

Attachment A

Automatic Retractable Screens (ARS) Requirements

The ARS units prevent trash and debris from entering a catch basin (CB) during dry weather and moderate storm flows by keeping the trash and debris in the street gutter for collection by street sweepers. ARS units are not allowed on catch basins (CBs) connecting to drains of less than a 4-year frequency design storm or when a sump condition exists.

The City and its contractor shall adhere to the requirements, conditions, and provisions listed below and on the Permit:

1. The City's contractor will be required to perform a field operational test on all of the CBs in which ARS units were installed, as required in the Public Works' specifications for ARS contracts (Attachment B). Any ARS units that do not open, close, and lock closed automatically under the test conditions, shall be repaired or replaced and retested. This process shall be repeated until the failed unit passes the test.
2. The exposed ends of the CB protection bar, when removed, must be drilled out to a minimum depth of 1/4 inch and refilled with neat "Sikadur 32, Hi-Mod" or Agency approved equal. When CB protection bars are removed, each ARS unit shall be fitted with a permanent, fixed horizontal, 3/4 inch diameter solid stainless steel bar located at the same distance above the flow line as the existing protection bar. Butt welding of the protection bar will not be allowed. The new protection bar shall remain fixed when the ARS unit opens and shall not protrude beyond the projected curb face. However, the protection bar replacement will be waived when both of the following conditions are met:
 - The CB curb face height is 12 inches or less.
 - The CB curb opening between the flow line and the ARS unit in the fully open position is such that a 4 inch diameter sphere cannot pass through.
3. The City shall, during storm events, patrol the locations where ARS units are installed and clear any trash lodged on the screen to allow storm flows to enter the CB.

Attachment A (cont.)

Connector Pipe Screen (CPS) Requirements

The CPS unit prevents trash and debris from entering the storm drain system during dry weather and moderate storm flows by keeping the trash and debris inside the CB. CPS units are not allowed in CBs at locations where sump conditions exist.

The CPS unit shall be designed to retain all trash larger than 5 mm (0.197 inch) in the CB, and shall comply with the following items:

1. The CPS shall be sized, fabricated, and installed conforming to the configurations shown in the CPS Sizing Table 1, Appendices A-1, A-2, A-3, and A-4.
2. The CPS shall not interfere with the operation of an existing or proposed ARS.
3. The CPS unit shall have a sufficient structural integrity to withstand a lateral force of standing water (62.4 lb/ft³) within the CB area when the screen becomes 100% clogged. CPS units shall be bolted to the CB walls.
4. CPS units shall be configured with deflector plates or screens preventing trash from falling between the screen and connector pipe. The deflector plate shall be designed to withstand a vertical load of 10 lbs per square foot.
5. The gap at the bottom, sides, and joints of CPS units shall not exceed 5 mm (0.197 inch).
6. The perimeter of CPS units shall include a structural frame for stiffness, a bolting surface for fastening to the CB wall, and support for the opening referred to as the "bypass (H_b)" (see Appendix A-1).
7. All CPS parts/components must be sized to fit through the CB's manhole opening and/or CB curb opening.
8. The CPS unit may encroach into the manhole opening no more than 4 inches.
9. The CPS frame shall be fabricated from S-304 stainless steel, or an Agency approved equal stainless steel alloy. The Structural members shall have a minimum thickness of 3/16 inches.
10. The CPS screen shall be fabricated from perforated metal of Type S-304 stainless steel, or an Agency approved equal stainless steel alloy. The screen shall have a minimum thickness of fourteen (14) gauge (0.0781 inch) The geometrical opening shape shall have a diameter of 5 mm (0.197 inch).
11. The screen material used shall have at least 45% open area.
12. Any edge of the CPS that is not flush with the wall or floor of the CB shall be smooth with no prongs or jagged edges.
13. The assembly bolts, screws, nuts, and washers shall be fabricated entirely from S-316 stainless steel. The concrete anchor bolts shall use a Red Head Multi-Set II drop-in anchor, SSRM-38, with Type S-316 stainless steel threaded rods, nuts and washers, or Agency approved equal.

Attachment A (cont.)

Preliminary Measurements. The Contractor shall make detailed measurements of each CB's location, dimension, configuration, and operational condition, including the size and location of the connector pipe, for the proper fabrication of the devices. The Contractor shall submit written records of this information to the District for review and approval prior to fabrication of the CPS units. Improper fabrication of devices due to errors in the measurements shall be corrected at the Contractor's expense.

Cleaning of Existing Catch Basins. The Contractor shall furnish all materials, equipment, tools and labor to cleanout (i.e. remove and dispose of all debris from within and around) all CBs in which CPS units will be installed under this Contract to the maintenance standards specified. Cleanout shall also include the CB connector pipe openings and the first 6 feet thereof. The CB shall be clean at the time of the CPS installation. Any trash and debris that accumulates between the dates the CB is cleaned and the date the device is installed shall be removed prior to installation of the device at the Contractor's expense.

Maintenance Conditions and Maintenance Standards. Following are deficiencies in maintenance conditions and their corresponding maintenance standards which shall apply to this Contract. The cleanout of each CB shall meet the maintenance standards listed as follows:

	Description of Maintenance Condition Deficiency	Description of Maintenance Standard
1.	Trash and debris located immediately in front of curb opening or side opening of CB, and on top or between metal grates of grated CB.	No trash and debris located immediately in front of CB opening, and on top or between metal grates.
2.	Vegetation growing across and/or blocking the basin opening.	No vegetation blocking CB opening.
3.	Trash and debris in the CB.	No trash and debris within the CB.
4.	Trash and debris in the connector pipe opening, upstream or downstream.	No trash and debris in connector pipe opening and/or in the connector pipe for a distance of 6 feet from the opening.

Attachment A (cont.)

Trash and debris shall include, but is not limited to, mud, vegetation, and garbage.

Upon completion of a cleanout operation at a CB and before leaving it, the Contractor shall sweep the top surface of the CB and the area 2 feet around the CB, and shall remove any trash and debris resulting from the cleanout operations. No debris is to be left at a CB for future pick-up.

Method of Removal. All trash and debris required to be removed from the CBs shall be removed in a manner to be determined by the Contractor. The Contractor shall not allow any trash or debris to enter the connector pipe or main line as a result of the cleanout operations.

Debris Disposal. All trash and debris removed under this Contract shall become the property of the Contractor and shall be legally disposed of away from the CB sites. The Contractor is responsible for proper disposal of the trash and debris, including obtaining approvals from all jurisdictional agencies, as applicable. The contractor shall be responsible for contacting and coordinating with LA County Animal Care and Control for pickup and disposal of dead animals. However, the Contractor shall be responsible for removing any dead animal from inside a CB. A list of local Animal Care and Control offices may be obtained at:

http://animalcare.lacounty.gov/wps/portal/acc/aboutus/care_centers.

Staff Gauge. The contractor shall paint a staff gauge per Appendix A-4. The staff gauge shall be located such that it is visible through the CB curb opening or grating.

Attachment B

Field Testing of ARS Units

Onsite Test. Each unit shall be manually operated upon completion of the installation to ensure that the screen and all moving parts move freely and the screen locks securely in the closed position. Units that are determined by Public Works to be malfunctioning shall be repaired or replaced at the sole expense of the Contractor.

All of the CBs in which ARS units were installed will be tested using water supplied from a fire hydrant or water truck. The Contractor shall be responsible for providing the source of water, including written approval from the water agency if a hydrant is used. Sufficient water shall be provided to cause the ARS units to open with no other assistance as follows:

Flowing Water Test

1. Sandbags shall be placed around the CB's curb opening to allow the water to pond in front of the CB to a depth of 3 inches, measured from the flow line of the CB curb opening local depression. The sandbags shall be located 5 feet upstream and downstream of the end of the local depression. Sandbags shall also be placed 7 feet from and parallel to the CB curb face.
2. An impermeable rigid membrane/barrier shall be placed covering the CB curb opening to allow the water to pond in front of the CB. The membrane/barrier shall be capable of sealing the CB curb opening without leakage so that the water ponds to the depth required.
3. Once the water reaches the depth described herein, the impermeable membrane shall be removed in one quick and continuous motion to allow the ponded water to instantaneously enter the CB and cause the ARS unit to open. A continuous flow of water shall be provided for at least two minutes after the initial opening of the ARS unit in sufficient quantity to maintain the device open. At the end of the two minutes, the flow of the water shall be stopped and the device shall fully close automatically prior to or immediately after the flow into the CB stops.
4. This process shall be successfully completed at least two consecutive times without adjustments and/or calibration between trials.
5. Any ARS unit that do not open, close, and lock closed automatically under the test conditions, described herein, shall be repaired or replaced at the sole expense of the Contractor and retested. This process shall be repeated until the failed device passes the test at the sole expense of the Contractor.

Attachment C

General Requirements

1. A minimum of five (5) working days Notice to the District's designated representative prior to Preconstruction Meeting. A Preconstruction meeting is required before commencement of the Work authorized under this Permit.
2. The Permittee shall provide a Construction Schedule to District's field representative before starting work on this Permit. The schedule shall indicate the CBs that the Permittee will complete each week, identified by the assigned Identification Number listed in the attached "LOS ANGELES COUNTY FLOOD CONTROL DISTRICT CATCH BASIN IDENTIFICATION LIST". Also, Permittee shall submit to the District's designated representative a paper copy of the updated Construction Schedule on the first working day of each month.
3. County will be administering the CB Cleanout contracts within the City that may take place concurrent with City's Project. Work on District's CBs, under County Contract, shall have priority and/or testing be completed without interruption.
4. Permittee shall coordinate with the District's designated representative to schedule inspection for selected CBs. The District designated representative will select the CBs to be inspected and/or tested.
5. Permittee shall be responsible for enforcing Section 7-10 PUBLIC CONVENIENCE AND SAFETY of the GREENBOOK, (e.g. Traffic and Access, Safety, Confined Spaces etc.). The inspection provided by the District shall not be construed as a Safety Inspection.
6. Upon Completion of the installations and testing, Permittee shall produce Inspection Records for each CB.
7. Any damage resulting from the Permittee's operations shall be restored and/or repaired at Permittee's expense and to the satisfaction of the District's field representative.
8. When removing and reinstalling the CB manhole covers, the Permittee shall grease all CB manhole cover screws with a high temperature thread lubricant and seal grease (Jet-Cube by Koper-Kote or equal). Unusable, damaged, and/or missing screws or bolts shall be replaced with new ones meeting the requirements specified in applicable Standard Plans as directed by the District's field representative. If the CB manhole cover screws are frozen (e.g. rusted in place), the Contractor shall remove the frozen cover screws. If during their removal the manhole covers or screws should become damaged, it shall be the Contractor's responsibility to replace them in accordance with the applicable standard plan and to re-drill and tap new holes, if necessary.
9. Permittee shall be responsible for collecting the retaining trash and debris within the street by street sweeping and other equipment.

Attachment C (cont.)

- 10.** Permittee shall furnish eight (8) copies of a Technical Manual for ARS and CPS Units and eight (8) electronic copies on CD-Rom in Portable Document Format (PDF). The Technical Manual shall be submitted prior to field acceptance of the permitted work. Each manual shall, at minimum, include the following:
 - a.** Title Sheet.
 - b.** Table of Contents.
 - c.** Manufacturer, supplier, spare parts, and servicing location information including name, address, phone number of the manufacturer and local representative.
 - d.** Recommended installation, adjustment, calibration and troubleshooting procedures.
 - e.** Lubrication recommended if applicable.
 - f.** Recommended preventive maintenance and maintenance procedure.
 - g.** Complete parts list, by generic title and identification number, with isometric views and schematics of each assembly.
 - h.** Recommended spare parts list and list of special tools and equipment required for O&M.
 - i.** Disassembly, overhaul, reassembly, and realignment instructions.
 - j.** A discussion of the warranty and how to obtain warranty service.

- 11.** ARS and CPS units shall be covered by a three (3) year manufacturer's warranty starting on the date of acceptance of the work authorized under this Permit by the District. The warranty shall cover the units against corrosion, excessive wearing of moving parts, and operational malfunction. The manufacturer shall provide, at no cost to the District, all labor, material, and equipment required to repair or replace the units during the warranty period, including but not limited to calibration and adjustment of moving parts to ensure the units operate properly.

- 12.** Detailed shop drawings for the ARS and CPS units shall be submitted to the District. No ARS and/or CPS unit fabrication shall start until the shop drawings are approved by the District. The Shop Drawings must clearly describe the details and mechanical operation of the ARS and CPS Units, and, at a minimum, must contain:

Attachment C (cont.)

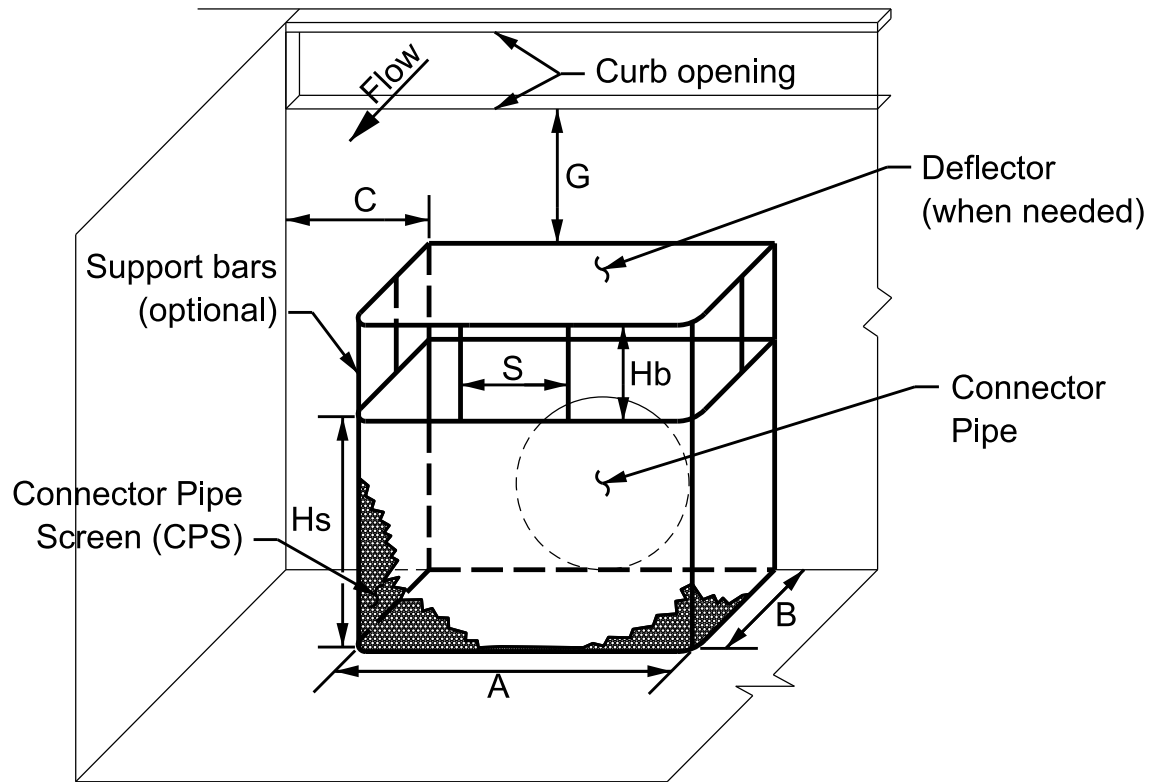
- a. Drawings descriptions and details of the units.
 - b. Materials used.
 - c. Connection details.
 - d. Assembly details.
 - e. Mounting details.
 - f. Dimensions of all parts.
 - g. Any other information needed to manufacture, install, and use the units.
 - h. Correct title of the City Project.
 - i. Names of the City and Permit Number(s).
- 13.** Upon completion of the contract, the City must submit an as-built spreadsheet for each permit, containing the following data:
- a. County approved ARS and/or CPS manufacturer name and contact information.
 - b. ARS and/or CPS name and model.
 - c. For each CB:
 - i. County CB No.
 - ii. County Drain Name.
 - iii. Street Name.
 - iv. Nearest cross street.
 - v. Northing and Easting coordinates.
 - vi. CB type (SPPWC Std. Plan No.).
 - vii. W dimension.
 - viii. Number of grates.
 - ix. V dimension.
 - x. Curb face height "X".
 - xi. Listing of ARS units installed and/or not installed.
 - xii. Listing of CPS units installed and/or not installed.

ATTACHMENT C (cont.)

- 14.** No ARS or CPS units shall be installed in a CB located in a sump. Where a CB is found to be in a sump, in a cul-de-sac, or with flow entering the basin from two opposing directions, the CB must be removed from the project.

- 15.** ARS and CPS units must be regularly inspected and serviced. Additionally, to ensure the effectiveness of CPS units, CBs must be cleaned when the trash/debris level is at the 40% mark, as shown on Appendix A-4: Staff Gauge and as stenciled on the CB wall.

APPENDIX A-1: CPS CONFIGURATION



CATCH BASIN INTERIOR VIEW
(Not to scale)

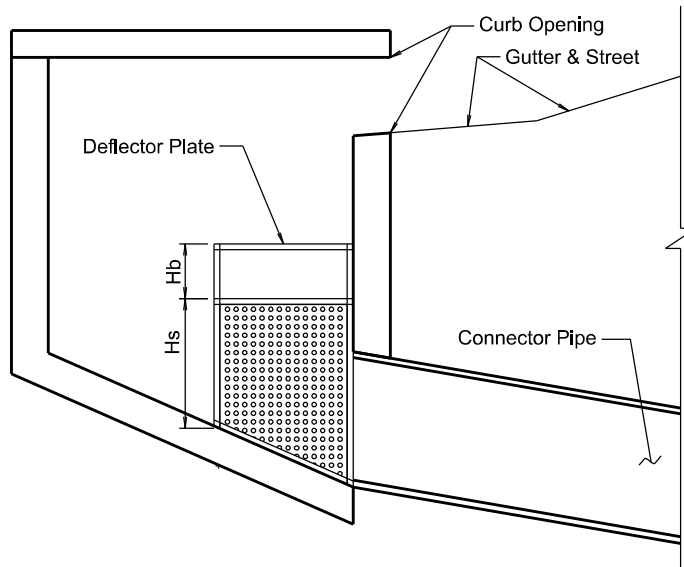
CPS Length	$L = A + 2B$
CPS Height	Hs
Bypass Height	Hb
Minimum Wall Clearance	$C \geq 4"$
Minimum Bar Spacing	$S \geq 6"$
Minimum Interior Spacing	$B \geq 10"$
Minimum Distance from Street Flow Line	$G \geq 4"$

NOTES

1. The CPS shown above is for illustrative purposes only. The catch basin connector pipe location and the shape and design of the CPS may significantly deviate from the above example.
2. For grated catch basins, "G" shall be measured from the bottom of the grate to the top of the deflector plate.

COUNTY OF LOS ANGELES
DEPARTMENT OF PUBLIC WORKS

APPENDIX A-2: CATCH BASIN



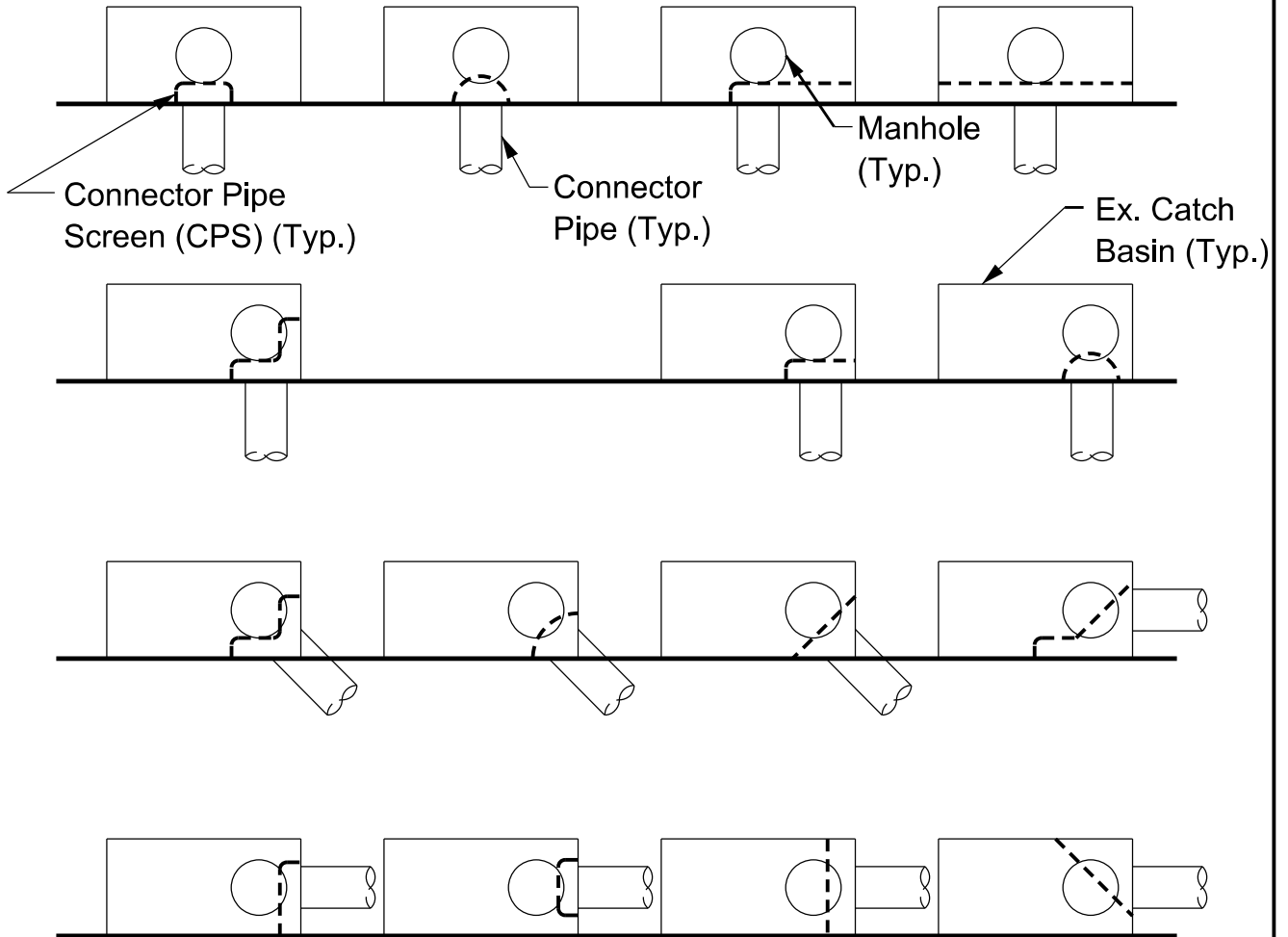
ELEVATION VIEW
NTS

NOTES

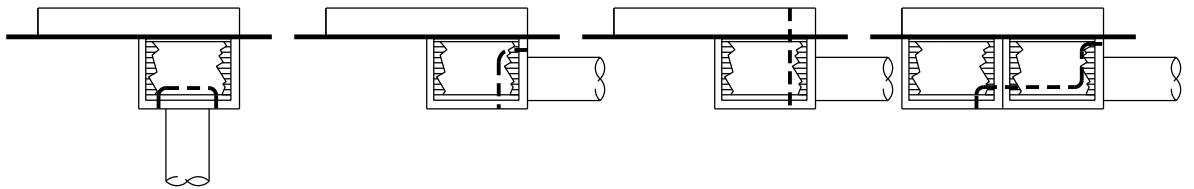
1. The CPS shown above is for illustrative purposes only.
2. CPS shall be flush with catch basin walls and invert. Contractor to verify dimensions prior to fabrication.

APPENDIX A-3: EXAMPLE CPS LAYOUTS

CURB OPENING CATCH BASINS (TYPES 300, 306)

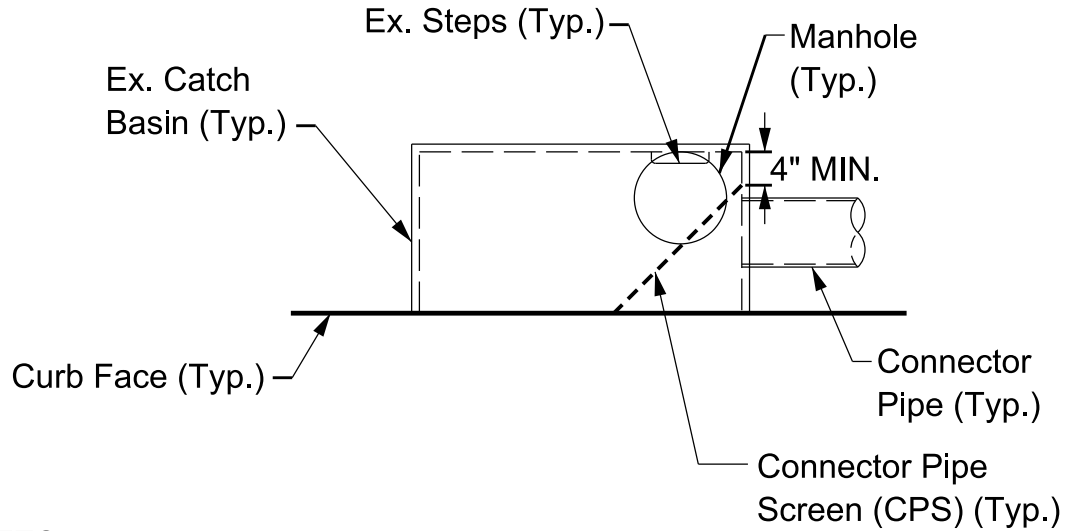


CURB OPENING CATCH BASINS WITH GRATES (TYPES 301, 302)



APPENDIX A-3: EXAMPLE CPS LAYOUTS (CONT.)

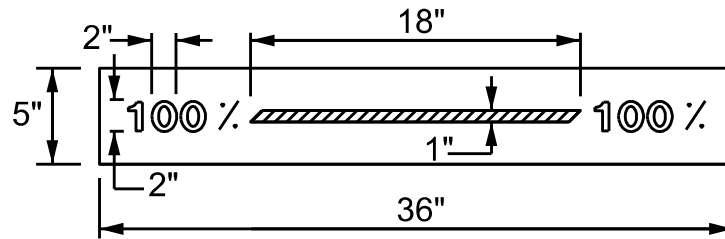
CURB OPENING CATCH BASINS (TYPES 300)



NOTES:

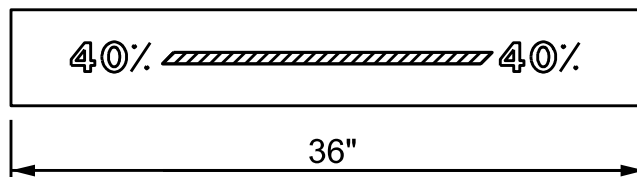
1. The CPS configurations shown above are for illustrative purposes only. This is not a comprehensive list.
2. The CPS unit may encroach into the manhole opening no more than 4 inches.

APPENDIX A-4: STAFF GAUGE



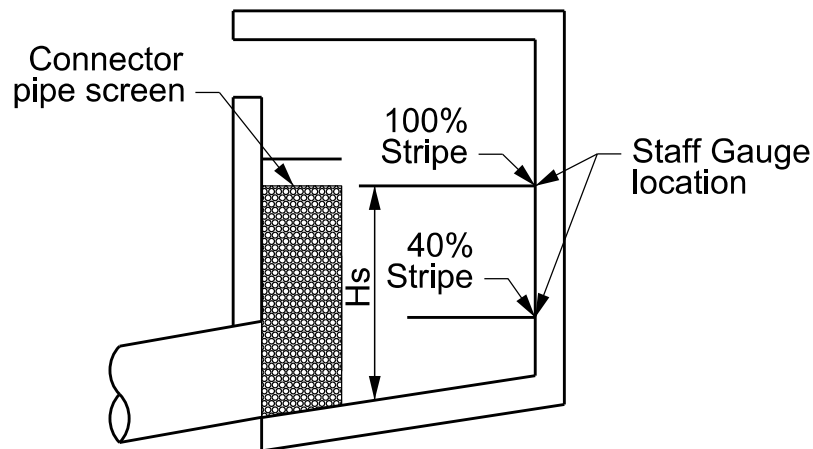
100% STRIPE

(Red Stripe and Numbers on White Background)



40% STRIPE

(Red Stripe and Numbers on White Background)



EXAMPLE LAYOUT

"THE PAINT TYPE AND SPECIFICATIONS MUST BE SUBMITTED TO THE DISTRICT FOR REVIEW AND APPROVAL PRIOR TO USE."

1. The Contractor shall paint a staff gauge as shown on an externally visible interior wall of each catch basin.
2. The Contractor shall paint red stripes and numbers on white background labeling 40% and 100% screen height (Hs) as shown above.
3. Surfaces must be clean, dry and free from all contaminants including rust that may impair adhesion.

APPENDIX B - CPS SIZING TABLE

Revised 5/4/2016

TABLE 1

CPS SIZING TABLE FOR NON-SUMP CONDITIONS

Catch Basin Type	* V-depth (ft)	CB Width (ft)	No. Grates	** Bypass Height H _b (in)	**Screen Height H _s (in)	**Screen Length L (ft)	**G (in)
300	2.5 (30 inch)	3.5	-	8	8	3.0	4
		7				4.0	
		10				6.0	
		14				7.0	
	2.67 (32 inch)	3.5	-	8	10	3.0	4
		7				4.0	
		10				6.0	
		14				7.0	
	2.83 (34 inch)	3.5	-	8	12	3.0	4
		7				4.0	
		10				6.0	
		14				6.0	
		21				7.0	
	3.0	3.5	-	8	12	3.0	6
		7				4.0	
		10				6.0	
		14		8	14	6.0	4
		21				7.0	
		28				8.0	
	3.5	3.5	-	8	18	3.0	6
		7				4.0	
		10				6.0	
		14		10	16	6.0	
		21				7.0	
		28				8.0	
	4.0	3.5	-	12	20	3.0	6
		7				4.0	
		10				6.0	
14		6.0					
21		7.0					
28		8.0					
4.5 or greater	3.5	-	12	24	3.0	≥ 8	
	7				4.0		
	10				6.0		
	14				6.0		
	21				7.0		
	28				8.0		

* CB's with V-depth values less than given above, the CB must be removed from the project.

** H_b, H_s, L, and G values given above are minimum values.

APPENDIX B - CPS SIZING TABLE

Revised 5/4/2016

TABLE 1

CPS SIZING TABLE FOR NON-SUMP CONDITIONS

Catch Basin Type	* V-depth (ft)	CB Width (ft)	No. Grates	** Bypass Height H _b (in)	**Screen Height H _s (in)	**Screen Length L (ft)	**G (in)
301	3.0 (36 inch)	7	1	8	10	4.0	10
		10	2			5.0	
		14	1			4.0	
		14	2			5.0	
	3.5	7	1	10	12	4.0	12
		10	2			5.0	
		14	1			4.0	
		14	2			5.0	
	4.0	7	1	12	15	4.0	13
		10	2			5.0	
		14	1			4.0	
		14	2			5.0	
	4.5 or greater	7	1	12	18	4.0	≥ 16
		10	2			5.0	
		14	1			4.0	
		14	2			5.0	
302	3.0 (36 inch)	-	1	9	9	2.5	10
		-	2			4.0	
		-	3			5.0	
	3.5	-	1	10	12	2.5	12
		-	2			4.0	
		-	3			5.0	
	4.0 or greater	-	1	10	18	2.5	≥ 12
		-	2			4.0	
		-	3			5.0	
303	3.0 (36 inch)	-	1	9	9	2.5	10
		-	2			4.0	
		-	3			5.0	
	3.5	-	1	10	12	2.5	12
		-	2			4.0	
		-	3			5.0	
	4.0	-	1	12	16	2.5	12
		-	2			4.0	
		-	3			5.0	
	4.5 or greater	-	1	12	22	2.5	≥ 12
		-	2			4.0	
		-	3			5.0	

* CB's with V-depth values less than given above, the CB must be removed from the project.

** H_b, H_s, L, and G values given above are minimum values.