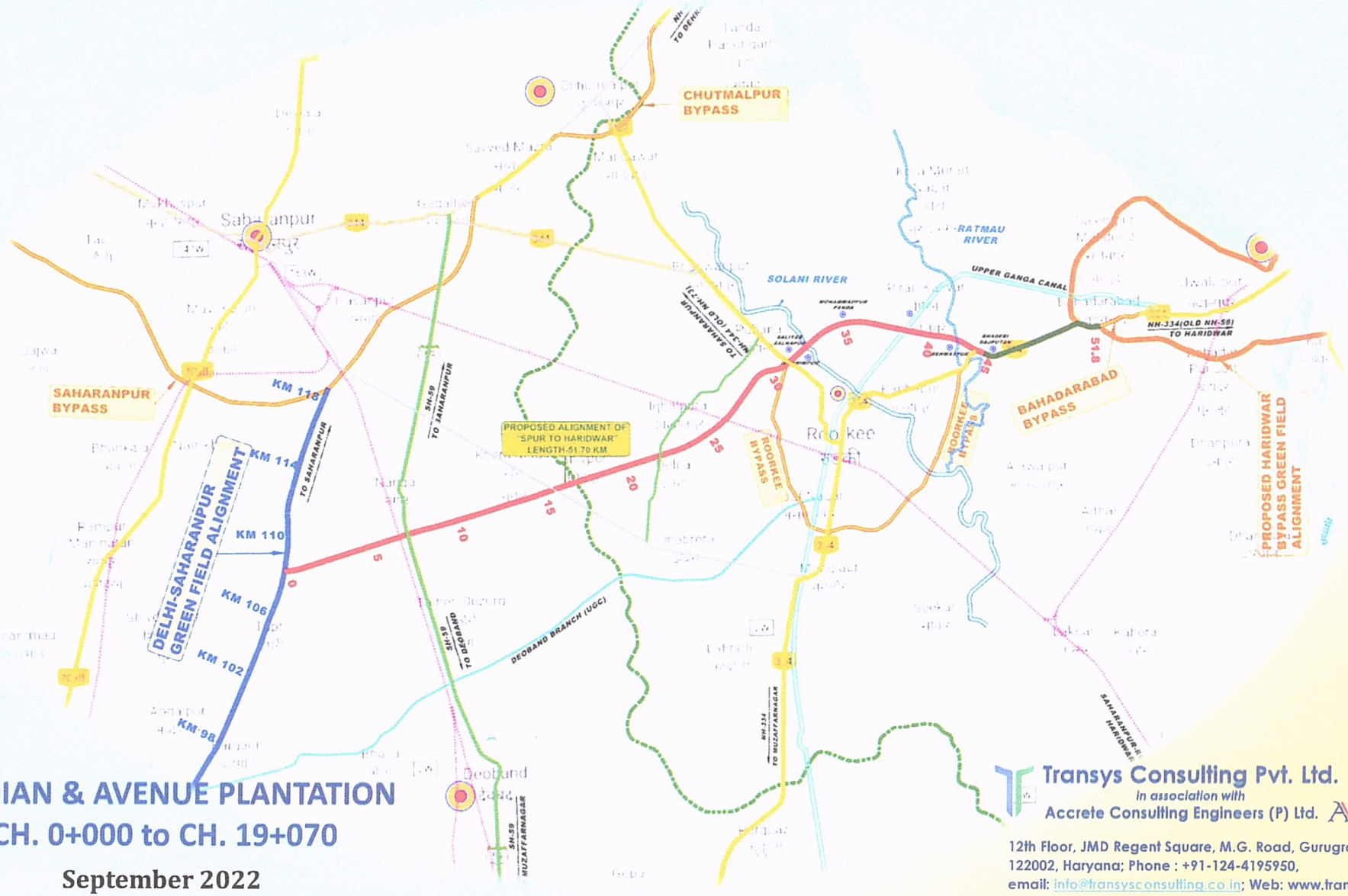
भारतीय राष्ट्रीय राजमार्ग प्राधिकरण

National Highways Authority Of India

(Ministry Of Road Transport & Highways Government Of India)

DPR for Development of 6-lane access controlled Spur to Haridwar from Delhi-Sharanpur-Dehradun Economic Corridor in the state of Uttar Pradesh and Uttarakhand under Bharatmala Pariyojana



MEDIAN & AVENUE PLANTATION

CH. 0+000 to CH. 19+070

September 2022

Transys Consulting Pvt. Ltd.

In association with

Accrete Consulting Engineers (P) Ltd. ACE

12th Floor, JMD Regent Square, M.G. Road, Gurugram – 122002, Haryana; Phone : +91-124-4195950,

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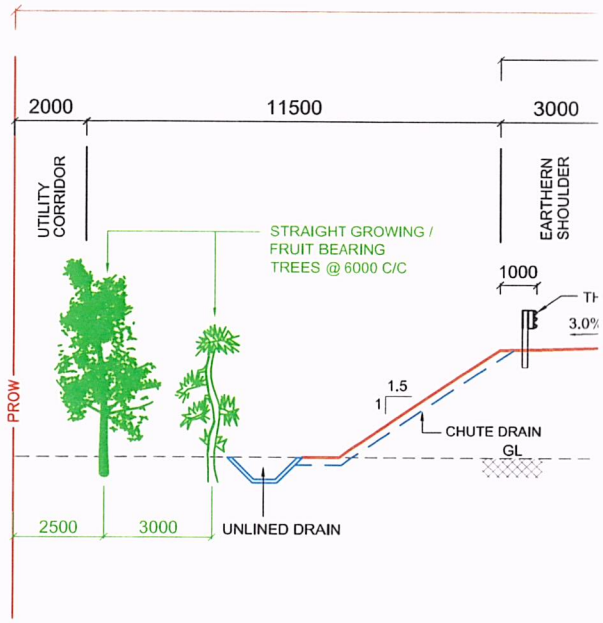
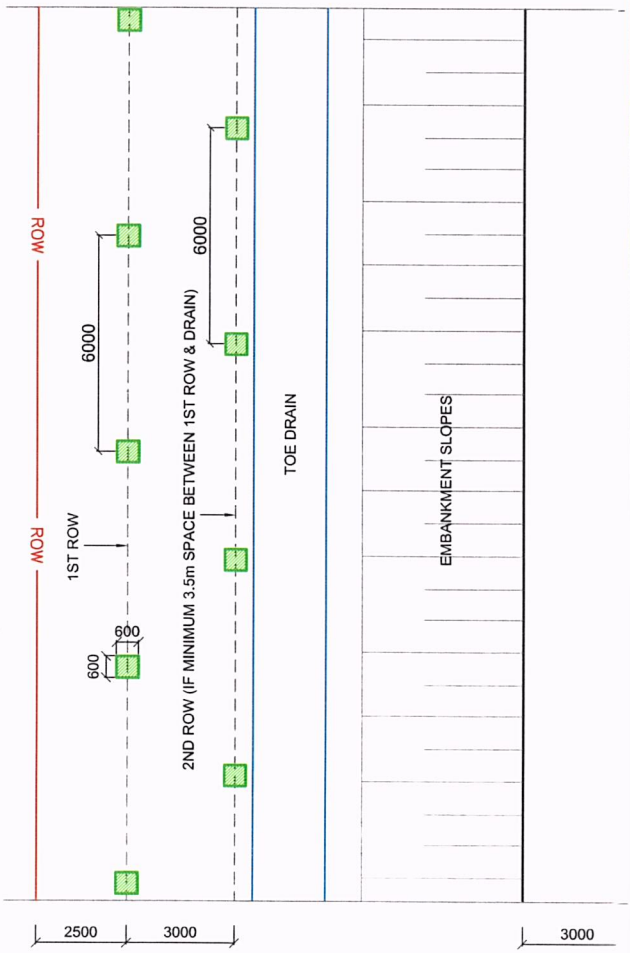




Requirement of trees for Avenue Plantation

Sl. No.	Chainage From	Chainage To	Length (m)	Side	Spacing	Avenue Plantation No. of ROW	Total Trees Nos	Total Trees Total	Remarks
1	0	180	180	LHS	6	1	30	30	Trees at ROW @ 6m C/C
2	180	380	200	BHS	6	2	33	67	
3	380	400	20	BHS	6	3	3	10	
4	400	510	110	BHS	6	2	18	37	
5	510	550	40	BHS	6	3	7	20	
6	550	630	80	BHS	6	2	13	27	
7	660	740	80	BHS	6	2	13	27	
8	850	950	100	RHS	6	2	17	33	
9	1310	1450	140	RHS	6	1	23	23	
10	1450	1520	70	BHS	6	2	12	23	
11	1560	1950	390	BHS	6	2	65	130	
12	1950	2260	310	BHS	6	3	52	155	
13	2260	4040	1780	BHS	6	2	297	593	
14	4040	4600	560	BHS	6	3	93	280	
15	4600	5470	870	BHS	6	2	145	290	
16	5490	5930	440	BHS	6	2	73	147	
17	5930	6020	90	BHS	6	3	15	45	
18	6020	6250	230	BHS	6	2	38	77	
19	6270	6400	130	BHS	6	2	22	43	
20	6410	7170	760	BHS	6	2	127	253	
21	7170	7190	20	LHS	6	1	3	3	
22	7300	7530	230	BHS	6	2	38	77	
23	7570	7640	70	BHS	6	4	12	47	
24	7640	7930	290	BHS	6	2	48	97	
25	8140	8220	80	BHS	6	4	13	53	
26	8270	8330	60	BHS	6	4	10	40	
27	8330	8500	170	BHS	6	2	28	57	
28	8720	8780	60	BHS	6	2	10	20	
29	8780	8940	160	BHS	6	4	27	107	
30	8940	9000	60	BHS	6	3	10	30	
31	9000	9420	420	BHS	6	2	70	140	
32	9420	9850	430	BHS	6	3	72	215	
33	9850	11250	1400	BHS	6	2	233	467	
34	11250	11310	60	RHS	6	1	10	10	
35	11270	11320	50	LHS	6	1	8	8	
36	11320	12500	1180	BHS	6	2	197	393	
37	12520	14090	1570	BHS	6	2	262	523	
37	14090	14220	130	RHS	6	1	22	22	
38	14450	15120	670	BHS	6	2	112	223	
39	15120	15520	400	BHS	6	4	67	267	
40	15520	15570	50	BHS	6	3	8	25	
41	15570	15660	90	BHS	6	2	15	30	
42	15660	15670	10	RHS	6	1	2	2	
43	15670	15700	30	BHS	6	2	5	10	
44	15700	15760	60	BHS	6	3	10	30	
46	15760	15990	230	BHS	6	4	38	153	
47	15990	16060	70	BHS	6	3	12	35	
48	16060	16650	590	BHS	6	2	98	197	
49	16650	16670	20	RHS	6	1	3	3	
50	16670	16690	20	BHS	6	2	3	7	
51	16690	16730	40	LHS	6	1	7	7	
52	16730	17020	290	BHS	6	2	48	97	
53	17020	17090	70	BHS	6	3	12	35	
54	17090	17440	350	BHS	6	4	58	233	
55	17440	17470	30	BHS	6	3	5	15	
56	17470	18080	610	BHS	6	2	102	203	
57	18080	18130	50	BHS	6	3	8	25	
58	18130	18200	70	BHS	6	2	12	23	
59	18230	19000	770	BHS	6	2	128	257	
							Total	6495	
Requirement of trees for Median Plantation (4m Median)									
60	450	760	310	BHS	3	2	103	207	
61	840	1470	630	BHS	3	2	210	420	
62	1590	7520	5930	BHS	3	2	1977	3953	
63	7575	8000	425	BHS	3	2	142	283	
64	8070	19070	11000	BHS	3	2	3667	7333	
							Total	12197	

NOTES:

A) MEDIAN PLANTATION

1. TWO ROWS OF PLANTATION TO BE DONE IN THE 4M WIDE MEDIAN IN STAGGERED MANNER WITH LONGITUDINAL SPACING OF 1.5M. IN SUPERELEVATED SECTION ONE ROW OF PLANTATION TO BE DONE
2. THE SIZE OF PITS FOR MEDIAN PLANTATION SHALL BE 600X600X600MM AND THE CENTER OF PIT SHALL BE 1.5M DISTANCE FROM THE FACE OF MEDIAN KERB. COMPOST AND MANURE SHALL BE USED UP TO 1/3RD VOLUME OF PIT MIXED WITH SOIL AND REFILLED.
3. THE SPECIES TO BE PLANTED IN THE MEDIAN PORTION ARE AS FOLLOWS:

   I.) WHITE COLOUR FLOWERING SHRUBS: STAR JASMINE, ALBANIA, BAHUNIA, MANOKAMNI,CHANDANI.

   II)YELLOW COLOUR FLOWERING SHRUBS: TIKOMA, ACASIA ALATA, ACASIA, LAVLIGATA, PEACOCK FLOWER.

   III) RED COLOUR FLOWERING SHRUBS: HIBISCUS, CRIMSON BOTTLE BRUSH, BOUGAINVILLEA GLABRA, FAMILAPATENS EXOR

   IV) BLUE COLOUR FLOWERING SHRUBS: DURANTA ERECTA, PURPLE LAKE, RODODRON

B) AVENUE PLANTATION

4. THE NUMBER OF ROWS OF AVENUE PLANTATION SHALL BE TWO ROWS ON EITHER SIDE.
5. THE SPECIES OF PLANT SHALL BE PLANTED IN ROW WISE AS FOLLOWS:

   (I) THE FRUIT BEARING TREES/ ENVIRONMENT FRIENDLY TREES IN 1st ROW LIKE NEEM, PAKER, IMLI, BARGAD, CHROSIA SPICIOSA, SHISHAM, MANGO, PIPAL ETC.
   (II) SPECIES OF STRAIGHT GROWING TREES IN 2nd ROW LIKE KATANG BAMBOO, CASSIA FISTULA, TTABEBUIA ROSEA, ARJUN, KACHNAR GULMORH, JAMUN, AMALTAS, TECOMA CAPENCIS, BBOTTLE BRUSH ETC.
6. THE SIZE OF PITS SHALL BE 600X600X600MM FOR ALL TYPE OF PLANTS; COMPOST AND MANURE SHALL BE USED UP TO 1/3RD VOLUME OF PIT MIXED WITH SOIL AND REFILLED.
7. TYPES OF SPECIES HAVING MORE LIFE SPAN SHALL BE PLANTED AS PER IRC:SP21–2009 & SUITABLE FOR TEMPERATURE AND SUB–TROPICAL AREA.
8. ALL DIMENSIONS ARE IN MM

REV.	DATE	DESCRIPTION
R0	01–09–2022	FINAL DETAILED PROJECT REPORT

FINAL DETAILED PROJECT REPORT

Title: **Typical Drawing of Median Plantation & Avenue Plantation**

Size	Scale	Drg. No	Rev:
A2	NOT TO SCALE	HARIDWAR-SPUR-PLANT-01	R0

LEGEND :

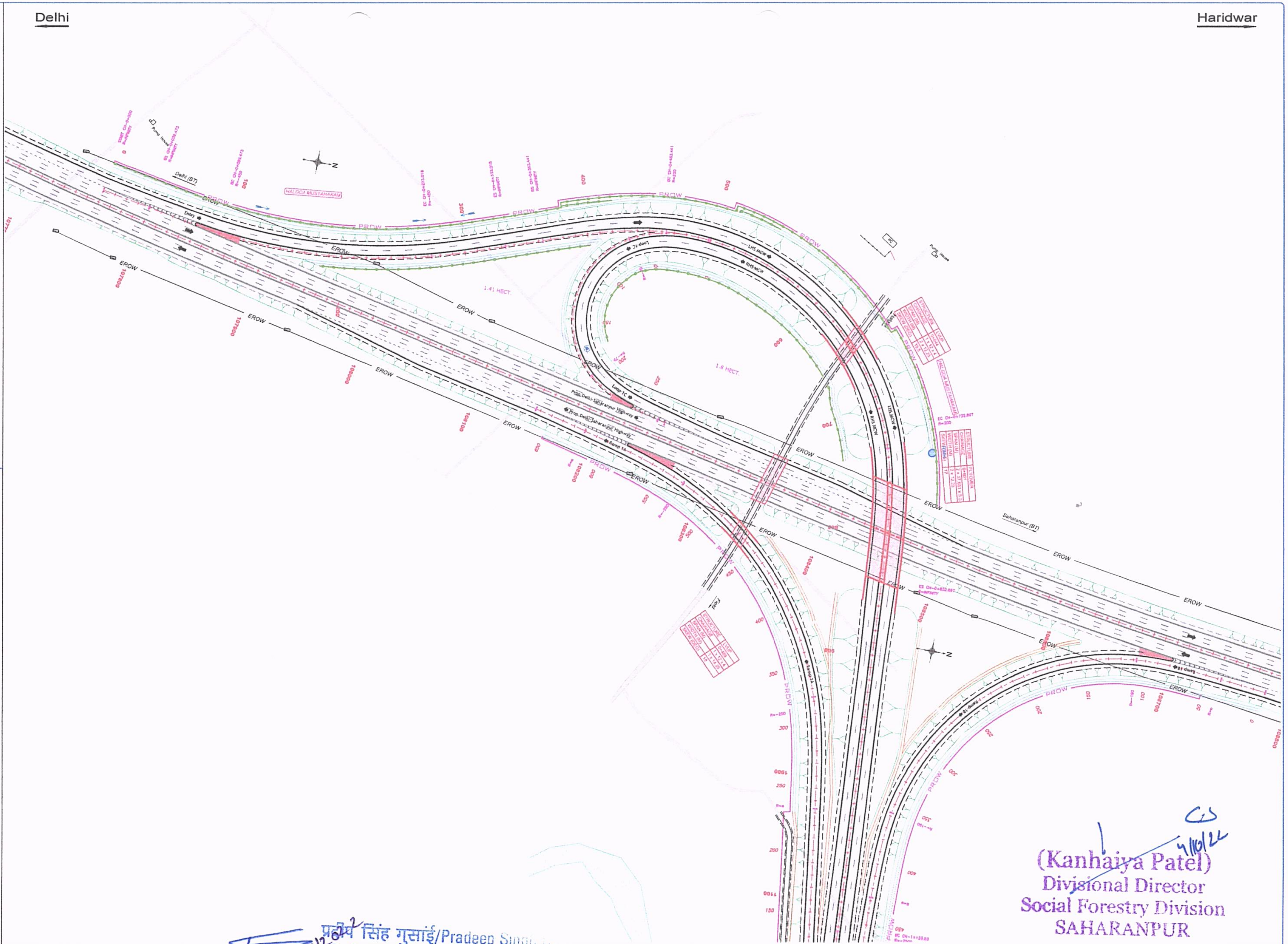
PLAN :

EXISTING

- Exist. Road
- SP-R : Semi Pucca Resi.
- SP-C : Semi Pucca Comm.
- P-R : Pucca Residential
- P-C : Pucca Commercial
- K-R : Katcha Residential
- HUT : Hut
- : Paddy Field
- : Boundary Wall
- : Fencing
- EROW — Existing RoW
- PROW — Proposed RoW

PROPOSED

- Toe Line / SH Edge / C/W Edge
- Median
- C/W Edge / SH Edge / Toe Line
- Hor. Tangent Point
- Culvert
- Lined Drain
- Unlined Drain
- TOE / RE WALL
- PLANTATION



(Kanhaiya Patel)
Divisional Director
Social Forestry Division
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प्रदीप सिंह गुसाईं/Pradeep Singh G...
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National Highways Authority of India
पीआईयू–रुड़की/PIU-Roorkee

REV.	DATE	DESCRIPTION
R0	01-09-2022	FINAL DETAILED PROJECT REPORT

Authority: National Highways Authority of India (Ministry of Road Transport & Highways)

Design Consultants: Transys Consulting Pvt. Ltd. / Accrete Consulting Engineers Pvt. Ltd.

Project: **Spur to Haridwar from Delhi-Dehradun Greenfield Project**

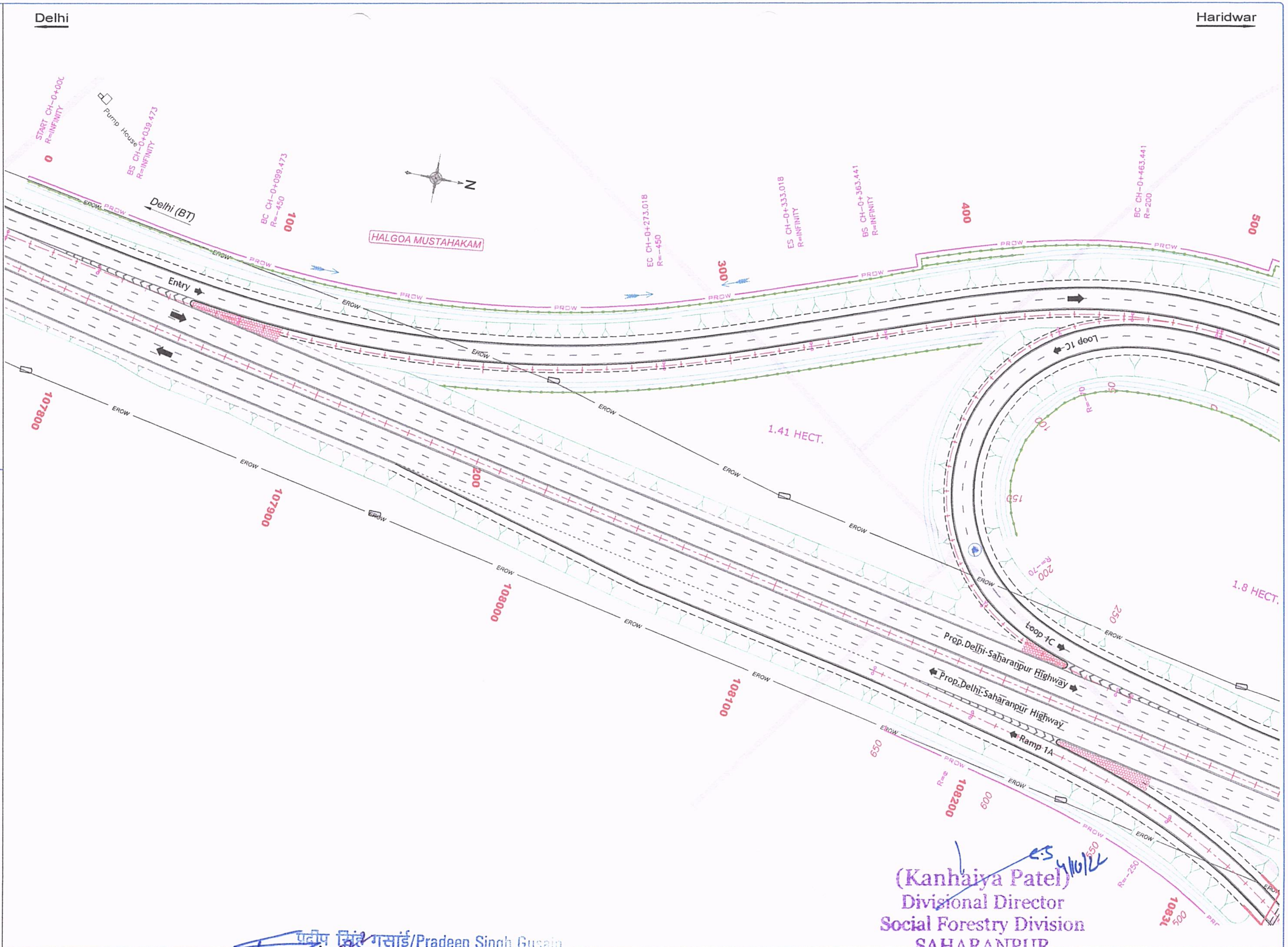
Development of 6-lane access controlled Spur to Haridwar from Delhi-Saharanpur-Dehradun Economic Corridor in the state of Uttar Pradesh and Uttarakhand under Bharatmala Pariyojana

DRAWN BY	SUMAN
DESIGNED BY	SANDEEP
CHECKED BY	KSN REDDY
APPROVED BY	BHUPENDER

FINAL DETAILED PROJECT REPORT

Title: **Median & Avenue Plantation** **(Interchange at Ch. 0+801)**

Size	Scale	Drg. No	Rev:
A2	HOR-1:1000	HARIDWAR-SPUR-PLANTATION-01	R0



LEGEND :

PLAN :

EXISTING

Exist. Road

SP-R : Semi Pucca Resi.
SP-C : Semi Pucca Comm.
P-R : Pucca Residential
P-C : Pucca Commercial
K-R : Katcha Residential
HUT : Hut
: Paddy Field
: Boundary Wall
: Fencing
— EROW — Existing RoW
— PROW — Proposed RoW

PROPOSED

Toe Line
SH Edge
C/W Edge
Median
C/W Edge
SH Edge
Toe Line
Hor. Tangent Point
Culvert
Lined Drain
Unlined Drain
TOE / RE WALL
PLANTATION

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Divisional Director
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भारतीय राष्ट्रीय राजमार्ग प्राधिकरण
National Highway Authority of India
पी0आई0यू0–रूड़की / PIU-Roorkee

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Authority: National Highways Authority of India (Ministry of Road Transport & Highways)

Design Consultants: Transys Consulting Pvt. Ltd. in association with Acclete Consulting Engineers Pvt. Ltd. 12th Floor, JMD Regent Square, MG Road, Gurugram - 122002

Project: **Spur to Haridwar from Delhi-Dehradun Greenfield Project**
Development of 6-lane access controlled Spur to Haridwar from Delhi-Saharanpur-Dehradun Economic Corridor in the state of Uttar Prdesh and Uttarakhand under Bharatmala Pariyojana

DRAWN BY	SUMAN
DESIGNED BY	SANDEEP
CHECKED BY	KSN REDDY
APPROVED BY	BHUPENDER

FINAL DETAILED PROJECT REPORT

Title: Median & Avenue Plantation (Ch. 0+000 to Ch. 0+500)

Size	Scale	Drg. No	Rev:
A2	HOR-1:1000	HARIDWAR-SPUR-PLANTATION-02	R0

LEGEND :

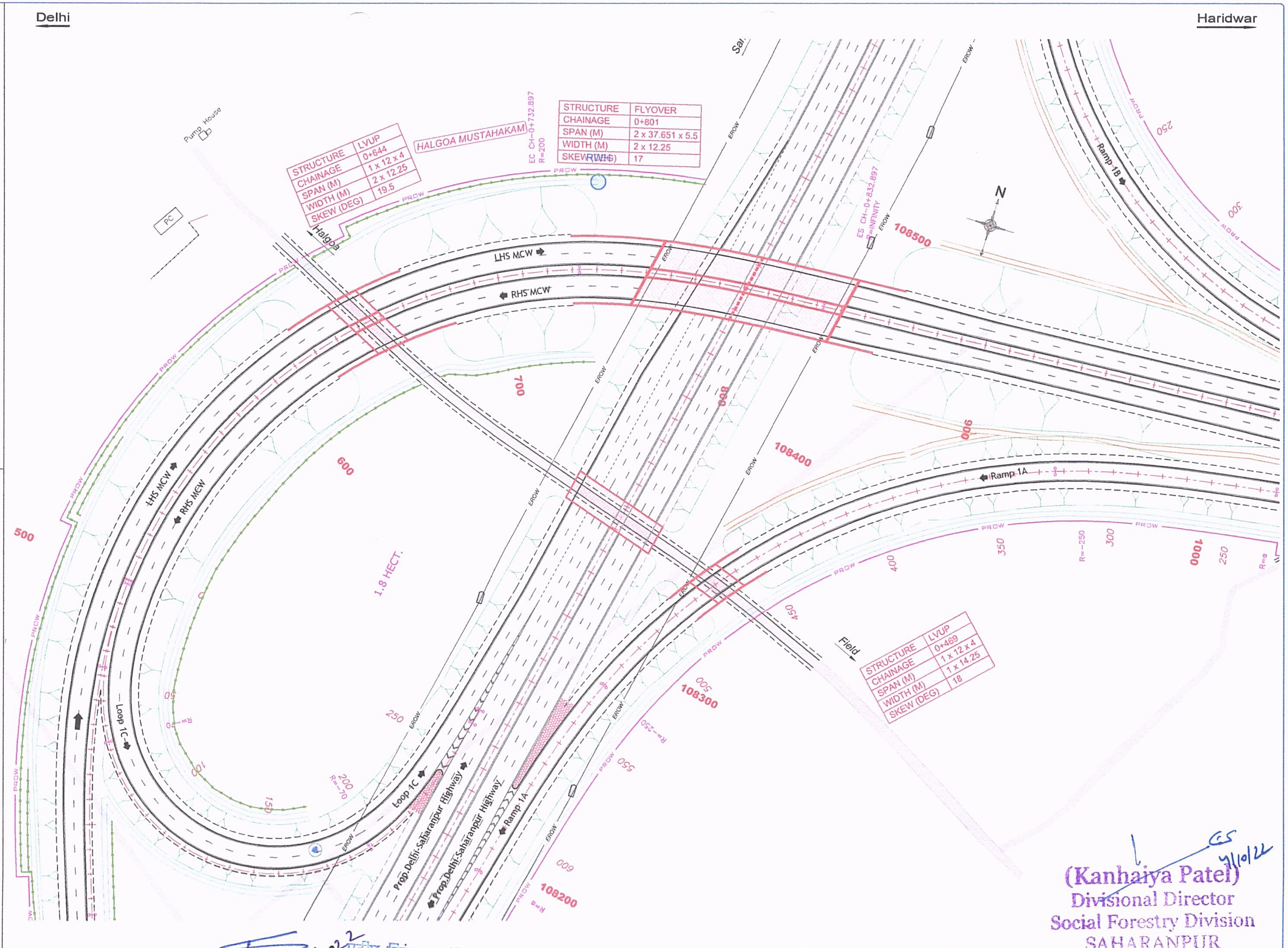
PLAN :

EXISTING

- Exist. Road
- SP-R : Semi Pucca Resi.
- SP-C : Semi Pucca Comm.
- P-R : Pucca Residential
- P-C : Pucca Commercial
- K-R : Katcha Residential
- HUT : Hut
- : Paddy Field
- : Boundary Wall
- : Fencing
- EROW — Existing RoW
- PROW — Proposed RoW

PROPOSED

- Toe Line / SH Edge / C/W Edge
- Median
- C/W Edge / SH Edge / Toe Line
- Hor. Tangent Point
- Culvert
- Lined Drain
- Unlined Drain
- TOE / RE WALL
- PLANTATION



(Kanhaiya Patel)
Divisional Director
Social Forestry Division
SAHARANPUR

REV.	DATE	DESCRIPTION
R0	01-09-2022	FINAL DETAILED PROJECT REPORT

Authority: National Highways Authority of India (Ministry of Road Transport & Highways)

Design Consultant: Tranays Consulting Pvt. Ltd. in association with Accrete Consulting Engineers Pvt. Ltd.

Project: **Spur to Haridwar from Delhi-Dehradun Greenfield Project**

Development of 6-lane access controlled Spur to Haridwar from Delhi-Saharanpur-Dehradun Economic Corridor in the state of Uttar Prdesh and Uttarakhand under Bharatmala Pariyojana

DRAWN BY	SUMAN
DESIGNED BY	SANDEEP
CHECKED BY	KSN REDDY
APPROVED BY	BHUPENDER

FINAL DETAILED PROJECT REPORT

Title: Median & Avenue Plantation (Ch. 0+000 to Ch. 0+500)

Size	Scale	Drg. No	Rev:
A2	HOR-1:1000	HARIDWAR-SPUR-PLANTATION-03	R0

National Highway Authority of India

LEGEND :

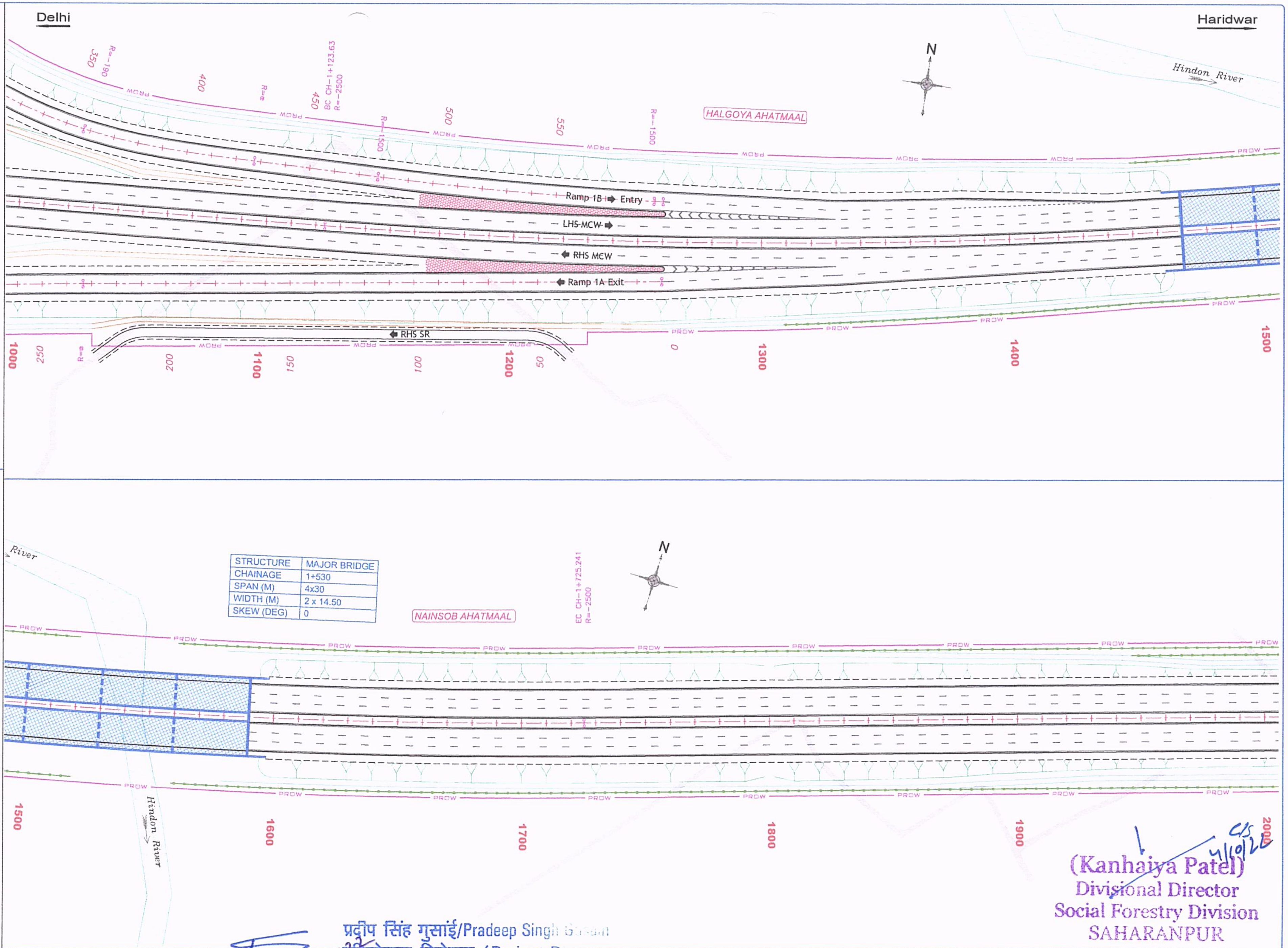
PLAN :

EXISTING

- Exist. Road
- SP-R : Semi Pucca Resi.
- SP-C : Semi Pucca Comm.
- P-R : Pucca Residential
- P-C : Pucca Commercial
- K-R : Katcha Residential
- HUT : Hut
- : Paddy Field
- : Boundary Wall
- : Fencing
- EROW — Existing RoW
- PROW — Proposed RoW

PROPOSED

- Toe Line / SH Edge / C/W Edge
- Median
- C/W Edge / SH Edge / Toe Line
- Hor. Tangent Point
- Culvert
- Lined Drain
- Unlined Drain
- TOE / RE WALL
- PLANTATION



STRUCTURE	MAJOR BRIDGE
CHAINAGE	1+530
SPAN (M)	4x30
WIDTH (M)	2 x 14.50
SKEW (DEG)	0

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भारतीय राष्ट्रीय राजमार्ग प्राधिकरण
National Highways Authority of India
पीआईयू-रुड़की/PIU-Roorkee

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R0	01-09-2022	FINAL DETAILED PROJECT REPORT

Authority: National Highways Authority of India (Ministry of Road Transport & Highways)

Design Consultants: Transys Consulting Pvt. Ltd. in association with Acclaim Consulting Engineers Pvt. Ltd.

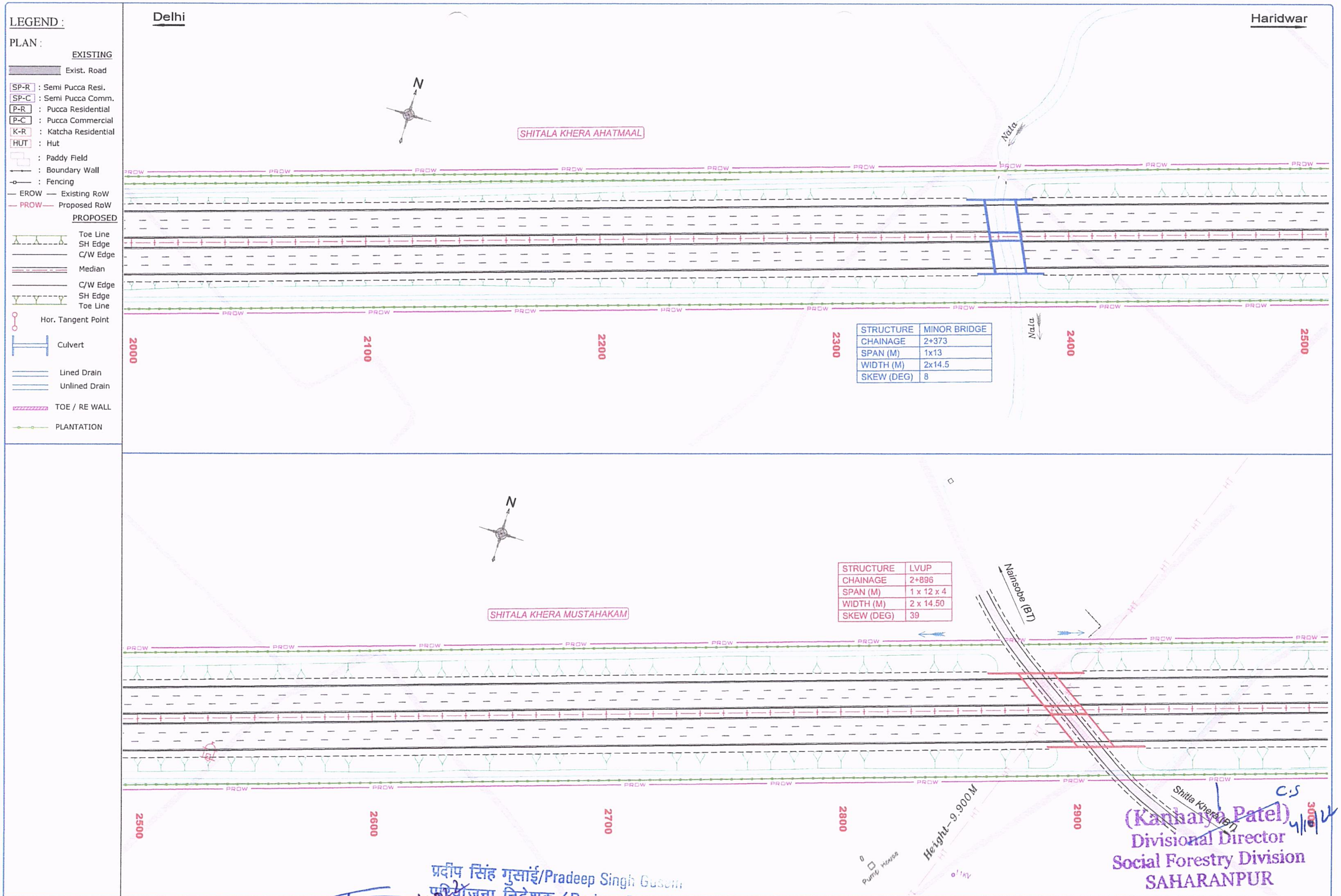
Project: Spur to Haridwar from Delhi-Dehradun Greenfield Project
Development of 6-lane access controlled Spur to Haridwar from Delhi-Saharanpur-Dehradun Economic Corridor in the state of Uttar Pradesh and Uttarakhand under Bharatmala Pariyojana

DRAWN BY	SUMAN
DESIGNED BY	SANDEEP
CHECKED BY	KSN REDDY
APPROVED BY	BHUPENDER

FINAL DETAILED PROJECT REPORT

Title: Median & Avenue Plantation (Ch. 1+000 to Ch. 2+000)

Size	Scale	Drg. No	Rev:
A2	HOR-1:1000	HARIDWAR-SPUR-PLANTATION-04	R0



STRUCTURE	MINOR BRIDGE
CHAINAGE	2+373
SPAN (M)	1x13
WIDTH (M)	2x14.5
SKEW (DEG)	8

STRUCTURE	LVUP
CHAINAGE	2+896
SPAN (M)	1 x 12 x 4
WIDTH (M)	2 x 14.50
SKEW (DEG)	39

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National Highways Authority of India
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DESIGNED BY	SANDEEP
CHECKED BY	KSN REDDY
APPROVED BY	BHUPENDER

FINAL DETAILED PROJECT REPORT

Title: Median & Avenue Plantation (Ch. 2+000 to Ch. 3+000)

Size	Scale	Drg No	Rev:
A2	HOR-1:1000	HARIDWAR-SPUR-PLANTATION-05	R0

LEGEND :

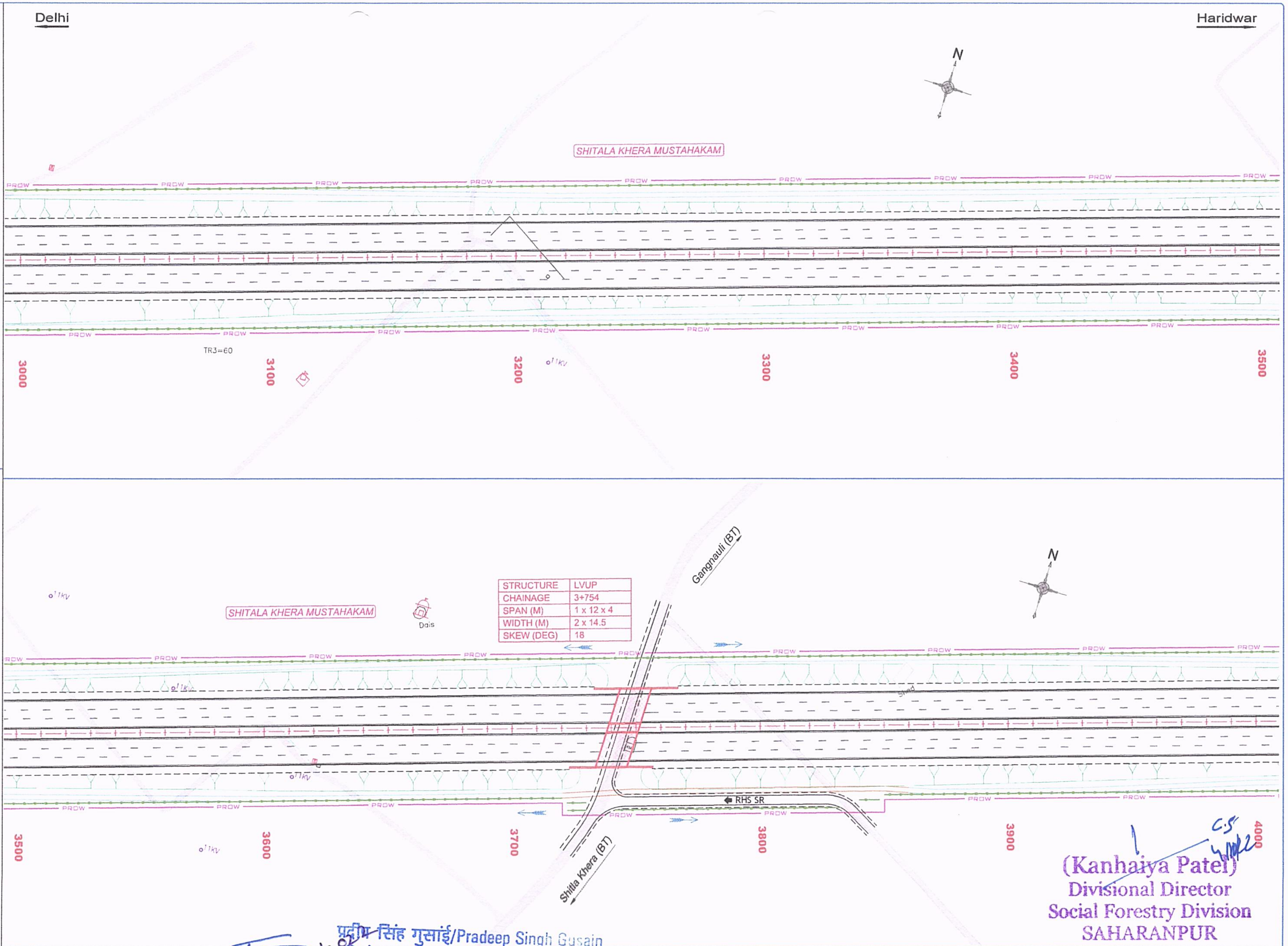
PLAN :

EXISTING

- Exist. Road
- SP-R : Semi Pucca Resi.
- SP-C : Semi Pucca Comm.
- P-R : Pucca Residential
- P-C : Pucca Commercial
- K-R : Katcha Residential
- HUT : Hut
- : Paddy Field
- : Boundary Wall
- : Fencing
- EROW — Existing RoW
- PROW — Proposed RoW

PROPOSED

- Toe Line
- SH Edge
- C/W Edge
- Median
- C/W Edge
- SH Edge
- Toe Line
- Hor. Tangent Point
- Culvert
- Lined Drain
- Unlined Drain
- TOE / RE WALL
- PLANTATION



STRUCTURE	LVUP
CHAINAGE	3+754
SPAN (M)	1 x 12 x 4
WIDTH (M)	2 x 14.5
SKEW (DEG)	18

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DESIGNED BY	SANDEEP
CHECKED BY	KSN REDDY
APPROVED BY	BHUPENDER

FINAL DETAILED PROJECT REPORT

Title: **Median & Avenue Plantation** (Ch. 3+000 to Ch. 4+000)

Size	Scale	Drg. No	Rev:
A2	HOR-1:1000	HARIDWAR-SPUR-PLANTATION-06	R0

LEGEND :

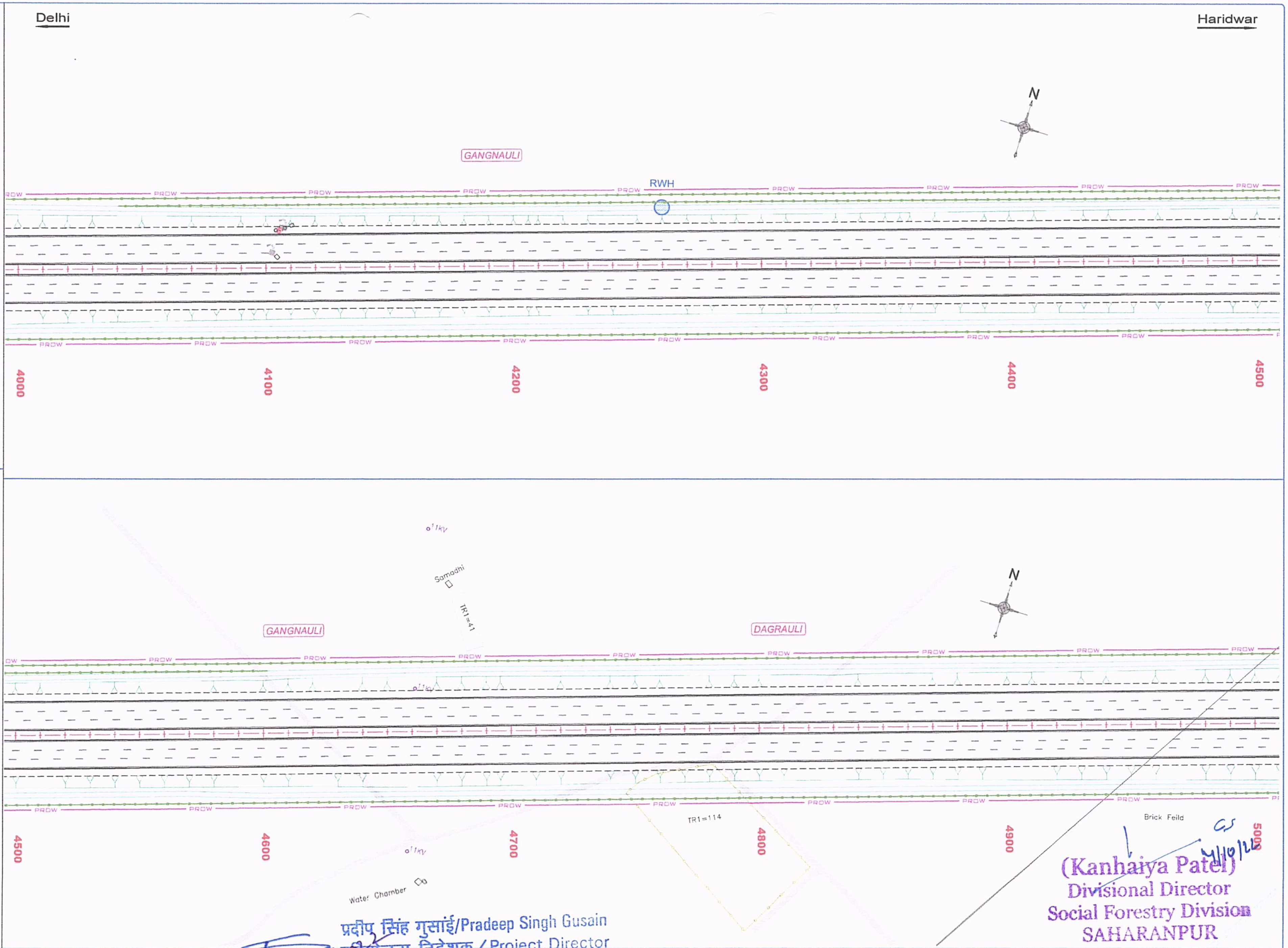
PLAN :

EXISTING

- Exist. Road
- SP-R : Semi Pucca Resi.
- SP-C : Semi Pucca Comm.
- P-R : Pucca Residential
- P-C : Pucca Commercial
- K-R : Katcha Residential
- HUT : Hut
- : Paddy Field
- : Boundary Wall
- : Fencing
- EROW — Existing RoW
- PROW — Proposed RoW

PROPOSED

- Toe Line
- SH Edge
- C/W Edge
- Median
- C/W Edge
- SH Edge
- Toe Line
- Hor. Tangent Point
- Culvert
- Lined Drain
- Unlined Drain
- TOE / RE WALL
- PLANTATION



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REV.	DATE	DESCRIPTION
R0	01-09-2022	FINAL DETAILED PROJECT REPORT

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Design Consultants: Theme Consulting Pvt. Ltd. in association with Aarvee Consulting Engineers Pvt. Ltd.

Project: **Spur to Haridwar from Delhi-Dehradun Greenfield Project**
Development of 6-lane access controlled Spur to Haridwar from Delhi-Saharanpur-Dehradun Economic Corridor in the state of Uttar Pradesh and Uttarakhand under Bharatmala Pariyojana

DRAWN BY	SUMAN
DESIGNED BY	SANDEEP
CHECKED BY	KSN REDDY
APPROVED BY	BHUPENDER

FINAL DETAILED PROJECT REPORT

Title: Median & Avenue Plantation (Ch. 4+000 to Ch. 5+000)			
Size	*Scale*	*Drg No*	*Rev:*
A2	HOR-1:1000	HARIDWAR-SPUR-PLANTATION-07	R0

LEGEND :

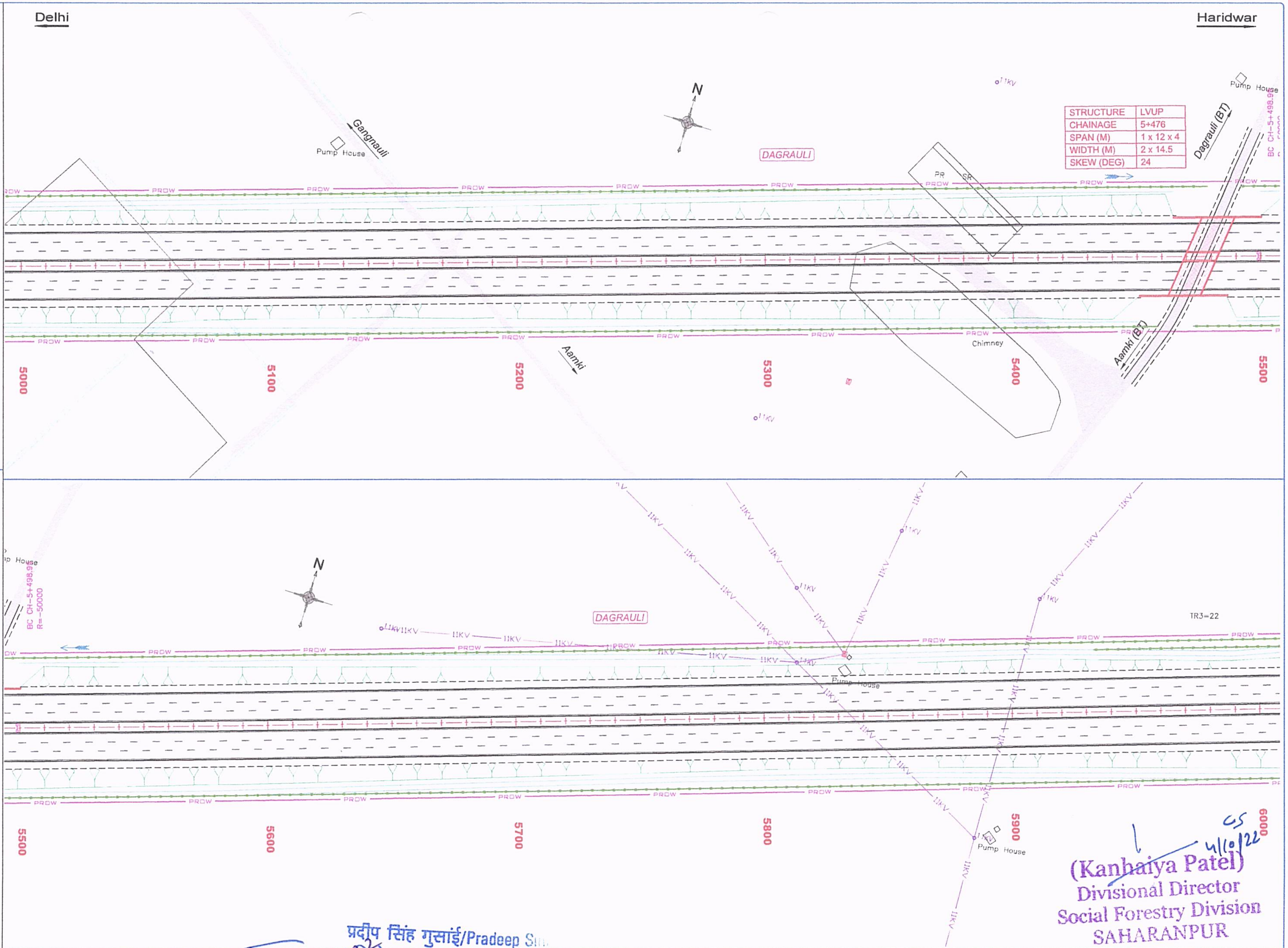
PLAN :

EXISTING

- Exist. Road
- SP-R : Semi Pucca Resi.
- SP-C : Semi Pucca Comm.
- P-R : Pucca Residential
- P-C : Pucca Commercial
- K-R : Katcha Residential
- HUT : Hut
- : Paddy Field
- : Boundary Wall
- : Fencing
- EROW — Existing RoW
- PROW — Proposed RoW

PROPOSED

- Toe Line
- SH Edge
- C/W Edge
- Median
- C/W Edge
- SH Edge
- Toe Line
- Hor. Tangent Point
- Culvert
- Lined Drain
- Unlined Drain
- TOE / RE WALL
- PLANTATION



STRUCTURE	LVUP
CHAINAGE	5+476
SPAN (M)	1 x 12 x 4
WIDTH (M)	2 x 14.5
SKEW (DEG)	24

(Kanhaiya Patel)
Divisional Director
Social Forestry Division
SAHARANPUR

प्रदीप सिंह गुसाईं/Pradeep Si...
परियोजना निदेशक / Project ...
भारतीय राष्ट्रीय राजमार्ग ...
National Highways Authority ...
पी०आई०यू०–रुड़की / PIU-Roork...

REV.	DATE	DESCRIPTION
R0	01-09-2022	FINAL DETAILED PROJECT REPORT

Authority: National Highways Authority of India (Ministry of Road Transport & Highways)

Design Consultants: Tyrneys Consulting Pvt. Ltd. in association with Accete Consulting Engineers Pvt. Ltd.

Project: **Spur to Haridwar from Delhi-Dehradun Greenfield Project**

Development of 6-lane access controlled Spur to Haridwar from Delhi-Saharanpur-Dehradun Economic Corridor in the state of Uttar Prdesh and Uttarakhand under Bharatmala Pariyojana

DRAWN BY	SUMAN
DESIGNED BY	SANDEEP
CHECKED BY	KSN REDDY
APPROVED BY	BHUPENDER

FINAL DETAILED PROJECT REPORT

Title:	Median & Avenue Plantation	(Ch. 5+000 to Ch. 6+000)	
Size	Scale	Drg. No	Rev:
A2	HOR-1:1000	HARIDWAR-SPUR-PLANTATION-08	R0

LEGEND :

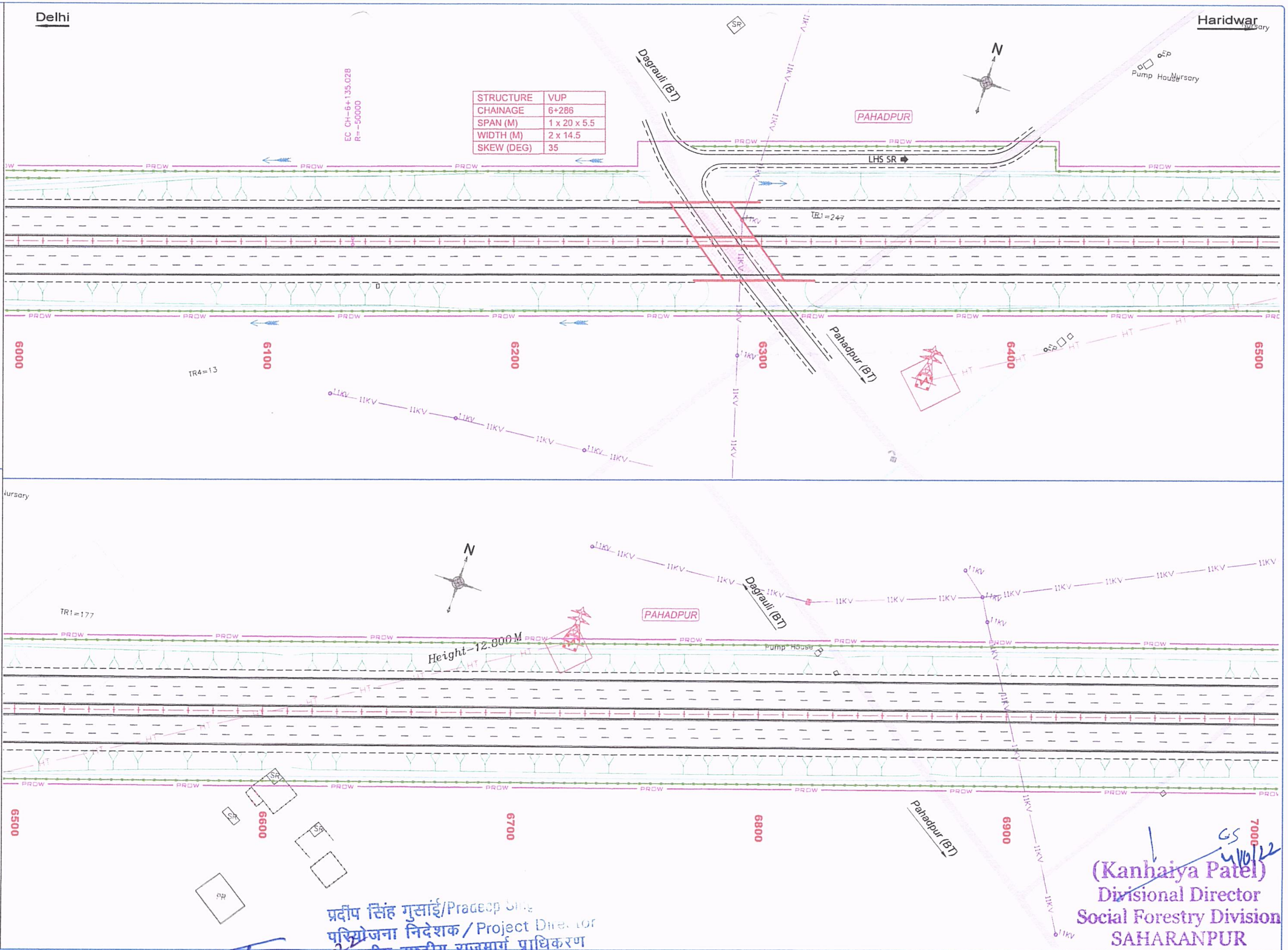
PLAN :

EXISTING

- Exist. Road
- SP-R : Semi Pucca Resi.
- SP-C : Semi Pucca Comm.
- P-R : Pucca Residential
- P-C : Pucca Commercial
- K-R : Katcha Residential
- HUT : Hut
- : Paddy Field
- : Boundary Wall
- : Fencing
- EROW — Existing RoW
- PROW — Proposed RoW

PROPOSED

- Toe Line / SH Edge / C/W Edge
- Median
- C/W Edge / SH Edge / Toe Line
- Hor. Tangent Point
- Culvert
- Lined Drain
- Unlined Drain
- TOE / RE WALL
- PLANTATION



STRUCTURE	VUP
CHAINAGE	6+286
SPAN (M)	1 x 20 x 5.5
WIDTH (M)	2 x 14.5
SKEW (DEG)	35

(Kanhaiya Patel)
Divisional Director
Social Forestry Division
SAHARANPUR

प्रदीप सिंह गुसाईं/Pradeep Sing...
परियोजना निदेशक / Project Director
भारतीय राष्ट्रीय राजमार्ग प्राधिकरण
National Highway Authority of India
पी0आई0यू0-रूड़की / PIU-Roorkee

REV.	DATE	DESCRIPTION
R0	01-09-2022	FINAL DETAILED PROJECT REPORT

Authority: National Highways Authority of India (Ministry of Road Transport & Highways)

Design Consultants: Tranayas Consulting Pvt. Ltd. in association with Concrete Consulting Engineers Pvt. Ltd.

Project: Spur to Haridwar from Delhi-Dehradun Greenfield Project — Development of 6-lane access controlled Spur to Haridwar from Delhi-Saharanpur-Dehradun Economic Corridor in the state of Uttar Pradesh and Uttarakhand under Bharatmala Pariyojana

DRAWN BY	SUMAN
DESIGNED BY	SANDEEP
CHECKED BY	KSN REDDY
APPROVED BY	BHUPENDER

FINAL DETAILED PROJECT REPORT

Title: Median & Avenue Plantation (Ch. 6+000 to Ch. 7+000)

Size	Scale	Drg. No	Rev:
A2	HOR-1:1000	HARIDWAR-SPUR-PLANTATION-09	R0

LEGEND :

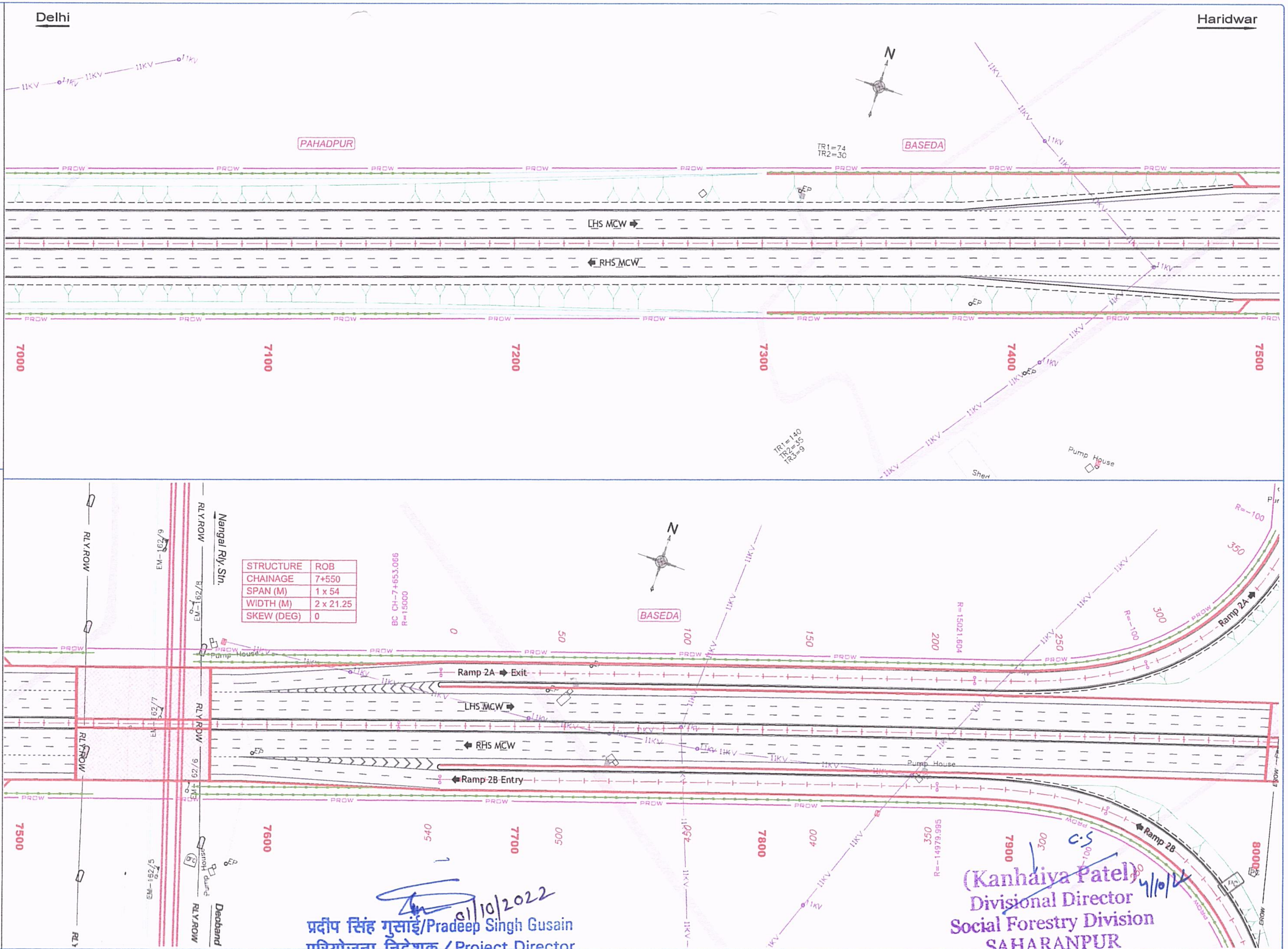
PLAN :

EXISTING

- Exist. Road
- SP-R : Semi Pucca Resi.
- SP-C : Semi Pucca Comm.
- P-R : Pucca Residential
- P-C : Pucca Commercial
- K-R : Katcha Residential
- HUT : Hut
- : Paddy Field
- : Boundary Wall
- : Fencing
- EROW — Existing RoW
- PROW — Proposed RoW

PROPOSED

- Toe Line / SH Edge / C/W Edge
- Median
- C/W Edge / SH Edge / Toe Line
- Hor. Tangent Point
- Culvert
- Lined Drain
- Unlined Drain
- TOE / RE WALL
- PLANTATION



STRUCTURE	ROB
CHAINAGE	7+550
SPAN (M)	1 x 54
WIDTH (M)	2 x 21.25
SKEW (DEG)	0

C.S
(Kanhaiya Patel) 4/10/22
Divisional Director
Social Forestry Division
SAHARANPUR

01/10/2022
प्रदीप सिंह गुसाईं/Pradeep Singh Gusain
परियोजना निदेशक/Project Director
भारतीय राष्ट्रीय राजमार्ग प्राधिकरण
National Highway Authority of India

REV.	DATE	DESCRIPTION
R0	01-09-2022	FINAL DETAILED PROJECT REPORT

Authority: National Highways Authority of India (Ministry of Road Transport & Highways)

Design Consultants: Transys Consulting Pvt. Ltd.

Project: **Spur to Haridwar from Delhi-Dehradun Greenfield Project**

Development of 6-lane access controlled Spur to Haridwar from Delhi-Saharanpur-Dehradun Economic Corridor in the state of Uttar Prdesh and Uttarakhand under Bharatmala Pariyojana

DRAWN BY	SUMAN
DESIGNED BY	SANDEEP
CHECKED BY	KSN REDDY
APPROVED BY	BHUPENDER

FINAL DETAILED PROJECT REPORT

Title: Median & Avenue Plantation (Ch. 7+000 to Ch. 8+000)

Size	Scale	Drg. No	Rev:
A2	HOR-1:1000	HARIDWAR-SPUR-PLANTATION-10	R0

LEGEND :

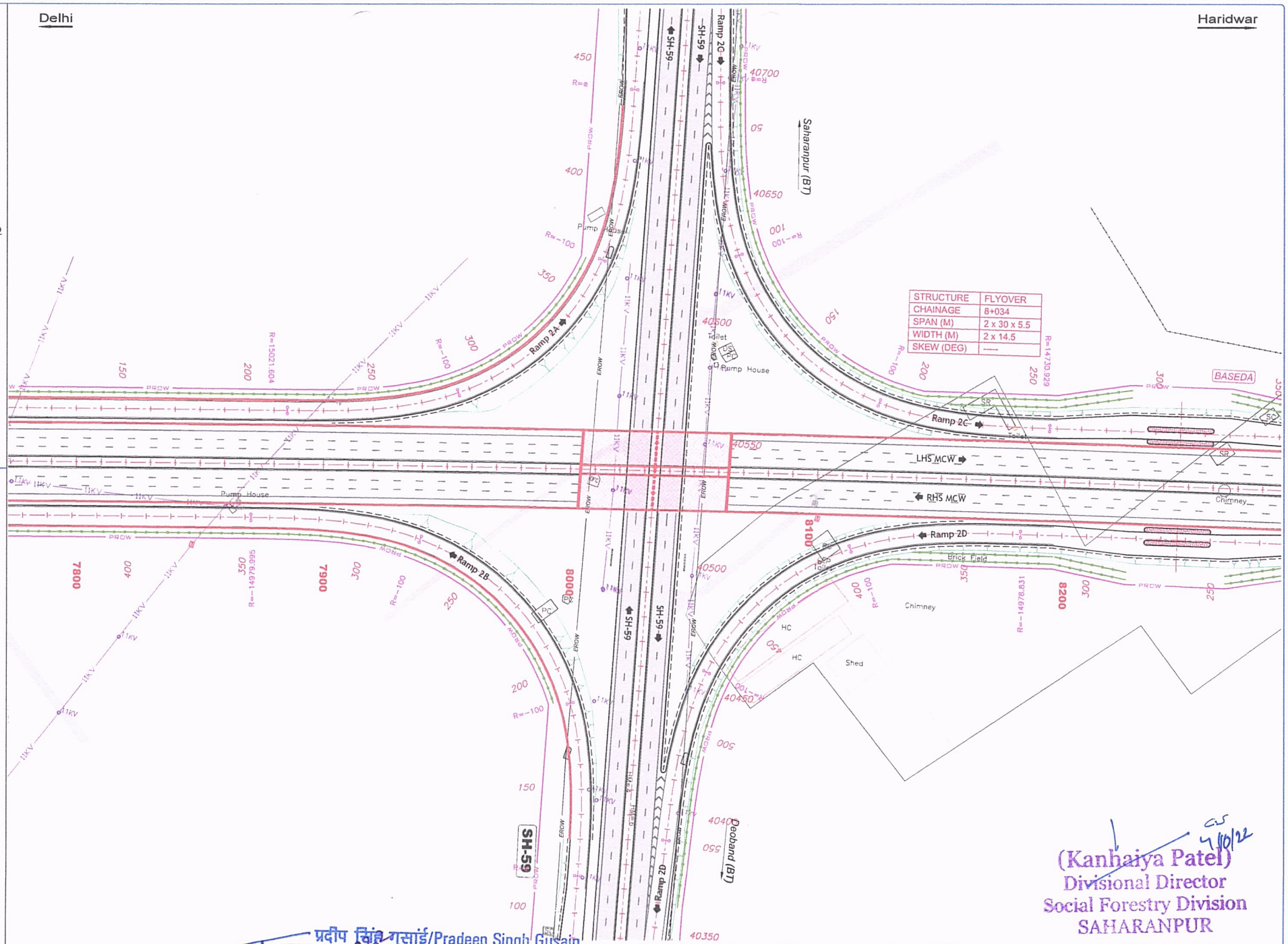
PLAN :

EXISTING

- Exist. Road
- SP-R : Semi Pucca Resi.
- SP-C : Semi Pucca Comm.
- P-R : Pucca Residential
- P-C : Pucca Commercial
- K-R : Katcha Residential
- HUT : Hut
- : Paddy Field
- : Boundary Wall
- : Fencing
- EROW — Existing RoW
- PROW — Proposed RoW

PROPOSED

- Toe Line
- SH Edge
- C/W Edge
- Median
- C/W Edge
- SH Edge
- Toe Line
- Hor. Tangent Point
- Culvert
- Lined Drain
- Unlined Drain
- TOE / RE WALL
- PLANTATION



STRUCTURE	FLYOVER
CHAINAGE	8+034
SPAN (M)	2 x 30 x 5.5
WIDTH (M)	2 x 14.5
SKEW (DEG)	-----

(Kanhaiya Patel) 4/10/22
Divisional Director
Social Forestry Division
SAHARANPUR

REV.	DATE	DESCRIPTION
R0	01-09-2022	FINAL DETAILED PROJECT REPORT

Authority: National Highways Authority of India (Ministry of Road Transport & Highways)

Design Consultants: Transys Consulting Pvt. Ltd. in association with Accrete Consulting Engineers Pvt. Ltd.

Project: Spur to Haridwar from Delhi-Dehradun Greenfield Project

Development of 6-lane access controlled Spur to Haridwar from Delhi-Saharanpur-Dehradun Economic Corridor in the state of Uttar Pradesh and Uttarakhand under Bharatmala Pariyojana

DRAWN BY	SUMAN
DESIGNED BY	SANDEEP
CHECKED BY	KSN REDDY
APPROVED BY	BHUPENDER

FINAL DETAILED PROJECT REPORT

Title: Median & Avenue Plantation (Interchange at Ch. 8+034)

Size	Scale	Drg. No	Rev.
A2	HOR-1:1000	HARIDWAR-SPUR-PLANTATION-11	R0

प्रदीप सिंह गुसाईं/Pradeep Singh Gusain
परियोजना निदेशक / Project Director
राष्ट्रीय राजमार्ग प्राधिकरण भारत
National Highways Authority of India
पी०आई०यू०–रूड़की / PIU-Roorkee

LEGEND :

PLAN :

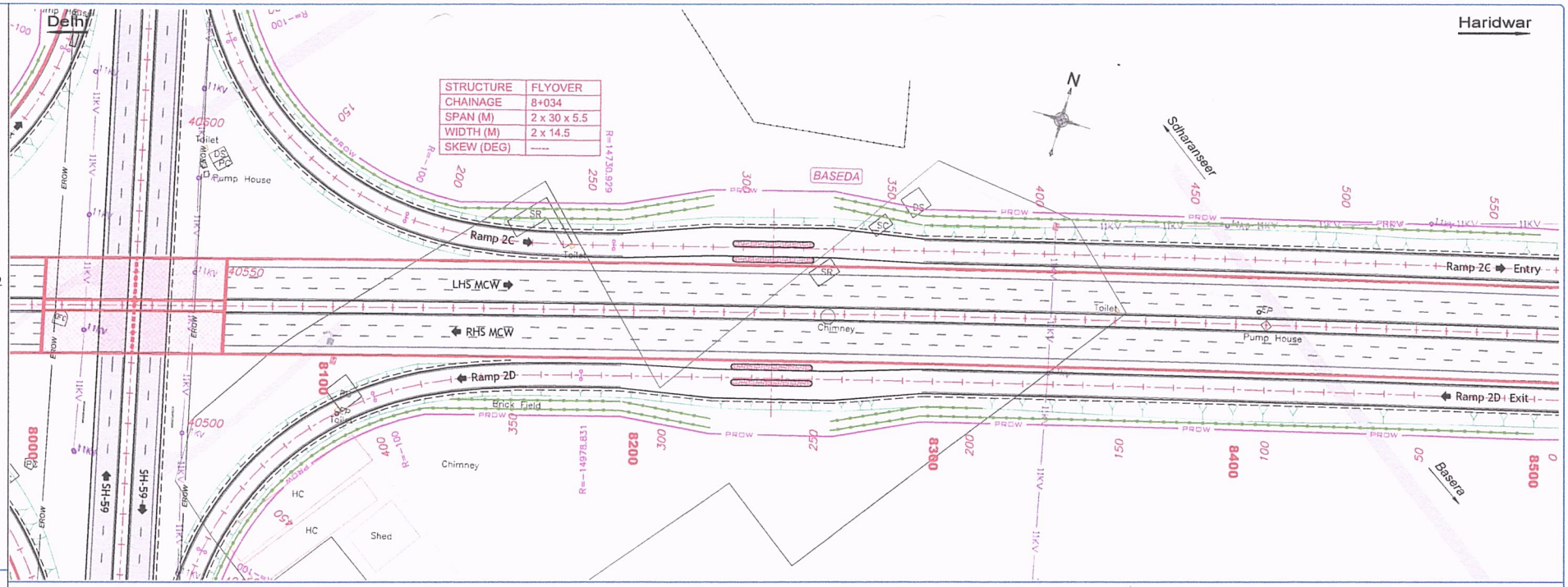
EXISTING

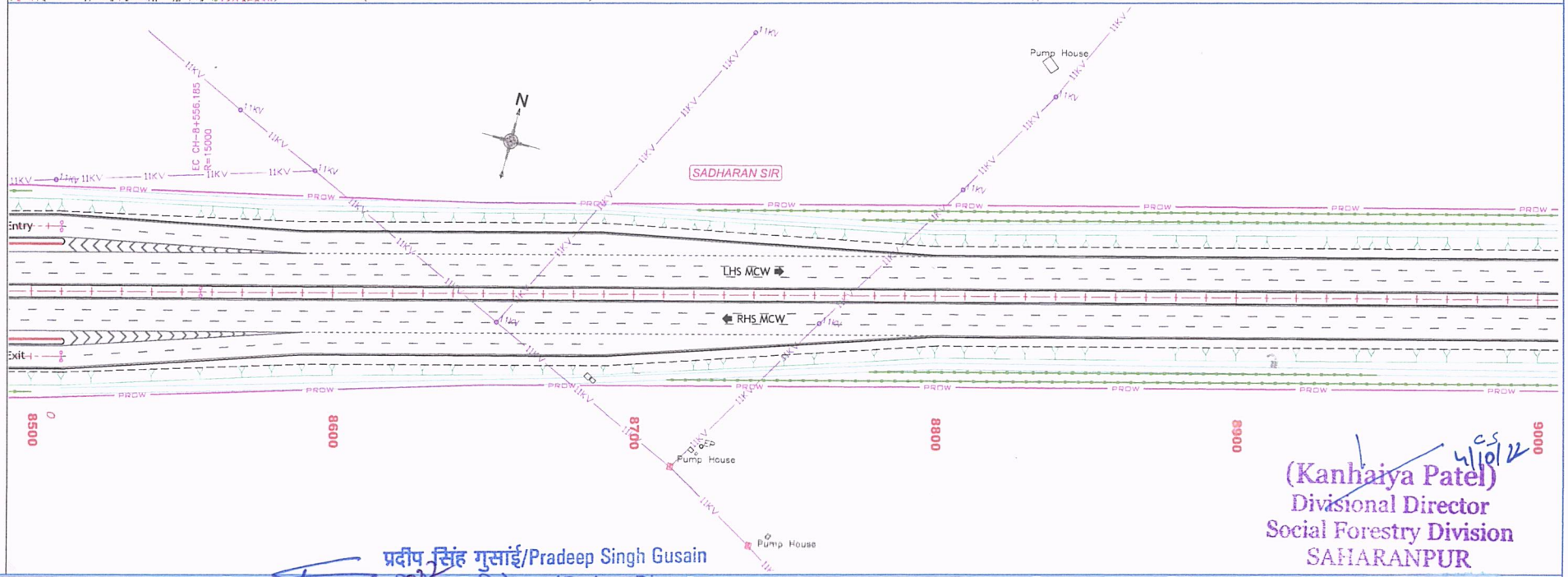
Exist. Road

SP-R : Semi Pucca Resi.
SP-C : Semi Pucca Comm.
P-R : Pucca Residential
P-C : Pucca Commercial
K-R : Katcha Residential
HUT : Hut
: Paddy Field
: Boundary Wall
: Fencing
— EROW — Existing RoW
— PROW — Proposed RoW

PROPOSED

Toe Line
SH Edge
C/W Edge
Median
C/W Edge
SH Edge
Toe Line
Hor. Tangent Point
Culvert
Lined Drain
Unlined Drain
TOE / RE WALL
PLANTATION





(Kanhaiya Patel)
Divisional Director
Social Forestry Division
SAHARANPUR

REV.	DATE	DESCRIPTION
R0	01-09-2022	FINAL DETAILED PROJECT REPORT

Authority: National Highways Authority of India (Ministry of Road Transport & Highways)

Detail Consultants: Transys Consulting Pvt. Ltd. Accrete Consulting Engineers Pvt. Ltd.

Project: **Spur to Haridwar from Delhi-Dehradun Greenfield Project**
Development of 6-lane access controlled Spur to Haridwar from Delhi-Saharanpur-Dehradun Economic Corridor in the state of Uttar Pradesh and Uttarakhand under Bharatmala Pariyojana

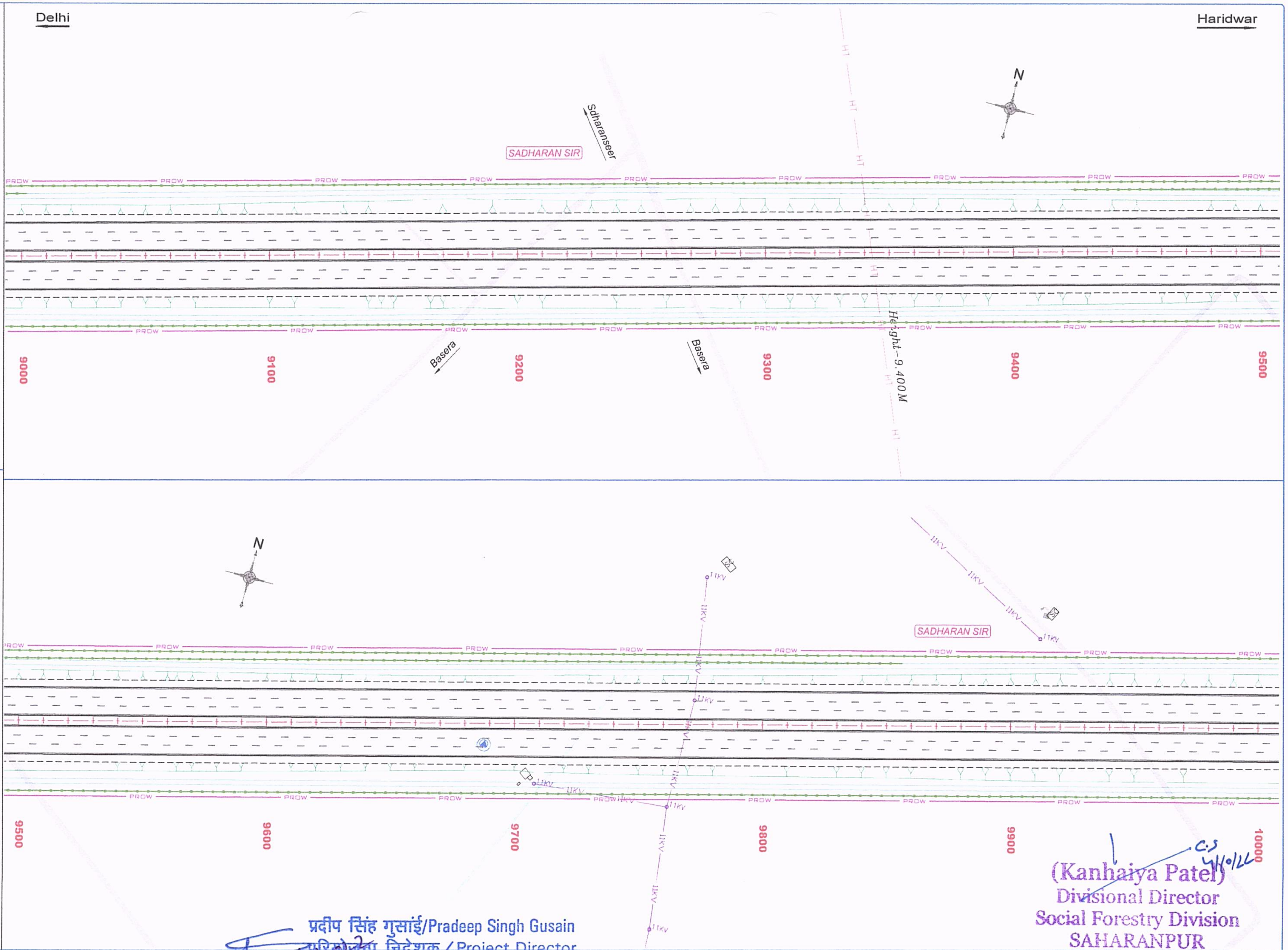
DRAWN BY	SUMAN
DESIGNED BY	SANDEEP
CHECKED BY	KSN REDDY
APPROVED BY	BHUPENDER

FINAL DETAILED PROJECT REPORT

Title: **Median & Avenue Plantation** (Ch. 8+000 to Ch. 9+000)

Size	Scale	Drg. No	Rev.
A2	HOR-1:1000	HARIDWAR-SPUR-PLANTATION-12	R0

प्रदीप सिंह गुसांई/Pradeep Singh Gusain
परियोजना निदेशक/Project Director
भारतीय राष्ट्रीय राजमार्ग प्राधिकरण
National Highways Authority of India
पी०आई०यू०-रूड़की/PIU-Roorkee



LEGEND :

PLAN :

EXISTING

- Exist. Road
- SP-R : Semi Pucca Resi.
- SP-C : Semi Pucca Comm.
- P-R : Pucca Residential
- P-C : Pucca Commercial
- K-R : Katcha Residential
- HUT : Hut
- : Paddy Field
- : Boundary Wall
- : Fencing
- EROW — Existing RoW
- PROW — Proposed RoW

PROPOSED

- Toe Line
- SH Edge
- C/W Edge
- Median
- C/W Edge
- SH Edge
- Toe Line
- Hor. Tangent Point
- Culvert
- Lined Drain
- Unlined Drain
- TOE / RE WALL
- PLANTATION

(Kanhaiya Patel)
Divisional Director
Social Forestry Division
SAHARANPUR

प्रदीप सिंह गुसाईं/Pradeep Singh Gusain
परियोजना निदेशक/Project Director
भारतीय राष्ट्रीय राजमार्ग प्राधिकरण
National Highway Authority of India
पी०आई०यू०–रुड़की/PIU-Roorkee

REV.	DATE	DESCRIPTION
R0	01-09-2022	FINAL DETAILED PROJECT REPORT

Authority: National Highways Authority of India (Ministry of Road Transport & Highways)

Design Consultants: Transys Consulting Pvt. Ltd. in association with Aarvee Consulting Engineers Pvt. Ltd.

Project: **Spur to Haridwar from Delhi-Dehradun Greenfield Project**
Development of 6-lane access controlled Spur to Haridwar from Delhi-Saharanpur-Dehradun Economic Corridor in the state of Uttar Prdesh and Uttarakhand under Bharatmala Pariyojana

DRAWN BY	SUMAN
DESIGNED BY	SANDEEP
CHECKED BY	KSN REDDY
APPROVED BY	BHUPENDER

FINAL DETAILED PROJECT REPORT

Title: **Median & Avenue Plantation** (Ch. 9+000 to Ch. 10+000)

Size	Scale	Drg. No	Rev:
A2	HOR-1:1000	HARIDWAR-SPUR-PLANTATION-13	R0

LEGEND :

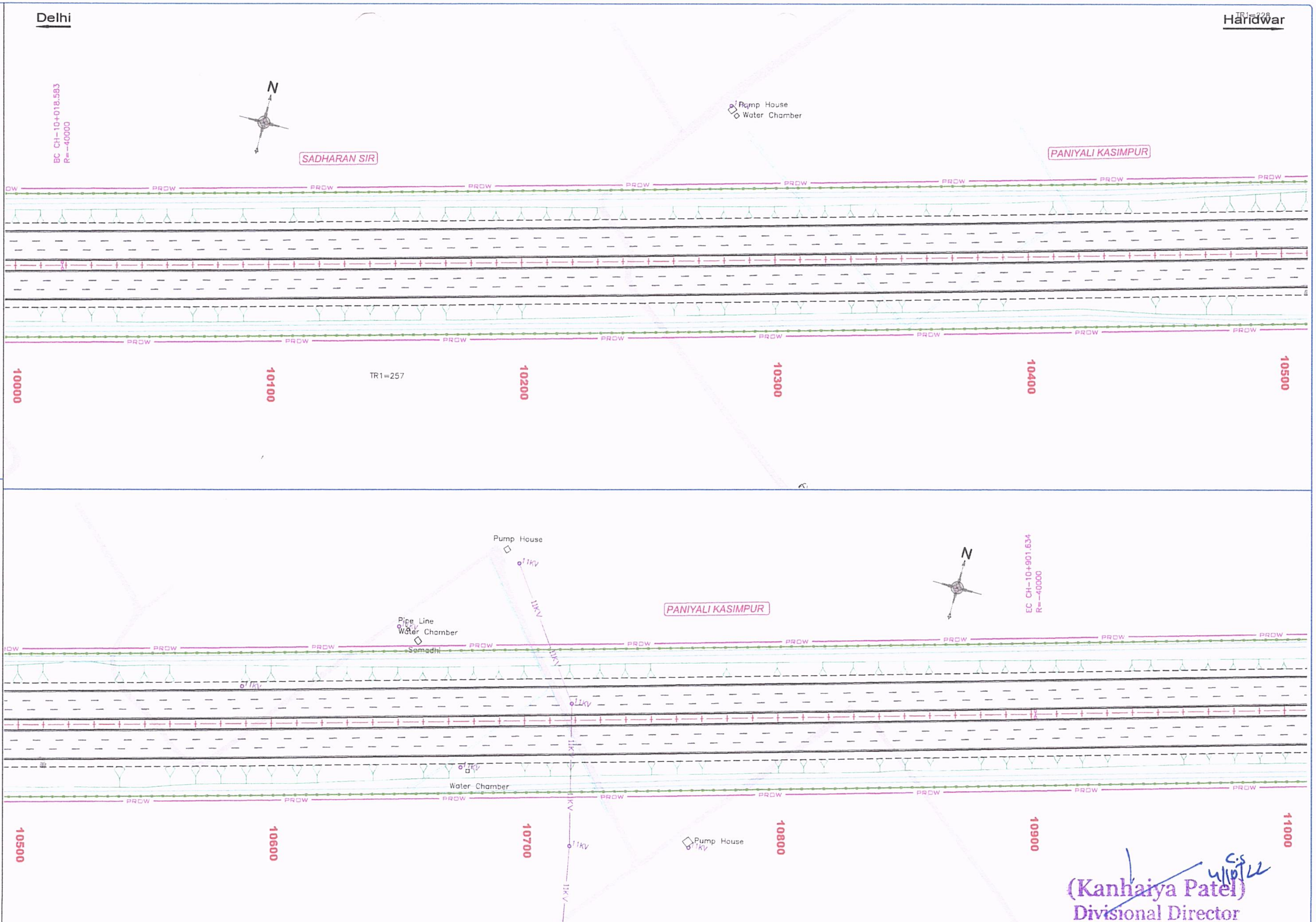
PLAN :

EXISTING

- Exist. Road
- SP-R : Semi Pucca Resi.
- SP-C : Semi Pucca Comm.
- P-R : Pucca Residential
- P-C : Pucca Commercial
- K-R : Katcha Residential
- HUT : Hut
- : Paddy Field
- : Boundary Wall
- : Fencing
- EROW — Existing RoW
- PROW — Proposed RoW

PROPOSED

- Toe Line / SH Edge / C/W Edge
- Median
- C/W Edge / SH Edge / Toe Line
- Hor. Tangent Point
- Culvert
- Lined Drain
- Unlined Drain
- TOE / RE WALL
- PLANTATION



(Kanhaiya Patel)
Divisional Director
Social Forestry Division
SAHARANPUR

प्रदीप सिंह गुसांई/Pradeep Singh Gusain
परियोजना निदेशक / Project Director
भारतीय राष्ट्रीय राजमार्ग प्राधिकरण
National Highways Authority of India
पी०आई०यू० — रुड़की / PIU-Roorkee

REV.	DATE	DESCRIPTION
R0	01-09-2022	FINAL DETAILED PROJECT REPORT

Authority: National Highways Authority of India (Ministry of Road Transport & Highways)

Design Consultants: Transys Consulting Pvt. Ltd. / Accrete Consulting Engineers Pvt. Ltd.

Project: **Spur to Haridwar from Delhi-Dehradun Greenfield Project**
Development of 6-lane access controlled Spur to Haridwar from Delhi-Saharanpur-Dehradun Economic Corridor in the state of Uttar Prdesh and Uttarakhand under Bharatmala Pariyojana

DRAWN BY	SUMAN
DESIGNED BY	SANDEEP
CHECKED BY	KSN REDDY
APPROVED BY	BHUPENDER

FINAL DETAILED PROJECT REPORT

Title: Median & Avenue Plantation (Ch. 10+000 to Ch. 11+000)

Size	Scale	Drg. No	Rev:
A2	HOR-1:1000	HARIDWAR-SPUR-PLANTATION-14	R0

LEGEND :

PLAN :

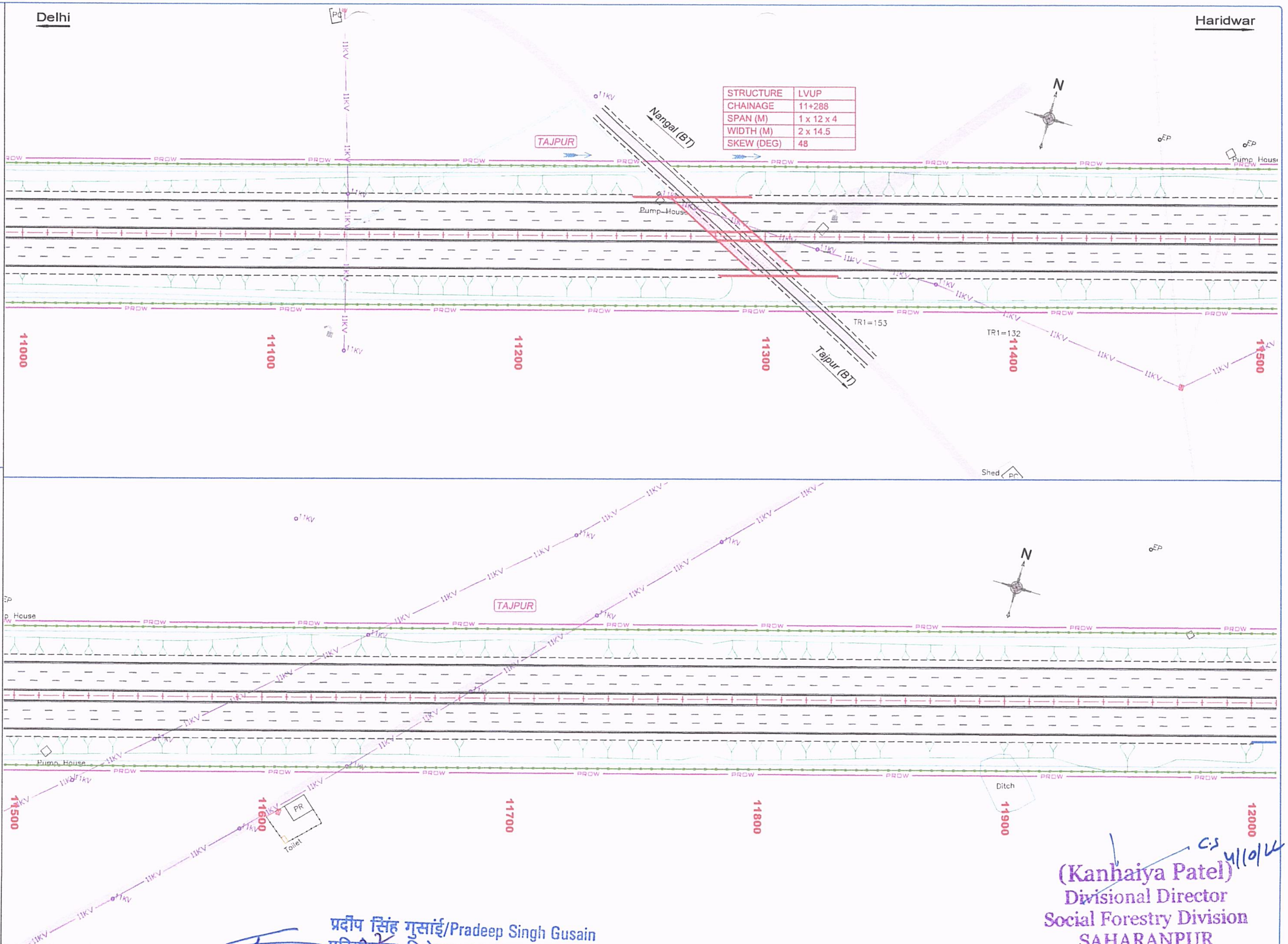
EXISTING

Exist. Road

SP-R : Semi Pucca Resi.
SP-C : Semi Pucca Comm.
P-R : Pucca Residential
P-C : Pucca Commercial
K-R : Katcha Residential
HUT : Hut
: Paddy Field
: Boundary Wall
: Fencing
EROW — Existing RoW
PROW — Proposed RoW

PROPOSED

Toe Line
SH Edge
C/W Edge
Median
C/W Edge
SH Edge
Toe Line
Hor. Tangent Point
Culvert
Lined Drain
Unlined Drain
TOE / RE WALL
PLANTATION



STRUCTURE	LVUP
CHAINAGE	11+288
SPAN (M)	1 x 12 x 4
WIDTH (M)	2 x 14.5
SKEW (DEG)	48

(Kanhaiya Patel)
Divisional Director
Social Forestry Division
SAHARANPUR
C.S 4/10/22

प्रदीप सिंह गुसाईं/Pradeep Singh Gusain
परियोजना निदेशक / Project Director
भारतीय राष्ट्रीय राजमार्ग प्राधिकरण
National Highway Authority of India
पी०आई०यू० – रूड़की / PIU-Roorkee

REV.	DATE	DESCRIPTION
R0	01-09-2022	FINAL DETAILED PROJECT REPORT

Authority: National Highways Authority of India (Ministry of Road Transport & Highways)

Design Consultants: Transys Consulting Pvt. Ltd. in association with Aarvee Consulting Engineers Pvt. Ltd.

Project: **Spur to Haridwar from Delhi-Dehradun Greenfield Project**

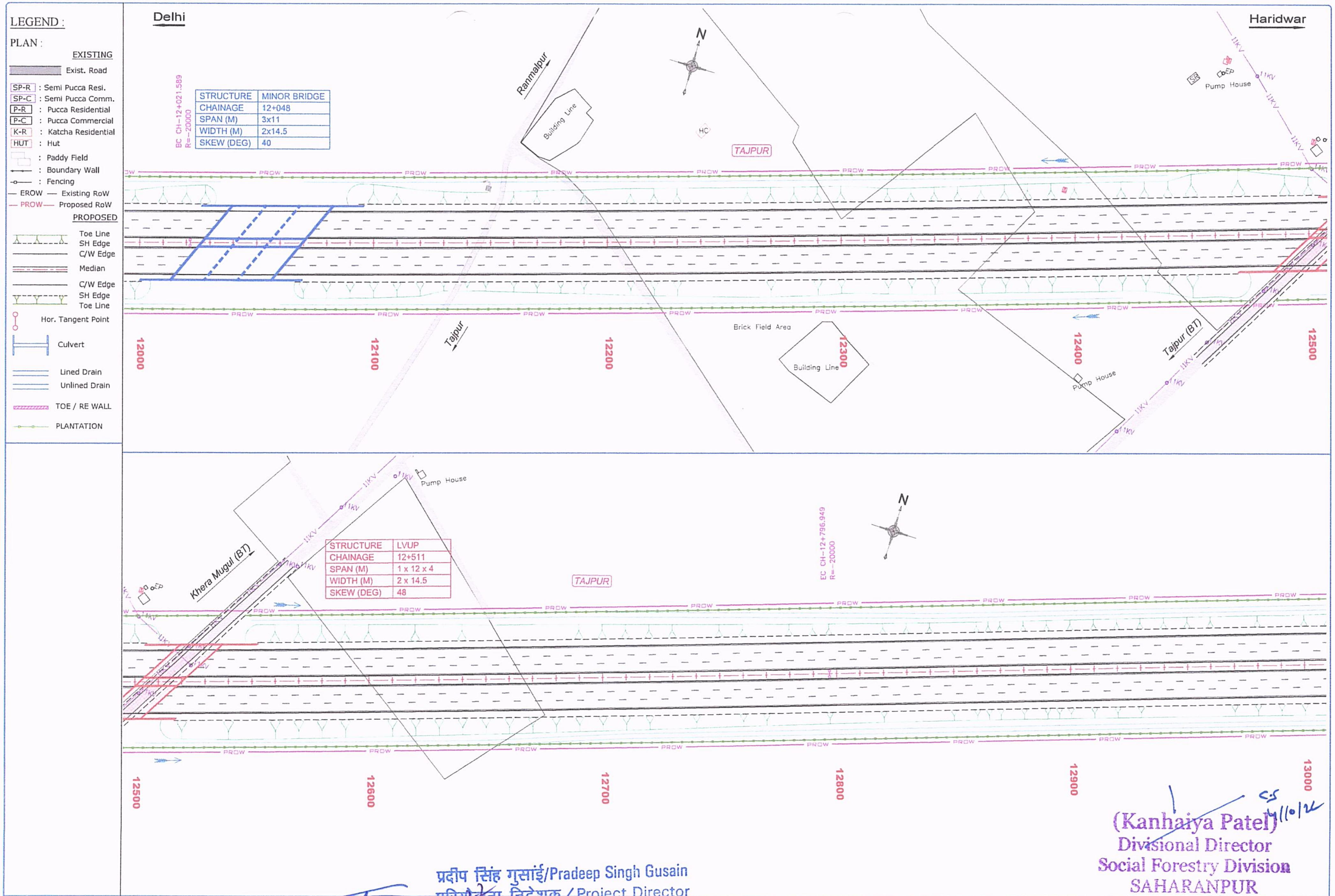
Development of 6-lane access controlled Spur to Haridwar from Delhi-Saharanpur-Dehradun Economic Corridor in the state of Uttar Prdesh and Uttarakhand under Bharatmala Pariyojana

DRAWN BY	SUMAN
DESIGNED BY	SANDEEP
CHECKED BY	KSN REDDY
APPROVED BY	BHUPENDER

FINAL DETAILED PROJECT REPORT

Title: Median & Avenue Plantation (Ch. 11+000 to Ch. 12+000)

Size	Scale	Drg. No	Rev.
A2	HOR-1:1000	HARIDWAR-SPUR-PLANTATION-15	R0



(Kanhaiya Patel)
Divisional Director
Social Forestry Division
SAHARANPUR

प्रदीप सिंह गुसाईं/Pradeep Singh Gusain
परियोजना निदेशक / Project Director
भारतीय राष्ट्रीय राजमार्ग प्राधिकरण
National Highways Authority of India
पी0आई0यू0 रूड़की/PIU Roorkee

REV.	DATE	DESCRIPTION
R0	01-09-2022	FINAL DETAILED PROJECT REPORT

Authority: National Highways Authority of India (Ministry of Road Transport & Highways)

Design Consultants: Fransys Consulting Pvt. Ltd. in association with Accord Consulting Engineers Pvt Ltd.

Project: Spur to Haridwar from Delhi-Dehradun Greenfield Project
Development of 6-lane access controlled Spur to Haridwar from Delhi-Saharanpur-Dehradun Economic Corridor in the state of Uttar Prdesh and Uttarakhand under Bharatmala Pariyojana

DRAWN BY	SUMAN
DESIGNED BY	SANDEEP
CHECKED BY	KSN REDDY
APPROVED BY	BHUPENDER

FINAL DETAILED PROJECT REPORT

Title: Median & Avenue Plantation (Ch. 12+000 to Ch. 13+000)

Size	Scale	Drg. No	Rev:
A2	HOR-1:1000	HARIDWAR-SPUR-PLANTATION-16	R0

LEGEND :

PLAN :

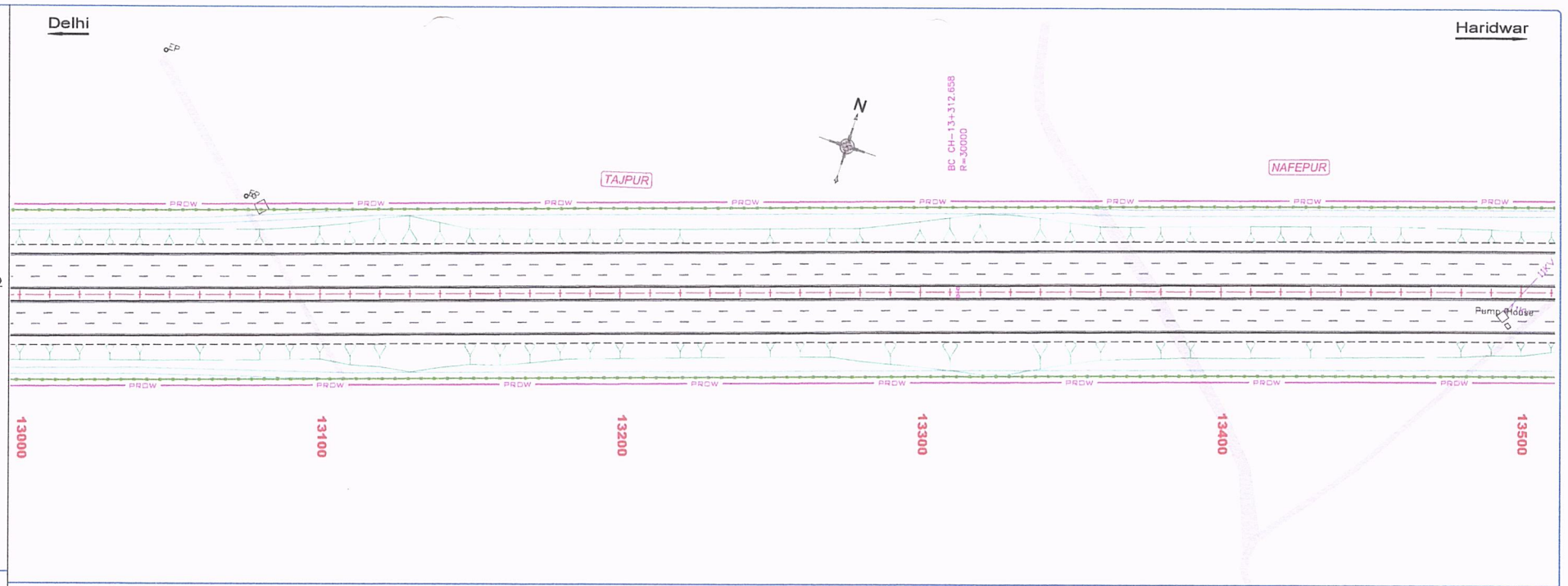
EXISTING

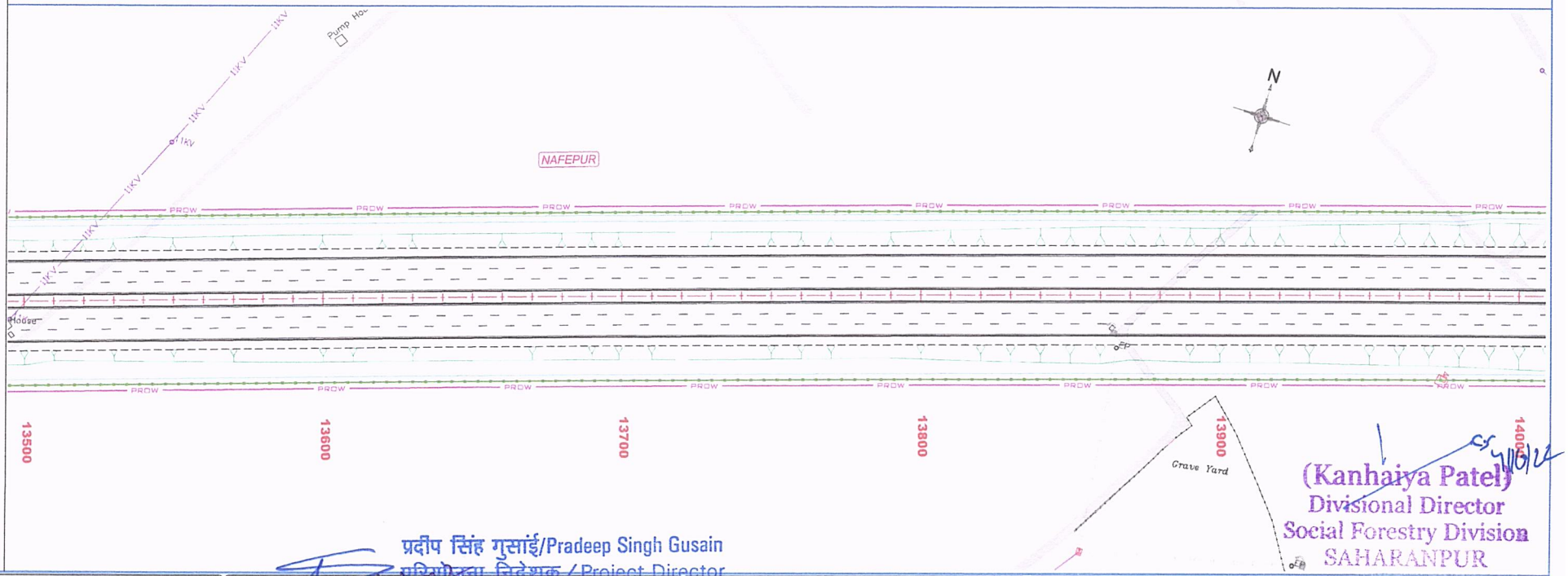
Exist. Road

SP-R : Semi Pucca Resi.
SP-C : Semi Pucca Comm.
P-R : Pucca Residential
P-C : Pucca Commercial
K-R : Katcha Residential
HUT : Hut
: Paddy Field
: Boundary Wall
: Fencing
EROW — Existing RoW
PROW — Proposed RoW

PROPOSED

Toe Line
SH Edge
C/W Edge
Median
C/W Edge
SH Edge
Toe Line
Hor. Tangent Point
Culvert
Lined Drain
Unlined Drain
TOE / RE WALL
PLANTATION





(Kanhaiya Patel)
Divisional Director
Social Forestry Division
SAHARANPUR

प्रदीप सिंह गुसाईं/Pradeep Singh Gusain
परियोजना निदेशक/Project Director
भारतीय राष्ट्रीय राजमार्ग प्राधिकरण
National Highways Authority of India
पी०आई०यू० रुड़की/PIU Roorkee

REV.	DATE	DESCRIPTION
R0	01-09-2022	FINAL DETAILED PROJECT REPORT

Authority: National Highways Authority of India (Ministry of Road Transport & Highways)

Design Consultant: Trapeys Consulting Pvt. Ltd. in association with Accrete Consulting Engineers Pvt. Ltd. 12th Floor, JMD Regent Square, MG Road, Gurugram - 122002, Email : info@trapeys-consulting.com, Web : www.trapeys.in

Project: Spur to Haridwar from Delhi-Dehradun Greenfield Project
Development of 4-lane access controlled Spur to Haridwar from Delhi-Saharanpur-Dehradun Economic Corridor in the state of Uttar Pradesh and Uttarakhand under Bharatmala Pariyojana

DRAWN BY	SUMAN
DESIGNED BY	SANDEEP
CHECKED BY	KSN REDDY
APPROVED BY	BHUPENDER

FINAL DETAILED PROJECT REPORT

Title: Median & Avenue Plantation (Ch. 13+000 to Ch. 14+000)

Size	Scale	Drg. No	Rev.
A2	HOR-1:1000	HARIDWAR-SPUR-PLANTATION-17	R0

LEGEND :

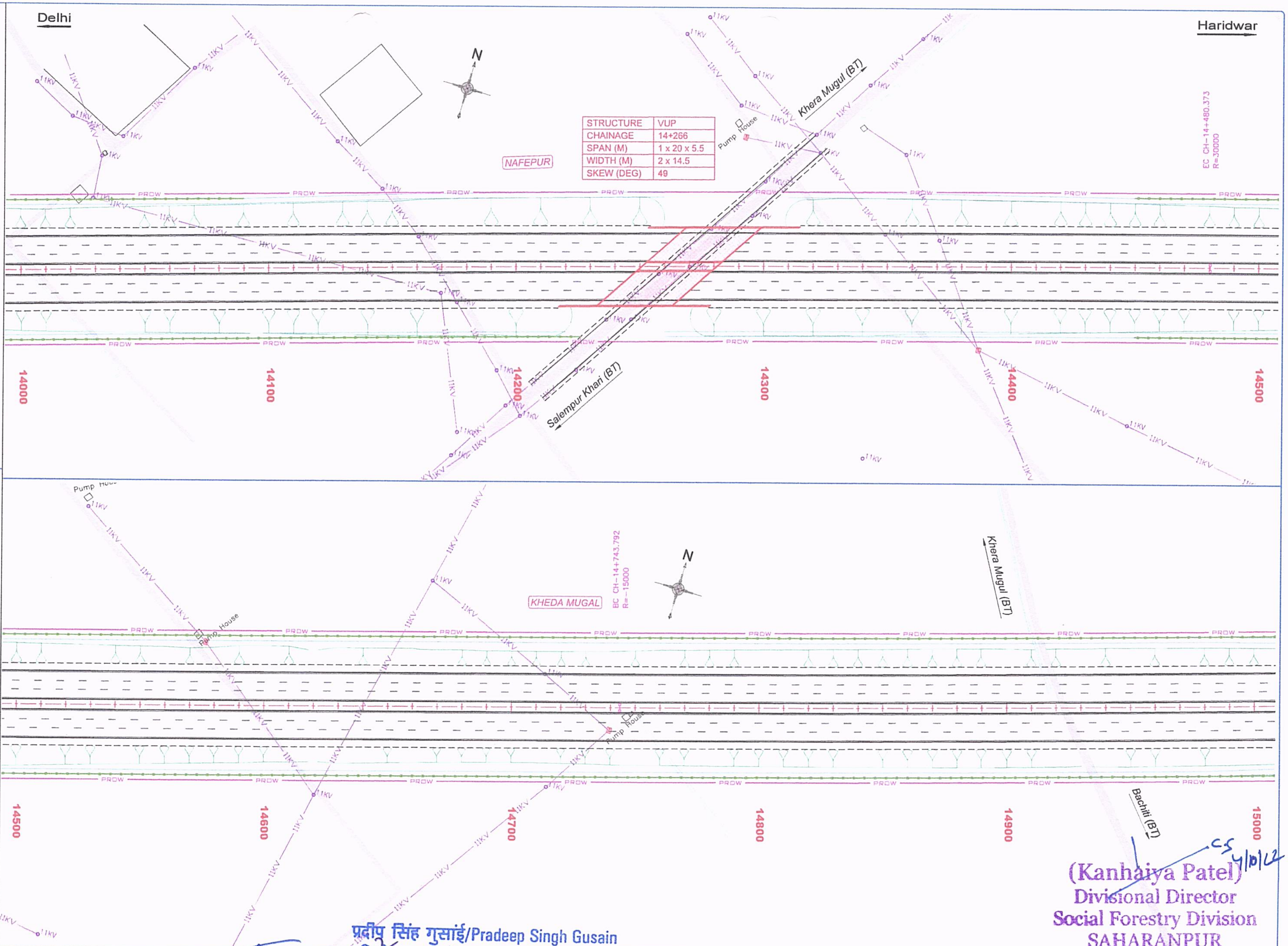
PLAN :

EXISTING

- Exist. Road
- SP-R : Semi Pucca Resi.
- SP-C : Semi Pucca Comm.
- P-R : Pucca Residential
- P-C : Pucca Commercial
- K-R : Katcha Residential
- HUT : Hut
- : Paddy Field
- : Boundary Wall
- : Fencing
- EROW — Existing RoW
- PROW — Proposed RoW

PROPOSED

- Toe Line
- SH Edge
- C/W Edge
- Median
- C/W Edge
- SH Edge
- Toe Line
- Hor. Tangent Point
- Culvert
- Lined Drain
- Unlined Drain
- TOE / RE WALL
- PLANTATION



STRUCTURE	VUP
CHAINAGE	14+266
SPAN (M)	1 x 20 x 5.5
WIDTH (M)	2 x 14.5
SKEW (DEG)	49

(Kanhaiya Patel)
Divisional Director
Social Forestry Division
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प्रदीप सिंह गुसाईं/Pradeep Singh Gusain
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National Highway Authority of India
पीआईयू–रुड़की / PIU-Roorkee

REV.	DATE	DESCRIPTION
R0	01-09-2022	FINAL DETAILED PROJECT REPORT

Authority: National Highways Authority of India (Ministry of Road Transport & Highways)

Design Consultants: Transys Consulting Pvt. Ltd. in association with Accete Consulting Engineers Pvt. Ltd.

Project: Spur to Haridwar from Delhi-Dehradun Greenfield Project — Development of 6-lane access controlled Spur to Haridwar from Delhi-Saharanpur-Dehradun Economic Corridor in the state of Uttar Prdesh and Uttarakhand under Bharatmala Pariyojana

DRAWN BY	SUMAN
DESIGNED BY	SANDEEP
CHECKED BY	KSN REDDY
APPROVED BY	BHUPENDER

FINAL DETAILED PROJECT REPORT

Title: Median & Avenue Plantation (Ch. 14+000 to Ch. 15+000)

Size	Scale	Drg. No	Rev:
A2	HOR-1:1000	HARIDWAR-SPUR-PLANTATION-18	R0

LEGEND :

PLAN :

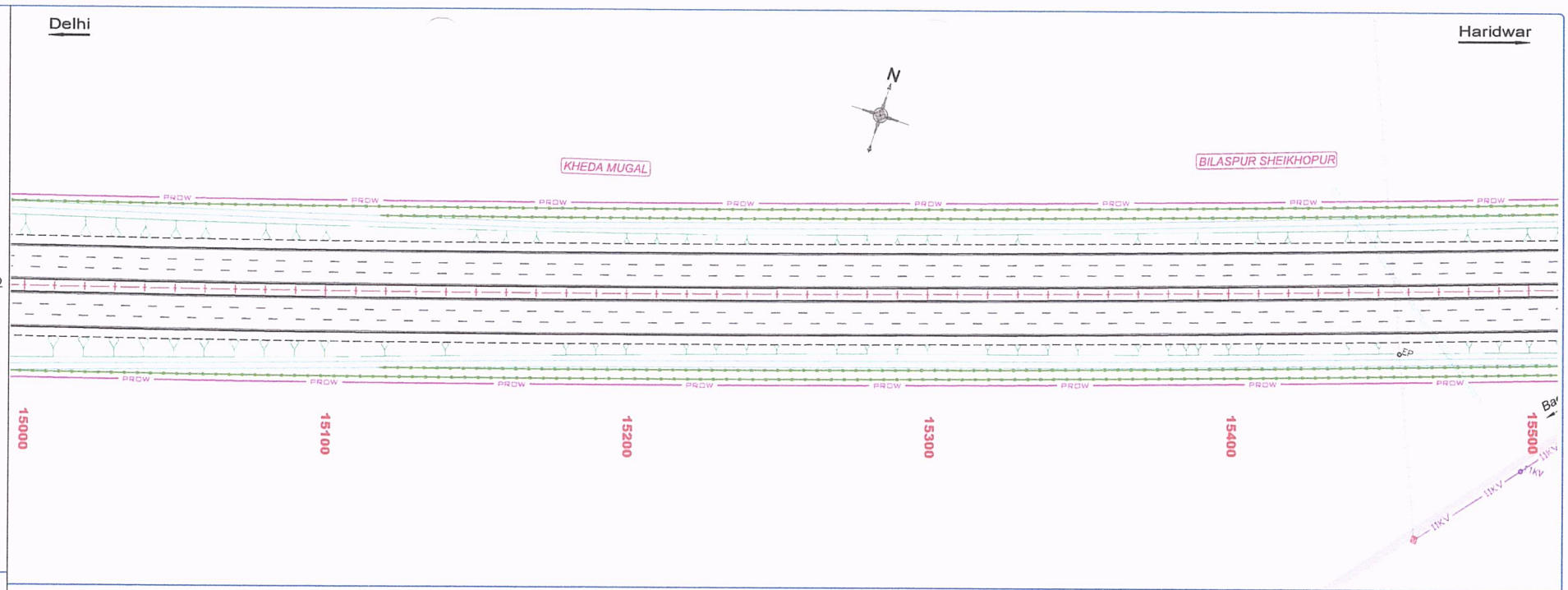
EXISTING

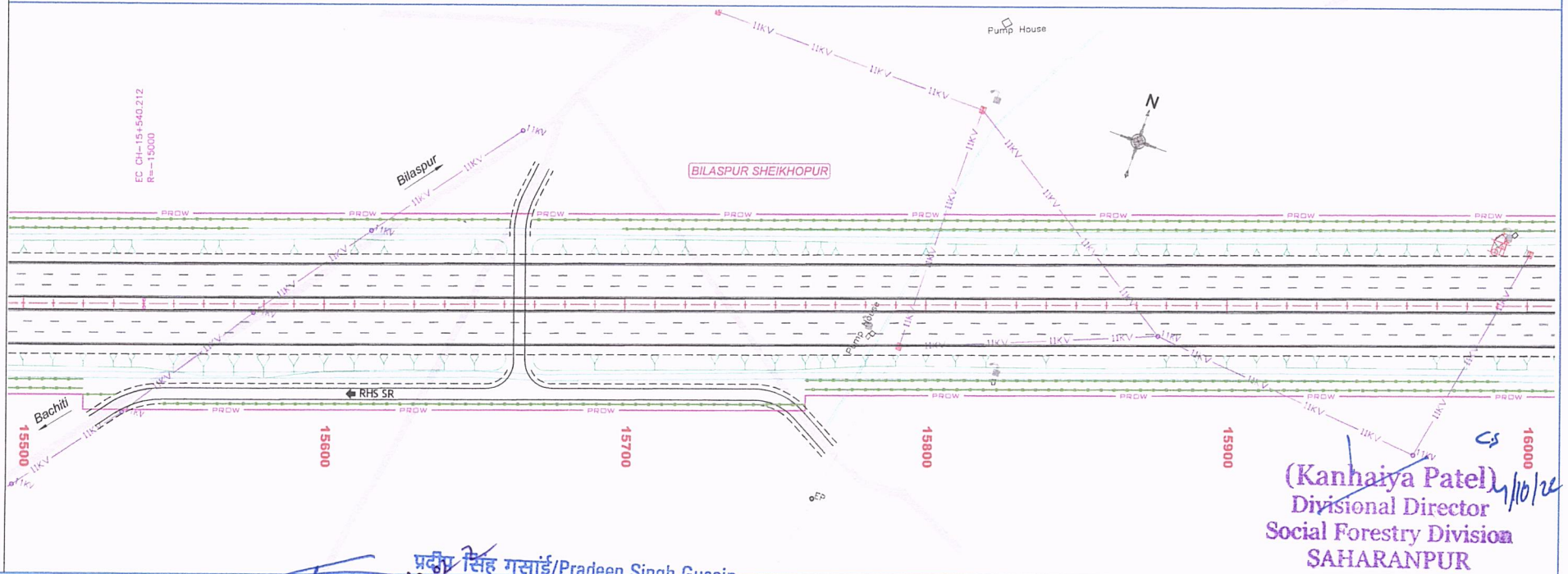
Exist. Road

SP-R : Semi Pucca Resi.
SP-C : Semi Pucca Comm.
P-R : Pucca Residential
P-C : Pucca Commercial
K-R : Katcha Residential
HUT : Hut
: Paddy Field
: Boundary Wall
: Fencing
EROW — Existing RoW
PROW — Proposed RoW

PROPOSED

Toe Line
SH Edge
C/W Edge
Median
C/W Edge
SH Edge
Toe Line
Hor. Tangent Point
Culvert
Lined Drain
Unlined Drain
TOE / RE WALL
PLANTATION





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Social Forestry Division
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REV.	DATE	DESCRIPTION
R0	01-09-2022	FINAL DETAILED PROJECT REPORT

Authority: National Highways Authority of India (Ministry of Road Transport & Highways)

Design Consultants: Transys Consulting Pvt. Ltd. in association with Aachete Consulting Engineers Pvt. Ltd. 12th Floor, JMD Regent Square, MG Road, Gurugram - 122002, www.transys.co.in, www.aachete.com

Project: Spur to Haridwar from Delhi-Dehradun Greenfield Project
Development of 6-lane access controlled Spur to Haridwar from Delhi-Saharanpur-Dehradun Economic Corridor in the state of Uttar Pradesh and Uttarakhand under Bharatmala Pariyojana

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DESIGNED BY	SANDEEP
CHECKED BY	KSN REDDY
APPROVED BY	BHUPENDER

FINAL DETAILED PROJECT REPORT

Title: Median & Avenue Plantation (Ch. 15+000 to Ch. 16+000)

Size	Scale	Drg. No	Rev.
A2	HOR-1:1000	HARIDWAR-SPUR-PLANTATION-19	R0

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National Highways Authority of India
पी०आई०यू०-रुड़की / PIU-Roorkee

LEGEND :

PLAN :

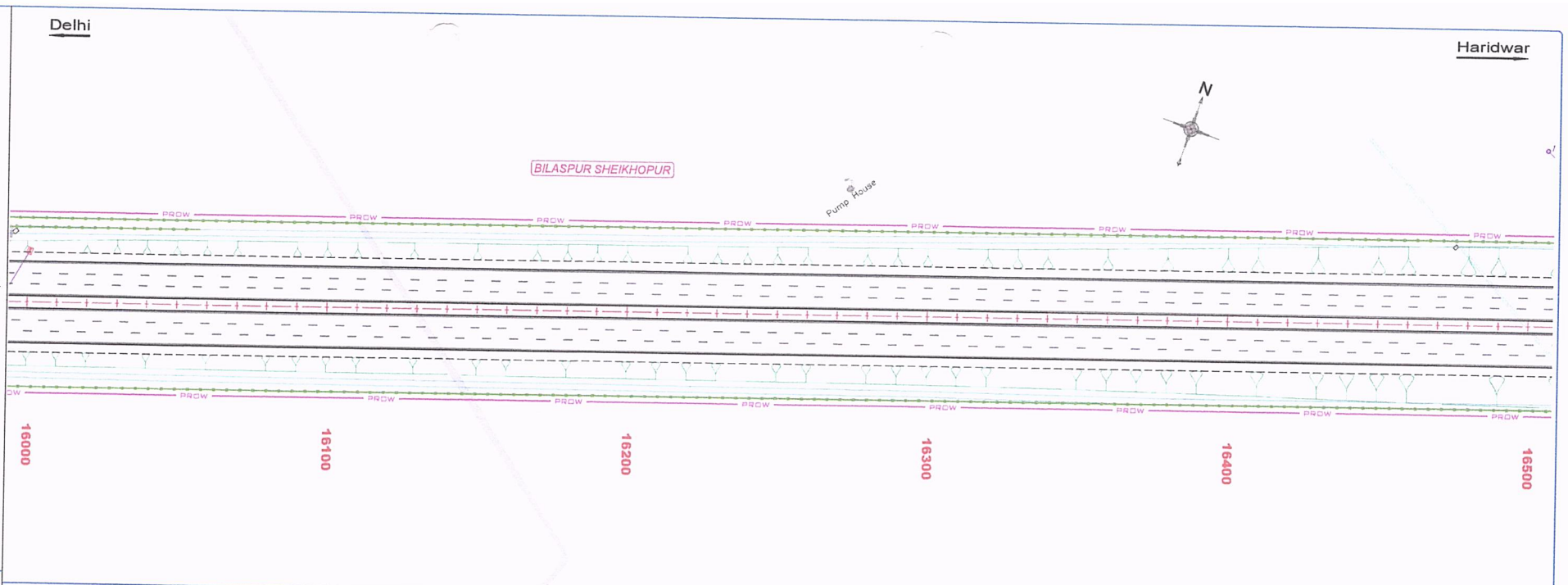
EXISTING

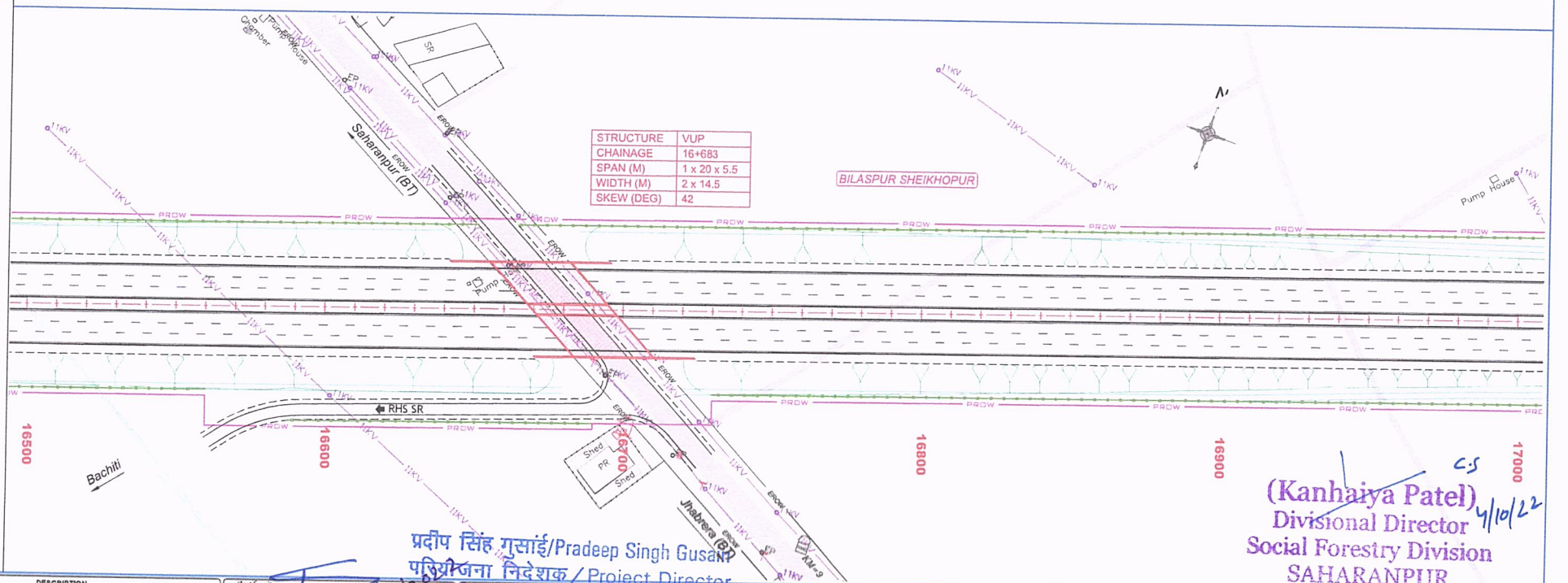
Exist. Road

SP-R : Semi Pucca Resi.
SP-C : Semi Pucca Comm.
P-R : Pucca Residential
P-C : Pucca Commercial
K-R : Katcha Residential
HUT : Hut
: Paddy Field
: Boundary Wall
: Fencing
EROW — Existing RoW
PROW — Proposed RoW

PROPOSED

Toe Line
SH Edge
C/W Edge
Median
C/W Edge
SH Edge
Toe Line
Hor. Tangent Point
Culvert
Lined Drain
Unlined Drain
TOE / RE WALL
PLANTATION





STRUCTURE	VUP
CHAINAGE	16+683
SPAN (M)	1 x 20 x 5.5
WIDTH (M)	2 x 14.5
SKEW (DEG)	42

(Kanhaiya Patel) 4/10/22
Divisional Director
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National Highways Authority of India
पी०आई०यू० रुड़की / PIU-Roorkee

REV.	DATE	DESCRIPTION
R0	01-09-2022	FINAL DETAILED PROJECT REPORT

Authority: National Highways Authority of India (Ministry of Road Transport & Highways)

Design Consultants: Transys Consulting Pvt. Ltd. Accient Consulting Engineers Pvt. Ltd.

Project: Spur to Haridwar from Delhi-Dehradun Greenfield Project
Development of 6-lane access controlled Spur to Haridwar from Delhi-Saharanpur-Dehradun Economic Corridor in the state of Uttar Pradesh and Uttarakhand under Bharatmala Pariyojana

DRAWN BY	SUMAN
DESIGNED BY	SANDEEP
CHECKED BY	KSN REDDY
APPROVED BY	BHUPENDER

FINAL DETAILED PROJECT REPORT

Title: Median & Avenue Plantation (Ch. 16+000 to Ch. 17+000)

Size	Scale	Drg. No	Rev.
A2	HOR-1:1000	HARIDWAR-SPUR-PLANTATION-20	R0

LEGEND :

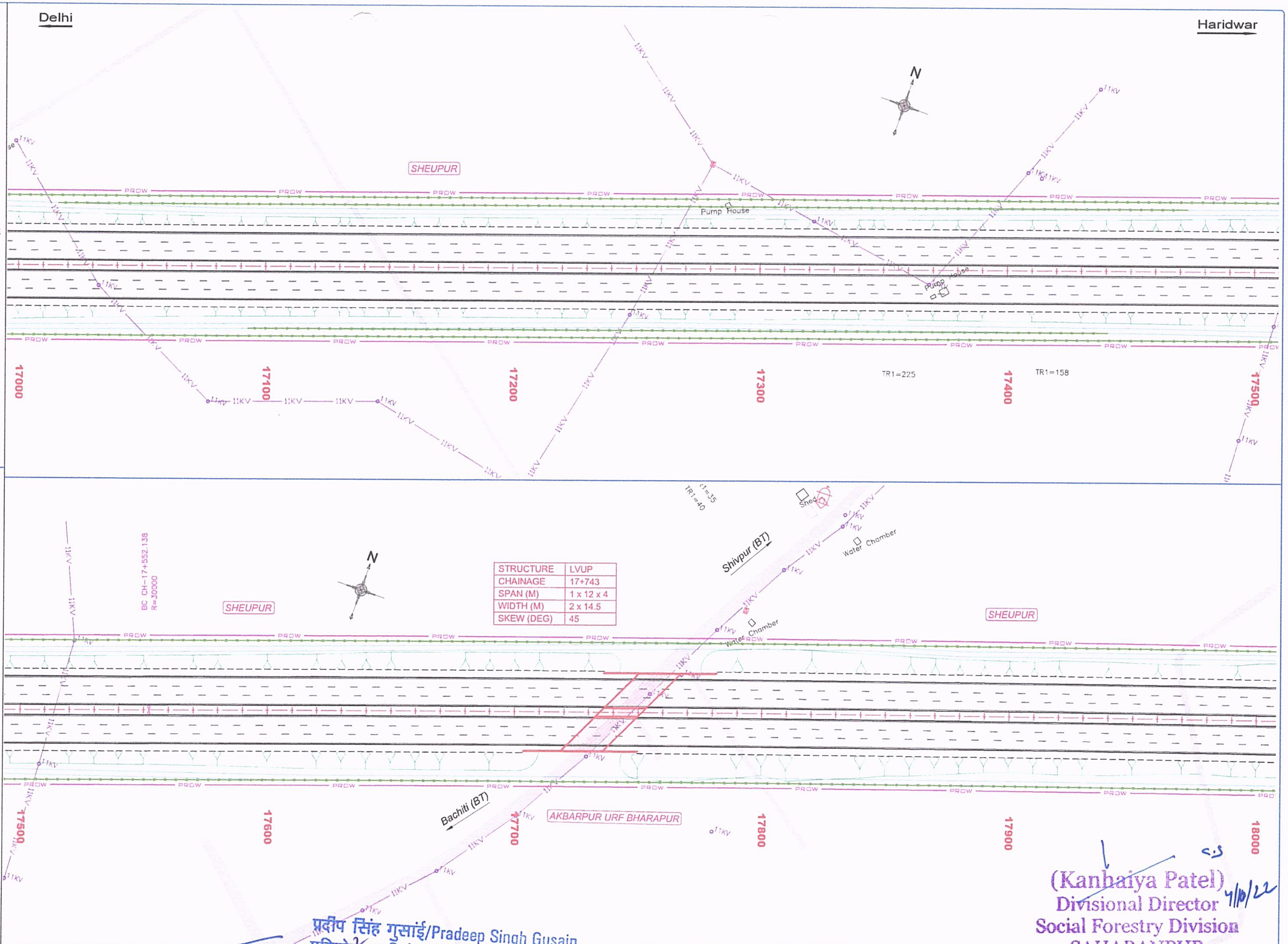
PLAN :

EXISTING

- Exist. Road
- SP-R : Semi Pucca Resi.
- SP-C : Semi Pucca Comm.
- P-R : Pucca Residential
- P-C : Pucca Commercial
- K-R : Katcha Residential
- HUT : Hut
- : Paddy Field
- : Boundary Wall
- : Fencing
- EROW — Existing RoW
- PROW — Proposed RoW

PROPOSED

- Toe Line / SH Edge / C/W Edge
- Median
- C/W Edge / SH Edge / Toe Line
- Hor. Tangent Point
- Culvert
- Lined Drain
- Unlined Drain
- TOE / RE WALL
- PLANTATION



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पी०आई०यू० रुड़की/PIU-Roorkee

REV.	DATE	DESCRIPTION
R0	01-09-2022	FINAL DETAILED PROJECT REPORT

Authority: National Highways Authority of India (Ministry of Road Transport & Highways)

Design Consultants: Transys Consulting Pvt. Ltd. / Accrete Consulting Engineers Pvt. Ltd.

Project: **Spur to Haridwar from Delhi-Dehradun Greenfield Project**
Development of 6-lane access controlled Spur to Haridwar from Delhi-Saharanpur-Dehradun Economic Corridor in the state of Uttar Pradesh and Uttarakhand under Bharatmala Pariyojana

DRAWN BY	SUMAN
DESIGNED BY	SANDEEP
CHECKED BY	KSN REDDY
APPROVED BY	BHUPENDER

FINAL DETAILED PROJECT REPORT

Title: Median & Avenue Plantation (Ch. 17+000 to Ch. 18+000)

Size	Scale	Drg. No	Rev:
A2	HOR-1:1000	HARIDWAR-SPUR-PLANTATION-21	R0

LEGEND :

PLAN :

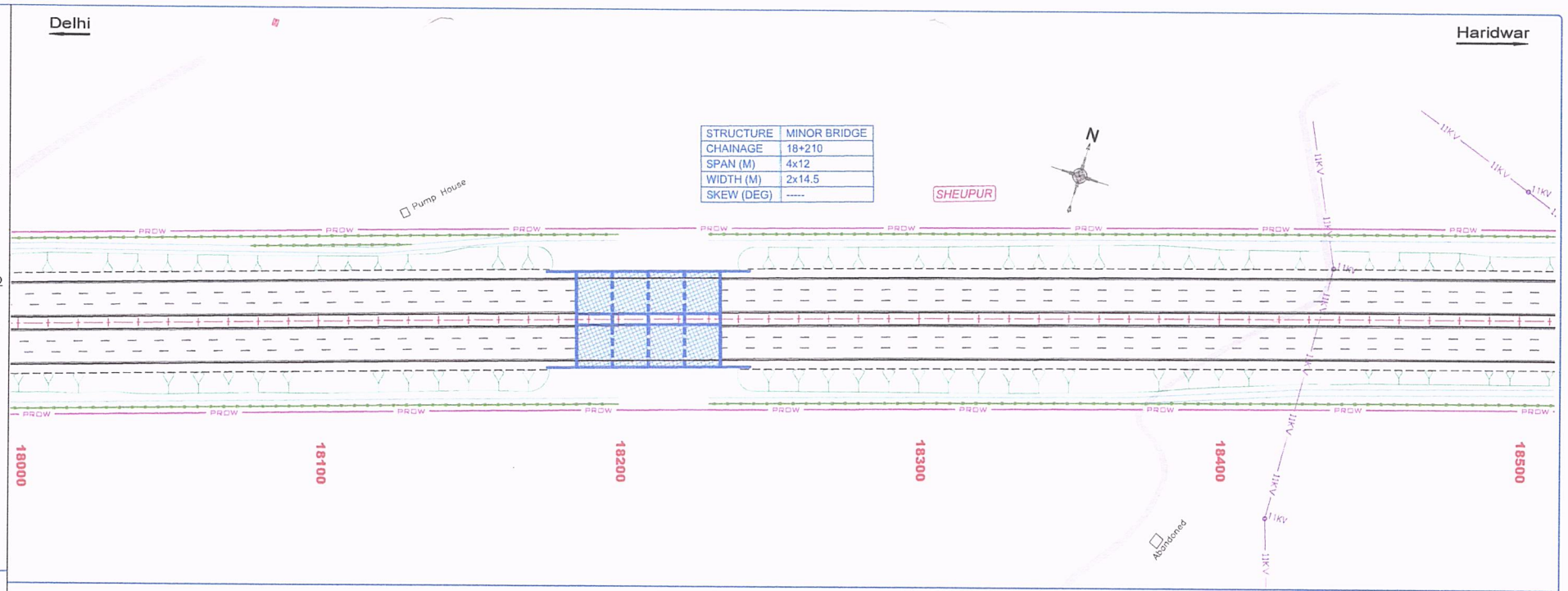
EXISTING

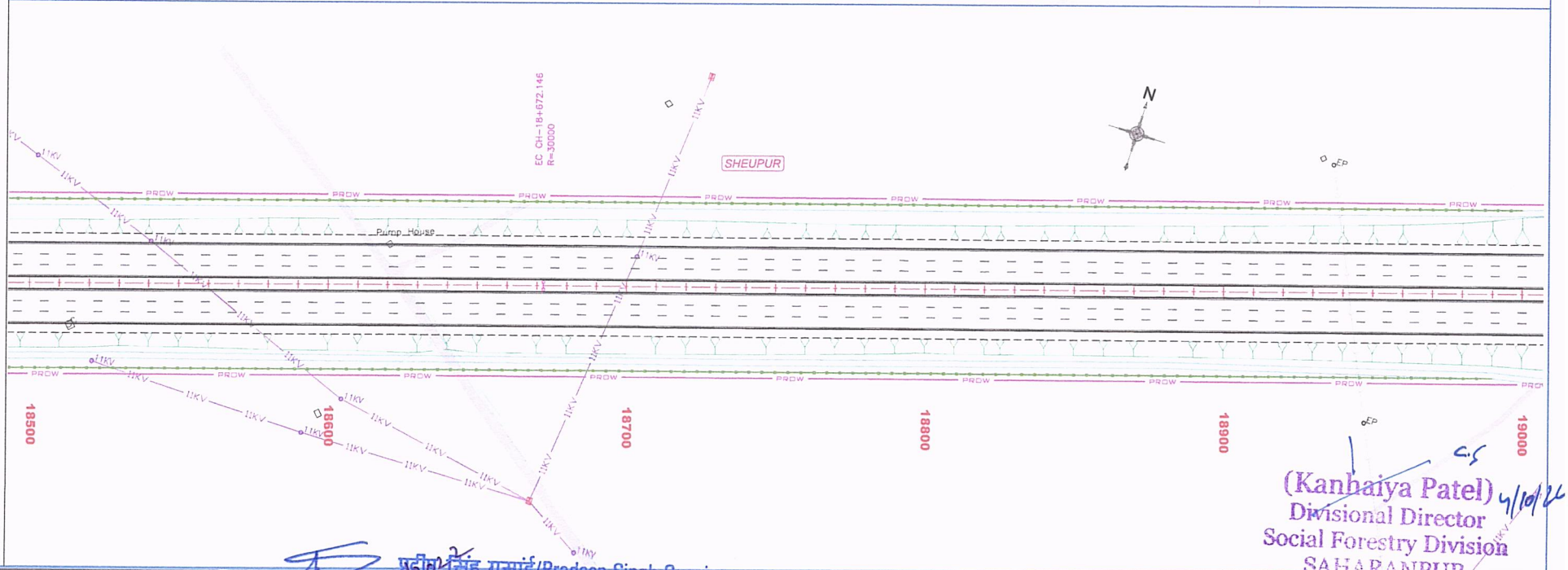
Exist. Road

SP-R : Semi Pucca Resi.
SP-C : Semi Pucca Comm.
P-R : Pucca Residential
P-C : Pucca Commercial
K-R : Katcha Residential
HUT : Hut
: Paddy Field
: Boundary Wall
: Fencing
EROW — Existing RoW
PROW — Proposed RoW

PROPOSED

Toe Line
SH Edge
C/W Edge
Median
C/W Edge
SH Edge
Toe Line
Hor. Tangent Point
Culvert
Lined Drain
Unlined Drain
TOE / RE WALL
PLANTATION





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REV.	DATE	DESCRIPTION
R0	01-09-2022	FINAL DETAILED PROJECT REPORT

Authority: National Highways Authority of India (Ministry of Road Transport & Highways)

Design Consultants: Transys Consulting Pvt. Ltd. in association with Accelerate Consulting Engineers Pvt. Ltd.

Project: Spur to Haridwar from Delhi-Dehradun Greenfield Project
Development of 4-lane access controlled Spur to Haridwar from Delhi-Saharanpur-Dehradun Economic Corridor in the state of Uttar Pradesh and Uttarakhand under Bharatmala Pariyojana

DRAWN BY	SUMAN
DESIGNED BY	SANDEEP
CHECKED BY	KSN REDDY
APPROVED BY	BHUPENDER

FINAL DETAILED PROJECT REPORT

Title: Median & Avenue Plantation (Ch. 18+000 to Ch. 19+000)

Size	Scale	Drg. No	Rev.
A2	HOR-1:1000	HARIDWAR-SPUR-PLANTATION-22	R0

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National Highway Authority of India
पीआईयू–रूड़की / PIU Roorkee

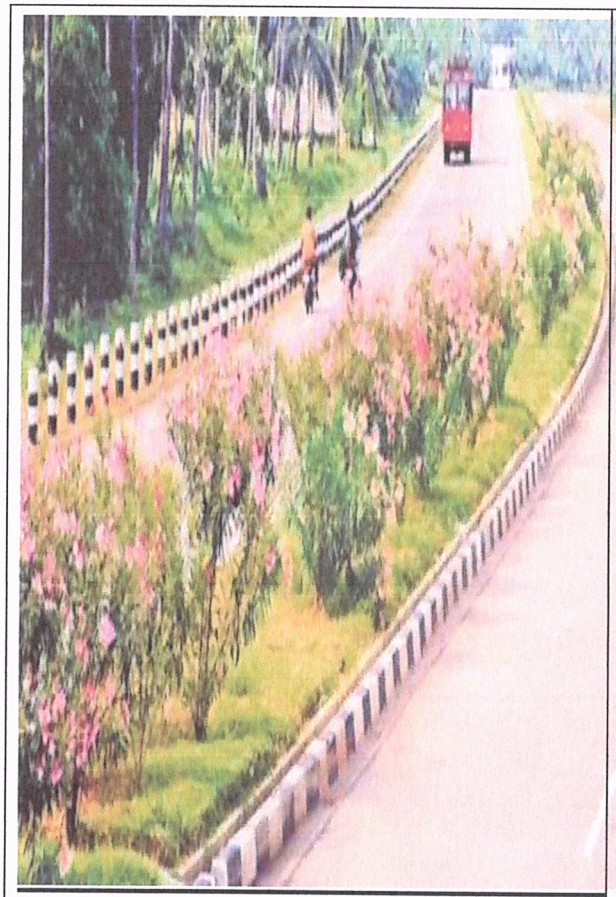
Plantation Scheme for Roadside plantation
(Avenue & Median Plantation)

Name of the project: - Diversion of forest land for the development of 6-lane (greenfield) access-controlled spur to Haridwar from Delhi-Saharanpur-Dehradun Economic Corridor Section of NH 344BG from 0.000 to Km19.070 in Saharanpur district of Uttar Pradesh State and Km. 19.070 to Km 50.700 in Haridwar District of Uttarakhand State under Bharatmala Pariyojana.

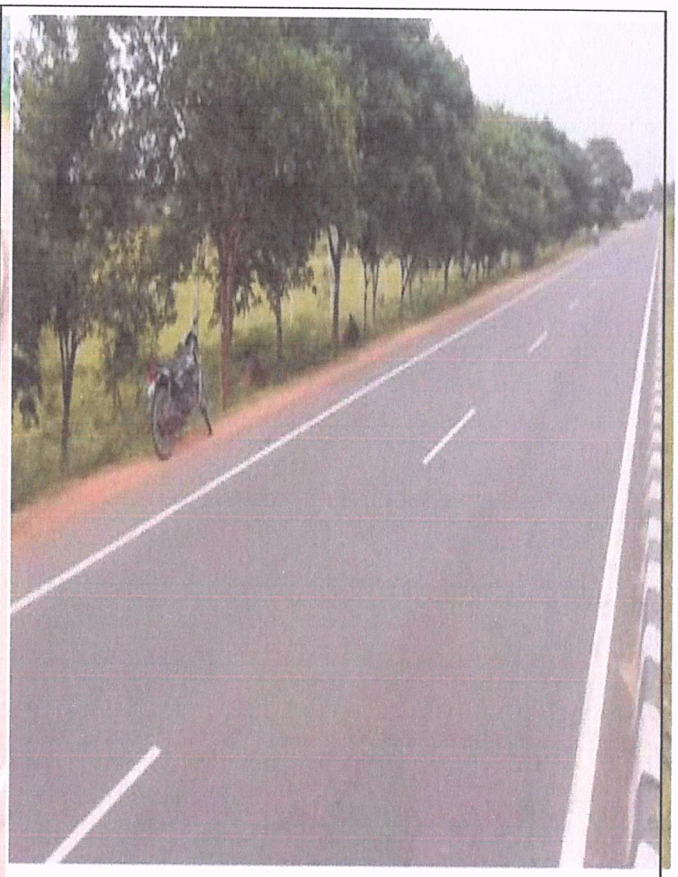
Online Proposal No.- FP/UP/ROAD/145614/2021

Area of Forest Land Diversion: - 1.6518 ha.

Length of Project Road: - 19.070 km in Saharanpur district of Uttar Pradesh.



Median Plantation



Avenue Plantation

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4/10/22
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Divisional Director
Social Forestry Division
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National Highway Authority of India
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Plantation Scheme

1. Introduction

To compensate the ecological loss for felling of trees, development of aesthetic values and enhancement microclimatic conditions, total 18,692 nos. of trees will be planted with in the PROW of proposed highway. Avenue and median plantation will be carried out as per IRC SP: 21 2009 and National Green Highways Policy 2015. The project highway for which Plantation scheme is prepared is in Saharanpur district, Uttar Pradesh. The total length of project highway is 19.070 km in Saharanpur district of Uttar Pradesh.

2. Objectives of the Project:

The main objectives of planting along the Highways are as follows: -

- For aesthetic enhancement of the project corridors and places of importance by planting selective ornamental trees, median plantation with ornamental shrubs and turfing with grass.
- To reduce the impacts of air pollution and dust as trees and shrubs are known to be natural sink for air pollutants.
- To provide much needed shade on glaring hot roads during summer season.
- To reduce the impact of ever-increasing noise pollution caused due to increase in number of vehicles.
- To arrest soil erosion at the embankment slopes.
- Prevention of glare from the headlight of incoming vehicles.
- Moderating the effect of wind and incoming radiation

3. Average width available for avenue plantation:

The average width on either side available for avenue plantation is 3.0 m along the project highway.

4. Average width available for median plantation:

Average width available for median plantation is 4 m.

The area of plantation in median and avenue has been presented in **Table 1** below.

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National Highway Authority of India
पी0आई0यू0–रूड़की / PIU-Roorkee

Table 1: Avenue & median Plantation

Requirement of trees for Avenue Plantation

Sl. No.	Chainage		Length (m)	Side	Spacing	Avenue Plantation	Total Trees		Remarks
	From	To				No. of ROW	Nos	Total	
1	0.00	180	180	LHS	6	1	30	30	Trees at ROW @ 6m C/C
2	180	380	200	BHS	6	2	33	67	
3	380	400	20	BHS	6	3	3	10	
4	400	510	110	BHS	6	2	18	37	
5	510	550	40	BHS	6	3	7	20	
6	550	630	80	BHS	6	2	13	27	
7	660	740	80	BHS	6	2	13	27	
8	850	950	100	RHS	6	2	17	33	
9	1310	1450	140	RHS	6	1	23	23	
10	1450	1520	70	BHS	6	2	12	23	
11	1560	1950	390	BHS	6	2	65	130	
12	1950	2260	310	BHS	6	3	52	155	
13	2260	2360	100	BHS	6	2	17	33	
14	2380	2870	490	BHS	6	2	82	163	
15	2870	2880	10	RHS	6	1	2	2	
16	2880	2910	30	BHS	6	2	5	10	
17	2910	2930	20	LHS	6	1	3	3	
18	2930	3720	790	BHS	6	2	132	263	
19	3720	3730	10	BHS	6	3	2	5	
20	3730	3740	10	LHS	6	1	2	2	
21	3740	3750	10	BHS	6	2	2	3	
22	3750	3760	10	RHS	6	1	2	2	
23	3760	3830	70	BHS	6	2	12	23	
24	3830	3840	10	LHS	6	1	2	2	
25	3840	4040	200	BHS	6	2	33	67	
26	4040	4600	560	BHS	6	3	93	280	
27	4600	5470	870	BHS	6	2	145	290	
28	5490	5930	440	BHS	6	2	73	147	
29	5930	6020	90	BHS	6	3	15	45	
30	6020	6250	230	BHS	6	2	38	77	
31	6250	6270	20	RHS	6	1	3	3	
32	6270	6300	30	BHS	6	2	5	10	
33	6300	6310	10	LHS	6	1	2	2	
34	6310	6400	90	BHS	6	2	15	30	
35	6400	6410	10	RHS	6	1	2	2	
36	6410	7170	760	BHS	6	2	127	253	
37	7170	7190	20	LHS	6	1	3	3	
38	7300	7530	230	BHS	6	2	38	77	
39	7570	7640	70	BHS	6	4	12	47	

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Requirement of trees for Avenue Plantation									
Sl. No.	Chainage		Length (m)	Side	Spacing	Avenue Plantation	Total Trees		Remarks
	From	To				No. of ROW	Nos	Total	
40	7640	7930	290	BHS	6	2	48	97	
41	8140	8220	80	BHS	6	4	13	53	
42	8270	8330	60	BHS	6	4	10	40	
43	8330	8500	170	BHS	6	2	28	57	
44	8720	8780	60	BHS	6	2	10	20	
46	8780	8940	160	BHS	6	4	27	107	
47	8940	9000	60	BHS	6	3	10	30	
48	9000	9420	420	BHS	6	2	70	140	
49	9420	9850	430	BHS	6	3	72	215	
50	9850	11250	1400	BHS	6	2	233	467	
51	11250	11260	10	RHS	6	1	2	2	
52	11260	11310	50	BHS	6	2	8	17	
53	11310	11330	20	LHS	6	1	3	3	
54	11330	12020	690	BHS	6	2	115	230	
55	12020	12040	20	LHS	6	1	3	3	
56	12060	12080	20	RHS	6	1	3	3	
57	12080	12470	390	BHS	6	2	65	130	
58	12470	12490	20	LHS	6	1	3	3	
59	12490	12540	50	BHS	6	2	8	17	
60	12540	12550	10	RHS	6	1	2	2	
61	12550	14090	1540	BHS	6	2	257	513	
62	14090	14220	130	RHS	6	1	22	22	
63	14450	15120	670	BHS	6	2	112	223	
64	15120	15520	400	BHS	6	4	67	267	
65	15520	15570	50	BHS	6	3	8	25	
66	15570	15660	90	BHS	6	2	15	30	
67	15660	15670	10	RHS	6	1	2	2	
68	15670	15700	30	BHS	6	2	5	10	
69	15700	15760	60	BHS	6	3	10	30	
70	15760	15990	230	BHS	6	4	38	153	
71	15990	16060	70	BHS	6	3	12	35	
72	16060	16650	590	BHS	6	2	98	197	
73	16650	16670	20	RHS	6	1	3	3	
74	16670	16690	20	BHS	6	2	3	7	
75	16690	16730	40	LHS	6	1	7	7	
76	16730	17020	290	BHS	6	2	48	97	
77	17020	17090	70	BHS	6	3	12	35	
78	17090	17440	350	BHS	6	4	58	233	
79	17440	17470	30	BHS	6	3	5	15	
80	17470	18080	610	BHS	6	2	102	203	
81	18080	18130	50	BHS	6	3	8	25	

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National Highway Authority of India
पी0आई0यू0–रूड़की/PIU-Roorkee

Requirement of trees for Avenue Plantation									
Sl. No.	Chainage		Length (m)	Side	Spacing	Avenue Plantation	Total Trees		Remarks
	From	To				No. of ROW	Nos	Total	
82	18130	18200	70	BHS	6	2	12	23	
83	18230	19070	840	BHS	6	2	140	280	
							Total	**6495**	
Median Plantation									
1	450	760	310	BHS	3	2	103	207	
2	840	1470	630	BHS	3	2	210	420	
3	1590	7520	5930	BHS	3	2	1977	3953	
4	7575	8000	425	BHS	3	2	142	283	
5	8070	19070	11000	BHS	3	2	3667	7333	
							Total	**12197**	

1) Median Plantation = 12197 no.
2) Avenue Plantation = 6495 no.
Total Plantation = 18,692 no.

5. Plantation Layout Plan and Pits digging:

Multiple row of plantation is advised for better protection against soil erosion and water purification, but due to constrain in space at some location single row avenue plantation is proposed. However, median plantation is proposed in 2 row and avenue plantation is proposed 2,3 and 4 rows except some location through the project road length. Plantation to be done in staggered manner. The plantation layout plan has been attached as **Annexure-I.**

6. Technical Specifications

The technical specifications specified here are proposed and during execution of project the concerned DFO may suggest for some modification as per site condition or condition stipulated in In-principal approved of forest Clearance. The site-specific project report shall prescribe plantation pattern based on actual site conditions. The technical specifications of ornamental/flowering plants (Row I) and shade/fruit bearing trees (Row II) have been presented in **Table 2** and **Table 3** respectively.

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Table 2: Technical Specifications of Ornamental/ Flowering Plants (Row I)

Distance from face of the median kerb.	1.5m
Longitudinal spacing between plant to plant	1.5m
Spacing between rows	1.5m
Size of the pits (normal soil)	60 X 60 X 60 cm
For Alkaline soil (usar)	By auger
Water logged areas	Mounds with height varying depending on the water level
No of plants per Km	640
Height of the plant	1.5 m to 2 m

Table 3: Technical Specifications of Shade/Fruit bearing trees (Row II) Last Row

Spacing between tree to tree	6 m
Canopy Shape & Size	Preferable spreading with medium CSA
Size of the pits (normal soil)	60 X 60 X 60 cm
For Alkaline soil (usar)	By auger
Water logged areas	Mounds
No. of plants per line Km	341
Height of the plant	More than 3 m

7. Species Planned for median Plantation:

The shrubs to be planted in the median shall be of low or medium height for prevention of the headlight glare. Two rows of flowering shrubs have proposed in general median width is 4.0 meter. Some herbaceous species may also be planted as ground cover, notonly on the medians but on special landscapes and embankment slopes also.

In median width of 4 meters, plantation of two rows of flowering shrubs at a spacing of 1.5 m from the inner edge is recommended. The plants shall be at spacing of 3 X 3 m and size of the pits for planting shall be 0.6 m dia and deep.

The surface for the median plantation shall be well prepared. The masses of loose debris on the median and any convexities shall be removed and similarly any concavities are to be filled with good soil. The surface shall have sufficient layer of good quality soil so as to have a better growth and survival of grasses and shrubs. The species recommended for median plantation has been presented in **Table 4** below.

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Table 4: Species Recommended for Median Plantation

S. No.	Name
1.	White colour flowering Shrubs: Star Jasmine, Albania, Bahunia, Manokamnia, Chandani.
2.	Yellow colour flowering Shrubs: Tikoma, Acasia , Alata, Lavligata, Pecock flower
3.	Red colour flowering Shrubs: Hibiscus, Crimson, Bottle brush, Bougainvillea Glabra, Familapatens Exor
4.	Blue colour flowering Shrubs: Duranta Erecta , Purple Lake, Rododron

8. Species Planned for 1st Row of Avenue Plantation:

First row of plantation along the highway have been worked out based on the land availability within the ROW. Based on the Agro-climatic zone and climatic conditions following tree species as presented in **Table 5** may planted in 1st row.

Table 5: Species Recommended for 1st Row of Avenue Plantations

S. No.	Name
Fruit Bearing Trees/ Environmentally Friendly Trees	
1.	Neem
2.	Paker
3.	Imli
4.	Bargad
5.	Chrosia Spiciosa
6.	Sisham
7.	Mango
8.	Pipal

Trees recommended for 2nd Row of road side Avenues:

Table 6: Trees Recommended for Last (or the only) Row in Roadside Avenues

S. No.	Name
1.	Katang Bambo
2.	Cassia Fistula
3.	Ttabebuia Rosea
4.	Arjun
5.	Kachnar Gulmorh
6.	Jamun
7.	Amaltas
8.	Tecoma Capencis

9. Planting Material:

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The plant quality determines success in plantation, particularly in relation to root development. Once the plantation contractor has selected which tree species to use it is then important to select seedlings that are best suited to the site conditions but also ensure that the seed stock is healthy (i.e. it comes without pests or diseases).

a. Insecticide/pesticide/fungicide:

When a plant cannot function normally, it is diseased. The primary causes of disease in trees are pathogens and environmental factors. Trees have many disease pathogens: viruses, bacteria, fungi, nematodes, mycoplasma-like organisms, and parasitic higher plants. Fungal pathogens are the most prevalent. They cause seed rots, seedling damping-off, root rots, foliage diseases, cankers, vascular wilts, diebacks, galls and tumors, trunk rots, and decays of aging trees. Unfavorable weather and environmental factors such as temperature and moisture extremes, high winds, or ice can damage trees directly and predispose the trees to pest attack.

All parts of a tree—roots, stems, foliage, shoots and terminal leaders—are vulnerable to attack by pests. Pest damage can range from slight damage that has no effect on the value of the harvested product to severe damage that stunts or kills the trees or reduces their market value. Tree pests include insects and mites, diseases, weeds, vertebrates, and nematodes. Managing tree pests effectively should be based on thorough consideration of ecological and economic factors.

Pesticides are a very important tool in IPM when large pest populations threaten high-value trees. Knowledge of the pest's life cycle, selection of an appropriate pesticide, proper timing of the application, and use of the right application equipment will improve coverage and effectiveness. The ability to recognize beneficial bio control organisms, combined with cultural and mechanical controls, may allow you to reduce, delay, or eliminate pesticide treatment of a minor pest problem. The method you choose to apply a pesticide will depend on the nature and habits of the target pest, the site, the pesticide, available application equipment, and the cost and efficiency of alternative methods. Your choice is often predetermined by one or more of these factors. Some common application methods are described below.

- Broadcast application is the uniform application of a pesticide to an entire area.
- A directed-spray application targets pests in a specific area in an effort to minimize pesticide contact with the crop or beneficial insects.
- Foliar application directs pesticide to the leafy portions of a plant. Spot treatment is application of a pesticide to small, discrete areas.
- Soil application places pesticide directly on or in the soil rather than on a growing plant.
- Soil incorporation is the use of tillage equipment to mix the pesticide with the soil.
- Soil injection is application of a pesticide beneath the soil surface.

b. Manure/compost/fertilizer:

Manures are plant and animal wastes that are used as sources of plant nutrients. They release nutrients after their decomposition. The art of collecting and using wastes from animal, human and vegetable sources for improving crop productivity is as old as agriculture. Manures are the organic materials derived from animal, human and plant residues which contain plant nutrients in complex organic forms. Naturally occurring or synthetic chemicals containing plant nutrients are called fertilizers. Manures with low nutrient, content per unit quantity have longer residual effect besides

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improving soil physical properties compared to fertilizer with high nutrient.
Farmyard manure refers to the decomposed mixture of dung and urine of farm animals along with litter and left-over material from roughages or fodder fed to the cattle. On an average well decomposed farmyard manure contains 0.5 per cent N, 0.2 per cent P_2O_5 and .0.5 per cent K_2O.Urine, which is wasted, contains one per cent nitrogen and 1.35 per cent potassium.

c. Watering Plan:

Watering in avenue plantations need at least periodic watering during the first growing season to obtain a satisfactory survival rate. Watering will begin after the cessation of rains, when the moisture content of the soil has fallen to near the wilting coefficient; then watering should be repeated at intervals until the onset of the next rainy season. Before each watering, the area around the tree should be cleared of weeds, and a shallow basin should be made around the stem of each tree or shrub to collect as much water as possible. In some instances, regular cultivation and weeding, especially during the first growing season, are sufficient measures to conserve soil moisture for satisfactory survival of the plants, eliminating the need for watering. Since, length of project road is only 19.070km, watering for proposed plantation can be easily done through water tanker from available surface water sources.

d. Plantation Protection Plan:

Once a plantation has been established, the work shall not be considered finished. It will be necessary to protect the plantation against weather, fire, insects and fungi, and animals. A variety of cultural treatments also may be required to meet the purpose of the plantation.

e. Fire:

Damage by fire imposes a serious threat to plantations. The fire risk is generally high in the dryer climatic regions; but, even in relatively moist or high rainfall areas, there may be warm and dry spells when the fire risk is high. Fire risk has been considered a major consideration from the early stages of plantation development.

f. Insects and fungi:

Most insects and fungi are selective of the host species. In their natural environment, trees and shrubs normally attain a state of equilibrium with indigenous pests. However, when exotic trees andshrubs are planted, exotic pests can also be introduced. Quite often, these exotic pests readily adapt themselves to the conditions of their new habitat. In general, the risk of damage from pests ishigher when the plants are physiologically weakened from planting on unsuitable sites, impropersite preparation, inefficient planting, adverse climatic conditions, or neglect of weeding and other maintenance operations. The main precautions to be taken in guarding against possible future damage from insects and fungi are to plant tree or shrub species that are suitable to the climatic and soil conditions of the site.

Insects and fungi can often be checked by applications of appropriate chemical insecticides or fungicides. Usually, these chemicals are available as liquids (or wettable powder), dusts, or smokes. Spraying with hand-operated spray guns or portable mist-blowers is frequently used to control attacks in young plantations; with canopy closure, aerial spraying and dusting or smoking can be more effective and cheaper. Only previously tested and environmentally sound insecticides and fungicides should be prescribed for use.

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g. **Wild animals**:

Damage to avenue plantations by wild animals mainly takes the form of tree browsing or de- barking. In general, there are three orders of wild animals responsible for damage: rodents (rats, mice, and moles and squirrels); lagomophs (hares and rabbits); and artiodactyls (pigs and buffaloes). The principal method of controlling damage by wild animals involves the use of fences, hedges or ditches, trapping and removal, and poison baits. However, within 10km either side of project road there is no Wildlife area, so chance of damaging plant by wild animal is much low.

h. **Domestic animals**:

Grazing or browsing by sheep, goats and cattle can be a menace to young plantations. At times, hedges and fences are used to prevent intrusion by domestic animals. Where fencing costs are high, trespass by livestock can be controlled by guards.

The fencing of single row plantation is generally done by using iron/bricks/cement guards. Locally available bamboo guards or thorn fencing should be used where protection can be ensured through them. The description and specification for the iron and brick guards as per **IRC:SP: 21-2009** are given below:

i. **Barbed Wire fencing:**

The fencing of multiple rows plantations will be done preferably by barbed wire. five strands barbed wire fencing, with cross strands, stretches on angle iron poles fixed at a distance of 4 mfrom one another; is recommended. Live fencing/ bamboo fencing/thorn fencing may be used where protection can be ensured through them.

As per site condition the barbed wire fencing is the most suitable and cost effective option recommended for protection of plantation.

10. Benefits of tree plantation in terms of Greenhouse effect

Trees help by removing (sequestering) CO_2 from the atmosphere during photosynthesis to form carbohydrates that are used in plant structure/function and return oxygen back into the atmosphere as a byproduct. Roughly half of the greenhouse effect is caused by CO_2. Therefore, trees act as carbon sinks, alleviating the greenhouse effect. On average, one acre of new forest can sequester about 2.5 tons of carbon annually. Young trees absorb CO_2 at a rate of 5.9 kg per tree each year. Trees reach their most productive stage of carbon storage at about 10 years at which point they are estimated to absorb 21.8 kg of CO_2 per year.

Trees also reduce the greenhouse effect by shading houses and office buildings. This reduces the need for air conditioning by up to 30 percent which in turn reduces the amount of fossil fuels burned to produce electricity. The combination of CO_2 removal from the atmosphere, carbon storage in wood and the cooling effect makes trees extremely efficient tools in fighting the greenhouse effect. Planting trees remains one of the most cost-effective means of drawing excess CO_2 from the atmosphere.

11. Abstract of estimated project cost:

The abstract of estimated cost of plantation is presented in **Table 9** below:

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Table 9: Cost of Plantation

S. No.	Type of Plantation	Plantation Cost per plant (Rs.)	Number of Plants	Cost (Rs.)
1.	Avenue Plantation	3000	6,495	19,485,000
2.	Median Plantation	1200	12197	14,636,400
Total			**18,692**	**34,121,400**

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