

On behalf of Longfellow Energy, Pettigrew and Associates is requesting a variance to Section 19.15.34.12(A)(4) requiring secondary liner to be 30-mil LLDPE string reinforced. Longfellow Energy is requesting approval to use 40-mil HDPE liner.

The proposed 40-mil HDPE liner is an appropriate material to be use in the impoundment due to multiple factors. The proposed liner will be thicker than required and will provide a stronger, tougher and weather (UV) resistant option with a higher density. A thicker liner will also benefit the construction of the pond as it is less likely to be damaged during the installation process.

With the leakage through a geomembrane liner being directly a function of the height of liquid head above any hole or imperfection, upgrading from a 30-mil to a 40-mil thickness will decrease the probability of leakage during the pond's operational life.

It is in my professional opinion that the 40-mil HDPE liner as a secondary liner will provide equal or better protection of fresh water, public health and the environment. Attached with this request is a sample specification sheet for the previously mentioned 40-HDPE liner. Additionally, specifications for a 30-mil HDPE liner have been provided for comparison.

If you have any questions or require additional information regarding the secondary liner variance, please contact me.

Sincerely,

David Roybal, PE NM License # 23576



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Technical data sheet

HDPE 7000 Series, 40 mil Black, Smooth

PROPERTY	TEST METHOD	FREQUENCY(1)	UNIT Imperial	1102193
SPECIFICATIONS				
Thickness (Nominal ±10%) (11)	ASTM D5199	Every roll	mils	40
Resin Density Melt Index - 190/2.16 (max.)	ASTM D1505 ASTM D1238	Certified Certified	g/cc g/10 min	> 0.932 1.0
Sheet Density Carbon Black Content Carbon Black Dispersion OIT - standard (avg.)	ASTM D792 ASTM D4218 ASTM D5596 ASTM D3895	1/Batch Every 2 rolls Every 10 rolls Per formulation	g/cc % Category min	≥ 0.940 2.0 - 3.0 Cat. 1 & Cat. 2 100
Tensile Properties (min. avg) (2) Strength at Yield Elongation at Yield Strength at Break Elongation at Break	ASTM D6693	Every 5 rolls	ppi % ppi %	85.7 12 154.2 700
Tear Resistance (min. avg.) Puncture Resistance (min. avg.)	ASTM D1004 ASTM D4833	Every 10 rolls Every 10 rolls	lbf lbf	24 72
Dimensional Stability Stress Crack Resistance (SP-NCTL) Oven Aging - % retained after 90 days	ASTM D1204 ASTM D5397 ASTM D5721	Certified 1/Batch Per formulation	% hr	± 2 500
HP OIT (min. avg.) UV Res % retained after 1600 hr HP-OIT (min. avg.)	ASTM D5885 ASTM D7238 ASTM D5885	Per formulation	%	80 50
SUPPLY SPECIFICATIONS(Roll dime	nsions may vary ±1%)			
Roll Dimension - Width	-		ft	22.5
Roll Dimension - Length	-		ft 642	940
Area (Surface/Koll)	-		π-	21150

NOTES

1. Testing frequency based on standard roll dimensions and one batch is approximately 180,000 lbs (or one railcar).

Machine Direction (MD) and Cross Machine Direction (XMD or TD) average values should be on the basis of 5 specimens each direction.
 The minimum average thickness is ± 10% of the nominal value.

* All values are nominal test results, except when specified as minimum or maximum.

* The information contained herein is provided for reference purposes only and is not intended as a warranty of guarantee. Final determination of suitability for use contemplated is the sole responsibility of the user. SOLMAX assumes no liability in connection with the use of this information.

Solmax is not a design professional and has not performed any design services to determine if Solmax's goods comply with any project plans or specifications, or with the application or use of Solmax's goods to any particular system, project, purpose, installation or specification.



Technical Data Sheet

HDPE 7000 Series, 30 mil Black, Smooth

PROPERTY	TEST METHOD	FREQUENCY(1)	UNIT Imperial	1102187
SPECIFICATIONS				
Thickness (Nominal ±10%) (11)	ASTM D5199	Every roll	mils	30
Resin Density Melt Index - 190/2.16 (max.)	ASTM D1505 ASTM D1238	Certified Certified	g/cc g/10 min	> 0.932 1.0
Sheet Density Carbon Black Content Carbon Black Dispersion OIT - standard (avg.)	ASTM D792 ASTM D4218 ASTM D5596 ASTM D3895	1/Batch Every 2 rolls Every 10 rolls Per formulation	g/cc % Category min	≥ 0.940 2.0 - 3.0 Cat. 1 & Cat. 2 100
Tensile Properties (min. avg) (2) Strength at Yield Elongation at Yield Strength at Break Elongation at Break	ASTM D6693	Every 5 rolls	ppi % ppi %	63 12 114 700
Tear Resistance (min. avg.) Puncture Resistance (min. avg.)	ASTM D1004 ASTM D4833	Every 10 rolls Every 10 rolls	lbf Ibf	18 54
Dimensional Stability Stress Crack Resistance (SP-NCTL) Oven Aging - % retained after 90 days	ASTM D1204 ASTM D5397 ASTM D5721	Certified 1/Batch Per formulation	% hr	± 2 500
UV Res % retained after 1600 hr HP-OIT (min. avg.)	ASTM D5885 ASTM D7238 ASTM D5885	Per formulation	%	50
SUPPLY SPECIFICATIONS(Roll dime	ensions may vary ±1%)			
Roll Dimension - Width	-		ft	22.5
Roll Dimension - Length	-		ft	1240
Area (Surface/Roll)	-		ft²	27900

NOTES

1. Testing frequency based on standard roll dimensions and one batch is approximately 180,000 lbs (or one railcar).

2. Machine Direction (MD) and Cross Machine Direction (XMD or TD) average values should be on the basis of 5 specimens each direction. 11. The minimum average thickness is \pm 10% of the nominal value.

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GENERAL NOTES

1. THE PROPOSED DESIGN IS BASED ON TOPOGRAPHIC AND BOUNDARY INFORMATION OBTAINED FROM PETTIGREW &

2. ALL CONSTRUCTION SHALL BE PERFORMED IN ACCORDANCE WITH THE PROJECT CONSTRUCTION PLANS OF THE REGISTRATION/PERMIT. NEW MEXICO STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION LATEST EDITION SHALL APPLY TO THIS PROJECT.

ALL DATA SHOWN HEREIN CONCERNING EXISTING PRIVATE AND/OR PUBLIC OWNED UTILITIES HAVE BEEN OBTAINED FROM THE OWNERS AND/OR FIELD OBSERVATIONS. THESE MAY OR MAY NOT BE ACCURATE. THE CONTRACTOR IS CAUTIONED THAT HE IS RESPONSIBLE FOR THE EXACT LOCATION AND PROTECTION OF ALL LINES DURING CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING, IN ADVANCE OF HIS/HER CONSTRUCTION OPERATIONS, IF OVERHEAD UTILITY LINES, SUPPORT STRUCTURES, POLES, GUYS, ETC. ARE AN OBSTRUCTION TO CONSTRUCTION OPERATIONS, IF ANY OBSTRUCTION IS EVIDENT, THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING WITH THE APPROPRIATE UTILITY OWNER TO REMOVE OR SUPPORT THE UTILITY OBSTRUCTION. ANY COST ASSOCIATED WITH THIS EFFORT IS INCIDENTAL TO THE PROJECT.

4. IT WILL BE THE CONTRACTOR'S RESPONSIBILITY TO SECURE AND SUPPLY WATER FOR THE PROJECT.

THE PERIMETER OF THE SITE SHALL BE ENCLOSED WITH CHAINLINK FENCE AS PRESCRIBED BY DESIGN/CONSTRUCTION PLAN IN REGISTRATION/PERMIT APPLICATION.

STRIP AND STOCKPILE TOP SOIL FOR FUTURE CLOSURE USE. NEW MEXICO ADMINISTRATIVE CODE 19.15.34 AND (DESIGN AND CONSTRUCTION SPECIFICATIONS FOR A RECYCLING CONTAINMENT IN REGISTRATION/PERMIT) SHALL APPLY TO THIS

THE RECYCLING CONTAINMENT SHALL HAVE A PROPERLY CONSTRUCTED FOUNDATION AND INTERIOR SLOPES CONSISTING OF A FIRM, UNYIELDING BASE, SMOOTH AND FREE OF ROCKS, DEBRIS, SHARP EDGES OR IRREGULARITIES TO PREVENT THE LINER'S RUPTURE OR TEAR. GEOTEXTILE IS REQUIRED UNDER AND OVER THE LINER WHEN NEEDED TO REDUCE LOCALIZED STRESS-STRAIN OR PROTUBERANCES THAT OTHERWISE MAY COMPROMISE THE LINER'S INTEGRITY. AS DESCRIBED IN THE DESIGN/CONSTRUCTION PLANS OF THE REGISTRATION/PERMIT. ALL PRIMARY (UPPER) LINERS IN A RECYCLING CONTAINMENT SHALL BE GEOMEMBRANE LINERS COMPOSED OF AN IMPERVIOUS, SYNTHETIC MATERIAL THAT IS RESISTANT TO ULTRAVIOLET LIGHT, PETROLEUM HYDROCARBONS, SALTS AND ACIDIC AND ALKALINE SOLUTIONS. ALL PRIMARY LINERS SHALL BE 60-MIL HDPE LINERS. SECONDARY LINERS SHALL BE 40-MIL HDPE STRING REINFORCED OR EQUIVALENT WITH A HYDRAULIC CONDUCTIVITY NO GREATER THAN 1 X 10-9 CM/SEC. LINER COMPATIBILITY SHALL MEET OR EXCEED THE EPA SW-846 METHOD 9090A OR SUBSEQUENT RELEVANT PUBLICATIONS. 10. LINER SEAMS SHALL BE MINIMIZED AND ORIENTED UP AND DOWN, NOT ACROSS THE SLOPE.

11. EXPANSION WRINKLE SHALL BE INSTALLED IF NECESSARY INSIDE POND FOR THERMAL EXPANSION / CONTRACTION.

UNLESS DIFFERENTLY STATED IN THE CONSTRUCTION PLAN OF THE REGISTRATION PERMIT, THE OPERATOR SHALL ENSURE FIELD SEAMS IN GEOSYNTHETIC MATERIAL ARE THERMALLY SEAMED. PRIOR TO FIELD SEAMING, THE OPERATOR SHALL OVERLAP LINERS FOUR TO SIX INCHES. THE OPERATOR SHALL MINIMIZE THE NUMBER OF FIELD SEAMS AND CORNERS AND IRREGULARLY SHAPED AREAS. THERE SHALL BE NO HORIZONTAL SEAMS WITHIN FIVE FEET OF THE SLOPE'S TOE. QUALIFIED PERSONNEL SHALL PERFORM FIELD WELDING AND TESTING.

13. AT A POINT OF DISCHARGE INTO OR SUCTION FROM THE RECYCLING CONTAINMENT, THE OPERATOR SHALL INSURE THAT THE LINER IS PROTECTED FROM EXCESSIVE HYDROSTATIC FORCE OR MECHANICAL DAMAGE. EXTERNAL DISCHARGE OR SUCTION LINES SHALL NOT PENETRATE THE LINER.

14. THE OPERATOR SHALL POST AN UPRIGHT SIGN NO LESS THAN 12 INCHES BY 24 INCHES WITH LETTERING NOT LESS THAN TWO INCHES IN HEIGHT IN A CONSPICUOUS PLACE ON THE FENCE SURROUNDING THE CONTAINMENT. THE OPERATOR SHALL POST THE SIGN IN A MANNER AND LOCATION SUCH THAT A PERSON CAN EASILY READ THE LEGEND. THE SIGN SHALL PROVIDE THE FOLLOWING INFORMATION: THE OPERATOR'S NAME, THE LOCATION OF THE SITE BY QUARTER-QUARTER OR UNIT LETTER, SECTION, TOWNSHIP AND RANGE, AND EMERGENCY TELEPHONE NUMBERS.

15. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO CONTACT NEW MEXICO 811 (FORMERLY NEW MEXICO ONE CALL) A MINIMUM OF 48 HOURS BEFORE EXCAVATION. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL EXCAVATE AND VERIFY THE HORIZONTAL AND VERTICAL LOCATIONS OF ALL DESIGNATED UNDERGROUND UTILITIES. SHOULD A CONFLICT EXIST, THE CONTRACTOR SHALL NOTIFY THE ENGINEER SO THAT THE CONFLICT CAN BE RESOLVED WITH A MINIMUM AMOUNT OF DELAY.

16. DURING CONSTRUCTION OF THE CONTAINMENT, THE CONTRACTOR WILL REPORT AND RESPOND TO ANY SPILLS OF HAZARDOUS MATERIALS SUCH AS GASOLINE, DIESEL, MOTOR OILS, SOLVENTS, CHEMICALS. TOXIC OR CORROSIVE SUBSTANCES, ETC. A SPILL IS DEFINED AS ANY RELEASE OF A CORROSIVE, HAZARDOUS, TOXIC OR RADIOACTIVE SUBSTANCE THAT MAY BE A THREAT TO PUBLIC HEALTH OR THE ENVIRONMENT. REPORTS OF SPILLS WILL BE MADE IMMEDIATELY TO BOTH THE NEW MEXICO ENVIRONMENT DEPARTMENT EMERGENCY RESPONSE TEAM (505-827-9329 OR 866-428-6535). THE CONTRACTOR WILL BE RESPONSIBLE FOR REPORTING AND CLEANUP OF ANY SPILL ASSOCIATED WITH PROJECT CONSTRUCTION. THE CONTRACTOR WILL BE RESPONSIBLE FOR REPORTING ANY DISCOVERIES OF PAST SPILLS OR CURRENT SPILLS NOT ASSOCIATED WITH CONSTRUCTION.

17. CONTRACTOR MUST OBTAIN CLIENT PERMISSION BEFORE SALVAGING ANY ITEMS SPECIFIED FOR REMOVAL AND DISPOSAL AFTER COMPLETION OF CONSTRUCTION OF THE CONTAINMENT.

18. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING DISPOSAL SITES THAT ARE ENVIRONMENTALLY SUITABLE FOR DISPOSAL OF ITEMS NOT SPECIFIED TO BE SALVAGED. THE CONTRACTOR IS EXPECTED TO ABIDE BY ALL FEDERAL. STAT AND LOCAL LAWS AND REGULATIONS IN OBTAINING THE NECESSARY PERMITS FROM ALL APPLICABLE AGENCIES AND/OR PRIVATE PROPERTY OWNERS. ALL COSTS ASSOCIATED WITH OBTAINING THESE PERMITS SHALL BE INCIDENTAL TO THE COMPLETION OF THE PROJECT AND NO DIRECT MEASUREMENT OR PAYMENT SHALL BE MADE THEREFORE. THE CONTRACTOR SHALL PROVIDE THE ENGINEER WITH COPIES OF ALL PERTINENT INFORMATION, AGREEMENTS, AND PERMITS RELATED TO DISPOSAL SITES UTILIZED. BORROW MATERIAL, ROCK WASTE, AND VEGETATIVE DEBRIS SHALL NOT BE PLACED IN WETLANDS, ARROYOS, OR AREAS THAT MAY IMPACT THREATENED OR ENDANGERED SPECIES. ARCHEOLOGICAL AND ENVIRONMENTAL CLEARANCES MUST BE OBTAINED BEFORE DISPOSAL.

19. ALL MATERIALS SHALL BE APPROVED BY LONGFELLOW ENERGY CONSTRUCTION REPRESENTATIVES PRIOR TO PURCHASING AND SHALL BE DISCLOSED IN BID.

20. LINER INSTALLATION SHALL BE PERFORMED PER INDUSTRY BEST PRACTICES, STANDARDS AND APPLICABLE STATE 21. IT IS THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE WITH UTILITY COMPANY FOR POWER POLE REMOVAL.

KEYED NOTES

- T POND SUMP PER DETAIL 1, SHEET CS-501
- (2) LEAK DETECTION SYSTEM PER DETAILS 1, 2 AND 3, SHEET CS-501
- (3) 3' FREEBOARD DEPTH (ELEV. 3647.10')
- 4 ANCHOR TRENCH PER DETAIL 5, SHEET CS-501
- $\langle 5 \rangle$ CONTAINMENT FENCE WITH NETTING (BY OTHERS)
- (6) PERMANENT 6' CHAINLINK FENCE PER DETAIL 6, SHEET CS-501
- (7)
 EXISTING POWER POLE TO BE REMOVED



PETTIGREW & ASSOCIATES PA ENGINEERING SURVEYING TESTING DEFINING QUALITY SINCE 1965 100 E. Navajo Drive Suite 100 Hobbs New Mexico 88240 T 575 393 9827 F 575 393 1543 Pettigrew.us			
DAVID A. ROV DAVID A. ROV 23576 BATTOS JONAL ENGINE SOMAL ENGINE DOMAL ENGINE DOMAL ENGINE DOMAL ENGINE			
PROJECT ENGINEER: David Roybal, PE PROJECT DESIGNER: Juan C. Dominguez, El DRAWN BY: Juan C. Dominguez, El			
LEGEND FINISH GRADE 1.0' CONTOUR FINISH GRADE 5.0' CONTOUR EXIST. GRADE 1.0' CONTOUR EXIST. GRADE 5.0' CONTOUR GRADING LIMITS FLOWLINE CONTAINMENT FENCE PERMANENT CHAINLINK FENCE FREEBOARD ELEVATION ANCHOR TRENCH			
REVISIONS			
No. DATE DESCRIPTION A 1/29/2021 EMNRD COMMENTS - 1/26/2021 I IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII			
GENERAL SITE LAYOUT AND GENERAL NOTES			
IMPOUND 24 RECYCLING CONTAINMENT			
LONGFELLOW ENERGY			
PROJECT NUMBER:			
2020.1212			
SHEET:			
CS-101			





