Stationary Infantry Targets

SIT, DTASIT, WSIT, and IM

RANGE AND TRAINING LAND PROGRAM – MANDATORY CENTER OF EXPERTISE
U.S. ARMY ENGINEERING AND SUPPORT CENTER, HUNTSVILLE
HUNTSVILLE, ALABAMA
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General

The Stationary Infantry Targets section covers the following targets and emplacements: Stationary Infantry Targets (SIT), Double Target Arm SIT (DTASIT), Widened SIT (WSIT), Narrow SIT (NSIT), and Iron Maiden (IM) Targets. Use the requirements in this RDG section for target arrays and grouped targets on small arms ranges. Target clusters on mounted maneuver ranges have special additional requirements; refer also to the separate Infantry Target Clusters Section of the RDG.

Use the standard SIT emplacement for the installation of a SIT target and/or for the installation of a DTASIT or other downrange devices such as the Mortar Simulation Device (MSD), Battle Effects or Sound Effects Simulator (BES or SES), Hostile Fire Simulator (HFS), Radio Frequency (RF) mesh network access point (NAP), etc. Use the WSIT for the installation of two SIT lifters in the same emplacement, when two or more devices are required at the same location, or when the amount of electrical power and/or data equipment requires additional front wall space. Use the NSIT for emplacements that do have all of the standard power and data requirements, (e.g. some pistol and RF controlled target ranges). Iron Maiden (IM) Targets are non-automated steel targets that do not require power or data, refer to the section at the end of this document. See the standard Civil and Electrical detail drawings for additional specific dimensions and details for each type.

Range designers should refer to the Inspection Checklists provided in the RDG to ensure that all required items are included in the design.

Civil/Siting

This section covers the Civil Engineering and Siting issues unique to these types of emplacements. Refer to the separate range sections of the RDG for additional siting issues specific to a particular range. See the special sections below for additional information particular to a specific target type.

Emplacement

The standard SIT emplacement is typically a concrete emplacement (coffin) with a protective earthen berm. It has a treated timber, to help protect the front wall, and a gravel drainage layer. Either precast or cast-in-place concrete is acceptable. Installations may prefer other materials for the coffin, which is acceptable as long as it is durable, provides protection, and is compatible with the electrical and target equipment. The compacted earth berm provides the protection for the coffin and installed equipment from all anticipated directions of fire. The concrete emplacement does not provide significant protection. Orient the emplacement toward the anticipated direction of fire.

Mount all SIT emplacement permanent electrical and communication boxes on the front wall of the emplacement no less than 50 mm (2 in) below the top of the emplacement wall. This mounting height helps protect them from rounds that might skim over the top of the berm. The targetry provider installs the target mechanism on the floor of the concrete emplacement as far forward as practical to minimize its potential to be hit by a low round, yet still allow access to the electrical/data boxes.

Above-Grade Emplacement:

Above-grade emplacements are the most common in range construction due to their ease of drainage, ease of obtaining line-of-sight, and small disturbance to the existing grade.

Below-Grade Emplacement:

Below grade emplacements blend with the natural terrain and do not present the target position profile to the soldier/firer. Unfortunately, below-grade emplacements present several design issues as follows:

Drainage:

Positive drainage is harder to achieve on a below grade emplacement. Floor drains are problematic in that they require a lower elevation nearby for a daylight drain and tend to clog. Drainage swales increase excavation requirements.

Unexploded Ordnance (UXO):

UXO disturbance potential increases with the depth of excavation. While an above-grade emplacement might only require disturbing the surface to 150mm (6in) below natural grade, below-grade emplacements often require excavation of 1m (3ft) or more. For medium and high-risk areas, normally a subsurface clearance to a depth of one foot below the construction footprint is required.

Line-of-Sight:

Line-of-sight between the firing position and the target emplacement may not be possible using the natural terrain.

Other debris:

Below-grade emplacements also tend to gather more sand, snow, dirt, trash, and other windblown objects, which can cause maintenance problems.

The designer should discuss with the installation whether they desire above or below-grade SIT emplacements, while ensuring that the installation understands the design issues and costs associated with either choice.

Drainage

Ensuring proper drainage is critical in the design and construction of target emplacements. Even though the electrical and target equipment is designed for outdoor installation, many of the issues with range targetry can be avoided with proper emplacement drainage. The ground should slope away from the emplacement whenever possible; add swales as necessary to ensure positive drainage. The floor of the emplacement must slope to the rear. Special care is required in the use of floor and trench drains, as they tend to clog easily and freeze in some climates. Ensure proper compaction under the emplacement to avoid differential settlement. Drainage is especially critical on newly constructed ranges before vegetation is fully established.

Target Clearance

No obstruction may be present which interferes with travel of the target from the up to down position. Provide a minimum of 2.3m (7.5ft) clear space from the face of the emplacement wall.

Wall Height

The front wall and berm must be high enough to protect the targetry equipment while still allowing the target to be visible from the firing position. The standard (minimum) front wall height is 457 mm (18 in). The height has been coordinated within the program as the minimum that hides both the electrical equipment and the targetry based on a relatively flat angle of fire from the shooter to the target, generally +/- 2 degrees.

Angle of Fire

The angle of fire (AOF) from the gun barrel to the target is a critical parameter on a range and affects the functionality in a number of ways. Certain range and weapon types have a limit on the allowable angle of fire, e.g. a Known Distance range limits the AOF to +/-2 degrees. Refer to the installation trainers, applicable training manuals, and the RDG section for specific range types for additional information and guidance. In addition, the amount of the target that is visible to shooters can affect the ability to qualify, i.e. it is harder to hit the target when only half of it is visible. Finally, rounds can hit and damage targetry and electrical equipment on higher angles of fire.

The standard SIT emplacement with an 18-inch front wall and a 2-percent slope on the berm provides adequate protection for AOF of +/-2 degrees. Greater angles require special design consideration. Higher negative angles may require increasing the front wall height, adjusting the slope of the berm to match the AOF, or some other method. Theoretically, the minimum wall height hides the electrical equipment, including the target arms and clamps, up to a -10^{o} AOF, but the berm does not protect the concrete. In situations with a positive AOF, greater than 2 degrees, the berm itself begins to hide the target. Adjustments to the berm slope may be necessary.

On ranges where target engagement is from multiple points, the designer must coordinate closely with the installation and the targetry provider to determine the correct front wall height. The emplacement protection is also critical for aviation gunnery.

Berm Criteria

The Target Protection Design Curves in the RDG provide the recommended thickness for emplacement protective berms. The curve thicknesses provide protection from many bullet impacts; the amount of soil needed to stop a single round is significantly less. The berm must protect the emplacement from all anticipated directions of fire, but is thickest in the expected direction of fire. Use thinner berms to protect the emplacement from occasional directions of fire and ricochets. The standard berm extensions are ¼ of the berm thickness; see figure below.

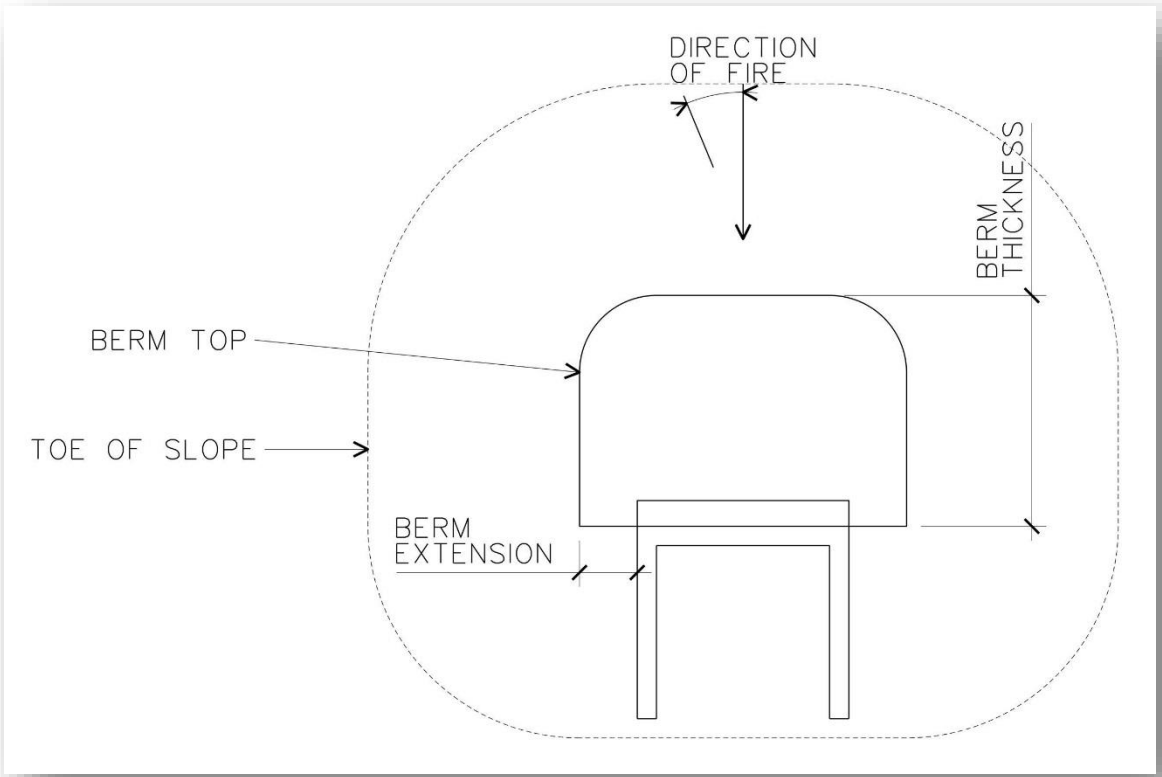
Determine the berm thicknesses based on projectile type, soil compaction, and the in-place soil density. In addition, the designer must coordinate with the range trainer or user to determine the appropriate berm thickness for each target, since individual target siting may dictate added target protection. For example, when SIT emplacements are in front of or behind a MAT or SAT, the

emplacements will need to be designed to withstand the largest weapon system that will engage that group of targets. At a minimum, berm widths will be at least 4 feet to facilitate ease of maintenance.

The worst case for berm wear on SIT targets is on small arms qualification ranges, MRF/ARF/AFF. Historical experience shows that, under normal usage, well-compacted berms, designed with the recommended widths require maintenance cycles of 6-months or more on these type of ranges. Ranges without fixed firing positions and those with lower usage can go much longer between maintenance cycles.

Direction of Fire

The direction of fire (DOF) is the horizontal angle from perpendicular to the target. The standard berm provides full thickness protection for DOF of +/- 20 degrees and adequate protection to +/- 30 degrees or more. Due to SDZ and range safety considerations, it is uncommon to engage targets regularly at larger DOF; coordinate with the RTLP MCX in those cases. The standard berm will protect the electronics and mechanism from errant rounds and ricochets to much higher DOF, up 90 degrees.



Weather Considerations

In regions with large quantities of blowing sand or snow, consider providing elevated target mechanism platforms and emplacement covers. The elevated target mechanism platform allows

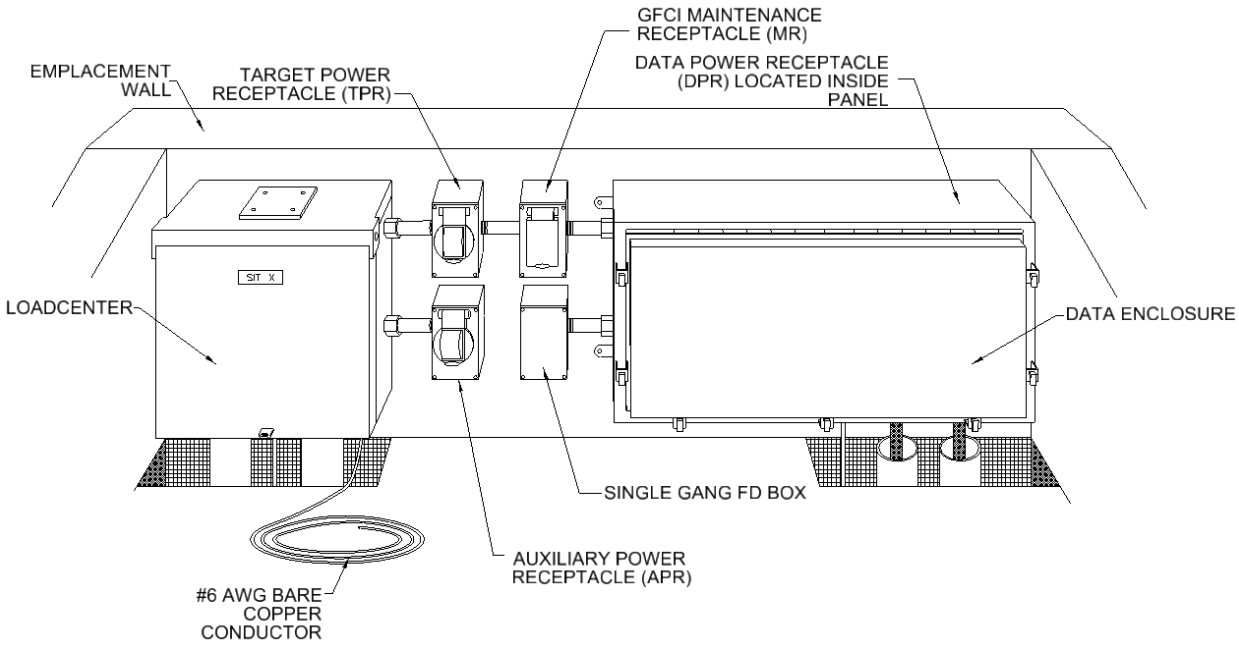
for shoveling out snow and sand, while the emplacement cover keeps the accumulation of blown or fallen material to a minimum. Consider access for snow removal equipment as well.

Electrical/Communications

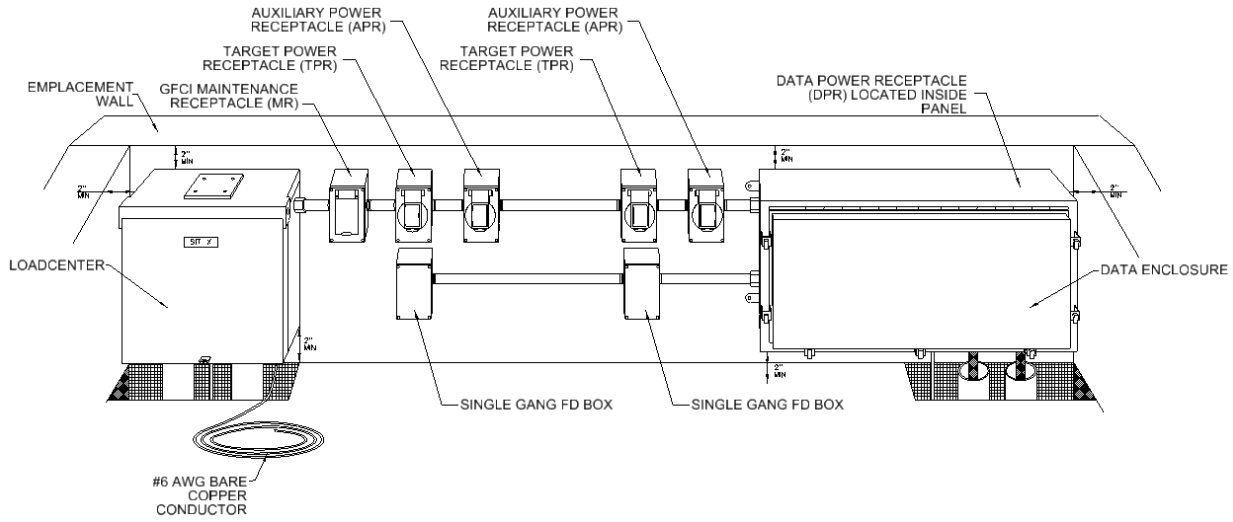
This section documents the electrical/communication requirements and equipment installed in a SIT emplacement. It primarily focuses on standard targets with hardwired power and data; a paragraph below has information on battery-operated targets. The Downrange Power & Data Distribution Sections of the RDG describe requirements for downrange power distribution, data networks, transformers, trenching, etc. Use those sections in addition this document to design a complete range. In addition, since some range types have power and data requirements that differ from the standard, (e.g. CP/MPFQC), refer to the specific range section for details.

Target Emplacement Wall Configuration

Refer to the emplacement elevation figures below and the electrical detail drawings for typical wall configurations. The electrical equipment required in each SIT emplacement are the 1) Load Center (LC), 2) Target Power Receptacle (TPR), 3) Auxiliary Power Receptacle, 4) GFCI Maintenance Receptacle (MR), 5) and the data enclosure, along with the associated wiring and conduits which are not detailed in this document. The load center contains the secondary branch circuits and provides feed-through capability to the load center in the next adjoining target emplacement. Mount all boxes and receptacles on the front wall of the emplacement no higher than two inches below the top of the emplacement wall; this protects the boxes and receptacles from low rounds that might skim the top of the emplacement wall. The standard electrical detail drawings in the RDG include detailed drawings of the electrical equipment requirements for SIT emplacements.



Representative SIT Elevation Drawing (Not to Scale)



Representative Widened SIT Elevation Drawing (Not to Scale)

Routing

All conduits and/or cables should enter and exit from the side or rear of the emplacement. This cable routing helps to minimize damage to the cables from range operations and maintenance crews performing berm repair.

Grounding

Grounding is required for safety at each downrange emplacement or equipment location. Install a 19mm (3/4 in) by 3,050mm (10ft) copper-clad steel ground rod to a depth of 305mm (1 ft) below finished grade at each emplacement or equipment location. Connect the MTDP/TDP and load center equipment to the emplacement's single ground rod with a #6 AWG bare copper conductor using exothermic welded connections. Bond all data cable armor or shields to the ground bar in the MTDP/TDP. The design includes an 1829 mm (6') coil of #6 AWG bare copper wire for the target installer to ground the target mechanism.

Surge Suppression

Provide surge protective devices (SPD) in the load center of all target emplacements. The target vendor provides surge suppression for the data communication cables during the installation of targets.

Conduit and Cable Fittings

All penetrations into the MTDP or TDP must be made with fittings approved for use with a NEMA 4, 4X or 6P enclosure. Non-compliance with this requirement will result in equipment failure. The standard electrical detail drawings in the RDG illustrate the preferred sealing method. **Foam filled conduits are not acceptable.** The SIT load center only requires a

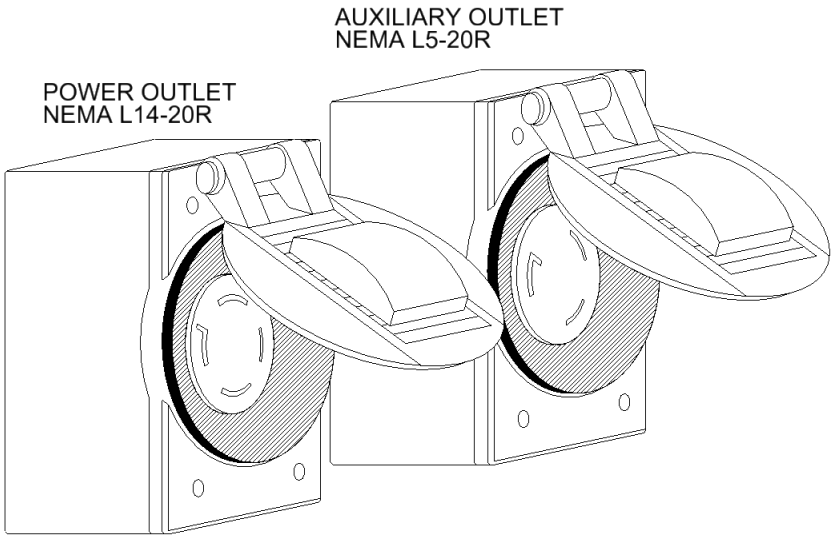
NEMA 3R rated enclosure. Provide fittings approved for use with a NEMA 3R enclosure for connection to the load center.

Target Outlets

Target Power Receptacles and Auxiliary Power Receptacles must be equipped with a waterproof enclosure approved for use with the power plug inserted and unattended, according to NEC 406.8(B) (2). The tables and figures below show emplacement outlet configurations:

TARGET POWER RECEPTACLE	AUXILIARY POWER RECEPTACLE	FIBER OPTIC CABLE CONNECTORS	CATEGORY 5e OR BETTER CABLE CONNECTORS
NEMA L14-20R	NEMA L5-20R	Type "SC"	MALE, RJ45

SIT Emplacement Target Interface Specifics



TARGET POWER OUTLETS (TPO)

Target Power Receptacle (TPR) – Auxiliary Receptacle (AR)

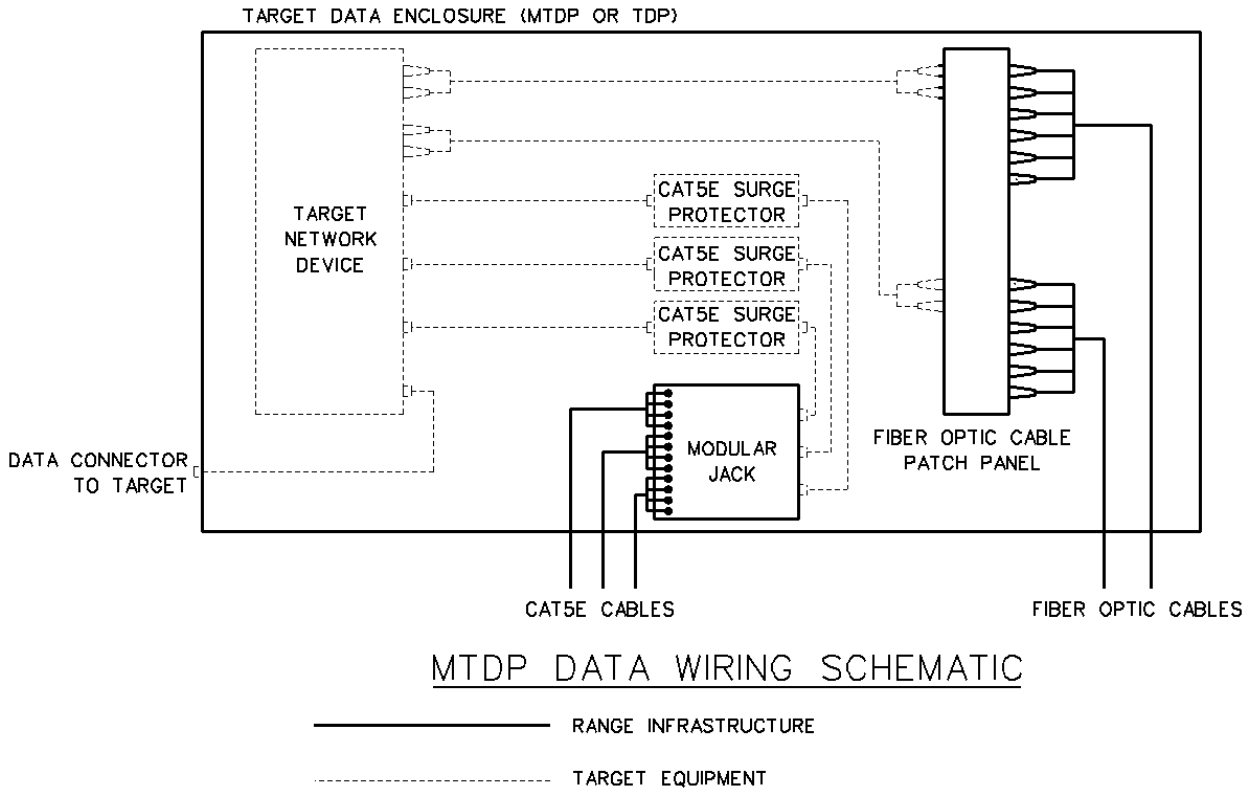
EMPLACEMENT TYPE	POWER FEED TYPE	PEAK	STATIC LOAD	DESIGN LOAD
SIT with Thermal Blanket	120/240V, Single Phase	700VA while raising or lowering target. Add 260VA if Thermal Blanket is utilized	50VA Thermal Blanket 260VA	960VA
			Total	**960VA**

SIT EMPLACEMENT TARGET POWER TABLE

Standard Target Interface

All targets operate at 240 Volts. Power is supplied to the target through a 120/240V cord and plug connection. The target emplacement includes a standard 120/240V receptacle, supplied power through a circuit breaker. There is also an auxiliary 120V outlet for additional devices or training aids. Thermal blankets are the most common devices that use this power outlet. The specific components used to supply power to the target mechanisms installed inside each target emplacement is fully defined in the remaining sections.

Target and training device communication is accomplished by equipment installed inside the data enclosure located in each target emplacement. All networking equipment will be provided with the target mechanism when the target mechanism is purchased. The target mechanisms are normally purchased with Other Appropriations-Army (OPA) funded target installation contracts. The range data infrastructure should be installed with data cables to the target emplacement and these cables should be properly terminated inside the target emplacement data enclosures. These data enclosures are referred to as either a Target Data Panel (TDP) or a Master Target Data Panel (MTDP), and they are fully defined in other sections of this document. The target mechanism installer will interface with the data cables inside these enclosures during the installation of the targets. The schematic below provides an overview of the wiring responsibilities inside the data enclosures.



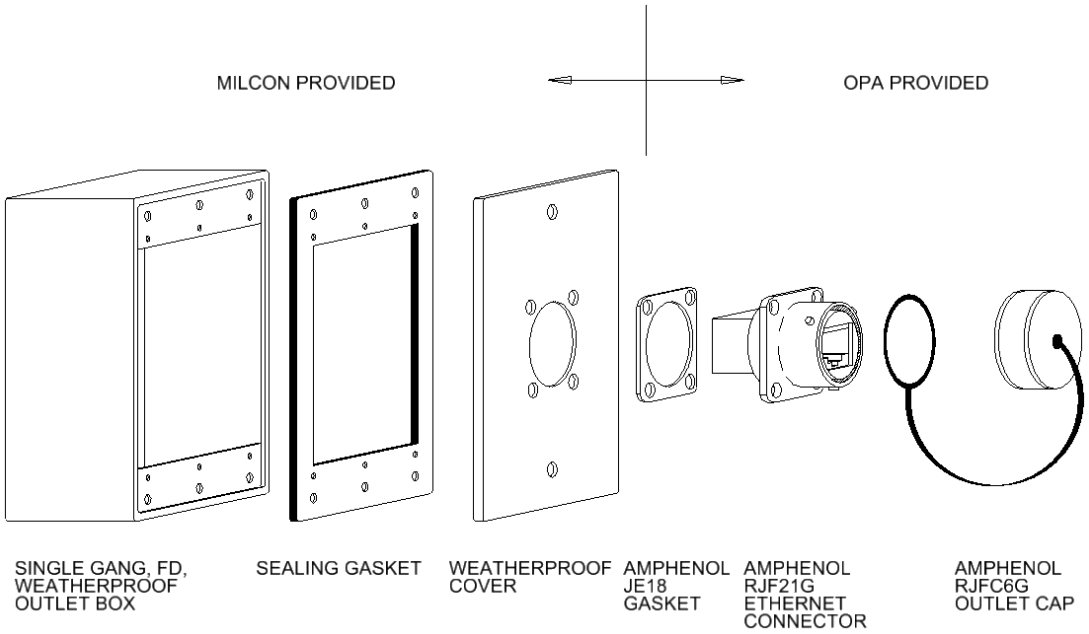
MTDP Data Wiring Schematic

The Master Target Data Panel (MTDP), or the Target Data Panel (TDP) must be rated NEMA 4, 4X, or 6P depending on environmental conditions (refer to Conduit and Cable Fittings section below for connections). The MTDP/TDP contains the electronics for local target operation, including data cable splicing and terminations. Data cabling shall enter and exit the data panels through approved cable seal fittings (refer to Conduit and Cable Fittings below). All fiber optic cabling will be terminated with SC type connectors, and the network cables will be terminated with CAT 5e or better rated RJ45 connectors. The MTDP and TDP provides space for Other Appropriations-Army (OPA) funded equipment which may include the fiber optic jumpers, switch/media converter, target data outlet, and network cables. The OPA equipment is installed by others and not the MILCON contractor. The designer must ensure the dimensions of the data panel are consistent with those dimensions stated on the detail plans for the MTDP and TDP equipment. A 120v AC power outlet is provided in the TDP for "Use by Others". The TDP and the GFCI maintenance receptacle may utilize the same power circuit, but the TDP equipment must be wired ahead of the maintenance to ensure no nuisance tripping occurs. Reference the Electrical and Civil Details in the directory of the Range Design Guide for more information pertaining to the MTDP, TDP and their mounting requirements.

Target Data Connection

All automated targets are connected to the data cable infrastructure through copper patch cables provided by the target vendor. The interface point between the facility infrastructure and the target installation occurs through the faceplate in the weatherproof outlet box installed immediately adjacent to the MTDP or TDP enclosure. The target vendor will penetrate the

faceplate on the outlet box and install a weatherproof coupling mechanism that mates with the patch cord provided with their targets.



TARGET DATA CONNECTION

Environmental Limits

The temperature and humidity limits for electronic equipment are as follows:

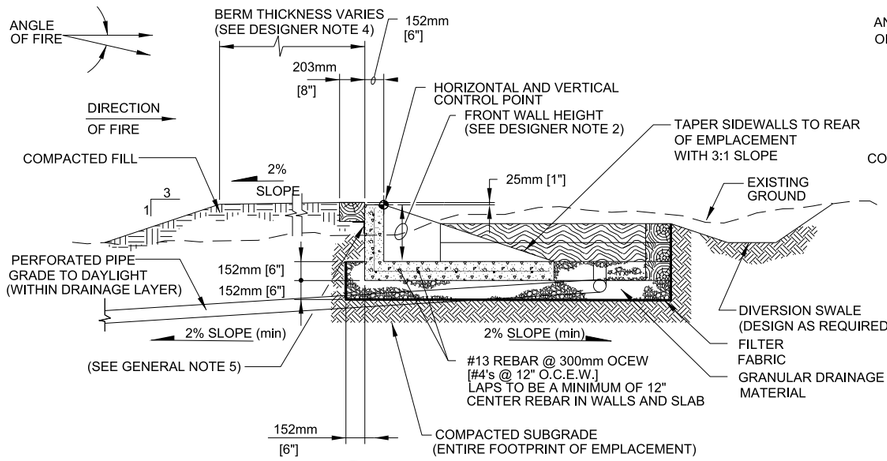
- Non-operating and operating temperature: -34°C (-30°F) to 60°C (140°F).
- Humidity: 5% to 95% RH (non-condensing).

Battery Operated Targets

Targets that are battery operated do not need any of the electrical equipment in the SIT. Depending on the soil conditions and other factors, a ground rod may be necessary; coordinate with the RTLP-MCX.

Iron Maiden Targets

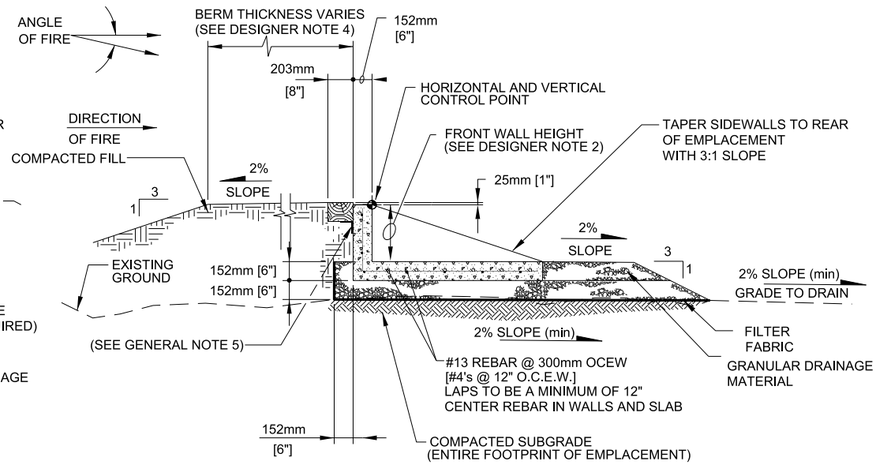
Iron Maiden (IM) targets are non-automated, steel targets primarily used in sniper training. They do not require any power or data connections. OPA provides the targets. Range Personnel typically place the targets at unknown distances around the range. However, there are certain instances where a prepared gravel pad is necessary. Some ranges, e.g. Sniper Field Fire, require a gravel pad with line of sight from the firing position at specific distances. The gravel pad should be 2 meters (6 feet) square. On ranges where the terrain does not allow sufficient areas for placement of IMs at unknown distances or in high risk for Unexploded Ordnance (UXO), prepared IM positions may be required. This should be coordinated with the installation and trainers during the planning and design process.



A
SIT SIT

SECTION

SCALE: 1/2" = 1'



B
SIT SIT

SECTION

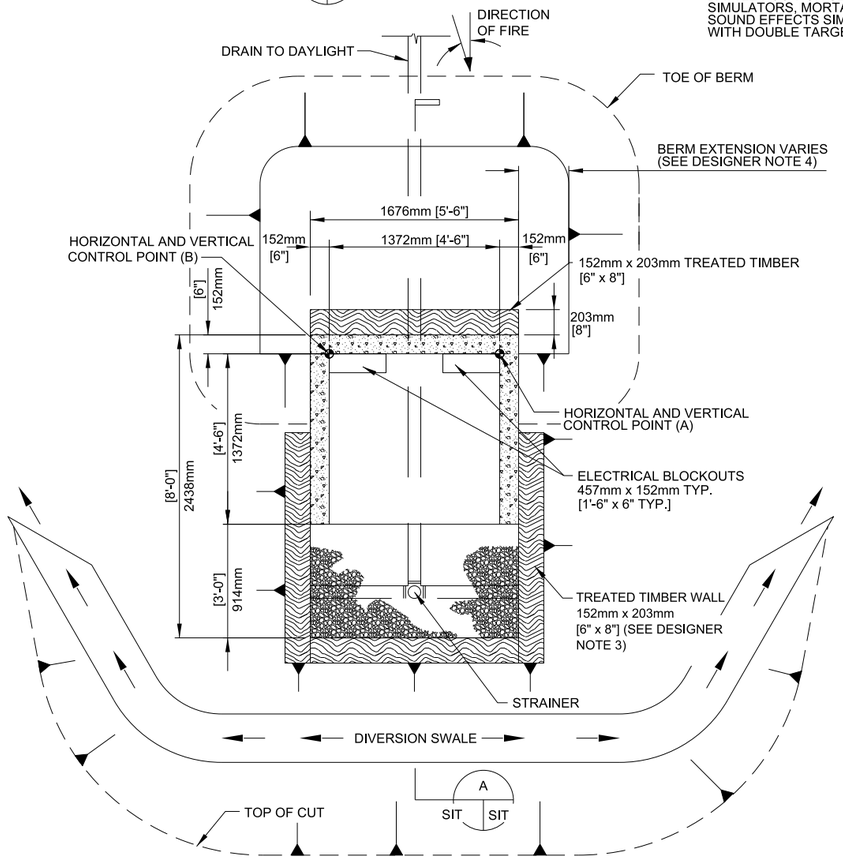
SCALE: 1/2" = 1'

NOTE:

THIS EMPLACEMENT DETAIL ALSO APPLIES FOR BATTLE POSITION SENSORS, BATTLE EFFECTS SIMULATORS, MORTAR SIMULATION DEVICES, SOUND EFFECTS SIMULATORS, AND EMPLACEMENTS WITH DOUBLE TARGET ARM LIFTERS .

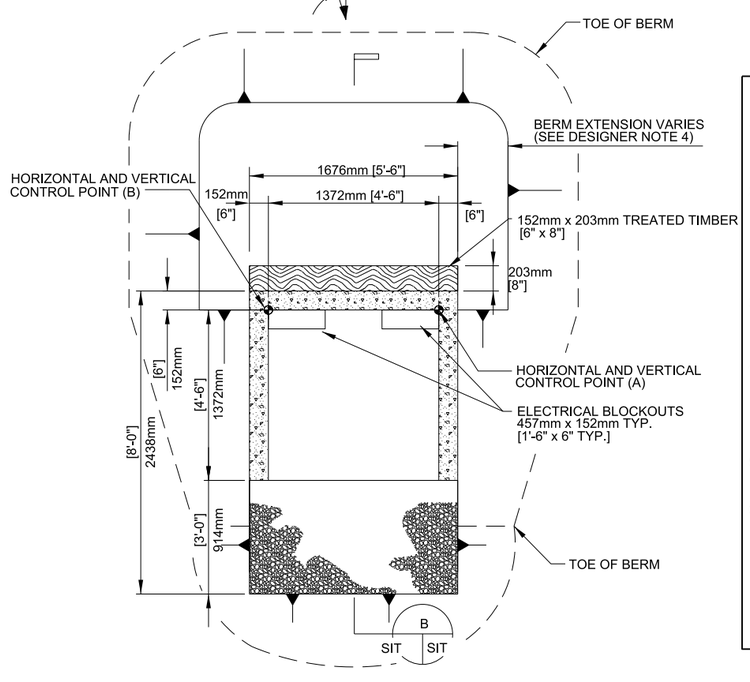
GENERAL NOTES:

1. CONCRETE SHALL DEVELOP A MINIMUM COMPRESSIVE STRENGTH OF 28MPa (4000psi) IN 28 DAYS.
2. EMPLACEMENTS SHALL BE CONSTRUCTED OF REINFORCED CONCRETE; CONCRETE STRUCTURES SHALL BE PRECAST OR CAST-IN-PLACE. PRECAST STRUCTURE WILL HAVE LIFTING EYES CUT FLUSH.
3. ALL REINFORCING STEEL SHALL BE PER ASTM A615, GRADE 60.
4. AREAS DISTURBED BY CONSTRUCTION ACTIVITIES SHALL BE REVEGETATED OR RESURFACED CONSISTENT WITH THE NATURAL SURROUNDINGS. GROUND COVER SHALL NOT REDUCE TARGET VISIBILITY.
5. PLACE TREATED TIMBERS AGAINST CONCRETE WALL ON L102mm x 102MM x 12.7mm x 102mm [4"x4"x½"x 4"] STEEL ANGLES SPACED A MAXIMUM OF 914mm [3'] ON CENTER. ATTACH ANGLE TO CONCRETE WITH CONCRETE ANCHORS.
6. ALL DIMENSIONS ARE INDICATED AS FOLLOWS: METRIC UNITS [ENGLISH] FOR INSTANCE, 1372mm [4'-6"]
7. HORIZONTAL CONTROL POINT (A) IS LOCATED ON THE LEFT SIDE OF TARGET AS VIEWED FROM THE FIRING POSITION.
8. PROVIDE 13mm [1/2"] CHAMFER ON ALL EXPOSED CONCRETE SURFACES.
9. LABEL EACH EMPLACEMENT. COORDINATE WITH RANGE CONTROL FOR NUMBERING SCHEME.



PLAN
ASCENDING SLOPE OR BELOW GRADE EMPLACEMENT

SCALE: 1/2" = 1'



PLAN
SURFACE / FILL EMPLACEMENT

SCALE: 1/2" = 1'

DESIGNER NOTES:

1. REFER TO THE STATIONARY INFANTRY TARGETS WRITE-UP IN THE RDG FOR ADDITIONAL INFORMATION AND REQUIREMENTS.
2. THE MINIMUM FRONT WALL HEIGHT OF 460MM (18") PROVIDES FULL PROTECTION FOR THE TARGETRY AND ELECTRICAL EQUIPMENT FOR AN ANGLE OF FIRE OF +/- 2 DEGREES AND HIDES THE TARGET LIFTER INCLUDING THE TARGET ARMS UP TO A 10 DEGREE DOWN ANGLE OF FIRE. COORDINATE WITH THE INSTALLATION AND THE RTLP-MCX FOR GREATER ANGLES OF FIRE.
3. RETAINING WALLS MUST BE CONSTRUCTED OUT OF ADEQUATELY CONNECTED TREATED TIMBERS WITH FILTER FABRIC EXTENDING THE FULL HEIGHT OF WALL DESIGNED BASED ON LOCAL CONDITIONS
4. REFER TO THE TARGET EMPLACEMENT PROTECTION SECTION OF THE RDG FOR THE REQUIRED BERM THICKNESS AND BERM EXTENSION REQUIREMENTS. BERM EXTENSIONS OF ¼ OF THE BERM THICKNESS PROVIDE FULL PROTECTION FOR DIRECTIONS OF FIRE OF UP TO +/- 20 DEGREES AND ADEQUATE PROTECTION UP TO +/- 30 DEGREES.
5. THE DESIGN MUST INCLUDE POSITIVE DRAINAGE AWAY FROM THE TARGET, INCLUDING BELOW GRADE EMPLACEMENTS
6. THE 3:1 BERM SLOPES SHOWN ARE TYPICAL; ADJUST BASED ON A SITE-SPECIFIC GEOTECHNICAL REPORT.
7. THE SIT ELECTRICAL EQUIPMENT AND TARGET LIFTER/SILHOUETTE REQUIRES A MINIMUM OF 2290MM (7'-6") CLEAR SPACE BEHIND THE FRONT WALL FOR TARGET MOVEMENT/LAYDOWN.

GRAPHIC SCALE:

0 2' 4' 8'

SCALE:1/2"=1'

STATIONARY INFANTRY TARGET EMPLACEMENT

%PRODUCTION DATA 1%

US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

DESIGNED BY: | ISSUE DATE:
DRAWN BY: | SOLICITATION NO.:
CHECKED BY: | CONTRACT NO.:
SUBMITTED BY: | PROJECT NUMBER:
SIZE:

U.S. ARMY CORPS OF ENGINEERS
ENGINEERING & SUPPORT CENTER
HUNTSVILLE, ALABAMA

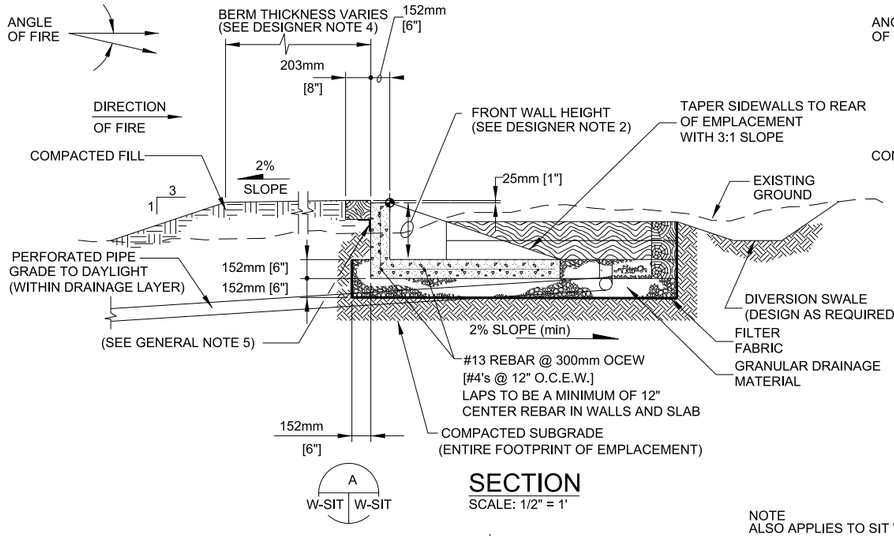
AUGUST 2017

RANGE AND TRAINING LAND PROGRAM
STANDARD DESIGN MANUAL

STATIONARY INFANTRY
TARGET EMPLACEMENTS

SHEET ID

SIT



SECTION
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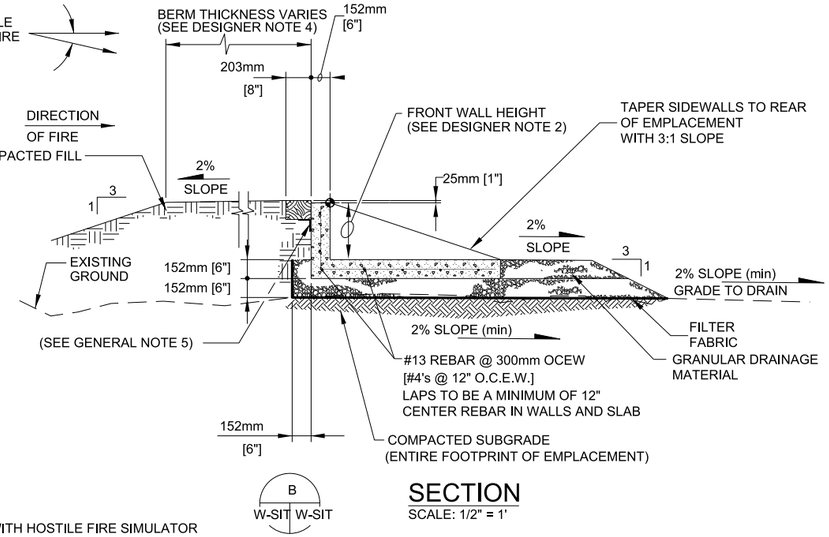
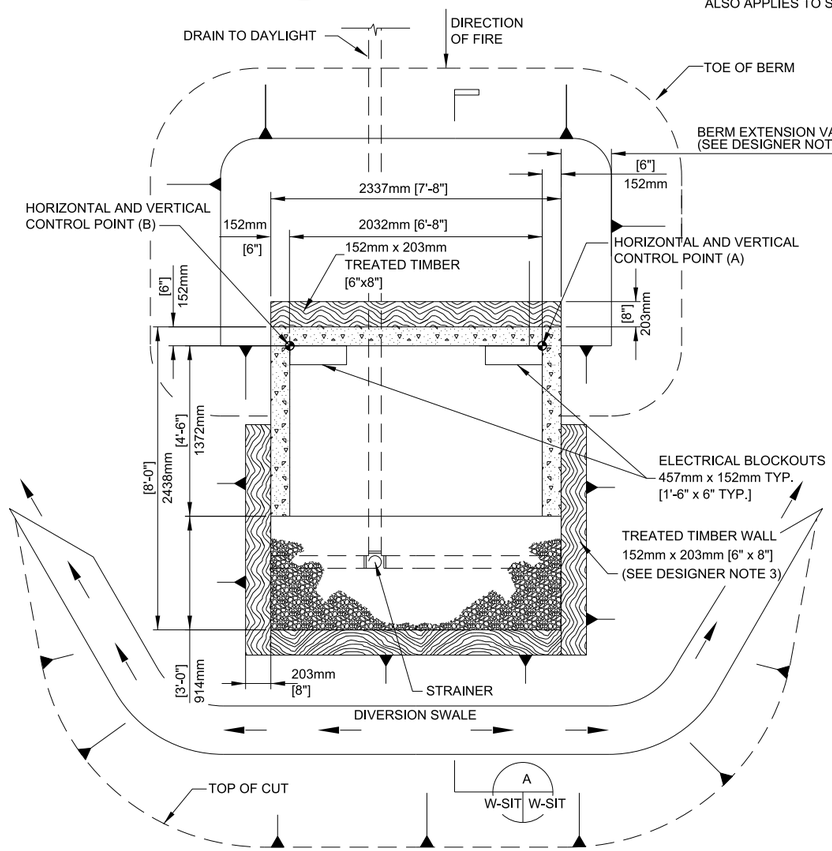


SECTION
SCALE: 1/2" = 1'

NOTE
ALSO APPLIES TO SIT WITH HOSTILE FIRE SIMULATOR



PLAN
ASCENDING SLOPE OR BELOW GRADE EMPLACEMENT
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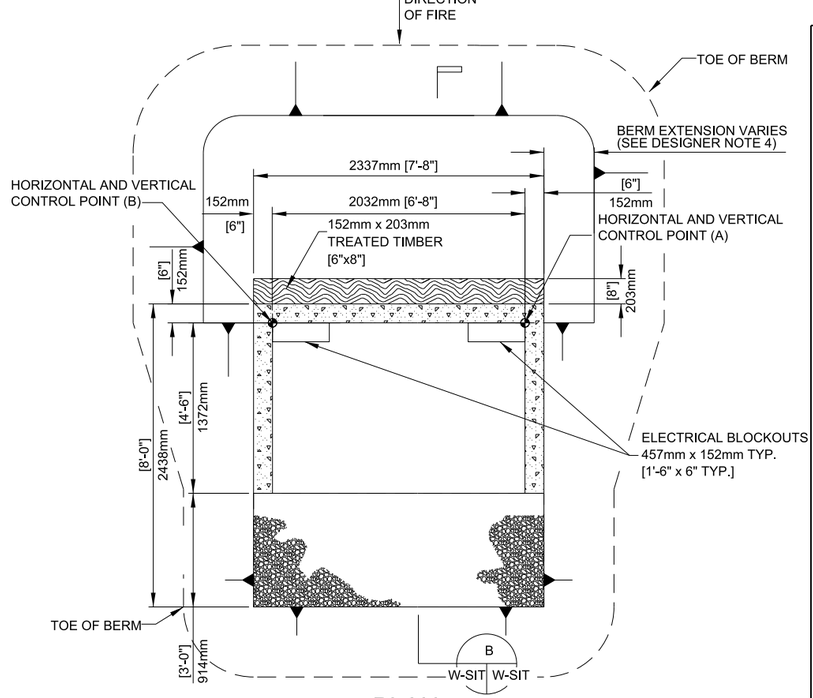

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3. RETAINING WALLS MUST BE CONSTRUCTED OUT OF ADEQUATELY CONNECTED TREATED TIMBERS WITH FILTER FABRIC EXTENDING THE FULL HEIGHT OF WALL DESIGNED BASED ON LOCAL CONDITIONS
4. REFER TO THE TARGET EMPLACEMENT PROTECTION SECTION OF THE RDG FOR THE REQUIRED BERM THICKNESS AND BERM EXTENSION REQUIREMENTS. BERM EXTENSIONS OF ¼ OF THE BERM THICKNESS PROVIDE FULL PROTECTION FOR DIRECTIONS OF FIRE OF UP TO +/- 20 DEGREES AND ADEQUATE PROTECTION UP TO +/- 30 DEGREES.
5. THE DESIGN MUST INCLUDE POSITIVE DRAINAGE AWAY FROM THE TARGET, INCLUDING BELOW GRADE EMPLACEMENTS
6. THE 3:1 BERM SLOPES SHOWN ARE TYPICAL; ADJUST BASED ON A SITE-SPECIFIC GEOTECHNICAL REPORT.
7. THE SIT ELECTRICAL EQUIPMENT AND TARGET LIFTER/SILHOUETTE REQUIRES A MINIMUM OF 2290MM (7'-6") CLEAR SPACE BEHIND THE FRONT WALL FOR TARGET MOVEMENT/LAYDOWN.

GRAPHIC SCALE:
0 1' 2' 4'
SCALE:1/2"=1'-0"

WIDENED STATIONARY INFANTRY TARGET EMPLACEMENT

US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

ISSUE DATE:
SOLICITATION NO.:
CONTRACT NO.:
PROJECT NUMBER:

DESIGNED BY:
DRAWN BY:
CHECKED BY:
SUBMITTED BY:
SIZE:

U.S. ARMY CORPS OF ENGINEERS
ENGINEERING & SUPPORT CENTER
HUNTSVILLE, ALABAMA

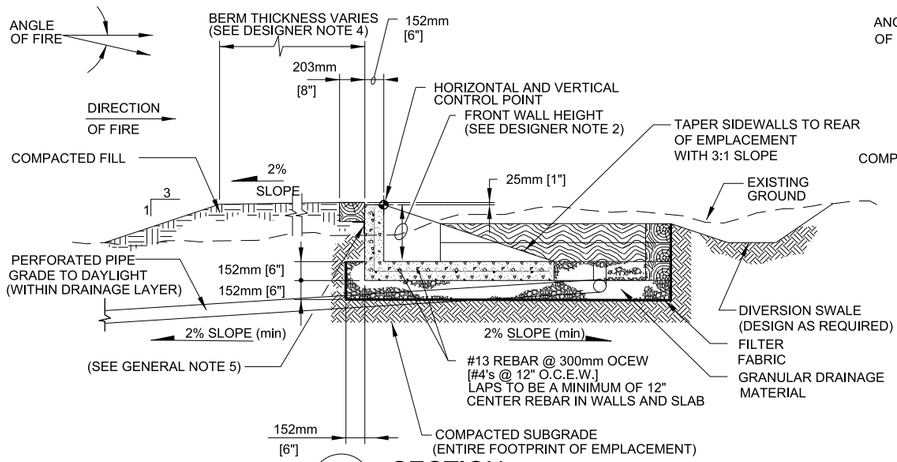
AUGUST 2017

RANGE AND TRAINING LAND PROGRAM
STANDARD DESIGN MANUAL

WIDENED STATIONARY INFANTRY TARGET EMPLACEMENT

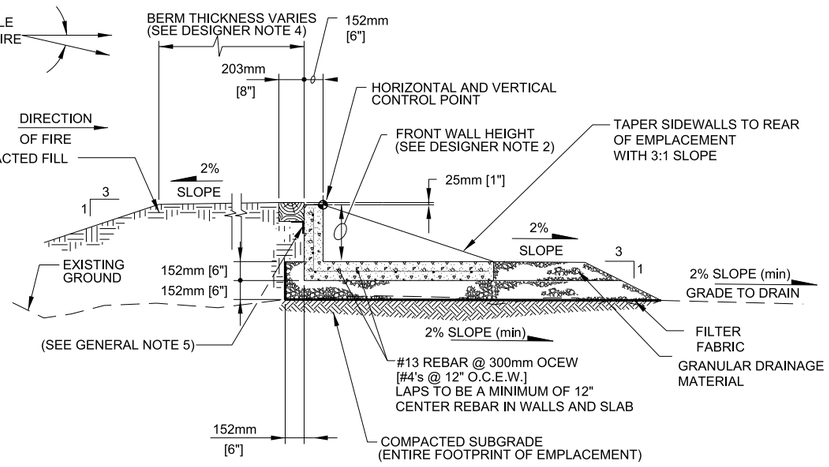
SHEET ID
W-SIT

%PRODUCTION DATA 1%



SECTION

SCALE: 1/2" = 1'



SECTION

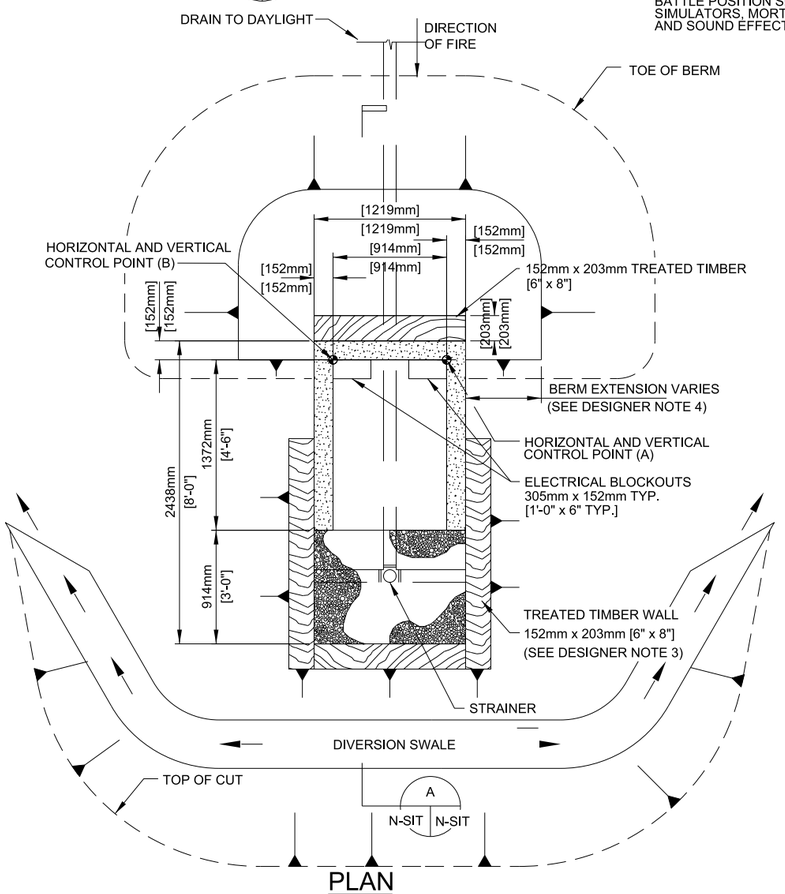
SCALE: 1/2" = 1'

NOTE:

THIS EMPLACEMENT DETAIL ALSO APPLIES FOR BATTLE POSITION SENSORS, BATTLE EFFECTS SIMULATORS, MORTAR SIMULATION DEVICES, AND SOUND EFFECTS SIMULATORS.

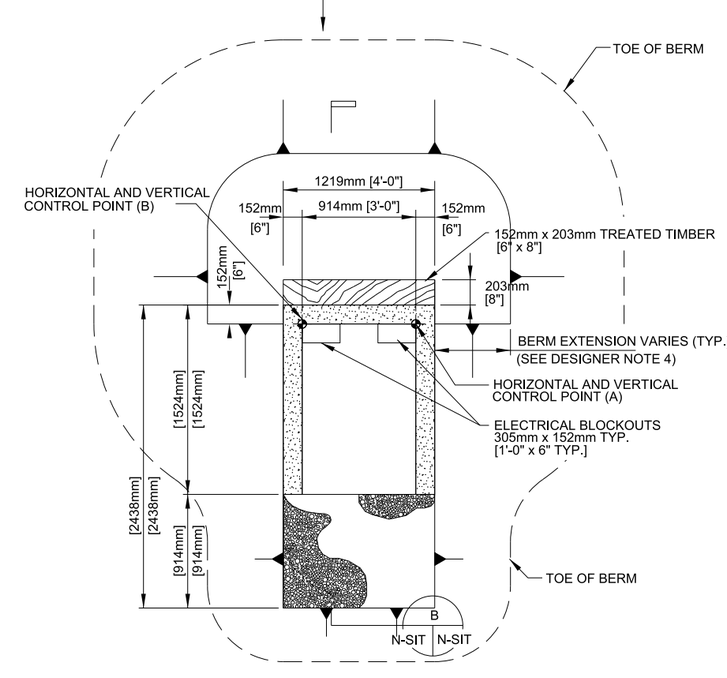
GENERAL NOTES:

1. CONCRETE SHALL DEVELOP A MINIMUM COMPRESSIVE STRENGTH OF 28MPa (4000psi) IN 28 DAYS.
2. EMPLACEMENTS SHALL BE CONSTRUCTED OF REINFORCED CONCRETE; CONCRETE STRUCTURES SHALL BE PRECAST OR CAST-IN-PLACE. PRECAST STRUCTURE WILL HAVE LIFTING EYES CUT FLUSH.
3. ALL REINFORCING STEEL SHALL BE PER ASTM A615, GRADE 60.
4. AREAS DISTURBED BY CONSTRUCTION ACTIVITIES SHALL BE REVEGETATED OR RESURFACED CONSISTENT WITH THE NATURAL SURROUNDINGS. GROUND COVER SHALL NOT REDUCE TARGET VISIBILITY.
5. PLACE TREATED TIMBERS AGAINST CONCRETE WALL ON L102mm x 102MM x 12.7mm x 102mm [4"x4"x½"x 4"] STEEL ANGLES SPACED A MAXIMUM OF 914mm [3'] ON CENTER. ATTACH ANGLE TO CONCRETE WITH CONCRETE ANCHORS.
6. ALL DIMENSIONS ARE INDICATED AS FOLLOWS: METRIC UNITS [ENGLISH] FOR INSTANCE, 1372mm [4'-6"]
7. HORIZONTAL CONTROL POINT (A) IS LOCATED ON THE LEFT SIDE OF TARGET AS VIEWED FROM THE FIRING POSITION.
8. PROVIDE 13mm [1/2"] CHAMFER ON ALL EXPOSED CONCRETE SURFACES.
9. LABEL EACH EMPLACEMENT. COORDINATE WITH RANGE CONTROL FOR NUMBERING SCHEME.



PLAN
ASCENDING SLOPE OR BELOW GRADE EMPLACEMENT

SCALE: 1/2" = 1'



PLAN
SURFACE / FILL EMPLACEMENT

SCALE: 1/2" = 1'

DESIGNER NOTES:

1. REFER TO THE STATIONARY INFANTRY TARGETS WRITE-UP IN THE RDG FOR ADDITIONAL INFORMATION AND REQUIREMENTS.
2. THE MINIMUM FRONT WALL HEIGHT OF 460MM (18") PROVIDES FULL PROTECTION FOR THE TARGETRY AND ELECTRICAL EQUIPMENT FOR AN ANGLE OF FIRE OF +/- 2 DEGREES AND HIDES THE TARGET LIFTER INCLUDING THE TARGET ARMS UP TO A 10 DEGREE DOWN ANGLE OF FIRE. COORDINATE WITH THE INSTALLATION AND THE RTLP-MCX FOR GREATER ANGLES OF FIRE.
3. RETAINING WALLS MUST BE CONSTRUCTED OUT OF ADEQUATELY CONNECTED TREATED TIMBERS WITH FILTER FABRIC EXTENDING THE FULL HEIGHT OF WALL DESIGNED BASED ON LOCAL CONDITIONS
4. REFER TO THE TARGET EMPLACEMENT PROTECTION SECTION OF THE RDG FOR THE REQUIRED BERM THICKNESS AND BERM EXTENSION REQUIREMENTS. BERM EXTENSIONS OF ¼ OF THE BERM THICKNESS PROVIDE FULL PROTECTION FOR DIRECTIONS OF FIRE OF UP TO +/- 20 DEGREES AND ADEQUATE PROTECTION UP TO +/- 30 DEGREES.
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GRAPHIC SCALE:

0 2' 4' 8'

SCALE:1/2"=1'

NARROW STATIONARY INFANTRY TARGET EMPLACEMENT

%PRODUCTION DATA 1%

US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

ISSUE DATE:
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