

Idejni projekt lokalne ceste

Goić, Tamara

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UNIVERSITY OF SPLIT



SVEUČILIŠTE U SPLITU
FAKULTET GRAĐEVINARSTVA, ARHITEKTURE I GEODEZIJE

ZAVRŠNI RAD

TAMARA GOIĆ

Split, 2020.

SVEUČILIŠTE U SPLITU
FAKULTET GRAĐEVINARSTVA, ARHITEKTURE I GEODEZIJE

IDEJNI PROJEKT LOKALNE CESTE

Završni rad

Split, 2020.

SVEUČILIŠTE U SPLITU

FAKULTET GRAĐEVINARSTVA, ARHITEKTURE I GEODEZIJE

Split, Matice hrvatske 15

STUDIJ: **PREDDIPLOMSKI SVEUČILIŠNI STUDIJ
GRAĐEVINARSTVA**

KANDIDAT: **Tamara Goić**

BROJ INDEKSA: **4563**

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, rujan 2020.

Voditelj završnog rada:

Prof. dr. sc. Dražen Cvitanić

Idejni projekt lokalne ceste

Sažetak: Idejni projekt lokalne ceste je izrađen na geodetskoj podlozi, prema zadatku iz kolegija Ceste, koristeći se programom AutoCAD Civil 3D. Cesta je projektirana za godišnji dnevni promet (PGDP) od 950 vozila na dan, na brdovitom terenu. Predviđena projektna brzina ceste 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, poprečni presjek

Conceptual project of local road

Abstract:

A conceptual project of local road, on a geodetic ground according to the task from course „Roads“, is made using software AutoCAD Civil 3D. The road is designed for the annual average daily traffic (AADT) of 950 vehicles per day, on the hilly terrain. The predicted project speed of the road is 40 miles per hour. Preliminary design of local road was created according to the Regulations on the basic conditions for the design of public roads with the elements that meet the applicable rules, as well as safety and aesthetic criteria.

Keywords:

Conceptual project, local road, design speed, the road axis, profile, cross-section

SADRŽAJ

| | |
|---|---------|
| 1. PROGRAMSKI ZADATAK..... | 1.str. |
| 2. TEHNIČKI OPIS..... | 2.str. |
| 2.1. Općenito..... | 2.str. |
| 2.2. Horizontalni elementi..... | 2.str. |
| 2.3. Vertikalni elementi | 2.str. |
| 2.4. Poprečni presjek..... | 2.str. |
| 2.5. Kolnička konstrukcija..... | 2.str. |
| 2.6. Odvodnja..... | 3.str. |
| 2.7. Oprema ceste..... | 3.str. |
| 3. GRAFIČKI PRILOZI..... | 4.str. |
| 3.1. Situacija M 1:1000..... | 5.str. |
| 3.2. Uzdužni presjek M 1:1000/100..... | 6.str. |
| 3.3. Normalni poprečni presjek M 1:50..... | 9.str. |
| 3.4. Karakteristični poprečni presjeci M 1:200..... | 11.str. |
| 4. TABLICA UKUPNOG VOLUMENA ZEMLJANIH RADOVA..... | 25.str. |
| 5. OBRADA NA RAČUNALU..... | 28.str. |
| 6. IZLAZNI PODACI IZ PROGRAMA..... | 29.str. |
| 6.1. Koordinatni račun glavnih točaka osi..... | 30.str. |
| 6.2. Koordinatni račun detaljnih točaka osi..... | 41.str. |
| 6.3. Račun kota kolnika..... | 43.str. |
| 6.4. Vertikalni tok trase..... | 52.str. |
| 7. LITERATURA..... | 54.str. |

1. PROGRAMSKI ZADATAK

Katedra za prometnice

Studij: Preddiplomski

Nastavni predmet: CESTE

Student/ica: Tamara Goić

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
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, dipl.ing. građ.

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 230 metara nadmorske visine, do točke B koja se nalazi na 218 metara nadmorske visine. Cesta je projektirana za prosječni dnevni promet od 950 vozila na dan i to na brdovitom terenu (ceste je V. kategorije). Predviđena projektna brzina je 40 km/h.

2.2. Horizontalni elementi

Za navedenu kategoriju prema pravilniku, minimalni radijus horizontalne krivine je 45 m, a prijelaznice 30 m. Trasa kontinuirane ceste ima dužinu od 294 m, a sastoji se od tri pravca i dvije krivine. Obe krivine imaju radijus 50 m, a duljinu prijelaznice 30 m. Svaka krivina je konstruirana pomoću dvije prijelaznice oblika klotoide i jednog kružnog luka. Proširenje kružnog luka za promet teretnih vozila s priključkom u prvom i u drugom krivini iznosi 1.68 m.

2.3. Vertikalni elementi

Na temelju kategorije ceste najveći dopušteni nagib nivelete iznosi 12%, a najmanji dopušteni radijus vertikalne krivine 300 m. Tok trase se sastoji od tri pravca i dvije krivine. Nagib prvog pravca iznosi 5.21%, a drugog 9.54%. Tangenta krivine je dužine 21.483 m, a radijus konkavne krivine 500 m.

2.4. Poprečni presjek

Projektirana cesta ima dva kolnička traka širine svakog po 3 m, betonski rubni trak širine 0.20 m i bankinu širine 1 m i nagiba 4%. Cesta se dijelom nalazi u zasjeku, a dijelom u usjeku i nasipu. Nagib pokosa nasipa iznosi 1:1, a usjeka 2:1. Na usjecima se izvode rigoli za odvodnju vode širine 0.65 m i drenaža koja je postavljena u glinenu posteljicu, a u nasipu se izvode potporni zidovi zbog konfiguracije terena.

2.5. Kolnička konstrukcija

Projektom je predviđena kolnička konstrukcija sa sljedećim slojevima:

- Habajući sloj AC 11 surf (BIT50/70) AG4 M4 u debljini 4 cm
- Nosivi sloj AC 22 base (BIT50/70) AG6 M2 u debljini 6 cm
- Mehanički zbijeni nosivi sloj debljine 30 cm

2.6. Odvodnja

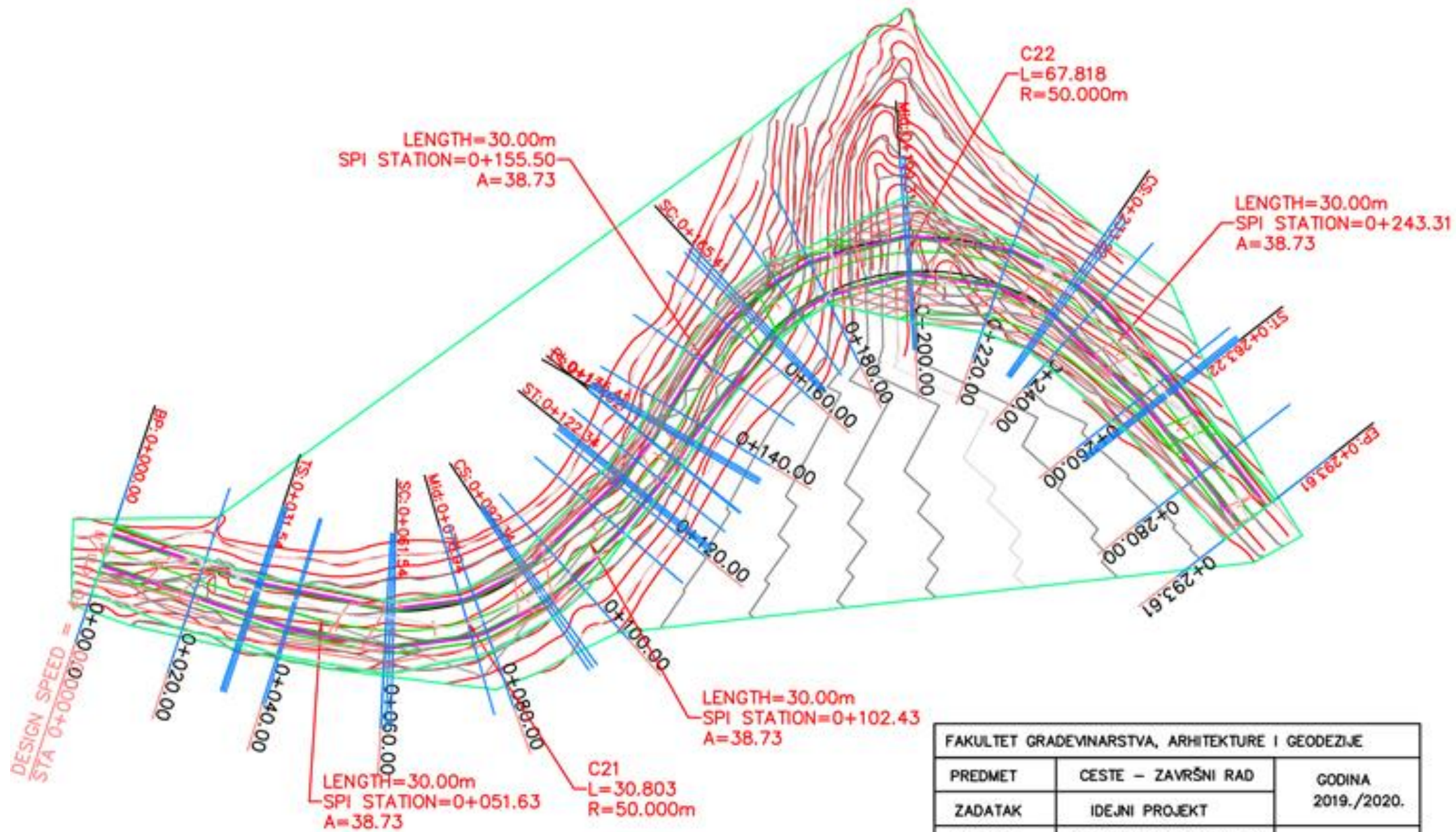
Odvodnja kolnika predviđa se otvorenim sustavom odvodnje prihvaćanjem kolničkih pribrežnih voda u zasjeku i usjeku u betonske rigole te kontroliranim ispuštanjem u teren direktno ili betonskim cijevnim propustima kroz trup kolnika.

2.7. Oprema ceste

Idejnim rješenjem je predviđena horizontalna signalizacija koja se sastoji od jedne pune razdjelne crte širine 10 cm koja se postavlja u osi prometnice i punih rubnih crta širine 10 cm koje se postavljaju na svaki od rubnih trakova. Na nasip se postavlja jednostrana zaštitna čelična ograda.

3. GRAFIČKI PRILOZI

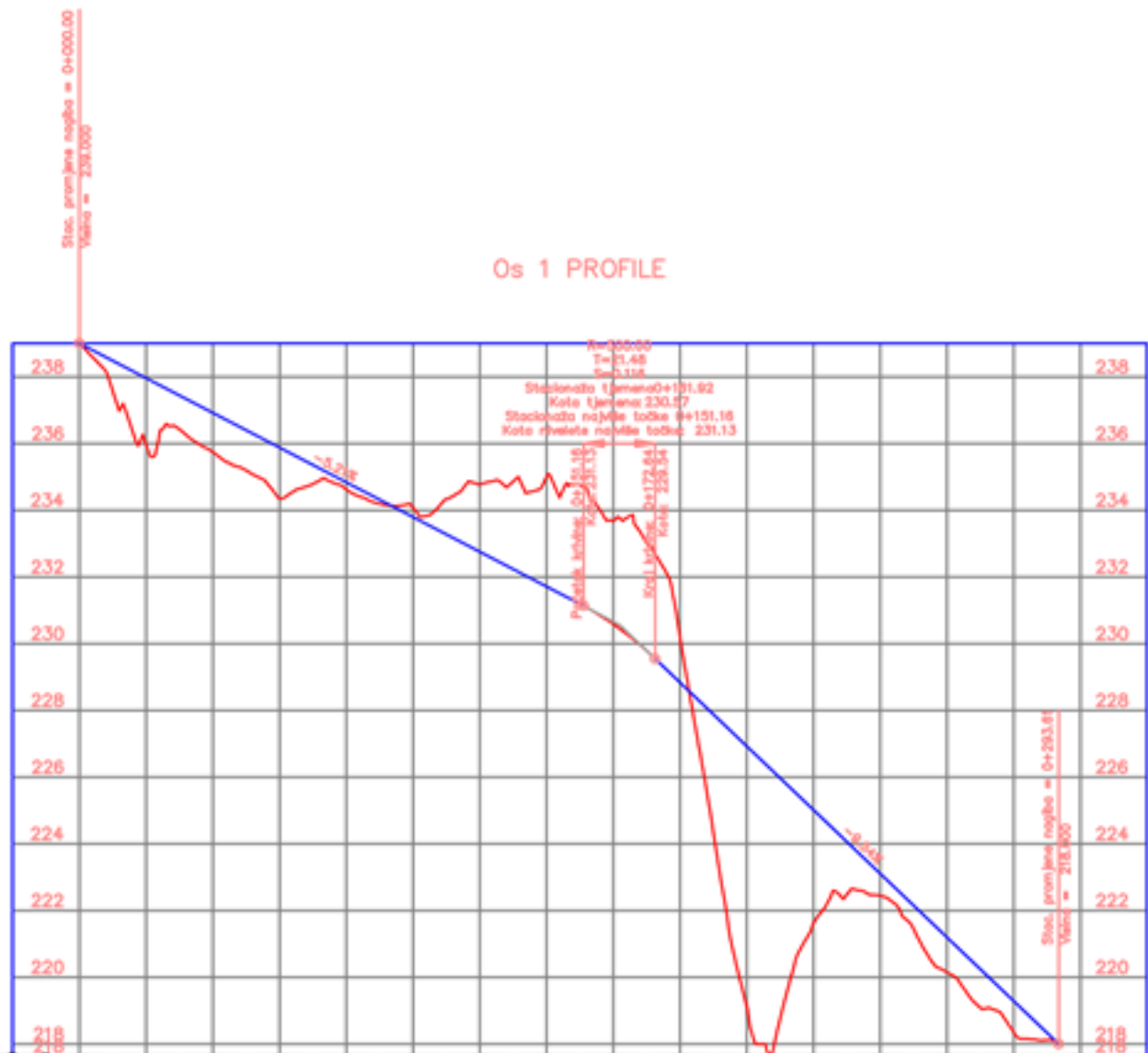
3.1. Situacija M 1:1000



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|--|-----------------------|-----------------------|
| PREDMET | CESTE – ZAVRŠNI RAD | GODINA 2019./2020. |
| ZADATAK | IDEJNI PROJEKT | |
| SADRŽAJ | GRADEVINSKA SITUACIJA | M 1:1000 |
| STUDENTICA | TAMARA GOIĆ | |

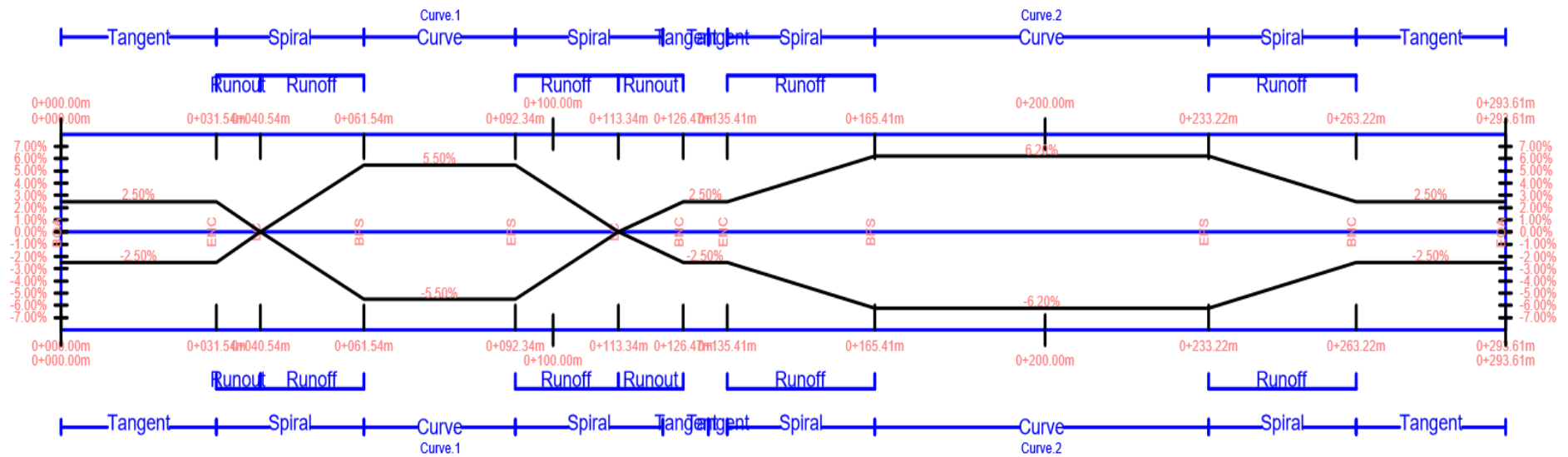
3.2. Uzdužni presjek M 1:1000/100

Os 1 PROFILE



| | | | | | | | |
|------------------------------|----------|----------|----------|----------|----------|----------|----------|
| Stacionaža | 0+000.00 | 0+050.00 | 0+100.00 | 0+150.00 | 0+200.00 | 0+250.00 | 0+300.00 |
| Kote nivelete | 238.00 | 237.58 | 237.06 | 236.54 | 236.02 | 235.50 | 235.00 |
| Kote terena | 238.00 | 237.58 | 237.06 | 236.54 | 236.02 | 235.50 | 235.00 |
| Horizontalni elementi | | | | | | | |
| Vitoperenje | | | | | | | |

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| ZADATAK | IDEJNI PROJEKT | |
| SADRŽAJ | UZDUŽNI PRESJEK | M 1:1000/100 |
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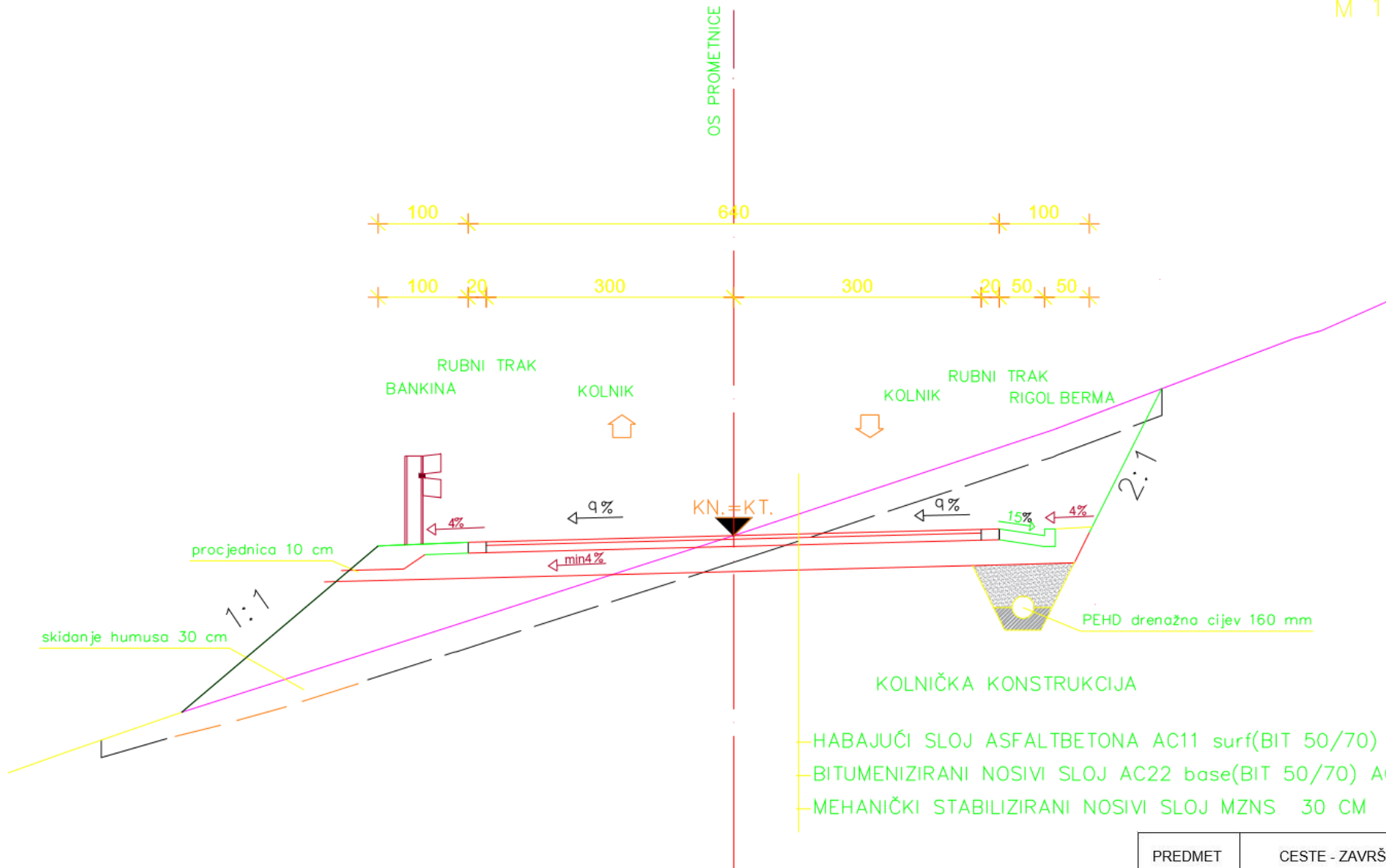


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| ZADATAK | IDEJNI PROJEKT | |
| SADRŽAJ | DIJAGRAM VITOPERENJA | M 1:1000 |
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3.3. Normalni poprečni presjek M 1:50

NORMALNI POPREČNI PRESJEK

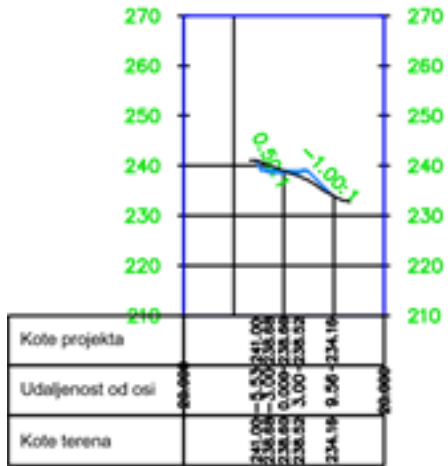
M 1:50



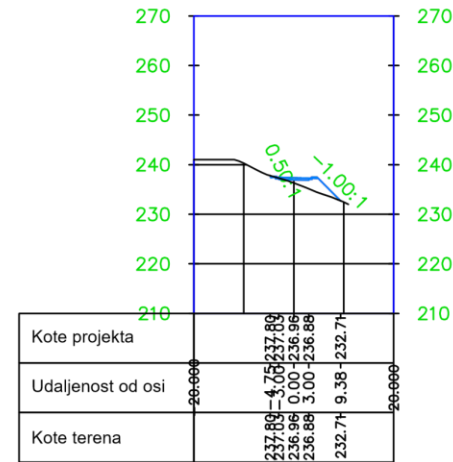
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| PROGRAM | IDEJNI PROJEKT | |
| SADRŽAJ | NORMALNI POPREČNI PRESJEK | M 1:50 |
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3.4. Karakteristični poprečni presjeci M 1:200

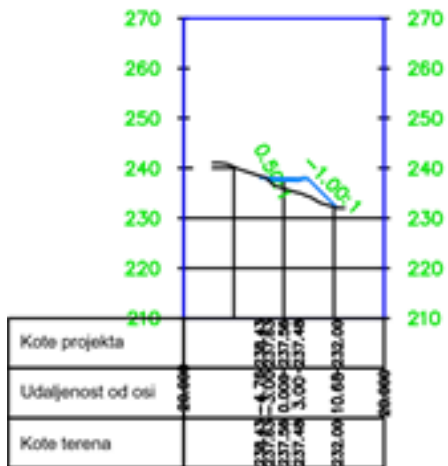
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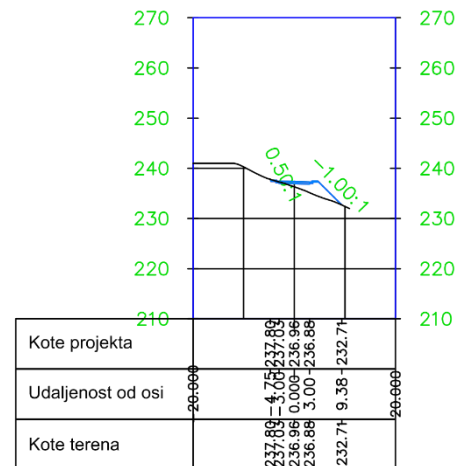
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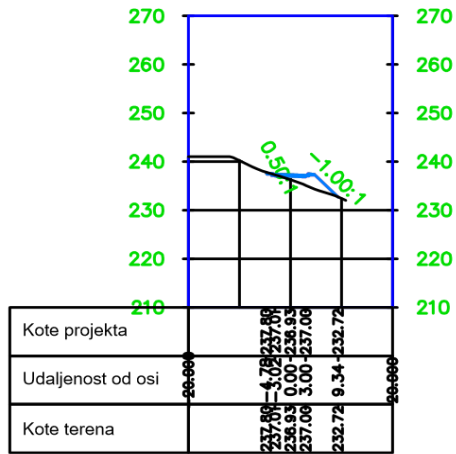


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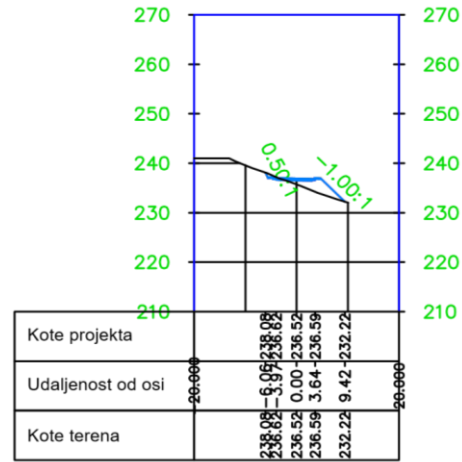


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| ZADATAK | IDEJNI PROJEKT | |
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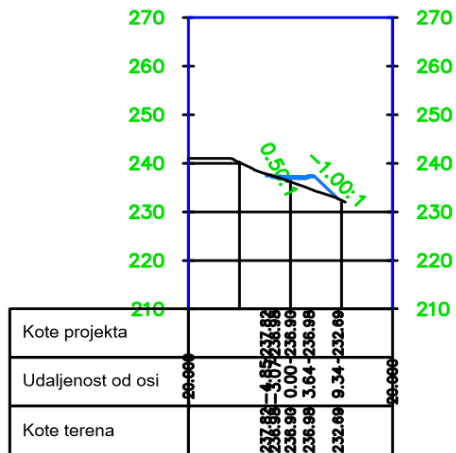
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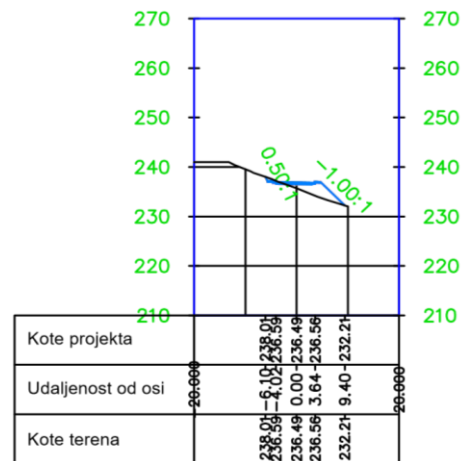
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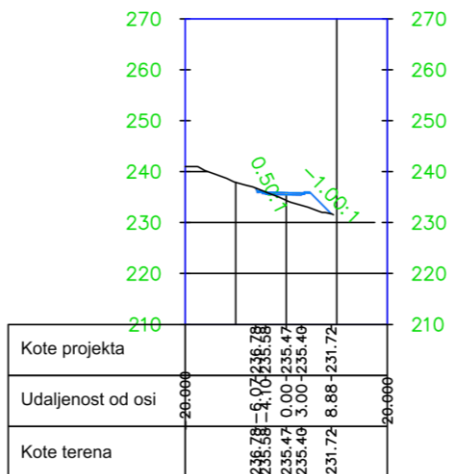


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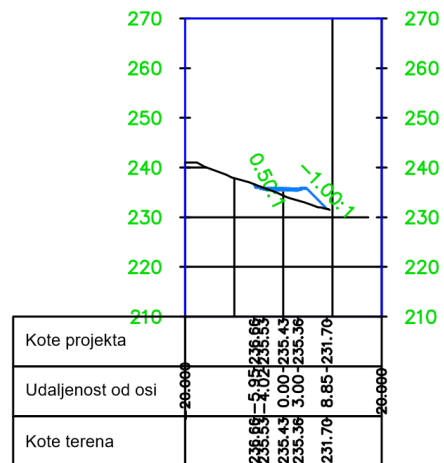


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| ZADATAK | IDEJNI PROJEKT | 2019./2020. |
| SADRŽAJ | KARAKTERISTIČNI POPREČNI PRESJECI | M 1:200 |
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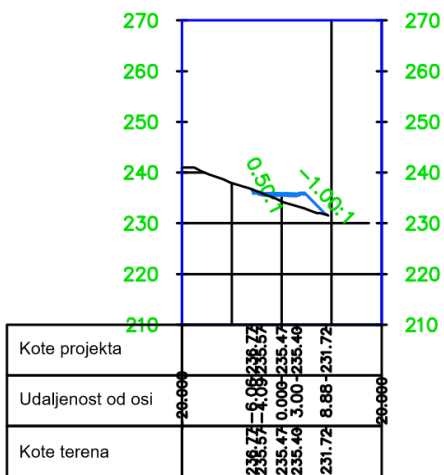
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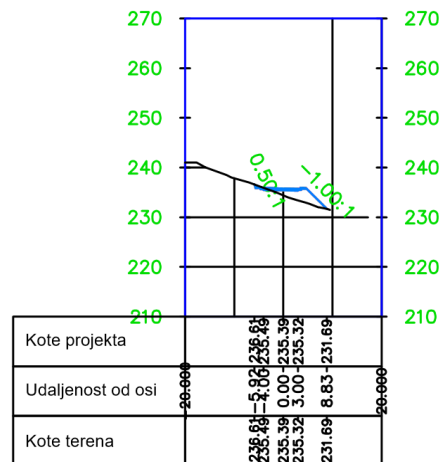
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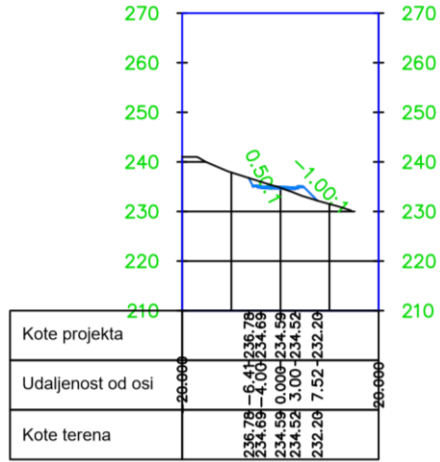


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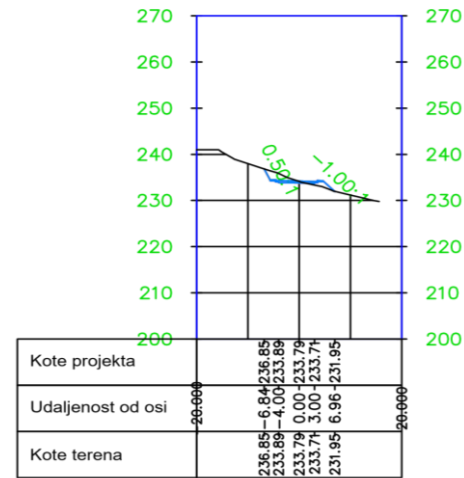


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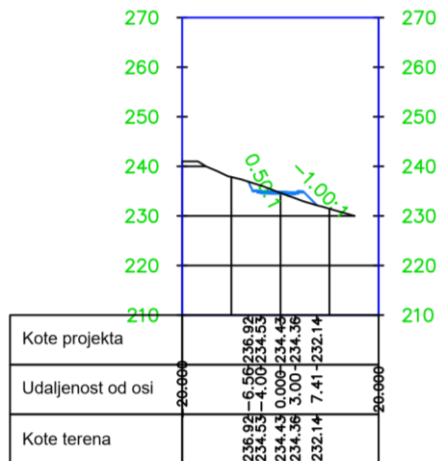
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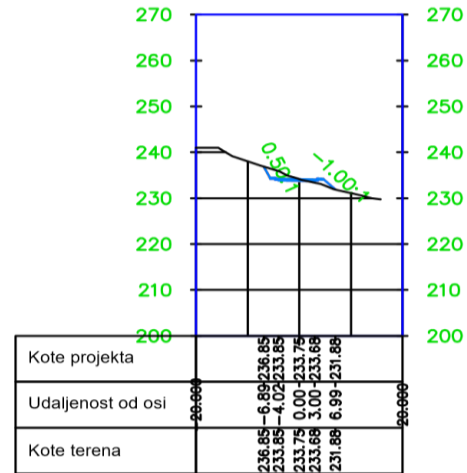
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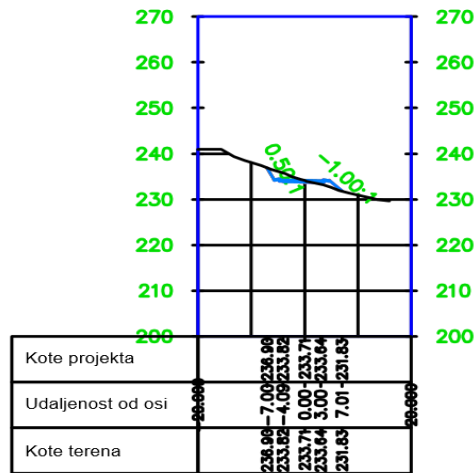


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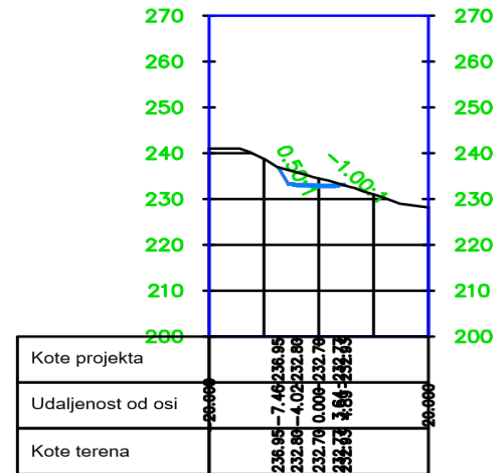


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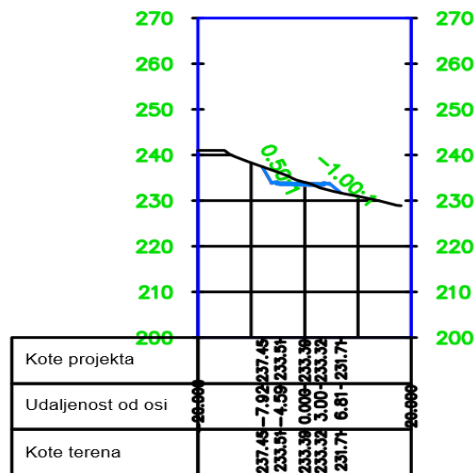
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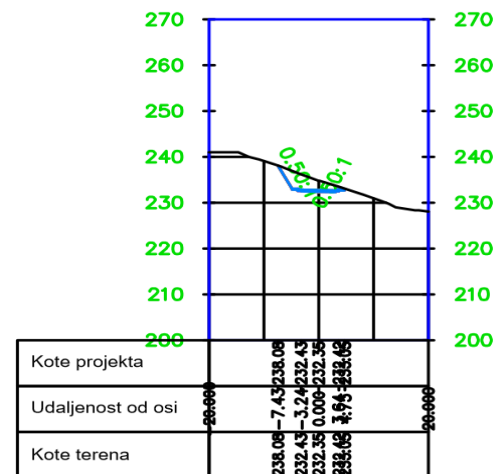
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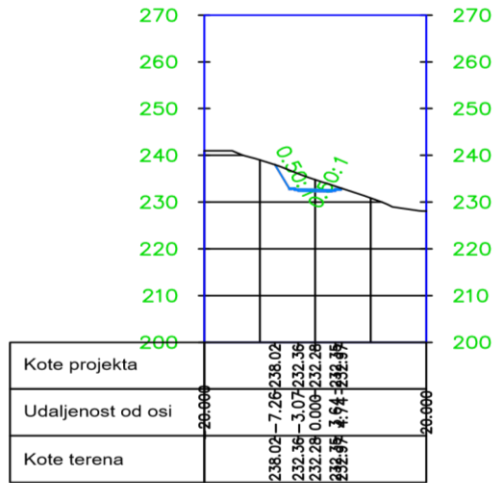


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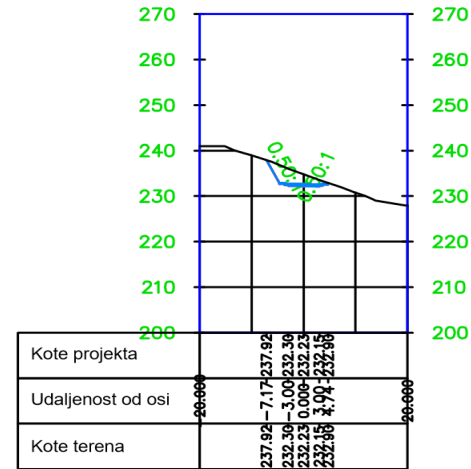


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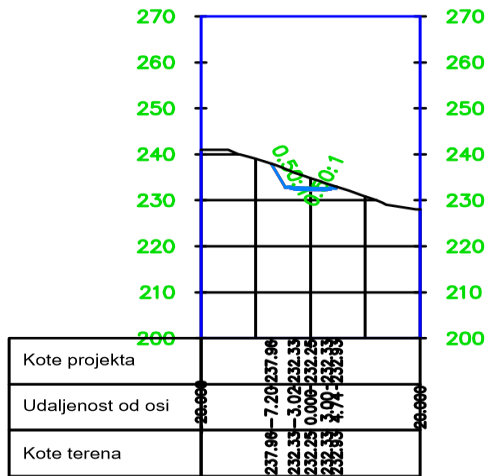
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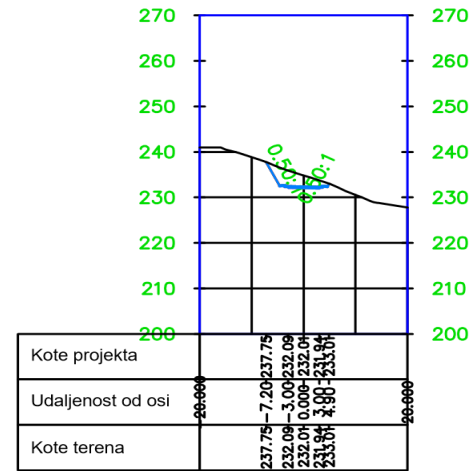
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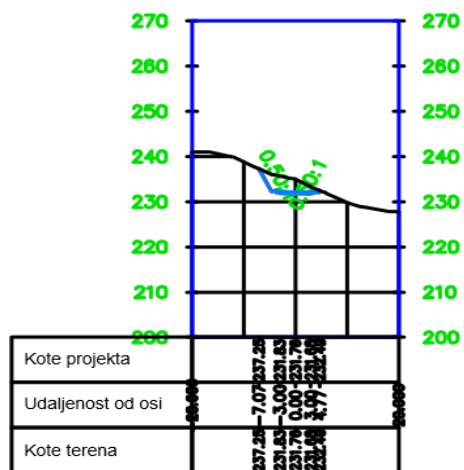


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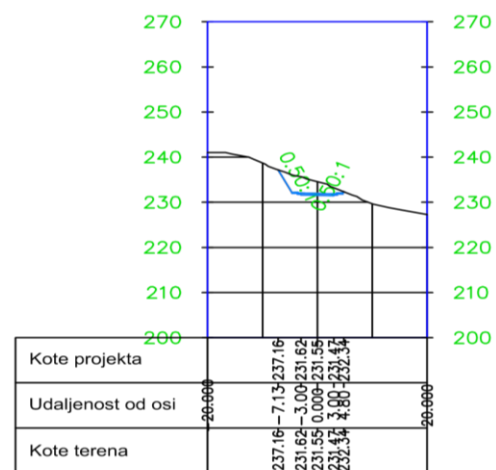


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| SADRŽAJ | KARAKTERISTIČNI POPREČNI PRESJECI | M 1:200 |
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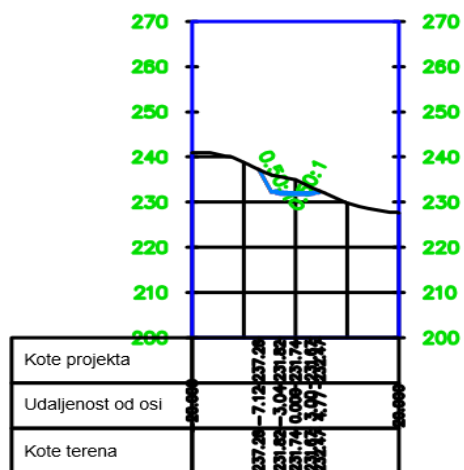
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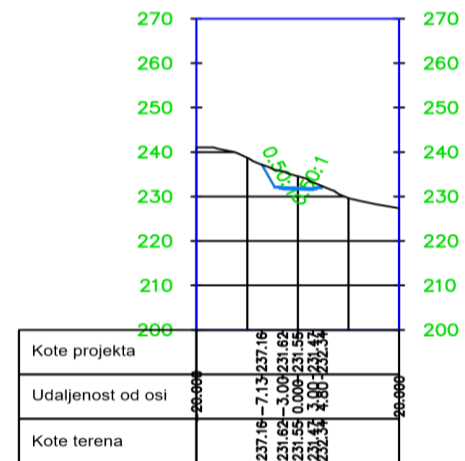
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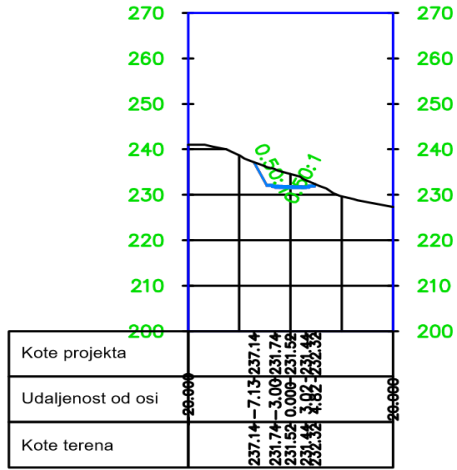


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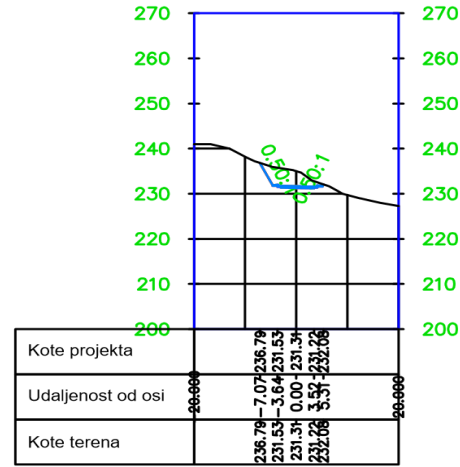


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| FAKULTET GRADEVINARSTVA, ARHITEKTURE I GEODEZIJE | | |
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| SADRŽAJ | KARAKTERISTIČNI POPREČNI PRESJECI | M 1:200 |
| STUDENTICA | TAMARA GOIĆ | |

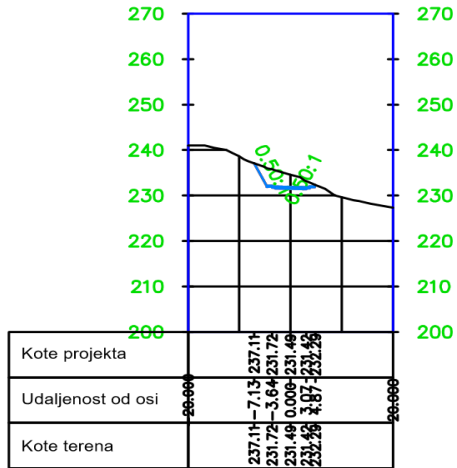
0+135.93



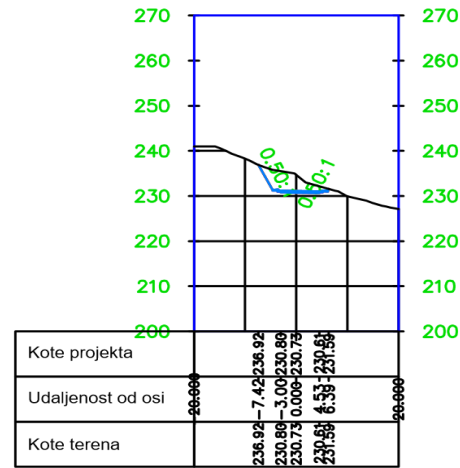
0+140.00



0+136.45

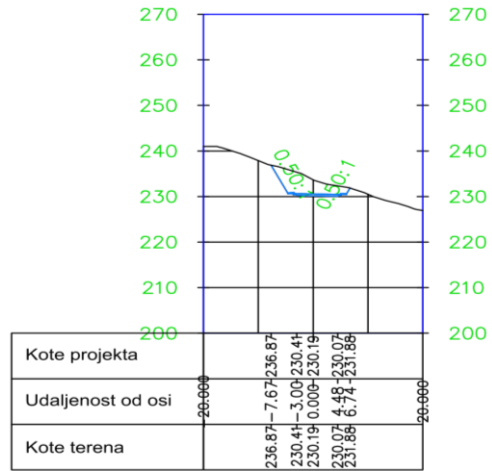


0+151.16

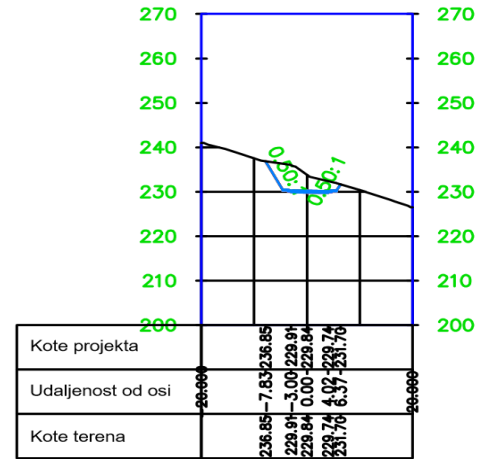


| | | |
|--|-----------------------------------|-----------------------|
| FAKULTET GRADEVINARSTVA, ARHITEKTURE I GEODEZIJE | | |
| PREDMET | CESTE - ZAVRŠNI RAD | GODINA 2019./2020. |
| ZADATAK | IDEJNI PROJEKT | |
| SADRŽAJ | KARAKTERISTIČNI POPREČNI PRESJECI | M 1:200 |
| STUDENTICA | TAMARA GOIĆ | |

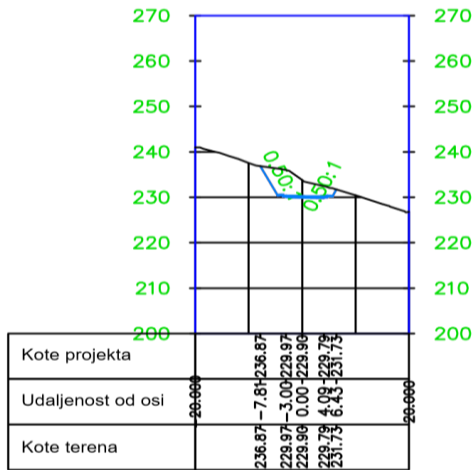
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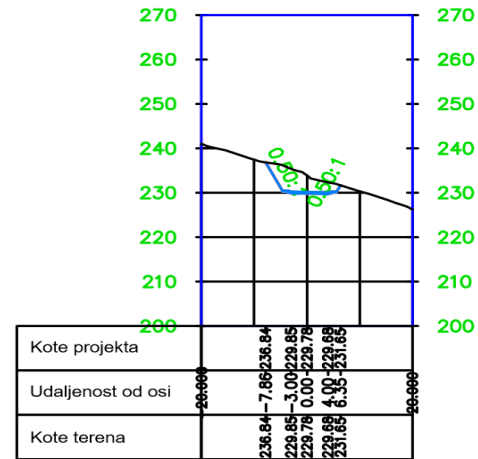
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0+163.94

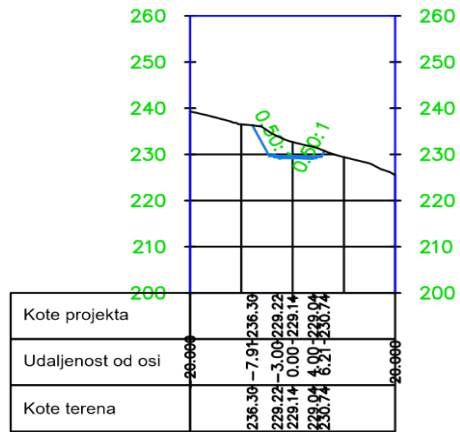


0+165.41

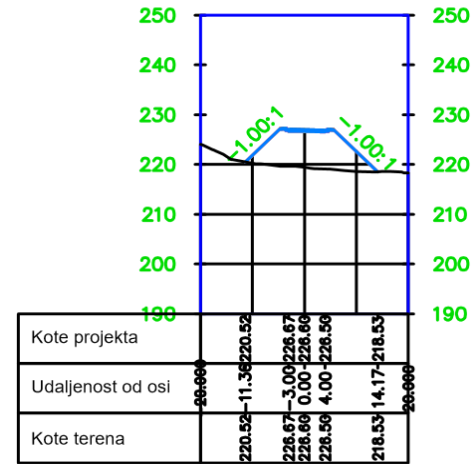


| | | |
|--|-----------------------------------|-----------------------|
| FAKULTET GRAĐEVINARSTVA, ARHITEKTURE I GEODEZIJE | | |
| PREDMET | CESTE - ZAVRŠNI RAD | GODINA 2019./2020. |
| ZADATAK | IDEJNI PROJEKT | |
| SADRŽAJ | KARAKTERISTIČNI POPREČNI PRESJECI | M 1:200 |
| STUDENTICA | TAMARA GOIĆ | |

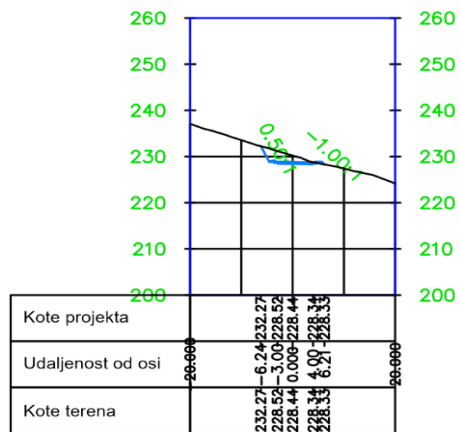
0+172.64



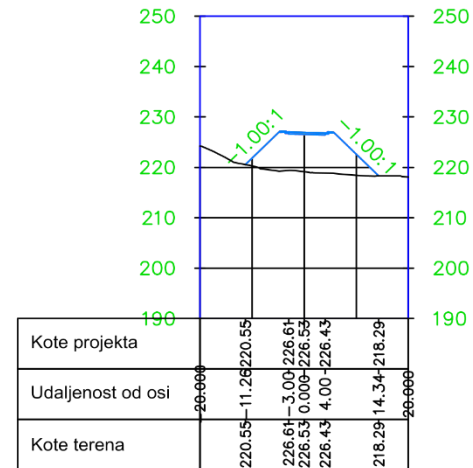
0+199.31



0+180.00

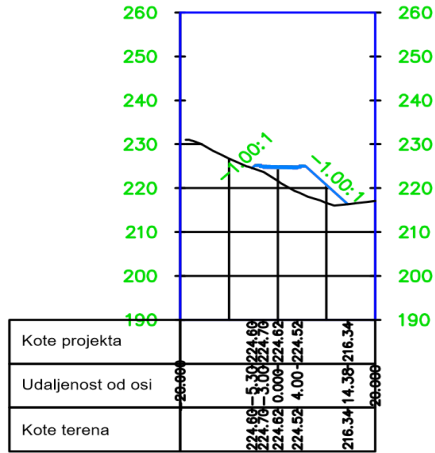


0+200.00

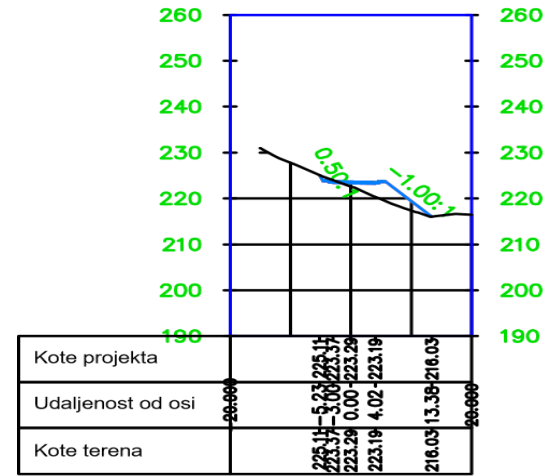


| | | |
|--|-----------------------------------|-----------------------|
| FAKULTET GRAĐEVINARSTVA, ARHITEKTURE I GEODEZIJE | | |
| PREDMET | CESTE - ZAVRŠNI RAD | GODINA 2019./2020. |
| ZADATAK | IDEJNI PROJEKT | |
| SADRŽAJ | KARAKTERISTIČNI POPREČNI PRESJECI | M 1:200 |
| STUDENTICA | TAMARA GOIĆ | |

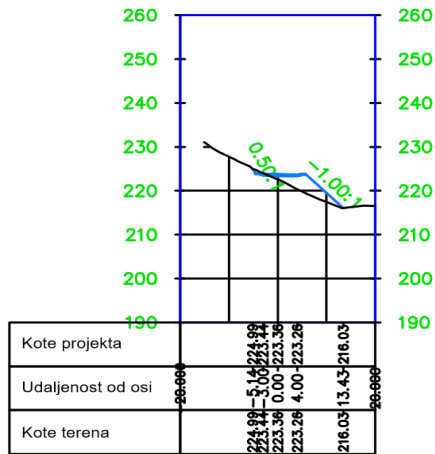
0+220.00



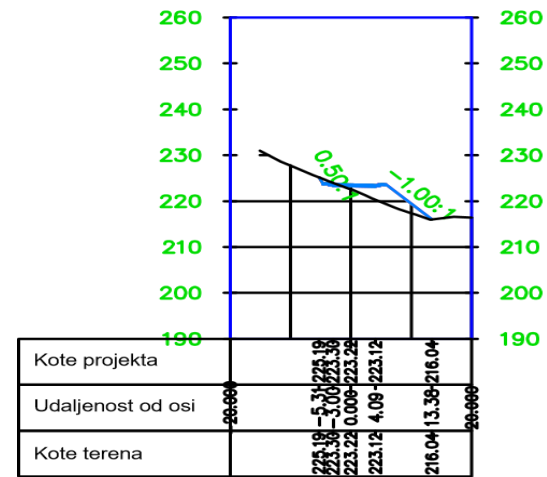
0+233.96



0+233.22

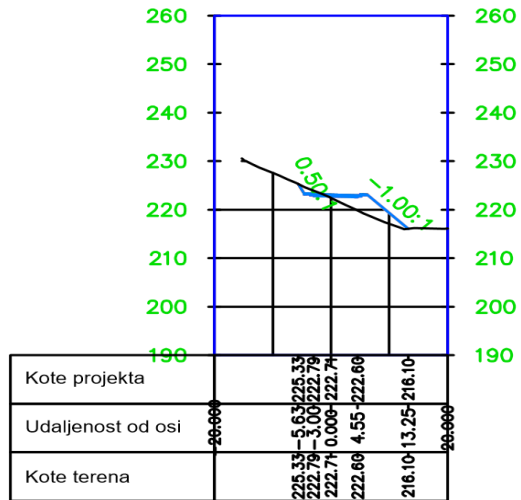


0+234.69

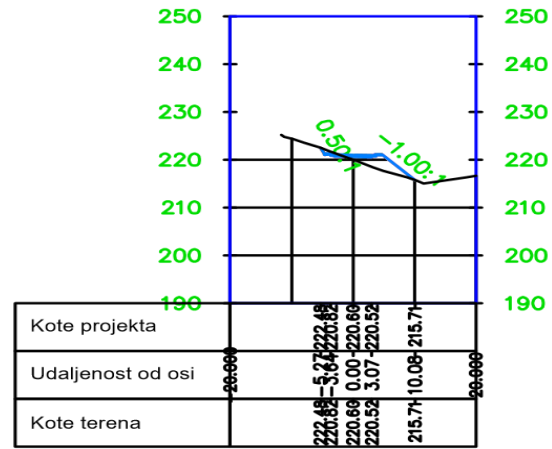


| | | |
|--|-----------------------------------|-----------------------|
| FAKULTET GRADEVINARSTVA, ARHITEKTURE I GEODEZIJE | | |
| PREDMET | CESTE - ZAVRŠNI RAD | GODINA 2019./2020. |
| ZADATAK | IDEJNI PROJEKT | |
| SADRŽAJ | KARAKTERISTIČNI POPREČNI PRESJECI | M 1:200 |
| STUDENTICA | TAMARA GOIĆ | |

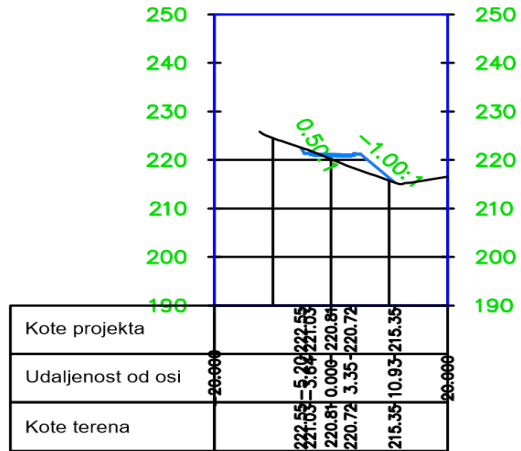
0+240.00



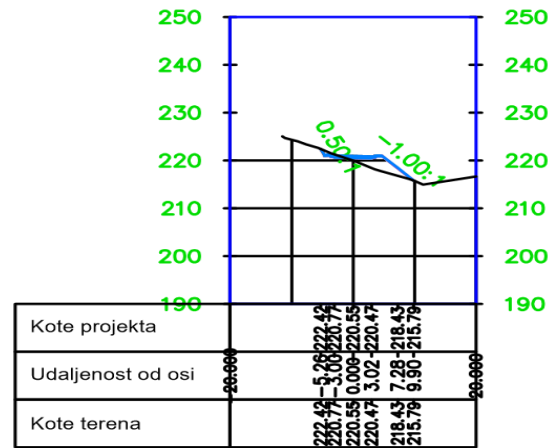
0+262.18



0+260.00

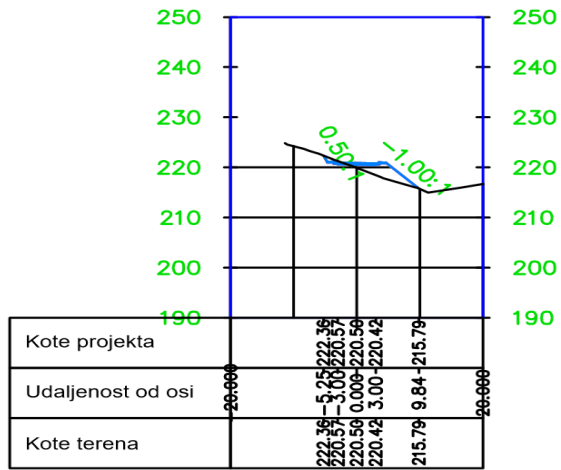


0+262.70

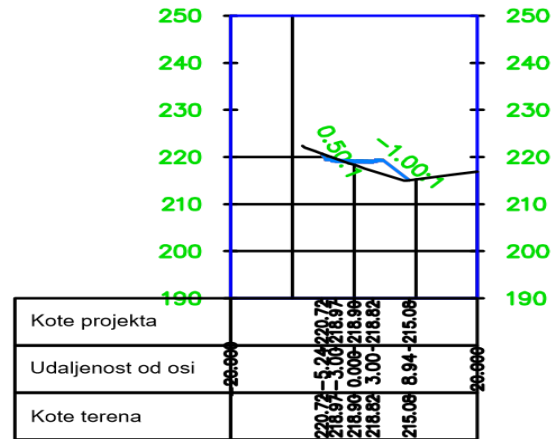


| | | |
|--|-----------------------------------|-----------------------|
| FAKULTET GRAĐEVINARSTVA, ARHITEKTURE I GEODEZIJE | | |
| PREDMET | CESTE - ZAVRŠNI RAD | GODINA 2019./2020. |
| ZADATAK | IDEJNI PROJEKT | |
| SADRŽAJ | KARAKTERISTIČNI POPREČNI PRESJECI | M 1:200 |
| STUDENTICA | TAMARA GOIĆ | |

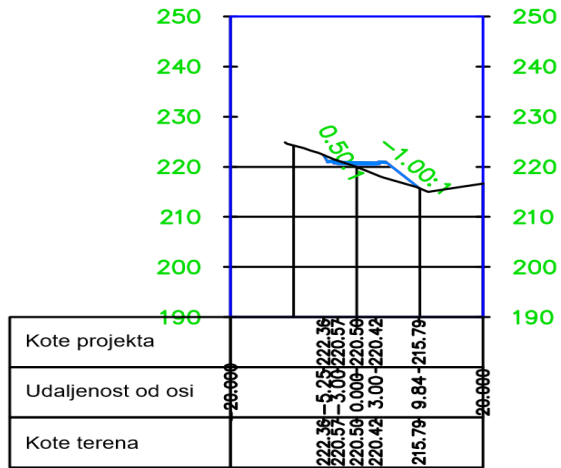
0+263.22



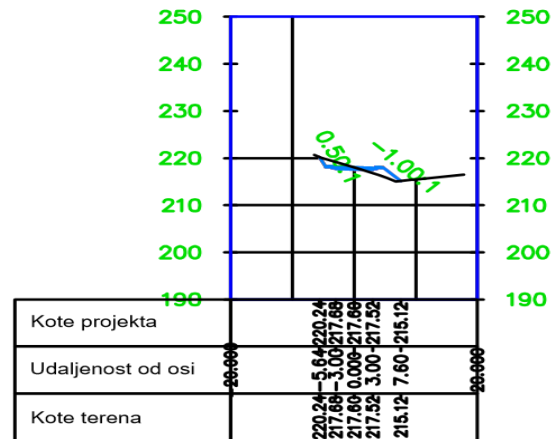
0+280.00



0+263.22



0+293.61



| | | |
|--|-----------------------------------|-------------|
| FAKULTET GRAĐEVINARSTVA, ARHITEKTURE I GEODEZIJE | | |
| PREDMET | CESTE - ZAVRŠNI RAD | GODINA |
| ZADATAK | IDEJNI PROJEKT | 2019./2020. |
| SADRŽAJ | KARAKTERISTIČNI POPREČNI PRESJECI | M 1:200 |
| STUDENTICA | TAMARA GOIĆ | |

4. TABLICA UKUPNOG VOLUMENA ZEMLJANIH RADOVA

| Stacionaža | Površina usjeka | Volumen usjeka | Površina nasipa | Volumen nasipa | Kumulativni volumen usjeka | Kumulativni volumen nasipa | Kumulativni volumen |
|-------------------|------------------------|-----------------------|------------------------|-----------------------|-----------------------------------|-----------------------------------|----------------------------|
| 0+000.000 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0+020.000 | 20.10 | 254.05 | 14.09 | 167.61 | 254.05 | 167.61 | 86.44 |
| 0+031.538 | 47.08 | 387.54 | 8.04 | 127.65 | 641.60 | 295.26 | 346.34 |
| 0+031.540 | 47.08 | 0.07 | 8.04 | 0.01 | 641.67 | 295.28 | 346.40 |
| 0+032.062 | 47.37 | 24.63 | 8.12 | 4.21 | 666.30 | 299.49 | 366.81 |
| 0+032.583 | 47.66 | 24.78 | 8.20 | 4.26 | 691.08 | 303.74 | 387.34 |
| 0+040.000 | 49.83 | 345.66 | 9.20 | 65.05 | 1036.74 | 368.79 | 667.95 |
| 0+040.538 | 49.74 | 26.81 | 9.25 | 4.97 | 1063.54 | 373.76 | 689.79 |
| 0+060.000 | 46.20 | 766.80 | 10.65 | 199.17 | 1830.35 | 572.93 | 1257.42 |
| 0+060.074 | 46.18 | 3.43 | 10.62 | 0.79 | 1833.77 | 573.72 | 1260.06 |
| 0+060.804 | 46.08 | 33.67 | 10.26 | 7.62 | 1867.44 | 581.34 | 1286.11 |
| 0+061.538 | 46.12 | 33.85 | 9.84 | 7.38 | 1901.30 | 588.72 | 1312.58 |
| 0+076.940 | 61.30 | 595.06 | 3.28 | 106.14 | 2496.36 | 694.86 | 1801.50 |
| 0+080.000 | 64.44 | 140.69 | 3.24 | 10.66 | 2637.05 | 705.52 | 1931.53 |
| 0+092.342 | 75.33 | 634.89 | 1.67 | 32.42 | 3271.94 | 737.94 | 2534.00 |
| 0+093.076 | 76.24 | 55.65 | 2.11 | 1.39 | 3327.59 | 739.33 | 2588.26 |
| 0+093.806 | 77.20 | 56.00 | 2.69 | 1.75 | 3383.59 | 741.08 | 2642.51 |
| 0+100.000 | 85.77 | 394.99 | 10.85 | 46.40 | 3778.57 | 787.47 | 2991.10 |
| 0+113.342 | 106.80 | 1122.05 | 27.76 | 291.08 | 4900.63 | 1078.55 | 3822.08 |
| 0+120.000 | 123.07 | 732.67 | 24.89 | 185.11 | 5633.30 | 1263.66 | 4369.64 |
| 0+121.297 | 124.24 | 160.40 | 25.18 | 32.47 | 5793.70 | 1296.13 | 4497.57 |
| 0+121.819 | 124.67 | 64.91 | 25.33 | 13.17 | 5858.61 | 1309.30 | 4549.31 |
| 0+122.342 | 125.13 | 65.34 | 25.44 | 13.28 | 5923.95 | 1322.58 | 4601.37 |
| 0+126.467 | 129.05 | 524.24 | 25.23 | 104.50 | 6448.19 | 1427.08 | 5021.11 |
| 0+131.383 | 131.91 | 641.46 | 27.57 | 129.79 | 7089.65 | 1556.88 | 5532.78 |
| 0+131.620 | 131.88 | 31.23 | 27.71 | 6.54 | 7120.88 | 1563.42 | 5557.46 |
| 0+135.405 | 133.09 | 276.40 | 26.35 | 164.09 | 7397.29 | 1727.52 | 5669.77 |
| 0+135.410 | 133.09 | 0.65 | 26.35 | 0.13 | 7397.93 | 1727.64 | 5670.29 |

| | | | | | | | |
|-----------|--------|---------|--------|---------|----------|----------|----------|
| 0+135.928 | 133.41 | 69.06 | 26.32 | 13.65 | 7466.99 | 1741.29 | 5725.70 |
| 0+136.450 | 133.79 | 69.67 | 26.22 | 13.70 | 7536.67 | 1754.99 | 5781.67 |
| 0+140.000 | 137.13 | 480.92 | 23.75 | 88.71 | 8017.58 | 1843.70 | 6173.89 |
| 0+151.162 | 71.93 | 1233.69 | 15.19 | 194.84 | 9251.27 | 2038.53 | 7212.74 |
| 0+160.000 | 40.76 | 515.79 | 9.85 | 86.27 | 9767.06 | 2124.80 | 7642.26 |
| 0+163.941 | 46.49 | 170.23 | 8.89 | 25.67 | 9937.29 | 2150.47 | 7786.81 |
| 0+164.671 | 46.99 | 34.12 | 9.00 | 6.53 | 9971.40 | 2157.00 | 7814.40 |
| 0+165.405 | 46.06 | 34.16 | 9.12 | 6.65 | 10005.57 | 2163.65 | 7841.91 |
| 0+172.645 | 38.54 | 303.38 | 11.23 | 48.10 | 10308.95 | 2211.75 | 8097.19 |
| 0+180.000 | 15.43 | 199.20 | 26.86 | 96.29 | 10508.14 | 2308.04 | 8200.10 |
| 0+199.314 | 0.00 | 153.06 | 194.24 | 1753.86 | 10661.20 | 4061.90 | 6599.30 |
| 0+200.000 | 0.00 | 0.00 | 198.77 | 134.77 | 10661.20 | 4196.67 | 6464.53 |
| 0+220.000 | 0.00 | 0.00 | 154.67 | 2886.33 | 10661.20 | 7083.00 | 3578.20 |
| 0+233.223 | 1.55 | 10.99 | 114.20 | 1377.69 | 10672.19 | 8460.69 | 2211.51 |
| 0+233.958 | 1.63 | 1.17 | 113.13 | 83.47 | 10673.36 | 8544.16 | 2129.20 |
| 0+234.687 | 1.80 | 1.25 | 112.15 | 82.22 | 10674.61 | 8626.37 | 2048.24 |
| 0+240.000 | 3.51 | 14.87 | 107.26 | 458.71 | 10689.48 | 9085.08 | 1604.40 |
| 0+260.000 | 1.91 | 55.70 | 94.57 | 1801.18 | 10745.18 | 10886.26 | -141.08 |
| 0+262.179 | 1.88 | 4.13 | 91.17 | 202.33 | 10749.31 | 11088.59 | -339.28 |
| 0+262.700 | 1.84 | 0.97 | 90.37 | 47.34 | 10750.28 | 11135.93 | -385.65 |
| 0+263.220 | 1.80 | 0.95 | 89.62 | 46.79 | 10751.22 | 11182.71 | -431.49 |
| 0+263.223 | 1.80 | 0.00 | 89.62 | 0.29 | 10751.23 | 11183.00 | -431.77 |
| 0+280.000 | 1.77 | 29.92 | 67.72 | 1319.82 | 10781.15 | 12502.82 | -1721.67 |
| 0+293.605 | 5.54 | 49.73 | 2.84 | 480.04 | 10830.88 | 12982.87 | -2151.98 |

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 točaka

Alignment: Os_1

Description:

Tangent Data

| Description | PT Station | Northing | Easting |
|-------------|------------|----------|------------|
| Start: | 0+00.000 | 3284.707 | -19916.653 |
| End: | 0+31.538 | 3274.660 | -19886.757 |

Tangent Data

| Parameter | Value | Parameter | Value |
|-----------|--------|-----------|----------------------|
| Length: | 31.538 | Course: | S 71° 25' 23.5199" E |

Spiral Point Data

| Description | Station | Northing | Easting |
|-------------|----------|----------|------------|
| TS: | 0+31.538 | 3274.660 | -19886.757 |
| SPI: | | 3268.258 | -19867.709 |
| SC: | 0+61.538 | 3268.014 | -19857.626 |

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: | S 77° 08' 54.2507" E |

Curve Point Data

| Description | Station | Northing | Easting |
|-------------|----------|----------|------------|
| SC: | 0+61.538 | 3268.014 | -19857.626 |
| RP: | | 3317.999 | -19856.415 |
| CS: | 0+92.342 | 3276.503 | -19828.520 |

Circular Curve Data

| Parameter | Value | Parameter | Value |
|-----------|------------------|-----------|----------------------|
| Delta: | 35° 17' 52.9015" | Type: | LEFT |
| Radius: | 50.000 | | |
| Length: | 30.803 | Tangent: | 15.908 |
| Mid-Ord: | 2.353 | External: | 2.470 |
| Chord: | 30.319 | Course: | N 73° 44' 20.5875" E |

Spiral Point Data

| Description | Station | Northing | Easting |
|-------------|----------|----------|------------|
| CS: | 0+92.342 | 3276.503 | -19828.520 |
| SPI: | | 3282.131 | -19820.149 |
| ST: | 1+22.342 | 3297.769 | -19807.530 |

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 44° 37' 35.4257" E |

Tangent Data

| Description | PT Station | Northing | Easting |
|-------------|------------|----------|------------|
| Start: | 1+22.342 | 3297.769 | -19807.530 |
| End: | 1+31.620 | 3304.990 | -19801.703 |

Tangent Data

| Parameter | Value | Parameter | Value |
|-----------|-------|-----------|----------------------|
| Length: | 9.278 | Course: | N 38° 54' 04.6949" E |

Tangent Data

| Description | PT Station | Northing | Easting |
|-------------|------------|----------|------------|
| Start: | 1+31.620 | 3304.990 | -19801.703 |
| End: | 1+35.405 | 3308.272 | -19799.818 |

Tangent Data

| Parameter | Value | Parameter | Value |
|-----------|-------|-----------|----------------------|
| Length: | 3.785 | Course: | N 29° 52' 32.8644" E |

Spiral Point Data

| Description | Station | Northing | Easting |
|-------------|----------|----------|------------|
| TS: | 1+35.405 | 3308.272 | -19799.818 |
| SPI: | | 3325.696 | -19789.808 |
| SC: | 1+65.405 | 3332.567 | -19782.423 |

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 35° 36' 03.5952" E |

Curve Point Data

| Description | Station | Northing | Easting |
|-------------|----------|----------|------------|
| SC: | 1+65.405 | 3332.567 | -19782.423 |
| RP: | | 3295.961 | -19748.365 |
| CS: | 2+33.223 | 3337.029 | -19719.845 |

Circular Curve Data

| Parameter | Value | Parameter | Value |
|-----------|------------------|-----------|----------------------|
| Delta: | 77° 42' 49.7150" | Type: | RIGHT |
| Radius: | 50.000 | | |
| Length: | 67.818 | Tangent: | 40.283 |
| Mid-Ord: | 11.064 | External: | 14.208 |
| Chord: | 62.738 | Course: | N 85° 55' 17.1638" E |

Spiral Point Data

| Description | Station | Northing | Easting |
|-------------|----------|----------|------------|
| CS: | 2+33.223 | 3337.029 | -19719.845 |
| SPI: | | 3331.276 | -19711.560 |
| ST: | 2+63.223 | 3315.448 | -19699.179 |

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: | S 43° 45' 29.2677" E |

Tangent Data

| Description | PT Station | Northing | Easting |
|-------------|------------|----------|------------|
| Start: | 2+63.223 | 3315.448 | -19699.179 |
| End: | 2+93.605 | 3291.517 | -19680.460 |

Tangent Data

| Parameter | Value | Parameter | Value |
|-----------|--------|-----------|----------------------|
| Length: | 30.382 | Course: | S 38° 01' 58.5369" E |

Alignment: Os 1-Left-3.000**Description:**Tangent Data

| Description | PT Station | Northing | Easting |
|-------------|------------|----------|------------|
| Start: | 0+00.000 | 3287.551 | -19915.697 |
| End: | 0+31.538 | 3277.504 | -19885.802 |

Tangent Data

| Parameter | Value | Parameter | Value |
|-----------|--------|-----------|----------------------|
| Length: | 31.538 | Course: | S 71° 25' 23.5199" E |

Curve Point Data

| Description | Station | Northing | Easting |
|-------------|----------|----------|------------|
| PC: | 0+31.538 | 3277.504 | -19885.802 |
| RP: | | 3285.087 | -19883.253 |
| PT: | 0+32.585 | 3277.236 | -19884.791 |

Circular Curve Data

| Parameter | Value | Parameter | Value |
|-----------|------------------|-----------|----------------------|
| Delta: | 07° 29' 40.6609" | Type: | LEFT |
| Radius: | 8.000 | | |
| Length: | 1.046 | Tangent: | 0.524 |
| Mid-Ord: | 0.017 | External: | 0.017 |
| Chord: | 1.046 | Course: | S 75° 10' 13.8503" E |

Tangent Data

| Description | PT Station | Northing | Easting |
|-------------|------------|----------|------------|
| Start: | 0+32.585 | 3277.236 | -19884.791 |
| End: | 0+58.995 | 3272.160 | -19858.873 |

Tangent Data

| Parameter | Value | Parameter | Value |
|-----------|--------|-----------|----------------------|
| Length: | 26.411 | Course: | S 78° 55' 04.1808" E |

Curve Point Data

| Description | Station | Northing | Easting |
|-------------|----------|----------|------------|
| PC: | 0+58.995 | 3272.160 | -19858.873 |
| RP: | | 3280.010 | -19857.335 |
| PCC: | 0+60.349 | 3272.013 | -19857.529 |

Circular Curve Data

| Parameter | Value | Parameter | Value |
|-----------|------------------|-----------|----------------------|
| Delta: | 09° 41' 38.7810" | Type: | LEFT |
| Radius: | 8.000 | | |
| Length: | 1.354 | Tangent: | 0.678 |
| Mid-Ord: | 0.029 | External: | 0.029 |
| Chord: | 1.352 | Course: | S 83° 45' 53.5713" E |

Curve Point Data

| Description | Station | Northing | Easting |
|-------------|----------|----------|------------|
| PCC: | 0+60.349 | 3272.013 | -19857.529 |
| RP: | | 3317.999 | -19856.415 |
| PCC: | 0+88.688 | 3279.823 | -19830.752 |

Circular Curve Data

| Parameter | Value | Parameter | Value |
|-----------|------------------|-----------|----------------------|
| Delta: | 35° 17' 52.9015" | Type: | LEFT |
| Radius: | 46.000 | | |
| Length: | 28.339 | Tangent: | 14.635 |
| Mid-Ord: | 2.165 | External: | 2.272 |
| Chord: | 27.893 | Course: | N 73° 44' 20.5875" E |

Curve Point Data

| Description | Station | Northing | Easting |
|-------------|----------|----------|------------|
| PCC: | 0+88.688 | 3279.823 | -19830.752 |
| RP: | | 3286.462 | -19835.215 |
| PT: | 0+90.042 | 3280.669 | -19829.697 |

Circular Curve Data

| Parameter | Value | Parameter | Value |
|-----------|------------------|-----------|----------------------|
| Delta: | 09° 41' 38.7810" | Type: | LEFT |
| Radius: | 8.000 | | |
| Length: | 1.354 | Tangent: | 0.678 |
| Mid-Ord: | 0.029 | External: | 0.029 |
| Chord: | 1.352 | Course: | N 51° 14' 34.7463" E |

Tangent Data

| Description | PT Station | Northing | Easting |
|-------------|------------|----------|------------|
| Start: | 0+90.042 | 3280.669 | -19829.697 |
| End: | 1+16.452 | 3298.884 | -19810.573 |

Tangent Data

| Parameter | Value | Parameter | Value |
|-----------|--------|-----------|----------------------|
| Length: | 26.411 | Course: | N 46° 23' 45.3558" E |

Curve Point Data

| Description | Station | Northing | Easting |
|-------------|----------|----------|------------|
| PC: | 1+16.452 | 3298.884 | -19810.573 |
| RP: | | 3304.677 | -19816.090 |
| PT: | 1+17.499 | 3299.653 | -19809.864 |

Circular Curve Data

| Parameter | Value | Parameter | Value |
|-----------|------------------|-----------|----------------------|
| Delta: | 07° 29' 40.6609" | Type: | LEFT |
| Radius: | 8.000 | | |
| Length: | 1.046 | Tangent: | 0.524 |
| Mid-Ord: | 0.017 | External: | 0.017 |
| Chord: | 1.046 | Course: | N 42° 38' 55.0253" E |

Tangent Data

| Description | PT Station | Northing | Easting |
|-------------|------------|----------|------------|
| Start: | 1+17.499 | 3299.653 | -19809.864 |
| End: | 1+26.540 | 3306.689 | -19804.187 |

Tangent Data

| Parameter | Value | Parameter | Value |
|-----------|-------|-----------|----------------------|
| Length: | 9.041 | Course: | N 38° 54' 04.6949" E |

Tangent Data

| Description | PT Station | Northing | Easting |
|-------------|------------|----------|------------|
| Start: | 1+26.540 | 3306.689 | -19804.187 |
| End: | 1+30.088 | 3309.766 | -19802.419 |

Tangent Data

| Parameter | Value | Parameter | Value |
|-----------|-------|-----------|----------------------|
| Length: | 3.549 | Course: | N 29° 52' 32.8644" E |

Spiral Point Data

| Description | Station | Northing | Easting |
|-------------|----------|----------|------------|
| TS: | 1+30.088 | 3309.766 | -19802.419 |
| SPI: | | 3327.584 | -19792.183 |
| SC: | 1+60.988 | 3334.764 | -19784.467 |

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 35° 41' 04.3975" E |

Curve Point Data

| Description | Station | Northing | Easting |
|-------------|----------|----------|------------|
| SC: | 1+60.988 | 3334.764 | -19784.467 |
| RP: | | 3295.961 | -19748.365 |
| CS: | 2+32.875 | 3339.493 | -19718.133 |

Circular Curve Data

| Parameter | Value | Parameter | Value |
|-----------|------------------|-----------|----------------------|
| Delta: | 77° 42' 49.7150" | Type: | RIGHT |
| Radius: | 53.000 | | |
| Length: | 71.887 | Tangent: | 42.700 |
| Mid-Ord: | 11.728 | External: | 15.061 |
| Chord: | 66.502 | Course: | N 85° 55' 17.1638" E |

Spiral Point Data

| Description | Station | Northing | Easting |
|-------------|----------|----------|------------|
| CS: | 2+32.875 | 3339.493 | -19718.133 |
| SPI: | | 3333.481 | -19709.476 |
| ST: | 2+63.775 | 3317.296 | -19696.816 |

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 43° 50' 30.0700" E |

Tangent Data

| Description | PT Station | Northing | Easting |
|-------------|------------|----------|------------|
| Start: | 2+63.775 | 3317.296 | -19696.816 |
| End: | 2+94.157 | 3293.366 | -19678.097 |

Tangent Data

| Parameter | Value | Parameter | Value |
|-----------|--------|-----------|----------------------|
| Length: | 30.382 | Course: | S 38° 01' 58.5369" E |

Alignment: Os 1-Right-3.000

Description:

Tangent Data

| Description | PT Station | Northing | Easting |
|-------------|------------|----------|------------|
| Start: | 0+00.000 | 3281.864 | -19917.608 |
| End: | 0+31.538 | 3271.816 | -19887.713 |

Tangent Data

| Parameter | Value | Parameter | Value |
|-----------|--------|-----------|----------------------|
| Length: | 31.538 | Course: | S 71° 25' 23.5199" E |

Spiral Point Data

| Description | Station | Northing | Easting |
|-------------|----------|----------|------------|
| TS: | 0+31.538 | 3271.816 | -19887.713 |
| SPI: | | 3265.270 | -19868.235 |
| SC: | 0+62.438 | 3265.015 | -19857.698 |

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 77° 13' 55.0530" E |

Curve Point Data

| Description | Station | Northing | Easting |
|-------------|----------|----------|------------|
| SC: | 0+62.438 | 3265.015 | -19857.698 |
| RP: | | 3317.999 | -19856.415 |
| CS: | 0+95.090 | 3274.014 | -19826.846 |

Circular Curve Data

| Parameter | Value | Parameter | Value |
|-----------|------------------|-----------|----------------------|
| Delta: | 35° 17' 52.9015" | Type: | LEFT |
| Radius: | 53.000 | | |
| Length: | 32.652 | Tangent: | 16.863 |
| Mid-Ord: | 2.495 | External: | 2.618 |
| Chord: | 32.138 | Course: | N 73° 44' 20.5875" E |

Spiral Point Data

| Description | Station | Northing | Easting |
|-------------|----------|----------|------------|
| CS: | 0+95.090 | 3274.014 | -19826.846 |
| SPI: | | 3279.894 | -19818.099 |
| ST: | 1+25.990 | 3295.885 | -19805.195 |

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 44° 42' 36.2280" E |

Tangent Data

| Description | PT Station | Northing | Easting |
|-------------|------------|----------|------------|
| Start: | 1+25.990 | 3295.885 | -19805.195 |
| End: | 1+35.505 | 3303.290 | -19799.220 |

Tangent Data

| Parameter | Value | Parameter | Value |
|-----------|-------|-----------|----------------------|
| Length: | 9.515 | Course: | N 38° 54' 04.6949" E |

Tangent Data

| Description | PT Station | Northing | Easting |
|-------------|------------|----------|------------|
| Start: | 1+35.505 | 3303.290 | -19799.220 |
| End: | 1+39.527 | 3306.778 | -19797.216 |

Tangent Data

| Parameter | Value | Parameter | Value |
|-----------|-------|-----------|----------------------|
| Length: | 4.022 | Course: | N 29° 52' 32.8644" E |

Curve Point Data

| Description | Station | Northing | Easting |
|-------------|----------|----------|------------|
| PC: | 1+39.527 | 3306.778 | -19797.216 |
| RP: | | 3302.793 | -19790.280 |
| PT: | 1+40.573 | 3307.648 | -19796.637 |

Circular Curve Data

| Parameter | Value | Parameter | Value |
|-----------|------------------|-----------|----------------------|
| Delta: | 07° 29' 40.6609" | Type: | RIGHT |
| Radius: | 8.000 | | |
| Length: | 1.046 | Tangent: | 0.524 |
| Mid-Ord: | 0.017 | External: | 0.017 |
| Chord: | 1.046 | Course: | N 33° 37' 23.1948" E |

Tangent Data

| Description | PT Station | Northing | Easting |
|-------------|------------|----------|------------|
| Start: | 1+40.573 | 3307.648 | -19796.637 |
| End: | 1+66.984 | 3328.637 | -19780.607 |

Tangent Data

| Parameter | Value | Parameter | Value |
|-----------|--------|-----------|----------------------|
| Length: | 26.411 | Course: | N 37° 22' 13.5253" E |

Curve Point Data

| Description | Station | Northing | Easting |
|-------------|----------|----------|------------|
| PC: | 1+66.984 | 3328.637 | -19780.607 |
| RP: | | 3323.782 | -19774.249 |
| PCC: | 1+68.337 | 3329.639 | -19779.699 |

Circular Curve Data

| Parameter | Value | Parameter | Value |
|-----------|------------------|-----------|----------------------|
| Delta: | 09° 41' 38.7810" | Type: | RIGHT |
| Radius: | 8.000 | | |
| Length: | 1.354 | Tangent: | 0.678 |
| Mid-Ord: | 0.029 | External: | 0.029 |
| Chord: | 1.352 | Course: | N 42° 13' 02.9158" E |

Curve Point Data

| Description | Station | Northing | Easting |
|-------------|----------|----------|------------|
| PCC: | 1+68.337 | 3329.639 | -19779.699 |
| RP: | | 3295.961 | -19748.365 |
| PCC: | 2+30.730 | 3333.744 | -19722.126 |

Circular Curve Data

| Parameter | Value | Parameter | Value |
|-----------|------------------|-----------|----------------------|
| Delta: | 77° 42' 49.7150" | Type: | RIGHT |
| Radius: | 46.000 | | |
| Length: | 62.393 | Tangent: | 37.060 |
| Mid-Ord: | 10.179 | External: | 13.072 |
| Chord: | 57.719 | Course: | N 85° 55' 17.1638" E |

Curve Point Data

| Description | Station | Northing | Easting |
|-------------|----------|----------|------------|
| PCC: | 2+30.730 | 3333.744 | -19722.126 |
| RP: | | 3327.173 | -19726.689 |
| PT: | 2+32.084 | 3332.882 | -19721.085 |

Circular Curve Data

| Parameter | Value | Parameter | Value |
|-----------|------------------|-----------|----------------------|
| Delta: | 09° 41' 38.7810" | Type: | RIGHT |
| Radius: | 8.000 | | |
| Length: | 1.354 | Tangent: | 0.678 |
| Mid-Ord: | 0.029 | External: | 0.029 |
| Chord: | 1.352 | Course: | S 50° 22' 28.5882" E |

Tangent Data

| Description | PT Station | Northing | Easting |
|-------------|------------|----------|------------|
| Start: | 2+32.084 | 3332.882 | -19721.085 |
| End: | 2+58.494 | 3314.379 | -19702.239 |

Tangent Data

| Parameter | Value | Parameter | Value |
|-----------|--------|-----------|----------------------|
| Length: | 26.411 | Course: | S 45° 31' 39.1978" E |

Curve Point Data

| Description | Station | Northing | Easting |
|-------------|----------|----------|------------|
| PC: | 2+58.494 | 3314.379 | -19702.239 |
| RP: | | 3308.671 | -19707.843 |
| PT: | 2+59.541 | 3313.600 | -19701.542 |

Circular Curve Data

| Parameter | Value | Parameter | Value |
|-----------|------------------|-----------|----------------------|
| Delta: | 07° 29' 40.6609" | Type: | RIGHT |
| Radius: | 8.000 | | |
| Length: | 1.046 | Tangent: | 0.524 |
| Mid-Ord: | 0.017 | External: | 0.017 |
| Chord: | 1.046 | Course: | S 41° 46' 48.8673" E |

Tangent Data

| Description | PT Station | Northing | Easting |
|-------------|------------|----------|------------|
| Start: | 2+59.541 | 3313.600 | -19701.542 |
| End: | 2+89.922 | 3289.669 | -19682.823 |

Tangent Data

| Parameter | Value | Parameter | Value |
|-----------|--------|-----------|----------------------|
| Length: | 30.382 | Course: | S 38° 01' 58.5369" E |

6.2. Koordinatni račun detaljnih točaka osi

Alignment Name: Os 1

Description:

Station Range: Start: 0+000.00, End: 29+361.00

Station Increment: 20.00

| Station | Northing | Easting | Tangential Direction |
|----------------|-----------------|----------------|-----------------------------|
| 0+000.00 | 3,284.7074m | -19,916.6526m | S71° 25' 24"E |
| 0+020.00 | 3,278.3359m | -19,897.6946m | S71° 25' 24"E |
| 0+040.00 | 3,272.0283m | -19,878.7157m | S72° 47' 26"E |
| 0+060.00 | 3,268.0744m | -19,859.1629m | S86° 53' 39"E |
| 0+080.00 | 3,270.9455m | -19,839.5045m | N70° 13' 58"E |
| 0+100.00 | 3,281.2068m | -19,822.4836m | N48° 26' 04"E |
| 0+120.00 | 3,295.9476m | -19,809.0015m | N39° 00' 22"E |
| 0+140.00 | 3,312.2507m | -19,797.5196m | N30° 16' 44"E |
| 0+160.00 | 3,328.6907m | -19,786.1870m | N41° 25' 43"E |
| 0+180.00 | 3,340.8198m | -19,770.4486m | N63° 47' 20"E |
| 0+200.00 | 3,345.8786m | -19,751.2365m | N86° 42' 26"E |
| 0+220.00 | 3,343.0565m | -19,731.5711m | S70° 22' 28"E |
| 0+240.00 | 3,332.8254m | -19,714.5346m | S48° 19' 59"E |
| 0+260.00 | 3,317.9844m | -19,701.1678m | S38° 13' 53"E |
| 0+280.00 | 3,302.2336m | -19,688.8426m | S38° 01' 59"E |

6.3. Račun kota kolnika

Corridor Name: Koridor1

Description:

Base Alignment Name: Os 1

Station Range: Start: 0+000.00, End: 0+293.61

CHAINAGE 0+000.00

| POINT | X | Y | Z | OFFSET | STRING CUT |
|--------------|--------------|------------|----------|---------------|-------------------|
| 1 | -19,915.1738 | 3,289.1072 | 239.3130 | -4.642m | EPS |
| 2 | -19,915.1742 | 3,289.1063 | 239.1130 | -4.641m | EPS_Sub |
| 3 | -19,915.4924 | 3,288.1593 | 239.2730 | -3.642m | Back_Curb |
| 4 | -19,915.5402 | 3,288.0171 | 239.2730 | -3.492m | Top_Curb |
| 5 | -19,915.5535 | 3,287.9776 | 239.0480 | -3.450m | Flowline_Gutter |
| 6 | -19,915.6969 | 3,287.5511 | 238.6750 | -3.000m | ETW_SubBase |
| 7 | -19,915.6969 | 3,287.5511 | 239.0750 | -3.000m | Flange |
| 8 | -19,917.6083 | 3,281.8637 | 238.9250 | 3.000m | Flange |
| 9 | -19,917.6083 | 3,281.8637 | 238.5250 | 3.000m | ETW_SubBase |
| 10 | -19,917.7517 | 3,281.4371 | 238.8980 | 3.450m | Flowline_Gutter |
| 11 | -19,917.7649 | 3,281.3976 | 239.1230 | 3.492m | Top_Curb |
| 12 | -19,917.8127 | 3,281.2554 | 239.1230 | 3.642m | Back_Curb |
| 13 | -19,918.1310 | 3,280.3085 | 238.8830 | 4.641m | EPS_Sub |
| 14 | -19,918.1313 | 3,280.3075 | 239.0830 | 4.642m | EPS |

CHAINAGE 0+020.00

| POINT | X | Y | Z | OFFSET | STRING CUT |
|--------------|--------------|------------|----------|---------------|-------------------|
| 1 | -19,896.2159 | 3,282.7357 | 238.2712 | -4.642m | EPS |
| 2 | -19,896.2162 | 3,282.7348 | 238.0712 | -4.641m | EPS_Sub |
| 3 | -19,896.5345 | 3,281.7878 | 238.2312 | -3.642m | Back_Curb |
| 4 | -19,896.5823 | 3,281.6456 | 238.2312 | -3.492m | Top_Curb |
| 5 | -19,896.5955 | 3,281.6061 | 238.0062 | -3.450m | Flowline_Gutter |
| 6 | -19,896.7389 | 3,281.1795 | 237.6332 | -3.000m | ETW_SubBase |
| 7 | -19,896.7389 | 3,281.1795 | 238.0332 | -3.000m | Flange |
| 8 | -19,898.6504 | 3,275.4922 | 237.8832 | 3.000m | Flange |
| 9 | -19,898.6504 | 3,275.4922 | 237.4832 | 3.000m | ETW_SubBase |
| 10 | -19,898.7937 | 3,275.0656 | 237.8562 | 3.450m | Flowline_Gutter |
| 11 | -19,898.8070 | 3,275.0261 | 238.0812 | 3.492m | Top_Curb |
| 12 | -19,898.8548 | 3,274.8839 | 238.0812 | 3.642m | Back_Curb |
| 13 | -19,899.1730 | 3,273.9369 | 237.8412 | 4.641m | EPS_Sub |
| 14 | -19,899.1734 | 3,273.9360 | 238.0412 | 4.642m | EPS |

CHAINAGE 0+040.00

| POINT | X | Y | Z | OFFSET | STRING CUT |
|--------------|--------------|------------|----------|---------------|-------------------|
| 1 | -19,877.3424 | 3,276.4622 | 237.2293 | -4.642m | EPS |
| 2 | -19,877.3427 | 3,276.4612 | 237.0293 | -4.641m | EPS_Sub |
| 3 | -19,877.6382 | 3,275.5070 | 237.1893 | -3.642m | Back_Curb |
| 4 | -19,877.6826 | 3,275.3637 | 237.1893 | -3.492m | Top_Curb |
| 5 | -19,877.6950 | 3,275.3238 | 236.9643 | -3.450m | Flowline_Gutter |
| 6 | -19,877.8281 | 3,274.8940 | 236.5913 | -3.000m | ETW_SubBase |
| 7 | -19,877.8281 | 3,274.8940 | 236.9913 | -3.000m | Flange |
| 8 | -19,879.6033 | 3,269.1626 | 236.8413 | 3.000m | Flange |
| 9 | -19,879.6033 | 3,269.1626 | 236.4413 | 3.000m | ETW_SubBase |
| 10 | -19,879.7364 | 3,268.7328 | 236.8143 | 3.450m | Flowline_Gutter |
| 11 | -19,879.7488 | 3,268.6929 | 237.0393 | 3.492m | Top_Curb |
| 12 | -19,879.7931 | 3,268.5496 | 237.0393 | 3.642m | Back_Curb |
| 13 | -19,880.0887 | 3,267.5954 | 236.7993 | 4.641m | EPS_Sub |
| 14 | -19,880.0890 | 3,267.5944 | 236.9993 | 4.642m | EPS |

CHAINAGE 0+060.00

| POINT | X | Y | Z | OFFSET | STRING CUT |
|--------------|--------------|------------|----------|---------------|-------------------|
| 1 | -19,858.9114 | 3,272.7092 | 236.1875 | -4.642m | EPS |
| 2 | -19,858.9115 | 3,272.7082 | 235.9875 | -4.641m | EPS_Sub |
| 3 | -19,858.9656 | 3,271.7107 | 236.1475 | -3.642m | Back_Curb |
| 4 | -19,858.9737 | 3,271.5609 | 236.1475 | -3.492m | Top_Curb |
| 5 | -19,858.9760 | 3,271.5193 | 235.9225 | -3.450m | Flowline_Gutter |
| 6 | -19,859.0004 | 3,271.0700 | 235.5495 | -3.000m | ETW_SubBase |
| 7 | -19,859.0004 | 3,271.0700 | 235.9495 | -3.000m | Flange |
| 8 | -19,859.3254 | 3,265.0788 | 235.7995 | 3.000m | Flange |
| 9 | -19,859.3254 | 3,265.0788 | 235.3995 | 3.000m | ETW_SubBase |
| 10 | -19,859.3498 | 3,264.6294 | 235.7725 | 3.450m | Flowline_Gutter |
| 11 | -19,859.3521 | 3,264.5878 | 235.9975 | 3.492m | Top_Curb |
| 12 | -19,859.3602 | 3,264.4380 | 235.9975 | 3.642m | Back_Curb |
| 13 | -19,859.4143 | 3,263.4405 | 235.7575 | 4.641m | EPS_Sub |
| 14 | -19,859.4144 | 3,263.4395 | 235.9575 | 4.642m | EPS |

CHAINAGE 0+080.00

| POINT | X | Y | Z | OFFSET | STRING CUT |
|--------------|--------------|------------|----------|---------------|-------------------|
| 1 | -19,841.0743 | 3,275.3137 | 235.1456 | -4.642m | EPS |
| 2 | -19,841.0739 | 3,275.3127 | 234.9456 | -4.641m | EPS_Sub |
| 3 | -19,840.7361 | 3,274.3726 | 235.1056 | -3.642m | Back_Curb |
| 4 | -19,840.6854 | 3,274.2314 | 235.1056 | -3.492m | Top_Curb |
| 5 | -19,840.6712 | 3,274.1922 | 234.8806 | -3.450m | Flowline_Gutter |
| 6 | -19,840.5191 | 3,273.7687 | 234.5076 | -3.000m | ETW_SubBase |
| 7 | -19,840.5191 | 3,273.7687 | 234.9076 | -3.000m | Flange |
| 8 | -19,838.4899 | 3,268.1223 | 234.7576 | 3.000m | Flange |
| 9 | -19,838.4899 | 3,268.1223 | 234.3576 | 3.000m | ETW_SubBase |
| 10 | -19,838.3377 | 3,267.6988 | 234.7306 | 3.450m | Flowline_Gutter |
| 11 | -19,838.3236 | 3,267.6595 | 234.9556 | 3.492m | Top_Curb |
| 12 | -19,838.2728 | 3,267.5184 | 234.9556 | 3.642m | Back_Curb |
| 13 | -19,837.9350 | 3,266.5782 | 234.7156 | 4.641m | EPS_Sub |
| 14 | -19,837.9346 | 3,266.5773 | 234.9156 | 4.642m | EPS |

CHAINAGE 0+100.00

| POINT | X | Y | Z | OFFSET | STRING CUT |
|--------------|--------------|------------|----------|---------------|-------------------|
| 1 | -19,825.5632 | 3,284.6797 | 234.1038 | -4.642m | EPS |
| 2 | -19,825.5626 | 3,284.6790 | 233.9038 | -4.641m | EPS_Sub |
| 3 | -19,824.8998 | 3,283.9315 | 234.0638 | -3.642m | Back_Curb |
| 4 | -19,824.8002 | 3,283.8193 | 234.0638 | -3.492m | Top_Curb |
| 5 | -19,824.7726 | 3,283.7881 | 233.8388 | -3.450m | Flowline_Gutter |
| 6 | -19,824.4740 | 3,283.4514 | 233.4658 | -3.000m | ETW_SubBase |
| 7 | -19,824.4740 | 3,283.4514 | 233.8658 | -3.000m | Flange |
| 8 | -19,820.4931 | 3,278.9622 | 233.7158 | 3.000m | Flange |
| 9 | -19,820.4931 | 3,278.9622 | 233.3158 | 3.000m | ETW_SubBase |
| 10 | -19,820.1946 | 3,278.6255 | 233.6888 | 3.450m | Flowline_Gutter |
| 11 | -19,820.1669 | 3,278.5943 | 233.9138 | 3.492m | Top_Curb |
| 12 | -19,820.0674 | 3,278.4821 | 233.9138 | 3.642m | Back_Curb |
| 13 | -19,819.4046 | 3,277.7347 | 233.6738 | 4.641m | EPS_Sub |
| 14 | -19,819.4039 | 3,277.7339 | 233.8738 | 4.642m | EPS |

CHAINAGE 0+120.00

| POINT | X | Y | Z | OFFSET | STRING CUT |
|--------------|--------------|------------|----------|---------------|-------------------|
| 1 | -19,812.6084 | 3,298.8691 | 233.0619 | -4.642m | EPS |
| 2 | -19,812.6076 | 3,298.8685 | 232.8619 | -4.641m | EPS_Sub |
| 3 | -19,811.8313 | 3,298.2397 | 233.0219 | -3.642m | Back_Curb |
| 4 | -19,811.7148 | 3,298.1453 | 233.0219 | -3.492m | Top_Curb |
| 5 | -19,811.6824 | 3,298.1191 | 232.7969 | -3.450m | Flowline_Gutter |
| 6 | -19,811.3327 | 3,297.8358 | 232.4239 | -3.000m | ETW_SubBase |
| 7 | -19,811.3327 | 3,297.8358 | 232.8239 | -3.000m | Flange |
| 8 | -19,806.6702 | 3,294.0594 | 232.6739 | 3.000m | Flange |
| 9 | -19,806.6702 | 3,294.0594 | 232.2739 | 3.000m | ETW_SubBase |
| 10 | -19,806.3205 | 3,293.7762 | 232.6469 | 3.450m | Flowline_Gutter |
| 11 | -19,806.2881 | 3,293.7499 | 232.8719 | 3.492m | Top_Curb |
| 12 | -19,806.1716 | 3,293.6555 | 232.8719 | 3.642m | Back_Curb |
| 13 | -19,805.3953 | 3,293.0267 | 232.7119 | 4.641m | EPS_Sub |
| 14 | -19,805.3945 | 3,293.0261 | 232.9119 | 4.642m | EPS |

CHAINAGE 0+140.00

| POINT | X | Y | Z | OFFSET | STRING CUT |
|--------------|--------------|------------|----------|---------------|-------------------|
| 1 | -19,801.5281 | 3,314.5911 | 232.0201 | -4.642m | EPS |
| 2 | -19,801.5273 | 3,314.5906 | 231.8201 | -4.641m | EPS_Sub |
| 3 | -19,800.6645 | 3,314.0869 | 231.9801 | -3.642m | Back_Curb |
| 4 | -19,800.5350 | 3,314.0113 | 231.9801 | -3.492m | Top_Curb |
| 5 | -19,800.4990 | 3,313.9903 | 231.7551 | -3.450m | Flowline_Gutter |
| 6 | -19,800.1104 | 3,313.7634 | 231.3821 | -3.000m | ETW_SubBase |
| 7 | -19,800.1104 | 3,313.7634 | 231.7821 | -3.000m | Flange |
| 8 | -19,794.9289 | 3,310.7381 | 231.6321 | 3.000m | Flange |
| 9 | -19,794.9289 | 3,310.7381 | 231.2321 | 3.000m | ETW_SubBase |
| 10 | -19,794.5403 | 3,310.5112 | 231.6051 | 3.450m | Flowline_Gutter |
| 11 | -19,794.5043 | 3,310.4902 | 231.8301 | 3.492m | Top_Curb |
| 12 | -19,794.3747 | 3,310.4145 | 231.8301 | 3.642m | Back_Curb |
| 13 | -19,793.5120 | 3,309.9108 | 231.6701 | 4.641m | EPS_Sub |
| 14 | -19,793.5112 | 3,309.9103 | 231.8701 | 4.642m | EPS |

CHAINAGE 0+160.00

| POINT | X | Y | Z | OFFSET | STRING CUT |
|--------------|--------------|------------|----------|---------------|-------------------|
| 1 | -19,789.6673 | 3,331.7620 | 230.8997 | -4.642m | EPS |
| 2 | -19,789.6665 | 3,331.7614 | 230.6997 | -4.641m | EPS_Sub |
| 3 | -19,788.9175 | 3,331.1003 | 230.8597 | -3.642m | Back_Curb |
| 4 | -19,788.8050 | 3,331.0011 | 230.8597 | -3.492m | Top_Curb |
| 5 | -19,788.7738 | 3,330.9735 | 230.6347 | -3.450m | Flowline_Gutter |
| 6 | -19,788.4364 | 3,330.6757 | 230.2617 | -3.000m | ETW_SubBase |
| 7 | -19,788.4364 | 3,330.6757 | 230.6617 | -3.000m | Flange |
| 8 | -19,783.9377 | 3,326.7056 | 230.5117 | 3.000m | Flange |
| 9 | -19,783.9377 | 3,326.7056 | 230.1117 | 3.000m | ETW_SubBase |
| 10 | -19,783.6003 | 3,326.4079 | 230.4847 | 3.450m | Flowline_Gutter |
| 11 | -19,783.5690 | 3,326.3803 | 230.7097 | 3.492m | Top_Curb |
| 12 | -19,783.4566 | 3,326.2810 | 230.7097 | 3.642m | Back_Curb |
| 13 | -19,782.7075 | 3,325.6200 | 230.5497 | 4.641m | EPS_Sub |
| 14 | -19,782.7068 | 3,325.6193 | 230.7497 | 4.642m | EPS |

CHAINAGE 0+180.00

| POINT | X | Y | Z | OFFSET | STRING CUT |
|--------------|--------------|------------|----------|---------------|-------------------|
| 1 | -19,772.4987 | 3,344.9842 | 229.1531 | -4.642m | EPS |
| 2 | -19,772.4983 | 3,344.9833 | 228.9531 | -4.641m | EPS_Sub |
| 3 | -19,772.0571 | 3,344.0870 | 229.1131 | -3.642m | Back_Curb |
| 4 | -19,771.9908 | 3,343.9524 | 229.1131 | -3.492m | Top_Curb |
| 5 | -19,771.9724 | 3,343.9150 | 228.8881 | -3.450m | Flowline_Gutter |
| 6 | -19,771.7736 | 3,343.5113 | 228.5151 | -3.000m | ETW_SubBase |
| 7 | -19,771.7736 | 3,343.5113 | 228.9151 | -3.000m | Flange |
| 8 | -19,769.1236 | 3,338.1283 | 228.7651 | 3.000m | Flange |
| 9 | -19,769.1236 | 3,338.1283 | 228.3651 | 3.000m | ETW_SubBase |
| 10 | -19,768.9248 | 3,337.7245 | 228.7381 | 3.450m | Flowline_Gutter |
| 11 | -19,768.9064 | 3,337.6871 | 228.9631 | 3.492m | Top_Curb |
| 12 | -19,768.8401 | 3,337.5525 | 228.9631 | 3.642m | Back_Curb |
| 13 | -19,768.3989 | 3,336.6563 | 228.7231 | 4.641m | EPS_Sub |
| 14 | -19,768.3985 | 3,336.6554 | 228.9231 | 4.642m | EPS |

CHAINAGE 0+200.00

| POINT | X | Y | Z | OFFSET | STRING CUT |
|--------------|--------------|------------|----------|---------------|-------------------|
| 1 | -19,751.5031 | 3,350.5126 | 227.1647 | -4.642m | EPS |
| 2 | -19,751.5031 | 3,350.5116 | 226.9647 | -4.641m | EPS_Sub |
| 3 | -19,751.4457 | 3,349.5142 | 227.2047 | -3.642m | Back_Curb |
| 4 | -19,751.4371 | 3,349.3645 | 227.2047 | -3.492m | Top_Curb |
| 5 | -19,751.4347 | 3,349.3229 | 226.9797 | -3.450m | Flowline_Gutter |
| 6 | -19,751.4088 | 3,348.8736 | 226.6067 | -3.000m | ETW_SubBase |
| 7 | -19,751.4088 | 3,348.8736 | 227.0067 | -3.000m | Flange |
| 8 | -19,751.0642 | 3,342.8835 | 226.8567 | 3.000m | Flange |
| 9 | -19,751.0642 | 3,342.8835 | 226.4567 | 3.000m | ETW_SubBase |
| 10 | -19,751.0384 | 3,342.4342 | 226.8297 | 3.450m | Flowline_Gutter |
| 11 | -19,751.0360 | 3,342.3926 | 227.0547 | 3.492m | Top_Curb |
| 12 | -19,751.0274 | 3,342.2429 | 227.0547 | 3.642m | Back_Curb |
| 13 | -19,750.9700 | 3,341.2455 | 226.8147 | 4.641m | EPS_Sub |
| 14 | -19,750.9699 | 3,341.2445 | 227.0147 | 4.642m | EPS |

CHAINAGE 0+220.00

| POINT | X | Y | Z | OFFSET | STRING CUT |
|--------------|--------------|------------|----------|---------------|-------------------|
| 1 | -19,730.0120 | 3,347.4285 | 225.2563 | -4.642m | EPS |
| 2 | -19,730.0124 | 3,347.4276 | 225.0563 | -4.641m | EPS_Sub |
| 3 | -19,730.3479 | 3,346.4866 | 225.2963 | -3.642m | Back_Curb |
| 4 | -19,730.3983 | 3,346.3453 | 225.2963 | -3.492m | Top_Curb |
| 5 | -19,730.4123 | 3,346.3060 | 225.0713 | -3.450m | Flowline_Gutter |
| 6 | -19,730.5634 | 3,345.8822 | 224.6983 | -3.000m | ETW_SubBase |
| 7 | -19,730.5634 | 3,345.8822 | 225.0983 | -3.000m | Flange |
| 8 | -19,732.5787 | 3,340.2307 | 224.9483 | 3.000m | Flange |
| 9 | -19,732.5787 | 3,340.2307 | 224.5483 | 3.000m | ETW_SubBase |
| 10 | -19,732.7298 | 3,339.8069 | 224.9213 | 3.450m | Flowline_Gutter |
| 11 | -19,732.7438 | 3,339.7676 | 225.1463 | 3.492m | Top_Curb |
| 12 | -19,732.7942 | 3,339.6263 | 225.1463 | 3.642m | Back_Curb |
| 13 | -19,733.1297 | 3,338.6853 | 224.9063 | 4.641m | EPS_Sub |
| 14 | -19,733.1301 | 3,338.6844 | 225.1063 | 4.642m | EPS |

CHAINAGE 0+240.00

| POINT | X | Y | Z | OFFSET | STRING CUT |
|--------------|--------------|------------|----------|---------------|-------------------|
| 1 | -19,711.4488 | 3,336.2928 | 223.4279 | -4.642m | EPS |
| 2 | -19,711.4494 | 3,336.2921 | 223.2279 | -4.641m | EPS_Sub |
| 3 | -19,712.1136 | 3,335.5458 | 223.3879 | -3.642m | Back_Curb |
| 4 | -19,712.2133 | 3,335.4338 | 223.3879 | -3.492m | Top_Curb |
| 5 | -19,712.2410 | 3,335.4026 | 223.1629 | -3.450m | Flowline_Gutter |
| 6 | -19,712.5402 | 3,335.0665 | 222.7899 | -3.000m | ETW_SubBase |
| 7 | -19,712.5402 | 3,335.0665 | 223.1899 | -3.000m | Flange |
| 8 | -19,716.5290 | 3,330.5843 | 223.0399 | 3.000m | Flange |
| 9 | -19,716.5290 | 3,330.5843 | 222.6399 | 3.000m | ETW_SubBase |
| 10 | -19,716.8281 | 3,330.2482 | 223.0129 | 3.450m | Flowline_Gutter |
| 11 | -19,716.8558 | 3,330.2170 | 223.2379 | 3.492m | Top_Curb |
| 12 | -19,716.9556 | 3,330.1050 | 223.2379 | 3.642m | Back_Curb |
| 13 | -19,717.6197 | 3,329.3587 | 222.9979 | 4.641m | EPS_Sub |
| 14 | -19,717.6204 | 3,329.3579 | 223.1979 | 4.642m | EPS |

CHAINAGE 0+260.00

| POINT | X | Y | Z | OFFSET | STRING CUT |
|--------------|--------------|------------|----------|---------------|-------------------|
| 1 | -19,697.5216 | 3,320.8569 | 221.5196 | -4.642m | EPS |
| 2 | -19,697.5224 | 3,320.8563 | 221.3196 | -4.641m | EPS_Sub |
| 3 | -19,698.3071 | 3,320.2380 | 221.4796 | -3.642m | Back_Curb |
| 4 | -19,698.4250 | 3,320.1452 | 221.4796 | -3.492m | Top_Curb |
| 5 | -19,698.4577 | 3,320.1194 | 221.2546 | -3.450m | Flowline_Gutter |
| 6 | -19,698.8112 | 3,319.8409 | 220.8816 | -3.000m | ETW_SubBase |
| 7 | -19,698.8112 | 3,319.8409 | 221.2816 | -3.000m | Flange |
| 8 | -19,703.5243 | 3,316.1279 | 221.1316 | 3.000m | Flange |
| 9 | -19,703.5243 | 3,316.1279 | 220.7316 | 3.000m | ETW_SubBase |
| 10 | -19,703.8778 | 3,315.8494 | 221.1046 | 3.450m | Flowline_Gutter |
| 11 | -19,703.9106 | 3,315.8236 | 221.3296 | 3.492m | Top_Curb |
| 12 | -19,704.0284 | 3,315.7308 | 221.3296 | 3.642m | Back_Curb |
| 13 | -19,704.8131 | 3,315.1126 | 221.0896 | 4.641m | EPS_Sub |
| 14 | -19,704.8139 | 3,315.1120 | 221.2896 | 4.642m | EPS |

CHAINAGE 0+280.00

| POINT | X | Y | Z | OFFSET | STRING CUT |
|--------------|--------------|------------|----------|---------------|-------------------|
| 1 | -19,685.1865 | 3,305.0934 | 219.6112 | -4.642m | EPS |
| 2 | -19,685.1873 | 3,305.0928 | 219.4112 | -4.641m | EPS_Sub |
| 3 | -19,685.9741 | 3,304.4773 | 219.5712 | -3.642m | Back_Curb |
| 4 | -19,686.0923 | 3,304.3849 | 219.5712 | -3.492m | Top_Curb |
| 5 | -19,686.1251 | 3,304.3592 | 219.3462 | -3.450m | Flowline_Gutter |
| 6 | -19,686.4796 | 3,304.0819 | 218.9732 | -3.000m | ETW_SubBase |
| 7 | -19,686.4796 | 3,304.0819 | 219.3732 | -3.000m | Flange |
| 8 | -19,691.2055 | 3,300.3852 | 219.2232 | 3.000m | Flange |
| 9 | -19,691.2055 | 3,300.3852 | 218.8232 | 3.000m | ETW_SubBase |
| 10 | -19,691.5600 | 3,300.1080 | 219.1962 | 3.450m | Flowline_Gutter |
| 11 | -19,691.5928 | 3,300.0823 | 219.4212 | 3.492m | Top_Curb |
| 12 | -19,691.7110 | 3,299.9899 | 219.4212 | 3.642m | Back_Curb |
| 13 | -19,692.4978 | 3,299.3744 | 219.1812 | 4.641m | EPS_Sub |
| 14 | -19,692.4986 | 3,299.3738 | 219.3812 | 4.642m | EPS |

6.4. Vertikalni tok trase

Vertical Alignment: Niveleta

Description:

Station Range: Start: 0+000.00, End: 29+361.00

| PVI | Station | Grade Out | Curve Length |
|------------|--|---------------------|---------------------|
| 0.00 | 0+000.00 | -5.21% | |
| 1.00 | 0+161.92 | -9.54% | 21.483m |
| | Vertical Curve Information:(crest curve) | | |
| | PVC Station: 0+151.16 | Elevation: 231.126m | |
| | PVI Station: 0+161.92 | Elevation: 230.565m | |
| | PVT Station: 0+172.64 | Elevation: 229.542m | |
| | High Point: 0+151.16 | Elevation: 231.126m | |
| | Grade in: -5.21% | Grade out: -9.54% | |
| | Change: 4.33% | K: | |
| | Curve Length: 21.483m | | |
| | Passing Distance: | Stopping Distance: | |
| 2.00 | 0+293.61 | | |

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