

# Idejni projekt lokalne ceste

---

Škalic, Filip

Undergraduate thesis / Završni rad

2023

*Degree Grantor / Ustanova koja je dodijelila akademski / stručni stupanj:*

**University of Split, Faculty of Civil Engineering, Architecture and Geodesy / Sveučilište u Splitu, Fakultet građevinarstva, arhitekture i geodezije**

*Permanent link / Trajna poveznica:* <https://um.nsk.hr/um:nbn:hr:123:203508>

*Rights / Prava:* [In copyright](#)/[Zaštićeno autorskim pravom.](#)

*Download date / Datum preuzimanja:* **2024-07-24**



*Repository / Repozitorij:*

[FCEAG Repository - Repository of the Faculty of Civil Engineering, Architecture and Geodesy, University of Split](#)



UNIVERSITY OF SPLIT



**SVEUČILIŠTE U SPLITU  
FAKULTET GRAĐEVINARSTVA, ARHITEKTURE I GEODEZIJE**

# **ZAVRŠNI RAD**

**FILIP ŠKALIC**

**Split, 2023.**

**SVEUČILIŠTE U SPLITU  
FAKULTET GRAĐEVINARSTVA, ARHITEKTURE I GEODEZIJE**

## **IDEJNI PROJEKT LOKALNE CESTE**

**Završni rad**

**Split, 2023.**

**SVEUČILIŠTE U SPLITU**

**FAKULTET GRAĐEVINARSTVA, ARHITEKTURE I GEODEZIJE**

Split, Matice hrvatske 15

STUDIJ: **PREDDIPLOMSKI STRUČNI STUDIJ GRAĐEVINARSTVA**  
KANDIDAT: **FILIP ŠKALIC**  
JMBAG: **0083227024**  
KATEDRA: **Katedra za prometnice**  
PREDMET: **Ceste**

### **ZADATAK ZA ZAVRŠNI RAD**

Tema: Idejni projekt lokalne ceste

Opis zadatka: Uz pomoć programa za projektiranje cesta AutoCAD Civil 3D potrebno je izraditi idejni projekt ceste na geodetskoj podlozi koja je korištena za izradu programa u okviru kolegija Ceste. Trasa se treba položiti od točke A do točke B koristeći podatke iz programskog zadatka.

Zadatak treba sadržavati:

1. Kopiju programskog zadatka
2. Tehnički opis s prikazom korištenja programa Civil 3D
3. Građevinsku situaciju u mjerilu 1:1000
4. Uzdužni presjek u mjerilu 1:1000/100
5. Karakteristične poprečne presjeke u mjerilu 1:200
6. Obradu na računalu
7. Računalne ispise koordinatnih točaka osi
8. Proračun količina zemljanih radova
9. Proračun količine radova po presjecima

U Splitu, srpanj 2023.

Voditelj završnog rada: prof. dr. sc. Dražen Cvitanić

## **Idejni projekt lokalne ceste**

### ***Sažetak:***

Idejni projekt lokalne ceste izrađen je na geodetskoj podlozi u mjerilu 1:1000 od točke A do točke B prema zadatku iz kolegija Ceste. Za izradu projekta korišten je program AutoCAD Civil 3D. Vrsta terena na kojem se polaže trasa je brdovit. Cesta je projektirana za godišnji dnevni promet (PGDP) od 950 vozila na dan. Predviđena projektna brzina je 40 km/h. Idejno rješenje izrađeno je prema Pravilniku i osnovnim uvjetima za projektiranje ceste s elementima koji zadovoljavaju važeće propise, kao i sigurnosne i estetske kriterije.

### ***Ključne riječi:***

Idejni projekt, lokalna cesta, projektna brzina, os ceste, niveleta, uzdužni presjek, poprečni presjek

## **Preliminary design of a local road**

### ***Abstract:***

The preliminary design of a local road was created at a scale of 1:1000 of a geodetic base. The AutoCAD Civil 3D software was used for the project design. The road's route is marked by a hilly terrain. The road is designed for annual daily traffic of 950 vehicles per day (AADT). Intended design speed is 40 miles per hour. The preliminary design was made according to the Regulation on basic requirements for the public road design with elements that meet relevant regulations, as well as safety and aesthetic criteria.

### ***Keywords:***

Preliminary design, local road, design speed, centre line, level line, longitudinal cross section, cross section

## SADRŽAJ

1.	PROGRAMSKI ZADATAK .....	2
2.	TEHNIČKI OPIS .....	4
2.1.	OPĆENITO .....	5
2.2.	HORIZONTALNI ELEMENTI .....	5
2.3.	VERTIKALNI ELEMENTI .....	5
2.4.	POPREČNI PRESJEK .....	5
2.5.	KOLNIČKA KONSTRUKCIJA .....	5
2.6.	ODVODNJA .....	5
3.	GRAFIČKI PRILOZI .....	6
3.1.	GRAĐEVINSKA SITUACIJA M 1:1000 .....	6
3.2.	UZDUŽNI PRESJEK M 1:1000/100 .....	7
3.3.	NORMALNI POPREČNI PRESJEK M 1:50 .....	8
3.4.	KARAKTERIČNI POPREČNI PRSEJECI M 1:200 .....	9
4.	TABLICA VOLUMENA UKUPNIH ZEMLJANIH RADOVA .....	10
5.	OBRADA NA RAČUNALU .....	14
6.	IZLAZNI PODACI IZ PROGRAMA .....	15
6.1.	KOORDINATNI RAČUN GLAVNIH TOČAKA .....	15
6.2.	KOORDINATNI RAČUN DETALJNIH TOČAKA OSI .....	31
6.3.	RAČUN KOTA KOLNIKA .....	33
6.4.	VERTIKALNI TOK TRASE .....	50
7.	LITERATURA .....	52

# 1. PROGRAMSKI ZADATAK

Katedra za prometnice

Studij: Stručni

Nastavni predmet: CESTE

Student: Filip Škalic

## ZADATAK

Treba izraditi idejni projekt dionice ceste između točaka A i B naznačenih na priloženoj geodetskoj podlozi u mjerilu 1:1000.

Zadano je:

- ➔ PGDP - prosječni godišnji dnevni promet: **950 voz/dan**,
- ➔ vrsta terena: **brdovit**.

Idejni projekt treba sadržavati:

1. Tehnički opis
2. Proračun horizontalne geometrije
3. Proračun proširenja kolnika u krivini
4. Proračun vertikalne geometrije i kota nivelete
5. Proračun vitoperenja kolnika
6. Građevinska situacija MJ. 1:1000
7. Uzdužni presjek MJ. 1:1000/100
8. Normalni poprečni presjek MJ. 1:50
9. Karakteristični poprečni presjeci MJ. 1:100

Predmetna asistentica:  
Daniela Dumanić, mag.ing.aedif.



## 2. TEHNIČKI OPIS

## 2.1. OPĆENITO

Na priloženoj geodetskoj podlozi u mjerilu 1:1000 izrađen je idejni projekt ceste na dionici od točke A koja se nalazi na 319,00 metara nadmorske visine, do točke B koja se nalazi na 299,00 metara nadmorske visine. Cesta je projektirana na brdovitom terenu za prosječni godišnji dnevni promet od 950 vozila na dan. Predviđena projektna brzina za ovu kategoriju ceste je  $V_r=40$  km/h. Trasa kontinuirane ceste ima dužinu od 309.35 metra.

## 2.2. HORIZONTALNI ELEMENTI

Trasa se sastoji od tri pravca i dvije krivine.

Minimalni radijus horizontalne krivine je 45 m, a minimalna duljina prijelaznice je 30 m. Prva krivina ima radijus  $R=50$  m, duljinu prijelaznice  $L=35$  m, a druga krivina ima radijus  $R=50$  m, duljinu prijelaznice  $L=35$  m.

## 2.3. VERTIKALNI ELEMENTI

Maksimalni dozvoljeni nagib nivelete je 12%, a minimalni 0,5 % dok je minimalni radijus vertikalne krivine 136,91m. Nagib prve tangente je  $S_1=10,34$  %, a druge  $S_2=3,93$  %. Tangenta je dužine 31,78 m, a radijus vertikalne krivine je 500 m.

## 2.4. POPREČNI PRESJEK

Cesta ove kategorije ima dva kolnička traka širine svakog po 3,00 m i rubni trak širine 0,2 m. U nasipu bankine širine 1,0 m nagiba 4 % i berma 4 % širine 1,0 m u usjeku. U usjecima se izvode rigoli za odvodnju vode 0,65 m, nagiba 15 % i drenaža koja je postavljena u glinenu posteljicu. Cesta se dijelom nalazi u zasjeku, nasipu i usjeku. Poprečni nagib prve i druge krivine je 7 %. Nagibi usjeka su 2:1, a nasipa 1:1. U nasipima se predviđaju armirano betonski zidovi.

## 2.5. KOLNIČKA KONSTRUKCIJA

Projektom je predviđena sljedeća kolnička konstrukcija:

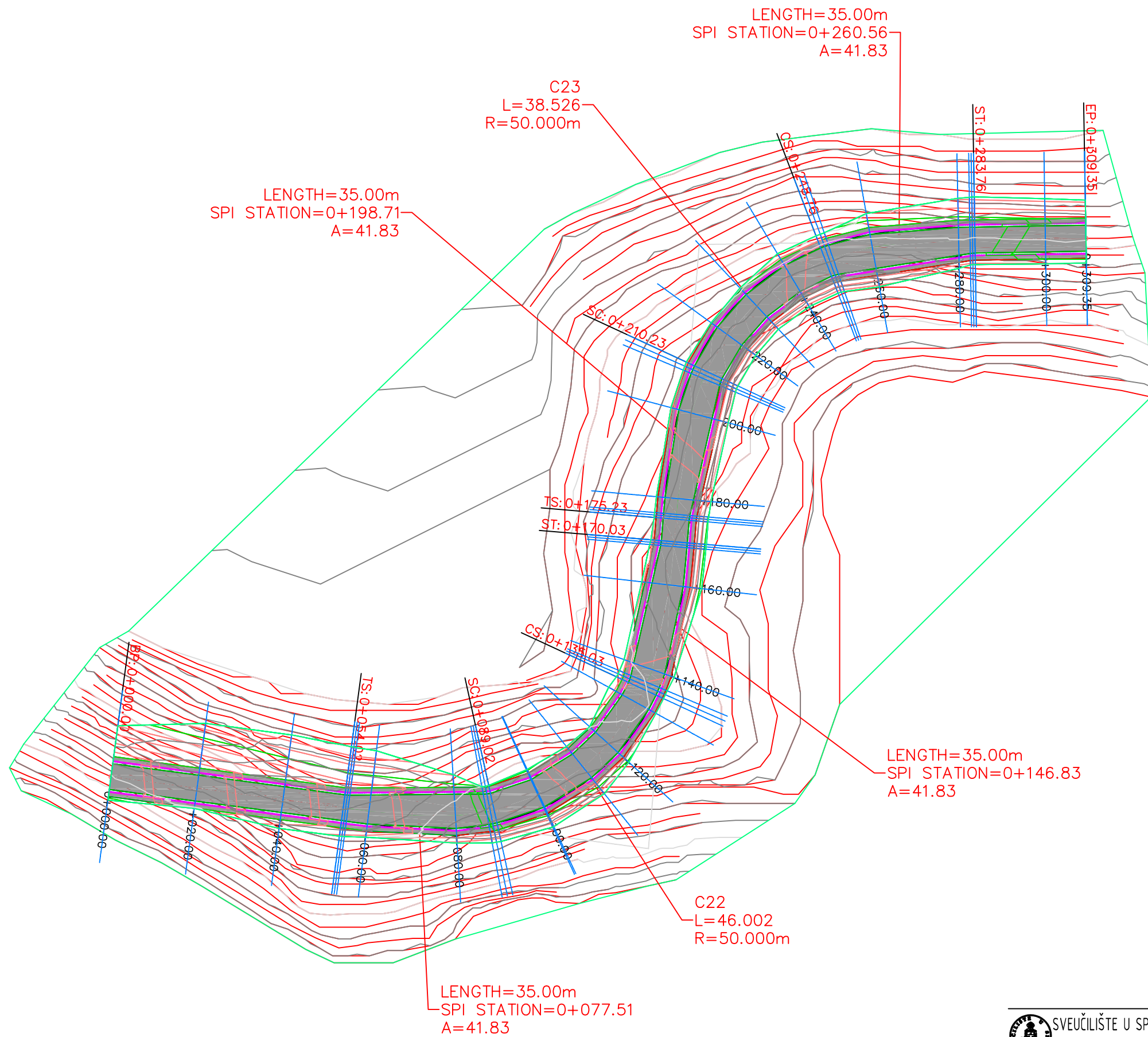
- asfalt beton AB11 u debljini 4 cm
- bitumenizirani nosivi sloj BNS22 u debljini 6 cm
- mehanički zbijeni nosivi sloj tampon debljine 30 cm.

## 2.6. ODVODNJA

Odvodnja kolnika predviđa se otvorenim sustavom odvodnje prihvaćanjem kolničkih i pribrežnih voda u zasjeku i usjeku u betonske rigole, te kontroliranim ispušanjem u teren direktno ili betonskim cijevnim propustima kroz trup kolnika.

### **3. GRAFIČKI PRILOZI**

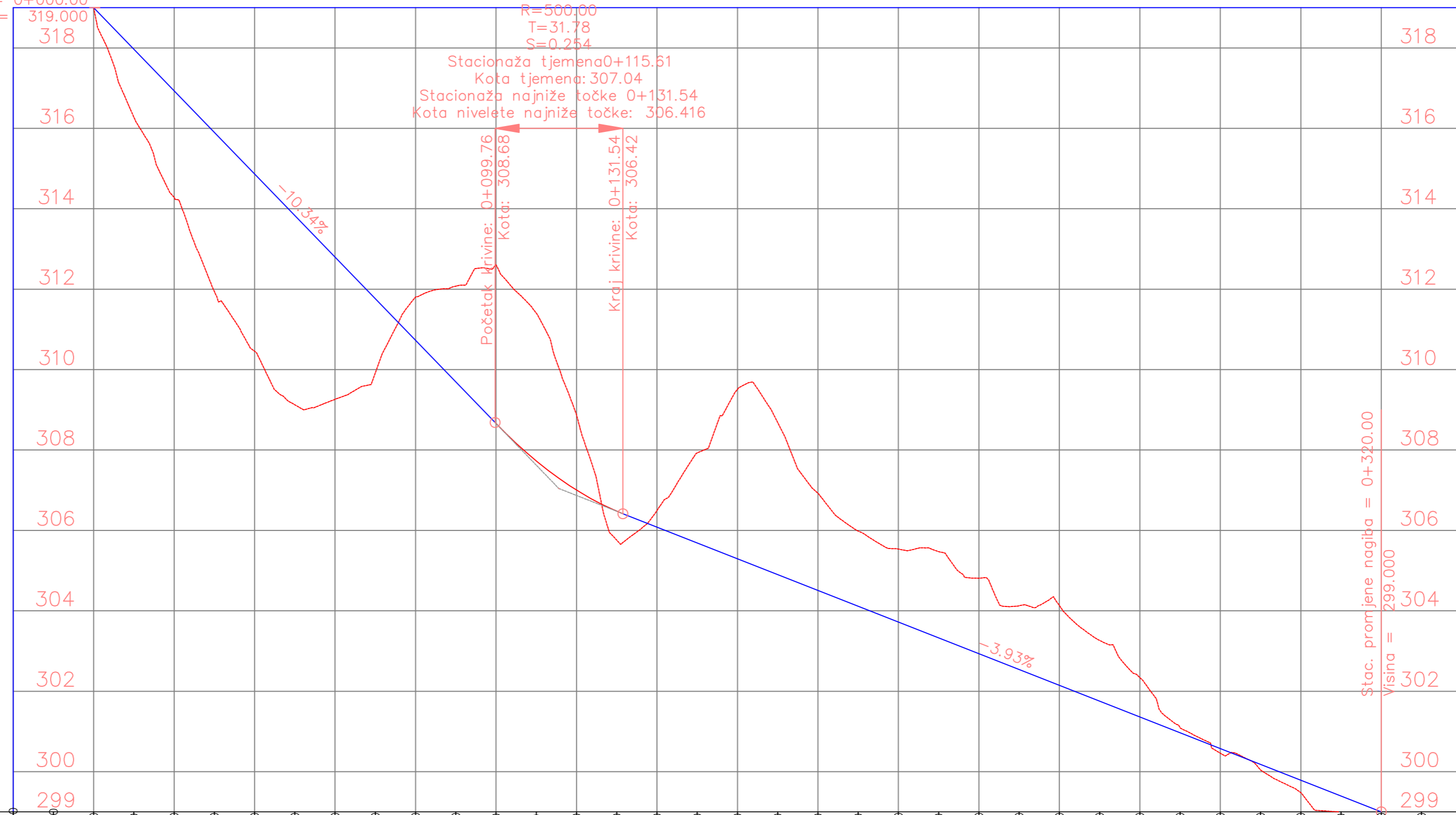
#### **3.1. GRAĐEVINSKA SITUACIJA M 1:1000**



### 3.2. UZDUŽNI PRESJEK M 1:1000/100

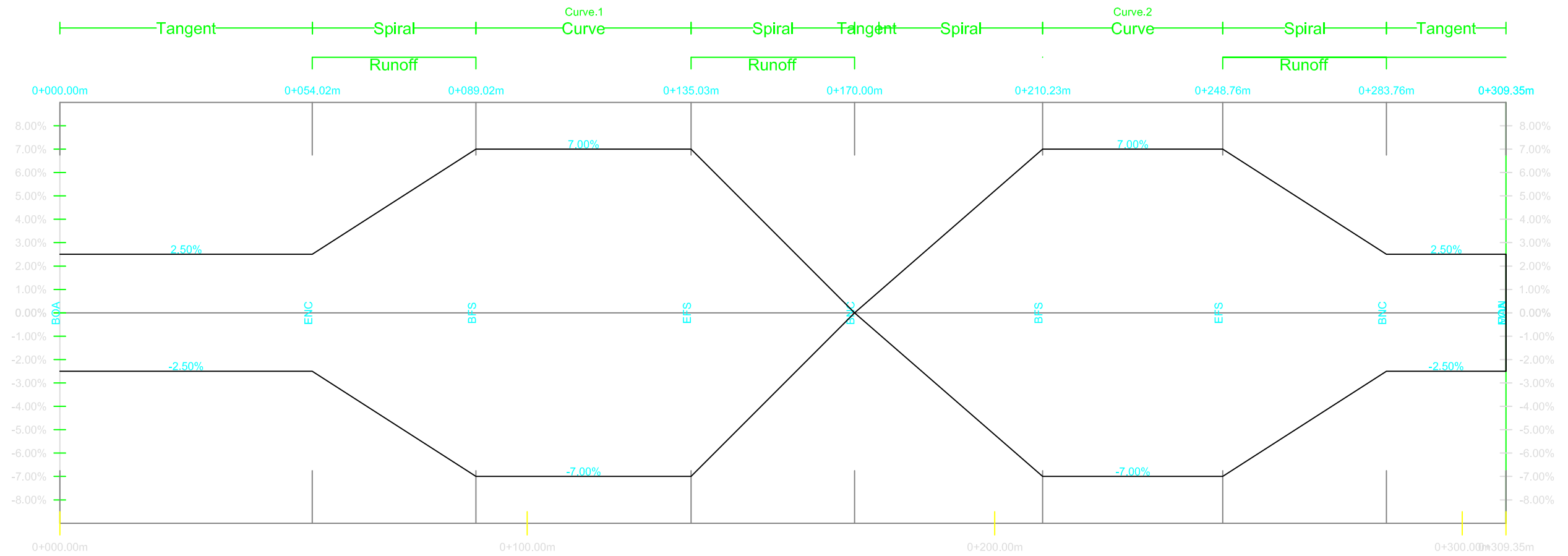
# os 1 PROFILE

Stac. promjene nagiba = 0+000.00  
Visina = 319.000



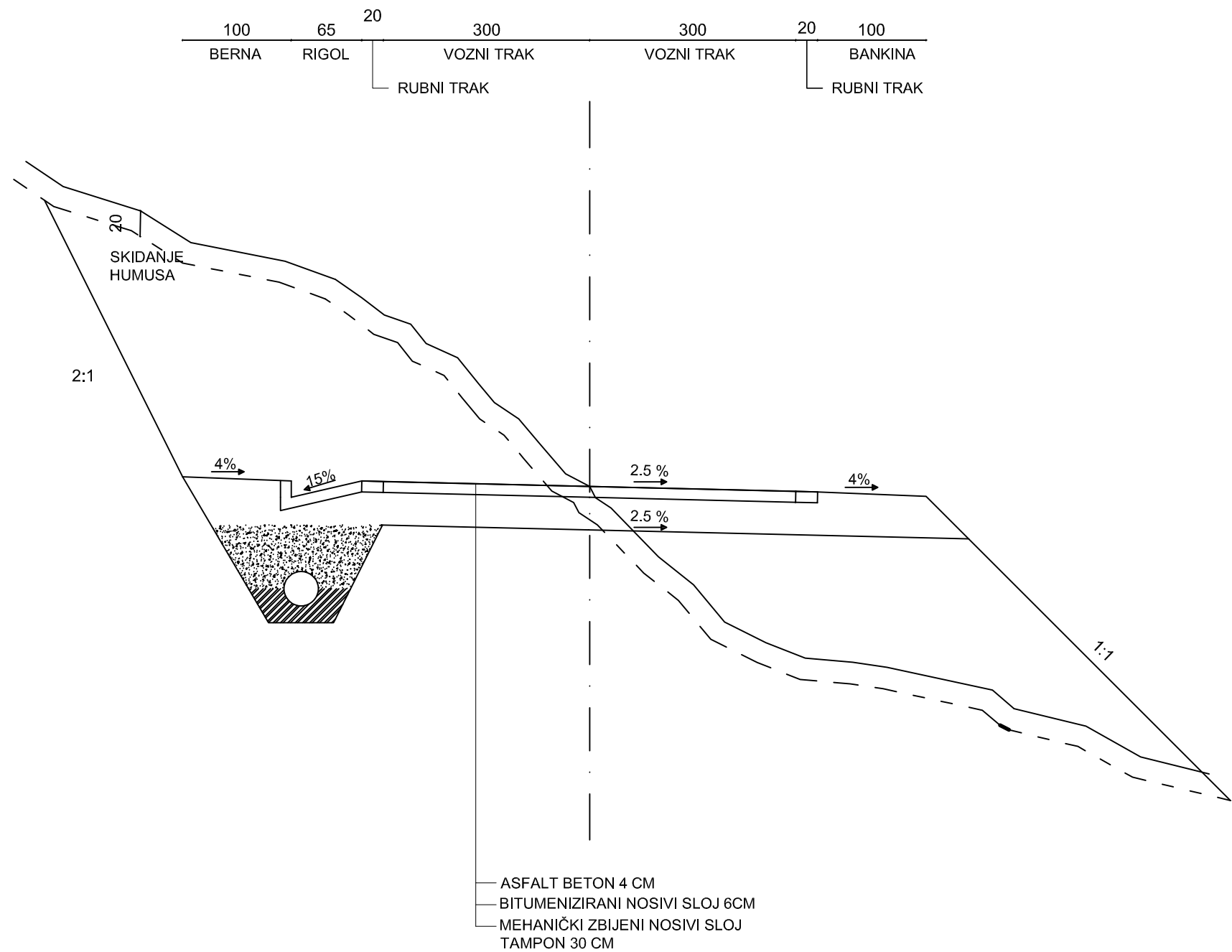
<b>Stacionaža</b>	0+000.00	0+010.00	0+020.00	0+030.00	0+040.00	0+050.00	0+060.00	0+070.00	0+080.00	0+090.00	0+100.00	0+110.00	0+120.00	0+130.00	0+140.00	0+150.00	0+160.00	0+170.00	0+180.00	0+190.00	0+200.00	0+210.00	0+220.00	0+230.00	0+240.00	0+250.00	0+260.00	0+270.00	0+280.00	0+290.00	0+300.00	0+310.00	0+320.00	0+330.00	0+340.00	
<b>Kote nivelete</b>		319.00	317.97	316.93	315.90	314.86	313.83	312.79	311.76	310.73	309.69	308.66	307.73	307.00	306.48	306.08	305.69	305.30	304.90	304.51	304.12	303.72	303.33	302.93	302.54	302.15	301.75	301.36	300.97	300.57	300.18	299.79	299.39	299.00	299.00	299.00
<b>Kote terena</b>		319.00	316.27	314.29	311.94	310.46	309.12	309.26	309.92	311.81	312.08	312.60	311.40	308.87	305.76	306.49	307.93	309.51	308.68	306.92	305.98	305.54	305.47	304.81	304.13	304.13	303.26	302.34	301.09	300.46	300.04	299.48				
<b>Horizontalni elementi</b>			L = 54.02 S82° 21' 57"E		L: 35.00		R: 50.00 L: 46.00		L: 35.00		L = 5.20 N4° 48' 45"E		L: 35.00		R: 50.00 L: 38.53		L: 35.00								L = 25.60 N89° 04' 00"E											
<b>Vitoperenje</b>			-2.50% 0+054.02		-7.00%		-7.00% sta: 0+089.02 D: 7.00%		-7.00% sta: 0+135.03 D: 7.00%		0.00% 0+170.00		0.00% 0+170.00		-7.00% sta: 0+210.23 D: 7.00%		-7.00% sta: 0+248.76 D: 7.00%		-2.50% 0+283.76		-2.50%															

# Superelevation



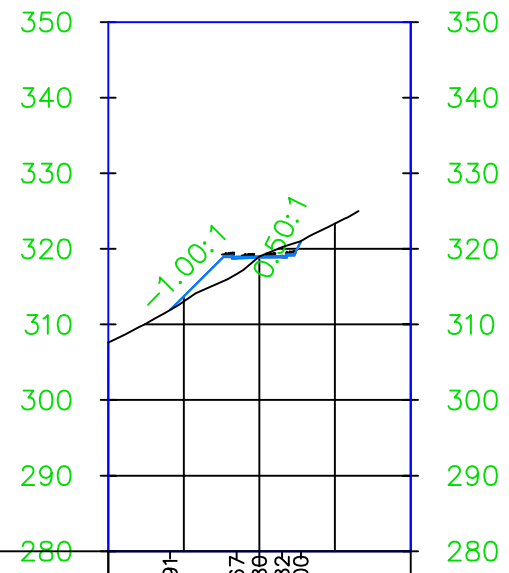
### 3.3. NORMALNI POPREČNI PRESJEK M 1:50





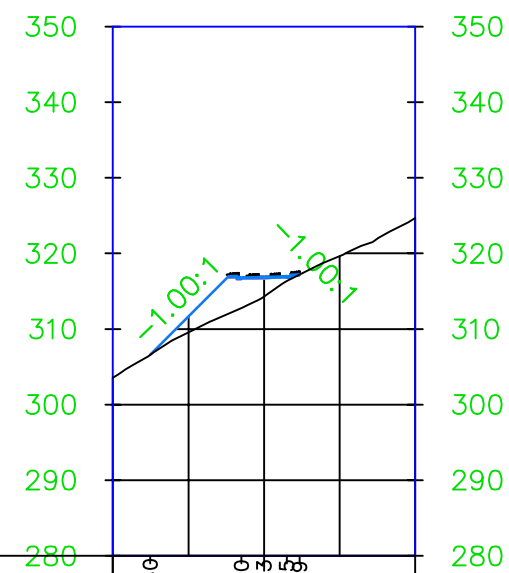
### 3.4. KARAKTERIČNI POPREČNI PRSESJECI M 1:200

0+000.00



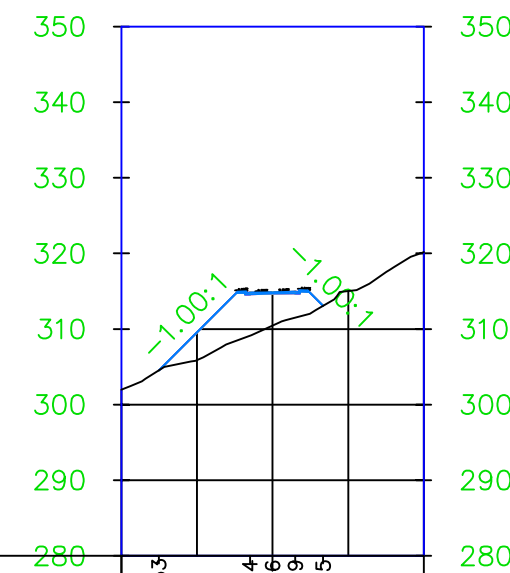
Kote projekta	20+000	311.91	11.81	311.91	318.67	3.00	318.67	318.80	0.00	318.80	318.82	3.00	318.82	321.00	5.48	321.00
Udaljenost od osi	20+000															20+000
Kote terena																

0+020.00



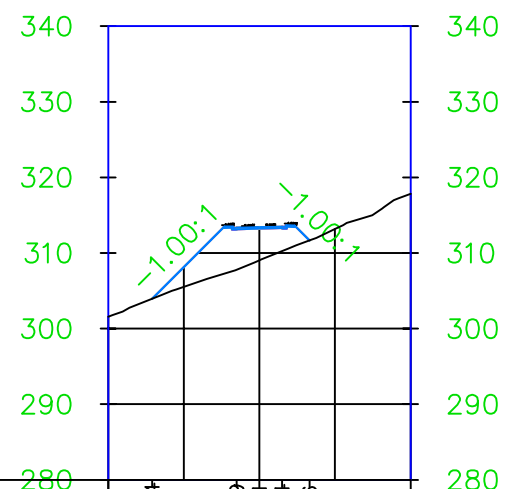
Kote projekta	20+000	306.60	15.06	306.60	316.60	3.00	316.60	316.73	0.00	316.73	319.75	3.90	319.75			
Udaljenost od osi	20+000															20+000
Kote terena																

0+040.00



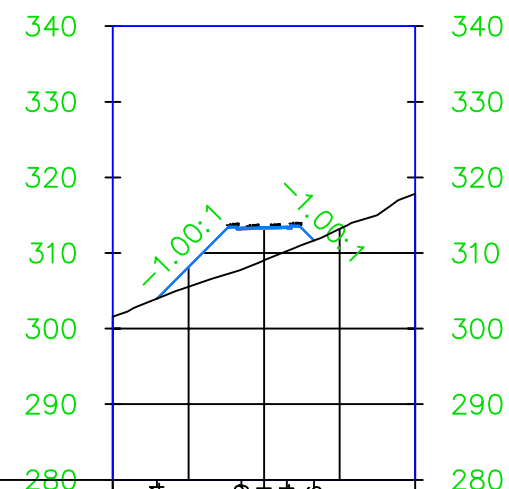
Kote projekta	20+000	304.53	15.05	304.53	314.54	3.00	314.54	314.66	0.00	314.66	314.69	3.00	314.69	313.05	6.68	313.05
Udaljenost od osi	20+000															20+000
Kote terena																

0+054.02



Kote projekta	20+000	303.94	14.19	303.94	313.09	3.00	313.09	313.21	0.00	313.21	313.24	3.00	313.24	311.66	6.63	311.66
Udaljenost od osi	20+000															20+000
Kote terena																

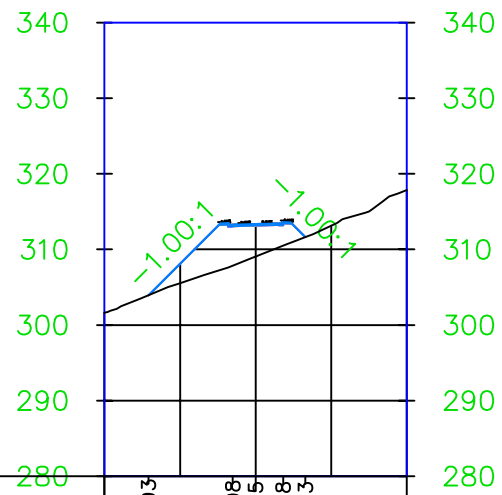
0+054.02



Kote projekta	20+000	303.94	14.19	303.94	313.09	3.00	313.09	313.21	0.00	313.21	313.24	3.00	313.24	311.66	6.63	311.66
Udaljenost od osi	20+000															20+000
Kote terena																

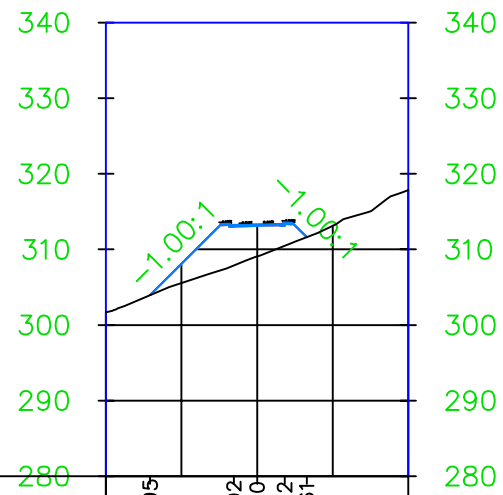


0+054.59



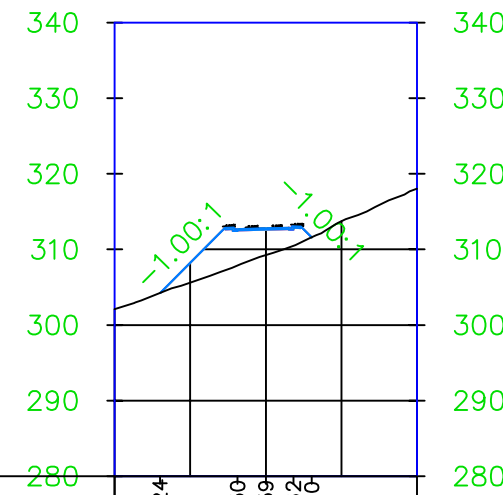
Kote projekta	280.000	303.93	14.16	303.93	313.08	-3.02	313.08	313.15	0.00	313.15	313.18	3.64	313.18	311.63	6.60	311.63	280.000
Udaljenost od osi	20.000																20.000
Kote terena		303.93			313.08		313.15		313.18		311.63						

0+055.15



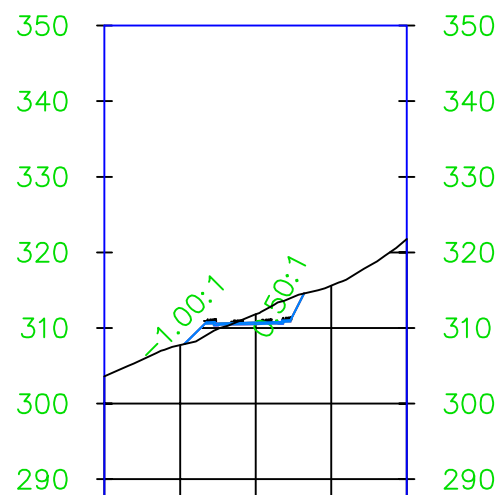
Kote projekta	280.000	303.95	14.15	303.95	313.02	-3.08	313.02	313.10	0.00	313.10	313.12	3.64	313.12	311.61	6.56	311.61	280.000
Udaljenost od osi	20.000																20.000
Kote terena		303.95			313.02		313.10		313.12		311.61						

0+060.00



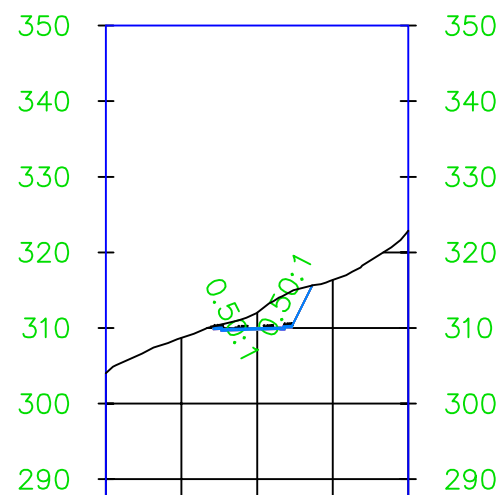
Kote projekta	280.000	304.24	14.04	304.24	312.50	-3.74	312.50	312.59	0.00	312.59	312.62	3.64	312.62	311.60	6.07	311.60	280.000
Udaljenost od osi	20.000																20.000
Kote terena		304.24			312.50		312.59		312.62		311.60						

0+080.00



Kote projekta	280.000	307.86	-9.42	307.86	310.40	-4.88	310.40	310.53	0.00	310.53	310.60	3.00	310.60	314.56	6.40	314.56	280.000
Udaljenost od osi	20.000																20.000
Kote terena		307.86			310.40		310.53		310.60		314.56						

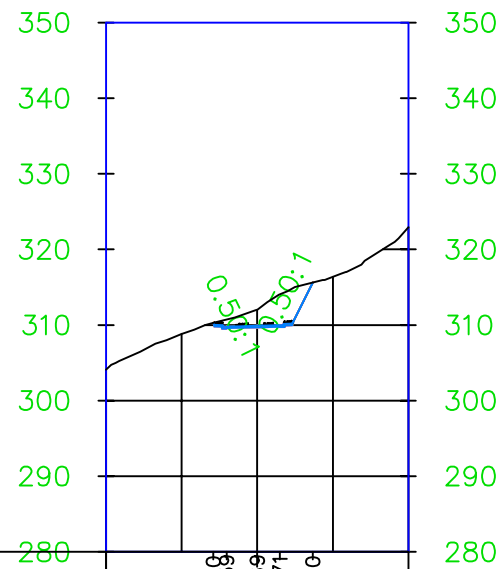
0+087.22



Kote projekta	280.000	308.18	-2.14	308.18	309.78	0.00	309.78	309.85	3.00	309.85	315.64	7.32	315.64				280.000
Udaljenost od osi	20.000																20.000
Kote terena		308.18			309.78		309.85		315.64								

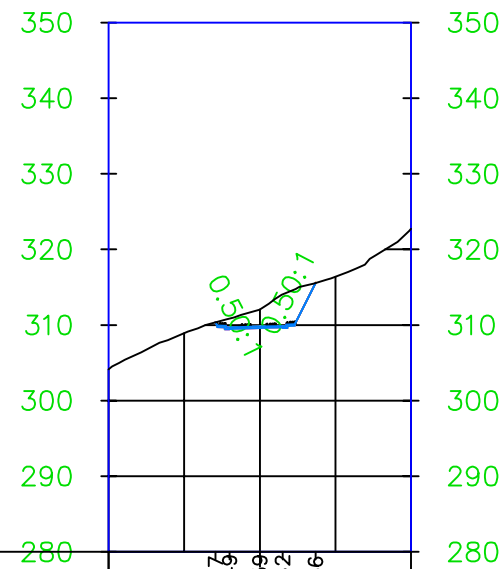


0+088.12



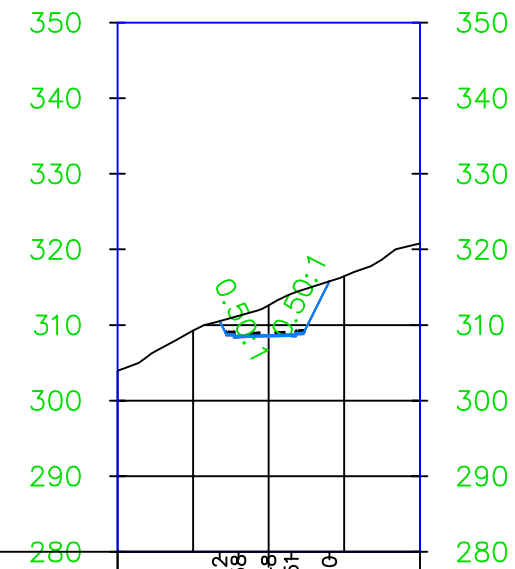
Kote projekta	20.000	310.39	309.69	309.71	315.60	20.000
Udaljenost od osi		-5.82	0.00	3.00	7.34	
Kote terena		310.39	309.69	309.71	315.60	

0+089.02



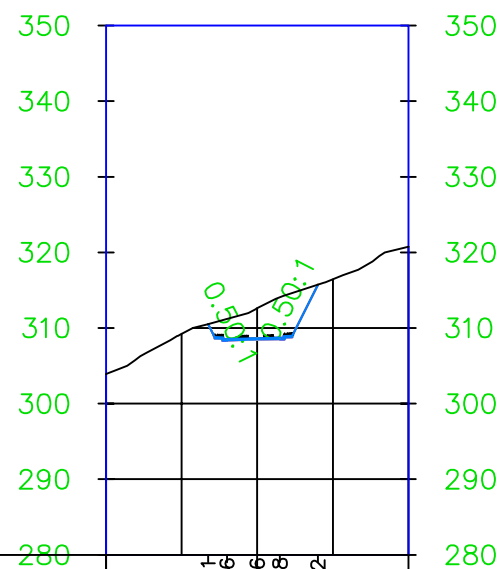
Kote projekta	20.000	310.45	309.59	309.62	315.56	20.000
Udaljenost od osi		-5.88	0.00	3.00	7.37	
Kote terena		310.45	309.59	309.62	315.56	

0+099.76



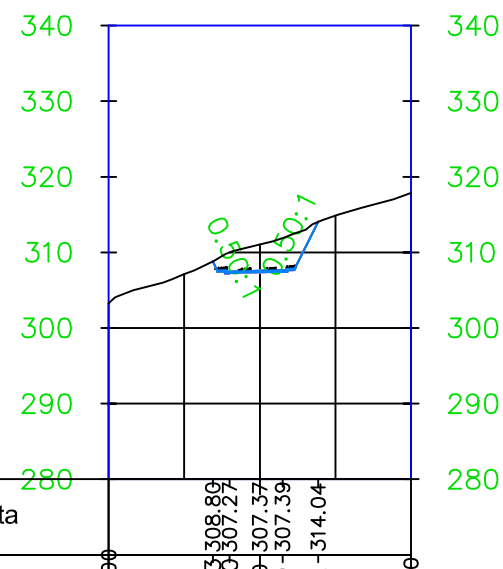
Kote projekta	20.000	310.52	308.38	308.51	315.80	20.000
Udaljenost od osi		-6.49	0.00	3.00	8.04	
Kote terena		310.52	308.38	308.51	315.80	

0+100.00



Kote projekta	20.000	310.51	308.36	308.48	315.72	20.000
Udaljenost od osi		-6.50	0.00	3.00	8.02	
Kote terena		310.51	308.36	308.48	315.72	

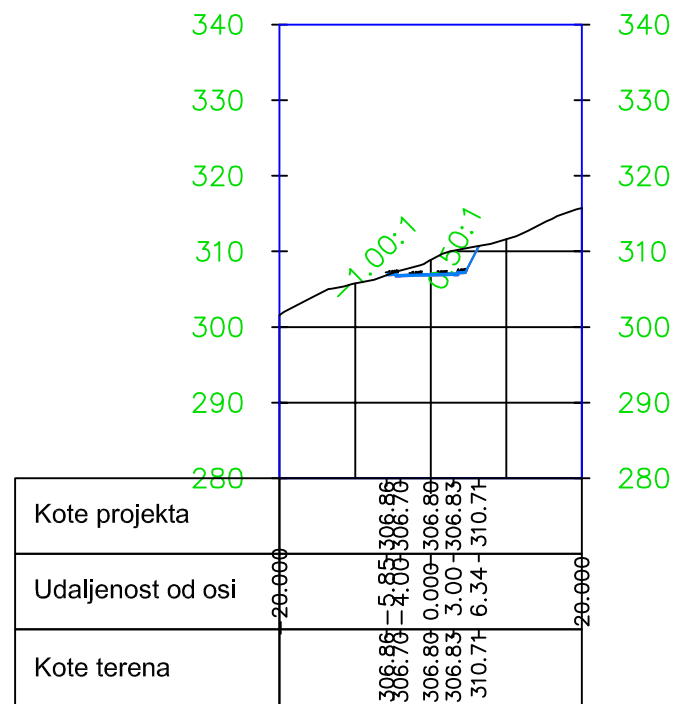
0+112.02



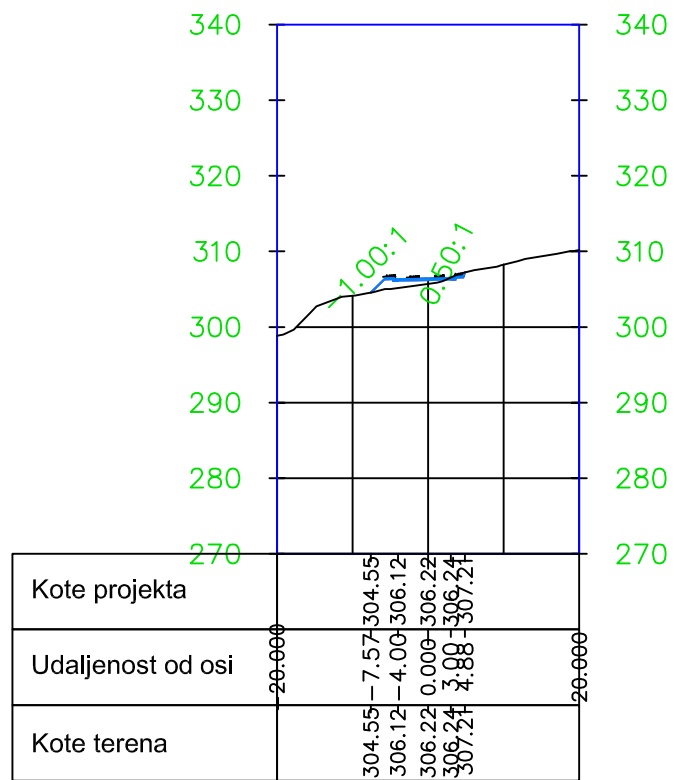
Kote projekta	20.000	308.89	307.27	307.37	314.04	20.000
Udaljenost od osi		-6.23	0.00	3.00	7.72	
Kote terena		308.89	307.27	307.37	314.04	



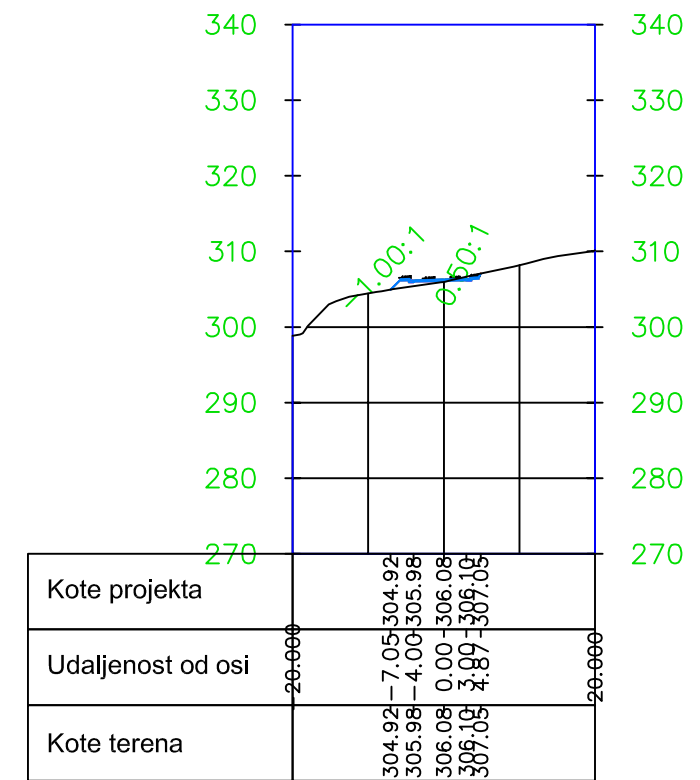
0+120.00



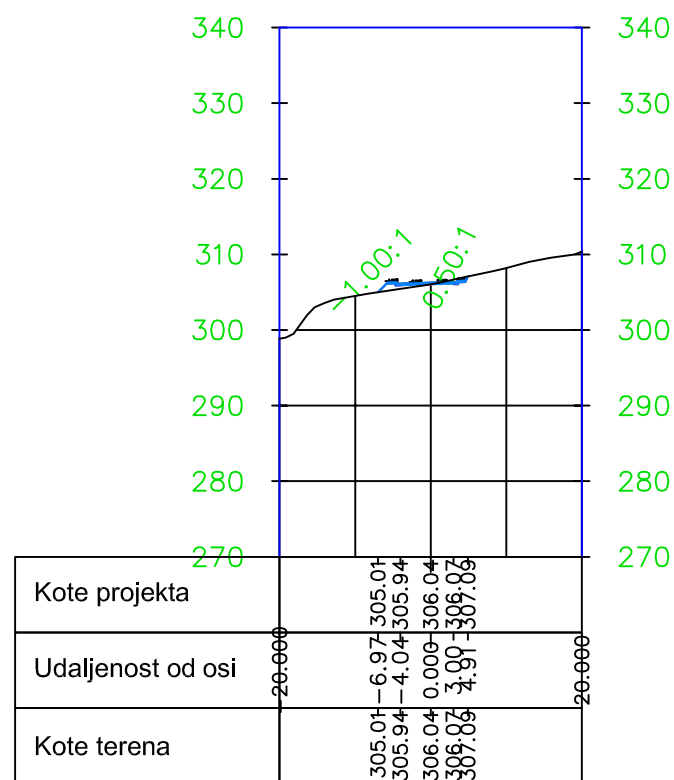
0+131.54



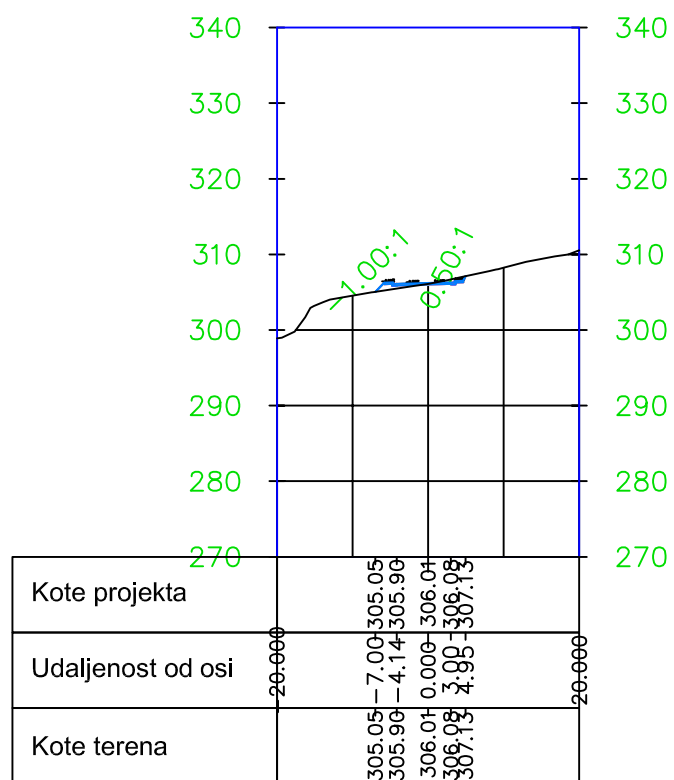
0+135.03



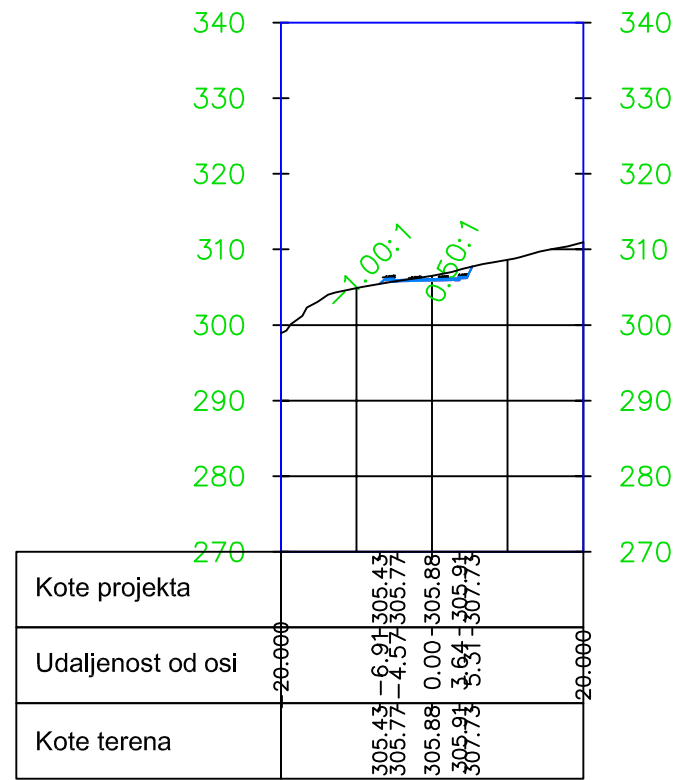
0+135.93



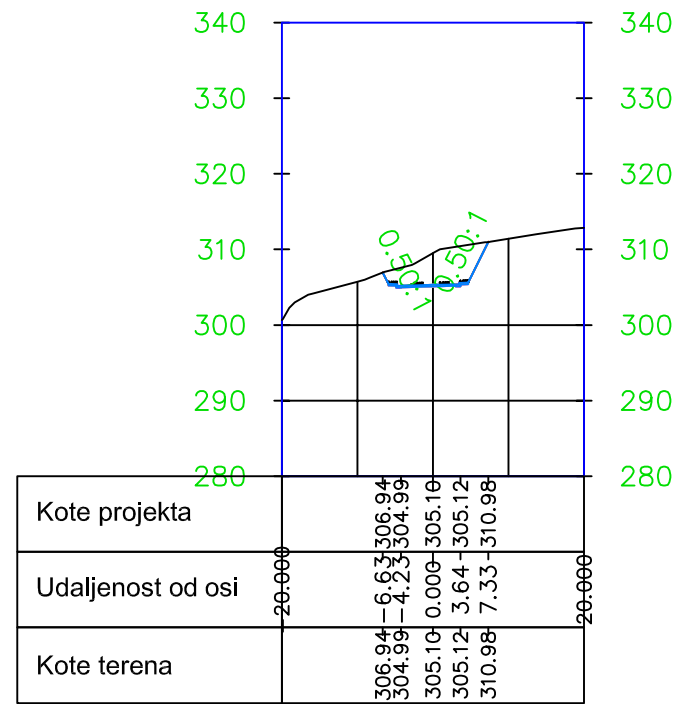
0+136.83



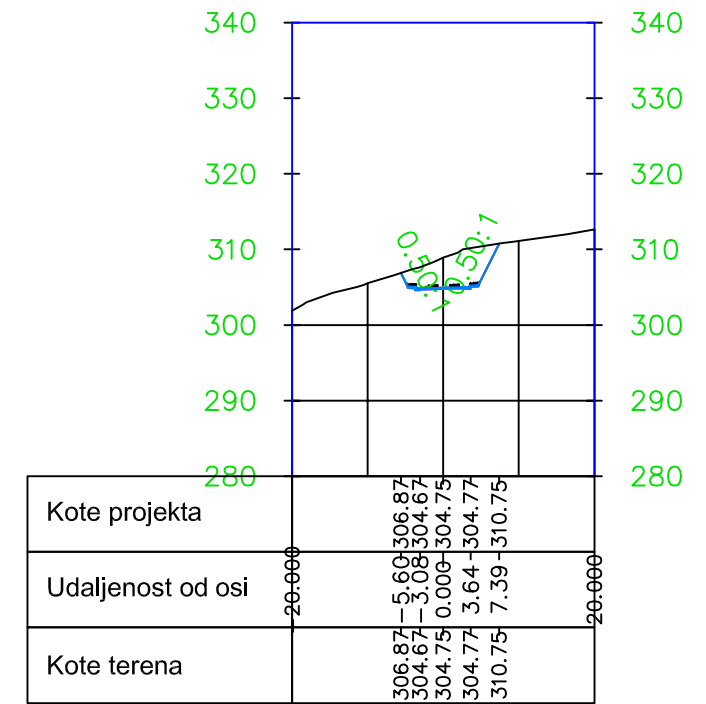
0+140.00



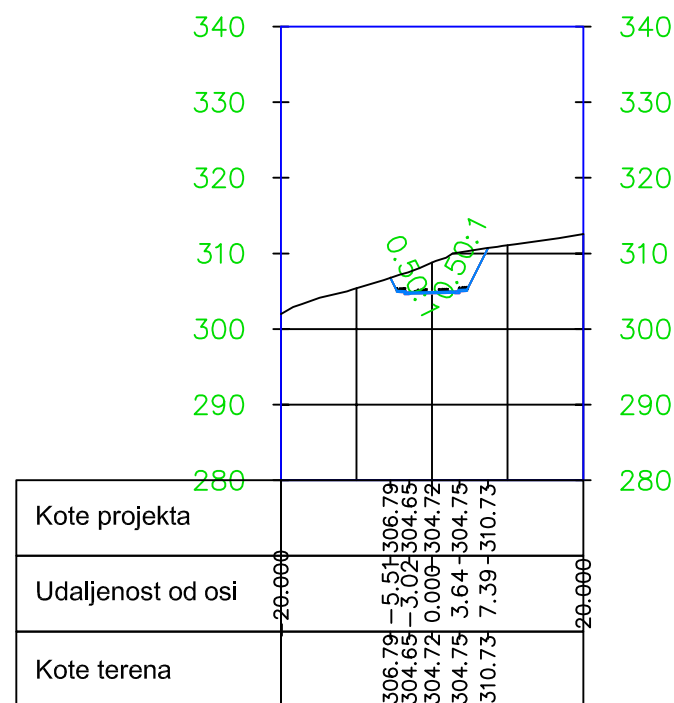
0+160.00



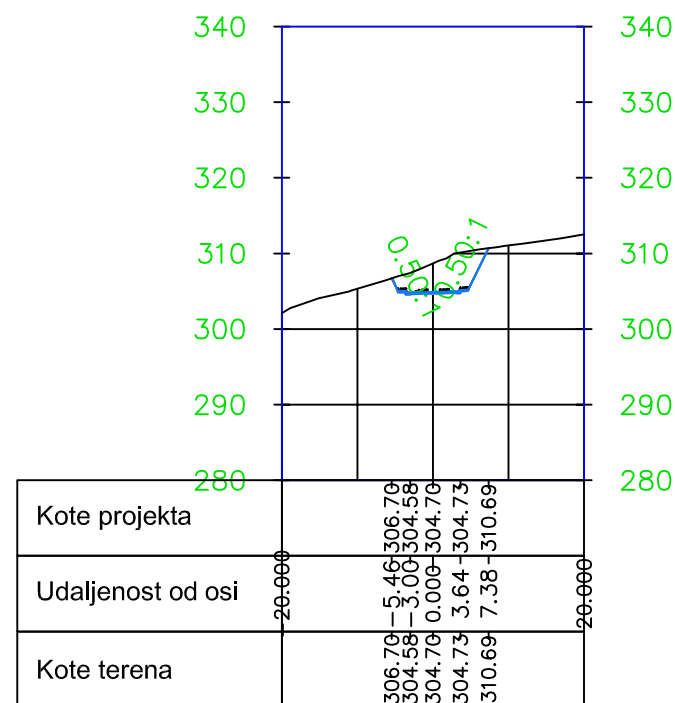
0+168.90



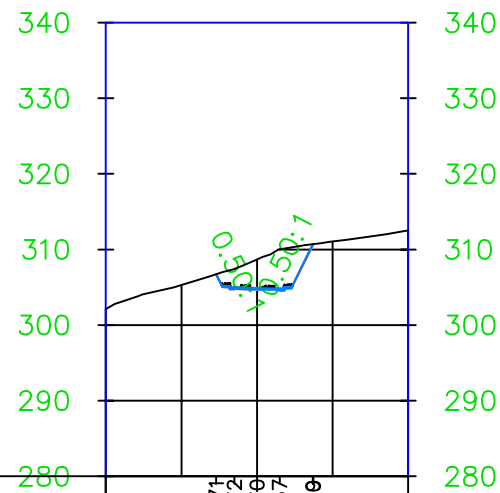
0+169.46



0+170.00

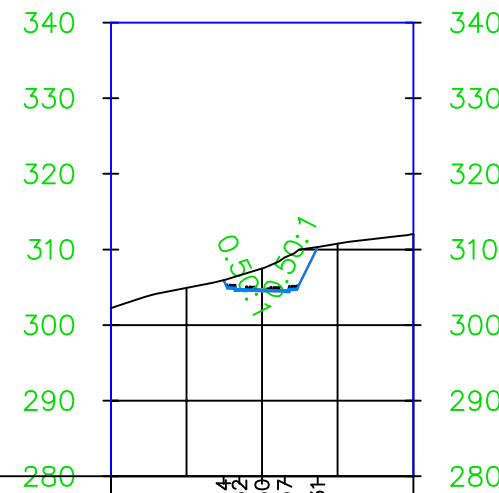


0+170.03



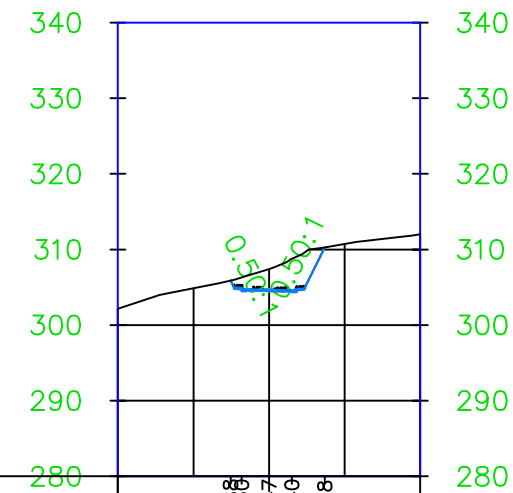
Kote projekta							
Udaljenost od osi	20.000	-5.39	306.71	304.72	-3.00	304.72	20.000
Kote terena			306.71	304.72	0.000	304.72	

0+175.23



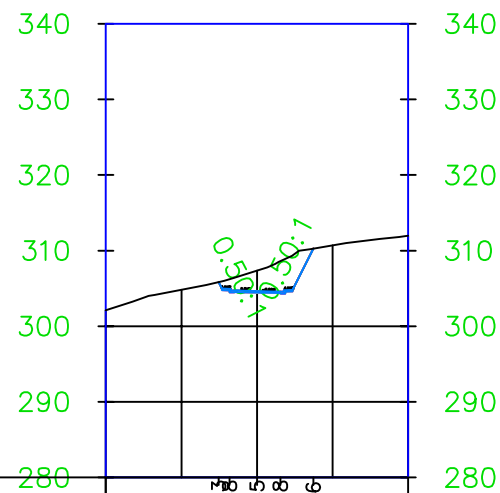
Kote projekta							
Udaljenost od osi	20.000	-5.11	305.94	304.52	-3.70	304.52	20.000
Kote terena			305.94	304.52	0.00	304.52	

0+175.79



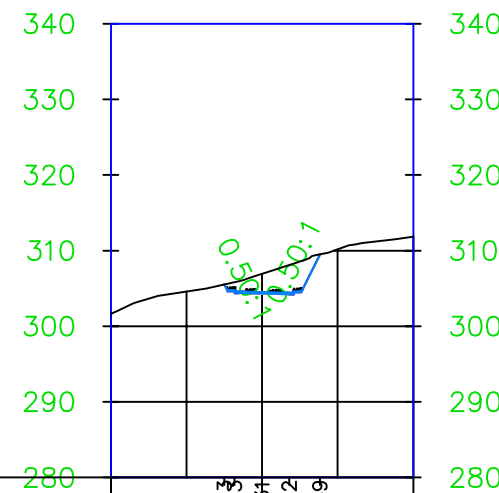
Kote projekta							
Udaljenost od osi	20.000	-5.02	305.86	304.47	-3.02	304.47	20.000
Kote terena			305.86	304.47	0.00	304.47	

0+176.35



Kote projekta							
Udaljenost od osi	20.000	-5.02	305.86	304.45	-3.08	304.38	20.000
Kote terena			305.86	304.45	0.00	304.38	

0+180.00

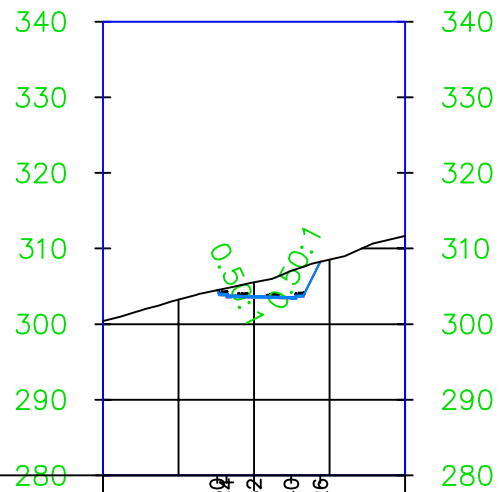


Kote projekta							
Udaljenost od osi	20.000	-4.82	305.53	304.31	-3.58	304.22	20.000
Kote terena			305.53	304.31	0.00	304.22	



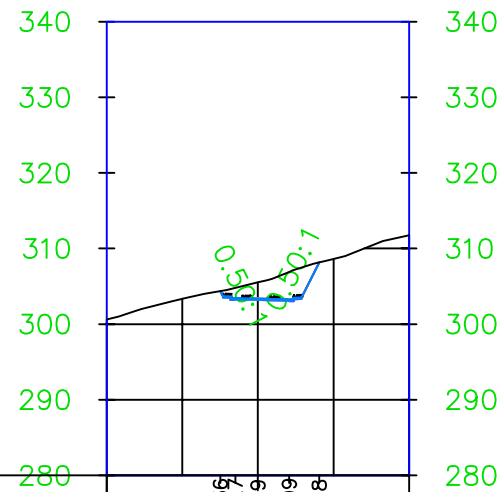


0+200.00



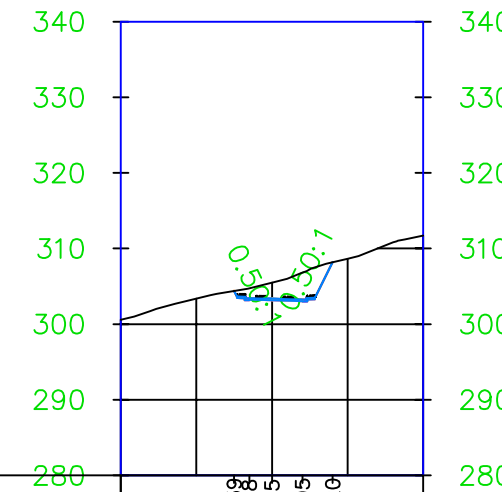
Kote projekta			303.52	303.52	303.40	308.26
Udaljenost od osi	20.000	4.88	0.000	4.93	8.79	20.000
Kote terena		303.52	303.52	303.40	308.26	

0+208.42



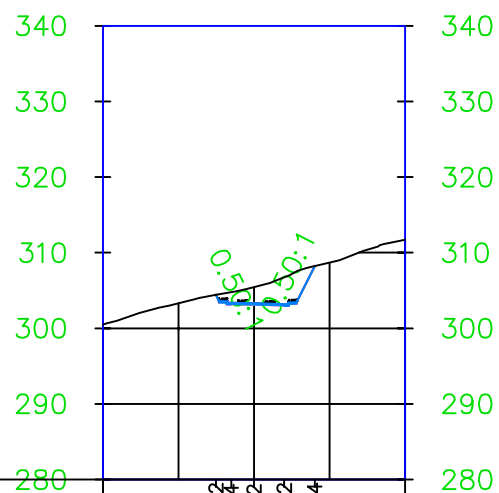
Kote projekta			303.19	303.19	303.09	308.18
Udaljenost od osi	20.000	4.87	0.000	4.14	8.11	20.000
Kote terena		303.19	303.19	303.09	308.18	

0+209.32



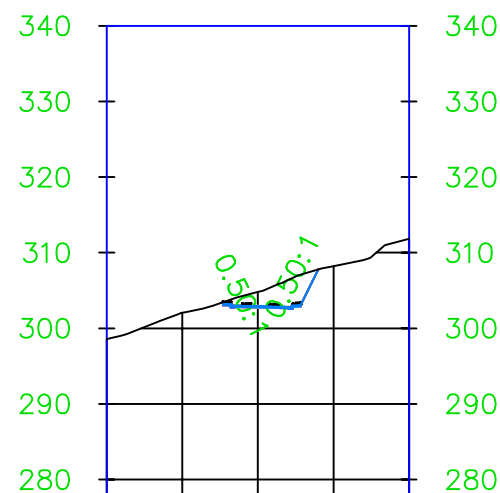
Kote projekta			303.15	303.15	303.05	308.20
Udaljenost od osi	20.000	5.00	0.00	4.04	8.03	20.000
Kote terena		303.15	303.15	303.05	308.20	

0+210.23



Kote projekta			303.12	303.12	303.02	308.24
Udaljenost od osi	20.000	5.04	0.00	4.00	8.03	20.000
Kote terena		303.12	303.12	303.02	308.24	

0+220.00



Kote projekta			302.73	302.73	302.63	307.77
Udaljenost od osi	20.000	4.72	0.000	4.00	7.99	20.000
Kote terena		302.73	302.73	302.63	307.77	



SVEUČILIŠTE U SPLITU ♦ Fakultet građevinarstva, arhitekture i geodezije  
Matice hrvatske 15, HR 21000, SPLIT www.gradst.hr

ZAVRŠNI RAD

predmet: CESTE

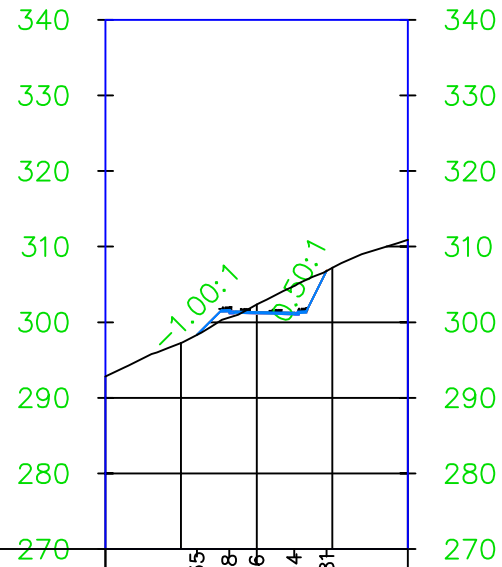
student-ica: Filip Škalic

mjerilo: M 1:200

sadržaj: KARAKTERISTIČNI POPREČNI PRESJECI

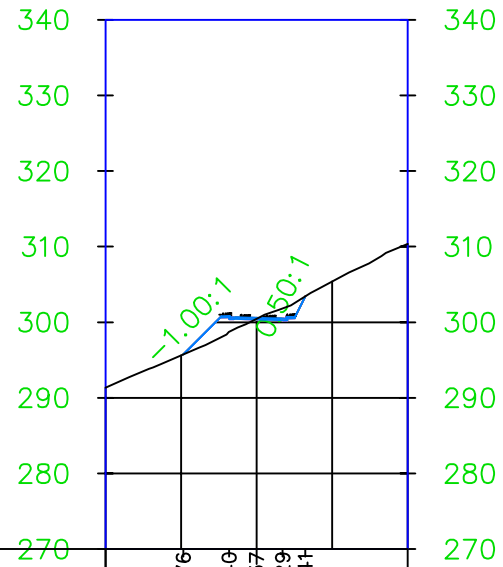


0+260.00



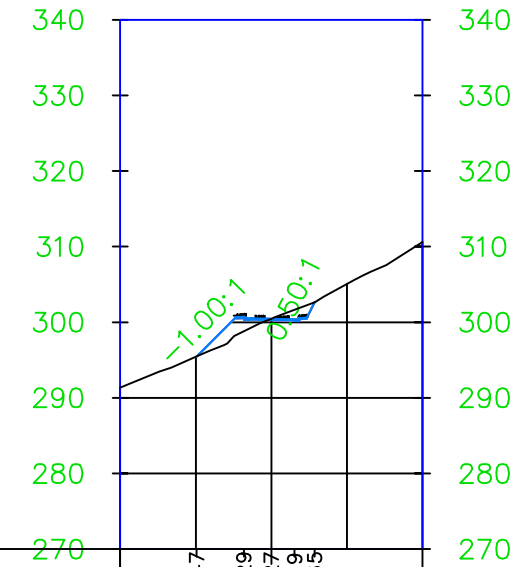
Kote projekta	298.35	298.35	301.18	301.18	301.16	301.16	301.04	301.04	306.81	306.81
Udaljenost od osi	20.000	7.89	3.64	0.00	4.96	9.27	20.000			
Kote terena		298.35	301.18	301.16	301.04	306.81				

0+280.00



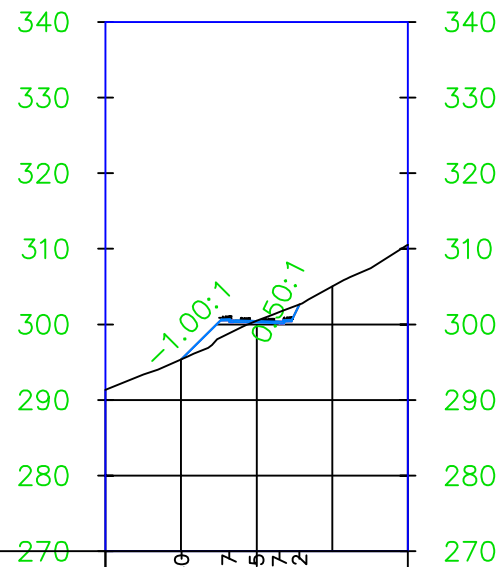
Kote projekta	295.76	295.76	300.40	300.37	300.29	300.29	303.41	303.41		
Udaljenost od osi	20.000	9.69	3.64	0.00	3.45	6.43	20.000			
Kote terena		295.76	300.40	300.37	300.29	303.41				

0+282.63



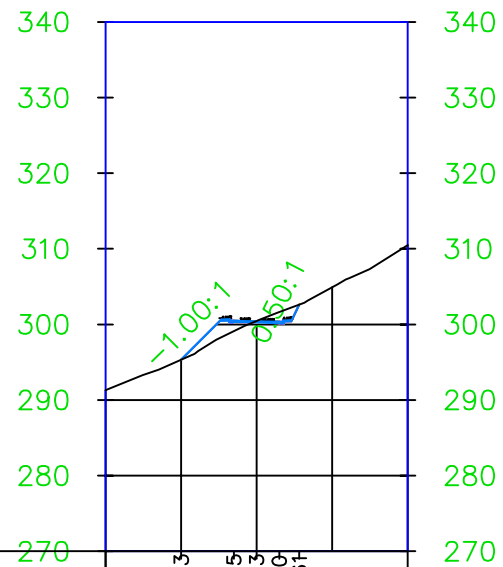
Kote projekta	295.47	295.47	300.29	300.27	300.19	302.65				
Udaljenost od osi	20.000	9.87	3.64	0.00	3.08	5.73	20.000			
Kote terena		295.47	300.29	300.27	300.19	302.65				

0+283.19



Kote projekta	295.40	295.40	300.27	300.25	300.17	302.62				
Udaljenost od osi	20.000	9.92	3.64	0.00	3.02	5.67	20.000			
Kote terena		295.40	300.27	300.25	300.17	302.62				

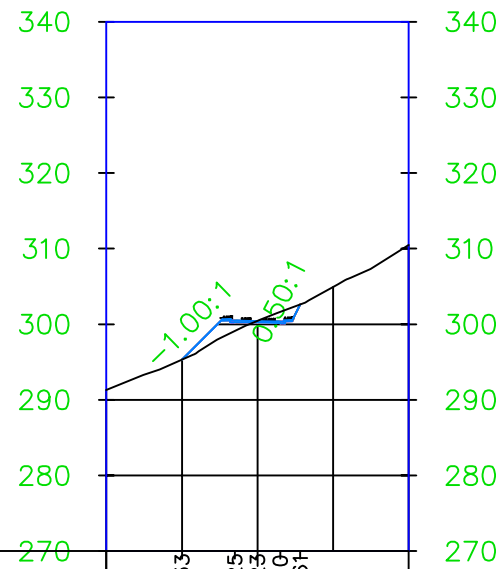
0+283.76



Kote projekta	295.33	295.33	300.25	300.23	300.10	302.61				
Udaljenost od osi	20.000	9.97	3.00	0.00	3.00	5.65	20.000			
Kote terena		295.33	300.25	300.23	300.10	302.61				

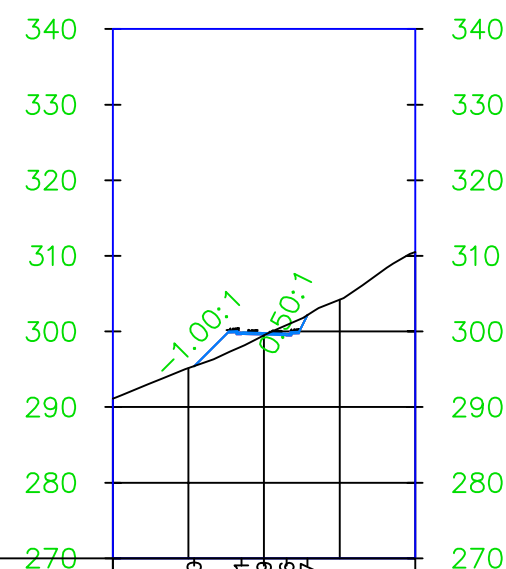


0+283.76



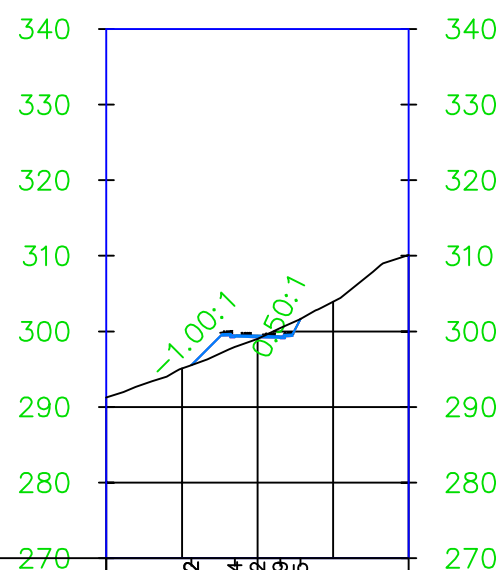
Kote projekta	295.33	295.33	300.25	300.25	300.23	300.23	300.10	302.61
Udaljenost od osi	-20.000	-9.97	3.00	3.00	0.000	3.00	5.65	20.000
Kote terena		295.33	300.25	300.23	300.10	300.10	302.61	

0+300.00



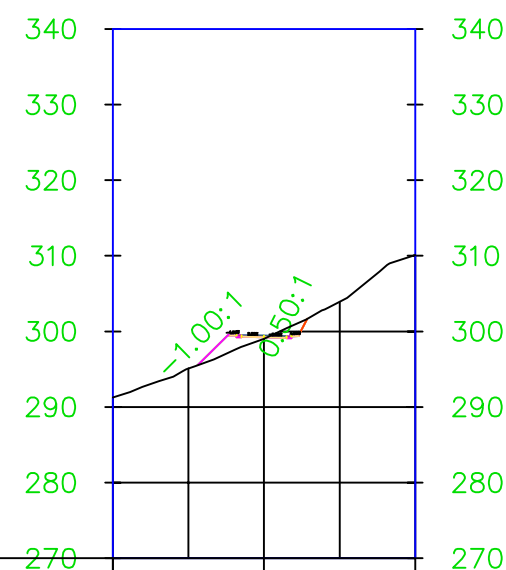
Kote projekta	295.40	295.40	299.61	299.59	299.46	299.46	302.17
Udaljenost od osi	-20.000	-9.26	3.00	0.00	3.00	5.75	20.000
Kote terena		295.40	299.61	299.59	299.46	299.46	302.17

0+309.35



Kote projekta	295.52	295.52	299.24	299.22	299.09	299.09	301.65
Udaljenost od osi	-20.000	-8.77	3.00	0.00	3.00	5.68	20.000
Kote terena		295.52	299.24	299.22	299.09	299.09	301.65

0+309.35



Kote projekta							
Udaljenost od osi	-20.000		0.000				20.000
Kote terena							



#### 4. TABLICA VOLUMENA UKUPNIH ZEMLJANIH RADOVA

Alignment: os 1

Sample Line Group: SL Collection - 5

Start Sta: 0+000.000

End Sta: 0+309.354

<b>Station</b>	<b>Cut Area (Sq.m.)</b>	<b>Cut Volume (Cu.m.)</b>	<b>Reusable Volume (Cu.m.)</b>	<b>Fill Area (Sq.m.)</b>	<b>Fill Volume (Cu.m.)</b>	<b>Cum. Cut Vol. (Cu.m.)</b>	<b>Cum. Reusable Vol. (Cu.m.)</b>	<b>Cum. Fill Vol. (Cu.m.)</b>	<b>Cum. Net Vol. (Cu.m.)</b>
0+000.000	5.43	0.00	0.00	17.78	0.00	0.00	0.00	0.00	0.00
0+020.000	0.01	54.48	54.48	44.78	625.65	54.48	54.48	625.65	-571.18
0+040.000	0.00	0.13	0.13	79.06	1238.43	54.61	54.61	1864.09	-1809.48
0+054.020	0.00	0.00	0.00	70.66	1049.53	54.61	54.61	2913.62	-2859.01
0+054.023	0.00	0.00	0.00	70.65	0.21	54.61	54.61	2913.83	-2859.22
0+054.586	0.00	0.00	0.00	69.48	39.48	54.61	54.61	2953.31	-2898.70
0+055.148	0.00	0.00	0.00	68.63	38.75	54.61	54.61	2992.06	-2937.45
0+060.000	0.00	0.00	0.00	61.21	315.01	54.61	54.61	3307.06	-3252.45
0+080.000	15.54	159.03	159.03	4.88	636.49	213.64	213.64	3943.55	-3729.92
0+087.216	30.66	172.99	172.99	0.00	15.60	386.63	386.63	3959.15	-3572.53
0+088.116	32.19	28.27	28.27	0.00	0.00	414.90	414.90	3959.15	-3544.25
0+089.023	33.68	30.96	30.96	0.00	0.00	445.86	445.86	3959.15	-3513.29

0+099.7 56	52.19	474.27	474.27	0.00	0.00	920.13	920.13	3959.15	- 3039.02
0+100.0 00	52.05	12.70	12.70	0.00	0.00	932.83	932.83	3959.15	- 3026.32
0+112.0 24	43.75	588.81	588.81	0.00	0.00	1521.63	1521.63	3959.15	- 2437.52
0+120.0 00	22.08	268.72	268.72	0.01	0.05	1790.36	1790.36	3959.20	- 2168.84
0+131.5 38	0.91	137.08	137.08	7.13	38.40	1927.44	1927.44	3997.59	- 2070.15
0+135.0 25	1.54	4.58	4.58	3.60	17.33	1932.02	1932.02	4014.93	- 2082.91
0+135.9 33	1.87	1.64	1.64	2.95	2.72	1933.66	1933.66	4017.64	- 2083.98
0+136.8 32	2.31	1.88	1.88	2.44	2.42	1935.54	1935.54	4020.07	- 2084.53
0+140.0 00	6.63	14.68	14.68	0.51	4.26	1950.22	1950.22	4024.32	- 2074.10
0+160.0 00	48.40	556.47	556.47	0.00	4.75	2506.69	2506.69	4029.08	- 1522.39
0+168.9 01	45.77	420.47	420.47	0.00	0.00	2927.16	2927.16	4029.08	- 1101.92
0+169.4 62	44.96	25.46	25.46	0.00	0.00	2952.62	2952.62	4029.08	- 1076.46
0+170.0 00	44.20	23.99	23.99	0.00	0.00	2976.61	2976.61	4029.08	- 1052.47
0+170.0 25	44.32	1.12	1.12	0.00	0.00	2977.73	2977.73	4029.08	- 1051.35
0+175.2 30	36.21	209.57	209.57	0.00	0.00	3187.30	3187.30	4029.08	-841.77
0+175.7 94	35.32	20.15	20.15	0.00	0.00	3207.46	3207.46	4029.08	-821.62
0+176.3 55	34.66	19.64	19.64	0.00	0.00	3227.09	3227.09	4029.08	-801.99

0+180.0 00	31.58	120.74	120.74	0.00	0.00	3347.83	3347.83	4029.08	-681.25
0+200.0 00	30.53	608.16	608.16	0.00	0.00	3955.99	3955.99	4029.08	-73.09
0+208.4 23	31.59	250.08	250.08	0.00	0.00	4206.07	4206.07	4029.08	177.00
0+209.3 23	31.35	28.31	28.31	0.00	0.00	4234.39	4234.39	4029.08	205.31
0+210.2 30	31.52	27.22	27.22	0.00	0.00	4261.61	4261.61	4029.08	232.53
0+220.0 00	28.95	280.99	280.99	0.00	0.00	4542.60	4542.60	4029.08	513.52
0+229.4 93	24.49	239.61	239.61	0.06	0.31	4782.20	4782.20	4029.38	752.82
0+240.0 00	28.30	260.80	260.80	0.93	5.71	5043.00	5043.00	4035.09	1007.91
0+248.7 56	25.53	220.89	220.89	0.77	8.19	5263.89	5263.89	4043.29	1220.61
0+249.6 63	25.75	21.75	21.75	0.73	0.75	5285.65	5285.65	4044.03	1241.61
0+250.5 63	26.38	23.45	23.45	0.75	0.67	5309.10	5309.10	4044.70	1264.40
0+260.0 00	25.75	230.32	230.32	3.67	22.55	5539.42	5539.42	4067.25	1472.17



## 5. OBRADA NA RAČUNALU

Za izradu idejnog projekta lokalne ceste korišten je AutoCAD Civil 3D koji znatno olakšava izradu programskog zadatka. U odnosu na ručno rješavanje, postupak na računalu je znatno brži i jednostavniji.

Prvi korak pri izradi idejnog rješenja je skeniranje geodetske podloge te slijedi iscrtavanje slojnica. Slojnice se iscrtavaju pomoću 3D poligonalnih linija te se postupkom triangulacije na tim linijama dobije trodimenzionalni model terena. Zatim definiramo koordinate točaka tangenti (dvije točke ta svaku tangentu) te ih definiramo na terenu. Na sjecištima tangenti definiramo kružne lukove i prijelazne krivine te na taj način definiramo horizontalni tok ceste.

Slijedi izrada uzdužnog presjeka ceste kojeg definira niveleta. Niveleta se postavlja tako da se zadovolje geometrijski i sigurnosni elementi te odvodnja. Između tangenti se ubacuje kružna krivina određenog radijusa.

Sljedeći korak je definiranje poprečnog profila prometnice. Poprečnim presjekom su definirani: poprečni nagib i širina kolnika te pokosi usjeka i nasipa.

Na temelju definiranih horizontalnih i vertikalnih elemenata te osi ceste, izrađujemo koridor. On omogućuje uvid u poprečne presjeke u svim karakterističnim i zadanim točkama osi ceste. Time smo definirali cijelu dionicu ceste.

Izlazni podaci su računalni ispisi koordinatnih točaka osi, točaka svakog poprečnog presjeka te količina zemljanih radova po presjeku.

## **6. IZLAZNI PODACI IZ PROGRAMA**

### **6.1. KOORDINATNI RAČUN GLAVNIH TOČKA**

Alignment: os\_1

Description:

---

Tangent Data

Description	PT Station	Northing	Easting
Start:	0+00.000	114.433	-297.919
End:	0+54.023	107.256	-244.375

Tangent Data

Parameter	Value	Parameter	Value
Length:	54.023	Course:	S 82° 21' 56.9509" E

---

Spiral Point Data

Description	Station	Northing	Easting
TS:	0+54.023	107.256	-244.375
SPI:		104.137	-221.099
SC:	0+89.023	106.675	-209.570

Spiral Curve Data: clothoid

Parameter	Value	Parameter	Value
Length:	35.000	L Tan:	23.485
Radius:	50.000	S Tan:	11.805
Theta:	20° 03' 12.6822"	P:	1.016
X:	34.574	K:	17.429
Y:	4.048	A:	41.833
Chord:	34.810	Course:	S 89° 02' 36.1485" E

---

Curve Point Data

Description	Station	Northing	Easting
-------------	---------	----------	---------

SC:	0+89.023	106.675	-209.570
RP:		155.505	-220.324
CS:	1+35.025	134.480	-174.959

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	52° 42' 53.0052"	Type:	LEFT
Radius:	50.000		
Length:	46.002	Tangent:	24.774
Mid-Ord:	5.198	External:	5.801
Chord:	44.397	Course:	N 51° 13' 23.8643" E

Spiral Point Data

Description	Station	Northing	Easting
CS:	1+35.025	134.480	-174.959
SPI:		145.191	-169.995
ST:	1+70.025	168.593	-168.025

Spiral Curve Data: clothoid

Parameter	Value	Parameter	Value
Length:	35.000	L Tan:	23.485
Radius:	50.000	S Tan:	11.805
Theta:	20° 03' 12.6822"	P:	1.016
X:	34.574	K:	17.429
Y:	4.048	A:	41.833
Chord:	34.810	Course:	N 11° 29' 23.8771" E

Tangent Data

Description	PT Station	Northing	Easting
-------------	------------	----------	---------

Start:            1+70.025                    168.593                    -168.025  
 End:             1+75.230                    173.779                    -167.588

Tangent Data

Parameter	Value	Parameter	Value
Length:	5.205	Course:	N 04° 48' 44.6795" E

Spiral Point Data

Description	Station	Northing	Easting
TS:	1+75.230	173.779	-167.588
SPI:		197.181	-165.618
SC:	2+10.230	207.891	-160.654

Spiral Curve Data: clothoid

Parameter	Value	Parameter	Value
Length:	35.000	L Tan:	23.485
Radius:	50.000	S Tan:	11.805
Theta:	20° 03' 12.6822"	P:	1.016
X:	34.574	K:	17.429
Y:	4.048	A:	41.833
Chord:	34.810	Course:	N 11° 29' 23.8771" E

Curve Point Data

Description	Station	Northing	Easting
SC:	2+10.230	207.891	-160.654
RP:		186.867	-115.290
CS:	2+48.756	233.550	-133.197

Circular Curve Data

Parameter	Value	Parameter	Value
-----------	-------	-----------	-------

Delta:	44° 08' 50.0354"	Type:	RIGHT
Radius:	50.000		
Length:	38.526	Tangent:	20.276
Mid-Ord:	3.665	External:	3.955
Chord:	37.580	Course:	N 46° 56' 22.3794" E

Spiral Point Data

Description	Station	Northing	Easting
CS:	2+48.756	233.550	-133.197
SPI:		237.777	-122.176
ST:	2+83.756	238.160	-98.694

Spiral Curve Data: clothoid

Parameter	Value	Parameter	Value
Length:	35.000	L Tan:	23.485
Radius:	50.000	S Tan:	11.805
Theta:	20° 03' 12.6822"	P:	1.016
X:	34.574	K:	17.429
Y:	4.048	A:	41.833
Chord:	34.810	Course:	N 82° 23' 20.8817" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	2+83.756	238.160	-98.694
End:	3+09.354	238.577	-73.099

Tangent Data

Parameter	Value	Parameter	Value
Length:	25.598	Course:	N 89° 04' 00.0793" E

**Alignment: os 1-Left-3.000**

**Description:**

---

Tangent Data

Description	PT Station	Northing	Easting
Start:	0+00.000	117.407	-297.521
End:	0+54.023	110.230	-243.977

Tangent Data

Parameter	Value	Parameter	Value
Length:	54.023	Course:	S 82° 21' 56.9509" E

---

Curve Point Data

Description	Station	Northing	Easting
PC:	0+54.023	110.230	-243.977
RP:		118.159	-242.914
PT:	0+55.150	110.159	-242.853

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	08° 04' 22.2377"	Type:	LEFT
Radius:	8.000		
Length:	1.127	Tangent:	0.565
Mid-Ord:	0.020	External:	0.020
Chord:	1.126	Course:	S 86° 24' 08.0698" E

---

Tangent Data

Description	PT Station	Northing	Easting
Start:	0+55.150	110.159	-242.853

End:                    0+85.914                    110.395                    -212.090

Tangent Data

Parameter	Value	Parameter	Value
Length:	30.764	Course:	N 89° 33' 40.8114" E

Curve Point Data

Description	Station	Northing	Easting
PC:	0+85.914	110.395	-212.090
RP:		118.395	-212.151
PCC:	0+87.587	110.582	-210.431

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	11° 58' 50.4445"	Type:	LEFT
Radius:	8.000		
Length:	1.673	Tangent:	0.839
Mid-Ord:	0.044	External:	0.044
Chord:	1.670	Course:	N 83° 34' 15.5891" E

Curve Point Data

Description	Station	Northing	Easting
PCC:	0+87.587	110.582	-210.431
RP:		155.505	-220.324
PCC:	1+29.909	136.162	-178.588

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	52° 42' 53.0052"	Type:	LEFT
Radius:	46.000		



Length: 42.322                      Tangent: 22.792  
 Mid-Ord: 4.782                      External: 5.337  
 Chord: 40.845                      Course: N 51° 13' 23.8643" E

Curve Point Data

Description	Station	Northing	Easting
PCC:	1+29.909	136.162	-178.588
RP:		139.526	-185.846
PT:	1+31.582	137.742	-178.048

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	11° 58' 50.4445"	Type:	LEFT
Radius:	8.000		
Length:	1.673	Tangent:	0.839
Mid-Ord:	0.044	External:	0.044
Chord:	1.670	Course:	N 18° 52' 32.1395" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	1+31.582	137.742	-178.048
End:	1+62.345	167.732	-171.188

Tangent Data

Parameter	Value	Parameter	Value
Length:	30.764	Course:	N 12° 53' 06.9173" E

Curve Point Data

Description	Station	Northing	Easting
-------------	---------	----------	---------

PC:	1+62.345	167.732	-171.188
RP:		169.516	-178.986
PT:	1+63.473	168.844	-171.014

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	08° 04' 22.2377"	Type:	LEFT
Radius:	8.000		
Length:	1.127	Tangent:	0.565
Mid-Ord:	0.020	External:	0.020
Chord:	1.126	Course:	N 08° 50' 55.7984" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	1+63.473	168.844	-171.014
End:	1+68.677	174.031	-170.578

Tangent Data

Parameter	Value	Parameter	Value
Length:	5.205	Course:	N 04° 48' 44.6795" E

Spiral Point Data

Description	Station	Northing	Easting
TS:	1+68.677	174.031	-170.578
SPI:		197.961	-168.563
SC:	2+04.727	209.153	-163.376

Spiral Curve Data: clothoid

Parameter	Value	Parameter	Value
Length:	36.050	L Tan:	24.181

Radius:	53.000	S Tan:	12.151
Theta:	19° 29' 09.4931"	P:	1.017
X:	35.635	K:	17.956
Y:	4.053	A:	43.711
Chord:	35.853	Course:	N 11° 35' 14.9889" E

Curve Point Data

Description	Station	Northing	Easting
SC:	2+04.727	209.153	-163.376
RP:		186.867	-115.290
CS:	2+45.565	236.351	-134.272

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	44° 08' 50.0354"	Type:	RIGHT
Radius:	53.000		
Length:	40.837	Tangent:	21.493
Mid-Ord:	3.885	External:	4.192
Chord:	39.835	Course:	N 46° 56' 22.3794" E

Spiral Point Data

Description	Station	Northing	Easting
CS:	2+45.565	236.351	-134.272
SPI:		240.768	-122.755
ST:	2+81.615	241.160	-98.743

Spiral Curve Data: clothoid

Parameter	Value	Parameter	Value
Length:	36.050	L Tan:	24.181

Radius:	53.000	S Tan:	12.151
Theta:	19° 29' 09.4931"	P:	1.017
X:	35.635	K:	17.956
Y:	4.053	A:	43.711
Chord:	35.853	Course:	N 82° 17' 29.7700" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	2+81.615	241.160	-98.743
End:	3+07.213	241.577	-73.148

Tangent Data

Parameter	Value	Parameter	Value
Length:	25.598	Course:	N 89° 04' 00.0793" E

**Alignment: os 1-Right-3.000**

**Description:**

Tangent Data

Description	PT Station	Northing	Easting
Start:	0+00.000	111.460	-298.318
End:	0+54.023	104.283	-244.774

Tangent Data

Parameter	Value	Parameter	Value
Length:	54.023	Course:	S 82° 21' 56.9509" E

Spiral Point Data

Description	Station	Northing	Easting
-------------	---------	----------	---------

TS:	0+54.023	104.283	-244.774
SPI:		101.093	-220.971
SC:	0+90.073	103.746	-208.925

Spiral Curve Data: clothoid

Parameter	Value	Parameter	Value
Length:	36.050	L Tan:	24.181
Radius:	53.000	S Tan:	12.151
Theta:	19° 29' 09.4931"	P:	1.017
X:	35.635	K:	17.956
Y:	4.053	A:	43.711
Chord:	35.853	Course:	S 89° 08' 27.2603" E

Curve Point Data

Description	Station	Northing	Easting
SC:	0+90.073	103.746	-208.925
RP:		155.505	-220.324
CS:	1+38.835	133.219	-172.237

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	52° 42' 53.0052"	Type:	LEFT
Radius:	53.000		
Length:	48.762	Tangent:	26.260
Mid-Ord:	5.510	External:	6.149
Chord:	47.061	Course:	N 51° 13' 23.8643" E

Spiral Point Data

Description	Station	Northing	Easting
-------------	---------	----------	---------

CS:	1+38.835	133.219	-172.237
SPI:		144.410	-167.050
ST:	1+74.885	168.341	-165.035

Spiral Curve Data: clothoid

Parameter	Value	Parameter	Value
Length:	36.050	L Tan:	24.181
Radius:	53.000	S Tan:	12.151
Theta:	19° 29' 09.4931"	P:	1.017
X:	35.635	K:	17.956
Y:	4.053	A:	43.711
Chord:	35.853	Course:	N 11° 35' 14.9889" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	1+74.885	168.341	-165.035
End:	1+80.090	173.527	-164.599

Tangent Data

Parameter	Value	Parameter	Value
Length:	5.205	Course:	N 04° 48' 44.6795" E

Curve Point Data

Description	Station	Northing	Easting
PC:	1+80.090	173.527	-164.599
RP:		172.856	-156.627
PT:	1+81.217	174.640	-164.426

Circular Curve Data

Parameter	Value	Parameter	Value
-----------	-------	-----------	-------

Delta:	08° 04' 22.2377"	Type:	RIGHT
Radius:	8.000		
Length:	1.127	Tangent:	0.565
Mid-Ord:	0.020	External:	0.020
Chord:	1.126	Course:	N 08° 50' 55.7984" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	1+81.217	174.640	-164.426
End:	2+11.981	204.629	-157.565

Tangent Data

Parameter	Value	Parameter	Value
Length:	30.764	Course:	N 12° 53' 06.9173" E

Curve Point Data

Description	Station	Northing	Easting
PC:	2+11.981	204.629	-157.565
RP:		202.845	-149.767
PCC:	2+13.654	206.209	-157.025

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	11° 58' 50.4445"	Type:	RIGHT
Radius:	8.000		
Length:	1.673	Tangent:	0.839
Mid-Ord:	0.044	External:	0.044
Chord:	1.670	Course:	N 18° 52' 32.1395" E

Curve Point Data

Description	Station	Northing	Easting
PCC:	2+13.654	206.209	-157.025
RP:		186.867	-115.290
PCC:	2+49.098	229.815	-131.765

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	44° 08' 50.0354"	Type:	RIGHT
Radius:	46.000		
Length:	35.444	Tangent:	18.654
Mid-Ord:	3.372	External:	3.638
Chord:	34.573	Course:	N 46° 56' 22.3794" E

---

Curve Point Data

Description	Station	Northing	Easting
PCC:	2+49.098	229.815	-131.765
RP:		222.346	-128.899
PT:	2+50.770	230.247	-130.152

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	11° 58' 50.4445"	Type:	RIGHT
Radius:	8.000		
Length:	1.673	Tangent:	0.839
Mid-Ord:	0.044	External:	0.044
Chord:	1.670	Course:	N 75° 00' 12.6193" E

---

Tangent Data



Description	PT Station	Northing	Easting
Start:	2+50.770	230.247	-130.152
End:	2+81.534	235.063	-99.767

Tangent Data

Parameter	Value	Parameter	Value
Length:	30.764	Course:	N 80° 59' 37.8416" E

Curve Point Data

Description	Station	Northing	Easting
PC:	2+81.534	235.063	-99.767
RP:		227.161	-98.515
PT:	2+82.661	235.160	-98.645

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	08° 04' 22.2377"	Type:	RIGHT
Radius:	8.000		
Length:	1.127	Tangent:	0.565
Mid-Ord:	0.020	External:	0.020
Chord:	1.126	Course:	N 85° 01' 48.9604" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	2+82.661	235.160	-98.645
End:	3+08.259	235.577	-73.051

Tangent Data

Parameter	Value	Parameter	Value
Length:	25.598	Course:	N 89° 04' 00.0793" E

## 6.2. KOORDINATNI RAČUN DETALJNIH TOČKA OSI

**Alignment Name: os 1**

**Description:**

**Station Range: Start: 0+000.00, End: 30+935.00**

**Station Increment: 20.00**

<b>Station</b>	<b>Northing</b>	<b>Easting</b>	<b>Tangential Direction</b>
0+000.00	114.4333m	-297.9195m	S82° 21' 57"E
0+020.00	111.7764m	-278.0968m	S82° 21' 57"E
0+040.00	109.1194m	-258.2740m	S82° 21' 57"E
0+060.00	106.4826m	-238.4487m	S82° 57' 02"E
0+080.00	105.4686m	-218.5029m	N86° 35' 15"E
0+100.00	110.1892m	-199.1942m	N65° 00' 07"E
0+120.00	121.9946m	-183.2152m	N42° 05' 01"E
0+140.00	139.0864m	-173.0839m	N19° 34' 14"E
0+160.00	158.6116m	-168.9615m	N6° 27' 28"E
0+180.00	178.5314m	-167.1778m	N5° 11' 06"E
0+200.00	198.2648m	-164.0775m	N14° 51' 23"E
0+220.00	216.2992m	-155.7089m	N36° 03' 41"E
0+240.00	229.7158m	-141.0566m	N58° 58' 47"E
0+260.00	236.4998m	-122.3643m	N79° 49' 42"E
0+280.00	238.0938m	-102.4493m	N88° 50' 09"E
0+300.00	238.4246m	-82.4520m	N89° 04' 00"E

### 6.3. RAČUN KOTA KOLNIKA

**Corridor Name: corridorNOVI**

**Description:**

**Base Alignment Name: os 1**

**Station Range: Start: 0+000.00, End: 0+309.35**

**CHAINAGE 0+000.00**

<b>POINT</b>	<b>X</b>	<b>Y</b>	<b>Z</b>	<b>OFFSET</b>	<b>STRING CUT</b>
1	-296.3504	126.1401	311.9132	-11.811m	Daylight
2	-297.3029	119.0339	319.0830	-4.642m	Hinge
3	-297.3030	119.0329	318.8830	-4.641m	EPS_Sub
4	-297.4357	118.0427	319.1230	-3.642m	Back_Curb
5	-297.4556	117.8941	319.1230	-3.492m	Top_Curb
6	-297.4612	117.8527	318.8980	-3.450m	Flowline_Gutter
7	-297.5210	117.4067	318.9250	-3.000m	ETW
8	-297.5210	117.4067	318.7250	-3.000m	ETW_SubBase
9	-298.3180	111.4599	318.8750	3.000m	ETW_SubBase
10	-298.3180	111.4599	319.0750	3.000m	ETW
11	-298.3778	111.0139	319.0480	3.450m	Flowline_Gutter
12	-298.3834	110.9726	319.2730	3.492m	Top_Curb
13	-298.4033	110.8239	319.2730	3.642m	Back_Curb
14	-298.5360	109.8338	319.1130	4.641m	EPS_Sub
15	-298.5361	109.8328	319.3130	4.642m	EPS
16	-298.6481	108.9976	320.9984	5.484m	Daylight

**CHAINAGE 0+020.00**

<b>POINT</b>	<b>X</b>	<b>Y</b>	<b>Z</b>	<b>OFFSET</b>	<b>STRING CUT</b>
1	-276.0964	126.7005	306.5985	-15.058m	Daylight
2	-277.4801	116.3769	317.0144	-4.642m	Hinge
3	-277.4803	116.3759	316.8144	-4.641m	EPS_Sub
4	-277.6130	115.3858	317.0544	-3.642m	Back_Curb
5	-277.6329	115.2371	317.0544	-3.492m	Top_Curb
6	-277.6384	115.1958	316.8294	-3.450m	Flowline_Gutter
7	-277.6982	114.7498	316.8564	-3.000m	Flange
8	-277.6982	114.7498	316.6564	-3.000m	ETW_SubBase
9	-278.4953	108.8030	317.0064	3.000m	Flange
10	-278.4953	108.8030	316.8064	3.000m	ETW_SubBase
11	-278.5551	108.3569	316.9794	3.450m	Flowline_Gutter
12	-278.5606	108.3156	317.2044	3.492m	Top_Curb
13	-278.5806	108.1669	317.2044	3.642m	Back_Curb
14	-278.7133	107.1768	317.0444	4.641m	EPS_Sub
15	-278.7134	107.1758	317.2444	4.642m	Hinge
16	-278.7211	107.1181	317.1862	4.700m	Daylight

**CHAINAGE 0+040.00**

<b>POINT</b>	<b>X</b>	<b>Y</b>	<b>Z</b>	<b>OFFSET</b>	<b>STRING CUT</b>
1	-256.2742	124.0398	304.5337	-15.054m	Daylight
2	-257.6574	113.7200	314.9458	-4.642m	Hinge
3	-257.6575	113.7190	314.7458	-4.641m	EPS_Sub
4	-257.7902	112.7288	314.9858	-3.642m	Back_Curb
5	-257.8102	112.5802	314.9858	-3.492m	Top_Curb
6	-257.8157	112.5388	314.7608	-3.450m	Flowline_Gutter
7	-257.8755	112.0928	314.5878	-3.000m	ETW_SubBase
8	-257.8755	112.0928	314.7878	-3.000m	Flange
9	-258.6726	106.1460	314.9378	3.000m	Flange
10	-258.6726	106.1460	314.7378	3.000m	ETW_SubBase
11	-258.7324	105.7000	314.9108	3.450m	Flowline_Gutter
12	-258.7379	105.6587	315.1358	3.492m	Top_Curb
13	-258.7578	105.5100	315.1358	3.642m	Back_Curb
14	-258.8905	104.5198	314.8958	4.641m	EPS_Sub
15	-258.8907	104.5189	315.0958	4.642m	EPS
16	-259.1620	102.4944	313.0532	6.684m	Daylight

**CHAINAGE 0+060.00**

<b>POINT</b>	<b>X</b>	<b>Y</b>	<b>Z</b>	<b>OFFSET</b>	<b>STRING CUT</b>
1	-236.7298	120.3828	304.2364	-14.006m	Daylight
2	-237.7879	111.8258	312.8586	-5.384m	Hinge
3	-237.7881	111.8248	312.6586	-5.383m	EPS_Sub
4	-237.9107	110.8333	312.8986	-4.384m	Back_Curb
5	-237.9291	110.6844	312.8986	-4.234m	Top_Curb
6	-237.9342	110.6431	312.6736	-4.192m	Flowline_Gutter
7	-237.9894	110.1965	312.5006	-3.742m	ETW_SubBase
8	-237.9894	110.1965	312.7006	-3.742m	Flange
9	-238.8168	103.5054	312.8692	3.000m	Flange
10	-238.8168	103.5054	312.6692	3.000m	ETW_SubBase
11	-238.8721	103.0588	312.8422	3.450m	Flowline_Gutter
12	-238.8772	103.0174	313.0672	3.492m	Top_Curb
13	-238.8956	102.8686	313.0672	3.642m	Back_Curb
14	-239.0182	101.8771	312.8272	4.641m	EPS_Sub
15	-239.0183	101.8761	313.0272	4.642m	EPS
16	-239.1937	100.4581	311.5983	6.070m	Daylight



**CHAINAGE 0+080.00**

<b>POINT</b>	<b>X</b>	<b>Y</b>	<b>Z</b>	<b>OFFSET</b>	<b>STRING CUT</b>
1	-219.0638	114.8743	307.8643	-9.422m	Daylight
2	-218.8913	111.9822	310.7615	-6.525m	Hinge
3	-218.8913	111.9812	310.5615	-6.524m	EPS_Sub
4	-218.8318	110.9840	310.8015	-5.525m	Back_Curb
5	-218.8229	110.8343	310.8015	-5.375m	Top_Curb
6	-218.8204	110.7926	310.5765	-5.333m	Flowline_Gutter
7	-218.7936	110.3434	310.6035	-4.883m	ETW
8	-218.7936	110.3434	310.4035	-4.883m	ETW_SubBase
9	-218.3243	102.4735	310.6006	3.000m	ETW_SubBase
10	-218.3243	102.4735	310.8006	3.000m	ETW
11	-218.2975	102.0243	310.7736	3.450m	Flowline_Gutter
12	-218.2951	101.9827	310.9986	3.492m	Top_Curb
13	-218.2861	101.8329	310.9986	3.642m	Back_Curb
14	-218.2267	100.8357	310.8386	4.641m	EPS_Sub
15	-218.2266	100.8347	311.0386	4.642m	EPS
16	-218.1219	99.0789	314.5564	6.401m	Daylight

**CHAINAGE 0+100.00**

<b>POINT</b>	<b>X</b>	<b>Y</b>	<b>Z</b>	<b>OFFSET</b>	<b>STRING CUT</b>
1	-201.9411	116.0804	310.5120	-6.500m	Daylight
2	-201.5783	115.3024	308.7951	-5.642m	EPS
3	-201.5779	115.3015	308.5951	-5.641m	EPS_Sub
4	-201.1558	114.3961	308.7551	-4.642m	Back_Curb
5	-201.0924	114.2601	308.7551	-4.492m	Top_Curb
6	-201.0748	114.2223	308.5301	-4.450m	Flowline_Gutter
7	-200.8846	113.8145	308.5571	-4.000m	ETW
8	-200.8846	113.8145	308.3571	-4.000m	ETW_SubBase
9	-197.9265	107.4702	308.5321	3.000m	ETW_SubBase
10	-197.9265	107.4702	308.7321	3.000m	ETW
11	-197.7363	107.0624	308.7051	3.450m	Flowline_Gutter
12	-197.7187	107.0246	308.9301	3.492m	Top_Curb
13	-197.6553	106.8886	308.9301	3.642m	Back_Curb
14	-197.2331	105.9832	308.7701	4.641m	EPS_Sub
15	-197.2327	105.9823	308.9701	4.642m	Hinge_Cut
16	-195.8068	102.9241	315.7188	8.016m	Daylight

**CHAINAGE 0+120.00**

<b>POINT</b>	<b>X</b>	<b>Y</b>	<b>Z</b>	<b>OFFSET</b>	<b>STRING CUT</b>
1	-187.5535	125.9122	306.8576	-5.845m	Daylight
2	-187.4023	125.7757	307.0612	-5.642m	Hinge
3	-187.4016	125.7750	306.8612	-5.641m	EPS_Sub
4	-186.6602	125.1055	307.1012	-4.642m	Back_Curb
5	-186.5488	125.0050	307.1012	-4.492m	Top_Curb
6	-186.5179	124.9770	306.8762	-4.450m	Flowline_Gutter
7	-186.1839	124.6754	306.9032	-4.000m	ETW
8	-186.1839	124.6754	306.7032	-4.000m	ETW_SubBase
9	-180.9887	119.9839	306.8782	3.000m	ETW_SubBase
10	-180.9887	119.9839	307.0782	3.000m	ETW
11	-180.6548	119.6823	307.0512	3.450m	Flowline_Gutter
12	-180.6238	119.6544	307.2762	3.492m	Top_Curb
13	-180.5125	119.5538	307.2762	3.642m	Back_Curb
14	-179.7711	118.8843	307.1162	4.641m	EPS_Sub
15	-179.7703	118.8836	307.3162	4.642m	EPS
16	-178.5125	117.7478	310.7057	6.336m	Daylight

**CHAINAGE 0+140.00**

<b>POINT</b>	<b>X</b>	<b>Y</b>	<b>Z</b>	<b>OFFSET</b>	<b>STRING CUT</b>
1	-179.5970	141.4018	305.4260	-6.912m	Daylight
2	-178.9371	141.1672	306.1264	-6.212m	Hinge
3	-178.9361	141.1669	305.9264	-6.211m	EPS_Sub
4	-177.9948	140.8323	306.1664	-5.212m	Back_Curb
5	-177.8535	140.7820	306.1664	-5.062m	Top_Curb
6	-177.8142	140.7681	305.9414	-5.020m	Flowline_Gutter
7	-177.3902	140.6173	305.9684	-4.570m	ETW
8	-177.3902	140.6173	305.7684	-4.570m	ETW_SubBase
9	-170.2578	138.0817	305.9577	2.999m	ETW_SubBase
10	-170.2578	138.0817	306.1577	2.999m	ETW
11	-169.8338	137.9310	306.1307	3.449m	Flowline_Gutter
12	-169.7945	137.9170	306.3557	3.491m	Top_Curb
13	-169.6532	137.8668	306.3557	3.641m	Back_Curb
14	-168.7119	137.5322	306.1957	4.640m	EPS_Sub
15	-168.7110	137.5318	306.3957	4.641m	EPS
16	-168.0838	137.3089	307.7269	5.307m	Daylight

**CHAINAGE 0+160.00**

<b>POINT</b>	<b>X</b>	<b>Y</b>	<b>Z</b>	<b>OFFSET</b>	<b>STRING CUT</b>
1	-175.5487	159.3572	306.9424	-6.629m	Daylight
2	-174.7963	159.2721	305.4280	-5.872m	EPS
3	-174.7953	159.2719	305.2280	-5.871m	EPS_Sub
4	-173.8026	159.1596	305.3880	-4.872m	Back_Curb
5	-173.6536	159.1427	305.3880	-4.722m	Top_Curb
6	-173.6122	159.1380	305.1630	-4.680m	Flowline_Gutter
7	-173.1650	159.0874	305.1900	-4.230m	ETW
8	-173.1650	159.0874	304.9900	-4.230m	ETW_SubBase
9	-165.9816	158.2743	305.1707	2.999m	ETW_SubBase
10	-165.9816	158.2743	305.3707	2.999m	ETW
11	-165.5344	158.2237	305.3437	3.449m	Flowline_Gutter
12	-165.4930	158.2190	305.5687	3.491m	Top_Curb
13	-165.3439	158.2022	305.5687	3.641m	Back_Curb
14	-164.3513	158.0898	305.4087	4.640m	EPS_Sub
15	-164.3503	158.0897	305.6087	4.641m	Hinge_Cut
16	-161.6800	157.7874	310.9835	7.328m	Daylight

**CHAINAGE 0+180.00**

<b>POINT</b>	<b>X</b>	<b>Y</b>	<b>Z</b>	<b>OFFSET</b>	<b>STRING CUT</b>
1	-172.1510	178.9826	305.5277	-4.994m	Daylight
2	-171.7994	178.9507	304.8217	-4.641m	EPS
3	-171.7984	178.9506	304.6217	-4.640m	EPS_Sub
4	-170.8035	178.8604	304.7817	-3.641m	Back_Curb
5	-170.6541	178.8468	304.7817	-3.491m	Top_Curb
6	-170.6126	178.8430	304.5567	-3.449m	Flowline_Gutter
7	-170.1645	178.8024	304.5837	-2.999m	ETW
8	-170.1645	178.8024	304.3837	-2.999m	ETW_SubBase
9	-163.6095	178.2076	304.2192	3.583m	ETW_SubBase
10	-163.6095	178.2076	304.4192	3.583m	ETW
11	-163.1614	178.1669	304.3922	4.033m	Flowline_Gutter
12	-163.1198	178.1631	304.6172	4.075m	Top_Curb
13	-162.9705	178.1496	304.6172	4.225m	Back_Curb
14	-161.9756	178.0593	304.4572	5.224m	EPS_Sub
15	-161.9746	178.0592	304.6572	5.225m	Hinge_Cut
16	-159.5695	177.8410	309.4870	7.640m	Daylight

**CHAINAGE 0+200.00**

<b>POINT</b>	<b>X</b>	<b>Y</b>	<b>Z</b>	<b>OFFSET</b>	<b>STRING CUT</b>
1	-168.7899	199.5149	304.5024	-4.875m	Daylight
2	-168.5639	199.4549	304.0348	-4.642m	EPS
3	-168.5630	199.4547	303.8348	-4.641m	EPS_Sub
4	-167.5973	199.1985	303.9948	-3.642m	Back_Curb
5	-167.4524	199.1601	303.9948	-3.492m	Top_Curb
6	-167.4121	199.1494	303.7698	-3.450m	Flowline_Gutter
7	-166.9771	199.0340	303.7968	-3.000m	ETW
8	-166.9771	199.0340	303.5968	-3.000m	ETW_SubBase
9	-159.3105	197.0003	303.3985	4.932m	ETW_SubBase
10	-159.3105	197.0003	303.5985	4.932m	ETW
11	-158.8756	196.8850	303.5715	5.382m	Flowline_Gutter
12	-158.8352	196.8743	303.7965	5.424m	Top_Curb
13	-158.6903	196.8358	303.7965	5.574m	Back_Curb
14	-157.7247	196.5797	303.6365	6.573m	EPS_Sub
15	-157.7237	196.5794	303.8365	6.574m	Hinge_Cut
16	-155.5861	196.0124	308.2595	8.785m	Daylight

**CHAINAGE 0+220.00**

<b>POINT</b>	<b>X</b>	<b>Y</b>	<b>Z</b>	<b>OFFSET</b>	<b>STRING CUT</b>
1	-159.5276	219.0799	303.4123	-4.724m	Daylight
2	-159.4612	219.0315	303.2478	-4.642m	EPS
3	-159.4604	219.0309	303.0478	-4.641m	EPS_Sub
4	-158.6528	218.4428	303.2078	-3.642m	Back_Curb
5	-158.5315	218.3546	303.2078	-3.492m	Top_Curb
6	-158.4978	218.3300	302.9828	-3.450m	Flowline_Gutter
7	-158.1340	218.0651	303.0098	-3.000m	ETW
8	-158.1340	218.0651	302.8098	-3.000m	ETW_SubBase
9	-152.4753	213.9445	302.6348	4.000m	ETW_SubBase
10	-152.4753	213.9445	302.8348	4.000m	ETW
11	-152.1116	213.6796	302.8078	4.450m	Flowline_Gutter
12	-152.0778	213.6551	303.0328	4.492m	Top_Curb
13	-151.9566	213.5668	303.0328	4.642m	Back_Curb
14	-151.1490	212.9787	302.8728	5.641m	EPS_Sub
15	-151.1482	212.9782	303.0728	5.642m	Hinge_Cut
16	-149.2483	211.5947	307.7734	7.992m	Daylight



**CHAINAGE 0+240.00**

<b>POINT</b>	<b>X</b>	<b>Y</b>	<b>Z</b>	<b>OFFSET</b>	<b>STRING CUT</b>
1	-144.2434	235.0153	300.8387	-6.184m	Daylight
2	-143.4487	233.6937	302.3809	-4.642m	Hinge
3	-143.4482	233.6928	302.1809	-4.641m	EPS_Sub
4	-142.9333	232.8367	302.4209	-3.642m	Back_Curb
5	-142.8560	232.7081	302.4209	-3.492m	Top_Curb
6	-142.8345	232.6724	302.1959	-3.450m	Flowline_Gutter
7	-142.6026	232.2867	302.2229	-3.000m	ETW
8	-142.6026	232.2867	302.0229	-3.000m	ETW_SubBase
9	-138.9952	226.2879	302.0479	4.000m	Flange
10	-138.9952	226.2879	301.8479	4.000m	ETW_SubBase
11	-138.7633	225.9022	302.0209	4.450m	Flowline_Gutter
12	-138.7419	225.8665	302.2459	4.492m	Top_Curb
13	-138.6646	225.7379	302.2459	4.642m	Back_Curb
14	-138.1497	224.8818	302.0859	5.641m	EPS_Sub
15	-138.1492	224.8809	302.2859	5.642m	Hinge_Cut
16	-136.8996	222.8028	307.1357	8.067m	Daylight

**CHAINAGE 0+260.00**

<b>POINT</b>	<b>X</b>	<b>Y</b>	<b>Z</b>	<b>OFFSET</b>	<b>STRING CUT</b>
1	-123.7574	244.2642	298.3464	-7.888m	Daylight
2	-123.1839	241.0678	301.5939	-4.641m	Hinge
3	-123.1837	241.0668	301.3939	-4.640m	EPS_Sub
4	-123.0073	240.0835	301.6339	-3.641m	Back_Curb
5	-122.9808	239.9359	301.6339	-3.491m	Top_Curb
6	-122.9734	239.8948	301.4089	-3.449m	Flowline_Gutter
7	-122.8940	239.4519	301.4359	-2.999m	ETW
8	-122.8940	239.4519	301.2359	-2.999m	ETW_SubBase
9	-121.4888	231.6201	301.2370	4.958m	Flange
10	-121.4888	231.6201	301.0370	4.958m	ETW_SubBase
11	-121.4093	231.1772	301.2100	5.408m	Flowline_Gutter
12	-121.4020	231.1361	301.4350	5.449m	Top_Curb
13	-121.3755	230.9885	301.4350	5.599m	Back_Curb
14	-121.1990	230.0052	301.2750	6.598m	EPS_Sub
15	-121.1989	230.0042	301.4750	6.599m	Hinge_Cut
16	-120.7280	227.3796	306.8080	9.266m	Daylight

**CHAINAGE 0+280.00**

<b>POINT</b>	<b>X</b>	<b>Y</b>	<b>Z</b>	<b>OFFSET</b>	<b>STRING CUT</b>
1	-102.6462	247.7816	295.7568	-9.690m	Daylight
2	-102.5436	242.7325	300.8069	-4.640m	Hinge
3	-102.5435	242.7315	300.6069	-4.639m	EPS_Sub
4	-102.5232	241.7327	300.8469	-3.640m	Back_Curb
5	-102.5202	241.5828	300.8469	-3.490m	Top_Curb
6	-102.5194	241.5411	300.6219	-3.448m	Flowline_Gutter
7	-102.5102	241.0912	300.6489	-2.998m	ETW
8	-102.5102	241.0912	300.4489	-2.998m	ETW_SubBase
9	-102.3793	234.6489	300.4878	3.446m	Flange
10	-102.3793	234.6489	300.2878	3.446m	ETW_SubBase
11	-102.3701	234.1990	300.4608	3.896m	Flowline_Gutter
12	-102.3693	234.1573	300.6858	3.937m	Top_Curb
13	-102.3662	234.0073	300.6858	4.087m	Back_Curb
14	-102.3460	233.0085	300.5258	5.086m	EPS_Sub
15	-102.3459	233.0075	300.7258	5.087m	Hinge_Cut
16	-102.3186	231.6633	303.4147	6.432m	Daylight

**CHAINAGE 0+300.00**

<b>POINT</b>	<b>X</b>	<b>Y</b>	<b>Z</b>	<b>OFFSET</b>	<b>STRING CUT</b>
1	-82.6029	247.6826	295.4024	-9.259m	Daylight
2	-82.5276	243.0657	300.0200	-4.642m	Hinge
3	-82.5276	243.0647	299.8200	-4.641m	EPS_Sub
4	-82.5114	242.0658	300.0600	-3.642m	Back_Curb
5	-82.5089	241.9159	300.0600	-3.492m	Top_Curb
6	-82.5082	241.8742	299.8350	-3.450m	Flowline_Gutter
7	-82.5009	241.4242	299.8620	-3.000m	ETW
8	-82.5009	241.4242	299.6620	-3.000m	ETW_SubBase
9	-82.4032	235.4250	299.7120	3.000m	Flange
10	-82.4032	235.4250	299.5120	3.000m	ETW_SubBase
11	-82.3958	234.9751	299.6850	3.450m	Flowline_Gutter
12	-82.3952	234.9334	299.9100	3.492m	Top_Curb
13	-82.3927	234.7834	299.9100	3.642m	Back_Curb
14	-82.3764	233.7845	299.7500	4.641m	EPS_Sub
15	-82.3764	233.7835	299.9500	4.642m	Hinge_Cut
16	-82.3583	232.6733	302.1708	5.752m	Daylight

## 6.4. VERTIKALNI TOK TRASE

**Vertical Alignment: NIVELETA**

**Description:**

**Station Range: Start: 0+000.00, End: 32+000.00**

PVI	Station	Grade Out	Curve Length
0.00	0+000.00	-10.34%	
1.00	0+115.61	-3.93%	31.782m
Vertical Curve Information:(sag curve) <hr/> PVC Station:      0+099.76    Elevation: 308.682m PVI Station:      0+115.61    Elevation: 307.042m PVT Station:      0+131.54    Elevation: 306.416m Low Point:        0+131.54    Elevation: 306.416m Grade in:         -10.34%    Grade out:    -3.93% Change:            6.41%    K: Curve Length:    31.782m Headlight Distance:			
2.00	0+320.00		

## 7. LITERATURA

1. Prof. dr. sc. Željko Korlaet, "Uvod u projektiranje i građenje cesta", Građevinski Fakultet Sveučilišta u Zagrebu, Zagreb, 1995.
2. Ministarstvo pomorstva, prometa i veza, "Pravilnik o osnovnim uvjetima kojima javne ceste izvan naselja i njihovi elementi moraju udovoljavati sa stajališta sigurnosti prometa", Narodne novine, Zagreb, 30. studenoga 2001.
3. Hrvatske ceste – Hrvatske autoceste, „Opći tehnički uvjeti za radove na cestama“, Institut građevinarstva Hrvatske, Zagreb, prosinac 2001.
4. Ministarstvo mora, turizma, prometa i razvitka, "Pravilnik o prometnim znakovima, signalizaciji i opremi na cestama", Narodne novine, Zagreb, 03. ožujka 2005