

July 21, 2020

Mr. Leo Cosentini
California State Water Resources Control Board Division of Water Quality
P.O. Box 100
Sacramento, CA 95812-0100

RE: Amended Application for Trash Treatment Control Device Certification
Current Product Name: NSBB™-TC and NSBB™-TCT by Oldcastle Infrastructure™
Former Product Name: Nutrient Separating Baffle Box (NSBB™) by Suntree Technologies Inc®

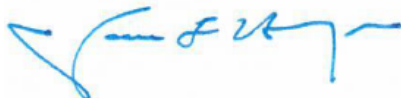
Dear Mr. Cosentini,

Oldcastle Infrastructure® is pleased to submit this amended application for recertification of the NSBB™ as the NSBB™-TC and NSBB™-TCT full capture trash treatment control devices. The Nutrient Separating Baffle Box (NSBB™) by Suntree Technologies Inc® is currently on the California Water Board's Certified List of Trash Devices. Oldcastle Infrastructure acquired Suntree Technologies in late 2019 and has renamed the full trash capture version of the NSBB™ to prevent confusion; the NSBB™-TC and NSBB™-TCT are only offered with a 5mm screen, while the standard NSBB™ has a screen with larger openings. Access to the NSBB™-TC and NSBB™-TCT for mosquito control has also been improved. The attached application has been compiled in conformance with the Trash Treatment Control Device Certification and Fact Sheet Update Requirements (updated March 2020) and includes the following sections:

1. Cover Letter
2. Table of Contents
3. Physical Description
4. Installation Guidance
5. Operations and Maintenance Information
6. Vector Control Accessibility
7. Reliability Information
8. Field/Lab Testing Information and Analysis

Thank you for your consideration of this application. If any additional information is needed, please contact me.

Respectfully,



Jay Holtz, PE
Oldcastle Infrastructure™
Regulatory Manager
jay.holtz@oldcastle.com
(971) 271-0796

1. Cover Letter

Oldcastle Infrastructure™ seeks listing of the Nutrient Separating Baffle Box Trash Capture System (NSBB™-TC) and Nutrient Separating Baffle Box Trash Capture Treatment System (NSBB™-TCT) on the California State Water Board's Certified List of Trash Devices. The NSBB™-TC and NSBB™-TCT are high flow capacity trash capture devices that are refined versions of the Nutrient Separating Baffle Box (NSBB™) by Suntree Technologies Inc® which is currently on the Board's Certified List. Oldcastle Infrastructure acquired Suntree Technologies in late 2019 and has renamed the full trash capture version of the NSBB™ to prevent confusion. The standard NSBB™ is supplied with a coarse screen for removal of litter and leaves while the NSBB™-TC and NSBB™-TCT are only offered with a 5mm screen suitable for full trash capture. Access to both systems has also been improved to facilitate mosquito control activities.

a. General Description of Device

The Oldcastle Infrastructure™ NSBB™-TC and NSBB™-TCT are advanced multi-stage stormwater treatment systems designed for 100% capture of trash and debris greater than 5mm in size. Both systems are versions of the standard NSBB™ treatment system which has been used to successfully treat stormwater for more than 20 years. However, the NSBB™-TC and NSBB™-TCT are only offered with a 5mm screen for full trash capture while the NSBB™ is usually provided with a coarse screen which does not meet California Water Board requirements. The difference between the NSBB™-TC and NSBB™-TCT is the depth of the sediment sump. NSBB™-TC is intended for full trash capture and only incidental sediment control and therefore has a shallow sediment sump. The NSBB™-TCT, on the other hand, is intended for significant and predictable sediment control as well as full trash capture and therefore has a deeper sediment sump.

For all versions of the NSBB™, the patented screen system is designed to capture and store debris in a dry state to minimize nutrient leaching, provide improved water quality treatment, and provide for easier maintenance. The triple chamber design facilitates removal of total suspended solids (TSS) over a range of particle sizes and is effective in reducing nutrient and hydrocarbon loads associated with the sediment. All NSBB™ models have an internal bypass, so there is no need for a separate diversion structure. The flow path for bypass flow and a patented deflector system ensure that no captured trash is lost and no sediment scouring occurs during high flow conditions.

The NSBB™-TC and NSBB™-TCT filter trash and debris that is 5mm and larger by using a screen basket system with 5mm openings. Stormwater entering the system must pass through the screen to flow downstream, so that full trash capture is assured. The hydraulic and storage capacities of the screen basket are substantial and vary depending on the model.

Sediment is removed and stored in three settling chambers located under the screen basket system. These chambers collect and contain sediment smaller than 5mm in size. The NSBB™-TC has a shallow sump for limited sediment reduction and storage and the NSBB™-TCT has a deep sump for more substantial sediment reduction and storage. The sediment storage capacity of both systems varies depending on the model.

b. Applicant's Contact Information and Location

Chief Executive Officer: Matt Clemson
Oldcastle Infrastructure™
Vice President and General Manager, Stormwater
matt.clemson@oldcastle.com
(470) 261-7620

Authorized Representatives: Laraine Sanfilippo (Primary Contact)
Oldcastle Infrastructure™
Regulatory Manager
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(619) 481-0608

Jay Holtz, PE (Backup Contact)
Oldcastle Infrastructure™
Regulatory Manager
jay.holtz@oldcastle.com
(971) 271-0796

Mailing Address: Oldcastle Infrastructure, Stormwater
c/o Laraine Sanfilippo
10441 Vine Street
Lakeside, California 92040

c. Device's Manufacturing Location

Manufacturer Name: Oldcastle Infrastructure™

Manufacturer Address: 7100 Longe Street
Stockton, CA 95304

Manufacturer Phone: (800) 579-8819

Manufacturer Representative: Gary Jones
(888) 950-8826

d. Summary of Field/Lab Testing Results

The NSBB™ has been used to successfully treat stormwater for more than 20 years. Hundreds of systems have been installed across the United States. The performance of the system has been tested in accordance with various programs over the years and the system is time-tested for durability and longevity.

Since the openings in the screen basket system used in the NSBB™-TC and the NSBB™-TCT are 5mm in diameter and all flow must pass through the screen to advance downstream, the system ensures 100% trash capture. Empirical testing and observation have shown that even during peak flow conditions, captured trash does not escape the screen basket to wash downstream.

Laboratory test results for sediment removal by a standard NSBB™ equipped with a screen having openings greater than 5mm are available upon request. The configuration and dimensions of the sediment chambers on the NSBB™-TCT are identical to the configuration and dimensions of the sediment chambers on the standard NSBB™. The only difference between the two models is the size of the openings in the internal screen. Thus, the sediment removal test results for the NSBB™ may be considered representative of expected sediment removal by the NSBB™-TCT. This information is important when a designer or owner would like to get definite and predictable sediment removal from a trash capture device.

e. Summary of Device Limitations, and Operational, Sizing, and Maintenance Considerations

The NSBB™-TC and the NSBB™-TCT are engineered treatment systems and are designed to meet site-specific requirements. Oldcastle's Engineering team will work with the Specifying Engineer to ensure that systems are properly sized and applied. Systems are typically sized to meet the site's water quality flow rate, but the expected frequency of maintenance activities and other factors may also influence the final sizing recommendation.

The internal components of all NSBB™ products including the NSBB™-TC and NSBB™-TCT are engineered to last. The screen basket, turbulence deflectors, skimmers and other internal components are manufactured using stainless steel, aluminum, and high tensile marine grade plastic polymer materials. These materials are exceptionally durable, economical, and ensure longevity. All systems are warranted to be free from manufacturing defects.

The invert elevations of the inlet and outlet pipes are typically the same since headloss through the unit is minimal during a design storm event. There are no limitations on pipe slope or pipe diameter if the opening for the pipe connection to the treatment system structure does not compromise the structural integrity of the vault structure.

Since the NSBB™-TC and the NSBB™-TCT are both configured with an internal bypass, either system may be used online or offline. A designer may opt for an offline system if a certain model can meet the water quality flow rate but not the peak flow rate.

As with all stormwater treatment systems, routine maintenance must be conducted to ensure that the device continues to function as designed. Oldcastle Infrastructure™ recommends inspection of the NSBB™-TC or NSBB™-TCT on a semi-annual basis with maintenance performed annually or as needed. Maintenance is conducted using with a vacuum truck and is quick and relatively easy. All NSBB™ products are maintained similarly, regardless of screen aperture or sump depth. Maintenance guidelines are included with this application.

f. Description, or List of Locations, where Device has been installed

System: NSBB™ 11-24 with 5mm screen
Project: Collins Avenue OCTA
Location: Orange County, California
Owner: City of Orange, California
Contact: Frank Sun, Civil Engineer; fsun@cityoforange.org
300 E. Chapman Avenue, Orange, CA, 92866
(714) 744-5544

System: NSBB™ 11-26 with 5mm screen
Project: Avenida De La Playa
Location: La Jolla, California
Owner: City of San Diego Public Works Department
Contact: Engineering Department; engineering@sandiego.gov
525 B Street, Suite 750, MS# 908A, San Diego, CA, 92101
(619) 533-4207

System: NSBB™ 11-34 with 5mm screen
Project: Mountain View Casey Avenue
Location: Mountain View, California
Owner: City of Mountain View – Public Works Department
Contact: Marichrisse Gabon, PE; Marichrisse.Gabon@mountainview.gov
500 Castro Street, Mountain View, CA, 94041
(650) 903-6300

Please contact Oldcastle Infrastructure for more detailed project information.

G. Certification

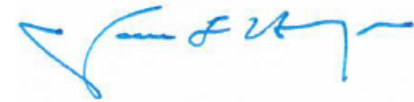
I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons that manage the system or those persons directly responsible for gathering the information, to the best of my knowledge and belief, the information submitted is, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.



6/2/2020

Matt Clemson
Oldcastle Infrastructure™
General Manager, Stormwater
matt.clemson@oldcastle.com
(470) 261-7620

Date



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Jay Holtz, PE
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Date

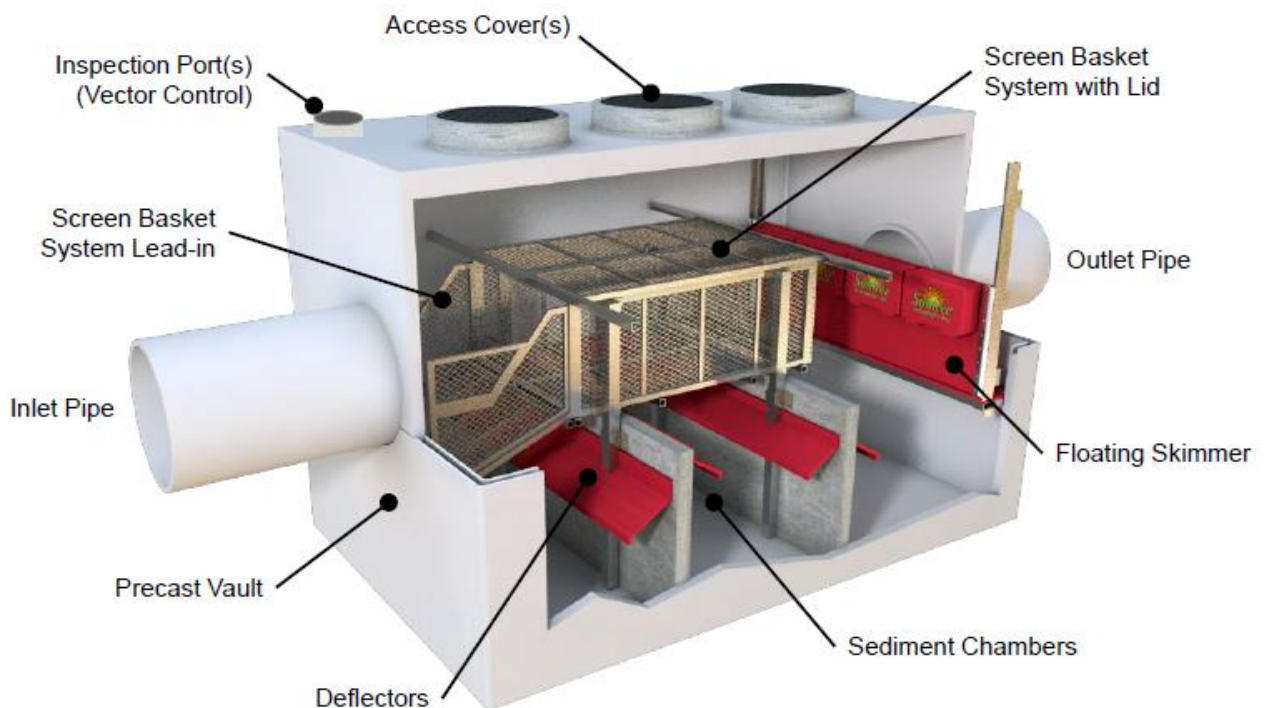
2. Table of Contents

1. Cover Letter	1
a. General Description of Device	1
b. Applicant’s Contact Information and Location	2
c. Device’s Manufacturing Location	2
d. Summary of Field/Lab Testing Results	2
e. Summary of Device Limitations, and Operational, Sizing, and Maintenance Considerations	3
f. Description, or List of Locations, where Device has been installed	4
g. Certification	5
2. Application Package Table of Contents	6
3. Physical Description	8
a. Trash Capture	9
b. Peak Flows/ Trash Volumes	11
c. Hydraulic Capacity	12
d. Comparison Table	12
e. Design Drawings	12
f. Alternative Configurations	13
g. Internal Bypass	13
h. Previously Trapped Trash	13
i. Calibration Feature	13
j. Photos	13
k. Material Type	15
l. Design Life	16
4. Installation Guidance	17
a. Installation Procedures	17
b. Device Installation Limitations or Alternate Procedures	19
c. Methods for Diagnosing and Correcting Installation Errors	19
5. Operation and Maintenance Information	20
a. Inspection Procedures	20
b. Maintenance Frequency Related to Hydraulic Capacity	20
c. Maintenance Procedures	21
d. Maintenance Equipment and Materials	21
e. Effects of Delayed Maintenance	22
f. Repair Procedures	22

6. Vector Control Accessibility	23
a. Date of Application Submittal to Mosquito Vector Control Association	23
b. Description of Access for Vector Control Personnel	23
c. Letter of Verification from Mosquito Vector Control Association	25
7. Reliability Information	26
a. Estimated Design Life	26
b. Warranty Information	26
c. Customer Support Information	26
8. Field/Lab Testing Information and Analysis	27
a. Devices with 5mm Screen: Field/Lab Testing Information	27
b. Devices without 5mm Screen: Field/Lab Testing Information	27
APPENDIX A: NSBB™-TC and NSBB™-TCT Hydraulic Calculations	29
APPENDIX B: NSBB™-TC Design Drawings/Diagrams	39
APPENDIX C: NSBB™-TCT Design Drawings/Diagrams	43
APPENDIX D: MVCAC Letter of Verification	47
APPENDIX E: NSBB™ Warranty	50

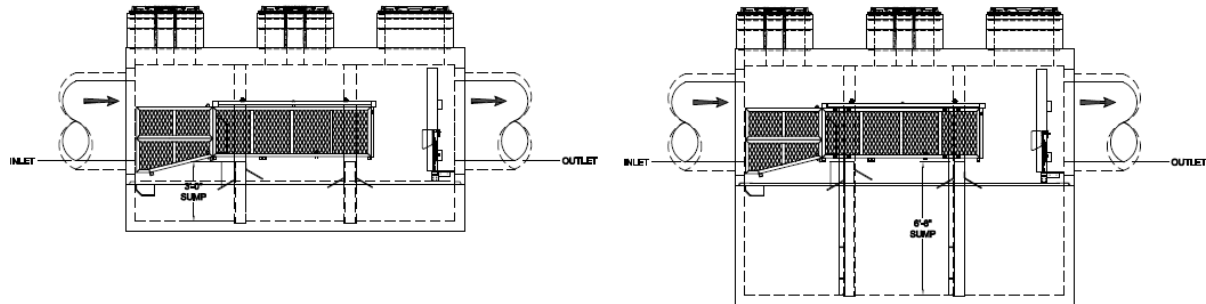
3. Physical Description

The Oldcastle Infrastructure™ NSBB™-TC and NSBB™-TCT are advanced, high-flow, multi-stage stormwater treatment systems designed for 100% capture of trash and debris greater than 5mm in size. Both systems are versions of the standard Nutrient Separating Baffle Box (NSBB™) treatment system which has been used to successfully treat stormwater for more than 20 years. However, the NSBB™-TC and NSBB™-TCT are only offered with a 5mm screen for full trash capture to meet California Water Board requirements, while the standard NSBB™ is usually provided with a coarse screen which does not meet California Water Board trash capture requirements. The rendering below shows an isometric view of a typical NSBB™ treatment system and depicts the configuration and critical components.



NSBB™-TC and NSBB™-TCT Configuration and Components

The difference between the NSBB™-TC and NSBB™-TCT is the depth of the sediment chambers. NSBB™-TC is intended for full trash capture and only incidental sediment control and therefore has shallow sediment chambers. On all models of the NSBB™-TC, the sediment chambers are just 3 feet deep. The NSBB™-TCT, on the other hand, is intended for significant and predictable sediment control as well as full trash capture and therefore has deeper sediment chambers to increase residence time to promote sedimentation and to provide more sediment storage capacity. Access to the NSBB™-TC and NSBB™-TCT has also been improved to facilitate mosquito control activities.



**NSBB™-TC
with Shallow Sediment Chambers**

**NSBB™-TCT
with Deeper Sediment Chambers**

a. Trash Capture

The Oldcastle Infrastructure™ NSBB™-TC and NSBB™-TCT are online, high-performance, screening and hydrodynamic separation systems which uses physical straining, settling, and floatation to capture trash, debris, sediment, and hydrocarbons as well as other associated pollutants. Trash and debris capture is provided by a rectangular screen basket system which is suspended above the static water level of the sediment chambers. The suspended screen allows captured pollutants to be stored in a dry state between storm events which prevents breakdown of debris and nutrient leaching and protects water quality. The separation of trash and debris from other pollutants also make maintenance easier.

As runoff enters the vault it must flow through the screen basket system to reach the sediment chambers and flow downstream for discharge through the outlet pipe. The screen basket system is comprised of stainless steel sheets that are punched with 5mm round openings. All trash and debris that is 5mm in size or greater is strained from the runoff and remains in the screen basket as water and fine sediment drops through the screen perforations to enter the sediment chambers below. Trash and debris are captured in the screen basket while sediment is deposited within one of the three sediment chambers at the base of the vault. The sediment chambers are separated by baffle walls outfitted with turbulence deflectors to promote settling and prevent turbulence, potential scour, and sediment resuspension. The separation of trash and debris from the permanent pool in the sediment chambers prevents decomposition of gross solids which improves water quality, reduces odors, and makes maintenance easier and faster. The system can be fully maintained without confined space entry using a vacuum truck.

The NSBB™-TC and NSBB™-TCT incorporate patented features to achieve full capture of particles 5mm and larger. These features prevent the release of captured trash and minimize resuspension of trapped sediment during periods of peak flow. These features also allow for efficient storage of captured pollutants and easy access for maintenance.

The screen system is manufactured from a stainless steel non-clogging screen with 5mm openings. The openings are angled to push water and trash across the screen for capture while minimizing blockage of the screen openings. Sedimentation and deposition of finer pollutants occurs in the sediment chambers below the screen basket. The screen basket has a hinged top and hinged doors on the bottom to easily facilitate efficient removal of pollutants and maintenance. The systems also contain a flow spreader which helps to widen the incoming storm flow to improve sedimentation and particle removal efficiency in the chambers below.

Patented turbulence deflectors prevent resuspension of sediment that has settled into the bottoms of the sediment chambers for storage.

Low / Medium Flow Storm Event

- Runoff filters through the screen and skimmer leaving behind pollutants.
- Turbulence deflectors prevent captured particles from becoming resuspended.



High / Extreme Flow Storm Event

- Turbulence deflectors prevent captured particles from becoming resuspended.



After Storm Event

- Separating organics from static water prevents bacterial growth.



NSBB™-TC and NSBB™-TCT Function and Operation

b. Peak Flows/Trash Volumes

The system specifications and hydraulic capacities for the NSBB™-TC and NSBB™-TCT are shown in the tables below. The system specifications for the NSBB™-TC and NSBB™-TCT are shown in separate tables since the two systems have differing sediment chamber depths and corresponding sediment storage capacities. The hydraulic capacities are the same for the NSBB™-TC and NSBB™-TCT and are shown in the same table. All hydraulic capacities reflect use of the 5mm screen basket for full trash capture. Hydraulic and storage capacities for custom sizes may be determined using standard calculations, if needed.

NSBB-TC: System Specifications					
Model and Drawing Number	Maximum Pipe Size (in)	Screen Surface Area (ft²)	Sediment Chamber Depth (ft)	Total Storage Capacity	
				Screen Basket (ft³)	Sediment Chamber (ft³)
NSBB-48-TC	24	12.75	3.0	25.8	88.1
NSBB-612-TC	36	21.49	3.0	54.5	204.1
NSBB-816-TC	48	43.08	3.0	124.6	360.0

* Additional sizes available per region and request. Please speak with an Oldcastle Infrastructure representative for more detailed information.

NSBB-TCT: System Specifications					
Model and Drawing Number	Maximum Pipe Size (in)	Screen Surface Area (ft²)	Sediment Chamber Depth (ft)	Total Storage Capacity	
				Screen Basket (ft³)	Sediment Chamber (ft³)
NSBB-48-TCT	24	12.75	3.0	25.8	88.1
NSBB-612-TCT	36	21.49	4.1	54.5	277.8
NSBB-816-TCT	48	43.08	6.7	124.6	800.0

* Additional sizes available per region and request. Please speak with an Oldcastle Infrastructure representative for more detailed information.

NSBB-TC and NSBB-TCT: Hydraulic Capacities						
Model and Drawing Number	NSBB-48-TC and NSBB-48-TCT		NSBB-612-TC and NSBB-612-TCT		NSBB-816-TC and NSBB-816-TCT	
Screen Capacity	Treatment Capacity (cfs)	Peak Capacity (cfs)	Treatment Capacity (cfs)	Peak Capacity (cfs)	Treatment Capacity (cfs)	Peak Capacity (cfs)
Empty	28.8	37.8	42.8	85.3	72.0	143.9
25% Full	26.5	35.5	39.6	82.1	68.8	140.7
50% Full	22.2	31.2	33.8	76.3	61.8	133.7
75% Full	14.4	23.4	22.7	65.2	45.0	116.9
100% Full ⁽¹⁾	0.0	21.6	0.0	56.2	0.0	94.1

Note: (1) Peak Capacity when 100% full is bypass flow only. For NSBB-48, 25% of screen capacity used for bypass flow.

c. Hydraulic Capacity

The hydraulic capacities for the three standard sizes of the NSBB™-TC and the three standard sizes of the NSBB™-TCT are shown in the tables in Section 3b. The hydraulic capacities for treatment and peak flows were calculated based on standard hydraulic equations and the configuration and characteristics of the different size treatment systems. A sliding safety factor was applied to the treatment capacities as shown in the description of the hydraulic calculations which is included in Appendix A. The treatment and peak flow capacities shown in the table in Section 3b were determined using a headloss calculator spreadsheet based on the formulas presented in the description of the hydraulic calculations. The water surface used to calculate the treatment flow is at the elevation of the top of the screen basket. The water surface used to calculate the peak flow is at an elevation 2 inches below the bottom of the lid slab. A printout of the headloss calculator for the NSBB-612-TC is used as an example and is provided in Appendix A following the description of the hydraulic calculations.

d. Comparison Table

The tables in Section 3b. list storage and hydraulic capacities for the three standard sizes of the NSBB™-TC and the three standard sizes of the NSBB™-TCT so they may be easily compared. Storage capacities were calculated based on the configuration and characteristics of the screen baskets and sediment chambers in the different size treatment systems and simple volumetric equations.

e. Design Drawings

Design drawings for the three standard sizes of the NSBB™-TC are included in Appendix B and design drawings for the three standard sizes of the NSBB™-TCT are included in Appendix C.

f. Alternative Configurations

There are no alternative configurations. The NSBB™-TC and NSBB™-TCT are both trash capture devices equipped with a 5mm screen basket to provide 100% trash capture for trash and debris 5mm in size and greater. The second “T” in the “TCT” designation indicates sediment treatment in addition to trash capture. The NSBB™-TC and NSBB™-TCT both have ports to allow for visual inspection and treatment of the sediment chambers for mosquito vector control.

Both configurations are variations of the standard NSBB™ which includes no mosquito vector control ports and has a coarse screen basket that does not provide 100% trash capture for trash and debris 5mm in size and greater. The standard NSBB™ is not eligible for full capture system certification.

g. Internal Bypass

The NSBB™-TC and NSBB™-TCT can be used in either an online or offline configuration. All models are designed to provide full trash capture treatment at or below the treatment hydraulic capacity. When the flow exceeds the hydraulic capacity of a unit, water can bypass the screen basket system. No previously captured trash and debris can escape the screen basket system during a bypass condition because of the lids covering the screen basket. Stormwater that bypasses the screen basket system will still receive some treatment since settling of heavier material may still occur in the settling chambers and floatables may be trapped by the floating outlet boom. The bypass function provides greater versatility and gives the NSBB™-TC and NSBB™-TCT the ability to treat a wide range of flows without concern for flooding or other adverse hydraulic effects. An external bypass may be used if a certain model can meet the water quality flow rate but not the peak flow rate.

h. Previously Trapped Trash

The NSBB™-TC and NSBB™-TCT have been designed to remove and retain all trash and debris 5mm in size and larger. The screen basket system has a lid to ensure that all captured trash and debris will be retained even under peak flow conditions. The only condition that would allow trash to escape downstream is if a system is somehow damaged.

i. Calibration Feature

Neither the NSBB™-TC nor the NSBB™-TCT include an adjustable calibration feature.

j. Photos

Photos of NSBB™ installations are included with brief descriptions below. NSBB™-TC and NSBB™-TCT installations look exactly like NSBB™ installations except the screen openings are smaller (5 mm) and the chamber depth for the NSBB™-TC is shallower.

Photos of NSBB™ installations are included with brief descriptions below. NSBB™-TC and NSBB™-TCT installations look exactly like NSBB™ installations except the screen openings are smaller (5 mm) and the chamber depth for the NSBB™-TC is shallower.



Base section set in excavation with sediment chamber baffle walls, turbulence deflectors, and screen basket system installed. Screen basket system cover shown in open position.



Base section set in excavation with sediment chamber baffle walls, turbulence deflectors, and screen basket system installed. Screen basket system cover shown in closed position.



Finished installation. Two manhole castings shown provide access to the vault.



Active installation. Trash and debris shown captured in the screen basket system. Left side of screen basket system cover shown in closed position and right side of screen basket system shown in open position. Both sides can be opened to facilitate maintenance.

k. Material Type

The NSBB™-TC and NSBB™-TCT are constructed from high-strength, durable materials and hardware components to ensure a long service life. The vault and interior baffle walls are made of concrete that typically has a 5000 psi or greater 28-day compressive strength. The concrete is reinforced with steel

rebar meeting ASTM A615 standards. The traffic load rating for a typical vault is HS-20, but higher load ratings can be provided. The screen basket system frame is manufactured from corrosion resistant type 304 stainless steel or aluminum channel and angle stock. The screen material is made from type 304 stainless steel punched with 5mm diameter openings. Finally, the turbulence deflectors are typically fabricated from high-grade, rigid plastic, but are sometimes made from stainless steel or aluminum plate material.

I. Design Life

The expected design life for the NSBB™-TC and NSBB™-TCT is 50 to 100 years. The stainless steel and plastic internal parts are expected to last at least 50 years while the concrete vault is expected to last at least 100 years. The actual life span of an individual installed unit however, will depend on proper care and maintenance.

4. Installation Guidance

The NSBB™-TC and NSBB™-TCT are relatively easy to install. The system is delivered in sections that are assembled by the Site Contractor on the project site. In most cases the internal components will be preinstalled to save the Installation Contractor time and ease installation.

a. Installation Procedures

Transport, site preparation, and installation requirements and procedures for the NSBB™-TC and NSBB™-TCT are described below:

1. Transport and Delivery

- Transport and delivery must be coordinated with Oldcastle Infrastructure™ Representative.

2. Site preparation

- The Installation Contractor is responsible for all pre-installation site preparation and for ensuring proper safety procedures and protocols are followed.
- The Installation Contractor is responsible for providing adequate and complete sediment and erosion control protection for the NSBB™-TC or NSBB™-TCT system from sediment and other pollutant loading until the site has been stabilized. The site is considered stabilized when all landscaping and paving activities are complete, and the impervious surfaces have been swept.
- The Installation Contractor will adhere to all jurisdictional and OSHA safety rules. This includes providing temporary shoring of the excavation zone. The Installation Contractor is responsible for appropriately barricading the NSBB™-TC or NSBB™-TCT from traffic in accordance with local codes.

3. Inspection Information

- The NSBB™-TC or NSBB™-TCT is a key component of any stormwater management program. Inspection of the structural components of the system upon delivery is essential to ensure that no damage occurred during shipping. Inspection of the NSBB™-TC or NSBB™-TCT unit and all parts contained in or shipped outside of the vault, are to be inspected at the time of delivery by both the Site Engineer or Site Inspector and the Installation Contractor. Any non-conformance to approved drawings or damage to any part of the system must be documented on the official shipping ticket. Damage to the unit during and after unloading shall be corrected at the expense of the Installation Contractor. Any necessary repairs to the NSBB™-TC or NSBB™-TCT must be coordinated with the Site Engineer or Site Inspector.

4. Installation Protocol

- Each NSBB™-TC or NSBB™-TCT vault is manufactured to accommodate site-specific characteristics including elevations, pipe sizes, pipe configurations, and surface treatment, as shown on the approved drawings. Any field modifications to the plan or the treatment system must be coordinated and approved by the Site Engineer.
- The vault shall be placed on a level compacted sub-grade with a minimum 6-inch gravel base. Compact undisturbed sub-grade materials are to be in accordance with geotechnical or soils report. Unsuitable material below the sub-grade must be replaced to the Site Engineer's approval.
- Once the base section and risers (if applicable) are set, the installation contractor is responsible for grouting the baffle walls to the vault to provide a watertight seal.
- Pipe connections must be aligned and sealed to meet approved plans and specifications. The inlet opening and outlet opening will be marked on the structure so that the unit may be set and plumbed correctly. The pipe connections are to be flush with the interior walls of the vault and are not to protrude into the vault.
- Once the vault has been set and plumbed, the system should be protected from construction runoff entering the vault. The Installation Contractor should provide a dry and clean working environment for the manufacturers' installation personnel to complete the installation of the internal components, if required.
- Once the connections and baffles are grouted in, the manufacturers' installation personnel will install the internal components in accordance with Oldcastle Infrastructure™ specifications.
- Backfilling should be performed with care. Precast sections must be properly set to result in watertight joints. Installation of the NSBB™-TC or NSBB™-TCT vault must conform to ASTM specification C891 "Standard Practice for Installation of Underground Precast Utility Structures" unless specified otherwise in contract documents or local requirements.

5. Basket Installation

- Install turbulence deflectors and baffle posts. Once bolt holes are drilled, clean bolt threads with a brush, apply anti seize compound and bolt deflectors in place.
- The top of the deflector should be within 1" of the top of the baffle and centered between the interior walls.
- Tape 3½" wooden blocks on the inside of the baffle posts resting on the baffles for basket installation preparation.

- Attach the flow spreader to the center of the inflow side of the baffle wall using included SS wedge bolts. The top of the flow spreader and baffle wall should be even.
- Set the basket on top of the baffles with the lead in end flush to the inflow wall and centerline of the basket centered between the interior side walls.
- Locate and install two legs for the basket using ½" x 1¼" SS bolts and locknuts to attach the brackets to the frame.
- Use ½" x 8" SS bolts, plain nuts, and fender washers to install the legs to the baffle walls.
- Use ½" x 4¼" SS wedge bolts mount the panels. Tighten all bolts to complete work.
- Check all fasteners for tightness and doors for operation.

b. Device Installation Limitations or Alternate Procedures

Installation of the NSBB™-TC or NSBB™-TCT is similar to the installation of many precast storm drain structures used on municipal applications. The internal components including the baffle walls, screen system, turbulence deflectors, and floating baffle, if required, are either pre-installed at the precast concrete facility or installed on site once the vault has been set. Post installation inspection of the NSBB™-TC and NSBB™-TCT is advised to establish that the vault and internal components were correctly installed.

Installation to help meet trash TMDLs or the statewide trash amendment are often retrofit installations. In the case of retrofit, the site should be inspected prior to design to be sure record drawings are correct. The trash capture system should be designed and fabricated to meet existing site conditions.

c. Methods for Diagnosing and Correcting Installation Errors

Oldcastle Infrastructure™ employs systematic processes for product design, manufacture, and installation. Detailed checklists are used to guide each step of development to minimize the potential for error. The design process and configuration of the NSBB™-TC or NSBB™-TCT includes consideration of all site requirements and a formal submittal and review process for design and fabrication details. Submittal drawings created by Oldcastle Infrastructure™ must be reviewed and signed by the Installation Contractor prior to fabrication of the unit.

If an error is found during or after installation, the error should be documented and photographed, and submitted to Oldcastle Infrastructure™ for consideration. Oldcastle Infrastructure™ will work with the Site Engineer or Site Inspector and the Installation Contractor to resolve the issue.

5. Operation and Maintenance Information

The NSBB™-TC and NSBB™-TCT were designed and manufactured to facilitate operation and maintenance activities. Full access is provided to the screen basket for trash removal and to all three sediment chambers for sediment removal. A vacuum truck is used to complete maintenance.

a. Inspection Procedures and frequency

A summary of inspection procedures, requirements, and recommendations for the NSBB™-TC and NSBB™-TCT are as follows:

- Following installation, the unit will require routine scheduled maintenance to ensure optimum operation. The frequency of maintenance should be established based on periodic inspections during the first year of operation. Inspections provide a general assessment of the overall condition and operation of the system.
- The system should be inspected quarterly during the first year and semi-annually after the first year.
- Inspection is simple and does not require entry into the treatment vault. Inspection is typically comprised of observation of the system's screen basket and sediment chambers for condition and pollutant load. The screen system should be in proper working condition, free from obstructions and damage and accumulated trash and sediment should be less than the specified capacity. System condition and pollutant load should be documented, and the unit should be serviced if it is at or near maximum capacity.
- The structural and functional condition of the system including the access openings and vault structure should also be inspected at least annually.

b. Maintenance Procedures and frequency

Basic maintenance procedures and recommended frequencies for the NSBB™-TC and NSBB™-TCT are as follows:

- Empty and clean the screen basket using a vacuum truck. The typical service interval for this activity is annual.
- Empty and clean the sediment chambers using a vacuum truck. The typical service interval for this activity is annual.
- Actual maintenance cycles are dependent on site-specific pollutant loading. If the hydraulic capacity of a unit is met in less than a year, source control activities should be intensified, or a new maintenance schedule should be established based on the actual site conditions. Ideally, capacity should remain below 50 to 60 percent full to allow for major, unplanned storm events to occur without bypass.

c. Maintenance Procedures

Maintenance procedures, requirements, and recommendations for the NSBB™-TC and NSBB™-TCT are as follows:

1. Screen Basket Maintenance

- Remove all manhole covers or open the hatches to gain access to the screen basket.
- Open the lid to the screen basket and remove all captured trash and debris from within the basket using a vacuum truck. The vacuum hose will not damage the screen. The screen basket may be serviced more frequently than the lower sediment chambers, depending on loading.
- When maintenance is complete, close the lid on the screen basket and replace the manhole covers or close the hatch doors.
- Transport all trash and debris to an approved facility for disposal in accordance with local and state requirements.

2. Sediment Chambers Maintenance

- Remove all manhole covers or open the hatches to gain access to the sediment chambers.
- After removing all trash and debris from the screen basket, open the doors on the bottom of the screen basket to provide access to the first and second sediment chambers. The third sediment chamber can be accessed directly since the screen basket is only located over the first and second chambers.
- Lower vacuum truck hose into the first sediment chamber to remove all sediment from the chamber. Repeat for the second and third sediment chambers. Pressure washing may be required to remove compacted sediments.
- When maintenance is complete, close the bottom doors and lid on the screen basket and replace the manhole covers or close the hatch doors.
- Transport all trash and debris to an approved facility for disposal in accordance with local and state requirements.

d. Maintenance Equipment and Materials

The following equipment should be used to conduct maintenance on the NSBB™-TC and NSBB™-TCT:

- Camera
- Recording materials (pen, paper, tablet, etc.)

- Suitable Clothing (hardhat, gloves, appropriate footwear, safety glasses, etc.)
- Traffic control materials (cones, barricades, signage)
- Manhole hook or pry bar
- Flashlight
- Tape measure
- Measuring stick
- Vacuum truck
- Pressure washer

e. Effects of Delayed Maintenance

Deferred maintenance may allow the screen basket and sediment chambers to fill to capacity. This is not expected to damage the treatment system structure and internal components, but water quality is likely to suffer since deferred maintenance is likely to cause sustained bypass of all flow. Deferred maintenance may cause trash captured in the screen basket to become tightly packed and sediment captured in sediment chambers to become compacted. These conditions will make maintenance activities more time consuming.

f. Repair Procedures

If inspection of the condition of structural and internal components of an NSBB™-TC or NSBB™-TCT reveals damage and need for repair, the damage should be documented and photographed and then submitted to Oldcastle Infrastructure™ for assessment. Engineering and Operations staff at Oldcastle Infrastructure™ will evaluate the damage and recommend a repair. Responsibility for the repair will depend on the cause of damage.

6. Vector Control Accessibility

the NSBB™-TC and NSBB™-TCT were designed and manufactured to meet vector control accessibility requirements. Supplemental access points are provided for unobstructed access to the sedimentation chambers for observation and application of vector treatment materials.

a. Date of Mosquito and Vector Control Association Application

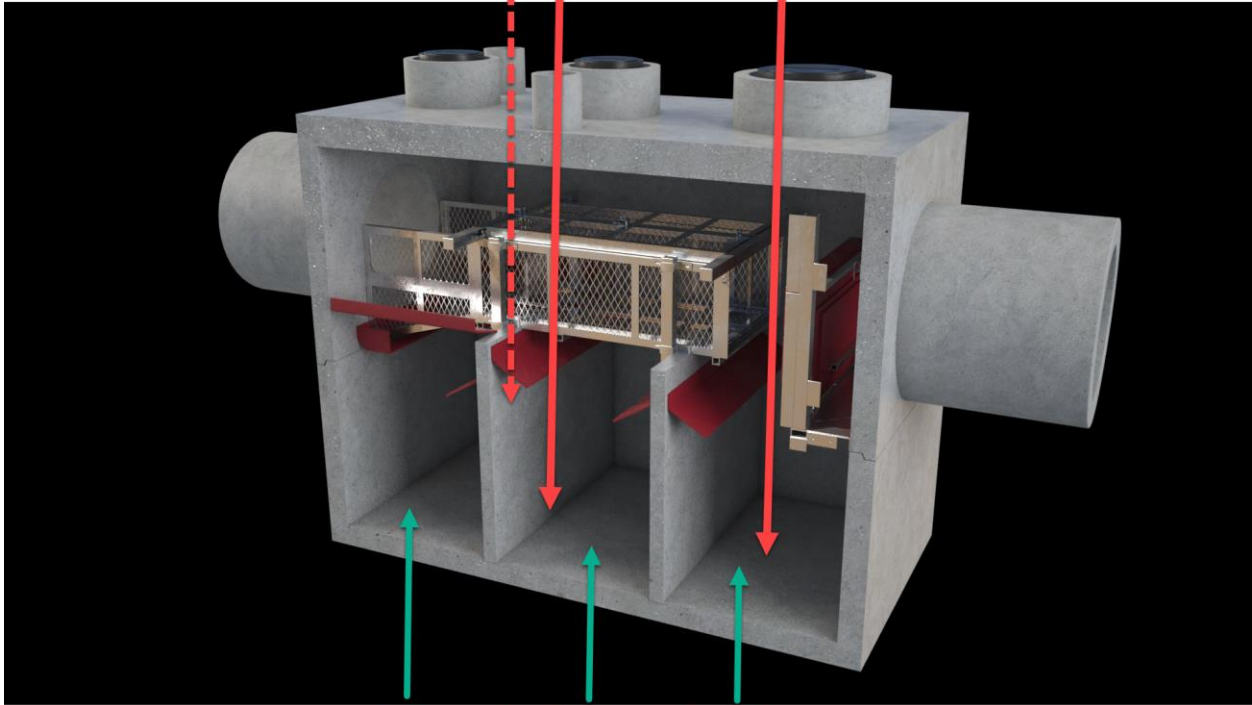
Application for approval of the NSBB™-TC and NSBB™-TCT was initially submitted to the Mosquito and Vector Control Association of California (MVCAC) on April 10, 2020. This submittal was made concurrently with the original California Water Boards Trash Treatment Control Device Application submittal. The application was approved on July 20, 2020. Although parts of the original application content have been modified to meet California Water Boards requirements, all details and characteristics pertaining to mosquito and vector control remain unchanged. A copy of the July 20th approval letter is included in Appendix D.

b. Description of Access for Vector Control Personnel

The NSBB™-TC and NSBB™-TCT were designed for ease of access for vector control and system maintenance. The three sediment chambers are necessary for sediment removal and storage but, by design, cause standing water. Standing water creates a potential for mosquito breeding. As a result, all three sediment chambers within the structure are designed to be accessible from the ground surface for vector control assessment and treatment as well as standard maintenance procedures. The NSBB™-TC and NSBB™-TCT are designed so that, from inlet to outlet, the first two chambers are accessible for mosquito control through 9-inch inspection ports. The inspection ports offer an unobstructed clear line of sight and access for delivery of vector treatments to the sediment chambers which extend beneath the trash capture basket as the center of the unit. The inspection ports are located along the sides of the unit beyond the basket envelope. The third, and final, sediment chamber can be accessed through a manhole cover or top hatch without obstruction since the basket envelope ends before that chamber. When the access covers are opened, the direct line of sight provided to each sediment chamber allows liquid or solid vector control treatment material to be dropped directly into the standing water without obstruction.

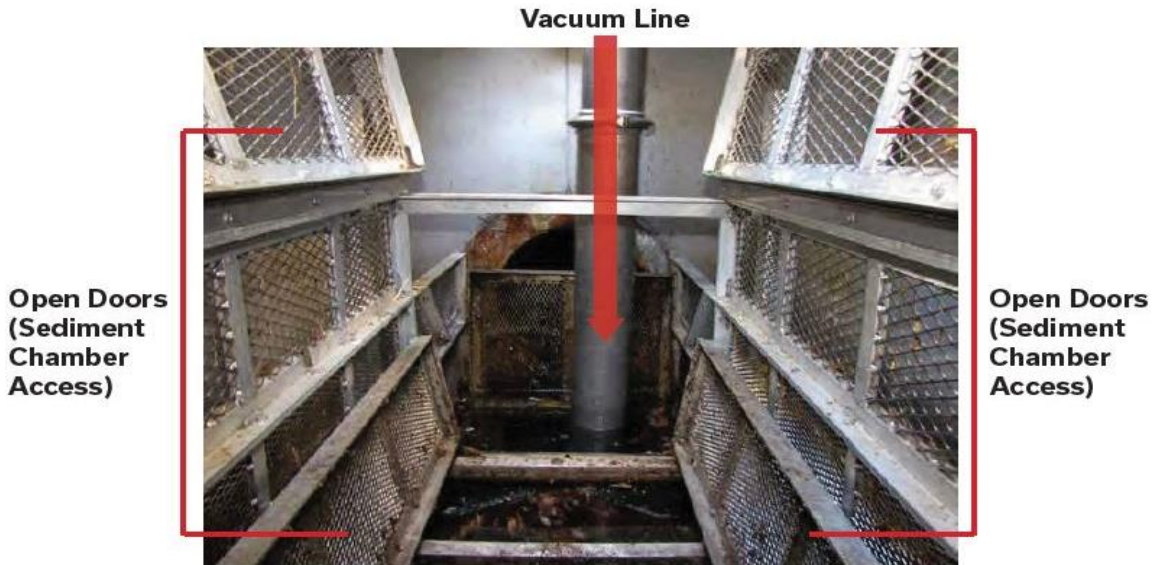
**9" Inspection Port Access:
Sedimentation Chamber 1 and 2**

**Manhole/ Hatch Access:
Sedimentation Chamber 3**



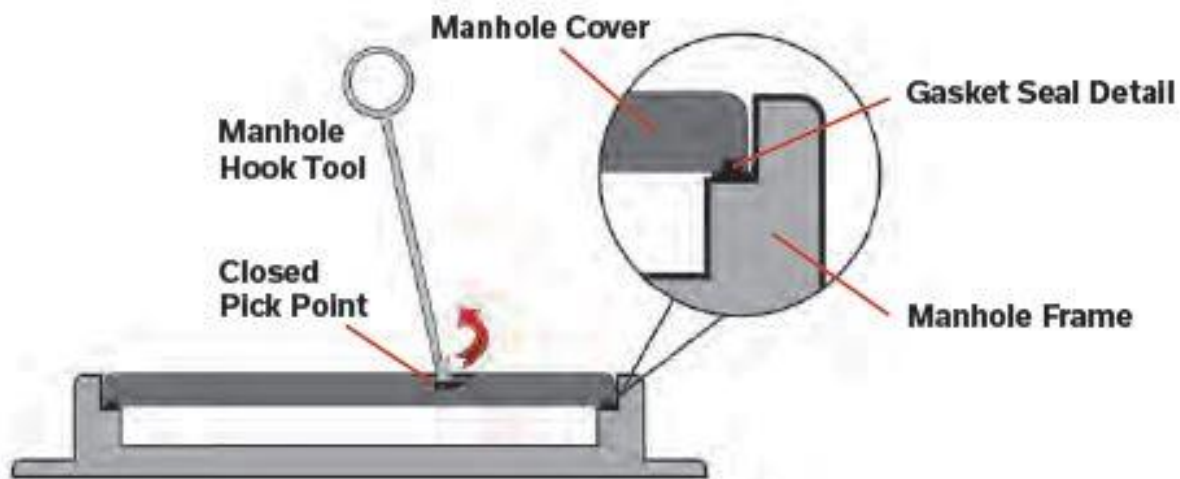
Sedimentation Chamber 1, 2 and 3

NSBB™-TC and NSBB™-TCT Vector Control Access Ports



NSBB™-TC and NSBB™-TCT Screen Basket Access

The NSBB™-TC and NSBB™-TCT also include design features to prevent mosquito access to the structure through manholes and hatches at the ground surface. All Oldcastle Infrastructure™ manhole covers, hatches, and ports are supplied with gasketed lids that seal the structure at the ground surface to prevent vector access through the points of inspection and maintenance access. Furthermore, each manhole cover and hatch is provided with closed pick points. Unlike common open-hole pick points, the pick points on the NSBB™-TC and NSBB™-TCT are closed recessed slots which allow access using a hooked pick tool, but do not allow physical entry for mosquitos or other vectors.



NSBB™-TC and NSBB™-TCT Access Seal

c. Letter of Verification from Mosquito Vector Control Association

Refer to Appendix D for a letter of verification from the Mosquito and Vector Control Association of California (MVCAC), dated July 20, 2020. The approval letter verifies all design requirements have been met to allow for full visual and treatment access.

7. Reliability Information

The NSBB™-TC and NSBB™-TCT are designed and built to perform and last for decades. However, in the rare event of damage or failure, Oldcastle Infrastructure™ offers full product support including a product warranty.

a. Estimated Design Life

The expected design life for the NSBB™-TC and NSBB™-TCT is 50 to 100 years. The stainless steel and plastic internal parts are expected to last at least 50 years while the concrete vault is expected to last at least 100 years. The actual life span of an individual installed unit, however, will depend on proper care and maintenance.

b. Warranty Information

Oldcastle Infrastructure™ provides a 5-year limited warranty for the NSBB™-TC and NSBB™-TCT in accordance with the conditions listed in the warranty document provided in Appendix E.

c. Customer Support Information

Oldcastle Infrastructure offers full customer support for all products including the NSBB™-TC and NSBB™-TCT. Customer Support contact information is as follows:

Oldcastle Infrastructure™
7100 Longe Street
Stockton, CA 95304
Phone: (888) 965-3227
Website: www.oldcastleinfrastructure.com
Email Contact: ContactInfrastructure@Oldcastle.com

8. Field and Lab Testing Information and Analysis

The NSBB™-TC and NSBB™-TCT have not been formally field tested although dozens of units have been installed and have met trash capture requirements and expectations. Limited lab test data is available as discussed below.

a. Devices with 5mm Screen

Since both the NSBB™-TC and NSBB™-TCT include a 5mm screen through which all treatment flow must pass to travel downstream, testing is not required to demonstrate trash capture performance because particles 5mm in diameter and larger cannot physically pass through the screen. The screen basket is equipped with a lid that prevents the loss of captured trash and debris during periods of high flow. Empirical testing was conducted to adequately determine the strength and durability of the internal components.

b. Devices without 5mm Screen

Laboratory test results for sediment removal by a standard NSBB™ equipped with a screen having openings greater than 5mm are available upon request. The configuration and dimensions of the sediment chambers on the NSBB™-TCT are identical to the configuration and dimensions of the sediment chambers on the standard NSBB™. The only difference between the two models is the size of the openings in the internal screen. Thus, the sediment removal test results for the NSBB™ may be considered representative of expected sediment removal by the NSBB™-TCT. This information is important when a designer or owner would like to get definite and predictable sediment removal from a trash capture device.

The New Jersey Corporation for Advanced Technology (NJCAT) and the New Jersey Department of Environmental Protection (NJDEP) conduct perhaps the most comprehensive and well-recognized sediment removal verification and certification program in the country. The NSBB™ has verified testing for 50% removal of sediment with a d50 of 75 microns and 80% removal of sediment with a d50 of 110 microns. The NJDEP has certified the NSBB™ as a qualified Hydrodynamic Sedimentation Manufactured Treatment Device. Although the New Jersey testing was conducted on a standard NSBB™ with a coarse screen, the NSBB™-TCT is expected to achieve similar or better sediment removal results since the 5mm screen acts to further reduce flow velocities and turbulence to promote settling.

APPENDIX A: NSBB™-TC and NSBB™-TCT Hydraulic Calculations

Technical Memorandum NSBB™- TC and NSBB™- TCT Hydraulic Calculations

This technical memorandum documents the hydraulic calculations for the Nutrient Separating Baffle Box® Trash Capture (NSBB-TC) and Trash Capture Treatment system (NSBB-TCT). Oldcastle Infrastructure has developed a Hydraulic Calculator to calculate the upstream water surface elevation for project specific applications, which is based on the equations and calculations noted below.

I. Standard Equations

The flow capacity through the NSBB-TC and NSBB-TCT is based on several standard equations:

- Manning's Equation for pipe flow; $Q = VA = \left(\frac{1.49}{n}\right) AR^{\frac{2}{3}} \sqrt{S}$
 - Q = Treatment Flow Rate, (ft³/s)
 - V = Velocity, (ft/s)
 - A = Flow Area, (ft²)
 - n = Manning's Roughness Coefficient (0.012)
 - R = Hydraulic Radius, (ft)
 - S = Pipe Slope, (ft/ft)
- Pipe Entrance Loss Equation; $H_L = K_e \left(\frac{V^2}{2g}\right)$
 - H_L = Exit Loss (ft)
 - K_e = Exit Loss Coefficient (=0.2, for rounded entrance)
 - V = Velocity, (ft/s)
 - g = Gravity (=32.174 ft/s²)
- Orifice Equation for head loss through the Screen Basket; $Qt = CA_S \sqrt{2gh}$
 - Qt = Treatment Flow Rate, (ft³/s)
 - C = Orifice Coefficient, (=0.60)
 - A_S = Screen Surface Area x % Open, (ft²)
 - g = Gravity (=32.174 ft/s²)
 - h = Available head (ft)
- Weir Equation for Peak Flows; $Q_P = C_W L H_P^{\frac{3}{2}}$
 - Q_P = Peak Flow Rate, (ft³/s)
 - C_W = Weir Coefficient (=3.33)
 - L = Length of Weir (ft)
 - H_P = Available head during Peak Conditions (ft)
- Submerged Weir Equation for Peak Flows; $Q_{Psub} = Q_P (1 - (H_{d_sub}/H_{u_sub})^{\frac{3}{2}})^{0.385}$
 - Q_{Psub} = Peak Flow Rate during Submerged Condition, (ft³/s)
 - Q_P = Peak Flow Rate, (ft³/s)
 - H_{d_sub} = Downstream head over Weir during Peak Conditions (ft)
 - H_{u_sub} = Upstream head over Weir during Peak Conditions (ft)

II. Treatment Capacity Calculations

The following steps were used to calculate the Treatment Capacity of the NSBB-TC and NSBB-TCT:

1. The Downstream Depth of Flow (Depth_DS_Tx) is the Normal Depth in the Outlet Pipe plus the Pipe Entrance Loss equation and was calculated using the Manning's Equation and Pipe Entrance Head Loss equation, based on the Maximum Pipe Size for each NSBB-TC and NSBB-TCT model size. The pipe Slope (S) varied by model size and was based on an anticipated full pipe flow with a Velocity less than 11 ft/s. The Floating Skimmer is designed to rise such that there is no additional head loss upstream of the Floating Skimmer.
2. The Upstream Depth of Flow (Depth_US) is based on the Top of Screen Height, such that 100% of the treatment flow passes through the Screen Basket System. At the calculated treatment capacity, all water passes through the Screen Basket System.
3. The available Head (h) is then calculated, $h = \text{Depth_US} - \text{Depth_DS_Tx}$
4. The Screen Surface Area is the full surface area of the Screen Basket System, not including the lid. The 5 mm screen has a Percent Open Area = 51%, which was applied to the Area. A Safety Factor (SF) was also applied to the Screen Surface Area (A) to calculate the Treatment Capacity for a varying Percent (%) Full basket.
 - o 0% Full: SF = 1.00
 - o 25% Full: SF = 0.75
 - o 50% Full: SF = 0.75
 - o 75% Full: SF = 0.25
5. The Treatment Flow Rate (Qt) was then calculated using the Orifice Equation, noted above.

III. Internal Bypass Capacity Calculations

During peak flow events, water flows through the NSBB-TC and NSBB-TCT by cresting the Screen Basket System, therefore the full width of the vault act as internal weir to bypass peak flows. Flow that passes over the top sides of the Screen Basket System Lead-in flows through the 3" wide opening under the screen, which acts as an orifice during peak flows. The Floating Skimmer is designed to rise such that there is no additional head loss upstream of the Floating Skimmer during a peak flow condition. The following steps were used to calculate the Internal Bypass Capacity of the NSBB-TC and NSBB-TCT:

1. The Length of the Weir (L) = NSBB Vault Width.
2. The Available Head (H_p) is the allowable Upstream Water Depth (which is 2" below the inside top of the precast vault) – [Top of Screen Lid] or [Downstream Water Surface Elevation (Depth_DS_Pk)], whichever downstream depth is greater.
3. The Peak Flow is then calculated based on the Weir Equation, noted above. Alternatively, the Submerged Weir Equation is used when the Downstream Water Depth is above the Top of Screen Lid.
4. During a 100% full screen condition, the top side walls of the Lead-in are unstructured. Therefore, during the 100% full screen capacity condition, the flow through the top side walls of the Lead-in are included in the Internal Bypass Capacity. This capacity was calculated in the same manner as noted in Section II.
5. The Treatment Capacity will still be passing through the screen (unless 100% Full), therefore the Total Flow Capacity = Treatment Capacity + Internal Bypass Capacity.



7/14/2020

Project Information

Project Name:	Example Trash Capture	
Location:	California	
Design Basis:	Trash Capture (100% of 5mm)	
Screen Basket Capacity (% Full):	0% (Empty)	
Treatment Flow Rate, Qt (cfs):	42.80	<i>Select -TC Model</i>
Peak Flow Rate, Qp (cfs):	56.20	
NSBB Model:	NSBB-612-TC	

Inlet & Outlet Pipe Information

Inlet Pipe Diameter (in):	36
Inlet Invert Elevation (ft):	0.00
Outlet Pipe Diameter (in):	36
Outlet Invert Elevation (ft):	0.00
Outlet Slope %:	1.08%
Manning's Roughness Coefficient (n):	0.012
Tailwater Present?	No

Outlet Pipe Flow Characteristics

	<i>Treatment</i>	<i>Peak</i>
Normal Depth During Design Flow (ft):	1.620	1.93
Flow Area (sq ft):	3.89	4.81
Velocity (ft/s):	10.99	11.68
Wetted Perimeter (ft):	4.95	5.59
Downstream Depth of Flow, Depth_DS (ft):	1.995	2.355

NSBB Discharge Coefficients

Screen Orifice, Co:	0.60
Outlet Pipe Entrance, K:	0.20

System Design Summary

Rim Elevation (ft):	6.00	
Rim to Invert Out Depth (ft):	6.00	
Upstream WSE during Treatment Flow (ft):	2.158	Outlet IE + Depth_DS_Tx
Upstream WSE during Peak Flow (ft):	3.833	Outlet IE + Depth_DS_Pk

Disclaimer: Calculations are best estimate based on information available and are intended only for use by the party to whom they were transmitted and for the project referenced.



Screen Flow Calculations - FOR REFERENCE ONLY

Treatment Flow Condition

Max Treatment Depth	26 in 2.167 ft	% Screen Open	0.51
		% Full Safety Factor	1
Screen Bottom Area,A1	13.29 sf	Screen Orifice, Co:	0.6
Screen Side Area,A2	28.87 sf	Weir Coefficient,C:	3.33
Treatment Upstream Head	2.1583 ft		
Qt= Co*(A1+A2)*SQRT(2*g*(Hup - Depth_DS_Tx))			

Peak Flow Condition

Max Peak Hu	3.83 ft	Lead-in Height:	0.917 ft
Peak Q, Screen Max Hu	55.783 cfs	Orifice Height,Hor:	0.25 ft
Lead-in Screen Area,A_pk	2.292 sf	Top of Weir Elevation:	2.417 ft
DS Depth, Depth_DS_Pk	2.355 ft	Weir Length,L:	6.00 ft
Invert Height of Lead-in	1.083 ft		

Qpeak-screen= Co*A*SQRT(2*g*(Hup-Depth_DS_Pk))

Qpeak-orifice= Co*(L*Hor)*SQRT(2*32.174*(Hup-Depth_DS_Pk))

Qpeak-weir: Equation changes depending on Depth_DS_Pk

Qfree flow= CLHup^1.5

Qsubmerged= Qf*(1-(Hd_sub/Hu_sub)^1.5)^0.385

Hd_sub= Depth_DS_Pk - Top of Weir

Hs_sub= Hup - Top of Weir

Qpeak-total= Qpeak-screen + Qpeak-orifice + Qpeak-weir

Iterative Calculations for Treatment and Peak Flows based on Upstream Depth:

Upstream Depth (Hup)		Treatment Flow Condition		Peak Flow Condition				
		Area (A)	Qt	A_pk	Qpeak-screen	Qpeak-orifice	Qpeak-weir	Qpeak-total
(in)	(ft)	(sf)	(cfs)	(sf)	(cfs)	(cfs)	(cfs)	(cfs)
0	0.000	6.7779	0.00	0.000	0.000	0.000	0.000	0.000
24	2.000	20.3690	6.91	2.338	0.000	0.000	0.000	0.000
24.1	2.008	20.4256	11.34	2.338	0.000	0.000	0.000	0.000
24.2	2.017	20.4823	14.50	2.338	0.000	0.000	0.000	0.000
24.3	2.025	20.5389	17.11	2.338	0.000	0.000	0.000	0.000
24.4	2.033	20.5955	19.40	2.338	0.000	0.000	0.000	0.000
24.5	2.042	20.6522	21.47	2.338	0.000	0.000	0.000	0.000
24.6	2.050	20.7088	23.37	2.338	0.000	0.000	0.000	0.000
24.7	2.058	20.7654	25.15	2.338	0.000	0.000	0.000	0.000
24.8	2.067	20.8220	26.82	2.338	0.000	0.000	0.000	0.000
24.9	2.075	20.8787	28.42	2.338	0.000	0.000	0.000	0.000
25	2.083	20.9353	29.94	2.338	0.000	0.000	0.000	0.000
25.1	2.092	20.9919	31.41	2.338	0.000	0.000	0.000	0.000
25.2	2.100	21.0486	32.82	2.338	0.000	0.000	0.000	0.000
25.3	2.108	21.1052	34.19	2.338	0.000	0.000	0.000	0.000
25.4	2.117	21.1618	35.52	2.338	0.000	0.000	0.000	0.000
25.5	2.125	21.2185	36.82	2.338	0.000	0.000	0.000	0.000
25.6	2.133	21.2751	38.08	2.338	0.000	0.000	0.000	0.000
25.7	2.142	21.3317	39.32	2.338	0.000	0.000	0.000	0.000

25.8	2.150	21.3883	40.52	2.338	0.000	0.000	0.000	0.000
25.9	2.158	21.4450	41.71	2.338	0.000	0.000	0.000	0.000
26	2.167	21.5016	42.87	2.338	0.000	0.000	0.000	0.000
26.1	2.175	21.5016	42.87	2.338	0.000	0.000	0.000	0.000
26.2	2.183	21.5016	42.87	2.338	0.000	0.000	0.000	0.000
26.3	2.192	21.5016	42.87	2.338	0.000	0.000	0.000	0.000
26.4	2.200	21.5016	42.87	2.338	0.000	0.000	0.000	0.000
26.5	2.208	21.5016	42.87	2.338	0.000	0.000	0.000	0.000
26.6	2.217	21.5016	42.87	2.338	0.000	0.000	0.000	0.000
26.7	2.225	21.5016	42.87	2.338	0.000	0.000	0.000	0.000
26.8	2.233	21.5016	42.87	2.338	0.000	0.000	0.000	0.000
26.9	2.242	21.5016	42.87	2.338	0.000	0.000	0.000	0.000
27	2.250	21.5016	42.87	2.338	0.000	0.000	0.000	0.000
27.1	2.258	21.5016	42.87	2.338	0.000	0.000	0.000	0.000
27.2	2.267	21.5016	42.87	2.338	0.000	0.000	0.000	0.000
27.3	2.275	21.5016	42.87	2.338	0.000	0.000	0.000	0.000
27.4	2.283	21.5016	42.87	2.338	0.000	0.000	0.000	0.000
27.5	2.292	21.5016	42.87	2.338	0.000	0.000	0.000	0.000
27.6	2.300	21.5016	42.87	2.338	0.000	0.000	0.000	0.000
27.7	2.308	21.5016	42.87	2.338	0.000	0.000	0.000	0.000
27.8	2.317	21.5016	42.87	2.338	0.000	0.000	0.000	0.000
27.9	2.325	21.5016	42.87	2.338	0.000	0.000	0.000	0.000
28	2.333	21.5016	42.87	2.338	0.000	0.000	0.000	0.000
28.1	2.342	21.5016	42.87	2.338	0.000	0.000	0.000	0.000
28.2	2.350	21.5016	42.87	2.338	0.000	0.000	0.000	0.000
28.3	2.358	21.5016	42.87	2.338	0.602	0.387	0.000	0.989
28.4	2.367	21.5016	42.87	2.338	1.191	0.764	0.000	1.955
28.5	2.375	21.5016	42.87	2.338	1.572	1.009	0.000	2.581
28.6	2.383	21.5016	42.87	2.338	1.878	1.205	0.000	3.083
28.7	2.392	21.5016	42.87	2.338	2.141	1.374	0.000	3.514
28.8	2.400	21.5016	42.87	2.338	2.374	1.524	0.000	3.898
28.9	2.408	21.5016	42.87	2.338	2.587	1.660	0.000	4.247
29	2.417	21.5016	42.87	2.338	2.783	1.786	0.000	4.569
29.1	2.425	21.5016	42.87	2.338	2.967	1.904	0.015	4.886
29.2	2.433	21.5016	42.87	2.338	3.139	2.015	0.043	5.197
29.3	2.442	21.5016	42.87	2.338	3.303	2.120	0.079	5.502
29.4	2.450	21.5016	42.87	2.338	3.459	2.220	0.122	5.800
29.5	2.458	21.5016	42.87	2.338	3.608	2.316	0.170	6.094
29.6	2.467	21.5016	42.87	2.338	3.752	2.407	0.223	6.383
29.7	2.475	21.5016	42.87	2.338	3.890	2.496	0.281	6.667
29.8	2.483	21.5016	42.87	2.338	4.023	2.582	0.344	6.949
29.9	2.492	21.5016	42.87	2.338	4.152	2.664	0.410	7.227
30	2.500	21.5016	42.87	2.338	4.277	2.745	0.481	7.503
30.1	2.508	21.5016	42.87	2.338	4.399	2.823	0.555	7.776
30.2	2.517	21.5016	42.87	2.338	4.517	2.899	0.632	8.048
30.3	2.525	21.5016	42.87	2.338	4.632	2.973	0.712	8.317
30.4	2.533	21.5016	42.87	2.338	4.745	3.045	0.796	8.586
30.5	2.542	21.5016	42.87	2.338	4.855	3.115	0.883	8.853
30.6	2.550	21.5016	42.87	2.338	4.962	3.184	0.973	9.119

30.7	2.558	21.5016	42.87	2.338	5.067	3.252	1.065	9.384
30.8	2.567	21.5016	42.87	2.338	5.170	3.318	1.161	9.649
30.9	2.575	21.5016	42.87	2.338	5.271	3.383	1.259	9.913
31	2.583	21.5016	42.87	2.338	5.370	3.446	1.359	10.176
31.1	2.592	21.5016	42.87	2.338	5.468	3.509	1.463	10.439
31.2	2.600	21.5016	42.87	2.338	5.563	3.570	1.568	10.702
31.3	2.608	21.5016	42.87	2.338	5.657	3.630	1.677	10.964
31.4	2.617	21.5016	42.87	2.338	5.750	3.690	1.787	11.227
31.5	2.625	21.5016	42.87	2.338	5.841	3.748	1.900	11.489
31.6	2.633	21.5016	42.87	2.338	5.930	3.806	2.015	11.751
31.7	2.642	21.5016	42.87	2.338	6.019	3.862	2.132	12.013
31.8	2.650	21.5016	42.87	2.338	6.106	3.918	2.252	12.276
31.9	2.658	21.5016	42.87	2.338	6.192	3.973	2.374	12.538
32	2.667	21.5016	42.87	2.338	6.276	4.027	2.498	12.801
32.1	2.675	21.5016	42.87	2.338	6.360	4.081	2.623	13.064
32.2	2.683	21.5016	42.87	2.338	6.442	4.134	2.751	13.327
32.3	2.692	21.5016	42.87	2.338	6.523	4.186	2.881	13.591
32.4	2.700	21.5016	42.87	2.338	6.604	4.238	3.013	13.855
32.5	2.708	21.5016	42.87	2.338	6.683	4.289	3.147	14.119
32.6	2.717	21.5016	42.87	2.338	6.762	4.339	3.283	14.384
32.7	2.725	21.5016	42.87	2.338	6.839	4.389	3.421	14.649
32.8	2.733	21.5016	42.87	2.338	6.916	4.438	3.560	14.914
32.9	2.742	21.5016	42.87	2.338	6.992	4.487	3.702	15.180
33	2.750	21.5016	42.87	2.338	7.067	4.535	3.845	15.447
33.1	2.758	21.5016	42.87	2.338	7.141	4.582	3.990	15.714
33.2	2.767	21.5016	42.87	2.338	7.214	4.630	4.137	15.981
33.3	2.775	21.5016	42.87	2.338	7.287	4.676	4.286	16.249
33.4	2.783	21.5016	42.87	2.338	7.359	4.722	4.436	16.518
33.5	2.792	21.5016	42.87	2.338	7.430	4.768	4.588	16.787
33.6	2.800	21.5016	42.87	2.338	7.501	4.814	4.742	17.057
33.7	2.808	21.5016	42.87	2.338	7.571	4.858	4.897	17.327
33.8	2.817	21.5016	42.87	2.338	7.640	4.903	5.055	17.598
33.9	2.825	21.5016	42.87	2.338	7.709	4.947	5.213	17.869
34	2.833	21.5016	42.87	2.338	7.777	4.991	5.374	18.142
34.1	2.842	21.5016	95.222	2.338	7.845	5.034	5.536	18.415
34.2	2.850	21.5016	95.690	2.338	7.912	5.077	5.699	18.688
34.3	2.858	21.5016	96.155	2.338	7.978	5.120	5.865	18.962
34.4	2.867	21.5016	96.618	2.338	8.044	5.162	6.031	19.237
34.5	2.875	21.5016	97.078	2.338	8.109	5.204	6.200	19.513
34.6	2.883	21.5016	97.537	2.338	8.174	5.245	6.370	19.789
34.7	2.892	21.5016	97.993	2.338	8.238	5.287	6.541	20.066
34.8	2.900	21.5016	98.448	2.338	8.302	5.327	6.714	20.343
34.9	2.908	21.5016	98.900	2.338	8.365	5.368	6.888	20.622
35	2.917	21.5016	99.350	2.338	8.428	5.408	7.064	20.900
35.1	2.925	21.5016	99.798	2.338	8.490	5.448	7.241	21.180
35.2	2.933	21.5016	100.245	2.338	8.552	5.488	7.420	21.461
35.3	2.942	21.5016	100.689	2.338	8.614	5.528	7.600	21.742
35.4	2.950	21.5016	101.131	2.338	8.675	5.567	7.782	22.024
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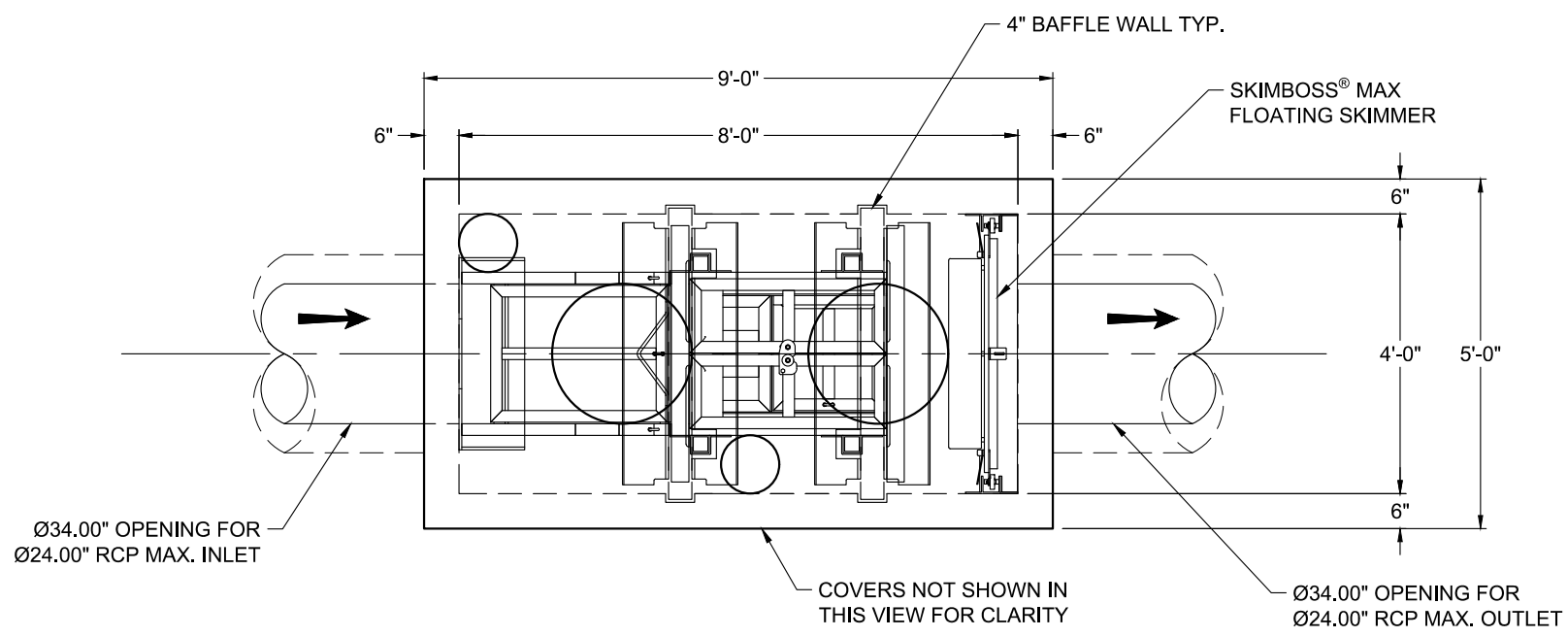
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35.7	2.975	21.5016	102.446	2.338	8.855	5.683	8.336	22.873
35.8	2.983	21.5016	102.881	2.338	8.915	5.721	8.523	23.158
35.9	2.992	21.5016	103.314	2.338	8.974	5.758	8.712	23.444
36	3.000	21.5016	103.745	2.338	9.032	5.796	8.902	23.730
36.1	3.008	21.5016	104.174	2.338	9.090	5.833	9.093	24.017
36.2	3.017	21.5016	104.601	2.338	9.148	5.871	9.286	24.305
36.3	3.025	21.5016	105.027	2.338	9.206	5.907	9.480	24.593
36.4	3.033	21.5016	105.451	2.338	9.263	5.944	9.675	24.882
36.5	3.042	21.5016	105.873	2.338	9.320	5.980	9.872	25.172
36.6	3.050	21.5016	106.294	2.338	9.376	6.017	10.070	25.463
36.7	3.058	21.5016	106.713	2.338	9.432	6.053	10.270	25.754
36.8	3.067	21.5016	107.130	2.338	9.488	6.088	10.470	26.047
36.9	3.075	21.5016	107.546	2.338	9.543	6.124	10.672	26.340
37	3.083	21.5016	107.960	2.338	9.598	6.159	10.876	26.633
37.1	3.092	21.5016	108.373	2.338	9.653	6.195	11.080	26.928
37.2	3.100	21.5016	108.784	2.338	9.708	6.229	11.286	27.223
37.3	3.108	21.5016	109.193	2.338	9.762	6.264	11.493	27.519
37.4	3.117	21.5016	109.601	2.338	9.816	6.299	11.702	27.816
37.5	3.125	21.5016	110.008	2.338	9.869	6.333	11.911	28.114
37.6	3.133	21.5016	110.412	2.338	9.923	6.367	12.122	28.412
37.7	3.142	21.5016	110.816	2.338	9.976	6.401	12.334	28.711
37.8	3.150	21.5016	111.218	2.338	10.028	6.435	12.547	29.011
37.9	3.158	21.5016	111.618	2.338	10.081	6.469	12.762	29.311
38	3.167	21.5016	112.017	2.338	10.133	6.502	12.977	29.613
38.1	3.175	21.5016	112.415	2.338	10.185	6.536	13.194	29.915
38.2	3.183	21.5016	112.811	2.338	10.236	6.569	13.412	30.218
38.3	3.192	21.5016	113.206	2.338	10.288	6.602	13.632	30.521
38.4	3.200	21.5016	113.600	2.338	10.339	6.635	13.852	30.826
38.5	3.208	21.5016	113.992	2.338	10.390	6.667	14.074	31.131
38.6	3.217	21.5016	114.383	2.338	10.441	6.700	14.297	31.437
38.7	3.225	21.5016	114.772	2.338	10.491	6.732	14.520	31.744
38.8	3.233	21.5016	115.160	2.338	10.541	6.764	14.746	32.051
38.9	3.242	21.5016	115.547	2.338	10.591	6.796	14.972	32.359
39	3.250	21.5016	115.933	2.338	10.641	6.828	15.199	32.668
39.1	3.258	21.5016	116.317	2.338	10.690	6.860	15.428	32.978
39.2	3.267	21.5016	116.700	2.338	10.739	6.892	15.658	33.288
39.3	3.275	21.5016	117.082	2.338	10.788	6.923	15.888	33.600
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39.5	3.292	21.5016	117.842	2.338	10.886	6.985	16.353	34.224
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39.7	3.308	21.5016	118.596	2.338	10.982	7.047	16.823	34.852
39.8	3.317	21.5016	118.972	2.338	11.030	7.078	17.059	35.167
39.9	3.325	21.5016	119.347	2.338	11.078	7.109	17.297	35.483
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40.1	3.342	21.5016	120.092	2.338	11.173	7.170	17.775	36.117
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40.4	3.367	21.5016	121.202	2.338	11.313	7.260	18.500	37.074

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40.6	3.383	21.5016	121.936	2.338	11.406	7.319	18.989	37.715
40.7	3.392	21.5016	122.301	2.338	11.452	7.349	19.235	38.037
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40.9	3.408	21.5016	123.029	2.338	11.544	7.408	19.731	38.683
41	3.417	21.5016	123.391	2.338	11.590	7.437	19.980	39.007
41.1	3.425	21.5016	123.752	2.338	11.635	7.466	20.230	39.332
41.2	3.433	21.5016	124.112	2.338	11.680	7.495	20.482	39.657
41.3	3.442	21.5016	124.471	2.338	11.725	7.524	20.734	39.984
41.4	3.450	21.5016	124.829	2.338	11.770	7.553	20.987	40.311
41.5	3.458	21.5016	125.186	2.338	11.815	7.582	21.242	40.638
41.6	3.467	21.5016	125.542	2.338	11.860	7.610	21.497	40.967
41.7	3.475	21.5016	125.897	2.338	11.904	7.639	21.754	41.296
41.8	3.483	21.5016	126.251	2.338	11.948	7.667	22.011	41.626
41.9	3.492	21.5016	126.604	2.338	11.992	7.696	22.269	41.957
42	3.500	21.5016	126.956	2.338	12.036	7.724	22.529	42.289
42.1	3.508	21.5016	127.307	2.338	12.080	7.752	22.789	42.621
42.2	3.517	21.5016	127.657	2.338	12.123	7.780	23.051	42.954
42.3	3.525	21.5016	128.006	2.338	12.167	7.808	23.313	43.288
42.4	3.533	21.5016	128.354	2.338	12.210	7.835	23.577	43.622
42.5	3.542	21.5016	128.701	2.338	12.253	7.863	23.841	43.957
42.6	3.550	21.5016	129.048	2.338	12.296	7.891	24.106	44.293
42.7	3.558	21.5016	129.393	2.338	12.339	7.918	24.373	44.630
42.8	3.567	21.5016	129.737	2.338	12.382	7.945	24.640	44.967
42.9	3.575	21.5016	130.081	2.338	12.424	7.973	24.908	45.305
43	3.583	21.5016	130.424	2.338	12.467	8.000	25.178	45.644
43.1	3.592	21.5016	130.765	2.338	12.509	8.027	25.448	45.984
43.2	3.600	21.5016	131.106	2.338	12.551	8.054	25.719	46.324
43.3	3.608	21.5016	131.446	2.338	12.593	8.081	25.991	46.665
43.4	3.617	21.5016	131.785	2.338	12.635	8.108	26.264	47.007
43.5	3.625	21.5016	132.123	2.338	12.676	8.135	26.538	47.349
43.6	3.633	21.5016	132.461	2.338	12.718	8.161	26.813	47.692
43.7	3.642	21.5016	132.797	2.338	12.759	8.188	27.089	48.036
43.8	3.650	21.5016	133.133	2.338	12.801	8.214	27.366	48.381
43.9	3.658	21.5016	133.467	2.338	12.842	8.241	27.644	48.726
44	3.667	21.5016	133.801	2.338	12.883	8.267	27.923	49.072
44.1	3.675	21.5016	134.134	2.338	12.924	8.293	28.203	49.419
44.2	3.683	21.5016	134.467	2.338	12.964	8.319	28.483	49.767
44.3	3.692	21.5016	134.798	2.338	13.005	8.345	28.765	50.115
44.4	3.700	21.5016	135.129	2.338	13.045	8.371	29.047	50.464
44.5	3.708	21.5016	135.459	2.338	13.086	8.397	29.331	50.814
44.6	3.717	21.5016	135.788	2.338	13.126	8.423	29.615	51.164
44.7	3.725	21.5016	136.116	2.338	13.166	8.449	29.900	51.515
44.8	3.733	21.5016	136.443	2.338	13.206	8.474	30.186	51.867
44.9	3.742	21.5016	136.770	2.338	13.246	8.500	30.473	52.219
45	3.750	21.5016	137.096	2.338	13.286	8.526	30.761	52.573
45.1	3.758	21.5016	137.421	2.338	13.325	8.551	31.050	52.926
45.2	3.767	21.5016	137.745	2.338	13.365	8.576	31.340	53.281
45.3	3.775	21.5016	138.069	2.338	13.404	8.602	31.630	53.636

45.4	3.783	21.5016	138.392	2.338	13.444	8.627	31.922	53.992
45.5	3.792	21.5016	138.714	2.338	13.483	8.652	32.214	54.349
45.6	3.800	21.5016	139.035	2.338	13.522	8.677	32.508	54.707
45.7	3.808	21.5016	139.356	2.338	13.561	8.702	32.802	55.065
45.8	3.817	21.5016	139.675	2.338	13.600	8.727	33.097	55.423
45.9	3.825	21.5016	139.995	2.338	13.638	8.752	33.393	55.783
46	3.833	21.5016	140.313	2.338	13.677	8.777	33.690	56.143

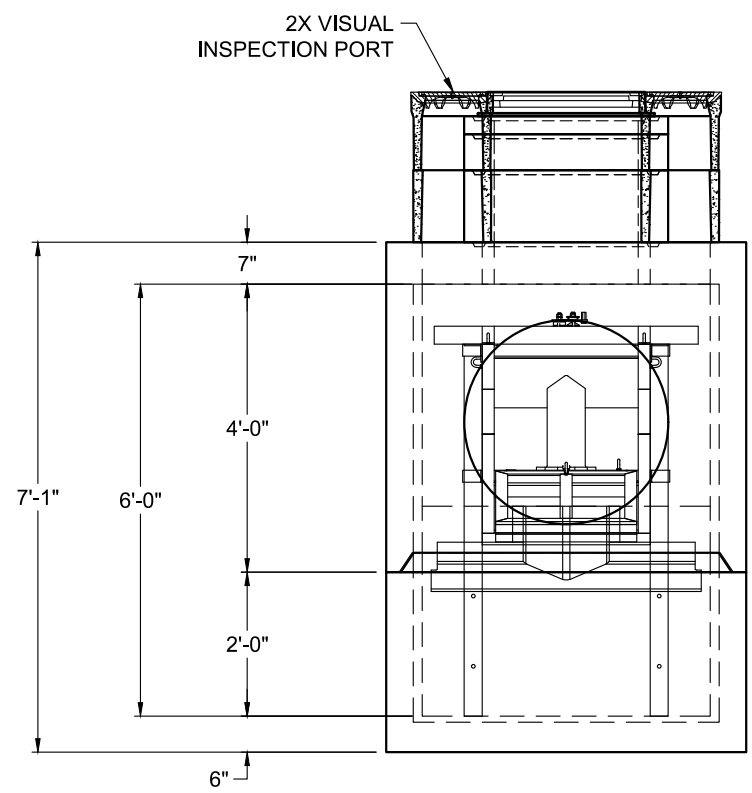
APPENDIX B: NSBB™-TC Design Drawings/Diagrams

TRASH CAPTURE PERFORMANCE SPECIFICATIONS	
Screen System Storage Volume	25.8 cf
Total Sump Volume	88.1 cf
Peak Flow Capacity (100% Full Screen)	21.6 cfs
Treatment Flow (Trash Capture)*	28.8 cfs
*Contact Oldcastle for alternative treatment flow capacities.	

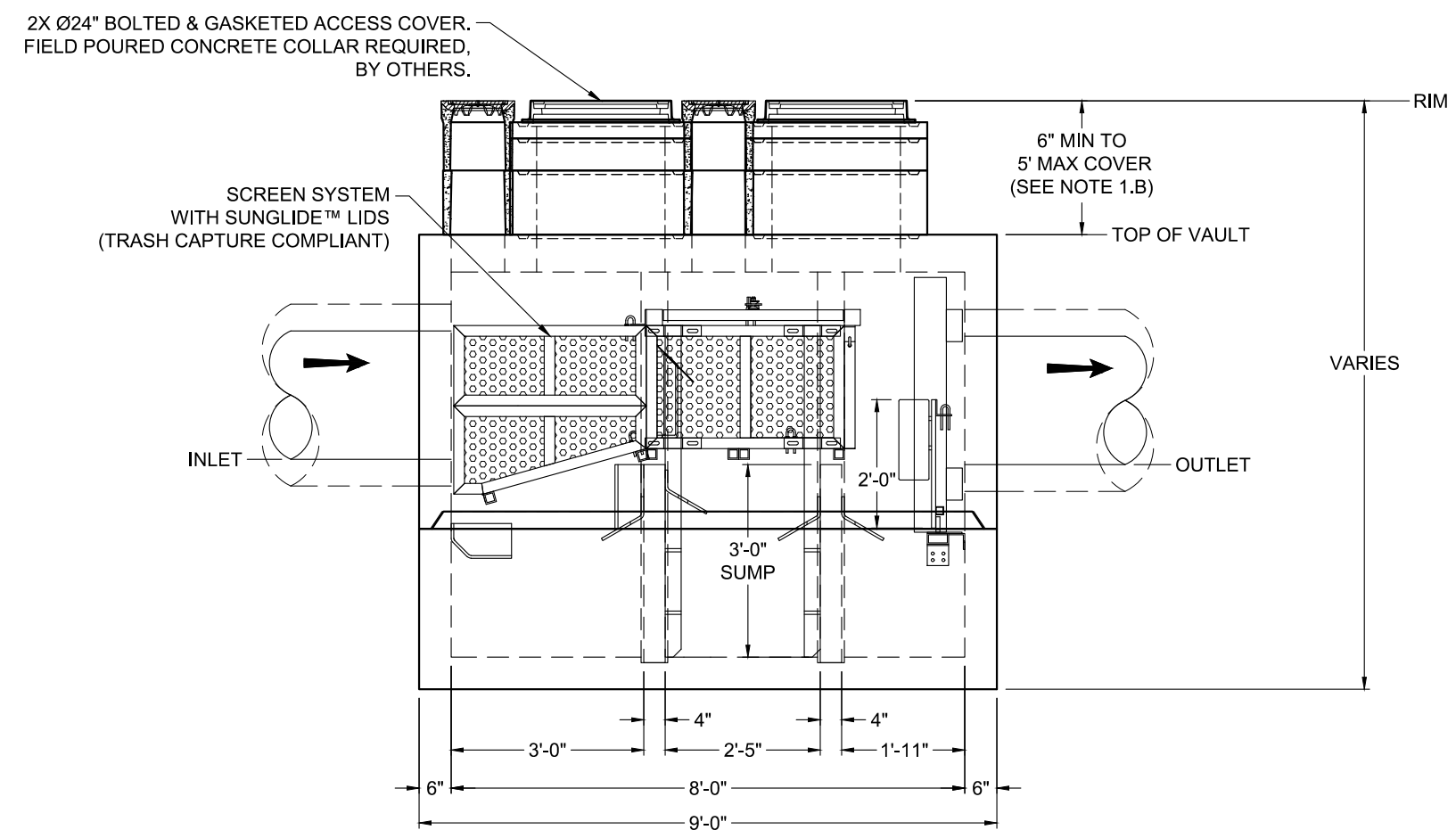


PLAN VIEW

- NOTES:
- DESIGN LOADINGS:
 - AASHTO HS-20-44 W/ IMPACT.
 - STANDARD DESIGN FILL: 5' MAXIMUM; FLORIDA ONLY: 3' MAXIMUM.
 - ASSUMED WATER TABLE: MAX 2' ABOVE TOP OF STRUCTURE. ASSUMED WATER TABLE FOR FLORIDA ONLY: AT TOP OF STRUCTURE.
 - DRY LATERAL EARTH PRESSURE (EFP) = 45 PCF.
 - LATERAL LIVE LOAD SURCHARGE = 80 PSF (APPLIED TO 8' BELOW GRADE).
 - NO LATERAL SURCHARGE FROM ADJACENT BUILDINGS, WALLS, PIERS, OR FOUNDATIONS.
 - CONCRETE 28 DAY COMPRESSIVE STRENGTH SHALL BE 5,000 PSI MINIMUM.
 - STEEL REINFORCEMENT: REBAR, ASTM A-615 OR A-706, GRADE 60.
 - CEMENT: ASTM C-150 SPECIFICATION.
 - REQUIRED ALLOWABLE SOIL BEARING PRESSURE = 2,500 PSF.
 - REFERENCE STANDARD:
 - ASTM C 890
 - ASTM C 913
 - ACI 318-14
 - THIS STRUCTURE IS DESIGNED TO THE PARAMETERS NOTED HEREIN. PLEASE VERIFY THAT THESE PARAMETERS MEET PROJECT REQUIREMENTS (I.E. LIVE LOAD, FILL RANGE, WATER TABLE). IF DESIGN PARAMETERS ARE INCORRECT, REVIEWING ENGINEER/AUTHORITY SHALL NOTIFY OLDCASTLE INFRASTRUCTURE UPON REVIEW OF THIS SUBMITTAL.
 - OVERSIZED HOLES TO ACCOMMODATE SPECIFIC PIPE TYPE MUST BE CONCENTRIC TO PIPE ID. AFTER PIPES ARE INSTALLED, ALL ANNULAR SPACES SHALL BE FILLED WITH A MINIMUM OF 3000 PSI CONCRETE FOR FULL THICKNESS OF PRECAST WALLS. PIPES ARE TO BE FLUSH WITH THE INSIDE SURFACE OF THE CONCRETE STRUCTURE.
 - CONTRACTOR RESPONSIBLE TO VERIFY ALL SIZES, LOCATIONS AND ELEVATIONS OF OPENINGS.
 - CONTRACTOR RESPONSIBLE TO ENSURE ADEQUATE BEARING SURFACE IS PROVIDED (I.E. COMPACTED AND LEVEL PER PROJECT SPECIFICATIONS).
 - SECTION HEIGHTS, SLAB/WALL THICKNESSES AND KEYWAYS ARE SUBJECT TO CHANGE DUE TO AVAILABILITY AND PRODUCTION PLANT CAPABILITY.



LEFT END VIEW



ELEVATION VIEW

THIS PRODUCT IS PROTECTED BY ONE OR MORE OF THE FOLLOWING US PATENT(S): 6,428,692; 7,270,747; 7,981,283; 8,142,666; 8,366,923; 8,491,797; 7,846,327; 8,034,236; RELATED FOREIGN PATENTS, OR OTHER PATENTS PENDING.

Oldcastle Infrastructure
A CRH COMPANY

Ph: 800.579.8819 | www.oldcastleinfrastructure.com/stormwater

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Nutrient Separating Baffle Box®
NSBB-48-TC

CUSTOMER: -
JOB NAME: -

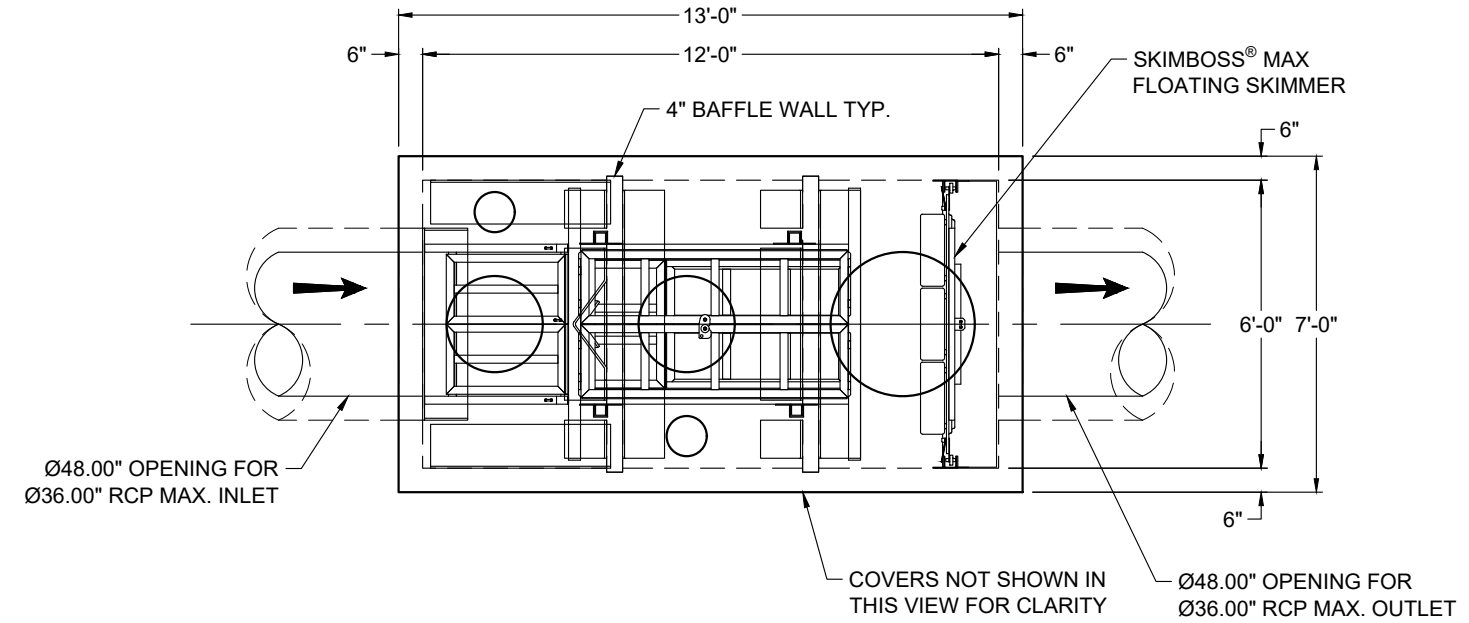
DRAWING NUMBER	REVISION	SHEET
NSBB-48-TC	REV DATE	1 OF 1

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TRASH CAPTURE PERFORMANCE SPECIFICATIONS

Screen System Storage Volume	54.5 cf
Total Sump Volume	204.1 cf
Peak Flow Capacity (100% Full Screen)	56.2 cfs
Treatment Flow (Trash Capture)*	42.8 cfs

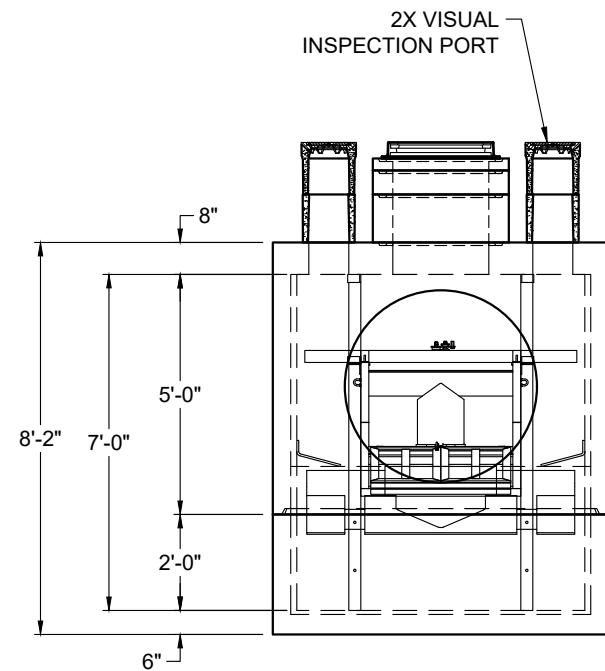
*Contact Oldcastle for alternative treatment flow capacities.



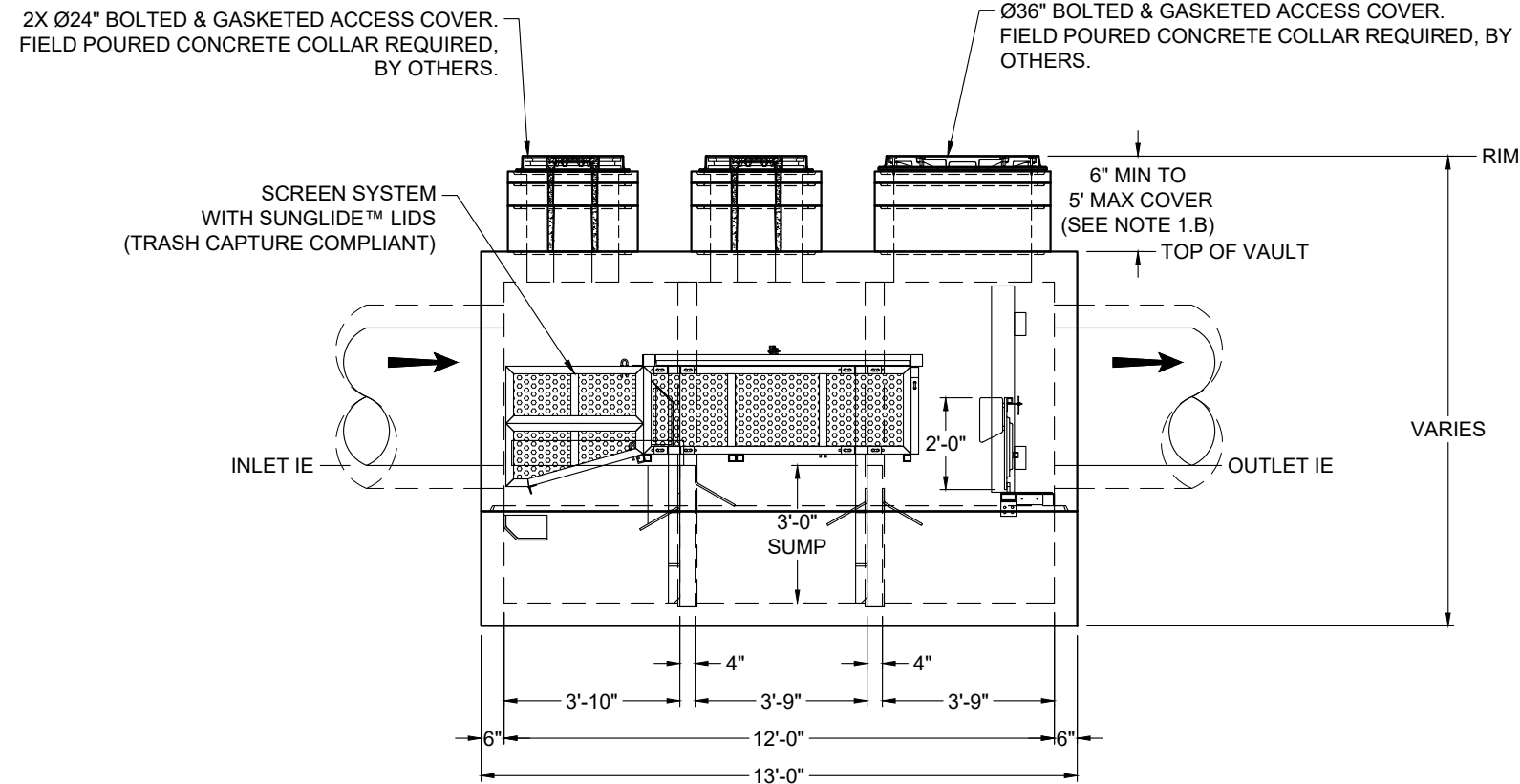
PLAN VIEW

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 - ASTM C 913
 - ACI 318-14
- THIS STRUCTURE IS DESIGNED TO THE PARAMETERS NOTED HEREIN. PLEASE VERIFY THAT THESE PARAMETERS MEET PROJECT REQUIREMENTS (I.E. LIVE LOAD, FILL RANGE, WATER TABLE). IF DESIGN PARAMETERS ARE INCORRECT, REVIEWING ENGINEER/AUTHORITY SHALL NOTIFY OLDCASTLE INFRASTRUCTURE UPON REVIEW OF THIS SUBMITTAL.
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- SECTION HEIGHTS, SLAB/WALL THICKNESSES AND KEYWAYS ARE SUBJECT TO CHANGE DUE TO AVAILABILITY AND PRODUCTION PLANT CAPABILITY.



LEFT END VIEW



ELEVATION VIEW

THIS PRODUCT IS PROTECTED BY ONE OR MORE OF THE FOLLOWING US PATENT(S): 6,428,692; 7,270,747; 7,981,283; 8,142,666; 8,366,923; 8,491,797; 7,846,327; 8,034,236; RELATED FOREIGN PATENTS, OR OTHER PATENTS PENDING.

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A CRH COMPANY

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Nutrient Separating Baffle Box®
NSBB-612-TC

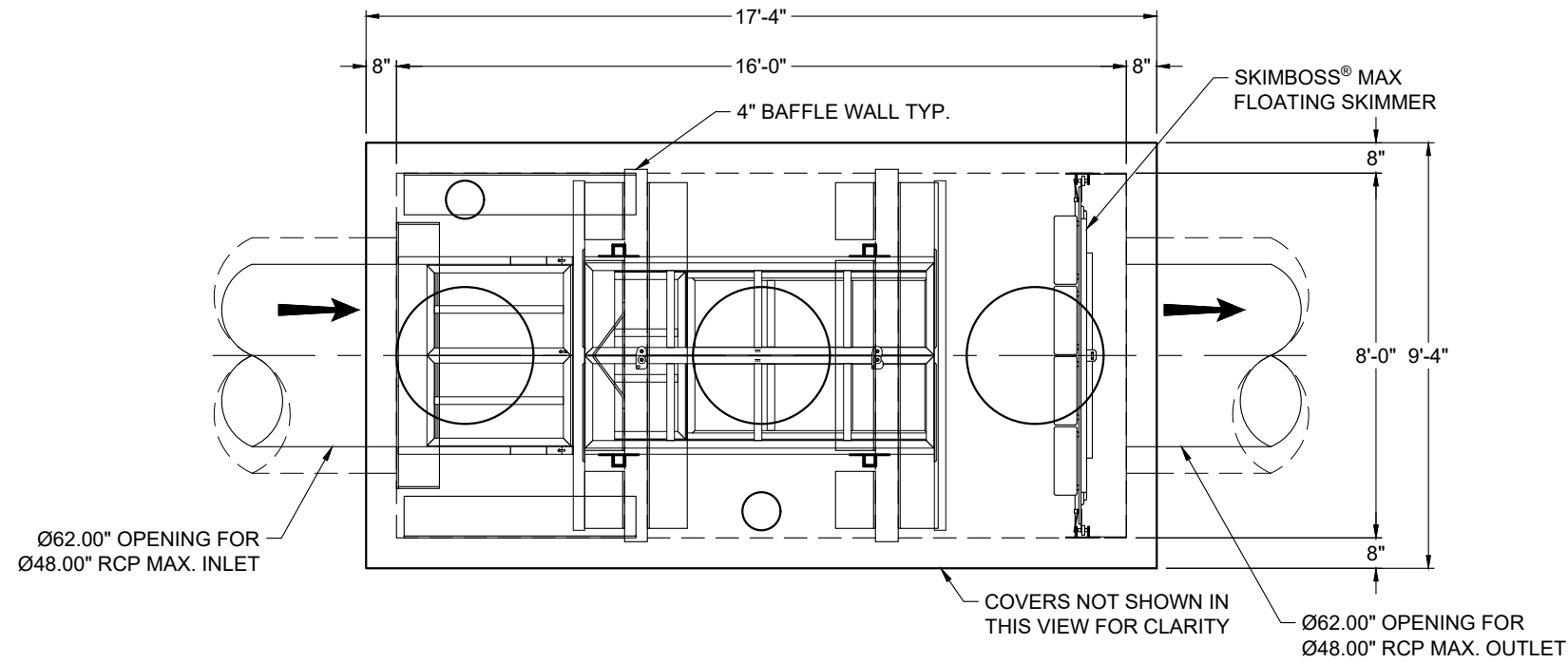
CUSTOMER
-

JOB NAME
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DRAWING NUMBER	REVISION	SHEET
NSBB-612-TC	REV DATE	1 OF 1

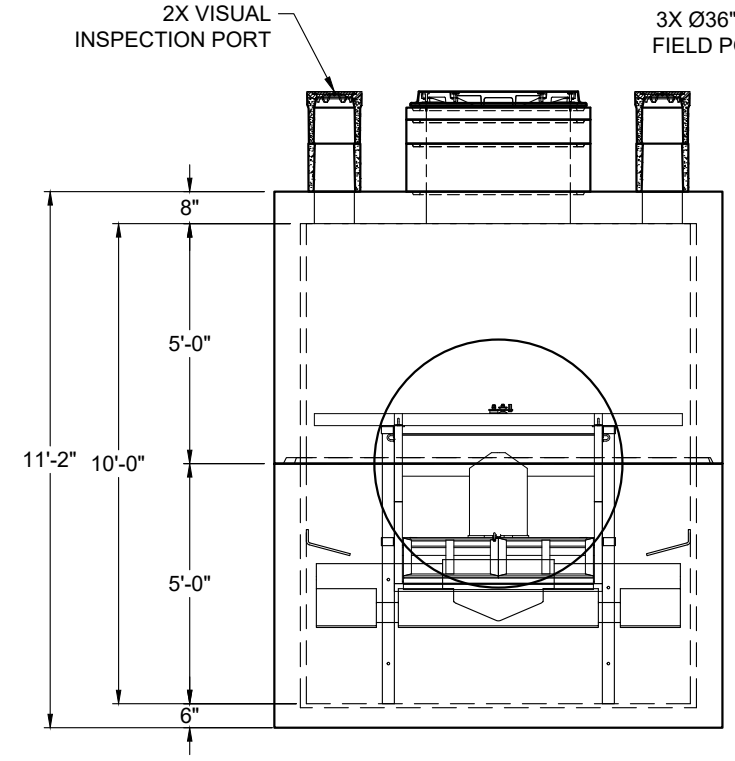
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TRASH CAPTURE PERFORMANCE SPECIFICATIONS	
Screen System Storage Volume	124.6 cf
Total Sump Volume	360.0 cf
Peak Flow Capacity (100% Full Screen)	94.1 cfs
Treatment Flow (Trash Capture)*	72.0 cfs
*Contact Oldcastle for alternative treatment flow capacities.	

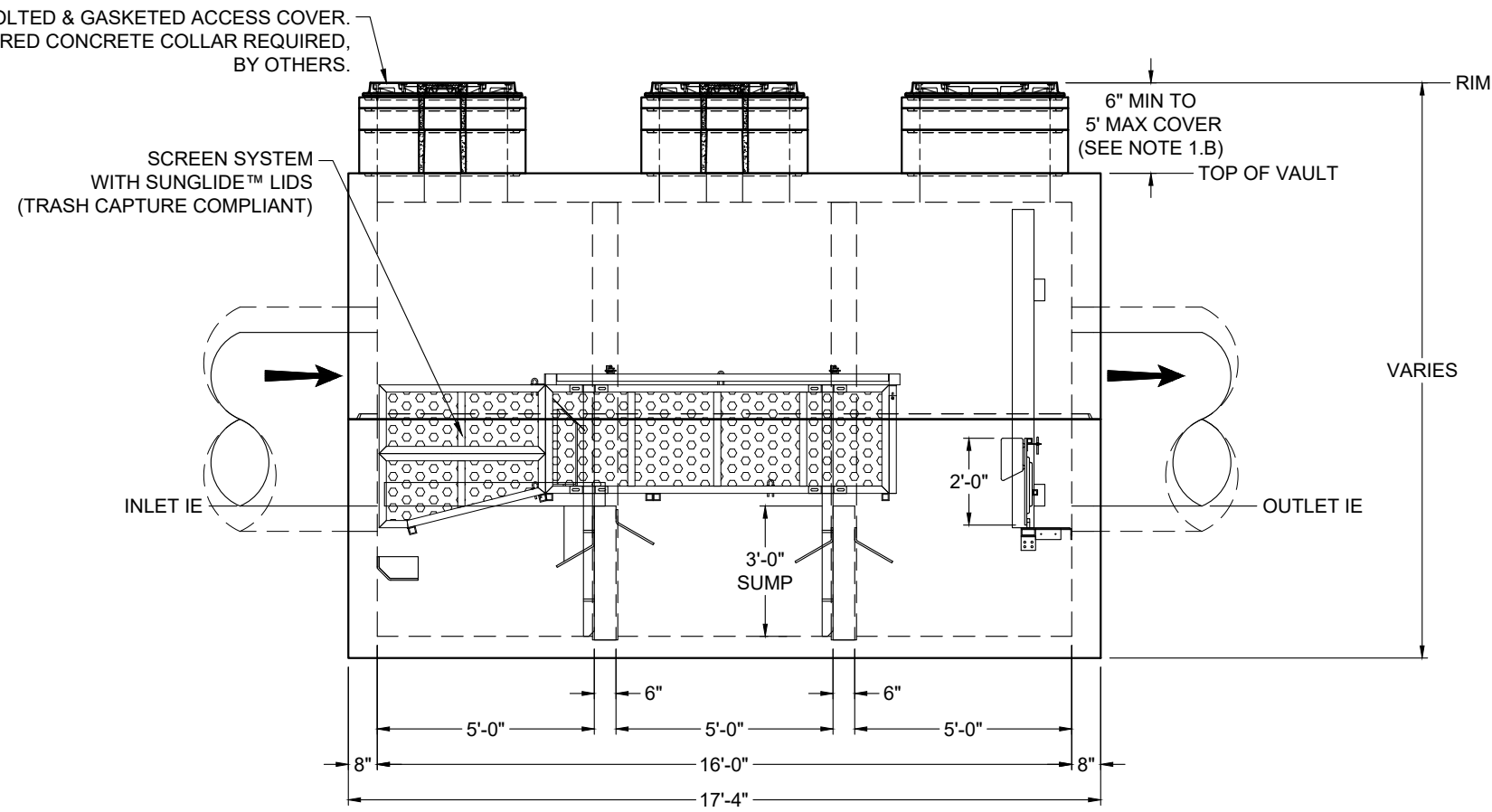


PLAN VIEW

- NOTES:**
- DESIGN LOADINGS:
 - AASHTO HS-20-44 W/ IMPACT.
 - STANDARD DESIGN FILL: 5' MAXIMUM; FLORIDA ONLY: 3' MAXIMUM.
 - ASSUMED WATER TABLE: MAX 2' ABOVE TOP OF STRUCTURE. ASSUMED WATER TABLE FOR FLORIDA ONLY: AT TOP OF STRUCTURE.
 - DRY LATERAL EARTH PRESSURE (EFP) = 45 PCF.
 - LATERAL LIVE LOAD SURCHARGE = 80 PSF (APPLIED TO 8' BELOW GRADE).
 - NO LATERAL SURCHARGE FROM ADJACENT BUILDINGS, WALLS, PIERS, OR FOUNDATIONS.
 - CONCRETE 28 DAY COMPRESSIVE STRENGTH SHALL BE 5,000 PSI MINIMUM.
 - STEEL REINFORCEMENT: REBAR, ASTM A-615 OR A-706, GRADE 60.
 - CEMENT: ASTM C-150 SPECIFICATION.
 - REQUIRED ALLOWABLE SOIL BEARING PRESSURE = 2,500 PSF.
 - REFERENCE STANDARD:
 - ASTM C 890
 - ASTM C 913
 - ACI 318-14
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LEFT END VIEW



ELEVATION VIEW

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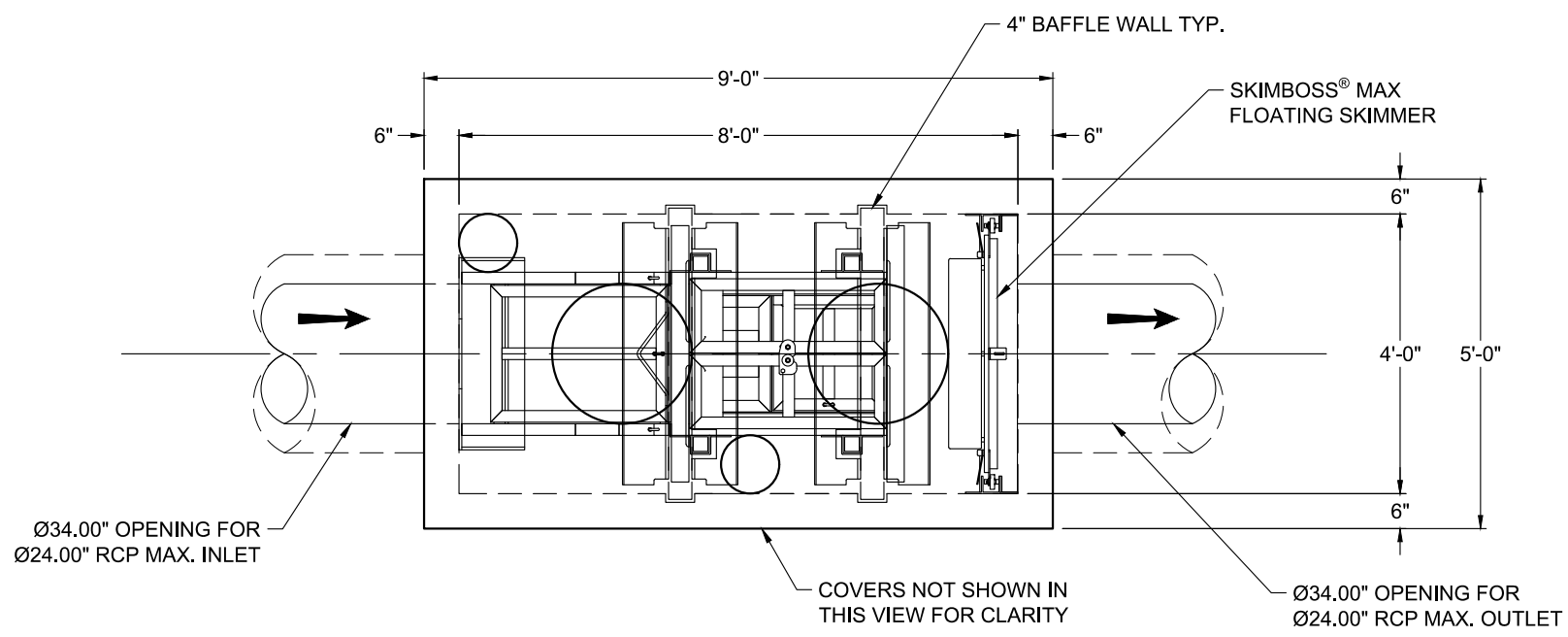
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Nutrient Separating Baffle Box®		
NSBB-816-TC		
CUSTOMER	-	
JOB NAME	-	
DRAWING NUMBER	REVISION	SHEET
NSBB-816-TC	REV DATE	1 OF 1

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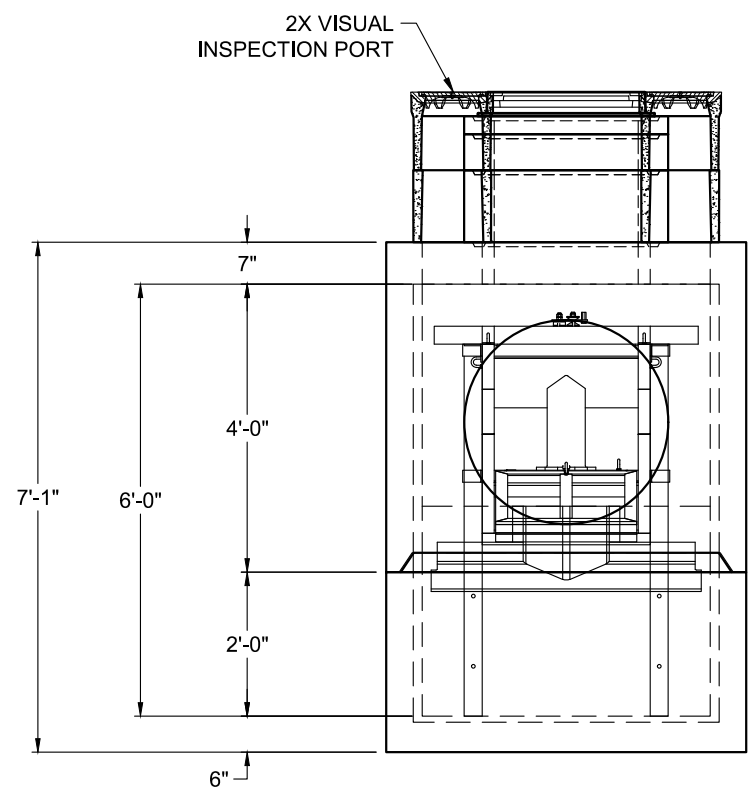
APPENDIX C: NSBB™-TCT Design Drawings/Diagrams

TRASH CAPTURE PERFORMANCE SPECIFICATIONS	
Screen System Storage Volume	25.8 cf
Total Sump Volume	88.1 cf
Peak Flow Capacity (100% Full Screen)	21.6 cfs
Treatment Flow (Trash Capture)*	28.8 cfs
*Contact Oldcastle for alternative treatment flow capacities.	

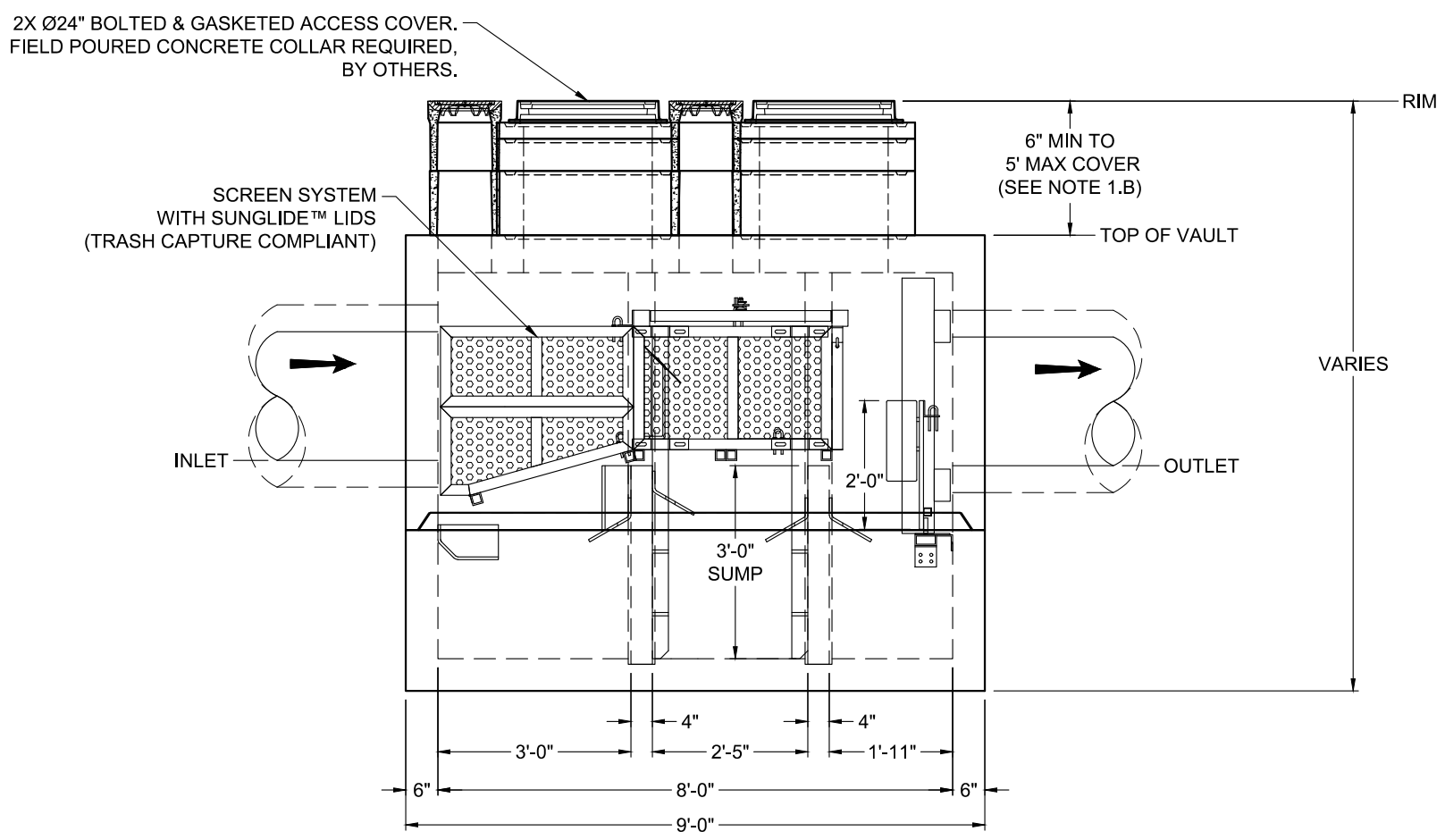


PLAN VIEW

- NOTES:
- DESIGN LOADINGS:
 - AASHTO HS-20-44 W/ IMPACT.
 - STANDARD DESIGN FILL: 5' MAXIMUM; FLORIDA ONLY: 3' MAXIMUM.
 - ASSUMED WATER TABLE: MAX 2' ABOVE TOP OF STRUCTURE. ASSUMED WATER TABLE FOR FLORIDA ONLY: AT TOP OF STRUCTURE.
 - DRY LATERAL EARTH PRESSURE (EFP) = 45 PCF.
 - LATERAL LIVE LOAD SURCHARGE = 80 PSF (APPLIED TO 8' BELOW GRADE).
 - NO LATERAL SURCHARGE FROM ADJACENT BUILDINGS, WALLS, PIERS, OR FOUNDATIONS.
 - CONCRETE 28 DAY COMPRESSIVE STRENGTH SHALL BE 5,000 PSI MINIMUM.
 - STEEL REINFORCEMENT: REBAR, ASTM A-615 OR A-706, GRADE 60.
 - CEMENT: ASTM C-150 SPECIFICATION.
 - REQUIRED ALLOWABLE SOIL BEARING PRESSURE = 2,500 PSF.
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LEFT END VIEW



ELEVATION VIEW

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NSBB-48-TCT

CUSTOMER: -
JOB NAME: -

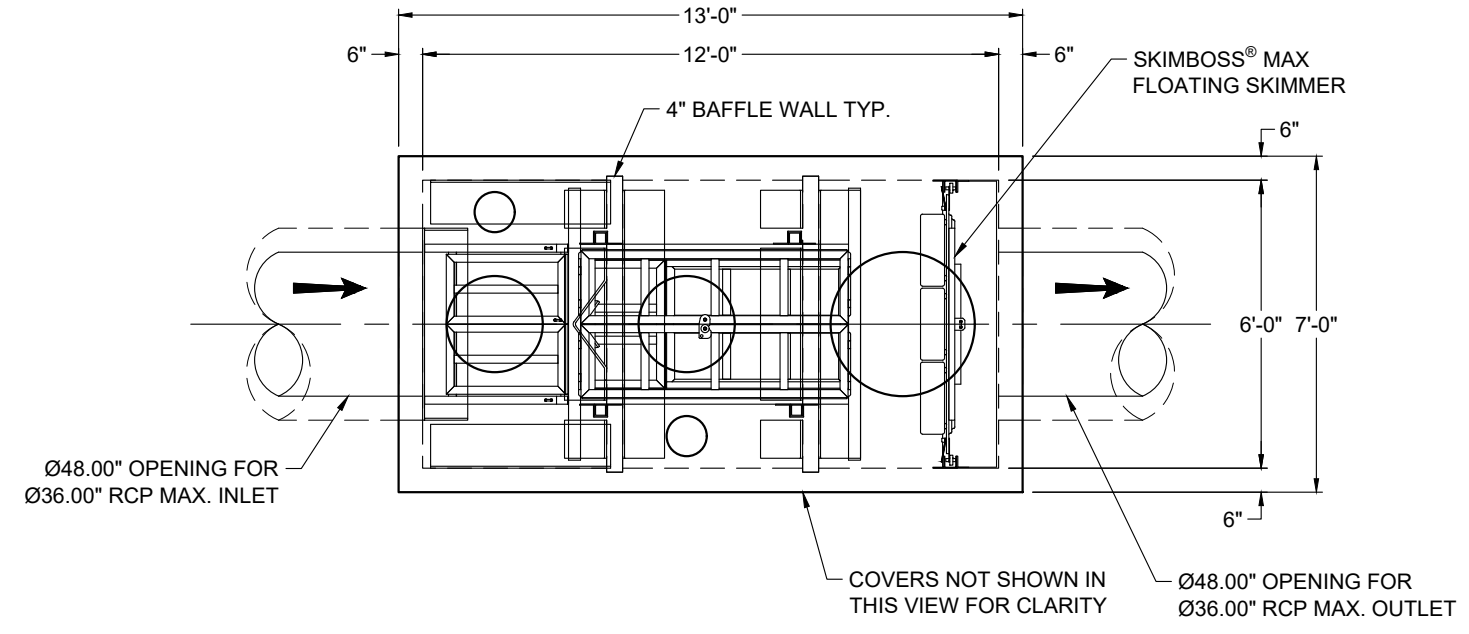
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NSBB-48-TCT	REV DATE	1 OF 1

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TRASH CAPTURE PERFORMANCE SPECIFICATIONS

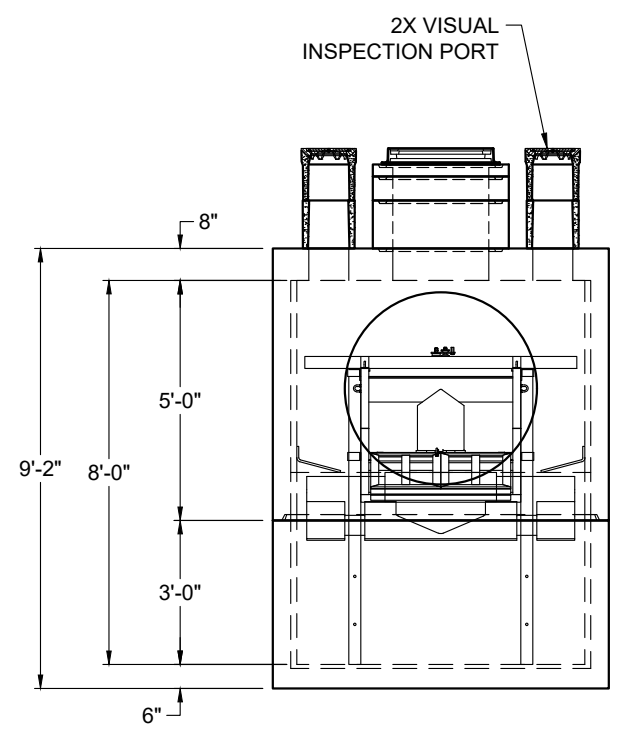
Screen System Storage Volume	54.5 cf
Total Sump Volume	277.8 cf
Peak Flow Capacity (100% Full Screen)	56.2 cfs
Treatment Flow (Trash Capture)*	42.8 cfs

*Contact Oldcastle for alternative treatment flow capacities.

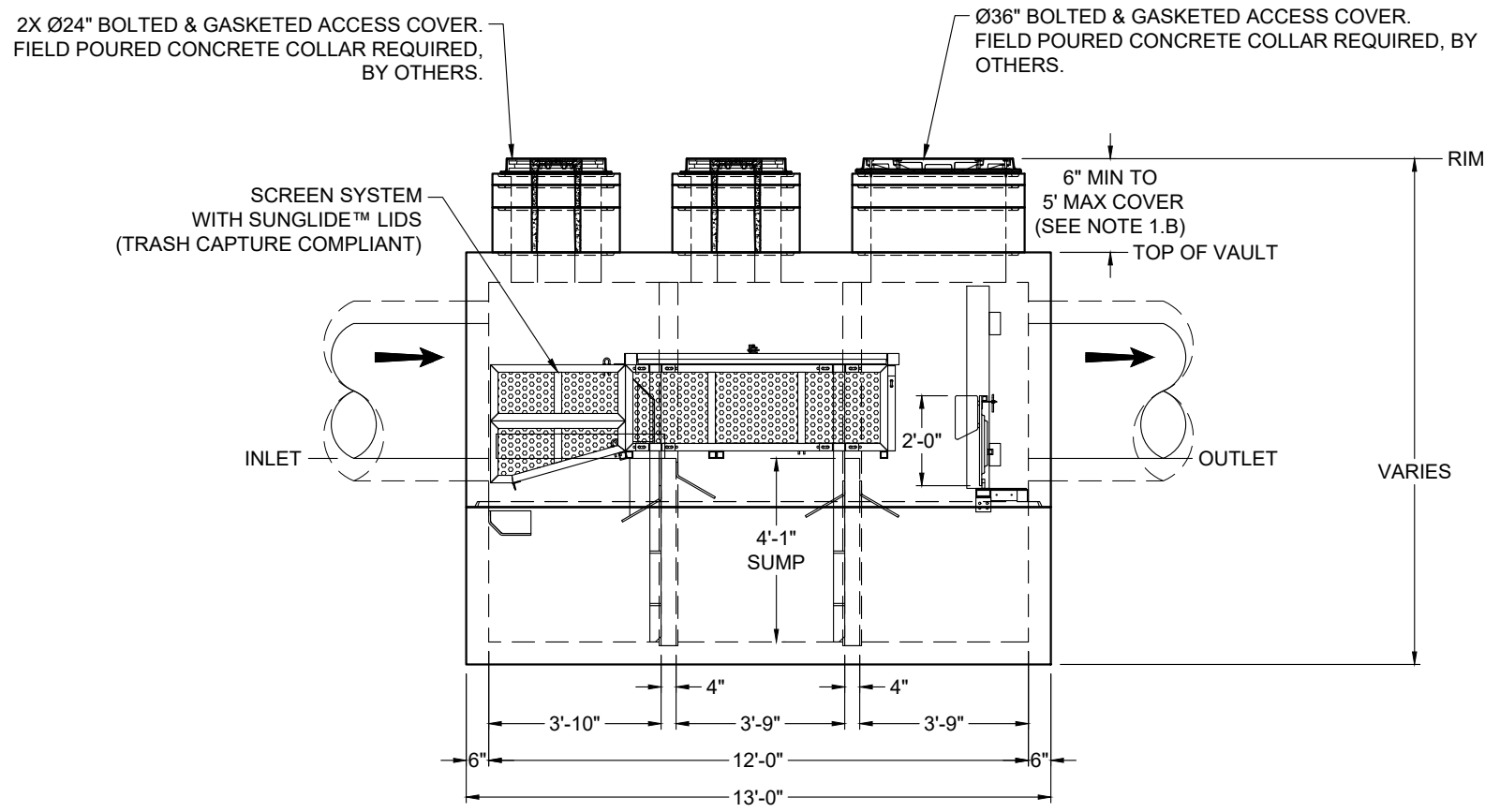


PLAN VIEW

- NOTES:**
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 - DRY LATERAL EARTH PRESSURE (EFP) = 45 PCF.
 - LATERAL LIVE LOAD SURCHARGE = 80 PSF (APPLIED TO 8' BELOW GRADE).
 - NO LATERAL SURCHARGE FROM ADJACENT BUILDINGS, WALLS, PIERS, OR FOUNDATIONS.
 - CONCRETE 28 DAY COMPRESSIVE STRENGTH SHALL BE 5,000 PSI MINIMUM.
 - STEEL REINFORCEMENT: REBAR, ASTM A-615 OR A-706, GRADE 60.
 - CEMENT: ASTM C-150 SPECIFICATION.
 - REQUIRED ALLOWABLE SOIL BEARING PRESSURE = 2,500 PSF.
 - REFERENCE STANDARD:
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LEFT END VIEW



ELEVATION VIEW

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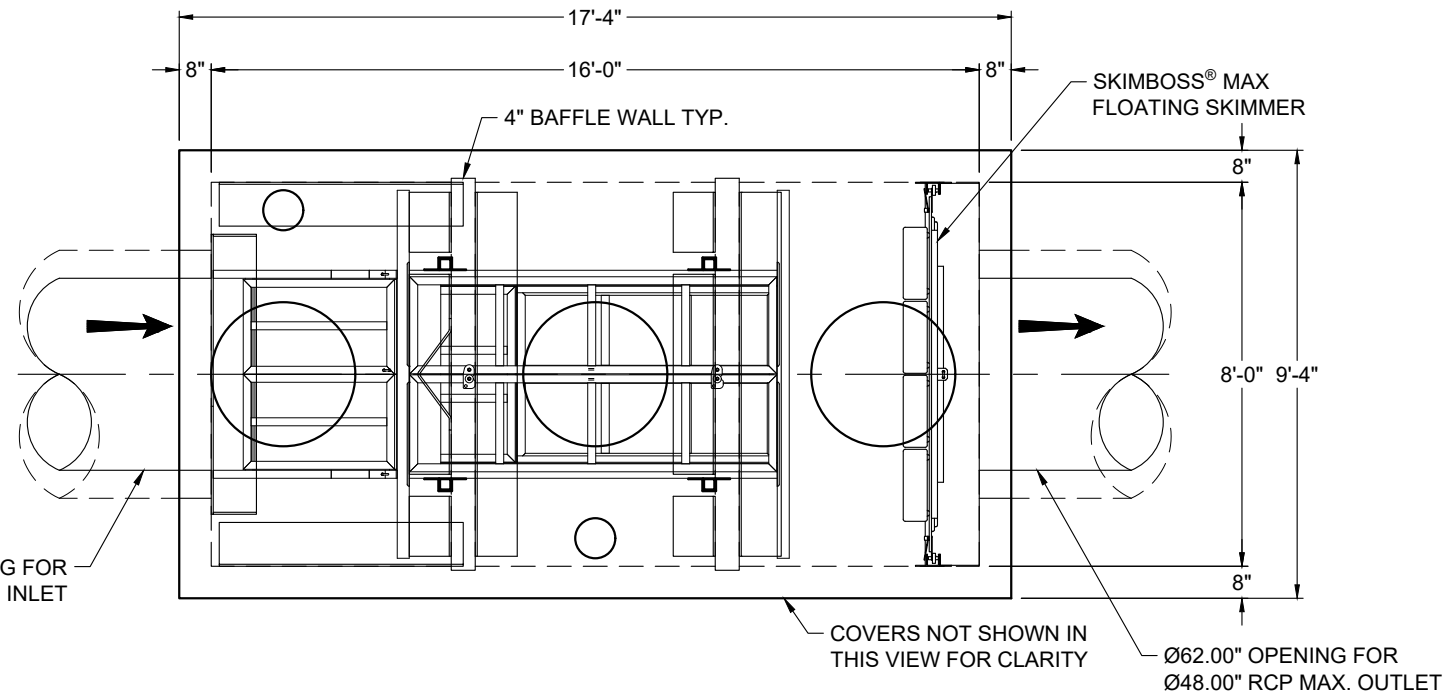
**Nutrient Separating Baffle Box®
 NSBB-612-TCT**

CUSTOMER		
JOB NAME		
DRAWING NUMBER	REVISION	SHEET
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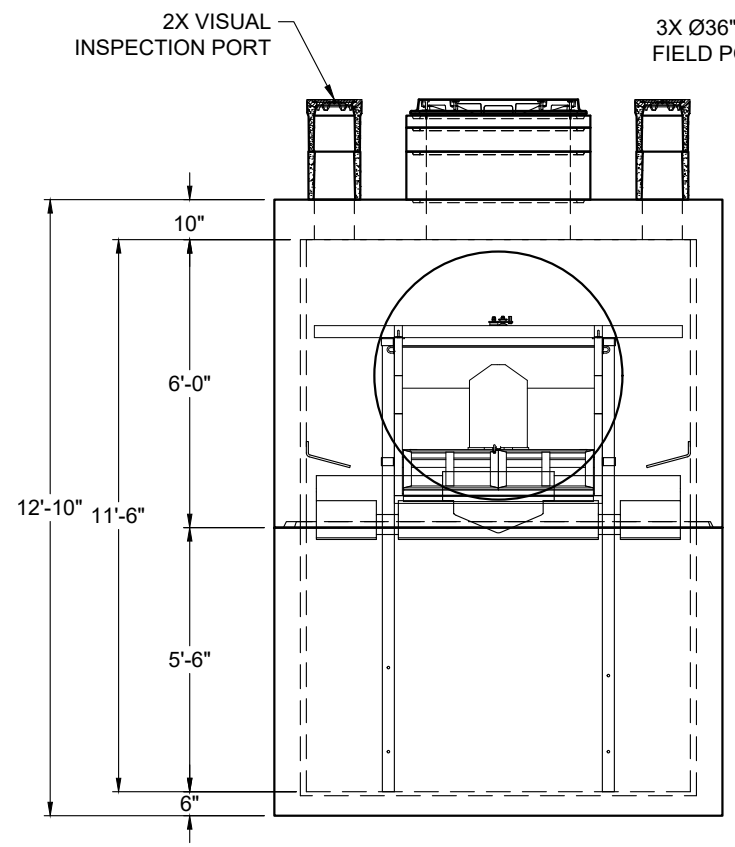
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TRASH CAPTURE PERFORMANCE SPECIFICATIONS	
Screen System Storage Volume	124.6 cf
Total Sump Volume	800.0 cf
Peak Flow Capacity (100% Full Screen)	94.1 cfs
Treatment Flow (Trash Capture)*	72.0 cfs

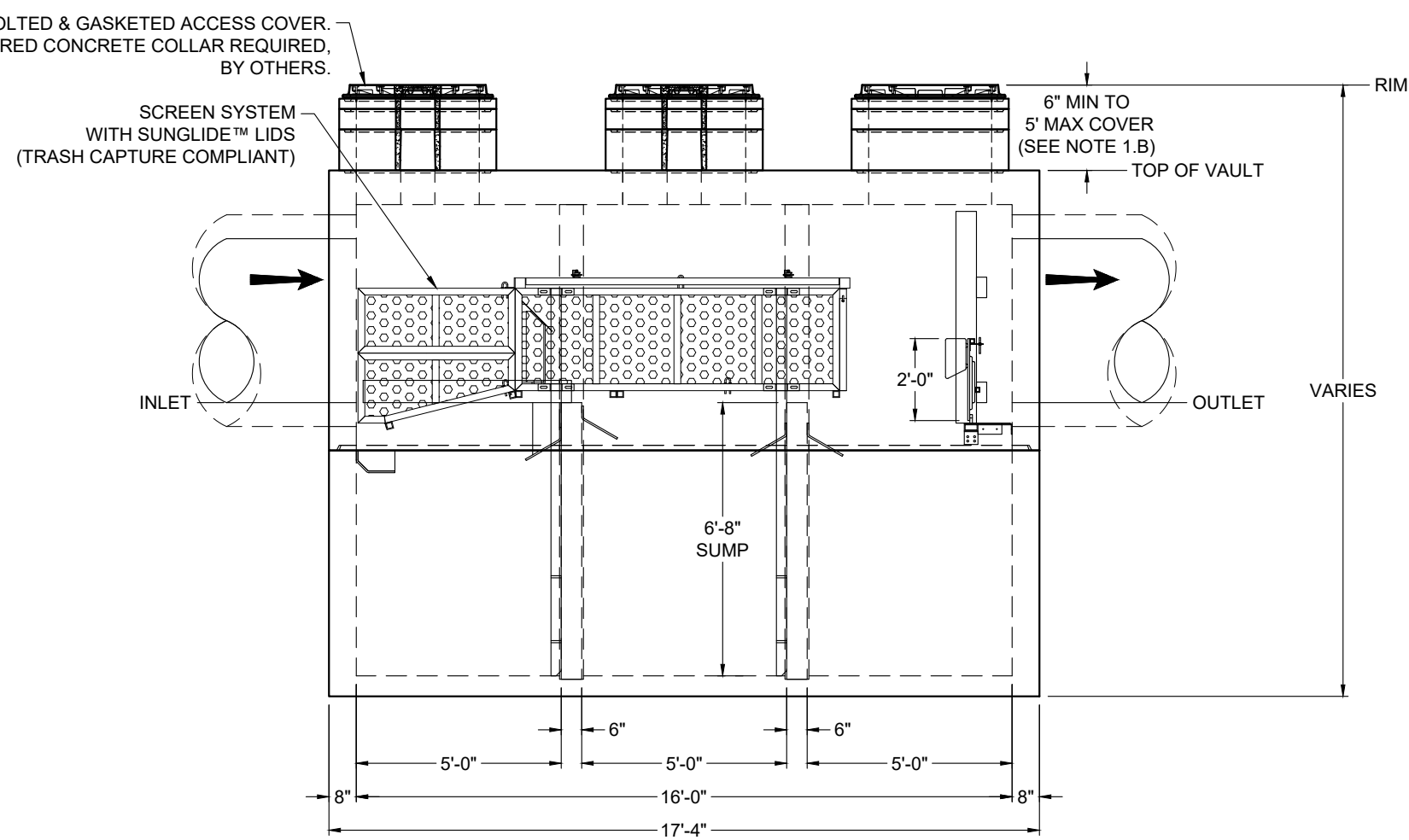
*Contact Oldcastle for alternative treatment flow capacities.



PLAN VIEW



LEFT END VIEW



ELEVATION VIEW

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Nutrient Separating Baffle Box®
 NSBB-816-TCT

CUSTOMER
 -

JOB NAME
 -

DRAWING NUMBER	REVISION	SHEET
NSBB-816-TCT	REV DATE	1 OF 1

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APPENDIX D: MVCAC Letter of Verification



MVCAC
Mosquito and Vector Control Association of California

One Capitol Mall, Suite 800 • Sacramento, CA 95814 • p: (916) 440-0826 • f: (916) 444-7462 • e: mvcac@mvcac.org

Oldcastle Infrastructure
10441 Vine Street
Lakeside, CA 92040

July 20, 2020

Dear Ms. Sanfilippo,

Thank you for the submission of the Oldcastle NSBB-TC and NSBB-TCT for review by the Mosquito and Vector Control Association of California pursuant to the SWRCB Trash Treatment Control Device Application Requirements. The Association has reviewed the conceptual drawings for the NSBB-TC and NSBB-TCT, and verifies that provisions have been included in the designs that allow for full visual access to all areas for presence of standing water, and when necessary, allows for treatments of mosquitoes.

While this verification letter confirms that inspection and treatment for the purpose of minimizing mosquito production should be possible with the NSBB-TC and NSBB-TCT as presented, it does not affect the local mosquito control agency's rights and remedies under the State Mosquito Abatement and Vector Control District Law. For example, if the installed device or the associated stormwater system infrastructure becomes a mosquito breeding source, it may be determined by a local mosquito control agency to be a public nuisance in accordance with California Health and Safety Code sections 2060-2067.


"Public nuisance" means any of the following:

1. Any property, excluding water that has been artificially altered from its natural condition so that it now supports the development, attraction, or harborage of vectors. The presence of vectors in their developmental stages on a property is prima facie evidence that the property is a public nuisance.
2. Any water that is a breeding place for vectors. The presence of vectors in their developmental stages in the water is prima facie evidence that the water is a public nuisance.
3. Any activity that supports the development, attraction, or harborage of vectors, or that facilitates the introduction or spread of vectors. (Heal. & Saf. Code § 2002 (j).)

Declaration of a facility or property as a public nuisance may result in penalties as provided under the Health and Safety Code. Municipalities and the vendors they work with are encouraged to discuss the design, installation, and maintenance of stormwater trash capture devices with their

local mosquito control agency to reduce the potential for disease transmission and public nuisance associated with mosquito production.

Sincerely,

A handwritten signature in black ink, appearing to read 'Bob Achermann', with a long, sweeping horizontal flourish extending to the right.

Bob Achermann,
MVCAC Executive Director

APPENDIX E: NSBB™ Warranty



Oldcastle Infrastructure

A CRH COMPANY

LIMITED WARRANTY FOR STRUCTURAL STORM WATER PRODUCTS

1. SCOPE & PERIOD.

Oldcastle Infrastructure Inc. (“Oldcastle”) provides the following limited warranty (the “Warranty”) for structural stormwater products with concrete components:

The Oldcastle stormwater treatment or storage system supplied by Oldcastle to the Project at the Location listed on **Schedule A** attached hereto (collectively, the “Product”) is free from defects in materials and workmanship as it relates to the manufacture of the Product. If, within five (5) years from the date of delivery ticket, any component of the Product is determined to be defective, Oldcastle will provide replacement components to the Buyer listed on **Schedule A** (“Buyer”) in the same quantity and as close to the same type and size as is commercially reasonable and practicable. Oldcastle shall have no responsibility to arrange or pay for replacement labor. This Warranty may not be assigned. In addition, this Warranty is only enforceable by Buyer and does not apply to any subsequent owner of the Product.

2. EXCLUSIONS.

This Warranty excludes all products not supplied by Oldcastle and all defects, failures, or damages not expressly covered above in Section 1, including, but not limited to, damages caused by:

- (i) Improper installation or other construction activities including field modifications;
- (ii) Defective design or construction;
- (iii) Defective liners or other peripheral products;
- (iv) Normal wear and tear;
- (v) Misuse, including, but not limited to, use of the Product beyond the scope of any applicable specifications or design criteria or lack of maintenance;
- (vi) The fault or negligence of anyone other than Oldcastle.

THE WARRANTIES IN THIS LIMITED WARRANTY ARE THE ONLY WARRANTIES APPLICABLE TO THE PRODUCT. THERE ARE NO OTHER WARRANTIES, REPRESENTATIONS, OR CONDITIONS OF ANY KIND, EXPRESS OR IMPLIED, STATUTORY OR OTHERWISE, WITH RESPECT TO THE PRODUCT SUPPLIED BY OLDCASTLE, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. ALL SUCH WARRANTIES ARE HEREBY SPECIFICALLY DISCLAIMED, AND OLDCASTLE SHALL HAVE NO LIABILITY THEREFORE, NOTWITHSTANDING (1) OLDCASTLE’S ACTUAL KNOWLEDGE OF ANY INTENDED USE OF THE PRODUCT OR (2) ANY ADVICE OR REPRESENTATIONS THAT MAY HAVE BEEN RENDERED BY OLDCASTLE CONCERNING THE DESIGN, MANUFACTURE, FABRICATION, SALE,

USE, INSTALLATION, OR PROVISION OF THE PRODUCT. NO STATEMENT, CONDUCT, OR DESCRIPTION BY OLDCASTLE OR ITS EMPLOYEES OR OTHER REPRESENTATIVES, IN ADDITION TO OR BEYOND THIS LIMITED WARRANTY SHALL CONSTITUTE A WARRANTY.

BUYER AGREES THAT ITS SOLE AND EXCLUSIVE REMEDY FOR BREACH OF THIS LIMITED WARRANTY, AND THE SOLE AND EXCLUSIVE OBLIGATION OF OLDCASTLE WITH RESPECT TO ANY CLAIMS FOR BREACH OF THIS LIMITED WARRANTY, SHALL BE THE REPLACEMENT OF THE DEFECTIVE PRODUCT OR COMPONENTS THEREOF WITH A NON-DEFECTIVE PRODUCT IN THE SAME QUANTITY AND AS CLOSE TO THE SAME TYPE AND SIZE AS IS COMMERCIALY REASONABLE AND PRACTICABLE, AT THE ORIGINAL POINT OF DELIVERY. IN NO EVENT SHALL OLDCASTLE BE LIABLE FOR ANY OTHER TYPES OF DAMAGES OR COSTS, INCLUDING, BUT NOT LIMITED TO: LOST PROFITS, LOSS OF GOODWILL, LOSS OF BUSINESS OPPORTUNITIES, DAMAGE TO REPUTATION, SPECIAL DAMAGES, INDIRECT DAMAGES, DELAY DAMAGES, PUNITIVE DAMAGES, EXEMPLARY DAMAGES, CONSEQUENTIAL DAMAGES, INCIDENTAL DAMAGES, SHIPPING AND FREIGHT COSTS, INSTALLATION OR REMOVAL COSTS, OR OTHER COSTS WHETHER SUCH CLAIM IS BASED UPON PRINCIPALS OR THEORIES OF CONTRACT, WARRANTY, NEGLIGENCE AND/OR TORT.

Actual Product performance is site-specific and dependent upon regular maintenance conducted by others and cannot be guaranteed, thus Oldcastle assumes no liability under this warranty relating thereto.

This Warranty is provided with the understanding that the products covered by it are NOT for use primarily for personal, family, or household purposes. To the extent that such understanding is incorrect or inaccurate in any way, this Warranty is void.

Some states do not allow the exclusion or limitation of implied warranties or certain types of damages; so, the above limitations and exclusions may not apply.

3. CLAIMS.

Every claim for breach under this Warranty shall be void unless (i) it is made in writing to Oldcastle and postmarked **within thirty (30) business days** of the date the defect was discovered or, in the exercise of ordinary care, should have been discovered and (ii) it is received by Oldcastle within five (5) years from the date of the delivery ticket. All claims shall be sent to:

Oldcastle Infrastructure Inc.
7100 Longe Street, Suite 100
Stockton, CA 95206
Attn: Warranty Claims Department

No claim under this Warranty shall be valid unless (i) such claim is accompanied by a reasonable written description of the alleged defect in sufficient detail for Oldcastle to understand the problem and (ii) Oldcastle is given a meaningful and reasonable opportunity to inspect the allegedly defective Product and their installation at the site, which shall include, but not be limited to, taking samples of any portion of the Product that is claimed to be defective.

**LIMITED WARRANTY
FOR STRUCTURAL STORM WATER PRODUCTS
SCHEDULE A**

Product: _____

Project Name: _____

Project Location: _____

Project Owner: _____

Product Buyer: _____

Warranty Start Date: Delivery Ticket Date of _____.

Special Provisions: None

Authorized Seller Representative: _____

Print: