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November 14, 2018

Mr. Jaime Favila  
California State Water Resources Control Board  
Division of Water Quality  
P.O. Box 100  
Sacramento, CA 94812-100

**RE: GITS Grated Inlet Trash Screen – Application for Trash Treatment Control Device**

Dear Mr. Favila,

G2 Construction (G2) is pleased to submit our **GITS** grated inlet trash screen application to the State Water Board for review as a full capture system. Information is organized and presented in accordance with the *Trash Treatment Control Device Application Requirements*, and broken into these sections:

1. Cover Letter
  2. Table of Contents
  3. Physical Description
  4. Installation Information
  5. Operation and Maintenance Information
  6. Reliability Information
  7. Field/Lab Testing Information and Analysis
- Appendices

Thank you for reviewing our GITS device application. Please contact me with any questions or if additional information is needed.

Sincerely,

A handwritten signature in blue ink that reads 'Eric H. Taylor'.

Eric H. Taylor, LEED AP BD+C, PMP  
VP, Projects & Research  
G2 Construction, Inc.

## **1. COVER LETTER**

### **A. General Description of the Device.**

The G2 GITS grated inlet trash screen is engineered as a full capture system for storm water drop inlets with grates. The device is installed under the grate and traps all particles that are 5 mm or greater. GITS devices are made of 100% stainless steel (type 304, 14-gauge) with 5 mm holes that filter storm water as it falls into the inlet. G2's GITS have a design treatment capacity that is: (a) greater than the peak flow rate of a one-year, one-hour storm or (b) sized and designed to carry more than the flows of the storm drain where it is installed.

The GITS is designed and fabricated to fit inside a grated inlet, and has a rectangular top rim sized to sit on the grate's frame directly under the grate. All storm water entering the grate is channeled into the GITS trash collection basket below. The basket captures all particles that are 5 mm or greater while water passes into the inlet. Each device configuration depends on the dimensions of the grate frame, depth of the inlet, discharge pipe location and size, and designed flow rates. Standard configurations are shown in section 3.

The GITS design allows it to function in grated inlets of different sizes and is very easy to install. The design and fabrication of the stainless steel devices help ensure that G2's CPS will outlast their 5 year warranty, and they have an expected use life of 10 years.

The G2 GITS unique design helps maximize both trash capture and flow rates, and very flexible sizing allows it to work as a full capture system in most grated inlets.

### **B. The applicant's contact information and location;**

G2 Construction, Inc.  
1352 E. Borchard Ave.  
Santa Ana, CA 92705  
info@g2construction.com  
714.448.4242

#### **Contacts:**

John R. Alvarado, President      714.448.8080, jalvarado@g2construction.com  
Eric H. Taylor, VP Projects      714.679.2550, etaylor@g2construction.com

### **C. The Devices' manufacturing location;**

G2 Construction, Inc.  
1352 E. Borchard Ave.  
Santa Ana, CA 92705

### **D. A brief summary of any field/lab testing results that demonstrates the Device functions as described within the application;**

G2's GITS has been lab tested in-house in simulated storm events to demonstrate that it functions fully as a full capture system (FCS) with waterflow of 9 CFS, and as described in this application. Details about the methodology and results are summarized in section 7 and Appendix A.

**E. A brief summary of the Device limitations, and operational, sizing, and maintenance considerations;**

Device limitations are related primarily to lack of maintenance and cleaning, which can reduce the effectiveness of the GITS due to blockage of the 5 mm screen. Operating the GITS requires only that maintenance cleanings be performed to prevent captured trash and debris from filling the trash collection basket and causing water to overflow through the bypass.

**F. A description or list of locations, if any, where the Device has been installed. Include the name and contact information of as many as three municipality(s) purchasing the Device,**

Installed locations: Expo Light Rail for Los Angeles Metro, City of Torrance, City of Buena Park, City of Lakewood

Municipalities purchasing contacts:

City of Lakewood, Konya Vivanti	KVivanti@lakewoodcity.org	562.866.9771
City of Buena Park, Joe Hunt	jhunt@buenapark.com	714.562.3653
City of Torrance, Wilson Mendoza	WMendoza@TorranceCA.Gov	310.618.3052

**G. The certification below:**

*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.*

  
\_\_\_\_\_  
John R. Alvarado, President & CEO

  
\_\_\_\_\_  
Date

  
\_\_\_\_\_  
Eric H. Taylor, VP, Projects & Research

  
\_\_\_\_\_  
Date

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### 3. PHYSICAL DESCRIPTION.

#### A. Description on how the Device works to trap all particles that are 5 mm or greater in size and how it is sized for varying flow volumes;

G2's GITS full capture system traps all particles that are 5 mm or greater because all water entering the grate will fall into the trash collection basket and pass through the screen with 5 mm holes.

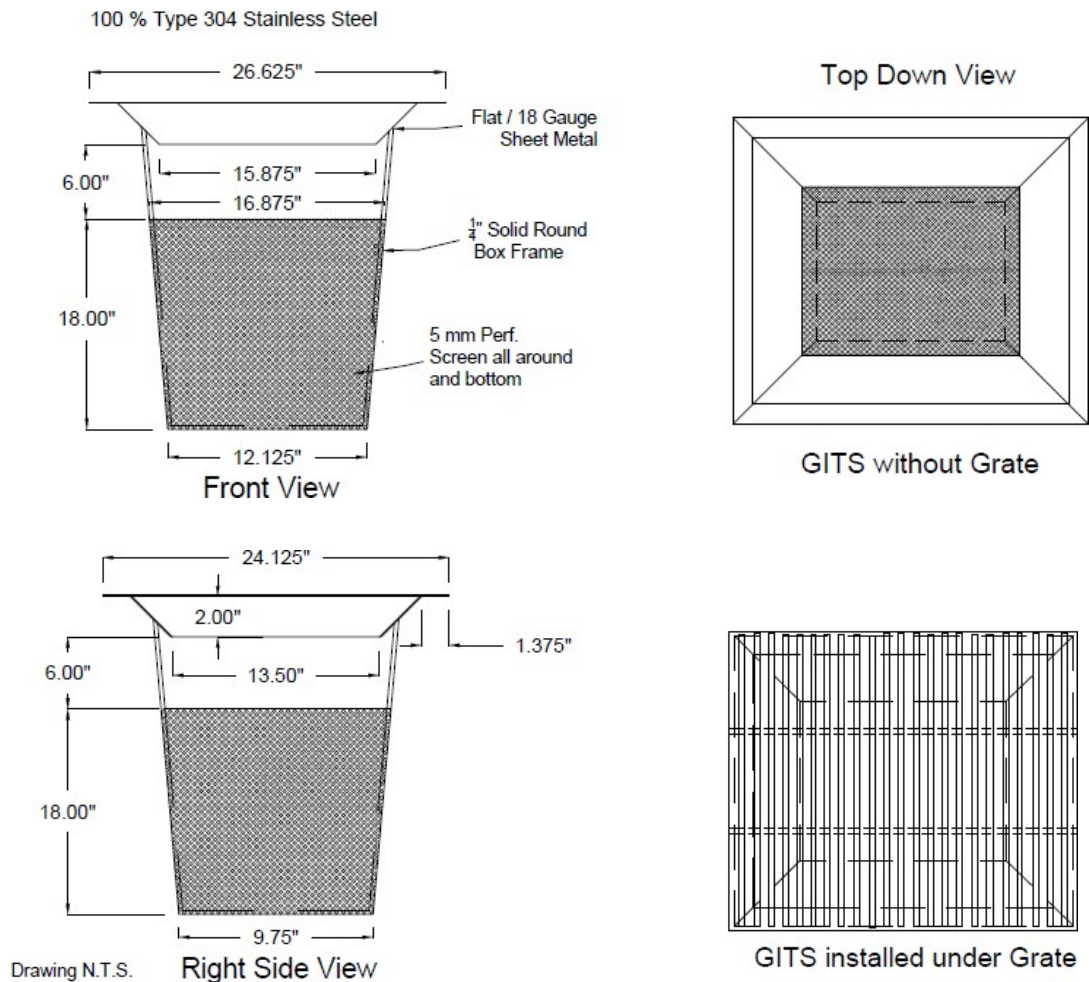
The GITS product size is determined by the grate inlet's frame dimensions, inlet depth and filtered flow rate volume requirements. Typically, the GITS is sized to the largest dimensions available for the inlet. At the very minimum, the GITS is sized to exceed that flow capacity of the discharge pipe opening.

#### B. Design drawings for all standard Device sizes including dimensions, and alternative configurations;

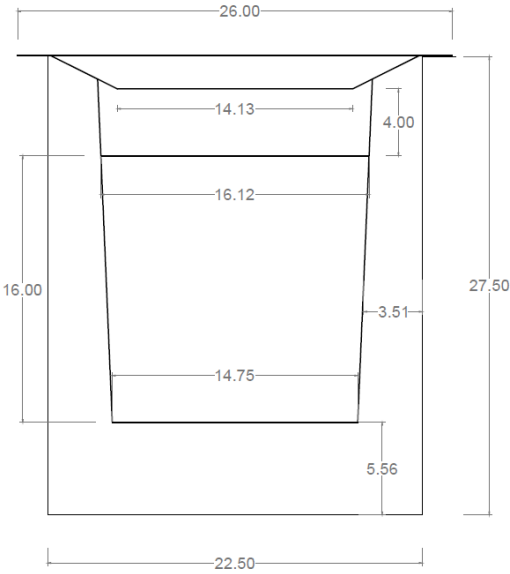
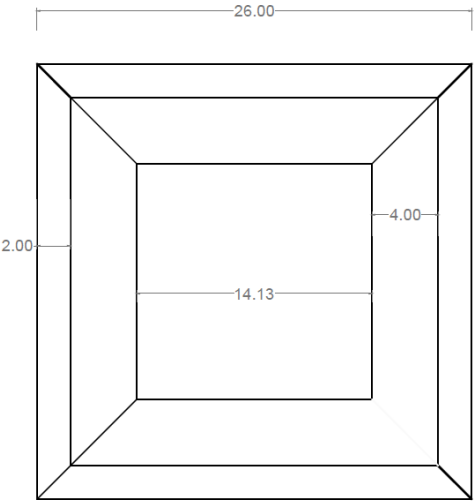
GITS grate inlet trash screens are designed to meet the specific needs of the inlet basin where it will be installed. The device is installed under the grate and traps all particles that are 5 mm or greater, and made of 100% stainless steel (type 304). Design size depends on dimensions of the inlet, grate, discharge pipe, and the inlet's designed flow rates.

Drawing for standard GITS devices:

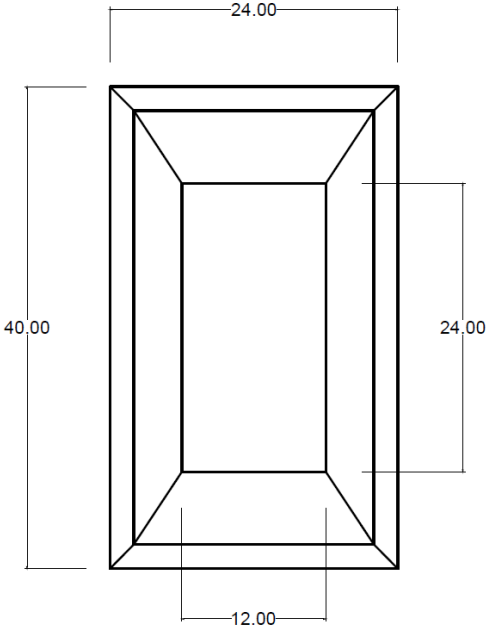
#### G2 GITS 26x24



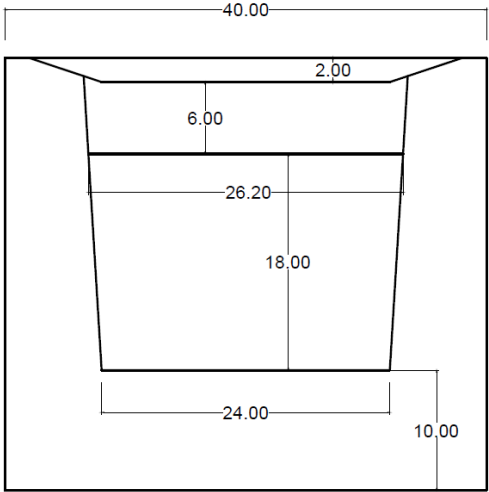
**G2 GITS 26x26**



**G2 GITS 40x24**

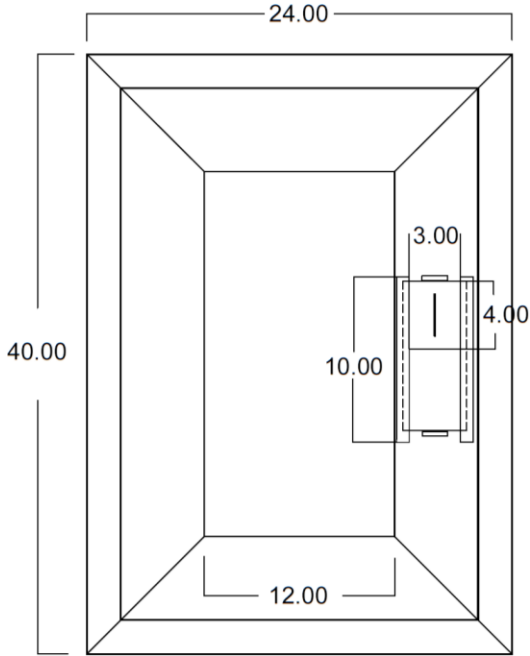


Plan View

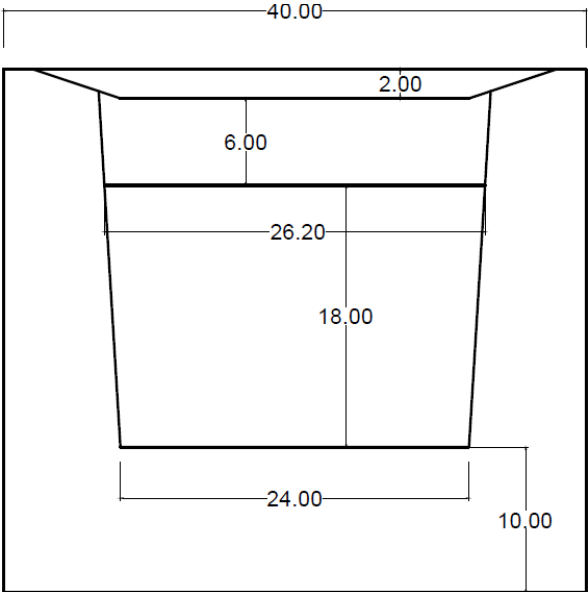


Side View

**G2 GITS 40x24-V** (with **Vector Control Port Door**. Available with any size GITS)

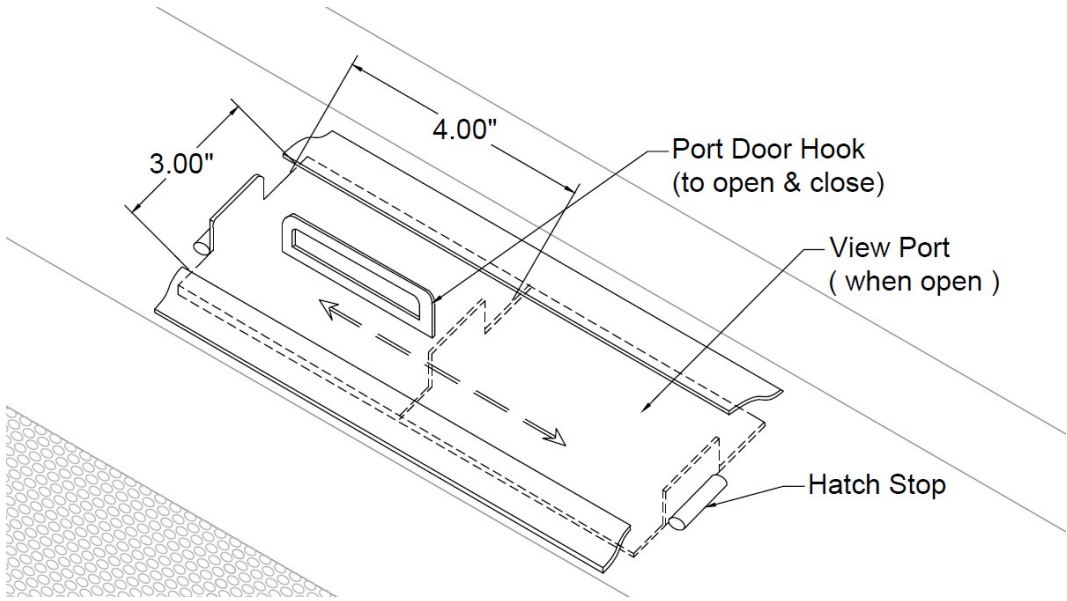


Plan View



Side View

**Vector Port Door**

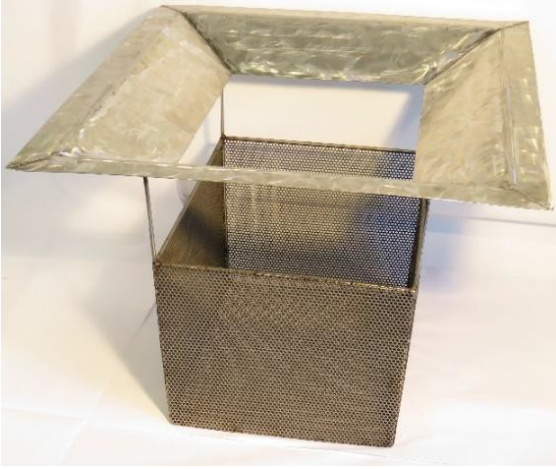




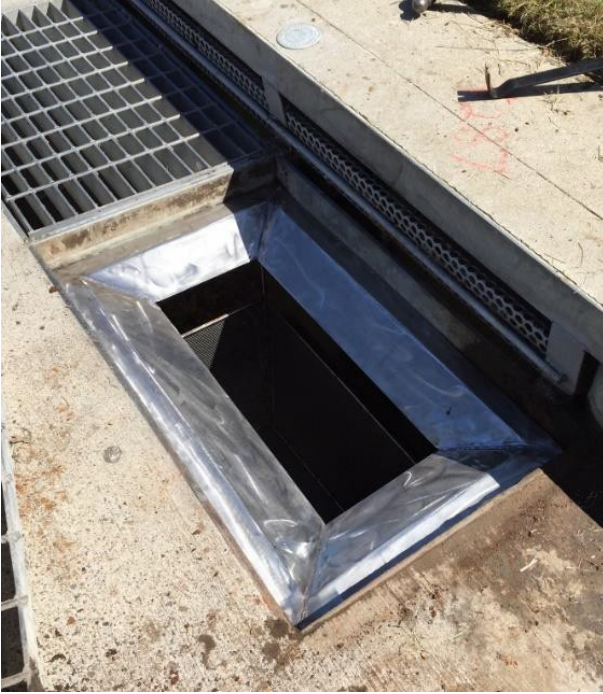


## PHOTOGRAPHS

### GITS™ Pre-Installation Photos



GITS™ Installation Photos



# G2 GITS™ Grated Trash Inlet Screen



**F. The Device maximum trash capture capacity;**

The maximum amount of trash captured by the GITS is the volume of the trash collection basket. Cleaning and maintenance to remove trash and debris take place prior to maximum trash capture. Please see Operations & Maintenance, section 5.

<b>Standard Configurations, Dimensions, Max Trash Capture Storage Capacity</b>							
G2 <b>GITS</b> Grated Inlet Trash Screen							
<b>G2 Model</b>	<b>Grate Size</b>	<b>Basket Length (Top) (In)</b>	<b>Basket Width (Top) (In)</b>	<b>Basket Height (In)</b>	<b>Basket Volume (Sq In)</b>	<b>Bypass Height* (In)</b>	<b>Max Trash Storage Capacity (Cubic Ft)</b>
<b>GITS 26x24</b>	26"x24"	16.9	14.5	18.0	3,266	6.0	<b>1.9</b>
<b>GITS 26x26</b>	26"x26"	16.1	16.1	16.0	3,802	4.0	<b>2.2</b>
<b>GITS 40x24</b>	40"x24"	26.2	13.5	18.0	5,357	6.0	<b>3.1</b>

Notes:  
\* Bypass height is adjusted for inlet depth.

**G. The Device hydraulic capacity (flow in cfs) at its maximum trash capture capacity for all standard Device sizes;**

<b>Standard Configurations, Dimensions, Max Treated Flows (CFS)</b>								
G2 <b>GITS</b> Grated Inlet Trash Screen								
<b>G2 Model</b>	<b>Grate Size</b>	<b>Basket Length (Top) (In)</b>	<b>Basket Width (Top) (In)</b>	<b>Basket Height (In)</b>	<b>Screen Total 5 mm (Sq In)</b>	<b>Treatment Flow Max (CFS)</b>	<b>Trash Full Capture System</b>	<b>50% Blocked Treatment Flow (CFS)</b>
<b>GITS 26x24</b>	26"x24"	16.9	14.5	18.0	1,075	<b>16.7</b>	Yes	8.4
<b>GITS 26x26</b>	26"x26"	16.1	16.1	16.0	1,202	<b>17.7</b>	Yes	8.8
<b>GITS 40x24</b>	40"x24"	26.2	13.5	18.0	1,568	<b>24.5</b>	Yes	12.2

**H. Each material and material grade used to construct the Device;**

Type 304 stainless steel is the only material used for all components of the GITS.

**I. Conditions under which the Device re-introduces previously trapped trash;**

Re-introduction of previously trapped trash requires several conditions to be present: 1) the trapped trash must float (note that common floatable trash such as plastic bottles are too large to fit through the grate opening), 2) the floatable trash in the collection basket must not be covered by other debris, and be able to float, and 3) there is a storm event that exceeds the 1-year, 1-hour storm or maintenance and cleaning was not performed.

**J. Estimated design life of the Device;**

The GITS device is designed for a minimum use life of 10 years if properly maintained. This assumes the GITS is properly maintained and is not exposed to vandalism or hazardous corrosive materials or spills.

**K. Similar Certified Device;**

While the GITS has unique features and properties, it has similar design features as several other approved devices.

Certified Device: "KS-1" By Kristar - Flo Gard Plus catch basin filter Inserts

Similarities: Made of 304 stainless steel with 5mm holes; installed on grate frame under grate

Differences: G2 GITS includes larger basket dimension and larger bypass.

Performance Impact: G2 GITS has greater trash capacity and higher flow rates.

Certified Device: By ADS-Flexstorm - Flexstorm FTC Insert for Grated Catch Basins

Similarities: Made of 304 stainless steel with 5mm holes; installed on grate frame under grate

Differences: G2 GITS includes larger basket dimension and larger bypass.

Performance Impact: G2 GITS has greater trash capacity and higher flow rates.

#### 4. INSTALLATION INFORMATION. Device installation description that includes the following:

##### A. Device installation considerations;

Prior to installation, the following steps will have been completed:

- Grated inlet evaluation. Prior to GITS fabrication, ensure the inlet is not located in a disqualifying situation. Identify potential safety concerns for the public or installers. Identify traffic control requirements. Communicate potential concerns to the Customer.
- Measure the dimensions of the grate (length, width, height). Measure the "V" depth of the inlet and the location of the discharge pipe. Identify or calculate the engineered CFS for the catch basin for the 1-year, 1-hour storm.
- Using the above information, select from standard GITS configurations or G2 will custom design the GITS for the inlet.
- G2 GITS is then either shipped to the installer or staged for G2's certified team to install.
- Project manager and/or Installers coordinates install details with the Customer and inspector(s) in advance. Required permits are obtained.
- Project manager and/or Installers coordinates the cleaning of the inlet prior to installation.

##### B. Device installation procedures;

###### INSTALLATION

1. Upon arrival at the install location, the install team will deploy all required safety measures and traffic control to ensure public safety. Remove potential hazards in the field, and/or contact responsible parties to report the issues. If pedestrians are near, installers should cease work until the work area is clear. Never leave a grate open and un-attended for safety.
2. Installation is simple. Remove the grate cover and place the GITS onto the grate frame rim.



3. Quality control. The installer should visually inspect the installed GITS to ensure a good fit on the grate frame and there are no gaps greater than 5mm.

4. Place the grate over the GITS. The installation is now complete.



5. Photos. It is highly recommended that photos of the installed GITS be taken. This helps to document the installation for the inlet for the owner.
6. The installation area should be cleaned and double-checked. Finally, traffic control and safety measured should be removed just prior to departure.

### **C. Methods for diagnosing and correcting installation errors.**

Visual observation by installer is best. Visual review of uploaded photos by management or experts is a very good method for diagnosing any product install errors. Correcting installation errors will likely require a simple re-adjustment of the GITS within the inlet.

**5. OPERATIONS AND MAINTENANCE INFORMATION. Include operation and maintenance information that includes the following:**

**A. Device inspection procedures and inspection frequency considerations;**

Inspection of the GITS is performed by visually looking for damage of the device. Visual inspection of the GITS should be made at least quarterly and can be performed while cleaning the collection basket.

Damaged or vandalized devices should be photographed and documented. Damaged devices should be repaired as soon as possible to ensure proper device function and prevent any possible flood hazard.

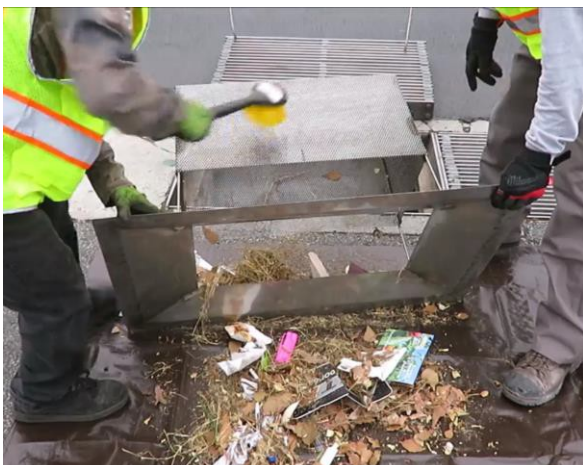
If trash or debris in the collection basket reaches 50% of the basket's height, then it should be cleaned. Inlets that receive significant amounts of trash, debris, or leaves and vegetation should be checked more frequently and always before and after significant storm events.

**B. Maintenance procedures, including a description of necessary equipment and materials;**

The GITS must be cleaned to prevent trash and debris build up, and to prevent blockage of screen. There are two methods for cleaning the GITS:

**1. Remove, Empty, Brush & Wipe**

Needed: tarp or garbage can, brush and/or garden rake, and rag or towel.





## 2. Vacuum in Place

Needed: vacuum (truck or shop vac).



### C. Maintenance frequency considerations, including effects of delay; and

Maintenance Frequency Requirements to keep the GITS working as a full capture system:

- 4x cleanings annually is required to remove trash, debris, and pollutants from the GITS.
- Cleaning the GITS prior to the rainy season is mandatory.

Additionally:

- Before significant rain events, trash and debris should be removed from the GITS.
- After rain event, each CPS device should be visually inspected and cleaned if there is build up.
- GITS collection baskets that are more than 50% full should be cleaned to guaranty full capture in future storms.
- Inlets that receive significant amounts of trash, debris, or leaves and vegetation should be checked more frequently and always before and after significant storm events.

GITS devices are highly effective at stopping all particles 5 mm or larger. Delayed maintenance and cleaning may result in trash and debris build-up that blocks the screen and results in trash bypassing the 5 mm filter. Extreme build-up in the inlet may result in flooding.

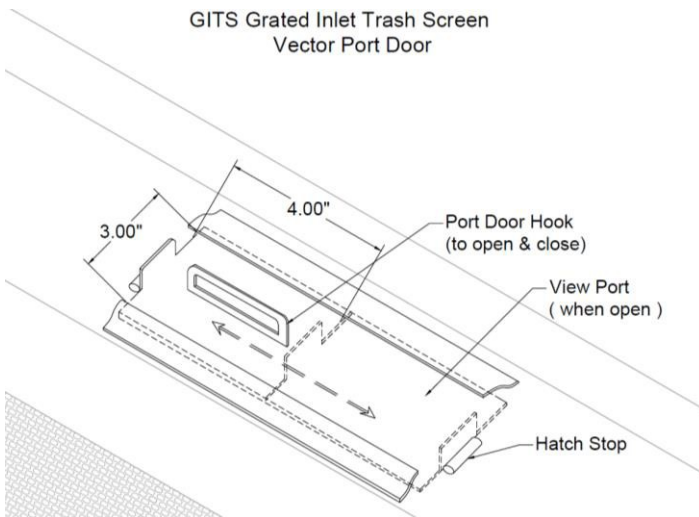
**D. Device maintenance and Vector control accessibility.**

**1. Include the date the Device application was submitted to the Mosquito Vector Control Assoc. of California's Review Team for input on Device design <[Trashtreatment@mvcac.org](mailto:Trashtreatment@mvcac.org)>;**

The application was submitted to the Mosquito Vector Control Association of California's Review Team for input on the Device design via email on Oct. 12, 2018 and this updated application on Oct. 24, 2018.

**2. Provide a video link or depict and describe how mosquito vector control personnel can readily access the bottom of the Device and/or storm water vault for visual observation and mosquito treatment;**

Mosquito vector control personnel can readily access the bottom of the GITS-V by sliding open the Vector Port Door located at the top of the GITS, as shown below. The 3" by 4" port opens with an unobstructed view directly to the bottom of the inlet. The Port Door Hook assists in opening while the grate is in place.



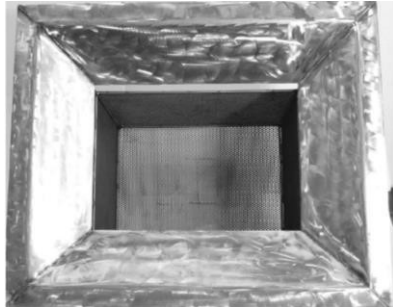
Door Closed



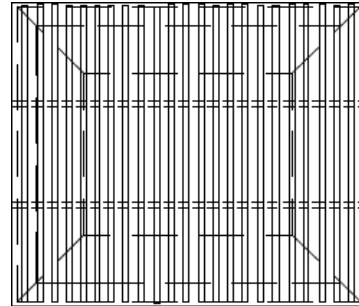
Door Open



GITS devices that do not have the Vector Port Door can still be readily accessed by mosquito vector control personnel, as described below. The GITS basket can be accessed through the center opening while it is installed in the inlet. This can be performed with the grate removed or through the grate.

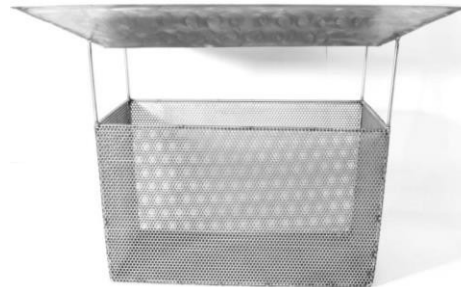
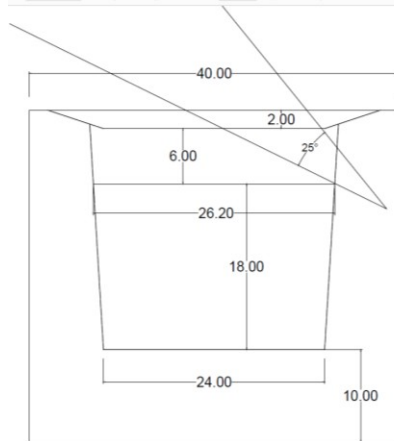


Bottom of GITS basket (center)



GITS installed under Grate

Vector control can also access to the bottom of the catch basin inlet while the grate and GITS are in place, by utilizing the 6" tall bypass open space, as shown below.



Full access to both the inlet bottom and GITS is available once the GITS is easily removed.

Video of the GITS cleaning and removal procedures can be seen at this link:

<https://www.dropbox.com/s/ulr8qrtqvgxyaq6/G2%20GITS%20Cleaning.mp4?dl=0>

**3. Provide a letter of verification from the Mosquito Vector Control Association of California when available.**

A letter of verification from the Mosquito Vector Control Association of California will be provided once available.

**E. Repair procedures for the Devices structural components.**

The GITS is a single piece device made of 304 stainless steel. If the structural steel needs repair, then please contact G2 Construction at [info@g2construction.com](mailto:info@g2construction.com) or 714.748.4242.

**6. RELIABILITY INFORMATION. Describe the following, if applicable:**

**A. Estimated design life of Device components before major overhaul;**

The GITS device is designed for a minimum use life of 10 years if properly maintained. This assumes the GITS is maintained and is not exposed to vandalism or hazardous corrosive materials or spills.

**B. Device sensitivity to loadings other than trash (i.e., leaves, sediment);**

G2's GITS devices work effectively to stop all items that are 5mm or greater. Loadings other than trash, such as leaves or sediment, have a similar impact on the effectiveness of the device. The GITS is made of 304 stainless steel and there is very minimal impact on the device due to water, sediment, vegetation, or other materials.

**C. Warranty Information; and**

G2 Construction provides a product warranty of 5 years for the GITS. G2 guarantees the device will be manufactured in accordance with the product drawings and specifications. If a GITS proves defective within five years, then G2 agrees to repair or provide a replacement.

If G2 also installed the GITS, then G2 agrees to repair or replace any GITS device that proves defective in its workmanship or material within one year of the project acceptance date. Accidents, product modifications, vandalism, unusual use, or lack of standard cleaning and maintenance may nullify a product's warranty.

Requests for warranty service must be made by the product owner or purchaser and should include photos and details.

**D. Applicant's customer support.**

G2 has a very responsive customer support team that can be reached by phone or email.

[Info@g2construction.com](mailto:Info@g2construction.com) is distributed to multiple support staff and management.  
714.448.4242

G2 is typically able to answer all questions by phone or email. However, G2's field crew is ready to respond to any customer situation when needed. Service and repairs are available from G2 Construction.

## **7. FIELD / LAB TESTING INFORMATION AND ANALYSIS.**

Lab testing of the G2 GITS was performed to determine filtered flow rates (CFS) in a simulated in-house storm water inlet. Three scenarios were tested using G2's standard model GITS 40x24 (10.9 sqft screen): 0% screen blockage, 50% screen blockage, and 71% screen blockage.

Test 1: 0% blockage, with 9 CFS water flow, resulted in 100% filtration through trash collection basket's screen without overflow. Water exited from the bottom and middle of the screen, but the upper portion of the filtration basket was not utilized, indicating there was more capacity. This 9 CFS filtered flow rate exceeds the peak flowrate of the one-year, one-hour storm event for most inlets with 40" by 24" grates.

Test 2: 50% blockage, with 9 CFS, resulted in 100% filtration through the screen without overflow. The projected maximum CFS of an unblocked GITS, based on this test, is 18 CFS.

Test 3: 71% blockage, with 9 CFS, resulted in 100% filtration through the screen without overflow. The projected maximum CFS of an unblocked GITS, based on this test, is 31 CFS.

The primary limitation of the testing was the limited supply of water, which was recycled during testing. If higher CFS flow rates were available during testing, then higher maximum filtered flow rates would have resulted.

Additional lab test information is provided in Appendix A.

## APPENDIX A

### Filtered Flowrate (CFS) Testing for G2 GITS 40x24

#### Summary:

Lab testing of the G2 GITS was performed to determine filtered flow rates (CFS) in a simulated in-house storm water inlet. Three scenarios were tested using the standard G2 GITS 40x24 (10.9 sqft screen): 0% screen blockage, 50% screen blockage, and 71% screen blockage. Results showed that 9 CFS flow rate was successfully filtered across on all 3 tests, and projected maximum CFS of the unblocked GITS is higher than 18 CFS. This is a conservative estimate. The GITS filtered flow rates qualify it as a full capture system.

#### Methodology:

G2 built an in-house water flow system to simulate a storm event for a grated inlet:

1. Water Source Chamber holds up to 120 cubic feet of water (900 gallons).
2. Test Chamber is a simulated inlet where the tested GITS was installed.

For Test 1, the GITS trash collection basket's screen was completely open. For Test 2 and 3, thick waterproof tape was applied to both the inside and outside of the screen to make it completely impermeable. Test 2 (50% blockage) was conducted after the GITS bottom was blocked completely, and all 4 sides were wrapped up to a 50% height of the collection basket. Test 3 (71% blockage) was conducted after the GITS bottom was blocked completely, and 3 of 4 sides were wrapped completely. This left one side open (29% of the screen surface).

#### Results and Analysis:

Test 1: 0% blockage, with 9 CFS water flow, resulted in 100% filtration through the screen without overflow. Water exited from the bottom and middle of the screen, but the upper portion of the filtration basket was not utilized, indicating there was more capacity. If higher CFS flow rates were available during this test, then higher maximum filtered flow rates would have resulted. This 9 CFS filtered flow rate exceeds the peak flowrate of the one-year, one-hour storm event for most inlets with 40" by 24" grates.

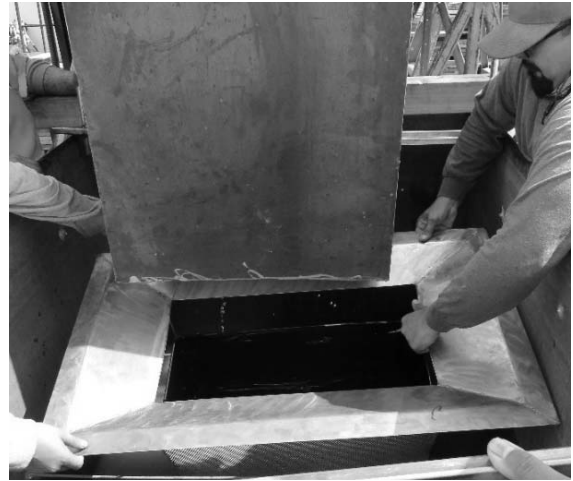
Test 2: 50% blockage, with 9 CFS, resulted in 100% filtration through the screen without overflow. The projected maximum CFS of an unblocked GITS, based on this test, is 18 CFS.

Test 3: 71% blockage, with 9 CFS, resulted in 100% filtration through the screen without overflow. The projected maximum CFS of an unblocked GITS, based on this test, is 31 CFS. The filtered flowrate of this test exceeded 2.5 CFS per square foot of screen.

#### Conclusion:

Testing showed that G2's GITS 40x24 (10.9 sqft screen) successfully filters waterflow of 9 CFS. Projected CFS exceeds 18 CFS (Test 2) and may reach 31 CFS (Test 3). The GITS filtered flow rates qualify it as a full capture system. The primary limitation of this test was the inability to supply higher water volumes and flow rates.

## G2 CFS Test Chamber



## TESTS

### Scenario 1: 0% Blockage of Screen

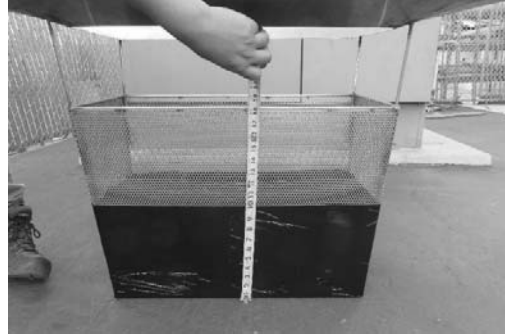


Pre-Test Setup

During Test (Image at Max CFS = No Overflow)



**Scenario 2: 50% Blockage of Screen**  
(Top half open; bottom and half of 4 sides blocked)



Pre-Test Setup



During Test (Image at Max CFS = No Overflow)



**Scenario 3: 79% Blockage of Screen**  
(Front side open; 3 sides and bottom blocked)



Pre-Test Setup



During Test (Image at Max CFS = No Overflow)

