	25.0
Gas, oil, and water pipelines 180–450 mm	50.0
Gas, oil, and water pipelines > 450 mm	100.0
Main roads, railways, and canals	40.0
Secondary roads	25.0
Outside conductors of any power supply circuit (any voltage)	20.0
Communication circuits	20.0
Residential buildings	30.0

Table 9

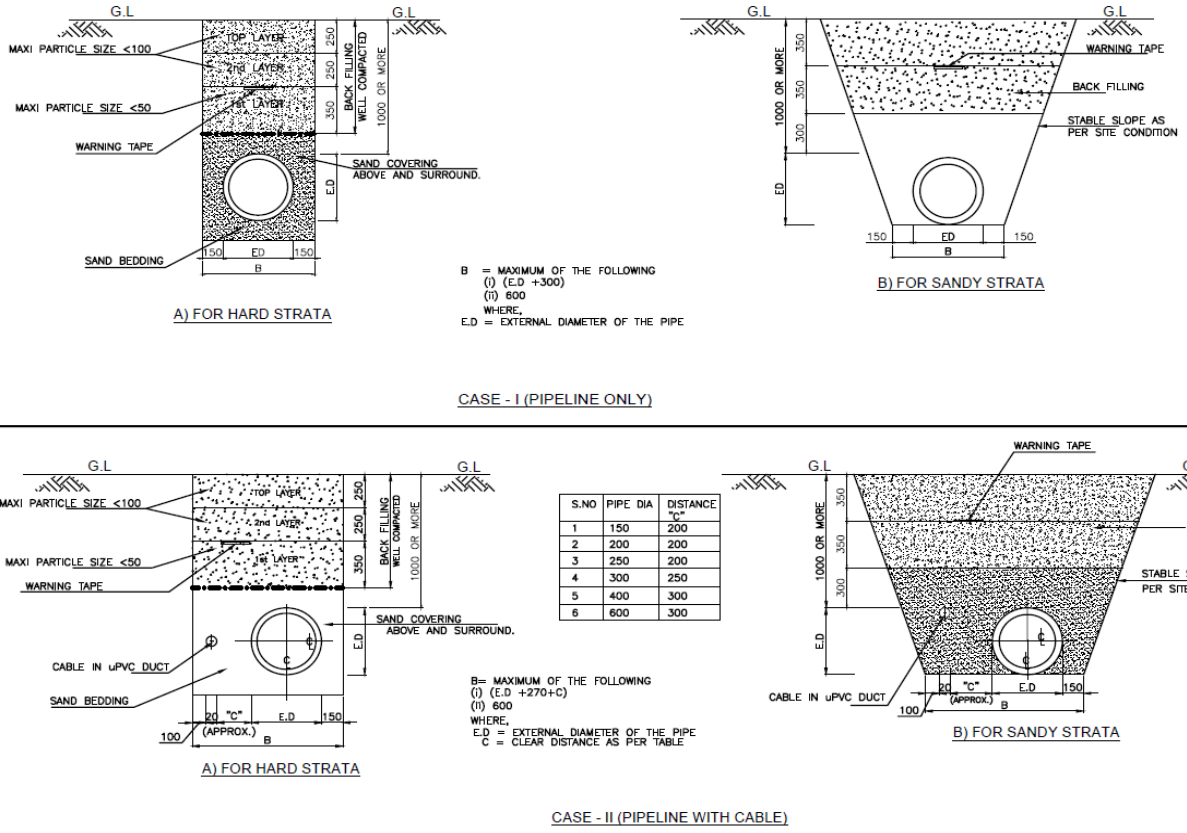


Image 20: Trenches for pipeline

Proposed Water Distribution Services			
Existing Utility	Clearance (m)		Conditions
	Horizontal	Vertical	
LV cable	0.5	0.4	- Install protection tiles, along with additional trench and cable protection if required by site or soil conditions. - The LV cable is positioned above.
11 KV cable	1	0.50	- Restore HV cables to original position if moved. Install protection tiles along with additional trench and cable protection if required by site or soil conditions. - Use PVC tiles for vertical clearance below electricity.
33 KV cable	1	0.50	- Restore HV cables to original position if moved. Install protection tiles along with additional trench and cable protection if required by site or soil conditions. - Use PVC tiles for vertical clearance below electricity.
132 KV Power / Pilot / F.O. Cable trough	0.5	1	- Install protection tiles along with additional trench and cable protection if required by site or soil conditions. - Only vertical crossings using NDRC are permitted beneath the trough, subject to site conditions and EtihadWE approval.
Distribution Water pipelines	0.5	0.5	- Restore pipelines to original position if moved. Install protection tiles/ PVC along with additional trench and cable protection if required by site or soil conditions.
Transmission Water pipelines	2	0.5	- Restore pipelines to original position if moved. Install protection tiles/ PVC along with additional trench and cable protection if required by site or soil conditions.
SCADA F.O. PVC / HDPE Duct	1	1	- Pipelines must be restored to their original position if relocated during work. - Protection measures may be required based on site and soil conditions. - The proposed crossing cable should be installed in a PVC pipe.

Table 10 | Horizontal clearance: edge to edge | Vertical clearance: top to bottom.

Water Transmission Services

Proposed Water Transmission Services			
Existing Utility	Clearance (m)		Conditions
	Horizontal	Vertical	
LV cable	1	1	- Install protection tiles, along with additional trench and cable protection if required by site or soil conditions. - The LV cable is positioned above.
11 KV cable	1	1	- Restore HV cables to original position if moved. Install protection tiles along with additional trench and cable protection if required by site or soil conditions. - Use PVC tiles for vertical clearance below electricity.
33 KV cable	1	1	- Restore HV cables to original position if moved. Install protection tiles along with additional trench and cable protection if required by site or soil conditions. - Use PVC tiles for vertical clearance below electricity.
132 KV Power / Pilot / F.O. Cable trough	0.5		- Install protection tiles along with additional trench and cable protection if required by site or soil conditions. - Only vertical crossings using NDRC are permitted beneath the trough, subject to site conditions and EtihadWE approval.
Distribution Water pipelines	2	0.5	- Restore pipelines to original position if moved. Install protection tiles / PVC along with additional trench and cable protection if required by site or soil conditions.
Transmission Water pipelines	2	1.5	- Restore pipelines to original position if moved. Install protection tiles/ PVC along with additional trench and cable protection if required by site or soil conditions.
SCADA F.O. PVC / HDPE Duct	0.5	-	- Restore pipelines to original position if moved. Install protection tiles along with additional trench and cable protection if required by site or soil conditions. - Use PVC tiles for vertical clearance.

Table 11 | Horizontal clearance: edge to edge | Vertical clearance: top to bottom.

Conditions new GAS line

A safe horizontal and vertical clearance must be maintained from all EtihadWE assets in accordance with the approved clearance table.

Existing Utility	Horizontal Clearance (m)
LV cable	5
11 KV cable	5
33 KV cable	5
132 KV Power / Pilot / F.O. Cable trough	5
Distribution Water pipelines	10
Transmission Water pipelines	10

Table 12

- Horizontal clearance is measured edge to edge.
- Trial pits are mandatory to verify utility locations at crossings or parallel alignments.
- Detailed drawings for each crossing point must be submitted, showing the proper clearances and coordinates.
- The gas pipeline should be buried at a minimum depth of 2 meters from the base of the power cables.
- Corrosion-protective paint must be applied to the pipes.
- Mastics should be wrapped around the pipes where they are buried beneath the power cables.
- Cathodic protection should be provided for the sections of the pipeline crossing beneath the power cables.
- At all crossing points, the gas pipeline must be encapsulated within steel-reinforced concrete (SRC-40N), with a minimum reinforcement of 16mm and 8mm rebar. The minimum distance below the power cables should be 2 meters.

- For crossing below 132KV cable through necessary safety precautions must be adhered like provide a steel support channels to secure the collapsing of the trough.
- An undertaking letter must be provided by the GAS Authority confirming that EtihadWE and its authorized contractors have the right to access and carry out maintenance activities at any time, without objection or obligation from the GAS Authority.

Conditions for sewerage/irrigation/ Drainage line

- Horizontal clearance must be measured edge to edge; Vertical clearance must be measured from the top of the lower utility to the bottom of the crossing pipeline.
- Trial pits must be excavated at proposed crossings and parallel alignment locations to confirm actual site conditions.
- At crossing points with EtihadWE services, a protective concrete encasement is required.
- Manholes for sewerage or irrigation systems must be installed outside the clearance zone of EtihadWE cables, ducts, or water pipelines.
- No manholes shall be placed above or adjacent to EtihadWE feeders, transformers, joint boxes, or valve chambers.
- For gravity-based sewer systems, special attention must be given to avoid damage or interference with EtihadWE services during trenching or compaction.
- Only vertical crossings with 132KV using NDRC are permitted beneath the trough, subject to site conditions and EtihadWE approval.
- For any new sewerage or irrigation pipeline proposed in proximity to Etihad Water & Electricity (EtihadWE) water infrastructure and constructed using the same pipe material type (e.g., HDPE, GRP), a distinct pipe color must be used. This measure is mandatory to avoid misidentification during excavation, maintenance, or emergency works. Color differentiation must follow the approved utility color coding standards

Existing Utility	Clearance (m)	
	Horizontal	Vertical
LV cable	0.25-0.50	0.25-0.40
11 KV cable	0.25-0.50	0.25-0.50
33 KV cable	0.5	0.30
132 KV Power / Pilot / F.O. Cable trough	0.5	
Distribution Water pipelines	3	2
Transmission Water pipelines	5	2

Table 13

Conditions for communication line

- A safe clearance must be maintained from existing EtihadWE cables and pipelines, as per the approved clearance table.
- Horizontal clearance is measured edge to edge; vertical clearance is measured top to bottom.
- In congested areas, trial pits must be conducted, and clearances verified prior to installation.
- All joint boxes, pull chambers, and access points must not be installed near to EtihadWE instruments or Existing joints.
- Manholes are not permitted within EtihadWE corridors for communication line infrastructure.
- Only vertical crossings with 132kv using NDRC are permitted beneath the trough, subject to site conditions and EtihadWE approval.

Existing Utility	Clearance (m)	
	Horizontal	Vertical
LV cable	0.5-1	0.5-1
11 KV cable	1	1
33 KV cable	2m	1.2
132 KV Power / Pilot / F.O. Cable trough	0.5	
Distribution Water pipelines	1	1
Transmission Water pipelines	1.5	1.2
SCADA F.O. PVC / HDPE Duct	1	1

Table 14

General Project

Utility Manhole

Manholes shall not be placed above or too close to existing EtihadWE underground cables or structures. A minimum horizontal clearance must be maintained from EtihadWE assets as per the table below.

Existing Utility	Horizontal Clearance (m)
LV cable	0.5-1
11 KV cable	1
33 KV cable	1.5
132 KV Power / Pilot / F.O. Cable trough	1.5
Distribution Water pipelines	1.5
Transmission Water pipelines	3

Table 15

Additional clearance or special protection measures may be required based on the requirement or site condition. Trial pit shall be carried out to verify the exact location of nearby EtihadWE services. Manual excavation is mandatory near any existing cable, and work must be performed under EtihadWE supervision. The installation of any manhole in close proximity to EtihadWE instruments, transformer rooms, GRP kiosks, or feeder pillars is strictly prohibited.

septic tank

Septic tanks shall not be installed above or near existing EtihadWE cables, pipelines, or structures. A minimum horizontal clearance of must be maintained between the septic tank and any EtihadWE utility asset based on the table below:

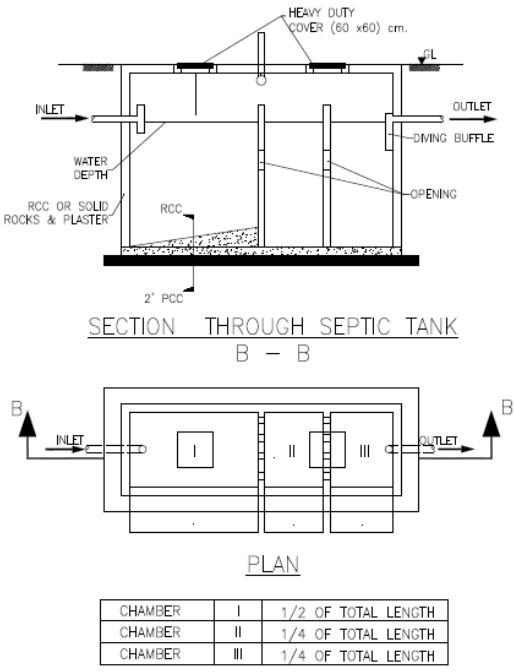


TABLE DIMENSION OF SEPTIC TANK IN METERS

S. NO	NO. OF PERSONS	A	B	C	D	D'	H	REMARKS
1	10	1.0	1.2	0.5	1.2	1.8	1.5	
2	15	1.2	1.2	0.6	1.5	2.1	1.8	
3	20	1.9	1.2	1.0	1.5	2.4	1.8	
4	25	2.3	1.2	1.1	1.5	2.7	2.1	
5	30	1.8	1.5	1.0	1.5	3.0	2.1	
6	35	2.4	1.5	1.2	1.5	3.4	2.1	
7	40	2.3	1.8	1.1	1.5	2.4	1.8	
8	45	2.5	1.8	1.2	1.5	2.5	2.1	
9	50	2.8	1.8	1.4	1.5	2.7	2.1	
10	55	3.0	1.8	1.5	1.5	2.7	2.1	
11	60	3.0	2.0	1.5	1.5	3.0	2.1	
12	65	3.2	2.0	1.6	1.5	3.2	2.1	
13	70	3.3	2.1	1.6	1.5	3.4	2.1	

Image 21: Septic Tank

Existing Utility	Horizontal Clearance (m)
LV cable	1
11 KV cable	1.5
33 KV cable	2
132 KV Power / Pilot / F.O. Cable trough	2
Distribution Water pipelines	5
Transmission Water pipelines	5

Table 16

A trial pit must be conducted prior to excavation to identify any existing utilities in the area.
Manual excavation is required within 1.5 meters of any EtihadWE asset,
No septic tank shall be allowed near EtihadWE substations, GRP, or feeder pillars.

removal of tree plant

The contractor shall submit a site drawing indicating the exact location of the tree proposed for removal. EtihadWE will review the drawing to verify the presence of existing networks in the area.
A trial pit must be excavated near the tree to detect any existing underground services. The decision to proceed with removal will depend on whether utilities are present and the level of associated risk.

Blasting

In order to obtain NOC for Blasting near EtihadWE asset. the contractor shall submit the following documentation for review and approval:

- Method Statement:
  Provide a detailed description of the blasting methodology, including:
  - Charge per delay
  - Peak Particle Velocity (PPV) control measures
  - Procedures for controlled blasting near EtihadWE overhead line (OHL) pylons and beneath conductors
  - Site-specific risk assessment addressing all potential hazards
- Drawings and Schematics:Submit drawings indicating:
  - Horizontal clearances from tower footings
  - Vertical clearances from the lowest conductor
- Permits and Approvals:
  Copies of all relevant permits and approvals from local authorities.
- Pre- and Post-Blast Documentation:

  - Pre- and post-blast photographs of affected structures and foundations (where applicable)
  - Inspection and testing reports for pipelines (where applicable)
- Safety and Compliance:
  - Strict adherence to all safety protocols and best practices is mandatory.
  - The NOC applicant shall bear full responsibility for any damage to EtihadWE assets or loss of revenue.

Method of Statement

- Transportation and handling of explosives in the UAE must adhere to strict regulations to ensure safety and security. The following procedures outline the safe execution of blasting operations:
- All explosives will be transported in approved vehicles and escorted following UAE regulations.
- Ministry of Interior officials will oversee operations until charging and blasting activities are completed.
- Before charging operations, bilingual warning signs reading "DANGER BLASTING IN PROGRESS – KEEP OUT," "NO RADIO TRANSMISSION," and "DANGER BLASTING AREA" will be placed in English and Arabic language at intervals up to 300 meters from the blast site.
- A perimeter of 60 meters around the rock face will be marked with red flags and/or ticker tape to establish a "NO ENTRY ZONE" for unauthorized personnel during charging operations.
- The explosives vehicle will be stationed at a safe distance from the work area, with explosives being transferred by Shovel to the charging site and manually shifted as needed.
- Detonators will be conveyed to the charging area in a designated wooden detonator box.
- Only tools made of wood, copper, brass, or aluminium will be permitted for use during charging operations. Metallic tools are strictly prohibited within the work area.
- Smoking and the possession of cigarettes, lighters, or any flammable materials are strictly prohibited within or near the work area.

- The charging of drilled holes will be conducted under the supervision of a licensed Blasting Engineer.
- Following a thorough check of the initiation sequence, the holes will be filled with appropriate stemming material to ensure safe and effective blasting.

Additional safety measures:

- Regular inspection and maintenance of blasting equipment and vehicles.
- Conducting thorough risk assessments before each blasting operation.
- Providing comprehensive training to personnel involved in handling explosives.
- Implementing emergency response procedures and evacuation plans in case of unforeseen incidents.
- Ensuring clear communication channels and coordination among all parties involved in the blasting operation.

Signaling:

For effective communication and warning dissemination, a combination of audible and visual signals will be employed consistently throughout the project. Two-way radio communication will serve as the primary means of communication. The audible warning signals indicating imminent blasting activities will be as follows:

A continuous signal will be sounded three minutes before and during the initiation process. This signal will persist until the issuance of the "All Clear" signal.

The "All Clear" signal will consist of a series of five hoots, each lasting five seconds with five-second intervals between them.

Pre-Blasting Safety Measures:

To ensure the safety of all personnel involved, a 300-meter radius around the blasting site will be cleared of all individuals fifteen minutes before the scheduled blasting operation. Additionally, the existing access road will be sealed off until the "All Clear" signal is given, signifying the conclusion of the blasting activity.

Operational Positioning:

The Blasting Engineer and Blasting Foreman will strategically position themselves at the termination point of the firing cable, enabling clear visual communication with the Flagmen.

Flagmen Protocol:

Designated Flagmen equipped with red flags will be stationed at the access road closure points to prevent unauthorized entry into the danger zone post-charging and during the initiation phase. These Flagmen will maintain their positions until the Blasting Engineer has inspected the rock pile and confirmed the successful initiation of all explosives and related accessories. Only after the issuance of the "All Clear" signal, signifying the area is safe for re-entry, will personnel be permitted to return to the work zone.

Additional technical safety measures:

- Conducting regular drills and exercises to ensure all personnel are familiar with emergencies procedures.
- Implementing a system for verifying the competency and qualifications of all personnel involved
- in the blasting operations.
- Establishing a clear chain of command and communication protocols to facilitate swift decision making in case of emergencies.
- Regularly reviewing and updating safety protocols and procedures to align with best practices and regulatory requirements.
- PRECAUTIONS TO MINIMISE FLY ROCK AND VIBRATION
- To effectively minimize fly rock and vibrations during blasting operations, the following robust methods and procedures will be implemented:
- Optimized Stemming Technique: Utilizing the appropriate stemming technique based on the hole diameter, burden, and spacing to ensure proper confinement of the explosive energy within the blast holes.
- Sequenced Delay System: Implementing a carefully planned delay system that minimizes the number of charged holes on any specific delay number. This sequential delay system will be designed in conjunction with optimal stemming practices to enhance blast efficiency.
- Directed Blasting: Whenever feasible, direct all blasts towards a free open face to facilitate the forward movement of the rock mass, thereby reducing the likelihood of fly rock and minimizing upward swelling.
- Blast Design Considerations: Considering the proximity to nearby structures or services when designing blasts. Factors such as drill pattern, hole diameter, delay sequence, and

maximum charge per delay will be meticulously calculated to ensure minimal vibration and controlled fragmentation.

- Test Blasting: We will Conduct test blasts as necessary to assess the rock's response to blasting operations. Test blasts will be performed to monitor and evaluate the effectiveness of the blasting techniques, or when required by clients or regulatory authorities to demonstrate compliance with safety standards.
- Monitoring and Analysis: Implementing a comprehensive monitoring and analysis system to track and evaluate blast performance, including fly rock and vibration levels. Real-time data collection and analysis will be utilized to adjust blasting parameters as needed to maintain safety and efficiency.
- Continuous Improvement: By reviewing regularly, we will update blasting procedures based on feedback, lessons learned, and technological advancements to continuously improve fly rock and vibration control measures.
- By adhering to these stringent precautions and incorporating advanced blasting techniques, we aim to enhance safety, minimize environmental impact, and optimize operational efficiency during blasting activities.

Evacuation area and procedures:

In adherence to safety protocols, the designated individual overseeing blasting operations will identify a secure evacuation area located outside the designated danger zone.

All personnel and machinery positioned within the danger zone will be promptly relocated to this designated safe area to ensure their safety.

Sentries equipped with red flags will be deployed to systematically evacuate all non-blasting personnel from the danger zone to the pre-designated safety zone. The on-site blasting supervisor will conduct thorough verification to confirm the complete evacuation of the danger zone and the successful congregation of all personnel within the designated safety zone before authorizing the continuation of operations.

Following the conclusion of all blasting activities and upon the satisfactory physical inspection of the blasted debris, the on-site supervisor will signal the "All Clear" alert, permitting personnel to safely return to the work site.

Adherence to these rigorous evacuation procedures is paramount to maintaining a secure work environment and safeguarding the well-being of all individuals involved in the blasting operations.

Theorical PPV calculations

According to "Swedish Blasting Technique" by Rune Gustafson

$Peak\ Particle\ Velocity\ in\ mm/$ sec $PPV = K$

$$Peak\ Particle\ Velocity\ in\ mm/\sec \qquad PPV = K\frac{\sqrt{Q}}{\sqrt{R^{3/2}}}$$

$\sqrt{Q}$

$\sqrt{R}3/2$

Where

K = Rock Constant (has been established at Max.60 from previously executed blast PPV values)

Q = (M.I.C)" Maximum Instantaneous Charge" per Delay in KG.

R = Distance in Meters from the Blast Area to the nearest structure.

Example- Bulk Blasting – 152mm

Q =200 Kgs.

R = 500 Meters

Therefore,

$$PPV = 60\frac{\sqrt{200}}{\sqrt{500^{3/2}}}$$

PPV = 8.00 mm/sec

Bulk Blasting – 134mm

Q =160 Kgs.

R = 500 Meters

Therefore,

$$PPV = 60\frac{\sqrt{160}}{\sqrt{1000^{3/2}}}$$

PPV = 7.20 mm/sec

Specific Conditions for Blasting Near EtihadWE Towers

- Allowable PPV value of 13 mm/sec shall be strictly maintained.
- Vibration monitoring device/Vibrograph to be installed on each foundation of the Pylon.
- Maximum charge per delay of 12–15 kg/delay shall be adhered to. Control blasting to be carried out accordingly.
- Method of Statement incorporating the above points along with risk assessment to be submitted for review.
- Utmost safety precautions shall be taken into consideration during blasting.
- Any damage to EtihadWE assets and/or loss of revenue to EtihadWE due to blasting activity shall be borne by the company requesting NOC.
- Blasting activity plan shall be submitted at least one week prior to the blasting activity.
- Physical photos of the EtihadWE assets shall be submitted before and after blasting activity for comparison
- Vibrograph records shall be submitted after completion of blasting.
- A clear drawing to be submitted describe the horizontal and vertical clearance from over headline and substations.
- All work shall be carried out in the presence of EtihadWE staff.

In addition, please be informed that all the above conditions are to be followed by EtihadWE as a standard practice whenever the clearance is less than 100 meters from EtihadWE assets.

Specific Conditions for Blasting Near EtihadWE Pipelines

Vibration Control:

Install vibration monitoring devices and ensure that ground vibration levels do not exceed 50 mm/s, or as specified by the pipeline's design criteria.

Environmental Protection:

Implement all necessary environmental protection measures to prevent contamination of water resources and surrounding areas.

Inspection and Testing:

Conduct thorough inspection and testing of pipelines before and after blasting to verify integrity and compliance with safety standards.

General Safe Distances from Blasting to Buried Water Pipes/ Tanks:

Pipe Type	Minimum Safe Distance (Approx.)	Notes
HDPE Pipe / AC pipe/ GRP pipe	50 meters	More sensitive to vibrations and deformation.
DI Pipe / CS pipe	30 meters	Stronger but joints can be affected by high vibration.
Elevated water tank	200 meters	
Larg water tank / PS	150 meters	

Table 17

Vibration Limits (Peak Particle Velocity – PPV):

Pipe Type	Max PPV near pipeline	Standard Reference
HDPE Pipe / AC pipe/ GRP pipe	< 25 mm/s	Manufacturer specs / ASTM / ISO
DI Pipe / CS pipe	< 50 mm/s	AWWA / EN 12889 / BS 5228
Water Tanks / PS	< 5 mm/s	

Table 18

Roads

Asphalt Road

Pre-Construction Requirements

Prior to any asphalt work, all existing EtihadWE utilities (electricity and water) must be identified, marked, and protected.

Trial trenches may be required in critical or unclear areas to confirm utility locations.

If the required utility clearance is insufficient, protective measures or asset relocation must be coordinated directly with EtihadWE.

Clearance Definitions

- Horizontal clearance: Measured edge to edge, from the proposed asphalt carriageway edge to the existing utility.
- Vertical clearance: Measured top to bottom, from the top of the existing utility (or its protection) to the finished asphalt level only for crossing cases.
- Proper bedding material and compacted backfilling in layers must be ensured. Backfilling with construction waste or stone is strictly prohibited.

Existing Utility	Clearance (m)	
	Horizontal	Vertical
LV cable	1	0.7
11 KV cable	1	1
33 KV cable	2	1.2
132 KV Power / Pilot / F.O. Cable trough	2	1.25
Distribution Water pipelines	2	1.3 -1.5
Transmission Water pipelines	2	2 - 3m
SCADA F.O. PVC / HDPE Duct	1	1

Table 19

Electricity Cable Conditions

- Maintain horizontal and vertical clearances from the proposed asphalt edge and level as per EtihadWE standards.
- Cable protection must be extended 1.0 m beyond the asphalt carriageway edge.
- Spare duct is required to provide redundancy and facilitate maintenance without service interruption.
- At utility crossing points, LV and 11 kV cables shall be raised or lowered to the standard depth as per EtihadWE specifications and protected using split ducts and spare ducts. In certain cases, additional protection using a concrete slab may be required based on site conditions.

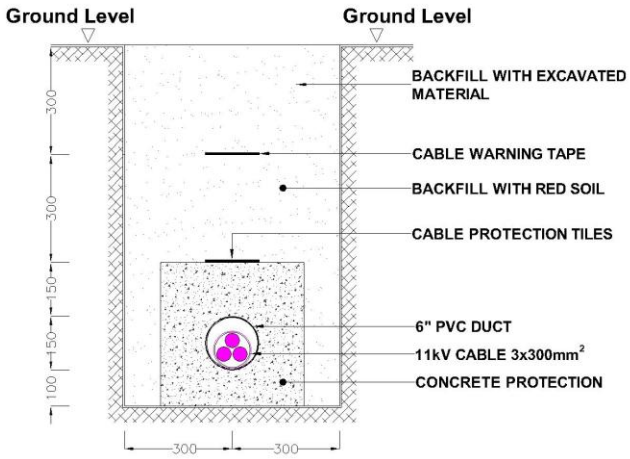


Image 22: 11KV Single cable with concrete protection

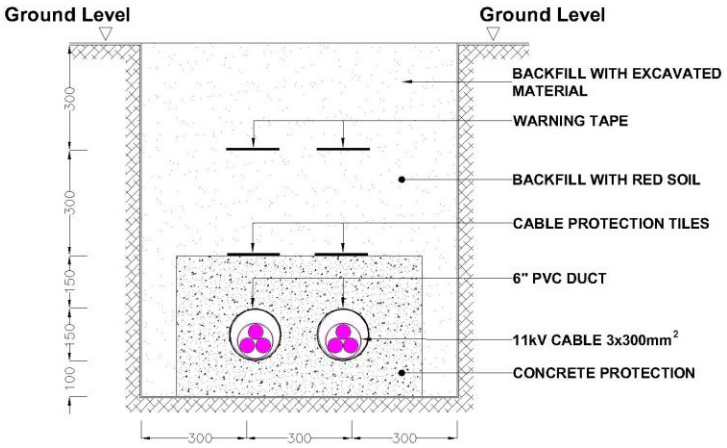


Image 23: 11KV Double cable with concrete protection

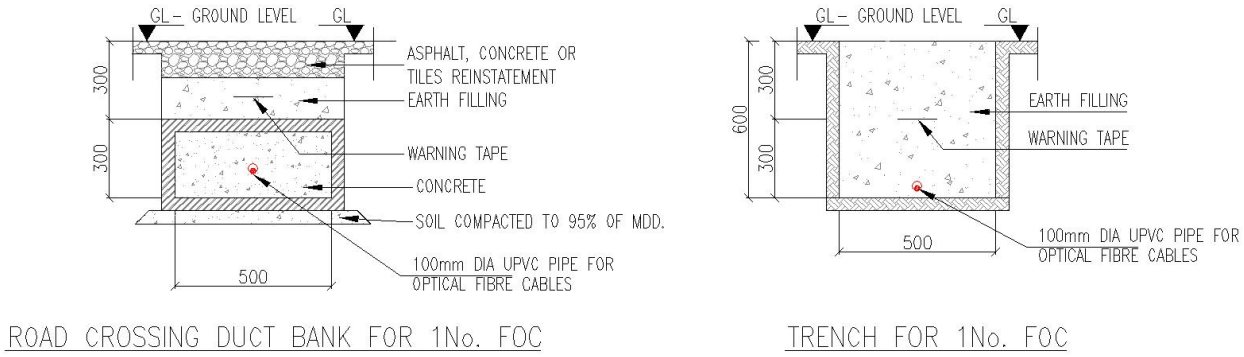


Image 24: cross section of single FOC

- For 33 kV cables, concrete slab protection is mandatory at all crossing locations.
- For 132 kV cable crossings with roads, prior approval must be obtained from the EtihadWE technical team. A reinforced concrete duct bank is required for any 132 kV crossing.
- Existing EtihadWE ducts (utilized or spare) must also be extended 1.0 m minimum beyond the asphalt limit.

- Asphalt construction is not allowed over or parallel to electricity network unless redesigned and approved.

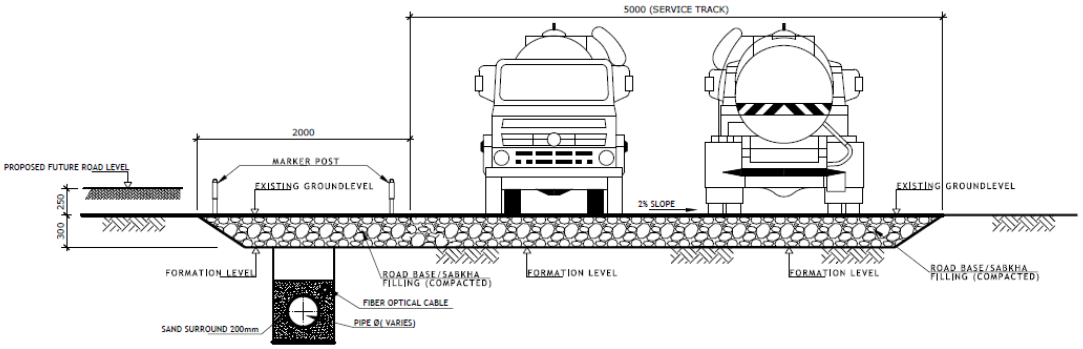
Water Network Conditions

- At road crossings or high-load areas, encase water pipes in concrete or provide concrete slap.
- For transmission and critical distribution pipelines, a secondary (duty) pipe is required to provide redundancy and facilitate maintenance without service interruption.
- Heavy machinery (e.g., excavators, rollers) must not operate directly above unprotected water pipelines. Use of tracked vehicles may be restricted within utility corridors.
- A duty pipe is required for all house water service connections.
- All manholes, valve boxes, and joint boxes belonging to EtihadWE must be adjusted to match the approved level using approved frames and covers.

Future Duct

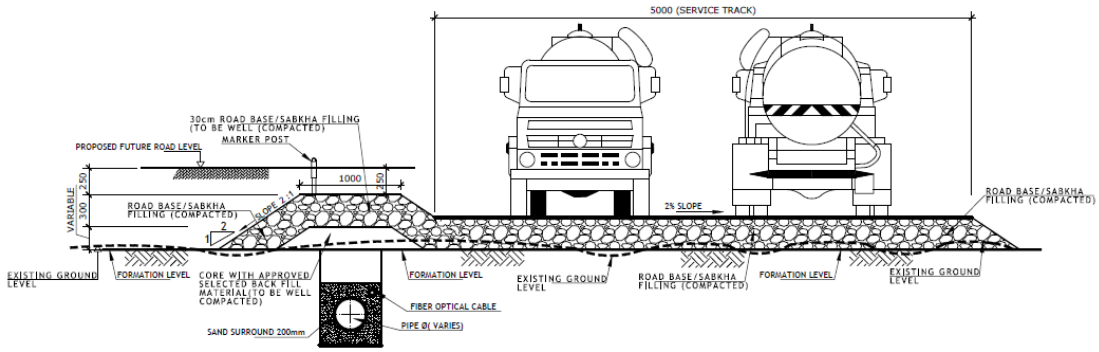
- Where future service provisions are anticipated, spare ducts must be installed before asphalt work begins based on EtihadWE approved locations and numbers.
- Duct marker tiles and route markers must be placed at both ends and at key intervals along the route.

Cross section of embankment and service track:



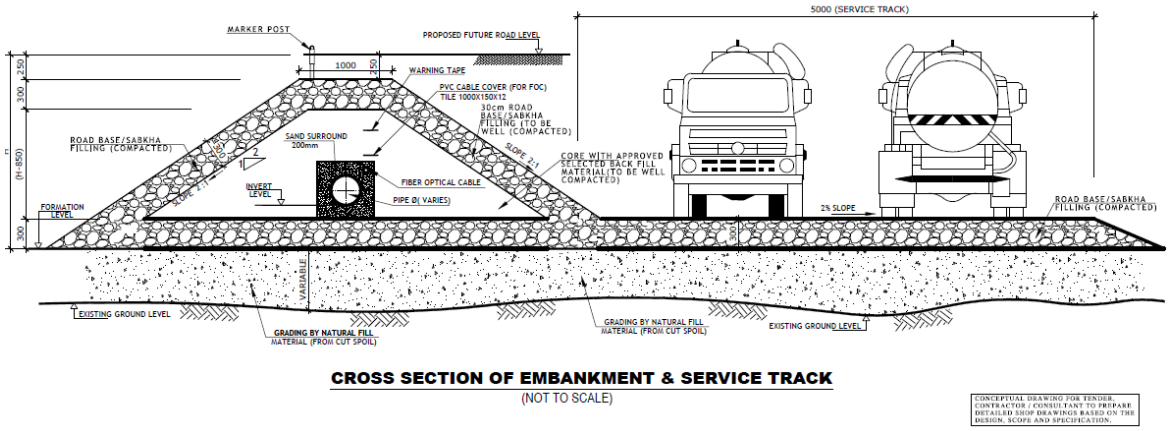
CROSS SECTION OF EMBANKMENT & SERVICE TRACK
(NOT TO SCALE)

Image 25: this case applies when the existing ground level is almost the same as that of the proposed future road level. This shall be executed in deserted areas, dune sand areas, remote areas etc. in case the existing ground level is hard and rocky, grading shall be carried out, to obtain a good, plain & defined service track (5m) & pipeline track (2m), thus avoiding complete road base.



CROSS SECTION OF EMBANKMENT & SERVICE TRACK

Image 26: this case applies when the existing ground level is between the top of pipe & the future road level. in case the existing ground level is hard & rocky, grading shall be carried out, to obtain a good, plain & defined service track thus avoiding road base for the service track.



CROSS SECTION OF EMBANKMENT & SERVICE TRACK

(NOT TO SCALE)

Image 27: this case applies when the existing ground level is below the pipe bottom level.

Interlock Road

Before commencing interlock works, all existing EtihadWE utilities (electricity and water) must be accurately identified using approved drawings and GIS data.

Trial trenches must be conducted in congested or unclear areas to confirm utility locations.

Interlock roads may be constructed above EtihadWE services, provided that all vertical clearance and protection requirements are fully satisfied as follow:

- EtihadWE reserves the full right to access, inspect, and expose its infrastructure at any time in the future for maintenance, emergency work, or network upgrades. No objections shall be raised regarding the removal or reinstatement of the interlock surface as part of such activities.
- Spare ducts must be provided at crossings for future upgrades or replacements.
- For water lines made of specific materials (e.g., AC, GRP), protection must be reviewed and approved by the technical team based on the site conditions.
- Heavy compaction equipment must not be used directly above utilities with limited depth. In such cases, only hand tools or light mechanical compactors are permitted. Protection slabs or improved backfilling may be required where compaction is necessary.
- For 132 kV joint and link box locations, a special arrangement and protection specification shall be applied. The approved details and standard drawings shown below.
- All manholes, valve boxes,chamber and joint boxes belonging to EtihadWE must be adjusted to match the approved level using approved frames and covers.

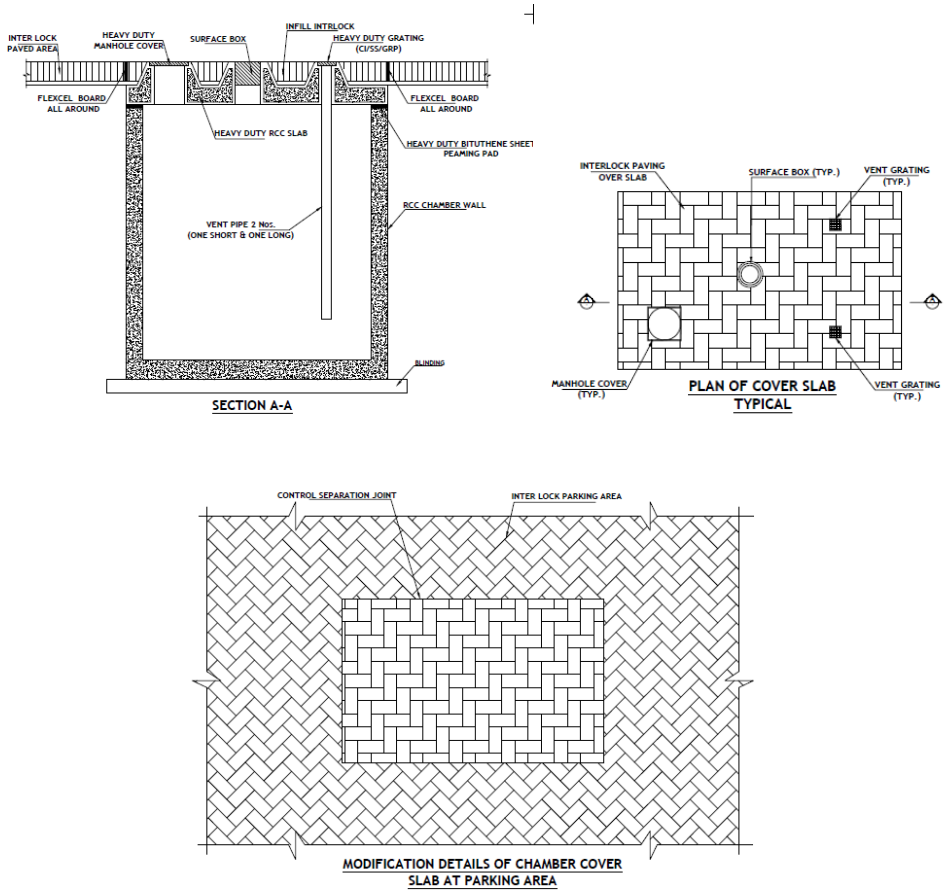


Image 28: Modification of chamber cover

- Access to these chambers must be preserved at all times.
- Duct markers must be installed.
    - A minimum vertical clearance must be maintained from any EtihadWE utility as per the table below.

Existing Utility	Vertical Clearance (m)
LV cable	0.7
11 KV cable	1
33 KV cable	1.2
132 KV Power / Pilot / F.O. Cable trough	1.2
Distribution Water pipelines	1.2 to 1.5
Transmission Water pipelines	1.2 to 1.5

Table 20

Future Ducts

Future ducts must be included in the infrastructure design for all new roads, railways, and developments, where EtihadWE assets may be required in the future. All duct routes and numbers must be coordinated and approved by EtihadWE before implementation.

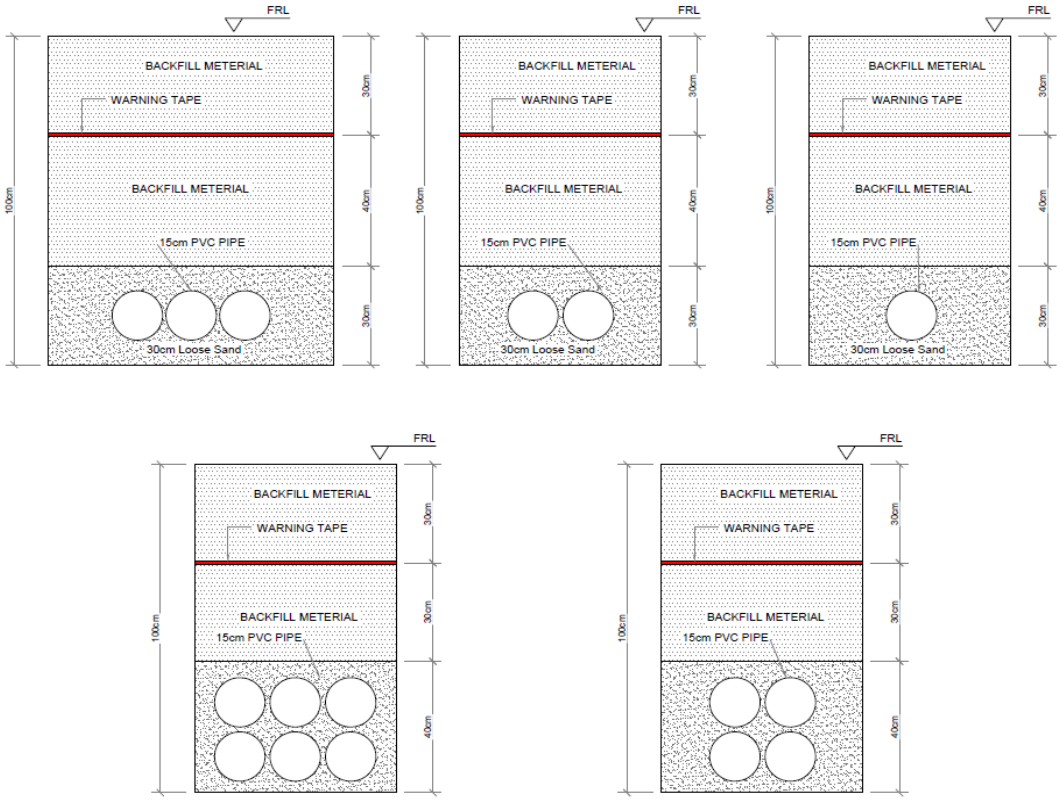


Image 29: 11 KV future duct cross section

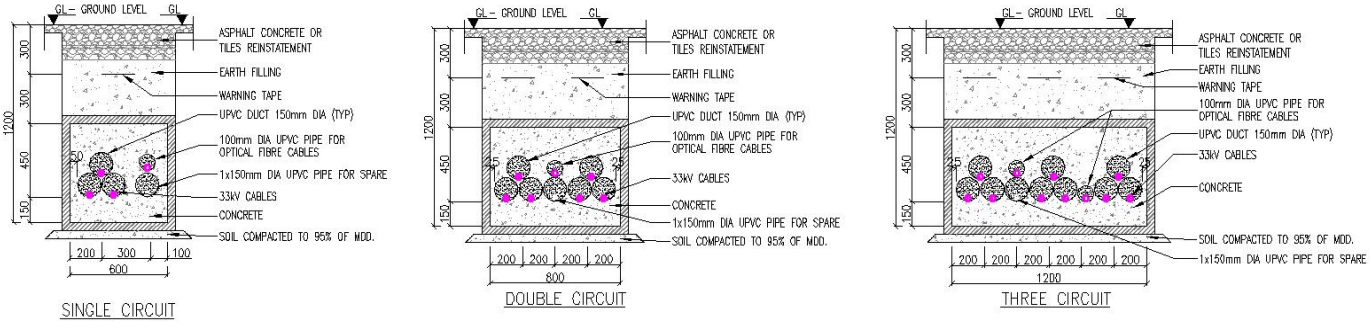


Image 30: 33 KV cables Duct bank

- Ducts must be tested using a mandrel pull test to verify cleanliness and straightness.
- Ducts must be sealed with end caps to prevent debris or water entry.
- All works are subject to inspection and final approval by EtihadWE site supervisor.
- As-built drawings must clearly indicate the ducts.
- Duct marker is required on both sides of the road/rail.

Image 31 : Duct marker

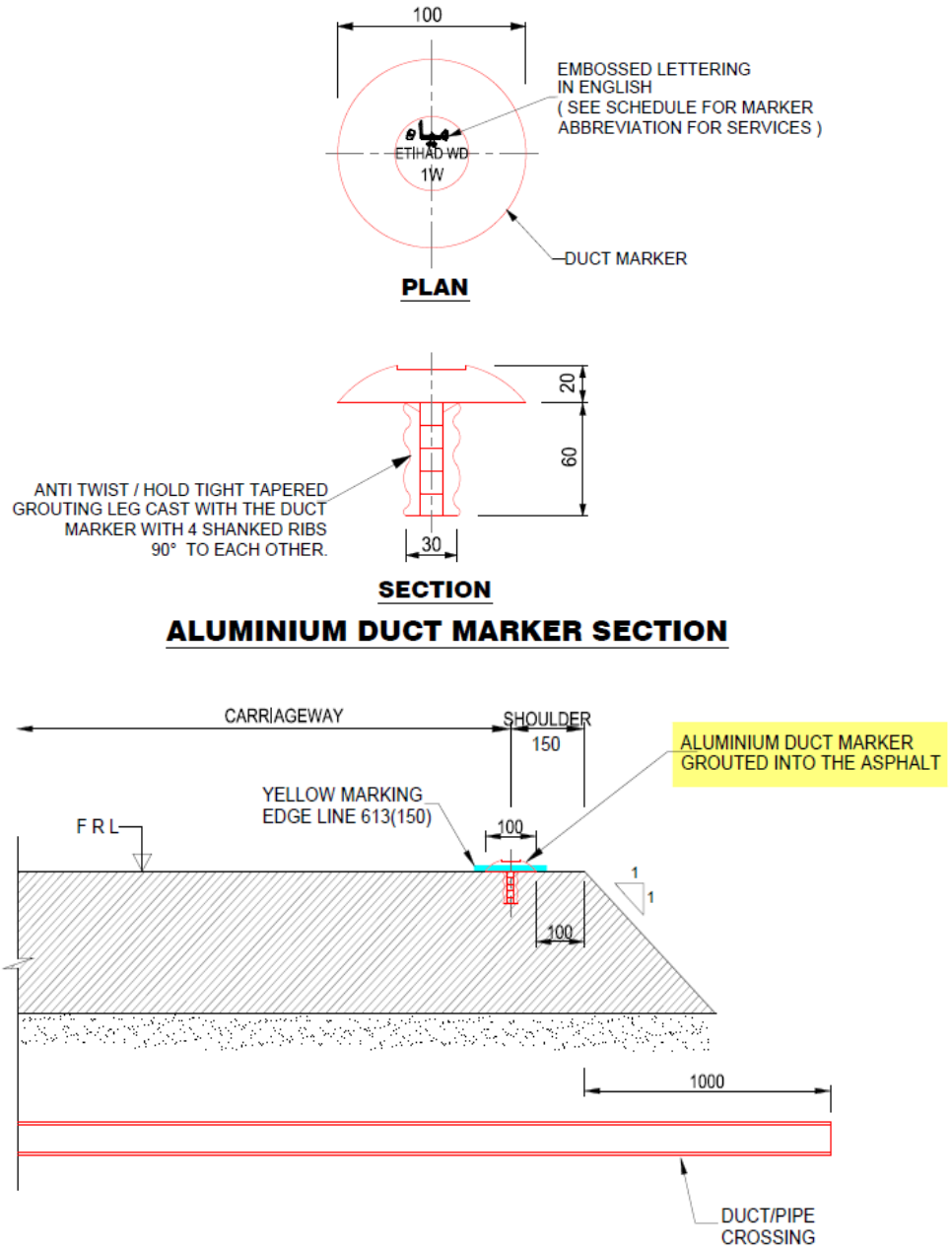


Image 32: cross section of duct marker

streetlight

Image 33: Streetlight

The installation of street lighting infrastructure must be planned in coordination with Etihad Water & Electricity (EtihadWE) to ensure the protection and safety of existing electricity and water assets.

Street light poles and their associated foundations must not be installed directly above or too close to existing underground EtihadWE cables or pipelines. A minimum horizontal clearance must be maintained from any EtihadWE utility based on the table below:

Existing Utility	Horizontal Clearance (m)
LV cable	1
11 KV cable	1
33 KV cable	1.5
132 KV Power / Pilot / F.O. Cable trough	2
Distribution Water pipelines	1.5
Transmission Water pipelines	3
SCADA F.O. PVC / HDPE Duct	1.5

Table 21

Prior to excavation, the contractor must perform a trial pit to confirm the location and depth of existing utilities. All work near existing services must be carried out under the direct supervision of EtihadWE.

No street light poles shall be installed near EtihadWE feeder pillars, GRP kiosks, substations, or inside utility service corridors, unless an approved protection plan is submitted and approved by EtihadWE.

sign board

Image 34: Signboard

The installation of sign boards must be planned in coordination with Etihad Water & Electricity (EtihadWE) to ensure the protection and safety of existing electricity and water infrastructure. Sign boards and their foundations must not be installed directly above or too close to existing underground EtihadWE cables or pipelines. A minimum horizontal clearance must be maintained from any EtihadWE utility as per the table below.

Existing Utility	Horizontal Clearance (m)
LV cable	1
11 KV cable	1
33 KV cable	1.5
132 KV Power / Pilot / F.O. Cable trough	2
Distribution Water pipelines	1.5
Transmission Water pipelines	3
SCADA F.O. PVC / HDPE Duct	1.5

Table 22

Rail

Image 35: Rail

Design Submission and Supervision

The Rail Authority must submit complete drawings clearly indicating the rail alignment, ROW boundaries, and the location of all EtihadWE utilities with the corresponding clearance dimensions.

All construction activities near EtihadWE assets must be conducted under EtihadWE supervision, with a minimum advance notice period of one week.

Right-of-Way (ROW) Clearance Requirements

The Rail Authority shall ensure that the newly proposed Railway Right-of-Way (Rail ROW) maintains the required minimum horizontal clearance from existing EtihadWE electricity and water infrastructure, in accordance with the following table:

Existing Utility	Clearance (m)	
	Horizontal	Vertical
LV Cable	3.0	1.0
11 KV Cable	3.0	1.5
33 KV Cable	5.0	1.5
132 KV Power / Pilot / Fiber Optic Trough	6.0	1.5
Distribution Water Pipelines	5.0	2.0
Transmission Water Pipelines	5.0	2.0

Table 23

If the required clearance cannot be achieved due to site constraints, the Rail Authority must coordinate directly with EtihadWE to implement protective measures or submit a shifting case application for the affected assets.

Utility Crossing Requirements

For all crossing locations, the Rail Authority must construct a dedicated duct bank for EtihadWE networks, which should include:

- Heavy-duty HDPE.
- Reinforced concrete protection slabs

The duct bank design must fully comply with EtihadWE technical standards to ensure asset protection and long-term reliability.

Consultancy Requirement

The Rail Authority must either:

- Appoint a consultant to evaluate the impact of railway work on the existing EtihadWE Network.
- The Rail Authority shall be fully responsible for the cost of the assessment if it is carried out by EtihadWE or by consultants appointed by EtihadWE.

Provision for Future Utilities

A spare future-use duct must be included in all new railway projects along the approved alignment, in coordination with EtihadWE. This duct shall be reserved for future network expansion.

ETIHAD Water & Electricity (EtihadWE) – Conditions for 132kV Overhead Line Crossing with Railway Corridors

- The 132kV OHL shall cross railway tracks at a right angle.
- The span across the railway shall not exceed 300 meters or 80% of the standard design span, whichever is less.
- Crossing spans shall use double tension insulator strings with yoke plates if needed.
- Each insulator string shall consist of two insulators and maintain a safety factor of at least 2.5 as per EtihadWE standards.
- Tower foundations must be designed based on geotechnical conditions and type-tested in accordance with EtihadWE requirements.
- Each tower shall have two independent earth connections, each with separate electrodes.
- Counterpoise earthing must be used if resistance exceeds 10 ohms.
- All four tower legs must be individually earthed with resistance less than 10 ohms.
- Step and touch potential tests must be conducted and approved by EtihadWE.
- No joints in conductors or earthwires are allowed within the railway crossing span.
- Towers located on railway land shall have anti-climbing devices and EtihadWE-approved warning signs.
- The crossing shall not interfere with EtihadWE communication lines.
- All structures and components must comply with EtihadWE safety factor requirements.
- Minimum vertical clearance from rail level to the conductor at 80°C shall be 14 meters.
- Minimum horizontal clearance from the nearest tower foundation to the railway track shall be 40 meters.
- No towers shall be installed within railway junctions, and rerouting shall be arranged accordingly.
- No transformers, traction substations, or cabins shall be located beneath the OHL crossing.

- Vibration studies on conductors and tower foundations shall be conducted and submitted to EtihadWE.
- Permanent access roads must be provided for EtihadWE maintenance within the railway corridor.
- Reflective signs showing clearance and voltage must be installed on both traffic sides, subject to EtihadWE approval.
- Modified towers must be renumbered and labeled with ID and danger plates per EtihadWE specifications.
- Contractors must obtain necessary NOCs from all relevant authorities.
- Joint site visits must be arranged to confirm OHL/railway crossing locations.
- Materials used must be pre-qualified and approved by EtihadWE.
- All vendors, contractors, and subcontractors must be approved by EtihadWE.
- Key project personnel must receive EtihadWE approval.
- TRANSCO-related OHLs must comply with TRANSCO procedures and standards.
- Outage schedules must be submitted at least 90 days in advance to EtihadWE for approval.
- Revised line parameters and protection settings must be submitted for EtihadWE review.
- Protection settings must be updated as per EtihadWE approval.
- Aviation lights, spheres, and tower painting must meet UAE Civil Aviation standards.
- Maintain vertical clearance from the top of the railway OHL or electric unit to the bottom conductor of EtihadWE lines.
- Maintain horizontal clearance from any railway support structures to EtihadWE OHL structures.
- Conduct vibration analysis on OHL foundations closest to the railway track.
- Submit electrical layout drawings and prepare a clearance presentation.
- Conduct FAT and type testing for all materials used in modification works.
- Obtain EtihadWE O&M Department approval.
- Obtain EtihadWE HSE Department approval.
- Obtain SCC-UAQ review and approval for communication-related works (OPGW/FOC).