

PARTICULAR SPECIFICATION

APPENDIX AA

SERVICES IDENTIFICATION & PROTECTION

SERVICES IDENTIFICATION & PROTECTION

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SERVICES IDENTIFICATION & PROTECTION

1 GENERAL

1.1 Introduction

1.1.1 Services identifications and protections are compulsory requirements to be implemented by the Contractor at all construction work sites.

1.1.2 The Contractor shall note that besides the severe penalties that are already imposed by the various utility agencies for causing wilful damage to services, Option Module E which allows the issuance of demerit points and administrative charges will be imposed by the Authority.

1.1.3 There are four main areas that the Contractor shall look at in order to ensure that services are not damaged at work sites during the course of works. They are:

- (a) Identifying and detecting services before and during the course of works.

This can be achieved by obtaining all available and necessary services drawings, conducting a properly thought of and well-planned trial trenching works and finally disseminating gathered information of all services present to all parties involved.

- (b) Marking All Services Detected

At times, services are damaged even though they have been previously detected. One of the reasons could be workers/supervisors do not realise their presence due to lack of proper markings or because there are no markings at all. The following addresses this concern by detailing the types of services markers to be used for each type of services and also how and when to use them in order to ensure that a safe working corridor is demarcated. The services markers to be colour coded/referenced for each type of service, will incorporate information such as description (e.g. diameter and voltage), classification (water, Gas, Telecom, etc), width and depth of the services.

(c) Protecting detected services in the vicinity of the works

Services that have been detected may be damaged if it has not been properly protected. Consultations will need to be carried out with the respective Utility Agencies on the best method of protection that need to be provided to the services for work to proceed safely. The requirements on the level of protection needed would differ depending on whether the services are to be protected permanently or temporarily whilst awaiting diversion. Where possible, the protection works shall be carried out by the Utility Agencies' officers themselves. Otherwise, close supervision would be carried out by them when the works are carried out.

(d) Working near services

The Contractor shall note and make use of the various forms/checklists attached in this document to ensure that all possible care has been taken before starting any works. The previous three areas of concern, that is, detecting services, marking services and protecting services, all involve, albeit in varying degree, working near services. Proper training, which could be in the form of briefings to supervisors / workers will need to be carried out.

2 SERVICES DETECTION

2.1 Introduction

2.1.1 Accurate identification and detection of existing services provide necessary information to map out the position of services at Site. This is a prerequisite to effective control and planning of work programme as critical decision on sequence and method of works is frequently determined in conjunction with knowledge of site constraints like existence of services and other obstructions below ground.

2.1.2 In this Clause, "services detection" shall be taken to encompass the whole process of identification of services on plans, field detection by licensed cable detection workers / underground detection specialist and trial trenching to ascertain the type and position of services. The field data obtained shall be verified, analysed in relation with works to be carried out and transferred onto services plans.

2.2 Responsibilities

- 2.2.1 The Contractor shall be fully responsible for carrying out the services detection to produce accurate services plans and disseminate them to all relevant personnel.

2.3 Identification of services from available plans

- 2.3.1 On commencement of the Contract, the Contractor shall purchase latest utility plans covering the entire work site, which are available from various Utility Agencies. The common type of services within road construction site includes but not limited to electrical cables, telecommunication cables, gas, sewer and water mains.
- 2.3.2 The Contractor shall engage a Licensed Cable Detector Worker (LCDW) and licensed Telecommunication Cable Detector Worker (TCDW) to source for the cable route plans, scan and detect telecommunication cables at site. These licensed detection workers are required to submit the Notice for Commencement of Earthworks to the relevant agencies.
- 2.3.3 The Contractor shall co-ordinate and organises meeting with relevant Utility Agencies to request for services plans and collate the services plans obtained from various sources including cable detection report, analyse and transfer them onto plans superimposed with construction details. These plans shall be drawn to scale to elicit preliminary information on areas of likely clashes between construction works and existing services.

2.4 Not Used.

2.5 Trial Trenching

- 2.5.1 Basing on the preliminary set of services plans prepared under clause 2.3, the Contractor shall study in details all work areas of likely crashes with existing services. In general, the study shall be carried out to systematically plan for trial trenching in order to ascertain the exact position and type of all services identified in the preliminary set of services plans.
- 2.5.2 The number and location of trial trenches shall be determined by experienced staff of the Contractor together with LCDW/LTDW and verified by the Engineer.

- 2.5.3 In general, the Contractor should adopt an iterative continuous and refining process for trial trenching, starting from coarse to fine grid pattern, even to fully expose entire work area in order to ascertain the type and position of services. As a guide, trial trenching for different work types shall be carried out as follows:
- (a) Drainwork.
Trial trenching at 20m interval along straight drain alignment. This shall be reduced further to 5m interval or less at curve area or when services are found to be laid at shallow level, services alignment changes, services crossing, link to manhole and other accessories.
 - (b) Culvert crossing.
Trial trenching along the entire stretch of culvert.
 - (c) Pile, pilecap & retaining wall.
Trial trenching at all pile positions to fully expose entire pilecap and retaining wall base working area.
- 2.5.4 The Contractor shall prepare trial trenching plan showing setting out co-ordinates of trial trenches and works. The Registered Surveyor engaged by the Contractor shall establish the exact locations of trial trenches and works at site.
- 2.5.5 The Contractor shall ensure that trial trenching operation, reinstatement works and reports are carried out in accordance with the Guidelines for Trial Trenching Work and procedures for working near services in Clause 5 of this document. Trial trenching work shall be inspected by LCDW/TCDW to verify accuracy of their detection. The Contractor shall also keep relevant Utility Agencies informed of all trial trenching work carried out.
- 2.5.6 If known services could not be detected by LCDW/TCDW and trial trenching because of depth, e.g. deep sewer or fibre optic cable, the Contractor shall consult services owners and engage specialist underground detection consultant to detect and ascertain exact positions of services. The Contractor shall inform Engineer of such incidences prior to further actions taken at site.
- 2.5.7 The Contractor shall also record any abandoned services in the trial trenching report.

- 2.5.8 The Contractor shall install Services Markers as specified in clause 3.5 of this document.

2.6 Preparation of working services plan

- 2.6.1 The Contractor shall update the preliminary set of services plan with information of the exact positions of services obtained from trial trenching. Cross-sectional details showing the type, number, size, depth of services and their relative position against work structure shall be added onto the plans. These plans shall be checked and endorsed by the LCDW/TCDW prior to use as working services plans.
- 2.6.2 The working services plans shall be treated as live documents and shall be continually updated by the Contractor, if other undetected services come to be uncovered during excavation or new/ diverted services are laid during the construction period.

2.7 Dissemination of information on services present

- 2.7.1 Site briefing shall be conducted regularly by the Contractor's Project Manager to ensure that all personnel involved in the works are aware of the presence of existing services. They shall also be informed of all precautions to be taken to avoid damaging existing services.
- 2.7.2 The personnel to be briefed shall include site supervisors, foremen, machine operators, guides and workers. The Contractor shall also keep the Engineer informed of such briefing sessions to reinforce message on services damage prevention. The briefing shall cover topics on exact position of existing services, precautionary measures to avoid damaging services and contingency actions when services are damaged.
- 2.7.3 The working services plans shall be made available to all personnel working in the vicinity of services. The Contractor's Project Manager shall ensure that the personnel are tested for knowledge of services present before approving the Permit to Work.

2.8 Reference

Guidelines on Trial Trenching. Working near services (clause 5 of this document)

3 SERVICES MARKINGS

3.1 Introduction

3.1.1 Upon completion of service detection, markers shall be installed at Site to provide a visual indication of the layout and type of underground services at site. This supplements the working service plan by providing a quick reference for the construction personnel and serves to remind them of the risk of damage to services whenever they plan to work there.

3.1.2 This Clause on “services markings” covers the detailed requirements for markers, procedures for installation of markers within “Services Grid” and procedures for marking "Services Protection Corridor".

3.2 Responsibilities

3.2.1 The Contractor shall be responsible to install all service markers and marking Services Protection Corridor. The services markings at site shall be carried out in accordance with the procedures in this Clause.

3.3 Definitions

3.3.1 Service Route

The physical route of each service as reflected in the service drawings or identified by the LCDW/TCDW and confirmed by the relevant service agencies. Refer figure 3.3a

3.3.2 Service Grid

An area within the work zone where services have been located and identified by the LCDW/TCDW. The dimension of each Service Grid is taken to be 100 square meter (10m by 10m) or as specified by the Employer. Refer figure 3.3b

Figure 3.3a - Service Route

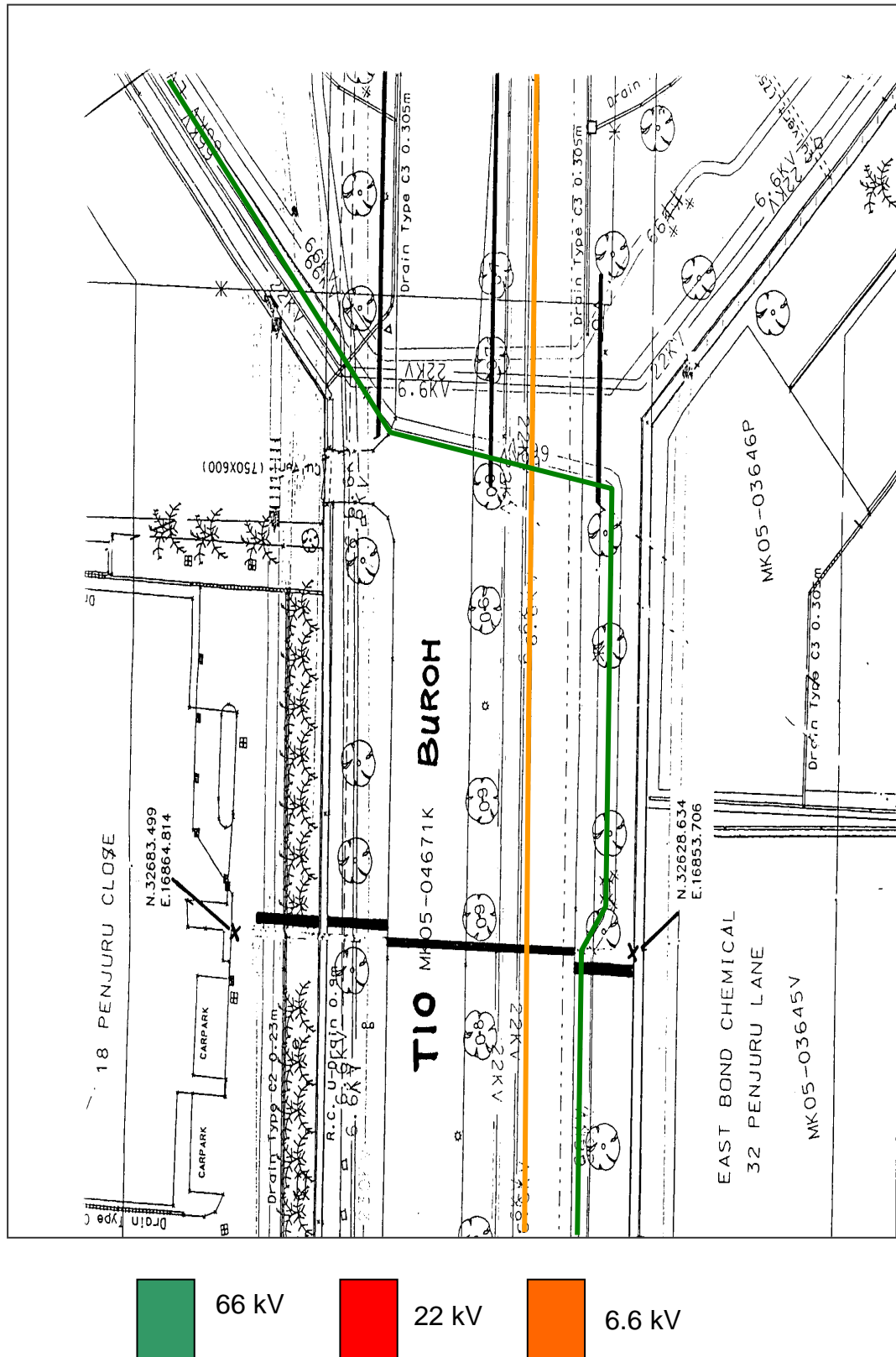
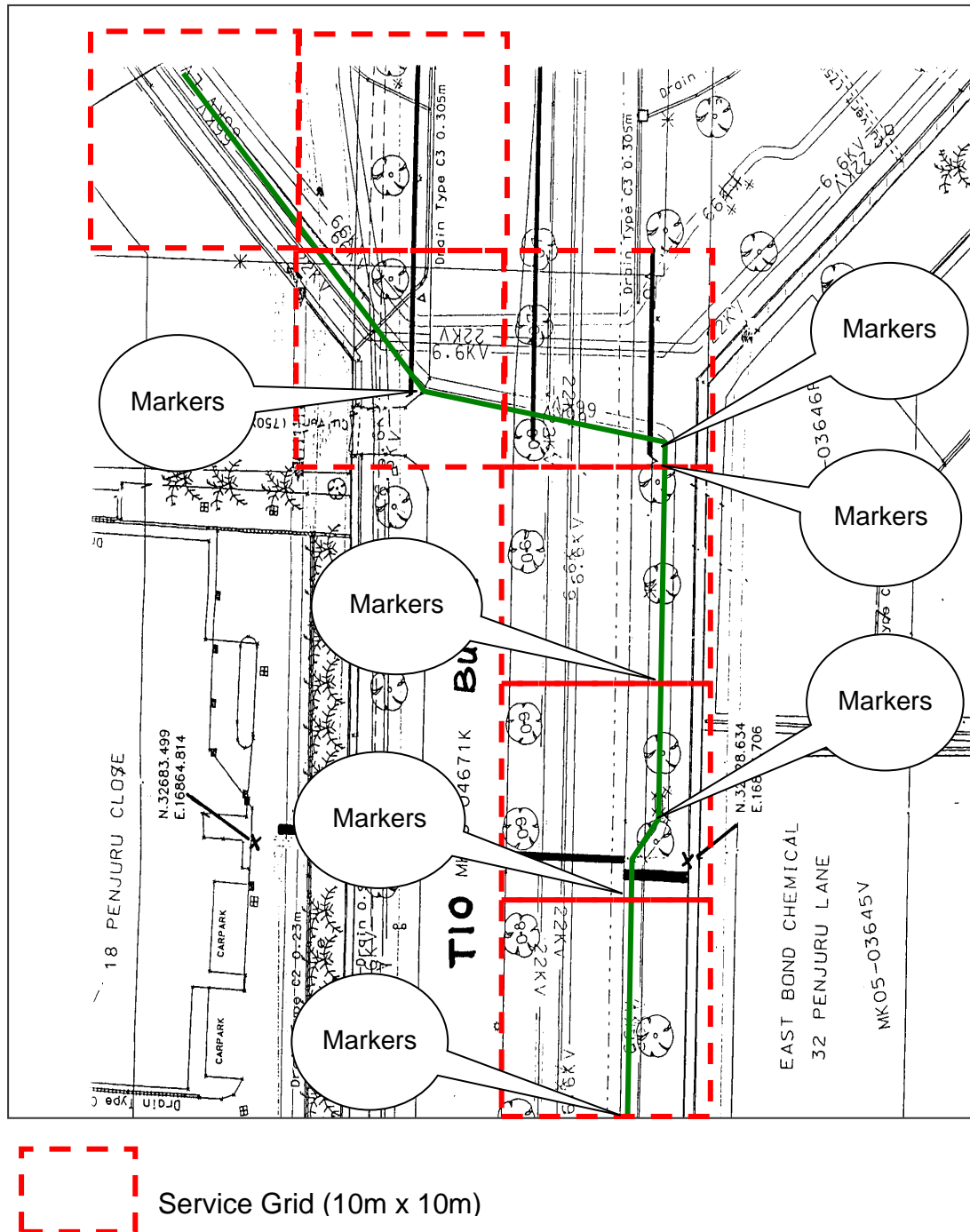


Figure 3.3b - Service Grid



Note:

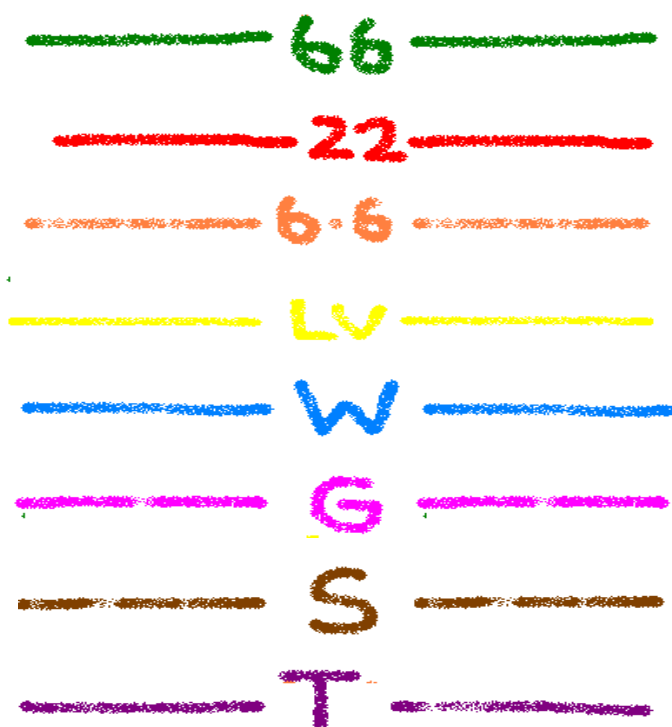
1. Service Markers Type II are installed at 10m interval and at every turning points

3.3.3 Service Marker

Used to facilitate locating of a Service. The location of the Service Markers corresponds to each of the service route. Refer figures 3.3c & 3.3d.

Figure 3.3c - Typical Service Marker (Type I)

i) Markings on “hard surface” using Coloured spray paint (examples)



Material	: Coloured Spray paint
Dimension	: 300 mm length
Colour Code	: Refer to Clause 3.4.4
Location of use	: E.g. road surface, concrete, drain slab, footpath etc.
Interval	: 300mm alternate

1. Dimensions (approximately)

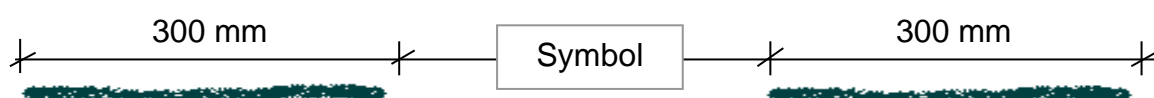


Figure 3.3c – Typical Service Marker (Type 1)

ii) Markings on “soft surface” using Coloured Pegs

Material	: Sturdy Wood or Metal (e.g rebar)
Cross section	: Uniform
Dimension	: 150 mm length
Colour Code	: Refer to Clause 3.4.4
Location of use	: E.g. Turf area, earth
Interval	: 500mm

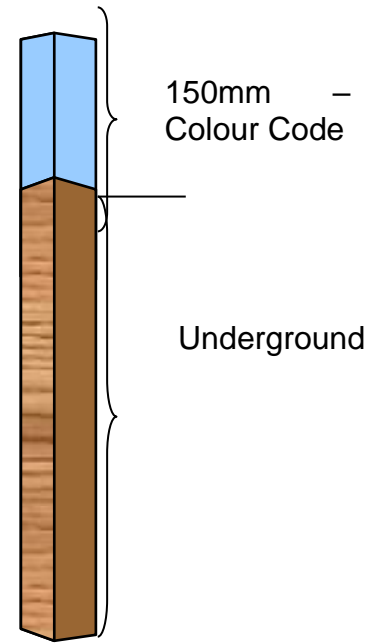
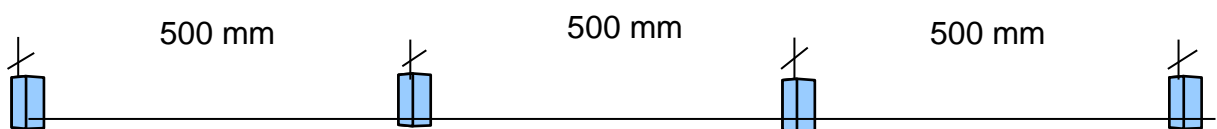
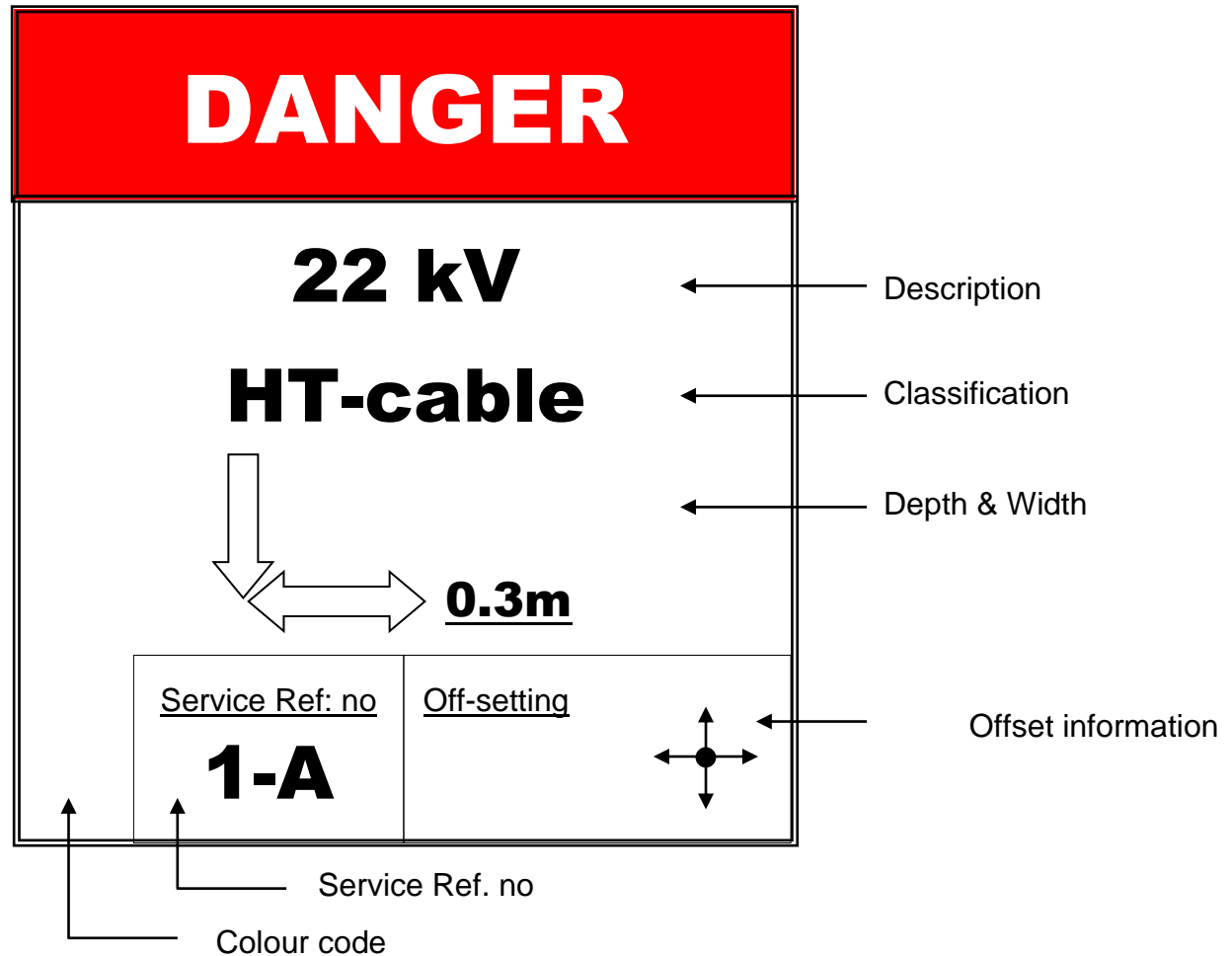








1. Interval (approximately)

Figure 3.3d: Typical Service Marker (Type II)



- Colour code

	66 kV		Telecom
	22 kV		Sewer
	6.6 kV		Water
	LV		Gas

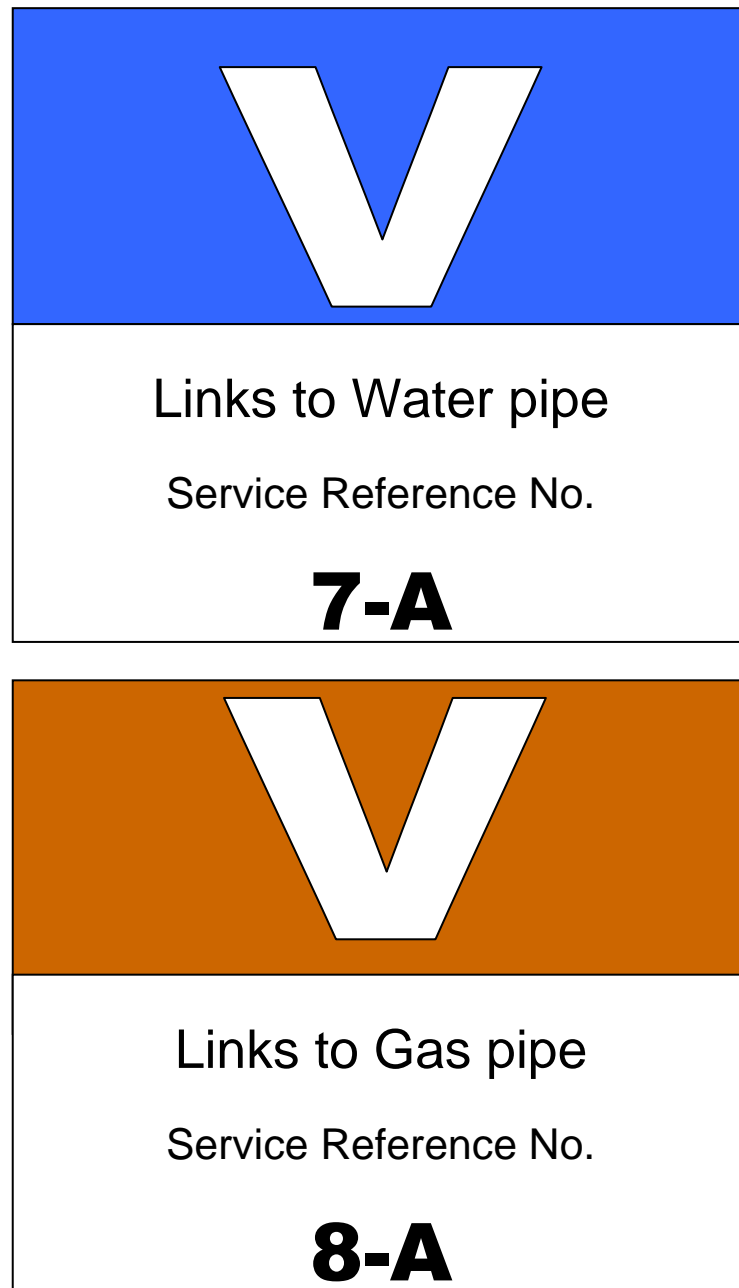
NOTE:
BLACK WORDINGS ON WHITE BACKGROUND

3.3.4 Valve Markers

Used to indicate nearby Valve connecting to water or gas services where the route of these services have been identified as to be within the Service Grid. Refer figure 3.3e

Figure 3.3e: Typical Valve Markers

(Dimension: 150mm x 150mm)



3.4 Specifications

3.4.1 Service Marker (Type I)

This marker is put in place during initial stages of services detection works. The purpose is to quickly map-up the service route as cable detection progresses. The following types are used depending on the surfaces where detection is done.

- (a) On Hard Surfaces e.g. concrete pavement, road pavement
 - Coloured Spray paint.
 - The colour to be used shall make reference to Clause 3.4.4.
 - The spray marks shall be done in dashes with each dash-line approximately 300mm length.
 - Identification codes are to be clearly marked at 5m interval throughout the length of the Service Route.
- (b) On “soft” surfaces e.g. turf, earth, mill waste etc.
 - Pegs with coloured tips.
 - Pegs shall be of durable wood or metal with not less than 150mm length and of uniform cross-section.
 - The colour to be used shall make reference to Clause 3.4.4.
 - The pegs are to be installed approximately 500mm interval.
 - Identification codes are to be clearly marked at 5m interval throughout the length of the Service Route. Where the flexible surface is less than 5m, at least one identification code is to be placed. The identification code shall be tagged to one of the pegs and written in indelible marker.

3.4.2 Service Marker (Type II)

The Type II service markers are usually used to mark services that need permanent or temporary protecting whilst waiting for diversion. The markers shall incorporate the following basic information:

(a) Description

The physical dimensions and form of the services detected. (E.g. 600ø pipe; 9-way etc); For electrical cables, this refers to the voltages (e.g. 22kV, 66kV)

(b) Classification

The type of services (e.g. WATER, GAS, TELECOM, etc). For electrical cables, this refers to the degree of which the voltages are classified (High Tension-HT or Low Tension-LV)

(c) Width

The effective width of the services includes all protective coverings and concrete haunching.

(d) Depth

The effective depth from ground level to the top of the services and shall take into consideration the protective cover, if present. Where trial trenches indicated varying depths for the service, this information is to be reflected on the Service Markers as well.

(e) Colour_code

Each of the Services would be assigned a specified colour code as in Clause 3.4.4

(f) Service Reference No. (SRN)

The Project team shall identify the total number of services present within the work site and assign a service reference number to each of the services.

The reference number shall be in the <Number-Alphabet> format:

- (i) Number refers to the type of services assigned by the project team.

Example:

1 for 66 Kv; 2 for 22 Kv; 3 for telecom; and 4 for Water.

- (ii) Alphabet would normally be the letter "A". However, if there were two services of similar type running along each other, the other would be indicated as "B" and so on.

- (g) Off-setting information

To be provided when the Service Markers are shifted from original position due to obstruction or other reasons. A sample of the Service Markers (Type II) is as shown in figure 3.3d.

3.4.3 Valve Markers (for Water and Gas mains only)

Markers shall incorporate the following basic information:

- (a) Symbol

The "V" symbol is adopted to identify valve & joint pipes.

- (b) Colour Code

The colour code relates to the two services i.e. Water and Gas. Refer to Clause 3.4.4 for the respective services colour codes to be used.

- (c) Service Reference Number (SRN)

This is similar to the SRN found on the Service Markers. A sample of the Valve Marker is as shown in figure 3.3e.

3.4.4 Colour Code

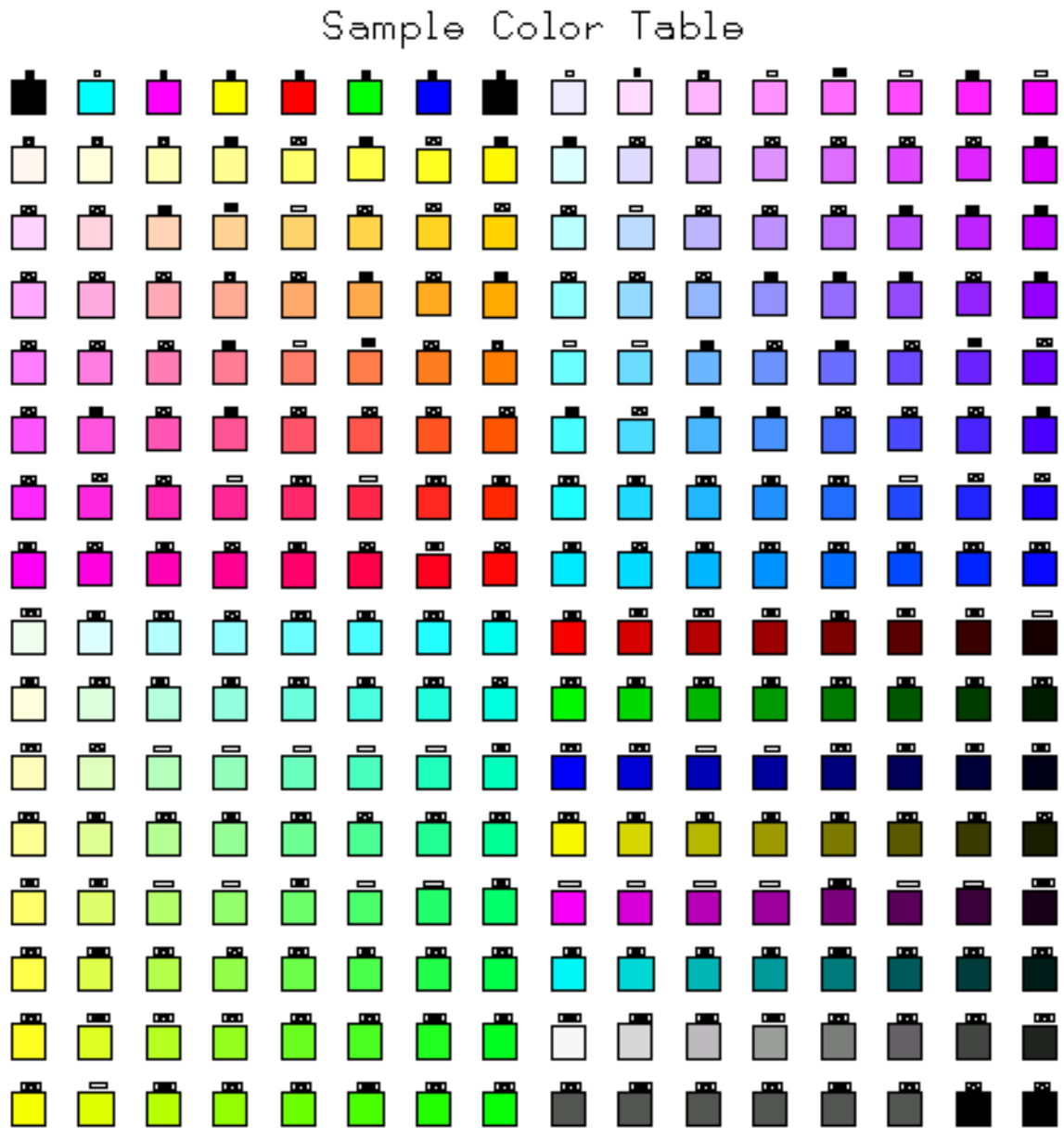
Refer to table 3.4.4 a and figure 3.3.4 a for the standard services colour codes and sample colour table.

Table 3.4.4 a

Services	Colour	Description
PowerGas	4	Underground steel welded pipeline 450-600mm dia for transmission of gas (GTP-Transmission pressure pipeline)
	4	Currently not available (GTPA-Transmission pressure A pipeline)
	82	100-450mm dia disuse pipe
	86	Underground pipe 50-450mm dia for distribution of gas (low pressure pipeline)
	86	Underground pipe 100-315mm dia for distribution of gas (low pressure A pipeline)
	70	Underground pipe 100-315mm dia for distribution of gas (Medium pressure pipeline)
	70	Underground pipe 100-315mm dia for distribution of gas (Medium pressure A pipeline)
	82	100-450mm dia disuse pipe
	1	MH valves
	1	LO valves
	1	MH gas device
	1	LO gas device
	1	Gas station coverage (e.g. offtake, regulator)
	1	Gas equip text
PowerGrid	34	230KV
	66	400KV
	5	66KV
	3	22KV
	70	6.6KV
	38	Distribution cable carrying low voltage power
Telecom	41	Ext'g manholes, coupling
	43	Ext'g pipeline section, pipeline trickmark
	41	Txt for ext'g manholes no, coupling
	41	Prop manholes
	55	Txt for prop manholes no
	46	Prop pipeline section

Services	Colour	Description
Sewer	66	Txt, leader line 7 arrow head relating to ext'g pumping main
	162	Txt, leader line & arrow head relating to ext'g sewer
	162	Txt, leader line & arrow head relating to prop sewer
	218	Demarcation of land reserve for sewerage facilities
	186	Ext'g sludge mains
	666	Ext'g pumping mains
	66	Prop pumping mains
	162	Ext'g sewer
	162	Sewer which has been planned to built
Water	91	Pipelines of varying dia carrying untreated/raw water
	91	Txt for pipelines of varying dia and all it water (raw) facilities
	57	Pipeline of dia<500m carrying treated water
	57	Txt for pipeline for dia<500mm & all it water facilities (treated water)
	121	Pipeline of dia> or = 500mm and all it water facilities (treated water)
	121	Txt for pipeline of dia> or = 500mm and all it water facilities (treated water)
Drainage	138	Ext'g drainage reserve
	138	Prop drainage reserve
	138	Txt for ext'g drainage reserve
	138	Txt for prop drainage reserve
	1	Prop drainage
	1	Ext'g drainage
	1	Txt for ext'g drainage
	1	Txt for prop drainage

Figure 3.3.4 a



3.5 Procedures for installation of Markers

3.5.1 Installation of Service Markers (Type I)

- (a) Service Markers Type (1) shall be as specified in Clause 3.4.1
- (b) The marker is meant to provide quick mapping of the Service Route and is done together with service detection works.
- (c) Contractor is to ensure that the markers are sufficiently available prior to detection of services by the LCDW/ TCDW
- (d) The Contractor shall assign a worker to the LCDW/ TCDW to assist him in the marking works. Markings shall be done in the presence of LTA staff.
- (e) As detection progresses, the worker shall under the instruction of the LCDW marks the Service route using the appropriate markers and colour codes.
- (f) For service markings on hard surfaces (e.g. road pavement, concrete footpath etc), indelible spray paint shall be used.
- (g) For service markings on soft surfaces (e.g. turf, earth etc.), coloured pegs shall be used.

3.5.2 Installation of Service Markers (Type II)

- (a) Service Markers Type (II) shall be as specified in Clause 3.4.2.
- (b) Within 2 days after the installation of Service Markers (Type 1), the contractor in the presence of LTA, shall begin to install Service Markers (Type II).
- (c) A minimum of two (2) such markers are required for each of the services identified, within each Service Grid, depending on the profile of the service route,
 - (i) For linear profile (straight route), each of the markers should be installed at both ends of the identified service route

- (ii) For non-linear profile, additional markers shall be installed at the point where the services change direction.
- (d) For all services identified within each Service Grid, Contractor shall;
 - (i) Mark out the service route within each Service Grid.
 - (ii) Install the required number of Service Markers.
- (e) The Contractor shall ensure compliance with the procedures for working near services in Clause 5 of this document.
- (f) Once installed, Service Markers shall not be moved / removed without prior notification and approval from the Authority. At all times, there shall be one set (minimum 2 nos) of these markers.
- (g) Where the positioning of the markers is not possible or practical due to site constraint or obstruction (e.g. on existing serviceable roads), the contractor may offset these markers. However, information of the offsetting shall be provided clearly on the Service Markers in an X-Y axis format.
- (h) Reconfirmation of services detection by LCDW/ TCDW is required for the following instances;
 - (i) When markers are damaged or repositioned.
 - (ii) Where offsetting of the Service Markers have been done.
 - (iii) Where the service route pass through obstacle such as drains, culvert etc.
 - (iv) Prior to intrusive works e.g. excavation, piling works etc.

3.5.3 Installation of Valve Markers

- (a) Valve Markers shall be as specified in Clause 3.4.3.
- (b) The identification and markings of the valves should be done together with the Service Markers (Type I & II).
- (c) Contractor shall identify nearby valves connecting to the following services:

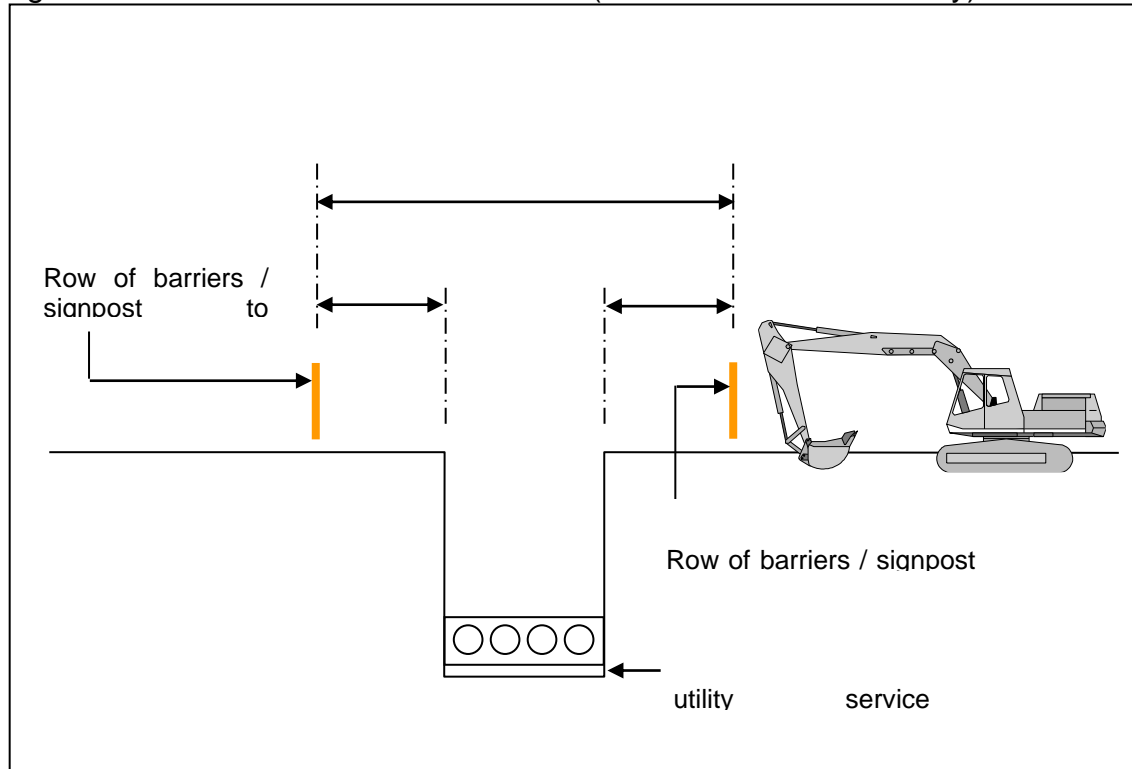
- (i) Water mains
- (ii) Gas main
- (d) All valves shall be identified prior to any excavation works within the particular Service Grid. The ability to locate these valves quickly would minimise any collateral damages in the event of a damage occurring to any of the above services during the course of excavation work.
- (e) Each time work progresses from one Service Grid to the other, the Contractor is to ensure that the valves that has been identified and marked actually serves the services within the Service Grid. There may be a need to identify and mark more than one valves/ joint pits during the course of the works.
- (f) All valves shall be identified, marked and shall be clear and visible at all times during the duration of excavation works within a particular Service Grid.

3.6

Services Protection Corridor (SPC)

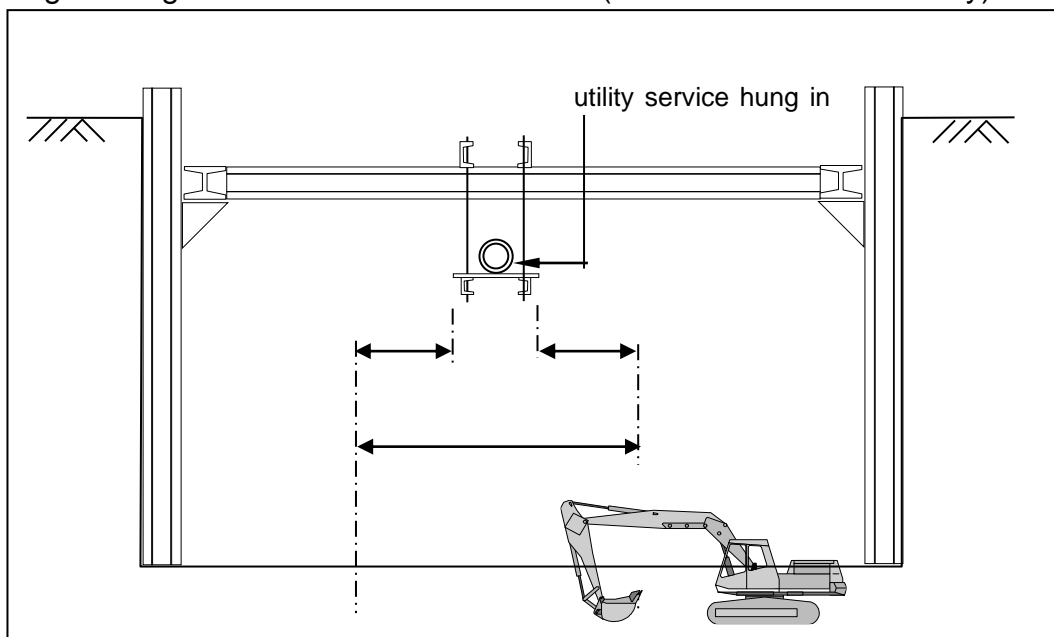
- (a) Services Protection Corridor (SPC) is defined as a specified area along the route where a service runs and where restriction is imposed on the use of equipment. Equipment employed within the SPC refers to any man-operated machinery causing extensive intrusion to the ground or earth. e.g. excavators, bore-rigs, piling rigs etc.
- (b) SPC is meant to protect all exposed services, either due to its existing condition or through precautionary measures undertaken by the contractor for purpose of ease of sire works e.g. trial trenches.
 - (i) For exposed Services that are located below approved equipment. E.g. in trenches, the SPC shall be one (1) meter away from the sides of the services including protective surface. Refer figure 3.3 f

Figure 3.3f - Services Protection Corridor (services below machinery)



- (ii) For exposed services that are located above approved equipment. E.g. overhanging support in deep excavation, the SWC is two (2) meters away from the sides of the services including protective surface. Refer figure 3.3 g

Figure 3.3g - Service Protection Corridor (services above machinery)



- (c) Before works are carried out along or within vicinity of exposed services, the contractor shall determine and put in place the Services Protection Corridor (SPC). The corridor shall be defined clearly and visibly on site at all times. Method defining the corridor shall be subjected to the approval of the Authority. Examples of method that could be used are by using netting, barriers, poles with red flags etc. The Project Officer shall ensure that the Contractor complies to the followings:
 - (i) Procedures for working near services in clause 5 of this document.
 - (ii) No equipment, machinery or material that impose substantial loading shall be allowed to operate, manoeuvred or stored within the Services Protection Corridor (SPC).
- (d) All works within the protection corridor shall be upon approval by the Authority.

3.7 Reference

Guidelines for Trial Trenching. Working near services (clause 5 of this document).

4 SERVICES PROTECTION

4.1 Introduction

- 4.1.1 When the exact position of services is known in relation to the Works, as determined through the services detection process elaborated in clause 2 of this document, and the services is found to be in the way of works, then a decision is required to either follow up with a protection plan or to divert the affected services. In general, where the affected services is likely to be exposed during construction, and where work is temporary in nature and the services would not cause direct obstruction to permanent works, then services protection shall be carried out by the Contractor.
- 4.1.2 If protection of affected services is not feasible, the contractor shall inform the S.O for decision on diversion of the affected services. The Contractor shall provide all necessary information on clear workspace at site for the S.O and Utility Agencies to determine the new location of services.
- 4.1.3 In this Clause, “services protection” covers the general requirements and procedures in planning and implementing services protection measure.

4.2 Responsibilities

- 4.2.1 The Contractor shall be responsible to design and submit services protection measures to LTA Senior Manager (Road Development & Management) and relevant Utility Agencies for approval and to implement the approved protection measures at site.
- 4.2.2 The Contractor shall comply with the procedures to achieve the objective of protection to affected services.

4.3 General requirements for services protection

- 4.3.1 The Contractor shall protect and support where necessary, all utility services liable to remain exposed during the construction of works in a manner acceptable to the Superintending Officer and the respective Utility Agencies.

- 4.3.2 The Contractor shall design and submit to LTA Senior Manager (Road Development & Management) and Utility Agencies for evaluation and approval of his proposed work method statement, risk analysis, work programme, method of protection or support during excavation, backfilling, compaction of ground under, over and around the services concerned.
- 4.3.3 All protection measures including services support design shall be undertaken by experienced Professional Engineer and comply with Statutory Requirements according to respective Utility Agencies.
- 4.3.4 The design shall take into account all forces of whatever nature including traffic vibrations (where applicable) acting on or produced by such services. In particular, valves, bends and tees on gas and water services shall be adequately restrained laterally and longitudinally in addition to being vertically support.
- 4.3.5 The protection method shall include provision of soil control measures such as shoring and shuttering to prevent soil movement, which can cause services damage in excavated areas.
- 4.3.6 In addition, the method of protection or support shall be such as to ensure that subsequent to the backfilling and compaction work, the services shall not suffer distortion or damage.
- 4.3.7 Instrumentation to monitor services, support and ground movement shall also be provided throughout the period of construction.

4.4 Procedures for implementing services protection measures

- 4.4.1 The Contractor shall implement the services protection measures in accordance with the same procedures for working near services.
- 4.4.2 The Utility Agencies shall be kept informed of all protection works. Where necessary, the Contractor may engage at their own cost the Utility Agencies to carry out and supervise the protection work.

4.5 Reference

Guideline for Trial Trenching. Services detection and Working near services (Clause 2 and 5 respectively of this document).

5 WORKING NEAR SERVICES

5.1 Introduction

5.1.1 Damage to services can happen in all stages of works at site, including preliminary activities like services detection, markings and protection. It is therefore crucial to emphasise to the Contractor, the importance of adopting correct working procedures near services right from the commencement of project. This should form part of the project management objectives, be driven, controlled and monitored throughout by the Contractor's top management and LTA project team.

5.1.2 This Clause on "working near services" covers the generic requirements to be adopted by the Contractor when working near all types of services. The specific requirements for each type of services are given in the Appendices below.

5.2 Responsibilities

5.2.1 The Contractor shall be responsible to implement all requirements for working near services to prevent damage and shall comply to the requirements spelt out in this document and Utilities Agencies.

5.3 Permit-to-work system

5.3.1 A permit-to-work system for earthwork, excavation/ digging, piling etc shall be implemented at site to manage different level of checks at every stage for close monitor of works within site.

5.3.2 The Contractor shall ensure that all construction personnel involved understand and execute the scope of works permitted to be carried out, their respective responsibility in the work flow, the expected quality of work, risks involved and measures to be taken to eliminate or mitigate the risks identified.

5.3.3 The permit shall be submitted by Contractor's site engineer or foreman and approved by the Project Manager. It should only be valid on the day of issue. On expiration of validity of permit at the end of day or earlier, the applicant shall return the permit and complete the close-out form on reverse page of permit to indicate the status of work permitted and any handing over condition.

5.3.4 A copy of the permit-to-work shall be given to the Superintending Officer's representative.

- 5.3.5 The permit shall include a checklist on all essential information to be considered prior to execution of work, including status of notification of earthworks to relevant Utility Agencies, availability of approved working services plans, services markings, safe working corridor, equipment, machinery, method statement on services protection, safety measures etc.
- 5.3.6 Prior to issuance of permit-to-work, the Contractor's project manager shall brief his whole work team including subcontractor, highlighting services present, precautionary and contingency measures to be taken during work. He shall also highlight any lessons learnt from past incidents to the work team. The project manager shall record the minutes of such briefing and forwards to all who attend the briefing for their acknowledgement.
- 5.3.7 A sample permit-to-work and close-out form are attached (see Appendices 5a & 5b)

5.4 Method statement

- 5.4.1 To facilitate work, standard method statement for common type of services protection shall be used wherever possible, e.g. services support for cable and pipe and etc shall be submitted to relevant Utility Agencies and the Superintending Officer for approval.
- 5.4.2 For complicated work, the Contractor shall carry out detailed investigation, risk analysis and design the protection/ support system and seek approval from relevant Utility Agencies and the Superintending Officer prior to implementation at site. The Contractor shall comply to the general requirements specified in Clause 4 of this document.

5.5 Other general requirements for working near services

- 5.5.1 All works permitted to be carried out shall be supervised full time by site engineer or foreman. LCDW/TCDW shall also be present as and when necessary to assess the condition of site.
- 5.5.2 The Contractor shall ensure that manual excavation is used whenever earthworks come to within separation distance specified by the Utility Agencies. Where necessary, the Contractor may engage at its own cost the relevant Utility Agencies to supervise the work.

5.5.3 At rigid pavement or concreted area, manual breaker shall be used to establish the presence of services prior to using hydraulic breaker. The operation shall be supervised by site engineer or foreman and the excavator operator shall be Registered Excavator Operator.

5.5.4 Photographic record of works showing location, type of equipment, machinery used and condition of site shall be taken before and end of work.

5.6 Reference

Guidelines for Trial Trenching Services detection, services markings, services protection (Clauses 2, 3 & 4 respectively of this document)

5.7 Appendices

Appendix 5a - Permit to Commence Piling or excavation

Appendix 5b - Checklists for underground utility services detection prior to excavation/ piling works

Appendix 5c - Permit to remove abandoned/ unused services ducts/ pipes/ cables

CONTRACT NO:

PROJECT TITLE

PERMIT TO COMMENCE PILING OR EXCAVATION WORKS / PILING WORKS

Date of Issue:

To:

(Name of Sub-contractor)

Location:

Type of Work:

(Special Instructions)

Prepared By

Site Engineer:

Signature: _____

Name: _____

Date: _____ Time: _____

Authorised by

Project Manager/Dy Project Manager

Signature: _____

Name: _____

Date: _____ Time: _____

Acknowledged by

Sub-contractor's Representative

Signature: _____

Name: _____

Date: _____ Time: _____

Acknowledged by

Excavator/Piling Machine Operator

Signature: _____

Name: _____

Date: _____ Time: _____

1. This permit is only valid for the day of issue. It shall be read together with the chec. One copy shall be kept by the operator at all times for checking. One copy shall be submitted to LTA before commencement of works.
2. A set of existing services plans shall be kept by the operator.

CONTRACT NO:**PROJECT TITLE****UNDERGROUND UTILITY SERVICES DETECTION PRIOR TO EXCAVATION /
PILING WORKS**

Location _____ (site plan attached)

Type of Works _____

Date _____

Start Date _____ Expected End Date _____

- 1 Check existing utility services drawing?
- 2 Detect and locate the utility services by LCDW?
- 3 Marking out the route of all utility services?
- 4 Trial trench/hole done?
- 5 Photographs of trail trench/utility services taken?
- 6 Machinery/Plant operator notified on the presence of utility services?
- 7 Workers notified on the presence of the utility services?
- 8 Utility services properly protected/supported?
- 9 Relevant services authority notified?

Yes	No	NA

Remarks: _____

Name of Operator: _____
Name/IC No.Contractor's Site Supervisor:
(full-time supervising the excavation/
piling works) _____
Name/SignatureContractor's Engineer-in-charge: _____
Name/Signature

CONTRACT NO:**PROJECT TITLE****PERMIT TO REMOVE ABANDONED / UNUSED SERVICES DUCTS / PIPES / CABLES**

Location _____ (site plan attached)

Type of Works _____

Type of Services _____ Date _____

Start Date _____ Expected End Date _____

- 1 Check existing utility services drawing?
- 2 Detect and locate the utility services by LCDW?
- 3 Permit to excavate from PowerGrid/IDA?
- 4 Photographs of trail trench/utility services taken?
- 5 Relevant services authority notified?
- 6 Machinery/Plant operator notified on the presence of utility services?
- 7 Workers notified on the presence of the utility services?
- 8 Utility services properly protected/supported?
- 9 Date of termination of existing services

Yes	No	NA

Remarks: _____

Name of Operator/worker: _____

Name/IC No.

Contractor's Site Supervisor:
(full-time supervising the termination
abandoned services)

Name/Signature

Contractor's Project Manager

Name/Signature