

# INSTALLATION

MWS – Linear

Hybrid Stormwater Filtration System



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## INSTALLATION

A. Each unit shall be constructed at the locations and elevations according to the details shown on the approved drawings. Any modifications to the elevation or location shall be at the direction of an approved by the Engineer.

B. If the MWS – Linear System is stored before installation, the grate inlet and wetland chamber and its internal components must be covered to prevent any contamination from the site.

C. The grate type unit to be placed such that elevation of the unit and the top of its catch basin grate are equal to or less than the elevation of the bottom of gutter, channel, or flume. The curb type unit to be places such that the elevation of the bottom of the units curb opening is equal to or slightly less that the elevation of the bottom of the gutter, channel, or flume; which is also equal to flow line. This will ensure proper drainage into the MWS – Linear.

D. Compact undisturbed sub-grade materials to 95% of maximum density at +1- 2% of optimum moisture. Unsuitable material below sub-grade shall be replaced to the site engineer's approval.

E. The MWS – Linear unit is constructed according to the sizes shown on the drawings and as specified herein. Install at elevations and locations shown on drawings or as otherwise directed by engineer. Place the pre-cast base unit on a granular sub-base of minimum thickness of six inches (152mm) after compaction or of greater thickness and compaction if specified elsewhere. The granular sub-base shall be checked for level at all four corners after it is set. If the slope from any corner to any other corner exceeds 0.5%, the base section shall be removed and the granular subbase material re-leveled.

D. Outlet connections shall be aligned and sealed to meet the approved drawings with modifications necessary to meet site conditions and local regulations.

E. The top lid should be sealed onto the box section before backfilling, using a nonshrink grout, butyl rubber or similar waterproof seal. Backfilling should be performed in a careful manner, bringing the appropriate fill material up in 6" lifts on all sides. Precast sections shall be set in a manner that will result in a watertight joint. In all instances, installation of The MWS – Linear shall conform to ASTM specification C891 "Standard Practice for Installation of Underground Precast Utility Structures", unless directed otherwise in contract documents.

G. The area around the system is to be backfilled with gravel, sand, or native backfill if deemed appropriate.

H. Carefully fill wetland container with recommended media mix (1/8 to 1/4 - inch diameter). Note: it is important that only manufacture supplied media is utilized. The media cannot contain fines and must be thoroughly washed before being put inside the wetland container. The recommended media commonly has high fractions of "fines" which may cause clogging of the wetland portion of the treatment system. Approximately 8.5 cubic yards of recommended media is needed for each unit. For weight of recommended media see Weights and Lifting Details page at the end of this section.

I. Plant wetland plants (provided from nursery as "plugs", approximate size of 6 inches in height). Note: plants do not apply to underground vault type installations. Wetland plant species may vary by region and local sunlight/shade and salt/fresh conditions as advised by nursery. Consult with local nursery for recommendations for other species. For plant and propagation details see plant section of MWS – Linear Design Kit

J. Each MWS – Linear (except underground type) unit must receive adequate irrigation to ensure survival of the plants and vegetation during periods of drier weather. This may be achieved through gutter flow and/or ordinary landscape watering techniques.

K. Each MWS- Over excavation of the side walls, 2 ft., is required to access the lifting hooks.

## Installation Notes:

1. The MWS - Linear shall be installed pursuant to the manufacturer's recommendations and the details on this sheet.
2. Attachments to inlet walls shall be made of non-corrosive hardware.
3. Filtration basket fine screen and coarse containment screen shall be manufactured of stainless steel.
4. Any holes made in the concrete sections for handling or other purposes shall be plugged with a non-shrink grout or by using grout in combination with concrete plugs.
5. Where holes must be cut in the pre-cast sections to accommodate pipes, do all cutting before setting the sections in place to prevent any subsequent jarring, which may loosen the mortar joints. The contractor shall make all pipe connections.
6. Modular Wetland Systems, Inc. and its distributors provide installation assistance and supervision, at charge, upon request. For first-time clients this is recommended.
7. Cost does not include installation of the MWS vault.
8. Contractor to off load vault(s) at delivery, along with providing all necessary equipment for offloading. These items not include but are not limited to: lifting knuckles that fit the MWS. Providing crane for off loading MWS vaults.
9. Contractor to provide access roads that are designed to handle size and loads of delivery trucks. Contractor to verify truck size.
10. Contractor is responsible to place stone into MWS after units have been installed. Contractor to take necessary steps to cover MWS after stone has been placed in units as not to contaminate stone.
11. All stone is delivered at the same time in bulk. Contractor is responsible to provide a suitable place to off load stone. Contractor will take all necessary steps to cover and protect stone from contamination prior to being placed into MWS vaults.
12. Contractor has one hour per MW vault to offload from delivery truck. Contractor will be charged standby time of \$100.00 per hour after one hour billed in 15 minute increments.
13. Contractor is allotted one hour for total off load of stone. Contractor will be charged standby time of \$100.00 per hour after one hour and billed in 15 minute increments.

14. Contractor is responsible to complete all curb and gutter work around the MWS vaults once the vaults have been set in place. Curb and Gutter to be as per local building codes.
15. The Curb type unit to be place such that the elevation is equal to the height of the finish curbs to be installed after the MWS vault has been installed.
16. The Grate type unit will be required to have a curbing build around three sides. 1/2" diameter x 4" deep holes will need to be drill into the top of the MWS to receive 3/8" rebar. Rebar will be epoxy into the 3/8" holes. Spacing for the holes shall be 6" on center and 3" in from the edges of the MWS, spaced evenly around the perimeter. Height of the curbing should match the height of the outside curbing.

### **Activation**

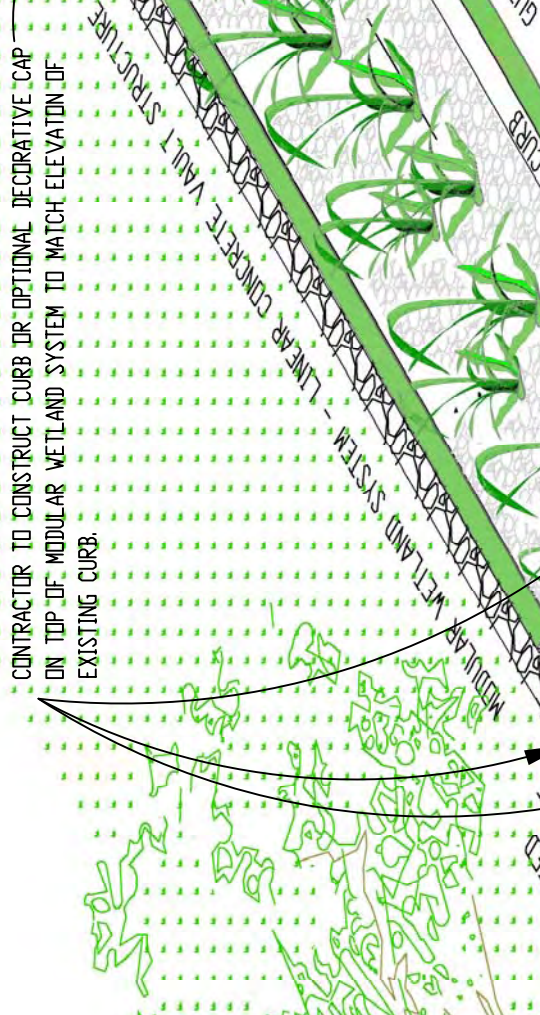
Activation of the MWS - Linear unit is performed ONLY after the project site is fully stabilized. Purchaser is responsible for MWS-Linear inlet protection and subsequent clean out cost. Activation should not commence until the project site is fully stabilized and cleaned (full landscaping, grass cover, final paving and street sweeping completed).

# INSTALLATION MODULAR WETLAND SYSTEMS

## GRATE INLET TYPE



CONTRACTOR TO CONSTRUCT CURB OR OPTIONAL DECORATIVE CAP ON TOP OF MODULAR WETLAND SYSTEM TO MATCH ELEVATION OF EXISTING CURB.



CONTRACTOR TO CONSTRUCT CURB ADJACENT TO MODULAR WETLAND SYSTEM WHERE CURB IS ADJACENT TO STREET. SEE INSTALLATION DETAILS.

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ISOMETRIC VIEW



## Installation Sequence



Pre Assembled Modular Wetland System Loaded At Manufacturing Plant



Delivery Truck Is Routed To Installation Site



Delivery Truck Is Positioned To Off Load Modular Wetland With The Crane Standing By (contractor to provide the crane)



Lifting Knuckles and Corner Protectors Must Be Used To Lift The Modular Wetland Off The Truck



The Hole Should Be Excavated Prior To Delivery And To The Appropriate Elevation. The System Is To Be Installed On 6" Of Level Rock Backfill



The Modular Wetland Is Position Over The Excavation Area



The Modular Wetland Is Lowered Into Place



The Modular Wetland Is Set Into Place and the Lifting Knuckles Are Detached. Elevation Should Be Confirmed



Appropriate Size Outlet Pipe Is Connected Into The Modular Wetland Systems Discharge Chamber And Appropriately Routed



The Curb and Gutter Form is Built in the Appropriate Configuration Along The Outer Perimeter of the Modular Wetland



The Area Around The Modular Wetland Is Carefully Backfilled



And Compacted



The Delivered Filter Media Is To Be Prepared To Be Washed And Mixed



The Filter Media Is Mixed Per Manufactures Recommendations And Is Now Ready For Installation



Approximately 8.5 Cubic Yards of Filter Media Are Carefully Placed Into The Modular Wetland



The Modular Wetland Should Be Filled To The Top And Covered With Plastic Until Activation After The Site Is Stabilized



The Curb And Gutter are Pored And The Site if Ready for Pavement

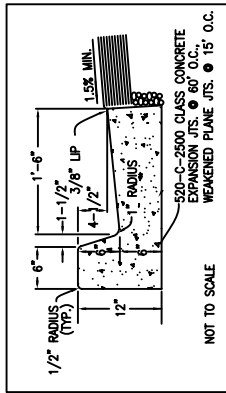


Pavement is Pored And Vegetation Is Planted. Once The Site Is Stabilized And Cleaned The System Is Ready to Activate.

# INSTALLATION: MODULAR WETLAND SYSTEMS - LINEAR GRATE TYPE

## CURB AND GUTTER DETAIL

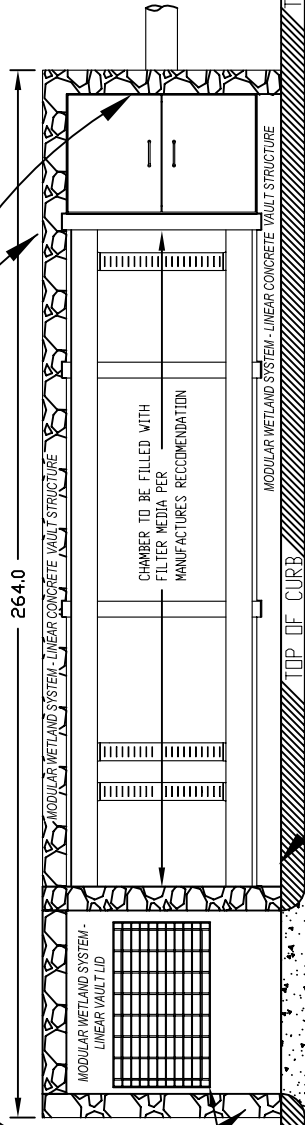
EXAMPLE SPECIFICATION - USE REGIONAL STANDARD



NOT TO SCALE

CONTRACTOR TO CONSTRUCT CURB OR OPTIONAL DECORATIVE CAP ON TOP OF MODULAR WETLAND SYSTEM TO MATCH ELEVATION OF EXISTING CURB.

## PLAN VIEW



TRAFFIC RATED GALVANIZED GRATE

GUTTER

GUTTER

GUTTER

## ELEVATION VIEW

BOTTOM OF CURB ELEVATION EQUAL TO TOP OF MODULAR WETLAND SYSTEM - LINEAR

CURB AND GUTTER PER REGIONAL STANDARD

CONTRACTOR TO CONSTRUCT CURB ADJACENT TO MODULAR WETLAND SYSTEM WHERE CURB IS ADJACENT TO STREET. SEE INSTALLATION DETAILS.

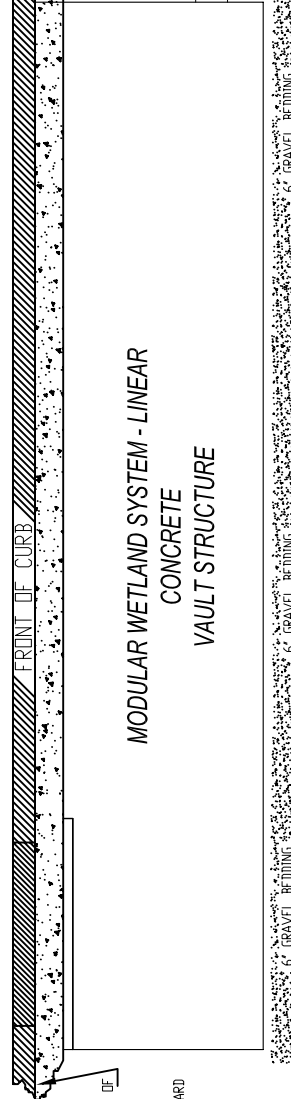
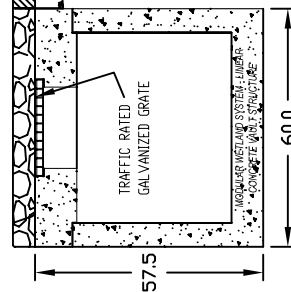
## GRATE OPENING CUT VIEW

BOTTOM OF GUTTER PER REGIONAL STANDARD

FRONT OF CURB

BOTTOM OF GUTTER

RIGHT END VIEW



MODULAR WETLAND SYSTEM - LINEAR CONCRETE VAULT STRUCTURE

MODULAR WETLAND SYSTEM - LINEAR CONCRETE VAULT STRUCTURE

GRAVEL BEDDING

GRAVEL BEDDING

GRAVEL BEDDING

GRAVEL BEDDING

## INSTALLATION NOTES:

1. INSTALL UNIT ON LEVEL BED OF GRAVEL OF AT LEAST 6" IN DEPTH. PATENT PENDING
2. CONCRETE 28 DAY COMPRESSIVE STRENGTH  $f_c=5,000$  PSI.
3. REINFORCING-ASTM A-615, GRADE 60.
4. SUPPORTS AN H20 LOADING AS INDICATED BY AASHTO.
5. ALL WALLS ARE 6" THICK, BAFFLES ARE 4" THICK BOTTOM 8" THICK, TOP 10" THICK.
6. JOINT SEALANT: BUTYL RUBBER SS-S-00210

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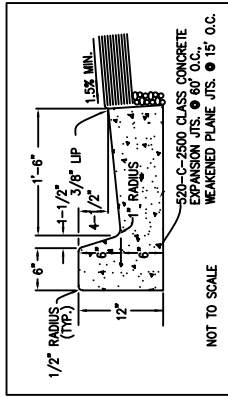
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TITLE: MWS LINEAR - GRATE TYPE		NAME	DATE
SIZE DWG. NO. A	MWS-L-G	P. Ashoff	7.23.07
SCALE 1:50	UNITS = INCHES	COMMENTS:	
SHEET 1 OF 1	REV		

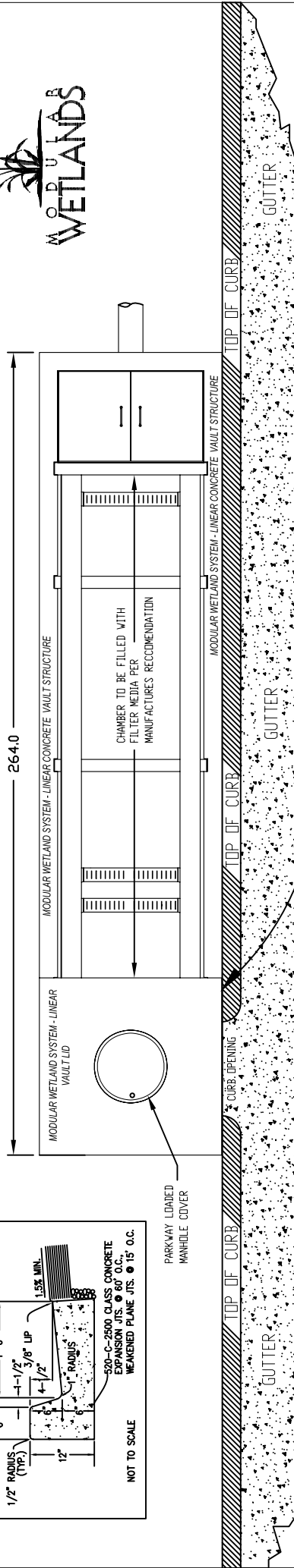


# INSTALLATION: MODULAR WETLAND SYSTEMS - LINEAR CURB TYPE

**CURB AND GUTTER DETAIL**  
EXAMPLE SPECIFICATION - USE REGIONAL STANDARD

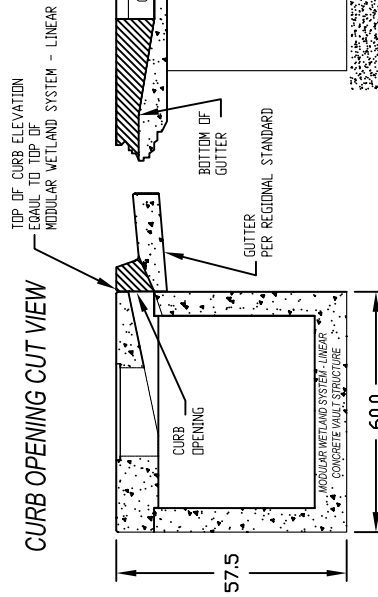


**PLAN VIEW**

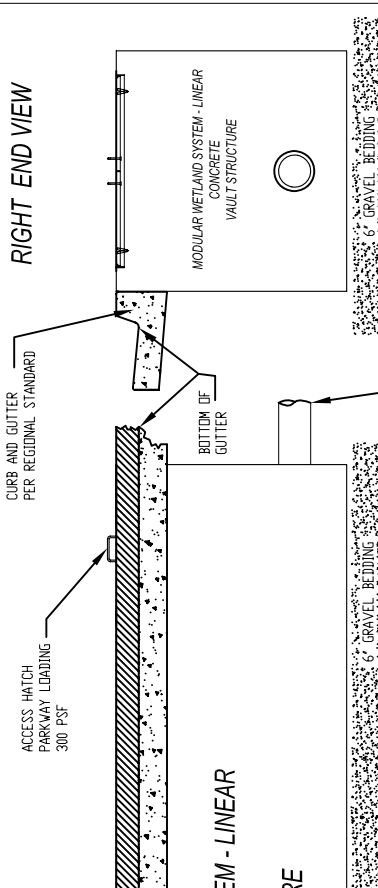


CONTRACTOR TO CONSTRUCT CURB ADJACENT TO MODULAR WETLAND SYSTEM WHERE CURB IS ADJACENT TO STREET. SEE INSTALLATION DETAILS.

**CURB OPENING CUT VIEW**



**ELEVATION VIEW**



**INSTALLATION NOTES:**

1. INSTALL UNIT ON LEVEL BED OF GRAVEL OF AT LEAST 6" IN DEPTH. PATENT PENDING
2. CONCRETE 28 DAY COMPRESSIVE STRENGTH  $f_c=5,000$  PSI.
3. REINFORCING-ASTM A-615, GRADE 60.
4. RATED FOR PARKWAY LOADING 300 PSF.
5. ALL WALLS ARE 6" THICK, BAFFLES ARE 4" THICK BOTTOM 8" THICK, TOP 10" THICK.
6. JOINT SEALANT: BUTYL RUBBER SS-S-00210

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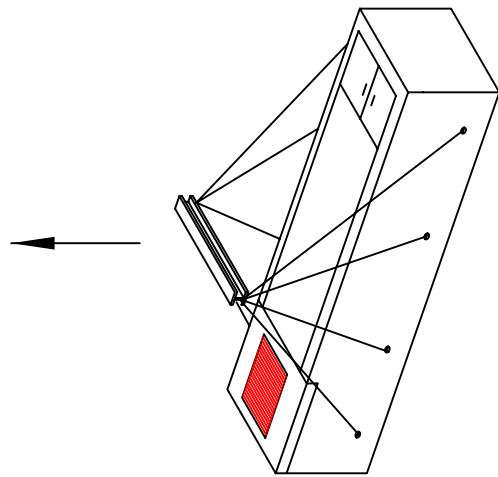
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DRAWN	NAME	A	MWS-L-C	
EDITED	DATE	COMMENTS:		
	P. Ashoff 7.23.07			
SCALE	UNITS = INCHES	SHEET 1 OF 1		
1:50				



# MODULAR WETLAND SYSTEMS - WEIGHTS AND LIFTING DETAILS

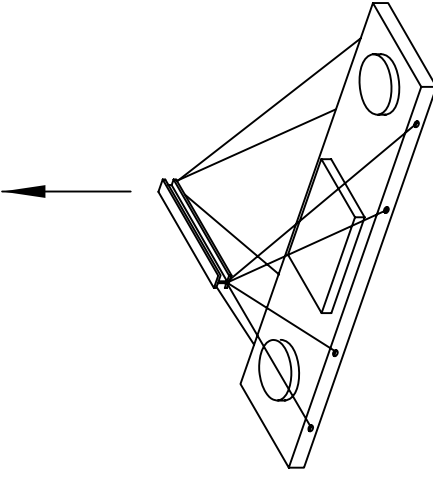


	BOX ONLY		TOP ONLY		BOX + TOP		MEDIA ONLY		BOX + TOP + MEDIA		SPREADER BAR	
	POUNDS	TONS	POUNDS	TONS	POUNDS	TONS	POUNDS	TONS	POUNDS	TONS	POUNDS	TONS
22 FT.X 5 FT. CURB/GRADE/VAULT MODELS	27,000	13.5	2,000	1	29,000	14.5	12,000	6	41,000	20.5	1,200	.6
22 FT.X 5 FT. UNDERGROUND MODELS	27,000	13.5	11,000	5.5	38,000	19	12,000	6	50,000	25	1,200	.6



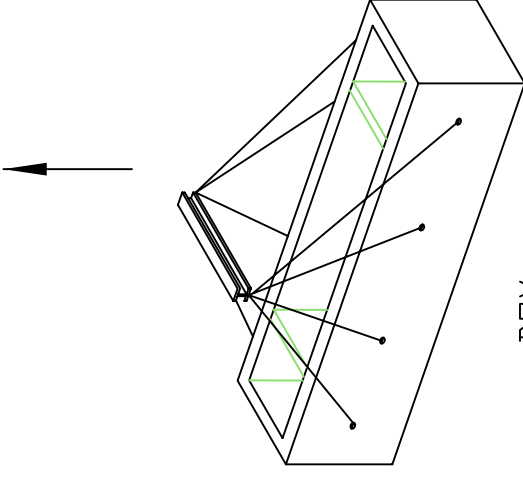
BOX + TOP

CURB/GRADE/VAULT MODELS



TOP

UNDERGROUND MODEL



BOX

UNDERGROUND MODEL

INSTALLATION NOTES:

1. INSTALL UNIT ON LEVEL BED OF GRAVEL OF AT LEAST 6' IN DEPTH.
2. CONCRETE 28 DAY COMPRESSIVE STRENGTH  $f_c=5,000$  PSI.
3. REINFORCINGASTM A-615, GRADE 60.
4. RATED FOR PARKWAY LOADING 300 PSF.
5. ALL WALLS ARE 6' THICK. BAFFLES ARE 4' THICK BOTTOM 8' THICK, TOP 10' THICK.
6. JOINT SEALANT: BUTYL RUBBER SS-S-00210
7. AN 8 FT. SPREADER BAR IS SUITABLE FOR ALL SIZES SHOWN AND IS ALWAYS NEEDED FOR SAFE LIFTING OF ALL BOX SIZES.

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