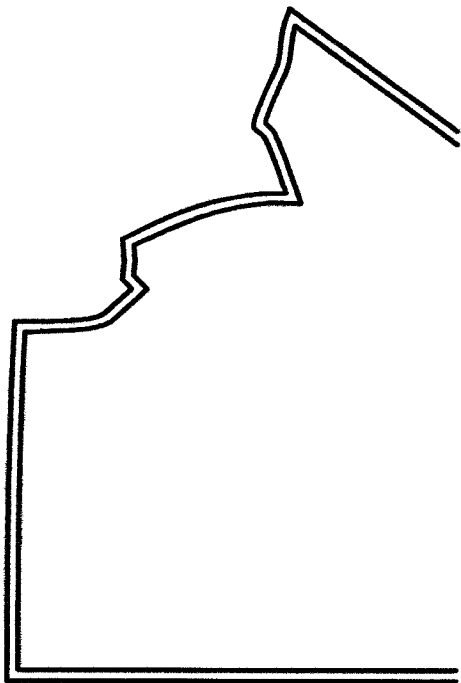


## **Appendix C – Design Drawings**



PROJECT NAME:

**EAGLE CREEK COLONY  
25-5-8W, R.M. OF LORNE  
DOMESTIC WASTE WATER LAGOON**



# South-Man Engineering



UNIT 15-1599 DUGALD ROAD | WINNIPEG, MANITOBA | R2J 0H3  
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sme@southmaneng.com

SHT NO.	SHEET SCHEDULE
CS	COVER SHEET
GN-1	GENERAL NOTES
SP	SITE PLAN
S-1	FLOOR PLAN
S-2	CROSS-SECTION DETAIL
S-3	INLET PIPING DETAILS
S-4	TRENCH DETAILS
S-5	SPLASH PAD
S-6	GAS VENTING PLAN
S-7	GAS VENTING DETAILS
S-8	GATE VALVE DETAILS
S-9	FENCE DETAIL

PROJECT NAME	EAGLE CREEK COLONY 25-5-8W	BUILDING AREA	N/A
SHEET TITLE	COVER SHEET	DRAWN BY	SOUTH-MAN ENGINEERING P. FERRER/R. FLORES
DATE DRAWN	FEBRUARY 2014	DRAWING SCALE	N/A
THIS DRAWING IS THE PROPERTY OF SOUTH-MAN ENGINEERING, WINNIPEG, MANITOBA, CANADA.		SHEET NUMBER	
		CS	

GENERAL NOTES:

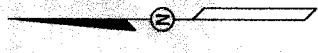
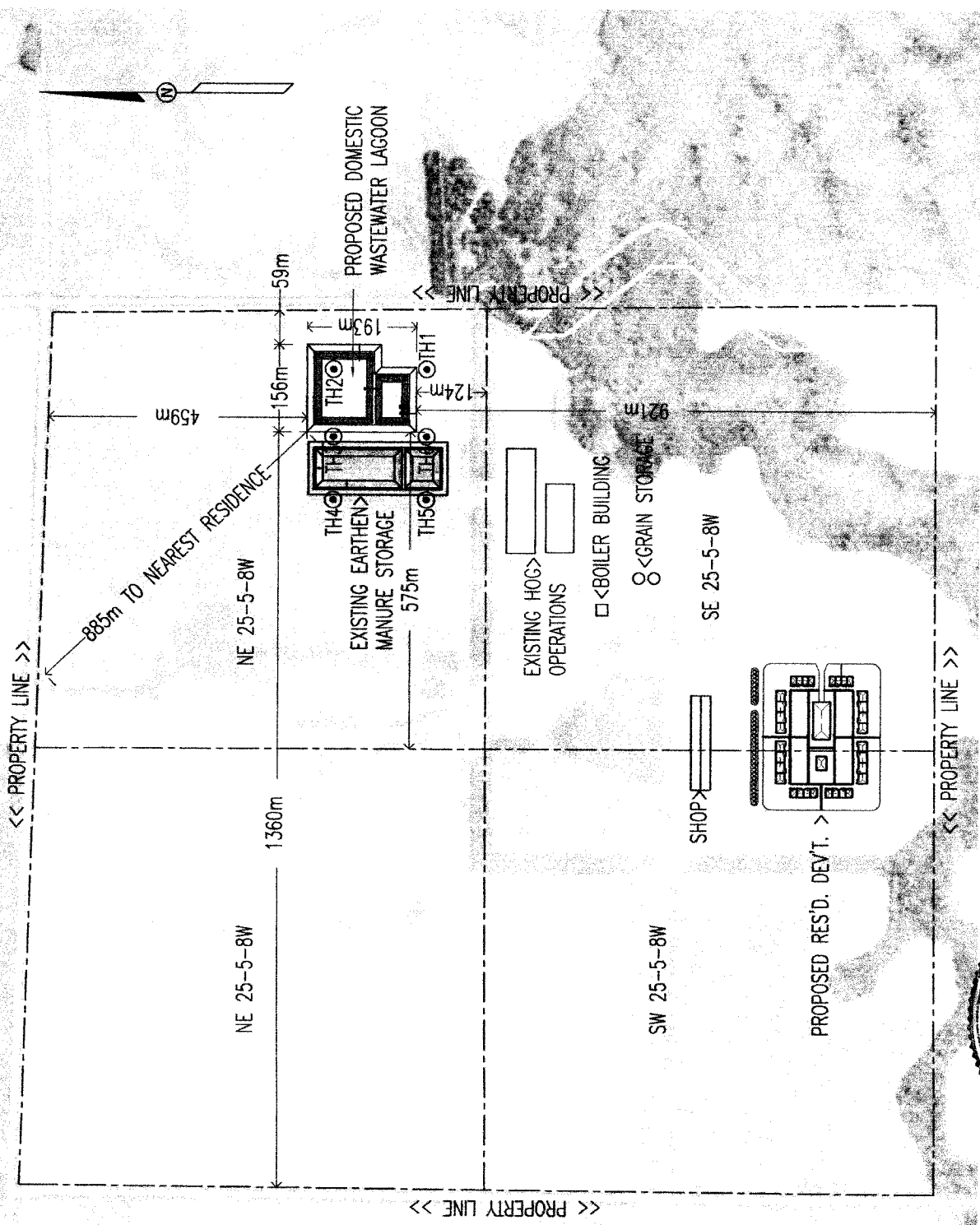
- THIS WASTE WATER LAGOON AND ASSOCIATED PRODUCTS SHALL CONFORM TO ASTM AND AWWA STD. SPECIFICATIONS. ALL CONSTRUCTION SHALL CONFORM TO SPECIFICATIONS.
- STRIP ALL ORGANIC MATERIAL AND TOPSOIL FROM STORAGE SITE TO OUTSIDE TOE OF BERM. REMOVE MATERIAL TO STOCK PILE FOR USE IN LANDSCAPING IN THE FUTURE.
- PROVIDE A .3 DEEP X 2.44 WIDE KEYWAY BENEATH BERMS PRIOR TO STARTING CONSTRUCTION OF BERMS. REMOVE ALL TOP SOIL AND ORGANIC MATERIAL BENEATH NEW BERM CONSTRUCTION.
- INTERIOR SURFACE OF FACILITY TO CONSIST OF A 60 mil HDPE LINER (TEXTURED SHEET) WITH .3 THICK GRANULAR COVER MATERIAL OVERTOP THE SYNTHETIC LINER.
- CONSTRUCT BERMS IN MAXIMUM 150mm LIFTS. COMPACT EACH LIFT USING A FULLY BALLASTED SHEEPSFOOT PACKER (2400kPa OF COMPACTION PRESSURE) TO ACHIEVE 95% OF STANDARD PROCTOR DENSITY. PRIOR APPROVAL REQUIRED FOR OTHER TYPES OF PACKING EQUIPMENT.
- UNACCEPTABLE MATERIAL CONSISTING OF ORGANIC MATERIAL, FROZEN SOIL OR STONES GREATER THAN 75mm SHALL NOT BE USED IN CONSTRUCTION OF THE BERMS. CONSULT ENGINEER IF QUALITY OF MATERIAL IS QUESTIONABLE.
- THE MOISTURE CONTENT OF THE FILL MATERIAL SHALL BE SUCH THAT PROPER PACKING CAN BE ACHIEVED (0.9-1.2 OPTIMUM). MATERIAL SHOULD BE STIFF TO THE TOUCH BUT NOT CRUMBLE WHEN HANDLED. ALLOW DRYING OR PROVIDE WETTING BETWEEN CONSECUTIVE LIFTS AS REQUIRED.
- THE FINISHED INTERIOR SURFACE OF STORAGE SHALL BE LEVELED AND PROOF ROLLED WITH A SMOOTH DRUM VIBRATORY ROLLER TO CONCEAL ALL STONES, GRAVEL AND POTENTIALLY SHARP OBJECTS.
- WHERE SHARP OBJECTS OR STONY MATERIAL IS STILL PRESENT ON INTERIOR SURFACE OF STRUCTURE, EITHER A 76mm LAYER OF CLEAN SAND OR 12oz. NON-WOVEN GEOTEXTILE SHALL BE INSTALLED OVER THE INTERIOR SURFACE LAYER TO PROTECT THE HDPE LINER FROM PUNCTURE OR ABRASION.
- ACCESS RAMPS AND SPLASH PADS TO BE CONSTRUCTED USING .15 REINFORCED CONCRETE, C/W 10M @ .40 O/C BOTH WAYS. ACCESS RAMPS TO HAVE .15 WIDE BY .3 HIGH RAISED CURB ALONG EDGES. PROVIDE 12 oz. NON-WOVEN GEO-TEXTILE SEPARATING CONCRETE FROM LINER WHERE POURED IN DIRECT CONTACT.
- ALL CONCRETE TO BE 25MPa TYPE 10 W/5-7% AIR ENTRAINMENT.
- CONCRETE PLACED IN COLD WEATHER (BELOW 0°C AIR TEMP. AND WINDCHILL) SHALL BE PROTECTED WITH INSULATED TARPS. BELOW -3°C CONCRETE IS TO BE HEATED TO MAINTAIN 10° CELSIUS FOR A MINIMUM OF TWO DAYS AFTER PLACEMENT. REMOVE INSULATION AND HEATING GRADUALLY TO AVOID THERMAL SHOCK.
- INSTALL FENCE AROUND ENTIRE PERIMETER OF WASTE WATER LAGOON AS PER DETAIL ATTACHED.
- SIGNAGE SHALL BE PROVIDED INDICATING THAT POTENTIAL FOR DANGER EXISTS.
- SIGNAGE SHALL BE POSTED IN ACCORDANCE TO ASAE S441 AND INCLUDE CONTACT NUMBERS IN CASE OF EMERGENCY.
- SEED BERMS WITH GRASS TO PREVENT LONG TERM EROSION.
- SYNTHETIC LINER MATERIAL SPECIFICATION: 60mil PREMIUM GRADE HDPE GEOMEMBRANE (TEXTURED SHEET) OR EQUIVALENT.
- SYNTHETIC LINER INSTALLATION TO BE IMPLEMENTED IN ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. INSTALLATION OF THE HDPE LINER SHALL BE CONTINUOUSLY SUPERVISED BY A QUALIFIED INSTALLATION SUPERVISOR. PROOF OF CERTIFICATION OR TRAINING REQUIRED UPON DEMAND.

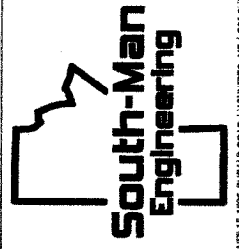


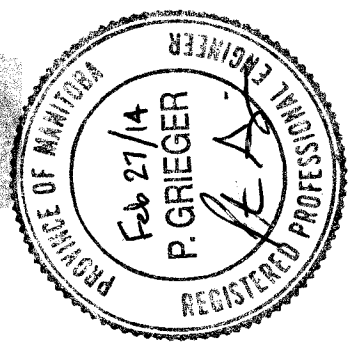
UNIT 15-155B DIGITAL ROAD | WINNIPEG, MB | R2J 0R5  
 PH: 204.668.8452 | FAX: 204.668.8204  
 sm@southmaneng.com

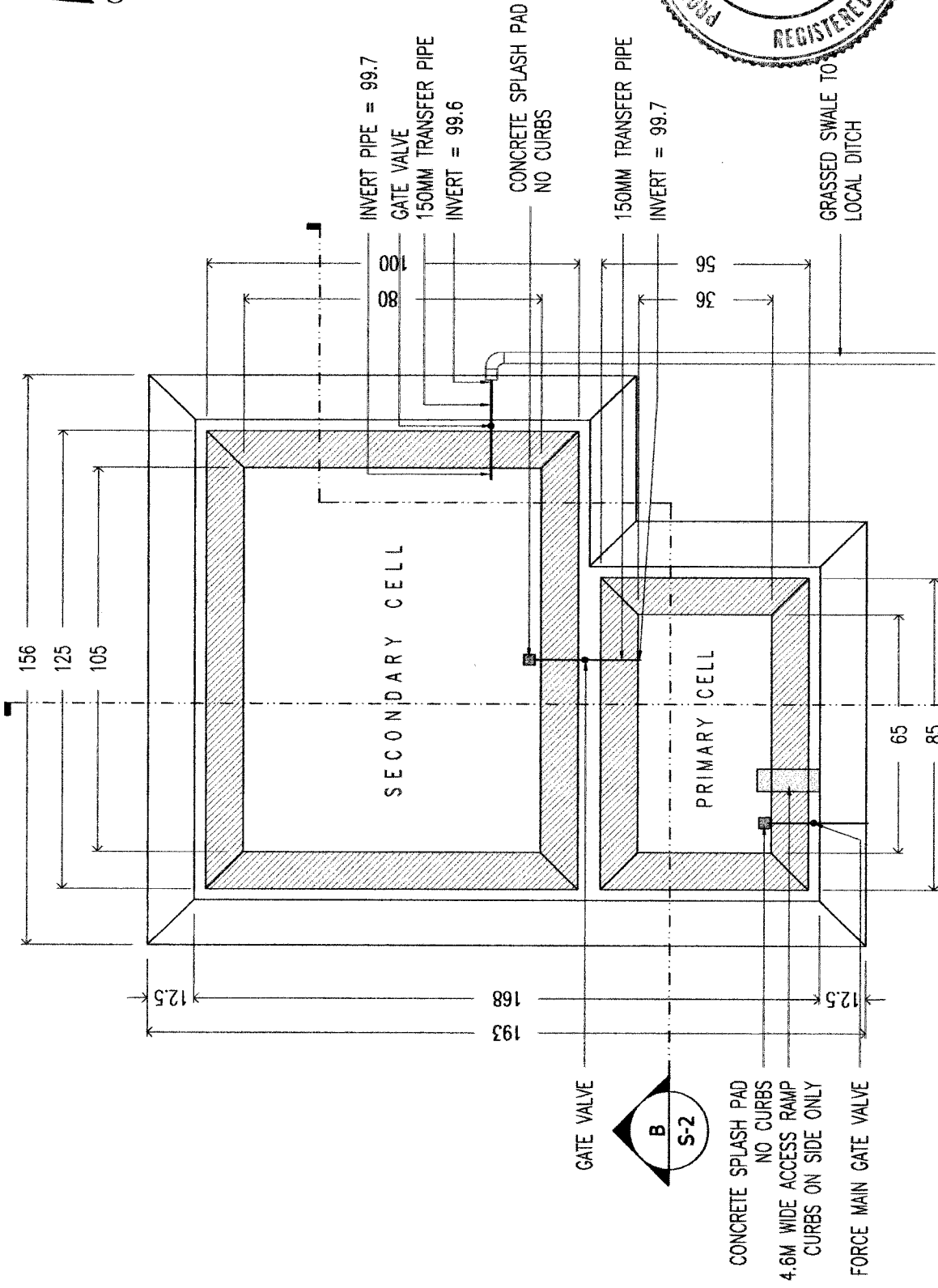
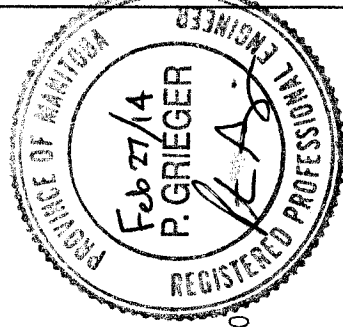
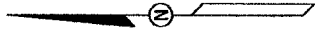


PROJECT NAME EAGLE CREEK COLONY 25-5-8W	BUILDING AREA N/A
SHEET TITLE GENERAL NOTES	DRAWN BY SOUTH-MAN ENGINEERING P. FERRER/R. FLORES
DATE DRAWN FEBRUARY 2014	DRAWING UNITS N/A
SHEET NUMBER <b>GN-1</b>	
THIS DRAWING IS THE PROPERTY OF SOUTH-MAN ENGINEERING, WINNIPEG, MANITOBA, CANADA.	



PROJECT NAME	EAGLE CREEK COLONY 25-5-8W	BUILDING AREA	N/A
SHEET TITLE	SITE PLAN	DRAWN BY	SOUTH-MAN ENGINEERING P. FERRER/R. FLORES
DATE DRAWN	FEBRUARY 2014	DRAWING UNITS	SCALED TO FIT
		SHEET NUMBER <b>SP</b>	
<small>UNIT 15-1576 DUNDAS ROAD   WINNIPEG, MB   R2J 0K3          PH: 204.668.9852   FAX: 204.668.9204          info@southmaneng.com</small>			
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INVERT PIPE = 99.7  
 GATE VALVE  
 150MM TRANSFER PIPE  
 INVERT = 99.6

CONCRETE SPLASH PAD  
 NO CURBS

150MM TRANSFER PIPE  
 INVERT = 99.7

GRASSSED SWALE TO  
 LOCAL DITCH

SECONDARY CELL

PRIMARY CELL

GATE VALVE

CONCRETE SPLASH PAD  
 NO CURBS  
 4.6M WIDE ACCESS RAMP  
 CURBS ON SIDE ONLY  
 FORCE MAIN GATE VALVE

PROJECT NAME EAGLE CREEK COLONY 25-5-8W	BUILDING AREA N/A
SHEET TITLE FLOOR PLAN	DRAWN BY SOUTH-MAN ENGINEERING P. FERRER/R. FLORES
DATE DRAWN FEBRUARY 2014	DRAWING UNITS METRIC
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 email@southmaneng.com

S-1

SHEET NUMBER

DRAWING UNITS

DATE DRAWN

PROJECT NAME

SHEET TITLE

BUILDING AREA

DRAWN BY

DRAWING UNITS

DATE DRAWN

PROJECT NAME

SHEET TITLE

BUILDING AREA

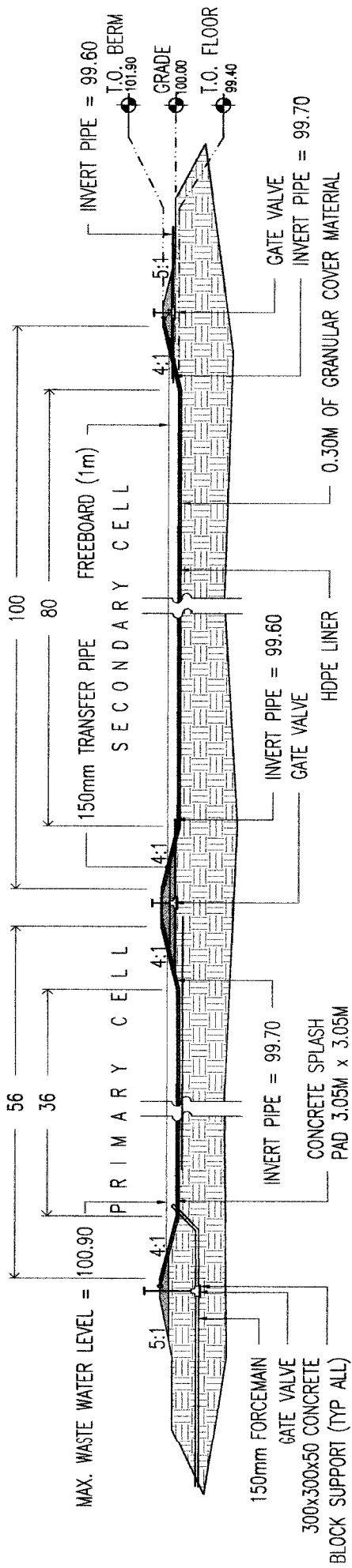
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DRAWING UNITS

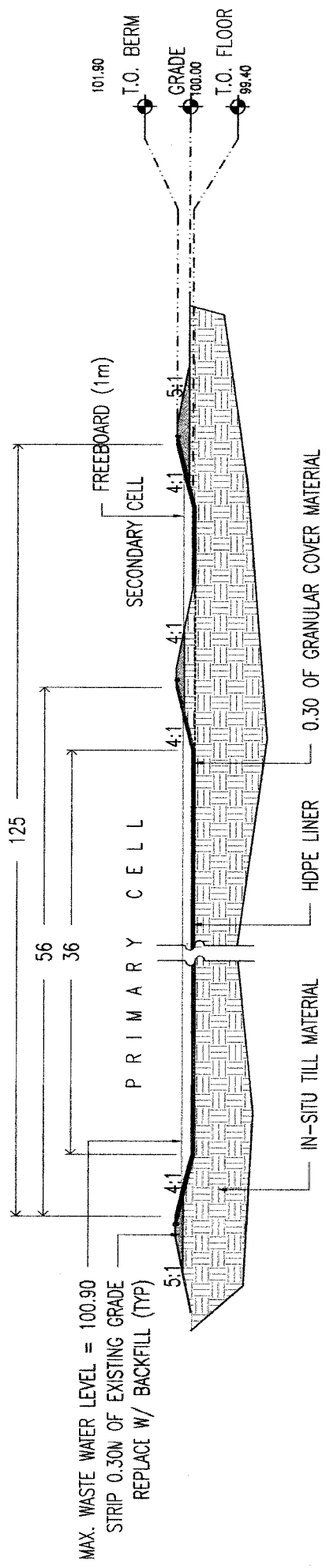
DATE DRAWN

PROJECT NAME

SHEET TITLE

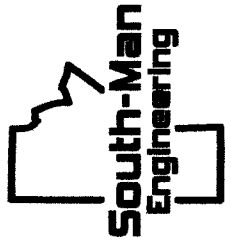


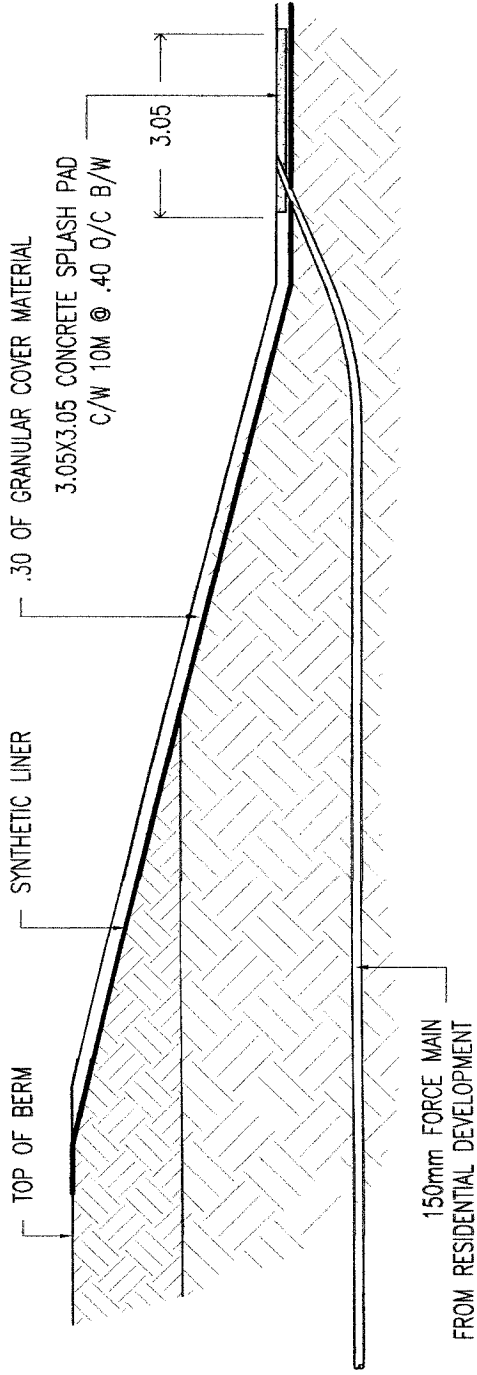
**CROSS-SECTION DETAIL**



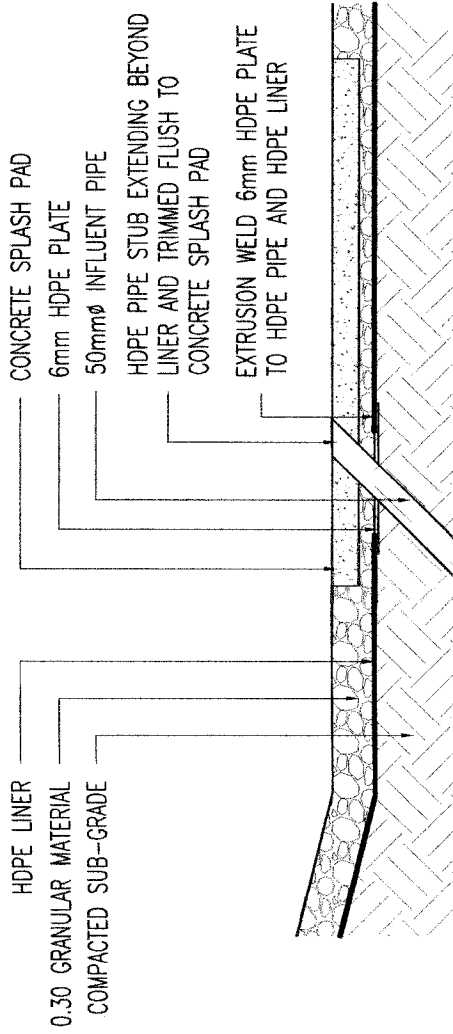
**CROSS-SECTION DETAIL**



PROJECT NAME	EAGLE CREEK COLONY 25-5-8W	BUILDING AREA	N/A
SHEET TITLE	CROSS-SECTION DETAIL	DRAWN BY	SOUTH-MAN ENGINEERING P. FERRER/R. FLORES
DATE DRAWN	FEBRUARY 2014	DRAWING UNITS	METRIC
		SHEET NUMBER	
<small>UNIT 15-1599 DUNDAS ROAD, WINNIPEG, MB   R2J 0P3 PH: 204.658.8552   FAX: 204.658.5004 sm@southmaneng.com</small>		S-2	
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**INLET PIPING DETAIL: SIDE VIEW**



**INLET PIPING DETAIL**

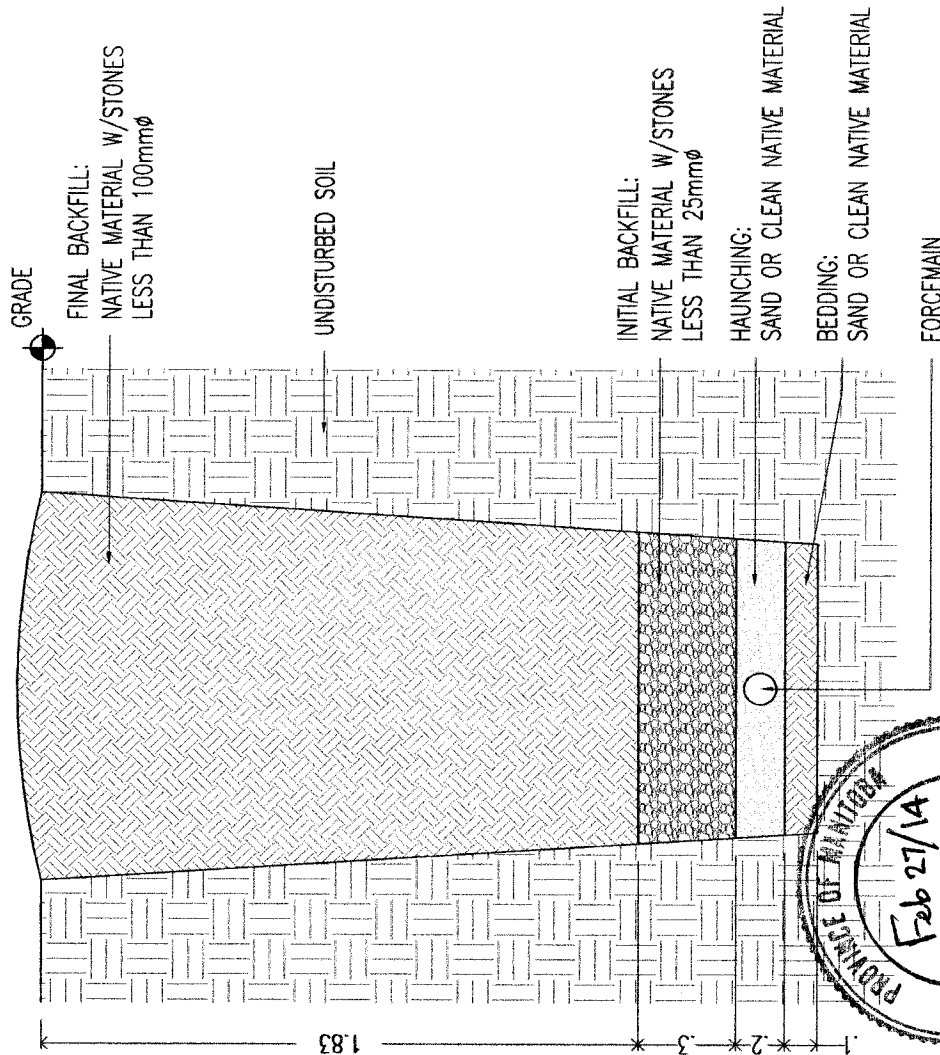


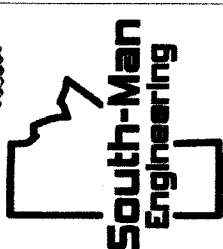
PROJECT NAME EAGLE CREEK COLONY 25-5-8W	BUILDING AREA N/A
SHEET TITLE INLET PIPING DETAILS	DRAWN BY SOUTH-MAN ENGINEERING P. FERRER/R. FLORES
DATE DRAWN FEBRUARY 2014	DRAWING UNITS METRIC
THIS DRAWING IS THE PROPERTY OF SOUTH-MAN ENGINEERING, WINNIPEG, MANITOBA, CANADA.	
SHEET NUMBER S-3	



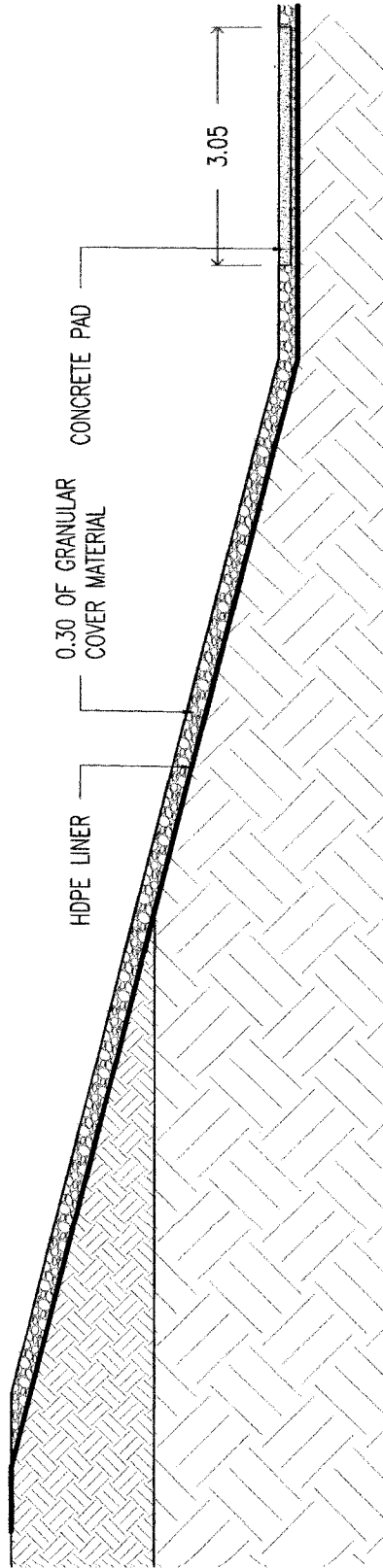
PIPING GENERAL NOTES:

1. ALL PIPELINE CONSTRUCTION AND PRODUCTS INCORPORATED INTO PROJECT SHALL CONFORM TO ASTM AND AWWA STANDARD SPECIFICATIONS.
2. INSTALLATION TO CONFORM WITH PIPE MANUFACTURER'S INSTALLATION INSTRUCTIONS.
3. FROZEN MATERIAL SHOULD NOT BE USED TO SUPPORT OR BED THE PIPE.
4. AT LEAST 1.2m OF BEDDING MATERIAL SHOULD BE PLACED UNDER THE PIPE IF ROCKY CONDITIONS EXIST. PROJECTING BELLS OF THE PIPE SHOULD BE PROPERLY RELIEVED IN THE TRENCH BOTTOM SO THAT THE ENTIRE PIPE IS EVENLY SUPPORTED BY THE BEDDING.
5. DO NOT THROW THE PIPE & FITTINGS INTO THE TRENCH, OR ALLOW ANY PART OF THE PIPE TO TAKE AN UNRESTRAINED FALL ON TO THE TRENCH BOTTOM.
6. PIPE MACHINING & CHAMFERING:  
CUT PIPE SHOULD BE CUT AS SQUARE AS POSSIBLE AND CHAMFERED SIMILAR TO THE PIPE SUPPLIED FROM THE FACTORY.
7. WHERE THE PIPE LINE EXPERIENCES CHANGES IN DIRECTION, THRUST BLOCKS CONSISTING OF CONCRETE ARE TO BE INSTALLED. MINIMUM THRUST BLOCK AREA IS 1.8msq. CONCRETE USED FOR THRUST BLOCKS ARE TO HAVE A MIN. 28 DAY COMPRESSIVE STRENGTH OF 15MPA. CONCRETE SHALL BE SULPHATE RESISTANT (TYPE GU/TYPER 10 CEMENT), AND FOLLOW THE CURRENT CSA STANDARD A23.1. WATER USED FOR CONCRETE SHALL BE CLEAN AND EQUAL TO POTABLE (DRINKABLE) WATER IN PHYSICAL AND CHEMICAL PROPERTIES.
8. PRESSURE PIPE & FITTINGS TO MEET THE FOLLOWING STANDARDS  
CANADIAN STANDARDS ASSOCIATION  
B137.2 RIGID PVC PIPE FOR PRESSURE APPLICATIONS  
B137.3 LARGE DIAMETER FABRICATED FITTINGS  
AMERICAN WATER WORKS ASSOCIATION  
AWWA C900 PVC PRESSURE PIPE, 1.2m THROUGH - 3.7m FOR WATER  
AWWA C907 PVC PRESSURE FITTINGS FOR WATER - 1.2m THROUGH 3.7m  
ASTM D2241 PVC PRESSURE RATED PIPE (SDR SERIES) OR DR17 HDPE PIPE  
PIPING: SCHEDULE 40 PVC GLUED CONNECTIONS, SDR26 SERIES 160 PVC OR DR17 HDPE
9. ALL UNDERGROUND PIPING IS TO BE PRESSURE TESTED TO ENSURE THE INTEGRITY OF THE PIPE AND CONNECTIONS. THE PRESSURE TEST SHALL BE CARRIED OUT AT 700 kPa PRESSURE WITH PRESSURE DROP OVER 1 HR PERIOD NOT TO EXCEED 1.5%.
10. CLEANOUTS TO BE PROVIDED ON PIPELINE AT MAXIMUM 300m (1000 ft) INTERVALS.

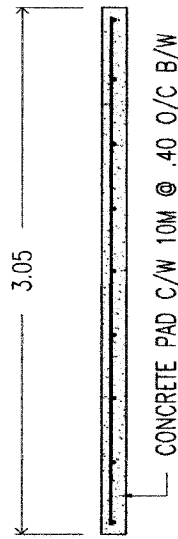


PROJECT NAME	EAGLE CREEK COLONY 25-5-8W	BUILDING AREA	N/A
SHEET TITLE	SPLASH PAD DETAIL	DRAWN BY	SOUTH-MAN ENGINEERING P. FERRER/R. FLORES
DATE DRAWN	FEBRUARY 2014	DRAWING UNITS	METRIC
		SHEET NUMBER <b>S-4</b>	
UNIT 18-1895 DUNDAS ROAD, WINNIPEG, MB   R2J 0K3 PH: 204.468.9652   FAX: 204.668.9204 email@southmaneng.com			
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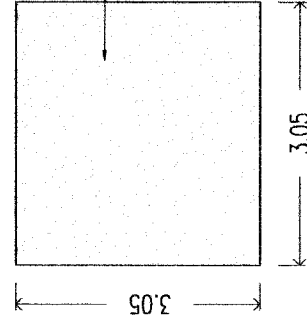




**SPLASH PAD: SIDE VIEW**



**SPLASH PAD: CROSS-SECTION DETAIL**



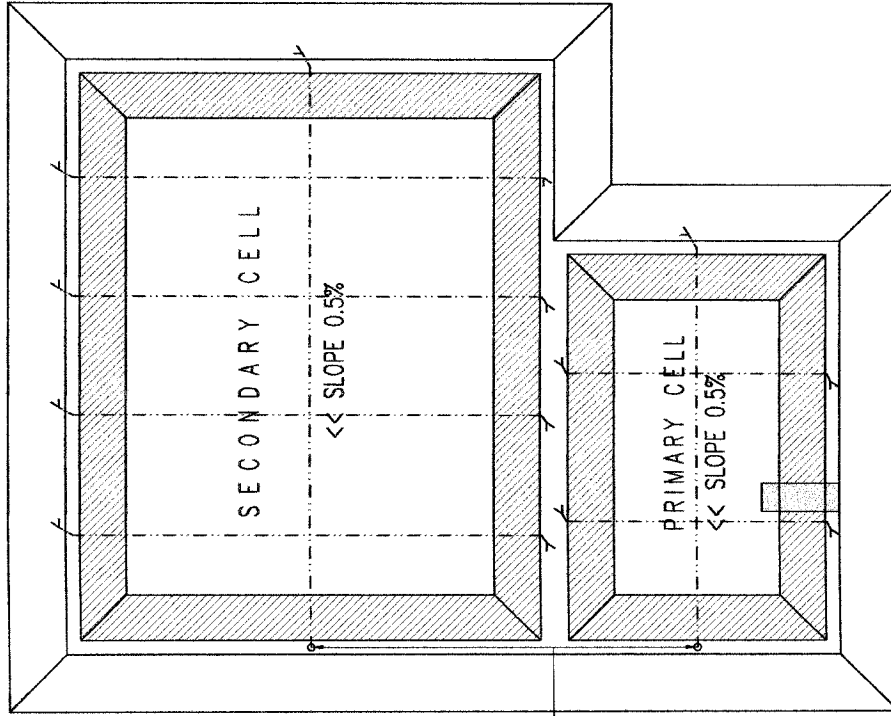
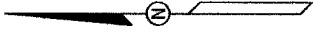
**SPLASH PAD: TOP VIEW**



<b>PROJECT NAME</b> EAGLE CREEK COLONY 25-5-8W	<b>BUILDING AREA</b> N/A
<b>SHEET TITLE</b> SPLASH PAD DETAILS	<b>DRAWN BY</b> SOUTH-MAN ENGINEERING P. FERRER/R. FLORES
<b>DATE DRAWN</b> FEBRUARY 2014	<b>DRAWING UNITS</b> METRIC
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DEWATERING SUMP



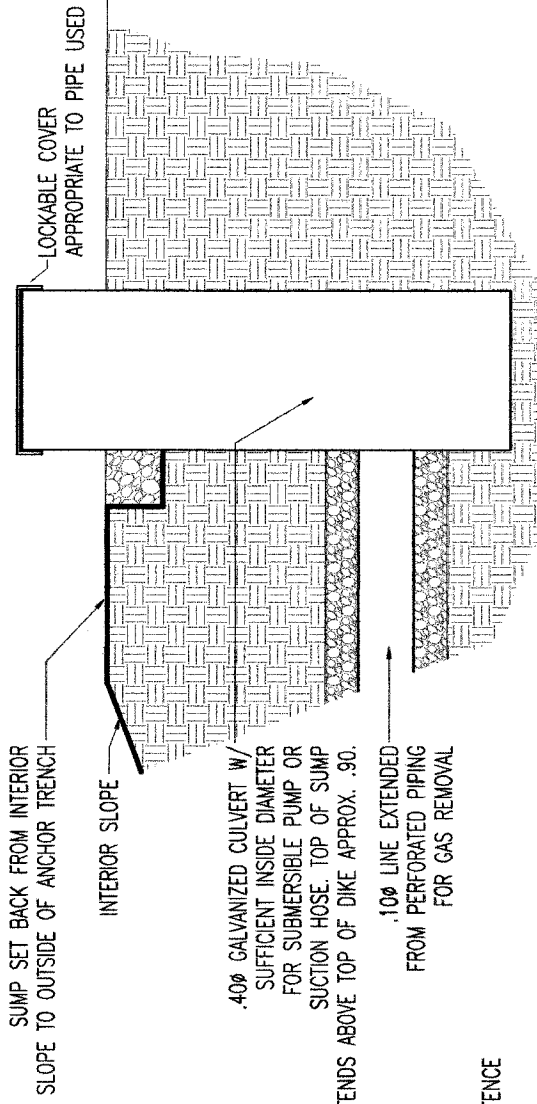
PROJECT NAME	EAGLE CREEK COLONY 25-5-8W
SHEET TITLE	GAS VENTING PLAN
DATE DRAWN	FEBRUARY 2014

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BUILDING AREA	N/A
DRAWN BY	SOUTH-MAN ENGINEERING P. FERRER/R. FLORES
DRAWING UNITS	METRIC
SHEET NUMBER	S-6

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**DEWATERING SUMP DETAIL**

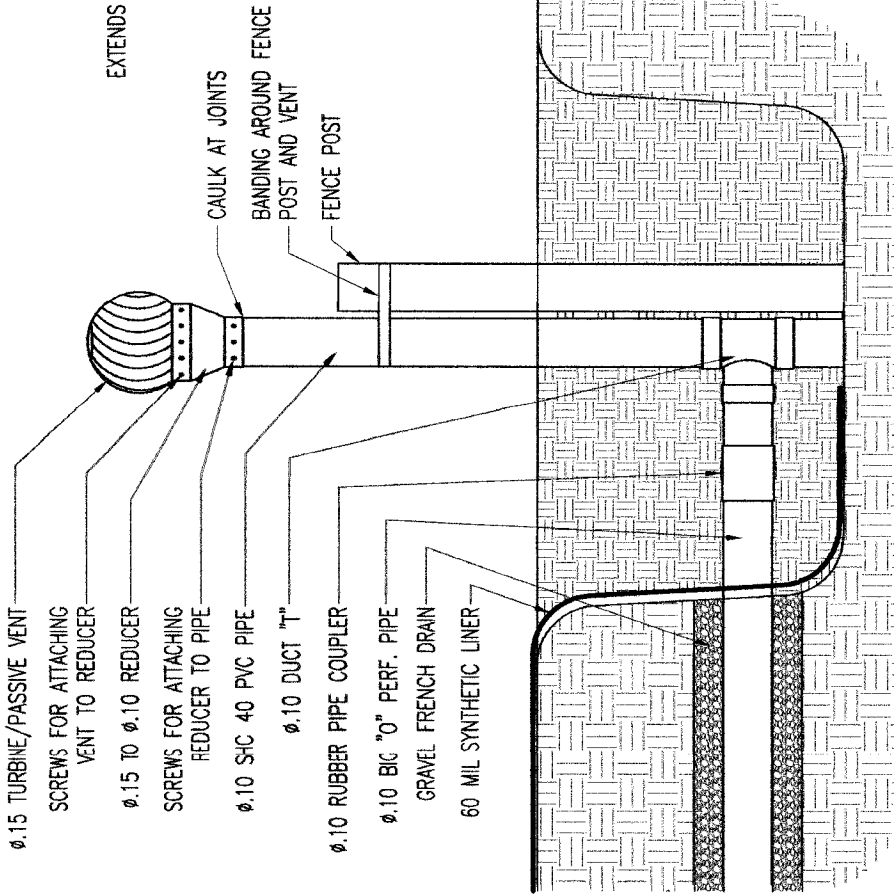
SUMP SET BACK FROM INTERIOR SLOPE TO OUTSIDE OF ANCHOR TRENCH

INTERIOR SLOPE

LOCKABLE COVER APPROPRIATE TO PIPE USED

4.0" GALVANIZED CULVERT W/ SUFFICIENT INSIDE DIAMETER FOR SUBMERSIBLE PUMP OR SUCTION HOSE. TOP OF SUMP EXTENDS ABOVE TOP OF DIKE APPROX. 90.

1.0" LINE EXTENDED FROM PERFORATED PIPING FOR GAS REMOVAL



**GAS VENTING DETAIL**

0.15 TURBINE/PASSIVE VENT

SCREWS FOR ATTACHING VENT TO REDUCER

0.15 TO 0.10 REDUCER

SCREWS FOR ATTACHING REDUCER TO PIPE

0.10 S1C 40 PVC PIPE

0.10 DUCT "1"

0.10 RUBBER PIPE COUPLER

0.10 BIG "O" PERF. PIPE

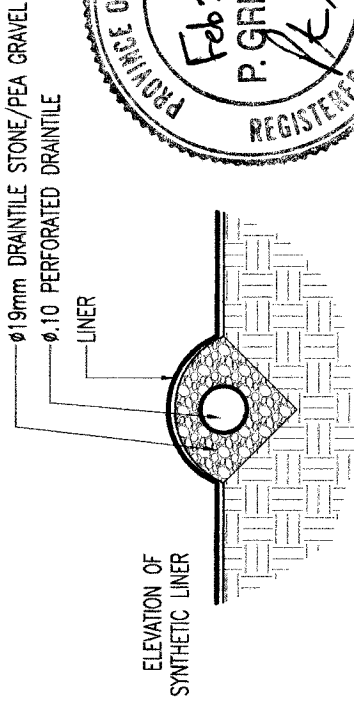
GRAVEL FRENCH DRAIN

60 MIL SYNTHETIC LINER

CAULK AT JOINTS

BANDING AROUND FENCE POST AND VENT

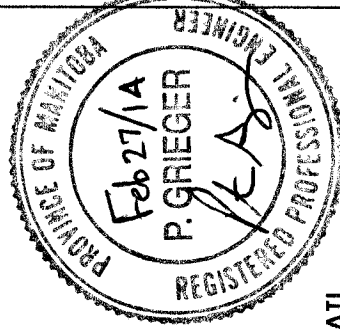
FENCE POST



**ELEVATION OF SYNTHETIC LINER**

19mm DRAINTILE STONE/PEA GRAVEL

0.10 PERFORATED DRAINTILE LINER



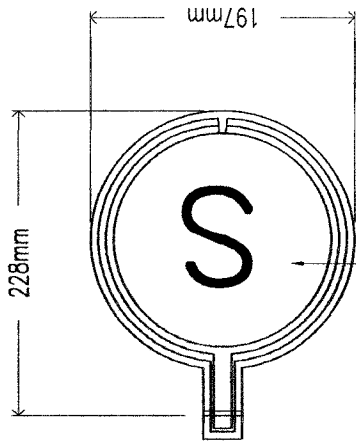
**GAS REMOVAL V-TRENCH DETAIL**

PROJECT NAME EAGLE CREEK COLONY 25-5-8W	BUILDING AREA N/A
SHEET TITLE GAS VENTING DETAIL	DRAWN BY SOUTH-MAN ENGINEERING P. FERRER/R. FLORES
DATE DRAWN FEBRUARY 2014	DRAWING SCALE METRIC
SHEET NUMBER S-7	

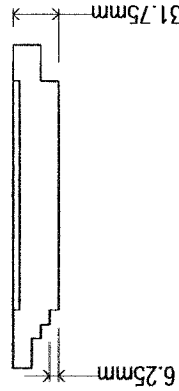
**South-Man Engineering**

UNIT 14-1895 DUGALD ROAD, WINNIPEG, MB, R2J 0H3  
PH: 204.668.9552 | FAX: 204.668.9204  
em@southmaneng.com

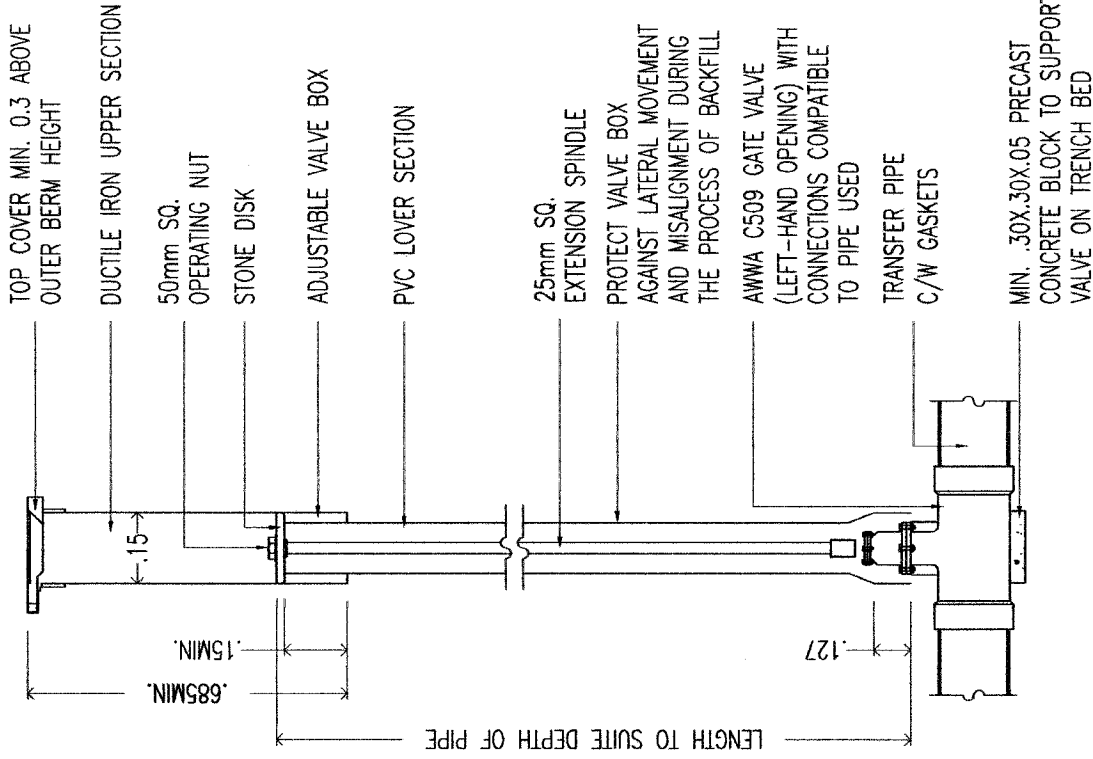
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DUCTILE IRON COVER  
"S" FOR SEWER

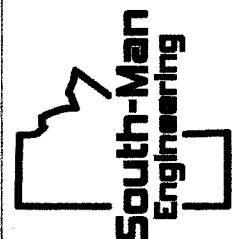


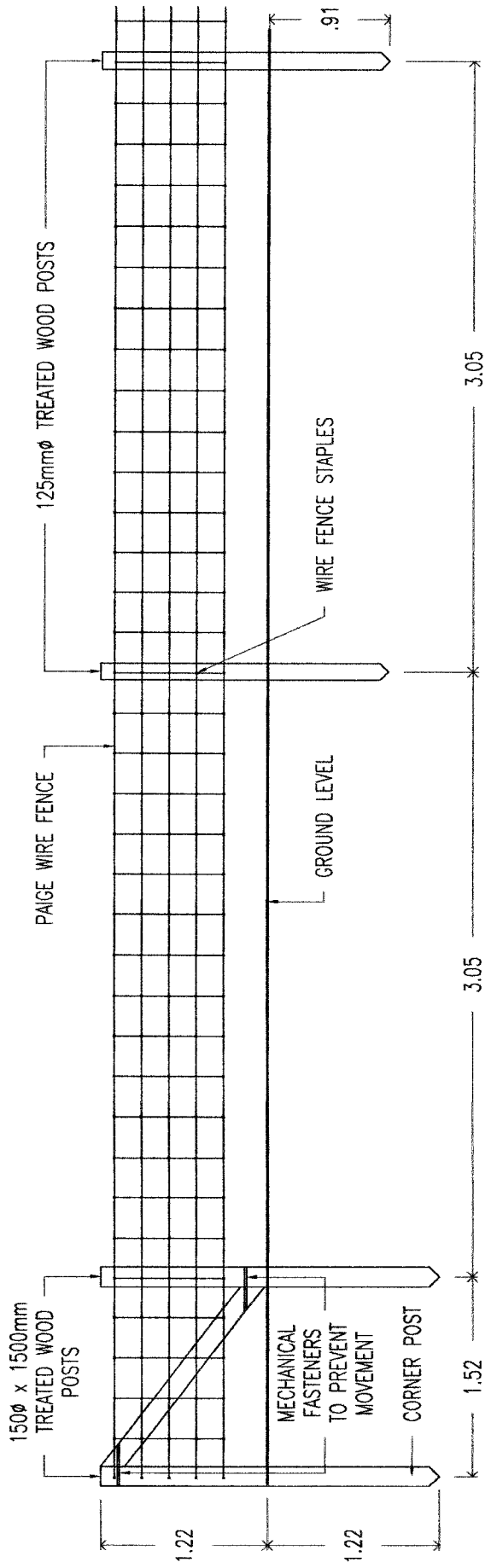
GATE VALVE COVER



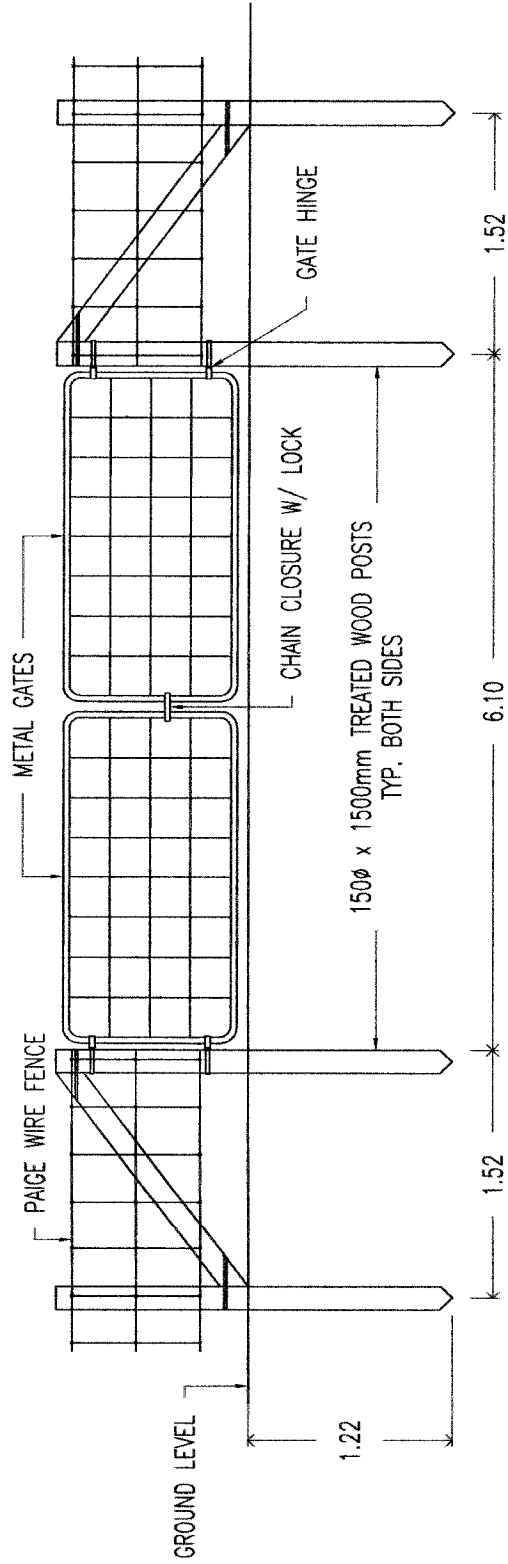
GATE VALVE INSTALLATION

EAGLE CREEK COLONY 25-5-8W	N/A
GATE VALVE DETAILS	SOUTH-MAN ENGINEERING P. FERRER/R. FLORES
FEBRUARY 2014	METRIC
<p>UNIT 16-1599 DUGALD ROAD   WINNIPEG, MB   R2Z 0P0          PH: 204-688-9652   FAX: 204-688-9264          WWW.SOUTHMANENGINEERING.COM</p>	
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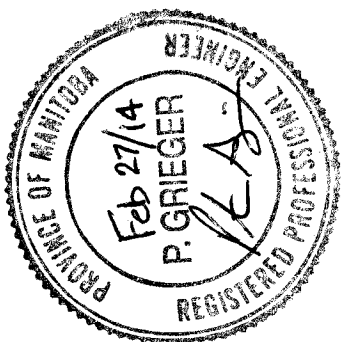




**FENCING CORNER DETAIL**



**GATE DETAIL**



**South-Man Engineering**

UNIT 18-1999 DUGLID ROAD | WINNIPEG, MB | R2Z 0P9  
 PH: 204-668-8652 | FAX: 204-668-9324  
 email@southmaneng.com

PROJECT NAME	EAGLE CREEK COLONY 25-5-8W	BUILDING AREA	N/A
SHEET TITLE	GATE & FENCE DETAIL	DRAWN BY	SOUTH-MAN ENGINEERING P. FERRER/R. FLORES
DATE DRAWN	FEBRUARY 2014	DRAWING SCALE	METRIC
THIS DRAWING IS THE PROPERTY OF SOUTH-MAN ENGINEERING, WINNIPEG, MANITOBA, CANADA.		SHEET NUMBER	S-9