Title	**Demonstrate knowledge of electromagnetic location for underground utility locating**		
Level	**3**	**Credits**	**5**

Purpose	People credited with this unit standard are able to demonstrate knowledge of electromagnetic location (EML) for underground utility locating.

Classification	Infrastructure Works > Generic Infrastructure Works

Available grade	Achieved

Guidance Information

1 Evidence presented for assessment against this unit standard must be consistent with safe working practices and be in accordance with industry requirements.

2 Legislation and guidelines relevant to this unit standard include:
- Health and Safety at Work Act 2015;
- *Excavation Safety Good Practice Guidelines;*
- *Guide for Safety with Underground Services:* available from www.worksafe.govt.nz and any subsequent amendments and replacements.

3 Definitions
Active locating refers to the use of a transmitter to apply a signal to the utility or asset by one of three methods, direct connection, C-Clamp, or drop the box spill induction.
Industry requirements may refer to but are not limited to relevant policies, processes, methodologies, industry codes of practice, site specific health and safety plans, standard operating procedures, site safety plans, quality plans, work plans, traffic management plans, contract work programmes, job safety analysis, safe work method statements, job instructions, manufacturer's requirements, contract specifications, manuals, procedural documents.
Passive locating refers to no transmitter, looking for electro-magnetic fields that are naturally radiating and can be picked up by a wand, mainly for close in proximity signals.
Utility locating refers to any application aimed at position or depth determination of man-made objects embedded within the earth. This includes target location of electrical, water, and gas lines, and man-made assets and utilities. The principal objectives are target identification and accurate measurement of its position and depth.
Utility locator refers to Ground Penetrating Radar (GPR) or Electro-magnetic location (EML).

Outcomes and performance criteria

Outcome 1

Demonstrate knowledge of EML for underground utility locating.

Performance criteria

1.1 EML is described in terms of passive, and active locating and why and how they are used for locating utilities.

1.2 EML components are described in terms of purpose, capabilities, and limitations.

Range components include – adjusting frequency and power output levels of the transmitter, control over the grounding location and connection point of the transmitter, transmitter, receiver, passive or active electromagnetic field, the signal, the sweep, signal placement on utility line, common bonding, distorted signals, depth, pipes constructed of different materials.

1.3 EML is described in terms of using frequency bands up to 200 kHz to locate different types of assets and utilities.

1.4 Types of electric conductive utilities and assets are described in terms of locating using EML.

Range iron & steel pipes, cables, tracer wire, some non-conductive services with the addition of sondes or flexi-trace, accessories.

1.5 EML is explained in terms of adjustments required to increase sensitivity when detecting underground utilities and assets.

Range raising the locator several inches above the ground, using the gain control, direction of the aerial.

1.6 EML is explained in terms of the impact of signal strength and proximity to an asset or utility on data interpretation.

1.7 Factors that lead to the success of an EML locating activity are described.

Range clean signal, repeatable, consistent with expected depth and direction, consistent with the utility type and asset plans.

1.8 EML is explained in terms of factors that impact on the strength, distortion and direction of the signal.

Range factors include – distance from service, frequency used, best use of the locator, antenna modes, accessories used, external interference, mode of signal application.

Planned review date	31 December 2027

Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	2 March 2023	N/A

Consent and Moderation Requirements (CMR) reference	0101

This CMR can be accessed at http://www.nzqa.govt.nz/framework/search/index.do.

Comments on this unit standard

Please contact Waihanga Ara Rau Construction and Infrastructure Workforce Development Council at qualifications@WaihangaAraRau.nz if you wish to suggest changes to the content of this unit standard.