

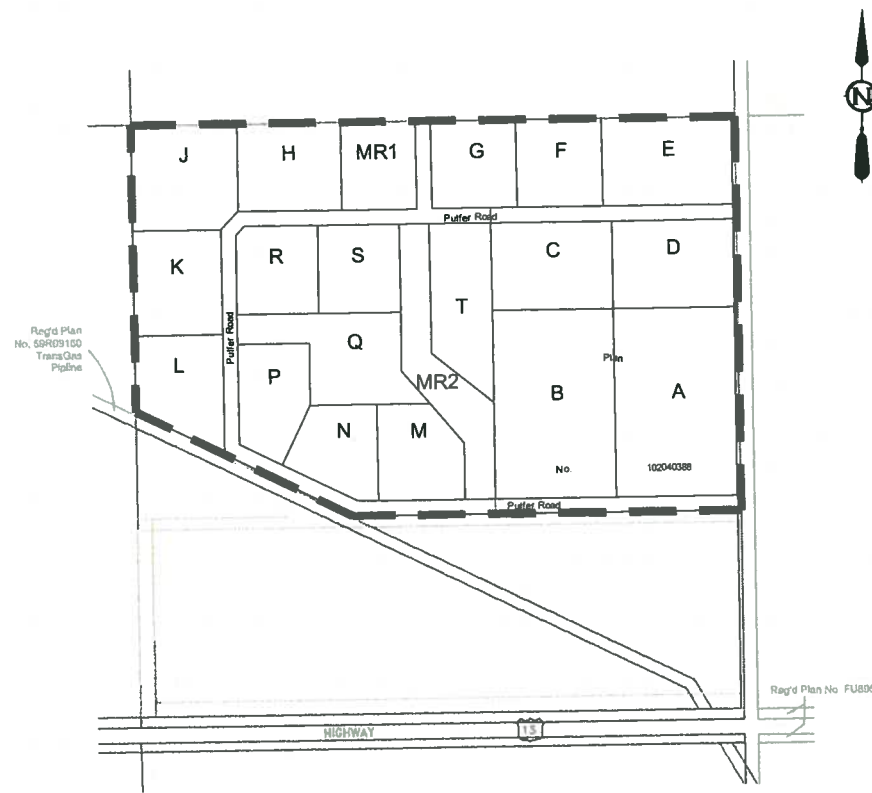
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FENRIS CONTRACTING

DAN PULFER ACCESS ROAD AND SUBDIVISION

AE Project No. 2010-4732

DRAWING LIST	
GENERAL	
4732-000	COVER AND DRAWING LIST
4732-101	LEGEND
CIVIL	
4732-102	DRAINAGE PLAN
4732-103	DRAINAGE AND GRADING PLAN
4732-104	DRAINAGE AND GRADING PLAN
4732-105	SPECIFICATIONS



1 PLAN
SITE PLAN SCALE N.T.S.



2 PLAN
LOCATION PLAN SCALE N.T.S.

ASSOCIATED ENGINEERING
QUALITY MANAGEMENT SIGN-OFF
Signature: *[Signature]*
Date: 2014 MAR 13



**Associated
Engineering**

GLOBAL PERSPECTIVE.
LOCAL FOCUS.

DRAWING NUMBER	REV. NO.	SHEET
4732-000	0	1 / 6

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DATE: 2014-03-13 11:30:00 AM User: jforster

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STANDARD SYMBOLS

SURVEY

BORE HOLE	
IRON PIN	
IRON PIN (FOUND)	
LEAD PLUG	
MONUMENT	
PILE	
SURVEY HUB	
TEST HOLE	
TEST PIT	
UNIDENTIFIED MANHOLE	

STANDARD DETAIL

BUSH	
GATE	
HEDGE	
ND POST BARRIER	
RAILWAY SIGNAL LIGHT	
SIGN	
TREE	
TREE (CONIFEROUS)	
TREE (DECIDUOUS)	

ELECTRICAL

ELECTRICAL MANHOLE	
ELECTRICAL MARKER	
ELECTRICAL METER	
GUY WIRE	
JUNCTION BOX	
LAMP STANDARD	
PULL BOX	
TRANSFORMER	
TRANSFORMER PAD	
TRANSFORMER VAULT MANHOLE	
UTILITY POLE	
VAULT BOX	

COMMUNICATIONS / TELEPHONE

COMMUNICATIONS MANHOLE	
COMMUNICATIONS VAULT BOX	
GUY WIRE	
TELEPHONE MANHOLE	
TELEPHONE MARKER	
TELEPHONE PEDESTAL	
TELEPHONE VAULT BOX	
UTILITY POLE	

EXISTING

DESIGN

GAS / OIL

GAS / OIL MANHOLE	
GAS / OIL MARKER	
GAS / OIL METER	
VALVE BOX	
VAULT BOX	

DRAINAGE

CATCH BASIN	
CATCH BASIN / MANHOLE	
CULVERT INLET (Ø, TYPE, AND m)	
CULVERT OUTLET (Ø, TYPE, AND m)	
DITCH HIGH POINT	
DITCH LOW POINT	
DRAINAGE MANHOLE	
FLOW DIRECTION	
LAWN BASIN	
VALVE BOX	

SANITARY SEWER

CLEANOUT	
COMBINED MANHOLE	
FLOW DIRECTION	
LIFT STATION	
SANITARY MANHOLE	
VALVE BOX	

WATER

45 DEGREE ELBOW	
90 DEGREE ELBOW	
AIR VALVE	
AIR VENT	
BLOW DOWN	
CHECK VALVE	
COUPLING	
CROSS FLANGE	
CURB STOP	
ENCASEMENT	
END CAP	
FIRE HYDRANT	
FLANGE	
GATE VALVE	
REDUCER	
REGULATOR VALVE	
SWING GATE CHECK VALVE	
TEE FLANGE	
THRUST BLOCK	
UNION	
VAULT BOX	
WATER LEVEL	
WATER MANHOLE	
WATER METER	
WATER VALVE (AIR VALVE IN MANHOLE)	
WELL	
WYE	

LINETYPES

CABLE VISION

CABLE SYSTEM	
CLOSED CIRCUIT TV	
FIBRE OPTIC TV	
OVERHEAD LINES	
UNIDENTIFIED CABLE LINE	
UNDERGROUND DUCTS	

COMMUNICATIONS / TELEPHONE

COMMUNICATIONS LINE	
TELEPHONE (FIBRE OPTICS)	
TELEPHONE LINES	
OVERHEAD LINES	
UNDERGROUND DUCTS	

NATURAL GAS / OIL

NATURAL GAS LINES	
OIL LINE	

POWER / ELECTRICAL

OVERHEAD LINES	
POWER LINES	
RIGID CONDUIT LINE	
UNDERGROUND DUCTS	

SANITARY SEWER

COMBINED SEWER LINE	
FORCEMAIN	
SANITARY LINES	

STORM DRAINAGE

STORM LINES	
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WATER

IRRIGATION WATER LINE	
WATER LINES	
RAW WATER LINE	
POTABLE WATER LINES	

SURFACE FEATURES

BERM	
BOTTOM OF BANK	
DITCH	
EDGE OF WATER	
HIGH WATER MARK	
MAJOR CONTOUR	
MINOR CONTOUR	
TOP OF BANK	

LOT BOUNDARIES

EASEMENT	
RIGHT OF WAY	
STATUTORY RIGHT-OF-WAY	

MAN-MADE FEATURES

FENCE	
GUARDRAIL	
RAILWAY	
SILT FENCE	

ALIGNMENT DETAIL

BICYCLE LANE PAINT LINE	
DECELERATION PAINT LINE	
GUIDELINE LANE PAINT LINE	
RURAL PAINT LINE	
URBAN PAINT LINE	

STANDARD HATCH PATTERNS

MATERIALS

APPROVED NATIVE BACKFILL	
ASPHALT	
CAST IN PLACE CONCRETE	
CONCRETE	
CONCRETE (TO BE REMOVED)	
DRAIN ROCK/RIP RAP	
GRANULAR BASE	
GRANULAR SUBBASE	
GRANULAR PIPE BEDDING/PIT RUN SAND	
GRASS / MARSH	
GRAVEL	
IMPORTED GRANULAR BACKFILL	
IMPORTED TOPSOIL	
NATIVE MATERIAL	
PRECAST CONCRETE	
RIP RAP	
ROCK	
UNDISTURBED GROUND	
WATER	

CHANNELIZATION SYMBOLS

SYMBOLS

BIKE PATH	
HANDICAP ONLY	
LANE CONTROL	
STRAIGHT ARROW	
LEFT ARROW	
RIGHT ARROW	
LEFT-STRAIGHT-RIGHT ARROW	
LEFT-RIGHT ARROW	
TWO-WAY LEFT TURN	
LEFT-STRAIGHT ARROW	
RIGHT-STRAIGHT ARROW	
H O V LANE SYMBOL	
PEDESTRIAN RAMP	
RAILWAY CROSSING	
SCHOOL	
STOP	
DEPRESS CURB	

DRAWING REDUCED TO HALF SIZE

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DATE: 2014-03-12 1:41:01 PM

NO	DATE	ENG.	BY	SUBJECT
1	20140312	B.R.	J.E.Y.	ISSUED FOR CONSTRUCTION
REVISIONS				

ASSOCIATION OF PROFESSIONAL ENGINEERS AND GEOSCIENTISTS OF SASKATCHEWAN
 CERTIFICATE OF AUTHORIZATION
 ASSOCIATED ENGINEERING (SASK.) LTD.
 NUMBER C116
 PERMISSION TO CONSULT HELD BY
Municipal 15793

Associated Engineering

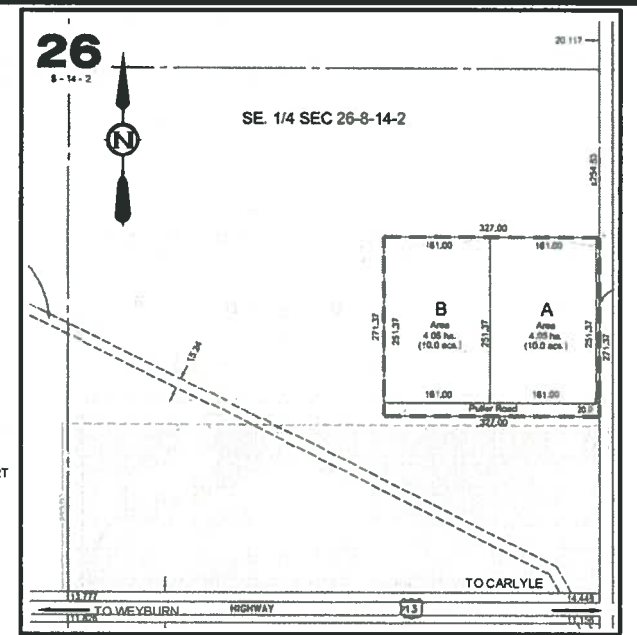
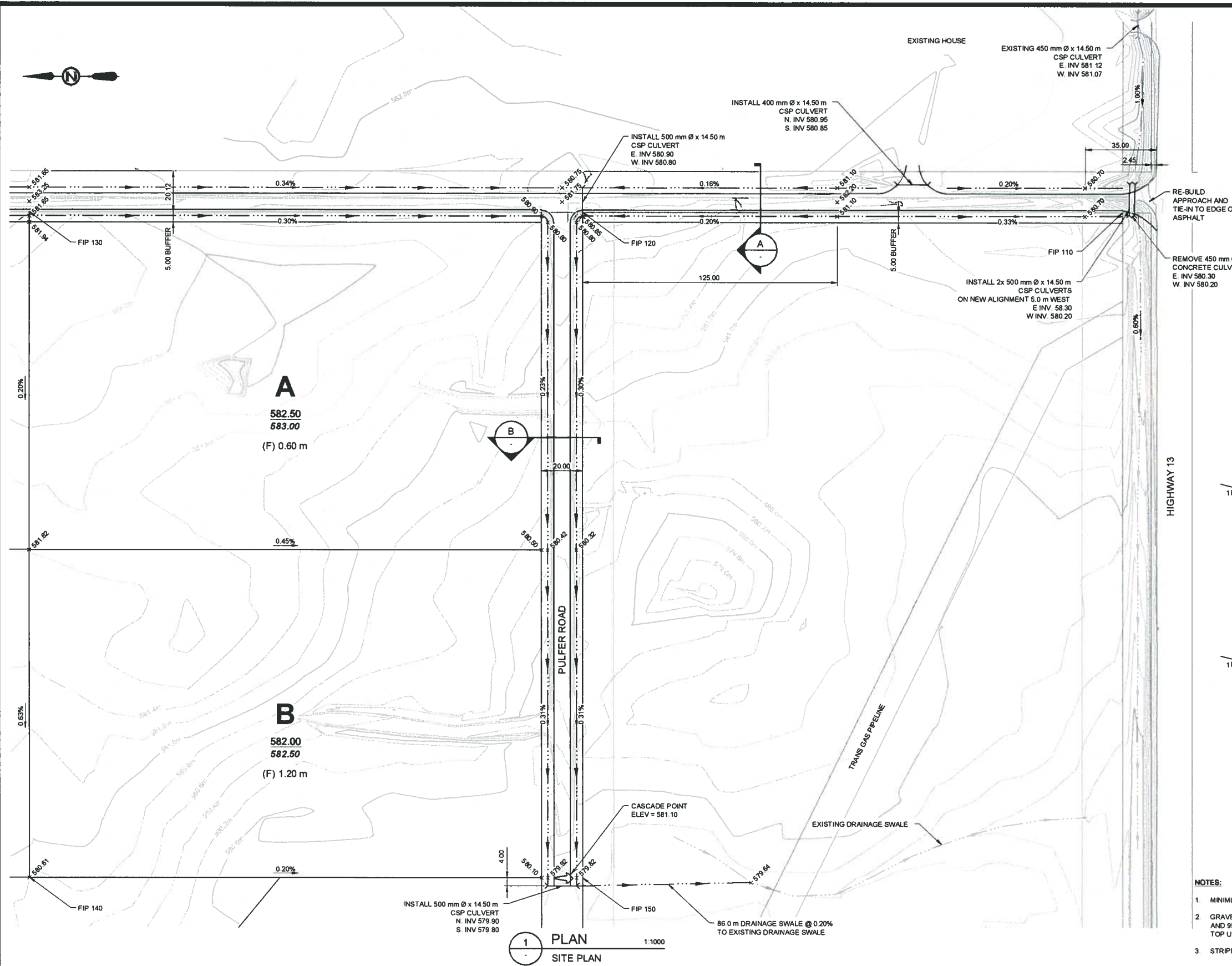
PROJECT No.	20104732
SCALE	AS NOTED
DRAWN	B. MARSHALL
DESIGNED	K. GALT
CHECKED	
APPROVED	
DATE	MARCH 2014

FENRIS CONTRACTING

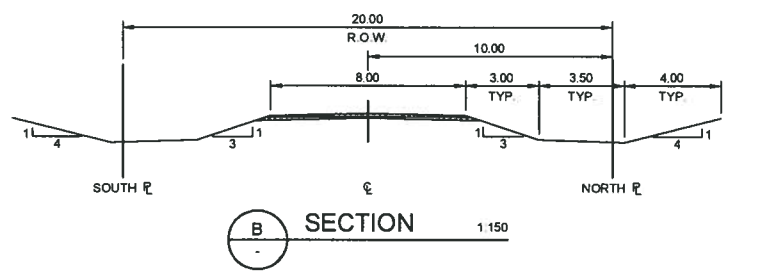
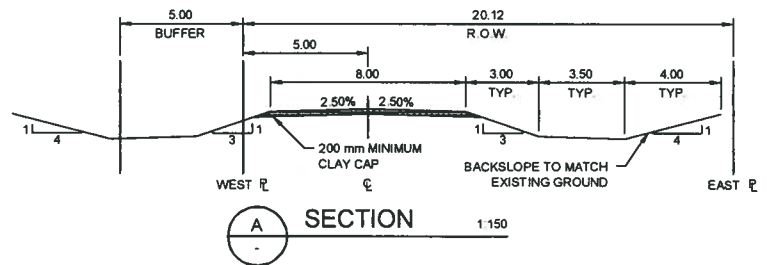
GENERAL LEGEND

DAN PULFER ACCESS ROAD AND SUBDIVISION		
DRAWING NUMBER	REV. NO.	SHEET
4732-101	0	2 / 6

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2 PLAN N.T.S.
LOCATION PLAN



BENCH MARK - F.I.P. @ N.E. CORNER SE 1/4 SEC 26 - 8 - 14 - W2 ELEV 582.576
BENCH MARK TO BE CONFIRMED BY ALTUS GEOMATICS PRIOR TO CONSTRUCTION.

HORIZONTAL CONTROL		
DESCRIPTION	NORTHING	EASTING
FIP 110	5504652.6350	587498.0850
FIP 120	5504917.5860	587493.7130
FIP 130	5505188.9130	587489.2110
FIP 140	5505183.4840	587162.2510
FIP 150	5504912.1520	587166.7500

- NOTES:**
- MINIMUM BUILDING GRADE REFERS TO THE GROUND AT THE BUILDING
 - GRAVELING: 95 m³ OF GRAVEL/KILOMETRE (200 YARDS OF GRAVEL/MILES) INCORPORATED, AND 95 m³ OF GRAVEL/KILOMETRE (200 YARDS OF GRAVEL/MILES) TO BE PLACED ON ROAD TOP UPON COMPLETION. 20 m³ (25 YARDS) OF GRAVEL ON ROAD TOP FOR ALL APPROACHES.
 - STRIPPING: REMOVE ALL TOPSOIL AND REPLACE AS REQUIRED WITH A MINIMUM 150 mm **DRAWING REDUCED TO HALF SIZE**

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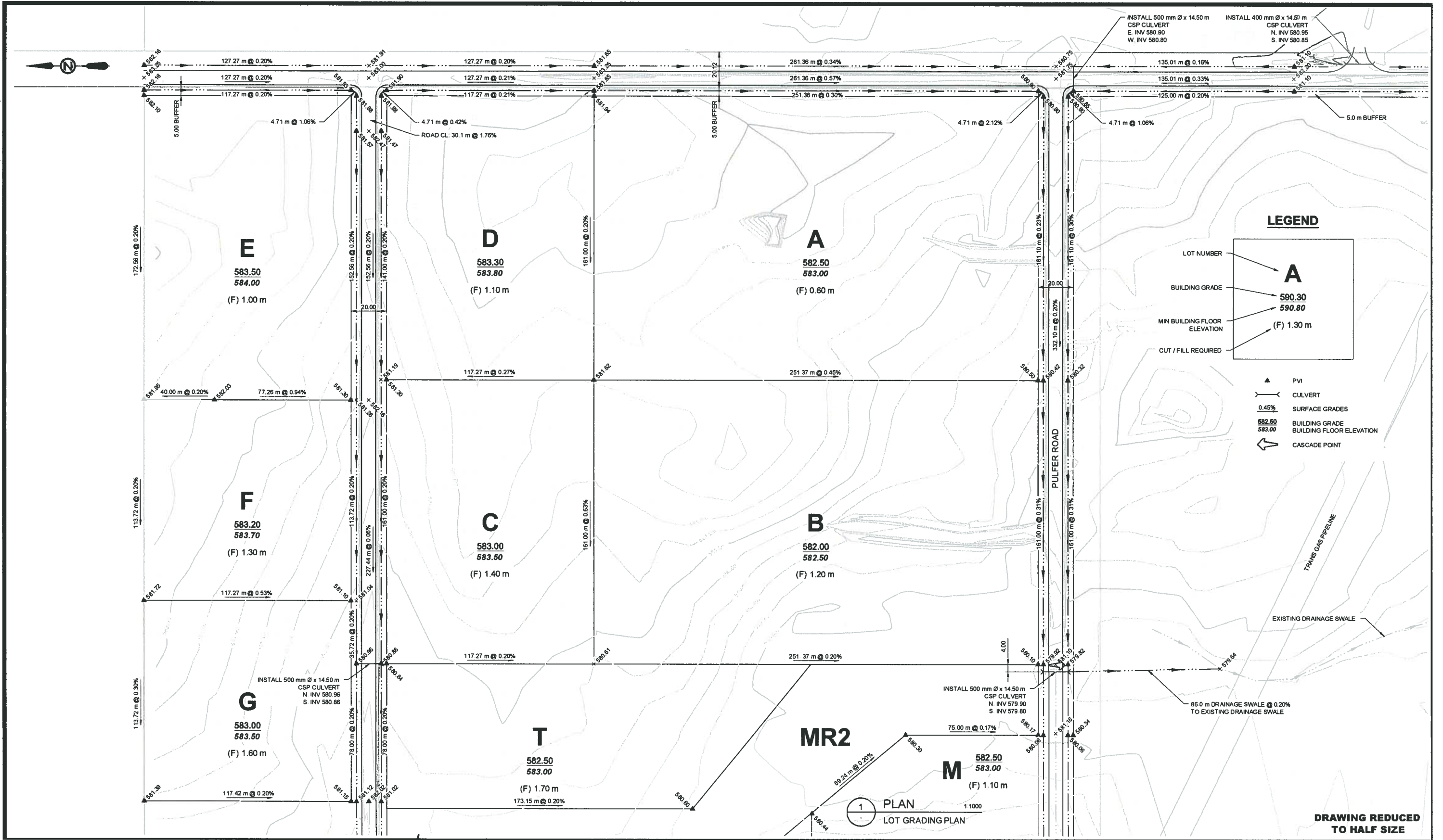


PROJECT No.	20104732
SCALE	AS NOTED
DRAWN	B MARSHALL
DESIGNED	K GALT
CHECKED	
APPROVED	
DATE	MARCH 2014

FENRIS CONTRACTING	
CIVIL DRAINAGE PLAN	

DAN PULFER ACCESS ROAD AND SUBDIVISION		
DRAWING NUMBER	REV NO	SHEET
4732-102	0	3
		6

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LEGEND

- ▲ PVI
- CULVERT
- 0.45% SURFACE GRADES
- 582.50 BUILDING GRADE
- 583.00 BUILDING FLOOR ELEVATION
- ↖ CASCADE POINT

LOT NUMBER → **A**

BUILDING GRADE → 590.30

MIN BUILDING FLOOR ELEVATION → 590.80

CUT / FILL REQUIRED → (F) 1.30 m

1 PLAN
LOT GRADING PLAN
1:1000

DRAWING REDUCED TO HALF SIZE

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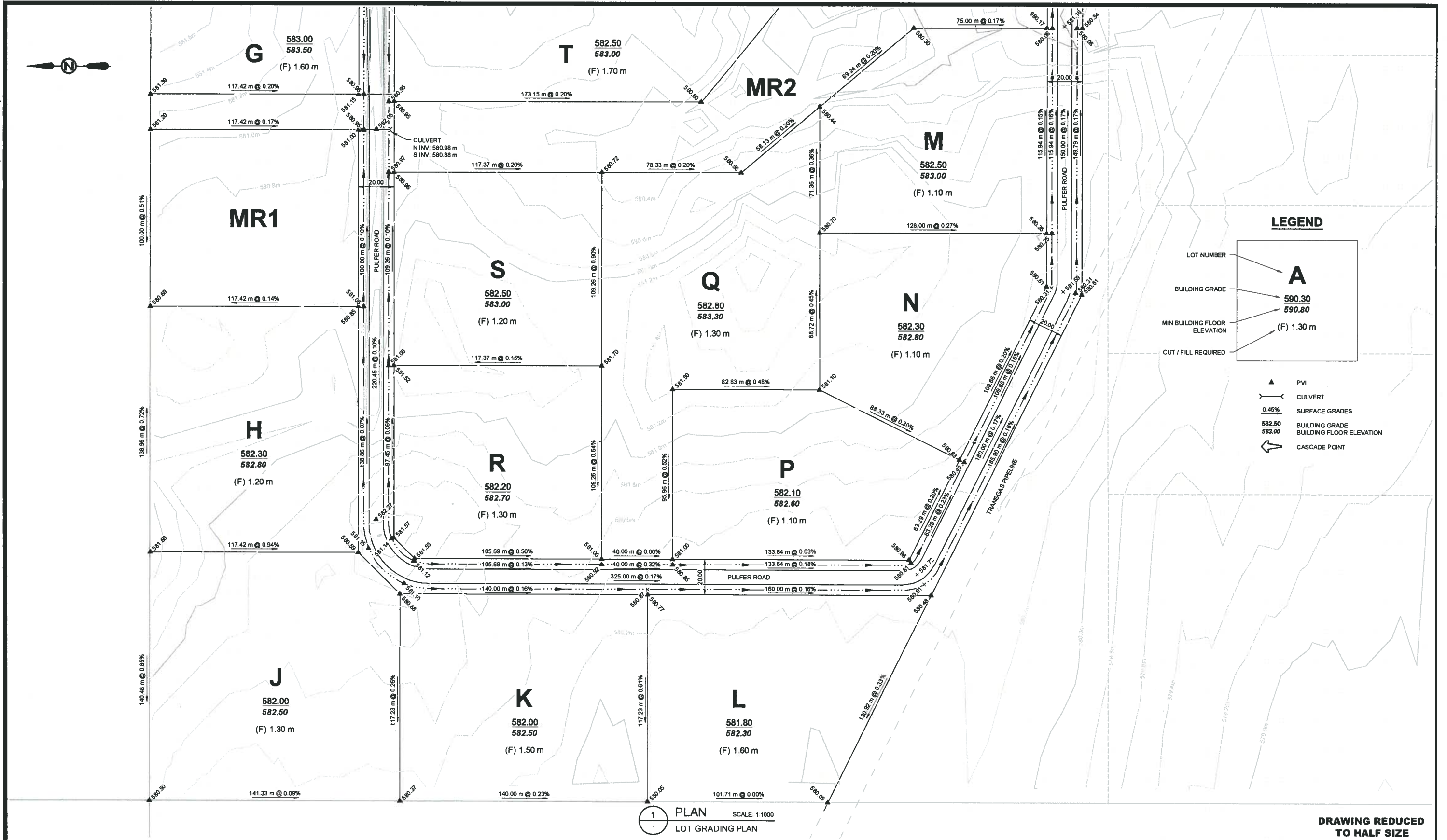
PROJECT No.	20104732
SCALE	AS NOTED
DRAWN	B. MARSHALL
DESIGNED	K. GALT
CHECKED	
APPROVED	
DATE	MARCH 2014

FENRIS CONTRACTING	
CIVIL	GRADING AND DRAINAGE PLAN

DAN PULFER ACCESS ROAD AND SUBDIVISION		
DRAWING NUMBER	REV NO	SHEET
4732-103	0	4 / 6

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 DATE: 2014-03-17, J. Kreider

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PROJECT No	20104732
SCALE	AS NOTED
DRAWN	J. FONTAINE
DESIGNED	J. KROEKER
CHECKED	
APPROVED	
DATE	MARCH 2014

FENRIS CONTRACTING	
CIVIL	GRADING AND DRAINAGE PLAN

DAN PULFER ACCESS ROAD AND SUBDIVISION		
DRAWING NUMBER	REV NO	SHEET
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1 GENERAL

- 1.1 DEFINITIONS**
- COMMON EXCAVATION: EXCAVATION OF ALL MATERIALS WHICH ARE NOT INCLUDED UNDER DEFINITION OF ROCK EXCAVATION.
 - ROCK EXCAVATION: EXCAVATION OF MASSIVE LEDGE ROCK, BOULDERS OR BEDROCK WHICH CANNOT BE REMOVED BY A TRACK EXCAVATOR WITH A MINIMUM OPERATING WEIGHT OF 36 TONNES AND A MINIMUM BUCKET CAPACITY OF 1.2 m³ WITHOUT DRILLING AND BLASTING.
 - BOULDERS: ALL FORMS OF ROCK, DETACHED MASSES OF ROCK, BOULDERS, CONCRETE OR MASONRY, GREATER THAN 600 MM IN AVERAGE DIAMETER, THAT CAN BE REMOVED BY A TRACK EXCAVATOR WITH A MINIMUM OPERATING WEIGHT OF 36 TONNES AND A MINIMUM BUCKET CAPACITY OF 1.2 m³ WITHOUT DRILLING OR BLASTING.
 - WASTE MATERIAL: EXCAVATED MATERIAL UNSUITABLE FOR USE IN WORK OR SURPLUS TO REQUIREMENTS.
 - IN SITU MATERIAL: MATERIAL EXCAVATED FROM THE ROADWAY OR BORROW AREAS FROM WHICH ALL BOULDERS LARGER THAN 400 mm IN MAXIMUM DIMENSION, LARGE ROOTS, STUMPS OR OTHER DEBRIS THAT WOULD PREVENT CONSOLIDATION OF THE BACKFILL HAVE BEEN REMOVED.
 - UNSHRINKABLE FILL: VERY WEAK MIXTURE OF PORTLAND CEMENT, CONCRETE AGGREGATES AND WATER THAT RESISTS SETTLEMENT WHEN PLACED IN UTILITY TRENCHES, AND CAPABLE OF BEING READILY EXCAVATED.
 - GRANULAR MATERIAL: MATERIAL SUCH AS SAND, NATURAL GRAVEL, AND RECLAIMED CONCRETE AGGREGATE, FREE OF RECLAIMED ASPHALT.
 - TOPSOIL: HUMUS, PEAT, OR OTHER MATERIAL CONTAINING ORGANICS WHICH MAKE UP THE TOP LAYER OF THE SOIL.
 - BORROW MATERIAL: MATERIAL OBTAINED FROM LOCATIONS OUTSIDE AREA TO BE GRADED, AND REQUIRED FOR CONSTRUCTION OF FILL AREAS OR FOR OTHER PORTIONS OF WORK.
 - UNUSABLE MATERIALS: VERY WEAK AND COMPRESSIBLE MATERIALS.
 - FREE HAUL DISTANCE: DISTANCE THAT EXCAVATED OR BORROW MATERIAL IS TO BE HAULED WITHOUT COMPENSATION. FREE HAUL DISTANCE TO BE 1000 m.
 - OVERHAUL: AUTHORIZED HAULING IN EXCESS OF FREE HAUL DISTANCE THAT EXCAVATED MATERIAL IS MOVED.
 - EMBANKMENT: MATERIAL DERIVED FROM USABLE EXCAVATION OR STOCKPILE AND PLACED ABOVE ORIGINAL GROUND OR STRIPPED SURFACE UP TO SUBGRADE ELEVATION.
 - PAVEMENT STRUCTURE: COMBINATION OF LAYERS OF UNBOUND OR STABILIZED GRANULAR SUB-BASE, BASE, AND ASPHALT OR CONCRETE SURFACING.
 - SUBGRADE ELEVATION: ELEVATION IMMEDIATELY BELOW PAVEMENT STRUCTURE.

- 1.2 REQUIREMENTS OF REGULATORY AGENCIES**
- ADHERE TO REGULATIONS OF AUTHORITY HAVING JURISDICTION IF BLASTING IS REQUIRED.
 - ADHERE TO PROVINCIAL AND NATIONAL ENVIRONMENTAL REQUIREMENTS IF TOXIC MATERIALS ARE INVOLVED.

- 1.3 TRAFFIC PROVISION**
- PROVIDE AND MAINTAIN ROADWAYS, WALKWAYS AND DETOURS, FOR VEHICULAR AND PEDESTRIAN TRAFFIC AND ACCESS TO FIRE HYDRANTS.

- 2 PRODUCTS**
- 2.1 MATERIALS**
- EMBANKMENT MATERIALS REQUIRE APPROVAL BY ENGINEER.
 - MATERIAL USED FOR EMBANKMENT NOT TO CONTAIN ORGANIC MATTER, FROZEN LUMPS, WEEDS, SOD, ROOTS, LOGS, STUMPS OR ANY OTHER UNSUITABLE MATERIAL.
 - BORROW MATERIAL:
 - OBTAIN FROM BORROW PIT TO BE APPROVED BY ENGINEER.
 - GRANULAR BASE FOR ROAD SURFACING GRAVEL: MATERIAL TO FOLLOWING REQUIREMENTS
 - CRUSHED STONE OR GRAVEL.
 - GRADATION TO: SASKATCHEWAN DEPARTMENT OF HIGHWAYS

- THE PERCENTAGE PASSING THE DESIGNATED SIEVE SIZES FOR ANY REPRESENTATIVE SAMPLE, WHEN PLOTTED ON A SEMI-LOG GRADING CHART, SHALL SHOW A FREE FLOWING CONCAVE CURVE WITHOUT SHARP BREAKS, WITHIN THE LIMITS SPECIFIED.
- LIQUID LIMIT: TO ASTM D4318, MAXIMUM 25
- PLASTICITY INDEX: TO ASTM D4318, MAXIMUM 6
- CRUSHED PARTICLES: AT LEAST 45% OF PARTICLES BY MASS WITHIN EACH OF FOLLOWING SIEVE DESIGNATION RANGES TO HAVE AT LEAST 1 FRESHLY FRACTURED FACE. MATERIAL TO BE DIVIDED INTO RANGES USING METHODS OF ASTM C136.

PASSING		RETAINED ON	
50 mm	TO	20 mm	
25 mm	TO	12.5 mm	
19.0 mm	TO	5 mm	

- 3 EXECUTION**
- 3.1 COMPACTION EQUIPMENT**
- COMPACTION EQUIPMENT MUST BE CAPABLE OF OBTAINING REQUIRED DENSITIES IN MATERIALS ON PROJECT.
- 3.2 WATER DISTRIBUTORS**
- APPLY WATER WITH EQUIPMENT CAPABLE OF UNIFORM DISTRIBUTION.
- 3.3 STRIPPING OF TOPSOIL**
- COMMENCE TOPSOIL STRIPPING OF AREAS AS DIRECTED BY ENGINEER AFTER BRUSH WEEDS AND GRASSES HAVE BEEN REMOVED FROM THESE AREAS.
 - STRIP TOPSOIL TO DEPTHS AS DIRECTED BY ENGINEER. DO NOT MIX TOPSOIL WITH SUBSOIL.
 - STOCKPILE IN LOCATIONS AS DIRECTED BY ENGINEER. STOCKPILE HEIGHT NOT TO EXCEED 2m.
 - DISPOSE OF UNUSED TOPSOIL TO LOCATION AS DIRECTED BY ENGINEER.

- 3.4 EXCAVATING**
- 1 GENERAL:**
- ADVISE ENGINEER AT LEAST 7 DAYS IN ADVANCE OF EXCAVATION OPERATIONS FOR INITIAL CROSS SECTIONS TO BE TAKEN.
 - MAINTAIN CROWNS AND CROSS SLOPES TO PROVIDE GOOD SURFACE DRAINAGE.
 - DISPOSE OF WASTE MATERIAL AS DIRECTED BY ENGINEER.
- 2 UNSUITABLE MATERIALS:**
- NOTIFY ENGINEER WHENEVER UNSUITABLE MATERIALS ARE ENCOUNTERED IN CUT SECTIONS AND REMOVE UNSUITABLE MATERIALS TO DEPTH AND EXTENT AS DIRECTED BY ENGINEER.
 - UNUSABLE MATERIALS TO BE DISPOSED OF AS DIRECTED BY ENGINEER.
- 3 ROCK EXCAVATION:**
- IF, DURING EXCAVATION, MATERIAL APPEARING TO CONFORM TO CLASSIFICATION FOR ROCK IS ENCOUNTERED, NOTIFY ENGINEER IMMEDIATELY TO ENABLE MEASUREMENTS TO BE MADE TO DETERMINE VOLUME OF ROCK.
 - SHATTER ROCK TO 150 mm BELOW SUBGRADE ELEVATION AS INDICATED.
 - PROVIDE EFFECTIVE DRAINAGE TO DITCHES, LEAVING NO UNDRAINED POCKETS IN FOUNDATION.
 - SCALE DOWN ROCK SLOPES AND REMOVE ROCK FRAGMENTS WHICH ARE LIABLE TO SLIDE OR ROLL DOWN SLOPES.

- 4 BORROW:**
- COMPLETELY USE IN EMBANKMENTS, SUITABLE MATERIALS REMOVED FROM CUT AREAS BEFORE TAKING MATERIAL FROM BORROW AREAS.
 - OBTAIN FROM BORROW AREAS ADDITIONAL SUITABLE EMBANKMENT MATERIAL
 - ENGINEER WILL DESIGNATE LOCATION AND EXTENT OF BORROW AREAS, AND ALLOWABLE DEPTH OF CUTTING.
 - SHAPE EDGES OF BORROW AREAS ON SLOPES OF 4:1 AND PROVIDE DRAINAGE AS DIRECTED BY ENGINEER.
 - PROVIDE ADDITIONAL SUITABLE EMBANKMENT MATERIAL FROM OFF-SITE AS REQUIRED.
 - TRIM AND LEAVE BORROW PITS IN CONDITION TO PERMIT ACCURATE MEASUREMENT OF MATERIAL REMOVED.
 - LEAVE BORROW PITS IN SAFE CONDITION SUITABLE FOR REHABILITATION.
- 5 SIDE DITCHES:**
- CONSTRUCT SIDE DITCHES TO DEPTHS AND WIDTHS AS INDICATED OR AS DIRECTED BY ENGINEER, TO PERMIT READY FLOW OF SURFACE WATER.
 - MAINTAIN AND KEEP DITCHES OPEN AND FREE FROM DEBRIS UNTIL FINAL ACCEPTANCE OF WORK.

- 3.5 EMBANKMENTS**
- SCARIFY ALL SURFACES PRIOR TO PLACING FILL TO ENSURE PROPER BOND BETWEEN NEW MATERIALS AND EXISTING SURFACES.
 - DO NOT PLACE MATERIAL WHICH IS FROZEN, NOR PLACE MATERIAL ON FROZEN SURFACES.
 - MAINTAIN CROWNED SURFACE DURING CONSTRUCTION TO ENSURE READY RUN-OFF OF SURFACE WATER. DO NOT PLACE MATERIAL IN FREE STANDING WATER.
 - WITH MATERIAL CONTAINING LESS THAN 25% BY VOLUME OF STONE OR ROCK FRAGMENTS LARGER THAN 100 mm:

- PLACE AND COMPACT TO FULL WIDTH IN UNIFORM LAYERS NOT EXCEEDING 200 mm LOOSE THICKNESS. ENGINEER MAY AUTHORIZE THICKER LIFTS IF SPECIFIED COMPACTION CAN BE ACHIEVED.
- COMPACT TO DENSITY OF NOT LESS THAN 97% STANDARD PROCTOR MAXIMUM DRY DENSITY AT A MINIMUM OF 1% WET OF OPTIMUM MOISTURE CONTENT IN ACCORDANCE WITH ASTM D698.
- BRING MOISTURE CONTENT OF SOIL TO LEVEL REQUIRED TO ACHIEVE SPECIFIED COMPACTION. ADD WATER OR AERATE AS REQUIRED.
- UPON COMPLETION OF EMBANKMENT CONSTRUCTION, IF SO DIRECTED BY ENGINEER, PLACE UNSUITABLE MATERIAL AGAINST EMBANKMENT AND TRIM TO MAINTAIN EMBANKMENT SLOPE.
- PLACE TOPSOIL TAKEN FROM STOCKPILE OR OTHER SOURCES, AT LOCATIONS AND TO DEPTHS AS DIRECTED BY ENGINEER. REMOVE SURFACE STONES, ROOTS AND OTHER DEBRIS AND LEAVE SURFACE IN UNIFORM CONDITION.

- 3.6 SUBGRADE COMPACTION**
- AFTER GRADING HAS BEEN COMPLETED, SCARIFY AND MIX SUBGRADE SURFACE TO REQUIRED DEPTH OF SUBGRADE COMPACTION.
 - REMOVE UNSUITABLE MATERIALS FOUND DURING WORK. REPLACE WITH MATERIAL APPROVED BY ENGINEER.
 - COMPACT TOP 150 mm OF SUBGRADE SOIL TO AT LEAST 97% STANDARD PROCTOR MAXIMUM DRY DENSITY AT A MINIMUM OF 1% WET OF OPTIMUM MOISTURE CONTENT IN ACCORDANCE WITH ASTM D698.
 - BRING MOISTURE CONTENT OF SOIL TO LEVEL REQUIRED TO ACHIEVE SPECIFIED COMPACTION. ADD WATER OR AERATE AS REQUIRED.
 - THE CONTRACTOR SHALL PROVIDE A LOADED TANDEM AXLE TRUCK FOR PROOF ROLLING OF THE SUBGRADE.

- 3.7 ROAD SURFACING GRAVEL**
- PLACE SURFACING GRAVEL AFTER SUBGRADE IS INSPECTED AND APPROVED BY ENGINEER.
 - PLACE 95m³/km (200 yrd³/mile) GRANULAR LIFT ON PREPARED SUBGRADE THOROUGHLY WORK INTO THE TOP 100 mm OF SUBGRADE BY SCARIFYING AND MIXING WITH THE SUBGRADE MATERIAL. COMPACT TO A SMOOTH SURFACE. PLACE ADDITIONAL 95 m³/km (200 yrd³/mile) LIFT ON TOP OF MIX LAYER.
 - CONSTRUCT SURFACING GRAVEL TO DEPTH AND GRADE IN AREAS INDICATED.
 - ENSURE NO FROZEN MATERIAL IS PLACED.
 - PLACE MATERIAL ONLY ON CLEAN UNFROZEN SURFACE, FREE FROM SNOW OR ICE.

- 3.8 FINISHING AND TOLERANCES**
- SHAPE AND COMPACT ENTIRE ROADBED TO WITHIN 20 mm OF DESIGN ELEVATIONS BUT NOT UNIFORMLY HIGH OR LOW.
 - DO SCARIFYING, BLADING, COMPACTING OR OTHER METHODS OF WORK AS NECESSARY TO PROVIDE THOROUGHLY COMPACTED ROADBED SHAPED TO GRADES AND CROSS SECTIONS AS INDICATED OR AS DIRECTED BY ENGINEER.
 - FINISH BACK AND SIDE SLOPES OF IN SITU MATERIAL TO NEAT CONDITION, SUITABLE FOR SEEDING, TRUE TO LINE AND GRADE.
 - REMOVE ISOLATED BOULDERS EXPOSED IN CUT SLOPES AND FILL RESULTING CAVITIES.
 - HAND FINISH SLOPES THAT CANNOT BE FINISHED SATISFACTORILY BY MACHINE.
 - FINISH BACK AND SIDE SLOPES OF ROCK MATERIAL TO NEAT AND SAFE CONDITION, TRUE TO LINE AND GRADE. FOR CUT SLOPES IN BEDROCK STEEPER THAN 1:1, SCALE SLOPE BY REMOVING LOOSE FRAGMENTS.

- 3.9 PROTECTION**
- MAINTAIN FINISHED SURFACES IN CONDITION CONFORMING TO THIS SECTION UNTIL ACCEPTANCE BY ENGINEER.

- 3.10 TESTING**
- TESTING OF EMBANKMENT, SUBGRADE AND SURFACING GRAVEL WILL BE CARRIED OUT BY AN INDEPENDENT LABORATORY.
 - COST OF TESTING WILL BE PAID BY THE OWNER.
 - SIEVE ANALYSIS SHALL BE TAKEN TO ENSURE UNIFORMITY IN GRADATION AND COMPLIANCE WITH THE SPECIFICATIONS.
 - ANY MATERIAL NOT MEETING THE SPECIFICATIONS SHALL BE RECOMPACTED OR REJECTED.
 - FIELD DENSITIES WILL BE TAKEN ON ALL EMBANKMENT AND SUBGRADE CONSTRUCTED.
 - THE MINIMUM NUMBER OF TESTS REQUIRED IS AS FOLLOWS:
 - FOR EMBANKMENT, ONE COMPACTION TEST FOR EVERY 1000 m² AND EACH 300 mm LIFT.
 - FOR SUBGRADE, ONE FIELD DENSITY FOR EACH 1000 m² OF SUBGRADE CONSTRUCTED.
 - FOR SURFACING GRAVEL, ONE SIEVE ANALYSIS OF EVERY 1500 m², OR PORTION THEREOF, AND MINIMUM ONE A DAY.


- 3.11 PIPE CULVERTS**
- CERTIFICATION TO BE MARKED ON PIPE.
 - CORRUGATED STEEL PIPE TO CAN3_G401.
 - GRANULAR BEDDING AND BACKFILL MATERIAL:
 - CRUSHED PIT RUN OR SCREENED STONE, GRAVEL OR SAND.
 - OBTAIN ENGINEER'S APPROVAL OF TRENCH LINE AND DEPTH PRIOR TO PLACING BEDDING MATERIAL OR PIPE.

- 5 BEDDING**
- DEWATER EXCAVATION, AS NECESSARY, TO ALLOW PLACEMENT OF CULVERT BEDDING IN THE DRY.
 - PLACE MINIMUM THICKNESS OF 200 MM OF APPROVED GRANULAR MATERIAL ON BOTTOM OF EXCAVATION AND COMPACT TO MINIMUM 95% OF CORRECTED MAXIMUM DRY DENSITY.
 - SHAPE BEDDING TO FIT LOWER SEGMENT OF PIPE EXTERIOR SO THAT WIDTH OF AT LEAST 50% OF PIPE DIAMETER IS IN CLOSE CONTACT WITH BEDDING AND TO CAMBER AS INDICATED OR AS DIRECTED BY ENGINEER, FREE FROM SAGS OR HIGH POINTS.
 - PLACE BEDDING IN UNFROZEN CONDITION.
 - LAYING CORRUGATED STEEL PIPE CULVERTS
 - COMMENCE PIPE PLACING AT DOWNSTREAM END.
 - ENSURE BOTTOM OF PIPE IS IN CONTACT WITH SHAPED BED OR COMPACTED FILL THROUGHOUT ITS LENGTH.
 - LAY PIPE WITH OUTSIDE CIRCUMFERENTIAL LAPS FACING UPSTREAM AND LONGITUDINAL LAPS OR SEAMS AT SIDE OR QUARTER POINTS.
 - DO NOT ALLOW WATER TO FLOW THROUGH PIPES DURING CONSTRUCTION EXCEPT AS PERMITTED BY ENGINEER.
 - JOINTS: CORRUGATED STEEL CULVERTS
 - MATCH CORRUGATIONS OR INDENTATIONS OF COUPLER WITH PIPE SECTIONS BEFORE TIGHTENING.
 - TAP COUPLERS FIRMLY AS THEY ARE BEING TIGHTENED, TO TAKE UP SLACK AND ENSURE SNUG FIT.
 - INSERT AND TIGHTEN BOLTS.
 - REPAIR SPOTS WHERE DAMAGE HAS OCCURRED TO SPELTER COATING BY APPLYING TWO COATS OF ZINC RICH EPOXY PAINT.
 - BACKFILLING
 - BACKFILL AROUND AND OVER CULVERTS AS INDICATED OR AS DIRECTED BY ENGINEER.
 - PLACE GRANULAR BACKFILL MATERIAL OR BACKFILL MATERIAL, APPROVED BY ENGINEER, IN 150 MM LAYERS TO FULL WIDTH ALTERNATELY ON EACH SIDE OF CULVERT, SO AS NOT TO DISPLACE IT LATERALLY OR VERTICALLY.
 - COMPACT EACH LAYER TO 95% CORRECTED MAXIMUM DRY DENSITY TAKING SPECIAL CARE TO OBTAIN REQUIRED DENSITY UNDER HAUNCHES.
 - PROTECT INSTALLED CULVERT WITH MINIMUM 300 MM COVER OF COMPACTED FILL BEFORE HEAVY EQUIPMENT IS PERMITTED TO CROSS. DURING CONSTRUCTION, WIDTH OF FILL, AT ITS TOP, TO BE AT LEAST TWICE DIAMETER OR SPAN OF PIPE AND WITH SLOPES NOT STEEPER THAN 1:2.
 - PLACE BACKFILL IN UNFROZEN CONDITION.

SIEVE DESIGNATION	PERCENT BY WEIGHT PASSING CANADIAN METRIC SIEVE SERIES		
	TYPE		
	31	33	35
31.5 mm	100.0		
18.0 mm	75.0 - 90.0	100.0	100.0
12.5 mm	65.0 - 83.0	75.0 - 100.0	81.0 - 100.0
5.0 mm	40.0 - 69.0	50.0 - 75.0	50.0 - 85.0
2.0 mm	26.0 - 47.0	32.0 - 52.0	32.0 - 65.0
900 µm	17.0 - 32.0	20.0 - 35.0	20.0 - 43.0
400 µm	12.0 - 22.0	15.0 - 25.0	15.0 - 30.0
150 µm	7.0 - 14.0	8.0 - 15.0	8.0 - 18.0
75 µm	6.0 - 11.0	6.0 - 11.0	7.0 - 12.0
PLASTICITY INDEX	0-7.0	0-6.0	0-5.0
FRACTURED FACE %	50.0 MINIMUM		
LIGHT WEIGHT PIECES %	5.0 MAXIMUM		

DRAWING REDUCED TO HALF SIZE

NO.	DATE	ENG.	BY	SUBJECT
1	20140312	B.R.	J.S.Y.	ISSUED FOR CONSTRUCTION
REVISIONS				

ASSOCIATION OF PROFESSIONAL ENGINEERS AND GEOSCIENTISTS OF SASKATCHEWAN
CERTIFICATE OF AUTHORIZATION
 ASSOCIATED ENGINEERING (SASK.) LTD.
 NUMBER C116
 PERMISSION TO CONSULT HELD BY

 MUNICIPAL 15793

PROJECT No.	20104732
SCALE	AS NOTED
DRAWN	B. MARSHALL
DESIGNED	K. GALT
CHECKED	
APPROVED	
DATE	MARCH 2014

FENRIS CONTRACTING

CIVIL SPECIFICATIONS

DAN PULFER ACCESS ROAD AND SUBDIVISION		
DRAWING NUMBER	REV. NO.	SHEET
4732-105	0	6 / 6

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