Part One: Guidelines & Procedures for Precast Product Verification by Destructive Testing

Tennessee Department of Transportation

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1.0 References from SOP 5-3

Section 11.0 Precast Product Verification by Destructive Testing

11.1 **Category 1**: Endwalls and Square/Rectangular Catchbasins, Stormwater Manholes, Junction Boxes, and Spring Boxes including Lids.
TDOT shall randomly select a minimum of one precast product from Category 1 at each plant for destructive testing every 6 months. Also, TDOT shall randomly select a minimum of one Category 1 precast product on a project in each region for destructive testing per year.

11.2 **Category 2**: Round Catchbasins, Stormwater Manholes, Spring Boxes, and Junction Boxes including Lids.
TDOT shall randomly select a minimum of one precast product from Category 2 at each plant for dimensional and reinforcement verification every 6 months.

11.5 All destructive testing at the plant will be performed by the manufacturer under the observation of TDOT. Regional Materials and Tests shall randomly determine when and what products to destructively test. All destructive testing at the plant will be at the cost of the manufacturer and any equipment needed for destructive testing shall be made available by the manufacturer for random inspection. TDOT will coordinate the regional test to ensure all plants have at least one item tested statewide each year.

11.6 For destructive testing on projects, Regional Materials and Tests shall identify a product to be tested and the contractor shall be responsible for arranging destructive testing to be performed as directed. Regional Materials and Tests shall consult with the project supervisor to eliminate any items needed within 3 weeks on the project for testing. The cost of any destructive testing on projects will be paid at the bid price assuming the structure tested meets TDOT Specifications. In the event of a failure, the cost of destructive testing and retesting will be assumed by the manufacturer.

2.0 PRODUCT SELECTION

Regional Materials and Tests shall randomly select one precast drainage structure manufactured for TDOT as specified in Section 11.1 and 11.2.

2.1 Standard Precast Drainage Catch Basins

2.1.1 Square and Rectangular Concrete & Lid

2.1.2 Standard Precast Circular Concrete & Lid

2.2 Endwall

2.3 Standard Precast Drainage Manholes

2.3.1 Square Concrete & Lid

2.3.2 Circular Concrete and Lid

2.4 Standard Precast Drainage Junction and Spring Box

2.4.1 Square Concrete & Lid

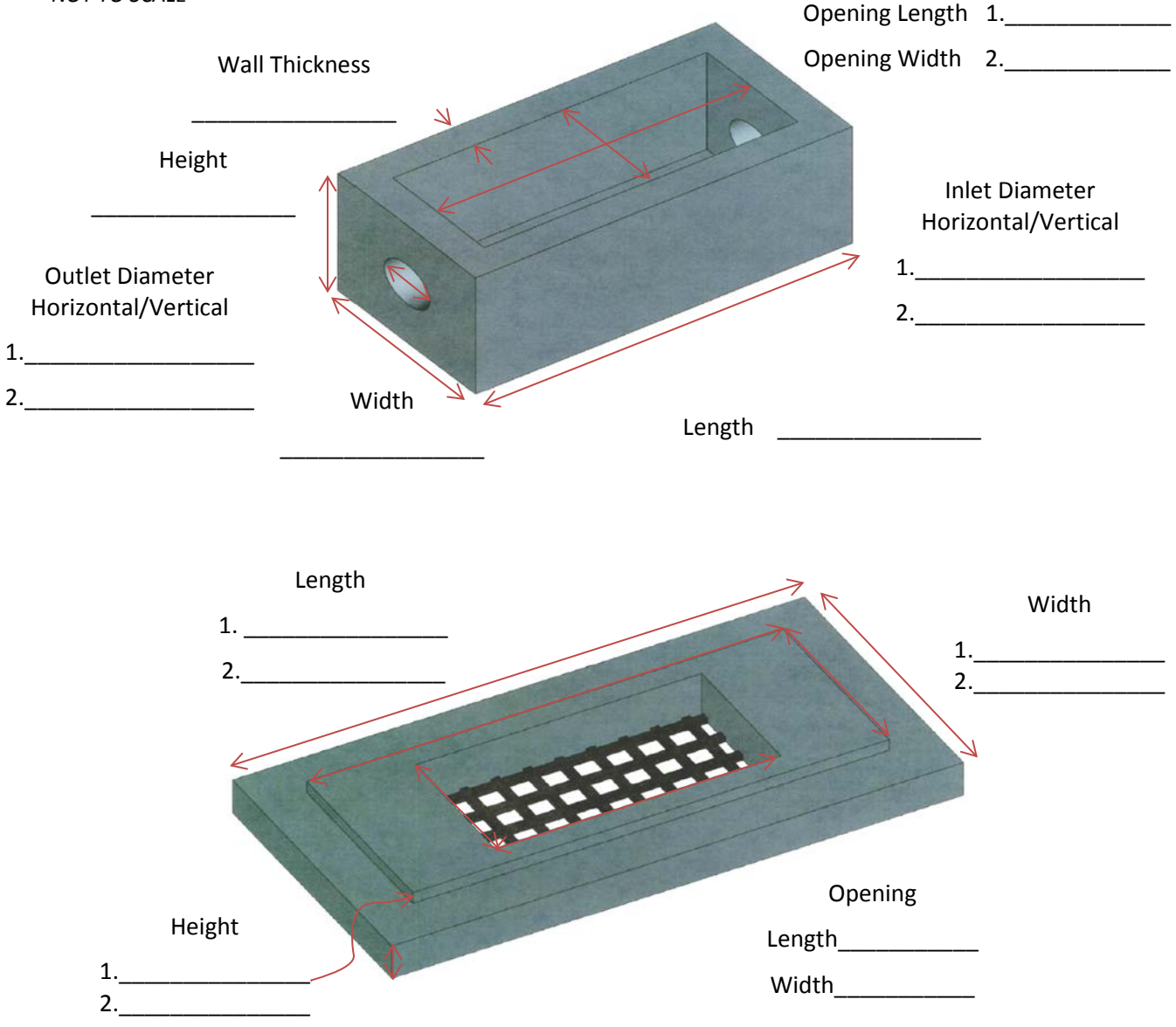
2.4.2 Circular Concrete & Lid

3.0 NON-DESTRUCTIVE VERIFICATION

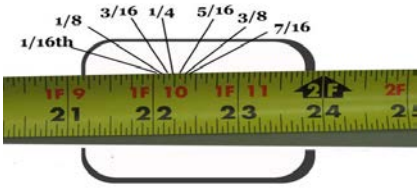
3.1 Dimensional Measurements

3.1.1 Square and Rectangular Concrete (Drainage Catch Basins)

NOT TO SCALE



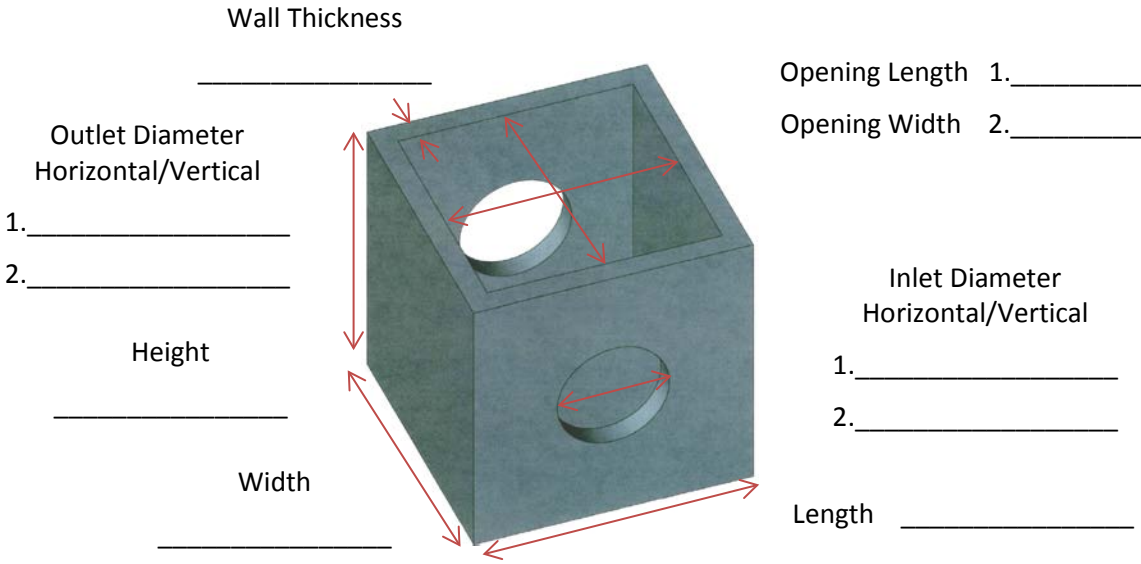
Note: All Measurements shall be reported to 1/16”

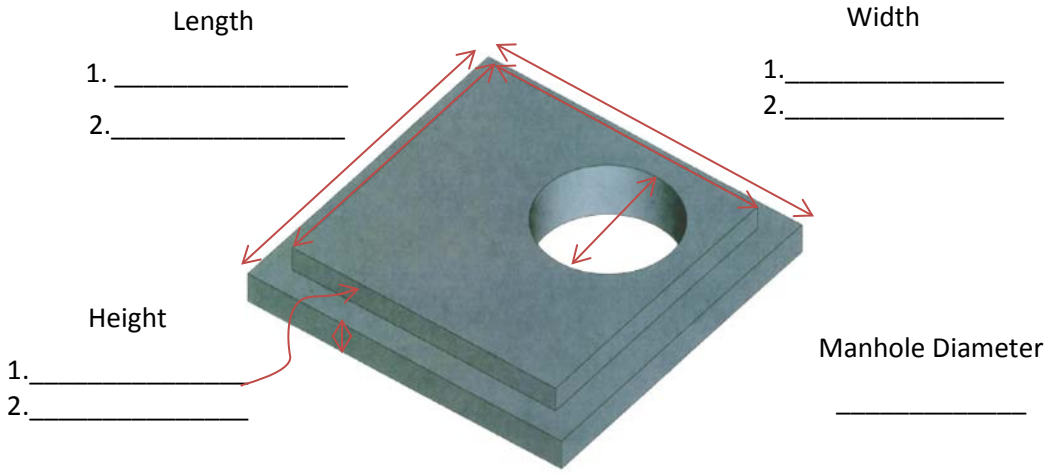


3.0 NON-DESTRUCTIVE VERIFICATION (CONTINUED)

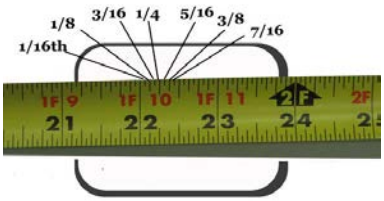
3.1.2 Square Concrete (Drainage Manhole)

NOT TO SCALE





Note: All Measurements shall be reported to 1/16”



3.0 NON-DESTRUCTIVE VERIFICATION (CONTINUED)

3.1.3 Endwall

NOT TO SCALE

Head Wall Thickness

_____

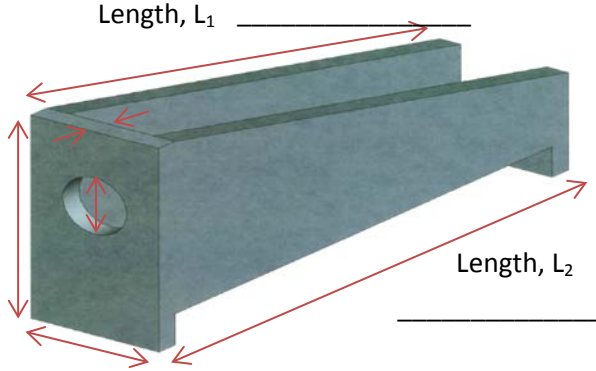
Height

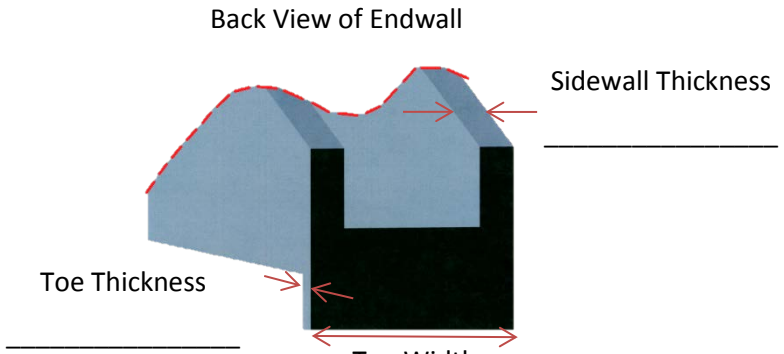
_____

Inlet Diameter
Horizontal/Vertical

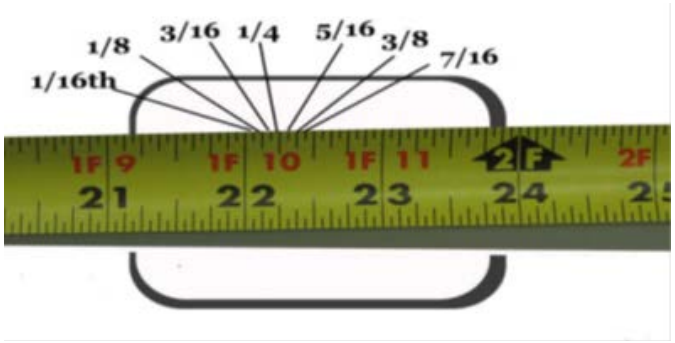
1._____

2._____





Note: All Measurements shall be reported to 1/16”



3.0 NON-DESTRUCTIVE VERIFICATION (CONTINUED)

3.1.4 Square Concrete (Drainage Junction Box)

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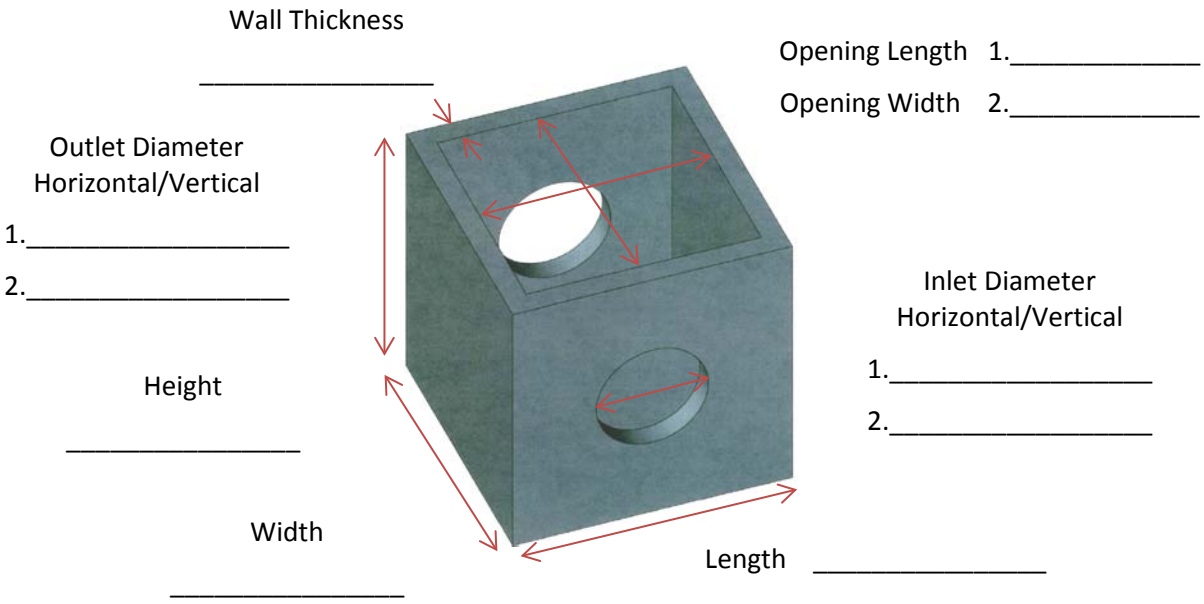
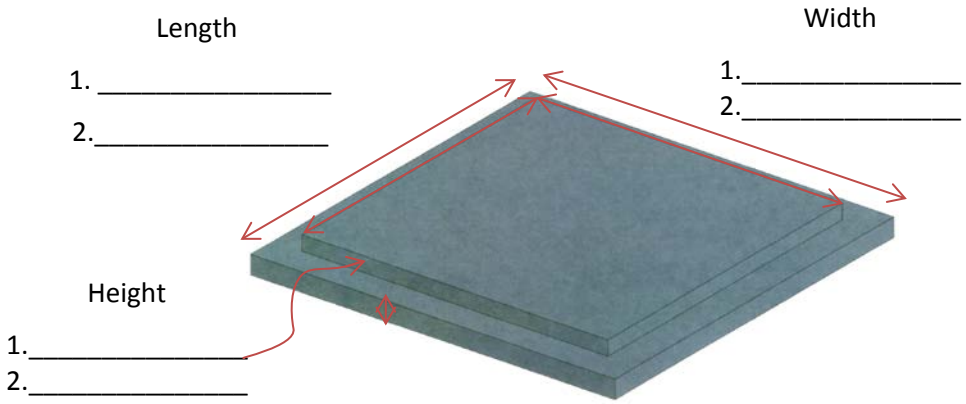
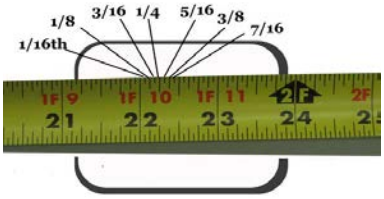




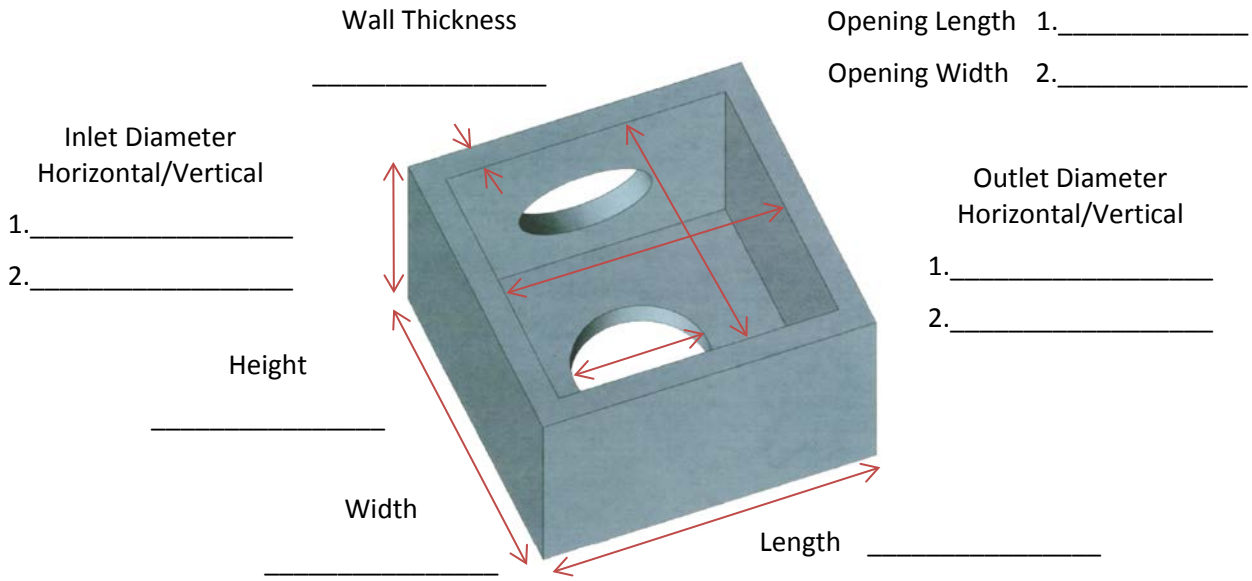
Note: All Measurements shall be reported to 1/16”

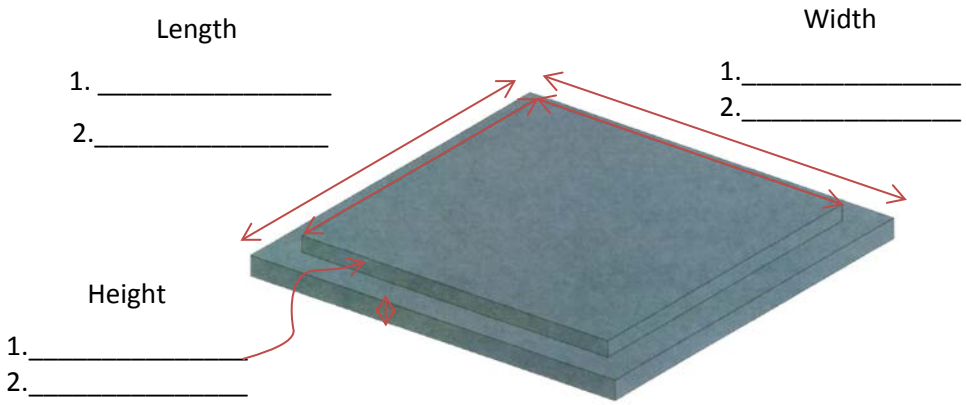


3.0 NON-DESTRUCTIVE VERIFICATION (CONTINUED)

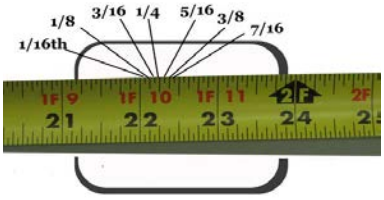
3.1.5 Square Concrete (Drainage Spring Box)

NOT TO SCALE





Note: All Measurements shall be reported to 1/16”



3.0 NON-DESTRUCTIVE VERIFICATION (CONTINUED)

3.1.6 Standard Precast Circular (Drainage Catch Basins)

NOT TO SCALE

Inside Diameter

_____

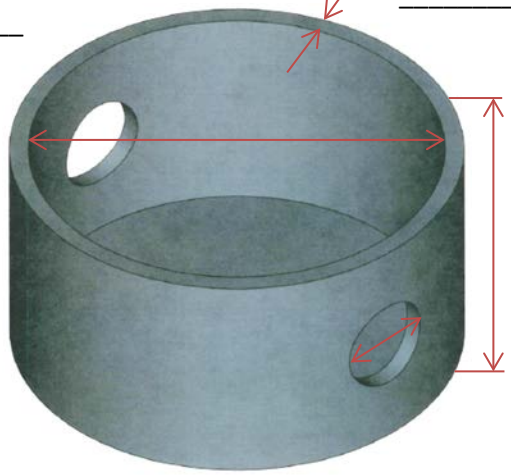
Wall Thickness

_____

Inlet Diameter
Horizontal/Vertical

1._____

2._____



Height

_____

Outlet Diameter
Horizontal/Vertical

1._____

2._____

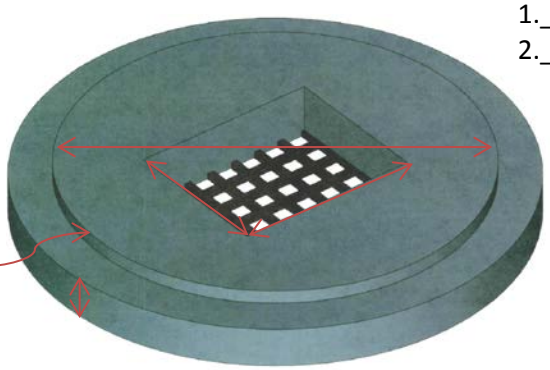
Inside Depth

_____

Diameter

1._____

2._____



Height

1._____

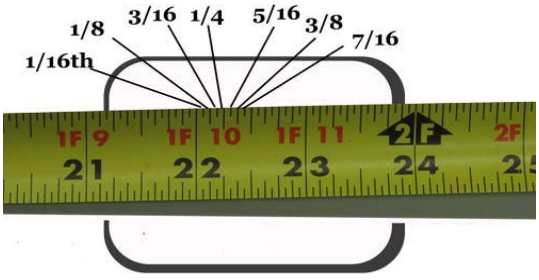
2._____

Opening

Length_____

Width_____

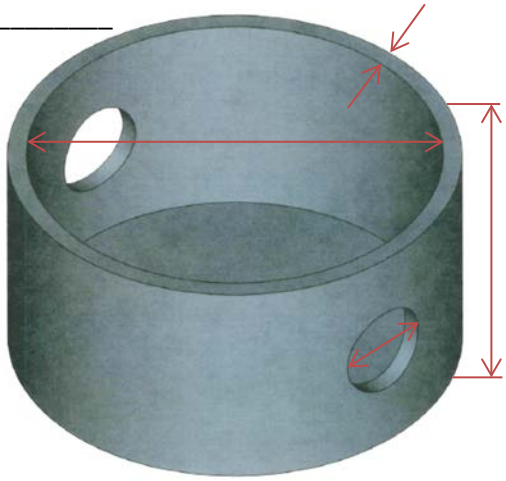
Note: All Measurements shall be reported to 1/16”



3.0 NON-DESTRUCTIVE VERIFICATION (CONTINUED)

3.1.7 Standard Precast Circular (Drainage Manhole)

NOT TO SCALE



Inside Diameter

_____

Wall Thickness

_____

Inlet Diameter
Horizontal/Vertical

1._____

2._____

Height

_____

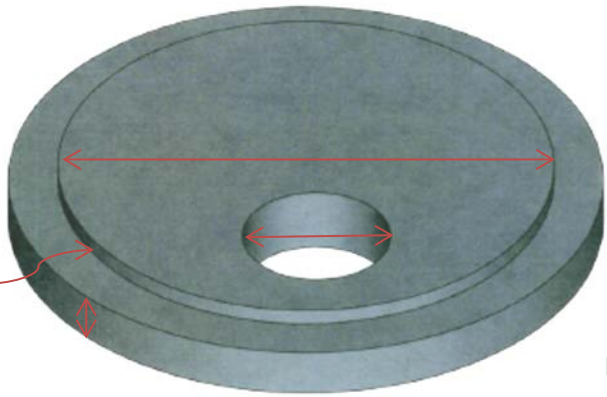
Inside Depth

_____

Outlet Diameter
Horizontal/Vertical

1._____

2._____



Diameter

1._____

2._____

Height

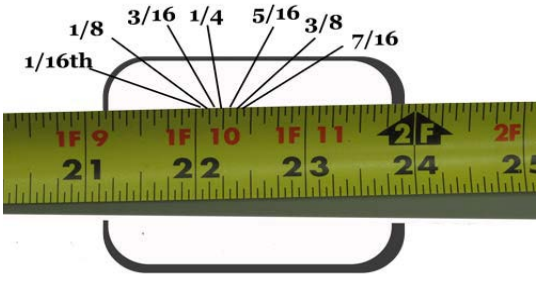
1._____

2._____

Manhole Diameter

_____

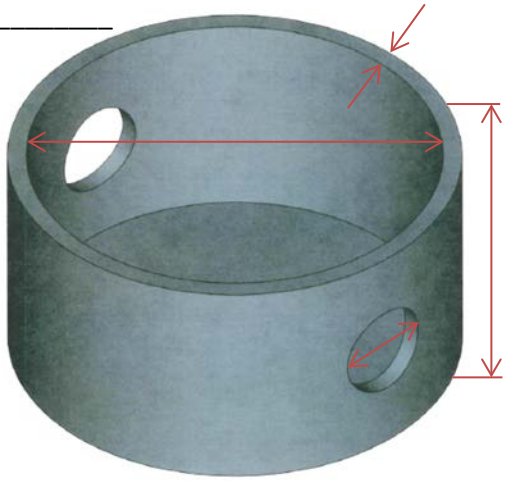
Note: All Measurements shall be reported to 1/16”



3.0 Non-Destructive verification (continued)

3.1.8 Standard Precast Circular (Drainage Junction Box)

NOT TO SCALE



Wall Thickness

_____

Inside Diameter

_____

Inlet Diameter
Horizontal/Vertical

1._____

2._____

Height

_____

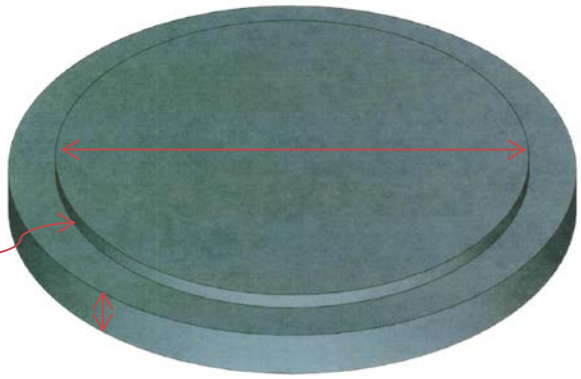
Inside Depth

_____

Outlet Diameter
Horizontal/Vertical

1._____

2._____



Height

1._____

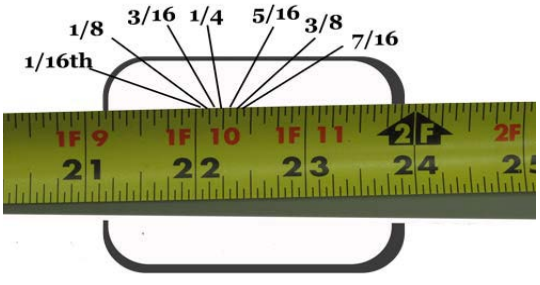
2._____

Diameter

1._____

2._____

Note: All Measurements shall be reported to 1/16”



3.0 NON-DESTRUCTIVE VERIFICATION (CONTINUED)

3.1.9 Standard Precast Circular (Drainage Junction Box)

NOT TO SCALE

Inside Diameter

_____

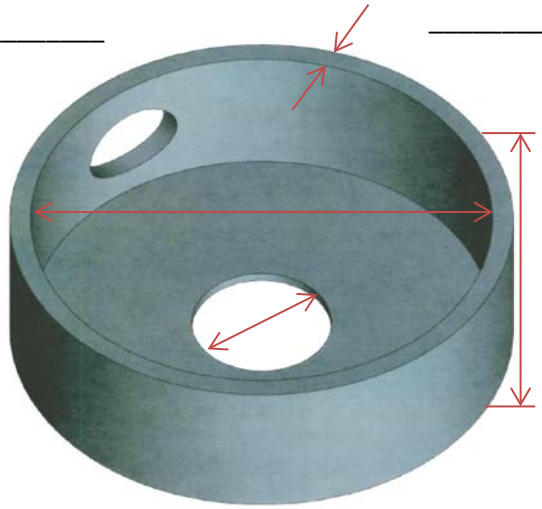
Wall Thickness

_____

Inlet Diameter
Horizontal/Vertical

1._____

2._____



Height

_____

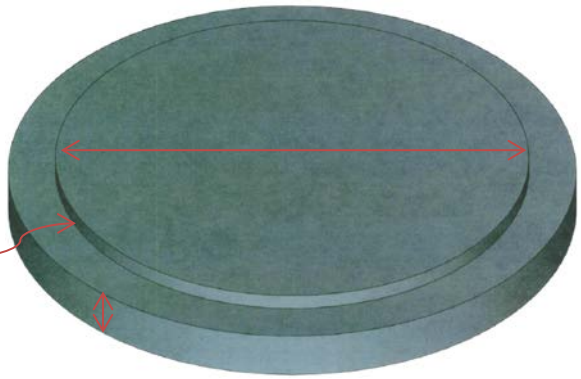
Inside Depth

_____

Outlet Diameter
Horizontal/Vertical

1._____

2._____



Height

1._____

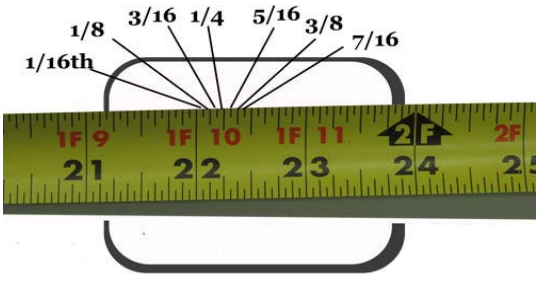
2._____

Diameter

1._____

2._____

Note: All Measurements shall be reported to 1/16”

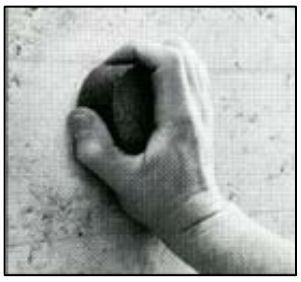


3.2 Verification of Concrete Strength (SCHMIDT Hammer Method)

The SCHMIDT concrete test hammer (also known as "Swiss Hammer") is designed for the non-destructive testing of the uniformity of concrete and for **estimating the compressive strength**. The test-hammer strikes the concrete with defined force, a body rebounds depending on the hardness of the concrete.

3.2.1 SCHMIDT Hammer Measuring Procedure

- Rub test surface with grinding stone.



-Release the impact bolt by applying pressure to it.
-Place test hammer perpendicular to the test surface.

-Press housing against the test surface at moderate speed until impact is triggered.

3.2.2 SCHMIDT Hammer Calculation

Per **ASTM C-805** 9.1 Discard readings differing from the average of 10 readings by **more than 6 units** and determine the average of the remaining readings. If more than 2 readings differ from the average by 6 units, discard the entire set of readings and determine rebound numbers at 10 new locations within the test area as shown in Table 1 below.

Table 1: Verification of Concrete Strength by SCHMIDT Hammer Method

Blow No.	Rebound	Blow No.	Rebound
1	32	6	39
2	35	7	45
3	36	8	32
4	33	9	29
5	31	10	34

REBOUND AVERAGE: 34.6

Blow No.	Rebound	Blow No.	Rebound
1	32	6	39
2	35	7	~~45~~
3	36	8	32
4	33	9	29
5	31	10	34

REBOUND AVERAGE: 33.4

Note: Eliminate values higher or lower than 6 units of first average rebounds.

COMPRESSIVE STRENGTH: 3600 psi

Note: Compressive Strength from Concrete Hammer Graph Position A.

4.0 DESTRUCTIVE VERIFICATION

4.1 Destructive Testing Equipment – The following saws are recommendations. Any type of sawing equipment is acceptable that will provide the appropriate required cuts.

4.1.1 Gas Powered Concrete Chain Saw

695GC AND 695F4 PRODUCT SPECIFICATIONS			
WEIGHT	21 lbs/9.6 kg (without bar and chain)	**BAR LENGTH**	Up to 16" (40 cm)
ENGINE SPEED	9300 +/- 150 rpm, 2700 rpm idle	**POWERHEAD DIMENSIONS**	19"L x 14"H x 12"W (48 cm x 36 cm x 30 cm)
HORSEPOWER	6.4 @ 9000 rpm	**WATER SUPPLY**	Minimum of 20 psi (1.5 bar)
ENGINE TYPE	2-stroke, single cylinder, air cooled	**FUEL MIX RATIO**	25:1 fuel to oil (4% oil)
DISPLACEMENT	5.7 cu. inch (94cc)	**FUEL CAPACITY**	0.26 gal (1.0 liter)

4.1.2 Hydraulic Powered Concrete Chain Saw

880F4 PRODUCT SPECIFICATIONS - 12 GPM	
WEIGHT	27.3 lbs (12.4 kg) with 15-inch (38 cm) bar and chain
BAR LENGTH	Up to 25 in (63 cm)
MOTOR SPEED	6400 rpm
POWERHEAD DIMENSIONS	23 in (58.5 cm) length 10.5 in (26.5 cm) height 9.5 in (24 cm) width
TORQUE	172 in-lbs (19.5 Nm)
HORSEPOWER	17.5 hp (13 kW)
HYDRAULIC SUPPLY	12 gpm (45 lpm), 2500 psi (172.5 bar)
NOISE LEVEL	88 dB @ 3 ft (1 m)
VIBRATION LEVEL	4 meters/second^2 (front handle)
WATER SUPPLY	Minimum 20 psi (1.5 bar)

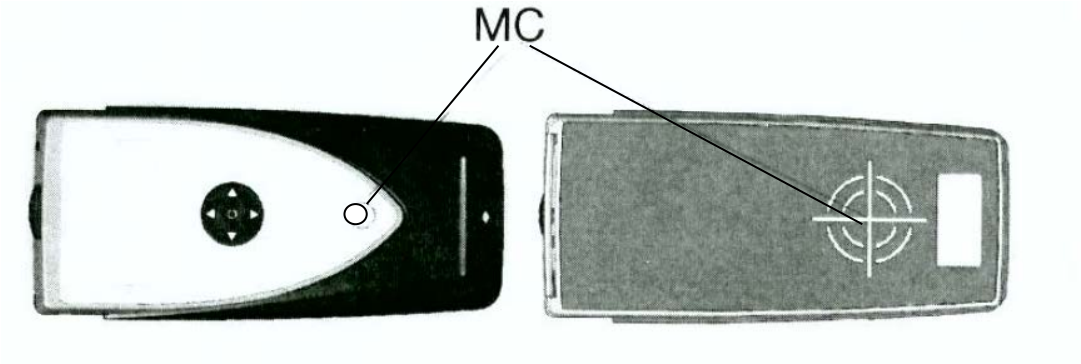
· *Product data shown is rated based on maximum input conditions and efficiency assumptions and may vary dependent on power supply.*

4.0 DESTRUCTIVE VERIFICATION

4.1.3. Location of Steel (Pachometer Method)

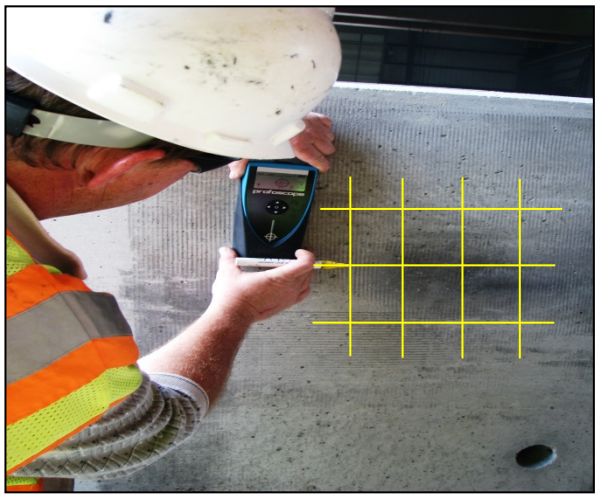
First time user: Complete the tutorial OR see a demo by a qualified representative. Also, please refer to manufacturer user's manual for further instructions.

1. Verify that there are no metal items on hands, fingers, or in the vicinity of test area
2. Power on: Press the ON/OFF button on the top panel
3. Reset the Instrument
4. Check the location of the Measurement Center (MC) which indicates the center of the probe



5. Check the operation with the start-up test kit and confirm:
   - -The location and orientation of the rebar
   - -The position between two rebar
   - -Cover depth 15mm/0.59" and 60mm/2.36"
   - -Diameter 16 mm/ #5

6. Locate and draw horizontal and vertical bars prior to cut as shown in Figures below



4.0 DESTRUCTIVE VERIFICATION (CONTINUED)

4.2 Drainage Structure Types

Figures 1 through 9 illustrate the different types of structures and possible saw cut locations. Saw cut locations and data sheets for each specific structure are detailed on the following pages.

Catch Basin

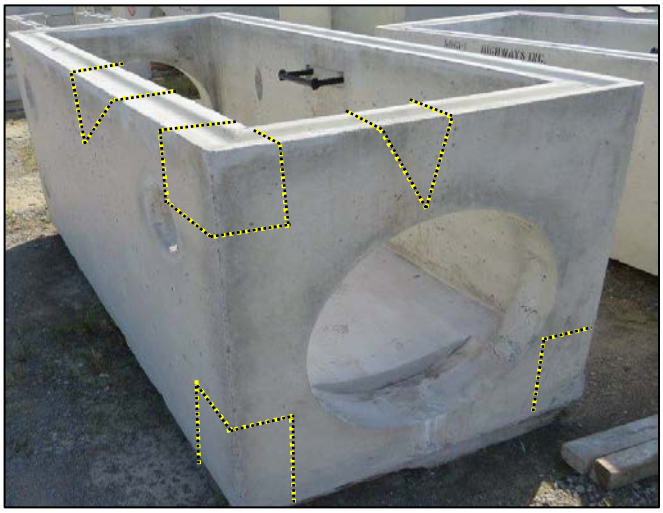


Figure 1

Lid

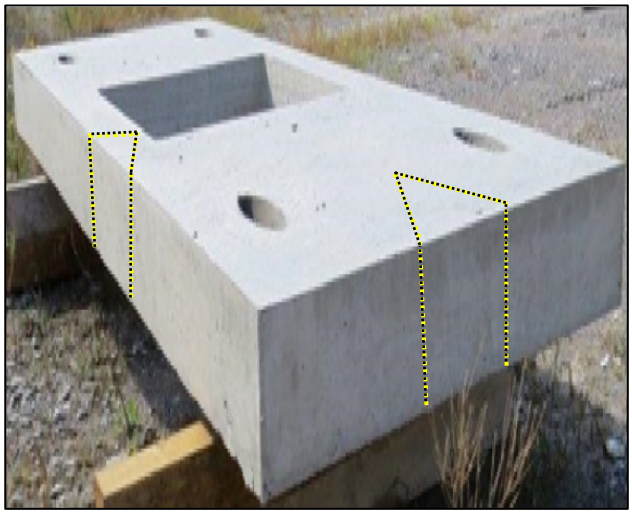


Figure 2

Manhole

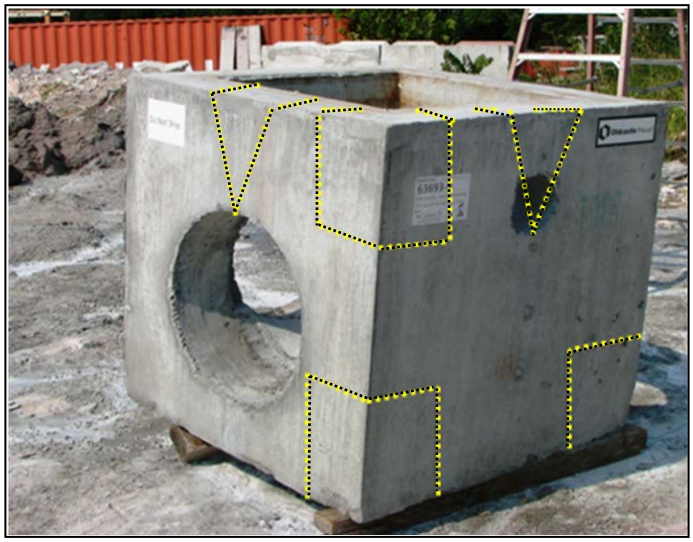


Figure 3

Lid

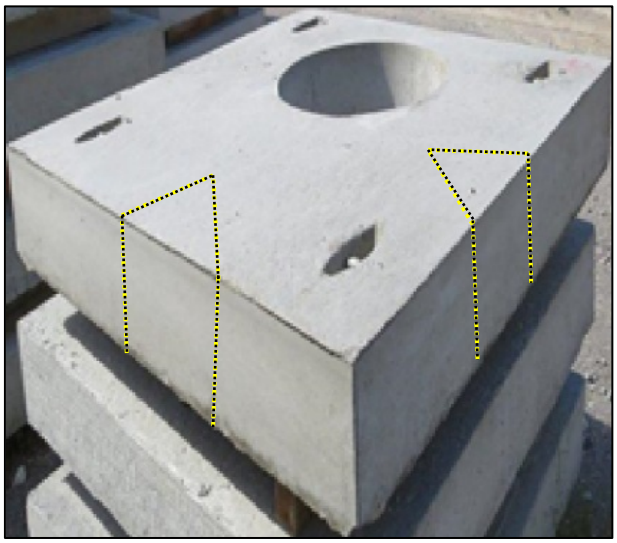


Figure 4

Endwall

Pipe End View

Figure 5

Side View

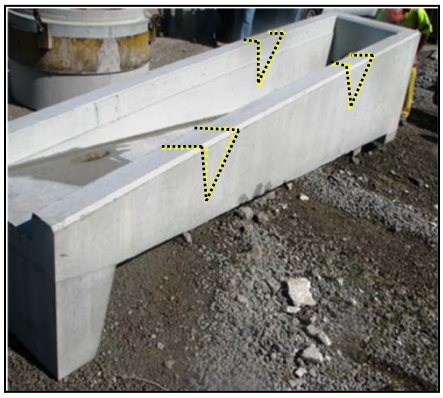


Figure 6

Toe End View

Figure 7

Junction and Spring Box

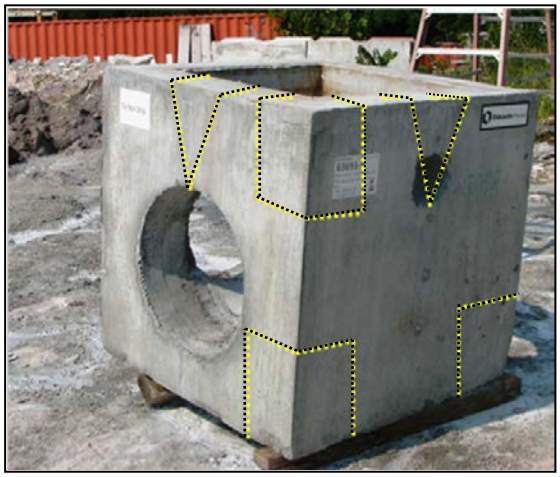


Figure 8

Lid

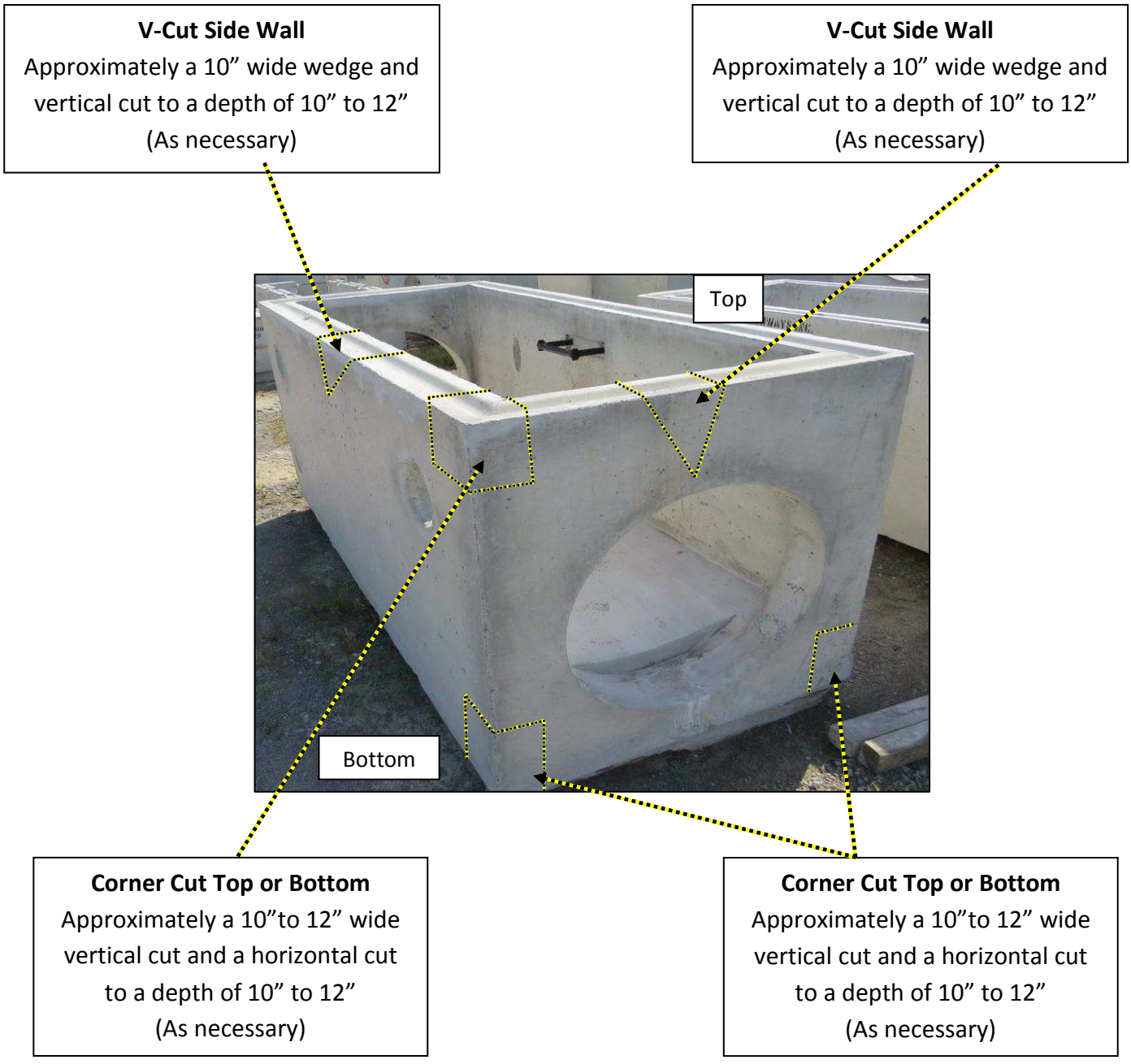
Figure 9

4.0 DESTRUCTIVE VERIFICATION (CONTINUED)

4.3. Drainage Catch Basins

4.3.1. Square and Rectangular Concrete

It's recommended that a minimum of **two saw cuts shall be made**. These cuts should include **one corner** cut and **one V-cut**. Corner cuts can be made on any of the eight corners of the structure. The V-cut can be taken from any side of the structure including directly over an inlet or outlet.



4.0 DESTRUCTIVE VERIFICATION (CONTINUED)

4.3.1.1. Verification of the Steel Placement (Saw Cut Method)

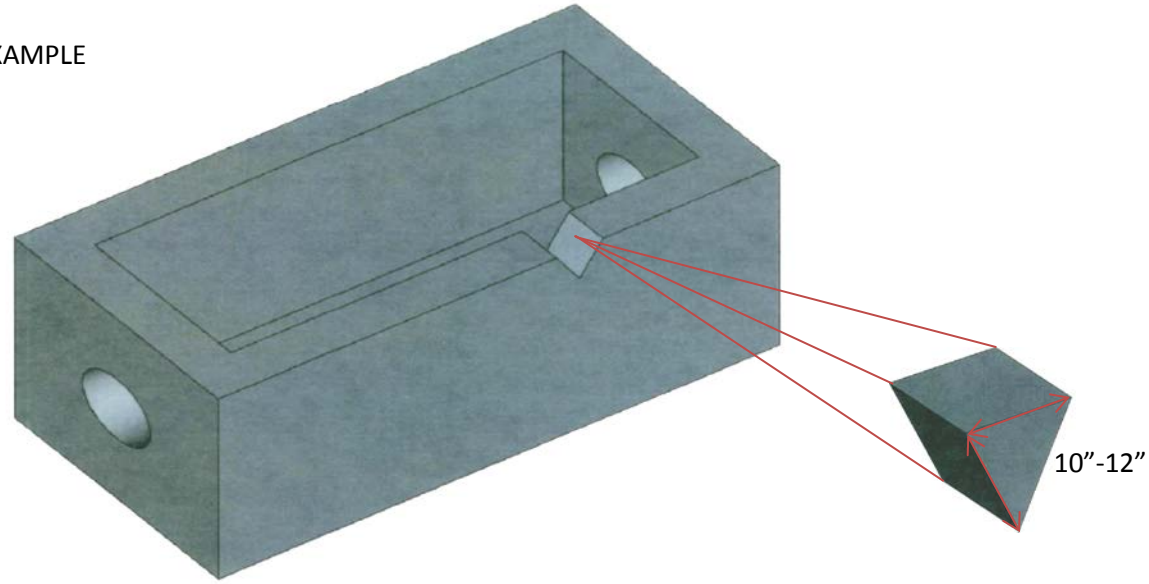
The following shows a recommended procedure for making a V-Cut and a Corner Cut for a Square and Rectangular Concrete Catch Basin.

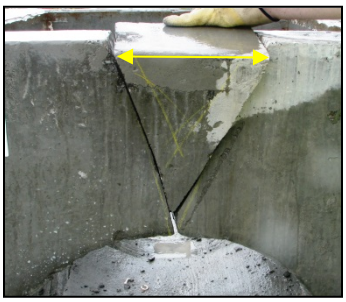
V-CUT ON SIDE OR OVER OUTLET/INLET

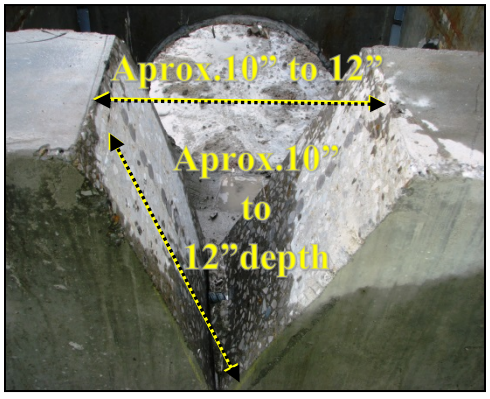
1. Choose the location of the V-cut; the cut shall be from the top edge of the structure or over an inlet or outlet.

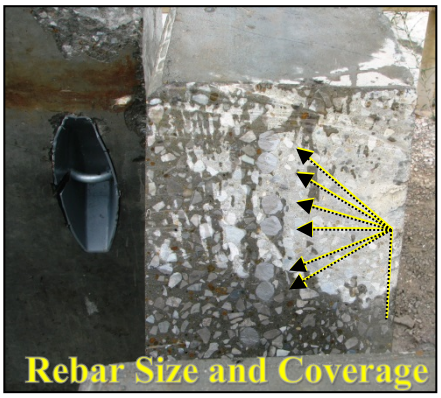
2. Measure and mark an area approximately **10 to 12** inches wide.

V-CUT EXAMPLE









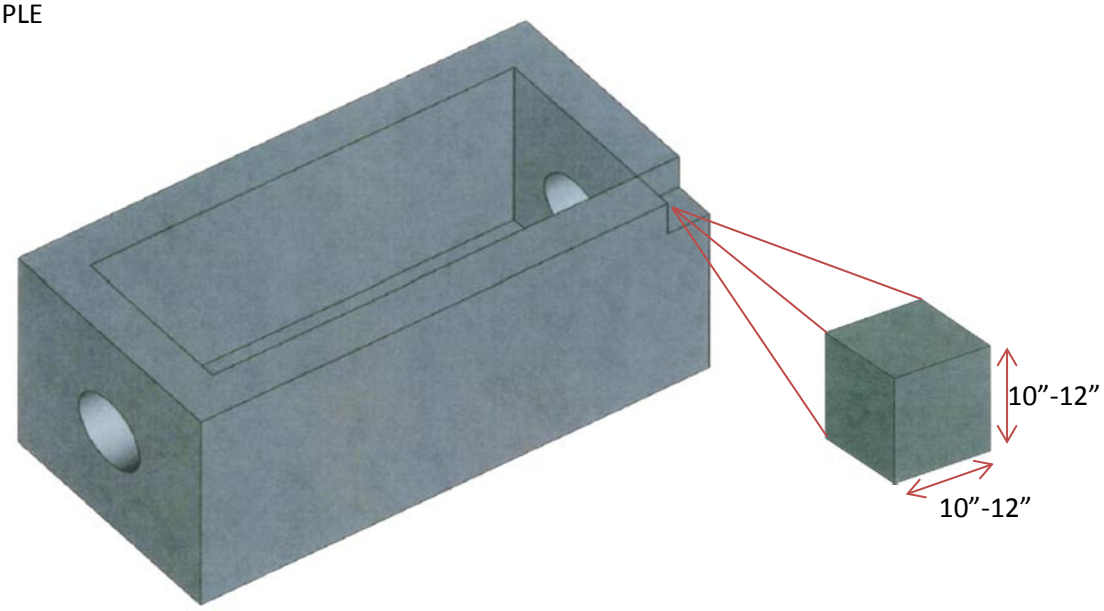
4.0 DESTRUCTIVE VERIFICATION (CONTINUED)

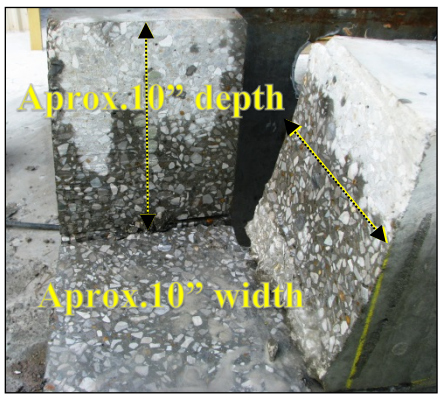
CORNER CUT TOP OR BOTTOM

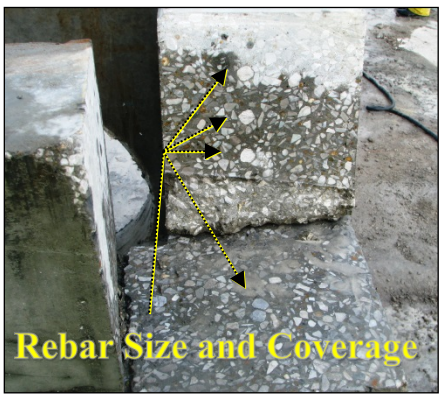
1. Choose the location of the corner cut; corner cut can be made on any of the eight corners of the structure.

2. Measure and mark an area approximately **10 to 12** inches wide.

CORNER CUT EXAMPLE





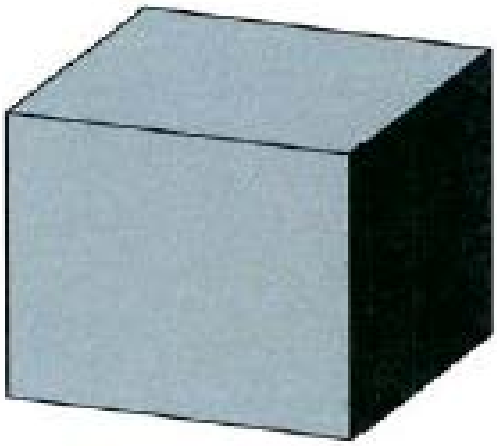


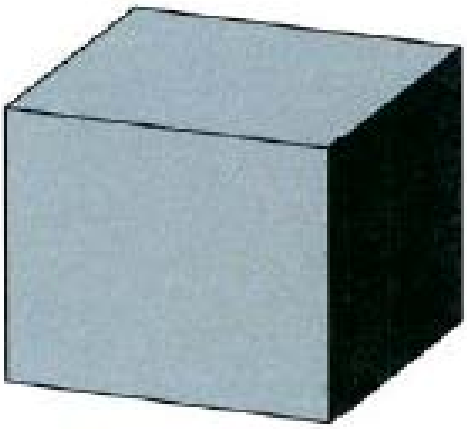
4.0 DESTRUCTIVE VERIFICATION (CONTINUED)

4.3.1.2 Confirm Rebar Size, Spacing, and Coverage

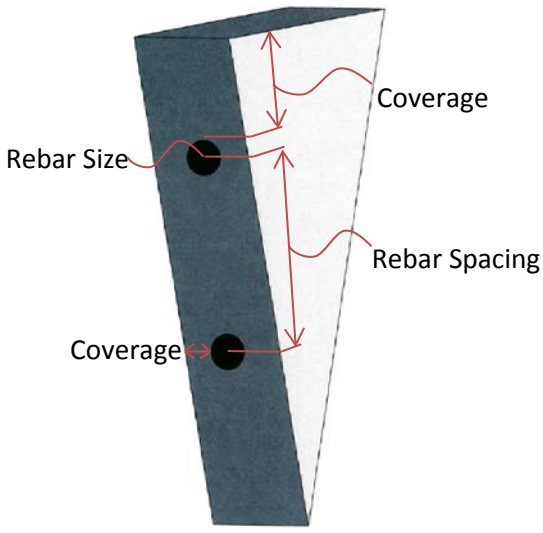
Verify Rebar Size, Spacing, & Coverage

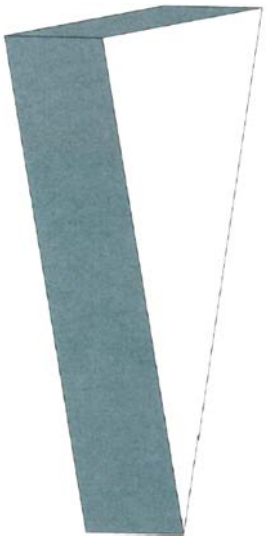
DOCUMENT ALL MEASUREMENTS BELOW





Example



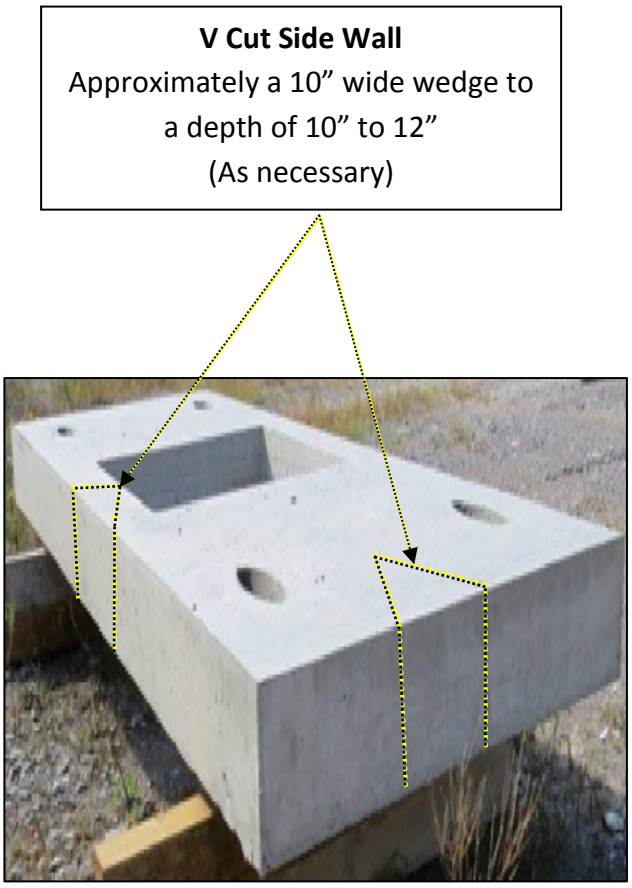


Example

4.0 DESTRUCTIVE VERIFICATION (CONTINUED)

4.3.2. Square/Rectangular Precast Lids

It's recommended that at a minimum of **two V-cut** shall be made. The V-cut can be taken from any side of the structure. The following shows the recommended procedure for making a V-Cut on a square/rectangular lid.



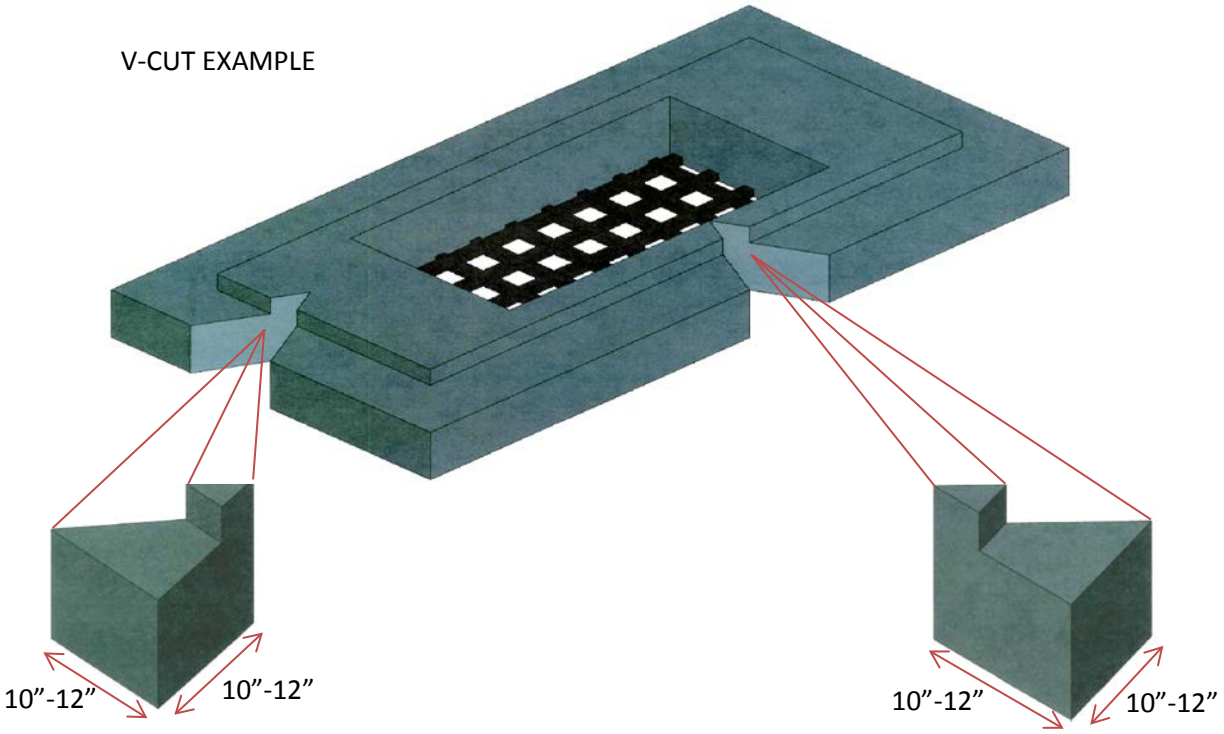
4.0 Destructive verification (continued)

4.3.2.1 Verification of the Steel Placement (Saw Cut Method)

The following shows a recommended procedure for making a V-Cut from a square/rectangular lid.

1. Choose the location of the V-cut; the cut shall be from two sides of the lid.

2. Measure and mark a wedge **10 to 12** inches wide and deep.

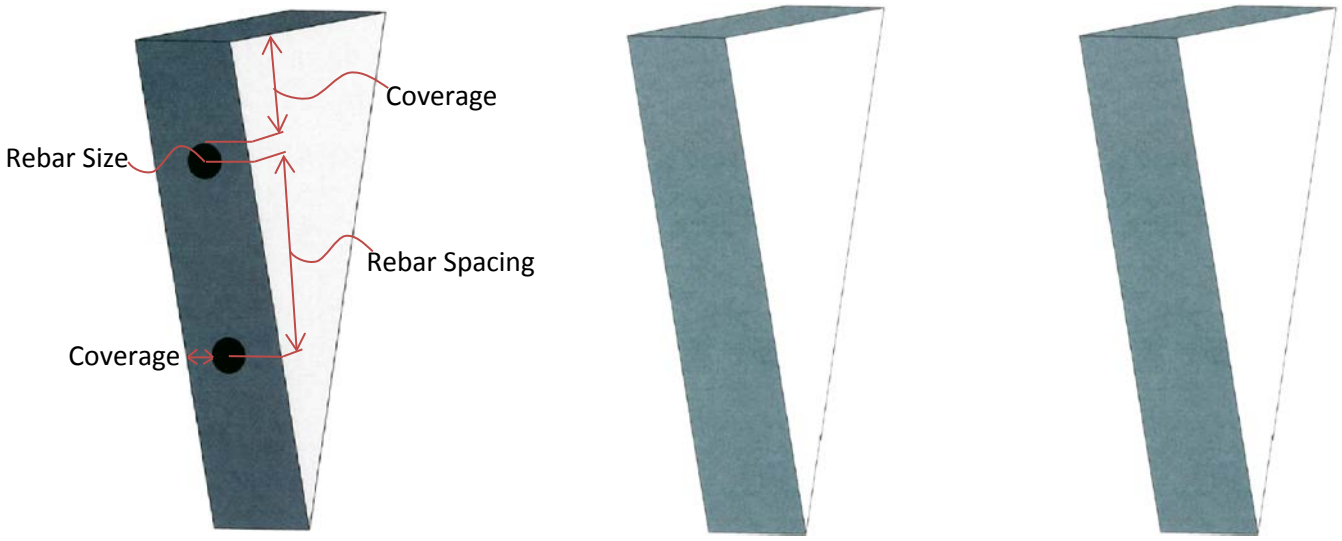


4.0 DESTRUCTIVE VERIFICATION (CONTINUED)

4.3.2.2 Confirm Rebar Size, Spacing, and Coverage

Verify Rebar Size, Spacing, & Coverage

DOCUMENT ALL MEASUREMENTS BELOW



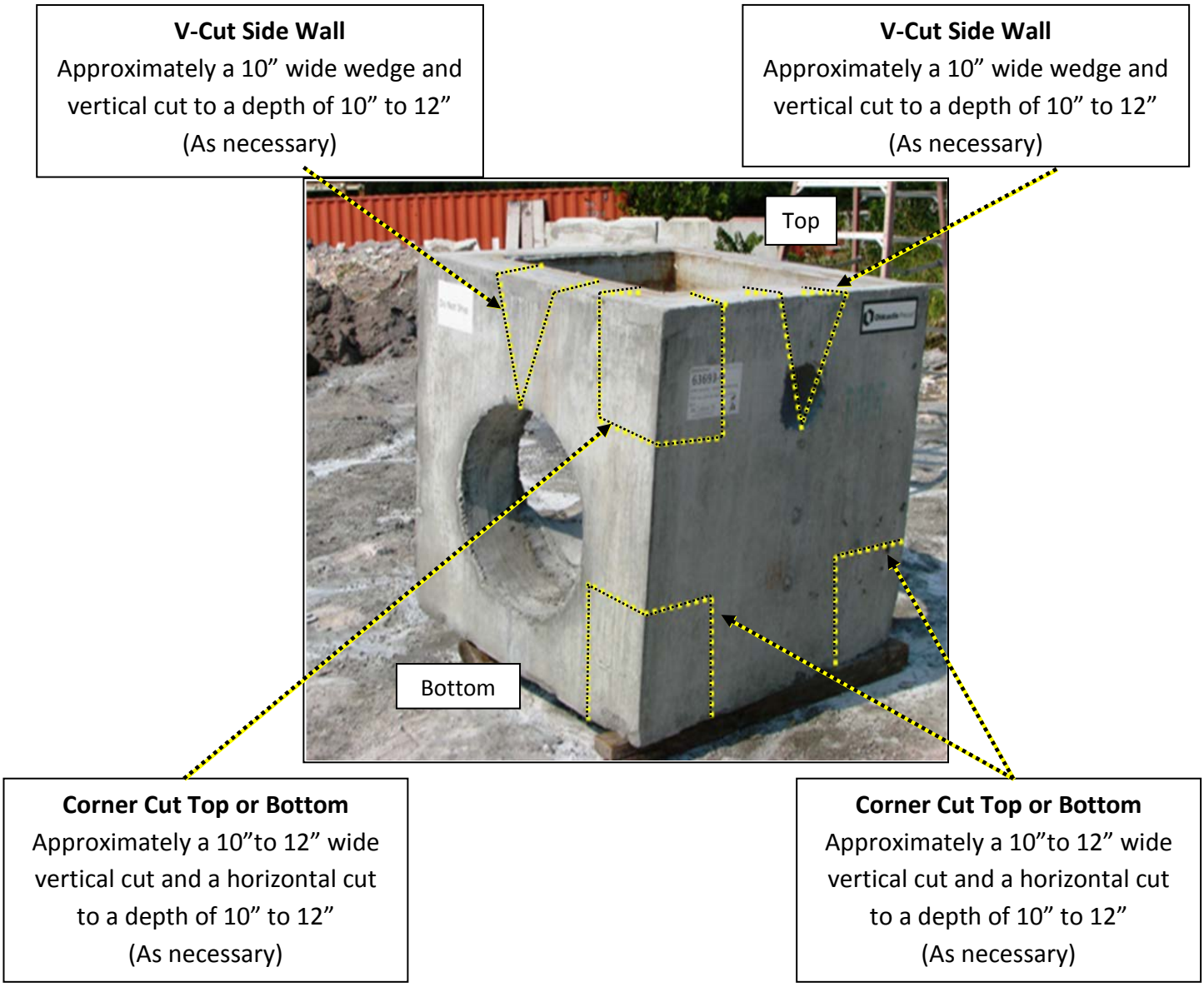
Example

4.0 DESTRUCTIVE VERIFICATION (CONTINUED)

4.4. Drainage Manhole

4.4.1. Square Concrete

It's recommended that a minimum of **two saw cuts shall be made**. These cuts should include **one corner** cut and **one V-cut**. Corner cuts can be made on any of the eight corners of the structure. The V-cut can be taken from any side of the structure including directly over an inlet or outlet.



4.0 DESTRUCTIVE VERIFICATION (CONTINUED)

4.4.1.1. Verification of the Steel Placement (Saw Cut Method)

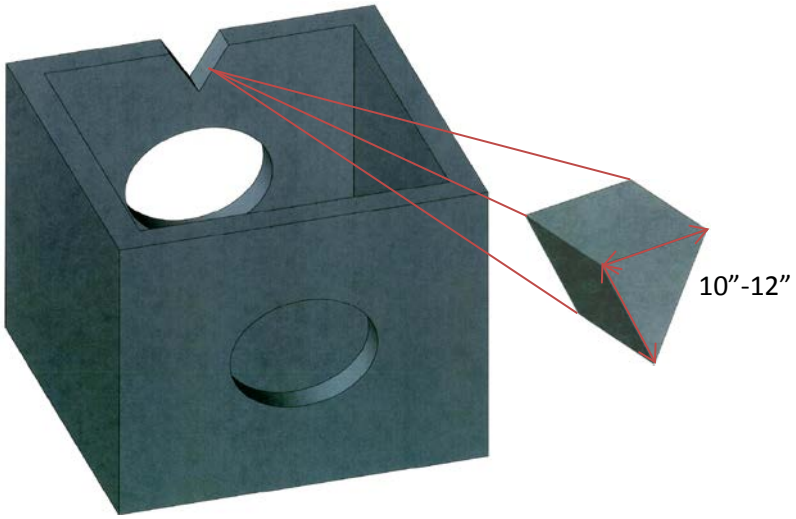
The following shows a recommended procedure for making a V-Cut and a Corner Cut for a Square Concrete Manhole.

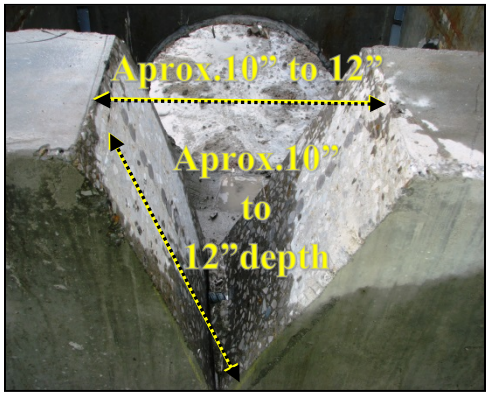
V-CUT ON SIDE OR OVER OUTLET/INLET

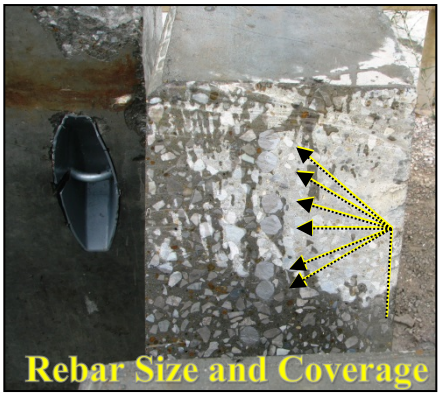
3. Choose the location of the V-cut; the cut shall be from the top edge of the structure or over an inlet or outlet.

4. Measure and mark an area approximately **10 to 12** inches wide.

V-CUT EXAMPLE







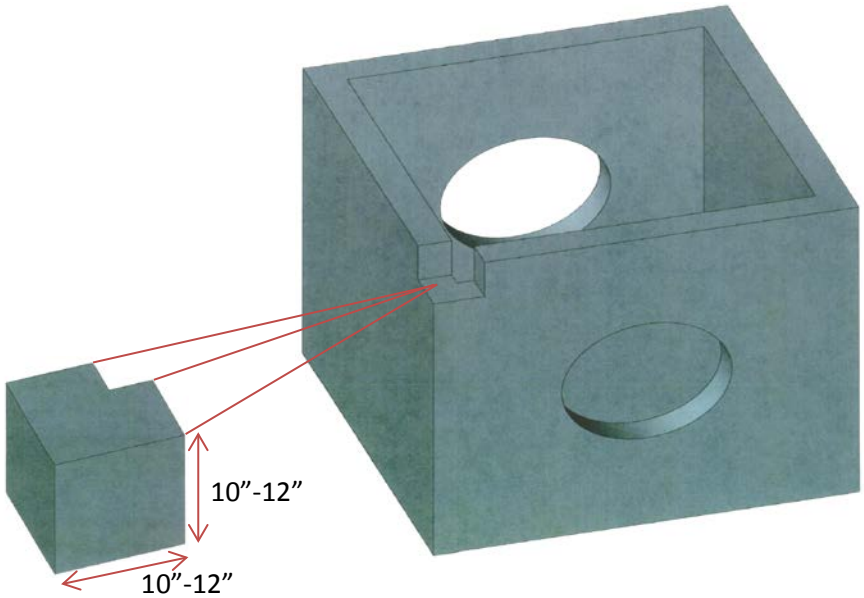
4.0 DESTRUCTIVE VERIFICATION (CONTINUED)

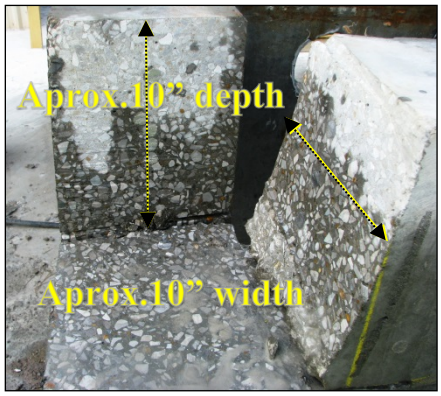
CORNER CUT TOP OR BOTTOM

3. Choose the location of the corner cut; corner cut can be made on any of the eight corners of the structure.

4. Measure and mark an area approximately **10 to 12** inches wide.

CORNER CUT EXAMPLE



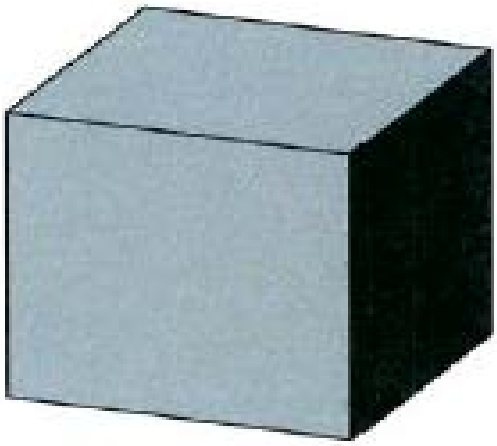


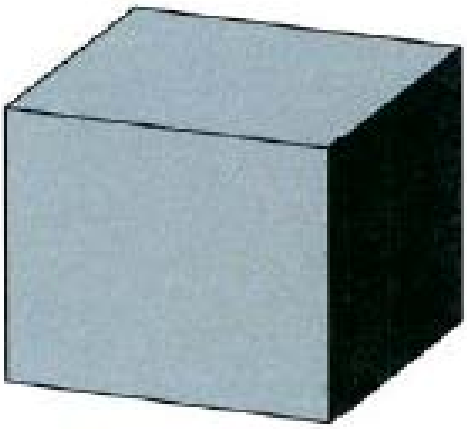
4.0 DESTRUCTIVE VERIFICATION (CONTINUED)

4.4.1.2 Confirm Rebar Size, Spacing, and Coverage

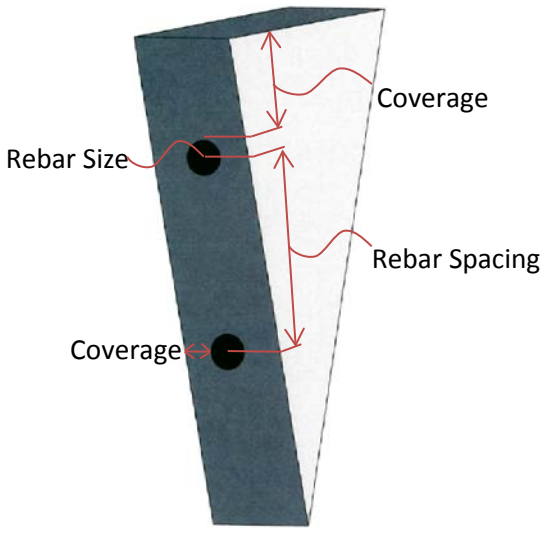
Verify Rebar Size, Spacing, & Coverage

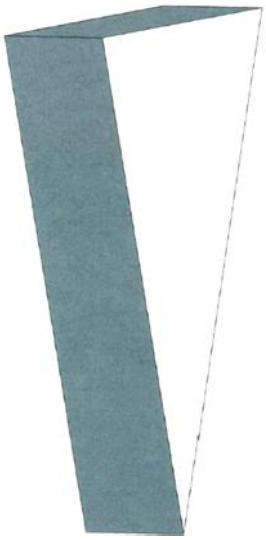
DOCUMENT ALL MEASUREMENTS BELOW





Example



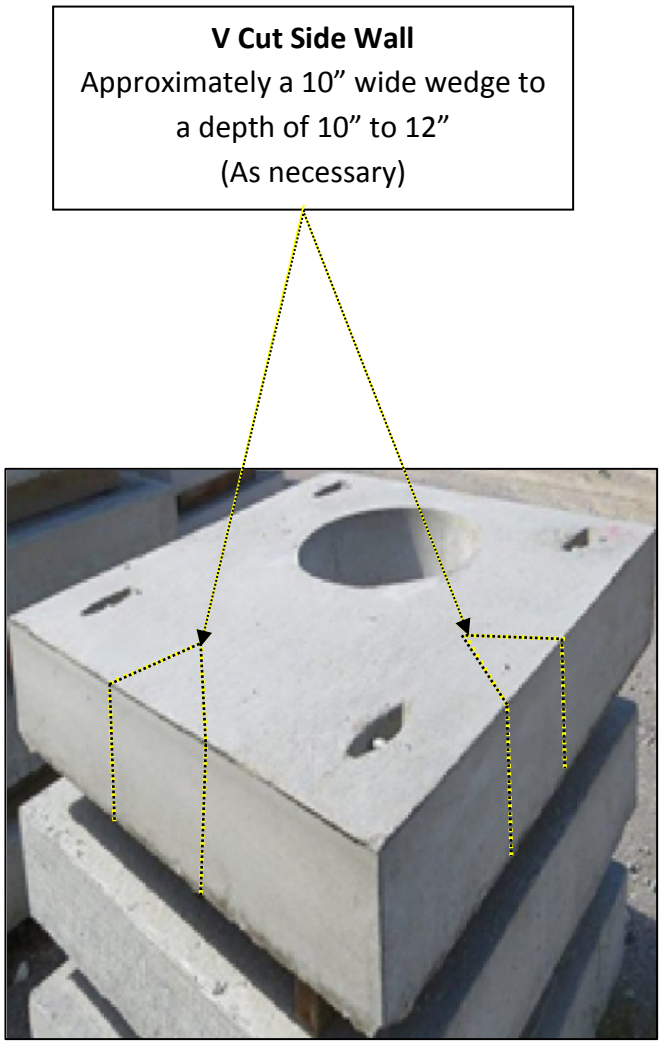


Example

4.0 DESTRUCTIVE VERIFICATION (CONTINUED)

4.4.2. Square Precast Lids

It's recommended that at a minimum of **two V-cut** shall be made. The V-cut can be taken from any side of the structure. The following shows the recommended procedure for making a V-Cut on a square lid.



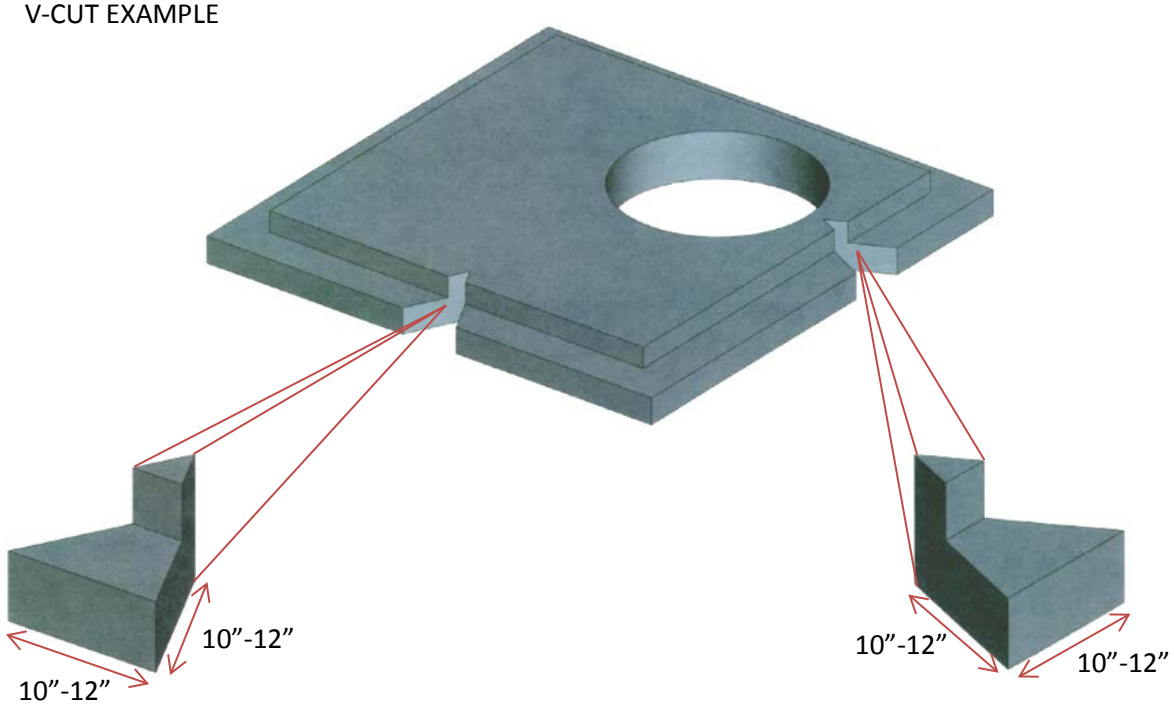
4.0 Destructive verification (continued)

4.4.2.1 Verification of the Steel Placement (Saw Cut Method)

The following shows a recommended procedure for making a V-Cut from a square lid.

3. Choose the location of the V-cut; the cut shall be from two sides of the lid.
4. Measure and mark a wedge **10 to 12** inches wide and deep.

V-CUT EXAMPLE

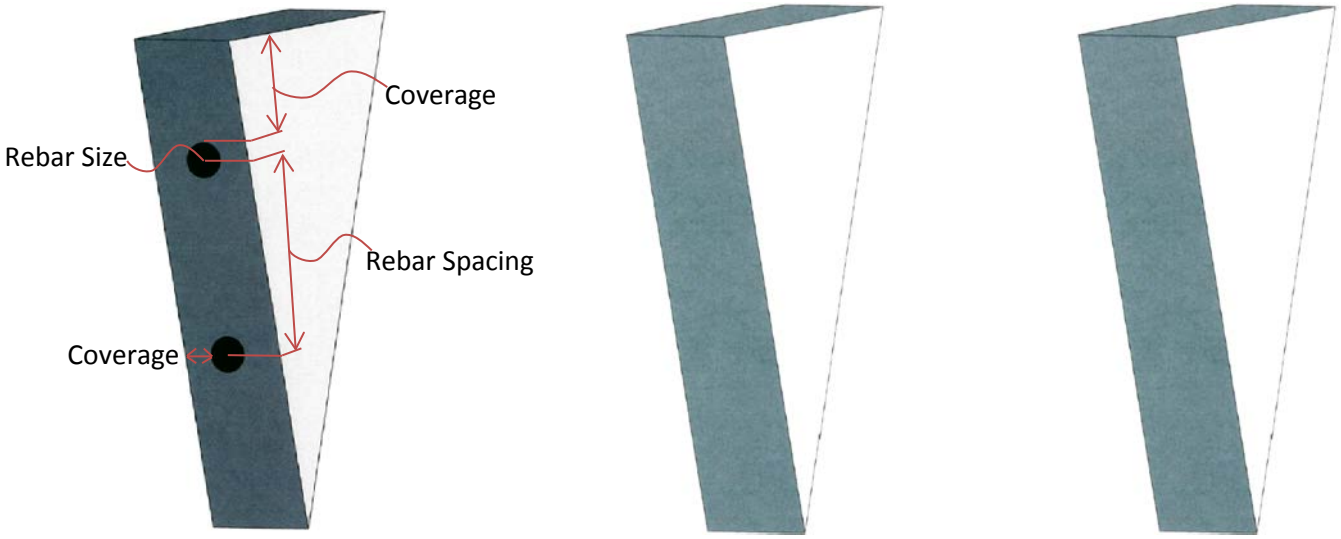


4.0 DESTRUCTIVE VERIFICATION (CONTINUED)

4.4.2.2 Confirm Rebar Size, Spacing, and Coverage

Verify Rebar Size, Spacing, & Coverage

DOCUMENT ALL MEASUREMENTS BELOW



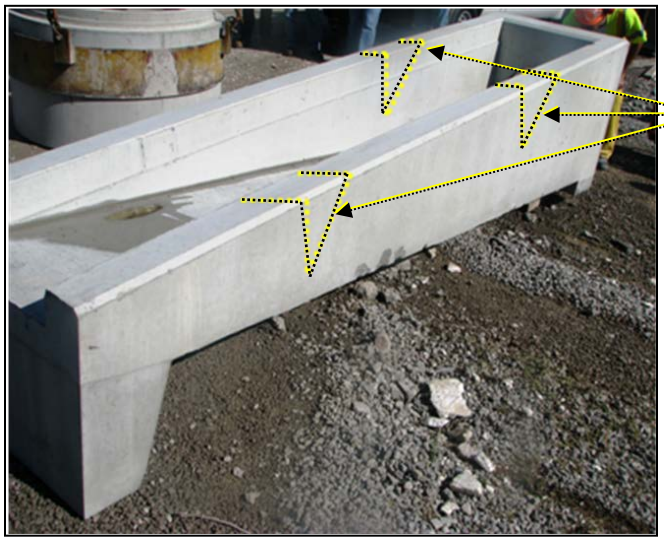
Example

4.0 DESTRUCTIVE VERIFICATION (CONTINUED)

4.5. Endwall

It's recommended that at a minimum of **three saw V-cuts shall be made**. One V-cut shall be taken from any side of the structure, one shall be directly over pipe inlet, and one shall be taken from the toe. The following shows a recommended procedure for multiple V-Cuts for an End Wall

V Cut over Inlet
Approximately a 10"to 12" wide wedge to a depth of 10" to 12"
(As necessary)



V Cut over Inlet
Approximately a 10"to 12" wide wedge to a depth of 10" to 12"
(As necessary)

4.0 DESTRUCTIVE VERIFICATION (CONTINUED)

Top or Bottom V Cut over Toe
A wedge cut approximately 10” to 12” wide

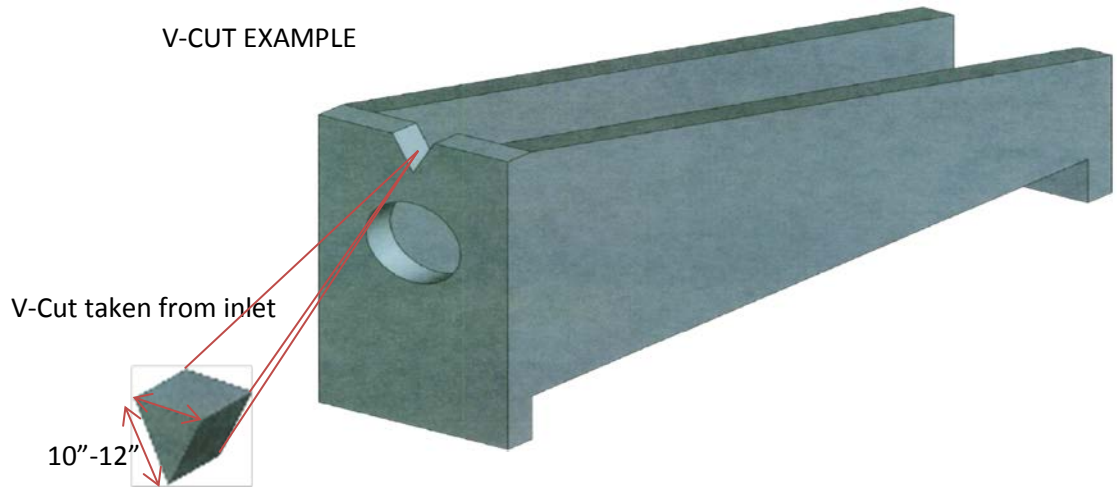
4.0 DESTRUCTIVE VERIFICATION (CONTINUED)

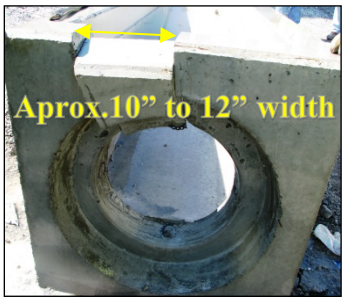
4.5.1 Verification of the Steel Placement (Saw Cut Method)

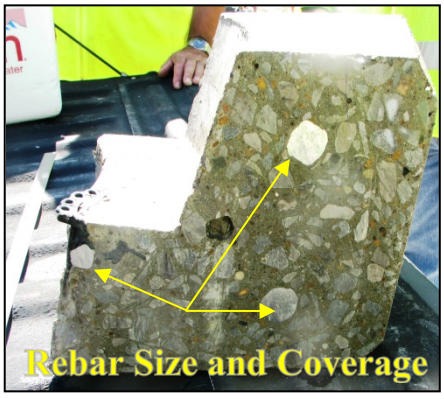
V-CUT OVER INLET

1. Choose the location of the V-cut; the cut shall be from the top edge of the structure and should be over inlet.

2. Measure and mark an area approximately **10 to 12** inches wide.







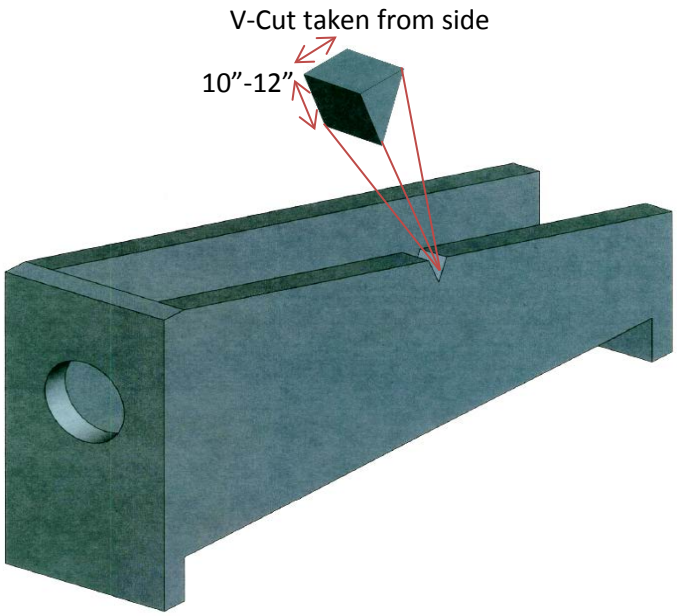
4.0 DESTRUCTIVE VERIFICATION (CONTINUED)

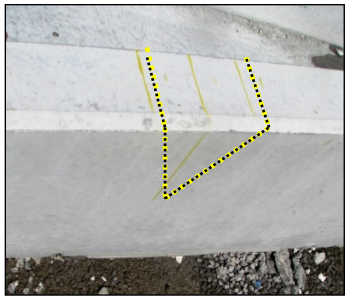
V-CUT ON SIDE

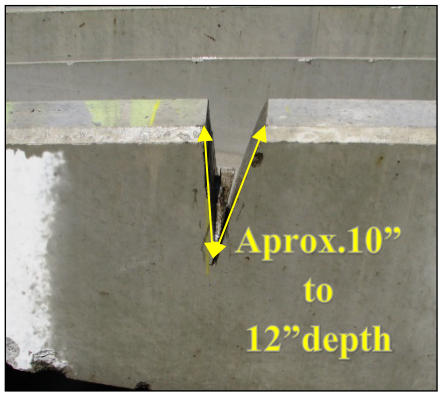
1. Choose the location of the V-cut; the cut shall be from the top edge of the structure and should be on one of the sides.

2. Measure and mark an area approximately **10 to 12** inches wide.

V-CUT EXAMPLE





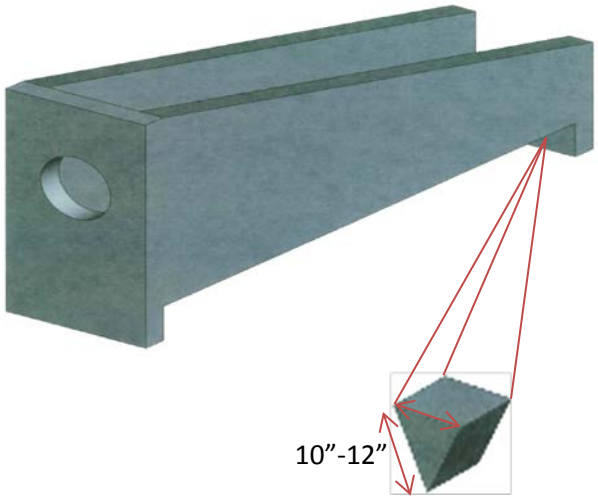


V-CUT ON TOE

1. Choose the location of the V-cut; the cut shall be from the top edge of the structure and should be on top or bottom of Endwall toe.

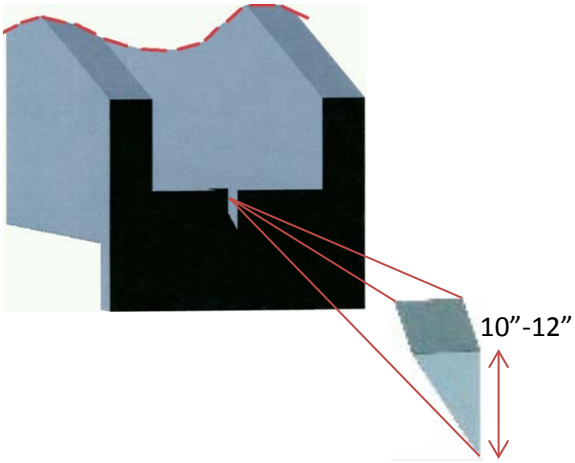
2. Measure and mark an area approximately **10 to 12** inches wide.

V-CUT EXAMPLE

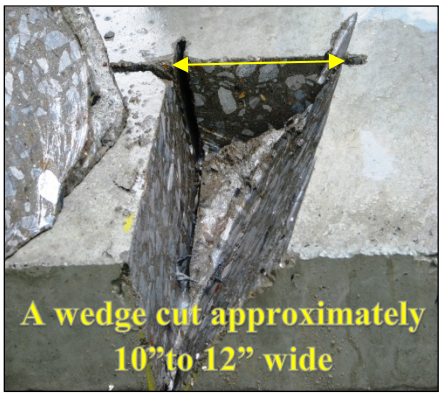


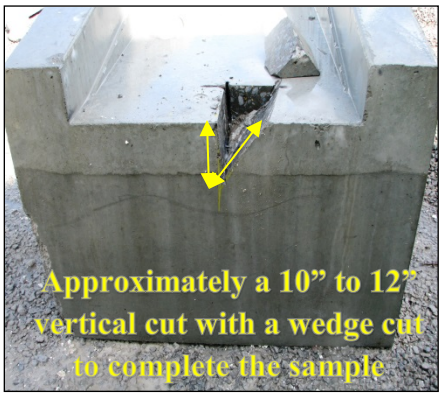
V-Cut taken from bottom of toe

Back View of Endwall



V-Cut taken from top of toe



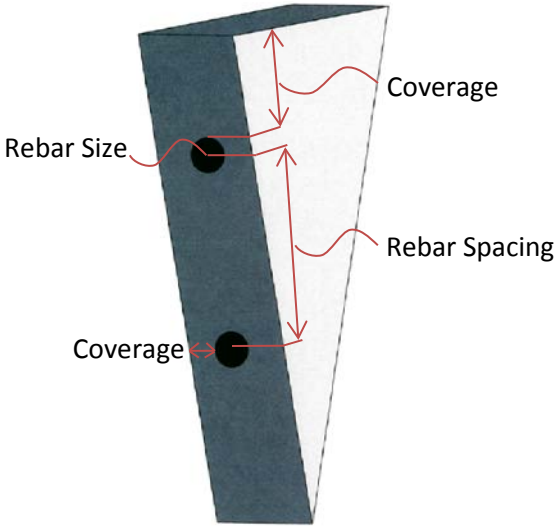


4.0 DESTRUCTIVE VERIFICATION (CONTINUED)

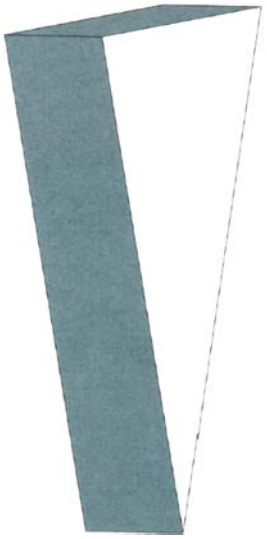
4.5.2 Confirm Rebar Size, Spacing, and Coverage

Verify Rebar Size, Spacing & Coverage

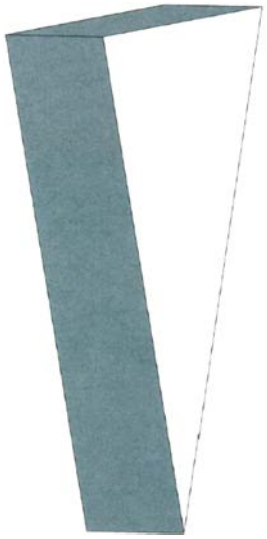
DOCUMENT ALL MEASUREMENTS BELOW



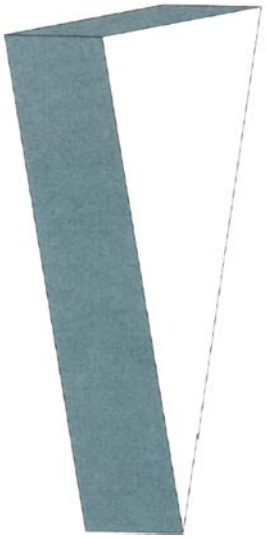
Example



Cut No.1



Cut No.2



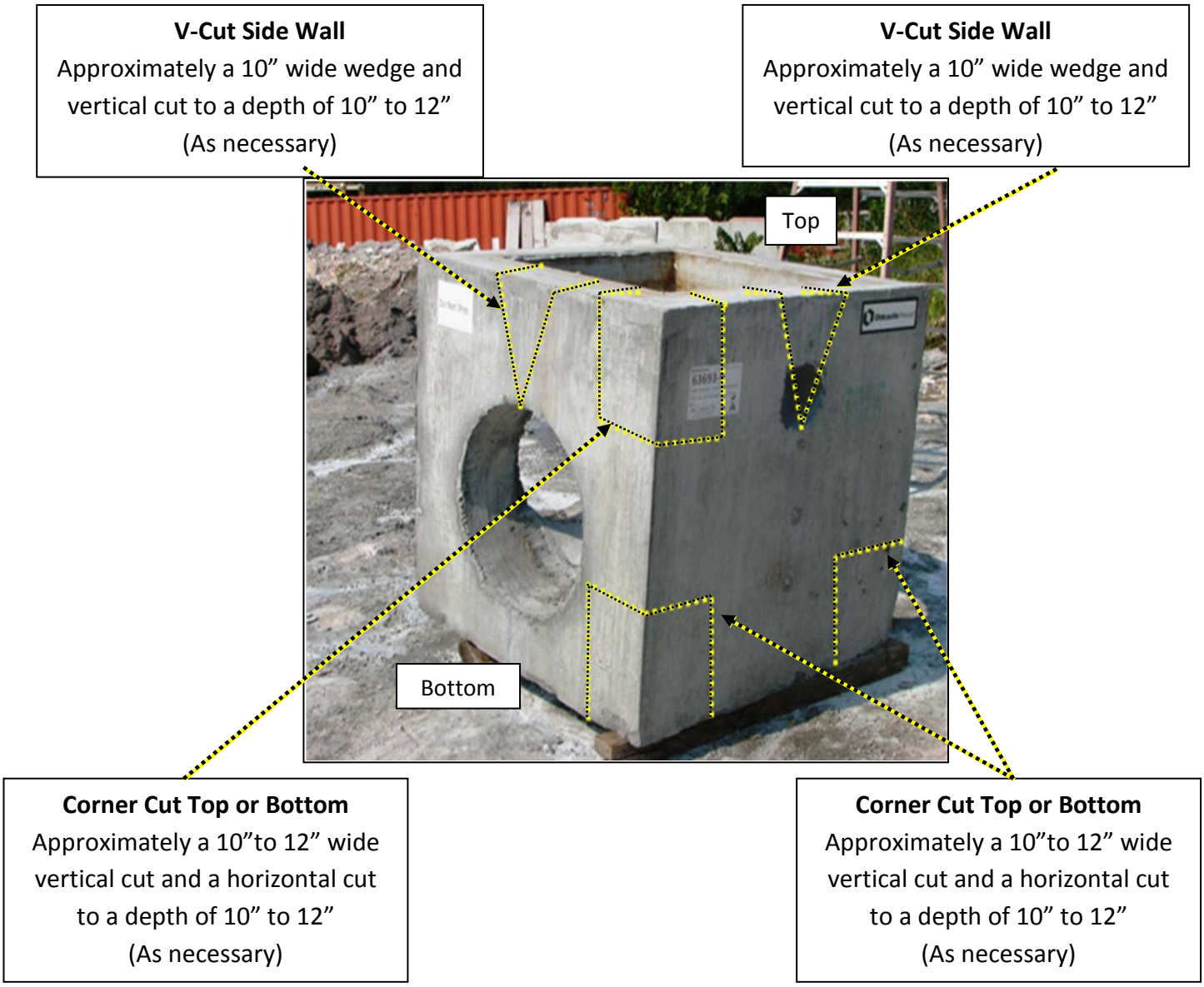
Cut No.3

4.0 DESTRUCTIVE VERIFICATION (CONTINUED)

4.6. Drainage Junction Box

4.6.1. Square Concrete

It's recommended that a minimum of **two saw cuts shall be made**. These cuts should include **one corner** cut and **one V-cut**. Corner cuts can be made on any of the eight corners of the structure. The V-cut can be taken from any side of the structure including directly over an inlet or outlet.



4.0 DESTRUCTIVE VERIFICATION (CONTINUED)

4.6.1.1. Verification of the Steel Placement (Saw Cut Method)

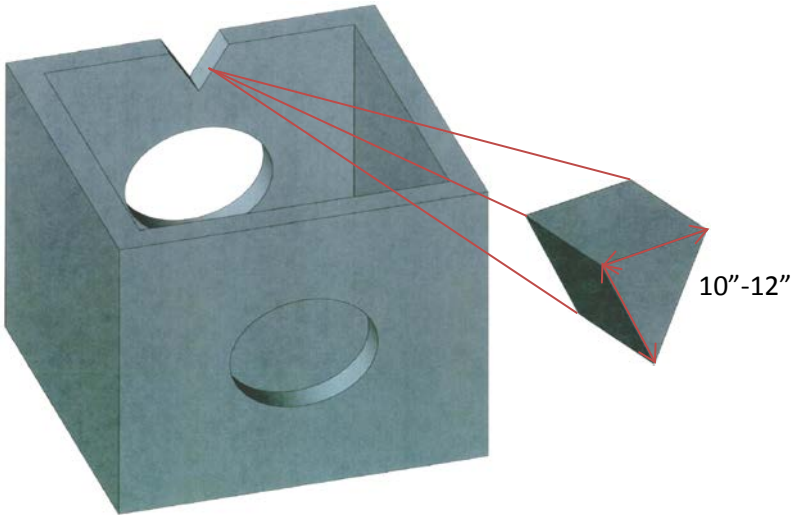
The following shows a recommended procedure for making a V-Cut and a Corner Cut for a Square Concrete Junction Box.

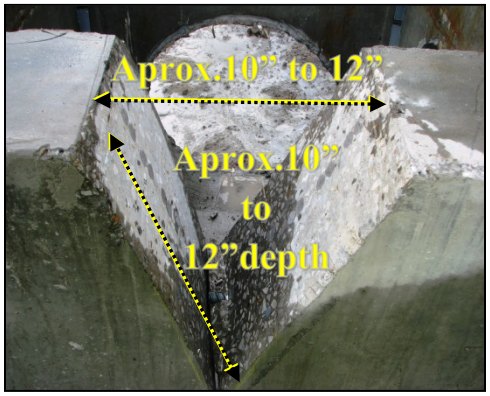
V-CUT ON SIDE OR OVER OUTLET/INLET

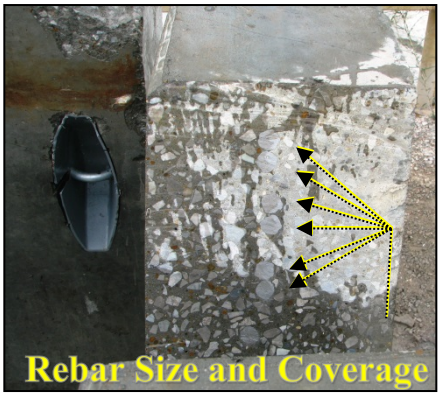
5. Choose the location of the V-cut; the cut shall be from the top edge of the structure or over an inlet or outlet.

6. Measure and mark an area approximately **10 to 12** inches wide.

V-CUT EXAMPLE







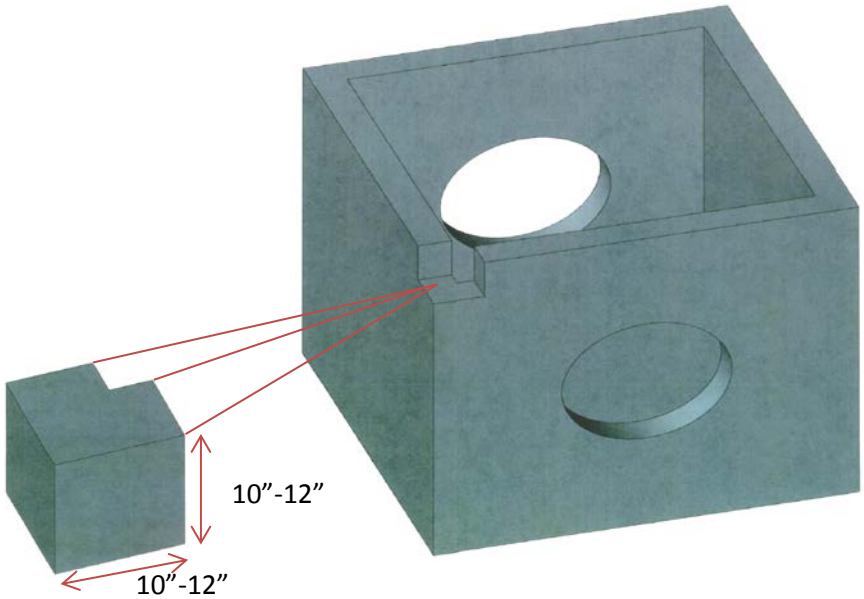
4.0 DESTRUCTIVE VERIFICATION (CONTINUED)

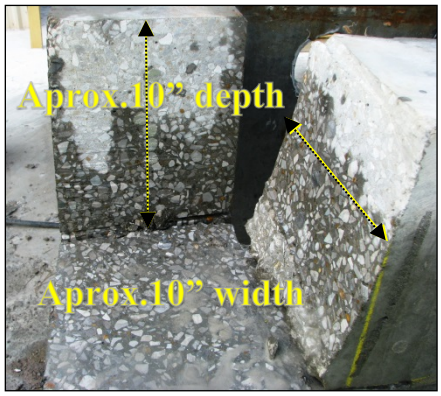
CORNER CUT TOP OR BOTTOM

5. Choose the location of the corner cut; corner cut can be made on any of the eight corners of the structure.

6. Measure and mark an area approximately **10 to 12** inches wide.

CORNER CUT EXAMPLE



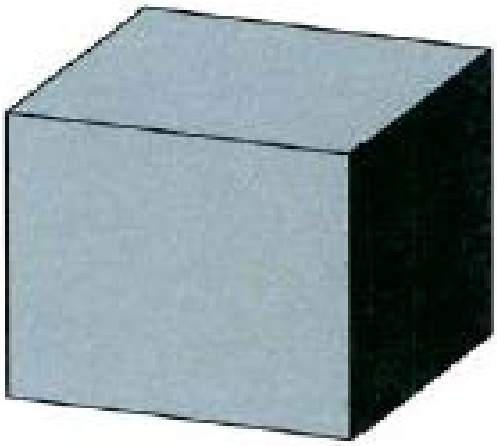


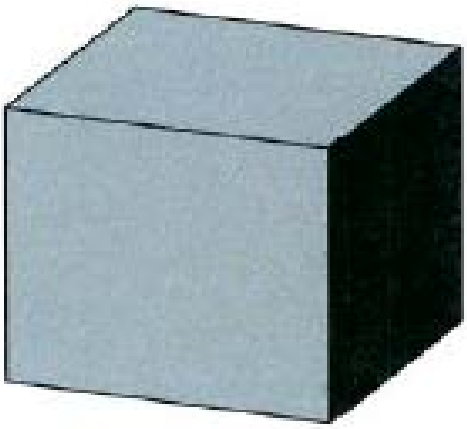
4.0 DESTRUCTIVE VERIFICATION (CONTINUED)

4.6.1.2 Confirm Rebar Size, Spacing, and Coverage

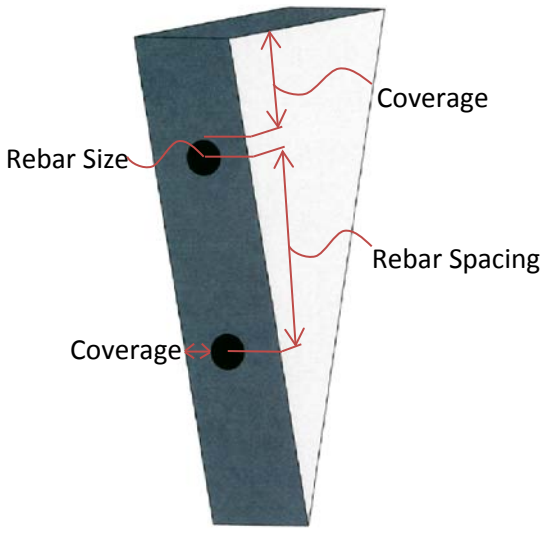
Verify Rebar Size, Spacing, & Coverage

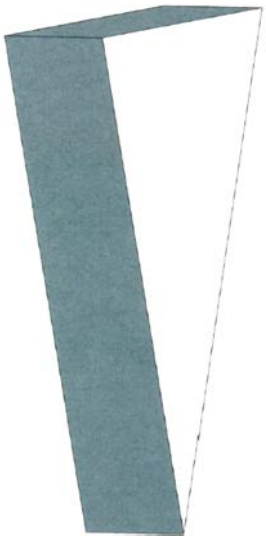
DOCUMENT ALL MEASUREMENTS BELOW





Example



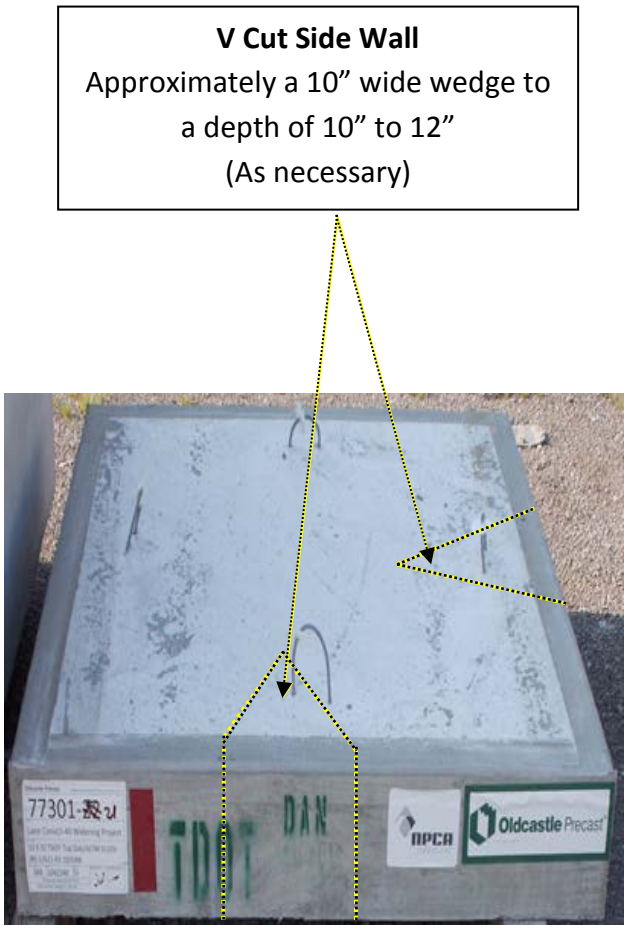


Example

4.0 DESTRUCTIVE VERIFICATION (CONTINUED)

4.6.2. Square Precast Lids

It's recommended that at a minimum of **two V-cut** shall be made. The V-cut can be taken from any side of the structure. The following shows the recommended procedure for making a V-Cut on a square lid.

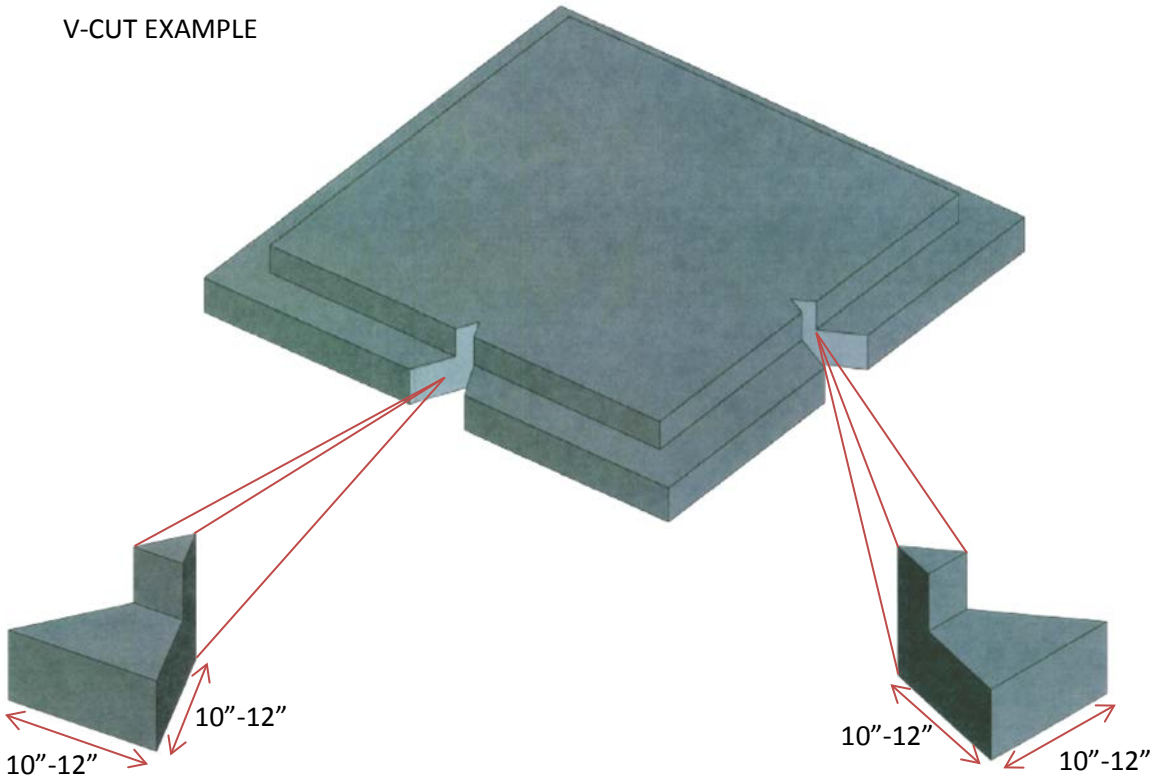


4.0 Destructive verification (continued)

4.6.2.1 Verification of the Steel Placement (Saw Cut Method)

The following shows a recommended procedure for making a V-Cut from a square lid.

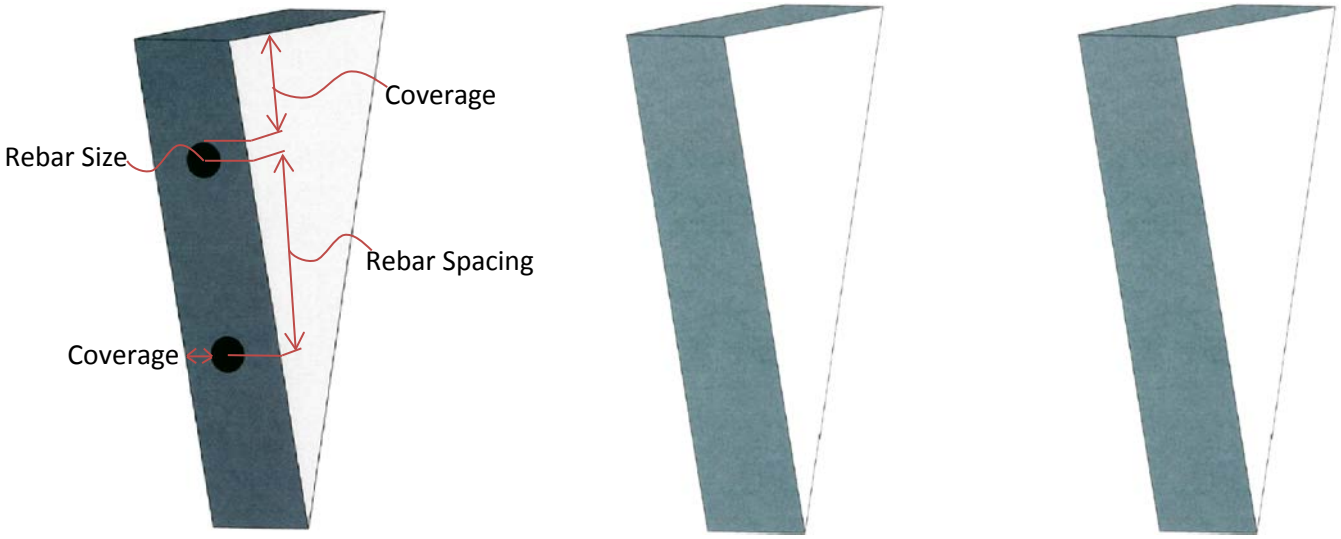
5. Choose the location of the V-cut; the cut shall be from two sides of the lid.
6. Measure and mark a wedge **10 to 12** inches wide and deep.



4.6.2.2 Confirm Rebar Size, Spacing, and Coverage

Verify Rebar Size, Spacing, & Coverage

DOCUMENT ALL MEASUREMENTS BELOW



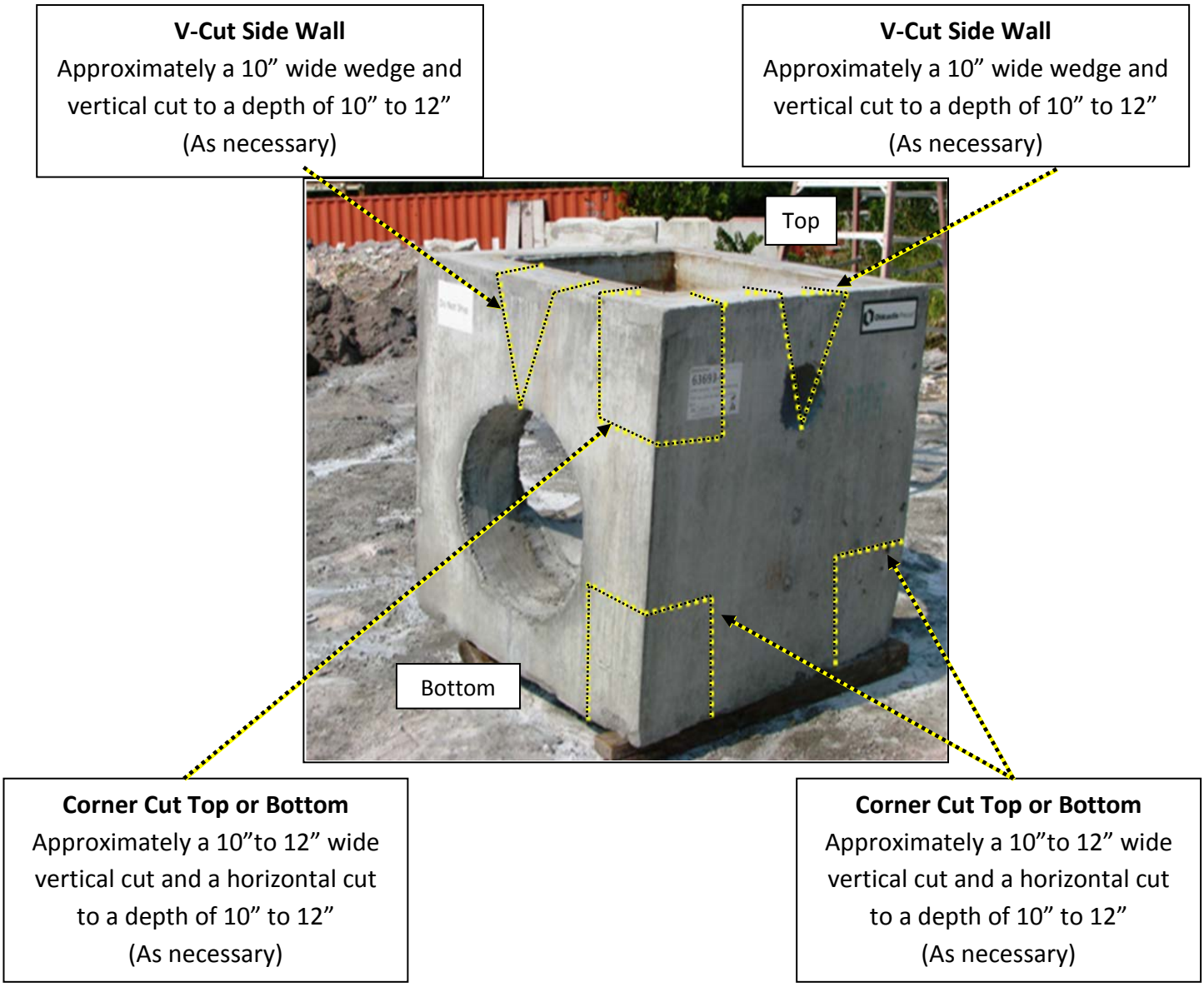
Example

4.0 DESTRUCTIVE VERIFICATION (CONTINUED)

4.7. Drainage Spring Box

4.7.1. Square Concrete

It's recommended that a minimum of **two saw cuts shall be made**. These cuts should include **one corner** cut and **one V-cut**. Corner cuts can be made on any of the eight corners of the structure. The V-cut can be taken from any side of the structure including directly over an inlet or outlet.



4.0 DESTRUCTIVE VERIFICATION (CONTINUED)

4.7.1.1. Verification of the Steel Placement (Saw Cut Method)

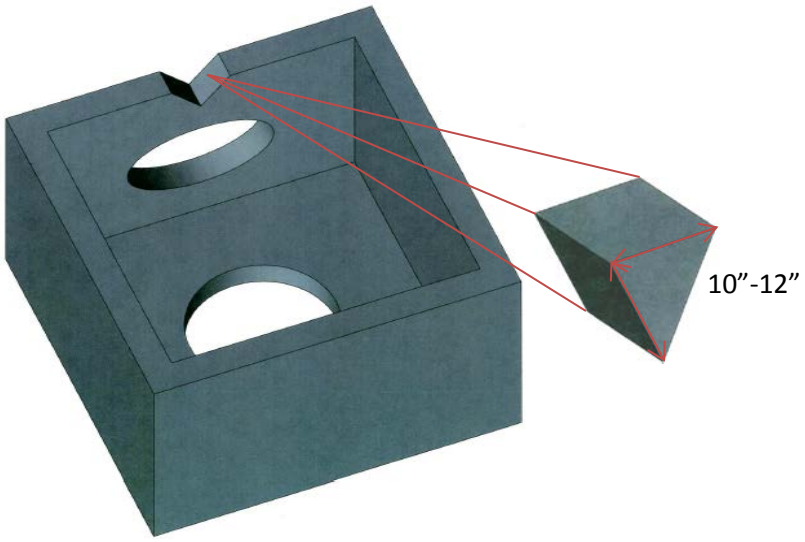
The following shows a recommended procedure for making a V-Cut and a Corner Cut for a Square Concrete Spring Box.

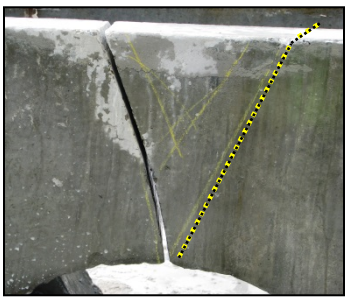
V-CUT ON SIDE OR OVER OUTLET/INLET

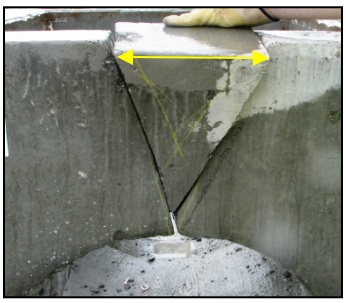
7. Choose the location of the V-cut; the cut shall be from the top edge of the structure or over an inlet or outlet.

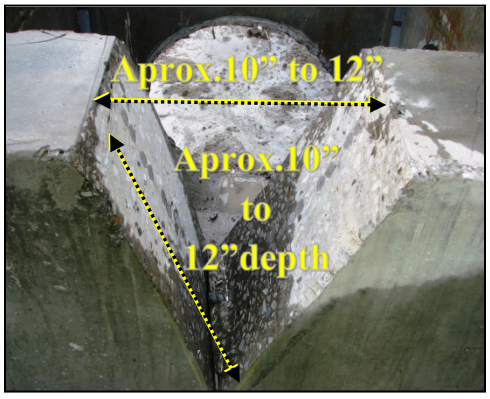
8. Measure and mark an area approximately **10 to 12** inches wide.

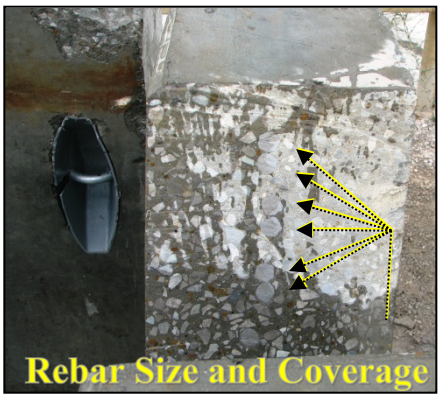
V-CUT EXAMPLE

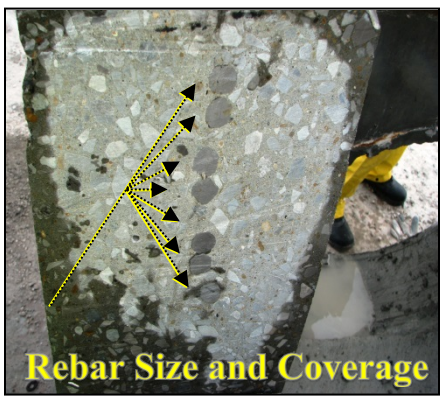












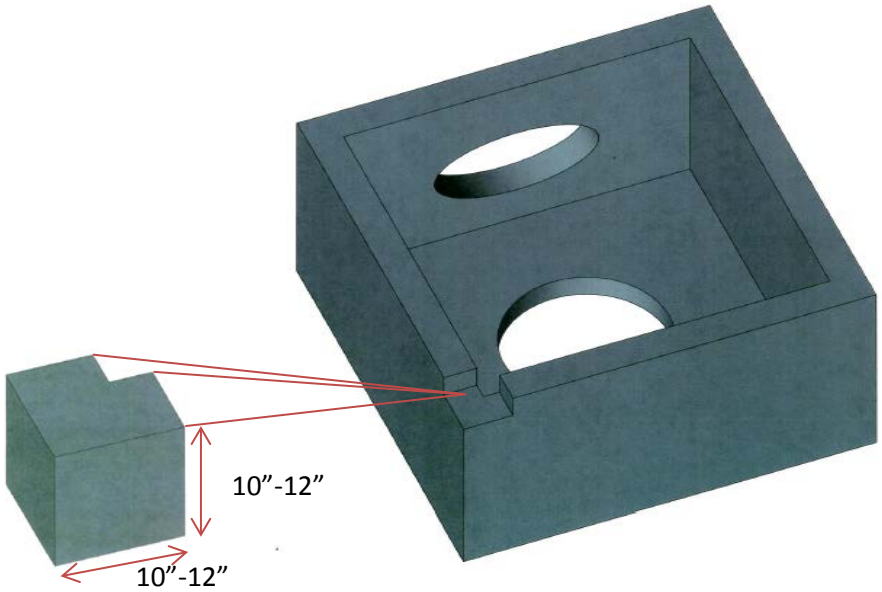
4.0 DESTRUCTIVE VERIFICATION (CONTINUED)

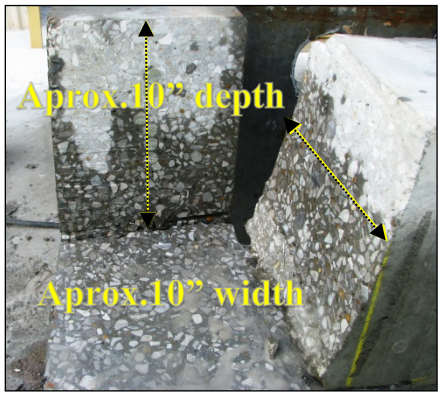
CORNER CUT TOP OR BOTTOM

7. Choose the location of the corner cut; corner cut can be made on any of the eight corners of the structure.

8. Measure and mark an area approximately **10 to 12** inches wide.

CORNER CUT EXAMPLE

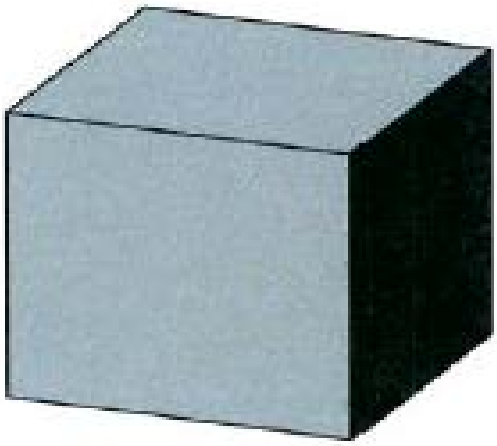


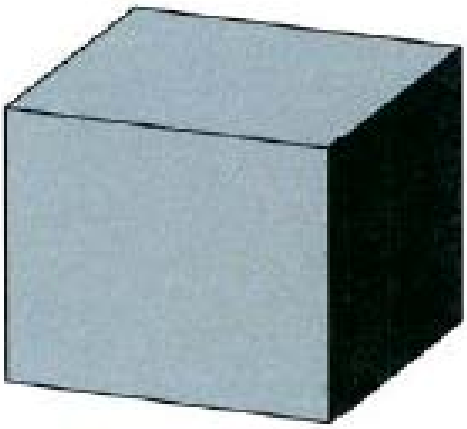


4.7.1.2 Confirm Rebar Size, Spacing, and Coverage

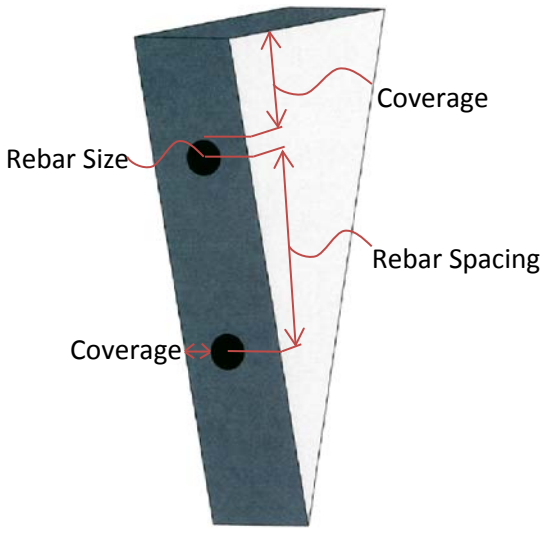
Verify Rebar Size, Spacing, & Coverage

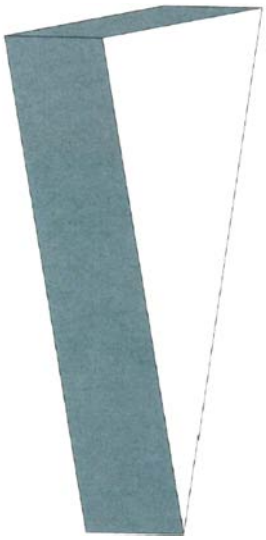
DOCUMENT ALL MEASUREMENTS BELOW





Example





Example

4.0 DESTRUCTIVE VERIFICATION (CONTINUED)

4.7.2. Square Precast Lids

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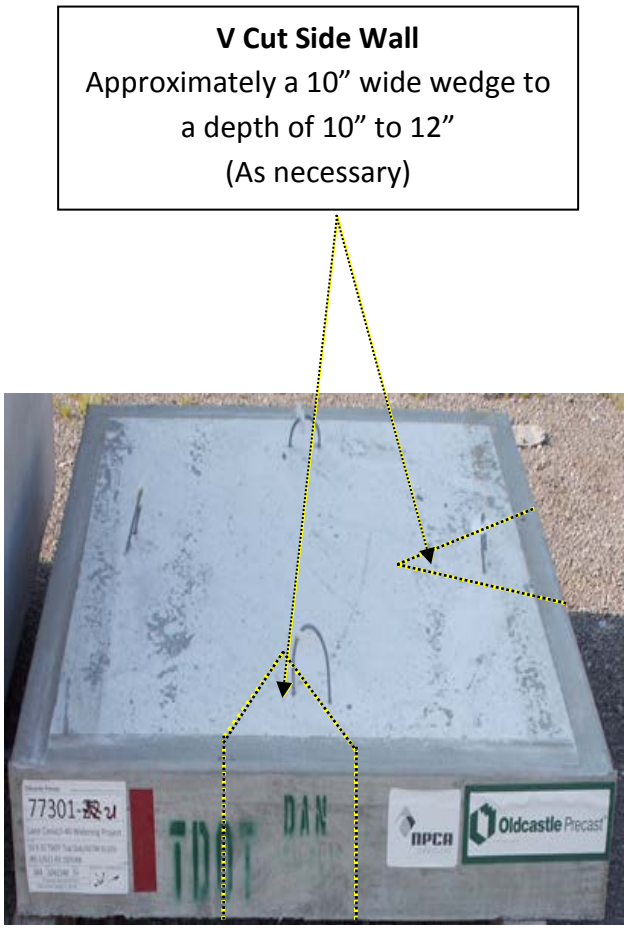

4.0 Destructive verification (continued)

4.7.2.1 Verification of the Steel Placement (Saw Cut Method)

The following shows a recommended procedure for making a V-Cut from a square lid.

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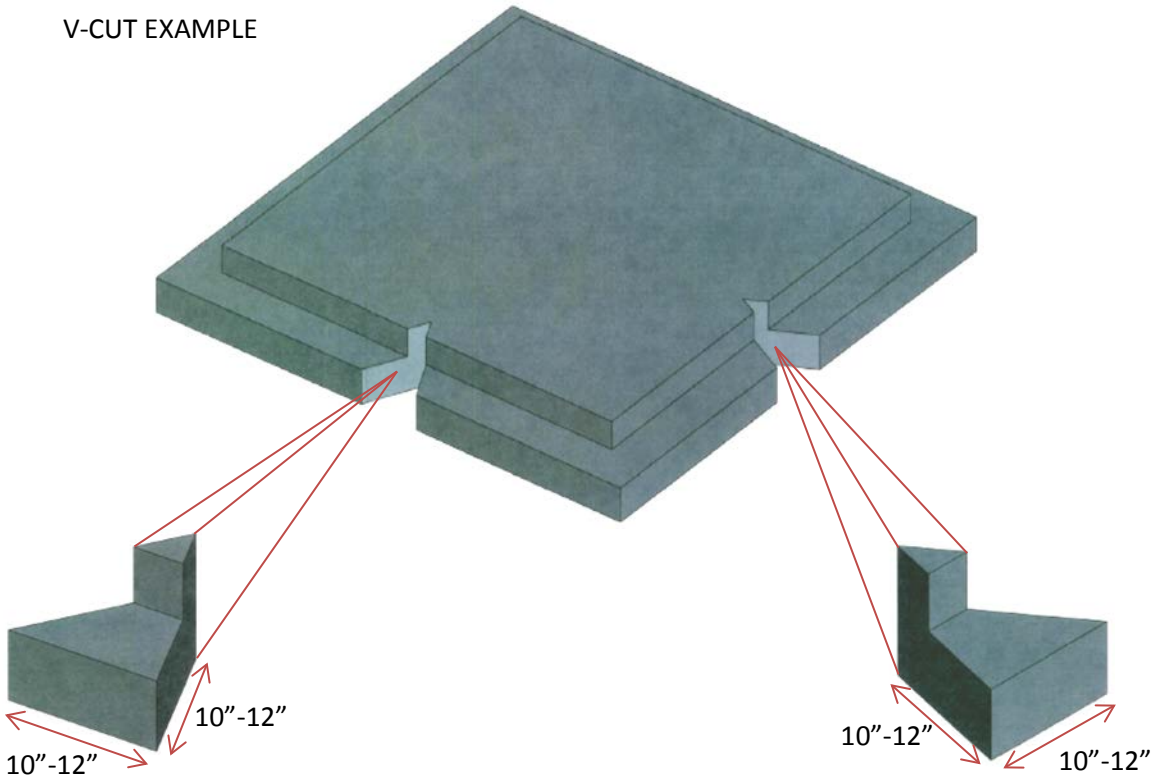
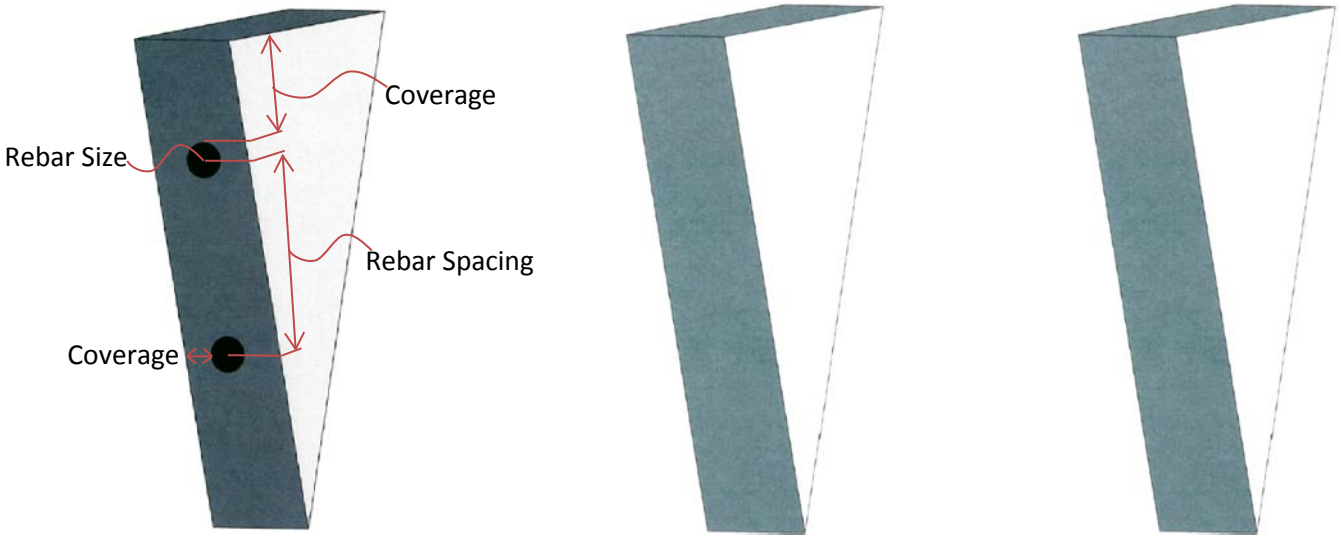


4.7.2.2 Confirm Rebar Size, Spacing, and Coverage

Verify Rebar Size, Spacing, & Coverage

DOCUMENT ALL MEASUREMENTS BELOW



Example

5.0 REPORT

Copies of all documentation (data recorded, photographs, etc.) of the process for verification testing of Precast Drainage Structures shall be sent to HQ Materials and Test and Construction. Also, samples in question shall be retained by Regional office.