

DESIGN CHECKLIST

HOW TO USE THIS CHECKLIST

1. This Sustainable Range Program Design checklist is provided for use by personnel involved in the SRP effort. It is a checklist of common items which should be verified during the design phase of a range project. Use this checklist in conjunction with reference documents listed in these Design Guides.
2. Checklist items marked with an M indicate that it is a MCX Critical design requirement. The checklist user should mark the “YES” or “NO” block after each item and write clarifying remarks in the “NOTES” column when appropriate. MCX Critical items marked “NO” must be corrected or resolved prior to project continuation to the next phase.
5. The checklist is designed to be a quality assurance guide only and is not intended to replace Army publications (ARs, TCs, FMs, UFCs, CEHNC 1110-1-23) which address key aspects of the SRP.

ADMINISTRATIVE DATA RANGE INFORMATION
RANGE TYPE
PN
INSTALLATION
MACOM
EST. CONSTRUCTION CONTRACT AWARD
(Month/Year)
REVIEWER INFORMATION
NAME
DATE
POSITION
ORGANIZATION
PHASE/EVENT

CHECKLIST ITEMS	M	YES	NO	NOTES
1. Munition Explosive Constituents (MEC)	M			
a. Has a range reconnaissance of the proposed construction area been conducted				
b. Were low, moderate, and high risk MEC areas designated in the range reconnaissance report				
c. Has a subsurface clearance been contracted and/or completed prior to range construction activities in the moderate and high risk MEC areas as required by EP 75-1-2				
d. Has construction and/or safety support been designated or contracted for during range construction activities as required by EP 75-1-2				
e. Have adequate provisions been incorporated into the Construction Specifications to adequately advise the Range Construction Contractor of the potential to encounter MEC and the site-specific training required for all employees working at the site				
2. Gun-Target Line (GTL), (TC 25-8, Chapter 4)				
a. GTL perpendicular to high ground on rough terrain.				
b. GTL horizontal or below horizontal on flat terrain.				
3. Surface Danger Zone:(TC 25-8)				
a. Rising terrain has been utilized to potentially reduce SDZ.				
b. Terrain is free of exposed rocks, boulders and other ricochet producing objects.				
b. Backstop consists of loam and sandy soil.				

CHECKLIST ITEMS	M	YES	NO	NOTES
4. Training Considerations:				
a. Vegetation is retained but does not obscure targets from firing position(s).				
b. Angle from firing position to targets enables shooters to acquire and recognize targets (infantry)	M			
c. All targets within a lane are visible from the lane firing position (small arms).	M			
d. All designated targets are visible from gunner's position throughout firing boxes (armor).	M			
e. Designated Targets in adjacent lanes are visible from defilade positions and firing boxes (armor).	M			
f. Vegetation or terrain provide intermittent concealment of MIT.				
g. SITS are oriented to face the firing line when upright.	M			
5. Range Design:				
a. Target emplacement quantities are IAW CEHNC 1110-1-23 and TC 25-8. Any deviation requires ATSC approval.	M			
b. ROCA facilities meet DD1391 and are IAW TC 25-8 and CEHNC 1110-1-23 requirements. Any deviation requires ATSC approval.	M			
c. Target emplacements meet DD 1391 and are IAW TC 25-8 and CEHNC 1110-1-23 requirements. Any deviation requires ATSC approval.	M			
d. Number of lanes meet DD 1391 and are IAW TC 25-8 and CEHNC 1110-1-23 requirements. Any deviation requires ATSC approval.	M			
e. Natural Resources Considerations:				
1) Threatened and endangered species are not impacted, IAW AR 420-74 by this project.	M			

CHECKLIST ITEMS	M	YES	NO	NOTES
2) Neither cultural nor historic resources are adversely impacted, IAW AR 420-40 by this project.	M			
3) <u>No water resources or wetlands are adversely impacted by this project.</u>	<u>M</u>			
4) <u>All required NEPA documentation has been completed IAW AR 200-2.</u>	<u>M</u>			
5) <u>All required environmental permits have been obtained.</u>	<u>M</u>			
f. Target arrays and distances meet the requirements of the appropriate gunnery manuals for weapons systems/tables to be used on this range.	M			
g. Infantry targets susceptible to main gun fire are adequately protected by berms. (armor)	M			
h. MIT locations do not exceed ±5 meters variance from required locations (small arms).	M			
i. Target emplacements utilize natural terrain to protect equipment without destroying existing terrain characteristics, whenever possible.				
j. Overall size and heights of front and side walls of target emplacements are IAW CEHNC 1110-1-23.	M			
k. Target Emplacements are oriented so that the target mechanism faces the firing line and/or firing points when upright.	M			
l. Front walls meet the following heights:				
1) SIT = 457 mm (18 in.) minimum	M			
2) MIT = 660 mm (26 in.) minimum	M			
3) SAT (non-aerial gunnery) = 1.05m (42 in.).				
4) SAT (aerial gunnery) = 1.35m (53 in.).	M			

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CHECKLIST ITEMS	M	YES	NO	NOTES
5) MAT (non-aerial gunnery) = 1.53m (60 in.) above sub-base.	M			
6) MAT (aerial gunnery) = 1.83m (72 in.) above sub-base.	M			
m. Berm thickness will withstand penetration by ammunition to be fired by weapons planned for use on this range.	M			
6. Geotechnical Considerations:				
a. Have geotechnical investigations been conducted near the building footprints, ROCA, or MATs to determine foundation design criteria				
b. Has a California Bearing Ratio (CBR) test or other design info been obtained for road design				
c. Has the soil conductivity been obtained to determine if electrical grounding may be a problem				
7. Trails and Service Roads:				
a. There is a minimum of two tank trails per lane. (for armor ranges only)	M			
b. Tank trails and/or service road networks provide adequate access to target emplacements for maintenance.				
<u>c. Low Water Stream Crossing(s) have been constructed at places where trails and roads cross channels, and stream bank protective measures implemented at the crossing sites to protect streams and creeks.</u>				
<u>d. Trail and road side drainage ditches have been stabilized as required to minimize erosion.</u>				
<u>e. High traffic areas on trails have been hardened, if required, to minimize rutting and erosion.</u>				
8. Infantry Firing Positions:				

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CHECKLIST ITEMS	M	YES	NO	NOTES
a. Foxholes are provided within each lane at the firing line on small arms ranges IAW with TC 25-8 and CEHNC 1110-1-23.	M			
b. Additional firing positions are provided along firing lane for supporting shooters. (sniper)				
c. Foxholes provide clear visibility of targets and facilitate drainage.	M			
d. Provisions are made for drainage of firing positions.				
9. Camera Tower or Pole:				
a. Camera enclosure size, configuration, and spacing conform to requirements shown in CEHNC 1110-1-23.	M			
b. Separate RGS conduit provided for power and optical fiber cable entrance into enclosure and securely anchored.	M			
c. The optical fiber cable armor jacket is bonded to earth ground bus at enclosure.	M			
d. The camera enclosure is bonded to earth ground with a No.6 AWG insulated ground cable.	M			
e. Lightning protection meets National Fire Prevention Association (NFPA) code 780.	M			
f. SC type connectors installed on all fiber cables.	M			
g. Minimum bend radius of optical cable has not been exceeded (10 times the diameter of the cable under no load conditions). There is also no micro bending of optical cable (pinched).	M			
h. Minimum of 2 meter service loop of six strand fiber in camera tower or pole enclosure.	M			
i. Buffer tube fan-out kit installed and furcation unit anchored in enclosure.	M			
j. Cables are permanently tagged adjacent to conduit penetrations showing cable destinations.	M			
k. Optical fiber cables are free of splices.	M			
l. A 120Vac, 20A duplex receptacle installed for media converter is located inside enclosure.	M			
m. Seal conduits entering enclosure.	M			
n. Surge Suppression is provided in local power panel at camera position.	M			
10. Control Tower:				
	M			

CHECKLIST ITEMS	M	YES	NO	NOTES
a. Work table surface is 36" by the width of the tower and has a slot or hole for power and data cable access.	M			
b. HVAC is provided in an appropriate location.	M			
c. Back wall of control room is windowless.	M			
d. Data Termination Rack (DTR) is installed IAW CEHNC 1110-1-23. The DTR is an industry standard, NEMA 12, 19" (22" OD), 36" deep, 83.125" tall rack with ventilation. There shall be a 36" working space in front, back, and on one side of the cabinet. There shall be a 6" space on the side of the cabinet that is adjacent to the nearest wall.	M			
e. A No. 6 AWG insulated ground cable is installed between the SPG (single point ground) and the DTR.	M			
f. 120-VAC, 20-amp receptacles are provided for RCS's and printer IAW CEHNC 1110-1-23.	M			
g. The tower ground is certified by COE contractor to yield earth resistance of 25 ohms or less.	M			
h. Two separate dedicated 20A, 120V circuits to a quadplex receptacle are provided near DTR for power.	M			
i. A 4-inch X 4-inch wire way is provided between the DTR and the RCS computer location IAW CEHNC 1110-1-23.	M			
j. A minimum of 1 meter of data cable left coiled inside of DTR connector housings.	M			
k. Pull wires are provided in all empty conduits.	M			
l. Minimum bend radius of optical cable has not been exceeded (10 times the diameter of the cable under no load conditions). There is also no micro bending of optical cable (pinched).	M			
m. Downrange data cables are terminated on a patch panel in the DTR (RJ45 female ends for copper cable and SC connectors for fiber optics).	M			
n. Buffer tube fan-out kits installed and furcation units anchored in DTR's connector housing.	M			
o. DTR vertical and horizontal cable management is clean, neat, and orderly.	M			
p. All optical cable armor jackets are bonded to earth ground at DTR.	M			
q. Optical fiber cable is installed in innerduct and RGS conduit from DTR to 5' line of tower.	M			
r.. Lightning protection meets national Fire Prevention Association (NFPA) code 780.	M			
s. Minimum of Cat5e rated cable is installed to all data outlets.	M			

CHECKLIST ITEMS	M	YES	NO	NOTES
t. All data cables at every termination point are labeled with a permanent label.	M			
u. Data outlets have an RJ45 connector with a minimum Cat5e rating.	M			
11. Range Operations Center (ROC):	M			
a. Adequate space is available for target installer work station. Power receptacles and Data outlets are provided.	M			
b. All empty conduits shall have a pull string.	M			
c. A raised computer floor 12" depth minimum installed in comm. and control room.	M			
d. An opening of 384sq. in. minimum cross sectional area is provided between raised floor in comm. and control rooms.	M			
e. HVAC is provided for comm. and control room.	M			
f. A minimum of 1 meter of optical fiber cable left coiled inside of Data Termination Rack (DTR) connector housings.	M			
g. Minimum bend radius of optical cable has not been exceeded (10 times the diameter of the cable under no load conditions). There is also no micro bending of optical cable (pinched).	M			
h. The number of DTR's installed are IAW CEHNC 1110-1-23. Adequate space is available for OPA funded racks.	M			
i. Data Termination Rack (DTR) is installed IAW CEHNC 1110-1-23. The DTR shall be an industry standard NEMA 12, 19" (22" OD), 36" deep, 83.125" tall rack with ventilation. There shall be 36" working space in front, back, and one side of the cabinet, There shall be 6" of space on the side adjacent to the nearest wall.	M			
j. Wire way is provided between the DTR's and RCS computer locations.	M			
k. Two separate dedicated 120-VAC, 20-amp circuits to a quadplex receptacle are provided for each DTR's power to outlet strip.	M			
l. A minimum #6 AWG ground cable bonds the DTRs and earth ground.	M			
m. Raised computer floor has grounding grid.	M			
n. Lightning protection meets national Fire Prevention Association (NFPA) code 780.	M			
o. Downrange communication conduits are stubbed up underneath DTRs and grounded IAW CEHNC 1110-1-23.	M			
p. Innerduct installed where main or downrange optical fiber cable enters the building in rigid conduit.	M			

CHECKLIST ITEMS	M	YES	NO	NOTES
q. Optical fiber cables are free of splices.	M			
r. DTR cables are permanently tagged adjacent to conduit penetrations showing cable destinations.	M			
s. Downrange data cables are terminated on a patch panel in the DTR (SC connectors are used for fiber optic cable).	M			
t. DTR vertical and horizontal cable management is clean, neat, and orderly.	M			
u. Buffer tube fan-out kits installed and furcation units anchored in DTR's connector housing.	M			
v. SC connector panels in the DTR are individually and permanently labeled showing cable destinations.	M			
w. Optical fiber cables meet CEHNC 1110-1-23 specifications.	M			
x. Minimum of Cat5e rated cable is installed to all data outlets.	M			
y. All data cables at every termination point are labeled with a permanent label.	M			
z. Data outlets have an RJ45 connector with a minimum Cat5e rating.	M			
aa. Observation room has 8 junction boxes with conduit back to the communication room. Each junction box in ob. Room shall be spaced above the observation room. Provide pull strings in each conduit. Each junction box has a 20A duplex receptacle nearby for OPA monitors.	M			
bb. All metal conduits and cable trays shall be bonded together and grounded.	M			
cc. Panelboards are recessed mounted in finished areas.	M			
dd. Exterior lighting is provided on separate switching located near points of egress.	M			
ee. Exterior or interior white and red lights have separate switching.	M			
ff. Emergency lighting and exits signs are provided IAW codes.	M			
gg. Red lighting is provided near white fixtures in observation rooms, control rooms, and on exterior walls.	M			
hh. Minimum of 24 strands of fiber optic cable is installed between DTRs in AAR and ROC.	M			
ii. UPS space is provided.	M			
jj. Two conduits with pull wire are provided in the control room through an exterior wall, is stubbed up 6" outside of the control room and is capped on both ends.	M			

CHECKLIST ITEMS	M	YES	NO	NOTES
12. After Action Review Building (AAR)	M			
a. Adequate space is available for target installer work stations. Power receptacles are provided on dedicated 20 amp circuits.	M			
b. Minimum of 24 strands of fiber optic cable is installed between DTRs in ROC and AAR.	M			
c. HVAC is provided in the development, theater, and control rooms.	M			
d. A minimum of 1 meter of optical fiber cable left coiled inside of DTR connector housings.	M			
e. Minimum bend radius of optical cable has not been exceeded (10 times the diameter of the cable under no load conditions). There is also no micro bending of optical cable (pinched).	M			
f. Data Termination Rack (DTR) is installed IAW CEHNC 1110-1-23. The DTR shall be an industry standard NEMA 12, 19" (22" OD), 36" deep, 83.125" tall rack with ventilation. There shall be 36" working space in front, back, and one side of the cabinet, There shall be 6" of space on the side adjacent to the nearest wall.	M			
g. Wire way is provided between the DTR's and workstation computer locations.	M			
h. Two separate dedicated 120-VAC, 20-amp circuits to a quadplex receptacle are provided for each DTR's power to outlet strip.	M			
i. Innerduct installed where optical fiber cable enters the building in rigid conduit.	M			
j. Communication conduits are stubbed up underneath DTR and grounded IAW CEHNC 1110-1-23.	M			
k. A minimum #6 AWG ground cable bonds the DTRs and earth ground.	M			
l. Lightning protection meets national Fire Prevention Association (NFPA) code 780.	M			
m. Optical fiber cables are free of splices between termination points.	M			
n. Data cables are terminated on a patch panel in the DTR (SC connectors are used for fiber optic cable).	M			
o. DTR cables are permanently tagged adjacent to conduit penetrations showing cable destinations.	M			
p. DTR vertical and horizontal cable management is clean, neat, and orderly.	M			
q. Each DTR optical fiber cable armor jacket is bonded to main ground bus at DTR rack.	M			
r. Buffer tube fan-out kits installed and furcation units anchored in DTR's connector housing.	M			

CHECKLIST ITEMS	M	YES	NO	NOTES
s. SC connector panels in the DTR are individually and permanently labeled showing cable destinations.	M			
t. Minimum of Cat5e rated cable is installed to all data outlets.	M			
u. All data cables at every termination point are labeled with a permanent label.	M			
v. Data outlets have an RJ45 connector with a minimum Cat5e rating.	M			
w. Optical fiber cables meet CEHNC 1110-1-23 specifications.	M			
x. All empty conduits shall have a pull string.	M			
y. All metal conduits and cable trays shall be bonded together and grounded.	M			
z. A continuous 12" minimum ladder type wireway extends from DTRs in development areas via control rooms to the theater projector area.	M			
aa. A 20A duplex receptacle is provided near each overhead projector location in the theater area(s).	M			
bb. A 1" conduit is provided from a junction box at each overhead projector location in the theater area to the ladder type wireway.	M			
cc. A 1" conduit is provided from a junction box at each control room to the ladder type wireway.	M			
dd. No counters are provided in development area(s).	M			
ee. Panelboards are recessed mounted in finished areas.	M			
ff. Exterior lighting is provided on separate switching located near points of egress.	M			
gg. Exterior or interior white and red lights have separate switching.	M			
hh. Emergency lighting and exits signs are provided IAW codes.	M			
ii. Red lighting is provided near white fixtures in observation rooms, control rooms, and on exterior walls.	M			
jj. Receptacles for work stations are fed on dedicated 20-amp circuits. There should be one duplex receptacle per workstation.	M			
13. SIT Emplacements:	M			
a. Emplacement size is IAW CEHNC 1110-1-23 (see drawing CD-01).	M			
b. Hostile fire simulator emplacements will have standard power and data IAW CEHNC 1110-1-23 (see drawing ED-01 and CD-02).	M			
c. Target emplacements are sloped (2%) to the rear of the emplacements for drainage.	M			

CHECKLIST ITEMS	M	YES	NO	NOTES
d. A minimum of 29 inches of clearance is provided from the rear of the emplacement to any retaining timber or rising ground to allow sufficient space for the target in the down position.	M			
e. Berm fill is level with the top of the protective timber at the front of the emplacement.	M			
f. All data and power conduits are routed to the rear or side of emplacement.	M			
g. TDP and LC location, configuration, and dimension is IAW CEHNC 1110-1-23..	M			
h. SIT cluster layout for front wall is IAW CEHNC 1110-1-23. (see drawing ED-05).	M			
i. SIT cluster layout for group data plan is IAW CEHNC 1110-1-23. (see drawing ED-05).	M			
j. TDP has adequate free space for installation of media converter, copper data cable protector, optical fiber switch, or hub.	M			
k. Buffer tube fan-out kits are properly installed and anchored (furcation units are not required).	M			
l. SC type connectors installed on all fiber cables.	M			
m. Data cables are installed in the TDP with a minimum of a 1 m service loop coiled inside the box with cable ends protected from contamination.	M			
n. Permanent tags are attached to the cables (inside the box, directly above the conduit opening) to identify the cable destination.	M			
o. SC connector panels are individually and permanently labeled showing fiber destinations.	M			
.p. All conduits are sealed entering the TDP from the ground.	M			
q. Watertight fittings are provided for all conduit and cable entries.	M			
r. A No. 6 AWG bare copper conductor is provided between the ground rod and the equipment grounding bar inside the TDP.	M			
s. All data cable armor or shields are bonded to ground bar in TDP.	M			
t. A No. 6 AWG bare copper conductor is provided between the ground rod and the LC equipment grounding bar.	M			
u. A 9-foot free length coil of No. 6 AWG is provided from the grounding rod.	M			
v. Minimum bend radius of optical cable has not been exceeded (10 times the diameter of the cable under no load conditions). There is also no micro bending of optical cable (pinched).	M			
w. TDP cover holding screws do not penetrate the box.	M			

CHECKLIST ITEMS	M	YES	NO	NOTES
x. Data cables meet CEHNC 1110-1-23 specifications.	M			
y. A double-pole, 20-amp circuit breaker is provided for target power outlet	M			
z. Target power outlet is a NEMA L14-20R, 20Amp, 125/250V with weatherproof cover.	M			
aa. 2-120V NEMA L5-20R receptacles with in-use cover are provided. 5 for main SIT in Cluster.	M			
bb. A 120-volt duplex receptacle is provided in the TDP.	M			
cc. A 120-volt, 20-amp weatherproof duplex GFCI receptacle is provided for maintenance.	M			
dd. Surge suppression in the LC is provided.	M			
ee. Data Surge Protection is provided between targetry emplacements on both ends of all copper cabling.	M			
ff. All emplacements and enclosures are clean of dirt and debris.	M			
gg. Emplacement bed and berm are compacted to the designed 95% compaction are free of holes.	M			
14. MIT Emplacements:	M			
a. Emplacement size is IAW CEHNC 1110-1-23 (see drawing CD-03).	M			
b. Emplacements are placed at a 45 degree (\pm 5 degrees) angle to the firing position(s)	M			
c. Berm fill is level with the top of the protective timber at the front of the emplacement.	M			
d. TDP and LC location, configuration, and dimension is IAW CEHNC 1110-1-23. (see drawing ED-02).	M			
e. All data and power conduits are routed to the rear or side of emplacement.	M			
f. TDP has adequate free space for installation of media converter, optical fiber switch, or hub.	M			
g. Data cables are installed in the TDP with a minimum 1 m service loop coiled inside the box with cable ends protected from contamination.	M			
h. Permanent tags are attached to the cables (inside the box, directly above the conduit opening) to identify the cable destination.	M			
i. Buffer tube fan-out kits are properly installed and anchored (furcation units are not required).	M			
j. SC type connectors installed on all fiber cables.	M			
k. All conduits are sealed entering the TDP from the ground.	M			
l. SC connector panels are individually and permanently labeled showing fiber destinations.	M			

CHECKLIST ITEMS	M	YES	NO	NOTES
m. Watertight fittings are provided for all conduit and cable entries.	M			
n. A No. 6 AWG bare copper conductor is provided between the ground rod and the equipment grounding bar inside the TDP.	M			
o. All data cable armor or shields are bonded to ground bar in TDP.	M			
p. A No. 6 AWG bare copper conductor is provided between the ground rod and the LC equipment grounding bar.	M			
q. A 6-foot length coil of No. 6 AWG bare conductor is provided from the grounding rod.	M			
r. Minimum bend radius of optical cable has not been exceeded (10 times the diameter of the cable under no load conditions). There is also no micro bending of optical cable (pinched).	M			
s. TDP cover holding screws do not penetrate the box.	M			
t. Data cables meet CEHNC 1110-1-23 specifications.	M			
u. A double-pole, 20-amp circuit breaker is provided for target power outlet	M			
v. Target power outlet is a NEMA L14-20R, 20Amp, 125/250V with weatherproof cover.	M			
w. 2-120V NEMA L5-20R receptacles with in-use cover are provided.	M			
x. A 120-volt duplex receptacle is provided in the TDP.	M			
y. A 120-volt, 20-amp weatherproof duplex GFCI receptacle is provided for maintenance.	M			
z. Equipment for power and data is located at end closest to firing position.	M			
aa. Surge suppression in the LC is provided.	M			
bb. Data Surge Protection is provided between targetry emplacements on both ends of all copper cabling.	M			
cc. All enclosures are clean of dirt and debris.	M			
dd. Emplacement bed and berm are compacted to the designed 95% compaction are free of holes.	M			
ee. All emplacements and enclosures are clean of dirt and debris.	M			
15. SAT Emplacements:	M			
a. Emplacement size is IAW CEHNC 1110-1-23 (see drawing CD-05).	M			
b. A 10-foot free length coil of No. 6 AWG copper wire is provided from the grounding rod.	M			

CHECKLIST ITEMS	M	YES	NO	NOTES
c. Berm fill is sloped 3" above wall level and tapers to level with protective timber at the front of the emplacement.	M			
d. TDP and LC location, configuration, and dimension is IAW CEHNC 1110-1-23. (see drawing ED-02).	M			
e. All data and power conduits are routed to the rear or side of emplacement.	M			
f. TDP has adequate free space for installation of media converter, optical fiber switch, copper data cable protector or hub.	M			
g. Data cables are installed in the TDP with a minimum of a one meter service loop coiled inside the box.	M			
h. Permanent tags are attached to the cables (inside the box, directly above the conduit opening) to identify the cable destination.	M			
i. Buffer tube fan-out kits are properly installed and anchored (furcation units are not required).	M			
j. SC type connectors installed on all fiber cables.	M			
k. All conduits are sealed entering the TDP from the ground.	M			
l. SC connector panels are individually and permanently labeled showing fiber destinations.	M			
m. Watertight fittings are provided for all conduit and cable entries.	M			
n. A No. 6 AWG bare copper conductor is provided between the ground rod and the equipment grounding bar inside the TDP.	M			
o. All data cable armor or shields are bonded to ground bar in TDP.	M			
p. A No. 6 AWG bare copper conductor is provided between the ground rod and the LC.	M			
q. Minimum bend radius of optical cable has not been exceeded (10 times the diameter of the cable under no load conditions). There is also no micro bending of optical cable (pinched).	M			
r. Data cables meet CEHNC 1110-1-23 specifications.	M			
s. A double-pole, 20-amp circuit breaker is provided for target power outlet	M			
t. Target power outlet is a NEMA L14-20R, 20Amp, 125/250V with weatherproof cover.	M			
u. 2-120V NEMA L5-20R receptacles with in-use cover are provided.	M			
v. 120-volt duplex receptacle is provided in the TDP.	M			
w. A 120-volt, 20-amp weatherproof duplex GFCI receptacle is provided for maintenance	M			

CHECKLIST ITEMS	M	YES	NO	NOTES
x. Data Surge Protection is provided between targetry emplacements on both ends of all copper cabling.	M			
y. Provide surge protection.	M			
z. All enclosures are clean of dirt and debris.	M			
aa. Emplacement bed and berm are compacted to the designed 95% compaction are free of holes.	M			
bb. All emplacements and enclosures are clean of dirt and debris.	M			
<u>cc. All emplacement berm slopes have been stabilized and vegetative cover established to minimize erosion.</u>				
16. MAT Emplacements:	M			
a. Emplacement size is IAW CEHNC 1110-1-23 (see drawing CD-06).	M			
b. No. 6 AWG bare copper conductor is provided between the grounding rod and the LC(power panel) mounting bolt.	M			
c. 10 KVA (minimum) power center with 120/240VAC secondary power is provided.	M			
d. Target power outlet is a NEMA L14-20R, 20Amp, 125/250V with weatherproof cover.	M			
e. 2-120V NEMA L5-20R receptacles with in-use cover are provided.	M			
f. Track bed/service road width is a minimum of 8.25 meters.	M			
g. MAT track bed/service road grade does not exceed 5.7 degrees (10 percent).	M			
h. The first 60 meters (196 feet) of MAT roadbed (at its power source end) and the last 40 meters (131 feet) of track has a grade of 0 degrees ±1 percent.	M			
i. Ensure all metal equipment is bonded and grounded.	M			
j. The minimum turning radius of curved track is 152.4 meter (500 feet).	M			
k. A No. 6 AWG bare copper conductor is provided between the grounding rod and the LC and TDP equipment grounding bar.	M			
l. A 15-foot free length coil of No. 6 AWG copper wire is provided from the grounding rod.	M			
m. Berm fill is sloped 3" above wall level and tapers to level with protective timber at the front of the emplacement.	M			
n. TDP and LC location, configuration, and dimension is IAW CEHNC 1110-1-23. (see drawing ED-04).	M			

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CHECKLIST ITEMS	M	YES	NO	NOTES
.o. All data and power conduits are routed to the rear or side of emplacement.	M			
p. TDP has adequate free space for installation of media converter, copper data cable protector, optical fiber switch, or hub.	M			
q. Data cables are installed in the TDP with a minimum of a one meter service loop coiled inside the box.	M			
r. Permanent tags are attached to the cables (inside the box, directly above the conduit opening) to identify the cable destination.	M			
s. Buffer tube fan-out kits are properly installed and anchored (furcation units are not required).	M			
t. All conduits are sealed entering the TDP from the ground.	M			
u. SC type connectors installed on all fiber cables.	M			
v. SC connector panels are individually and permanently labeled showing fiber destinations.	M			
w. Watertight fittings are provided for all conduit and cable entries.	M			
x. All data cable armor or shields are bonded to ground bar in TDP.	M			
y. Minimum bend radius of optical cable has not been exceeded (10 times the diameter of the cable under no load conditions). There is also no micro bending of optical cable (pinched).	M			
z. Data cables meet CEHNC 1110-1-23 specifications.	M			
aa. A 120-volt duplex receptacle is provided in the TDP.	M			
bb. A 120-volt, 20-amp weatherproof duplex GFCI receptacle is provided for maintenance.	M			
cc. Data Surge Protection is provided between targetry emplacements on both ends of all copper cabling.	M			
dd. Provide surge protection.	M			
ee. All enclosures are clean of dirt and debris.	M			
ff. Emplacement bed and berm are compacted to the designed 95% compaction are free of holes.	M			
gg. All emplacements and enclosures are clean of dirt and debris.	M			
hh. <u>All emplacement berm slopes have been stabilized and vegetative cover established to minimize erosion.</u>				
17. UAC:	M			

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CHECKLIST ITEMS	M	YES	NO	NOTES
a. Target emplacement, power, and data outlet quantities meet DD 1391 and are IAW TC 25-8 and CEHNC 1110-1-23. (Any deviation requires ATSC approval.)	M			
b. Target emplacements are oriented so that the target mechanism faces the firing line and/or firing points when upright (Grenadier Gunnery [GG]).	M			
c. Target and data outlet configurations are IAW CEHNC 1110-1-23. (All stations except GG)	M			
d. Target and data outlets have weatherproof boxes and covers.	M			
e. All power and data cabling above ground to be installed in RGS conduit.	M			
f. Pedestal location is IAW TC 25-8 and CEHNC 1110-1-23.	M			
g. A No. 6 AWG bare copper conductor is provided between the ground rod and the pedestal chassis.	M			
h. Target power outlet is a NEMA L14-20R, 20Amp, 125/250V.	M			
i. 1-120V NEMA L5-20R receptacles with in-use cover are provided.	M			
j. 2 target power outlets and 2 auxiliary receptacles are provided for double target outlets.	M			
j. Target data outlet is 2-RJ45 connectors with a minimum Cat.5e rating.	M			
k. Minimum of Cat.5e rated cable is installed to all target data outlets.	M			
l. All data cables at every termination point are labeled with a permanent label.	M			
m. Data cable on Station 3 runs from SIT to SIT in a "daisy chain" fashion. Home run of data cables from each SIT is not allowed.	M			
n. Pedestal rating is IAW CEHNC 1110-1-23.	M			
o. All conduit/cable entries into the pedestal have conduit/cable sealed IAW pedestal rating.	M			
p. A #6 AWG bare copper conductor is installed between the ground rod and pedestal chassis.	M			
q. Pedestal is clear of unwanted debris.	M			
r. Cables and termination points in pedestal are permanently labeled identifying destination.	M			
s. Grenadier Gunnery GG façade has an emplacement housing power panel with a minimum two double pole 20A breakers for 120/240V targets and a 120V maintenance receptacle installed.	M			

CHECKLIST ITEMS	M	YES	NO	NOTES
t. Grenadier Gunnery GG façade has a ground rod installed with a 15 foot #6 AWG bare copper grounding cable left coiled from the grounding system for the targetry.	M			
u. Grenadier Gunnery GG façade has a target data panel installed IAW CEHNC 1110-1-23.	M			
v. All enclosures are clean of dirt and debris.	M			
w. 120V, 20A dedicated power receptacles is provided within the pedestal.	M			
18. CACTF Training Buildings:	M			
a. Target and data outlet configurations are IAW CEHNC 1110-1-23.	M			
b. Target power outlet is one NEMA L14-20R 120/250V with a NEMA L5-20R 120V, 20Amp.	M			
c. Target data outlet is two RJ45 connectors with a minimum Cat.5e rating.	M			
d. Minimum of Cat.5e rated cable is installed to all target data outlets.	M			
e. All data cables at every termination point are labeled with a permanent label.	M			
f. Comm room doors are lockable.	M			
g. Data Termination Rack (DTR) installed in comm room IAW CEHNC 1110-1-23.	M			
h. A minimum #6 AWG ground cable bonds the DTR and earth ground.	M			
i. A minimum of 1 meter of optical fiber cable left coiled inside of DTR connector housings.	M			
j. Minimum bend radius of optical cable has not been exceeded (10 times the diameter of the cable under no load conditions). There is also no micro bending of optical cable (pinched).	M			
k. Each DTR is provided with a 120-VAC, 20-amp quadplex receptacle.	M			
l. Each DTR optical fiber cable armor jacket is bonded to main ground bus at DTR rack.	M			
m. Innerduct installed where main or downrange optical fiber cable enters the building in rigid conduit.	M			
n. Optical fiber cables are free of splices between termination points.	M			
o. DTR cables are permanently tagged adjacent to conduit penetrations showing cable destinations.	M			
p. SC type connectors installed on all fiber cables.	M			
q. DTR vertical and horizontal cable management is clean, neat, and orderly.	M			
r. Buffer tube fan-out kits installed and furcation units anchored in DTR's connector housing.	M			

CHECKLIST ITEMS	M	YES	NO	NOTES
s. SC connector panels in the DTR are individually and permanently labeled showing cable destinations.	M			
t. Optical fiber cables meet CEHNC 1110-1-23 specifications.	M			
u. One, 120-VAC, 20-amp duplex receptacle is provided in comm. room for maintenance purposes.	M			
v. Adequate climate control provided for electronics.	M			
w. All comm. room conduit and wireway penetrations through walls are sealed for rodent protection.	M			
x. Comm room roof is sealed against water penetration.	M			
y. Comm room is sealed as much as possible to help prevent dust from entering.	M			
z. All wireways have covers installed unless they are of "ladder" type of construction.	M			
aa. All empty conduits have pull wire.	M			
bb. Exterior lighting is provided on separate switching located near points of egress.	M			
cc. Exterior or interior white and red lights have separate switching.	M			
dd. Emergency lighting and exits signs are provided IAW codes.	M			
ee. Red lighting is provided near white fixtures in control rooms, and on exterior walls.	M			
ff. Target data outlet RJ45 connectors should be installed with the key way facing down.	M			
19. Shoothouse				
a. A 2-pole 120/240V circuit breaker is provided for every set of 4 target power outlets.	M			
b. Comm room doors are lockable.	M			
c. Data Termination Rack (DTR) is installed in comm. Room IAW CEHNC 1110-1-23.	M			
d. A minimum #6 AWG ground cable bonds the DTR and earth ground.	M			
e. A minimum of 1 m of All data cables at every termination point are labeled with a permanent label.	M			
f. Minimum bend radius of optical cable has not been exceeded (10 times the diameter of the cable under no load conditions). There is also no micro bending of optical cable (pinched).	M			
g. Each DTR is provided with a 120-VAC, 20-amp quadplex receptacle.	M			

CHECKLIST ITEMS	M	YES	NO	NOTES
h. Each DTR optical fiber cable armor jacket is bonded to main ground bus at DTR rack.	M			
i. Innerduct installed where main or downrange optical fiber cable enters the building in rigid conduit.	M			
j. Optical fiber cables are free of splices between termination points.	M			
k. DTR cables are permanently tagged adjacent to conduit penetrations showing cable destinations.	M			
l. SC type connectors installed on all fiber cables.	M			
m DTR vertical and horizontal cable management is clean, neat, and orderly.	M			
n. Buffer tube fan-out kits installed and furcation units anchored in DTR's connector housing.	M			
o. SC connector panels in the DTR are individually and permanently labeled showing cable destinations.	M			
p. Optical fiber cables meet CEHNC 1110-1-23 specifications.	M			
q. One, 120-VAC, 20-amp duplex receptacle is provided in comm. room for maintenance purposes.	M			
r. Climate control provided for electronics as defined by contract drawings.	M			
s. All comm. room conduit and wireway penetrations through walls are sealed for rodent protection.	M			
t. Comm room roof is sealed against water penetration.	M			
u. Comm room is sealed as much as possible to help prevent dust from entering.	M			
v. All wireways have covers installed unless they are of "ladder" type of construction.	M			
w. All empty conduits have pull wire.	M			
x. Exterior lighting is provided on separate switching located near points of egress.	M			
y. Lighting in shoothouse area does not hinder camera visibility.	M			
z. Power panel is installed properly.	M			
aa. A minimum of 4 single-pole 120V, 20A circuit breakers are provided in the power panel for cameras.	M			
bb. Maintenance receptacles are GFCI and installed in adequate locations in the Shoothouse.	M			
cc. Lightning protection meets National Fire Prevention Association (NFPA) code 700.	M			

CHECKLIST ITEMS	M	YES	NO	NOTES
dd. Bullet protection is installed properly.	M			
ee. Adequate lighting is provided in comm.. room.	M			