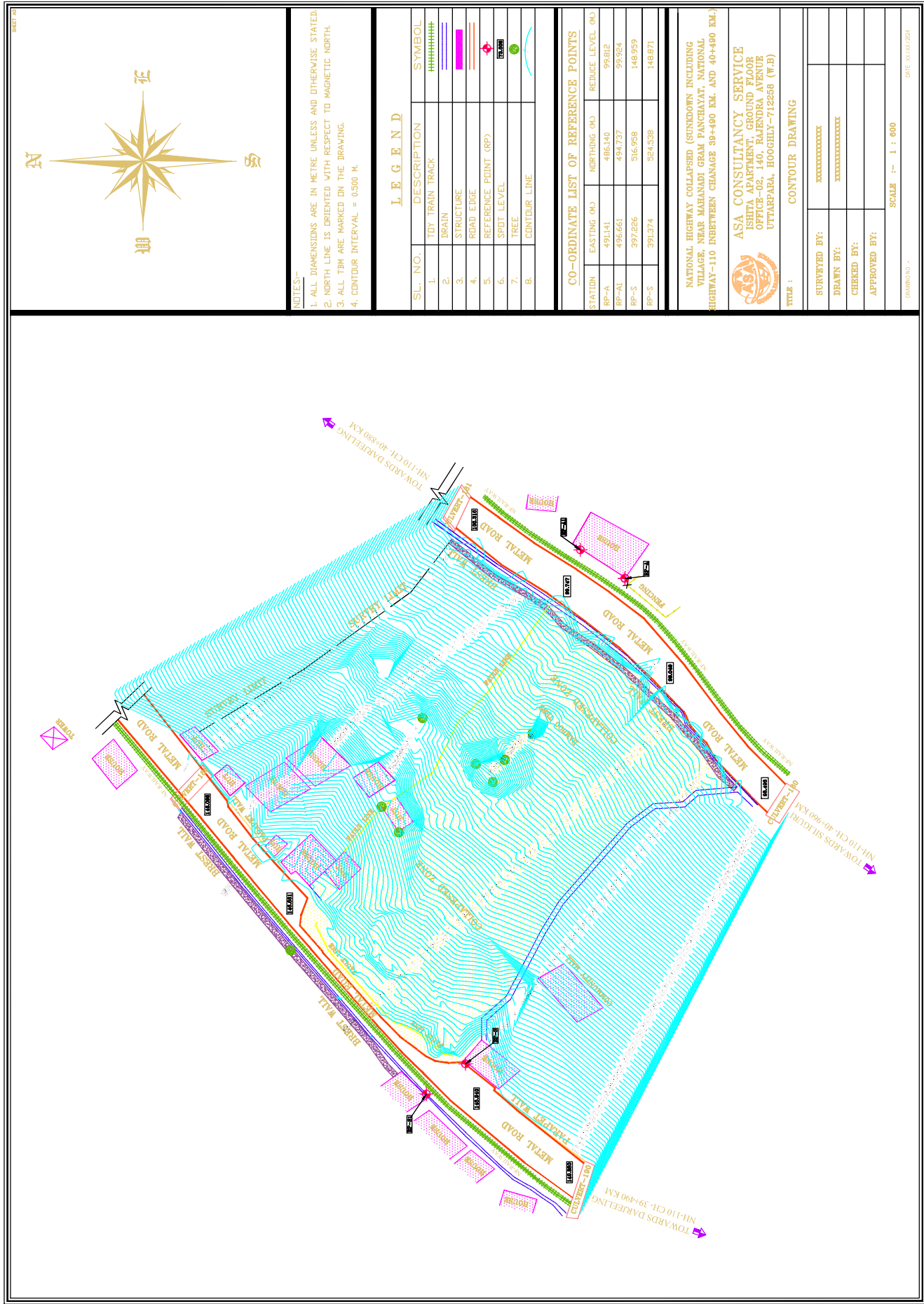






NOTES:-

All the Design Considerations shall be verified at the site.

General

1. All dimensions are in meters unless otherwise specified.

Material Specifications

1. Excavation, removal & disposal of material necessary for construction of roadway, drain shall conform to MORTH -Specifications for Road & Bridge Works: section 300.
2. The passive soil nails shall be of Self drilling anchors (SDA) -38mm dia. with yield load more than or equal to 400 kN shall be used. It shall have a minimum drill hole diameter of 76mm.The base plate shall be of size (min.) 200 X 200 X 10mm, which should be secured with nut. The exposed part of SDA, nuts and bearing plate shall be protected with suitable corrosion protection coating.
3. High tensile steel wire mesh of Rhomboidal shape (mesh opening 83x143) with diameter of inscribed circle 65mm, tensile strength 1770N/mm², Punching strength over the mesh according to ISO 17746:2016 is 180 kN, Tensile strength of mesh in the main direction is 150kN/m with wire dia 3.0mm, Galvanized (90%Zn/ 10%Al) with coating thickness 150g/m² and twisted at the ends. All accessories such as clips according to EN 13411-5.
4. BIS marked drainage composite for use behind walls/ slopes, between two different fills, alongside drains of road, below concrete lining of canals etc. having thermobonding a draining core - HDPE geonet stabilized by carbon black comprises of two sets of parallel overlaid ribs integrally connected to have a rhomboidal shape with nonwoven geotextile that will be working as separation or protecting layer, geocomposite having in plane flow capacity of 0.55 L / (m.s) at hydraulic gradient of 1.0 & 100 kPa pressure and tensile strength of 16 kN/m², with mass per unit area of 710 gsm.
5. BIS marked Knitted and Polymeric coated Polyester Uniaxial Geogrid for Soil Reinforcement indigenously manufactured from selected high tenacity polyester yarn with high molecular weight (> 25000 g/mol), and low carboxyl end group (<30mmol/kg) (extruded PP geogrids.Steel Strips not allowed & not accepted). Requirement of geogrid strength in both direction and granular fill as per IRC:SP-59-2002 & MORTH Section-700.
6. BIS Marked Needle Punched and Mechanically Bonded Non-Woven Geotextile indigenously manufactured from high quality polypropylene staple fibres (continuous filament will not be accepted) for separation, drainage and filtration application.
7. BIS marked Gabion unit is made with double twisted hexagonal shaped steel woven wire mesh, mechanically edged & selvaged with partitions at every 1m interval and shall have minimum 10 numbers of openings per meter of mesh perpendicular to twist, mesh type 10x12(D=100 mm with tolerance of $\pm$ 2%), and wire dia. 2.7/3.7mm (ID/OD) with 90% Zinc Coating as per IRC: SP-116, IS:16014 & MORTH -Specifications for Road & Bridge Works: Section 2500.
8. Drainage Pipes (Half perforated) PVC Pipes of 51mm dia.wrapped in non woven geotextile shall be installed as indicated in drawing as sub-surface drainage pipes over slope surface.
- 11.Half perforated PVC Pipes of 160mm dia.wrapped in non woven geotextile shall be installed as indicated in drawing for reinforced soil structures and subsurface drainage pipe.
- 12.The Boulders used in Gabion units shall be hard, angular to round, durable which shall not disintegrate on exposure to water or weathering during the life of the structure.
- 13.Structural fill shall comply with properties approved by engineer-in-charge. The fine passing through 75 micron shall be less than or equal to 15%. The soil shall not have PI>6. If in case structural fill with PI<6 is not available, the fill with phi > 30° is acceptable provided PI<12 and fine passing 75 micron sieve will be less than or equal to 15% and particle size in general 6mm to 20mm and in no case greater than 40mm as per MORTH -Specifications for Road & Bridge Works: section 3100.
- 14.Minimum M20 grade concrete shall be used for all concrete works (for Drains etc..) and M20 for CC wall and concrete work shall conform to specification given as per MORTH -Specifications for Road & Bridge Works: section 1700
- 15.CRS rod of 12mm diameter for connection between the fascia element (Gabion) and Geogrid as per drawings for reinforced soil wall.
- 16.Seepage observed if any shall be treated as per site conditions.

Construction Notes:

1. Extent of mitigation/restoration measures for each system should be checked before starting the work.
2. Loose scaling and excavation for drains shall be carried out before commencement of works.
3. All deposited debris/screes on the slope surface shall be removed before commencement of installation.
4. The length of anchors has to be kept as per design.
5. The spacing of anchors may change depending upon final cut profile - undulations or any other surface irregularities.
6. The location of anchors might have to be shifted locally or additional anchors and mesh might have to be installed at specific locations as per site condition, giving due consideration to joint/ fracture/ rock block.
7. In general, local bolting shall be adopted at site wherever loose boulders are encountered at site after the loose scaling operations.
8. The drill hole bore of anchors shall be grouted with neat cement grout with water cement ratio not more than 0.4. The grout shall be added with non-shrink admixture. Dosage shall be as per manufacture's guidelines.
9. The length of passive soil nails on excavated /insitu slope surface shall be maximum of length as shown in drawing or up to 2m into the rocky strata.
- 10.Gabions units shall be placed at the levels/locations as indicated in the drawing.
- 11.Gabion units filling should be done in 3 layers for 1.0m high gabion.The size of rock used for gabion filling shall be 150mm to 250mm. Lacing should be done in single & double looping fashion through every mesh opening approximately at every 150mm.
- 12.The front face shall be neatly packed with good facia rocks for the facing of Gabion/Gabion facia structure as per conditions at the site to ensure perfect drainage.
- 13.The road side drain arrangement has to be provided at suitable gradient and should be connected to the main drains as per conditions at the site.
- 16.Access to water shall be arranged at site for application of hydraulically applied erosion control products.
- 17.Germination period shall vary between 14 to 28 days for grasses, 1 to 3 months herbs/legumes.
- 18.A local horticulture expert should be consulted to select the appropriate seeds. The seeds of the selected plant species can be sourced locally or can be imported, as per the seed availability.
- 21.The location of drains shall be shifted locally or additional length of drains might have to be constructed at specific locations giving due consideration to the construction guidelines.
- 22.Proper drainage arrangement should be made to ensure sufficient water collection points at regular intervals. This will ensure reduction in seepage by diverting surface run-off to the main drains.
- 23.Foundation strata is to be inspected and verified by the competent engineer and further work shall start after their approval and verification of soil data and geometry of foundation.
- 24.Uniaxial geogrid shall be laid starting from outer line of fascia and unrolling it perpendicular to the Reinforced Soil Structure alignment.
- 25.Monsoon protection measures shall be installed prior to the rainy season, during construction period.
- 27.Periodic maintenance of proposed mitigation system and drains shall be done, which is required for efficient working for the system and to check for clogging of drains.
- 28.Construction sequence should be strictly followed as per site specific installation manual provided by technology partner/manufacturer during time of construction as per specific situation at site.

Design Considerations**

1. Soil properties

SOIL	Y (kN/m ³) Unit Weight	C (kN/m ²) Cohesion (Minimum)	φ (Degree) Friction Angle (Minimum)
STRUCTURAL FILL	19	2	32
INSITU STRATA (GEOTECHNICALLY STABLE)	19.8	5	32

2. Load combinations considered for the design are-

A - Static + Traffic Loads
B - Seismic + Traffic Loads (ah=0.12,av=0.08) (Zone IV)
24 kPa Load has been considered in design as Traffic load

3. Any change in properties shall be notified to Engineer In Charge for change in design.
4. Existing Hill side / Valley side Toe wall shall be repair wherever it is damaged.

Drawing Title: NOTES

PROJECT-

ROAD RETENTION AND SLOPE PROTECTION WORK AT 39.50 KM NEAR MAHANADI OF NH 110(OLD NH 55) ROAD, SILIGURI -DARJEELING HIGHWAY

Client: WEST BENGAL PWD NH CIRCLE 3

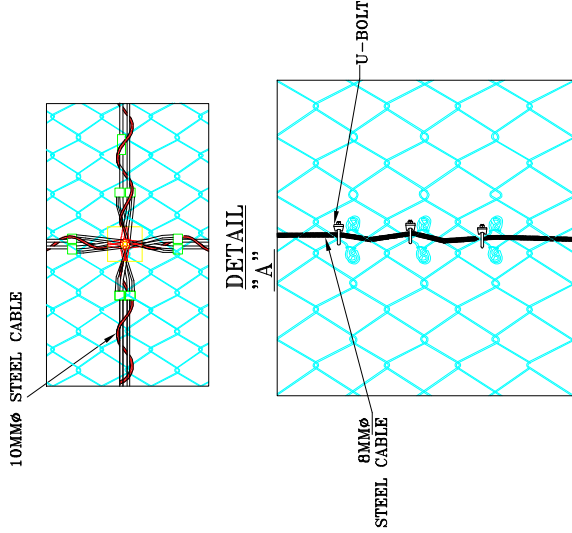
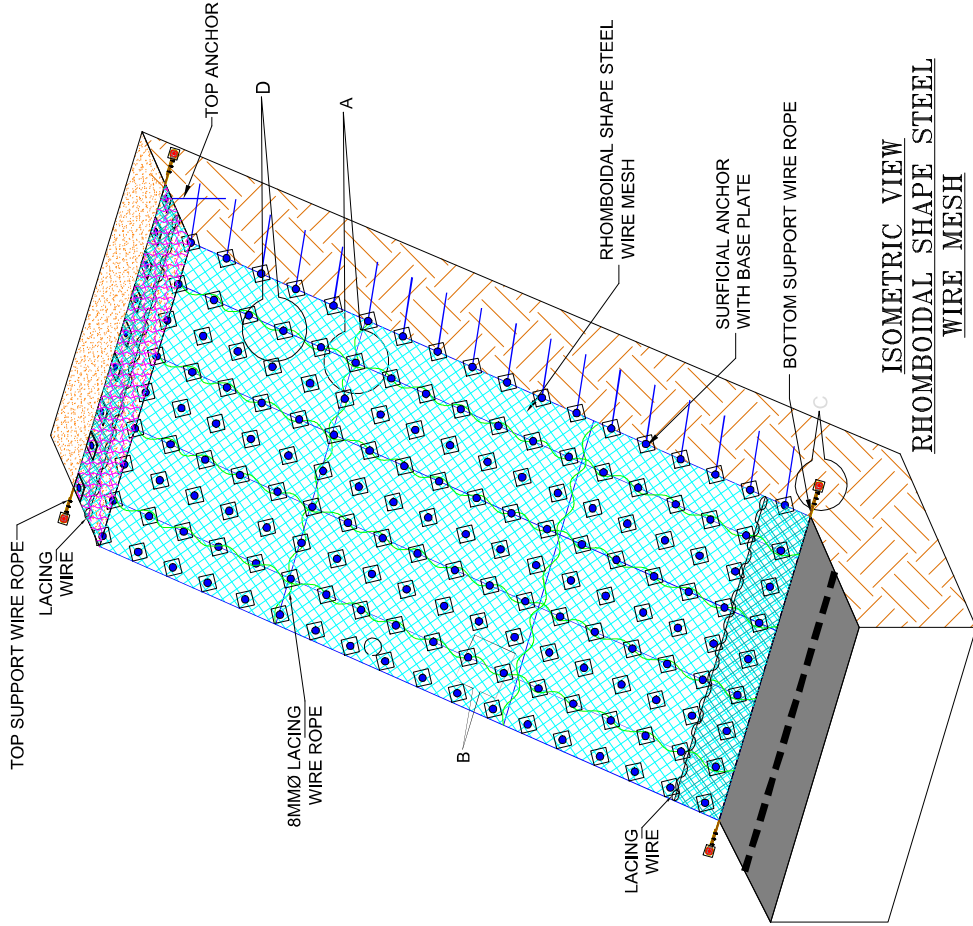
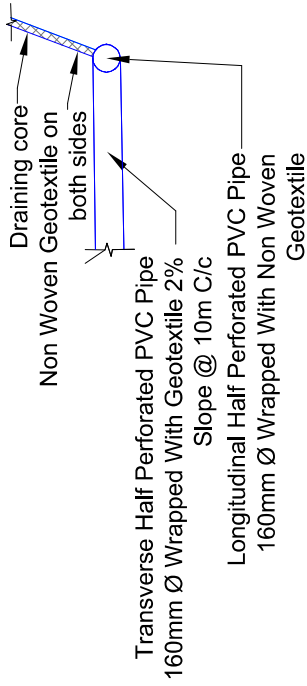
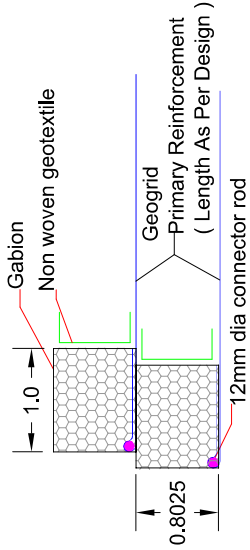
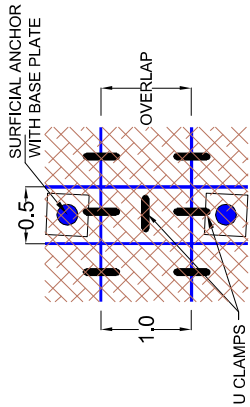
Date: 12-08-2024

Drawing No: SHEET 1 OF 4

N.T.S

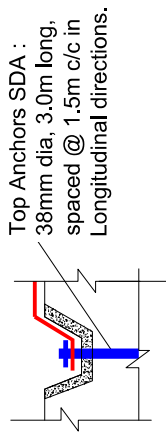
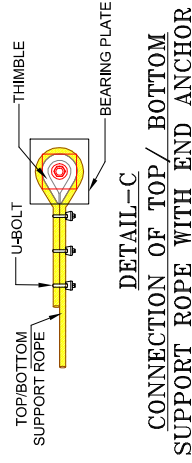


Drawing title: ROAD RETENTION AND SLOPE PROTECTION WORK FOR SLOPE HEIGHT OF 46.5 M	Client: WEST BENGAL PWD NH CIRCLE 3	Drawing No: SHEET 3 OF 4
107 PROJECT • ROAD RETENTION AND SLOPE PROTECTION WORK AT 39.50 KM NEAR MAHANADI OF NH 110(OLD NH 55) ROAD, SILEGURI -DARJEELING HIGHWAY	Date: 12-08-2024	N.T.S



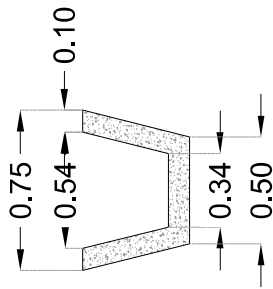
DETAIL "B"

LACING DETAILS OF RHOMBODIAL SHAPE STEEL WIRE MESH



TYPICAL DETAIL OF ANCHOR TRENCH CUM DRAIN

DETAIL-G

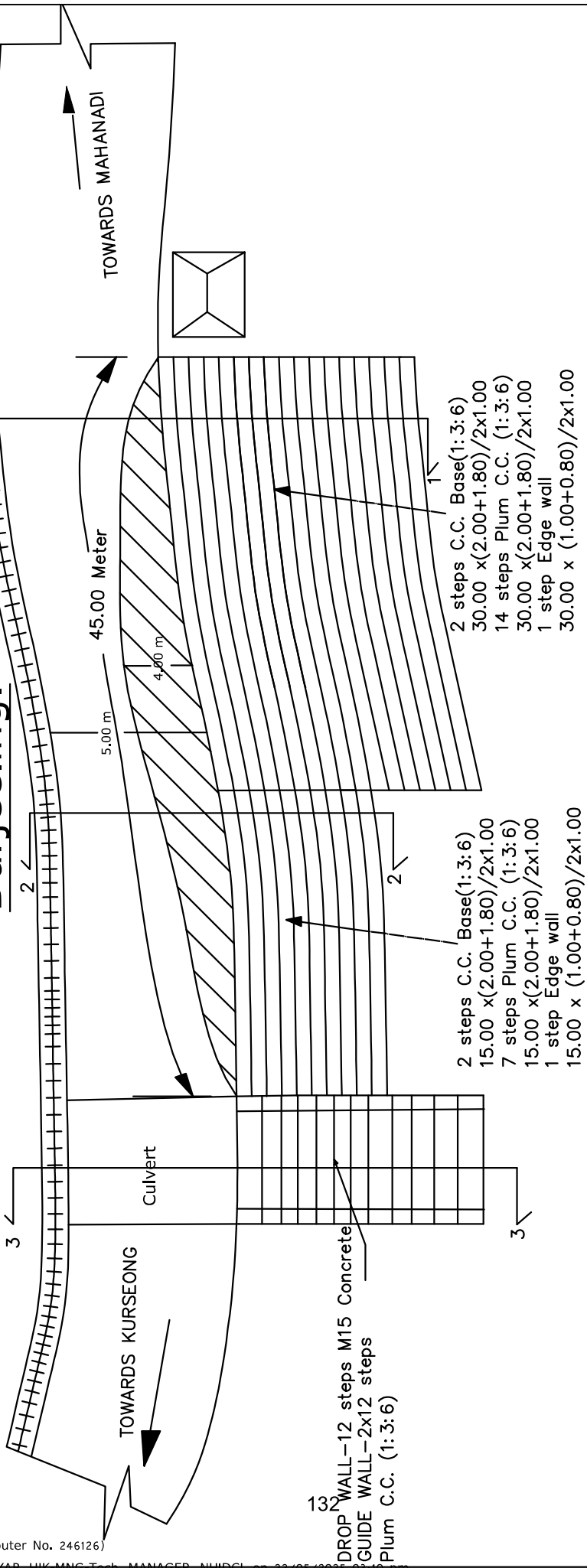


DETAIL OF TOE DRAIN

Drawing Title: DETAILS	Client: WEST BENGAL PWD NH CIRCLE 3	Drawing No: SHEET 4 OF 4
PROJECT: ROAD RETENTION AND SLOPE PROTECTION WORK AT 39.50 KM NEAR MAHANADI OF NH 110(OLD NH 55) ROAD SILIGURI -DARJEELING HIGHWAY	Date: 12-08-2024	N.T.S

Valley side restoration work at 37.00 km near Daragaon Devi Mandir of N.H. 110 (old N.H.55) under N.H.Division IX, in the district of

Darjeeling.



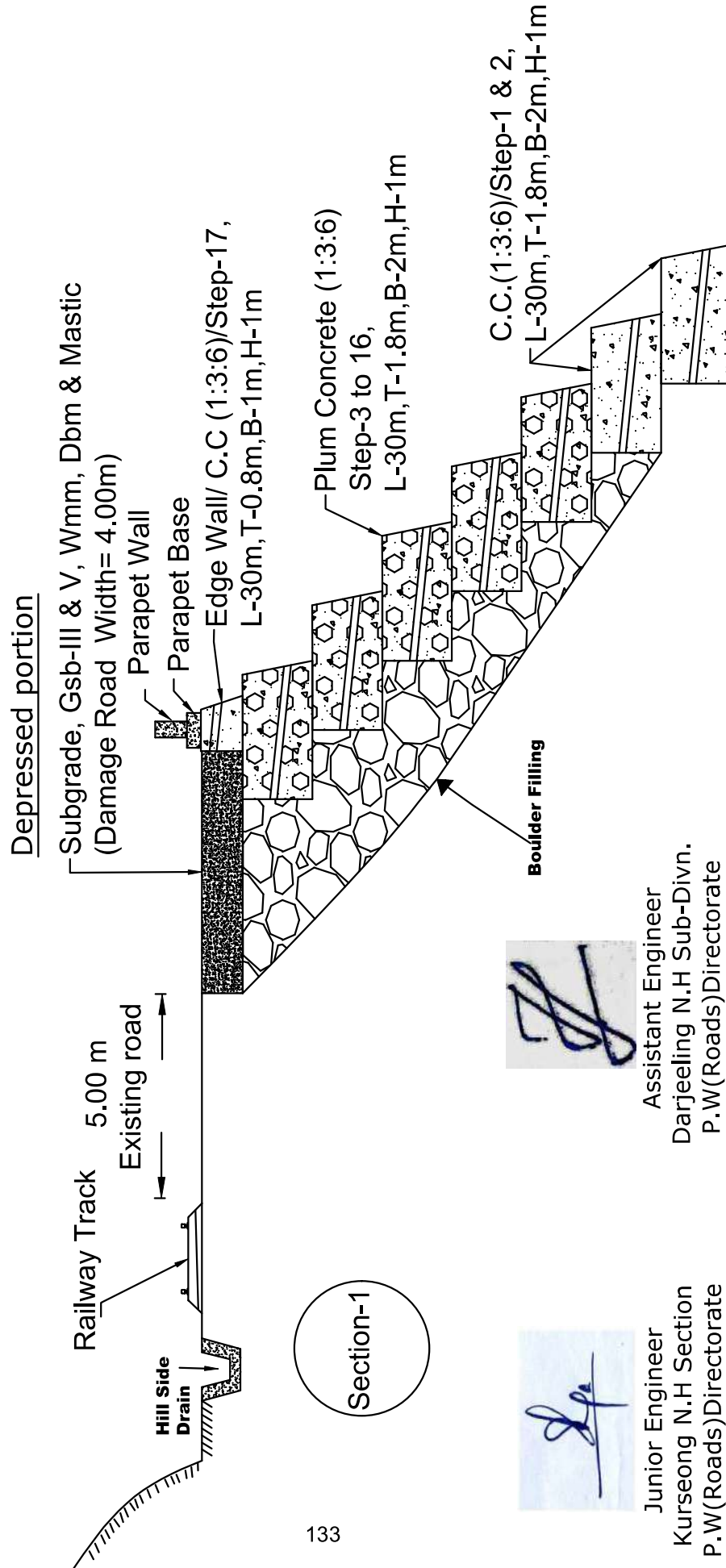
[Signature]

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Kurseong N.H Section Darjeeling N.H Sub-Division
P.W(Roads)Directorate

[Signature]

Assistant Engineer
Darjeeling N.H Sub-Division
P.W(Roads)Directorate

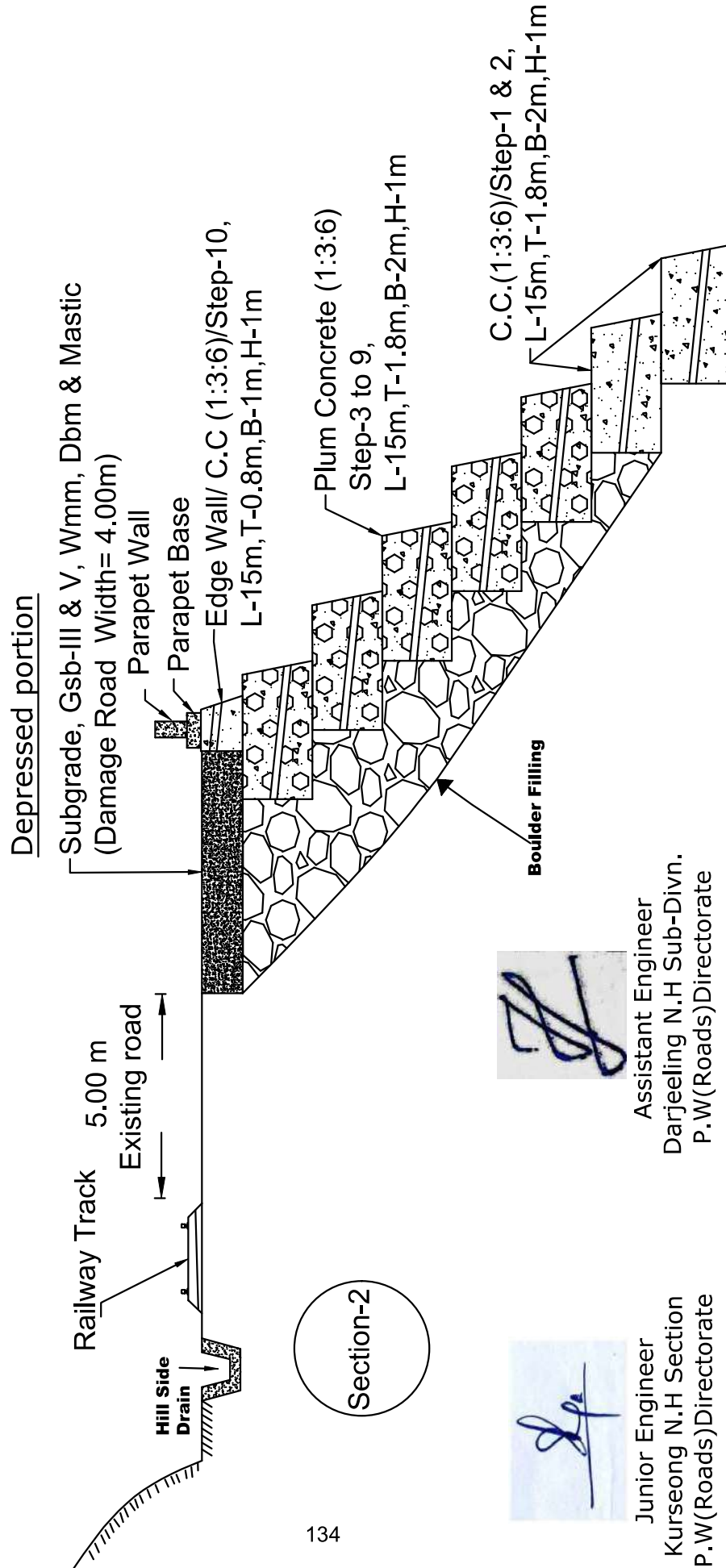
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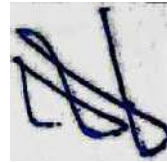


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P.W(Roads) Directorate

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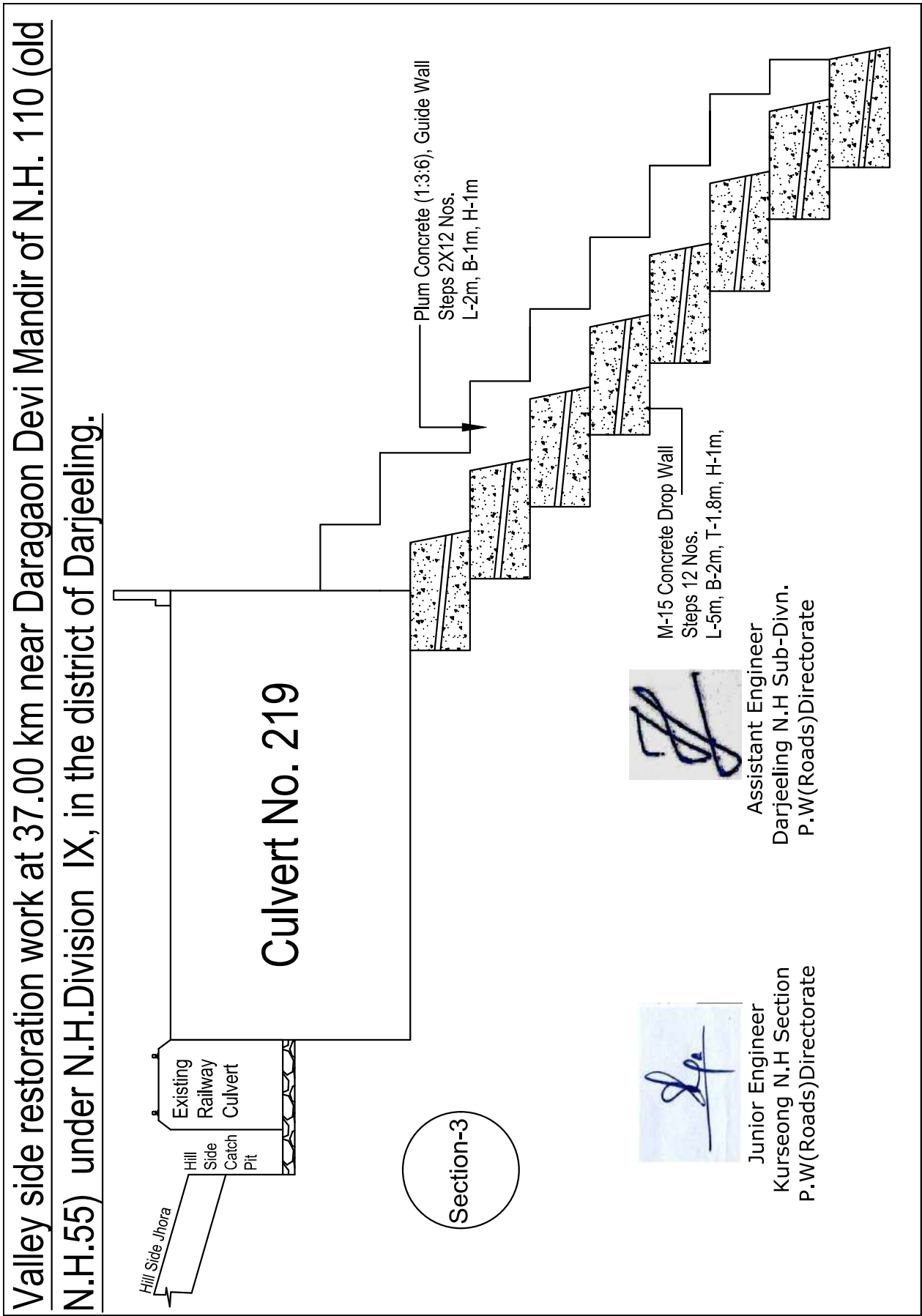




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SLIDEINTERPRET 9.023

