

## **Opinion on the Technical Memorandum by Hazen & Sawyer April 20, 2018**

With reference to the Hazen & Sawyer Technical Memorandum dated April 20<sup>th</sup>, 2018 we state the following. In general the report does not fully reflect the capabilities of the CableRunner system. CableRunner has installed fibre networks in sewers worldwide during the last 25 years.

As certain statements (point 3 Suitability Review) do not correspond to the technical possibilities offered by CableRunner International we hereby want to comment the main points:

### **1. Size of the Sewer System (see 3.1. H&S report)**

The report covers Miami Beach sewer lines and concludes that because 75% are not robot accessible (see figure 3-1) there is no possibility to install fibre on a large scale. This is not correct.

See the CableRunner Installation methods in general (also depending on material, conditions,...) below.

- till 30 cm (11.8") using CableRunner inliner technology
- from **25 cm (9,8")** to 80 cm (31.4") non accessible – **Robot installation**
- from 80 cm (31.4") up accessible – installation by teams

This means CableRunner can install fiber in **98,8%** of the Wastewater Collection System Gravity Sewer Distribution shown in **table 3.1**. Also many pipes will have a pipe size of 10", which means that the percentage of robot installation will increase significantly. **Figure 3-1** must be updated in terms of accessibility for robot installation.

### **2. Material of Sewer System (see 3.2. H&S report)**

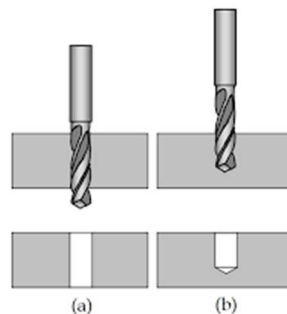
The report mentions on **page-12** *"Drilling bolts partially or fully into a terracotta sewer pipe for mounting of cable trays could compromise the structural integrity of the pipe and likely lead to leakage"*

There are no obstacles in installing in terra cotta pipes. In fact, most of the older pipes in cities worldwide and especially in Europe are made of terra cotta and ceramic/terra cotta. Terra cotta pipes in general are very robust and well suited for the CableRunner

technology. The Austrian company Wienerberger is the lead supplier of these pipes worldwide (<https://www.wienerberger.com/the-company/company-sites>).

CableRunner has more than 25 years of experience in ceramic/terra cotta pipes installations. CableRunner Austria has installed up to 200 km of cable trays in terra cotta pipes, eg in Vienna (AUT), Kerpen (GER), Cologne (GER), Hangzu (CHINA), Madrid (Spain), and Valladolid (Spain).

CableRunner does not drill a hole through a terra cotta pipe but drills a blind hole (see picture below b), that means a small hole up to 8 mm (0,3"). This is enough to fix the cable tray.



(a) drill through (b) blind hole

Before CableRunner starts an installation process, every section will be monitored by the robot, so the exact physical condition is known. This video material will be provided to the Water and Sewer department for information. Same standard procedure with any other pipe material.

### 3. Age of Pipes (see 3.3.1 H&S report)

The report mentions on **page-19** *"Based on the estimated age of the City's sewer infrastructure, a large amount of the existing sewer pipes will likely require repair in the next 10 - 20 years."*

It is unlikely that every section of the sewer system will be repaired within the next 10 - 20 years. For a more detailed evaluation CableRunner needs more specific information. Usually there is a long term maintenance and replacement cycle plan by the sewer department. Installations will be done according to that plan. This is a CableRunner standard procedure.

#### **4. Repair, Lining, Maintenance (see 3.3.2 H&S report)**

The reports mentions on **page-19** *"Maintenance procedures such as emergency repairs, lining of the pipe, or cleaning operations become more complex with the presence of an in-sewer fiber optic system."*

The CableRunner system has no effect on the cleaning operation, especially high pressure cleaning. Certificates can be provided. Lining of a pipe is predictable and considered as a standard procedure. The CableRunner system was designed to cause no negative effects on standard cleaning and maintenance procedures. Lining also depends on the age of the pipe (see above).

Emergency repairs can be done without considering the CableRunner system. CableRunner installations are planned and built in network rings. Therefore, the CableRunner installations are redundant which means there is no need to take care of the CableRunner system in case of an emergency. In case of an emergency a fiber bypass can be laid easily from manhold to manhold on the streetlevel.

#### **5. Infiltration/Inflow (see 3.4 H&S report)**

Since the pipes are not drilled through, there is no infiltration/inflow caused by the installation of the CableRunner system.

Also there should not be a problem with water in pipes and equipment as the blowing tubes are sealed and watertight. In fact, salt water is less corrosive than human waste.

#### **6. Security (see 3.5. H&S report)**

The report mentions on **page-18**: *"The integration of sewer and fiber optic infrastructure make the systems dually vulnerable in the case of an attack."* CableRunner has no experience how an attack of a sewer system looks like but having fiber cables underground, protected by a robust pipe, makes the system much less vulnerable than aerial installations. As CableRunner has also worked for governmental bodies like the Army Corps of Engineers we do not see any issues regarding security.