PROJECT MANUAL

Technical Specifications

CITY OF SPRING HILL, TENNESSEE

STANDARD SPECIFICATIONS FOR THE INSTALLATION OF SANITARY SEWER FLOW MONITORING FOR ALLOCATIONS PER ORDINANCE 25-29

City of
SPRING HILL
TENNESSEE

CITY OF SPRING HILL, TENNESSEE

APPROVED BY: _____

TITLE: General Manager

DATE: 3/4/2026

INDEX TO PROJECT MANUAL

These specifications give the minimum requirements for installation of flow monitoring for the sewer allocations in the city of Spring Hill, Tennessee. Any special construction problems or conditions not covered under these specifications shall be submitted in writing to the City of Spring Hill for approval.

The Standard Drawings are part of these specifications, and all construction shall conform to the details shown on these drawings.

DESIGN POLICIES COVERING THE INSTALLATION OF SANITARY SEWER FLOW
MONITORING FOR ALLOCATION SPECIFICATIONS

1. PURPOSE

The purpose of this specification is to establish the requirements for implementing sanitary sewer flow monitoring and allocation tracking associated with proposed development. This monitoring program is intended to allow Spring Hill Water to establish current baseline wastewater flows, track new flows generated by development, and ensure compliance with approved sewer capacity allocations.

2. SCOPE

The Developer shall provide all documentation, exhibits, calculations, and monitoring infrastructure necessary to implement sanitary sewer flow monitoring for the sewer basin identified in the proposed development. These requirements apply to all existing and proposed sewer infrastructure contributing to the monitored segment and any area incorporated into the approved allocation plan.

3. REQUIRED EXHIBITS AND DOCUMENTATION

The Developer shall submit the following materials as part of the sewer allocation and monitoring plan.

3.1 Sewer Infrastructure Exhibit

The Developer shall provide an engineer-sealed exhibit in PDF format clearly identifying all existing sanitary sewer infrastructure contributing to the monitored segment, as well as all proposed sanitary sewer infrastructure that will be incorporated into the allocation. The exhibit shall show all manholes and pipe segments, clearly labeled with pipe sizes and flow direction. The exhibit must accurately define the tributary basin that will be monitored and incorporated into the allocation plan.

In addition, the engineer-sealed construction plans shall include a clearly labeled table identifying the total sewer allocation for the proposed development. This table shall provide detailed flow calculations referencing Appendix C of the City of Spring Hill Municipal Code and shall clearly demonstrate how the total allocation was derived based on unit counts and design flow criteria. The total development allocation must be summarized in gallons per day (gpd).

3.2 Proposed Flow Monitoring Location

The Developer shall provide a map clearly showing the exact location of the proposed flow monitoring device and shall identify the specific manhole where monitoring equipment will be installed. The submittal shall include a written justification for the selected monitoring location, demonstrating that it captures the entire contributing basin and isolates the allocation area as applicable. Access details for maintenance and inspection must also be provided.

The monitoring location must capture all contributing flows from existing homes with issued Certificates of Occupancy (COs) as well as all future homes included in the allocation request. Spring Hill Water reserves the right to approve, deny, or require modification of the proposed monitoring location to ensure accurate data collection.

3.3 Existing Contributing Homes (Baseline Flow Establishment)

The Developer shall provide a complete list of all homes that currently have issued Certificates of Occupancy and that contribute wastewater flow to the sewer infrastructure being monitored. The list shall include the property address, parcel identification number, water meter number (if available), and the date the Certificate of Occupancy was issued.

This information will be used by Spring Hill Water to obtain historical water meter data and to establish baseline wastewater flow conditions.

3.4 Proposed Allocation Homes

The Developer shall provide a complete list of all projects, habitable buildings, or tenant spaces that are part of the requested sewer allocation and that will contribute new flow to the monitored sewer infrastructure. The list shall include the lot number, street address (if assigned), parcel identification number (if available), estimated build-out schedule, and estimated average daily flow per unit expressed in gallons per day (gpd), consistent with Appendix C of the Municipal Code.

This information will allow Spring Hill Water to track incremental flows associated with new development, compare projected design flows to actual monitored flows, and ensure compliance with the approved sewer allocation.

4. FLOW MONITORING REQUIREMENTS

4.1 Monitoring Equipment

All flow monitoring equipment for residential developments shall comply with the approved ADS Triton Flow Meter specifications and in compliance with Ordinance 25-29. Installation shall be completed in accordance with manufacturer requirements and Spring Hill Water standards to ensure accurate and continuous flow measurement. Refer to Technical Specifications attached.

Commercial buildings will be monitored with the use of the domestic water meter data and the Badger/Beacon software used for utility billing. Building structures that are not individually metered to the tenant space will be required to install a sub meter for the use of tracking and monitoring.

5. BASELINE FLOW DETERMINATION

Spring Hill Water shall utilize water meter data from existing contributing homes, habitable buildings, and tenant spaces to compare metered water consumption to monitored sewer flow data to establish a baseline Average Daily Flow (ADF) for the monitored basin.

6. FLOW ALLOCATION TRACKING

Spring Hill Water shall track new Certificate of Occupancy issuance within the approved allocation area and monitor incremental increases in sewer flow. Actual monitored flows shall be compared to projected design flows identified in the approved allocation calculations. Spring Hill Water will take appropriate action if monitored flows approach or exceed approved allocation limits as noted in Ordinance 25-29.

7. SUBMITTAL REQUIREMENTS

The Developer shall provide all required documentation electronically, including but not limited to, PDF exhibits, engineer-sealed construction plans, flow meter shop drawings, and updated contributing property lists.

All engineer-sealed plans shall include the required allocation summary table and Appendix C calculation references. Submittals shall be delivered to Spring Hill Water for review and approval.

8. APPROVAL & COMPLIANCE

Implementation of sewer monitoring and allocation tracking shall be reviewed and approved by Spring Hill Water prior to installation. Monitoring equipment shall be installed prior to the issuance of additional building permits unless otherwise approved in writing. All monitoring equipment installation, maintenance, monthly data reporting, and associated costs shall be the responsibility of the Developer.

Failure to comply with these specifications may result in delay of permit issuance and suspension of all sewer allocations associated with the development.

9. CONTACT INFORMATION

All submittals and coordination shall be directed to:

Development Services Department
City of Spring Hill, Tennessee

Planning Division

planning@springhilltn.org

Engineering Division

engineering@springhilltn.org

Office: 8060 Station Hill Drive, Spring Hill, Tn 37174

Hours: Monday – Friday, 8:00am – 4:30pm

10. APPENDIX A – TECHNICAL SPECIFICATION (ADS TRITON FLOW METER)

ADS ENVIRONMENTAL SERVICES

Flow Monitoring Equipment

TECHNICAL SPECIFICATIONS
FOR DEVELOPERS

City of Spring Hill, Tennessee

Equipment Covered:

TRITON+ Flow Monitor
AV|Max Sensor • AV|GATED Sensor • ParaFlow Sensor
ECHO Level Monitor
RainAlert III Rainfall Monitor

340 The Bridge Street, Suite 204
Huntsville, Alabama 35806
(256) 430-3366
www.adsenv.com

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EXECUTIVE SUMMARY

Purpose

This specification establishes requirements for wastewater flow monitoring equipment installed by developers within the City of Spring Hill, Tennessee service area.

System Compatibility

The City of Spring Hill operates an existing flow monitoring network using ADS Environmental Services equipment and PRISM software. All new monitoring installations shall utilize ADS equipment to maintain compatibility with the existing network. This standardization provides:

- Direct integration with the City's existing PRISM platform
- Uniform data collection and reporting formats
- Common spare parts inventory
- Single-source technical support

Applicability

This specification applies to all developers and contractors installing wastewater flow monitoring equipment within the City of Spring Hill's sewer service area. Equipment must meet or exceed the specifications contained herein and be approved by the City prior to installation.

Developer Responsibilities

The developer shall be responsible for all aspects of the flow monitoring system including, but not limited to:

- Procurement of all monitoring equipment, sensors, and mounting hardware
- Installation of all equipment (whether performed by developer or contracted through ADS)
- PRISM software subscriptions and all associated data hosting fees
- Cellular communication costs and SIM card services
- Ongoing maintenance, battery replacement, and equipment upkeep
- Shop drawing preparation and submittal
- Coordination with ADS for installation, technical support and training

City Responsibilities

The City of Spring Hill shall be responsible for reviewing and approving proposed meter locations to ensure compliance with allocation requirements and issuing final approval of installations upon verification that equipment is installed and functioning per specifications.

1. CITY OF SPRING HILL REQUIREMENTS

The following requirements are specific to the City of Spring Hill, Tennessee and shall govern all flow monitoring installations within the City's jurisdiction:

Software Access

The City of Spring Hill shall have access to the ADS PRISM software platform for monitoring purposes. The developer shall be responsible for all associated software licensing, data hosting, and communication costs.

Meter Location Approval

The City of Spring Hill must approve all installed meter locations prior to installation to ensure compliance with allocation requirements for each development. Developers shall submit proposed meter locations for City review and written approval before proceeding with any equipment installation.

Shop Drawings Requirement

All shop drawings related to the ADS TRITON+ meters, along with any necessary associated monitoring equipment (sensors, mounting hardware, communication equipment, power supplies), shall be submitted to the City for review. Shop drawings must include equipment specifications, installation details, and site-specific configurations.

Post-Installation Approval

The City of Spring Hill must issue an approval of all installations post-installation before installations are to be considered complete and accepted. This approval shall be based on verification that the installation meets all specifications and is functioning properly per ADS confirmation procedures. Installations performed by ADS are warranted to meet all confirmation standards

2. TRITON+ FLOW MONITOR SPECIFICATIONS

The TRITON+ flow monitor measures open channel flow in sanitary sewers, storm sewers, combined sewers, and similar applications. The monitor measures flow depth and velocity to calculate flow rate in pipes.

Equipment Substitution: Newer ADS flow monitor models released after the date of this specification may be substituted for the TRITON+ provided they meet or exceed the performance specifications herein and maintain full compatibility with the City's existing PRISM software platform. Substitutions shall be subject to City approval.

General Specifications

Parameter	Specification
Part Number	8000-FST-IM
Enclosure	Cylindrical 0.37-inch thick, seamless ABS plastic canister with stainless steel threaded inserts; Aluminum end-cap; Meets NEMA6P/IP68 standard
Dimensions	17.75 inches (451 mm) long x 8.75 inches (222 mm) max diameter
Weight	30.3 pounds (13.7 kg) with 12-volt battery pack
Operating Temperature	-4 to 140°F (-20 to 60°C)
Storage Temperature	-4 to 167°F (-20 to 75°C)
Internal Power	One 12-volt, 110 AH, IS alkaline battery pack
External Power (Optional)	ExPAC with 9- to 36-volt (minimum 15 watt) DC power supply
Battery Life (15-min sample)	15 months with one sensor and daily communications
Battery Life (5-min sample)	6 months with one sensor and daily communications
Memory	832 kilobytes
Data Storage	150 days for 6 stored entities at 15-minute sample rate
Connectors	U.S. MIL-C-26482 series 1, gold-plated contacts with interfacial seals
Sensor Inputs	2 configurable sensor input ports (interchangeable)
Data Recording Intervals	2, 5, 15, 30 minutes or 1, 2, 12, 24 hours

Intrinsic Safety Certifications

All monitoring equipment is certified as Intrinsically Safe for installation in hazardous areas:

Certification	Details
ATEX (European)	Zone 0 rated hazardous areas
IECEx (International)	Zone 0 (Class I, Division 1, Groups C & D)
CSA (Canada)	Class 225803
CSA (USA)	Class 225883

Communication Options

Type	Specification
WorldWide LTE-M	Telit ME910C1-WW modem; Multiple bands including 2G fallback
Verizon LTE-M	Telit ME910C1-NV modem using TCP/IP; Band: B13, 700 MHz

| Direct Connection | IS USB serial interface cable (ADS p/n 8000-0337) |
| SCADA Interface | Modbus protocol via wireless or serial connection to RTU |

3. SENSOR SPECIFICATIONS

The TRITON+ flow monitor supports multiple sensor types to address various flow conditions and applications. Sensor selection should be based on site-specific hydraulic conditions, pipe size, and flow characteristics.

Equipment Substitution: Newer ADS sensor models released after the date of this specification may be used in addition to or as substitution for the sensors specified herein, provided they are compatible with the TRITON+ flow monitor (or approved substitute) and meet or exceed the performance specifications for the intended application. Substitutions shall be subject to City approval.

3.1 AV|Max Sensor (Standard Flow Applications)

The AV|Max is the primary area-velocity sensor for most flow monitoring applications. It measures ultrasonic depth, peak Doppler velocity, pressure depth, and water temperature. Designed for depths from 1" to 60" and velocities up to 30 fps.

Parameter	Specification
Part Number	8K-CS9-10-35
Housing	Polycarbonate (PC)/PEEK
Dimensions	6.28" L x 1.49" W x 0.82" H (159.5 x 37.8 x 20.8 mm)
Weight	1.7 lb (0.77 kg) with cable
Cable	35 ft standard (10.7 m); Extensions to 300 ft available
Ultrasonic Depth Range	1.00 to 60.00 in (25.4 mm to 1.5 m)
Ultrasonic Depth Accuracy	±0.125 in or ±0.5% of reading, whichever greater
Doppler Velocity Range	-30 to 30 fps (-9.14 to 9.14 m/s)
Velocity Accuracy	±0.2 fps or ±4% of reading, whichever greater
Pressure Depth Range	0 to 10 PSI; 0 to 277 in (0 to 7.0 m)
Resolution (all)	0.01 in / 0.01 fps

3.2 AV|GATED Sensor (Low Flow Applications)

The AV|GATED sensor uses gated velocity technology for improved accuracy in low flow conditions. It measures velocity at multiple discrete points to characterize velocity distribution. Recommended for sites where low flow measurement accuracy is required.

Parameter	Specification
Part Number	8K-CS7-10-35
Housing	Polycarbonate
Dimensions	7.12" L x 1.49" W x 0.83" H (181 x 38 x 21 mm)
Weight	2 pounds (0.91 kg)
Cable	35 ft standard (10.7 m); Extensions to 300 ft available
Ultrasonic Depth Range	1 to 72 in (25.4 to 1828.8 mm)
Ultrasonic Depth Accuracy	±0.13 in or ±0.5% of depth, whichever greater

Gated Velocity Range	±15 fps bidirectional; ±20 fps forward/backward mode
Min Depth for Velocity	5 in (127 mm); may operate shallower per site hydraulics
Gated Velocity Accuracy	±0.2 ft/s or ±4% of average velocity, whichever greater
Pressure Depth Range	0 to 10 PSI; 0 to 277 in (0 to 7036 mm)

3.3 ParaFlow Sensor (Non-Contact Applications)

The ParaFlow is a non-contact area-velocity sensor that mounts above the flow. It measures depth and velocity in both non-submerged and surcharged conditions. Features a patented parabolic reflector design and optional Topside Retrieval System to reduce confined space entry.

Parameter	Specification
Part Number	8K-CS8-V2-10-30-IS
Housing	Polycarbonate (PC)/PEEK
Dimensions	13.91" L x 2.20" W x 2.58" H (353 x 56 x 66 mm)
Weight	3.30 lb (1.49 kg) with cable
Cable	30 ft (9.1 m)
Non-contact Ultrasonic Range	0 to 144 in (0 to 3.7 m) air range
Ultrasonic Depth Accuracy	±0.125 in or ±0.5% of reading, whichever greater
Surface Velocity Range	1.0 to 15.0 fps (0.3 to 4.6 m/s)
Surface Velocity Air Range	0 to 42 in (0 to 106.7 cm)
Surface Velocity Accuracy	±0.3 fps or ±5% of reading, whichever greater
Surcharge Pressure Range	0-10 PSI; 0 to 277 in (0 to 7.0 m)
Surcharge Doppler Range	-30 to 30 fps (-9.14 to 9.14 m/s)

4. ECHO LEVEL MONITOR

The ADS ECHO is a level-only monitoring system for applications where flow measurement is not required. Features 20 ft ultrasonic range and 8 ft pressure range. Includes blockage PREDICT integration.

Equipment Substitution: Newer ADS level monitoring equipment released after the date of this specification may be used in addition to or as substitution for the ECHO, provided it maintains full compatibility with the City's existing PRISM software platform and meets or exceeds the performance specifications herein. Substitutions shall be subject to City approval.

Parameter	Specification
System Type	Dual-measurement level monitor (ultrasonic and pressure)
Ultrasonic Range	Up to 20 ft (6.1 m)
Pressure Range	Up to 8 ft (2.4 m) above unit
Communication	4G LTE-M
Battery Life	Up to 2 years
Submersible	Meets IP68
Intrinsic Safety	CSA, ATEX, and IECEx certifications
Software	PRISM cloud-based with blockage PREDICT

5. MOUNTING HARDWARE SPECIFICATIONS

TRITON+ Monitor Mounting

Method	Part Number	Description
Manhole Rung Hook	8000-0021	Standard hook mounts to manhole rung with closure mechanism to prevent dislodging during surcharge
Wall/Rim Bracket	I40-0009	Monitor mounting bracket/flange for wall or rim mounting

Sensor Mounting Hardware

Hardware	Part Number	Application
Stainless Steel Band/Ring	Various sizes	Standard mounting for AV|Max, AV|GATED wetted sensors; Secures sensor at 6 o'clock position in pipe; ParaFlow mounts at crown (12 o'clock)
Silt Mount Adapter	8000-0271	Mounts sensor 30° up left side of pipe (7:00 position) when silt accumulation requires higher elevation
Silt Wedge	Contact ADS	For AV|Max; Allows greater rotation beyond ±5 degrees from center
Topside Retrieval System	8000-0597, 8000-0598, 8000-0654	For ParaFlow; Enables sensor retrieval without confined space entry

ECHO Level Monitor Mounting

Option	Description
PVC Wall Mount Bracket	Mounts ECHO to manhole wall
Stainless Steel Wall Bracket	Heavy-duty option for manhole wall mounting
Adjustable Tension Bar	Spans manhole opening for suspended mounting

RainAlert III Mounting Options

Option	Description
Ground Mount	Base plate for level ground installation
Pole Mount	Bracket for mounting to existing pole or post
Rooftop Mount	Base and sunshield for flat roof installation

6. RAINALERT III RAINFALL MONITOR

The RainAlert III is a rainfall monitor that connects to a tipping bucket rain gauge. It features flexible configuration, wireless communications, and alarming capabilities.

General Specifications

Parameter	Specification
Enclosure	Polycarbonate reinforced with 10% glass fiber; NEMA 4X, IP67, UL Rated
Dimensions	10.63"H x 7.09"W x 4.53"D (270 x 180 x 115 mm)
Weight	10 lbs (4.54 kg) with battery
Operating Temperature	-4°F to +140°F (-20°C to +60°C)
Resolution	0.01 inch/tip (US); 0.1, 0.2, 0.5, 1.0 mm/tip (Int'l)
Memory	1MB program, 256KB RAM, 8MB NV flash, 32KB NV FRAM
Data Storage	700+ days for Rain and Rain Intensity
Power	Replaceable 9V 60Ah alkaline battery or 6-24V DC external
Battery Life	Up to 3 years depending on configuration
Communication	4G LTE-M

7. DATA MANAGEMENT

The City of Spring Hill uses ADS PRISM software for collection system data management. All flow monitoring equipment installed under this specification shall transmit data to the City's PRISM platform.

Developer Responsibility: The developer shall be responsible for PRISM software subscription costs and data hosting fees for the duration of the monitoring period.

Item	Details
Platform	ADS PRISM - Cloud-based data management
Access	https://www.adsprism.com
Compatibility	All ADS TRITON+, ECHO, and RainAlert III equipment

8. CONTACT INFORMATION

Corporate Headquarters

ADS Environmental Services
340 The Bridge Street, Suite 204
Huntsville, Alabama 35806
Phone: (256) 430-3366

Regional Contacts

Tennessee Region

Role	Contact Information
Key Account Manager	Tom Reese
Cell Phone	256-497-8893
Email	greese@idexcorp.com
Project Manager	Sarah Hembree
Email	Shembree@idexcorp.com

Customer Support Center

For questions regarding ADS products, services, or software:

Contact Method	Details
Hours	Monday - Friday, 8AM to 5PM Central Time
Phone (U.S. Toll Free)	877-237-9585
Phone (International)	256-430-6242
Email	adssupportcenter@idexcorp.com
Fax	256-430-6615

General Inquiries & Sales

Contact Method	Details
General Information	adsinfo@idexcorp.com
Phone	800-633-7246
Quality Management	adsqualitymanagement@idexcorp.com

Training and Support

ADS provides training on the use of PRISM software and all equipment to the developer. Telephone support is provided by personnel experienced in troubleshooting problems with the specified software and equipment. Training can be coordinated through your regional Key Account Manager or by contacting the Customer Support Center.

Preliminary Workshop: ADS is available to conduct a preliminary workshop with the developer to address all questions, review project requirements, discuss equipment selection, and ensure a clear understanding of installation and operational needs prior to procurement. Note: ADS offers turnkey installation and ongoing maintenance services to ensure equipment is installed and maintained per manufacturer specifications and City requirements

APPENDIX A: TECHNICAL DATA SHEETS

The following manufacturer technical data sheets are included as attachments to this specification document:

1. TRITON+ Flow Monitor Data Sheet
2. AV|Max Sensor Data Sheet
3. AV|GATED Sensor Data Sheet
4. ParaFlow Sensor Data Sheet
5. ECHO Level Monitor Data Sheet
6. RainAlert III Rainfall Monitor Data Sheet
7. PRISM Software Data Sheet

Note: *Technical data sheets are provided as separate PDF attachments and should be appended to this document or provided in a combined specification package.*

— End of Technical Specifications —

TRITON+® Flow Monitoring System

ADS TRITON+®

Flow Monitoring for Open Channel Flows

The ADS® **TRITON+®** is the most versatile and cost-effective flow monitor on the market. The **TRITON+** includes connections for multiple sensor technology options and provides users with industry-standard data for a variety of applications.

The **TRITON+** is an intrinsically safe, "Fit-for-Purpose" open channel flow monitor for use in sanitary, combined, and storm sewers. It supports single pipe or dual pipe flow measurement installations.

The **TRITON+** Flow Monitoring System is used to gather data for use in a variety of applications:

Sanitary sewer overflows (SSOs)

Combined sewer overflows (CSOs)

Infiltration and inflow (I/I) analysis

Sewer model validation

Optimize cleaning process

Lift/pump station backup

Regulatory reporting

Mitigate SSOs

Bypass monitoring

Inter-jurisdictional billing

Versatile and Accurate
Monitor-Level Intelligence (MLI®) enables the **TRITON+** to effectively operate over a wide range of hydraulic conditions. The **TRITON+** supports single or dual pipe/monitoring point measurement capabilities. It supports actuation of a water quality sampler for flow proportional or level-based operation.

Access Data with Ease
Wireless options make it easy to collect data from your **TRITON+**. The ADS web software **PRISM™** enables you to access all your data in one platform from any device (PC, tablet, phone).

Configure to Suit Your Budget
The **TRITON+** has the lowest operational cost per data sample of any **Intrinsically Safe** flow monitor available. The platform adapts to a wide range of customer applications and budgets, and can be configured as an economical **single sensor monitor or dual sensor monitor.**

Extended Asset Life
The **TRITON+** has industry-leading battery life. It offers a longer battery life and fewer parts for a more reliable system, providing a lower purchase price and lower ownership cost over the life of the monitor.

ADS TRITON+

www.adsenv.com

ADS *TRITON+* Sensors are Adaptable to a Wide Variety of Applications

Non-Contact Depth Sensor

Submerged Velocity Sensor
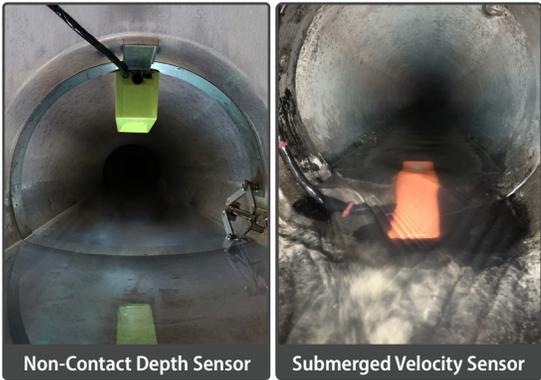
The *TRITON+* flow monitor is compatible with a suite of sensors designed to cover a wide range of applications and a wide range of flow conditions in sanitary sewer, combined sewer, and storm sewer applications. Choose from area-velocity (AV) sensors and depth sensors using submerged or non-contact mounting options. There is even an available inclinometer. The *TRITON+* is configurable with one or two sensors measuring one or two monitoring points. See the sensor specifications at *www.adsenv.com/triton.*

ADS Sensor Technologies Include: Pressure depth, Ultrasonic depth (non-contact & submerged), Doppler velocity, Gated velocity, Surface velocity, Temperature, Inclinometer (tilt sensor)

| **Peak Combo™** | **AV\|Max™** | **AV\|GATED®** | **Surface Combo™** | **ParaFlow™** | **ParaDepth™** | **Long Range Depth™** | **INCLINOMETER™** |
| Area-Velocity Submerged | Area-Velocity Submerged | Gated Velocity Submerged | Area-Velocity Non-Contact | Area -Velocity Non-Contact | Depth Non-Contact | Depth Non-Contact | Angle Tilt |

ADS PRISM™ Software Enhances Understanding

PRISM is a cloud-based, secure software system that acquires, stores and presents data with ongoing user access. The home page (right) provides a map view and a dashboard for quick access to essential parameters. Individual site details, hydrographs and remote site system settings are all accessible. **PRISM** APIs enable third party data exchange.

- Configure and activate
- Set alarms
- Manage data
- Manage blockages with **blockage PREDICT™**
- Conduct I/I studies with the *NEW* **SLiiCER™** app
- Utilize GIS
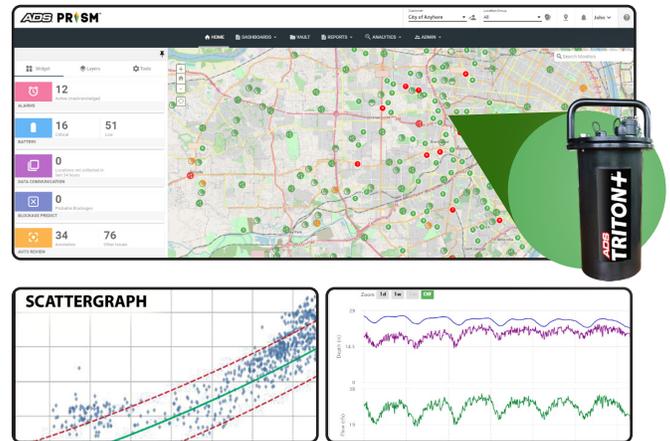
Real-time data is collected and communicated to the cloud-based **PRISM** software and analytics. With continuous user access, informed actions are enabled. Learn more about **PRISM** at *www.adsenv.com/prism.*
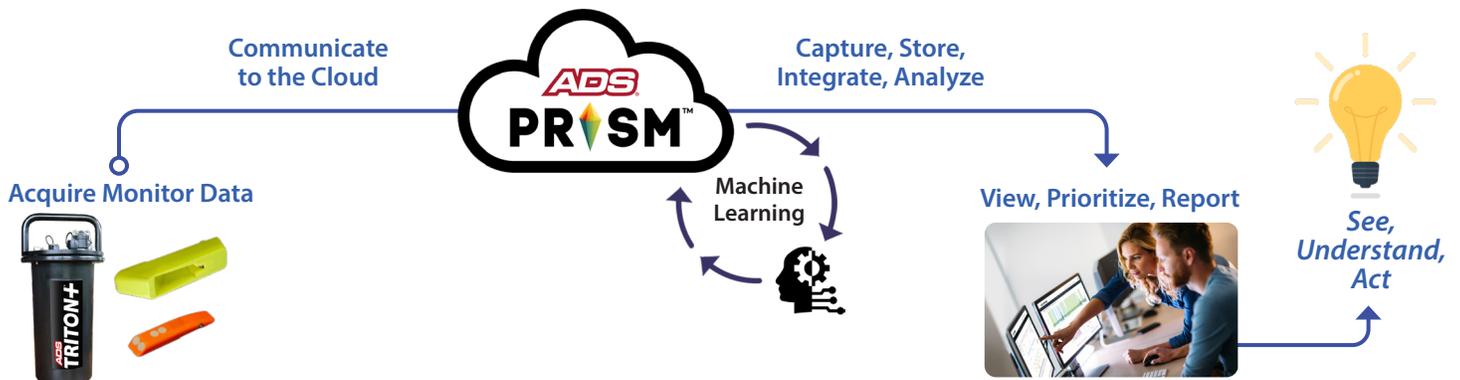
Self-Contained Solutions for Power, Communication, Analog and Digital I/O and Modbus

The ADS **TRITON+** COMM+EXT PWR port is used for external power via the ADS XIO, XBUS or ExPAC devices, delivery of Modbus output values as well as for on-site, direct monitor communication.

XIO Features

Process variables measured by the **TRITON+** can be converted to two (2) 4-20mA loop output signals for SCADA systems or local display and control

Logging capabilities of the **TRITON+** can be used for two (2) 4-20mA input process variables measured by other instrumentation

Alarms produced by the **TRITON+** can be output on the two (2) XIO relay contacts for process actuation

Two (2) switch, solid state or dry contact digital inputs can be sampled and logged

Design facilitates easy field wiring

Supports easy plug and play configuration and start-up

Associated Apparatus **IECEx certification** for use with approved equipment in **Zone 0** (equivalent to Class I, Division 1, Groups C & D); **ATEX Zone 0**; and **CSA Class I**, Zone 0, IIB hazardous areas

Rugged indoor/outdoor NEMA 4x case with hinged clear cover

Accepts 85-264 VAC, 120-375 VDC; 47-62 Hz; 1.1A@110/0.59A @250 VAC

Supplies 8 – 11.5 VDC, 500mA power to the **TRITON+** flow monitors

XBUS Features

Supports Modbus RTU, ASCII and TCP communications

Connects to wired networks via RS485 or RS232

Supports easy plug and play configuration and start-up

Associated Apparatus **IECEx certification** for use with approved equipment in **Zone 0** (equivalent to Class I, Division 1, Groups C & D); ATEX Zone 0; and CSA Class I, Zone 0, IIB hazardous areas

Rugged indoor/outdoor NEMA 4x case with hinged clear cover

Accepts 85-264 VAC, 120-375 VDC; 47-62 Hz; 1.1A@110/0.59A @250 VAC

Supplies 8 – 11.5 VDC, 500mA power to the **TRITON+** flow monitors

ExPAC Features

Designed to be housed in another enclosure

Associated Apparatus **IECEx certification** for use with approved equipment in Zone 0 (equivalent to Class I, Division 1, Groups C & D); ATEX Zone 0; and CSA Class I, Zone 0, IIB hazardous areas

Requires DC power input between 9 and 36 volts and a minimum of 15 watts

Supplies DC power of 8 to 11.5 volts, 500mA to the **TRITON+** flow monitors

RS485 and RS232 Modbus output connections to SCADA systems

Supports Modbus RTU, ASCII and TCP/IP communications

Specifications subject to change without notice.

ADS TRITON+®
Flow Monitor Specifications

Connectors	U.S. Military specification MIL-C 26482 series 1, for environmental sealing, with gold-plated contacts	**Mounting Options**	**Mount on the manhole rung** using standard hook (ADS p/n 8000-0021)
Communication	Third-party, FCC/IC/EC- and carrier-approved wireless modem		**Mount permanently to the manhole wall** using monitor mounting bracket/flange (ADS p/n I40-0009)
	Compatible with all 4G LTE-M networks worldwide with 2G fallback (where available)		**Mount to the manhole rim** using monitor bracket/flange (ADS p/n I40-0009)
	Automatically detects installed SIM upon boot up to determine correct network	**Intrinsic Safety Certifications**	**Certified under the ATEX** European Intrinsic Safety standards for Zone 0 rated hazardous areas
	Modem FCCID: R17ME910C1WW		**Certified under IECEx** (International Electrotechnical Commission) Intrinsic Safety Standards for use in Zone 0 rated hazardous areas (equivalent to Class I, Division 1, Groups C & D)
Monitor Interfaces	Supports simultaneous interfaces with up to two combo sensors		
	Supports optional Analog and Digital I/O with ADS XIO: two 4-20 mA inputs and outputs, two switch inputs and two relay outputs		**CSA Certified to Class 225803** Process Control Equipment, Intrinsically Safe and Non-Incendive Systems – For Zone 0 Hazardous Locations, Ex ia IIB T3 (152° C) in Canada
Power	**Internal** - Battery life with a cellular modem: • Over 15 months at a 15-minute sample rate* • Over 6 months at a 5-minute sample rate*		**CSA Certified to Class 225883** Process Control Equipment, Intrinsically Safe and Non-Incendive Systems – For Class I Zone 0 Hazardous Locations, AEx ia IIB T3 (152° C) in the USA (equivalent to Class I, Division 1, Groups C & D)
	External - Optional external power available with ADS External Power and Communications Unit (ExPAC) with an ADS- or customer-supplied 9-36 Volt DC power supply		
	*Rate based on collecting data once a day and varies according to sensor configuration and operating temperature	**Other Certifications/ Compliances**	FCC Part 15 compliant
Connectivity	**Modbus ASCII:** Wireless; Wired using ADS ExPAC or XBUS		Carries the EU CE mark
	Modbus RTU: Wireless; Wired using ADS ExPAC or XBUS		ROHS (lead-free) compliant
	Modbus TCP: Wireless only		Canada IC CS-03 compliant
Operating and Storage Temperature	-4° to 140° F (-20° to 60° C)		IP68 compliant
Compatibility	Attachable ADS Sensors		
	Qstart™*XML* with ADS **TRITON+**® firmware version 6.43 and higher		
	PRISM™		

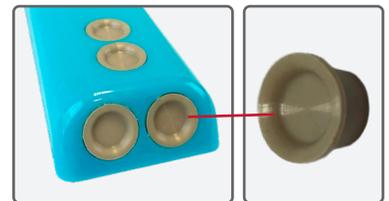# TRITON+® Flow Monitoring System
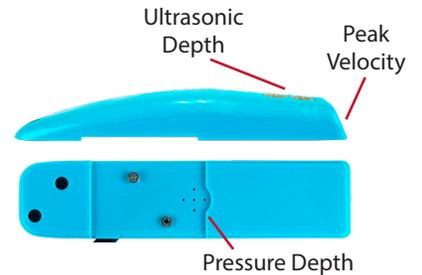# AV|MAX™ Sensor

Precision, High-durability Sensor

AV|MAX™ is a new area-velocity sensor used with the ADS® **TRITON+®** monitor. The sensor measures four parameters including:

· Depth - using ultrasonic "UpDepth"
· Depth - pressure
· Velocity - continuous wave ultrasonic Doppler
· Water temperature

The **AV|MAX** is a wetted sensor, installed in the pipe flow lending to its consistent, high quality data collection capability. It features an ultra-low profile, rugged, polycarbonate housing, in a high-visibility blue color. These characteristics bring exceptional durability and ease-of-maintenance for users.
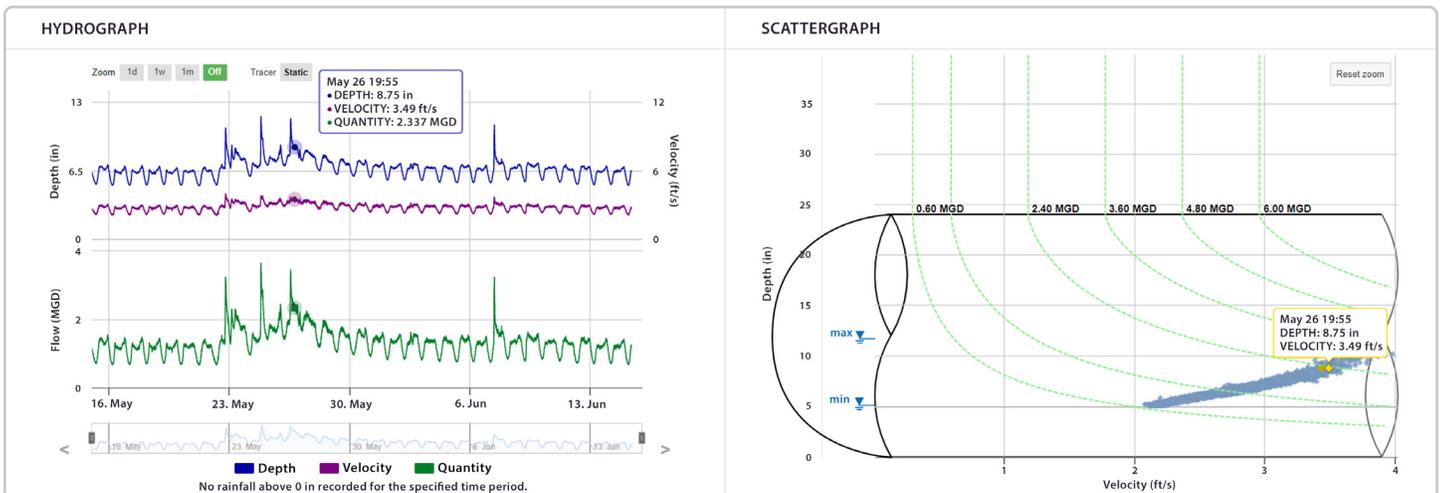
The **AV|MAX** is designed for accurate and consistent performance in depths from 1" to 60" (25.4 mm to 1.5 m) and in flows of up to 30 fps (9.14 m/s). It is typically the sensor of choice in most applications and can be used with confidence across the full sensor range. Where there are intermittent no-flows (dry pipe), it is recommended that the **AV|MAX** be used in combination with one of ADS' non-contact sensors.

TRITON+ and **AV|MAX** Flow Monitoring System is used to gather data for use in a variety of applications:

Infiltration and inflow (I/I) analysis

Model validation

Capacity assessment

Flow billing

Combined sewer overflows (CSOs)

Sanitary sewer overflows (SSOs)

SSO data & reporting

Ultrasonic Depth
Peak Velocity
Pressure Depth

Protected, recessed sensors

AV|MAX installed with standard installation ring

HYDROGRAPH

Zoom 1d 1w 1m Off   Tracer Static

May 26 19:55
• DEPTH: 8.75 in
• VELOCITY: 3.49 ft/s
• QUANTITY: 2.337 MGD

Depth (in)
Velocity (ft/s)
Flow (MGD)

16. May   23. May   30. May   6. Jun   13. Jun

Depth   Velocity   Quantity
No rainfall above 0 in recorded for the specified time period.

SCATTERGRAPH

Reset zoom

0.60 MGD   2.40 MGD   3.60 MGD   4.80 MGD   6.00 MGD

Depth (in)

max
min

May 26 19:55
DEPTH: 8.75 in
VELOCITY: 3.49 ft/s

Velocity (ft/s)

Accurate data capture and analysis with the Cloud-based ADS **PRISM™** software

AV|MAX™ Sensor
Specifications

Sensor Dimensions	**Height:** 0.82 in. (20.8 mm) **Width:** 1.49 in. (37.8 mm) **Length:** 6.28 in. (159.5 mm)
Sensor Housing	**Material:** Polycarbonate (PC)/PEEK **Color:** Blue
Weight	**Sensor & Cable:** 1.7 lb (0.77 kg)
Cable	**Length:** 35 ft (10.7 m) **Diameter:** 0.30 in. (7.6 mm) **Jacket Material:** Polyurethane
UpDepth / Ultrasonic Depth	**Depth Accuracy:** ±0.125 in. (± 3.2 mm) or ±0.5% of actual reading; whichever is greater
	Range: 1.00 to 60.00 in. (25.4 mm to 1.5 m)
	Resolution: 0.01 in. (0.25 mm)
	Deadband: 1.00 in. (25.4 mm) from bottom of pipe (Subject to hydraulics of flow)
Doppler Velocity	**Accuracy:** ±0.2 fps (0.06 m/s) or ±4% of actual reading; whichever is greater
	Range: -30 to 30 fps (-9.14 to 9.14 m/s)
	Resolution: 0.01 fps (0.003 m/s)
	Deadband: 1.00 in. (25.4 mm) from the bottom of the pipe (Subject to hydraulics of flow)
Pressure Depth	**Accuracy:** ± 1% of full range
	Range: 0 to 10 PSI; 0 to 277 in. (0 to 7.0 m)
	Resolution: 0.01 in. (0.25 mm)
Temperatures	**Operating range:** -4° to 140° F (-20° to 60° C)
	Storage: -4° to 167° F (-20° to 75° C)

* Note: This sensor will not produce accurate readings in frozen flow.

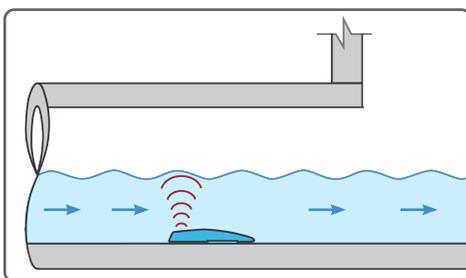|	
Compatibility	The **AV|MAX** sensor is used with the ADS **TRITON+** flow monitor
	Qstart™XML - setup and activation
	PRISM - data analysis
Mounting Method	ADS stainless steel ring or special metal. Must be mounted ±5 degrees from center; greater rotation possible with ADS Silt Wedge.
Certifications	The **AV|MAX** is developed and manufactured under the ISO 9001:2015 Quality Management Standard, and designed to meet requirements for RoHS and IP68 standards.
	Certified under the ATEX European Intrinsic Safety standards for Zone 0 rated hazardous areas
	Certified under IECEx (International Electrotechnical Commission) Intrinsic Safety Standards for use in Zone 0 rated hazardous areas (equivalent to Class I, Division 1, Groups C & D)
	CSA Certified to Class 225803 Process Control Equipment, Intrinsically Safe and Non-Incendive Systems – For Zone 0 Hazardous Locations, Ex ia IIB T3 Ga (152° C) in Canada
	CSA Certified to Class 225883 Process Control Equipment, Intrinsically Safe and Non-Incendive Systems – For Class I Zone 0 Hazardous Locations, AEx ia IIB T3 Ga (152° C) in the USA (equivalent to Class I, Division 1, Groups C & D)

Ultrasonic Depth
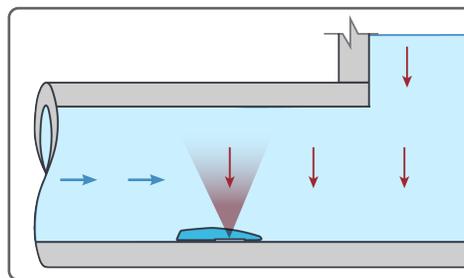
Surcharge Pressure Depth
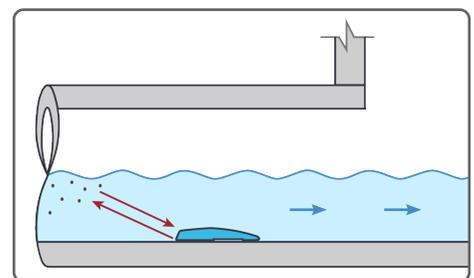
Continuous Wave Doppler Velocity

Learn More About *TRITON+*
www.adsenv.com/triton

Call: 800.633.7246
Email: adssales@idexcorp.com

ADS

Specifications subject to change without notice.

AV|MAX_06-18-2024

*AV|G*ATED®

Gated Area-Velocity flow measurement in a reliable, rugged, and affordable sensor, engineered by the most trusted name in wastewater flow monitoring!

Wastewater flow measurement using the *Area-Velocity Method* requires knowledge of the average flow velocity. A variety of approaches have been developed over the years to measure average velocity, but gated velocity methods are traditionally recognized among the most accurate and reliable. Gated velocity sensors work by measuring flow velocity at multiple discrete points, allowing the sensor to better characterize the velocity distribution and best measure average velocity. The ADS® **AV|GATED** sensor combines proven depth measurement methods with state-of-the-art gated velocity measurement technology to provide *accurate* and *reliable* area-velocity sewer flow measurements.

Gated Velocity. The **AV|GATED** sensor brings
gated velocity technology into everyday use, and measures average velocity through a wide range of flow conditions.

Dual Depth. The **AV|GATED** sensor leverages dual depth technology. Ultrasonic depth optimizes
measurements up to full pipe, while pressure depth provides redundancy and allows measurements during surcharge conditions.

Rugged Construction. Built with a rugged housing that is impact and abrasion-resistant
and a contoured form factor that resists debris, the **AV|GATED** sensor is designed to operate in tough sewer environments.

Multiple Sensing Technologies

Gated Doppler Velocity

Gated velocity technology works by measuring flow velocity at multiple discrete points, allowing the sensor to better characterize the velocity distribution and best measure average velocity. The returning reflected signal is processed using a digital signal processor, from which average velocity is calculated.

Ultrasonic Depth

Ultrasonic depth technology operates by measuring the elapsed time for an ultrasonic signal to travel to the flow surface and back, and calculates the distance to the flow surface. This information, in conjunction with data pertaining to pipe geometry, is used to compute wetted area area of flow. Ultrasonic depth optimizes measurements up to full pipe, while pressure depth provides redundancy and allows measurements during surcharge conditions.

Pressure Depth

Pressure depth technology measures the depth of flow by recording the difference in atmospheric and water height pressure. The pressure depth technology of the AV|GATED sensor serves as a back up the ultrasonic depth sensor. In addition, the pressure depth records the depth of surcharge.

ADS®

Compatibility with the ADS TRITON+®

The **AV|GATED** sensor is designed to work *exclusively* with the ADS **TRITON+** flow monitor. It is one of the latest offerings in the **TRITON+** array of sensors.

The **TRITON+** is an intrinsically safe, "Fit-for-Purpose" open channel flow monitor for use in sanitary, combined, and storm sewers. It is designed to be the most versatile flow monitoring system available for wastewater collection applications. It supports single pipe or dual pipe flow measurement installations.

For more information, please visit the ADS website at *www.adsenv.com/triton*.

Applications

The **AV|GATED** sensor is designed for use in many flow monitoring applications, including:

- Infiltration/inflow programs
- Inter-agency billing networks
- Combined sewer overflow (CSO) monitoring
- Sanitary sewer overflow (SSO) monitoring
- Sewer capacity studies/trending
- Rehabilitation effectiveness monitoring
- Comprehensive sewer performance monitoring
- Sewer master plan studies

*The **AV|GATED** sensor is built with a rugged Polycarbonate housing that is impact and abrasion-resistant and a contoured form factor that resists debris. The sensor is designed to operate in harsh sewer environments.*

AV|GATED Sensor Specifications

Housing
Solid molded polycarbonate providing high impact and high abrasion resistance

Color
High-visibility safety orange

Weight
2 pounds (0.91 kg)

Dimensions
Width: 1.49 in. (38 mm)
Height: 0.83 in. (21 mm)
Length: 7.12 in. (181 mm)

Temperatures
Operating: -4° to 140° F (-20° to 60° C)
Storage: -4° to 167° F (-20° to 75° C)
*Note: This sensor will *not* produce accurate readings in frozen flow.

Sensor Cable
Standard Length: 35 ft. (10.7 m)
Extended Lengths: Extension cables available up to 300 ft (91.4 m)
Diameter: 0.28 in. (0.72 cm)
Cable Jacket Material: Polyurethane

Operating Range
Ultrasonic Depth: 1 in. to 72 in. (25.4 mm to 1828.8 mm)
Pressure Depth (standard): 0 to 10 PSI; 0 in. to 277 in. (0 to 7036 mm)
Gated Velocity: ±15 fps (4.60 m/s) in Bidirectional mode or ±20 fps (6.10 m/s) in Forward and Backwards mode; minimum depth for velocity is 5 in. (127 mm); Gated Velocity may operate in shallower flows depending on site hydraulics

Accuracy
Ultrasonic Depth: ±0.13 in. (3.2 mm) or ±0.5% of flow depth; whichever is greater
Pressure Depth: ±1% of full range
Gated Velocity: ±0.2 ft/s or ±4% of average flow velocity; whichever is greater

Resolution
Ultrasonic Depth: 0.01 in. (0.25 mm)
Pressure Depth: 0.01 in. (0.25 mm)
Gated Velocity: 0.01 feet per second (0.003 m/sec)

Certifications
- Certified under the ATEX European Intrinsic Safety standards for Zone 0 rated hazardous areas
- Certified under IECEx (International Electrotechnical Commission) Intrinsic Safety Standards for use in Zone 0 rated hazardous areas (equivalent to Class I, Division 1, Groups C & D)
- CSA Certified to Class 225803 – Process Control Equipment, Intrinsically Safe and Non-Incendive Systems – For Zone 0 Hazardous Locations, Ex ia IIB T3 (152° C) in Canada
- CSA Certified to Class 225883 – Process Control Equipment, Intrinsically Safe and Non-Incendive Systems – For Class I Zone 0 Hazardous Locations, AEx ia IIB T3 (152° C) in the USA (equivalent to Class I, Division 1, Groups C & D)

Compatibility
ADS **TRITON+** flow monitor

Mounting Method
ADS stainless steel mounting band/ring

Learn more at www.adsenv.com/avgated

340 The Bridge Street, Suite 204, Huntsville, AL 35806
Phone: 256.430.3366 Fax: 256.430.6333
Toll Free: 1.800.633.7246, www.adsenv.com

ADS®
www.adsenv.com/triton

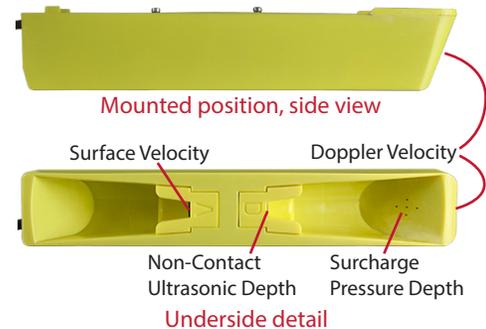# TRITON+® Flow Monitoring System
PARAFLOW™ Sensor

High-durability, Non-contact Area-velocity Sensor

PARAFLOW™ is a new non-contact area-velocity sensor used with the ADS® **TRITON+®** monitor. **PARAFLOW** measures five parameters including:

· Depth - non-contact ultrasonic depth
· Depth - surcharge pressure depth
· Velocity - non-contact surface velocity
· Velocity - surcharge Doppler velocity
· Air temperature (compensation)

PARAFLOW brings new capabilities alongside a new topside retrieval installation system. This installation system mitigates the need for regular confined space entry maintenance. Once installed, a specialized mounting bracket enables retrieval and placement of the sensor via the Topside Retrieval Tool. Depending on the application, the sensor can also be installed with a standard installation ring.

PARAFLOW uses a patented 'parabolic reflector' design that focuses the ultrasonic outputs to a targeted flow location to provide accurate readings. Additionally, it is designed with an impact-resistant, polycarbonate housing and nested sensors to protect from direct debris impact to withstand various sewer environments.

Mounted position, side view

Surface Velocity   Doppler Velocity

Non-Contact   Surcharge
Ultrasonic Depth   Pressure Depth
Underside detail

PARAFLOW installed in a manhole with Topside Retrieval System

PARAFLOW installed in a pipe with standard installation ring

TRITON+ Flow Monitor System with **PARAFLOW** is used to gather data for a variety of applications:

Infiltration and inflow (I/I) analysis

Model validation

Sanitary sewer overflows (SSOs)

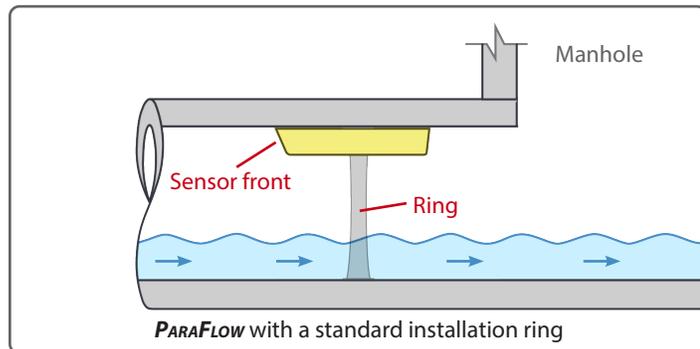Combined sewer overflows (CSOs)

Storm sewers

Non-contact sensor measures depth and velocity in non-submerged and submerged (surcharged) conditions

Optional Topside Retrieval System reduces confined space entry and improves safety

Patented parabolic reflector focuses ultrasonic output

High-durability housing design and nested sensor tranducers reduces maintenance and provides impact protection

ADS®
www.adsenv.com/triton

INFORMATION: Read the *ParaFlow* **Application Guidance** to learn more about flow conditions, locations, and installation types that may affect the performance of the *ParaFlow* sensor.
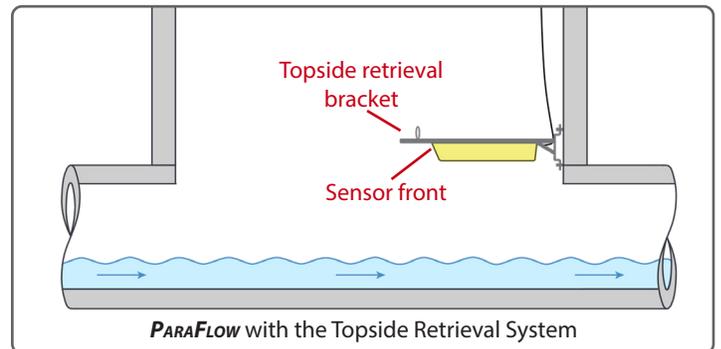https://www.adsenv.com/sites/default/files/Application_Briefs/ParaFlow-Application-Guidance.pdf

PARAFLOW™ Sensor
Specifications

Sensor Dimensions	**Height:** 2.58 in. (65.5 mm) **Width:** 2.20 in. (55.9 mm) **Length:** 13.91 in. (353.3 mm)
Sensor Housing	**Material:** Polycarbonate (PC)/PEEK **Color:** High-visibility yellow
Cable	**Length:** 30 ft (9.1 m) **Diameter:** 0.30 in. (7.6 mm) **Jacket Material:** Polyurethane
Weight	**Sensor & Cable:** 3.30 lb (1.49 kg)
Non-contact Ultrasonic Depth	**Accuracy:** ±0.125 in. (3.17 mm) or ±0.5% of actual reading, whichever is greater
	Operating air range: 0 to 144 in. (0.0 cm to 3.7 m)
	Resolution: 0.01 in. (0.25 mm)
	Deadband: 0 in. (0 mm)
Non-contact Surface Velocity	**Accuracy:** ±0.3 fps (0.09 m/s) or ±5% of actual reading, whichever is greater
	Surface velocity air range: 0 to 42 in. (0 cm to 106.7 cm)
	Surface velocity range: 1.0 to 15.0 fps (0.3 to 4.6 m/s)
	Resolution: 0.01 fps (0.003 m/s)
	Deadband: 0 in. (0 mm)
	* Some flow conditions/hydraulics may negatively impact the ability of the Surface Velocity sensor to read accurately
Surcharge Pressure Depth	**Accuracy:** ±1% of full range
	Range: 0-10 PSI; 0 to 277 in. (0 to 7.0 m)
	Resolution: 0.01 in. (0.25 mm)
Surcharge Doppler Velocity	**Accuracy:** ±0.2 fps (0.06 m/s) or 4% of actual reading, whichever is greater
	Range: -30 to 30 fps (-9.14 to 9.14 m/s)
	Resolution: 0.01 fps (0.003 m/s)

Temperatures	**Operating range:** -4° to 140° F (-20° to 60° C)
	Storage: -4° to 167° F (-20° to 75° C)
Compatibility	The **PARAFLOW** sensor is used with the ADS **TRITON+** flow monitor
	Q*start*™*XML* - setup and activation
	PRISM™ - data analysis
Mounting Method	ADS stainless steel mounting band/ring
	Topside Retrieval System
Certifications	The **ParaFlow** is developed and manufactured under the ISO 9001:2015 Quality Management Standard, and designed to meet the requirements for RoHS and IP68 standards.
	Certified under ATEX European Intrinsic Safety standards for Zone 0 rated hazardous areas
	Certified under IECEx (International Electrotechnical Commission) Intrinsic Safety Standards for use in Zone 0 rated hazardous areas (equivalent to Class I, Division 1, Groups C & D)
	CSA Certified to Class 225803 Process Control Equipment, Intrinsically Safe and Non-Incendive Systems – For Zone 0 Hazardous Locations, Ex ia IIB T3 Ga (152° C) in Canada
	CSA Certified to Class 225883 Process Control Equipment, Intrinsically Safe and Non-Incendive Systems – For Class I Zone 0 Hazardous Locations, AEx ia IIB T3 Ga (152° C) in the USA (equivalent to Class I, Division 1, Groups C & D)

Manhole · Sensor front · Ring

PARAFLOW with a standard installation ring

Topside retrieval bracket · Sensor front

PARAFLOW with the Topside Retrieval System

Level Monitoring System

ECHO™

Level Monitoring for Open Channel Flows

The ADS® **ECHO**™ is an all-new generation level monitor. It gives users up to 10X more monitoring range and uses machine learning software to predict overflows long before they occur.

Coupled with its wide range of uses and low cost, **ECHO** is the leading solution for level monitoring applications.

Collection Systems, Plants, Surface, and Storm Water Structures

Sanitary Sewers	Combined Sewers

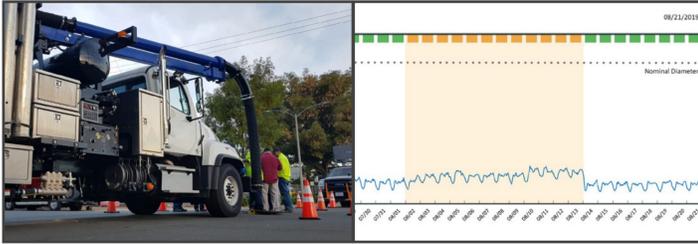| Wastewater Treatment Plants	Lagoons and Ponds

Rivers and Streams	Canals

The Wide Range of ECHO Applications Gives You Flexibility
Operations, Engineering, Planning, Modeling, and Contractor Professionals

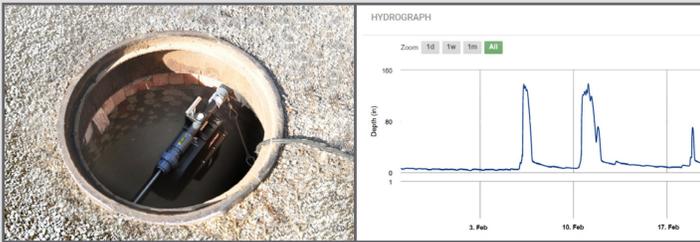## Efficient Cleaning Process

Reduce cleaning frequency and mitigate Sanitary Sewer Overflows (SSOs) with continuous monitoring and blockage prediction software.
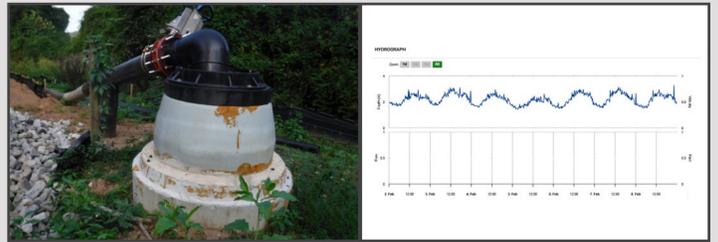
CSO Data and Reporting

Monitor Combined Sewer Overflows (CSO) activation and de-activation in real-time. Calculate overflows, prepare reports.

Hydraulic Model Validation

Acquire data for updating and validating hydraulic models. Low cost means higher sensor density.

Bypass Monitoring

Secure 24/7 protection from overflows with bypass monitoring.

Wastewater Pump Station Back-up

Avoid pump station overflows from power failures, partial pump blockages, or failed alarms with **ECHO** back-up.
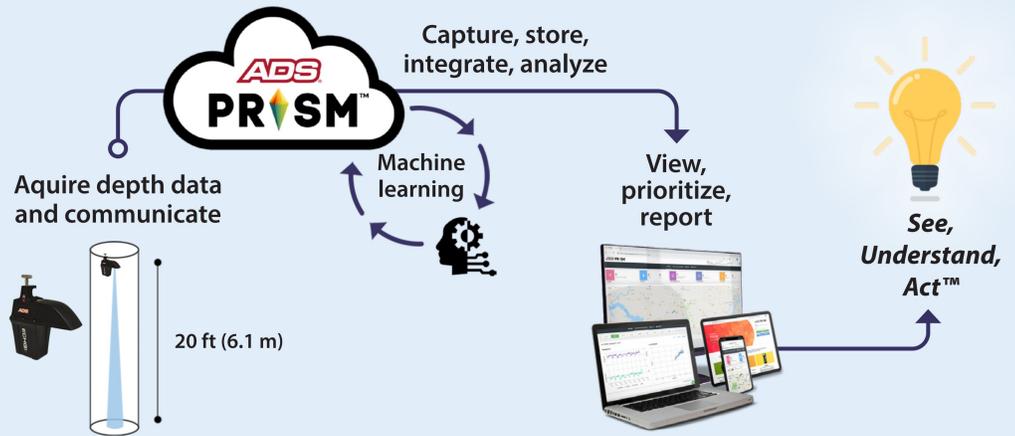
SSO Mitigation

ECHO is the latest generation level monitor. This means you get:
- Predictive, early-stage notices of developing blockages
- Precise, long range ultrasonic measurements
- Multiple high and low flow alarms
- Fast, easy installation
- Stabilized mounting with integral sensor that avoids false alarms
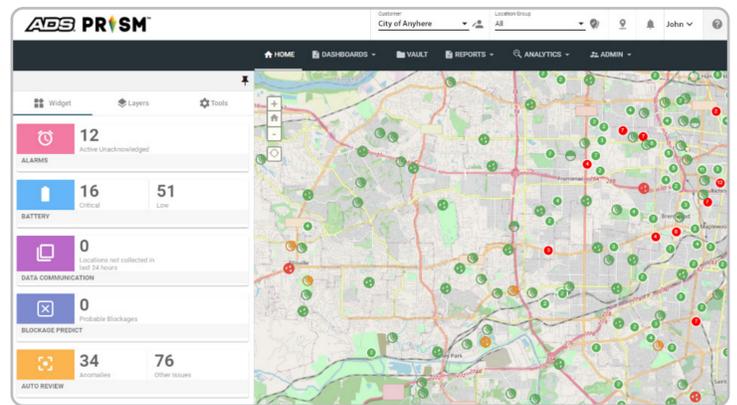
Continuous Monitoring Drives Informed Actions

Real-time depth data is collected and communicated to the cloud-based **PRISM** software and analytics. With continuous user access, informed actions are enabled.

ADS PRISM™

Capture, store, integrate, analyze

Aquire depth data and communicate

Machine learning

View, prioritize, report

20 ft (6.1 m)

See, Understand, Act™

ADS PR SM™ Software Enhances Understanding

PRISM is a cloud-based, secure software system that acquires, stores and presents data with ongoing user access. Its home page (right) provides a map view and a dashboard for quick access to essential parameters. Individual site details, hydrographs and remote site system settings are all accessible. **PRISM** APIs enable third party data exchange.

PRISM's **blockage** PREDICT™ app (below) uses machine learning and will predictively detect blockages, with days' or weeks' worth of warning. When detected, blockages are presented in the dashboard.

ADS PRISM™

Customer: City of Anyhere   Location Group: All   John ∨

🏠 HOME   📊 DASHBOARDS ∨   📁 VAULT   📄 REPORTS ∨   🔍 ANALYTICS ∨   👤 ADMIN ∨

■■ Widget   ⬚ Layers   ⚙ Tools

⏰	**12** Active Unacknowledged
	ALARMS
🔋	**16** Critical **51** Low
	BATTERY
▭	**0** Locations not collected in last 24 hours
	DATA COMMUNICATION
⊠	**0** Probable Blockages
	BLOCKAGE PREDICT
⬡	**34** Anomalies **76** Other Issues
	AUTO REVIEW

Dashboard Reveals Prioritized List
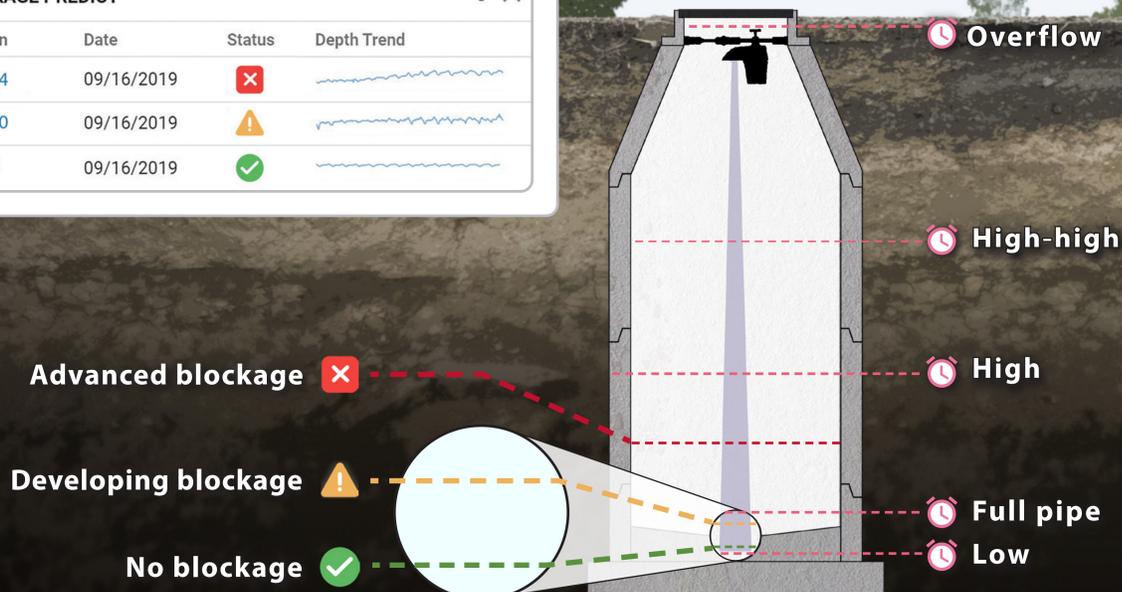
| ⊠ | **2** Probable Blockages |
| | BLOCKAGE PREDICT |

blockage PREDICT lists prioritized, colored-coded symbols and access to details for sites of interest (below).

BLOCKAGE PREDICT

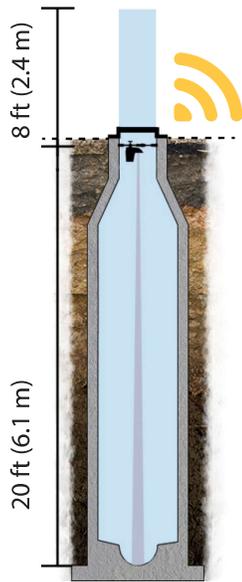| Location	Date	Status	Depth Trend
AN_204	09/16/2019	❌	〰〰〰
AN_110	09/16/2019	⚠️	〰〰〰
AN_96	09/16/2019	✅	〰〰〰

Real-Time Alarms

| ⏰ | **5** Active Unacknowledged |
| | ALARMS |

Dashboard summarizes Alarms and gives access details. Five redundant SSO alarms (below) guard against fast developing events.

Advanced blockage ❌

Developing blockage ⚠️

No blockage ✅

⏰ **Overflow**

⏰ **High-high**

⏰ **High**

⏰ **Full pipe**

⏰ **Low**

www.adsenv.com/echo

ADS

ECHO™ | ADS®

The ECHO Difference Means New Standards in Performance:

New LTE-M communications
LTE-M communications provide improved reliability often allowing the antenna to be installed in the manhole, eliminating drilling. Set-up is fast and easy, taking just minutes.

Total manhole visibility
ECHO's unique narrow beam technology provides up to a 20 ft (6.1 m) range and its pressure sensor can read up to 8 ft (2.4 m) above the **ECHO**.

8 ft (2.4 m)
20 ft (6.1 m)

ECHO System Components:

T-handle
Antenna connector
Parabolic beam-focusing head
Ultrasonic transducer
Battery pack
Pressure sensor

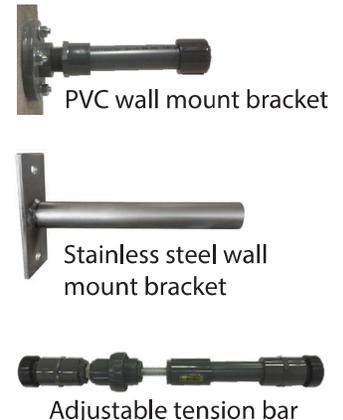"Bullseye" level located on top assures alignment in seconds

Installation Options:

The ADS **ECHO** installs quickly making it easy to move from one location to another.

ECHO with tension bar installation

PVC wall mount bracket

Stainless steel wall mount bracket

Adjustable tension bar

SPECIFICATIONS

System	Dual-measurement sensor (ultrasonic and pressure), tilt alarm for sensor alignment, battery powered, wireless communication
Software	**PRISM**, cloud-based with data storage, dashboard, analytics, and reports
Communications	Third-party, FCC/IC/EC- and carrier-approved wireless modem
	Compatible with all 4G LTE-M networks worldwide with 2G fallback
	Automatically detects installed SIM upon boot up to determine correct network
	Modem FCCID: R17ME910C1WW
Battery Life	Up to 2 years depending on operating temperature, modem power management, and frequency/type of communications
Submersible	Meets IP68
Manufacturing Standard	ISO-9001
Intrinsically Safe	CSA, ATEX, and IECEx certifications
	Multiple intrinsic safety certifications set the ADS **ECHO** apart with an intense focus on safety

Tailored, Affordable Purchase Programs

Purchase
The ADS **ECHO** can be purchased bundled with communications and software.

D-Site Turn-Key Service
ADS takes care of your monitoring network including equipment, software, and onsite maintenance through one low monthly fee.

2 Year Warranty
Our two-year warranty gives you added assurance of its quality and reliability.

Learn more about ECHO:
www.adsenv.com/echo

Access PRISM:
https://www.adsprism.com

Call: 800.633.7246
Email: adssales@idexcorp.com

Rainfall Monitoring System
RAIN ALERT III ™

Overview

Important decisions are made every day regarding sanitary sewer, combined sewer, and storm sewer systems and often require the use of rainfall data. Although these decisions involve significant capital investment and expenditures required to protect public health and the environment, the integrity of rainfall measurements supporting them is often overlooked.

The ADS® *RainAlert®III™* is a rainfall monitor that connects to a tipping bucket rain gauge to measure and record rainfall data. The *RainAlert III* is simple to install and simple to operate, with flexible configuration options, wireless communications, and alarming to deliver rainfall data when and where you need it.

Applications

The *RainAlert III* is used to gather rainfall data for use in a variety of applications:

Rainfall event analysis

Rainfall alarming

Infiltration and inflow analysis

Hydrologic modeling

CSO and SSO monitoring

Regulatory compliance

Typical Installation

The *RainAlert III* connects to an ADS or customer supplied tipping bucket.

Tipping Bucket

RainAlert III Rainfall Monitor

Mounting Hardware

Cover Plate
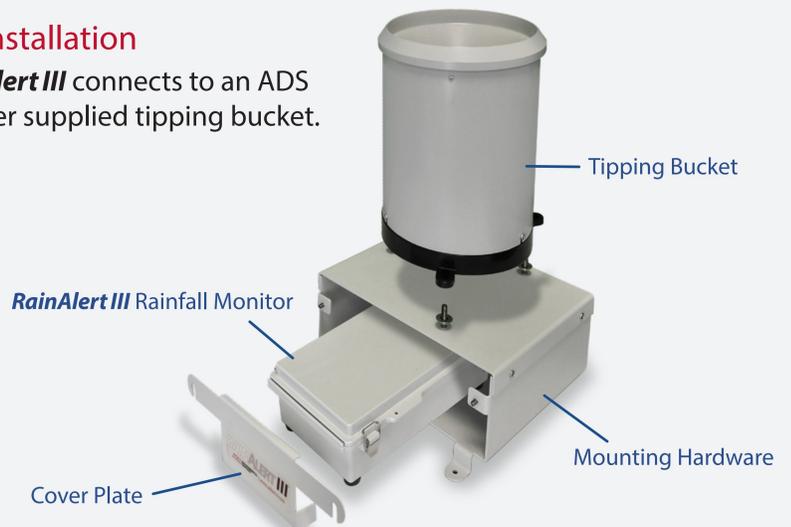
3 Mounting options to suit your needs

ground mount

pole mount

rooftop mount

RAINALERT III
Rainfall Monitor Specifications

Enclosure	Polycarbonate enclosure reinforced with 10% glass fiber resin
	NEMA Type 4X, IP67, and UL Rated
	Access cover includes stainless steel latches and a continuous gasket
	Pressure equalizing vent
Weight	10 lbs (4.54 kg), with battery
Operating Temperature	-4°F to +140°F (-20°C to +60°C)
Mounting	Optional mounting hardware designed for ground, pole mount, or rooftop installation
Resolution	0.01 inch/tip (United States)
	0.1, 0.2, 0.5, 1.0 mm/tip (International)
Dimensions	Height 10.63 in (270 mm) Width 7.09 in (180 mm) Depth 4.53 in (115 mm)

Memory	1MB program memory, 256 KB RAM
	8MB NV flash memory, 32KB NV FRAM
Processor	ARM Cortex M4 microprocessor
Data Storage	700+ days for two stored entities (Rain and Rain Intensity)
Clock	Battery-backed real-time clock module synchronized with wireless carrier
Firmware	Upgrade via remote wireless or local USB connection
Power	Replaceable 9V 60Ah alkaline battery pack or user-provided external power supply (6 to 24V DC, 1A)
Battery Life	Up to 3 years depending on operating temperature, modem power management and frequency/type of communications
Connector	2-Conductor 22 AWG wire provided for connection to tipping bucket
Diagnostics	Wireless communication or USBconnection to the unit through ADS *Qstart*™*XML* software for reading the latest monitor status and performing diagnostics to resolve problems
Antenna	Delivered with an internal ultra-wide band I-BAR type antenna. An SMA connector on the board is available for applications requiring an external antenna
Communications	Third-party, FCC/IC/EC- and carrier-approved wireless modem
	Compatible with all 4G LTE-M networks worldwide with 2G fallback (where available)
	Automatically detects installed SIM upon boot up to determine correct network
	Modem FCCID: R17ME910C1WW
Compatibility	*Qstart*™*XML*
	PRISM™

PRISM™

Proactive Insight for
Collection System Management

PRISM Transforms Your System Management

PRISM™ is a web application that puts critical data at your fingertips to support management, engineering, and operational decisions within your wastewater collection system. **PRISM** connects clients to an **ADS®** monitoring network, delivering near real-time operational intelligence on the status of your wastewater collection system. It is the fastest and easiest way to visualize the condition of your collection system. It offers dynamic analytical functions to fuel discoveries that will lead to enhanced management of your system.

Visualize sewer system performance through intuitive dashboards and graphical displays

Transform data into **actionable insight** with powerful analytics

Ensure timely **performance notifications** with configurable alarms for advance notice of developing problems

Provides an **easy and transformative** user experience for sewer data management

Collaborate for success by sharing data, reports, and related files among cross-functional groups

Display the full sewer network by linking **PRISM** to your **GIS Server** to have full control over symbology and visible layers

System Wide Performance at a Glance

Access your data and device status on our cloud-based Collection System Management platform, **PRISM**. The home page provides immediate system insight including a map view reflecting flow, level, and rainfall monitors with location and condition details, leaderboard tiles with system status, and quick access to the data vault as well as specialized reports. The intuitive interface allows you to quickly manage alarms, check collection and device status, generate reports, and link third party data through our self-service API to automate and enhance your specific workflow.

Flow   Level   Rain

ADS

www.adsenv.com/prism
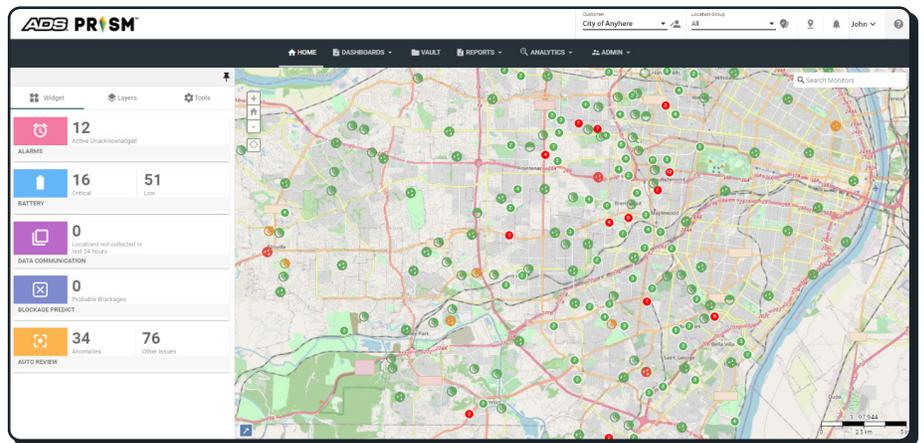
Easy, Intuitive, Actionable

PRISM's dashboard transforms your experience. Get in-depth system analysis that places operational intelligence at your fingertips.

Alarms

8
Active Unacknowledged

ALARMS

Self manage and review alarms to inform you of events, performance, and data anomalies at flow, level, or rainfall monitoring locations.

Battery Status

0 Critical | **2** Low

BATTERY

Easy battery status management ensures seamless operation of flow, level, and rainfall monitors.
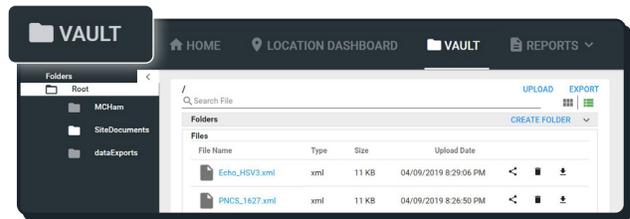
Data Communication

1
Locations not collected in last 24 hours

DATA COMMUNICATION
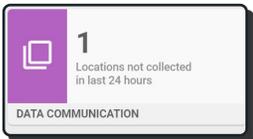
Track monitor communication status to identify any data collection problems that may arise.

REPORTS

SCATTERGRAPH

1 DAY   1 WEEK   1 MONTH

VIEW DETAIL
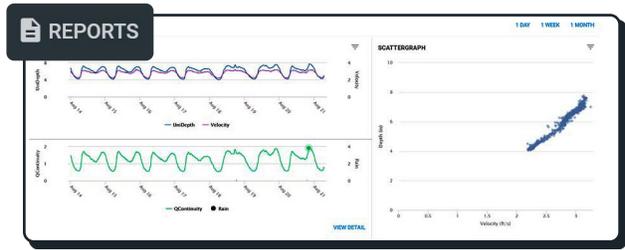
Visualizing and Reporting

Graphing and reporting capabilities include side-by-side Hydrograph and Scattergraph comparisons for rapid viewing of each site's status.
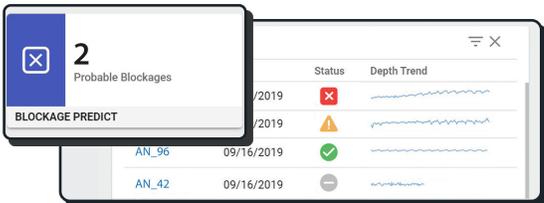
VAULT

HOME   LOCATION DASHBOARD   VAULT   REPORTS

Folders — Root

MCHam
SiteDocuments
dataExports

Search File   UPLOAD   EXPORT

Folders   CREATE FOLDER

Files

File Name	Type	Size	Upload Date
Echo_HSV3.xml	xml	11 KB	04/09/2019 8:29:06 PM
PNCS_1627.xml	xml	11 KB	04/09/2019 8:26:50 PM

Data Vault

Upload, store, organize, and delete any files pertinent to your project. Share a time-sensitive link of your files with **PRISM** users or non-users.

Advanced Features

ADS is introducing new advanced features so you can stay on top of your collection system with in-depth insights and specialized tools. Contact us for demos or to purchase.

2
Probable Blockages

BLOCKAGE PREDICT

	Status	Depth Trend
/2019	✗	
/2019	⚠	
AN_96	09/16/2019	✓
AN_42	09/16/2019	⊖

blockage PREDICT™

Prevent sewer overflows by coupling flow depth data with smart algorithms to sense developing sewer blockages. This *advanced machine learning* application recognizes flow anomalies and provides advance notifications so you can direct resources in a timely, cost-effective manner to proactively prevent sewer overflows before they become a problem. See www.adsenv.com/blockagePREDICT to learn more.

26 Anomalies | **0** Other Issues

AUTO REVIEW

New Auto Review™ & Advanced Data Editing

Perform quality control operations on your data within **PRISM.** Within the editing interface, eliminate suspicious data from final entity generation and correct errors at will with the ability to add commentary about site conditions. The ability to design custom pipe shapes, create calculation based entities, and edit data is at your fingertips.

SLiiCER®

New SLiiCER®

Together, **PRISM** and **SLiiCER** provide a powerful set of online engineering tools designed to extract rigorous Dry and Wet Weather Performance measurements from sewer flow and rain data with speed and precision. See www.adsenv.com/SLiiCER to learn more.

PRISM Links:
https://www.adsprism.com
https://www.adsprism.com/sliicer

Video Tutorials:
www.adsenv.com/video-library/

Talk to a Trained Representative:
T: 800.633.7246
E: adssales@idexcorp.com