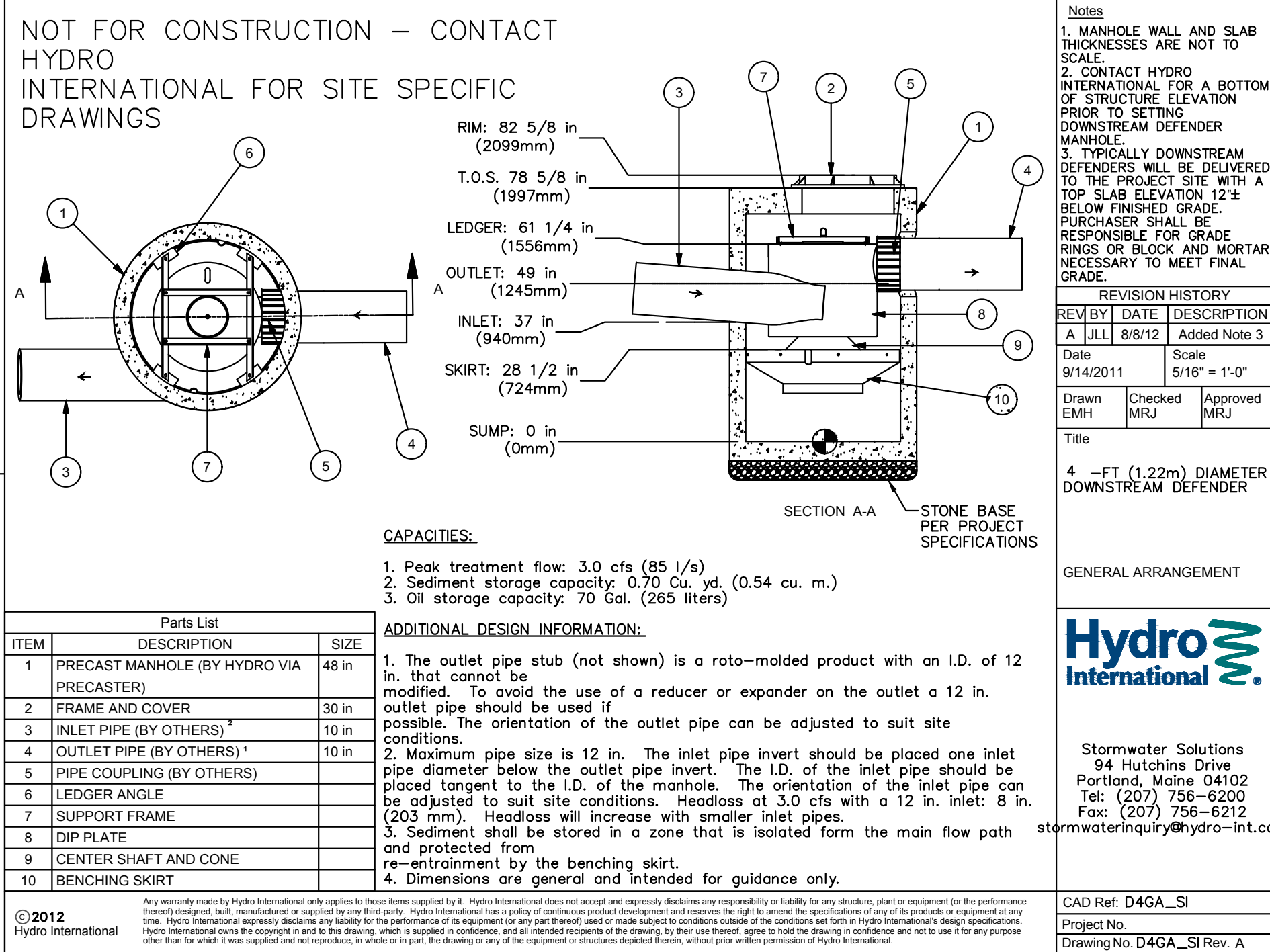


ISSUE	DATE	REMARKS
1	06/26/2017	Initial Submittal
2	10/06/2017	City Comments
3	11/10/2017	City Comments
4	12/16/2017	City Comments
5	01/11/2018	City Resubmittal



**CAPACITIES:**  
 1. Peak treatment flow: 3.0 cfs (85 l/s)  
 2. Sediment storage capacity: 0.70 Cu. yd. (0.54 cu. m.)  
 3. Oil storage capacity: 70 Gal. (265 liters)

**ADDITIONAL DESIGN INFORMATION:**  
 1. The outlet pipe stub (not shown) is a roto-molded product with an I.D. of 12 in. that cannot be modified. To avoid the use of a reducer or expander on the outlet a 12 in. outlet pipe should be used if possible. The orientation of the outlet pipe can be adjusted to suit site conditions.  
 2. Maximum pipe size is 12 in. The inlet pipe invert should be placed one inlet pipe diameter below the outlet pipe invert. The I.D. of the inlet pipe should be placed tangent to the I.D. of the manhole. The orientation of the inlet pipe can be adjusted to suit site conditions. Headloss at 3.0 cfs with a 12 in. inlet: 8 in. (203 mm). Headloss will increase with smaller inlet pipes.  
 3. Sediment shall be stored in a zone that is isolated from the main flow path and protected from re-entrainment by the benching skirt.  
 4. Dimensions are general and intended for guidance only.

ITEM	DESCRIPTION	SIZE
1	PRECAST MANHOLE (BY HYDRO VIA PRECASTER)	48 in
2	FRAME AND COVER	30 in
3	INLET PIPE (BY OTHERS)*	10 in
4	OUTLET PIPE (BY OTHERS)*	10 in
5	PIPE COUPLING (BY OTHERS)	
6	LEDGER ANGLE	
7	SUPPORT FRAME	
8	DIP PLATE	
9	CENTER SHAFT AND CONE	
10	BENCHING SKIRT	

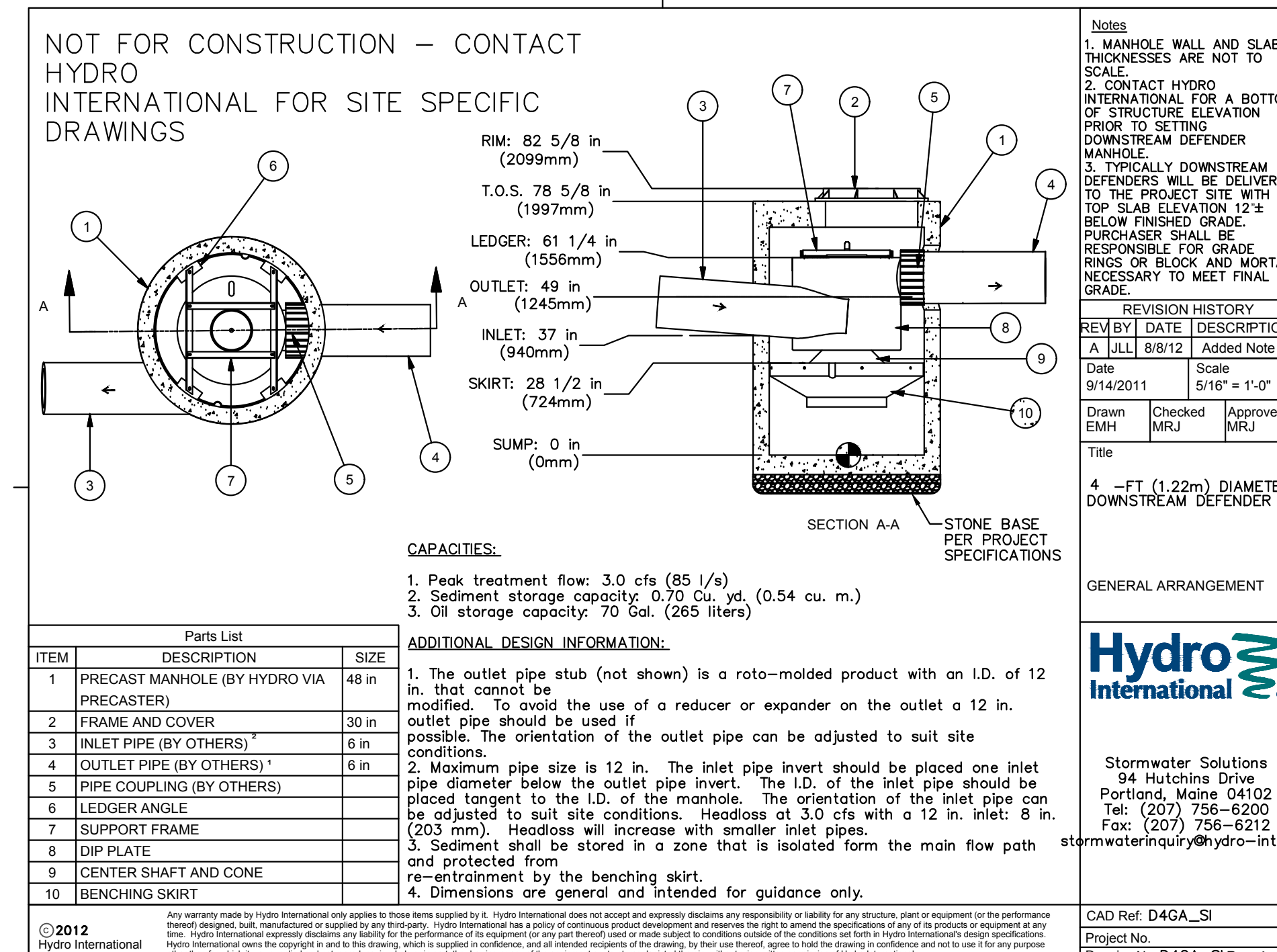
**Notes:**  
 1. MANHOLE WALL AND SLAB THICKNESSES ARE NOT TO SCALE.  
 2. CONTACT HYDRO INTERNATIONAL FOR A BOTTOM OF STRUCTURE ELEVATION PRIOR TO SETTING DOWNSTREAM DEFENDER MANHOLE.  
 3. TYPICALLY DOWNSTREAM DEFENDERS WILL BE DELIVERED TO THE PROJECT SITE WITH A TOP SLAB ELEVATION 12" BELOW FINISHED GRADE. PURCHASER SHALL BE RESPONSIBLE FOR GRADE RINGS OR BLOCK AND MORTAR NECESSARY TO MEET FINAL GRADE.

**REVISION HISTORY**

REV	BY	DATE	DESCRIPTION
A	JLL	8/8/12	Added Note 3

Date: 9/14/2011 Scale: 5/16" = 1'-0"  
 Drawn: EMH Checked: MRJ Approved: MRJ  
 Title: 4 -FT (1.22m) DIAMETER DOWNSTREAM DEFENDER  
 GENERAL ARRANGEMENT  
 Hydro International  
 Stormwater Solutions  
 94 Hutchins Drive  
 Portland, Maine 04102  
 Tel: (207) 756-6200  
 Fax: (207) 756-6212  
 stormwaterinquiry@hydro-int.com  
 CAD Ref: D4GA\_SI  
 Project No:  
 Drawing No. D4GA\_SI Rev. A

DD 102



**CAPACITIES:**  
 1. Peak treatment flow: 3.0 cfs (85 l/s)  
 2. Sediment storage capacity: 0.70 Cu. yd. (0.54 cu. m.)  
 3. Oil storage capacity: 70 Gal. (265 liters)

**ADDITIONAL DESIGN INFORMATION:**  
 1. The outlet pipe stub (not shown) is a roto-molded product with an I.D. of 12 in. that cannot be modified. To avoid the use of a reducer or expander on the outlet a 12 in. outlet pipe should be used if possible. The orientation of the outlet pipe can be adjusted to suit site conditions.  
 2. Maximum pipe size is 12 in. The inlet pipe invert should be placed one inlet pipe diameter below the outlet pipe invert. The I.D. of the inlet pipe should be placed tangent to the I.D. of the manhole. The orientation of the inlet pipe can be adjusted to suit site conditions. Headloss at 3.0 cfs with a 12 in. inlet: 8 in. (203 mm). Headloss will increase with smaller inlet pipes.  
 3. Sediment shall be stored in a zone that is isolated from the main flow path and protected from re-entrainment by the benching skirt.  
 4. Dimensions are general and intended for guidance only.

ITEM	DESCRIPTION	SIZE
1	PRECAST MANHOLE (BY HYDRO VIA PRECASTER)	48 in
2	FRAME AND COVER	30 in
3	INLET PIPE (BY OTHERS)*	6 in
4	OUTLET PIPE (BY OTHERS)*	6 in
5	PIPE COUPLING (BY OTHERS)	
6	LEDGER ANGLE	
7	SUPPORT FRAME	
8	DIP PLATE	
9	CENTER SHAFT AND CONE	
10	BENCHING SKIRT	

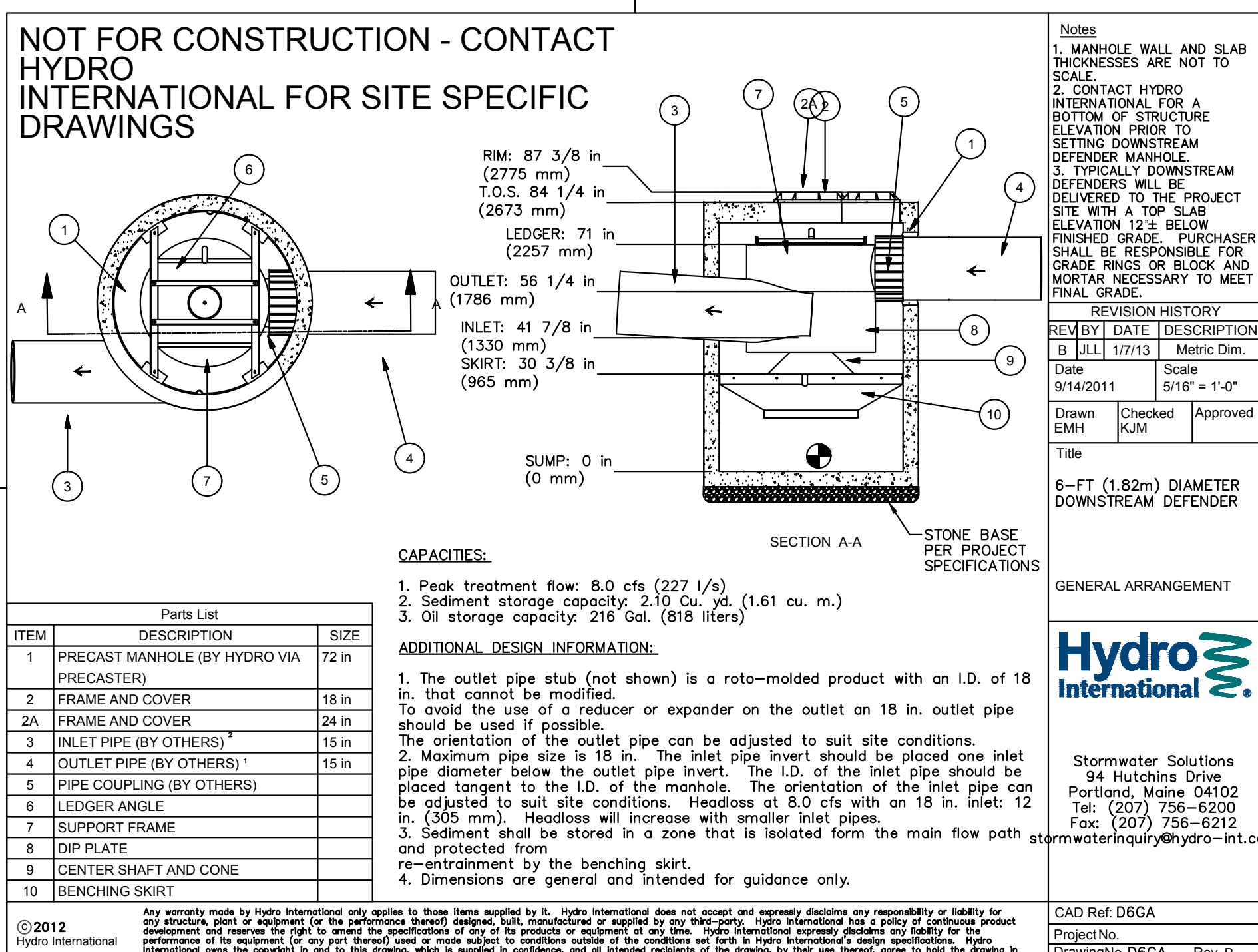
**Notes:**  
 1. MANHOLE WALL AND SLAB THICKNESSES ARE NOT TO SCALE.  
 2. CONTACT HYDRO INTERNATIONAL FOR A BOTTOM OF STRUCTURE ELEVATION PRIOR TO SETTING DOWNSTREAM DEFENDER MANHOLE.  
 3. TYPICALLY DOWNSTREAM DEFENDERS WILL BE DELIVERED TO THE PROJECT SITE WITH A TOP SLAB ELEVATION 12" BELOW FINISHED GRADE. PURCHASER SHALL BE RESPONSIBLE FOR GRADE RINGS OR BLOCK AND MORTAR NECESSARY TO MEET FINAL GRADE.

**REVISION HISTORY**

REV	BY	DATE	DESCRIPTION
A	JLL	8/8/12	Added Note 3

Date: 9/14/2011 Scale: 5/16" = 1'-0"  
 Drawn: EMH Checked: MRJ Approved: MRJ  
 Title: 4 -FT (1.22m) DIAMETER DOWNSTREAM DEFENDER  
 GENERAL ARRANGEMENT  
 Hydro International  
 Stormwater Solutions  
 94 Hutchins Drive  
 Portland, Maine 04102  
 Tel: (207) 756-6200  
 Fax: (207) 756-6212  
 stormwaterinquiry@hydro-int.com  
 CAD Ref: D4GA\_SI  
 Project No:  
 Drawing No. D4GA\_SI Rev. A

DD 304



**CAPACITIES:**  
 1. Peak treatment flow: 8.0 cfs (227 l/s)  
 2. Sediment storage capacity: 210 Cu. yd. (1.61 cu. m.)  
 3. Oil storage capacity: 216 Gal. (818 liters)

**ADDITIONAL DESIGN INFORMATION:**  
 1. The outlet pipe stub (not shown) is a roto-molded product with an I.D. of 18 in. that cannot be modified. To avoid the use of a reducer or expander on the outlet an 18 in. outlet pipe should be used if possible. The orientation of the outlet pipe can be adjusted to suit site conditions.  
 2. Maximum pipe size is 18 in. The inlet pipe invert should be placed one inlet pipe diameter below the outlet pipe invert. The I.D. of the inlet pipe should be placed tangent to the I.D. of the manhole. The orientation of the inlet pipe can be adjusted to suit site conditions. Headloss at 8.0 cfs with an 18 in. inlet: 12 in. (305 mm). Headloss will increase with smaller inlet pipes.  
 3. Sediment shall be stored in a zone that is isolated from the main flow path and protected from re-entrainment by the benching skirt.  
 4. Dimensions are general and intended for guidance only.

ITEM	DESCRIPTION	SIZE
1	PRECAST MANHOLE (BY HYDRO VIA PRECASTER)	72 in
2	FRAME AND COVER	18 in
3	FRAME AND COVER	24 in
4	INLET PIPE (BY OTHERS)*	15 in
5	OUTLET PIPE (BY OTHERS)*	15 in
6	LEDGER ANGLE	
7	SUPPORT FRAME	
8	DIP PLATE	
9	CENTER SHAFT AND CONE	
10	BENCHING SKIRT	

**Notes:**  
 1. MANHOLE WALL AND SLAB THICKNESSES ARE NOT TO SCALE.  
 2. CONTACT HYDRO INTERNATIONAL FOR A BOTTOM OF STRUCTURE ELEVATION PRIOR TO SETTING DOWNSTREAM DEFENDER MANHOLE.  
 3. TYPICALLY DOWNSTREAM DEFENDERS WILL BE DELIVERED TO THE PROJECT SITE WITH A TOP SLAB ELEVATION 12" BELOW FINISHED GRADE. PURCHASER SHALL BE RESPONSIBLE FOR GRADE RINGS OR BLOCK AND MORTAR NECESSARY TO MEET FINAL GRADE.

**REVISION HISTORY**

REV	BY	DATE	DESCRIPTION
B	JLL	1/7/13	Metric Dim.

Date: 9/14/2011 Scale: 5/16" = 1'-0"  
 Drawn: EMH Checked: KJM Approved: MRJ  
 Title: 6 -FT (1.82m) DIAMETER DOWNSTREAM DEFENDER  
 GENERAL ARRANGEMENT  
 Hydro International  
 Stormwater Solutions  
 94 Hutchins Drive  
 Portland, Maine 04102  
 Tel: (207) 756-6200  
 Fax: (207) 756-6212  
 stormwaterinquiry@hydro-int.com  
 CAD Ref: D6GA  
 Project No:  
 Drawing No. D6GA Rev. B

DD 214

PROJECT TITLE

Brookview

OFFALLON, MISSOURI

THE **STERLING** CO.  
 ENGINEERS & SURVEYORS

5055 New Baumgartner Road  
 St. Louis, Missouri 63129  
 Ph. 314-487-0440 Fax. 314-487-8944  
 www.sterling-eng-sur.com  
 Corporate Certificate of Authority #001348



Date: 01/11/18  
 SEAN ACKLEY  
 LICENSE # PE-2009018679  
 Civil Engineer

McBride Guhrlic, LLC  
 16091 Isvingley Ridge Road, Suite 300  
 Chesterfield, Missouri 63017  
 Ph. (636) 537-2000  
 Fax (636) 537-2546

DOWNSTREAM DEFENDER DETAILS

P-Z No. 17-005894  
 City No. 17-008288  
 Date: 01/11/18  
 Job No. 17-02-041

Page No.

13.6

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