

# Idejni projekt lokalne ceste

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**Brčić, Marino**

**Undergraduate thesis / Završni rad**

**2022**

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UNIVERSITY OF SPLIT



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

# **ZAVRŠNI RAD**

**Marino Brčić**

**Split, 2022.**

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

## **Idejni projekt lokalne ceste**

**Završni rad**

**Split, 2022.**

## Idejni projekt lokalne ceste

### ***Sažetak:***

Idejni projekt ceste izvodi se na zadanoj geodetskoj podlozi u mjerilu 1 : 1000 koja prikazuje teren na kojoj se cesta projektira. Cesta se formira od točke A koja se nalazi na 319 metara nadmorske visine prema točki B koja se nalazi 299 metara nadmorske visine. Vrsta terena na kojem se polaže trasa je brdoviti. Cesta se projektira za prosječni godišnji dnevni promet koji iznosi 950 vozila/dan (PGDP). Predviđena projektna brzina je 40 km/h. Trasa kontinuirane ceste ima dužinu 318,69 m. 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:*** lokalna cesta, teren, krivina, kolnik, stacionaža, uzdužni presjek, poprečni presjek

## Conceptual project of local road

### ***Abstract:***

The preliminary design of the road is performed on a given geodetic base at a scale of 1: 1000, which shows the terrain on which the road is designed. The road is formed from point A located at 319 meters above sea level towards point B, which is located at 299 meters above sea level. The type of terrain on which the route is laid is hilly. The road is designed for an average annual daily traffic of 950 vehicles / day (PGDP). Estimated design speed is 40km / h. The route of the continuous road has a length of 318,69 m. The conceptual design was made according to the Ordinance and the basic conditions for the design of roads with elements that meet the applicable regulations, as well as safety and aesthetic criteria.

***Keywords:*** local road, terrain, curve, pavement, stationing, longitudinal section, cross section

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

Split, Matice hrvatske 15

STUDIJ: **PREDDIPLOMSKI SVEUČILIŠNI STUDIJ  
GRAĐEVINARSTVA**

KANDIDAT: Marino Brčić

MATIČNI BROJ (JMBAG): 0083224038

KATEDRA: **Katedra za prometnice**

PREDMET: Ceste

**ZADATAK ZA ZAVRŠNI RAD**

Tema: Idejni projekt lokalne ceste

Opis zadatka:

Uz pomoć programa za projektiranje cesta Autodesk AutoCAD Civil 3D potrebno je izraditi idejni projekt ceste na geodetskoj podlozi koja je korištena za izradu programa u okviru kolegija Ceste. Trasu treba položiti od točke A do točke B prema svim podacima iz programskog zadatka

Zadatak treba sadržavati:

1. Kopiju programskog zadatka
2. Tehnički opis
3. Građevinsku situaciju u M 1:1000
4. Uzdužni presjek u M 1:1000/100
5. Karakteristične poprečne presjeke
7. Računalne ispise koordinatnih točaka osi
8. Proračun količina zemljanih radova
9. Proračun količine radova po presjecima

U Splitu, srpanj 2022.

Voditelj Završnog rada:

Prof. dr.sc. Dražen Cvitanić

## SADRŽAJ

<b>1. PROGRAMSKI ZADATAK .....</b>	<b>2</b>
<b>2. TEHNIČKI OPIS .....</b>	<b>3</b>
2.1.OPĆENITO .....	3
2.2.HORIZONTALNI ELEMENTI.....	3
2.3.VERTIKALNI ELEMENTI .....	3
2.4.POPREČNI PRESJEK.....	3
2.5.KOLNIČKA KONSTRUKCIJA .....	3
2.6.OĐVODNJA.....	3
<b>3. GRAFIČKI PRILOZI .....</b>	<b>4</b>
3.1.SITUACIJA M 1:1000 .....	5
3.2.UZDUŽNI PRESJEK M 1.1000/100 .....	6
3.3.DIAGRAM VITOPERENJA .....	7
3.4.NORMALNI POPREČNI PRESJEK M 1:50 .....	8
3.5.KARAKTERISTIČNI POPREČNI PRESJECI .....	9
<b>4. TABLICA UKUPNOG VOLUMENA ZEMLJANIH RADOVA .....</b>	<b>10</b>
<b>5. OBRADA NA RAČUNALU .....</b>	<b>11</b>
<b>6. IZLAZNI PODACI PROGRAMA .....</b>	<b>12</b>
6.1.KOORDINATNI RAČUN GLAVNIH TOČAKA.....	13
6.2.KOORDINATNI RAČUN DETALJNIH TOČAKA .....	25
6.3.RAČUN KOTA KOLNIKA .....	26
6.4.VERTIKALNI TOK TRASE .....	34
<b>7. LITERATURA .....</b>	<b>35</b>

# **1. PROGRAMSKI ZADATAK**

Katedra za prometnice

Studij: Preddiplomski

Nastavni predmet: CESTE

Student/ica: ..... MARINO BRČIĆ .....

## 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: **brdoviti**.

Idejni projekt treba sadržavati:

1. Tehnički opis
2. Proračun horizontalne geometrije
3. Proračun proširenja kolnika u krivini (ukupno i po presjecima)
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
10. Predmjer radova
11. Aproksimativni troškovnik

Predmetna nastavnica:

  
izv.prof.dr.sc. Deana Breški



## 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 metara nadmorske visine, do točke B koja se nalazi na 299 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  $v_p = 40$  km/h.

Trasa konstruirane ceste ima dužinu od 318,69 m.

### 2.2. HORIZONTALNI ELEMENTI

Za odabranu projektnu brzinu  $v_p = 40$  km/h prema Pravilniku minimalni radijus horizontalne krivine iznosi 45 m, a minimalna prijelaznica 30 m.

Trasa se sastoji od tri pravca i dvije krivine.

Prva krivina ima radijus  $R = 50$  m, duljinu prijelaznice  $L = 30$  m, a druga krivina ima radijus  $R = 45$  m, duljinu prijelaznice  $L = 30$  m.

### 2.3. VERTIKALNI ELEMENTI

Maksimalni dozvoljeni nagib nivelete je 12%, dok je minimalni radijus vertikalne krivine je 300 m.

Nagib prvog pravca je  $S_1 = 6,71$  %, a drugog  $S_2 = 5,54$  %.

Tangenta je dužine 6,79 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 dužine 1,0 m minimalnog nagiba 4% i berma 5% dužine 1,0 m u usjeku. Na usjecima se izvode rigoli za odvodnju vode 0,65 m i drenaža koja je postavljena u mršavi beton. Cesta se u većem dijelu nalazi u zasjeku.

Poprečni nagib prve krivine je  $q_1 = 6,5\%$ , a druge krivine  $q_2 = 7\%$ . Nagibi usjeka su 2:1, dok su nagibi nasipa 1:1.5. U dijelu nasipa koriste se potporni zidovi.

### 2.5. KOLNIČKA KONSTRUKCIJA

Projektom je predviđena slijedeća kolnička konstrukcija:

-asfaltbeton habajući sloj	AC 11 surf BIT 50/70 AG4M4	4 cm
-bitumenizirani nosivi sloj	AC 22 base BIT 50/70 AG6M2	6 cm
-nevezivi nosivi sloj	MZNS (Tampon)	30 cm

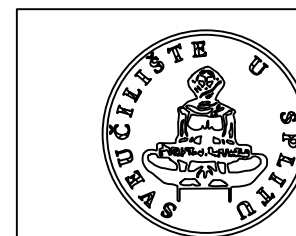
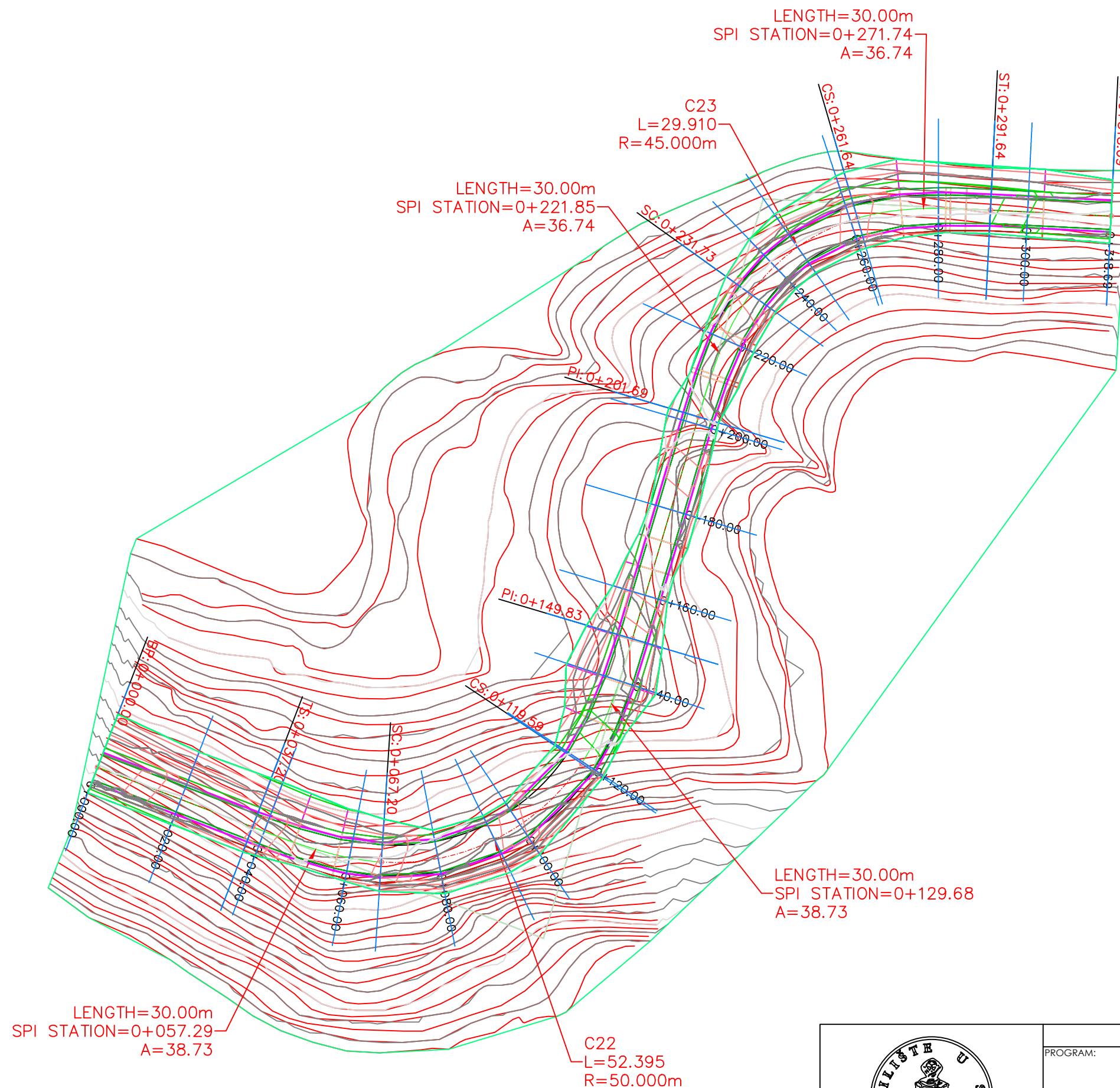
### 2.6. ODVODNJA

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

## **3. GRAFIČKI PRILOZI**

## **3.1. SITUACIJA**

# SITUACIJA M 1:1000



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 ARHITEKTURE I GEODEZIJE  
 21000 SPLIT, MATICE HRVATSKE 15

## ZAVRŠNI RAD

PROGRAM: IDEJNI PROJEKT LOKALNE CESTE

STUDENTI:  Marino Brčić	PREDMETNI NASTAVNIK	Prof.dr.sc. Dražen Cvitanić
	ASISTENT	Izv.prof.dr.sc. Deana Breški

SADRŽAJ:  SITUACIJA	MJERILO	1:1000
	PRILOG:	1

DATUM: 21.07.2022.

## **3.2. UZDUŽNI PRESJEK**

OS MARINO PROFILE



Stacionaža	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	
Kote nivelete			318.98	318.08	317.55	316.51	315.23	313.48	314.12	314.55	315.30	315.97	315.39	313.89	311.32	307.98	304.67	305.20	306.09	307.32	307.93	308.10	304.00	306.59	305.90	304.78	303.49	302.81	301.77	300.83	300.09	299.71	299.47	299.11		
Kote terena			318.98	318.08	317.55	316.51	315.23	313.48	314.12	314.55	315.30	315.97	315.39	313.89	311.32	307.98	304.67	305.20	306.09	307.32	307.93	308.10	304.00	306.59	305.90	304.78	303.49	302.81	301.77	300.83	300.09	299.71	299.47	299.11		
Horizontalni elementi			L = 37.20 S69° 00' 19"E	L: 30.00			R: 50.00 L: 52.40	L: 30.00	L = 0.23 N16° 34' 36"E	L = 51.86 N16° 34' 36"E	L = 0.04 N16° 34' 36"E	L: 30.00	R: 45.00 L: 29.91	L: 30.00	L = 0.04 L = 27.03 S89° 08' 51"E																					
Vitoperenje			-2.50% 0+037.20 2.50%	-6.50%	0+067.20 D: 6.50%	-6.50%	0+119.59 D: 6.50%	-6.50%	0+149.83 2.50%	-2.50% 0+172.76 2.50%	0.00%	-2.50% 0+201.69 2.50%	0.00%	7.00% 0+231.73 D: -7.00%	7.00%	-1.00% 0+261.64 D: -1.00%	0.00%	-2.50% 0+291.64 2.50%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	



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ARHITEKTURE I GEODEZIJE  
21000 SPLIT, MATICE HRVATSKE 15

**ZAVRŠNI RAD**

PROGRAM: IDEJNI PROJEKT LOKALNE CESTE

STUDENTI: Marino Brčić

PREDMETNI NASTAVNIK: Prof.dr.sc. Dražen Cvitanić

ASISTENT: Izv.prof.dr.sc. Deana Breški

SADRŽAJ: UZDUŽNI PRESJEK

MJERILO: 1:1000/100

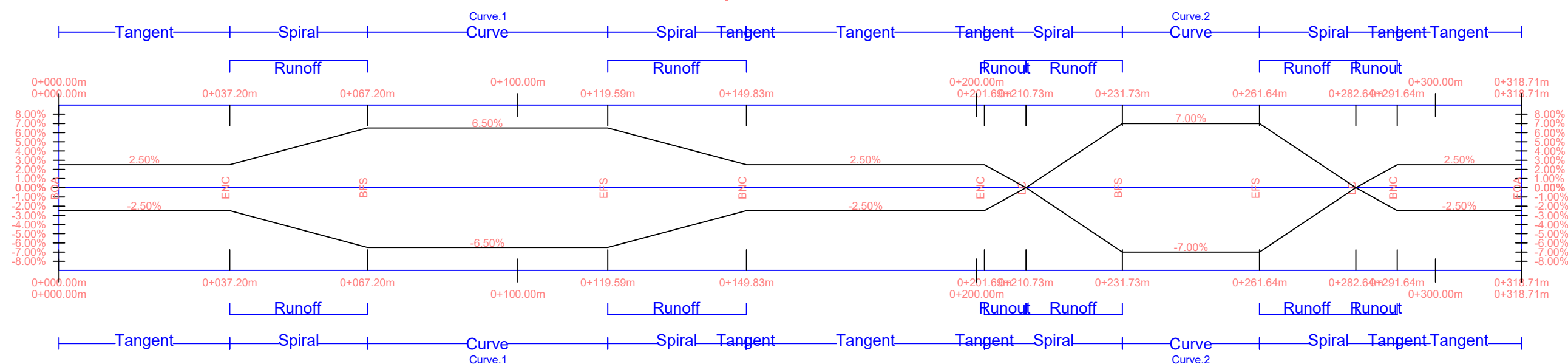
PRIOLOG: 2

DATUM: 21.07.2022.

### **3.3. DIJAGRAM VITOPERENJA**

# DIJAGRAM VITOPERENJA

## Superelevation



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ARHITEKTURE I GEODEZIJE  
21000 SPLIT, MATICE HRVATSKE 15

### ZAVRŠNI RAD

PROGRAM: IDEJNI PROJEKT LOKALNE CESTE

STUDENTI: Marino Brčić  
 PREDMETNI NASTAVNIK: Prof.dr.sc. Dražen Cvitanić  
 ASISTENT: Izv.prof.dr.sc. Deana Breški

SADRŽAJ: DIJAGRAM VITOPERENJA  
 MJERILO: 1:1000

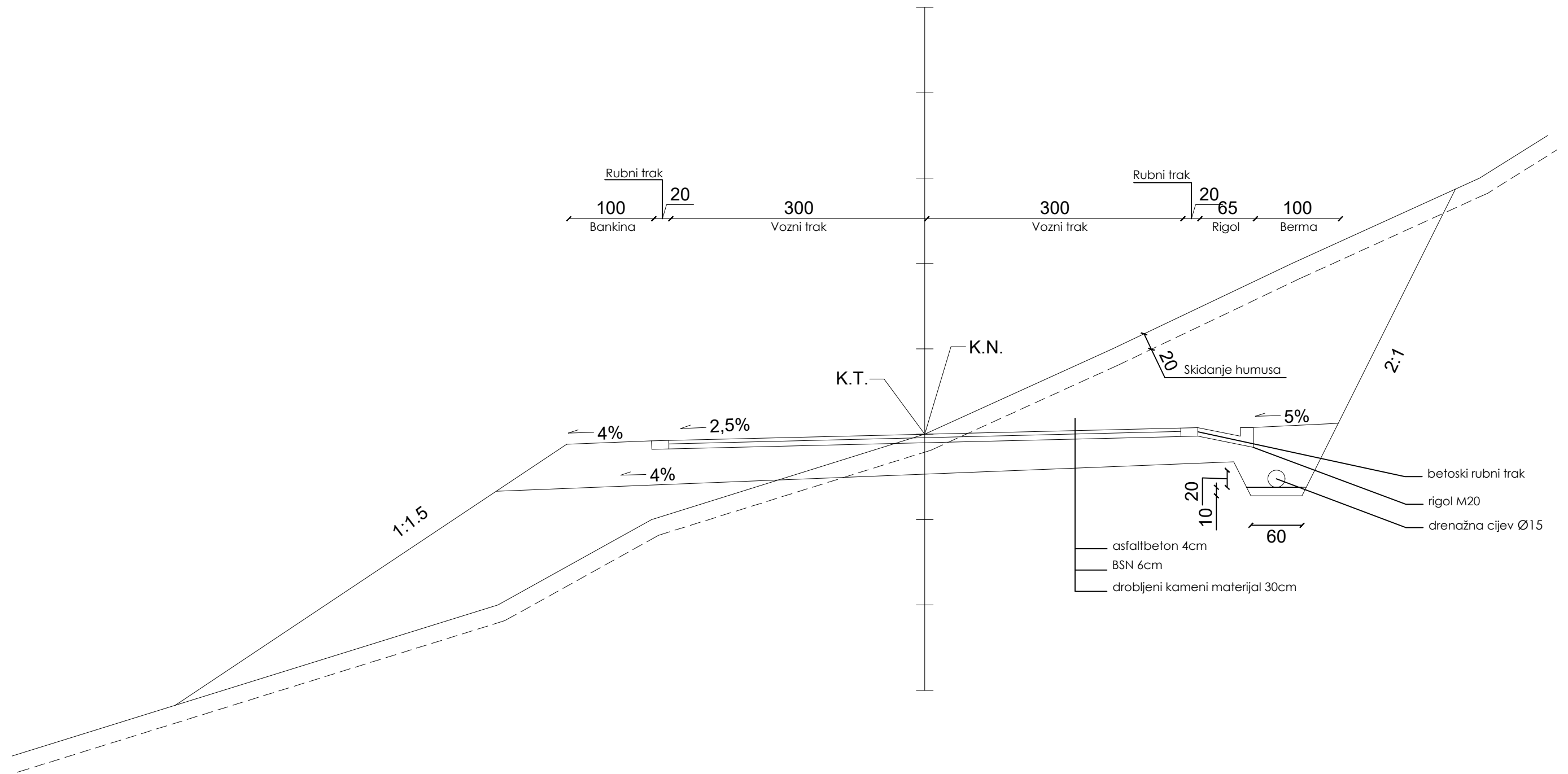
DATUM: 21.07.2022.

PRIOLOG: 3



## **3.4. NORMALNI POPREČNI PRESJEK**

NORMALNI POPREČNI  
PRESJEK  
M 1:50



 <p>SVEUČILIŠTE U SPLITU FAKULTET GRAĐEVINARSTVA, ARHITEKTURE I GEODEZIJE 21000 SPLIT, MATICE HRVATSKE 15</p>	<b>ZAVRŠNI RAD</b>		
	PROGRAM: IDEJNI PROJEKT LOKALNE CESTE		
	STUDENTI:  Marino Brčić	PREDMETNI NASTAVNIK	Prof.dr.sc. Dražen Cvitanić
		ASISTENT	Izv.prof.dr.sc. Deana Breški
	SADRŽAJ: NORMALNI POPREČNI PRESJEK	MJERILO	1:50
DATUM: 21.07.2022.	PRIOLOG:	<b>4</b>	

## **3.5. KARAKTERISTIČNI POPREČNI PRESJECI**

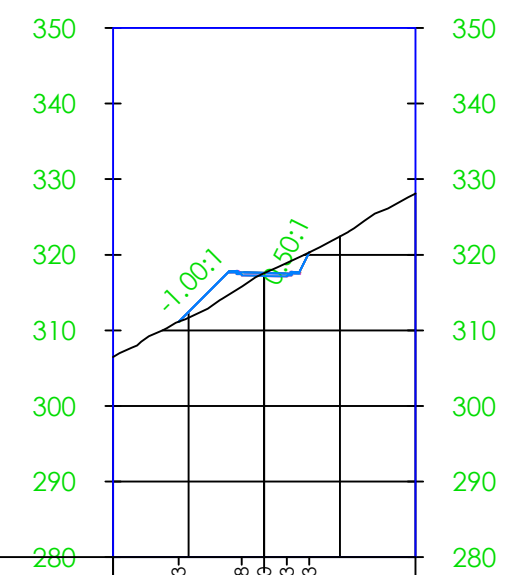
KARAKTERISTIČNI  
PRESJECI: 1-5  
M 1:1000

0+000.00



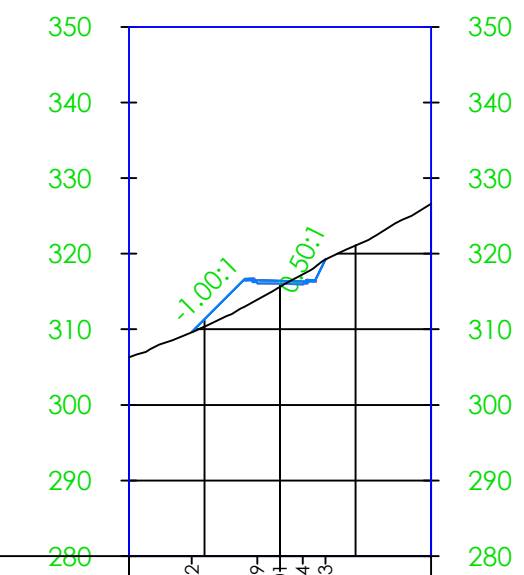
Kote projekta	311.11	311.11	318.66	318.66	318.58	318.51	322.01
Udaljenost od osi	-12.75	-3.00	0.00	3.00	6.12		
Kote terena	311.11	318.66	318.58	318.51	322.01		

0+020.00



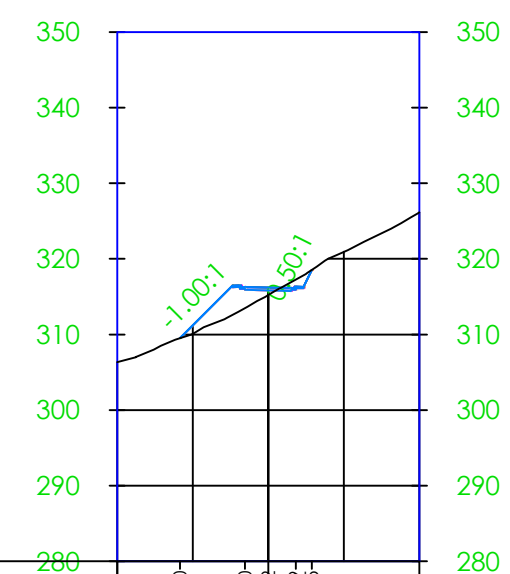
Kote projekta	311.13	317.28	317.20	317.13	320.33
Udaljenost od osi	-11.34	-3.00	0.00	3.00	5.97
Kote terena	311.13	317.28	317.20	317.13	320.33

0+037.20



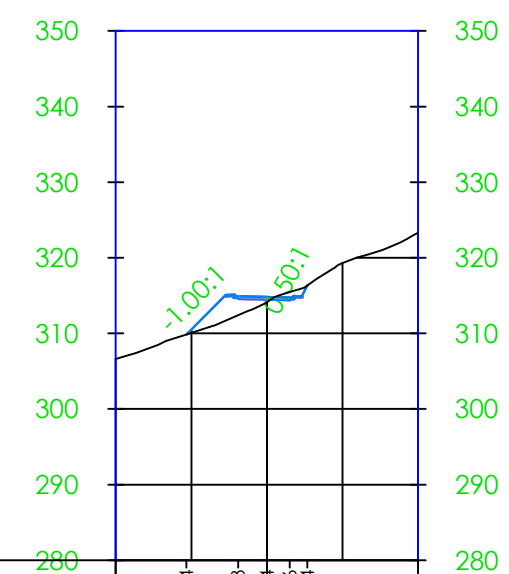
Kote projekta	309.62	316.09	316.01	315.94	319.23
Udaljenost od osi	-11.67	-3.00	0.00	3.00	6.01
Kote terena	309.62	316.09	316.01	315.94	319.23

0+040.00



Kote projekta	309.50	315.90	315.82	315.89	318.55
Udaljenost od osi	-11.70	-3.11	0.00	3.64	5.76
Kote terena	309.50	315.90	315.82	315.89	318.55

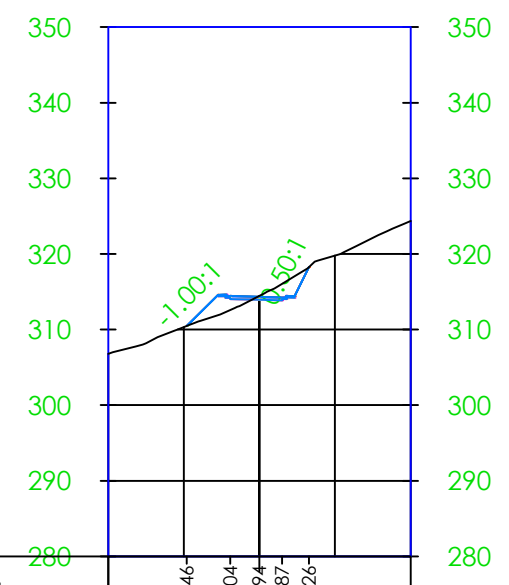
0+060.00



Kote projekta	309.84	314.53	314.44	314.36	316.34
Udaljenost od osi	-10.68	-3.79	0.00	3.00	5.35
Kote terena	309.84	314.53	314.44	314.36	316.34

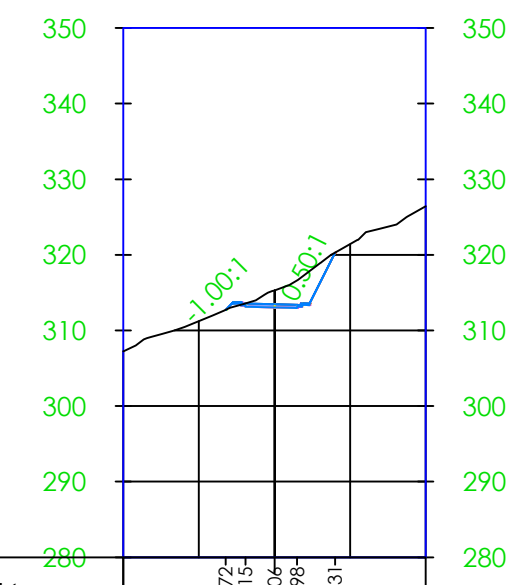
 SVEUČILIŠTE U SPLITU, FAKULTET GRAĐEVINARSTVA, ARHITEKTURE I GEODEZIJE 21000 SPLIT, MATICE HRVATSKE 15	<b>ZAVRŠNI RAD</b>	
	PROGRAM: IDEJNI PROJEKT LOKALNE CESTE	
STUDENTI:  <b>Marino Brčić</b>	PREDMETNI NASTAVNIK	Prof.dr.sc. Dražen Cvitanić
	ASISTENT	Izv.prof.dr.sc. Deana Breški
SADRŽAJ: Karakteristični presjeci: 1-5	MJERILO: 1:1000	PRIOLOG: <b>5</b>
DATUM: 21.07.2022.		

0+067.20



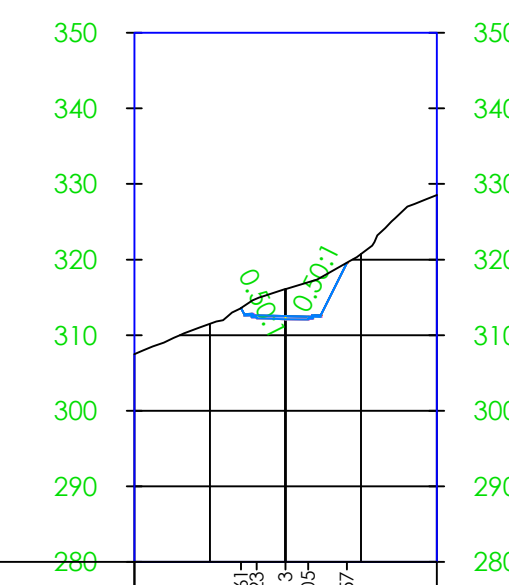
Kote projekta		310.46	310.46	314.04	313.94	313.87	318.26
Udaljenost od osi	-20.000	-9.61	-3.84	0.000	3.00	6.56	20.000
Kote terena		310.46	314.04	313.94	313.87	318.26	

0+080.00



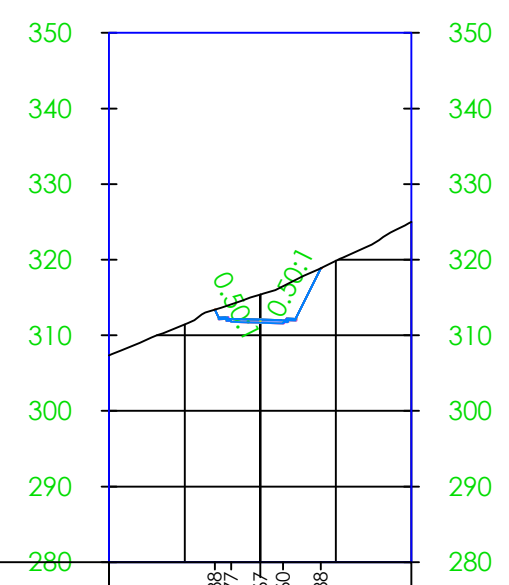
Kote projekta		312.72	313.15	313.06	312.98	320.31
Udaljenost od osi	-20.000	-6.48	-3.84	0.000	3.00	8.03
Kote terena		312.72	313.15	313.06	312.98	320.31

0+093.40



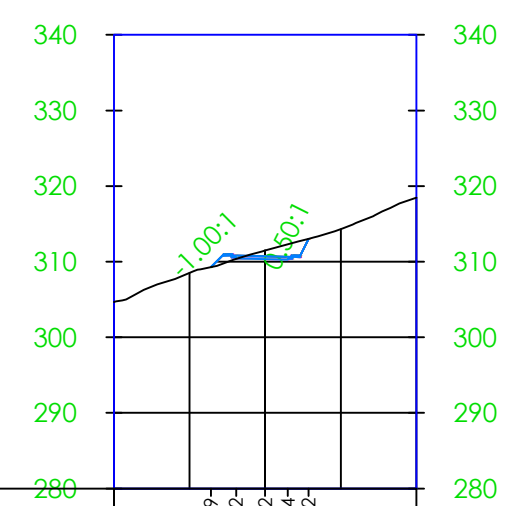
Kote projekta		313.61	312.23	312.13	312.05	319.57
Udaljenost od osi	-20.000	-5.89	-3.84	0.00	3.00	8.12
Kote terena		313.61	312.23	312.13	312.05	319.57

0+100.00



Kote projekta		313.38	311.77	311.67	311.60	318.88
Udaljenost od osi	-20.000	-6.01	-3.84	0.000	3.00	8.00
Kote terena		313.38	311.77	311.67	311.60	318.88

0+119.59



Kote projekta		309.29	310.42	310.32	310.24	313.02
Udaljenost od osi	-20.000	-7.17	-3.84	0.000	3.00	5.75
Kote terena		309.29	310.42	310.32	310.24	313.02

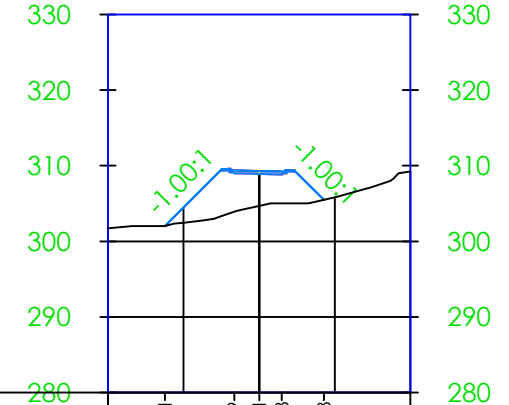
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	PROGRAM: IDEJNI PROJEKT LOKALNE CESTE		
	STUDENTI:  Marino Brčić	PREDMETNI NASTAVNIK	Prof.dr.sc. Dražen Cvitanić
		ASISTENT	Izv.prof.dr.sc. Deana Breški
SADRŽAJ: Karakteristični presjeci: 6-10	MJERILO: 1:1000	<b>5</b>	
DATUM: 21.07.2022.	PRILOG:		

0+120.00



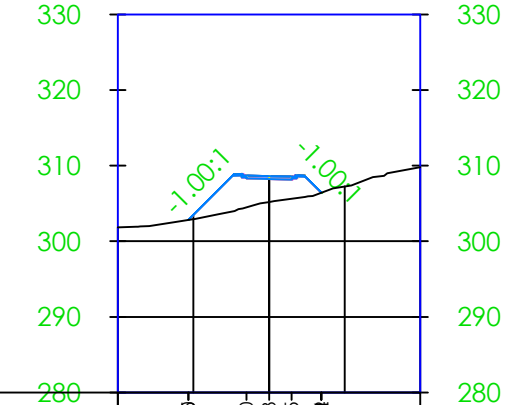
Kote projekta		309.13	309.13	310.39	310.39	310.29	310.22	312.87
Udaljenost od osi	20.000	-7.31	-3.86	0.00	3.00	5.69		20.000
Kote terena		309.13	310.39	310.29	310.22	312.87		

0+140.00



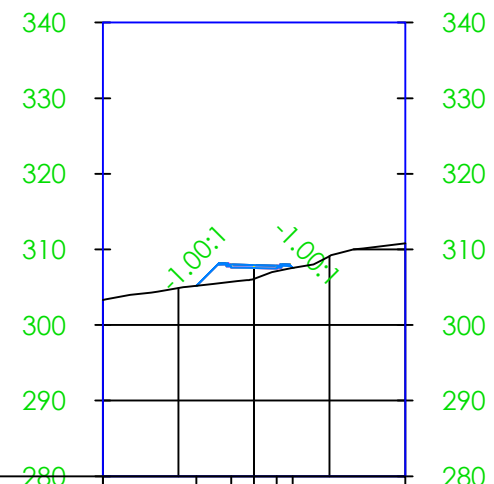
Kote projekta		302.01	308.99	308.91	308.98	305.48	
Udaljenost od osi	20.000	-12.46	-3.28	0.00	3.00	8.55	20.000
Kote terena		302.01	308.99	308.91	308.98	305.48	

0+149.83



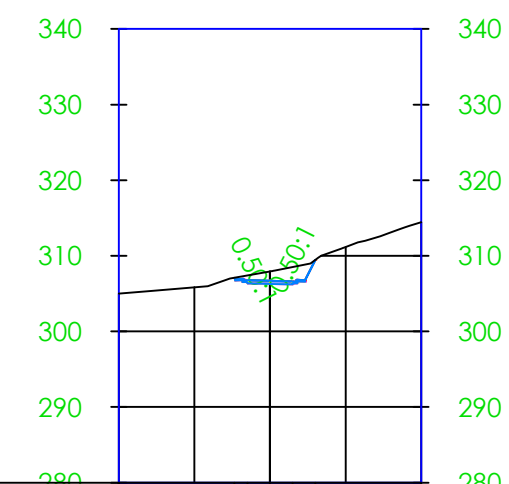
Kote projekta		302.86	308.30	308.23	308.15	306.48	
Udaljenost od osi	20.000	-10.76	-3.00	0.00	3.00	6.92	20.000
Kote terena		302.86	308.30	308.23	308.15	306.48	

0+160.00

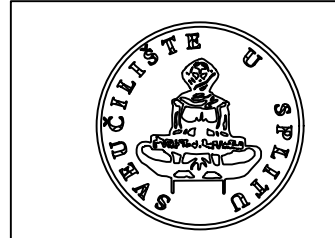


Kote projekta		305.19	307.60	307.53	307.45	307.53	
Udaljenost od osi	20.000	-7.61	-3.00	0.00	3.00	5.12	20.000
Kote terena		305.19	307.60	307.53	307.45	307.53	

0+180.00



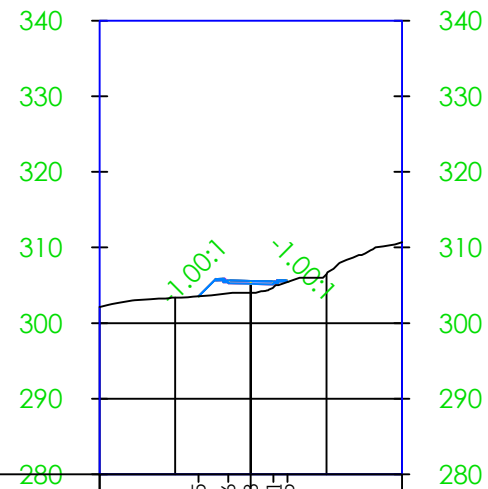
Kote projekta		307.10	307.30	306.29	306.21	309.46	
Udaljenost od osi	20.000	-4.76	-3.00	0.00	3.00	5.99	20.000
Kote terena		307.10	307.30	306.29	306.21	309.46	



SVEUČILIŠTE U SPLITU,  
FAKULTET GRAĐEVINARSTVA,  
ARHITEKTURE I GEODEZIJE  
21000 SPLIT, MATICE HRVATSKE 15

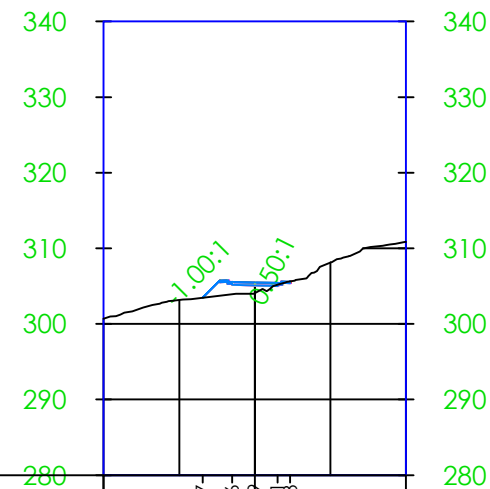
<b>ZAVRŠNI RAD</b>		
PROGRAM: IDEJNI PROJEKT LOKALNE CESTE		
STUDENTI:  Marino Brčić	PREDMETNI NASTAVNIK	Prof.dr.sc. Dražen Cvitanić
	ASISTENT	Izv.prof.dr.sc. Deana Breški
SADRŽAJ: Karakteristični presjeci 11-15	MJERILO: 1:1000	<b>5</b>
DATUM: 21.07.2022.	PRILOG:	

0+200.00



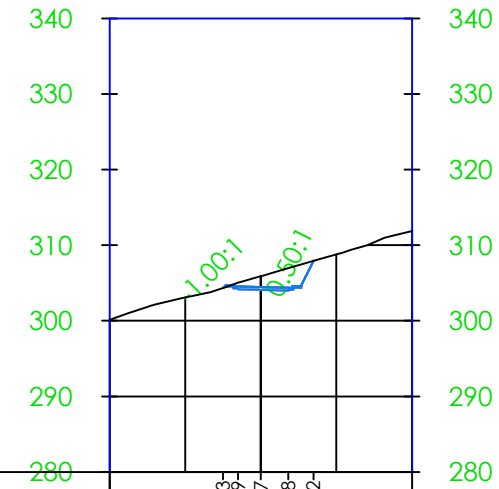
Kote projekta		303.55	303.55	305.26	305.18	305.11	305.45
Udaljenost od osi	20+000	-6.91	-3.00	0.000	3.00	4.86	20+000
Kote terena		303.55	305.26	305.18	305.11	305.45	

0+201.69



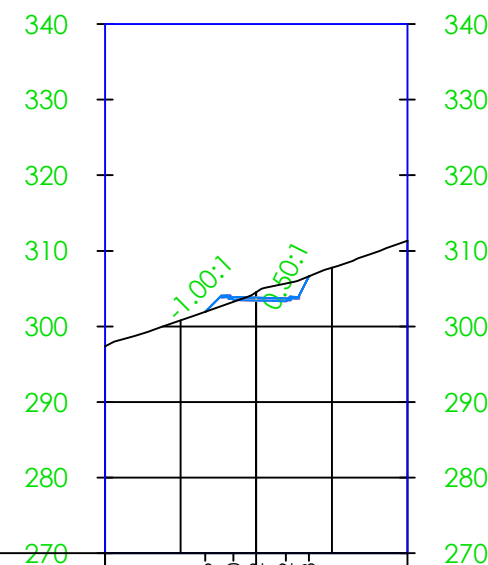
Kote projekta		303.47	303.47	305.16	305.09	305.01	305.83
Udaljenost od osi	20+000	-6.89	-3.00	0.000	3.00	4.67	20+000
Kote terena		303.47	305.16	305.09	305.01	305.83	

0+220.00



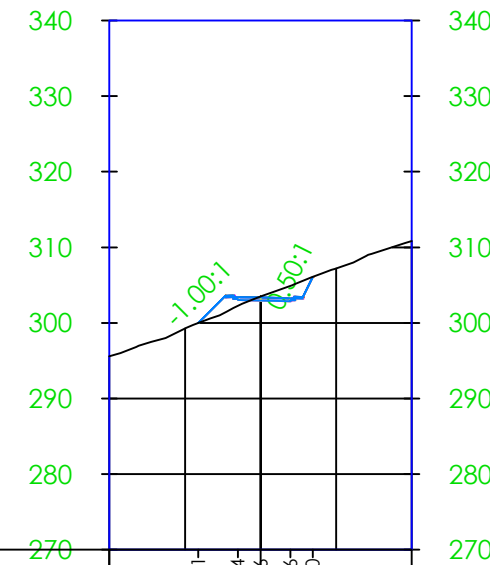
Kote projekta		304.33	304.33	304.28	304.07	303.98	307.92
Udaljenost od osi	20+000	-5.01	-3.00	0.00	3.65	6.98	20+000
Kote terena		304.33	304.28	304.07	303.98	307.92	

0+231.73



Kote projekta		301.96	301.96	303.50	303.42	303.32	306.63
Udaljenost od osi	20+000	-6.73	-3.00	0.000	3.93	6.95	20+000
Kote terena		301.96	303.50	303.42	303.32	306.63	

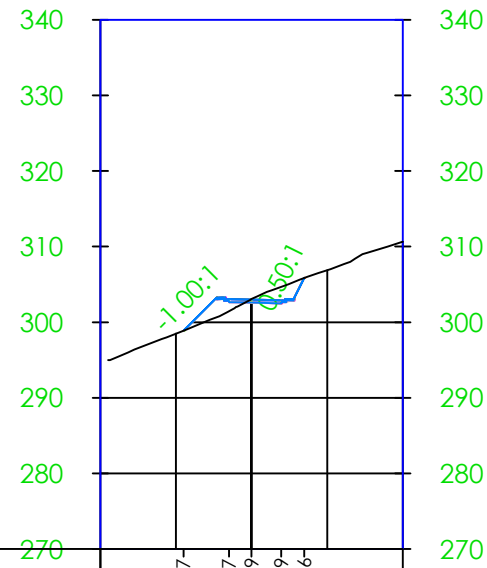
0+240.00



Kote projekta		300.01	300.01	303.04	302.96	302.86	306.10
Udaljenost od osi	20+000	-8.23	-3.00	0.000	3.93	6.91	20+000
Kote terena		300.01	303.04	302.96	302.86	306.10	

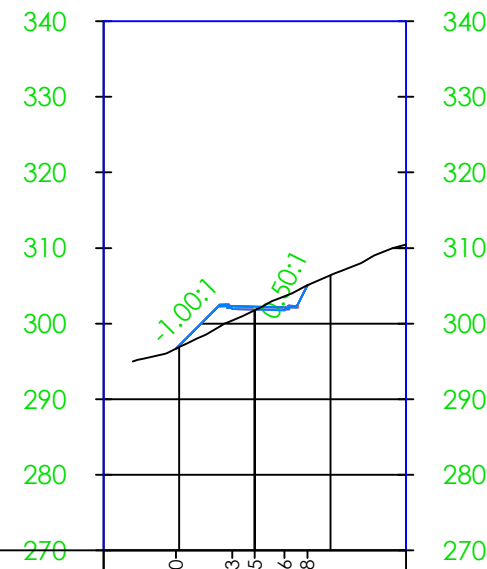
 SVEUČILIŠTE U SPLITU FAKULTET GRAĐEVINARSTVA, ARHITEKTURE I GEODEZIJE 21000 SPLIT, MATICE HRVATSKE 15	<b>ZAVRŠNI RAD</b>		
	PROGRAM: IDEJNI PROJEKT LOKALNE CESTE		
	STUDENTI:  Marino Brčić	PREDMETNI NASTAVNIK	Prof.dr.sc. Dražen Cvitanić
		ASISTENT	Izv.prof.dr.sc. Deana Breški
SADRŽAJ: Karakteristični presjeci 16-20	MJERILO: 1:1000	<b>5</b>	
DATUM: 21.07.2022.	PRIOLOG:		

0+246.68



Kote projekta		298.87	302.67	302.59	302.49	305.86	
Udaljenost od osi	20.000	-8.99	-3.00	0.00	3.93	6.98	20.000
Kote terena		298.87	302.67	302.59	302.49	305.86	

0+260.00



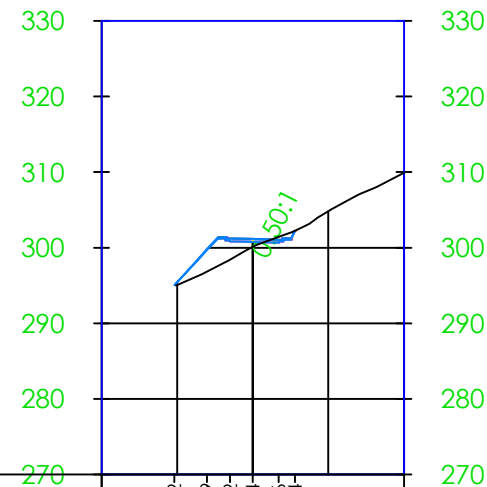
Kote projekta		296.70	301.93	301.85	301.76	305.08	
Udaljenost od osi	20.000	-10.43	-3.00	0.00	3.93	6.96	20.000
Kote terena		296.70	301.93	301.85	301.76	305.08	

0+261.64



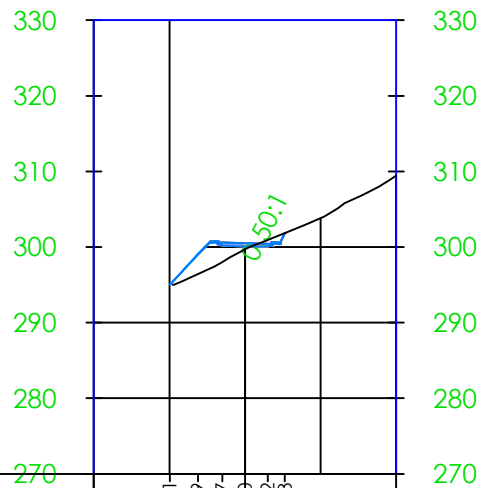
Kote projekta		296.36	301.84	301.76	301.66	305.01	
Udaljenost od osi	20.000	-10.68	-3.00	0.00	3.93	6.97	20.000
Kote terena		296.36	301.84	301.76	301.66	305.01	

0+280.00



Kote projekta		295.02	300.82	300.74	300.66	302.24	
Udaljenost od osi	20.000	-10.37	-6.05	0.00	3.43	5.58	20.000
Kote terena		295.02	300.82	300.74	300.66	302.24	

0+291.64



Kote projekta		295.01	300.17	300.10	300.02	301.83	
Udaljenost od osi	20.000	-9.94	-6.23	0.00	3.00	5.27	20.000
Kote terena		295.01	300.17	300.10	300.02	301.83	



SVEUČILIŠTE U SPLITU  
FAKULTET GRAĐEVINARSTVA,  
ARHITEKTURE I GEODEZIJE  
21000 SPLIT, MATICE HRVATSKE 15

ZAVRŠNI RAD

PROGRAM: IDEJNI PROJEKT LOKALNE CESTE

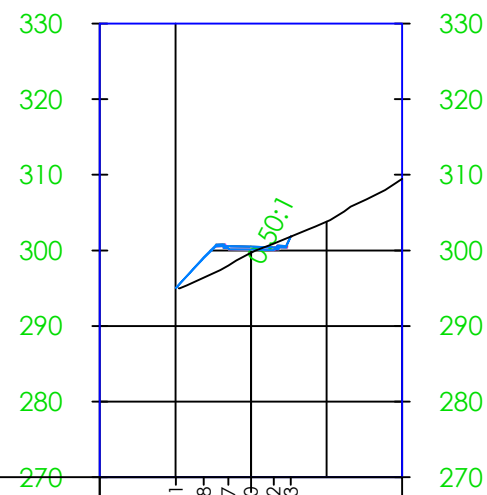
STUDENTI:  Marino Brčić	PREDMETNI NASTAVNIK	Prof.dr.sc. Dražen Cvitanić
	ASISTENT	Izv.prof.dr.sc. Deana Breški

SADRŽAJ: Karakteristični presjeci 21-25 MJERILO: 1:1000

DATUM: 21.07.2022.

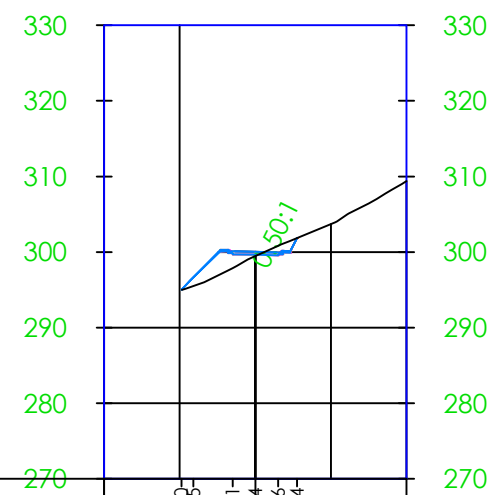


0+291.67



Kote projekta	295.01	295.01	298.98	300.17	300.10	300.02	301.83
Udaljenost od osi	-9.94	-6.24	-3.00	0.000	3.00	5.27	
Kote terena	295.01	298.98	300.17	300.10	300.02	301.83	

0+300.00



Kote projekta	295.00	295.00	299.71	299.64	299.56	301.84
Udaljenost od osi	-8.78	-3.00	0.000	3.00	5.50	
Kote terena	295.00	299.71	299.64	299.56	301.84	

0+318.69



Kote projekta	295.78	298.67	298.69	298.52	301.91
Udaljenost od osi	-8.10	-3.00	0.000	3.00	6.06
Kote terena	295.78	298.67	298.60	298.52	301.91



SVEUČILIŠTE U SPLITU  
FAKULTET GRAĐEVINARSTVA,  
ARHITEKTURE I GEODEZIJE  
21000 SPLIT, MATICE HRVATSKE 15

**ZAVRŠNI RAD**

PROGRAM: IDEJNI PROJEKT LOKALNE CESTE

STUDENTI:  Marino Brčić	PREDMETNI NASTAVNIK	Prof.dr.sc. Dražen Cvitanić
	ASISTENT	Izv.prof.dr.sc. Deana Breški

SADRŽAJ: Karakteristični presjeci 26-28

MJERILO: 1:1000  
PRILOG: 5

DATUM: 21.07.2022.

## **4. TABLICA UKUPNOG VOLUMENA ZEMLJANIH RADOVA**

### Total Volume Table

Station	Fill Area	Cut Area	Fill Volume	Cut Volume	Cumulative Fill Vol	Cumulative Cut Vol
0+000.00	17.50	8.68	0.00	0.00	0.00	0.00
0+020.00	16.93	7.79	344.30	164.74	344.30	164.74
0+037.20	22.03	5.27	335.05	112.35	679.36	277.10
0+040.00	23.94	4.25	64.36	13.34	743.76	290.44
0+060.00	18.61	3.70	406.20	81.92	1149.96	372.36
0+067.20	11.03	10.63	96.66	54.59	1246.62	426.95
0+080.00	0.56	27.63	66.21	258.99	1312.83	685.94
0+093.40	0.00	46.20	3.37	513.05	1316.20	1198.99
0+100.00	0.00	44.69	0.00	308.71	1316.20	1507.70
0+119.59	2.10	11.39	18.30	566.93	1334.50	2074.63
0+120.00	2.49	10.25	0.93	4.40	1335.43	2079.03
0+140.00	75.87	0.00	763.27	105.35	2098.71	2184.38
0+149.83	48.54	0.00	607.72	0.00	2706.42	2184.38
0+160.00	16.14	0.00	82.06	0.00	2788.53	2184.38
0+180.00	0.00	15.82	161.37	158.22	2949.90	2342.60
0+200.00	12.13	0.00	121.30	158.22	3071.20	2500.82
0+201.69	9.63	0.24	18.38	0.20	3089.58	2501.02
0+220.00	0.05	20.61	0.46	185.48	3090.05	2686.50
0+231.73	2.86	13.67	18.47	191.84	3108.52	2878.34
0+240.00	7.12	10.22	45.69	91.60	3154.21	2969.94
0+246.68	9.99	10.78	63.37	64.53	3217.58	3034.47
0+260.00	14.69	8.31	182.72	116.33	3400.30	3150.80
0+261.64	15.57	7.74	27.62	11.96	3427.92	3162.75
0+280.00	20.96	2.22	360.87	85.71	3788.79	3248.46
0+291.64	18.55	2.83	234.62	28.88	4023.40	3277.34
0+291.67	18.53	2.83	0.63	0.10	4024.07	3277.44
0+300.00	15.77	4.41	142.77	30.13	4166.85	3307.57
0+318.69	6.16	8.51	204.91	120.66	4371.76	3428.23

## 5. OBRADA NA RAČUNALU

Prilikom izrade predmetnog zadatka korišteno je računalo uz odgovarajući softver Autodesk AutoCAD Civil 3D. Postupak projektiranja trase na računalu sličan je ručnoj izradi rješenja, ali mnogo brži. Radu na računalu prethodi definiranje problema, uočavanje nedostataka te određivanje načina na koje bi se idejno rješenje kvalitetno izradilo.

Prvi korak pri izradi idejnog rješenja na računalu je digitaliziranje terena na temelju zadanih slojnica. Unošenjem slojnica u obliku 3D polilinja sa zadanim nadmorskim visinama pomoću kojih definiramo površinu odnosno trodimenzionalni model terena postojećeg stanja na području obuhvaćenim predmetnim zadatkom.

Nakon toga se unose koordinate točaka tangenti (po dvije za svaku tangentu) koje ih definiraju na terenu. Sjecišta tangenti definiramo ubacivanjem odgovarajućih kružnih lukova i prijelaznih krivina čime se dobija horizontalni tok ceste.

Sljedeći korak je izrada uzdužnog presjeka ceste. Linija terena se automatski generira iz zadane horizontalne osi ceste. Potrebno je definirati niveletu. Niveleta se postavlja tako da se u konačnici riješe geometrijski i sigurnosni elementi i odvodnja. Između tangenti se umeće kružna krivina radijusa prema potrebi.

Potrebno je definirati i poprečni profil prometnice. Poprečnim presjekom definirani su: poprečni nagib i širina kolnika te pokosi usjeka i nasipa.

Iz definirane osi trase, nivelete i poprečnog presjeka definiramo koridor. Ovime smo dobili poprečne presjeke u svim karakterističnim i zadanim točkama osi ceste a time i točke spajanja pokosa usjeka i nasipa sa terenom. Ovime smo definirali čitavu dionicu ceste u prostoru. Kao izlazni podaci dobiju se računalni ispisi koordinatnih točaka osi, točaka svakog poprečnog presjeka te količina zemljanih radova po presjeku.

## **6. IZLAZNI PODATCI IZ PROGRAMA**

## 6.1. KOORDINATNI RAČUN GLAVNIH TOČAKA

Alignment: OS\_MARINO

Description:

<u>Tangent Data</u>			
Description	PT Station	Northing	Easting
Start:	0+00.000	74.568	18.526
End:	0+37.198	61.240	53.255

<u>Tangent Data</u>			
Parameter	Value	Parameter	Value
Length:	37.198	Course:	S 69° 00' 19.4181" E

<u>Spiral Point Data</u>			
Description	Station	Northing	Easting
TS:	0+37.198	61.240	53.255
SPI:		54.041	72.016
SC:	0+67.198	53.371	82.081

<u>Spiral Curve Data: clothoid</u>			
Parameter	Value	Parameter	Value
Length:	30.000	L Tan:	20.095
Radius:	50.000	S Tan:	10.087
Theta:	17° 11' 19.4419"	P:	0.748
X:	29.731	K:	14.955
Y:	2.981	A:	38.730
Chord:	29.880	Course:	S 74° 43' 50.1489" E

<u>Curve Point Data</u>			
Description	Station	Northing	Easting
SC:	0+67.198	53.371	82.081
RP:		103.261	85.399
CS:	1+19.593	75.471	126.965

<u>Circular Curve Data</u>			
Parameter	Value	Parameter	Value
Delta:	60° 02' 25.4774"	Type:	LEFT
Radius:	50.000		
Length:	52.395	Tangent:	28.891
Mid-Ord:	6.708	External:	7.747
Chord:	50.031	Course:	N 63° 47' 08.4014" E

Spiral Point Data

Description	Station	Northing	Easting
CS:	1+19.593	75.471	126.965
SPI:		83.856	132.571
ST:	1+49.593	103.116	138.304

Spiral Curve Data: clothoid

Parameter	Value	Parameter	Value
Length:	30.000	L Tan:	20.095
Radius:	50.000	S Tan:	10.087
Theta:	17° 11' 19.4419"	P:	0.748
X:	29.731	K:	14.955
Y:	2.981	A:	38.730
Chord:	29.880	Course:	N 22° 18' 06.9517" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	1+49.593	103.116	138.304
End:	1+49.828	103.341	138.371

Tangent Data

Parameter	Value	Parameter	Value
Length:	0.235	Course:	N 16° 34' 36.2208" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	1+49.828	103.341	138.371
End:	2+01.692	153.049	153.168

Tangent Data

Parameter	Value	Parameter	Value
Length:	51.864	Course:	N 16° 34' 36.2208" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	2+01.692	153.049	153.168
End:	2+01.728	153.084	153.178

Tangent Data

Parameter	Value	Parameter	Value
Length:	0.036	Course:	N 16° 34' 36.2208" E

Spiral Point Data

Description	Station	Northing	Easting
TS:	2+01.728	153.084	153.178
SPI:		172.366	158.918
SC:	2+31.728	180.576	164.812

Spiral Curve Data: clothoid

Parameter	Value	Parameter	Value
Length:	30.000	L Tan:	20.118
Radius:	45.000	S Tan:	10.107
Theta:	19° 05' 54.9354"	P:	0.830
X:	29.668	K:	14.945
Y:	3.307	A:	36.742
Chord:	29.852	Course:	N 22° 56' 12.9169" E

Curve Point Data

Description	Station	Northing	Easting
SC:	2+31.728	180.576	164.812
RP:		154.333	201.367
CS:	2+61.638	197.536	188.781

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	38° 04' 55.2495"	Type:	RIGHT
Radius:	45.000		
Length:	29.910	Tangent:	15.531
Mid-Ord:	2.462	External:	2.605
Chord:	29.362	Course:	N 54° 42' 58.7810" E

Spiral Point Data

Description	Station	Northing	Easting
CS:	2+61.638	197.536	188.781
SPI:		200.363	198.484
ST:	2+91.638	199.361	218.577

Spiral Curve Data: clothoid

Parameter	Value	Parameter	Value
Length:	30.000	L Tan:	20.118
Radius:	45.000	S Tan:	10.107
Theta:	19° 05' 54.9354"	P:	0.830
X:	29.668	K:	14.945
Y:	3.307	A:	36.742
Chord:	29.852	Course:	N 86° 29' 44.6451" E



Tangent Data

Description	PT Station	Northing	Easting
Start:	2+91.638	199.361	218.577
End:	2+91.674	199.359	218.613

Tangent Data

Parameter	Value	Parameter	Value
Length:	0.036	Course:	S 87° 08' 38.6588" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	2+91.674	199.359	218.613
End:	3+18.706	198.014	245.612

Tangent Data

Parameter	Value	Parameter	Value
Length:	27.032	Course:	S 87° 08' 51.1171" E

Alignment: OS MARINO-Left-3.000

Description:

Tangent Data

Description	PT Station	Northing	Easting
Start:	0+00.000	77.369	19.601
End:	0+37.198	64.041	54.330

Tangent Data

Parameter	Value	Parameter	Value
Length:	37.198	Course:	S 69° 00' 19.4181" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	0+37.198	64.041	54.330
End:	0+47.095	60.861	63.703

Tangent Data

Parameter	Value	Parameter	Value
Length:	9.897	Course:	S 71° 15' 34.3648" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	0+47.095	60.861	63.703
End:	0+56.752	58.380	73.035

Tangent Data

Parameter	Value	Parameter	Value
Length:	9.656	Course:	S 75° 06' 35.6458" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	0+56.752	58.380	73.035
End:	0+66.127	57.203	82.335

Tangent Data

Parameter	Value	Parameter	Value
Length:	9.375	Course:	S 82° 47' 08.2274" E

Curve Point Data

Description	Station	Northing	Easting
PC:	0+66.127	57.203	82.335
RP:		103.261	85.399
PT:	1+14.498	77.606	123.773

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	60° 02' 25.4774"	Type:	LEFT
Radius:	46.160		
Length:	48.371	Tangent:	26.672
Mid-Ord:	6.192	External:	7.152
Chord:	46.188	Course:	N 63° 47' 08.4014" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	1+14.498	77.606	123.773
End:	1+23.873	85.695	128.511

Tangent Data

Parameter	Value	Parameter	Value
Length:	9.375	Course:	N 30° 21' 25.0302" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	1+23.873	85.695	128.511
End:	1+33.529	94.605	132.235

Tangent Data

Parameter	Value	Parameter	Value
Length:	9.656	Course:	N 22° 40' 52.4486" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	1+33.529	94.605	132.235
End:	1+43.427	103.972	135.429

Tangent Data

Parameter	Value	Parameter	Value
Length:	9.897	Course:	N 18° 49' 51.1676" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	1+43.427	103.972	135.429
End:	1+43.661	104.197	135.496

Tangent Data

Parameter	Value	Parameter	Value
Length:	0.235	Course:	N 16° 34' 36.2208" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	1+43.661	104.197	135.496
End:	1+95.525	153.905	150.293

Tangent Data

Parameter	Value	Parameter	Value
Length:	51.864	Course:	N 16° 34' 36.2208" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	1+95.525	153.905	150.293
End:	1+95.561	153.940	150.303

Tangent Data

Parameter	Value	Parameter	Value
Length:	0.036	Course:	N 16° 34' 36.2208" E

Spiral Point Data

Description	Station	Northing	Easting
TS:	1+95.561	153.940	150.303
SPI:		173.705	156.187
SC:	2+26.561	182.326	162.375

Spiral Curve Data: clothoid

Parameter	Value	Parameter	Value
Length:	31.000	L Tan:	20.781
Radius:	48.000	S Tan:	10.437
Theta:	18° 30' 06.3437"	P:	0.831
X:	30.678	K:	15.446
Y:	3.312	A:	38.575
Chord:	30.846	Course:	N 23° 02' 23.2016" E

Curve Point Data

Description	Station	Northing	Easting
SC:	2+26.561	182.326	162.375
RP:		154.333	201.367
CS:	2+58.465	200.417	187.942

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	38° 04' 55.2495"	Type:	RIGHT
Radius:	48.000		
Length:	31.904	Tangent:	16.566
Mid-Ord:	2.626	External:	2.778
Chord:	31.320	Course:	N 54° 42' 58.7810" E

Spiral Point Data

Description	Station	Northing	Easting
CS:	2+58.465	200.417	187.942
SPI:		203.385	198.130
ST:	2+89.465	202.357	218.726

Spiral Curve Data: clothoid

Parameter	Value	Parameter	Value
Length:	31.000	L Tan:	20.781
Radius:	48.000	S Tan:	10.437
Theta:	18° 30' 06.3437"	P:	0.831
X:	30.678	K:	15.446
Y:	3.312	A:	38.575
Chord:	30.846	Course:	N 86° 23' 34.3604" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	2+89.465	202.357	218.726
End:	2+89.501	202.355	218.763

Tangent Data

Parameter	Value	Parameter	Value
Length:	0.036	Course:	S 87° 08' 38.6588" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	2+89.501	202.355	218.763
End:	3+16.533	201.010	245.761

Tangent Data

Parameter	Value	Parameter	Value
Length:	27.032	Course:	S 87° 08' 51.1171" E

Alignment: OS MARINO-Right-3.000

Description:

Tangent Data

Description	PT Station	Northing	Easting
Start:	0+00.000	71.767	17.452
End:	0+37.198	58.440	52.180

Tangent Data

Parameter	Value	Parameter	Value
Length:	37.198	Course:	S 69° 00' 19.4181" E

Spiral Point Data

Description	Station	Northing	Easting
TS:	0+37.198	58.440	52.180
SPI:		51.077	71.365
SC:	0+68.098	50.378	81.881

Spiral Curve Data: clothoid

Parameter	Value	Parameter	Value
Length:	30.900	L Tan:	20.692
Radius:	53.000	S Tan:	10.384
Theta:	16° 42' 08.1369"	P:	0.748
X:	30.638	K:	15.406
Y:	2.984	A:	40.469
Chord:	30.776	Course:	S 74° 48' 50.9512" E

Curve Point Data

Description	Station	Northing	Easting
SC:	0+68.098	50.378	81.881
RP:		103.261	85.399
CS:	1+23.637	73.804	129.459

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	60° 02' 25.4774"	Type:	LEFT
Radius:	53.000		
Length:	55.539	Tangent:	30.624
Mid-Ord:	7.110	External:	8.212
Chord:	53.032	Course:	N 63° 47' 08.4014" E

Spiral Point Data

Description	Station	Northing	Easting
CS:	1+23.637	73.804	129.459
SPI:		82.566	135.317
ST:	1+54.537	102.260	141.180

Spiral Curve Data: clothoid

Parameter	Value	Parameter	Value
Length:	30.900	L Tan:	20.692
Radius:	53.000	S Tan:	10.384
Theta:	16° 42' 08.1369"	P:	0.748
X:	30.638	K:	15.406
Y:	2.984	A:	40.469
Chord:	30.776	Course:	N 22° 23' 07.7539" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	1+54.537	102.260	141.180
End:	1+54.772	102.485	141.247

Tangent Data

Parameter	Value	Parameter	Value
Length:	0.235	Course:	N 16° 34' 36.2208" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	1+54.772	102.485	141.247
End:	2+06.636	152.194	156.043

Tangent Data

Parameter	Value	Parameter	Value
Length:	51.864	Course:	N 16° 34' 36.2208" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	2+06.636	152.194	156.043
End:	2+06.672	152.228	156.054

Tangent Data

Parameter	Value	Parameter	Value
Length:	0.036	Course:	N 16° 34' 36.2208" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	2+06.672	152.228	156.054
End:	2+16.557	161.571	159.286

Tangent Data

Parameter	Value	Parameter	Value
Length:	9.885	Course:	N 19° 04' 58.6817" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	2+16.557	161.571	159.286
End:	2+26.170	170.395	163.098

Tangent Data

Parameter	Value	Parameter	Value
Length:	9.613	Course:	N 23° 21' 56.3404" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	2+26.170	170.395	163.098
End:	2+35.460	178.282	168.008

Tangent Data

Parameter	Value	Parameter	Value
Length:	9.290	Course:	N 31° 54' 01.4577" E

Curve Point Data

Description	Station	Northing	Easting
PC:	2+35.460	178.282	168.008
RP:		154.333	201.367
PT:	2+62.756	193.760	189.881

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	38° 04' 55.2495"	Type:	RIGHT
Radius:	41.067		
Length:	27.295	Tangent:	14.173
Mid-Ord:	2.247	External:	2.377
Chord:	26.796	Course:	N 54° 42' 58.7810" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	2+62.756	193.760	189.881
End:	2+72.046	195.766	198.952

Tangent Data

Parameter	Value	Parameter	Value
Length:	9.290	Course:	N 77° 31' 56.1043" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	2+72.046	195.766	198.952
End:	2+81.659	196.425	208.542

Tangent Data

Parameter	Value	Parameter	Value
Length:	9.613	Course:	N 86° 04' 01.2216" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	2+81.659	196.425	208.542
End:	2+91.544	196.365	218.427

Tangent Data

Parameter	Value	Parameter	Value
Length:	9.885	Course:	S 89° 39' 01.1197" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	2+91.544	196.365	218.427
End:	2+91.581	196.363	218.464

Tangent Data

Parameter	Value	Parameter	Value
Length:	0.036	Course:	S 87° 08' 38.6588" E



Tangent Data

<b>Description</b>	<b>PT Station</b>	<b>Northing</b>	<b>Easting</b>
Start:	2+91.581	196.363	218.464
End:	3+18.613	195.018	245.463

Tangent Data

<b>Parameter</b>	<b>Value</b>	<b>Parameter</b>	<b>Value</b>
Length:	27.032	Course:	S 87° 08' 51.1171" E

## 6.2. KOORDINATNI RAČUN DETALJNIH TOČAKA OSI

Alignment Name: OS MARINO

Description:

Station Range: Start: 0+000.00, End: 0+318.69

Station Increment: 20.00

Station	Northing	Easting	Tangential Direction
0+000.00	74.5678m	18.5263m	S69° 00' 19"E
0+020.00	67.4022m	37.1986m	S69° 00' 19"E
0+040.00	60.2389m	55.8718m	S69° 09' 19"E
0+060.00	54.3227m	74.9503m	S78° 56' 06"E
0+080.00	54.1571m	94.8231m	N79° 08' 10"E
0+100.00	61.7031m	113.2012m	N56° 13' 04"E
0+120.00	75.8102m	127.1899m	N33° 18' 10"E
0+140.00	93.9505m	135.4737m	N18° 20' 04"E
0+160.00	113.0904m	141.2734m	N16° 34' 36"E
0+180.00	132.2592m	146.9794m	N16° 34' 36"E
0+200.00	151.4279m	152.6854m	N16° 34' 36"E
0+220.00	170.3553m	159.1045m	N23° 39' 41"E
0+240.00	186.8157m	170.2251m	N46° 12' 26"E
0+260.00	197.0498m	187.2170m	N71° 40' 20"E
0+280.00	199.7464m	206.9469m	N89° 58' 55"E
0+300.00	198.9449m	226.9289m	S87° 08' 51"E
0+318.69	198.0148m	245.5957m	S87° 08' 51"E

### 6.3. RAČUN KOTA KOLNIKA

Corridor Name: KORIDOR MARINO

Description:

Base Alignment Name: OS MARINO

Station Range: Start: 0+000.00, End: 0+318.69

#### CHAINAGE 0+000.00

POINT	X	Y	Z	OFFSET	STRING CUT
1	23.0929	86.4675	311.1137	-12.746m	Daylight
2	20.1894	78.9014	319.2179	-4.642m	Hinge
3	20.1890	78.9005	319.0179	-4.641m	EPS_Sub
4	19.8311	77.9678	319.2579	-3.642m	Back_Curb
5	19.7773	77.8277	319.2579	-3.492m	Top_Curb
6	19.7624	77.7888	319.0329	-3.450m	Flowline_Gutter
7	19.6012	77.3687	319.0599	-3.000m	ETW
8	19.6012	77.3687	318.6599	-3.000m	ETW_SubBase
9	17.4515	71.7670	318.9099	3.000m	Flange
10	17.4515	71.7670	318.5099	3.000m	ETW_SubBase
11	17.2903	71.3469	318.8829	3.450m	Flowline_Gutter
12	17.2753	71.3079	319.1079	3.492m	Top_Curb
13	17.2216	71.1679	319.1079	3.642m	Back_Curb
14	16.8637	70.2352	318.8679	4.641m	EPS_Sub
15	16.8633	70.2343	319.0679	4.642m	Hinge_Cut
16	16.3354	68.8586	322.0149	6.115m	Daylight

#### CHAINAGE 0+020.00

POINT	X	Y	Z	OFFSET	STRING CUT
1	41.2629	77.9929	311.1335	-11.344m	Daylight
2	38.8617	71.7358	317.8355	-4.642m	Hinge
3	38.8613	71.7349	317.6355	-4.641m	EPS_Sub
4	38.5034	70.8022	317.8755	-3.642m	Back_Curb
5	38.4496	70.6621	317.8755	-3.492m	Top_Curb
6	38.4347	70.6232	317.6505	-3.450m	Flowline_Gutter
7	38.2735	70.2031	317.6775	-3.000m	ETW
8	38.2735	70.2031	317.2775	-3.000m	ETW_SubBase
9	36.1238	64.6014	317.5275	3.000m	Flange
10	36.1238	64.6014	317.1275	3.000m	ETW_SubBase
11	35.9626	64.1813	317.5005	3.450m	Flowline_Gutter
12	35.9476	64.1423	317.7255	3.492m	Top_Curb
13	35.8939	64.0023	317.7255	3.642m	Back_Curb
14	35.5360	63.0696	317.4855	4.641m	EPS_Sub
15	35.5356	63.0687	317.6855	4.642m	Hinge_Cut

16 35.0615 61.8332 320.3322 5.965m Daylight

CHAINAGE 0+040.00

POINT	X	Y	Z	OFFSET	STRING CUT
1	60.0357	71.1749	309.5032	-11.702m	Daylight
2	57.5617	64.6773	316.4559	-4.749m	Hinge
3	57.5614	64.6764	316.2559	-4.748m	EPS_Sub
4	57.2059	63.7428	316.4959	-3.749m	Back_Curb
5	57.1525	63.6026	316.4959	-3.599m	Top_Curb
6	57.1377	63.5636	316.2709	-3.558m	Flowline_Gutter
7	56.9776	63.1431	316.2979	-3.108m	ETW
8	56.9776	63.1431	315.8979	-3.108m	ETW_SubBase
9	54.8048	57.4367	316.1452	2.999m	Flange
10	54.8048	57.4367	315.7452	2.999m	ETW_SubBase
11	54.6447	57.0161	316.1182	3.449m	Flowline_Gutter
12	54.6298	56.9772	316.3432	3.490m	Top_Curb
13	54.5765	56.8370	316.3432	3.640m	Back_Curb
14	54.2210	55.9034	316.1032	4.639m	EPS_Sub
15	54.2206	55.9024	316.3032	4.640m	Hinge_Cut
16	53.8208	54.8522	318.5508	5.764m	Daylight

CHAINAGE 0+060.00

POINT	X	Y	Z	OFFSET	STRING CUT
1	77.0004	64.8061	309.8438	-10.682m	Daylight
2	75.9934	59.6567	315.0907	-5.435m	Hinge
3	75.9932	59.6557	314.8907	-5.434m	EPS_Sub
4	75.8014	58.6753	315.1307	-4.435m	Back_Curb
5	75.7726	58.5280	315.1307	-4.285m	Top_Curb
6	75.7646	58.4871	314.9057	-4.243m	Flowline_Gutter
7	75.6783	58.0455	314.9327	-3.793m	ETW
8	75.6783	58.0455	314.5327	-3.793m	ETW_SubBase
9	74.3745	51.3782	314.7629	3.000m	Flange
10	74.3745	51.3782	314.3629	3.000m	ETW_SubBase
11	74.2881	50.9366	314.7359	3.450m	Flowline_Gutter
12	74.2801	50.8957	314.9609	3.492m	Top_Curb
13	74.2513	50.7485	314.9609	3.642m	Back_Curb
14	74.0596	49.7680	314.7209	4.641m	EPS_Sub
15	74.0594	49.7670	314.9209	4.642m	Hinge_Cut
16	73.9234	49.0718	316.3376	5.350m	Daylight

CHAINAGE 0+080.00

POINT	X	Y	Z	OFFSET	STRING CUT
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1	93.6027	60.5164	312.7159	-6.475m	Daylight
2	93.7899	59.5406	313.7096	-5.482m	Hinge
3	93.7901	59.5396	313.5096	-5.481m	EPS_Sub
4	93.9784	58.5585	313.7496	-4.482m	Back_Curb
5	94.0067	58.4112	313.7496	-4.332m	Top_Curb
6	94.0145	58.3702	313.5246	-4.290m	Flowline_Gutter
7	94.0994	57.9283	313.5516	-3.840m	ETW
8	94.0994	57.9283	313.1516	-3.840m	ETW_SubBase
9	95.3885	51.2109	313.3806	3.000m	Flange
10	95.3885	51.2109	312.9806	3.000m	ETW_SubBase
11	95.4733	50.7689	313.3536	3.450m	Flowline_Gutter
12	95.4812	50.7280	313.5786	3.492m	Top_Curb
13	95.5095	50.5807	313.5786	3.642m	Back_Curb
14	95.6978	49.5996	313.3386	4.641m	EPS_Sub
15	95.6980	49.5986	313.5386	4.642m	Hinge_Cut
16	96.3358	46.2751	320.3068	8.026m	Daylight

CHAINAGE 0+100.00

POINT	X	Y	Z	OFFSET	STRING CUT
1	109.8591	66.6988	313.3848	-6.010m	Daylight
2	110.1531	66.2593	312.3272	-5.482m	EPS
3	110.1537	66.2584	312.1272	-5.481m	EPS_Sub
4	110.7092	65.4281	312.3672	-4.482m	Back_Curb
5	110.7926	65.3034	312.3672	-4.332m	Top_Curb
6	110.8158	65.2688	312.1422	-4.290m	Flowline_Gutter
7	111.0660	64.8948	312.1692	-3.840m	ETW
8	111.0660	64.8948	311.7692	-3.840m	ETW_SubBase
9	114.8693	59.2096	311.5982	3.000m	ETW_SubBase
10	114.8693	59.2096	311.9982	3.000m	ETW
11	115.1195	58.8356	311.9712	3.450m	Flowline_Gutter
12	115.1427	58.8010	312.1962	3.492m	Top_Curb
13	115.2261	58.6763	312.1962	3.642m	Back_Curb
14	115.7816	57.8460	311.9562	4.641m	EPS_Sub
15	115.7821	57.8451	312.1562	4.642m	Hinge_Cut
16	117.6507	55.0521	318.8771	8.002m	Daylight

CHAINAGE 0+120.00

POINT	X	Y	Z	OFFSET	STRING CUT
1	121.0778	79.8255	309.1349	-7.313m	Daylight
2	122.5910	78.8314	310.9454	-5.503m	Hinge
3	122.5918	78.8309	310.7454	-5.502m	EPS_Sub
4	123.4268	78.2824	310.9854	-4.503m	Back_Curb

5	123.5521	78.2000	310.9854	-4.353m	Top_Curb
6	123.5870	78.1771	310.7604	-4.311m	Flowline_Gutter
7	123.9631	77.9300	310.7874	-3.861m	ETW
8	123.9631	77.9300	310.3874	-3.861m	ETW_SubBase
9	129.6973	74.1630	310.6159	3.000m	Flange
10	129.6973	74.1630	310.2159	3.000m	ETW_SubBase
11	130.0734	73.9159	310.5889	3.450m	Flowline_Gutter
12	130.1083	73.8930	310.8139	3.492m	Top_Curb
13	130.2336	73.8107	310.8139	3.642m	Back_Curb
14	131.0686	73.2621	310.5739	4.641m	EPS_Sub
15	131.0694	73.2616	310.7739	4.642m	Hinge_Cut
16	131.9470	72.6850	312.8741	5.692m	Daylight

CHAINAGE 0+140.00

POINT	X	Y	Z	OFFSET	STRING CUT
1	123.6493	97.8689	302.0106	-12.457m	Daylight
2	130.8046	95.4977	309.5485	-4.919m	Hinge
3	130.8056	95.4974	309.3485	-4.918m	EPS_Sub
4	131.7539	95.1832	309.5885	-3.919m	Back_Curb
5	131.8962	95.1360	309.5885	-3.769m	Top_Curb
6	131.9358	95.1229	309.3635	-3.727m	Flowline_Gutter
7	132.3630	94.9813	308.9905	-3.277m	ETW_SubBase
8	132.3630	94.9813	309.3905	-3.277m	Flange
9	138.3213	93.0068	309.2336	3.000m	Flange
10	138.3213	93.0068	308.8336	3.000m	ETW_SubBase
11	138.7485	92.8653	309.2066	3.450m	Flowline_Gutter
12	138.7880	92.8522	309.4316	3.492m	Top_Curb
13	138.9304	92.8050	309.4316	3.642m	Back_Curb
14	139.8787	92.4907	309.1916	4.641m	EPS_Sub
15	139.8797	92.4904	309.3916	4.642m	EPS
16	143.5941	91.2595	305.4785	8.555m	Daylight

CHAINAGE 0+160.00

POINT	X	Y	Z	OFFSET	STRING CUT
1	133.9805	115.2613	305.1918	-7.609m	Daylight
2	136.8247	114.4147	308.1593	-4.642m	Hinge
3	136.8256	114.4144	307.9593	-4.641m	EPS_Sub
4	137.7831	114.1294	308.1993	-3.642m	Back_Curb
5	137.9269	114.0866	308.1993	-3.492m	Top_Curb
6	137.9668	114.0747	307.9743	-3.450m	Flowline_Gutter
7	138.3981	113.9463	307.6013	-3.000m	ETW_SubBase
8	138.3981	113.9463	308.0013	-3.000m	Flange

9	144.1488	112.2345	307.8513	3.000m	Flange
10	144.1488	112.2345	307.4513	3.000m	ETW_SubBase
11	144.5801	112.1061	307.8243	3.450m	Flowline_Gutter
12	144.6200	112.0942	308.0493	3.492m	Top_Curb
13	144.7638	112.0514	308.0493	3.642m	Back_Curb
14	145.7213	111.7664	307.8093	4.641m	EPS_Sub
15	145.7222	111.7661	308.0093	4.642m	EPS
16	146.1785	111.6303	307.5332	5.118m	Daylight

CHAINAGE 0+180.00

POINT	X	Y	Z	OFFSET	STRING CUT
1	142.4454	133.6088	307.1002	-4.731m	Daylight
2	142.5306	133.5834	306.9223	-4.642m	EPS
3	142.5316	133.5832	306.7223	-4.641m	EPS_Sub
4	143.4891	133.2981	306.9623	-3.642m	Back_Curb
5	143.6328	133.2553	306.9623	-3.492m	Top_Curb
6	143.6728	133.2435	306.7373	-3.450m	Flowline_Gutter
7	144.1041	133.1151	306.7643	-3.000m	ETW
8	144.1041	133.1151	306.3643	-3.000m	ETW_SubBase
9	149.8547	131.4033	306.2143	3.000m	ETW_SubBase
10	149.8547	131.4033	306.6143	3.000m	ETW
11	150.2860	131.2749	306.5873	3.450m	Flowline_Gutter
12	150.3260	131.2630	306.8123	3.492m	Top_Curb
13	150.4698	131.2202	306.8123	3.642m	Back_Curb
14	151.4273	130.9352	306.5723	4.641m	EPS_Sub
15	151.4282	130.9349	306.7723	4.642m	Hinge_Cut
16	152.7185	130.5508	309.4649	5.988m	Daylight

CHAINAGE 0+200.00

POINT	X	Y	Z	OFFSET	STRING CUT
1	146.0661	153.3983	303.5488	-6.906m	Daylight
2	148.2366	152.7522	305.8134	-4.642m	Hinge
3	148.2376	152.7519	305.6134	-4.641m	EPS_Sub
4	149.1951	152.4669	305.8534	-3.642m	Back_Curb
5	149.3388	152.4241	305.8534	-3.492m	Top_Curb
6	149.3788	152.4122	305.6284	-3.450m	Flowline_Gutter
7	149.8101	152.2838	305.2554	-3.000m	ETW_SubBase
8	149.8101	152.2838	305.6554	-3.000m	Flange
9	155.5607	150.5720	305.5054	3.000m	Flange
10	155.5607	150.5720	305.1054	3.000m	ETW_SubBase
11	155.9920	150.4437	305.4784	3.450m	Flowline_Gutter
12	156.0320	150.4318	305.7034	3.492m	Top_Curb

13	156.1758	150.3890	305.7034	3.642m	Back_Curb
14	157.1332	150.1040	305.4634	4.641m	EPS_Sub
15	157.1342	150.1037	305.6634	4.642m	EPS
16	157.3427	150.0416	305.4459	4.859m	Daylight

CHAINAGE 0+220.00

POINT	X	Y	Z	OFFSET	STRING CUT
1	154.5130	172.3672	304.3332	-5.013m	Daylight
2	154.8530	172.2182	304.7044	-4.642m	Hinge
3	154.8539	172.2178	304.5044	-4.641m	EPS_Sub
4	155.7689	171.8168	304.7444	-3.642m	Back_Curb
5	155.9063	171.7566	304.7444	-3.492m	Top_Curb
6	155.9445	171.7399	304.5194	-3.450m	Flowline_Gutter
7	156.3567	171.5593	304.5464	-3.000m	ETW
8	156.3567	171.5593	304.1464	-3.000m	ETW_SubBase
9	162.4480	168.8903	304.3802	3.650m	Flange
10	162.4480	168.8903	303.9802	3.650m	ETW_SubBase
11	162.8602	168.7097	304.3532	4.100m	Flowline_Gutter
12	162.8984	168.6930	304.5782	4.142m	Top_Curb
13	163.0357	168.6328	304.5782	4.292m	Back_Curb
14	163.9508	168.2318	304.3382	5.291m	EPS_Sub
15	163.9517	168.2314	304.5382	5.292m	Hinge_Cut
16	165.4992	167.5534	307.9173	6.982m	Daylight

CHAINAGE 0+240.00

POINT	X	Y	Z	OFFSET	STRING CUT
1	164.5310	192.7550	300.0093	-8.228m	Daylight
2	167.0128	190.1663	303.5955	-4.642m	Hinge
3	167.0135	190.1656	303.3955	-4.641m	EPS_Sub
4	167.7049	189.4445	303.6355	-3.642m	Back_Curb
5	167.8087	189.3362	303.6355	-3.492m	Top_Curb
6	167.8376	189.3061	303.4105	-3.450m	Flowline_Gutter
7	168.1490	188.9813	303.4375	-3.000m	ETW
8	168.1490	188.9813	303.0375	-3.000m	ETW_SubBase
9	172.9472	183.9765	303.2641	3.933m	Flange
10	172.9472	183.9765	302.8641	3.933m	ETW_SubBase
11	173.2586	183.6516	303.2371	4.383m	Flowline_Gutter
12	173.2875	183.6215	303.4621	4.425m	Top_Curb
13	173.3913	183.5133	303.4621	4.575m	Back_Curb
14	174.0826	182.7921	303.2221	5.574m	EPS_Sub
15	174.0833	182.7914	303.4221	5.575m	Hinge_Cut
16	175.0100	181.8248	306.1002	6.914m	Daylight



CHAINAGE 0+260.00

POINT	X	Y	Z	OFFSET	STRING CUT
1	183.9380	206.9484	296.7006	-10.428m	Daylight
2	185.7574	201.4560	302.4865	-4.642m	Hinge
3	185.7577	201.4551	302.2865	-4.641m	EPS_Sub
4	186.0718	200.5068	302.5265	-3.642m	Back_Curb
5	186.1190	200.3644	302.5265	-3.492m	Top_Curb
6	186.1321	200.3248	302.3015	-3.450m	Flowline_Gutter
7	186.2736	199.8976	302.3285	-3.000m	ETW
8	186.2736	199.8976	301.9285	-3.000m	ETW_SubBase
9	188.4538	193.3160	302.1552	3.933m	Flange
10	188.4538	193.3160	301.7552	3.933m	ETW_SubBase
11	188.5953	192.8888	302.1282	4.383m	Flowline_Gutter
12	188.6084	192.8493	302.3532	4.425m	Top_Curb
13	188.6556	192.7069	302.3532	4.575m	Back_Curb
14	188.9697	191.7585	302.1132	5.574m	EPS_Sub
15	188.9701	191.7576	302.3132	5.575m	Hinge_Cut
16	189.4049	190.4448	305.0790	6.958m	Daylight

CHAINAGE 0+280.00

POINT	X	Y	Z	OFFSET	STRING CUT
1	206.9454	204.3881	301.3776	-4.642m	EPS
2	206.9454	204.3871	301.1776	-4.641m	EPS_Sub
3	206.9457	203.3881	301.4176	-3.642m	Back_Curb
4	206.9458	203.2381	301.4176	-3.492m	Top_Curb
5	206.9458	203.1964	301.1926	-3.450m	Flowline_Gutter
6	206.9460	202.7464	301.2196	-3.000m	ETW
7	206.9460	202.7464	300.8196	-3.000m	ETW_SubBase
8	206.9480	196.3155	301.0588	3.431m	Flange
9	206.9480	196.3155	300.6588	3.431m	ETW_SubBase
10	206.9481	195.8655	301.0318	3.881m	Flowline_Gutter
11	206.9481	195.8238	301.2568	3.923m	Top_Curb
12	206.9482	195.6738	301.2568	4.073m	Back_Curb
13	206.9485	194.6748	301.0168	5.072m	EPS_Sub
14	206.9485	194.6738	301.2168	5.073m	EPS
15	206.9487	194.1637	302.2369	5.583m	Daylight

CHAINAGE 0+300.00

POINT	X	Y	Z	OFFSET	STRING CUT
1	227.1598	203.5808	300.2686	-4.642m	EPS
2	227.1598	203.5798	300.0686	-4.641m	EPS_Sub

3	227.1101	202.5821	300.3086	-3.642m	Back_Curb
4	227.1026	202.4322	300.3086	-3.492m	Top_Curb
5	227.1005	202.3906	300.0836	-3.450m	Flowline_Gutter
6	227.0781	201.9412	300.1106	-3.000m	ETW
7	227.0781	201.9412	299.7106	-3.000m	ETW_SubBase
8	226.7796	195.9486	299.9606	3.000m	Flange
9	226.7796	195.9486	299.5606	3.000m	ETW_SubBase
10	226.7572	195.4991	299.9336	3.450m	Flowline_Gutter
11	226.7551	195.4575	300.1586	3.492m	Top_Curb
12	226.7476	195.3077	300.1586	3.642m	Back_Curb
13	226.6979	194.3099	299.9186	4.641m	EPS_Sub
14	226.6979	194.3089	300.1186	4.642m	EPS
15	226.6550	193.4488	301.8410	5.503m	Daylight

## 6.4. TOČKE VERTIKALNE GEOMETRIJE

Vertical Alignment: NIVELETA

Description:

Station Range: Start: 0+000.00, End: 0+318.69

PVI	Station	Grade Out	Curve Length
0.00	0+000.00	-6.91%	
1.00	0+169.36	-5.54%	6.795m
Vertical Curve Information:(sag curve) <hr/> PVC Station:        0+165.97    Elevation: 307.514m PVI Station:        0+169.36    Elevation: 307.279m PVT Station:        0+172.76    Elevation: 307.091m Low Point:            0+172.76    Elevation: 307.091m Grade in:            -6.91%    Grade out:    -5.54% Change:              1.37%    K: Curve Length:        6.795m Headlight Distance:			
2.00	0+318.69		

## **7. LITERATURA**

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