# Supplemental Guidance – Proprietary Device Evaluation

## INTRODUCTION

The North Central Texas Council of Government's (NCTCOG) iSWM Subcommittee in coordination with the NCTCOG staff and consultant team developed the following memorandum to provide supplemental guidance for communities in the region in the evaluation of post-construction stormwater BMP proprietary devices. This document supplements Section 26 of the Site Development Controls Chapter in the *iSWM Technical Manual* and documents the assumptions and process for preparing this information.

Multiple programs have been established by federal, state, and local agencies for the testing and evaluation of stormwater products and practices including Washington, California, Georgia, North Carolina, and New Jersey. The Technology Assessment Protocol – Ecology (TAPE) Program in Washington and the New Jersey Corporation for Advanced Technology (NJCAT) are widely referenced programs. Of the two programs, the guidance documents provided for TAPE at the time of this writing were the most concise and streamlined. Multiple states and municipalities grant reciprocity for the TAPE program including New Hampshire, New York, Oregon, Rhode Island, Maine, Sacramento, CA, Denver, CO, St. Louis, MO, and Portland, OR. There were also multiple references to TARP, the Technology Acceptance Reciprocity Partnership (formed by the states of California, Illinois, Maryland, Massachusetts, New Jersey, New York, Pennsylvania, and Virginia), However, this program appears to have been dissolved. According to WEF 2014, the State of Texas at one time accepted TARP however, confirmation could not be found that this was the case at the time of this writing.

The following options are provided for consideration of acceptance of post-construction stormwater BMP proprietary devices:

## OPTION 1 - RECIPROCITY

Reciprocity is one method of proprietary device acceptance. The International Stormwater BMP Database has outlined a process for acceptance of studies that have undergone rigorous testing protocols with external verification, including the most current version of the following protocols:

1. Washington State Department of Ecology (2002). Guidance for Evaluating Emerging Stormwater Treatment Technologies, Technology Assessment Protocol – Ecology (TAPE), October 2002 (Revised June 2004), Publication Number 02-10-037. (http://www.ecy.wa.gov/biblio/0210037.html).

2. New Jersey Corporation for Advanced Technology (NJCAT) Technology Verification Program. (http://www.njcat.org/verification/protocol.cfm).

3. American Society of Civil Engineers Urban Water Resources Research Council (ASCE UWRRC) Task Committee Guidelines for Certification of Manufactured Stormwater BMPs.

4. U.S. Environmental Protection Agency Environmental Technology Verification (ETV) Program (http://www.epa.gov/etv/).

5. Other federal or state technology verification protocol comparable to TAPE, NJCAT or ETV.

6. Third-party peer review that has resulted in acceptance of a study for publication in a professional journal, provided that underlying data and study documentation meeting BMP Database reporting protocols are included with the study submission. (Note: magazine articles, conference proceedings and trade publications are not included)

**OPTION 2 - INDEPENDENT REVIEW AND APPROVAL**

Based on evaluation of the available programs, the proposed guidance here most closely follows TAPE with revisions to customize the guidance for the *iSWM Technical Manual*. The steps and procedures follow the guidance provided by TAPE with a few exceptions. Most notably the guidance standards proposed here:

1. Allow for immediate acceptance on a conditional status if the proprietary device has been approved for use by a federal or state technology verification protocol comparable to TAPE, NJCAT, or the EPA Environmental Technology Verification (ETV). Given the number of rigorous testing programs already established, approval by an existing technology verification program would suffice to indicate that the device functions as the vendor reports. It is recommended to have the vendor applicant submit all of the data that was submitted for acceptance in the verification program and that the data be reviewed by the local government and an established panel of experts.
2. Allow for a reduced number of field samples (i.e. 8 rather than 15) to be collected in order to be granted general status if the proprietary device has been is approved for use by a federal or state technology verification protocol comparable to TAPE, NJCAT, or ETV. Approval by an existing technology verification program would suffice to indicate that the device functions as the vendor reports and a minimum number of samples would be required to verify that the proprietary devices are appropriate, and function as reported, in North Central Texas. It is recommended that the vendor submit all of the data that was submitted for acceptance in the verification program and that the data be reviewed by the local government and/or an established panel of experts.

The Proprietary Device Performance Goals presented in Table 2 were adapted from the TAPE performance goals and updated based on data in the International BMP Database (Geosyntec Consultants and Wright Water Engineering 2012, Wright Water Engineering and Geosyntec Consultants 2016). Note that while it is understood that the *iSWM Technical Manual* establishes total suspended solids as the representative stormwater pollutant for measuring treatment effectiveness, additional performance goals are included here. Local communities may have other priority pollutants or water quality issues which should be considered during the device approval process.

## REFERENCES

Geosyntec Consultants and Wright Water Engineering. 2012. International Storm Water BMP Database: Manufactured Devices Performance Summary. International Storm Water BMP Database. http://www.bmpdatabase.org/.

Washington State Department of Ecology, 2018. Technology Assessment Protocol – Ecology Process Overview. September 2018. Revision of Publication Number 11-10-010. Publication Number 18-10-039. Washington State Department of Ecology, Water Quality Program, Olympia, WA. 21 pp. https://fortress.wa.gov/ecy/publications/documents/1110010.pdf (accessed January 23, 2019).

Water Environment Federation. 2014. Investigation into the Feasibility of a National Testing and Evaluation Program for Stormwater Products and Practices. www.wef.org/STEPP.

Wright Water Engineering and Geosyntec Consultants. 2017. International Storm Water BMP Database: 2016 Summary Statistics. International Storm Water BMP Database. http://www.bmpdatabase.org/.

**ATTACHMENT**

# Supplemental Guidance – Proprietary Device Evaluation

## GENERAL DESCRIPTION

There are many types of commercially-available proprietary stormwater structural controls available for both water quality treatment and quantity control. These systems include:

- Hydrodynamic systems such as gravity and vortex separators
- Filtration systems
- Catch basin media inserts
- Chemical treatment systems
- Package treatment plants
- Prefabricated detention structures

Many proprietary systems are useful on small sites and space-limited areas where there is not enough land or room for other structural control alternatives. Proprietary systems can often be used in pretreatment applications in a treatment train. However, proprietary systems are often more costly than other alternatives and may have high maintenance requirements. Perhaps the largest difficulty in using a proprietary system is the lack of adequate independent performance data, particularly for use in North Central Texas conditions. Below are general guidelines that should be followed before considering the use of a proprietary commercial system.

## GUIDELINES FOR USING PROPRIETARY SYSTEMS

In order for use as a limited application control, it is suggested that a proprietary system have a demonstrated capability of meeting the stormwater management goals for which it is being intended. Demonstrating the capability requires a three-step process including 1) completion of an application registering the proprietary device which provides laboratory data or data verified by an approved regulatory program, 2) field testing in North Texas or approved region, 3) verification of the data by a third party and final approval for regional use. This approval process is intended to provide:

- Independent third-party scientific verification of the ability of the proprietary system to meet water quality treatment objectives and/or to provide water quantity control (streambank or flood control);
- Proven record of longevity in the field;
- Proven ability to function in North Central Texas conditions (e.g., climate, rainfall patterns, soil types, etc.); and,
- Documented procedures for required maintenance including collection and removal of pollutants or debris.

For a proprietary system to meet the field testing requirements in step 2 for water quality goals, the following monitoring criteria is recommended for supporting studies:

- A minimum of fifteen storm events should be sampled unless a device has been approved for use by a federal or state technology verification protocol comparable to TAPE, NJCAT or ETV. An approved device should sample a minimum of eight storm events.
- The study should be independent or independently verified (i.e., may not be conducted by the vendor or designer without third-party verification).
- The study should be conducted in the field, as opposed to laboratory testing, for general approval status.
- Field monitoring should be conducted using standard protocols which require proportional sampling both upstream and downstream of the device.
- Concentrations reported in the study should be flow-weighted.
- The propriety system or device should have been in place for at least one year at the time of monitoring.

Although local data is preferred, data from other regions can be accepted as long as the design accounts for the local conditions. A poor performance record or high failure rate is valid justification for not allowing the use of a proprietary system or device. The approval process follows the steps and criteria outlined in Figure 1.

**Figure 1. Proprietary Device Approval Process**

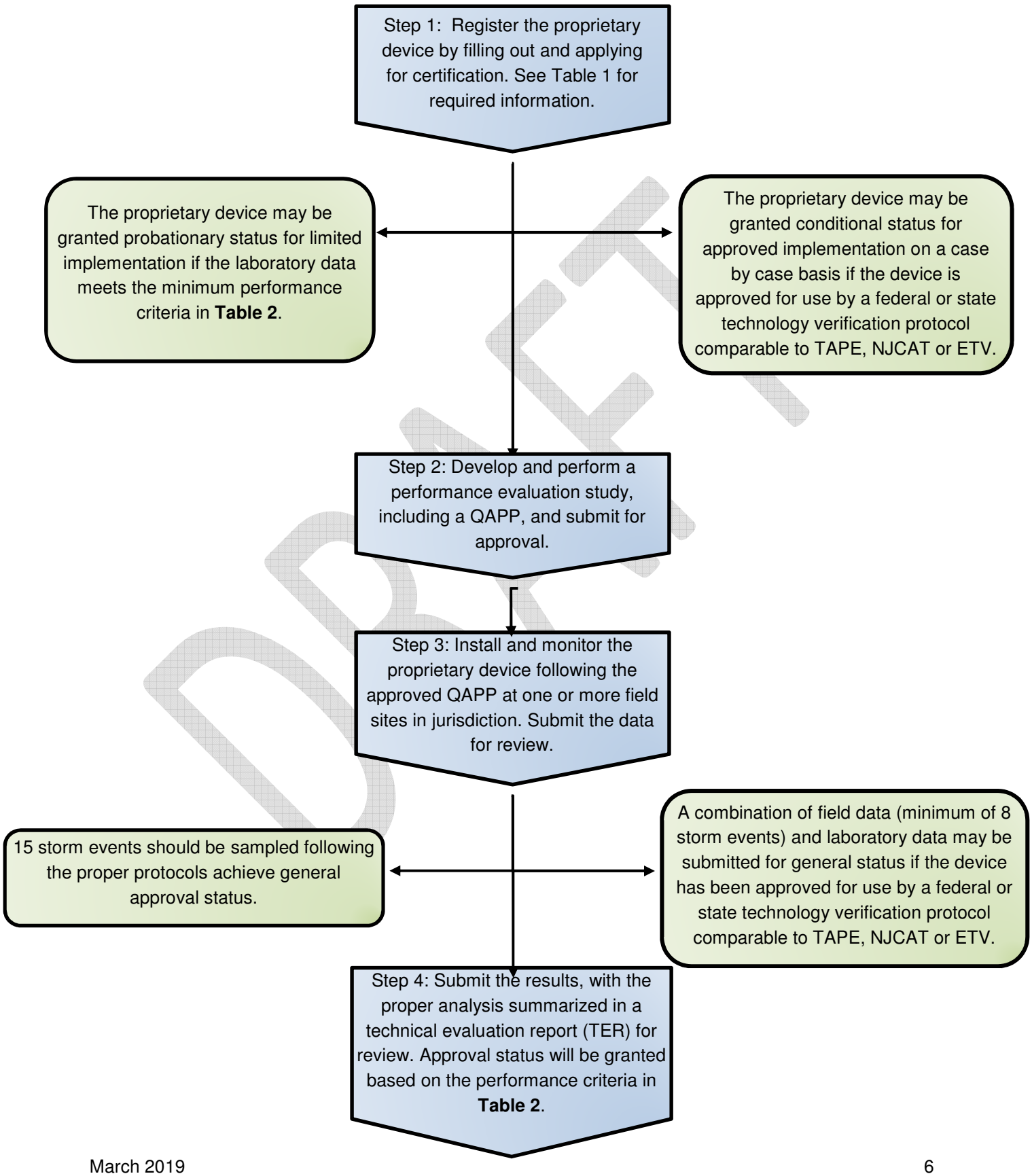

**Table 1. Information to Include in the City Application**

| |
|---|
| Description of physical, chemical, and/or biological treatment functions. |
| Design drawings/photographs. |
| Description of construction materials. |
| Equipment dimensions. |
| Design flow rate (gallons per minute [gpm], cubic feet per second [cfs], inches per hour [in/hr]). |
| Explanation of site installation requirements (e.g., necessary soil characteristics, hydraulic grade requirements, depth to groundwater limitations, utility requirements). |
| Description of any pretreatment requirements or recommendations. |
| Description of any components of the treatment system that may contain copper, zinc, or phosphorus or any other constituent of concern that might contribute to increased pollutant concentrations in the effluent. |
| Description of any components (i.e., concrete) that may result in pH fluctuations in the effluent. |
| Detailed description of the sizing methodology. |
| Expected treatment capabilities. |
| Maintenance procedures. |
| Description of bypass process. |
| Comparison of size of laboratory unit to typical field units (if laboratory testing data is submitted). |
| Raw water quality data. |
| Summary of water quality data and removal calculations. |
| Statistical analysis. |
| Flow rate(s) used for laboratory testing. |
| Influent and effluent flow data. |
| Storm event information. |
| Any other information or data that will help determine if your treatment technology can meet or does meet established performance goals. |

**Table 2. Proprietary Device Performance Goals**

| Performance Goal | Influent Range | Effluent Goal |
|---|---|---|
| Basic Treatment | 10-75 mg/L TSS | < 20 mg/L TSS |
| | 100-200 mg/L TSS | ≥ 80% TSS removal |
| **Optional Additional Device Performance Goals** | | |
| Dissolved Metals Treatment | Dissolved copper<br>0.002 - 0.015 mg/L | Must meet basic treatment goal and exhibit ≥ 30% dissolved copper removal |
| | Dissolved zinc<br>0.001 - 0.03 mg/L | Must meet basic treatment goal and exhibit ≥ 60% dissolved zinc removal |
| | Dissolved Lead<br>0.0009 – 0.005 mg/L | Must meet basic treatment goal and exhibit ≥ 65% dissolved zinc removal |
| Phosphorus Treatment | Total phosphorus (TP)<br>0.05 to 0.2 mg/L | Must meet basic treatment goal and exhibit ≥ 50% TP removal |
| Nitrogen Treatment | Total Nitrogen (TN)<br>0.8 to 2.0 mg/L | Must meet basic treatment goal and exhibit ≥ 30% TN removal |
| Oil Treatment | Total petroleum hydrocarbon (TPH) > 10 mg/L | 1) Daily average effluent TPH concentration < 10 mg/L<br>2) Maximum effluent TPH concentration of 15 mg/L for a discrete (grab) sample |
| Pretreatment * | 50-100 mg/L TSS | < 50 mg/L TSS |
| | 100-200 mg/L TSS | ≥ 50% TSS removal |

mg/L - milligrams per liter
TP - total phosphorus
TPH - total petroleum hydrocarbons
TSS - total suspended solids

* Pretreatment technologies generally apply to (1) project sites using infiltration treatment and (2) treatment systems where pretreatment is needed to ensure and extend performance of the downstream basic or dissolved metals treatment facilities.

**Table 3. Approval Status**

| Use Level Designation | Minimum Data Required for Certification[a] | Time Limit (months)[b] | Maximum Number of Installations in Jurisdiction | Field Testing Required Under Designation to achieve GULD |
|---|---|---|---|---|
| Probationary (PULD) | Laboratory | 30 | 5 | A minimum of one site located in jurisdiction |
| Conditional (CULD) | Field data required; laboratory data may supplement but not substitute for required field data. May be granted if approved for use by a federal or state technology verification protocol comparable to TAPE, NJCAT or ETV. | 30 | 10 | A minimum of one site located in jurisdiction |
| General (GULD) | Field data following required protocols; laboratory data may supplement but not substitute for required field data. Field data requirements may be reduced if approved for use by a federal or state technology verification protocol comparable to TAPE, NJCAT or ETV. | Unlimited | Unlimited[c] | None |

a. Proponent must supply all available performance data with the initial application. PULD and CULD approvals will depend on the relevance, amount, and quality of data. Submittal of data does not ensure approval.
b. From the time the original use level designation is received. Proponents with a PULD or CULD are typically allowed a maximum of 30 months to prepare a QAPP, receive QAPP approval, conduct stormwater monitoring according to the QAPP, and prepare a TER requesting CULD or GULD certification for their stormwater treatment technology. Proponents requiring extensions on the 30-month use level designation, or the submittal of a QAPP or TER, must submit a request at least 2 weeks before the due date. Extensions will be granted only if the proponent shows that progress is being made toward completing required components.
c. Subject to conditions and criteria in the *iSWM Technical Manual* (i.e., maximum flow rates, limitations on drainage basin size, locations for use, and others as appropriate). Local jurisdictions may impose additional conditions.