

P:\19-0002 (SUM-76-6.15) PID 100713) Kenmore - Part 6 (Roadway)\100713\geotechnical\Sheets\100713(CO01)gn_Sheet 8/2/2019 3:32:12 PM korrens

PROJECT DESCRIPTION

THE PROJECT INCLUDES: 1) THE RECONSTRUCTION/WIDENING OF IR-76 EB, IR-76 NB AND IR-77 NB IN THE VICINITY OF THE IR-76/IR-77 INTERCHANGE; 2) THE RECONSTRUCTION/WIDENING OF IR-277 EB AND IR-76 WB IN THE VICINITY OF THE IR-76/IR-277 INTERCHANGE; 3) THE REALIGNMENT AND RECONSTRUCTION OF 3 CONNECTING RAMPS (RAMP T, RAMP V, AND RAMP W); 4) THE WIDENING/RECONSTRUCTION OF 7 CONNECTING RAMPS/ROADWAYS (RAMP N, RAMP M, RAMP U, RAMP J, RAMP L, RAMP A2 AND RAMP B); AND, 5) THE CONSTRUCTION OF APPROXIMATELY 13 NOISE BARRIERS ALONG THE REFERENCED INTERSTATES WITHIN THE PROJECT LIMITS.

HISTORIC RECORDS

THE FOLLOWING REPORT/PLANS WERE AVAILABLE FOR REVIEW AND EVALUATION FOR THE PROJECT:

- SOIL PROFILE SHEETS AS PART OF ODOT PROJECT SUM-18-6.88, SHEETS 1-17, PREPARED BY THE STATE HIGHWAY TESTING AND RESEARCH LABORATORY DATED NOV. 10, 1960;
- SOIL PROFILE SHEETS AS PART OF ODOT PROJECT SUM-5-10.62, SHEETS 1-9, PREPARED BY THE STATE HIGHWAY TESTING AND RESEARCH LABORATORY DATED SEPT. 25, 1961;
- SOIL PROFILE SHEETS AS PART OF ODOT PROJECT SUM-224-5.85 SHEETS 1-12, PREPARED BY THE STATE HIGHWAY TESTING AND RESEARCH LABORATORY DATED MAY 9, 1960;
- SOIL PROFILE SHEETS AS PART OF ODOT PROJECT SUM-5-9.33 SHEETS 1-27, PREPARED BY THE STATE HIGHWAY TESTING AND RESEARCH LABORATORY DATED OCT. 30, 1963; AND,
- SOIL PROFILE SHEETS AS PART OF ODOT PROJECT SUM-18-9.23 SHEETS 1-16, PREPARED BY THE STATE HIGHWAY TESTING AND RESEARCH LABORATORY DATED JAN. 6, 1961.

HISTORICAL SOIL BORINGS ASSOCIATED WITH THE ABOVE PLANS WERE REVIEWED, HOWEVER, WERE NOT UTILIZED FOR OUR ANALYSIS, AND THEREFORE, ARE NOT REFERENCED OR PRESENTED WITHIN THE SOIL PROFILE SHEETS.

GEOLOGY

THE TOPOGRAPHY AT THE PROJECT SITE IS RELATIVELY FLAT IN THE NORTHERN AND SOUTHERN PORTIONS OF THE SITE WITH SLOPING GRADES PRESENT IN THE CENTRAL PORTION. IN THE NORTHERN PORTION OF THE SITE THE TOPOGRAPHY GRADUALLY SLOPES UPWARDS FROM WEST TO EAST WITH THE PEAK ELEVATION WITHIN THIS PART OF THE SITE AT AN APPROXIMATE ELEVATION OF 1076 FT AMSL NEAR RAMP J. THE CENTRAL PORTION OF THE PROJECT SITE BETWEEN THE NW AND SW INTERCHANGES GENERALLY SLOPES UPWARD FROM WEST TO EAST WITH A PEAK ELEVATION OF 1033 FT AMSL NEAR THE EAST AVE/IR-76 OVERPASS. THE SOUTH END OF THE PROJECT SITE SLOPES VERY GRADUALLY UPWARD FROM WEST TO EAST WITH THE PEAK ELEVATION BEING APPROXIMATELY 1000 FT AMSL AT THE EASTERN END OF IR-277.

THE PROJECT SITE IS LOCATED WITHIN THE AKRON-CANTON INTERLOBATE PLATEAU PHYSIOGRAPHIC REGION, PART OF THE GLACIATED ALLEGHENY PLATEAUS. THIS IS A MODERATE RELIEF, HUMMOCKY AREA BETWEEN TWO CONVERGING GLACIAL LOBES DOMINATED BY KAMES, KAME TERRACES, ESKERS, KETTLES, KETTLE LAKES, AND BOGS/FENS. SOILS IN THIS REGION ARE CHARACTERISTICALLY WISCONSINAN-AGE SAND AND OLDER DRIFT OVER DEVONIAN TO PENNSYLVANIAN AGE SANDSTONES, CONGLOMERATES AND SHALES.

THE NORTHERN PORTION OF THE PROJECT SITE (IR-77, IR-76) IS MAPPED AS 30 FT OF WISCONSINAN-AGE SAND AND GRAVEL, UNDERLAIN BY 150 FEET OF COMPLEXLY INTERBEDDED DEPOSITS OF CLAY, SILT, SAND, GRAVEL AND TILL. THE AREA WHICH INCLUDES THE NW INTERCHANGE AS WELL AS THE EASTERN PORTIONS OF IR-76 IS MAPPED AS 160 FT OF WISCONSINAN-AGE TILL ABOVE BEDROCK. THE PORTION OF THE PROJECT BETWEEN THE NW AND SW INTERCHANGES IS MAPPED AS 80 FT OF WISCONSINAN-AGE TILL NEAR THE SW INTERCHANGE THINNING OUT TO 20 FT TOWARDS THE NW INTERCHANGE. THE SOUTHERN PORTION OF THE OF PROJECT SITE (IR-277 AND IR-76, SW INTERCHANGE) IS MAPPED AS 160 FT OF WISCONSINAN-AGE ICE-CONTACT DEPOSITS, UNDERLAIN BY 90 FEET OF WISCONSINAN-AGE SAND AND GRAVEL. SMALL AREAS OF ORGANIC DEPOSITS WERE NOTED ON THE SURFICIAL GEOLOGY MAPS SOUTHEAST OF THE SW INTERCHANGE.

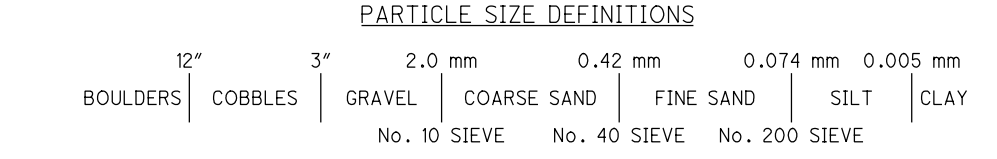
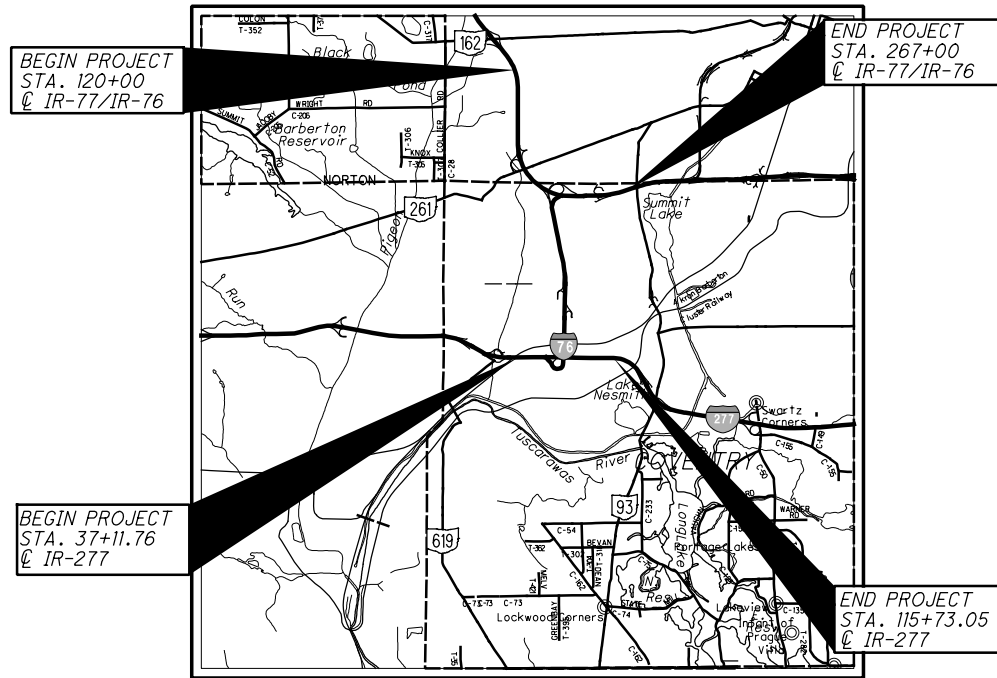
BASED ON THE BEDROCK GEOLOGIC UNITS MAP OF OHIO, BEDROCK WITHIN THE PROJECT AREA CONSISTS OF SHALE AND SILTSTONE OF THE ALLEGHENY AND POTTSVILLE GROUPS, UNDIVIDED. THIS UNIT IS COMPRISED OF PENNSYLVANIAN-AGE SHALE AND SILTSTONE LOCALLY CONTAINING MARINE FOSSILS, WITH MINOR LITHOLOGIC CONSTITUENTS OF LIMESTONE AND SANDSTONE. THE SHALE IN THIS FORMATION IS DESCRIBED AS BLACK, GRAY AND OLIVE IN COLOR, CLAYEY TO SILTY, AND CALCAREOUS IN PART, WHILE THE SILTSTONE IS DESCRIBED AS GRAY, GREENISH AND OLIVE IN COLOR, CLAYEY TO SANDY, AND THIN TO MEDIUM BEDED. BEDROCK IS ANTICIPATED TO BE SLOPING UPWARD FROM WEST TO EAST AT THE PROJECT SITE. BASED ON THE ODNR BEDROCK TOPOGRAPHY MAP OF OHIO, BEDROCK ELEVATIONS AT THE PROJECT SITE CAN BE EXPECTED TO BE BETWEEN ELEVATIONS OF 1050 AND 800 FT AMSL, PUTTING BEDROCK AT A DEPTH RANGING FROM ABOUT 225 FT BELOW GROUND SURFACE (BGS) TO OUTCROPPING (ABOVE THE GROUND SURFACE) IN LOCATIONS. BEDROCK WAS OBSERVED TO BE RELATIVELY SHALLOW IN THE NORTHEAST PORTION OF THE SITE AS OUTCROPPED ROCK WAS OBSERVED ON THE EASTERN SIDE OF IR-76 NEAR THE EAST AVE/IR-76 CROSSING AS WELL AS ALONG THE NORTHERN PORTION OF RAMP V.

THE SOILS AT THE PROJECT SITE ARE GENERALLY MAPPED (WEB SOIL SURVEY) BY THE NATURAL RESOURCES CONSERVATION SERVICE AS UDORTHERTS. THESE SOILS CAN BE DESCRIBED AS SOILS THAT HAVE BEEN DISTURBED BY CUTTING AND FILLING. THESE SOILS ARE NOT CLASSIFIED ACCORDING TO THE AASHTO METHOD OF SOIL CLASSIFICATION, BUT IT CAN BE EXPECTED THAT THESE SOILS WILL LARGELY CONSIST OF FILL SOILS AND OFTEN VARY IN COMPOSITION. A SIGNIFICANT PORTION OF THE SOILS SURROUNDING THE PROJECT SITE HAVE BEEN MAPPED AS

| LEGEND | ODOT CLASS | CLASSIFIED MECH./VISUAL |
|-----------------|---|-------------------------|
| [Pattern] | GRAVEL AND/OR STONE FRAGMENTS | A-1-a 3 6 |
| [Pattern] | GRAVEL AND/OR STONE FRAGMENTS WITH SAND | A-1-b 12 23 |
| [Pattern] | GRAVEL AND/OR ST. FRAGS. WITH SAND AND SILT | A-2-4 17 19 |
| [Pattern] | FINE SAND | A-3 12 27 |
| [Pattern] | COARSE AND FINE SAND | A-3a 33 68 |
| [Pattern] | SANDY SILT | A-4a 60 60 |
| [Pattern] | SILT | A-4b 14 5 |
| [Pattern] | SILT AND CLAY | A-6a 12 13 |
| [Pattern] | SILTY CLAY | A-6b 1 4 |
| [Pattern] | CLAY | A-7-6 1 1 |
| [Pattern] | ORGANIC SILT | A-8a 2 1 |
| | TOTAL | 167 227 |
| [Pattern] | SANDSTONE | VISUAL |
| [Pattern] | SHALE | VISUAL |
| [Symbol] | SOD AND TOPSOIL = X = APPROXIMATE THICKNESS | VISUAL |
| [Symbol] | PAVEMENT OR BASE = X = APPROXIMATE THICKNESS | VISUAL |
| [Symbol] | EXPLORATION LOCATION - PLAN VIEW | |
| [Symbol] | DRIVE SAMPLE AND/OR ROCK CORE BORING PLOTTED TO VERTICAL SCALE ONLY. HORIZONTAL BAR INDICATES A CHANGE IN STRATIGRAPHY. | |
| WC | INDICATES WATER CONTENT IN PERCENT. | |
| W | INDICATES FREE WATER ELEVATION. | |
| ▽ | INDICATES STATIC WATER ELEVATION. | |
| N ₆₀ | INDICATES STANDARD PENETRATION RESISTANCE NORMALIZED TO 60% DRILL ROD ENERGY RATIO. | |
| X/Y/D" | NUMBER OF BLOWS FOR STANDARD PENETRATION TEST (SPT): X = NUMBER OF BLOWS FOR 6 INCHES (UNCORRECTED). Y/D" = NUMBER OF BLOWS (UNCORRECTED) FOR D" OF PENETRATION AT REFUSAL. | |
| ● | INDICATES A PLASTIC MATERIAL WITH A MOISTURE CONTENT EQUAL TO OR GREATER THAN THE LIQUID LIMIT MINUS 3. | |
| ⊖ | INDICATES A NON-PLASTIC MATERIAL WITH A MOISTURE CONTENT GREATER THAN 25 % OR GREATER THAN 19 % WITH A WET APPEARANCE. | |
| SS | INDICATES A SPLIT-SPOON SAMPLE. | |
| ST | INDICATES A SHELBY TUBE SAMPLE. | |
| NP | INDICATES A NON-PLASTIC SAMPLE. | |
| TR | INDICATES THE TOP OF ROCK. | |
| NQ2 | INDICATES TRIPLE TUBE, CORE BARREL. | |

GEOLOGY (CONTINUED)

CANFIELD-URBAN LAND COMPLEX, CHILI-URBAN LAND COMPLEX, BOGART LOAM AND CARLISLE MUCK. SOILS IN THE CANFIELD SERIES ARE CHARACTERIZED AS VERY DEEP, MODERATELY WELL DRAINED SOILS FORMED IN WISCONSINAN-AGE TILL ON PLAINS. SOILS IN THE CHILI SERIES ARE CHARACTERIZED AS VERY DEEP, WELL DRAINED SOILS ON OUTWASH PLAINS, TERRACES, KAMES, AND BEACH RIDGES WHILE BOGART SERIES SOILS ARE CHARACTERIZED AS VERY DEEP, MODERATELY WELL DRAINED SOILS THAT FORMED IN STRATIFIED OUTWASH DEPOSITS ON TERRACES, BEACH RIDGES, AND OUTWASH PLAINS. SOIL MAPPED AS CARLISLE MUCK WERE ENCOUNTERED NEAR THE SW INTERCHANGE AS WELL AS SOUTHEAST OF THE INTERCHANGE. THE CARLISLE MUCK SERIES ARE CHARACTERIZED AS VERY DEEP, VERY POORLY DRAINED SOILS FORMED IN WOODY AND HERBACEOUS ORGANIC MATERIALS IN DEPRESSIONS WITHIN LAKE PLAINS, OUTWASH PLAINS, TILL PLAINS, FLOOD PLAINS, AND MORAINES. BASED ON THE WEB SOIL SURVEY THESE SURROUNDING SOILS ARE COMPRISED OF A MIX OF BOTH COARSE-GRAINED AND FINE-GRAINED SOILS, CLASSIFYING AS A-4, A-2, A-6 OR A-2-6 TYPE SOILS ACCORDING TO THE AASHTO METHOD OF SOIL CLASSIFICATION. THE SOILS MAPPED AS CARLISLE MUCK ARE CLASSIFIED PRIMARILY AS A-8 ACCORDING TO THE AASHTO METHOD OF SOIL CLASSIFICATION.



RECONNAISSANCE

FIELD RECONNAISSANCE VISITS FOR THE OVERALL PROJECT AREA WERE CONDUCTED BETWEEN JANUARY 14, 2019 AND JANUARY 17, 2019, ALONG IR-76, IR-77, IR-277 AND CONNECTING RAMPS. SITE CONDITIONS, INCLUDING THE EXISTING PAVEMENT CONDITIONS, WERE NOTED AND PHOTOGRAPHED DURING THE VISIT. A SUMMARY OF THE LAND USE AND PAVEMENT CONDITIONS BY ROADWAY SEGMENT ARE PROVIDED AND IS PROVIDED BELOW.

LAND USE AND COVER

THE LAND USE OF MOST OF THE PROJECT AREA ALONG IR-76 AND IR-77 CONSISTS OF RESIDENTIAL PROPERTY GENERALLY COMPRISED OF FAMILY HOMES AND APARTMENT BUILDINGS. NEAR THE SW INTERCHANGE AND ALONG THE PROJECT PORTION OF IR-277 THE LAND USE IS GENERALLY OPEN PROPERTY AND WETLANDS. MORE MINOR LAND USES WITHIN THE AREA SURROUNDING THE PROJECT INCLUDE: 1) EDUCATIONAL/INSTITUTIONAL FACILITIES (I.E., HIGH SCHOOL, MIDDLE SCHOOL, CHURCHES, PUBLIC WORKS, ETC.); 2) COMMERCIAL PROPERTY INCLUDING VARIOUS SMALL SHOPS AND RESTAURANTS; AND 3) INDUSTRIAL STRUCTURES.

INTERSTATE ROUTES

IN GENERAL, THE PAVEMENT CONDITION ALONG IR-76 AND IR-277 WAS OBSERVED TO BE FAIR TO GOOD WITH MARGINAL SIGNS OF WEATHERING AND SURFACE WEAR. LOW TO MODERATE SEVERITY LONGITUDINAL AND TRANSVERSE CRACKING WAS COMMON ALONG THESE SECTIONS, AS WELL AS A FEW LOW SEVERITY POTHOLES AND LOW SEVERITY CRACK SEALING DEFICIENCIES.

THE CONDITION OF THE PAVEMENT ALONG IR-77 CAN BE DIVIDED INTO TWO SECTIONS. THE PAVEMENT CONDITION OF THE ASPHALT PORTION OF IR-77 LOCATED AT THE NORTHERN END OF THE PROJECT WAS OBSERVED TO BE FAIR WITH MINOR SIGNS OF WEATHERING AND SURFACE WEAR. LOW SEVERITY LONGITUDINAL AND LATERAL JOINT SPALLING AND PATCHING WAS OBSERVED IN THIS SECTION.

- RECON. - 01/14/2019 - 01/17/2019
- DRILLING - 02/19/2019 - 05/11/2019
- DRAWN - EB, ZM, KA, 07/2019
- REVIEWED - BPA, 07/30/2019

| | | | |
|---|--------------------------|---------------------|--------------------|
| DESIGN AGENCY NEAS, INC. 2800 CORPORATE EXCHANGE DR., STE 240 COLUMBUS, OH 43231 (614) 714-0270 FAX (614) 714-0323 | PID NO. 100713 | SOIL PROFILE | SUM-76-6.15 |
| | | | 1/41 |

SPECIFICATIONS

THIS GEOTECHNICAL EXPLORATION WAS PERFORMED IN ACCORDANCE WITH THE STATE OF OHIO, DEPARTMENT OF TRANSPORTATION, OFFICE OF GEOTECHNICAL ENGINEERING, SPECIFICATIONS FOR GEOTECHNICAL EXPLORATIONS, DATED JANUARY 2019.

AVAILABLE INFORMATION

ALL AVAILABLE SOIL AND BEDROCK INFORMATION THAT CAN BE CONVENIENTLY SHOWN ON THE GEOTECHNICAL EXPLORATION SHEETS HAS BEEN SO REPORTED. ADDITIONAL EXPLORATIONS MAY HAVE BEEN MADE TO STUDY SOME SPECIAL ASPECT OF THE PROJECT. COPIES OF THIS DATA, IF ANY, MAY BE INSPECTED IN THE DISTRICT DEPUTY DIRECTOR'S OFFICE, THE OFFICE OF GEOTECHNICAL ENGINEERING AT 1980 WEST BROAD STREET.

INDEX OF SHEETS

| LOCATION FROM STA. TO STA. | PLAN VIEW SHEET | PROFILE SHEET | CUT MAX. | FILL EMB. MAX. |
|----------------------------|-----------------|---------------|----------|----------------|
| IR-77 | | | | |
| BEGIN 145+00 | 13 | 13 | <1 FT | <1 FT |
| 145+00 157+50 | 14 | 14 | <1 FT | <1 FT |
| 157+50 170+15 | 15 | 15 | <1 FT | <1 FT |
| 170+15 182+50 | 16 | 16 | <1 FT | <1 FT |
| 182+50 195+00 | 17 | 17 | <1 FT | <1 FT |
| 195+00 207+50 | 18 | 18 | <1 FT | <1 FT |
| 207+50 220+00 | 19 | 19 | <1 FT | <1 FT |
| 220+00 232+50 | 20 | 20 | <1 FT | <1 FT |
| 232+50 245+00 | 21 | 21 | <1 FT | <1 FT |
| 245+00 257+50 | 22 | 22 | <1 FT | <1 FT |
| 257+50 END | 23 | 23 | <1 FT | <1 FT |
| IR-76 | | | | |
| 90+00 102+50 | 24 | 24 | <1 FT | <1 FT |
| 102+50 104+56 | 25 | 25 | <1 FT | <1 FT |
| IR-277 | | | | |
| BEGIN 49+50 | 26 | 26 | <1 FT | <1 FT |
| 49+50 62+00 | 27 | 27 | <1 FT | <1 FT |
| 62+00 74+50 | 28 | 28 | <1 FT | <1 FT |
| 74+50 87+00 | 29 | 29 | <1 FT | <1 FT |
| 87+00 END | 30 | 30 | <1 FT | <1 FT |
| RAMP T | | | | |
| 0+00 12+50 | 31 | 31 | 5 FT | <1 FT |
| 12+50 20+69 | 32 | 32 | <1 FT | <1 FT |
| RAMP U | | | | |
| 0+00 12+50 | 33 | 33 | <1 FT | <1 FT |
| 12+50 17+63 | 34 | 34 | 1 FT | <1 FT |
| RAMP V | | | | |
| 0+00 12+50 | 35 | 35 | 1 FT | 2 FT |
| 12+50 20+28 | 36 | 36 | <1 FT | 3 FT |
| RAMP W | | | | |
| | 37 | 37 | <1 FT | 1.5 FT |
| RAMP L | | | | |
| | 38 | 38 | 1.5 FT | 1 FT |
| RAMP B | | | | |
| | 39 | 39 | <1 FT | <1 FT |
| RAMP A2 | | | | |
| | 40 | 40 | <1 FT | <1 FT |
| RAMP J | | | | |
| | 41 | 41 | - | - |

| SUM-76-6.15 | | |
|-------------|------------|--------------------|
| BORING ID | PLAN VIEW | PROFILE VIEW SHEET |
| B-001-0-18 | 19, 31 | 19 |
| B-002-0-18 | 18 | 18 |
| B-003-0-18 | 18 | 18 |
| B-004-0-18 | 18 | 18 |
| B-005-0-18 | 18 | 18 |
| B-006-0-18 | 17 | 17 |
| B-007-0-18 | 17 | 17 |
| B-008-0-18 | 16 | 16 |
| B-009-0-18 | 16 | 16 |
| B-010-0-18 | 16 | 16 |
| B-011-0-18 | 15 | 15 |
| B-012-0-18 | 15 | 15 |
| B-013-0-18 | 15 | 15 |
| B-014-0-18 | 15 | 15 |
| B-015-0-18 | 14 | 14 |
| B-016-0-18 | 14 | 14 |
| B-017-0-18 | 14 | 14 |
| B-018-0-18 | 14 | 14 |
| B-019-0-18 | 13 | 13 |
| B-020-0-18 | 26 | 26 |
| B-021-0-18 | 26 | 26 |
| B-022-0-18 | 26 | 26 |
| B-023-0-18 | 27 | 27 |
| B-024-0-18 | 27 | 27 |
| B-025-0-18 | 27 | 27 |
| B-026-0-18 | 27 | 27 |
| B-027-0-18 | 28 | 28 |
| B-028-0-18 | 28, 39 | 28, 39 |
| B-029-0-18 | 28, 39, 40 | 28, 39 |
| B-030-0-18 | 28 | 28 |
| B-031-0-18 | 29 | 29 |
| B-032-0-18 | 29 | 29 |
| B-033-0-18 | 29 | 29 |
| B-034-0-18 | 29 | 29 |
| B-035-0-18 | 29 | 29 |
| B-036-0-18 | 30 | 30 |
| B-037-0-18 | 30 | 30 |
| B-038-0-18 | 30 | 30 |
| B-039-0-18 | 19, 24 | 19 |
| B-040-0-18 | 20, 34, 37 | 20, 37 |
| B-041-0-18 | 20, 34 | 20 |
| B-042-0-18 | 20, 34, 35 | 20 |
| B-043-0-18 | 21, 34, 35 | 21, 35 |
| B-044-0-18 | 21, 35 | 21 |
| B-045-0-18 | 21 | 21 |
| B-045-1-18 | 21, 41 | 21 |
| B-046-0-18 | 22, 38 | 22 |
| B-047-0-18 | 22, 38 | 22, 38 |
| B-048-0-18 | 22, 38 | 22 |
| B-049-0-18 | 23 | 23 |
| B-050-0-18 | 23 | 23 |
| B-051-0-18 | 24, 31 | 24, 31 |
| B-052-0-18 | 19, 31 | 31 |
| B-053-0-18 | 19, 31 | 19, 31 |
| B-054-0-18 | 19, 24, 31 | 24 |
| B-055-0-18 | 19, 24 | 24 |
| B-056-0-18 | 19, 24 | 24 |
| B-057-0-18 | 24, 36 | 24 |
| B-058-0-18 | 25, 36, 37 | 37 |
| B-059-0-18 | 20, 34, 37 | 37 |
| B-060-0-18 | 19, 24 | 19 |
| B-061-0-18 | 19 | 19 |
| B-062-0-18 | 28, 39 | 39 |
| B-063-0-18 | 39, 40 | 40 |
| B-064-0-18 | 39, 40 | 40 |
| B-065-0-18 | 28, 39, 40 | 40 |
| B-066-0-18 | 28, 39, 40 | 40 |
| B-067-0-18 | 32, 33 | 33 |
| B-068-0-18 | 20, 33, 37 | 33 |
| B-069-0-18 | 20, 34 | 34 |
| B-070-0-18 | 20, 34, 35 | 34 |
| B-071-0-18 | 21, 34, 35 | 21 |

| SUM-76-6.15 | | |
|-------------|------------|--------------------|
| BORING ID | PLAN VIEW | PROFILE VIEW SHEET |
| B-072-0-18 | 24, 36 | 24 |
| B-073-0-18 | 25, 36, 37 | 25 |
| B-074-0-18 | 25, 36, 37 | 36 |
| B-075-0-18 | 20, 25, 36 | 36 |
| B-076-0-18 | 20, 34, 35 | 35 |
| B-077-0-18 | 22, 38 | 38 |
| B-077-1-18 | 41 | - |
| B-077-2-18 | 41 | - |
| B-077-3-18 | 41 | - |
| B-077-4-18 | 22, 41 | - |
| B-078-0-18 | 17 | 17 |
| B-079-0-18 | 17 | 17 |
| B-080-0-18 | 17 | 17 |
| B-081-0-18 | 17 | 17 |

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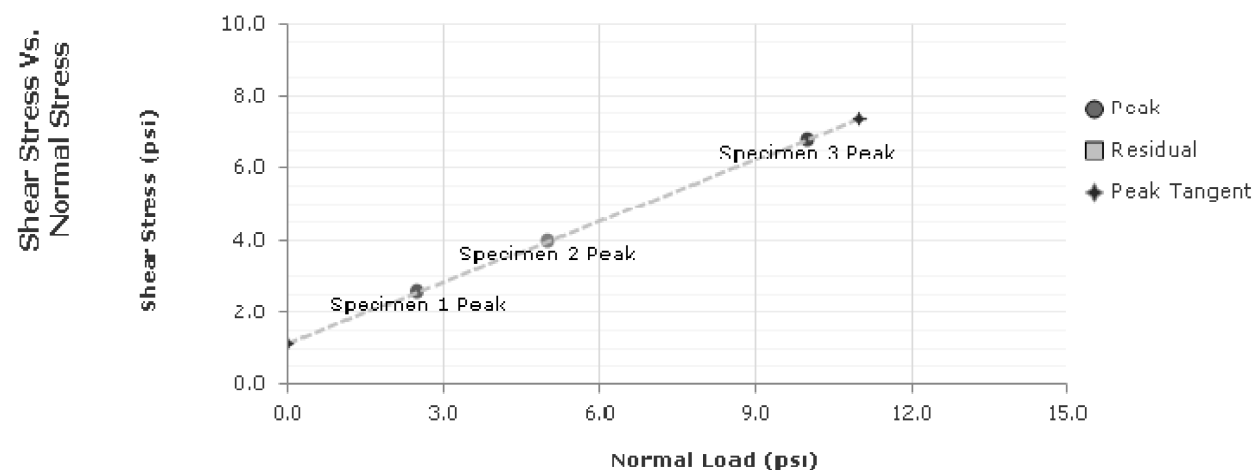
SUMMARY OF SOIL TEST DATA
PROJECT BORINGS - Ramp V

| EXPLORATION NO., STATION & OFFSET | FROM | TO | SAMPLE ID | N60 | REC | % HP tsf | % GR | % CS | % FS | % SILT | % CLAY | LL | PL | PI | WC | % | ODOT CLASS (GI) | ppm | | | |
|---|---|----|---|---|--|---|--------------|----------|----------|-----------|-----------|----------|----------|----------|---|--|--|------|---------------------|--|--|
| B-054-0-18 STA. 94+72, 25' RT LATITUDE = 41.060211 LONGITUDE = -81.568035 | 1.5 - 3 3 - 4.5 6 - 6.9 6.9 - 7.5 | | SS-1 SS-2 SS-3 SS-4A SS-4B | 28 38 48 - | 89 78 78 - | 4.5+ - - 4.5+ | 32 39 | 11 18 | 11 12 | 29 19 | 17 12 | 25 23 | 18 17 | 7 6 | 9 7 | | A-4a (2) A-2-4 (0) | | | | |
| NO RECOVERY | | | | | | | | | | | | | | | | | | | | | |
| B-055-0-18 STA. 98+03, 78' RT LATITUDE = 41.06096 LONGITUDE = -81.567593 | 2.5 - 4 5 - 6.5 6.5 - 6.54 | | SS-1 SS-2 SS-3 | 14 21 50/1" | 78 100 100 | 1 3.5 - | 15 - | 5 - | 12 - | 42 - | 26 - | 32 - | 20 - | 12 - | 21 21 1 | | A-6a (7) A-6a (VISUAL) Rock (VISUAL) | 393 | | | |
| HARD, BROWN AND GRAY, SANDY SILT | | | | | | | | | | | | | | | | | | | | | |
| B-056-0-18 STA. 97+76, 30' RT LATITUDE = 41.060971 LONGITUDE = -81.567787 | 1.5 - 3 3 - 4.5 4.5 - 6 6 - 7.5 | | SS-1 SS-2 SS-3 SS-4 | 20 11 6 4 | 33 56 78 78 | - - - 1.75 | SAME AS SS-2 | | | | | | | | | | | | 8 11 10 16 | A-3a (VISUAL) A-3a (0) A-3a (0) A-6a (VISUAL) | |
| B-072-0-18 STA. 99+85, 38' LT LATITUDE = 41.061524 LONGITUDE = -81.567471 | 2.5 - 4 7.5 - 9 10 - 10.3 10.3 - 11.5 12.5 - 13.5 13.5 - 14 15 - 16.5 17.5 - 19 20 - 21.5 22.5 - 24 25 - 26.5 27.5 - 29 30 - 31.5 32.5 - 34 35 - 36.5 37.5 - 38.25 40 - 40.17 | | SS-1 SS-2 SS-3 SS-4A SS-4B SS-5A SS-5B SS-6 SS-7 SS-8 SS-9 SS-10 SS-11 SS-12 SS-13 SS-14 SS-15 SS-16 | 23 14 31 - 29 - 10 18 22 30 42 20 25 14 44 18/50/3" 50/2" | 89 67 56 - 89 - 100 100 100 89 100 100 100 89 100 100 50 | 4.5+ - - - - - - - - - - - - - - - | 18 - | 9 - | 27 - | 29 - | 17 - | 21 - | 15 - | 6 - | 10 9 11 14 14 14 14 7 7 | A-4a (2) A-2-4 (VISUAL) A-2-4 (VISUAL) A-1-b (VISUAL) A-1-b (VISUAL) A-6b (VISUAL) A-4a (2) A-4a (VISUAL) A-6b (VISUAL) A-4a (5) A-2-4 (VISUAL) A-6a (VISUAL) A-6a (VISUAL) A-6a (VISUAL) A-6a (VISUAL) A-6a (VISUAL) Rock (VISUAL) Rock (VISUAL) | 73 | | | | |
| NO RECOVERY | | | | | | | | | | | | | | | | | | | | | |
| B-073-0-18 STA. 103+14, 39' LT LATITUDE = 41.061843 LONGITUDE = -81.566284 | 1.5 - 3 3 - 4.5 4.5 - 6 6 - 6.92 | | SS-1 SS-2 SS-3 SS-4 | 34 26 52 7/50/5" | 78 56 78 91 | - - - - | 49 40 | 14 21 | 25 21 | 7 11 | 5 7 | NP NP | NP NP | NP NP | 6 5 | | A-1-b (0) A-1-b (0) Rock (VISUAL) Rock (VISUAL) | 13 | | | |
| B-074-0-18 STA. 18+11, 7' RT LATITUDE = 41.061545 LONGITUDE = -81.565017 | 2.5 - 4 5 - 5.42 | | SS-1 SS-2 | 60 50/5" | 56 40 | - - | 48 - | 20 - | 24 - | 5 - | 3 - | NP - | NP - | NP - | 6 7 | | A-1-b (0) Rock (VISUAL) | 13 | | | |
| B-075-0-18 STA. 14+42, 77' LT LATITUDE = 41.060670 LONGITUDE = -81.564256 | 2.5 - 4 5 - 5.9 | | SS-1 SS-2 | 23 - | 78 - | - - | 1 10 | 1 9 | 15 21 | 57 37 | 26 23 | 25 24 | 16 15 | 9 9 | 5 5 | | A-4b (8) A-4a (5) | 20 | | | |
| B-076-0-18 STA. 10+85, 59' LT LATITUDE = 41.060150 LONGITUDE = -81.563065 | 2.5 - 4 5 - 6 5.7 - 5.7 | | SS-1 SS-2A SS-2B | 51 5/50/6" - | 78 100 - | - - - | 20 13 | 12 14 | 37 35 | 21 24 | 10 14 | NP 19 | NP 15 | NP 4 | 7 9 | | A-2-4 (0) A-4a (1) Rock (VISUAL) | 1133 | | | |
| SUMMARY OF SOIL TEST DATA PROJECT BORINGS - Ramp W | | | | | | | | | | | | | | | | | | | | | |
| EXPLORATION NO., STATION & OFFSET | FROM | TO | SAMPLE ID | N60 | REC | % HP tsf | % GR | % CS | % FS | % SILT | % CLAY | LL | PL | PI | WC | % | ODOT CLASS (GI) | ppm | | | |
| B-057-0-18 STA. 102+30, 28' RT LATITUDE = 41.061635 LONGITUDE = -81.566566 | 02.00 - 02.50 02.50 - 02.80 | | SS-1A SS-1B | 4/50/3" - | 44 - | 3.75 - | 22 - | 19 - | 38 - | 13 - | 8 - | NP - | NP - | NP - | 9 - | | A-3a (0) Rock (VISUAL) | | | | |
| B-058-0-18 STA. 106+50, 1' RT LATITUDE = 41.061258 LONGITUDE = -81.565229 | 02.50 - 03.00 04.00 - 04.10 | | SS-1 SS-2 | 85 50/2" | 85 50 | - - | 39 - | 17 - | 31 - | 9 - | 4 - | NP - | NP - | NP - | 6 4 | | A-1-b (0) Rock (VISUAL) | 33 | | | |
| B-059-0-18 STA. 110+72, 15' RT LATITUDE = 41.060386 LONGITUDE = -81.565883 | 02.50 - 04.00 05.00 - 06.25 06.50 - 06.58 | | SS-1 SS-2 SS-3 | 85 4/20/50/3" 50/1" | 85 93 100 | - - - | 0 - | 1 - | 62 - | 23 - | 14 - | NP - | NP - | NP - | 11 6 8 | | A-4a (0) Rock (VISUAL) Rock (VISUAL) | 53 | | | |
| SAME AS SS-2 | | | | | | | | | | | | | | | | | | | | | |

Direct Shear Test

D3080

Project: SUM-76-6.15
 Project Number: 100713
 Location: B-017-0-18
 Client Name:

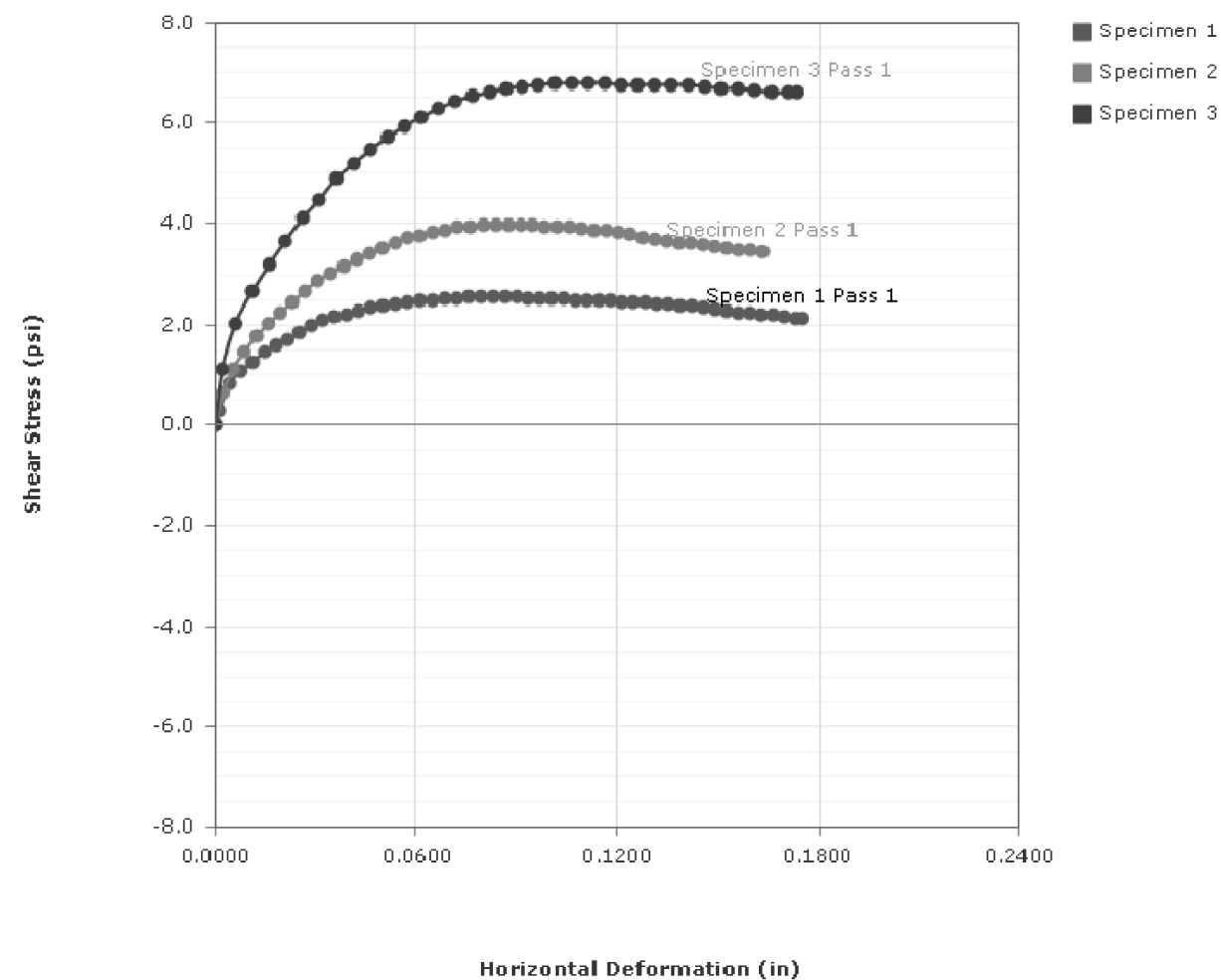


C (psi): 1.2 Residual C (psi): NA
 Phi (°): 29.5 Residual Phi (°): NA

| | Specimen Number | | | | | | | | |
|-----------------------------|-----------------|----------|----------|---|---|---|---|---|---|
| | Initial | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Moisture (%): | 20.2 | 17.3 | 15.6 | | | | | | |
| Dry Density (pcf): | 106.9 | 110.3 | 111.6 | | | | | | |
| Void Ratio: | 0.560 | 0.511 | 0.493 | | | | | | |
| Saturation (%): | 96.3 | 90.5 | 84.5 | | | | | | |
| Diameter (in): | 2.4973 | 2.4973 | 2.4973 | | | | | | |
| Height (in): | 1.0033 | 0.9998 | 1.0000 | | | | | | |
| | Final | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Moisture (%): | 21.9 | 20.0 | 17.6 | | | | | | |
| Dry Density (pcf): | 108.9 | 111.0 | 113.6 | | | | | | |
| Void Ratio: | 0.531 | 0.502 | 0.467 | | | | | | |
| Saturation (%): | 110.2 | 106.3 | 100.7 | | | | | | |
| Height (in): | 1.0003 | 0.9998 | 0.9901 | | | | | | |
| Normal Stress (psi): | 2.5 | 5.0 | 10.0 | | | | | | |
| Peak Shear Stress (psi): | 2.6 | 4.0 | 6.8 | | | | | | |
| Residual Stress (psi): | NA | NA | NA | | | | | | |
| Horizontal Deformation (%): | 3.3 | 3.7 | 4.1 | | | | | | |
| Rate (in/min): | 0.003535 | 0.003707 | 0.005000 | | | | | | |

Graph - Stress Deformation

D3080





5710 Westbourne Avenue
Columbus, OH 43213
614-892-0162

Unconfined Compressive Strength of Cohesive Soil (ASTM D2166)

(Project: SUM-76-6.15 Kenmore, Boring Location: B-034-0-18, ST-2, Depth: 5.0 - 5.5ft)

Tested Date: 4/8/2019

Specimen Properties

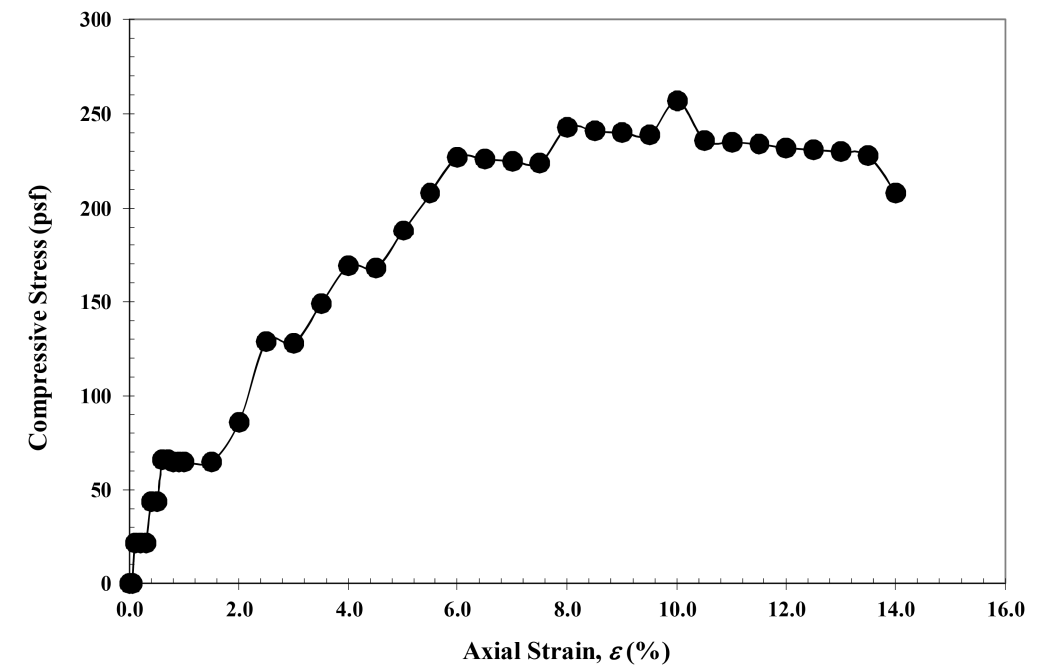
| | |
|--|-------|
| Average Dia., D_{avg} (in): | 2.89 |
| Average Height H_{avg} (in): | 5.74 |
| Area, A (in ²): | 6.55 |
| Volume, V (in ³): | 37.58 |
| Wet Mass of Specimen (lb): | 1.6 |
| Moisture Content (%): | 26.2 |
| Dry Mass of Specimen (lb): | 1.3 |
| Wet Unit Weight, γ (lb/ft ³): | 73.7 |
| Dry Unit Weight, γ_d (lb/ft ³): | 58.4 |

Final Specimen Figure



Results

| | |
|--|-------------|
| Unconfined Compressive Strength (psf): | 257 |
| Strain (%): | 10.0 |



Notes: Very soft, black with brown, ORGANIC SILT, some sand, little clay, trace gravel, wet. Contains 28.4% organic content.

DRAWN
EB
CHECKED
BPA

SOIL PROFILE
LABORATORY TEST DATA

SUM-76-6.15



P:\19-0002 (SUM-76-6.15 PID 100713) Kenmore - Part 6 (Roadway)\100713\geotechnical\sheets\100713\102.dgn Sheet 8/2/2019 3:33:57 PM korrens



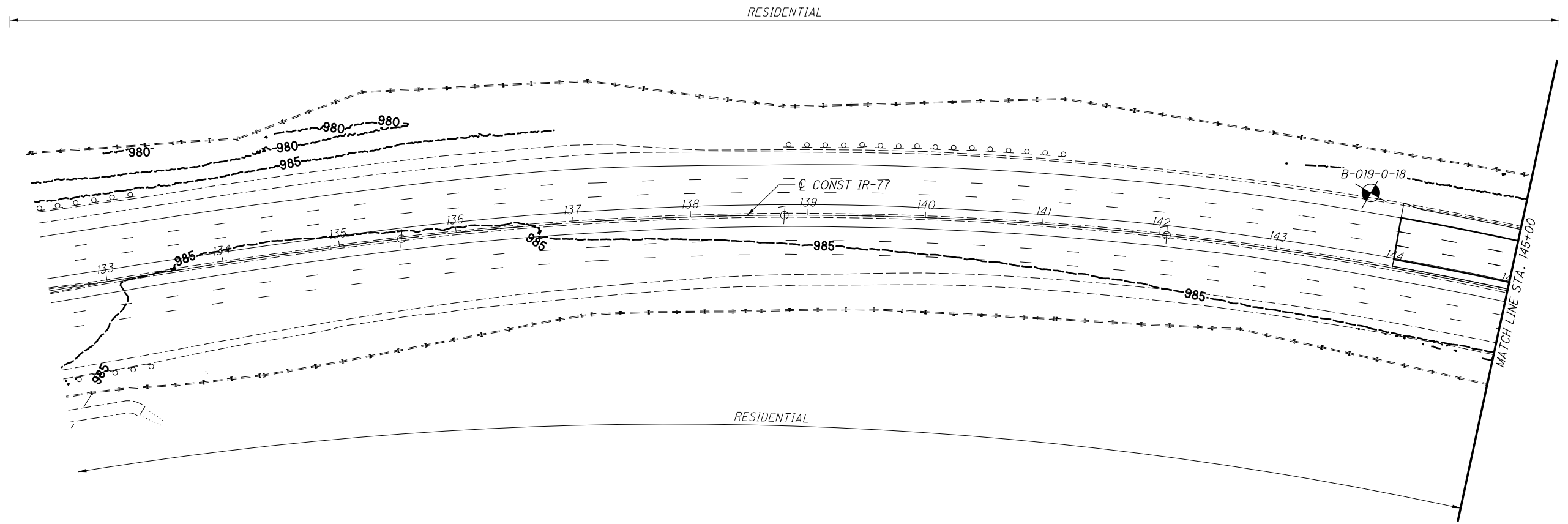
0 50 100
25
HORIZONTAL
SCALE IN FEET

DRAWN ZM
CHECKED BPA

SOIL PROFILE
BEGIN TO STA. 145+00 I.R. 77

SUM-76-6.15

13 / 41

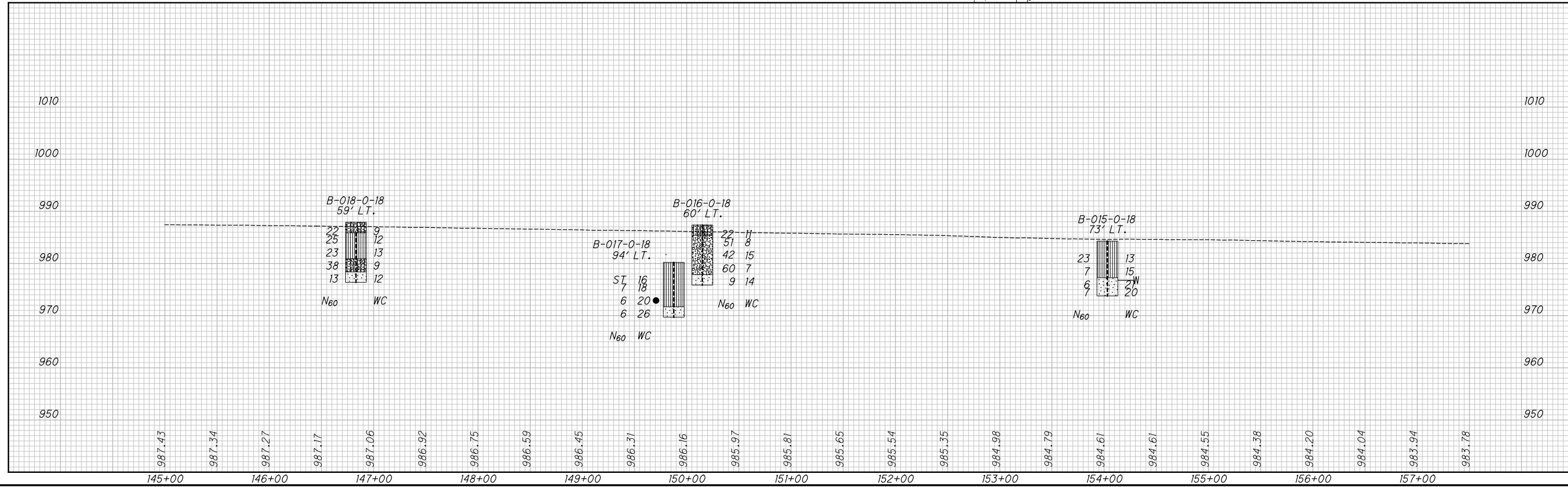
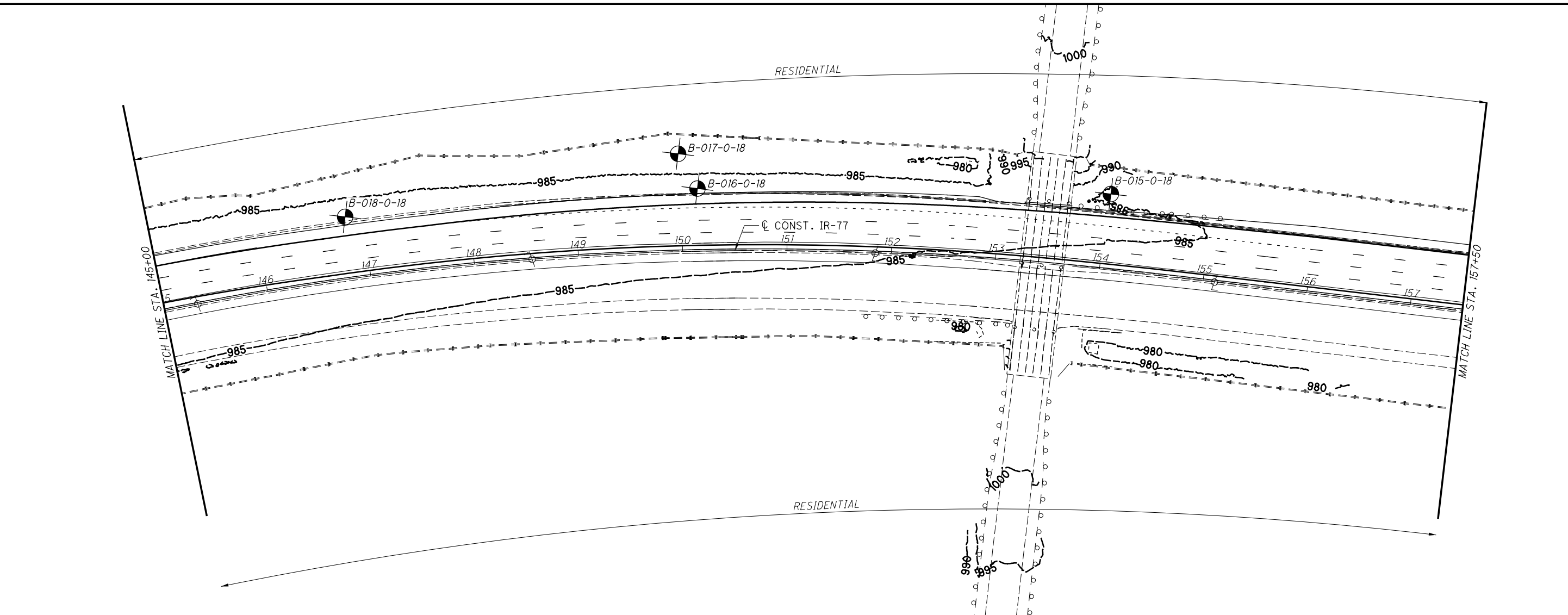




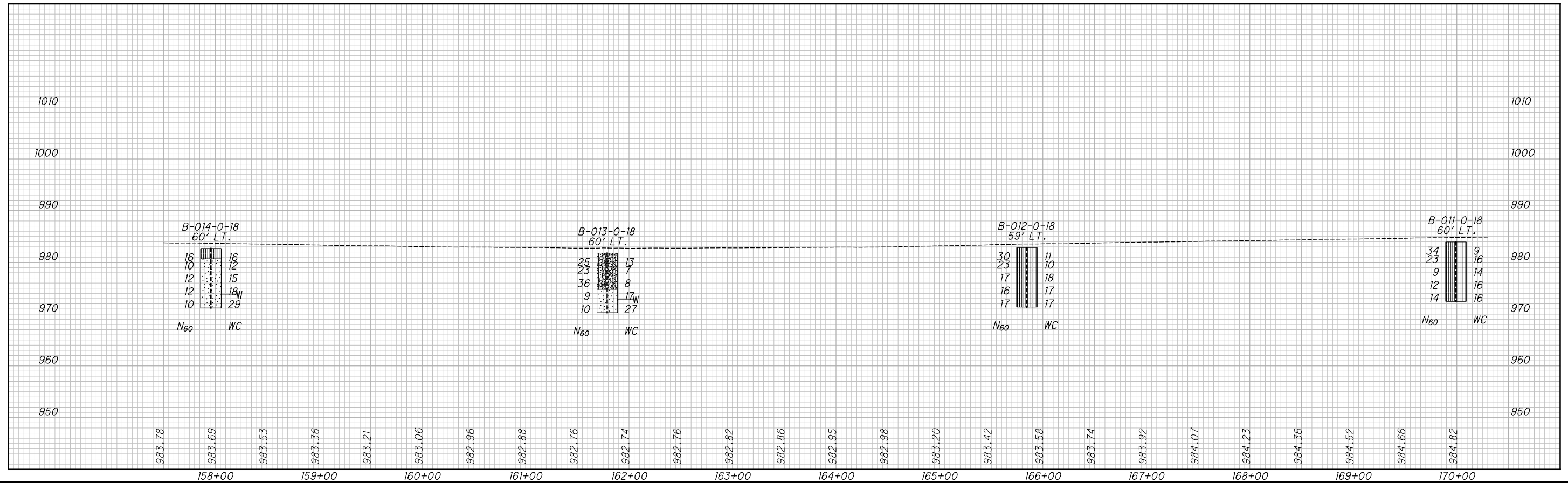
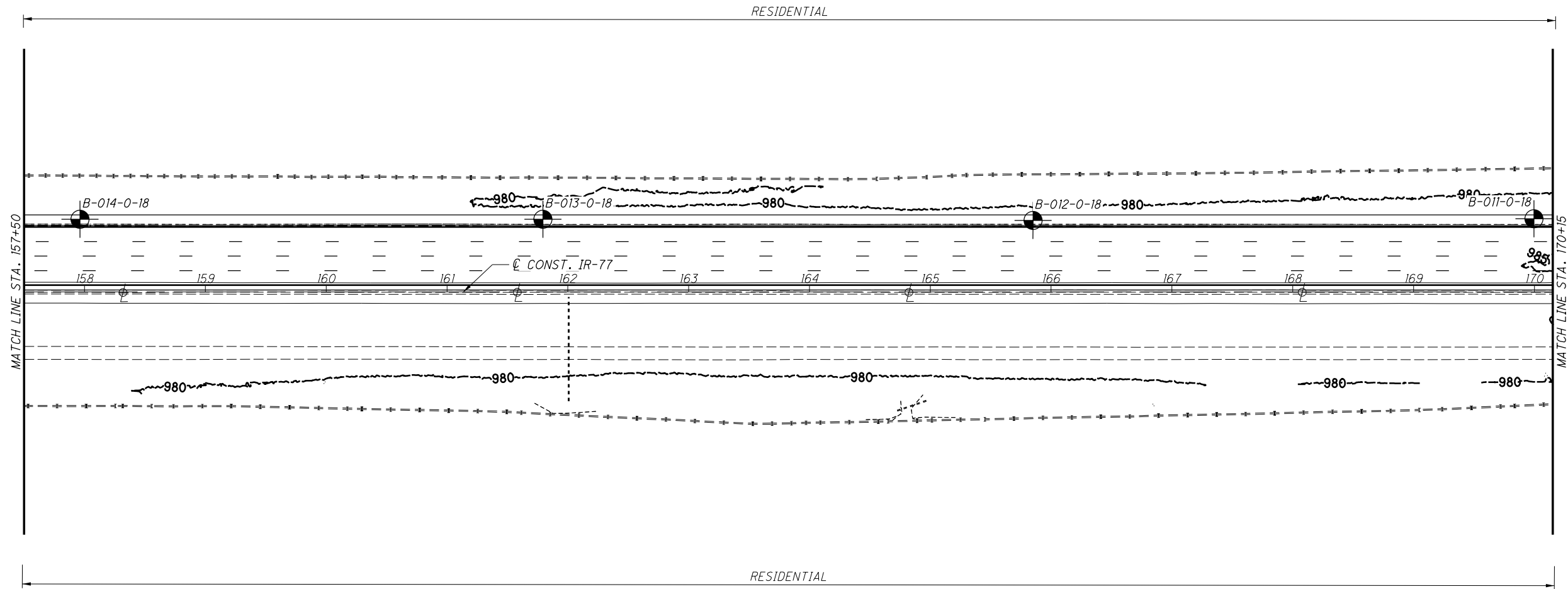
DRAWN ZM
CHECKED BPA

SOIL PROFILE
STA. 145+00 TO STA. 157+50 I.R. 77

SUM-76-6.15



P:\19-0002 (SUM-76-6.15 PID 100713) Kenmore - Part 6 (Roadway)\100713\geotechnical\sheets\100713\1104.dgn Sheet 8/2/2019 3:54:13 PM karens

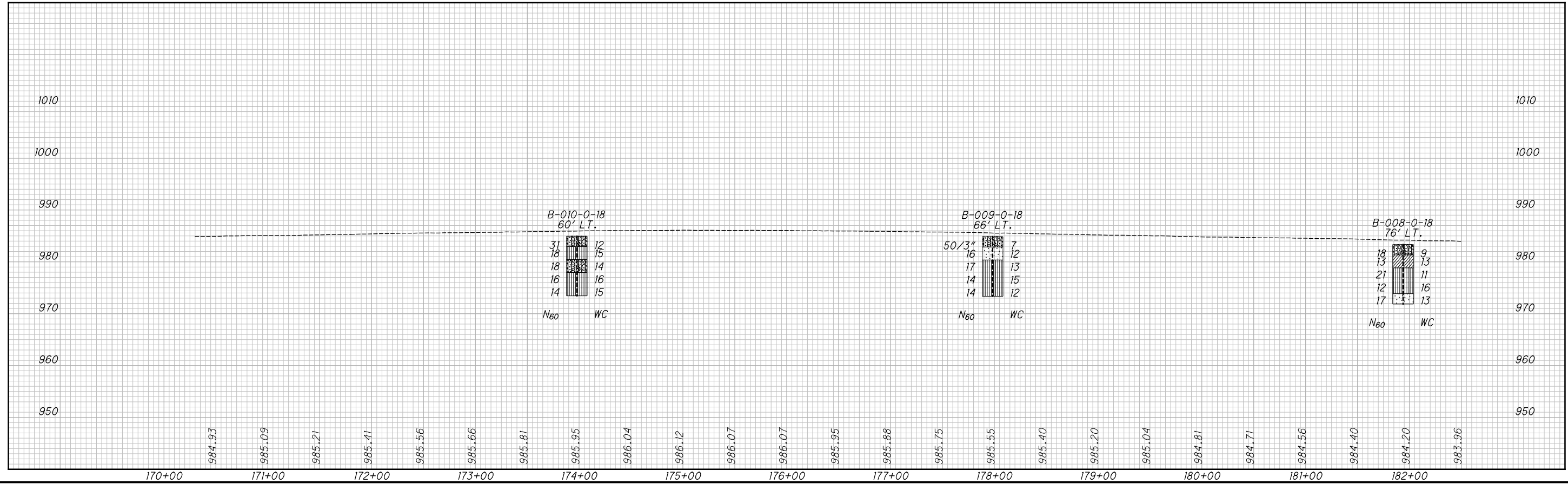
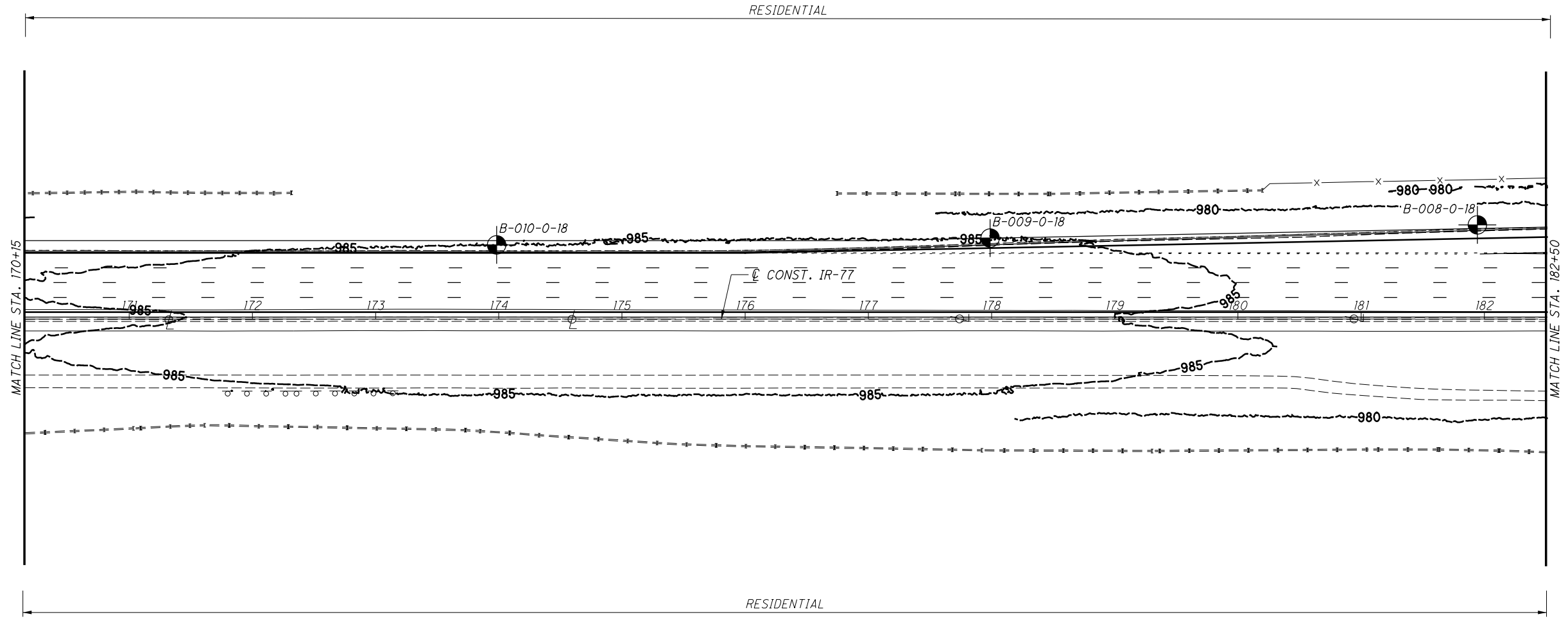


DRAWN: ZM
CHECKED: BPA

SOIL PROFILE
STA. 157+50 TO STA. 170+15 I.R. 77

SUM-76-6.15



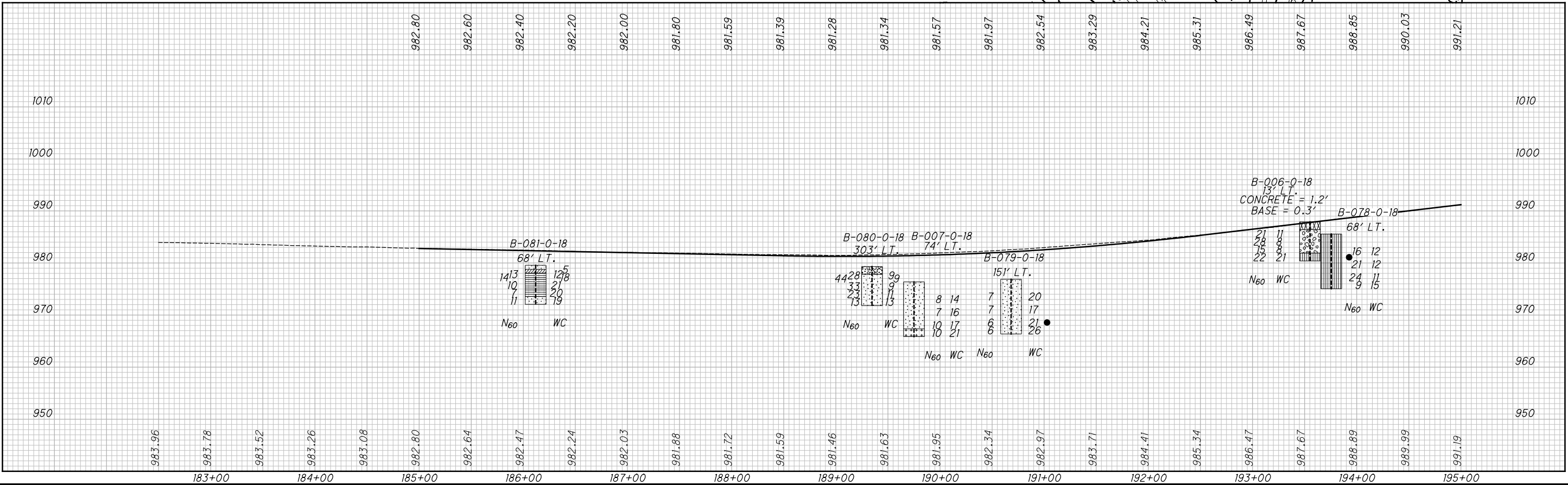
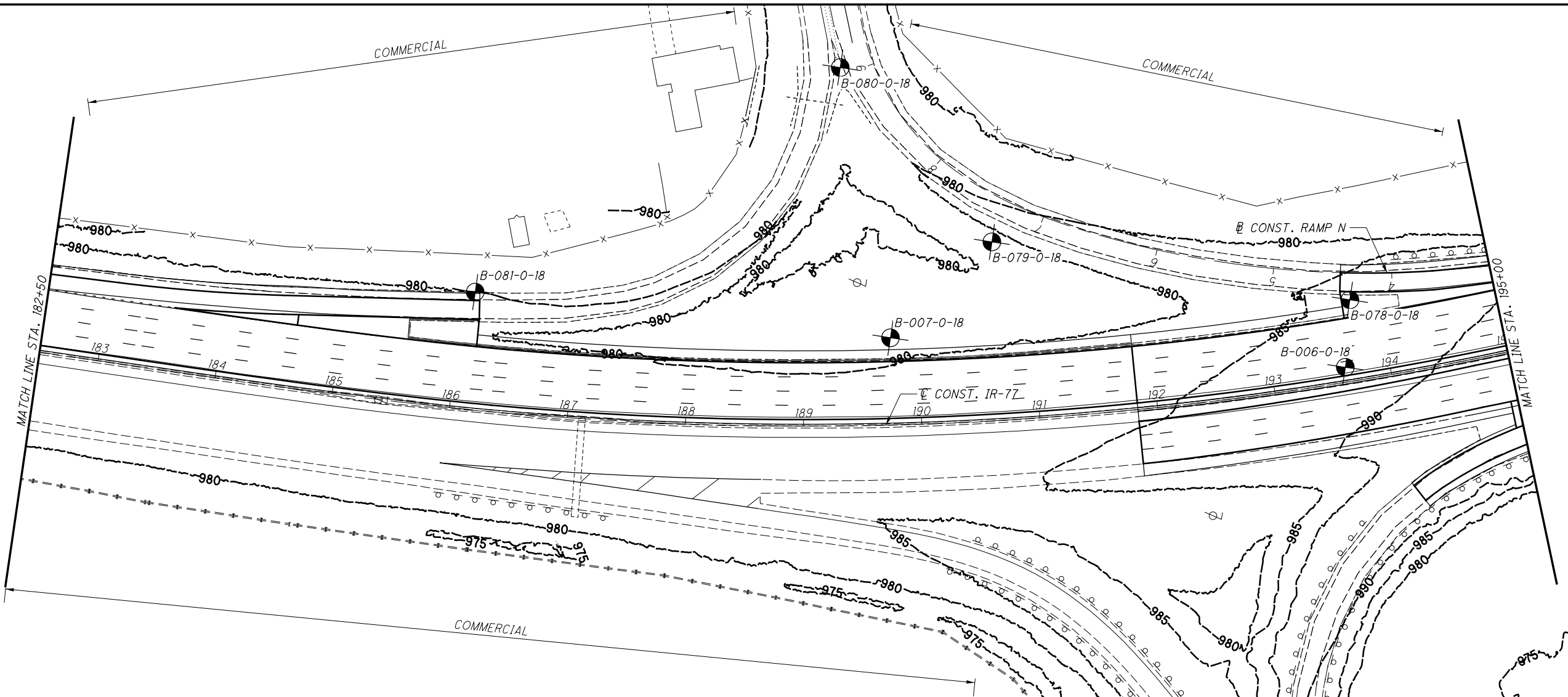


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STA. 170+15 TO STA. 182+50 I.R. 77

SUM-76-6.15

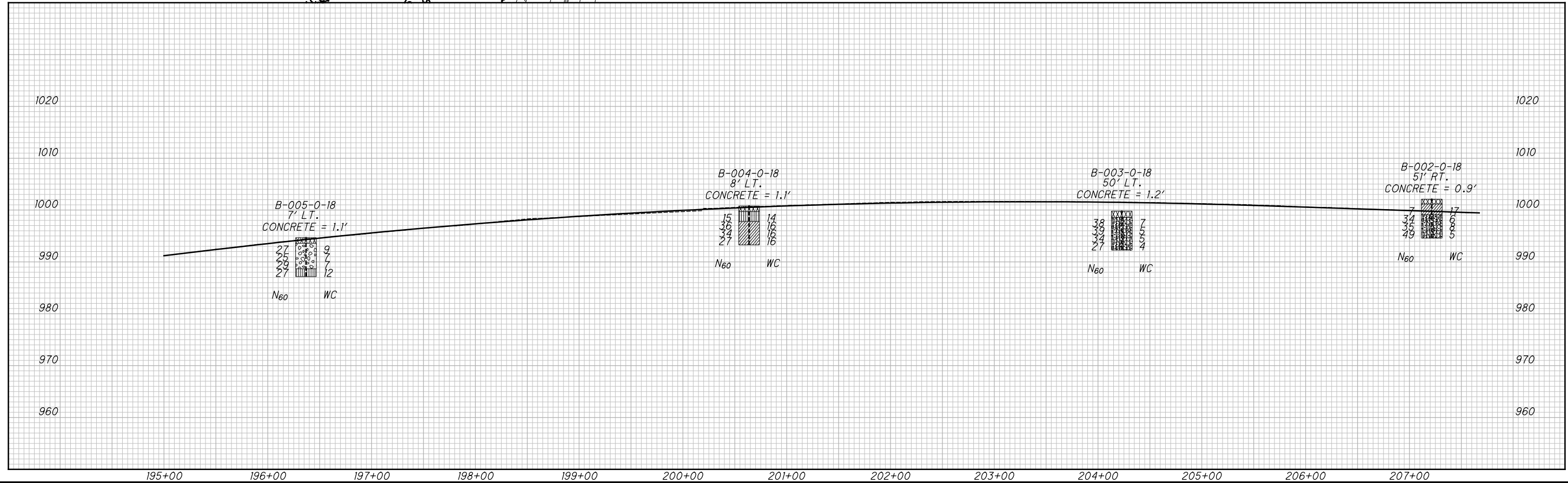
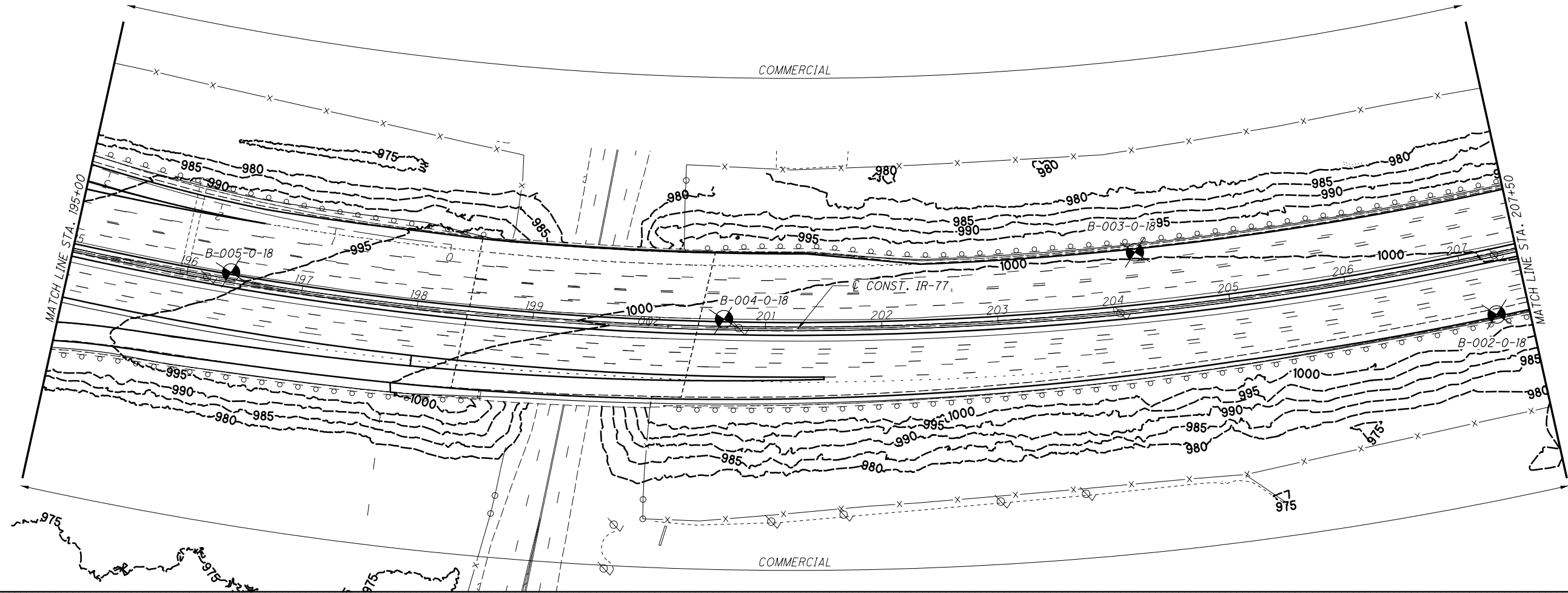


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SUM-76-6.15
SOIL PROFILE
STA. 182+50 TO STA. 195+00 I.R. 77

P:\19-0002 (SUM-76-6.15 PID 100713) Kenmore - Part 6 (Roadway)\100713\geotechnical\sheets\100713\1107.dgn Sheet 8/2/2019 3:34:17 PM korens

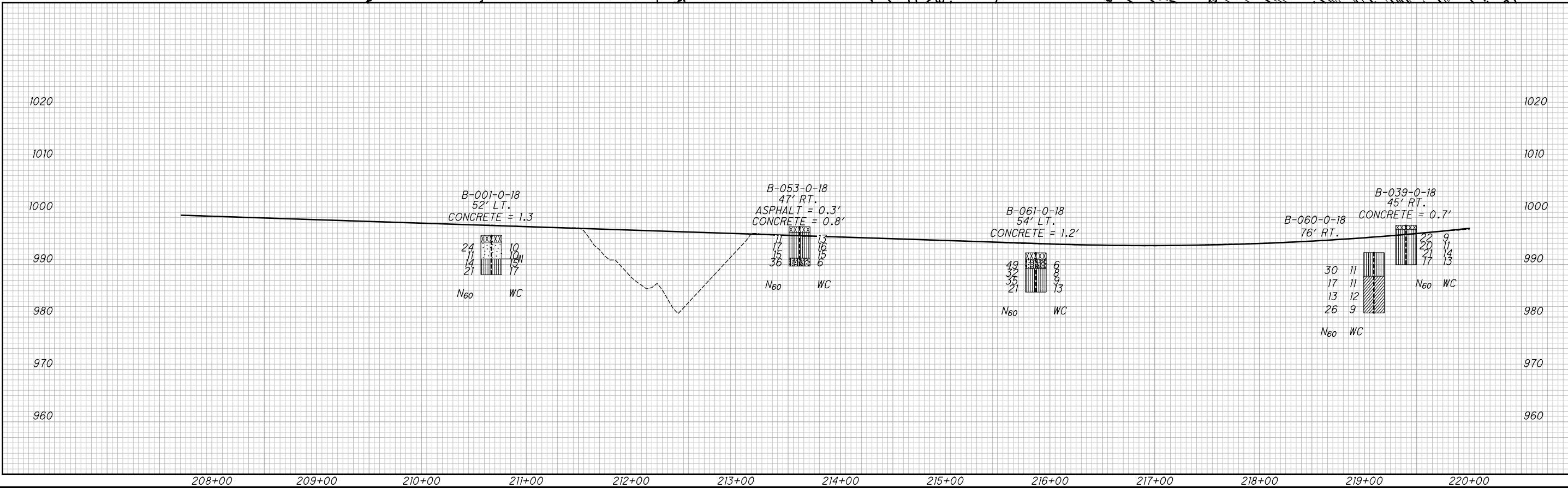
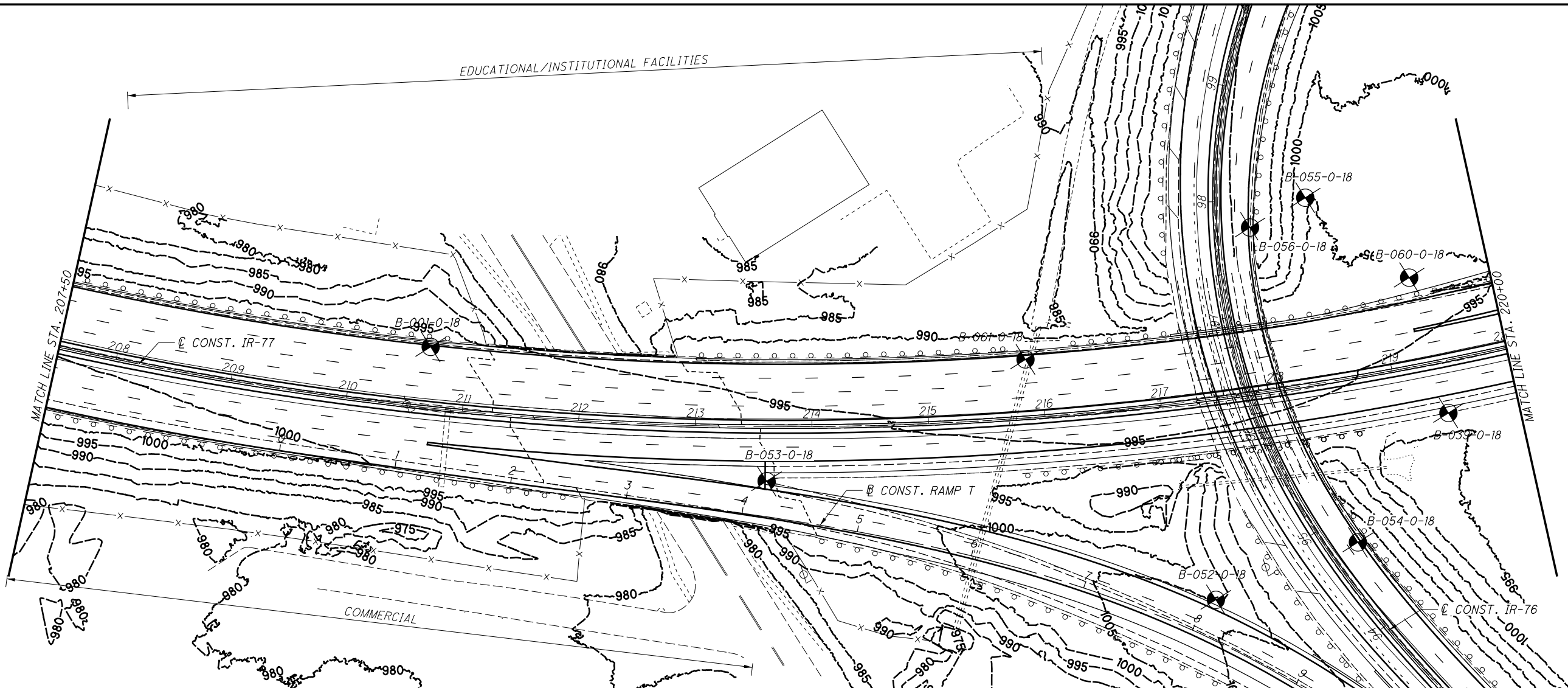


DRAWN: EB, CHECKED: BPA
SOIL PROFILE
STA. 195+00 TO STA. 207+50 I.R. 77

SUM-76-6.15



P:\19-0002 (SUM-76-6.15 PID 100713) Kenmore - Part 6 (Roadway)\100713\geotechnical\sheets\100713\PI108.dgn Sheet 8/2/2019 3:34:19 PM karen



25 HORIZONTAL SCALE IN FEET

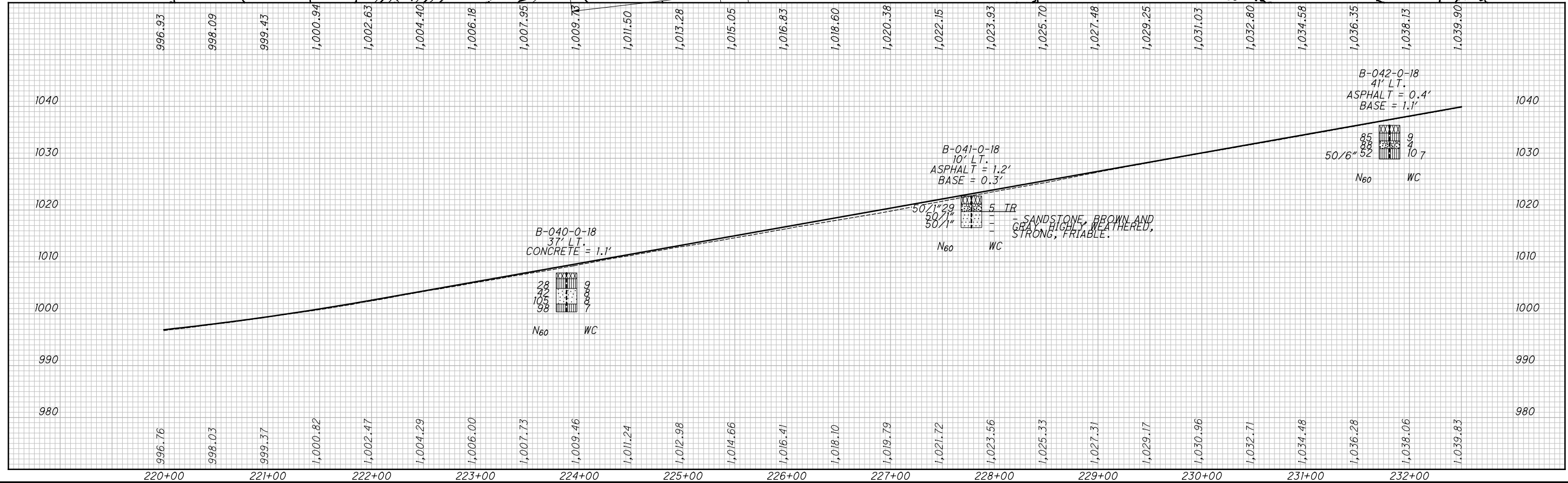
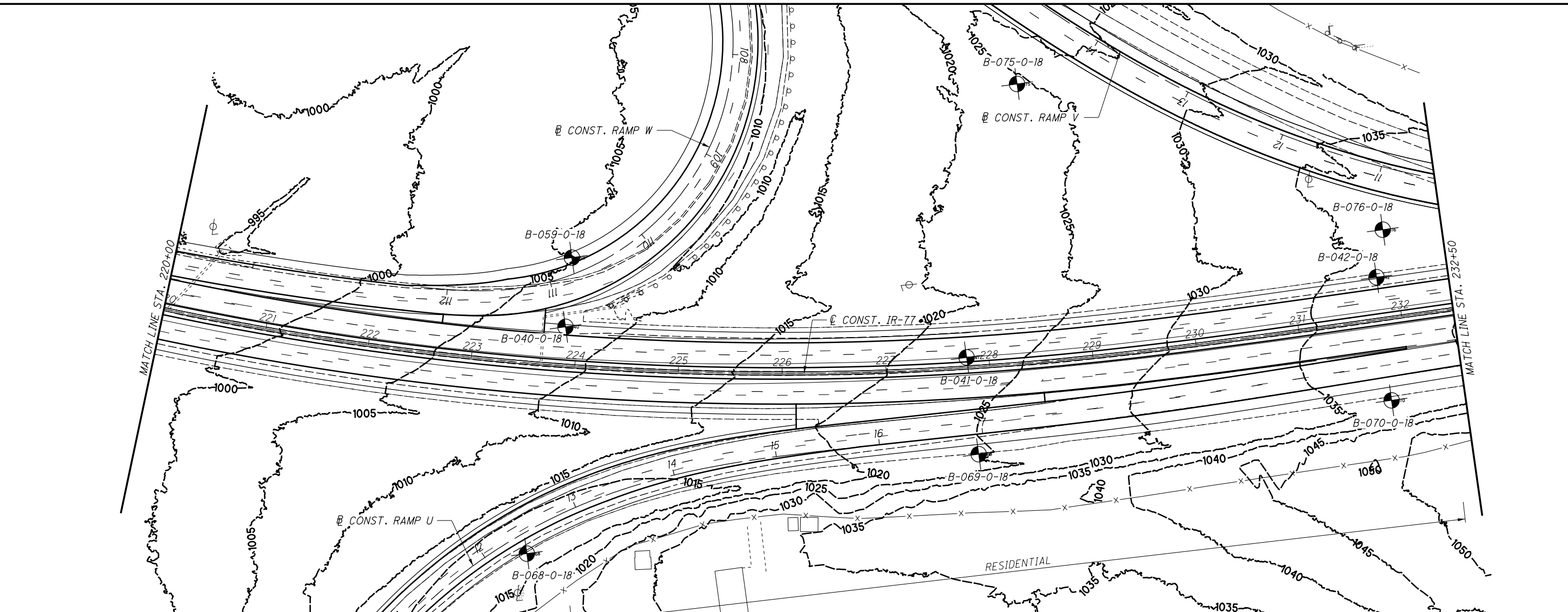
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|---------|-----|
| DRAWN | EB |
| CHECKED | BPA |


SOIL PROFILE

STA. 207+50 TO STA. 220+00 I.R. 77

SUM-76-6.15

19 / 41





0 50 100
HORIZONTAL SCALE IN FEET


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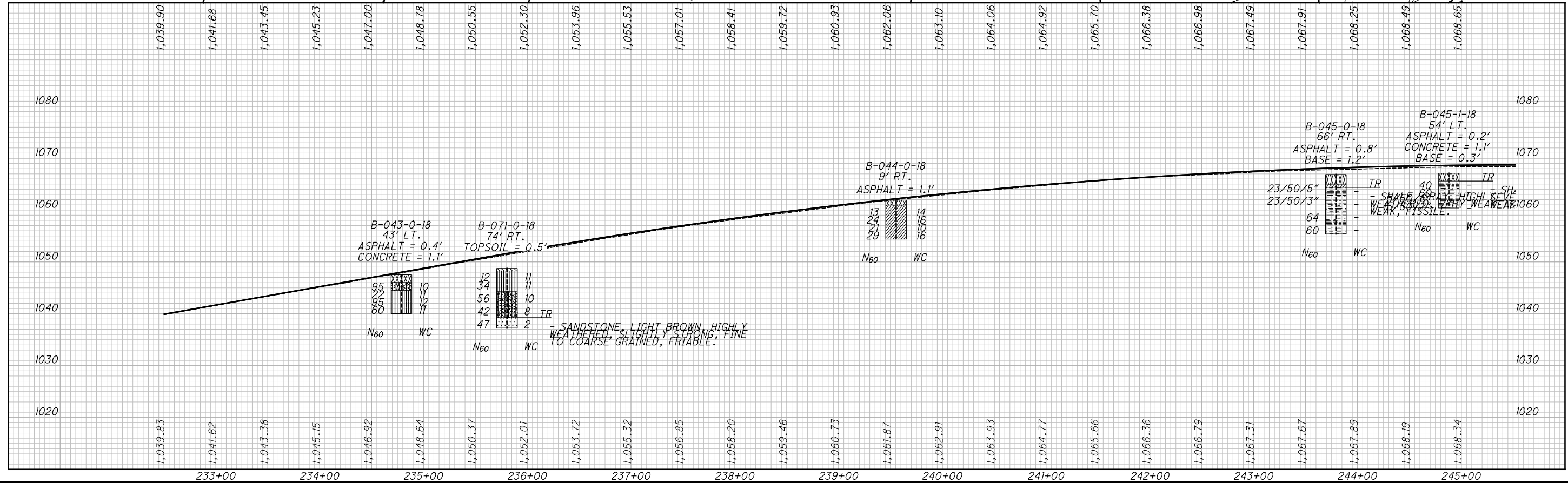
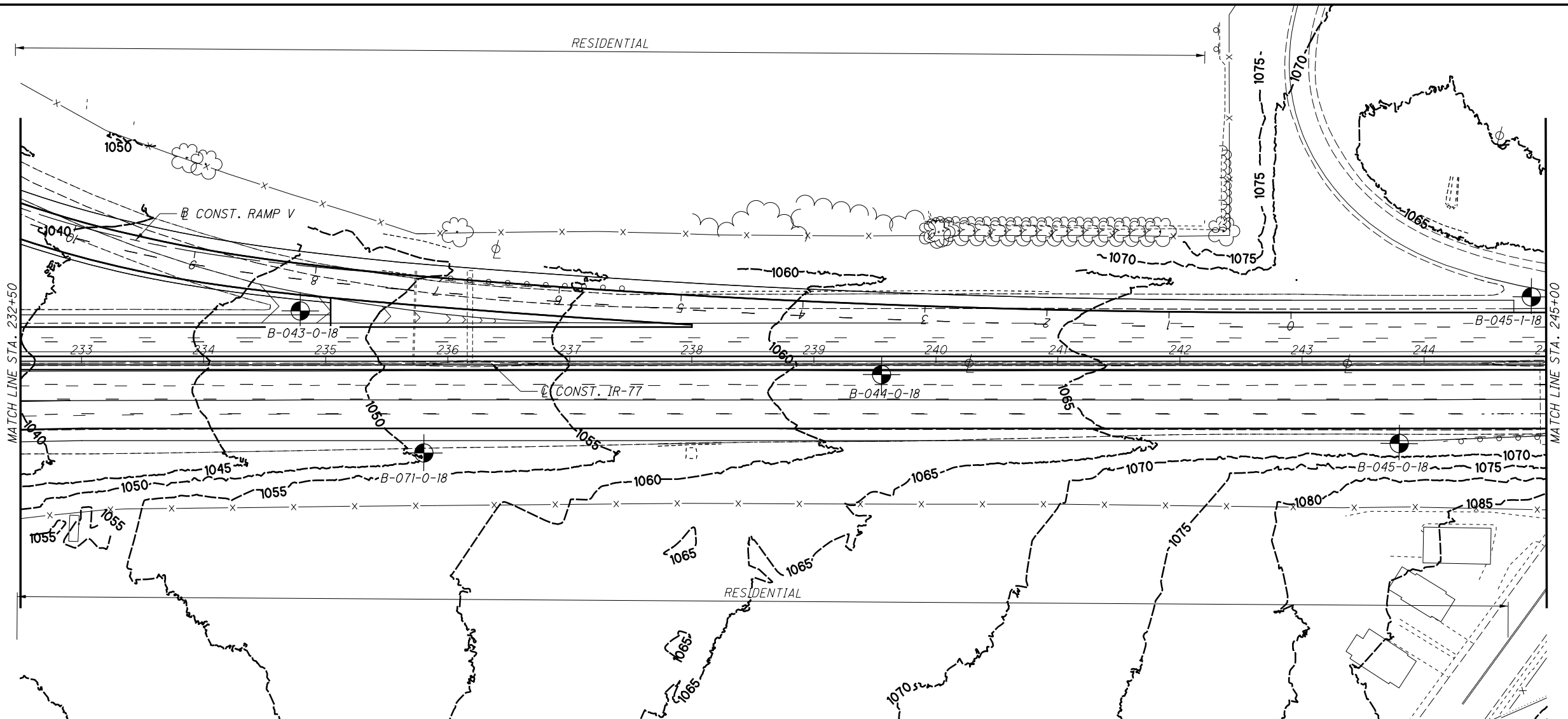
SOIL PROFILE

STA. 220+00 TO STA. 232+50 I.R. 77

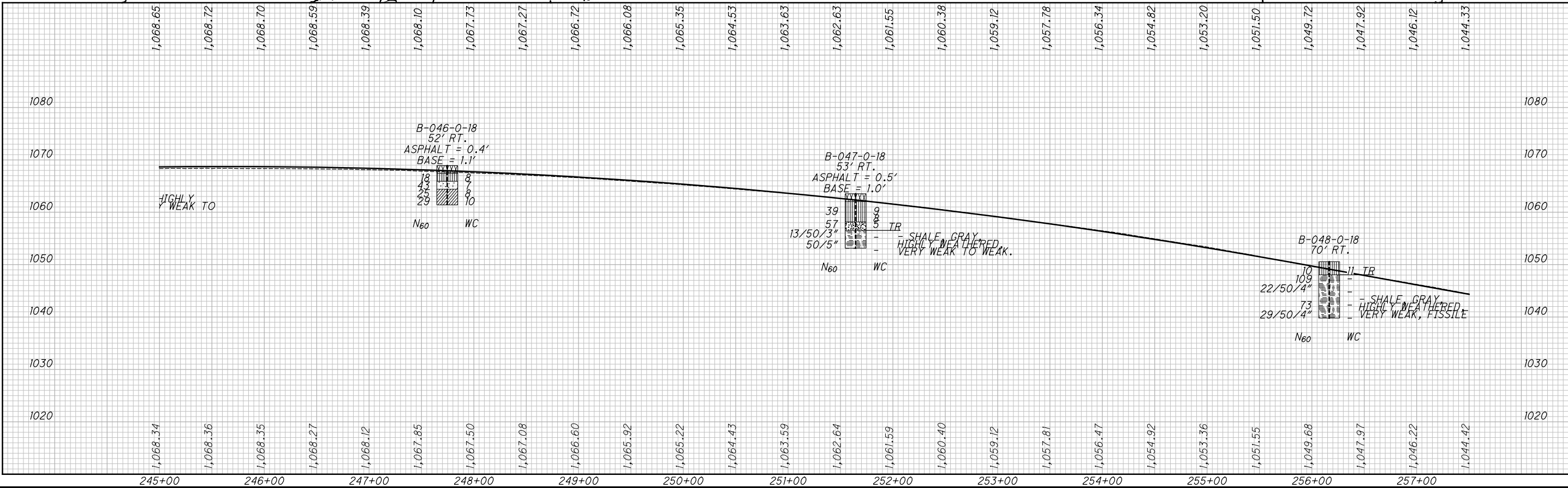
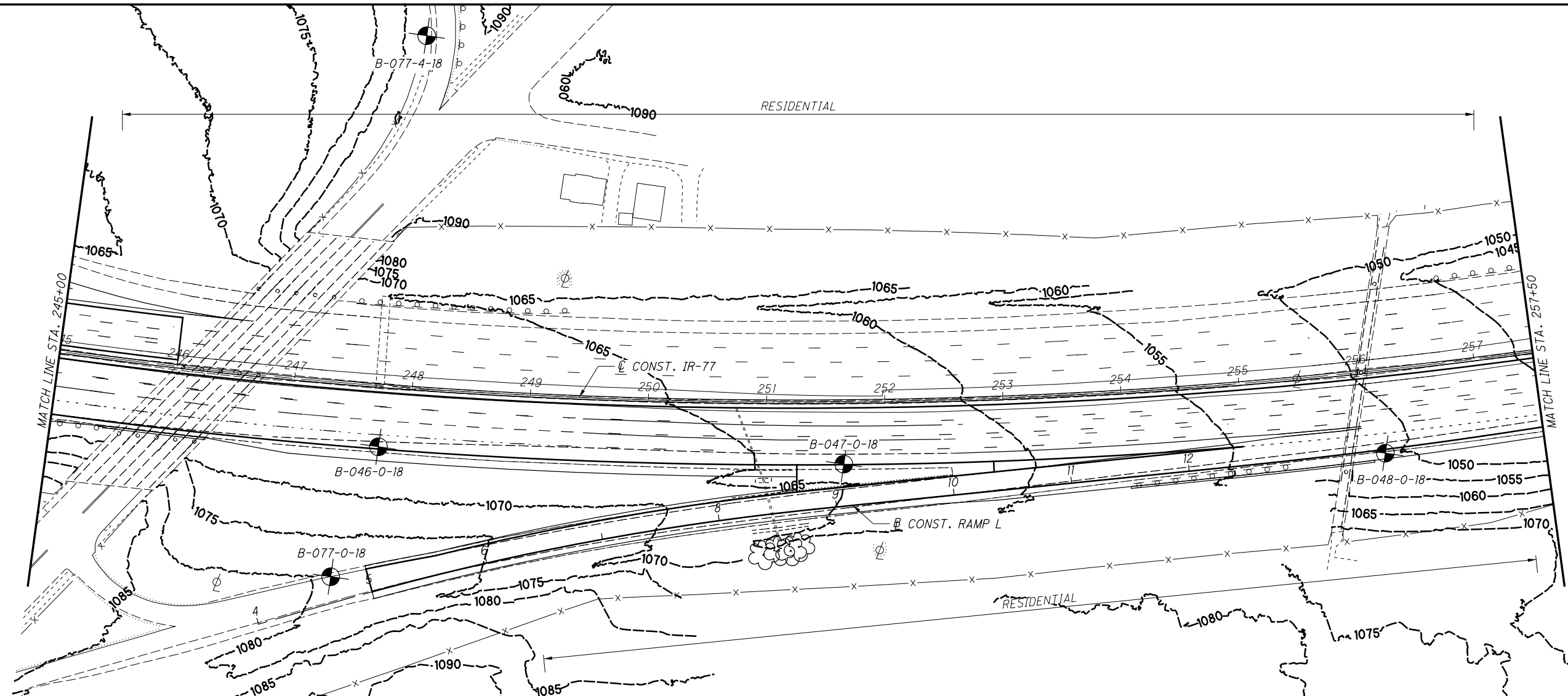
SUM-76-6.15

20 / 41





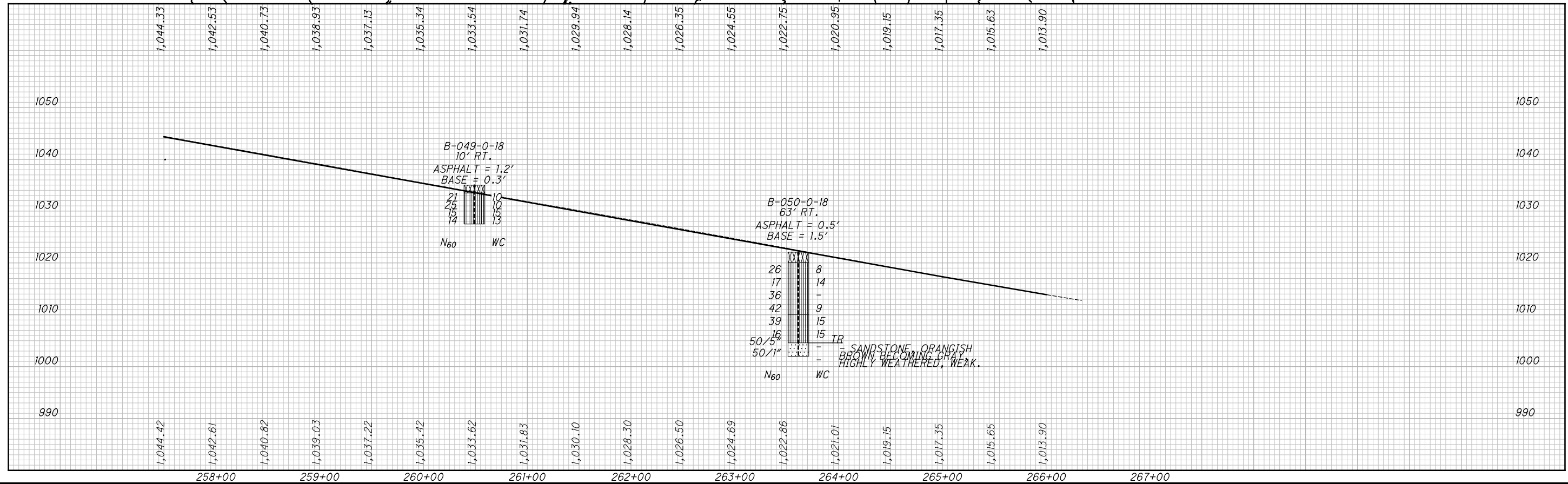
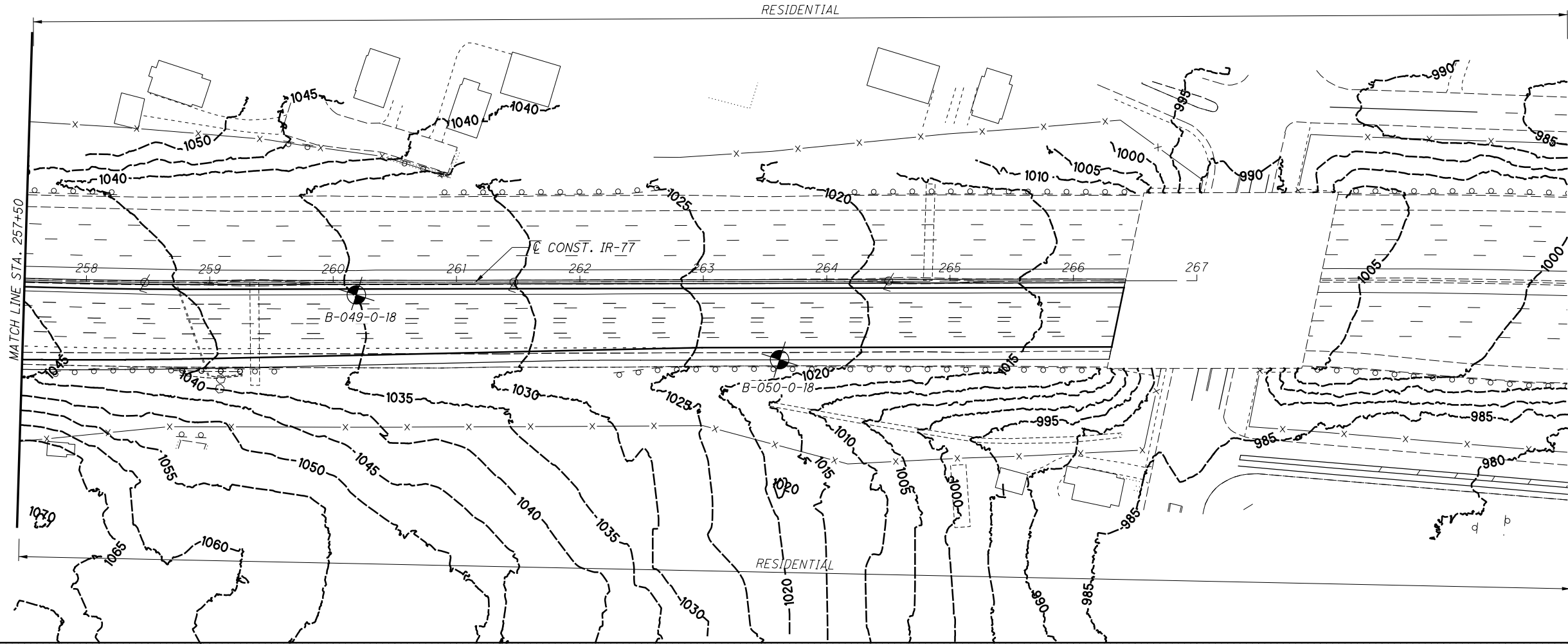
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SUM-76-6.15
SOIL PROFILE
STA. 245+00 TO STA. 257+50 I.R. 77

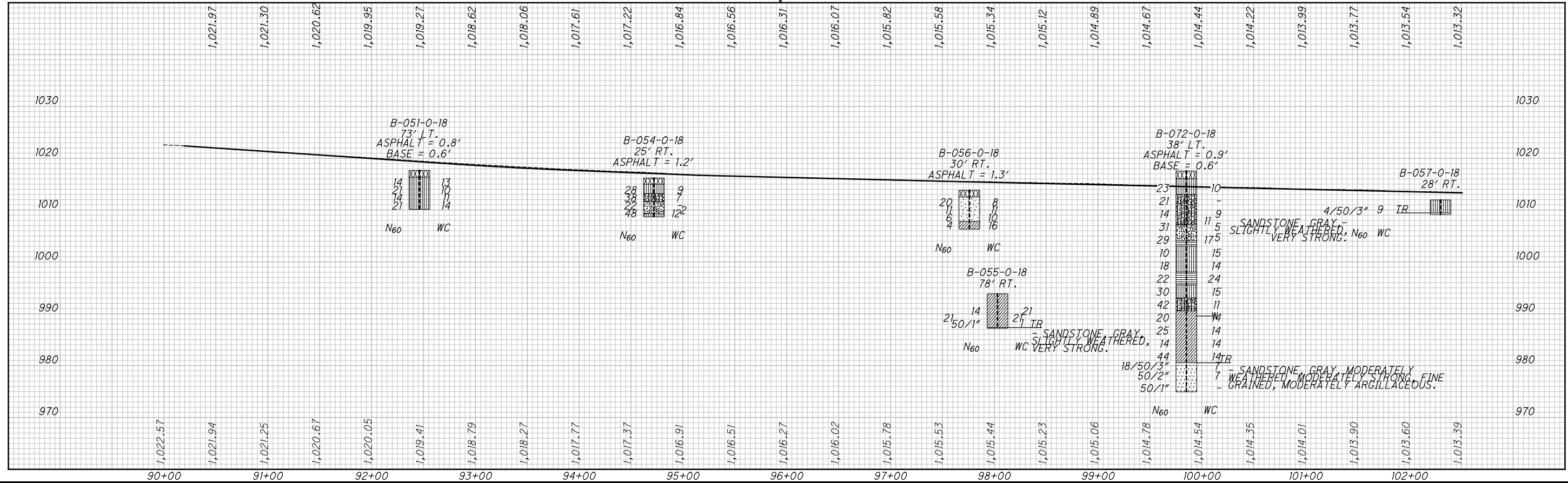
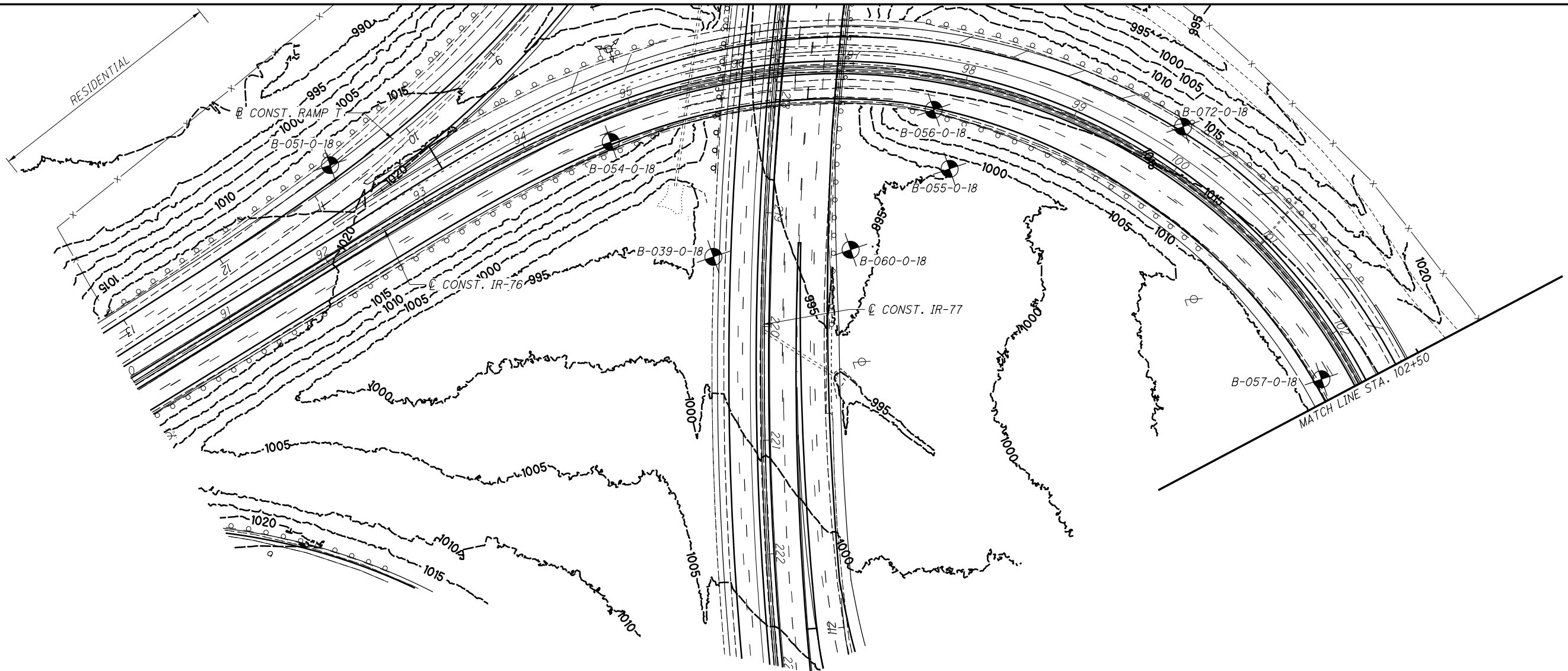
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SOIL PROFILE
STA. 257+50 TO END I.R. 77

SUM-76-6.15

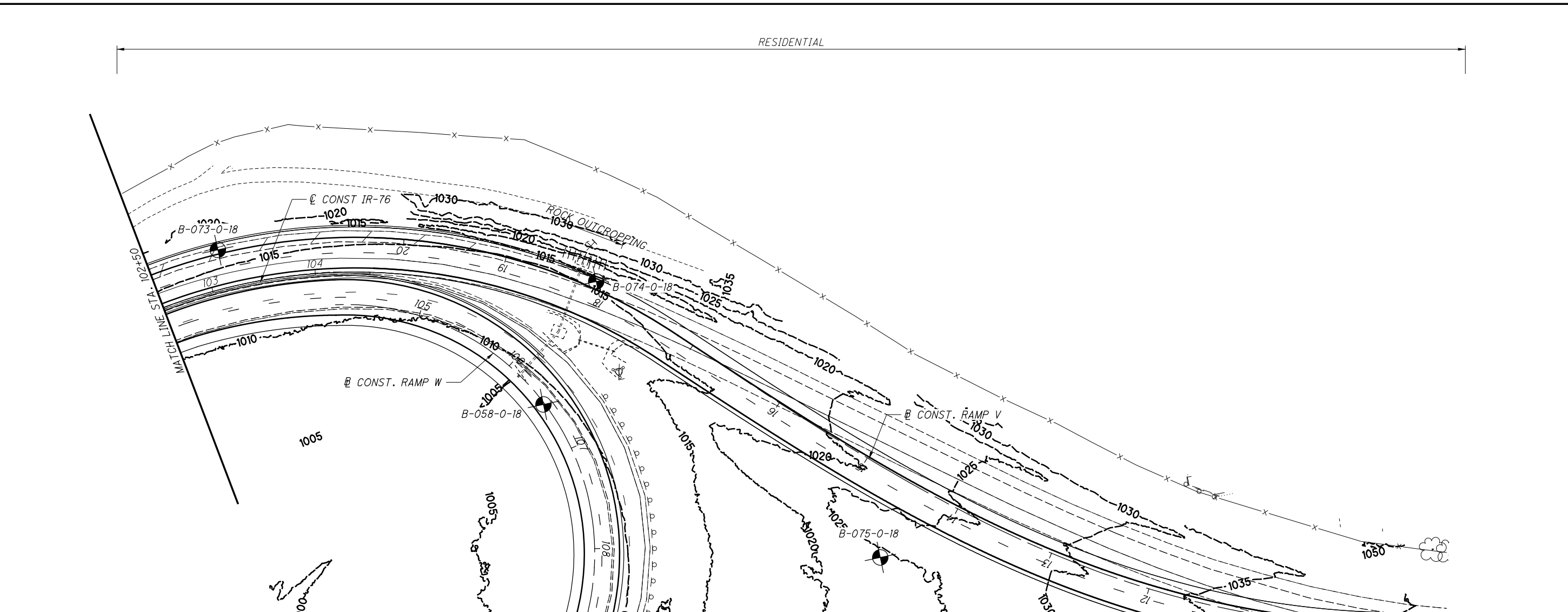
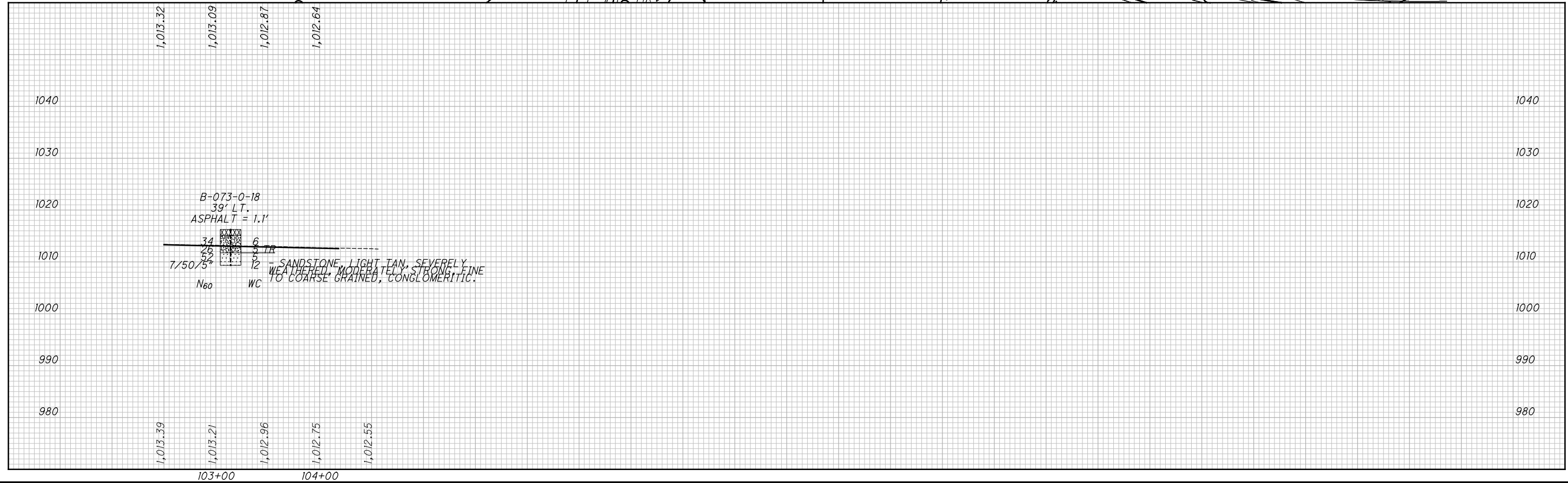
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SOIL PROFILE
STA. 90+00 TO STA. 102+50 I.R. 76

SUM-76-6.15

P:\19-0002 (SUM-76-6.15 PID 100713) Kenmore - Part 6 (Roadway)\100713\geotechnical\sheets\100713\PI202.dgn Sheet 8/2/2019 3:34:30 PM karrens



25 / 41

SUM-76-6.15

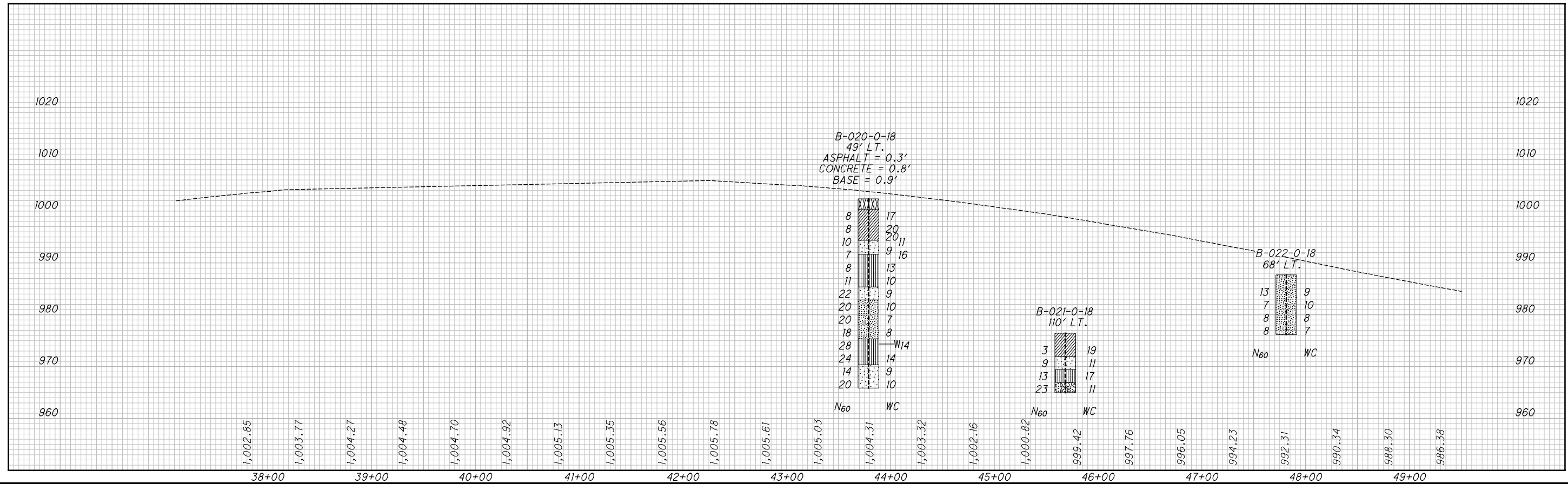
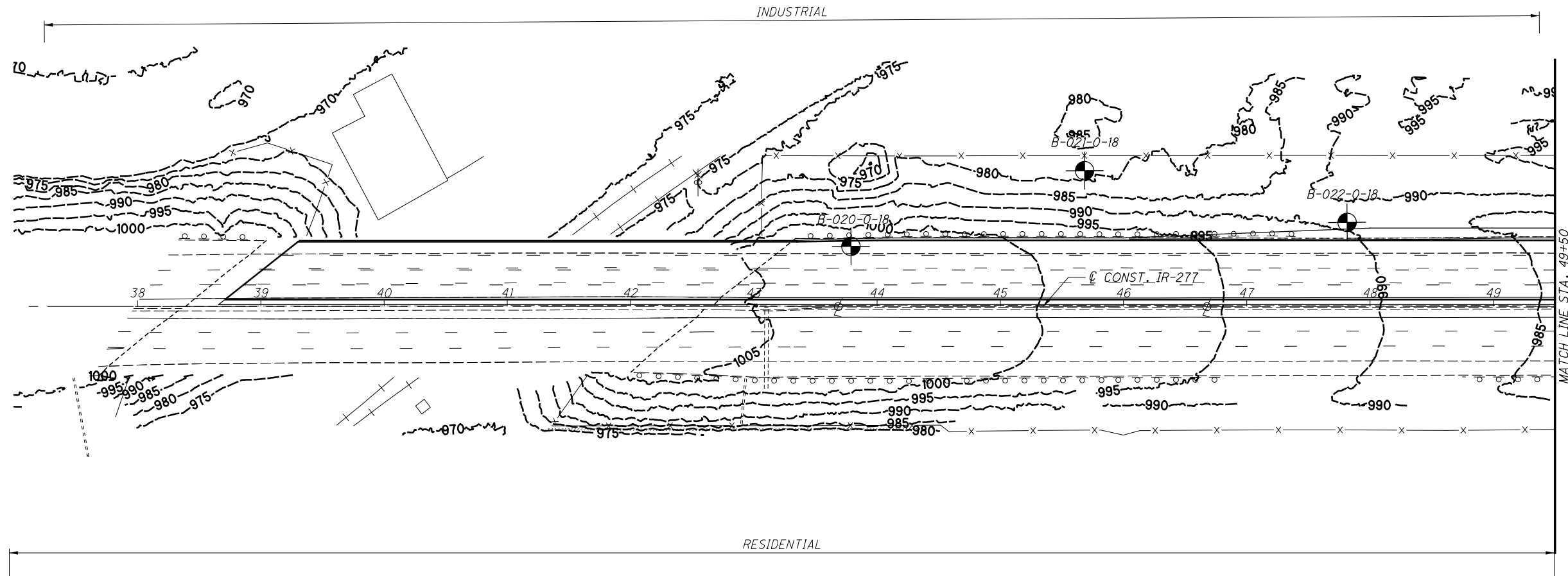
SOIL PROFILE

STA. 102+50 TO STA. 104+56 I.R. 76

| | |
|-------------|----------------|
| DRAWN EB | CHECKED BPA |
|-------------|----------------|

HORIZONTAL SCALE IN FEET

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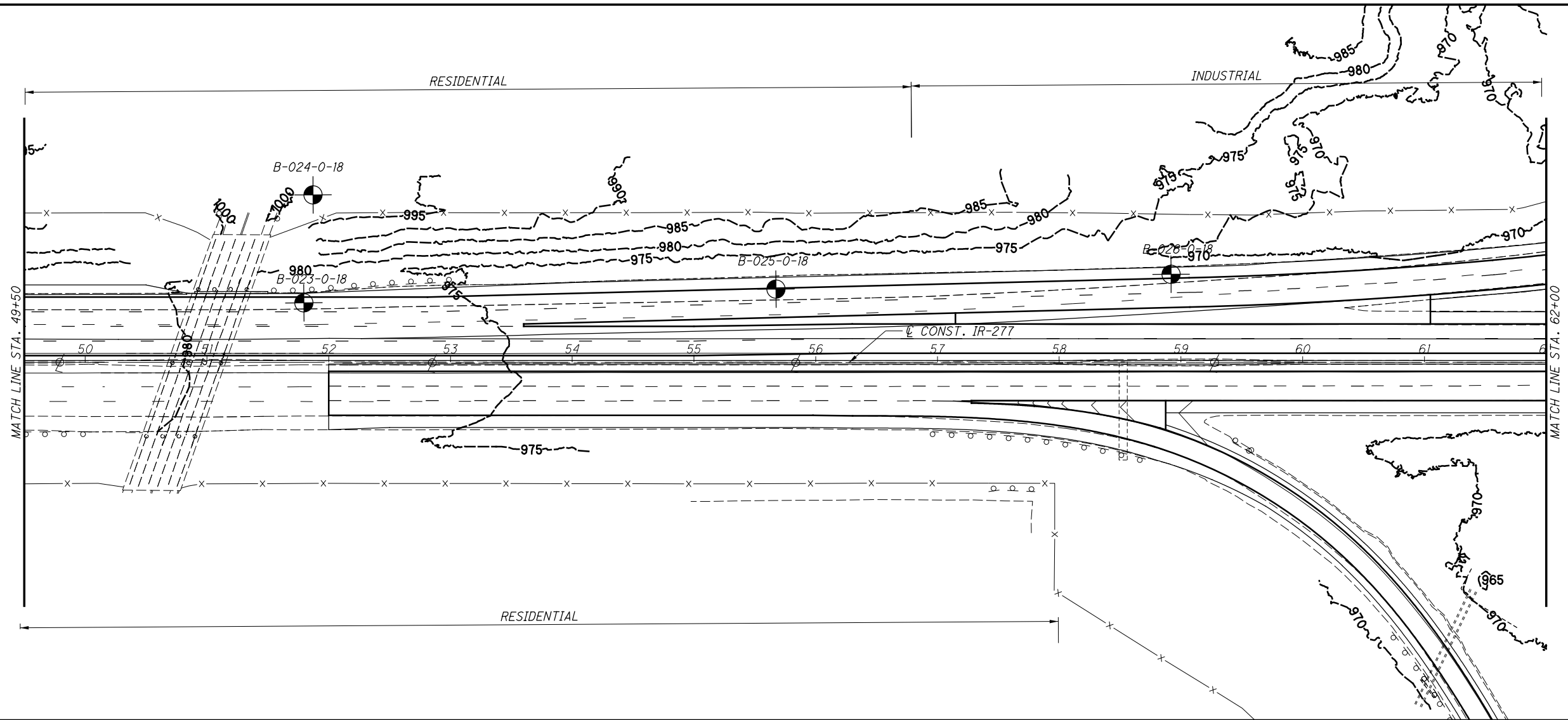
SOIL PROFILE
BEGIN TO STA. 49+50 I.R. 277

SUM-76-6.15

26 / 41



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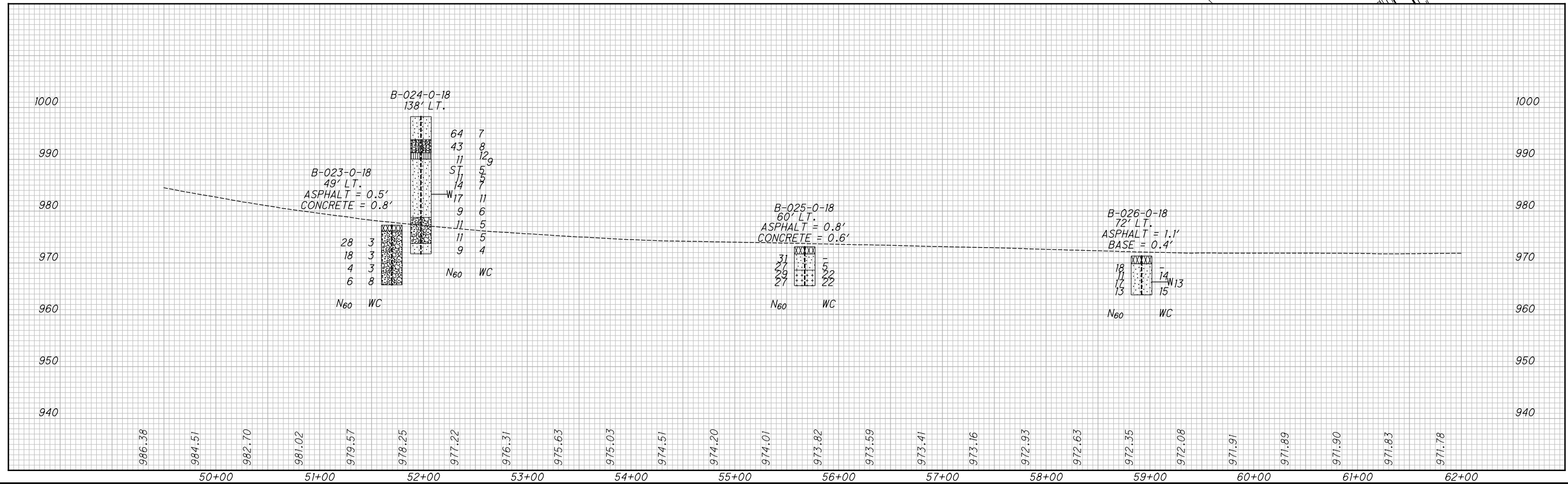


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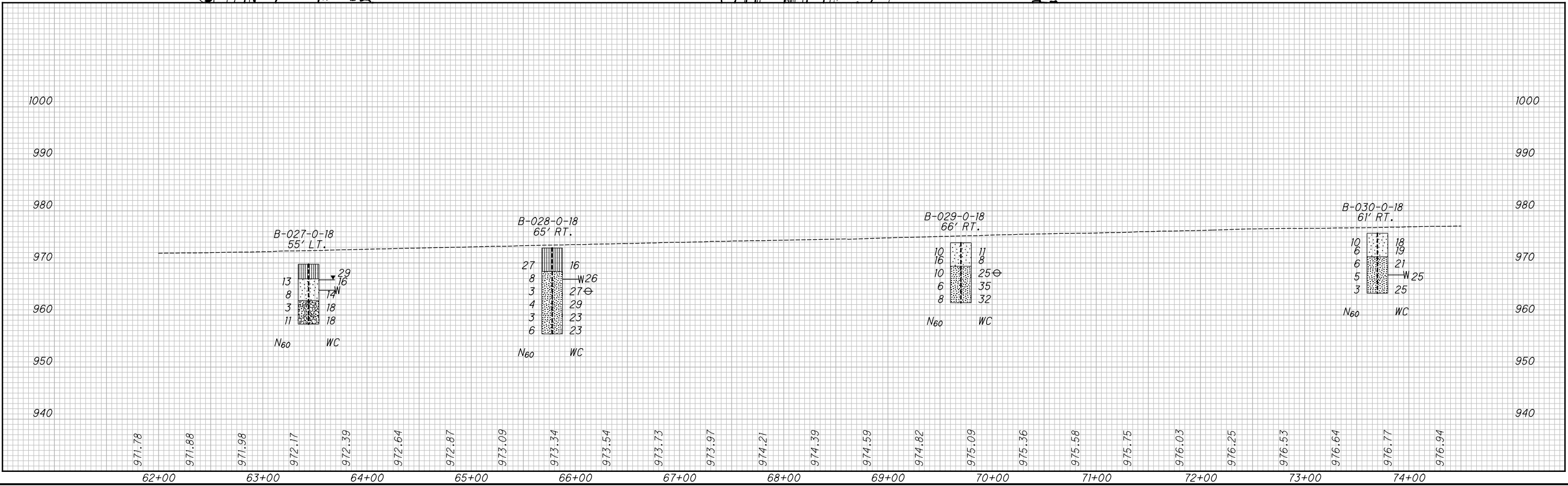
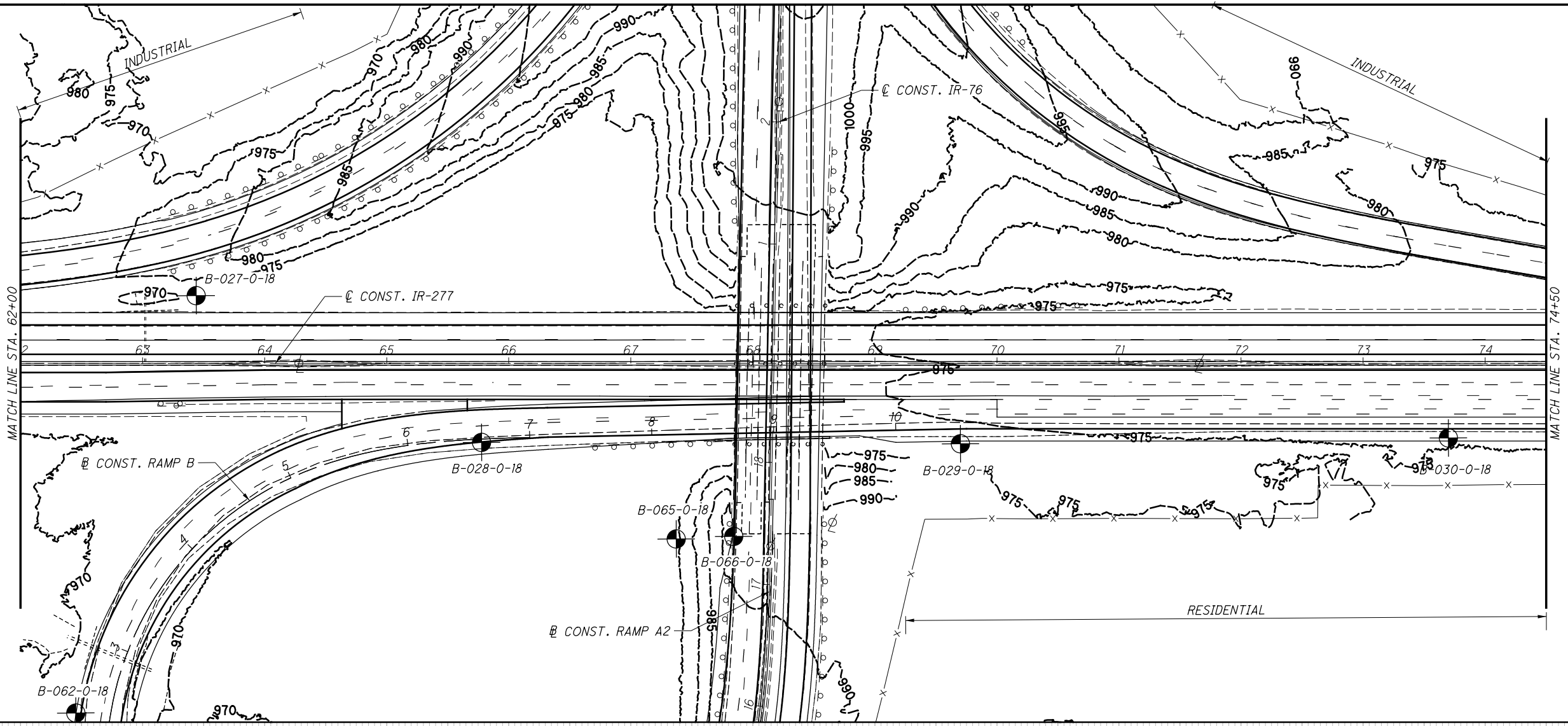
SUM-76-6.15

SOIL PROFILE

STA. 49+50 TO STA. 62+00 I.R. 277



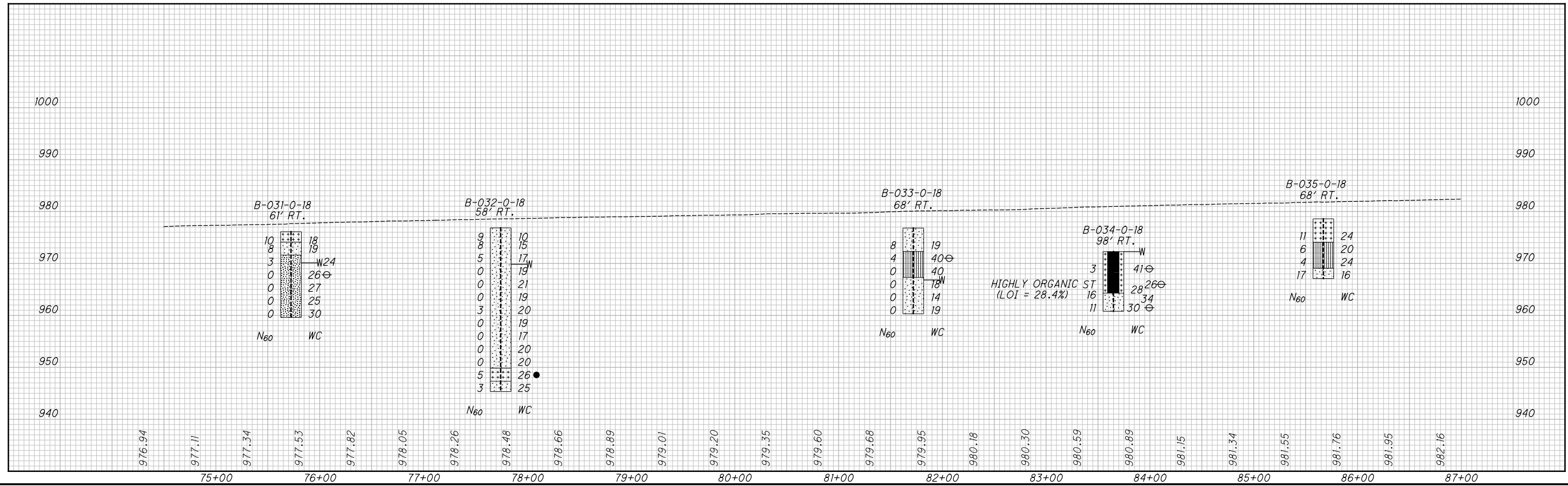
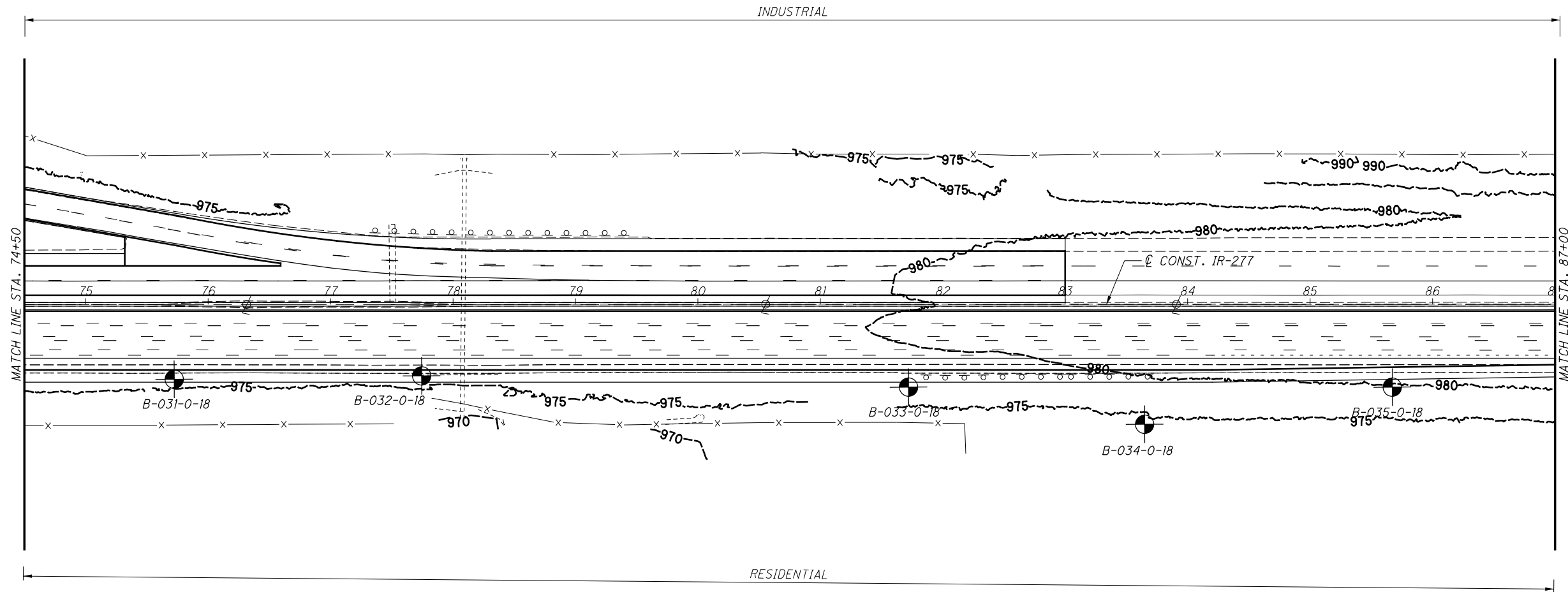
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SOIL PROFILE
STA. 62+00 TO STA. 74+50 I.R. 277

SUM-76-6.15



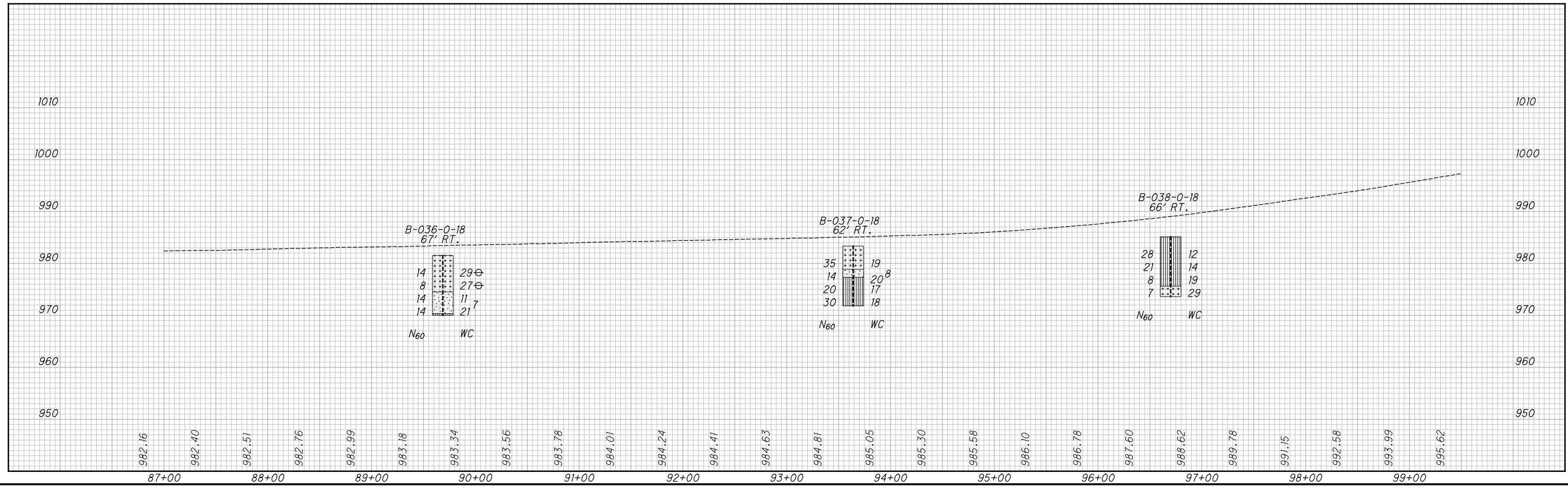
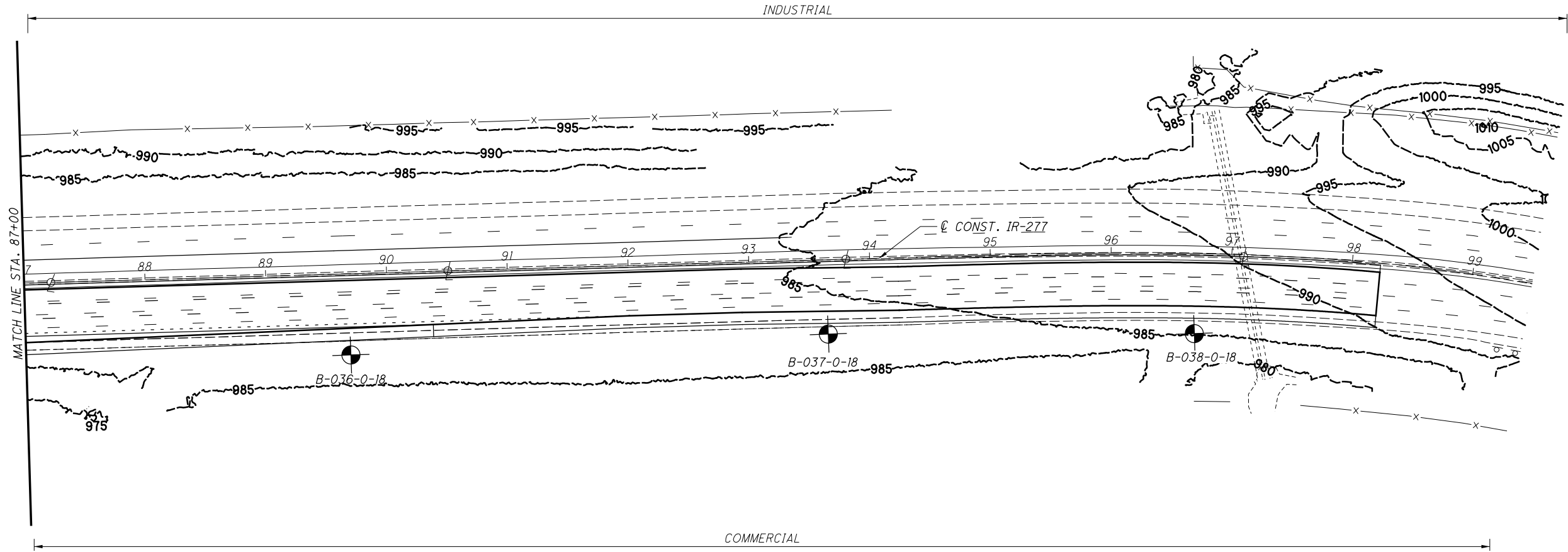


DRAWN: EB
CHECKED: BPA

SOIL PROFILE
STA. 74+50 TO STA. 87+00 I.R. 277

SUM-76-6.15



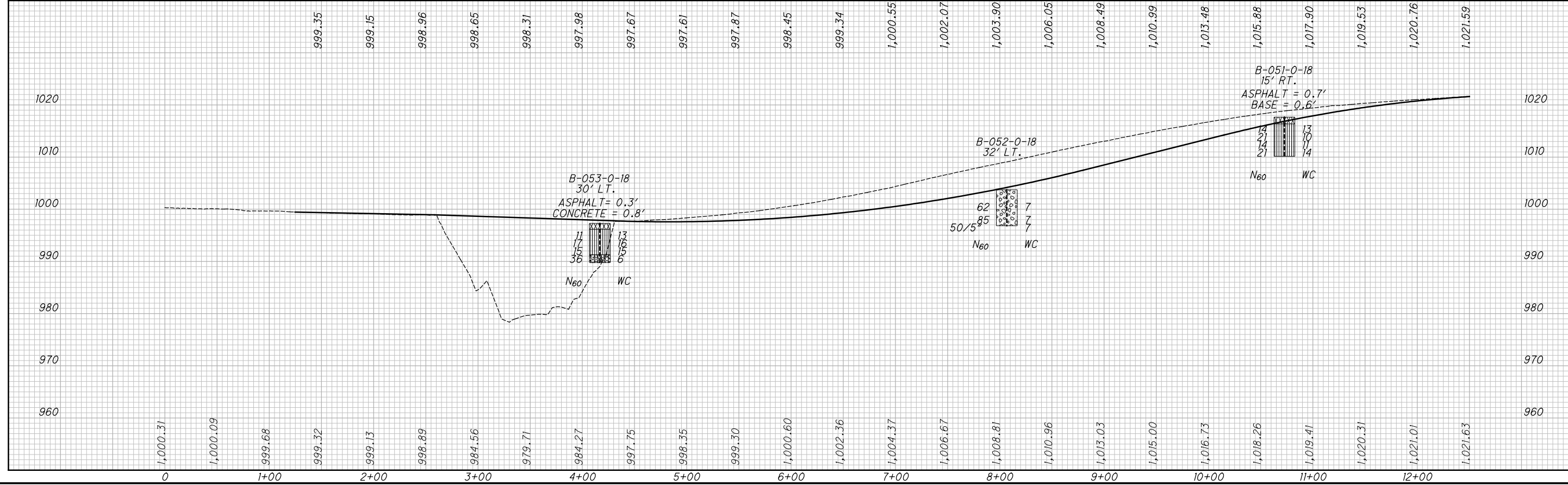
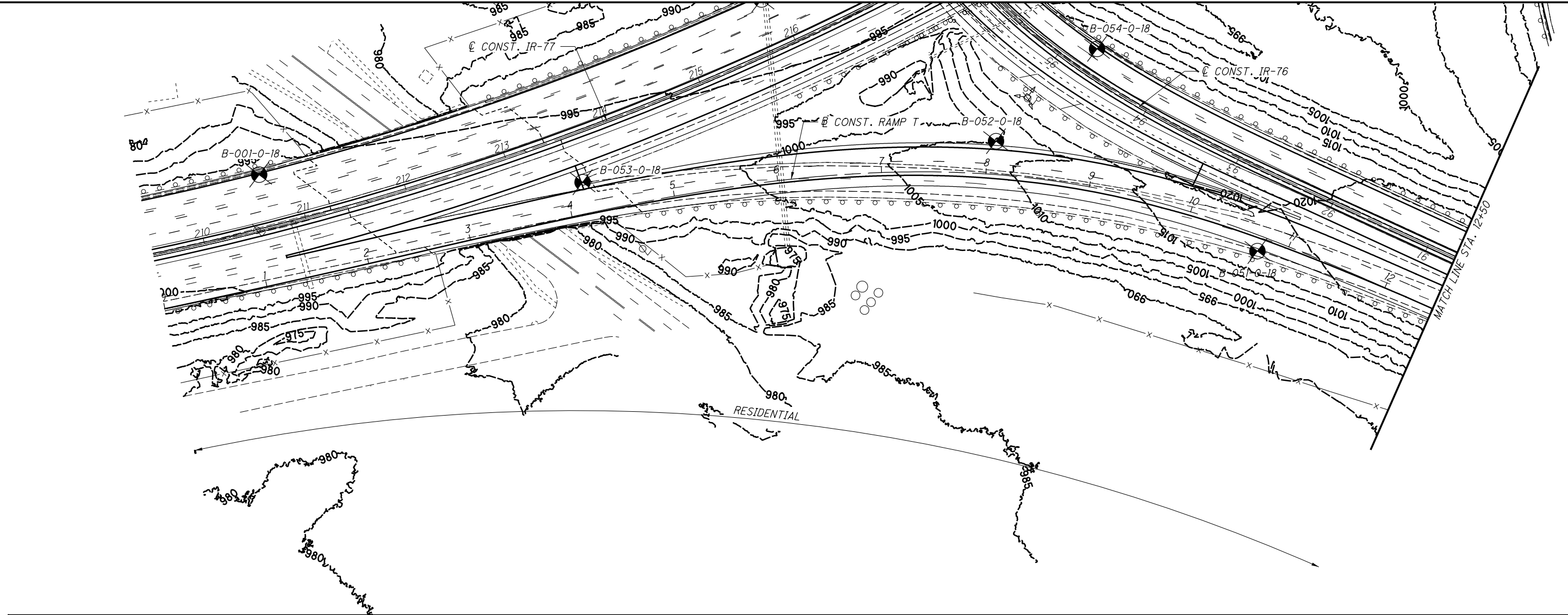


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CHECKED: BPA

SOIL PROFILE
STA. 87+00 TO END I.R. 277

SUM-76-6.15

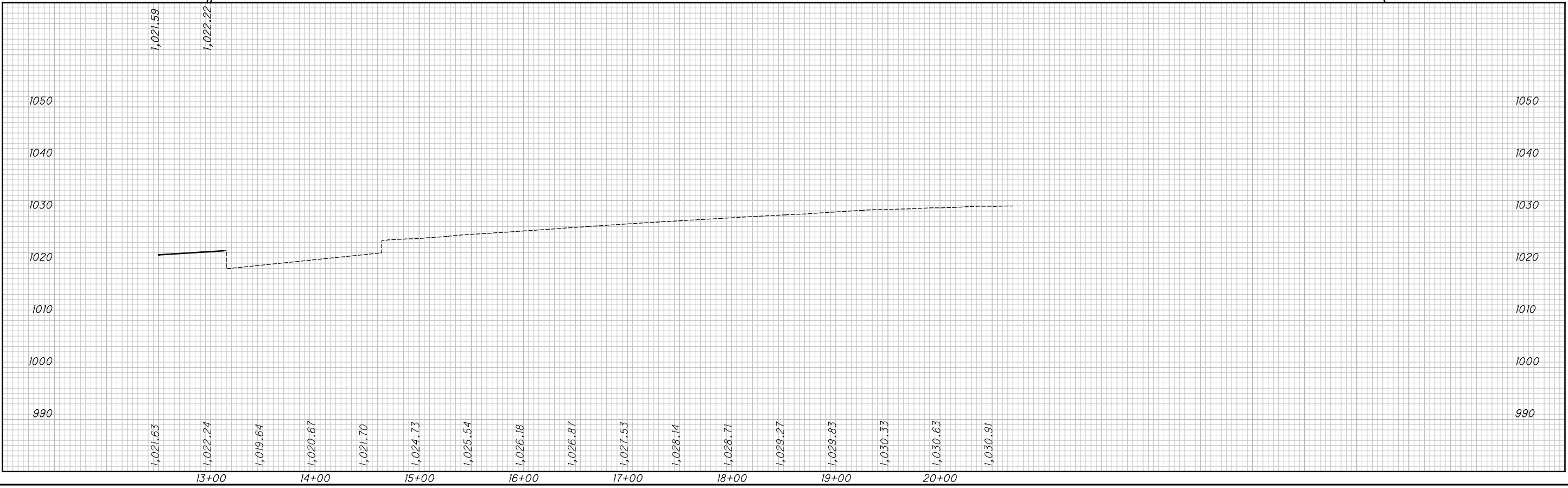
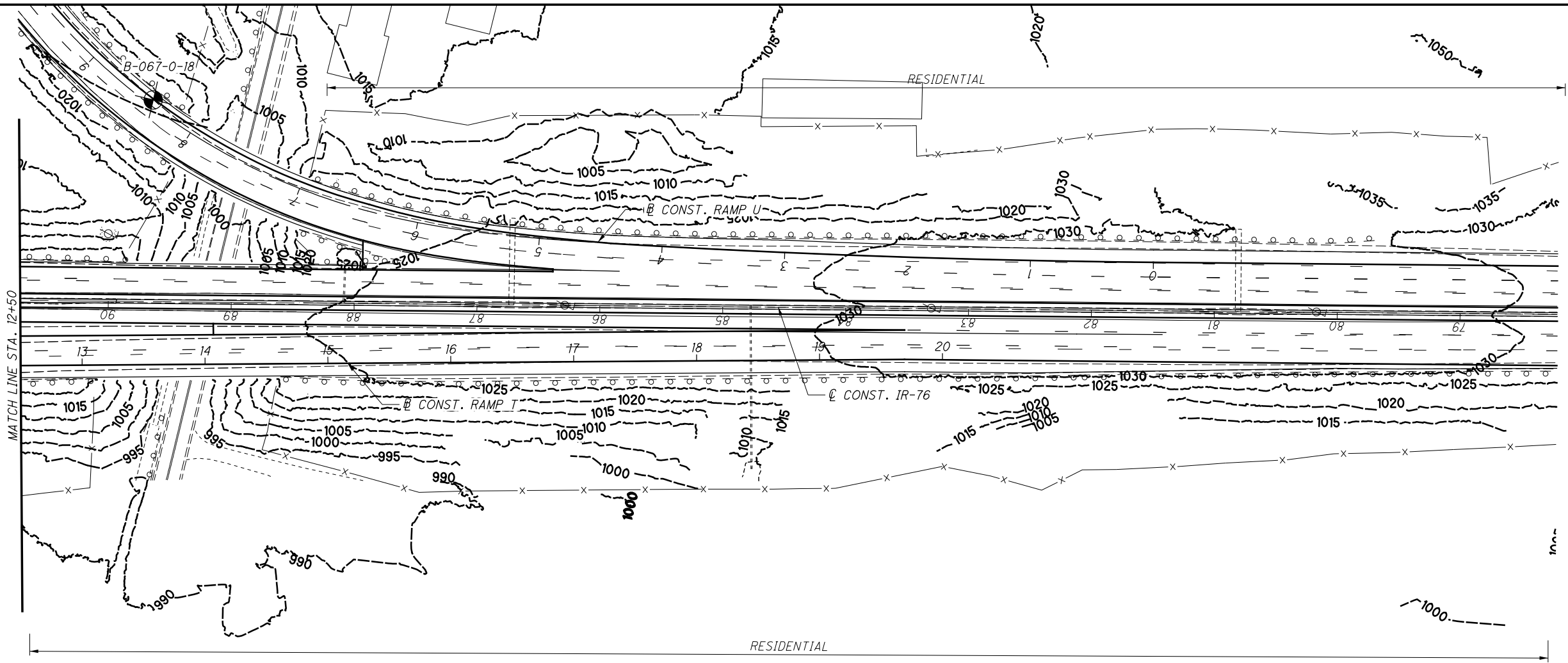




DRAWN: EB
CHECKED: BPA

SOIL PROFILE
STA. 0+00 TO 12+50 RAMP T

P:\19-0002 (SUM-76-6.15 PID 100713) Kenmore - Part 6 (Roadway)\100713\geotechnical\sheets\100713\F2102.dgn Sheet 8/2/2019 3:34:42 PM korrens



SOIL PROFILE

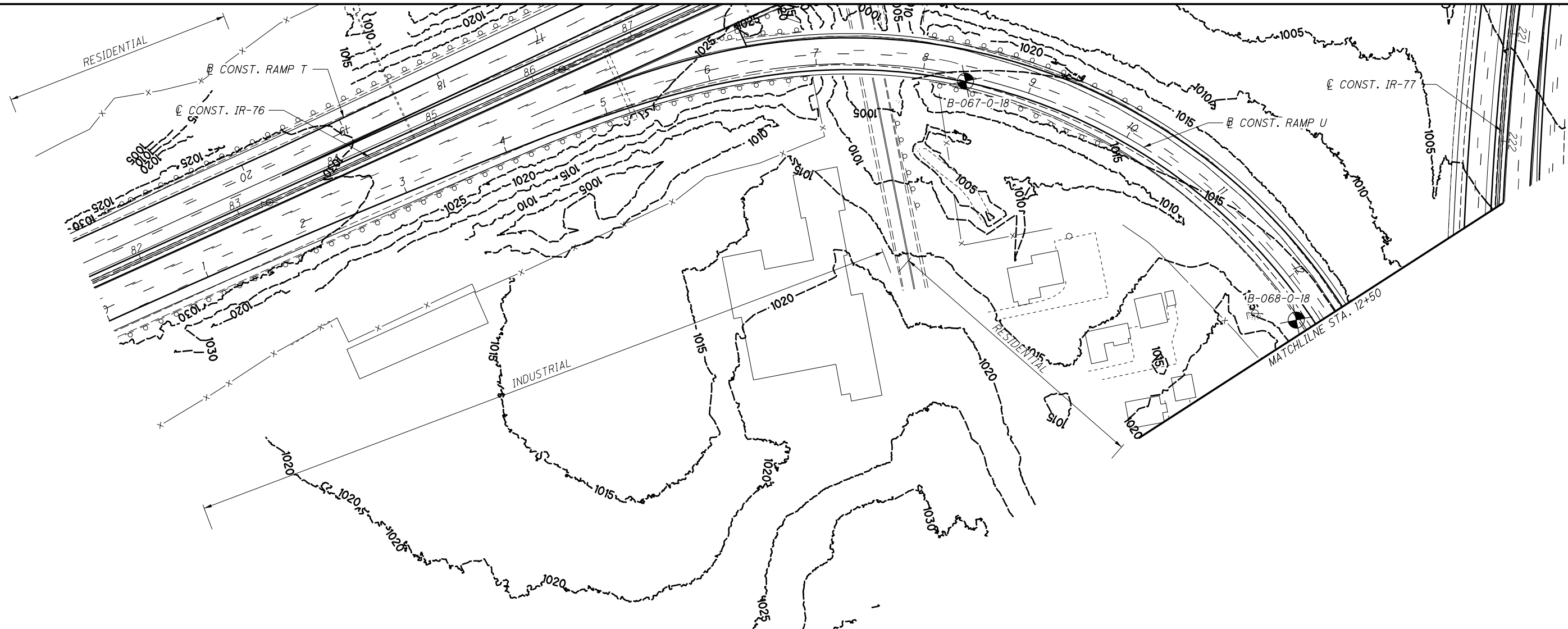
STA. 12+50 TO STA. 20+69 RAMP T

SUM-76-6.15

32 / 41

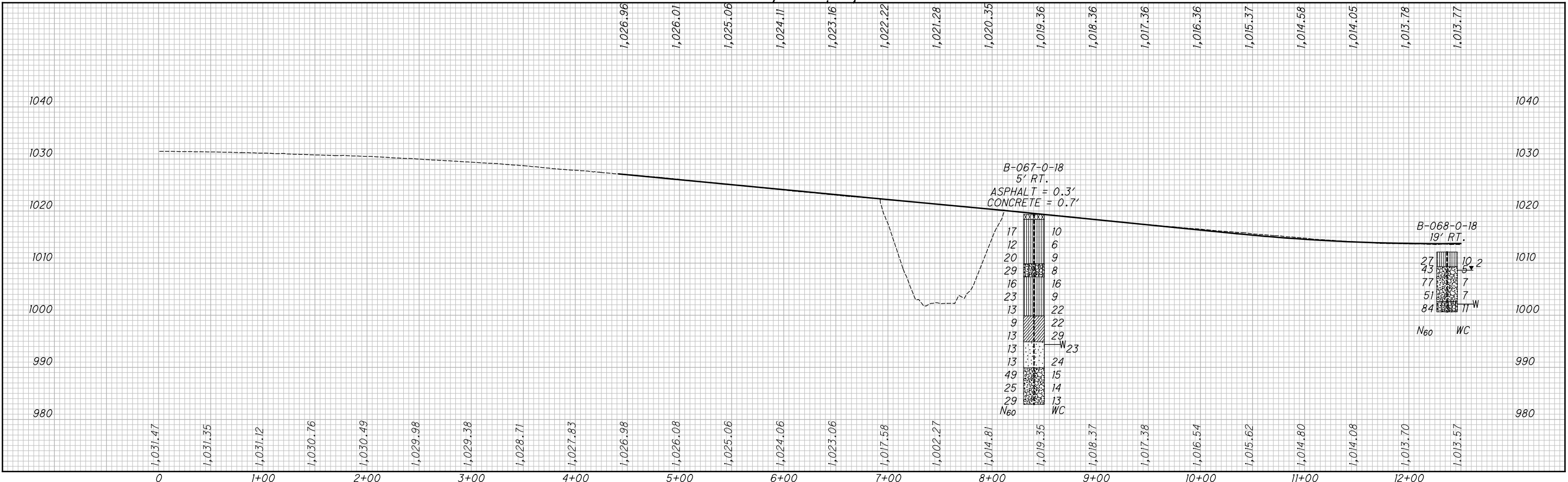
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25
HORIZONTAL
SCALE IN FEET

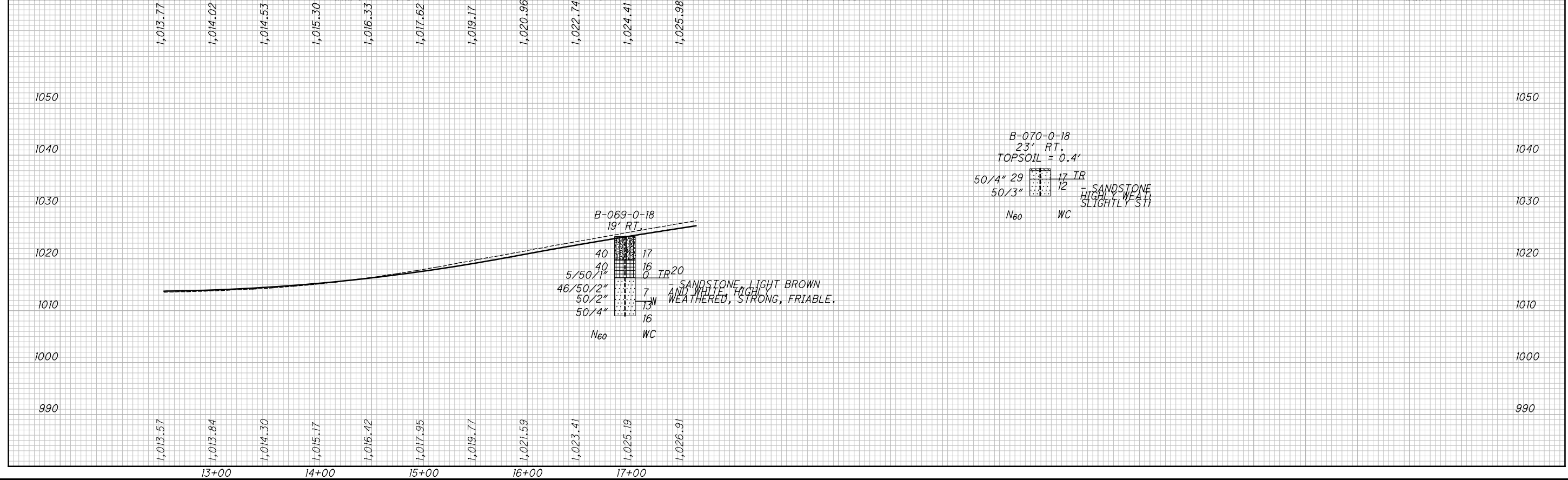
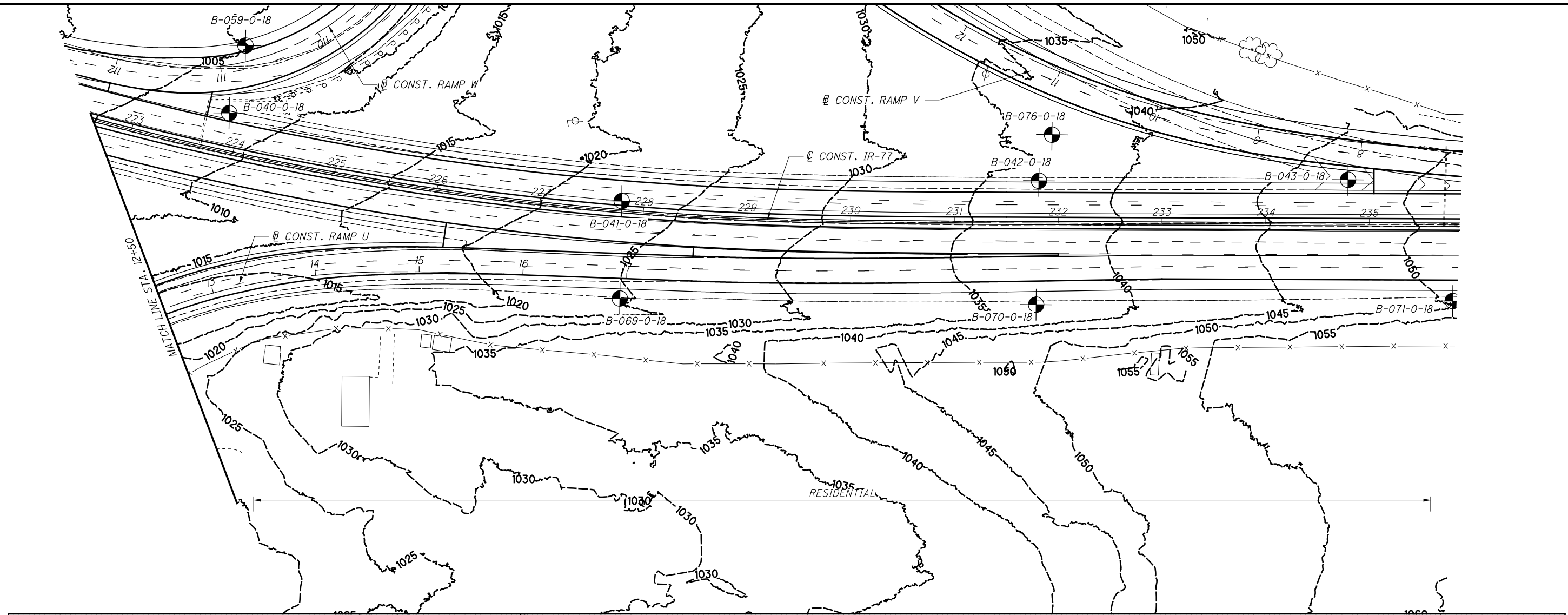


SOIL PROFILE
STA. 0+00 TO STA. 12+50 RAMP U

SUM-76-6.15



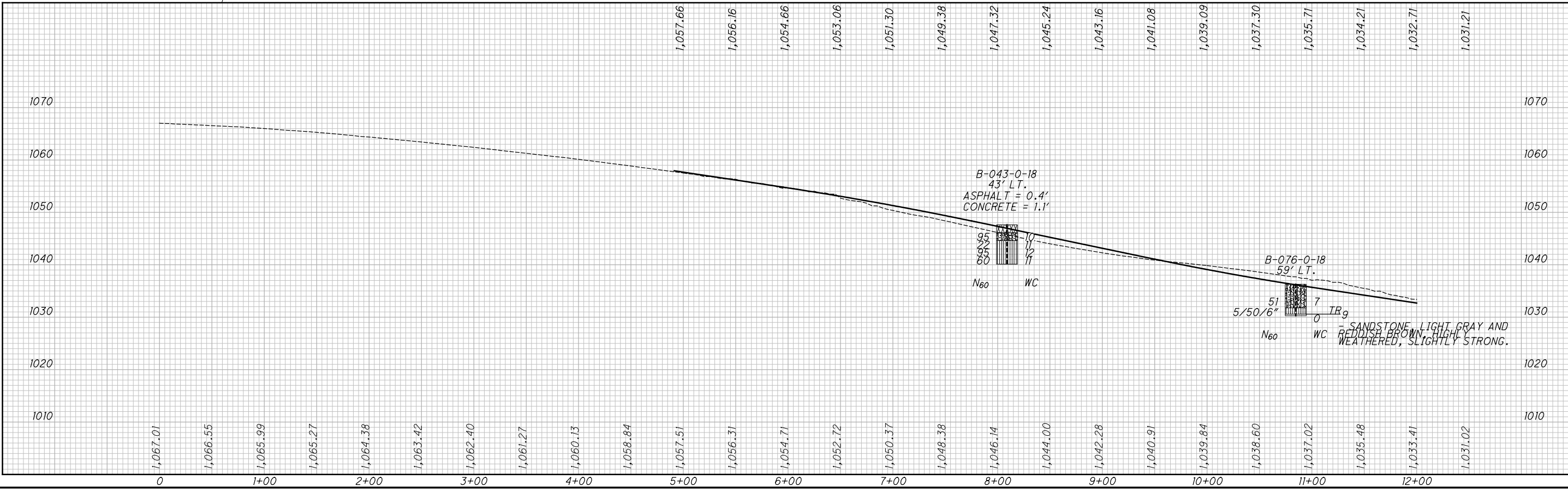
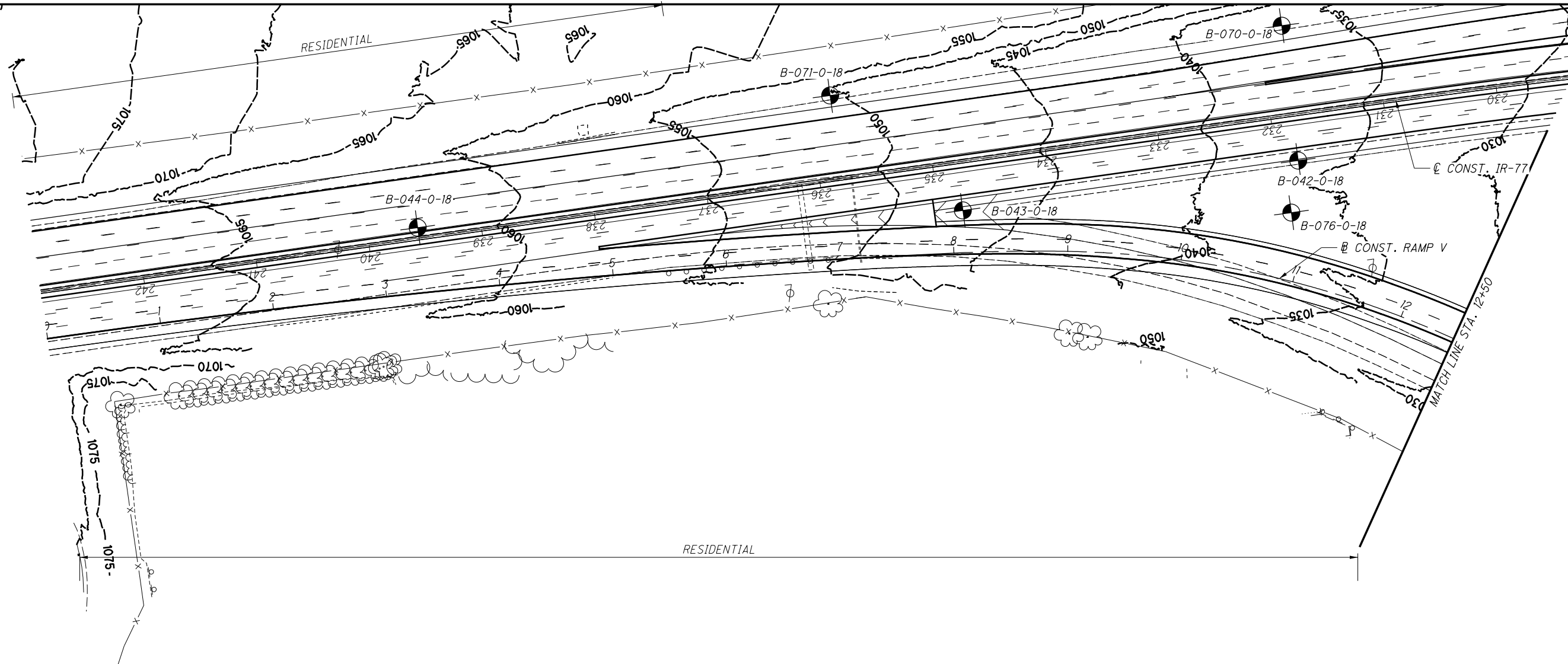
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DRAWN: EB
CHECKED: BPA

SOIL PROFILE
STA. 12+50 TO 17+63 RAMP U

P:\19-0002 (SUM-76-6.15 PID 100713) Kenmore - Part 6 (Roadway)\100713\geotechnical\sheets\100713\FP2301.dgn Sheet 8/2/2019 3:36:00 PM karens



SOIL PROFILE

STA. 0+00 TO STA. 12+50 RAMP V

SUM-76-6.15

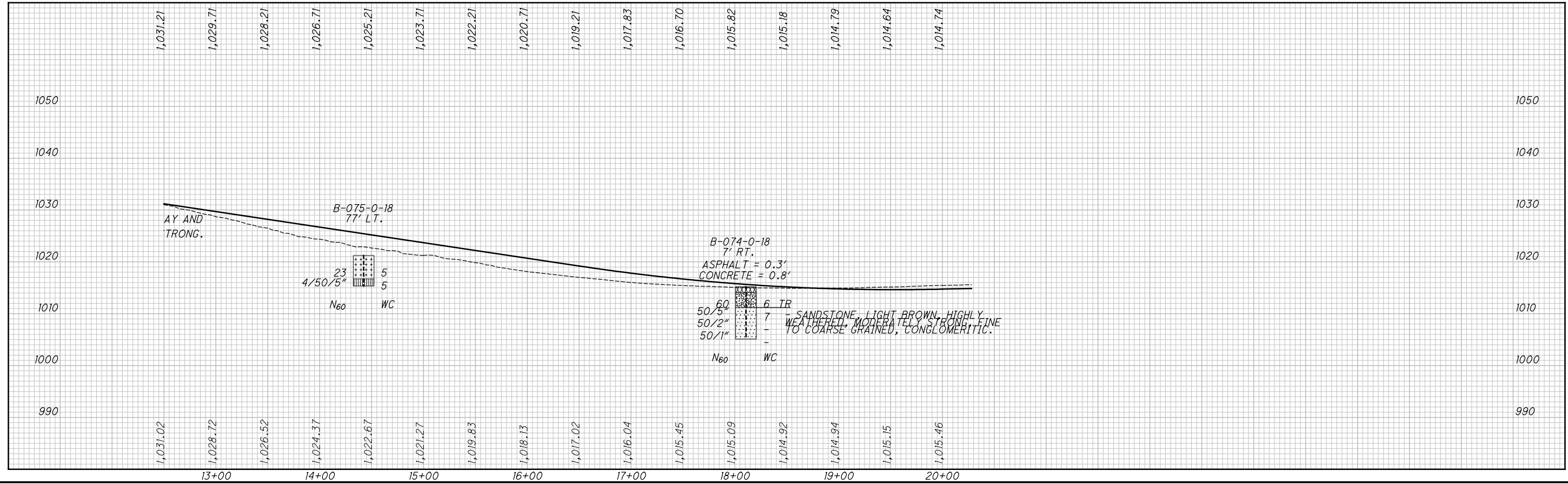
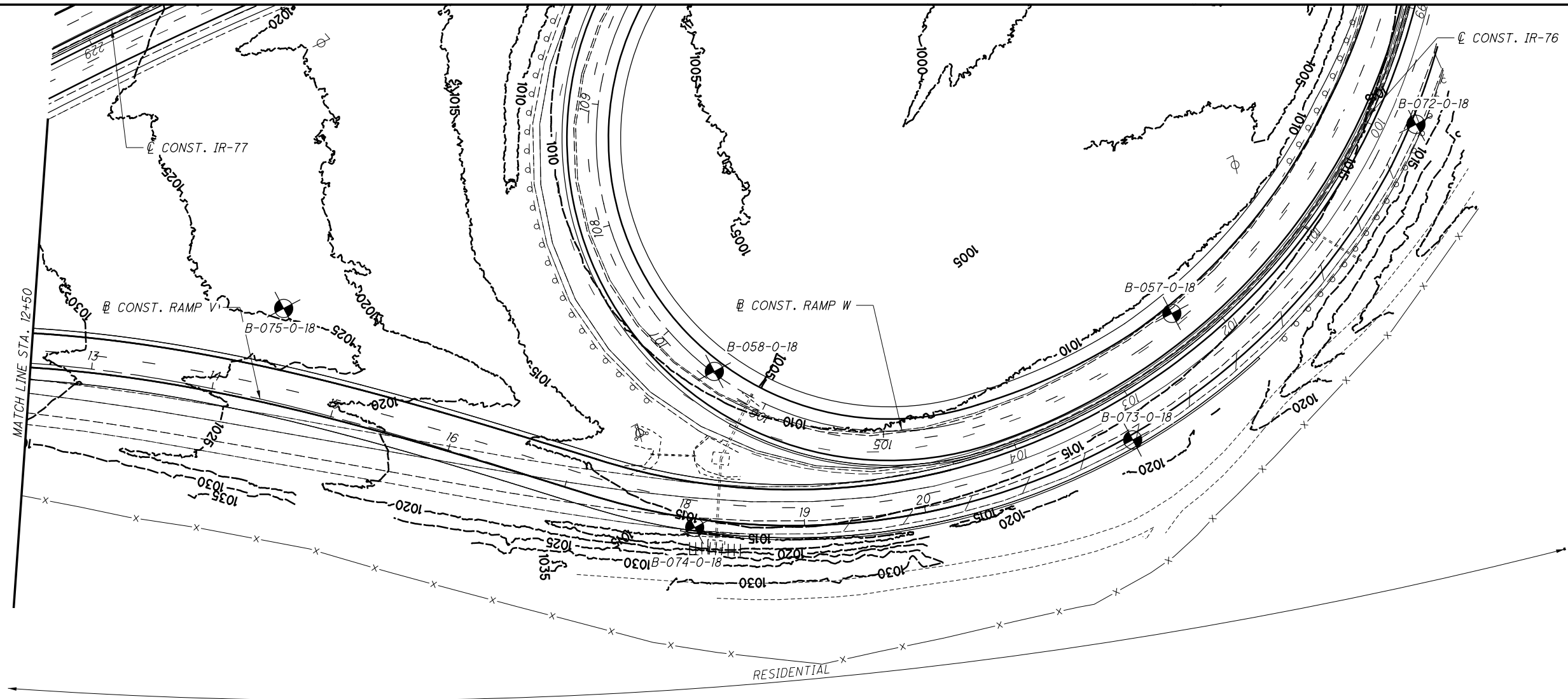
35 / 41

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CHECKED: BPA

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HORIZONTAL SCALE IN FEET

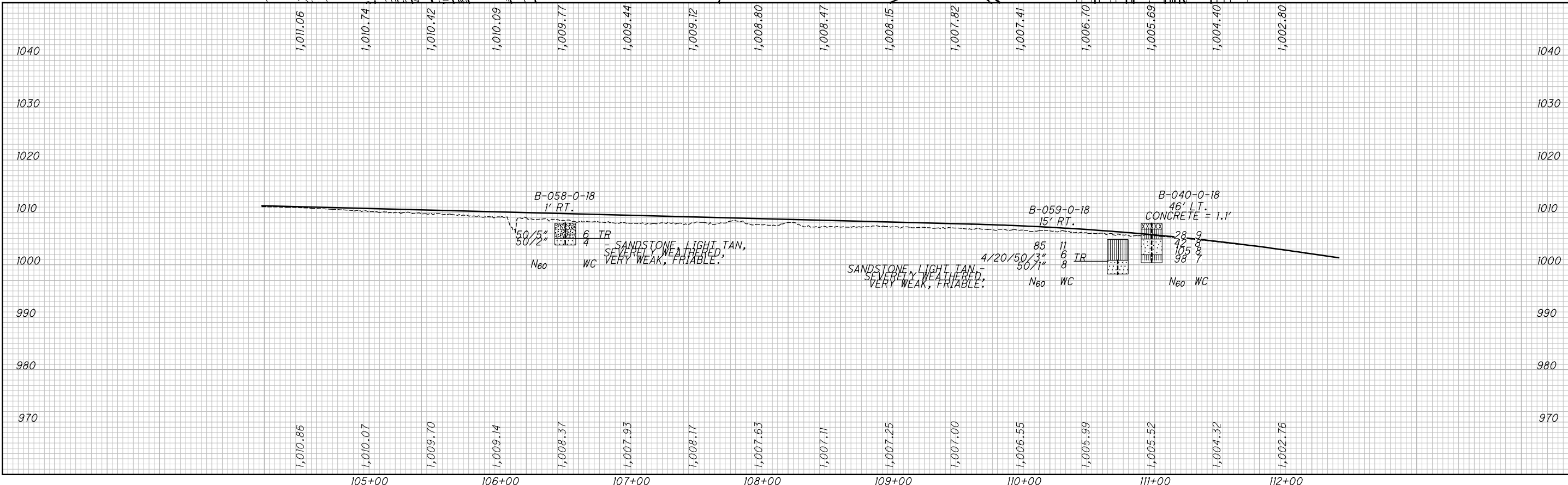
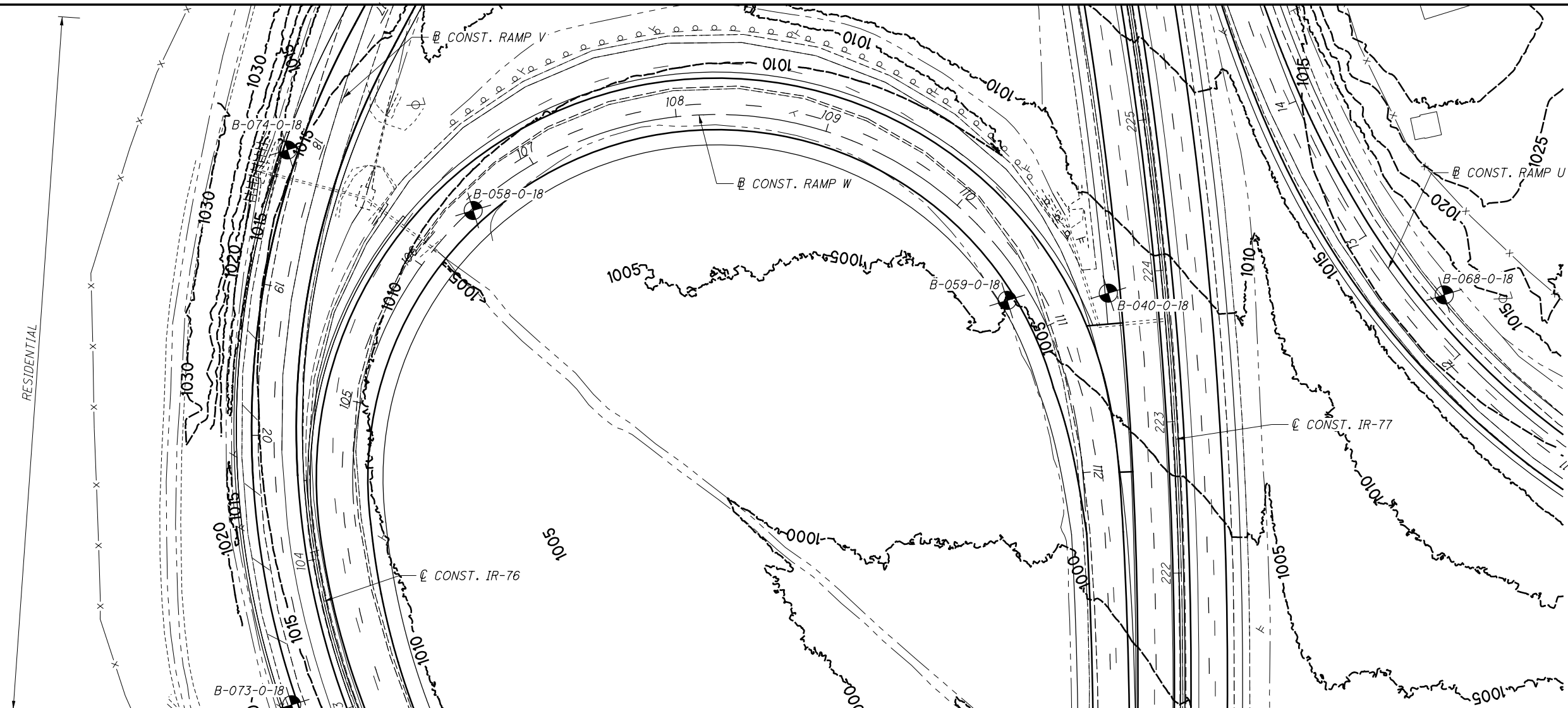


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SOIL PROFILE
STA. 12+50 TO STA. 20+28 RAMP V

SUM-76-6.15





DRAWN ZM
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SOIL PROFILE
RAMP W

SUM-76-6.15



P:\19-0002 (SUM-76-6.15 PID 100713) Kenmore - Part 6 (Roadway)\100713\geotechnical\sheets\100713\FP2501.dgn Sheet 8/2/2019 3:37:01 PM korens



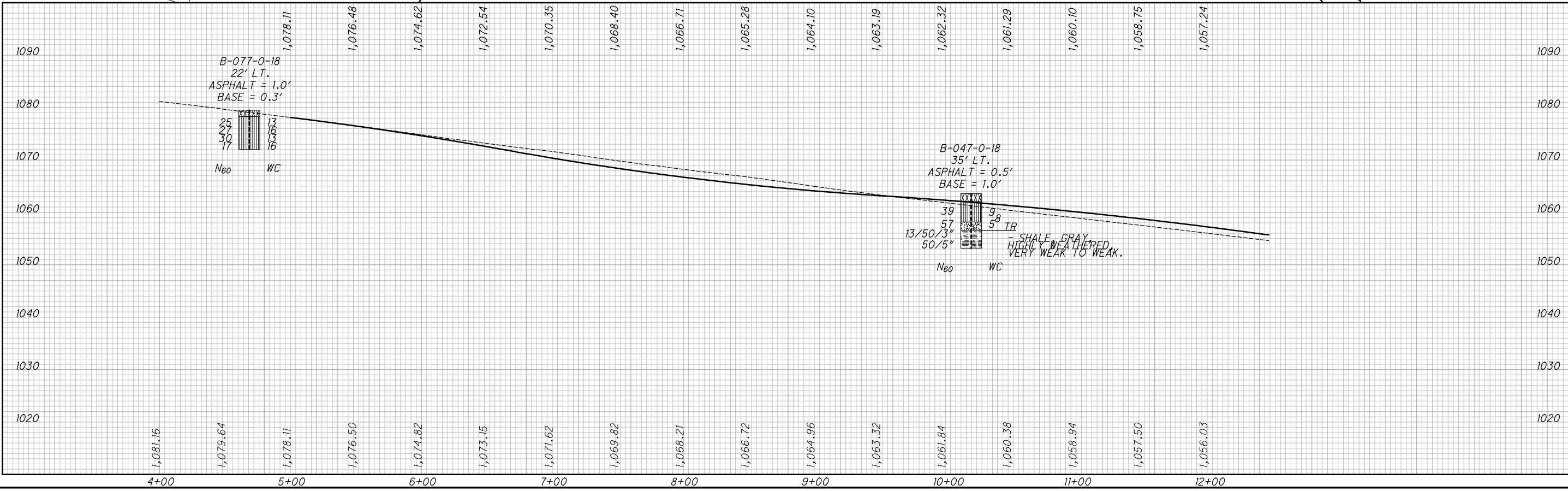
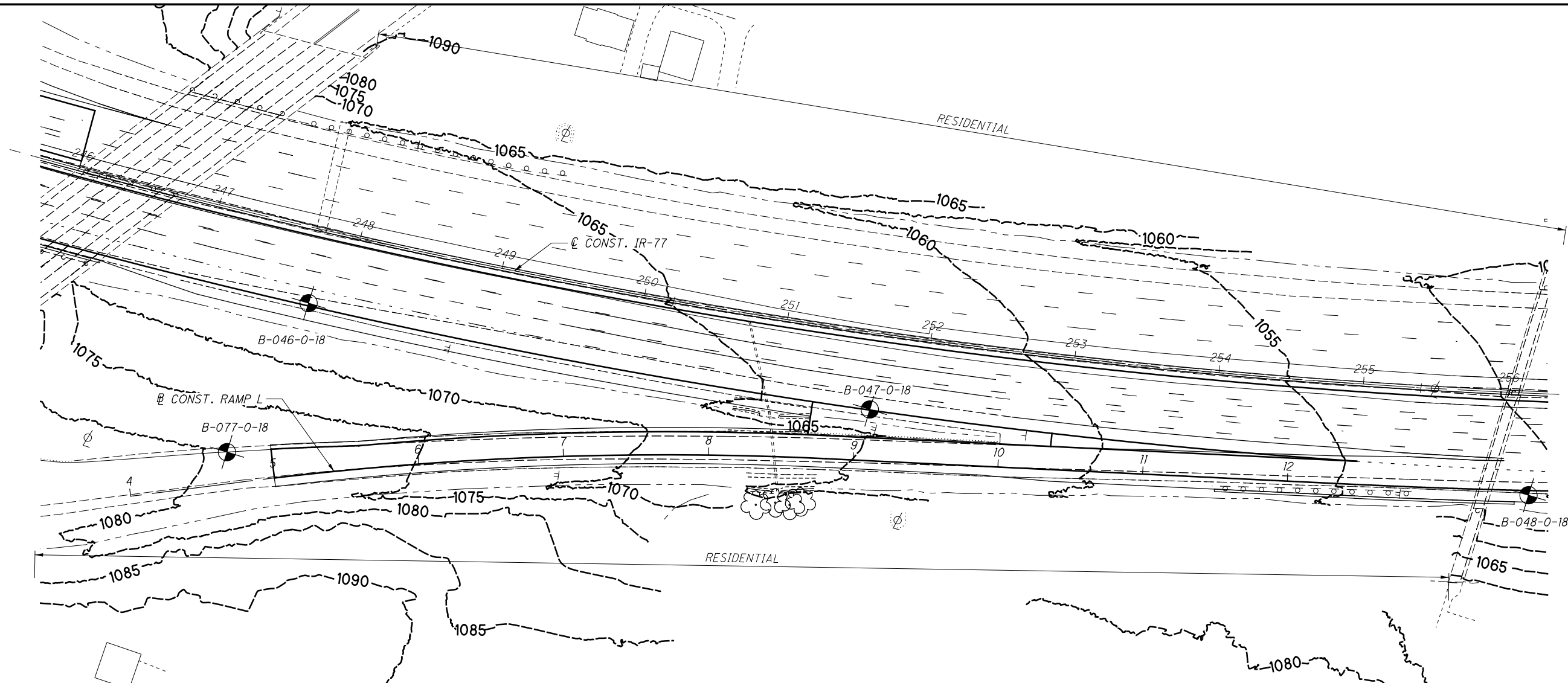
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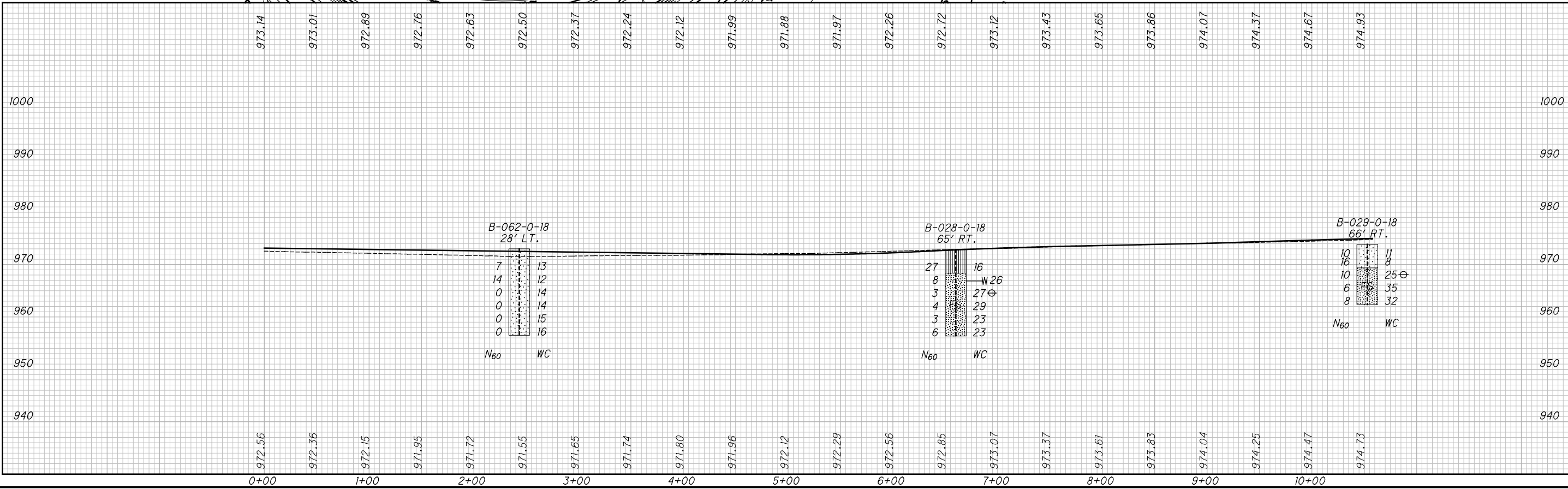
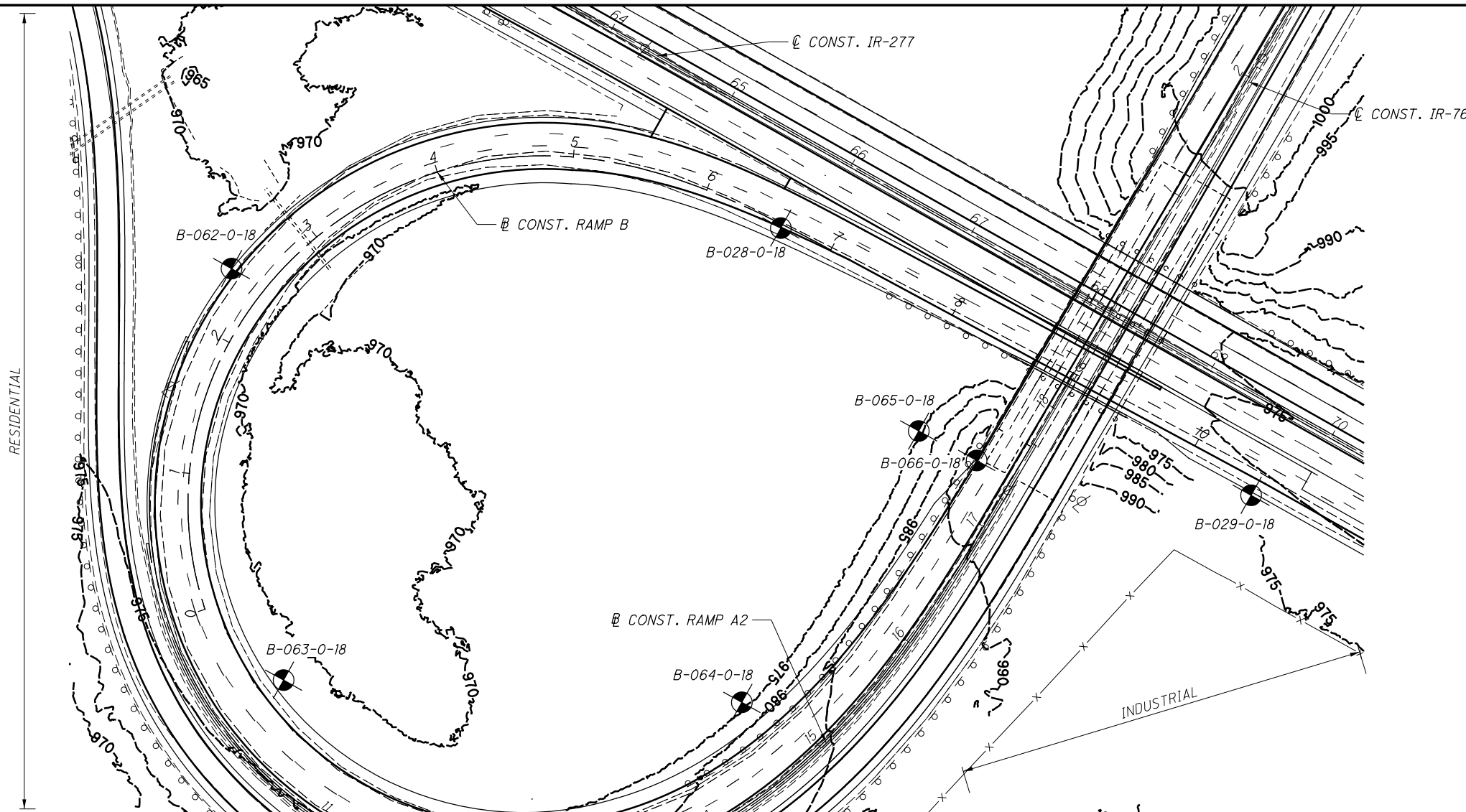
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SOIL PROFILE RAMP L

SUM-76-6.15

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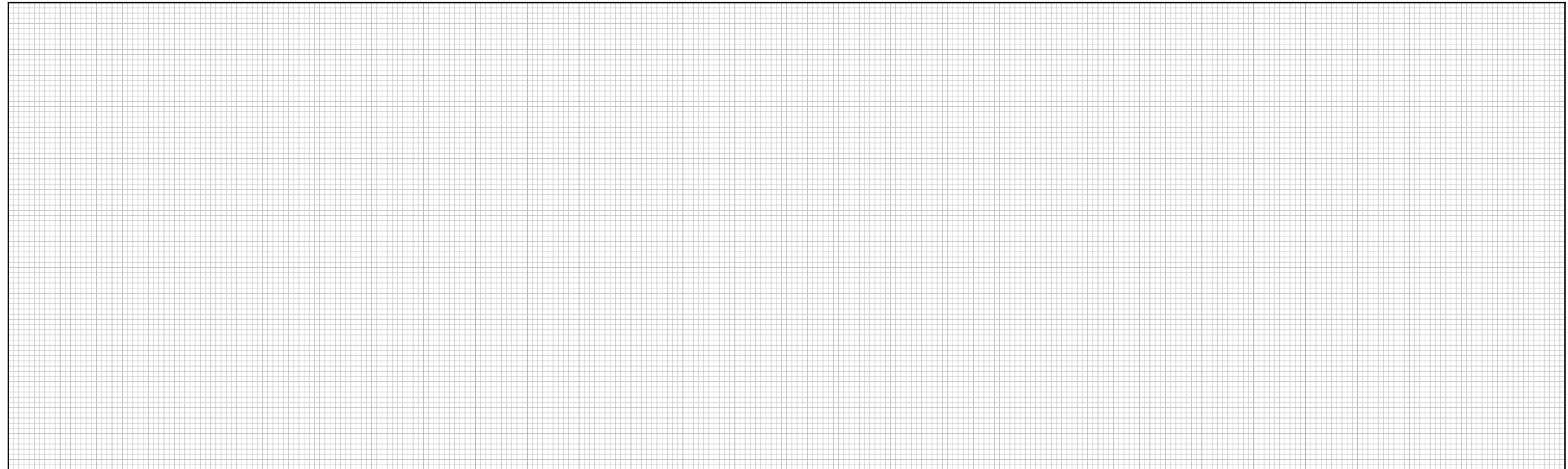
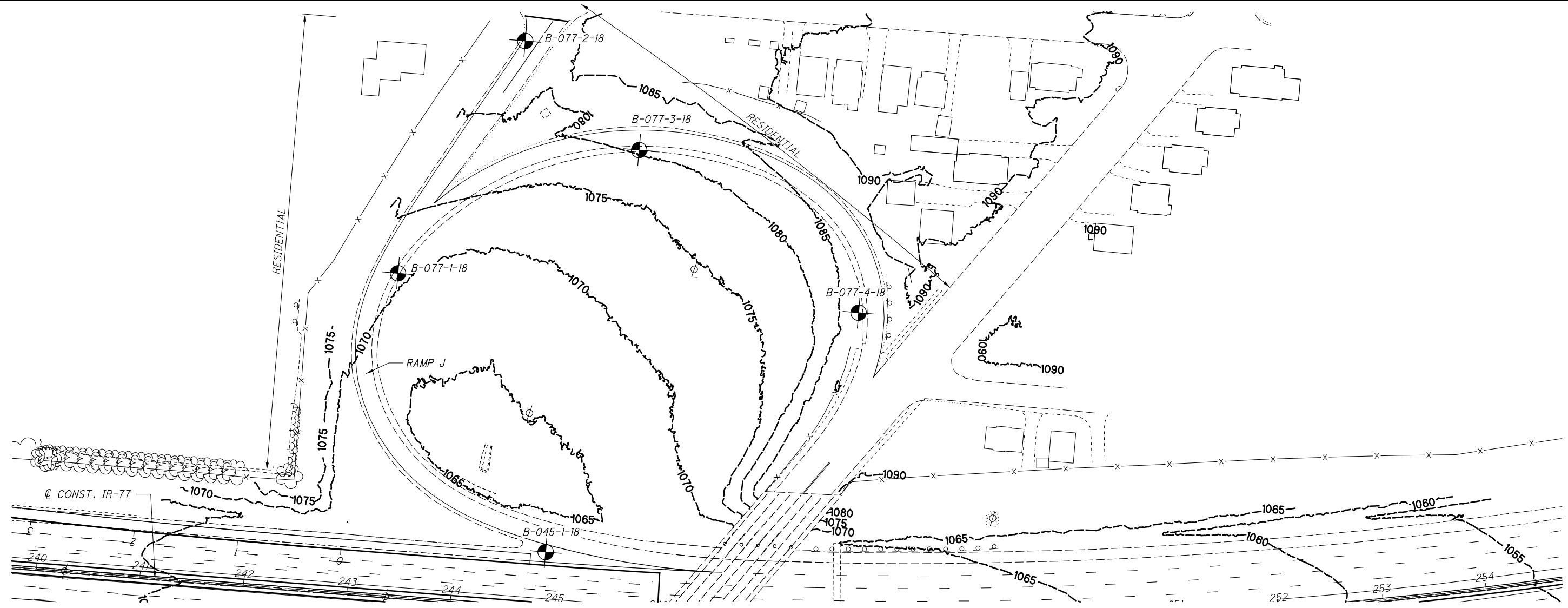
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SOIL PROFILE

RAMP B

SUM-76-6.15

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DRAWN: EB
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**SOIL PROFILE
RAMP J**

SUM-76-6.15