



SECTION 4: GROUNDWORKS



Contents

4.1 MANAGING GROUNDWORKS OPERATIONS	4
4.1.1 SUPERVISION, MONITORING, AND INSPECTION	4
4.1.2 GROUNDWORKS PRE-START MEETING	4
4.1.3 GROUNDWORKS SUPERVISOR	5
4.1.4 OPERATIVE TRAINING AND COMPETENCY	5
4.1.5 SAFE SYSTEM OF WORK.....	5
4.1.6 MONITORING AND INSPECTION	6
4.2 GROUNDWORKS PLANT AND EQUIPMENT	7
4.2.1 GROUND CONDITION / PLANT SELECTION ASSESSMENT.....	7
4.2.2 ONGOING ASSESSMENT OF GROUND CONDITIONS AND SELECTION OF PLANT (GROUNDWORKS CONTRACTORS HSE ADVISOR).....	8
4.2.3 CONTROL OF EXCAVATORS	9
4.2.3.1 OPERATIVES BRIEFINGS/PLANT PROMPTS	9
4.2.3.2 KEY CONTROLS	10
4.2.3.3 VISABILITY AIDS	11
4.2.3.4 ACCESS FOR SERVICE / MAINTENANCE OF EXCAVATOR AND FITTING SECURITY SHUTTERS	11
4.2.4 EXCAVATORS USED FOR LIFTING	12
4.2.5 SAFE USE OF QUICK HITCHES	14
4.2.6 CONTROL OF DUMPERS	16
4.2.7 LORRY MOUNTED CONCRETE PUMPS	19
4.2.8 OTHER GENERAL PLANT	20
4.3 EXCAVATIONS AND GROUND PENETRATION	21
4.3.1 GROUND CONTAMINATION	21
4.3.2.1 BATTERING	22
4.3.2.2 BENCHING	23
4.3.2.3 TRENCH AND MANHOLE BOXES	23
4.3.2.4 EXCAVATION BOX ENDS	24
4.3.2.5 SURCHARGING	24
4.3.2.6 ACCESS / EGRESS INTO EXCAVATIONS	24
4.3.2.7 EDGE PROTECTION	25

4.3.3 CONTROLS FOR WORK NEAR UNDERGROUND SERVICES	26
4.3.4 PLANNING THE WORK	26
4.3.4.1 SITE SERVICE PACKS	27
4.3.4.2 PAS128 (Level 4) COMPLIANT UTILITIES /SERVICES SURVEY	27
4.3.4.3 SERVICE REVIEW MEETING	27
4.3.4.4 SERVICE REQUIREMENTS	28
4.3.5 LOCATING AND IDENTIFYING BURIED SERVICES	28
4.3.6 SAFE EXCAVATION / SAFE DIGGING PRACTICES (EXCAVATION NEAR OR ADJACENT TO UNDERGROUND SERVICES)	29
4.3.6.1 AUTHORITY TO PROCEED – EXCAVATIONS/ GROUND PENETRATION	29
4.3.6.2 DIG PERMIT ARMBANDS	32
4.3.6.3 NO MECHANICAL DIGGING ZONE	33
4.3.6.4 SAFE DIGGING PRACTICES	33
4.3.6.5 EMERGENCY PROCEDURE	38
4.3.7 USE OF GROUND PINS	39
4.3.8 CONTROLS FOR WORK NEAR OVERHEAD SERVICES	39
4.3.8.1 PASSAGEWAYS UNDER OVERHEAD SERVICES	41
4.3.8.3 EMERGENCY PROCEDURES (Contact with Overhead Services)	42
4.3.9 CONFINED SPACES	43
4.3.9.1 DEFINITION	43
4.3.9.2 CONFINED SPACE ENTRY CONSIDERATIONS	43
4.3.9.4 AUTHORITY TO PROCEED: Confined Space Entry	44
4.4 FOUNDATIONS	44
4.4.1 STRIP FOUNDATIONS	44
4.4.2 HEAVE PROTECTION	45
4.4.3 PILE FOUNDATIONS	46
4.4.4 BUILDING UP TO OVERSITE	48
4.4.5 BLOCK AND BEAM FLOORS	48
4.5 INSPECTION CHAMBER COVERS	49
4.6 MECHANICAL KERB LIFTING	50
4.7 RELATED MATTERS NOTED ELSEWHERE IN THE MANUAL	51


4.1 MANAGING GROUNDWORKS OPERATIONS

4.1.1 SUPERVISION, MONITORING, AND INSPECTION

4.1.2 GROUNDWORKS PRE-START MEETING

Before any Groundworks activity commences on site, a pre-start meeting must be held.

Pre-start Meeting Agenda

ROADS AND SEWERS / GROUNDWORKS PRE-START MEETING AGENDA	
HSE Issues	
Attendees:	TW – Production Director / Manager, Site Manager, Engineer, Regional/Site HSE advisor CONTRACTOR – Director / Contracts Manager, Groundworks Supervisor, HSE Advisor
1.0	Scope of works – outline the work to be carried out, including complex temporary works and build routes.
2.0	Review of roles and responsibilities, e.g., change of Principal Contractor (see section standard letter 2.3 (available (available on )).
3.0	Information review – examination of information provided to contractor, e.g., Service drawings, survey reports (e.g., PAS128), foundation details, levels, ground investigation reports
4.0	Site management (TW or contractor) organisation/co-ordination/supervision
5.0	Traffic management
6.0	Site Specific Environmental Action Plan (SSEAP) including: <ul style="list-style-type: none"> Fuel storage and refuelling Silt Management and Protection Waste disposal (arisings) – where will it go, who is taking it, any variance to original arrangements. Protected species / invasive weeds
7.0	Security and public protection
8.0	Off-site works
9.0	Risk Assessment/Safety Method Statement review
10.0	Plant and Equipment. Groundworker must have prepared a Ground Condition/Plant Selection Assessment (see section 4.2.1)
11.0	Training records
12.0	Sub-contractors to be used
13.0	Other HSE Issues

4.1.3 GROUNDWORKS SUPERVISOR

No groundworks operation may be undertaken without the Nominated Groundworks Supervisor on site. The Groundworks Supervisor must be familiar with the safe system of work and controls to be adopted on site and must:

- Be SMSTS/SSSTS and TW trained; and
- Be identified on the Site Management / Support Team Board.

If the Groundworks Supervisor leaves or does not attend site, groundwork operations must be suspended until a trained TW substitute Groundworks Supervisor is in place.

4.1.4 OPERATIVE TRAINING AND COMPETENCY

The Groundworks Contractor must provide details of their Operatives' Safety Critical Training, e.g., plant operations, confined space entry, cable avoidance, etc. This is demonstrated by the Groundwork Contractor providing copies of:

- The individual's training certificates; and/or
- The company's H&S training matrix

For safety critical workers such as mobile plant operators, the Groundwork Contractor must have arrangements to check and monitor that these operatives are medically fit to operate mobile plant.

This includes checks to confirm that the authorised plant operators are not suffering any medical conditions or undergoing any medical treatment that could lead to sudden loss of consciousness or incapacity, concentration, balance, or co-ordination, etc.

4.1.5 SAFE SYSTEM OF WORK

Groundwork Contractor must have provided their risk assessments and safety method statements for review before the Roads and Sewers / Groundworks Pre-start Meeting.

The Site Management Team must ensure that they are familiar with them and that the Groundworks Supervisor has briefed the operatives prior to commencing the works, e.g. by:

- Discussing the [TW Authority to Proceed: Excavations and Ground Excavation](#) (see [section 4.3.6.1](#));
- Discussing the TW Authority to Proceed: Confined Space Entry (see [section 4.3.9.4](#));
- 'Take 5' briefings (see [section 3.2.2.7](#)); and
- Site Safe Briefings (see [Site Safe Briefing Folder](#)) including:
 - [Operatives Working Near 360° - 180° Excavators](#)
 - [360° - 180° Excavator Plant Operators](#); and
 - [Safe Use of Dumpers](#).

4.1.6 MONITORING AND INSPECTION

The **Site Management** Team must carry out regular monitoring of work underway, particularly medium to high-risk work such as work near/adjacent to underground services, excavations, etc.

The **Groundworks Supervisor** is responsible for:

- The supervision of the groundwork operations on site; and
- Carrying out and recording the statutory inspections (this may be delegated to their team, e.g., a trained plant operator):
 - Under PUWER (Provision and Use of Work Equipment) and;
 - LOLER (Lifting Operations and Lifting Equipment Regulations) using the [Work Equipment and Lifting Equipment Inspection Record Sheet \(Folder 2 F2.07\)](#); and
 - Excavations using the [Excavations Inspections Record Sheet \(Folder 2 F2.03\)](#).

The **Groundworks Contractor HSE Advisor** must:

- Attend the 1-day TW Groundworkers HSE Conversion Training
- Complete a Monthly Site HSE Inspection / Audit (as a minimum)
- Provide the TW Site Manager and Groundworks Supervisor with a copy of their report
- The report must clearly identify:
 - Any concerns / shortfalls with immediate actions taken and required
 - Include forthcoming / planned works and note controls agreed
 - Review of the Ground Condition/Plant Selection Assessment (see [section 4.2.1](#))

McAlister & Rushe		WEEKLY SITE SAFETY and EMS CHECKLIST		Date:		
<i>Tick one box per question.</i>				YES	NO	N/A
<i>If you place a tick in any unticked box, fill in the Comments/Remedial Action section with relevant details</i>						
SAFE ACCESS						
Are all access routes / roadways level and in good condition?						
Are all open edges adequately protected?						
Are all openings at ground level adequately covered or fenced off?						
Are all openings in floor slabs adequately covered or fenced off?						
Is area tidy, and materials safely stacked?						
Is artificial lighting available and adequate?						
Are all elevated walkways fitted with handrails?						
Are all signs visible, clean, and secure?						
Comments/Remedial Action						
LADDERS						
Are ladders in good condition, free from defect?						
Are ladders in use either tied at the top, or footed at the bottom?						
Are ladders properly positioned for gaining safe access?						
Do all ladders extend at least 1.05m above landing points?						
Comments/Remedial Action						
EXCAVATIONS/GROUND WORKS						
Are excavator operators recording weekly inspections?						
Are all deep excavations safe from collapse?						
Are banksmen appointed to control lorry movements?						
Are tipping areas level, and free from obstructions?						
Are excavations which are open more than 7 days inspected weekly?						
Is there safe access to excavations?						
Is there a barrier to prevent persons falling in?						
Comments/Remedial Action						

McAlister & Rushe		WEEKLY SITE SAFETY and EMS CHECKLIST		Date:		
<i>Tick one box per question.</i>				YES	NO	N/A
<i>If you place a tick in any unticked box, fill in the Comments/Remedial Action section with relevant details</i>						
Comments/Remedial Action						
FALSEWORK & FORMWORK						
Are props plumb and properly set out to design specification?						
Are bases and ground conditions adequate for loads?						
Are proper pins used in the props and are timbers in good condition?						
Is falsework checked before concrete pours?						
Is there safe access onto formwork?						
Are all high level work platforms fitted with handrails (2No.) and toeboards?						
Are all removed shuffling panels, timbers, and falsework stacked safely and neatly with all nails removed / clenched?						
Comments/Remedial Action						
ELECTRICITY AND OTHER SERVICES						
Are there any signs of damage to apparatus, especially portable equipment?						
Are there any signs of damage to outer casings of wires and cables?						
Are all connections to power cables by proper plugs?						
Are temporary cables safely located overhead or elsewhere to avoid damage?						
Are overhead lines assessed for clearance by site traffic and appropriate barriers erected?						
Are locations of underground cables known, marked, and protected where exposed due to excavation works?						
Are other underground services, <u>eg.</u> gas, BT, etc. identified and suitable precautions in place?						
Are all power tools 110Volt?						
Comments/Remedial Action						
CRANEAGE						
Are all operators recording their weekly inspections?						

4.2 GROUNDWORKS PLANT AND EQUIPMENT

4.2.1 GROUND CONDITION / PLANT SELECTION ASSESSMENT

Prior to any groundwork activities on site, particularly where plant such as dumpers are being used, the Groundworks Contractor must:

- Carry out an assessment of the topography, particularly gradients, and ground conditions, etc. in respect of the selection and use of suitable plant e.g. Site dumpers.
- Provide details to the TW Site Manager and Groundworks Supervisor of the assessment and the proposed selection of suitable plant.

NOTE: This could be a schedule which details the selected plant for specific tasks / work areas and / or restricted tasks / work areas for certain plant.

- Provide details to the TW Site Manager and Groundworks Supervisor of any plant which cannot be used for a task or area e.g., site dumpers.

Only once the Assessment of Ground Conditions and Selection of Plant has been carried out with details provided to the Site Manager and Groundworks Supervisor has briefed his site team and plant operators, can the groundworks activities commence.

NB. No Dumpers allowed on spoil heaps.



The groundworks contractor, as part of their overall assessment must identify where spoil heaps are necessary to be formed / removed without the use of dumpers e.g., using excavators to drag material up and form the spoil heap.

Suitable warning signage must be positioned at the base of all spoil heaps to remind dumper operators not to access any spoil heaps.

4.2.2 ONGOING ASSESSMENT OF GROUND CONDITIONS AND SELECTION OF PLANT (GROUNDWORKS CONTRACTORS HSE ADVISOR)

Monthly (as a minimum) Site HSE Inspection/Audit must be carried out by the Groundworks Contractor's HSE Advisor. During the Inspection/Audit - an ongoing assessment must be carried out of the existing and forthcoming ground conditions including gradients etc. to determine that the selection of plant is still in place, updated in line with any changes to gradients and being reviewed in line with ongoing and forthcoming works. The review and findings must be detailed in their Monthly Site HSE Inspection/Audit Report.

Groundworks Contractors and the Groundworks Supervisor are responsible for the plant and equipment they bring on site to perform their site activities. However, the TW Site Management Team must check that the plant and equipment meet with the TW requirements and that all plant and equipment is being inspected regularly by the Operators and Groundworks Supervisor and inspection records are being maintained.

The Groundworks Supervisor is fully responsible for ensuring all the statutory inspections are being carried out and the appropriate registers completed.

Site Management and Groundworks Supervisor must check that:

- Item of plant meets specific TW Requirements, (Refer to the TW Site HSE Manual)
- Is not on the TW excluded list (see [section 8.1.1](#))
- Has a suitable Risk Assessment for the operation of the plant / equipment
- Training records available for the operator
- Applicable Site Safe Briefings completed (see [Site Safe Briefing folder](#)); and
- Operators complete the prescribed pre-use / daily checks.
- Seatbelts are worn for all ride on plant including rollers, excavators etc.

4.2.3 CONTROL OF EXCAVATORS

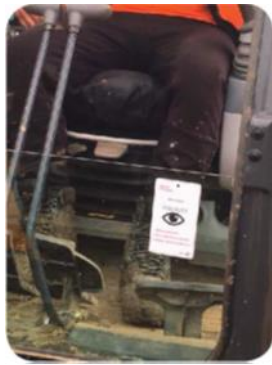
4.2.3.1 OPERATIVES BRIEFINGS/PLANT PROMPTS

Groundworks Supervisors must ensure that their operatives are briefed prior to work on or around plant. The following Site Safe Briefings have been developed for this purpose.

[Site Safe Briefing: 360° - 180° Excavator Plant Operators](#) and

[Site Safe Briefing: Operatives Working Near 360° - 180° Excavators](#)

Plant Prompt



Plant Prompts must be provided to Excavator Operators prior to commencing works to remind them of the safety critical actions that help ensure the safe use of plant. (see [section 2.2.5](#))

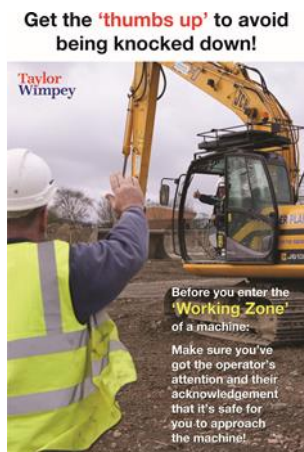
4.2.3.2 KEY CONTROLS

- All plant to be kept in good working order
- Machines are suitable for the site conditions (including gradients) and working space (e.g., uses of smaller / reduced 'zero tail swing' equipment)
- Operators never drive while using a mobile phone (including Bluetooth), 2-way radio, music radios, CD Players, iPods, etc. Where there is a need for Site Communication 2-way radios may be utilised, they can only be used when the machine is stationary, and no operations are being carried out
- Flashing beacon fitted to all machines
- Plant must never be left unattended without firstly removing the keys
- Key signage to be displayed and maintained, this includes:



'Thumbs Up' Decal:

Groundworks Contractors to attach the magnetic 'thumbs up' or adhesive decal reminder signs to all excavators. (Magnetic TWPS 18; Adhesive TWPS 18).



'Thumbs Up Poster'

Groundworks Contractors to use the "thumbs up" poster to raise the awareness of the dangers of operatives approaching the working zones of plant. (TWPS 19).

Whilst working on the plant itself, the operative must be protected from a fall, e.g., by:



- Guardrails; or
- An integrated access platform

4.2.3.3 VISIBILITY AIDS

Excavators must have a recognised blind spot removal system fitted. The operator must be able to see a 1.5m high object, 1m away from the cab (if in doubt, contact your Site HSE Advisor). Suitable devices include:



Rear view camera which must be kept in a fully operational state; and/or Convex mirror.

Note: All mirrors to be kept clean and serviceable



4.2.3.4 ACCESS FOR SERVICE / MAINTENANCE OF EXCAVATOR AND FITTING SECURITY SHUTTERS

Where there is a requirement to access the top of large plant [excavators], e.g., for refuelling, maintenance or fitting of security shutters, etc., measures must be taken to remove the risk of falls from a height, e.g.:

- Fitting a guardrail system on the machine; or
- By access from within the machine i.e., no access to top of machine.

4.2.4 EXCAVATORS USED FOR LIFTING

Excavators are regularly used for lifting operations by groundworks contractor, e.g. the handling and use of trench/manhole boxes, or the carrying and placement of concrete products such as pipes.

There are a number of key controls that must be in place:



- The groundworker's risk assessment/safety method statement must reflect the lifting activity
- A certificated excavator operator who is familiar with lifting techniques, lifting accessories and the hand signals to be used
- The machine operator must have the rated capacity load radius charts/tables for this activity within the cab, or the operator's handbook available within the cab covering the lifting limits of the machine
- A banksman supervising who is familiar with lifting techniques, lifting accessories and the hand signals to be used; and
- An exclusion zone must be maintained

When a machine is used for lifting, the following is required:

- A 'thorough examination' at least every 12 months
- A 'thorough examination' of accessories at least every 6 months



- Duty charts for the machine



- A Designated Lifting Point



- Appropriate Signage on the boom (i.e. safe working load);



- Check valves must be fitted when lifting more than 1000kg. These devices are fitted so that in the event of failure, it reverts to 'fail safe mode'; and



- If capable of lifting more than 1000kg, the machine must have a Rated Capacity Indicator fitted to assist the driver to operate within safe limits by the use of audible and visual alarms.

4.2.5 SAFE USE OF QUICK HITCHES

A quick hitch (QH) is the latching device that enables an attachment to be connected to the excavator boom.

Operatives' Briefing

All operators on site (including those with hired machines) must have received training on the use of Quick Hitches and received familiarisation training on the actual type they are operating.

REGISTER – SAFE USE OF QUICK HITCHES [QH]									
Contractor:		Site Name:							
Machine	Operator	✓ as appropriate					Name	Position	Date
		Fully Automatic QH	Semi Automatic QH	Manual QH	Direct Attachment	Quick Hitch System			

A site-specific register of the training must be maintained by the groundworks supervisor with each operator noted and training verified. A copy must also be given to the Site Manager for filing in [Site Operative Qualifications / Training Records Construction HSE Plan Folder 3, F3.12](#)

Key Controls

- Operators / Groundworks Supervisor must be able to demonstrate how the QH system fitted on their machine works and if a safety pin is required. This information must be communicated to the Operator by the Groundworks Contractor and recorded on the TW QH register.
- If a safety pin or safety device is required for the QH – it must be inserted
- The operator / supervisor must know what checks are to be made for ensuring the security of the QH



Manual System QH

This requires the operator to change the bucket by either a winding screw thread to open and close the latch or by using a bar to open a spring-actuated latch.



Semi-Automatic QH

(safety pin about to be inserted)

Machine driver must leave the cab to insert the pin.

Safety pin and locating hole must be painted / sprayed for ease of identification.



Automatic QH

Can be operated from the cab.

Must have a method where operator can verify from the cab that the latch is in the closed position.

Machine driver must check the locking mechanism by the shake-rattle-and-roll technique

Quick Hitch Signage



Automatic QH
No Safety Pin Required

Dipper Sticker: TW PS-13

Semi-Automatic QH
Safety Pin Required

Dipper Sticker: TW PS-04

Direct Attachment
No Safety Pin Required

Dipper Sticker: TW PS 07

Manual QH
Safety Pin Required

Dipper Sticker: TW PS-01

This Machine Requires a Quick
Hitch Safety Pin

Window Sticker: TW PS-16



The codes quoted are for durable, reusable adhesive signs (magnetic also available) from Communication Graphics, 16 Whitehouse St., Bristol BS3 4AY, Tel: 0117 925 6066.

Bucket Changing Areas



For congested areas or where considerable bucket changing is anticipated, a bucket changing area must be set up to keep operatives clear when changing buckets

4.2.6 CONTROL OF DUMPERS

The Groundworks Supervisor must ensure that their Dumper Operators are adequately trained and briefed in the key control measures for the safe use of dumpers. It is their direct responsibility to monitor and control the Dumper Operators on their site.

Key Controls

Dumper Operators Training

Groundworks Supervisors must ensure that only trained and authorised persons are permitted to operate dumpers (contact your Regional / Site HSE Advisor, if in doubt). Evidence of training must be through the provision of a training card from an organisation such as CPCS, NPORS or other approved dumper training provider (contact your Regional / Site HSE Advisor, if in doubt).

The Site Manager must request to see the card and either have it noted on a copy of the Groundworks Contractors Training Matrix or take a copy of the operator's training card.

Familiarisation

The Dumper Operator must have been provided with familiarisation of the controls of the specific machine being operated. This can be via the supplier, hire-company or the Groundworks Supervisor (if suitably trained). The Groundworks supervisor must keep a record of the familiarisation briefing given.



Site Safe Briefing

Site Safe Briefing: Safe use of Dumpers can be used by the Groundworks Supervisor or TW Site Manager to provide ongoing briefings / reinforcement of the key control measures for the safe use of dumpers of site.

Seat Belt Warning System



Dumper Operators must always wear a retractable seat belt to help ensure that they are held within the 'Roll-Over Protection System' in the event of overturning. All dumpers on TW Sites are to be fitted with a 'Seat Belt Warning System' consisting of:

- an interlock on the ignition system that prevents the Dumper from being started before the Operator's seatbelt is activated.
- a green flashing beacon, mounted on the Dumper, is also included to indicate that the seatbelt has been attached.

Alternative systems have been developed by some manufacturers which apply the same principles e.g. for the JCB Drive Inhibit System (DIS) the sequenced system requires that the operator performs a set series of events before the machine will drive and pull away.

In this case, the following sequence must be followed in order:

1. **Seat presence switch** – the operator must be sat on the seat before the engine can be started
2. **Lap belt engagement switch** – the operator must engage the lap belt into the buckle after sitting on the seat
3. The transmission must be in **neutral** gear
4. Following the above sequence in the correct order, machine drive will then be available with **forward or reverse gear** selected.

Plant Prompt



Plant Prompts must be provided to Dumper Operators prior to commencing works to remind them of the safety critical actions that help ensure the safe use of plant. (see section 2.2.5)

Slopes and Gradients

Prior to commencement of groundworks activities on site, the Groundworks Contractor must carry out an assessment of any gradients on site in respect of the selection of site dumpers. (see [section 4.2.1 re: assessment of gradients and ground conditions](#)).



As a minimum, any ramps constructed for dumpers must be set at minimum gradients, well within the safe working capabilities of the dumper, and include bunds at least half the height of the dumper wheel at each side of access routes (prevents the dumper going too near the edge).

Ramps must be regularly machine graded and maintained to avoid deep rutting or cross levels.

NB. No dumpers are to access any spoil heaps.

Other General Controls

- Operators must ensure that the routes used are safe – consider gradients, potholes, ruts, slopes, excavation sides, etc.
- Operators must never travel with the skip raised;
- Operators must apply the handbrake when stationery and tipping;
- Dumpers must never be left unattended without the keys being removed;
- **Operators must always dismount the dumper when it is being loaded including cabbed dumpers.**
- Dumpers must never be overloaded, unevenly loaded or loaded such as to obscure forward visibility;
- Plant inspections, including tyre pressures, hand brake and service brakes must be checked regularly and recorded weekly in the [Work Equipment and Lifting Equipment Inspection Record Sheet Folder 2 F2.07](#); and

When the pump arrives at site the following documentation must be available prior to the start of the pumping operation.

- Inspection Certificate/ Certificate of Conformity if less than 12 months old;
- operators CPCS card (or another equivalent scheme);
- daily /weekly check sheets.
- Evidence of Operators medical fitness

[TW Lifting Operations Co-ordination Plan – Lorry-Mounted Concrete Pump \(Construction HSE Plan, Folder 2, F2.11c\)](#) must be completed by the Supervisor in charge of the operation along with the Site Manager.

- Operators must never drive while using a mobile phone (including Bluetooth), 2-way radios, music radios, CD Players, iPods, etc. Where there is a need for Site Communication, 2-way radios may be used if authorised by the Site Manager and only when the machine is stationary, and no operations are being carried out.

If there are any concerns over the safe use of a dumper, STOP use immediately and review the safe systems of work with your Site/Regional HSE Advisor.

4.2.7 LORRY MOUNTED CONCRETE PUMPS



Lorry-mounted concrete pumps are used where concrete needs to be conveyed to large areas or areas that are difficult to access. The weight of laden machines can be very significant and therefore require similar checks and controls as with bringing a mobile crane onto site.

Before any operation is carried out with a lorry-mounted pump, the following must be taken into account;

- Access & egress from the pumping site suitable for the size of the machine
- Sufficient space for the machines stabilisers to be fully deployed
- Sufficient ground conditions for the loads imposed by the machine's stabilisers
- Underground & overhead restrictions or obstructions such as buried services, OH cables or scaffold structures
- The reach of the boom to the most remote point of the concrete pour
- Access for the ready-mixed concrete truck to the receiving hopper of the concrete pump
- The need for a signaller where the pump operator cannot see the receiving end of the pipeline
- Protection of the permanent works from potential damage by the concrete placing boom
- Any additional pipeline to supplement the reach of the boom pipeline and any support the pipeline may require
- The need for any additional labour for the pipeline work

The position of the machine must be determined by the Site Manager after discussion with the Owner, bearing in mind the ground conditions, the distance to the concrete pour, suitable access for the concrete delivery lorries and the working position of the concrete pump operator and any exclusion zones required for the operation. This requirement should be confirmed to the concrete pump operator on site during a pre-start briefing. Underground voids, e.g. new drainage trenches and manholes, should be avoided when determining the positions of stabilisers.

COMPANY NAME:
LIFTING OPERATIONS CO-ORDINATION PLAN - LORRY MOUNTED
CONCRETE PUMP

SITE NAME:

A. PRE-PLANNING

Site name and address:	
Location of Pumping Operations: <small>(e.g. set back or adjacent location)</small>	
Nominated Pump Supervisor:	
Date concrete pump is required:	
Maximum Reach Required:	

Site and Proposed Concrete Pump Position (Proximity Hazards and Ground Conditions)

Notes: - See page 2 for sketch plan of location.

Existing Hazard Type	Hazard Details
Overhead obstructions: <small>(e.g. cables / scaffold / lines / airfield, etc)</small>	
Ground Level obstructions: <small>(e.g. buildings / vehicles / railways)</small>	
Underground obstructions: <small>(e.g. excavations / drains / culverts / voids)</small>	
Other:	

Ground Type	Access Route <small>(Circle as appropriate)</small>	Operating Area <small>(Circle as appropriate)</small>	Comments on any other Ground Condition Factors
Coarse	Very Stiff	Very Stiff	
	Stiff	Stiff	
	Firm	Firm	
	Soft	Soft	
Granular	Very Dense	Very Dense	
	Dense	Dense	
	Medium	Medium	
	Loose	Loose	

The plan includes an assessment of:

- Operative's training
- Ground bearing information, e.g. need for support. Minimum of 1.5m x 1.5m x 18mm steel plates unless CBR results and assessment require more
- Location, size and reach of pump required
- Method of communication
- Any obstructions such as scaffold or form work
- Need for exclusion zones
- Traffic management arrangements; and
- Supervision and monitoring of the operation.

Contact your Regional/Site HSE advisor to assist with this assessment where necessary.

4.2.8 OTHER GENERAL PLANT

Details of other general plant, not specific to Groundworkers, and how it is managed is provided in [Section 8](#), including:

- Telehandlers (see [section 8.2](#));
- Cranes (see [section 8.3. Lifting Operations](#));
- Tipper vehicles (see [section 8.4.1](#)); and
- Abrasive wheels/disc cutters (see [section 8.4.2](#)).

4.3 EXCAVATIONS AND GROUND PENETRATION

4.3.1 GROUND CONTAMINATION

When carrying out excavations or other operations which involve breaking ground on a remediated site, there remains the potential to encounter contamination such as Asbestos, Hydrocarbons (oils) etc. i.e. contaminated hot spots not identified during the remediation.

If the land has had ground contamination remediation / treatment, then the follow action must be taken:

- Discuss at the Groundworks / Piling Contractor pre-start meeting, etc.
- Additional slide to be added to Site HSE Induction, raising awareness for contractors / operatives who may work in the ground or be exposed to soils, e.g. piling contractor, groundworkers or bricklayers, etc. re the remediation carried out and contaminants encountered;
- Inform the contractor / operatives that if contamination is found during any ground-breaking operations / groundworks, to stop all works inform the Site Manager immediately

Fence off the area and any exposed materials and contact your Regional or Site HSE Advisor who will be able to advise you on the correct course of action to deal with the contamination



4.3.2 CONTROLS FOR THE PREVENTION OF COLLAPSE

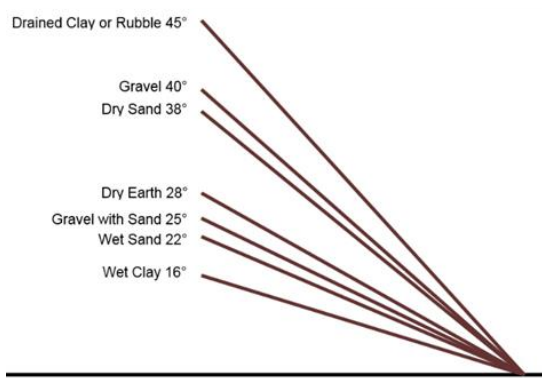
Before commencing an excavation, the Site Management Team and Groundworks Supervisor must identify the hazards associated with the excavation and associated works to be carried out, e.g.:

- Collapse of excavation
- Dislodgement of material adjacent to excavation
- Working near underground services; and/ or
- Confined spaces

All excavation works must be under the supervision of the Groundworks Supervisor.

To prevent the dislodgement of material, operative and objects falling into an open excavation the following control measures are necessary.

4.3.2.1 BATTERING

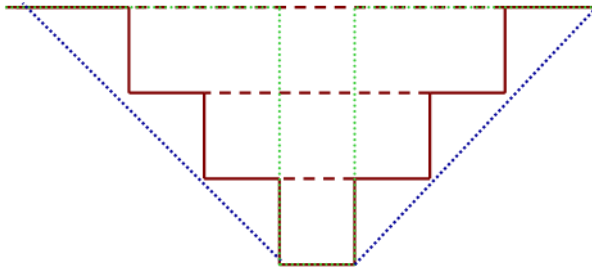


- Battering back the excavation sides to a safe angle of repose (see below)
- Inspect excavation before operatives enter, at regular intervals and after a change in circumstances, e.g. adverse weather conditions.
- Battering back the sides of an excavation to a safe angle is a simple and practicable means of preventing instability if assessed as adequate for excavation depth, etc.
- In granular soils, the angle of slope should be less than the natural angle of repose of the material being excavated. In wet ground a considerably flatter slope will be required.

4.3.2.2 BENCHING

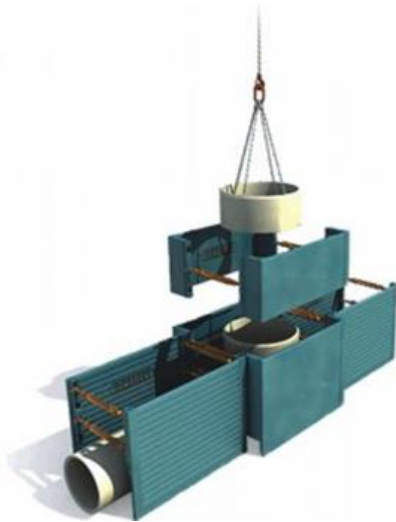


- Benching Step/s to be assessed, but never more than a maximum of 600mm



- Inspect excavation before operatives enter, at regular intervals and after a change in circumstances e.g. adverse weather conditions.

4.3.2.3 TRENCH AND MANHOLE BOXES



- Temporary works design statement must be in place or detailed manufacturer's data / conformity sheets.
- Inspections of box systems must be carried out before operatives enter, at regular intervals and after a change in circumstances, e.g. adverse weather conditions.

Consider:

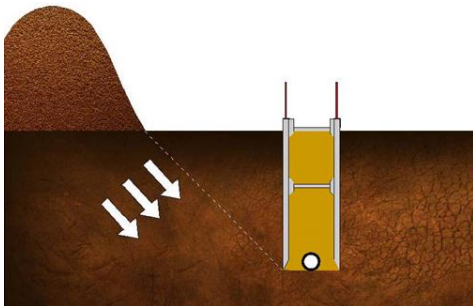
- Number of boxes required to ensure an enclosed safe working area;
- Handrail edge protection above ground level;
- Insertion to bottom of excavation (allowing clearance for Pea Gravel Bed); and
- Weight of boxes and Excavator lifting capability.

4.3.2.4 EXCAVATION BOX ENDS



- End stops need to be present to prevent material falling in

4.3.2.5 SURCHARGING



- Plant, equipment, and materials must not be located close to the side of an excavation. The distance away from the excavation must be in line with the angle of repose based on the ground conditions.
- The exclusion zone must be determined via the excavation Risk Assessment.

4.3.2.6 ACCESS / EGRESS INTO EXCAVATIONS



- Suitable means of access to be provided within the confines of the protected boxed area.
- Ladders to be secure and of the correct standard (i.e. nonslip profiled rungs).

4.3.2.7 EDGE PROTECTION

Before any excavation work is carried out, measures to prevent people, plant or materials falling into the excavation must be assessed and agreed. Subsequent checks must be made by the Groundworks Supervisor and Site Manager to ensure that suitable edge protection is in place and being maintained.



The type of protection used and distance away from the excavation is generally dependent on the depth of the excavation (see section 4.3.2.5), however all excavations, no matter how shallow, that interface with pedestrians or vehicles must have appropriate barriers in place.

- Edge protection on and around the excavation to prevent falls.
- The edge protection to be at least 950mm high.

4.3.2.8 SHALLOW EXCAVATIONS



Excavations adjacent to vehicle routes, even shallow ones, must be fenced off to highlight the risk and prevent operatives stepping off or plant driving into them



Excavation protection must be regularly inspected and kept in a suitable condition to ensure protection maintained until the excavation is backfilled.

4.3.3 CONTROLS FOR WORK NEAR UNDERGROUND SERVICES

Definitions	
High Voltage Electric (HV)	<ul style="list-style-type: none">Electricity cables that carry voltage over 1000 volts (>1kV)
Medium / High Pressure Gas	<ul style="list-style-type: none">Medium pressure mains operate between 75mbar and 7-bar and can be constructed from steel, polyethylene, cast iron or ductile iron pipe.High Pressure Gas Mains operate at 7-bar and above and normally constructed of steel.
Low Voltage Electric (LV)	Electricity cables that carry voltage up to 1000volts (<1Kv)
Low Pressure Gas	Low pressure mains operating at approximately 30-mbar and up to pressures of 75-mbar and are constructed of polyethylene, cast iron or ductile iron pipe.
Other Service	Water, BT, Virgin Media, Cable, or Fibre Optic

There are three critical elements that support a Safe System of Work, when working near or adjacent to live underground services:

1. Planning the work e.g. service drawings / surveys, etc.
2. Locating and identifying the location, run and depth of the buried services.
3. Safe excavation / safe digging practices.

4.3.4 PLANNING THE WORK

Before any work is carried out near or adjacent to live underground services steps must be taken to determine if the live service can be terminated during the works.

If not, then the information on the actual type and location of the underground services must be reviewed and the interface with the planned groundworks identified and noted (ATP).

The Site Management Team must have provided with site service information in CDM Folder 1 (Pre-Construction Information) and if HV / High/Med pressure services on site, these must be detailed within the 'Site Service Pack' provided by the BU Technical Team.

4.3.4.1 SITE SERVICE PACKS

Surveys and information obtained to identify existing underground services must be identified within the Pre-Construction Information. Full details including PAS 128 survey and applicable service drawings must be provided to the site management team by the BU Technical Team prior to start on site. The 'Site Service Pack' must be provided in hard copy.

If groundworks (e.g. ground-breaking activities) on site are going to interface with any live HV Electric or Medium/High Pressure Gas services on site and you have not been provided with a 'Site Service Pack' the Groundworks (ground-breaking activities) cannot commence until you have received your site specific 'Site Service Pack' and the Site Management Team and Groundworks Supervisor have been briefed on the contents.

4.3.4.2 PAS128 (Level 4) COMPLIANT UTILITIES /SERVICES SURVEY

A PAS128 survey must be carried out before work commences on site to locate and determine location, run and depth of existing underground services. The PAS 128 survey must be carried out by a specialist contractor (engaged by the BU Technical Team) and they must provide a survey report compliant to PAS128 or Level 4 (Survey Association) standard.

The PAS128 survey must be consulted when completing the ATP for breaking ground and must be attached to the ATP. Details of the survey findings are provided by your BU Technical Team within your 'Site Service Pack'.

4.3.4.3 SERVICE REVIEW MEETING

Service Review Meeting Agenda

- Scope of Works.
- Information review, service surveys / drawing
Where the services are complex or critical, the Site Manager must hold an additional Service Review Meeting, prior to works starting, with the Production Manager, Technical Department, Contractor, RHSEA or SHSEA and service provider(s) in attendance (as appropriate) covering the suggested agendas.
- Site Service Pack (where applicable)
- Proposed Service Location and design.
- Supervision and Operative Training Records.
- Risk Assessments, Method Statements, 'Authority to Proceed – Excavations and Ground Penetration'.

Where the services are complex or critical, the Site Manager must hold an additional Service Review Meeting, prior to works starting, with the Production Manager, Technical Department, Contractor, RHSEA or SHSEA and service provider(s) in attendance (as appropriate) covering the suggested agenda.

4.3.4.4 SERVICE REQUIREMENTS



- All mains and private / plot services (both gas and electric) must have the appropriate 'Warning Marker Tape' laid above the service
- Refer to Technical Guidelines for gas and electric services provided for further detail

If no detail provided in Pre-Start Pack, contact your Technical Team

4.3.5 LOCATING AND IDENTIFYING BURIED SERVICES

The identification of the location, run and depth of buried services and subsequent 'marking-out' of the services is a critical step in preventing the occurrence of a possible service strike. The Site Management Team, Groundwork's Supervisor and responsible operatives working near or adjacent to a service must be involved in the arrangement to:

- Locate any underground services near or adjacent to the excavation / ground-breaking activity
- Mark out the service location, run and depth
- Identify all services e.g.
 - High Voltage electrical (HV) cables
 - Medium / High pressure gas mains
 - Low Voltage electrical (LV)
 - Low pressure gas
 - Water mains and other services e.g., BT, Virgin Media, etc.

Locate and Mark Existing Service Locations

It is important to recognise that in most cases there will be no surface indication of the presence of existing underground cables. Therefore, the following actions must be taken.

- Don't assume that the plans are to scale - they may have been copied (several times). There is no guarantee that they are accurate. Be especially careful where topographical changes made since the plans were drawn



- Only Cable Avoidance Tools Categorized 'CAT 4' maybe used to locate services with the ability to record and log data
- Make sure that a competent trained person using a calibrated Cable Avoidance Tool (CAT) and Genny locates all cables/pipes shown on these plans
- Mark the location, run and depth (if known) of services on the ground surface with waterproof road paint or another permanent marker. **Frequent repeated use must be made of Cable Avoidance Tools throughout the 'dig'.** Note the 'CAT' locator may locate, but not identify multiple service runs e.g. running in parallel or close to each other. Care must be taken to identify all individual services within the area / service run

Always assume that services are live unless you have been informed otherwise in writing.

- By hand, with fully insulated tools, dig trial holes to locate the exact position of all cables / pipes.
- Where a service is encased in concrete there is a greater risk of service damage and arrangements must be made to consult with the service utility re isolation of the service or other precautionary measures.

4.3.6 SAFE EXCAVATION / SAFE DIGGING PRACTICES (EXCAVATION NEAR OR ADJACENT TO UNDERGROUND SERVICES)

4.3.6.1 AUTHORITY TO PROCEED – EXCAVATIONS/ GROUND PENETRATION

The Site Manager and Groundworks Supervisor must complete an **Authority to Proceed – Excavations/ Ground Penetration (Construction HSE Plan - Folder 2, F2.4)**, including service location drawings for the area, prior to any excavations or ground penetration where measures are required to prevent danger to any person from:

- A fall or dislodgement of material and/or:
- Underground services

NOTE: All 'Authority to Proceeds' must be completed by the Site Management Team and Groundworks Supervisor prior to works commencing and signed off once works are complete. The Site Manager must also log each Authority to Proceed on the **Authority to Proceed – Ground Penetration Log (Construction HSE Plan – Folder 2)** with each ATP given a log number.

Authority to Proceed

AUTHORITY TO PROCEED - EXCAVATIONS / GROUND PENETRATION

SITE NAME:

Contractor:		ATP Log Number	
Location of Works:			
Start Date:		Start time	
Brief description of works:			

Section A: Initial Assessment

Complete the initial assessment below to confirm or otherwise if there are:

Any known underground services (and/or)

If access required, risk of collapse or dislodgement

Yes	No
Yes	No

If 'No' to both - Proceed with excavation/ground penetration subject to suitable risk assessment and confirm by completing Parts C & D

If a 'Yes' - Remainder of this Authority to Proceed must be fully completed by the Groundwork Supervisor and Site Manager (complete Parts B, C & D)

Section B: Excavations Near Underground Services

Existing Services:	Service Checked	Yes / No / N.A.
Service Drawings / Service Pack is available, and drawings checked to confirm the presence and location of any known services? Note: Where services are identified near or adjacent to the proposed excavation/ground penetration, a drawing/sketch detailing their location must be attached to this ATP.	Electric	
	Gas	
	Water	
	Telecom / Other	

Notes: - If the answer to any of the following is No - **Do Not Proceed**

If the excavation is assessed as a Confined Space, an 'Authority to Proceed - Confined Spaces' must also be completed.

If excavation near or adjacent to underground HV Cable and M/H Pressure Gas Main Ground Works Supervisor MUST be present.

If excavation near or adjacent to LV Cable, Low Pressure Gas Main, a Groundwork Nominated 'Responsible Person' must be identified and present

The Service Pack Includes PAS 128 Survey(s)	Yes	No
Size of Exclusion Zone to be established for no mechanical digging and (must be min 500 mm each side)	Yes	No
Groundwork Supervisor allocated responsibility HV Cable and Medium / High Pressure Gas (Please insert name)		
Groundwork Nominated 'Responsible Person' LV Cable and Low-Pressure Gas Main (Please insert name)		
Number of RED 'Dig Permit' Armbands issued:	Number:	




QR Code for Taylor Wimpey's video on Safe Digging, use as part of the task briefing when excavating near underground service

It is critical that the Contractor / Groundworks Supervisor:

- Has assessed the requirements for supporting or securing the sides of excavations.
- If there are underground services in the area, has ensured that appropriate actions have been taken to mark the line of the service (See [section 4.3.6.3](#)); and
- Has assessed whether there are any Confined Spaces requiring an Authority to Proceed – Confined Space Entry ([Construction HSE Plan - Folder 2, F2.5](#)). (See [section 4.3.9](#)). Copies of the completed Authority to Proceed Excavations/Ground Penetration forms along with the supporting dig permits should be retained in a Construction HSE Plan for reference to previous activities for subsequent operations

Where High Voltage Electric or Medium / High Pressure Gas mains are identified - the Process / Control measures outlined in [Section 4.3.6](#) must be followed.

Authority to Proceed – Ground Penetration Log



Authority to Proceed – Ground Penetration Log

TW Business Unit:		Site Name:	
-------------------	--	------------	--

Date	Location of excavation	Services		Is Access Required in to the Excavation? Y/N	Estimated Duration of Works?	APT Required? Y/N	ATP Number
		HV or MP/HP Gas? Y/N	LV, LP gas or Other? Y/N				

The Authority to Proceed – Ground Penetration Log must be completed each time an Authority to Proceed is issued. Each Authority to Proceed must be given a 'ATP Number', recording the number on the ATP.

4.3.6.2 DIG PERMIT ARMBANDS

Where service are located within or adjacent to where excavation work is planned red coloured 'Dig Permit Armbands' must be used to clearly distinguish the higher level of control required.

To assist the Site Manager and Groundwork Supervisor to control excavation work involving either exposing or adjacent to known services, the operatives involved must be 'briefed' by the Groundworks supervisor and each issued with a **Red** Dig Permit Armband, including the plant operators involved.



Nominated service-dig operatives must always display the armband when within the excavation work area. If the ground conditions, services, scope of works or dig operatives change, the Site Manager and Groundwork Supervisor must reassess the work and review the Authority to Proceed – 'Excavations and Ground Penetration'.

4.3.6.3 NO MECHANICAL DIGGING ZONE

During any excavation works exposing or adjacent to any Services the control measures detailed in the Service Excavation Procedure (See [section 4.3.6](#)) must be followed.

As part of the process, an 'No Mechanical Digging Zone' must be established by the Groundworks Supervisor or Groundworks Nominated Responsible Person prior to any excavation work commencing.



The 'No Mechanically Digging Zone' normally:

- Extends to a minimum of 500mm either side of the service line (distance to be assessed as part of the [Authority to Proceed – Excavations and Ground Penetration](#) (See [section 4.3.6.1](#));
- Consider reference to the Service Provider's specification, for example no mechanical digging within 3m of an intermediate pressure gas main; and
- Be marked out by the Groundwork Supervisor or Groundworks Nominated Responsible Person once the line of the service has been established.

4.3.6.4 SAFE DIGGING PRACTICES

Site Managers must monitor the process of digging near underground services, making use of the [HSE Site Control Form](#) (see [section 3.2.2.7](#)) and the [Authority to Proceed – Excavations/Ground Penetration](#) (see [section 4.3.6.1](#)). The process, known as 'safe digging practice', is summarised in the following steps.

A) Refer to drawings / liaise with utilities

Copies of all up-to-date Service Drawings and a 'Site Service Pack' (where applicable) must be available on site. **All relevant drawings must be referred to before any work is carried out near or adjacent to live underground services. Note. Conflicting services may be shown on different service / utility drawings.** Drawings can come in two formats and must be read in conjunction with each other:

- DNO (District Network Operator) plans which will show all existing services within the site; and
- IDNO (Independent District Network Operator) plans which will show the scheme for the site.

B) Confirm existing services at the site set-up stage

Services must be confirmed at the site set-up stage and recorded on the [Site Information Plan](#) (see [section 2.2.2.2](#)) indicating:

- Compound services (old or new); and

- Record of 'as laid' services, including loops, bends, etc.; depths noted (remember that the temporary surface may be significantly lower than the intended finished surface).

C) Carry out Safe Digging (noting the following key points):

- Frequent repeated use must be made of Cable Avoidance Tools throughout the 'dig' i.e. regular scans from commencing the digging process through to completing the dig or exposing the services.
- Always use a spade or shovel – The use of picks, forks and power tool is not permitted within a minimum of 0.5m of a known service. (Consult with your service providers safe digging practice specification).

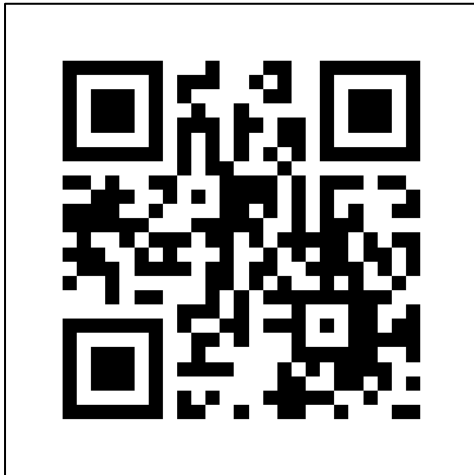


- For work near electrical services, tools must be fully insulated (non-conductive) to protect the user (to BS8020:2011).

- Look out for ducts, marker tape, sand or service tiles but do not rely on finding these.
- Even if a cable/pipe was originally laid in a duct or with a marker tape, these may have been removed during earlier excavations.
- The use of Cable Avoidance Tools must be used frequently and repeatedly during the work, i.e. regular scans from commencing the digging process through to completing the dig or exposing the services.
- Every effort must be made to excavate alongside a service rather than directly above it. The final exposure of the service/s can then be carried out by horizontal hand digging (the force applied to hand tools can be controlled more effectively).
- Cables / pipes can be flexible and can change direction and depth abruptly. Therefore prior to the use of any mechanical excavators an assessment must be made to ascertain the safe mechanical digging distance based on the service providers specification. There is no mechanical digging within 0.5m of any known underground electricity cable, however this could be extended up to 3m for some intermediate pressure gas pipes and permission from the service provider may be required. Further advice **must** be sought from your Regional HSE Advisor.
- Kerb lines, roads and buildings may have been moved or altered since the cables were laid.
- Services are ordinarily at least 450mm deep but don't assume this to be the case where you are working – ground levels could have changed.
- Services in areas where tracked machines operate need to be checked regularly to ensure weather conditions and wear have not removed the essential protective top cover.

- Not all services are shown on Service plans, so look for clues such as cables running down poles and bear in mind that all buildings, streetlights, and road furniture are likely to have cables running to them. Cables feeding street furniture may be relatively shallow near to the furniture.
- Cables do not run in straight lines and often “snake” through the ground avoiding surface and buried obstacles that may not be visible to you.
- Stop if suspect/damaged pipes or cables found and contact the utility company.
- Support any exposed services and never use them as hand or foot supports; and
- Replace warning tape/tile and backfill around pipes or cables with fine material (e.g. sand) properly compacted to prevent compaction damage and never with material that would be hazardous to excavate if the services had to be exposed again (e.g. concrete).

Note: On completion of the works, the Site Information Plan **must** be updated to reflect the new service location.



QR Code for TW Safe Digging Video

Please use this video as part of a Site Safe Briefing/Take 5 to illustrate and reinforce safe digging practices that must be adopted on all Taylor Wimpey Sites.

Safety Critical Control	
High Voltage Electric or Med / High Pressure Gas Main	Low Voltage / Low Pressure Gas Main /Other
<ul style="list-style-type: none"> Services Review Meeting Folder One: Pre-Construction Information re services 'Site Service Pack' Information Authority to Proceed Authority to Proceed-Ground Penetration Log Pre-Dig Briefing to all involved in the dig Red Arm Band Dig Permit Establish Exclusion Zone Groundworkers Supervisor in Attendance at all times Ongoing Site Management Team monitoring 	<ul style="list-style-type: none"> Services Review Meeting Folder One: Pre-Construction Information re services Authority to Proceed Authority to Proceed-Ground Penetration log Pre-Dig Briefing to all involved in the dig Red Arm Band Dig Permit Always nominated 'Responsible Person' in attendance Ongoing Groundworks Supervisor monitoring

D) Vacuum Extraction

Vacuum extraction can be used around buried services and other sensitive areas where 'No Mechanical Digging' has been identified.

Vacuum excavation can be an effective tool to reduce the likelihood of damaging services or other fragile existing infrastructure, however, as with all works, it requires careful planning

When exposing any existing services, including any higher-risk services (HV electric, IP/HP gas) vacuum excavation must be considered as part of the pre-planning for the works, i.e. as part of the process of identifying the safest practical way of carrying out the excavation works to expose underground services:

Planning the work

Operatives involved in vacuum excavation must be trained, briefed, and authorised, i.e., CPCS or NPORS

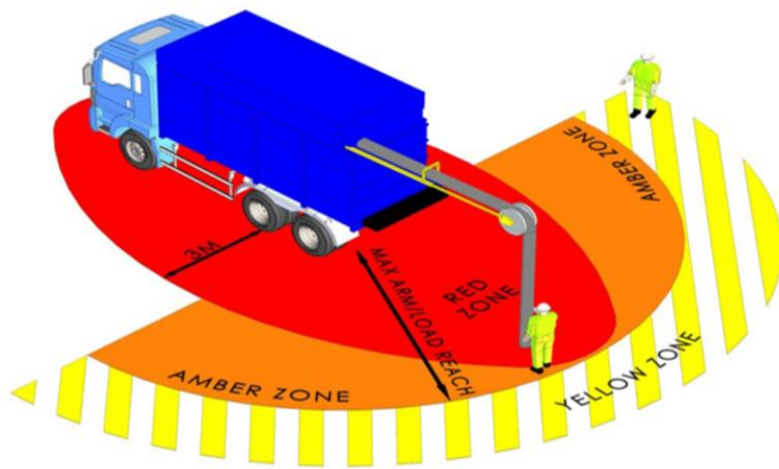
Prior to commencing Vac-Ex a pre-dig meeting must be held so that the scope of work, responsibilities and arrangements are clearly understood

Preparing to work

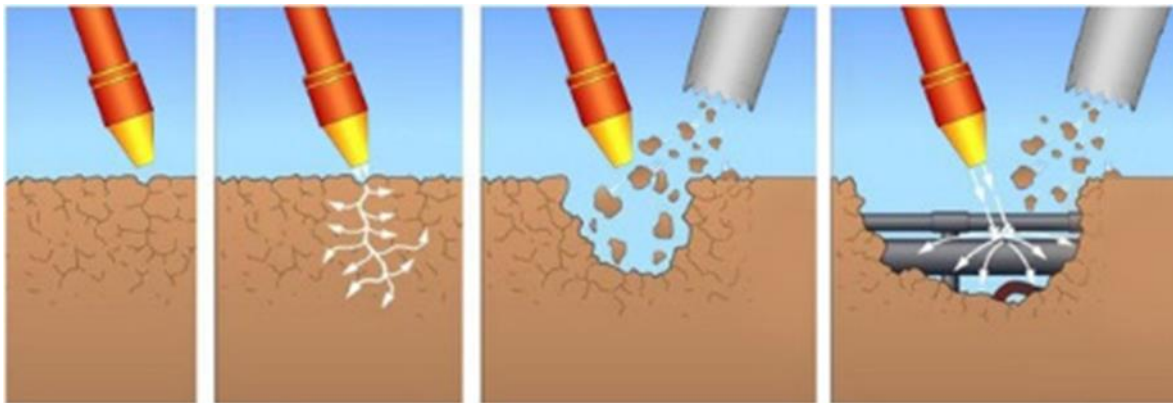
As with any other excavations works involving services an ATP-Excavations must be completed

Monitoring the work

Ensure that only authorised operatives are within the designated working zone and are displaying the necessary red armbands.



- The air lance fractures the ground and breaks it up to enable removal by the vacuum
- The air lance or the power arm must **not** make contact with the ground at any time when exposing services.
- Hand digging with insulated shovels is the only appropriate method of engaging the ground as part of the process when within 500mm of services.



4.3.6.5 EMERGENCY PROCEDURE

Contact with Live Underground Electrical Cables



The agreed safe system of work must include the procedures to be adopted if any contact is accidentally made with a live cable, particularly by a machine.

If contact is made with a live cable, the Groundworks Supervisor or Site Manager must clear the area and suspend all work within a minimum distance of 5m of the damage. The cable could still be live or could become live again. Contact the utility company immediately.

If the machine is still operable, the driver must lower any raised parts that are controlled from the cab and/or drive clear of the line provided that there is no risk of breaking the cable or dragging it.

If the machine cannot be driven clear of the cable - the driver must:

- Stay in the cab avoiding contact with any metal parts of the cab.
- Contact the Groundworks Supervisor or Site Manager as soon as possible (radio, mobile, shouting)
- Instruct others not to approach the machine; and
- Do not exit the cab until the power company confirms it is safe to do so.

If the machine is not operable or cannot be driven and there is a risk of fire or another immediate hazard, the driver must:

- Jump up and clear of the machine, avoiding simultaneous contact with the machine and the ground.
- Land with your feet as close together as possible and move away using “bunny hops” with your feet together until at least 15m away
- Instruct others not to approach the machine; and
- Stay away until the utility company confirms it is safe to return to the machine.

Contact with Live Gas Services

If contact is made with a gas pipe, the Groundworks Supervisor or Site Manager must clear the area and suspend all work within a minimum distance of 5m of the damage. Contact the utility company immediately.

While waiting for the work to proceed:

- Switch off the plant and take the keys.
- Leave the area
- Do not use any equipment (even a mobile phone) in the area; and
- Ensure no naked lights (no smoking in the area!)

4.3.7 USE OF GROUND PINS

Applies to non-conductive pins as well as conductive pins.



Case Study 1

Groundwork supervisor penetrated an 11KV cable with a metal pin to provide line and level for a kerb.



Case Study 2

A groundworker penetrated an 11KV cable with a metal pin to secure shuttering for a concrete pad foundation.

Ground penetrating pins are not permitted within 1.0m of any known service.

4.3.8 CONTROLS FOR WORK NEAR OVERHEAD SERVICES

Prior to any works being undertaken under or near to overhead power lines, the Site Manager must arrange a co-ordination meeting or meetings with their Regional HSE Advisor, Site Engineer, Power Company and relevant contractor(s). The following options must be discussed/established:

Can the power line or lines be diverted before the works commence? (Only an option if lines are planned to be diverted or placed underground, etc. and dependent on the level of risk involved).

- Can work under or near the power line or lines be avoided – e.g. locate all storage areas and compound away from the lines;

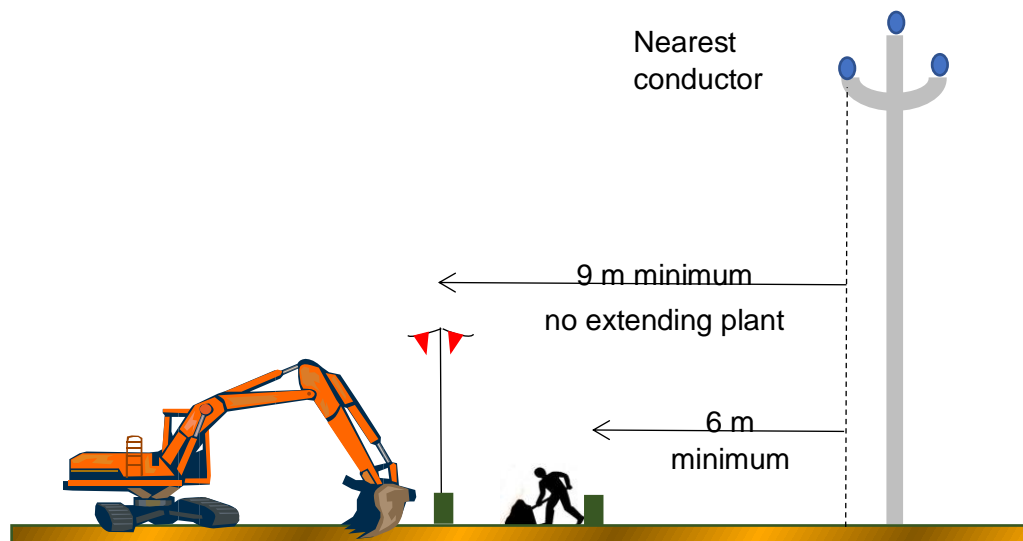
- Can the power be switched off whilst the work under or near the lines is underway? (May only be possible temporarily and this option depends on the level of risk involved);
- The clearance height under the lines (note that groundworks could raise or lower existing ground levels), the voltage and type of conductors.
- The status of the lines, e.g. 'live'; and
- The radial clearance distance to be maintained from the conductors (if necessary) remembering that electricity can arc (jump) to nearby conductors i.e. **Excavator dipper arm**

Note: If the site includes work near rail lines there will be a requirement to involve your Regional HSE Advisor and the relevant rail line operator to ensure that adequate assessment of the works and controls have been carried out.

DO NOT START SITE WORKS if the information noted above is not available or the necessary control measures are not in place.

Wherever possible working below or near live overhead lines **is to be avoided**. However, there may be some circumstances where there is no alternative. In these situations, the proposed work must be **discussed and agreed with your Regional HSE Advisor**. This includes temporary storage of materials, parking of vehicles or site compound units.

Barriers, with warning signs at suitable intervals, must be erected.



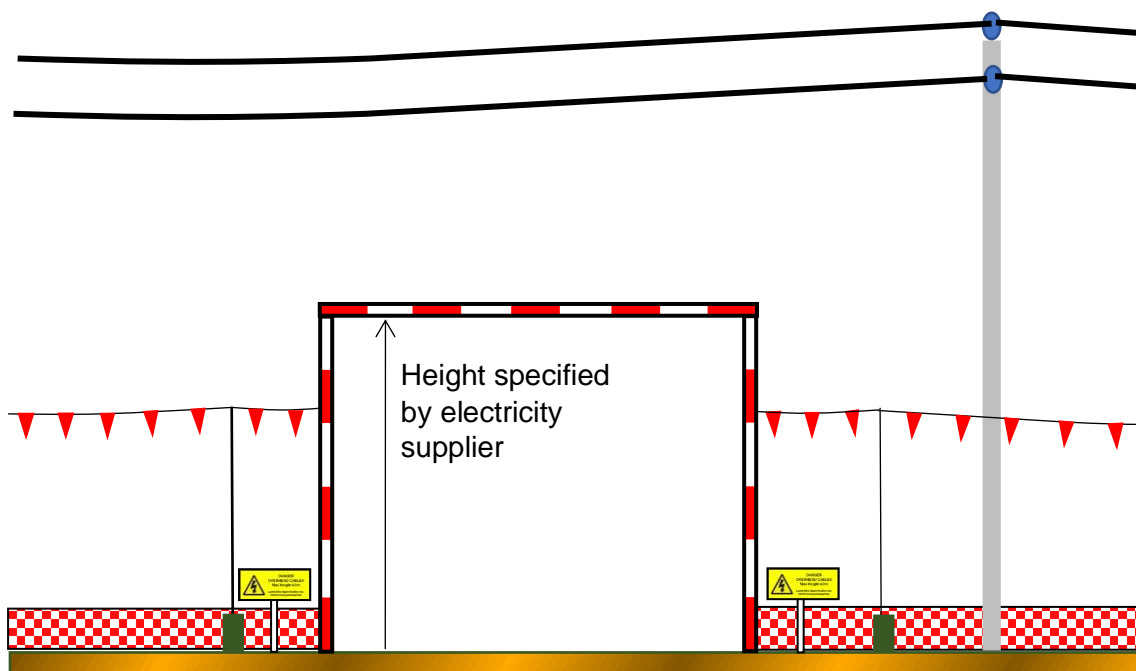
- No work to take place within 6m of the underneath of the nearest conductor (see diagram above) unless a safe system of work has been agreed with the Regional HSE Advisor in discussion with the Power Company.
- Fence off access to the 6m zone beneath the lines with substantial barriers, e.g. earth bund minimum 900mm / orange netting (see diagram above).
- Warning signs to be placed at suitable intervals along the barrier.
- No work with extending plant, e.g. excavator arm / bucket, may take place within 9m of the underneath of the nearest conductor (see diagram above) unless fitted with suitable restrictors to prevent it doing so. The only exception (where identified as necessary) is where

a safesystem of work has been agreed with the Regional HSE Advisor in discussion with the Power Company. The 9m zone must be demarcated with bunting at about 3-6m above ground (see diagram above).

Note: in some cases, the exclusion zones may have to increase (or can be decreased). If necessary, this can be discussed in detail with the Power Company at the co-ordination meeting.

All works under or in close proximity to overhead services are required to obtain a GS6 survey from the asset owners.

4.3.8.1 PASSAGEWAYS UNDER OVERHEAD SERVICES



- Passageways under power lines must be kept as small as possible and restricted in width to the minimum needed for safe plant crossing.
- The number of crossings points (and crossings) to be kept to a minimum, with crossing the lines at right angles
- Goal posts must be placed on either side, constructed of rigid non-conducting material (e.g. timber) distinctly marked, e.g. red and white stripes (see diagram above).
- The crossbar height to be to electricity supplier's agreed specification.



Warning signs indicating the clearance to be placed at suitable distances either side of the passageway.

TWSP 03

- Fence off the sides of the passageway with substantial barrier e.g. orange netting.
- Road surface at crossing points to be maintained firm and level to prevent undue bouncing or tilting of equipment passing through.

Note: Don't forget that tipper lorries must have lowered their bodies before passing under overhead lines.

4.3.8.3 EMERGENCY PROCEDURES (Contact with Overhead Services)

The agreed safe system of work must include the procedures to be adopted if any contact is accidentally made with a live overhead cable, particularly by a machine.

If contact is made with a live overhead line, the Groundworks Supervisor, Site Manager or other appropriate person must clear the area and suspend all work within a minimum distance of 5m of the damage. The line could still be live or could become live again.

If the machine is still operable, the driver to lower any raised parts that are controlled from the cab and/or drive clear of the line, provided there is no risk of breaking the line or dragging it to the ground.

If the machine cannot be driven clear of the line, the driver must:

- Stay in the cab avoiding contact with any metal parts of the cab;
- Contact the Groundworks Supervisor or Site Manager as soon as possible (radio, mobile, shouting)
- Instruct others not to approach the machine; and
- Not exit the cab until the power company confirms it is safe to do so.

If the machine is not operable or cannot be driven and there is a risk of fire or another immediate hazard, the driver must:

- Jump up and clear of the machine, avoiding simultaneous contact with the machine and the ground;
- Land with your feet as close together as possible and move away using "bunny hops" with your feet together until at least 15m away;
- Instruct others not to approach the machine; and
- Stay away until the utility company confirms it is safe to return to the machine.

4.3.9 CONFINED SPACES

4.3.9.1 DEFINITION

Confined spaces are places:

- That are substantially, though not always entirely, enclosed; and
- Where there is a reasonably foreseeable risk of serious injury from hazardous substances or conditions within the space or nearby.

e.g. entry into foul sewer manholes, deep excavations, Consider, for example:

- Oxygen deficiency;
- Toxic atmospheres
- Flammable atmospheres; and
- Possible flooding.
- If in doubt, consult your Regional / Site HSE Advisor.

4.3.9.2 CONFINED SPACE ENTRY CONSIDERATIONS

- It is unavoidable to do the work;
- Authority to Proceed (see below) is completed to record safe system of work including a risk assessment (all hazards considered), a written safety method statement to include emergency and rescue procedures;
- The contractor can demonstrate that his workforce is trained, and the gas/oxygen monitoring equipment calibrated, inspected / tested and working; otherwise, a specialist contractor must be used;
- Trained workforce of adequate size to effect rescue (normally at least a gang of three, e.g. one at the bottom, one at the top and one to help);
- Atmospheric tests are completed with continuous monitoring during works;
- Suitable PPE and equipment as detailed on the safety method statement is available on-site including gas detector, escape breathing apparatus and rescue equipment.
- Petrol driven equipment must not be used in areas where fumes can build up and cause asphyxiation, e.g. disc cutters in excavations or generators inside plots.

If you have any concerns about the way the contractor intends to carry out work in a confined space, seek advice from your Site HSE Advisor.

4.3.9.4 AUTHORITY TO PROCEED: Confined Space Entry

COMPANY NAME:	
AUTHORITY TO PROCEED – CONFINED SPACE ENTRY	
SITE NAME:	
JOB LOCATION:	
This Authority to Proceed is valid on day of issue only.	
To be completed by the contractor's Supervisor and Site Manager. If the answer to any of the following is No, Do Not Proceed.	
	Yes/No
Risk assessment and method statement detailing the safe system of work, including:	
• Hazards	
• Testing / Monitoring the Atmosphere	
• Personal Protective Equipment	
• Respiratory Protective Equipment	
• Access and Egress	
• Emergency Arrangements and Safety Equipment (including winches)	
Supervisor – I confirm that I am trained, competent and fully understand the safe system of work.	
Name:	Signature:
Operatives – I confirm that I have been fully briefed on the safe system of work.	
Name:	Signature:
Name:	Signature:
Name:	Signature:
Name:	Signature:
Name:	Signature:
Work Authorised to proceed. Site Manager:	Date: Time:
Reference: Site HSE Manual section 4.4: Confined Spaces	

No access will be permitted into a confined space without an [Authority to Proceed - Confined Space Entry \(Construction HSE Plan -Folder 2, F2.05\)](#) being completed by the contractor and submitted to the Site Manager, demonstrating that the appropriate measures are in place.

Contractors are responsible for providing risk assessments and, where necessary, safety method statements for any hazardous activity they carry out on site and managing any control measures. If you are concerned about the way the contractor intends to carry out work in a confined space, seek advice from your Site HSE Advisor.

4.4 FOUNDATIONS

4.4.1 STRIP FOUNDATIONS

Strip foundations are the most common type of foundation



Before starting the excavation:

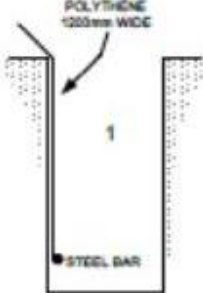
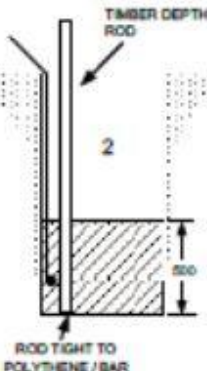
Refer to service drawings to determine if services are present. (see [section 4.3.6](#)). If services are present, excavation ATP must be followed.

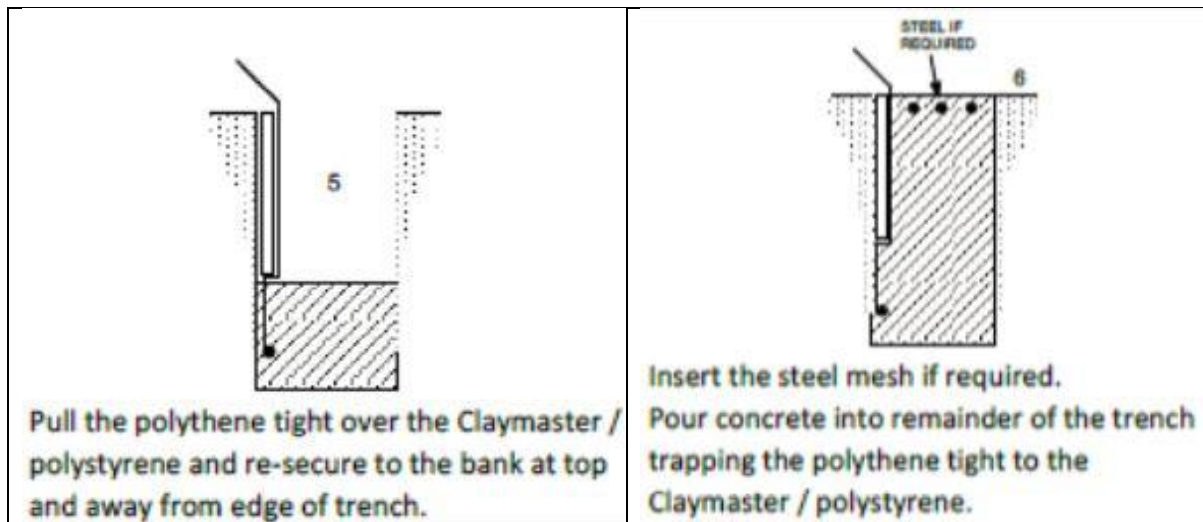
- CAT Scan the area prior to digging
- Suitable barriers are placed around the excavation when left unattended.



- Spoil to be loaded into a dumper and stockpiled in an agreed location. (see section 4.2.6)
- Levels to be checked from a safe position.
- If deep excavations and material spill present e.g. earth lumps, these must be crushed/levelled from a safe distance using rakes etc. No access into the excavation.
- Proprietary system or other suitable access to be used if access is required to cross the trenches.
- The concrete lorry to discharge the concrete directly into the trench from a safe distance. When not be possible the concrete is placed by concrete skip/ excavator.

4.4.2 HEAVE PROTECTION

General Method Statement – 'Clay Master'	
<p>Excavate trench to required depth</p>  <p>Lower weighted polythene down the outside of the trench to 100mm from the bottom of the trench. (Weighting achieved by attaching steel bar to bottom of polythene prior to lowering into trench).</p>	 <p>Pour concrete to 500mm up from the bottom of the trench.</p>



Method 2:

Similar to Method 1 including:

1. Excavate the foundation trench to the required depth and width
2. Lower polythene sheet into the trench ensuring that a reasonable quantity rests on the bottom of the trench.
3. Secure Polythene to the bank at the top and away from edge of trench.
4. Pour concrete into trench to a depth of 500mm.
5. Insert 'Clay master' behind polythene against wall of trench and tight against the concrete.
6. Pour rest of foundation.

If you are concerned about the way the contractor intends to install 'clay master' seek advice from your Regional HSE Advisor.

4.4.3 PILE FOUNDATIONS

Temporary Works

To carry out Piling operations safely non-standard temporary works in the form of piling platforms (mats), access roads and ramps are required. Please see [Section 1.4.8](#) for further details of the Non-standard Temporary works procedures.

All Non-standard temporary works must have designs for mats, roads and ramps, etc. provided by an 'approved and competent designer' and presented to the Piling Contractor before piling work commences.

Delivery and Set-up

Prior to the arrival of a piling rig or rigs consideration needs to be given how they are delivered to site for example:

- Proximity of overhead lines, adjacent to railways, any low bridges, etc.
- Safe means of 'off-loading' from low-loaders, etc.
- Use of MEWPS for setting and rigging of the piling rig

Traffic Management and Segregation

When piling operations are being undertaken the following arrangements must be in place:

- Exclusion zone established to keep unauthorised people from the work area
- Designated walkways/access routes to specific areas such as material storage, cage/reinforcement assembly areas, static agitators
- Use of banksmen/traffic marshals for manoeuvring piling rigs and controlling concrete deliveries

Common types of piles -

Continuous Flight Auger (CFA)



Key controls:

- Piling Rig to have safety gate fitted around the auger
- Mechanically clean auger wherever possible.
- Cover new, bores as soon as practicable (e.g. concrete on cover).
- Securely fit rebar caps on exposed steelwork ends as soon as cages in position.

Drop Hammer Method of Pile Driving (Preformed Piles)



Key Controls:

- Traffic routes for pile delivery to be considered.
- Lorry unloading and transport methods to be agreed
- Attachment of concrete piles to rig detailed within the method statement

Breaking down of piles (Pile Cap)



- Pile Caps to be broken down with an attachment on an excavator where possible.
- An exclusion zone to be put in place.
- When exposed, Rebar ends should be protected with securely fitting rebar safety caps (e.g. mushroom cap).
- Cages for the ring beam are to be formed in a controlled environment considering the size of the sections and weight of steel e.g. manual handling considered.
- Cages to be lifted to the working area by mechanical means wherever possible.

4.4.4 BUILDING UP TO OVERSITE



- Key Controls:
- Plot is to have clear designated foot paths in place for the bricklaying operatives.
- Segregation from plant working in the vicinity must be in place.
- Good level access around the foundation to be prepared for the blockwork to be laid.
- Blocks to be spread around the plot to minimise the manual handling of materials.
- Care to be taken about height and location of stacks.

4.4.5 BLOCK AND BEAM FLOORS

Traditional concrete block



- A Method statement to be prepared for placing beams.
- Work areas to be segregated with suitable pedestrian barriers.
- Blocks and beams to be located close to the point of laying as possible.
- Beams to be stacked on level ground and the intermediate supports placed directly one above each other.



- Weight of the blocks to be determined
- Safe manual handling techniques to be agreed
- Blocks to be located as close to the point of laying as possible.
- Voids (i.e. blocks left out for services) to be covered with cones and signage placed warning of the risk of trip hazards.
- Areas requiring cut blocks to be progressively filled to reduce the amount of openings/ trip hazards.

Jet-floor



- 'In fill' polystyrene blocks to be no less than 300mm long.
- Expanded polystyrene blocks/ 'Jet-floor' must not be walked upon or loaded out.
- Access, for example, to construct the internal blockwork screed rails etc. to be provided with plywood or a similar proprietary platform (minimum 600mm wide).
- Warning signage to be placed on the floor preventing access.

4.5 INSPECTION CHAMBER COVERS

Groundwork contractors must ensure:

- That any covers specified have suitable fixings for securing to the frame;
- That the fixings are provided with the cover; and
- That the fixings are used **immediately on installation** (following the manufacturer's instructions).



Protected Inspection Chambers with brightly coloured markers to highlight location (e.g. to prevent being damaged by plant, etc.).



Prior to an area becoming occupied, an inspection of paths, roads, walkways, etc. must be carried out in areas where there is an interface with the customers' homes to ensure that all potential trip hazards have been assessed and appropriate remedials taken, e.g. haunching at manholes, ramps at differing kerb levels, etc.

4.6 MECHANICAL KERB LIFTING

When carrying out kerbing works on site, consideration must be given to the weight of the items being lifted and the associated potential Manual Handling issues (see [section 3.6.2.1](#)). Prior to commencing any kerbing works the following must be reviewed:

- Weight of items being lifted
- Repetitiveness of the task
- Travel distance for placing items

The type of mechanical lifter used will depend on the conditions present, however the main principle is that the weight of the items being placed are supported mechanically and only the final positioning is undertaken by the operatives.



Note: kerb lifting scissor grabs are only suitable for one-off lifting operations. Significant runs of kerbs must utilise a mechanical lifting device which reduces manual handling.

4.7 RELATED MATTERS NOTED ELSEWHERE IN THE MANUAL

In addition to the matters raised in the previous sub sections of this section, the following matters need to be considered where appropriate:

- Contamination, Groundwater and Silt (see [section 9.3.5](#))
- Dewatering and pumping (see [section 9.3.5.6](#))
- Disc cutters and abrasive wheels (see [section 8.4.2](#))
- Dust (see [section 3.6.1.2](#))
- LOLER and PUWER (see [section 1.4.2](#))
- Noise (see [section 3.6.3](#)); and
- Vibration (see [section 3.6.4](#))
- Temporary Works (see [section 1.4.7](#))