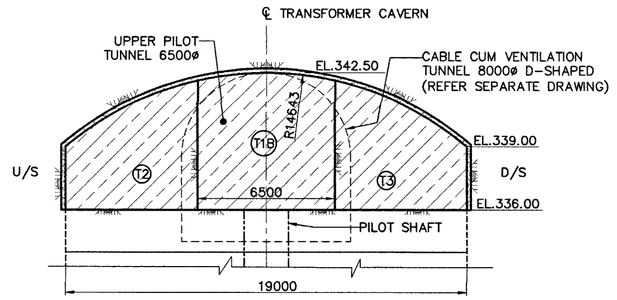
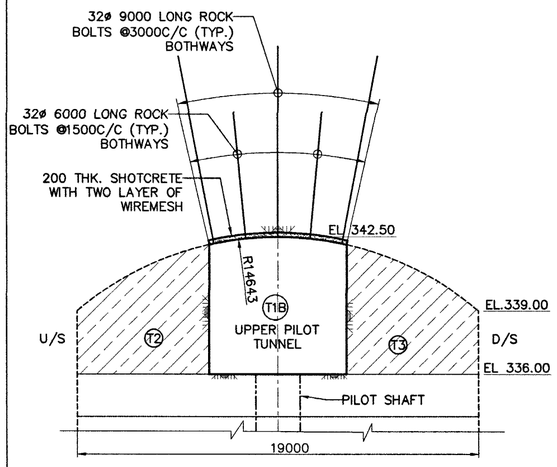
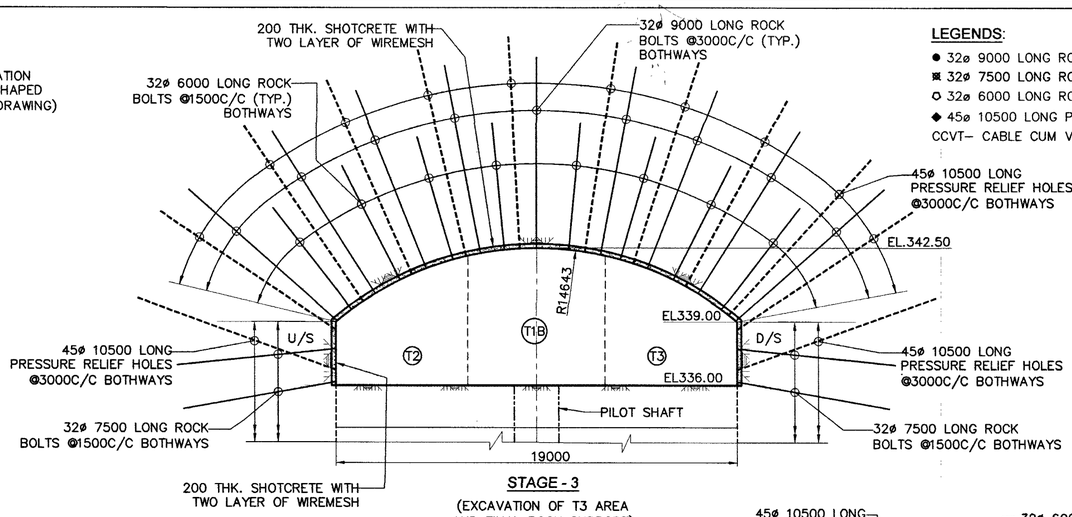


DEFINITION OF EXCAVATION



STAGE - 1
[EXCAVATION OF UPPER PILOT TUNNEL (T1B) AND FINAL ROCK SUPPORT]

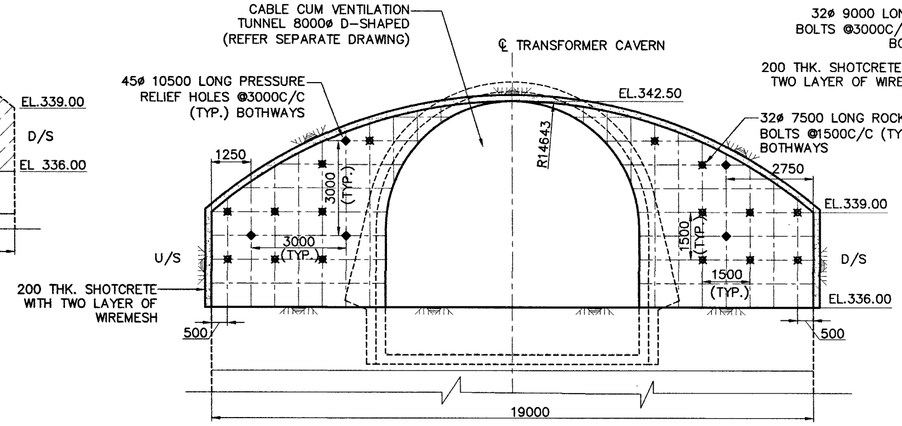


STAGE - 3
(EXCAVATION OF T3 AREA AND FINAL ROCK SUPPORT)

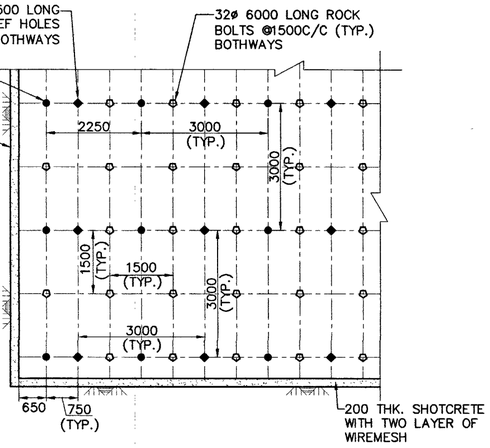
LEGENDS:

- ● 32ø 9000 LONG ROCK BOLT @3000C/C
- ◙ 32ø 7500 LONG ROCK BOLTS @1500C/C
- ○ 32ø 6000 LONG ROCK BOLT @1500C/C
- ◆ 45ø 10500 LONG PRESSURE RELIEF HOLES @3000C/C

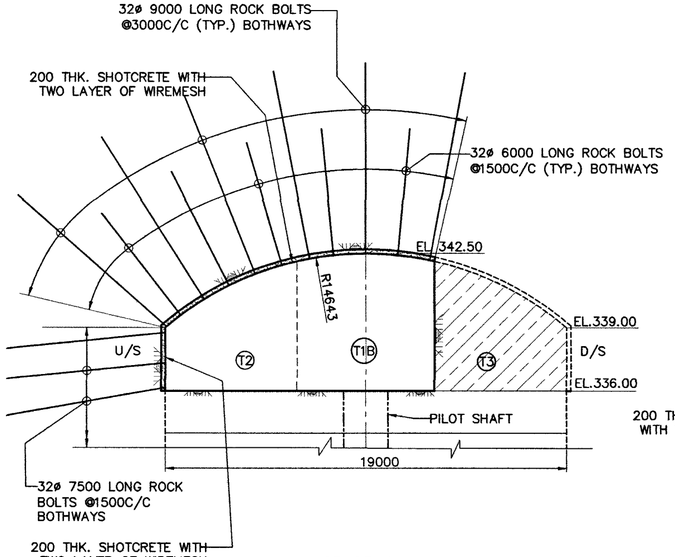
CCVT– CABLE CUM VENTILATION TUNNEL



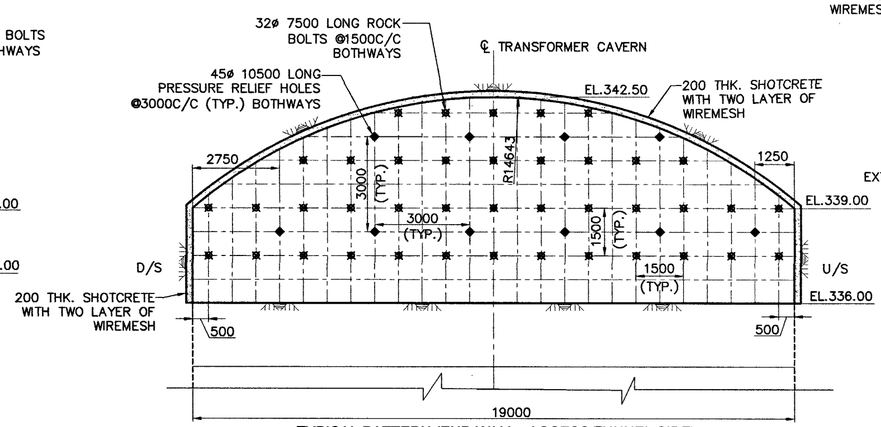
TYPICAL PATTERN (END WALL - CCVT SIDE)
(ROCK BOLTS & PRESSURE RELIEF HOLES)
(NTS)



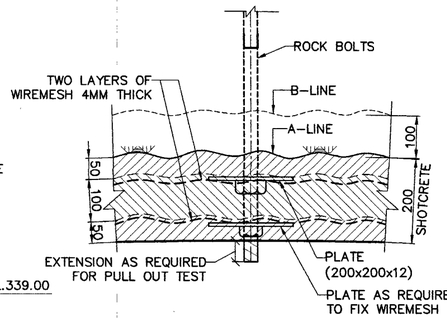
TYPICAL PATTERN (CROWN)
(ROCK BOLTS & PRESSURE RELIEF HOLES)
(NTS)



STAGE - 2
(EXCAVATION OF T2 AREA AND FINAL ROCK SUPPORT)



TYPICAL PATTERN (END WALL - ACCESS TUNNEL SIDE)
(ROCK BOLTS & PRESSURE RELIEF HOLES)
(NTS)



⚠01 TYP. DETAIL OF ROCK BOLT AND ANCHORAGE
(NTS)
(ARRANGEMENT MAY BE MODIFIED AS PER SITE REQUIREMENT)

NOTES:

1. सभी माप मिलीमीटर में तथा ऊचांई मीटर में दिए गए ळै।
   ALL DIMENSIONS ARE IN MILLIMETRE AND ELEVATIONS ARE IN METRE.
2. THIS DRAWING IS ISSUED FOR EXCAVATION & ROCK SUPPORT OF TRANSFORMER CAVERN EXCAVATION FROM EL.336.00 TO EL.342.50 M.
3. EXCAVATION SHALL BE DONE IN STAGES CONFORMING TO SECTION B.3.8.7 OF TECHNICAL SPECIFICATIONS. BEFORE TAKING UP THE EXCAVATION OF CAVERN, EXCAVATION METHODOLOGY SHALL BE SUBMITTED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER–IN–CHARGE.
4. EXCAVATION SEQUENCE MAY MODIFY TO SUIT THE SITE CONDITIONS.
5. THE DEFINITION OF 'A' AND 'B' LINE SHALL BE AS PER SECTION B.3 OF TECHNICAL SPECIFICATIONS.
6. NEXT STAGE EXCAVATION SHALL START ONLY AFTER INSTALLATION OF ROCK SUPPORT & INSTRUMENTS IN THE PREVIOUS STAGE INCLUDING GROUTING OF THE ROCK BOLTS.
7. THIS DRAWING SHOWS FINAL ROCK SUPPORT SYSTEM ONLY. IN ADDITION SOME TEMPORARY SUPPORTS MAY BE REQUIRED DURING EXCAVATION BEFORE INSTALLATION OF THE FINAL SUPPORTS. THE SAME MAY BE INSTALLED DEPENDING UPON SITE CONDITIONS WITH THE APPROVAL OF ENGINEER–IN–CHARGE.
8. THE BENCHING EXCAVATION SHALL IN NO CASE BE MORE THAN 3000 HEIGHT UNLESS IT IS SUPPORTED BY THE PERMANENT SUPPORT SHOWN IN THE DRAWINGS.
9. THE ROCK BOLTS SHOWN IN THE DRAWING SHALL BE *CONFORMING TO SECTION B.4 OF TECHNICAL SPECIFICATIONS.* THE ROCK BOLTS IN THE CROWN SHALL BE TENSIONED AS PER CLAUSE 4.5.8 OF SECTION B.4 OF TECHNICAL SPECIFICATIONS. MINOR MODIFICATION IN THE LENGTH, ORIENTATION, PATTERN AND LOCATION OF ROCK BOLTS MAY BE DONE TO SUIT THE SITE CONDITIONS WITH THE APPROVAL OF ENGINEER–IN–CHARGE. ADDITIONALLY, IN CASE OF PROMINENT SHEAR ZONES, IF ANY, PRE GROUTING SHALL BE PERFORMED AS PER SITE CONDITION IN CONSULTATION WITH SITE GEOLOGIST AS PER B.4 OF TECHNICAL SPECIFICATION AND AS APPROVED BY ENGINEER–IN–CHARGE.
10. IN CASE OF WEAK ROCK MASS WHERE END ANCHORAGE WITH EXPANSION SHELL ROCK BOLT IS NOT POSSIBLE, RESIN GROUTED ROCK BOLTS SHALL BE PROVIDED IN CONSULTATION WITH SITE GEOLOGIST AS PER DIRECTION OF ENGINEER–IN–CHARGE.
11. THE ROCK BOLTS SHALL BE INSTALLED ONLY ON FINISHED EXCAVATION SURFACES UNLESS AS GOVERNED BY GEOLOGICAL CONDITION AS APPROVED BY ENGINEER–IN–CHARGE.
12. THE CONTRACTOR SHALL EXERCISE ALL PRECAUTIONS TO PREVENT DAMAGE TO ALREADY PLACED SHOTCRETE DURING THE BLASTING FOR THE NEXT PHASE OF EXCAVATION.
13. ATLEAST 50% BOLTS SHALL FORM THE PART OF CYCLE. BALANCE BOLTS CAN BE INSTALLED OUT OF CYCLE BUT BEFORE COMPLETING A PARTICULAR STAGE OF EXCAVATION. THE SPACING BETWEEN THE TWO BOLTS SHALL IN NO CASE EXCEED 3000.
14. INSTALLATION METHODS OF ROCK BOLTS AND SHOTCRETE SHALL BE FULLY OPTIMIZED THROUGH TEST BOLTS IN THE REPRESENTATIVE ROCK, PRIOR TO ACTUAL START OF WORK.
15. PLAIN SHOTCRETE WITH WIREMESH SHOWN IN THE DRAWING SHALL BE APPLIED AS SPECIFIED IN SECTION B.4 & B.5 OF TECHNICAL SPECIFICATIONS. IF REQUIRED, SFR SHOTCRETE CAN BE USED WITH THE APPROVAL OF ENGINEER–IN–CHARGE.
16. 45ø 5000 LONG (INTO ROCK) CONSOLIDATION GROUTING @3000 C/C STAGGERED BOTHWAYS SHALL BE PROVIDED IN WEAK ROCK MASS AS *DIRECTED BY ENGINEER–IN–CHARGE*, AS PER SECTION B.7 OF TECHNICAL SPECIFICATIONS.
17. THE PRESSURE RELIEF HOLES SHOWN IN THE DRAWING SHALL CONFORM TO B.7 OF TECHNICAL SPECIFICATIONS. 36Ø SLOTTED PVC LINERS IN PRESSURE RELIEF HOLES SHALL BE INSTALLED AS PER THE DIRECTION OF ENGINEER–IN–CHARGE.
18. FOR INSTRUMENTATION REFER SEPARATE DRAWING.
19. FOR DETAILS OF PRESSURE RELIEF HOLES ARRANGEMENTS REFER SEPARATE DRAWING.
20. FOR ROCK SUPPORT OF SUSPENDED CEILING, REFER SEPARATE DRAWING.

REFERENCE DRAWINGS:

1. NHDB–4AC4–41–DD–0001
2. NHDB–4GC4–41–DD–1001

0 2 4 6 8 10 METRE
(SCALE= 1:200)

DATE	NO.	REVISION OR ISSUES	BY.	CH.	APP.
30.06.2025	⚠01	TYP. DETAIL OF ROCK BOLT AND ANCHORAGE UPDATED.	Sd./-	Sd./-	Sd./-
10.01.2025	00	ISSUED FOR CONSTRUCTION	Sd./-	Sd./-	Sd./-

DESIGN MEMO NO.- दिजाइन मेमो संख्या

एन एच पी सी लिमिटेड
(भारत सरकार का नवरत्न उद्यम)
NHPC Limited
(A GOVT. OF INDIA NAVRATNA ENTERPRISE)
A Navratna Company

दिबांग बहुउद्देशीय परियोजना
DIBANG MULTIPURPOSE PROJECT

TRANSFORMER CAVERN
EXCAVATION AND ROCK SUPPORTS
FROM EL 342.50 M TO EL 336.00 M

DRAWN अंकित	Sd./- VINAY KUMAR	SUBMITTED प्रस्तुत	Sd./- PRABHAT ASWAL	RECOMMENDED अनुशंसित	Sd./- RAJEEV KUMAR	DE/HM	APPROVED अनुमोदन	Sd./- S. CHOWDHURY

DATE दिनांक	DRG. NO.					
JAN.' 2025	NHDB	4GC4	41	DD	1003	01

DRG. NO. NHDB-4GC4-41-DD-1003-01