Idejno rješenje lokalne ceste

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SVEUČILIŠTE U SPLITU
FAKULTET GRAĐEVINARSTVA, ARHITEKTURE I GEODEZIJE

ZAVRŠNI RAD

Jeronim Živković

Split, 2017

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Završni rad

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FAKULTET GRAĐEVINARSTVA, ARHITEKTURE I GEODEZIJE

Split, Matice hrvatske 15

STUDIJ:	**PREDDIPLOMSKI SVEUČILIŠNI STUDIJ GRAĐEVINARSTVA**
KANDIDAT:	Jeronim Živković
BROJ INDEKSA:	4241
KATEDRA:	**Katedra za prometnice**
PREDMET:	Ceste

ZADATAK ZA ZAVRŠNI RAD

Tema: IDEJNO RJEŠENJE LOKALNE CESTE

Opis zadatka: Uz pomoć programa za projektiranje cesta Autodesk AutoCAD Civil 3D potrebno je izraditi idejni projekt ceste na godetskoj podlozi između točaka A i B prema podatcima preuzetima i programskoga zadatka iz kolegija Ceste.

U Splitu, Srpanj 2017

Voditelj Završnog rada: Dr. Sc. Dražen Cvitanić

Idejno rješenje lokalne ceste

Sažetak:

Koristeći program za projektiranje cesta Autodesk AutoCAD Civil 3D izrađeno je idejno rješenje lokalne ceste na geodetskoj podlozi. Očekivani godišnji dnevni promet (PGDP) je 950 vozila na dan a projektna brzina iznosi 40km/h.

Ključne riječi:

idejno rješenje, lokalna cesta, projektna brzina, poprečni presjek, os ceste, niveleta

Preliminary design of a local road

Abstract:

Using road design software Autodesk AutoCAD Civil 3D preliminary road design of a local road on a geodetic surface has been made. Expected annual average daily traffic (AADT) is 950 vehicles with design speed of 40km/h.

Keywords:

preliminary design, local road, design speed, cross-section, horizontal alignment, vertical alignment

Sadržaj

Kopija programskoga zadatka

SVEUČILIŠTE U SPLITU
FAKULTET GRAĐEVINARSTVA, ARHITEKTURE
I GEODEZIJE

Split, ak.god. 2015/2016.

Katedra za prometnice

Studij: Preddiplomski

Nastavni predmet: CESTE

Student: .....

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
10. Predmjer radova
11. Aproksimativni troškovnik

Predmetni nastavnik:

izv.prof.dr.sc. Deana Breški

Tehnički opis

TEHNIČKI OPIS

Općenito

Na priloženoj geodetskoj podlozi u mjerilu 1:1000 izrađen je idejni projekt ceste na dionici od točke A (330 m.n.v.) do točke B (252 m.n.v.). Ceste je projektirana za prosječni godišnji dnevni promet od 950 vozila na dan što znači da je riječ o cesti 5. kategorije. Budući da je teren brdovit – radi se o znatnom ograničenju ZO. Na temelju kategorije ceste (5.) i stupnja ograničenja određuje se projektna brzina $v_p = 40$ km/h.

Horizontalni elementi

Za projektnu brzinu $v_p = 40$ km/h najmanji dozvoljeni polumjer zavoja $R_{min} = 45$ m, a minimalna duljinu prijelaznice $L_{min} = 30$ m. Pazeći na te uvjete za svaku od dvije krivine biramo najoptimalnije radijuse zakrivljenosti i duljine prijelaznica. Tako smo odabrali:

- za 1. krivinu: R = 110 m, L = 40 m
- za 2. krivinu: R = 45 m, L = 30 m

Vertikalni elementi

Na temelju kategorije ceste (5.) i stupnja ograničenja maximalni dozvoljeni uzdužni nagib nivelete $s_{max} = 12\%$

Niveleta se sastoji od 2 pravca i 1 krivine (kankavne) i rastuća je na cijeloj dionici (od A do B).
Nagibi pravaca su redom (od A do B): $s_1 = 6{,}82\%$; $s_2 = 10{,}0\%$
Primijenjeni radijus krivine: $R_{konkavna} = 3000$ m

Poprečni presjek

Cesta ima dva prometna traka širine 2,75 te betonski rubni trak širine 0,20 m i nalazi se većim dijelom u zasjeku. Bankina je širine 0.9 m s nagibom od minimalno 4%. Poprečni nagibi kolnika se kreću od 0,0% do 7%. Na mjestima s nasipom predviđena je izvedba potpornih zidova
Nagib pokosa nasipa je 1:1,5, a usjeka 2:1.

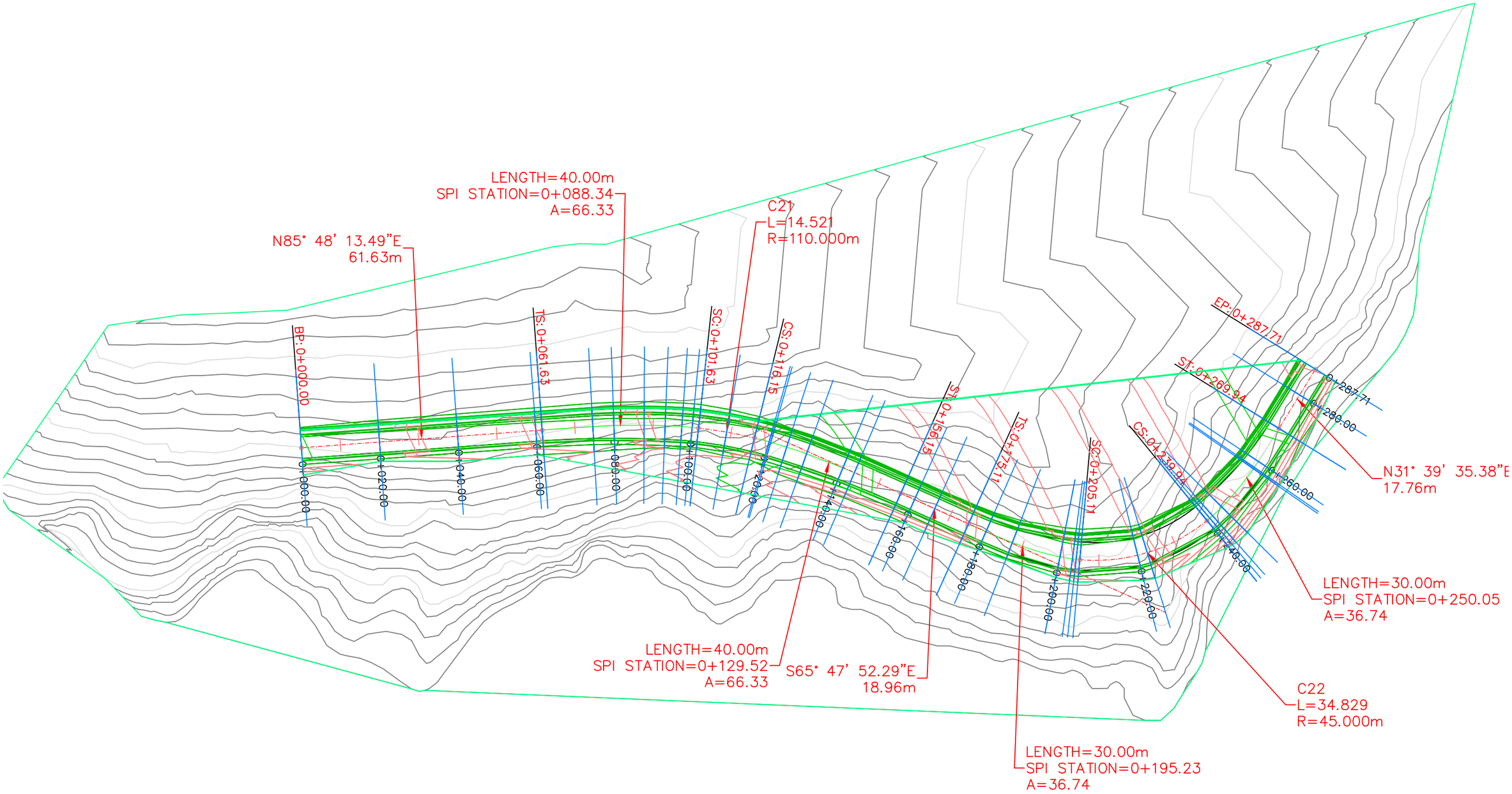
Kolnička konstrukcija

Projektom je predviđena slijedeća kolnička konstrukcija:
1. habajući sloj (asfaltbeton AB11): 4 cm
2. bitumenizirani nosivi sloj (BNS22): 6 cm
3. mehanički stabilizirani nosivi sloj: 30 cm

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.

Građevinska situacija
M 1:1000


LENGTH=40.00m
SPI STATION=0+088.34
A=66.33
N85° 48' 13.49"E
61.63m
C21
L=14.521
R=110.000m
BP:0+000.00
TS:0+061.63
SC:0+101.63
CS:0+116.15
ST:0+159.15
TS:0+175.11
SC:0+205.11
CS:0+239.94
ST:0+269.94
EP:0+287.71
0+000.00
0+020.00
0+040.00
0+060.00
0+080.00
0+100.00
0+120.00
0+140.00
0+160.00
0+180.00
0+200.00
0+220.00
0+240.00
0+260.00
0+280.00
0+287.71
0+300.00
0+320.00
0+340.00
0+360.00
0+380.00
0+400.00
0+420.00
0+440.00
0+460.00
0+480.00
0+500.00
0+520.00
0+540.00
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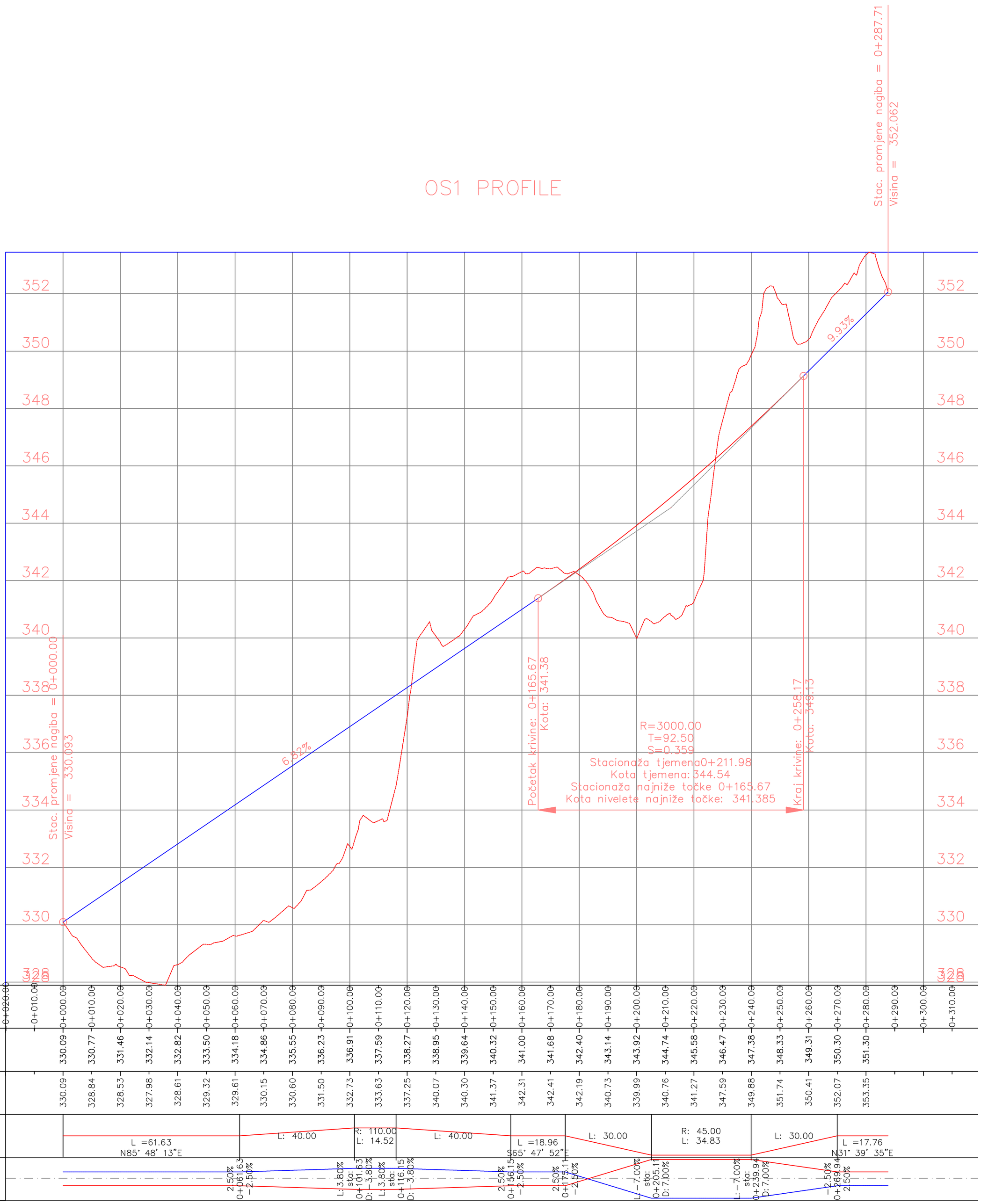
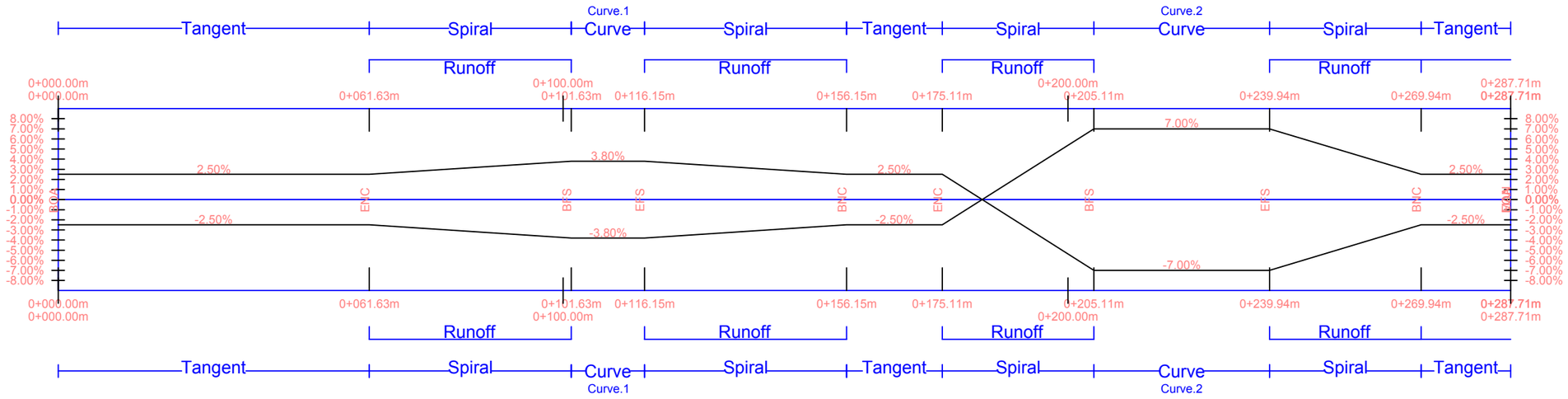
0+980.00
1+000.00
1+020.00
1+040.00
1+060.00
1+080.00
1+100.00
1+120.00
1+140.00
1+160.00
1+180.00
1+200.00
1+220.00
1+240.00
1+260.00
N31° 39' 35.38"E
17.76m
LENGTH=30.00m
SPI STATION=0+250.05
A=36.74
C22
L=34.829
R=45.000m
LENGTH=40.00m
SPI STATION=0+129.52
A=66.33
S65° 47' 52.29"E
18.96m
LENGTH=30.00m
SPI STATION=0+195.23
A=36.74

Uzdužni presjek
M 1:1000/100

OS1 PROFILE

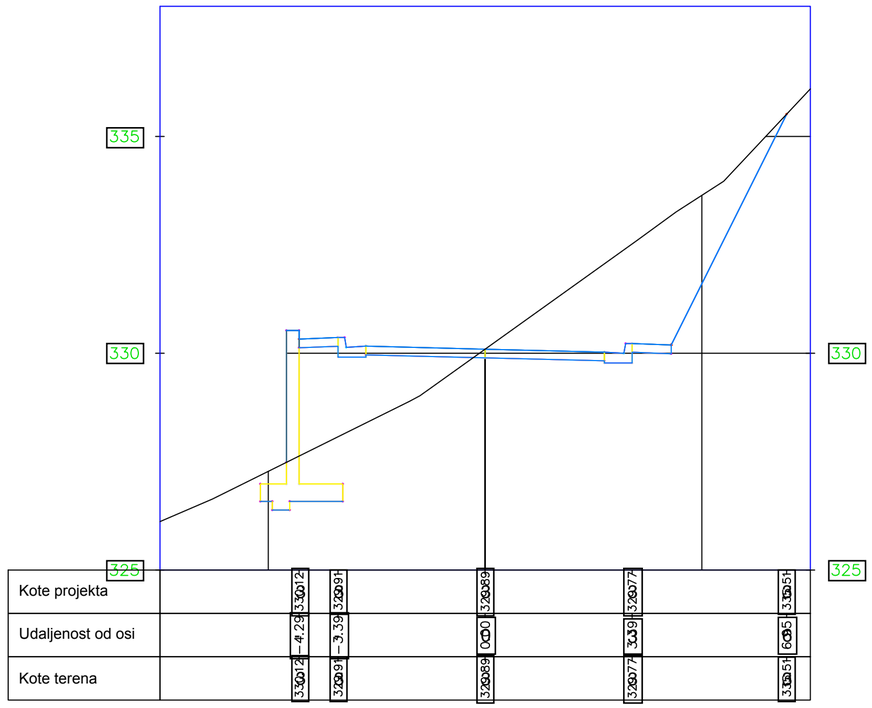


Superelevation



Karakteristični poprečni presjek

0+000.00



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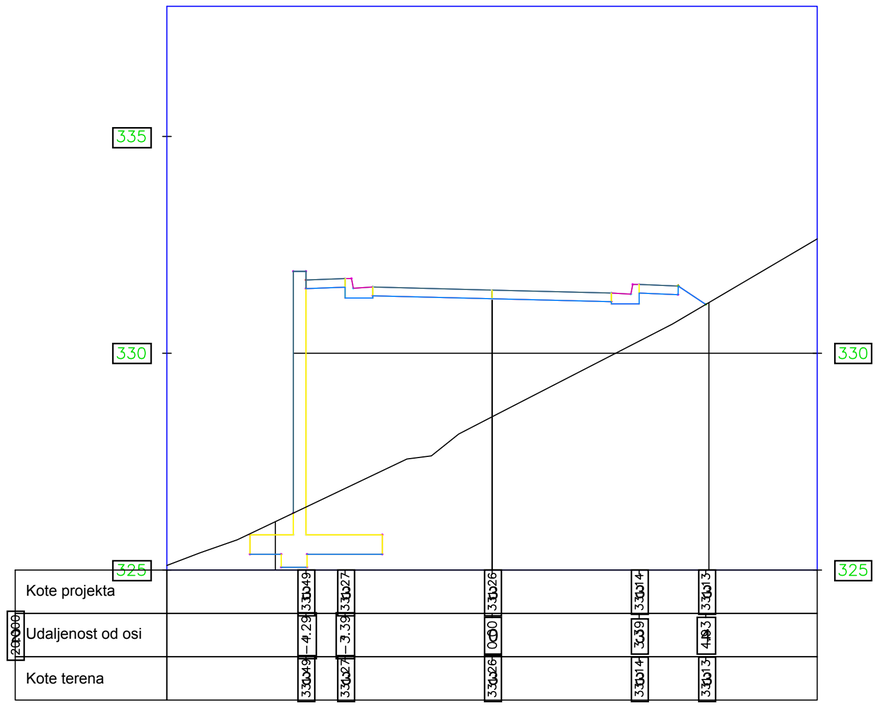

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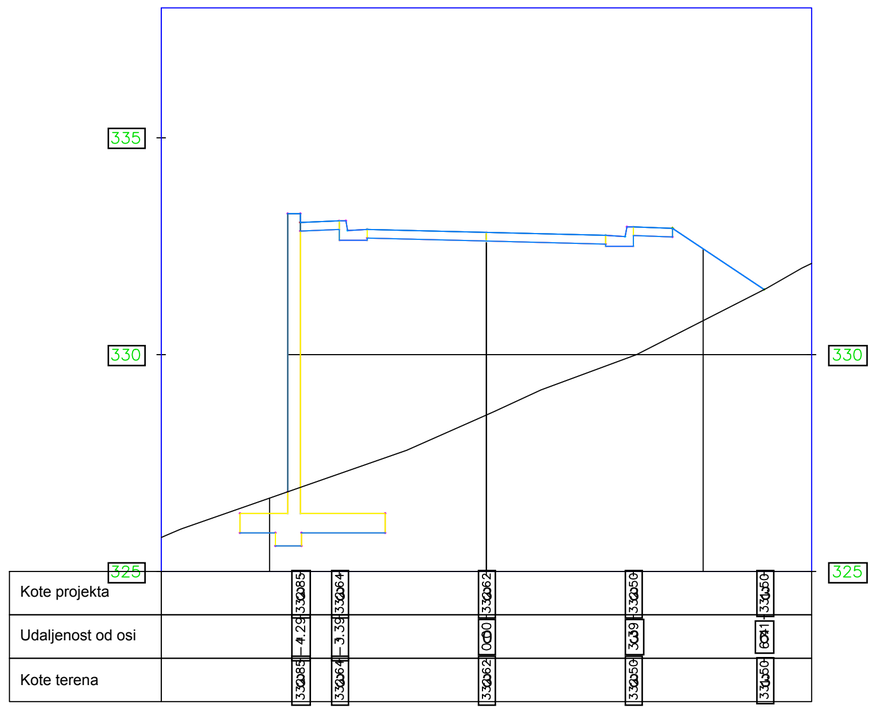

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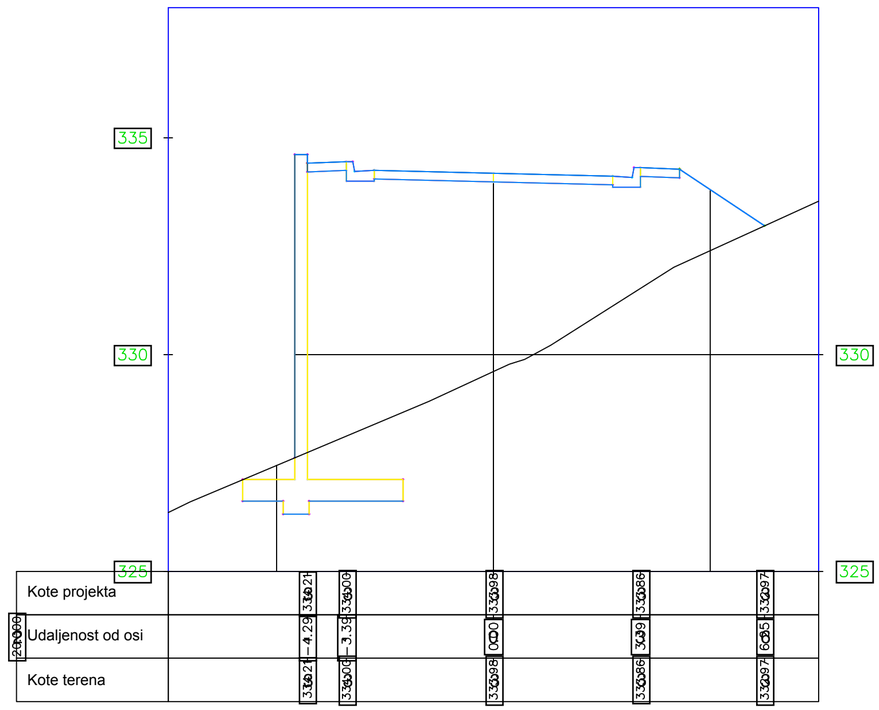

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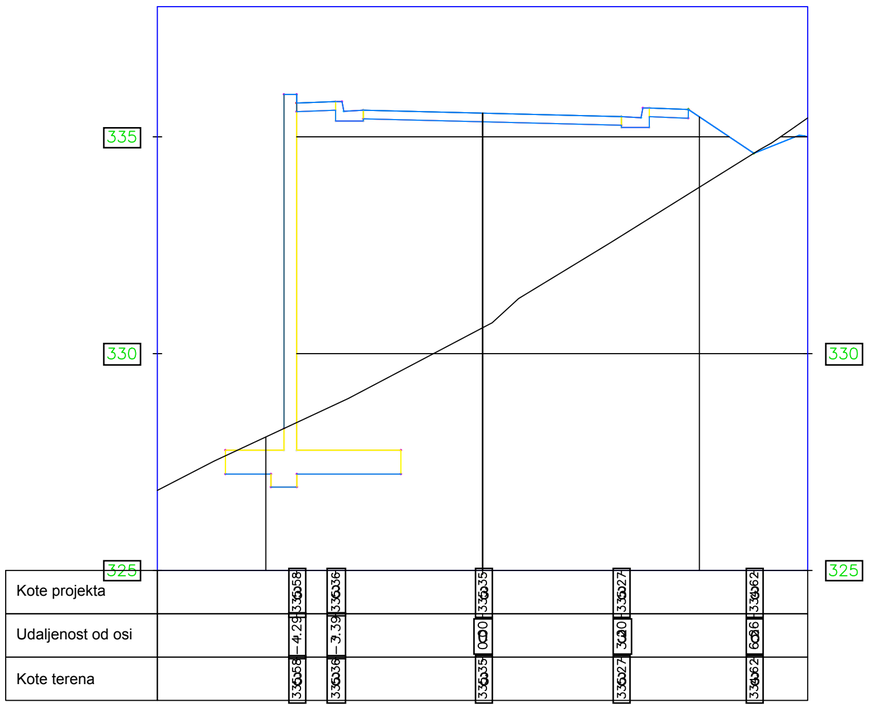
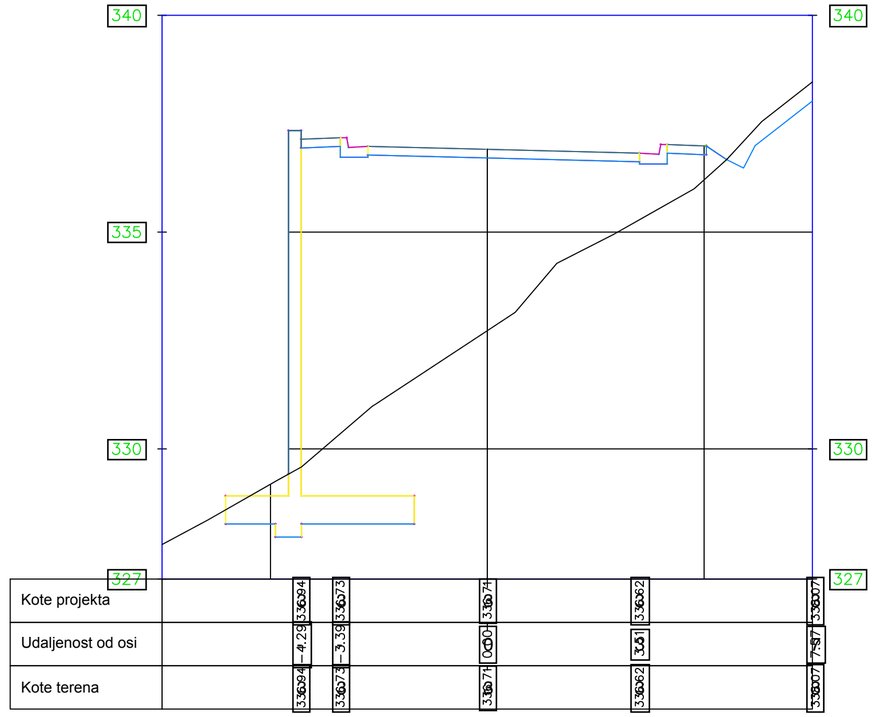


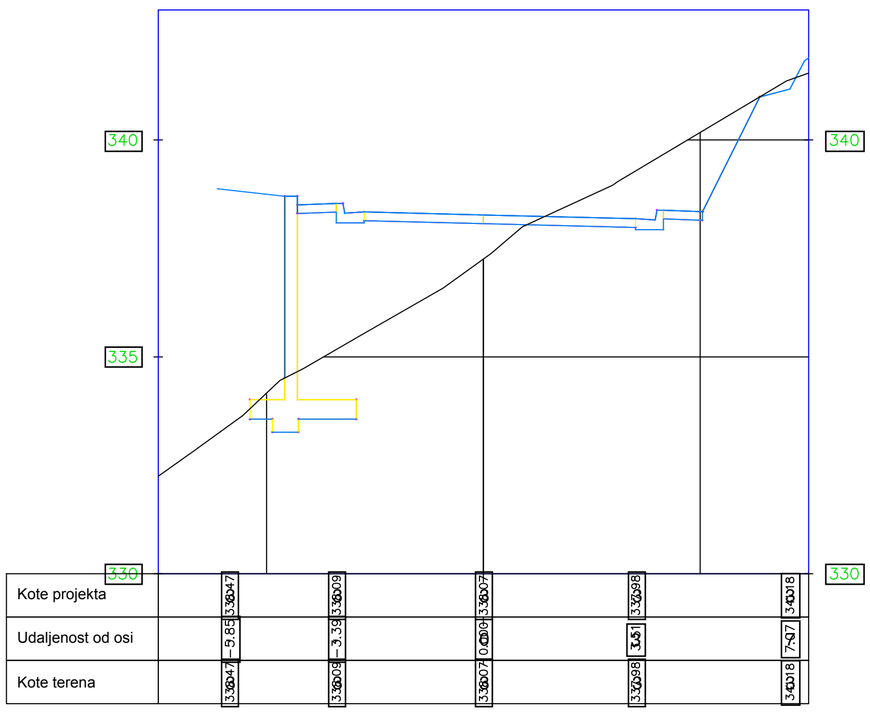
Kote projekta	336.58	336.36	336.35	336.27	336.62
Udaljenost od osi	-4.29	-3.39	0.00	3.40	6.86
Kote terena	336.58	336.36	336.35	336.27	336.62

0+100.00



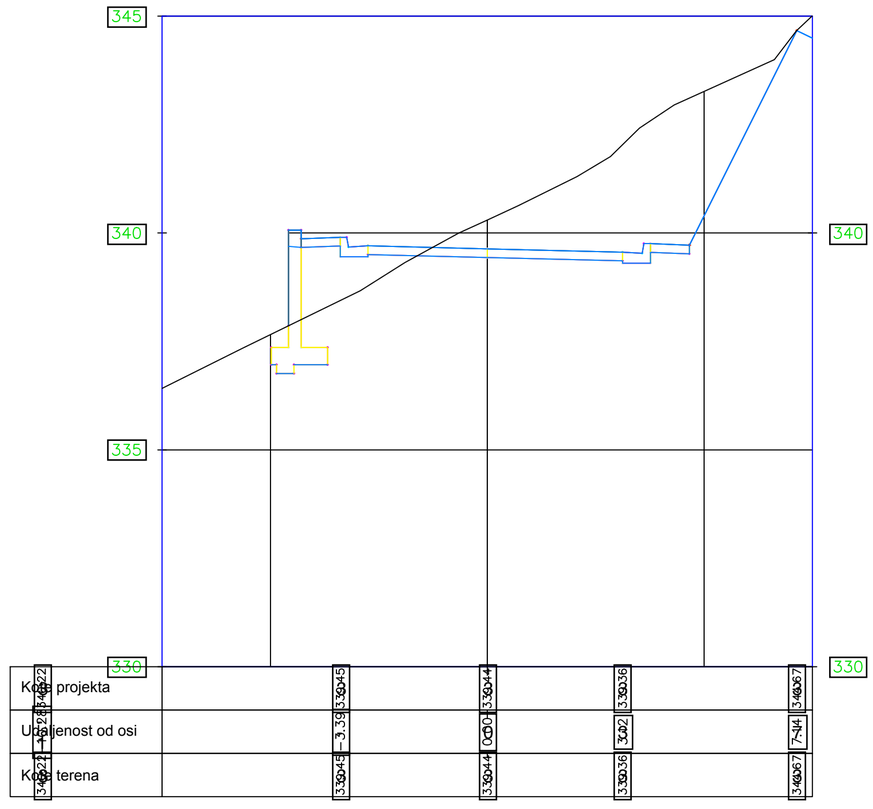
Kote projekta	336.94	336.73	336.74	336.62	338.07
Udaljenost od osi	-4.29	-3.39	0.00	3.61	7.47
Kote terena	336.94	336.73	336.74	336.62	338.07

0+120.00



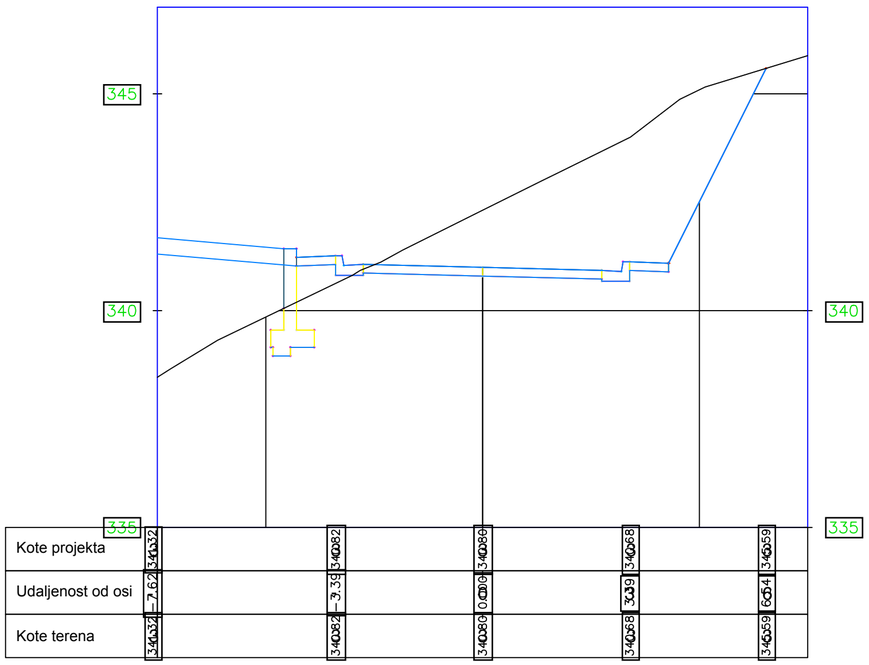
Kote projekta	336.47	336.09	336.07	336.98	340.18
Udaljenost od osi	-9.85	-3.39	0.00	3.61	7.47
Kote terena	336.47	336.09	336.07	336.98	340.18

0+140.00



Kote projekta	340.22	339.45	339.44	339.36	340.67
Udaljenost od osi	-9.85	-3.39	0.00	3.92	7.44
Kote terena	340.22	339.45	339.44	339.36	340.67

0+160.00



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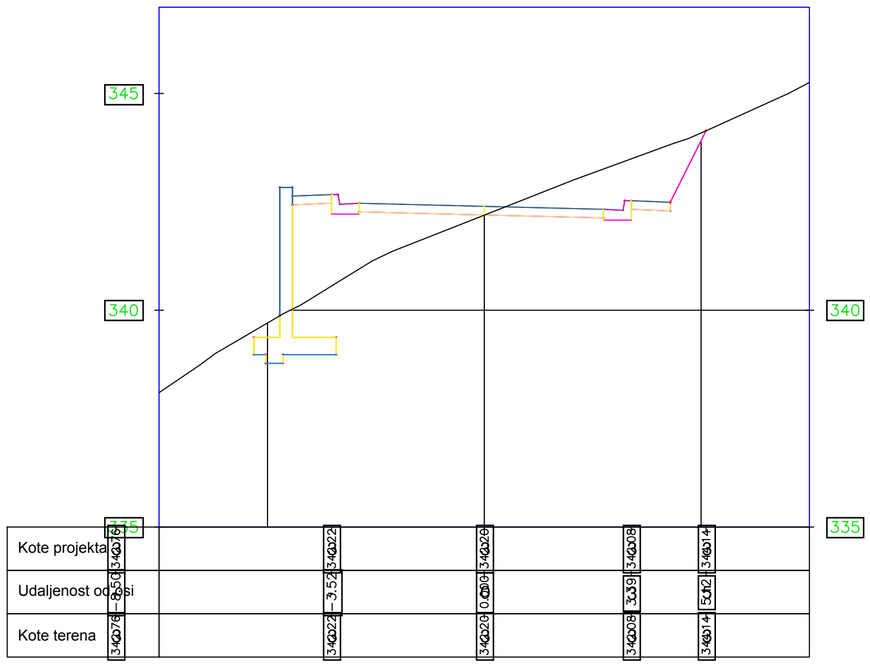

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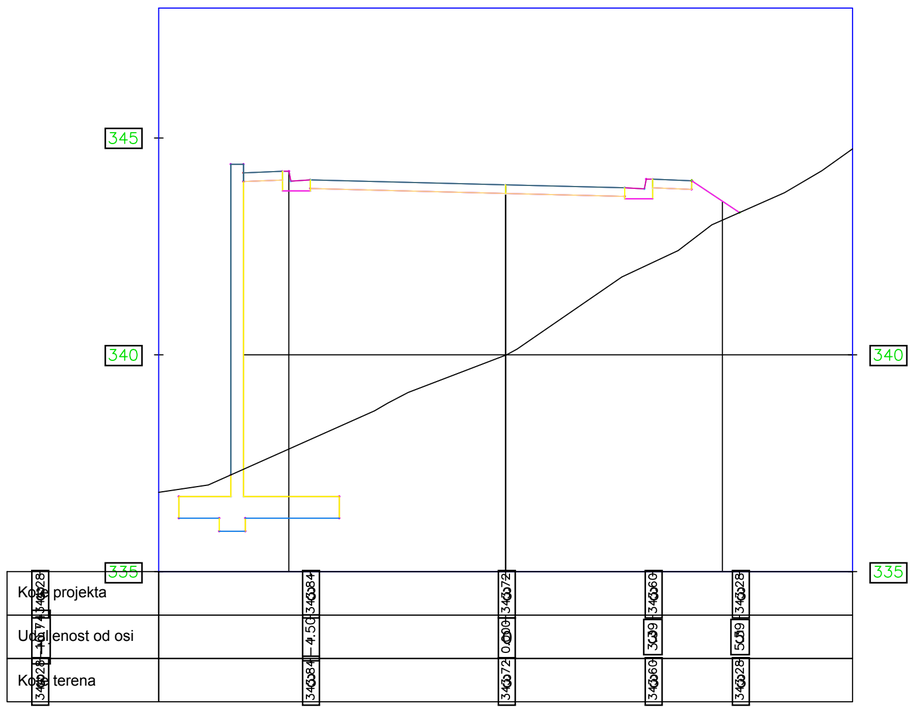

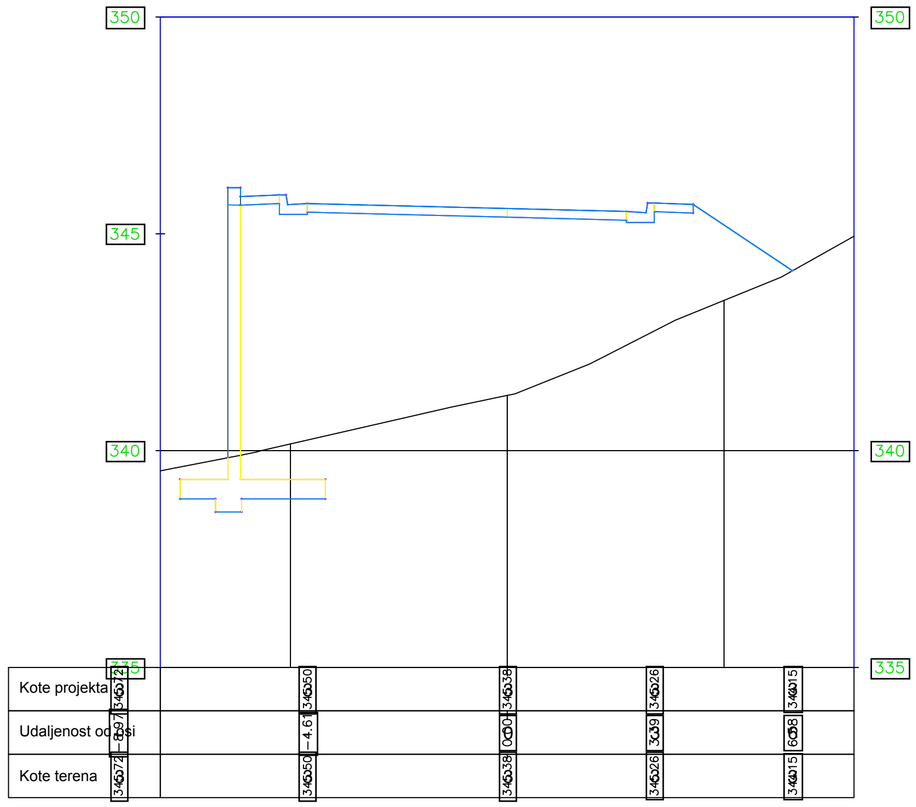

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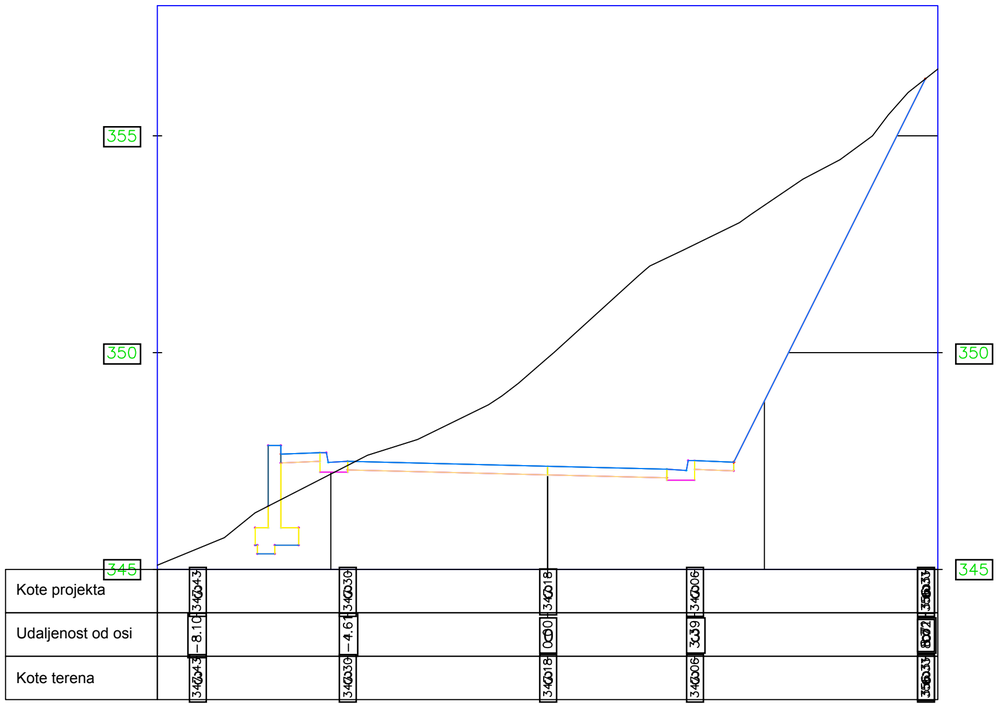

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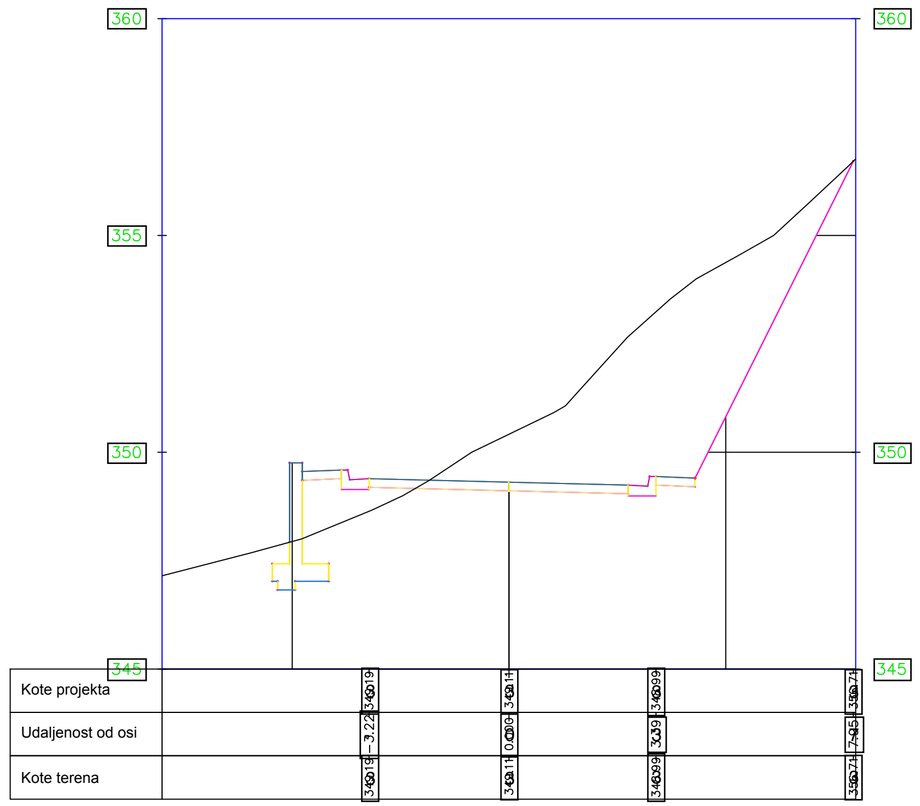

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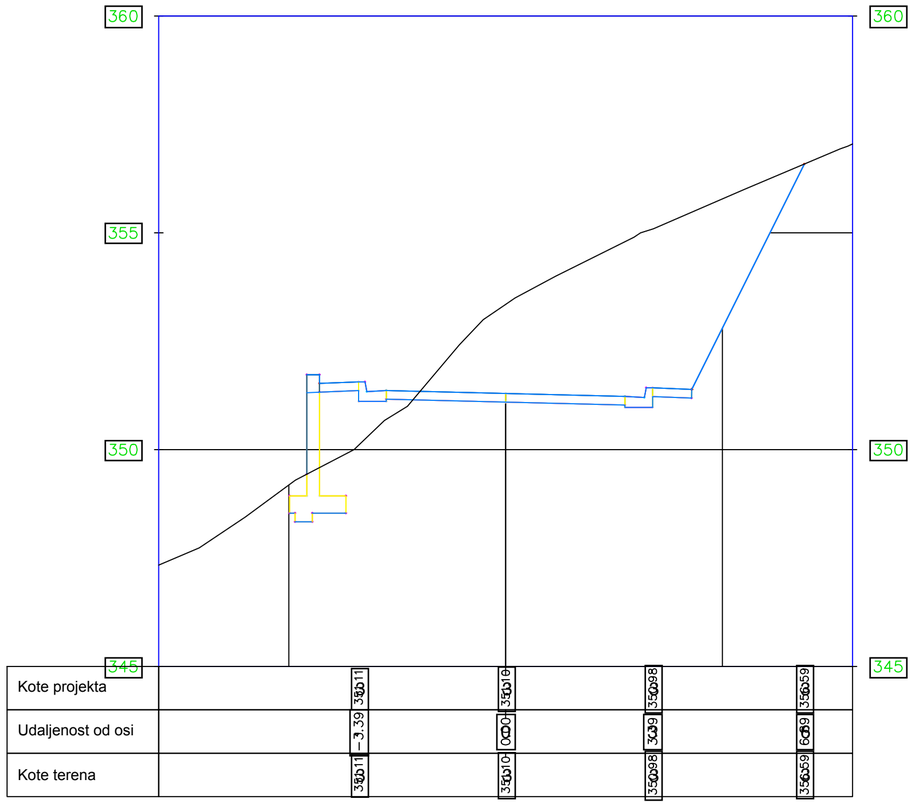
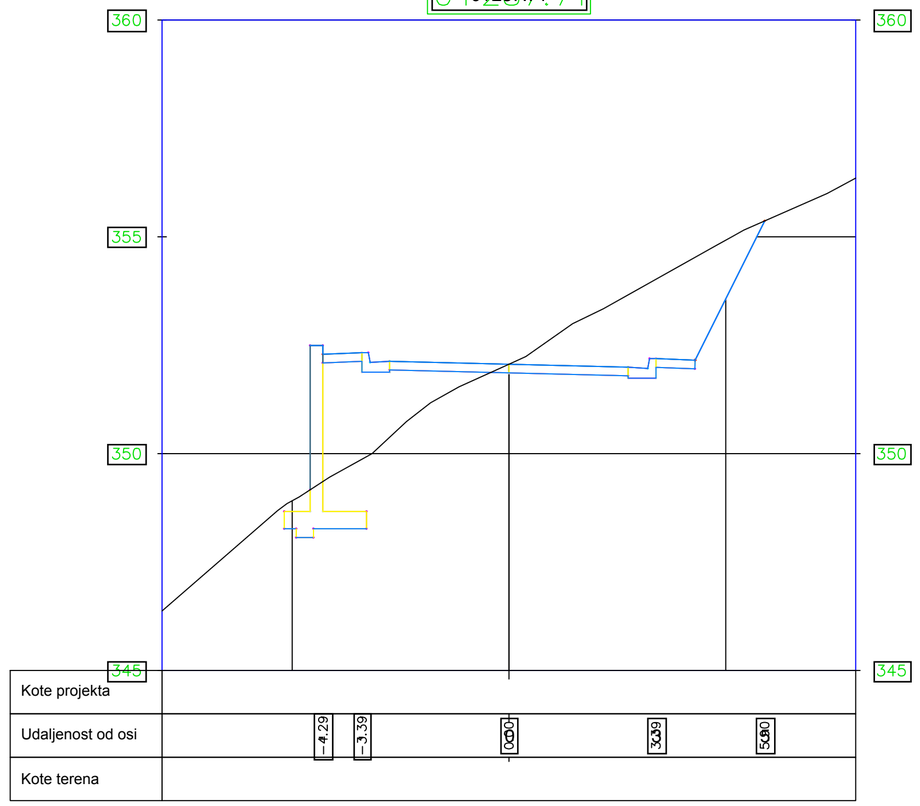


0+287.71



Obrada na računalu

OBRADA NA RAČUNALU

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

Prvi korak pri izradi idejnoga rješenja na računalu je digitaliziranje terena na temelju zadanih slojnica. Unošenjem slojnica u obliku polilinija te izrada točaka na tim polilinijama dobije se model terena, tj. trodimenzionalni model terena postojećega stanja na području obuhvaćenim predmetnim zadatkom.

Nakon toga se unose koordinate točaka tangenti (po dvije na svaku tangentu) koje ih definiraju na terenu, ubacuju se odgovarajući kružni lukovi i prijelazne krivine čime se dobiju horizontalni elementi ceste. Slijedeći korak je izrada uzdužnoga presjeka ceste. Niveleta se postavlja tako da se u konačnici rješe geometrijski i sigurnosni elementi odvodnja. Između tangenti interpolira se odgovarajuća kružna krivina.

Poprečnim presjekom definirani su: poprečni nagibi i širina kolnika. Kao izlazni podaci dobiju se računalni ispisi koordinatnih točaka osi i količina zemljanih radova po presjeku.

Računalni ispis točaka osi

Koordinatni račun glavnih točaka osi

Alignment: OS1
Description:

Tangent Data

Description	PT Station	Northing	Easting
Start:	0+00.000	140.944	130.995
End:	0+61.628	145.454	192.458

Tangent Data

Parameter	Value	Parameter	Value
Length:	61.628	Course:	N 85° 48' 13.4920" E

Spiral Point Data

Description	Station	Northing	Easting
TS:	0+61.628	145.454	192.458
SPI:		147.408	219.099
SC:	1+01.628	145.959	232.396

Spiral Curve Data: clothoid

Parameter	Value	Parameter	Value
Length:	40.000	L Tan:	26.713
Radius:	110.000	S Tan:	13.375
Theta:	10° 25' 02.6920"	P:	0.605
X:	39.868	K:	19.978
Y:	2.419	A:	66.332
Chord:	39.941	Course:	N 89° 16' 30.8881" E

Curve Point Data

Description	Station	Northing	Easting
SC:	1+01.628	145.959	232.396
RP:		36.607	220.476
CS:	1+16.149	143.438	246.686

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	07° 33' 48.8334"	Type:	RIGHT
Radius:	110.000		
Length:	14.521	Tangent:	7.271
Mid-Ord:	0.240	External:	0.240
Chord:	14.510	Course:	S 79° 59' 49.3992" E

Spiral Point Data

Description	Station	Northing	Easting
CS:	1+16.149	143.438	246.686

SPI:		140.251	259.676
ST:	1+56.149	129.300	284.041

Spiral Curve Data: clothoid

Parameter	Value	Parameter	Value
Length:	40.000	L Tan:	26.713
Radius:	110.000	S Tan:	13.375
Theta:	10° 25' 02.6920"	P:	0.605
X:	39.868	K:	19.978
Y:	2.419	A:	66.332
Chord:	39.941	Course:	S 69° 16' 09.6866" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	1+56.149	129.300	284.041
End:	1+75.113	121.526	301.338

Tangent Data

Parameter	Value	Parameter	Value
Length:	18.964	Course:	S 65° 47' 52.2905" E

Spiral Point Data

Description	Station	Northing	Easting
TS:	1+75.113	121.526	301.338
SPI:		113.278	319.688
SC:	2+05.113	112.379	329.754

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:	S 72° 09' 28.9866" E

Curve Point Data

Description	Station	Northing	Easting
SC:	2+05.113	112.379	329.754
RP:		157.201	333.758
CS:	2+39.941	122.349	362.224

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	44° 20' 42.4590"	Type:	LEFT
Radius:	45.000		

Length:	34.829	Tangent:	18.339
Mid-Ord:	3.328	External:	3.593
Chord:	33.966	Course:	N 72° 55' 51.5446" E

Spiral Point Data

Description	Station	Northing	Easting
CS:	2+39.941	122.349	362.224
SPI:		128.743	370.052
ST:	2+69.941	145.866	380.611

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 38° 01' 12.0758" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	2+69.941	145.866	380.611
End:	2+87.706	160.987	389.935

Tangent Data

Parameter	Value	Parameter	Value
Length:	17.764	Course:	N 31° 39' 35.3797" E

Alignment: OS1-Left-2.750
Description:

Tangent Data

Description	PT Station	Northing	Easting
Start:	0+00.000	143.687	130.794
End:	0+61.628	148.196	192.257

Tangent Data

Parameter	Value	Parameter	Value
Length:	61.628	Course:	N 85° 48' 13.4920" E

Spiral Point Data

Description	Station	Northing	Easting
TS:	0+61.628	148.196	192.257
SPI:		150.169	219.148
SC:	1+02.128	148.693	232.694

Spiral Curve Data: clothoid

Parameter	Value	Parameter	Value
Length:	40.500	L Tan:	27.046
Radius:	112.750	S Tan:	13.542
Theta:	10° 17' 25.3421"	P:	0.605
X:	40.370	K:	20.228
Y:	2.419	A:	67.575
Chord:	40.440	Course:	N 89° 17' 48.0930" E

Curve Point Data

Description	Station	Northing	Easting
SC:	1+02.128	148.693	232.694
RP:		36.607	220.476
CS:	1+17.012	146.109	247.341

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	07° 33' 48.8334"	Type:	RIGHT
Radius:	112.750		
Length:	14.884	Tangent:	7.453
Mid-Ord:	0.246	External:	0.246
Chord:	14.873	Course:	S 79° 59' 49.3992" E

Spiral Point Data

Description	Station	Northing	Easting
CS:	1+17.012	146.109	247.341
SPI:		142.862	260.575
ST:	1+57.512	131.808	285.168

Spiral Curve Data: clothoid

Parameter	Value	Parameter	Value
Length:	40.500	L Tan:	27.046
Radius:	112.750	S Tan:	13.542
Theta:	10° 17' 25.3421"	P:	0.605
X:	40.370	K:	20.228
Y:	2.419	A:	67.575
Chord:	40.440	Course:	S 69° 17' 26.8914" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	1+57.512	131.808	285.168
End:	1+76.476	124.034	302.465

Tangent Data

Parameter	Value	Parameter	Value

Length:	18.964	Course:	S 65° 47' 52.2905" E

Curve Point Data

Description	Station	Northing	Easting
PC:	1+76.476	124.034	302.465
RP:		198.364	335.874
PT:	2+00.544	117.528	325.547

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	16° 55' 17.8002"	Type:	LEFT
Radius:	81.493		
Length:	24.068	Tangent:	12.122
Mid-Ord:	0.887	External:	0.897
Chord:	23.980	Course:	S 74° 15' 31.1906" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	2+00.544	117.528	325.547
End:	2+03.486	117.155	328.465

Tangent Data

Parameter	Value	Parameter	Value
Length:	2.942	Course:	S 82° 43' 10.0906" E

Curve Point Data

Description	Station	Northing	Easting
PC:	2+03.486	117.155	328.465
RP:		161.793	334.168
PCC:	2+05.196	116.971	330.165

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	02° 10' 37.1352"	Type:	LEFT
Radius:	45.000		
Length:	1.710	Tangent:	0.855
Mid-Ord:	0.008	External:	0.008
Chord:	1.710	Course:	S 83° 48' 28.6583" E

Curve Point Data

Description	Station	Northing	Easting
PCC:	2+05.196	116.971	330.165
RP:		157.201	333.758
PCC:	2+36.456	125.919	359.308

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	44° 20' 42.4590"	Type:	LEFT
Radius:	40.390		
Length:	31.261	Tangent:	16.460
Mid-Ord:	2.987	External:	3.225
Chord:	30.486	Course:	N 72° 55' 51.5446" E

Curve Point Data

Description	Station	Northing	Easting
PCC:	2+36.456	125.919	359.308
RP:		160.771	330.841
PT:	2+38.166	127.026	360.611

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	02° 10' 37.1352"	Type:	LEFT
Radius:	45.000		
Length:	1.710	Tangent:	0.855
Mid-Ord:	0.008	External:	0.008
Chord:	1.710	Course:	N 49° 40' 11.7475" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	2+38.166	127.026	360.611
End:	2+41.108	128.972	362.817

Tangent Data

Parameter	Value	Parameter	Value
Length:	2.942	Course:	N 48° 34' 53.1799" E

Curve Point Data

Description	Station	Northing	Easting
PC:	2+41.108	128.972	362.817
RP:		190.083	308.906
PT:	2+65.176	147.310	378.270

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	16° 55' 17.8002"	Type:	LEFT
Radius:	81.493		
Length:	24.068	Tangent:	12.122
Mid-Ord:	0.887	External:	0.897
Chord:	23.980	Course:	N 40° 07' 14.2798" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	2+65.176	147.310	378.270
End:	2+82.940	162.430	387.594

Tangent Data

Parameter	Value	Parameter	Value
Length:	17.764	Course:	N 31° 39' 35.3797" E

Alignment: OS1-Right-2.750
Description:

Tangent Data

Description	PT Station	Northing	Easting
Start:	0+00.000	138.201	131.196
End:	0+61.628	142.711	192.659

Tangent Data

Parameter	Value	Parameter	Value
Length:	61.628	Course:	N 85° 48' 13.4920" E

Curve Point Data

Description	Station	Northing	Easting
PC:	0+61.628	142.711	192.659
RP:		-99.856	210.456
PT:	0+87.470	143.230	218.484

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	06° 05' 15.8177"	Type:	RIGHT
Radius:	243.219		
Length:	25.842	Tangent:	12.933
Mid-Ord:	0.343	External:	0.344
Chord:	25.830	Course:	N 88° 50' 51.4009" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	0+87.470	143.230	218.484
End:	0+92.715	143.057	223.726

Tangent Data

Parameter	Value	Parameter	Value
Length:	5.245	Course:	S 88° 06' 30.6903" E

Curve Point Data

Description	Station	Northing	Easting
PC:	0+92.715	143.057	223.726

RP:		33.117	220.095
PCC:	1+01.028	142.469	232.016

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	04° 19' 46.8743"	Type:	RIGHT
Radius:	110.000		
Length:	8.312	Tangent:	4.158
Mid-Ord:	0.079	External:	0.079
Chord:	8.310	Course:	S 85° 56' 37.2531" E

Curve Point Data

Description	Station	Northing	Easting
PCC:	1+01.028	142.469	232.016
RP:		36.607	220.476
PCC:	1+15.085	140.029	245.849

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	07° 33' 48.8334"	Type:	RIGHT
Radius:	106.490		
Length:	14.058	Tangent:	7.039
Mid-Ord:	0.232	External:	0.232
Chord:	14.047	Course:	S 79° 59' 49.3992" E

Curve Point Data

Description	Station	Northing	Easting
PCC:	1+15.085	140.029	245.849
RP:		33.198	219.639
PT:	1+23.398	137.746	253.840

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	04° 19' 46.8743"	Type:	RIGHT
Radius:	110.000		
Length:	8.312	Tangent:	4.158
Mid-Ord:	0.079	External:	0.079
Chord:	8.310	Course:	S 74° 03' 01.5453" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	1+23.398	137.746	253.840
End:	1+28.642	136.115	258.825

Tangent Data

Parameter	Value	Parameter	Value

Length:	5.245	Course:	S 71° 53' 08.1082" E

Curve Point Data

Description	Station	Northing	Easting
PC:	1+28.642	136.115	258.825
RP:		-95.049	183.204
PT:	1+54.485	126.792	282.914

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	06° 05' 15.8177"	Type:	RIGHT
Radius:	243.219		
Length:	25.842	Tangent:	12.933
Mid-Ord:	0.343	External:	0.344
Chord:	25.830	Course:	S 68° 50' 30.1993" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	1+54.485	126.792	282.914
End:	1+73.449	119.017	300.211

Tangent Data

Parameter	Value	Parameter	Value
Length:	18.964	Course:	S 65° 47' 52.2905" E

Spiral Point Data

Description	Station	Northing	Easting
TS:	1+73.449	119.017	300.211
SPI:		110.580	318.982
SC:	2+04.365	109.640	329.510

Spiral Curve Data: clothoid

Parameter	Value	Parameter	Value
Length:	30.917	L Tan:	20.725
Radius:	47.750	S Tan:	10.410
Theta:	18° 32' 55.0813"	P:	0.831
X:	30.594	K:	15.404
Y:	3.311	A:	38.422
Chord:	30.763	Course:	S 72° 15' 09.3280" E

Curve Point Data

Description	Station	Northing	Easting
SC:	2+04.365	109.640	329.510
RP:		157.201	333.758
CS:	2+41.322	120.219	363.964

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	44° 20' 42.4590"	Type:	LEFT
Radius:	47.750		
Length:	36.957	Tangent:	19.460
Mid-Ord:	3.531	External:	3.813
Chord:	36.041	Course:	N 72° 55' 51.5446" E

Spiral Point Data

Description	Station	Northing	Easting
CS:	2+41.322	120.219	363.964
SPI:		126.905	372.150
ST:	2+72.239	144.423	382.952

Spiral Curve Data: clothoid

Parameter	Value	Parameter	Value
Length:	30.917	L Tan:	20.725
Radius:	47.750	S Tan:	10.410
Theta:	18° 32' 55.0813"	P:	0.831
X:	30.594	K:	15.404
Y:	3.311	A:	38.422
Chord:	30.763	Course:	N 38° 06' 52.4173" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	2+72.239	144.423	382.952
End:	2+90.003	159.543	392.276

Tangent Data

Parameter	Value	Parameter	Value
Length:	17.764	Course:	N 31° 39' 35.3797" E

Koordinatni račun detaljnih točaka osi

Alignment Name: OS1
Description:
Station Range: Start: 0+000.00, End: 28+771.00
Station Increment: 20.00

Station	Northing	Easting	Tangential Direction
0+000.00	140.9441m	130.9950m	N85° 48' 13"E
0+020.00	142.4075m	150.9414m	N85° 48' 13"E
0+040.00	143.8710m	170.8878m	N85° 48' 13"E
0+060.00	145.3344m	190.8342m	N85° 48' 13"E
0+080.00	146.5635m	210.7951m	N88° 00' 05"E
0+100.00	146.1234m	230.7763m	S84° 36' 34"E
0+120.00	142.4575m	250.4096m	S74° 18' 21"E
0+140.00	135.7744m	269.2474m	S67° 29' 45"E
0+160.00	127.7214m	287.5536m	S65° 47' 52"E
0+180.00	119.5354m	305.8015m	S66° 18' 17"E
0+200.00	113.1059m	324.6958m	S78° 56' 28"E
0+220.00	113.5095m	344.5306m	N76° 08' 55"E
0+240.00	122.3861m	362.2694m	N50° 41' 02"E
0+260.00	137.4692m	375.2906m	N33° 45' 26"E
0+280.00	154.4280m	385.8906m	N31° 39' 35"E

Alignment Name: OS1-Left-2.750
Description:
Station Range: Start: 0+000.00, End: 28+294.00
Station Increment: 20.00

Station	Northing	Easting	Tangential Direction
0+000.00	143.6867m	130.7938m	N85° 48' 13"E
0+020.00	145.1501m	150.7402m	N85° 48' 13"E
0+040.00	146.6136m	170.6866m	N85° 48' 13"E
0+060.00	148.0771m	190.6330m	N85° 48' 13"E
0+080.00	149.3037m	210.4699m	N87° 56' 51"E
0+100.00	148.9058m	230.5516m	S84° 50' 41"E
0+120.00	145.3507m	250.2664m	S74° 44' 05"E
0+140.00	138.7563m	269.2284m	S67° 44' 44"E
0+160.00	130.7884m	287.4377m	S65° 47' 52"E
0+180.00	122.6592m	305.7100m	S68° 16' 32"E
0+200.00	117.5989m	325.0074m	S82° 20' 14"E
0+220.00	118.3557m	344.8210m	N74° 06' 09"E
0+240.00	128.2392m	361.9866m	N48° 34' 53"E
0+260.00	142.9935m	375.4158m	N35° 17' 56"E
0+280.00	159.9279m	386.0513m	N31° 39' 35"E

Alignment Name: OS1-Right-2.750
Description:
Station Range: Start: 0+000.00, End: 29+000.00
Station Increment: 20.00

Station	Northing	Easting	Tangential Direction
0+000.00	138.2014m	131.1963m	N85° 48' 13"E
0+020.00	139.6649m	151.1427m	N85° 48' 13"E
0+040.00	141.1283m	171.0890m	N85° 48' 13"E
0+060.00	142.5918m	191.0354m	N85° 48' 13"E
0+080.00	143.3623m	211.0151m	S89° 52' 06"E
0+100.00	142.5760m	230.9936m	S84° 18' 51"E
0+120.00	138.7521m	250.5950m	S73° 39' 19"E
0+140.00	132.3331m	269.5332m	S69° 12' 36"E
0+160.00	124.5308m	287.9442m	S65° 47' 52"E
0+180.00	116.4237m	306.0597m	S66° 39' 20"E
0+200.00	110.2374m	325.0749m	S79° 53' 02"E
0+220.00	110.8009m	345.0316m	N76° 20' 36"E
0+240.00	119.3970m	362.9283m	N52° 20' 42"E
0+260.00	134.3054m	376.4656m	N34° 39' 10"E
0+280.00	151.0291m	387.0255m	N31° 39' 35"E

Račun kota kolnika

Corridor Name: Koridor
Description:
Base Alignment Name: OS1
Station Range: Start: 0+000.00, End: 0+287.71

CHAINAGE 0+000.00

POINT	X	Y	Z	OFFSET	STRING CUT
1	130.6158	146.1129	326.9827	-5.183m	RW_Outside
2	130.6158	146.1129	326.5827	-5.183m	RWall_B1
3	130.6359	145.8386	326.3827	-4.908m	RWall_K1
4	130.6359	145.8386	326.5827	-4.908m	RWall_B2
5	130.6597	145.5145	327.4827	-4.583m	RW_Hinge
6	130.6597	145.5145	330.5242	-4.583m	RW_Back
7	130.6652	145.4397	326.5827	-4.508m	RWall_B3
8	130.6652	145.4397	326.3827	-4.508m	RWall_K2
9	130.6810	145.2242	330.3242	-4.292m	EPS
10	130.6811	145.2233	330.1242	-4.291m	EPS_Sub
11	130.6811	145.2233	330.5242	-4.291m	RW_Top
12	130.7469	144.3267	330.3602	-3.392m	Back_Curb
13	130.7548	144.2180	326.5827	-3.283m	RWall_B4
14	130.7548	144.2180	326.9827	-3.283m	RW_Inside
15	130.7578	144.1771	330.3602	-3.242m	Top_Curb
16	130.7609	144.1355	330.1352	-3.200m	Flowline_Gutter
17	130.7938	143.6867	330.1622	-2.750m	ETW
18	130.7938	143.6867	329.9622	-2.750m	ETW_SubBase
19	131.1963	138.2014	329.8247	2.750m	ETW_SubBase
20	131.1963	138.2014	330.0247	2.750m	ETW
21	131.2292	137.7526	329.9977	3.200m	Flowline_Gutter
22	131.2322	137.7110	330.2227	3.242m	Top_Curb
23	131.2432	137.5614	330.2227	3.392m	Back_Curb
24	131.3090	136.6649	329.9867	4.291m	EPS_Sub
25	131.3091	136.6639	330.1867	4.292m	Hinge
26	131.5039	134.0090	335.5106	6.954m	Daylight

CHAINAGE 0+025.00

CHAINAGE 0+050.00

CHAINAGE 0+075.00

CHAINAGE 0+100.00

POINT	X	Y	Z	OFFSET	STRING CUT
1	231.3430	152.1296	328.9179	-6.033m	RW_Outside
2	231.3430	152.1296	328.2679	-6.033m	RWall_B1
3	231.2350	150.9847	328.2679	-4.883m	RWall_B2
4	231.2350	150.9847	327.9679	-4.883m	RWall_K1
5	231.2068	150.6860	337.3399	-4.583m	RW_Back
6	231.2068	150.6860	329.4179	-4.583m	RW_Hinge
7	231.1794	150.3963	337.1399	-4.292m	EPS
8	231.1794	150.3953	337.3399	-4.291m	RW_Top
9	231.1794	150.3953	336.9399	-4.291m	RW_Front
10	231.1786	150.3873	327.9679	-4.283m	RWall_K2
11	231.1786	150.3873	328.2679	-4.283m	RWall_B3
12	231.0949	149.5003	337.1759	-3.392m	Back_Curb
13	231.0808	149.3509	337.1759	-3.242m	Top_Curb
14	231.0769	149.3094	336.9509	-3.200m	Flowline_Gutter
15	231.0346	148.8614	336.9779	-2.750m	ETW
16	231.0346	148.8614	336.7779	-2.750m	ETW_SubBase
17	230.9344	147.7988	328.9179	-1.683m	RW_Inside
18	230.9344	147.7988	328.2679	-1.683m	RWall_B4
19	230.4465	142.6291	336.8214	3.510m	ETW
20	230.4465	142.6291	336.6214	3.510m	ETW_SubBase
21	230.4043	142.1811	336.7944	3.960m	Flowline_Gutter
22	230.4004	142.1396	337.0194	4.001m	Top_Curb
23	230.3863	141.9902	337.0194	4.151m	Back_Curb
24	230.3018	141.0952	336.7834	5.050m	EPS_Sub
25	230.3017	141.0942	336.9834	5.051m	Hinge
26	230.2576	140.6266	336.6703	5.521m	Daylight

CHAINAGE 0+125.00

CHAINAGE 0+150.00

CHAINAGE 0+175.00

CHAINAGE 0+200.00

POINT	X	Y	Z	OFFSET	STRING CUT
1	326.1415	120.5029	336.7321	-7.537m	RW_Outside
2	326.1415	120.5029	336.2321	-7.537m	RWall_B1
3	325.9625	119.5869	336.2321	-6.604m	RWall_B2
4	325.9625	119.5869	335.9321	-6.604m	RWall_K1
5	325.9114	119.3252	344.3974	-6.337m	RW_Back
6	325.9114	119.3252	337.2321	-6.337m	RW_Hinge
7	325.8555	119.0396	344.1974	-6.046m	EPS
8	325.8553	119.0386	344.3974	-6.045m	RW_Top
9	325.8553	119.0386	343.9974	-6.045m	RW_Front
10	325.8474	118.9981	335.9321	-6.004m	RWall_K2
11	325.8474	118.9981	336.2321	-6.004m	RWall_B3
12	325.6829	118.1563	344.2334	-5.146m	Back_Curb
13	325.6541	118.0091	344.2334	-4.996m	Top_Curb
14	325.6461	117.9682	344.0084	-4.954m	Flowline_Gutter
15	325.5598	117.5265	344.0354	-4.504m	ETW
16	325.5598	117.5265	343.8354	-4.504m	ETW_SubBase
17	325.4318	116.8716	336.7321	-3.837m	RW_Inside
18	325.4318	116.8716	336.2321	-3.837m	RWall_B4
19	324.1684	110.4072	343.8541	2.750m	ETW
20	324.1684	110.4072	343.6541	2.750m	ETW_SubBase
21	324.0820	109.9655	343.8271	3.200m	Flowline_Gutter
22	324.0740	109.9246	344.0521	3.241m	Top_Curb
23	324.0453	109.7774	344.0521	3.391m	Back_Curb
24	323.8728	108.8951	343.8161	4.290m	EPS_Sub
25	323.8726	108.8941	344.0161	4.291m	Hinge
26	323.6613	107.8128	343.2816	5.393m	Daylight

CHAINAGE 0+225.00

CHAINAGE 0+250.00

CHAINAGE 0+275.00

Vertikalni tok trase

Vertical Alignment: Niveleta
Description:
Station Range: Start: 0+000.00, End: 28+771.00

PVI	Station	Grade Out	Curve Length	
0.00	0+000.00	6.82%		
1.00	0+211.98	9.93%	92.504m	
	Vertical Curve Information:(sag curve)			
	PVC Station:	0+165.67	Elevation:	341.385m
	PVI Station:	0+211.98	Elevation:	344.541m
	PVT Station:	0+258.17	Elevation:	349.129m
	Low Point:	0+165.67	Elevation:	341.385m
	Grade in:	6.82%	Grade out:	9.93%
	Change:	3.12%	K:	
	Curve Length:	92.504m		
	Headlight Distance:			
2.00	0+287.71			

Proračun količina zemljanih radova

Volume Summary

Name	Type	Cut Factor	Fill Factor	2d Area (sq.m)	Cut (Cu. M.)	Fill (Cu. M.)	Net (Cu. M.)
Surface3	full	1.000	1.000	6931.98	3402.80	32510.16	29107.36<Fill>

Totals

	2d Area (sq.m)	Cut (Cu. M.)	Fill (Cu. M.)	Net (Cu. M.)
Total	6931.98	3402.80	32510.16	29107.36<Fill>

* Value adjusted by cut or fill factor other than 1.0

Proračun količine zemljanih radova po presjecima

Station	Cut Area (Sq.m.)	Cut Volume (Cu.m.)	Reusable Volume (Cu.m.)	Fill Area (Sq.m.)	Fill Volume (Cu.m.)	Cum. Cut Vol. (Cu.m.)	Cum. Reusable Vol. (Cu.m.)	Cum. Fill Vol. (Cu.m.)	Cum. Net Vol. (Cu.m.)
0+000.000	11.17	0.00	0.00	5.25	0.00	0.00	0.00	0.00	0.00
0+020.000	0.00	111.67	111.67	23.78	290.37	111.67	111.67	290.37	-178.70
0+040.000	0.00	0.00	0.00	37.24	610.23	111.67	111.67	900.61	-788.93
0+060.000	0.00	0.00	0.00	39.06	763.03	111.67	111.67	1663.64	-1551.97
0+061.628	0.01	0.00	0.00	39.54	63.99	111.68	111.68	1727.63	-1615.95
0+061.630	0.01	0.00	0.00	39.54	0.08	111.68	111.68	1727.71	-1616.02
0+074.601	1.91	12.32	12.32	42.61	533.11	124.01	124.01	2260.82	-2136.81
0+080.000	4.15	15.82	15.82	41.84	228.30	139.82	139.82	2489.12	-2349.29
0+087.704	11.28	56.35	56.35	40.20	316.97	196.17	196.17	2806.08	-2609.91
0+093.072	21.12	80.87	80.87	38.89	213.22	277.05	277.05	3019.30	-2742.26
0+097.342	18.85	78.13	78.13	37.38	163.83	355.18	355.18	3183.14	-2827.96
0+100.000	18.90	45.32	45.32	34.27	95.96	400.49	400.49	3279.10	-2878.61
0+101.628	17.03	29.25	29.25	33.46	55.13	429.75	429.75	3334.22	-2904.48
0+101.629	17.03	0.02	0.02	33.46	0.03	429.76	429.76	3334.26	-2904.49
0+108.889	6.17	74.85	74.85	40.92	270.28	504.61	504.61	3604.54	-3099.93
0+116.148	8.87	48.46	48.46	25.12	239.20	553.07	553.07	3843.74	-3290.66
0+116.149	8.87	0.00	0.00	25.12	0.03	553.08	553.08	3843.76	-3290.68
0+120.000	17.54	46.28	46.28	17.15	82.60	599.36	599.36	3926.36	-3327.00
0+120.435	18.85	7.91	7.91	16.26	7.26	607.27	607.27	3933.62	-3326.35
0+124.705	37.25	112.72	112.72	11.33	61.04	719.99	719.99	3994.66	-3274.67
0+130.073	33.72	182.10	182.10	26.36	106.04	902.09	902.09	4100.70	-3198.61
0+140.000	23.27	274.40	274.40	65.14	476.70	1176.49	1176.49	4577.40	-3400.92
0+143.176	21.47	71.06	71.06	81.87	233.44	1247.54	1247.54	4810.84	-3563.30
0+156.149	18.27	256.38	256.38	90.12	1138.03	1503.93	1503.93	5948.87	-4444.95
0+156.150	18.27	0.02	0.02	90.12	0.09	1503.95	1503.95	5948.96	-4445.02
0+160.000	17.65	69.16	69.16	85.87	338.78	1573.11	1573.11	6287.75	-4714.64
0+165.667	14.87	92.16	92.16	83.20	479.04	1665.26	1665.26	6766.79	-5101.53
0+175.110	7.61	106.13	106.13	103.10	879.65	1771.39	1771.39	7646.43	-5875.04
0+175.113	7.61	0.02	0.02	103.12	0.30	1771.41	1771.41	7646.73	-5875.32
0+180.000	4.15	28.74	28.74	120.58	546.61	1800.15	1800.15	8193.34	-6393.19
0+187.295	0.11	15.84	15.84	140.58	875.13	1815.99	1815.99	9068.47	-7252.48
0+199.985	0.00	0.72	0.72	163.06	1624.43	1816.71	1816.71	10692.90	-8876.18
0+200.000	0.00	0.00	0.00	163.08	2.37	1816.71	1816.71	10695.26	-8878.55
0+203.215	0.00	0.00	0.00	165.61	417.95	1816.71	1816.71	11113.21	-9296.50
0+204.162	0.00	0.00	0.00	167.09	122.20	1816.71	1816.71	11235.41	-9418.70

0+205.113	0.00	0.00	0.00	168.64	122.78	1816.71	1816.71	11358.19	-9541.47
0+220.000	0.00	0.00	0.00	160.61	1886.88	1816.71	1816.71	13245.07	-11428.35
0+222.527	0.00	0.00	0.00	152.70	305.50	1816.71	1816.71	13550.57	-11733.85
0+239.941	35.90	332.17	332.17	72.67	1444.77	2148.88	2148.88	14995.34	-12846.45
0+240.000	35.98	2.10	2.10	72.55	4.25	2150.99	2150.99	14999.59	-12848.60
0+240.892	37.45	34.80	34.80	71.05	43.08	2185.78	2185.78	15042.67	-12856.89
0+241.840	40.23	39.02	39.02	69.46	45.45	2224.80	2224.80	15088.12	-12863.31
0+245.069	53.21	158.89	158.89	65.32	153.45	2383.70	2383.70	15241.57	-12857.87
0+257.760	22.75	500.76	500.76	64.69	660.11	2884.46	2884.46	15901.68	-13017.23
0+258.171	22.72	9.36	9.36	64.18	26.51	2893.81	2893.81	15928.20	-13034.38
0+260.000	21.91	40.81	40.81	62.47	115.81	2934.62	2934.62	16044.00	-13109.38
0+269.940	18.89	204.81	204.81	71.73	632.32	3139.43	3139.43	16676.32	-13536.89
0+269.941	18.89	0.03	0.03	71.73	0.11	3139.46	3139.46	16676.43	-13536.96
0+280.000	22.53	208.31	208.31	45.30	588.59	3347.78	3347.78	17265.01	-13917.24
0+287.706	8.29	118.72	118.72	4.92	193.49	3466.50	3466.50	17458.51	-13992.01

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