


Reference	MTS-Civils- 009			Construction of Manholes	
Revision	4	Review Date	01.03.21		

1. Purpose

- To detail the standard method for the construction of OPENREACH Manholes, in accordance with OPENREACH Specification LN 550.

2. Responsibilities

- 2.1** The **team leader** shall ensure staff involved in constructing underground manholes adhere to this method and are licensed under the OPENREACH scheme for the disciplines they are in charge of.
- 2.2** The **Site Supervisor** shall periodically monitor the compliance to this method statement.
- 2.3** The **Project Manager** shall ensure that all the necessary safety precautions have been undertaken to the work starting and periodically monitor the job during its implementation.
- 2.4** If this method cannot be adhered to, contact your supervisor for advice before proceeding.

3. References & Definitions

3.1 References

- OPENREACH Specification LN 550- Underground Duct Laying and Associated Works
- Safety at Street Works and Road Works – A Code of Practice
- OPENREACH CN Drawings
- New Roads and Street Works Act 1991
- HAUC – Specification for the Reinstatement of Openings in Highways
- NJUG – Codes of Practice
- HS (G) 47 Avoiding Danger from underground services

3.2 Definitions

- Chapter 8** - is the section of the New Roads and Street Works Act, which details the requirements of the road works guarding.
- Manhole** – is an underground chamber with a roof, in the footway or the carriageway.


4. Safety considerations

4.1 Hazards

Traffic	✓	Fumes/Gas	✓	Falls of material		Mobile Plant & Vehicles	✓
Buried Services	✓	Dust	✓	Demolition		Noise & Vibration	✓
Overhead Services		Deep Excavations	✓	Collapse of Structure		Lifting Operations	✓
Fire/Explosions		Confined Spaces	✓	Soft Ground	✓	Manual Handling	✓
Flying Particles/Objects		Lighting Levels	✓	Falls on Level		Working near Water	
Heat		Falls from Height		Defective Materials		Adverse Weather	✓

4.2 Precautions

- ASSESS THE RISK** - Ensure that prior to starting work a **SITE SPECIFIC RISK ASSESSMENT** is conducted and recorded on to identify specific risks that may be present, if in doubt contact your site supervisor.

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- **ROAD WORKS GUARDING**

- To be in accordance with Chapter 8.
- Signs and barriers to be secured with sand bags if necessary.
- Maintain a safe route for pedestrians to by pass by the works.
- Guard pedestrians from vehicles when directed into carriageway.
- Where required lights to be attached to signing and guarding.

- **PLANT, VEHICLES & WORK TOOLS**

- To be kept inside the work area.
- To be in good working order and properly maintained.
- To have mufflers and silencers fitted where practicable.
- Vehicles to be fitted with, and use amber rotating beacon/s.
- Plant operators to be trained and competent in the use of the plant they are using.
- Switch plant off when not in use.
- Ensure that all guards are properly secured and unauthorised persons do not use the plant/vehicle.
- Rotate operators to reduce individual exposure.
- Keep plant & vehicles away from the edge of the excavation.
- Air hoses to be maintained in good order with joints correctly coupled.
- Hose check arrestors to be fitted and used on all compressed air lines.
- Dust suppression is to be used when saw cutting or using equipment that can cause airborne dust, i.e. water.
- Fuel oil to be stored and handled safely to prevent spillage or contact with skin or clothing.
- Ensure the correct PPE is used for the type of equipment.
- Ensure fumes do not enter confined space.

- **SAFE DIGGING**


- Utility safe dig prints to be available on site at all times.
- Visual & CAT (and Genny, where required) surveys to take place.
- All identified services to be marked on the surface.
- Pilot Holes should be excavated by hand to confirm positions of services.
- Ensure where necessary that correct trench wall supports are available and are used.
- Excavated material shall be stored a safe distance away from the excavation to stop possible collapse into the excavation, but kept within the guarded area.
- Mechanical excavation equipment shall not be used in the vicinity of other utility services.
- Adequate access/ingress to be maintained at all times.

- **CONFINED SPACE WORKING**

- Ensure that gas-testing equipment is available, and is used when entering joint boxes or manholes.
- Where man entry is required ensure that all involved are trained and competent in confined space working and that there is an approved safe system of work and the confined space is continually gas monitored.
- Ensure that in confined spaces where there is no free flow of clean air, ensure there is adequate ventilation and where practicable used forced ventilation.

- **SAFE LIFTING TECHNIQUES**

- When lifting materials and tools from/to the excavation or onto/off the truck ensure that items are not too heavy. Either reduce them into lighter pieces or/and seek assistance to

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spread the load or use suitable lift equipment. If in doubt seek advice.

- When lifting manhole or box covers ensure that the proper lifting keys are used and that safe lifting techniques are employed. For carriageway covers lifting aids shall be used for lifting the covers wherever practicable, i.e. a suitable manhole lifter.

4.3 Personal Protective Equipment

- Ensure the following is worn at all times during the works:
 - Hard Hat
 - Safety boots or wellingtons
 - High visibility jacket or jerkin
 - Fire Retardant Coveralls
 - Ensure the following is worn as required during the works:
 - Eye protection – grinding, sawing and cutting
 - Ear protection – grinding, sawing, cutting, using jackhammers.
 - Dust masks – grinding, sawing, cutting or conducting activities that involve airborne dust.
 - Gloves – when using power equipment or manual handling.
 - Waterproofs – in wet weather.


5. Method

5.1 Prior to commencing work

- Establish the type of Manhole to be built from the job pack. Obtain the Manhole dimensions from the CN Drawing.
- Survey the works to be done, picking the best position/route to excavate, taking note the required size of your excavation, the vicinity of previous excavations and other utility services.
- Ensure that a full set of Manhole timber for shuttering has been collected, checked for damage and the dimensions are correct.
- Ensure that you check the set of steelwork against the Bar Schedule before leaving the yard.
- Erect road works guarding and signs.
- Read service prints and conduct survey with CAT and as far as practicable mark all services in the vicinity of the excavation.
- Ensure the area to be excavated for the manhole is free from services.
- Gas test any Chambers directly prior to entering and continuously during the works. If gases are found within the Chamber, no work must take place and your Supervisor informed.
- Conduct trial holes to locate existing services and to see what effect they might have on the works.
- Provided the works vicinity is free from all services the area for the Manhole location shall be marked. The external Manhole dimensions, as defined in the OPENREACH CN Drawings, shall determine the size of the excavation. The Supervisor will check the marking out prior to excavation.
- Shoring calculations shall be provided by the Supervisor, which shall determine the amount of shoring required. Ensure the shoring equipment is available prior to excavating.

5.2 De-Watering

- If de-watering is required during any stage of the work, then pumps and hoses should be positioned as to avoid any inconvenience to pedestrians, road traffic or other 3rd parties.
- Before de-watering ensure that your site supervisor has agreed all discharge points.
- Samples of water should be taken prior to setting up the de-watering equipment.
- If the water shows any sign of contamination then the water should not be discharged and the

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site supervisor/project manager contacted. There is a OPENREACH term contractor available that the OPENREACH planner can use to extract and dispose of the contaminated water and they should be used wherever possible.

- Ensure silt is not drawn from the excavation and where necessary use a settlement tank.

5.3 Breaking the Surface & Excavating

- Mark the area to be excavated.
- Where practicable, for large excavations in blacktop the surface shall be cut with a suitable road saw, however for small excavations a Style saw can be used.
- All excavation equipment used should be suitable for the work undertaken. Mechanical excavating equipment should not be used near other services.
- Any service damages caused by your or previous excavator's should be reported to your site supervisor immediately.
- Excavated materials must be strictly controlled during all stages of the works, ensuring that it is stored at a practical and safe distance from the excavation, within the road works guarding.
- Material being collected by a grab wagon should be done in such a way to ensure that minimum disruption is caused to pedestrians, road traffic or any other 3rd parties.
- Materials for re-use e.g. topsoil and granular materials, etc. should be kept free from contamination and where necessary protected from weather conditions.
- Ensure the shoring equipment is available on site prior to excavating. Where there is traffic passing along side the excavation or there is possibility of the trench collapsing then sheet piles and struts shall be used. Where there is doubt of the reliability of the method to be used then an external piling company/consultant shall be consulted/used.
- Ensure that all OPENREACH apparatus is protected from damage prior to and during the works.
- All excavated services shall be adequately supported during the excavating process to prevent damage occurring to them.

5.4 Preparing the Excavation


- The excavation shall be checked to ensure the dimensions are suitable for the bottom and sides to act as back shuttering. Where back shuttering is to be used, suitable shuttering shall be positioned.
- Prior to any concrete being placed, a polythene membrane of 1000 or 1200 gauge, shall be placed on the inside of the excavation to fully line the bottom and sides. This will act as a barrier to prevent ground contaminants attacking the concrete during the life of the manhole.

5.5 Steelwork

- Using the applicable CN drawings as guidance, layout the steel reinforcement and secure into position for the floor, using reinforcement bar clips or standard wire ties.
- Ensure any spacers used are centred at no more than 600mm from one another.
- Ensure the cover of concrete over the steelwork is no less than 40mm.

5.6 Concrete

- **For all Manholes ready mixed wet RC 40 concrete is to be used. Site mixed concrete is not allowed.**
- The slump shall be 50mm ±25mm when placed.
- When the ready mixed concrete is delivered to site, no additional water is to be added to the concrete. The delivery ticket is to be retained with the job pack.

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5.7 Casting the Concrete Box Floor

- Ensure the excavation is properly prepared and the steelwork, spacers, anchor irons and the sump have been properly fixed into position.
- A square sump or circular sump may be used the internal diameter of the circular sump is to be 230mm \pm 5mm.
- Place the concrete and consolidate using a vibrating poker, ensuring that the vibrating poker does not dislodge the steelwork.
- Once the required thickness of floor is achieved and is properly consolidated, level the floor off to a smooth finish.
- Protect the concrete from the environment and allow curing for a minimum of 12 hours.

5.8 Position the Shuttering for the Walls

- All concrete joints areas are to be wire brushed, cleaned and wetted prior to jointing.
- All duct entries, steel reinforcement and Manhole furniture should be correctly positioned and secured. The duct entries shall be blocked up with suitable material to stop concrete entering the ducts.
- The shuttering should be positioned to ensure that the Manhole walls and roof are the correct thickness and the cover over the steelwork is at least 40mm, both on the near face and the far face. Ensure the shuttering is properly supported to prevent the concrete for the roof and/or the walls moving during curing.
- The length and verticality of the walls and the squareness of the corners should be checked.

5.9 Casting the Concrete Walls


- Ensure the concrete is placed in layers and each layer is consolidated using a vibrating poker, ensuring the steelwork, furniture and ducts are not dislodged with the vibrating poker.
- Level off the top of the roof at the correct height and thickness.
- The walls are to be cast in one operation.
- Protect the concrete from the environment during the curing time

5.10 Curing Times

- **Removing shuttering** - allow a minimum of 5 days curing time before stripping out the shuttering. Refer to OPENREACH Specification LN 550 part .
If a OPENREACH approved rapid hardening concrete is used, then refer to the manufacturers recommendations.
- **Reinstating & Traffic** - allow a minimum of 5 days curing time for footway and 7 days curing time for carriageway before reinstating and allowing traffic over the manhole, unless a OPENREACH approved rapid hardening concrete is used.
- **Anchor irons** – allow 28 days curing time before the anchor irons are used. Anchor irons should be marked or labelled with the date the floor was cast.

5.11 Fitting Frames & Covers

- Remove the shuttering, finish off the duct mouths and ensure that the structure and manhole furniture complies with the applicable CN drawings.
- The frames and covers are installed as per the OPENREACH Specification LN 550 Part 521.
- **5.12 Housekeeping**
- The roadwork's guarding and signs should be regularly checked to ensure they always meet the requirements of Chapter 8.
- All spoil, materials, vehicles and plant should be properly guarded in accordance with Chapter 8.

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- The site should be kept as clean and tidy practicable during the works.
- Always be polite to the general public within the vicinity of the works and where necessary liaise with the local residents and other contractors present.
- Consideration should be given to houses, hotels, public houses, hospitals, nursing homes, etc in the vicinity of the works and the working hours using jackhammers, or peckers, etc should be limited to reasonable hours wherever possible.