

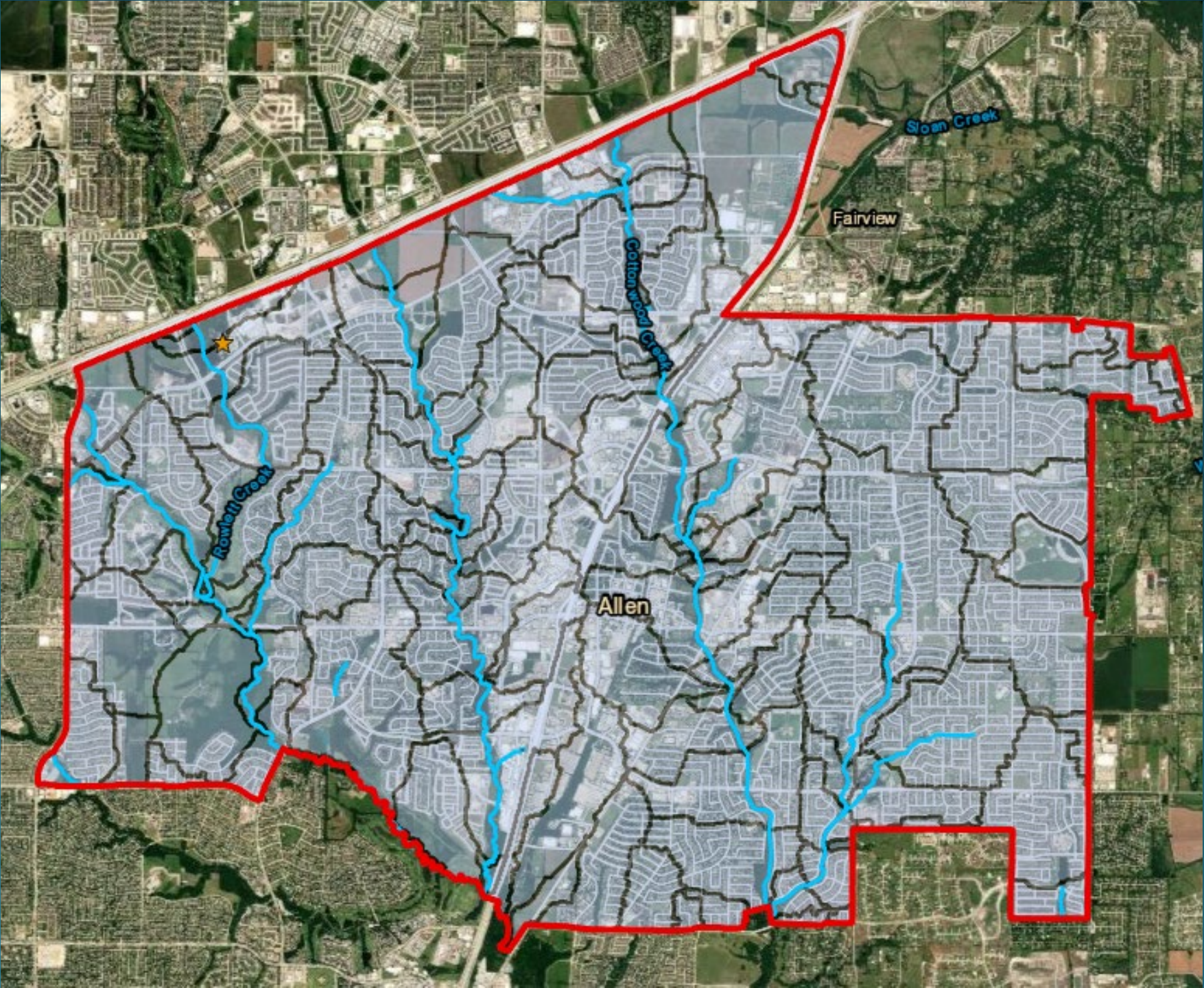
City of Allen & Huitt-Zollars, September 29<sup>th</sup>, 2023

# BLUE-GREEN-GREY INLET FLOATABLES FILTER PROJECT

NCTCOG Public Works Roundup



# City of Allen





# City of Allen

- As of the 2020 census, the population of City of Allen is now greater than 100,000 people
- The Texas Commission on Environmental Quality (TCEQ) requires that cities with a population of 100,000 or more meet Phase II, Level 4 stormwater permitting requirements by 2024
- Allen has about 12,000 inlets
- Without any trash capture system in place, all the stormwater runoff pollution is carried to Allen waterways and aquatic ecosystems



# NCTCOG Blue-Green-Grey Grant

- The Blue-Green-Grey Grant
  - Established by NCTCOG in 2017
  - Open to cities, counties, nonprofits, private firms, educational entities and individuals
  - Funding program supports innovative pilot projects that combine water (Blue), environment (Green), and transportation (Grey) infrastructure
  - Goal is to support the development of new and widely applicable ideas for cities and organizations regionally
- NCTCOG has awarded Huitt-Zollars & the City of Allen the Blue-Green-Grey Grant to develop an innovative solution to meet one of the TCEQ Phase II Level 4 stormwater permitting requirements



North Central Texas  
Council of Governments



TEXAS COMMISSION  
ON ENVIRONMENTAL QUALITY



# NCTCOG Blue-Green-Grey Grant



North Central Texas  
Council of Governments



TEXAS COMMISSION  
ON ENVIRONMENTAL QUALITY

Project grant money

Regulatory Agency

HUITT-ZOLLARS

Partnership



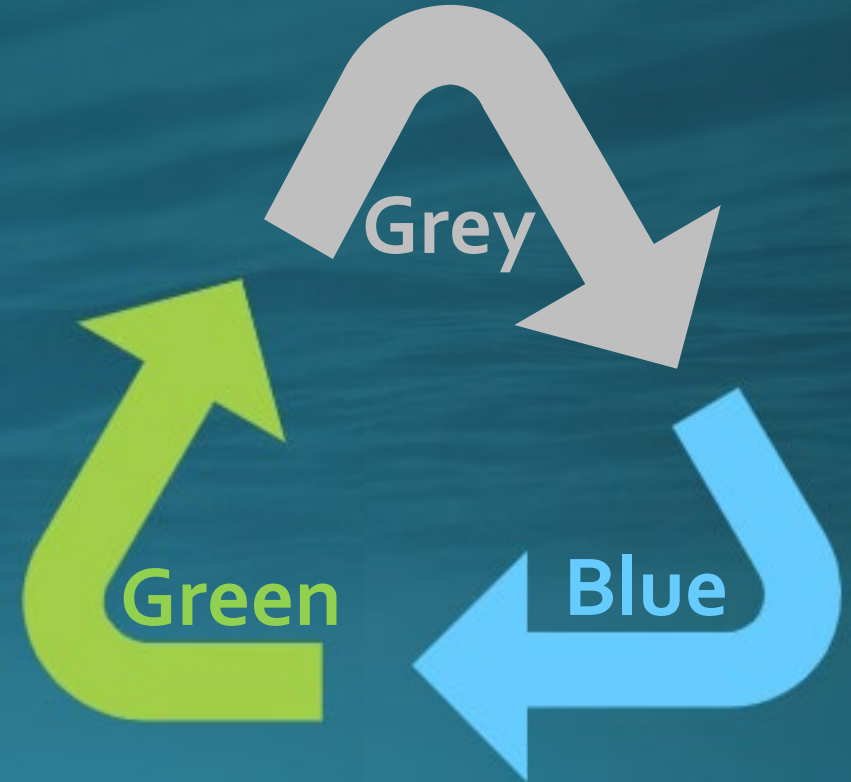
Brainstorming  
Workshops





# Project Scope – Inlet Floatables Filters

- Data Analysis & Literature Review
  - Assess current solutions
  - Assess possible solutions
  - Potential Locations for installment
  - Evaluate alternative Best Management Practices
- Community Involvement
  - Workshops at Allen ISD Steam Center
- Development of Details & Specifications
  - Inlet information
  - Material recommendations
  - Hydraulic capacity
- Summary Report & Future Opportunities
  - Benefit and use of NCTCOG Blue-Green-Grey Award
  - Project summary
  - Opportunity for pilot testing
  - Application to future projects
  - Lessons learned





# City and Project Goals

- The goal of this project is to develop innovative solution(s) to assist the City of Allen in meeting TCEQ stormwater permitting requirements. The inlet filter must meet the following criteria:
  - Non-proprietary
  - Able to be installed on new inlets and retrofit to existing inlet structures used on City, State, and Federal projects
  - Easy to maintain/replace
  - Effective removal of floatables and first flush debris
  - No significant impact to hydraulic efficiency
  - Permanent solution that can be used post-construction
  - Option to include additional sediment capture during construction



**North Central Texas  
Council of Governments**





# Problem Statement

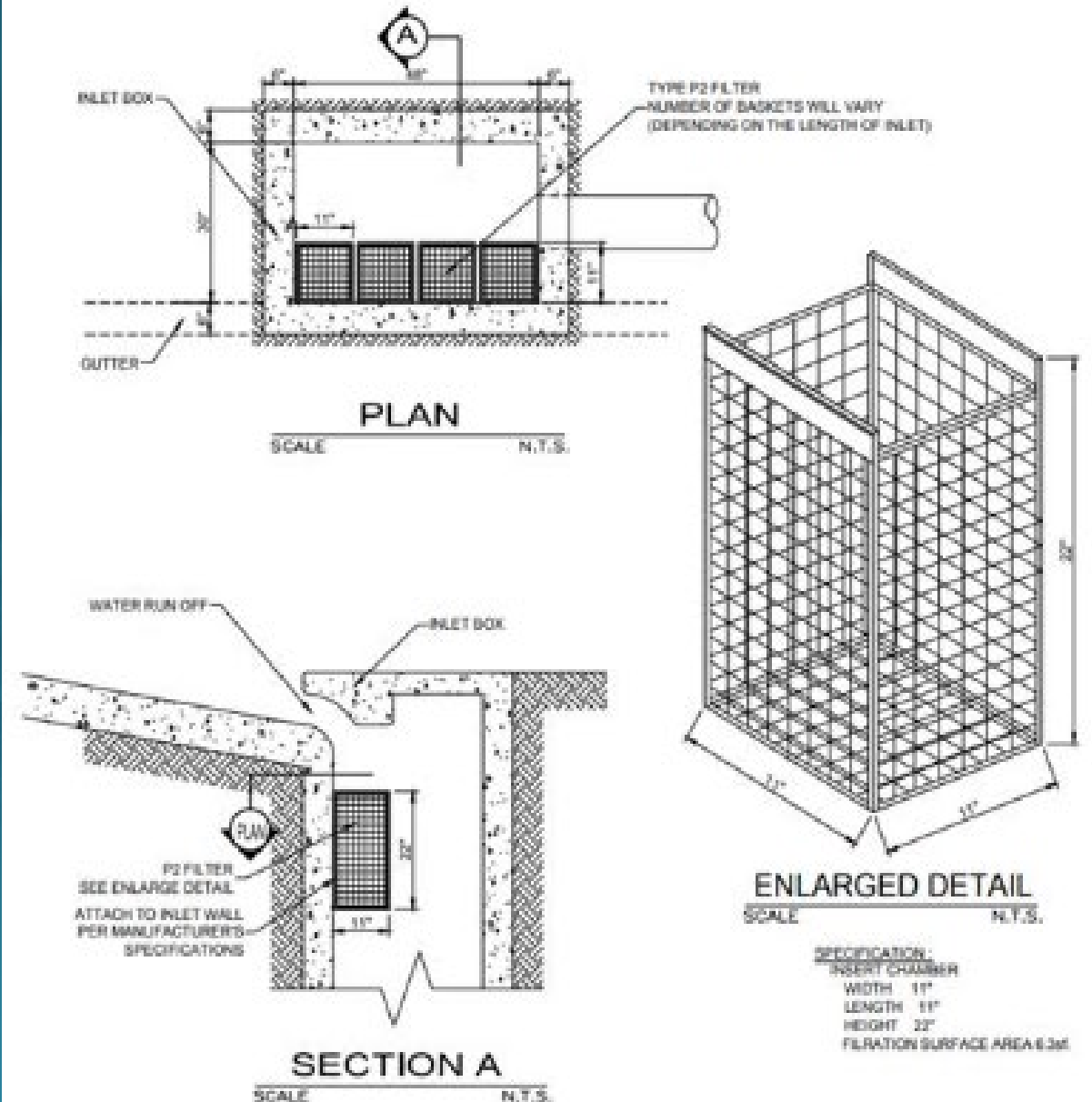
- Those TCEQ requirements include the implementation of a program to reduce discharge of floatables and the collection of floatables in a least two locations within the city limits
- Huitt-Zollars and the City of Allen are developing an Inlet Floatables Filter to capture stormwater runoff pollution and prevent it from entering the stormwater system
- The solution needs to capture fine sediments during construction and continue to capture floatables post-construction
- Floatables Include:
  - Aluminum cans
  - Drink Cups
  - Food packaging
  - Plastic Bags
  - Styrofoam
  - Wrappers





# Current System

- City of Allen currently uses Sneider's inlet filter system at construction sites to collect sediment (dirt, sand, dust, etc.) and floatables while construction activities are occurring
- These filter systems are not currently used post construction
- The filters are costly to install and can be difficult to maintain
- Maintenance is contracted to occur every 4-6 weeks
- The floatables filter consists of a metal basket and the fines filter is a geotextile (felt-like cloth)



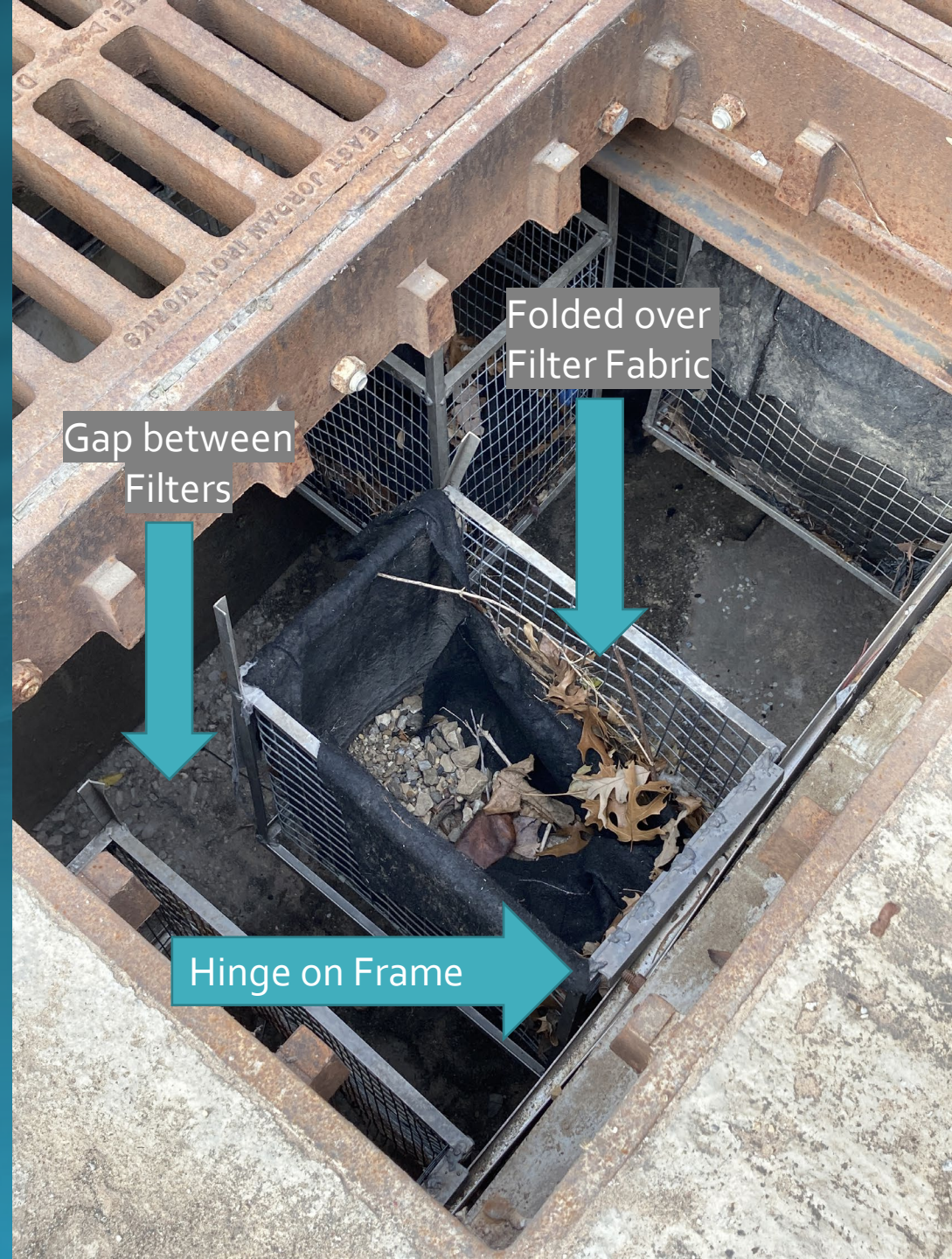
P-2 INLET FILTERS AFTER PAVEMENT CONSTRUCTION

"City of Allen Standard Construction Details, Erosion Control (SD-EC04) - Product by Sneider"



# Current System Challenges

- This is a proprietary design – they are more expensive to manufacture and dependent on manufacturer to maintain
- Filter baskets are attached to a wall mounted frame via a hinge, when the basket gets very full (heavy) these hinges can break and the basket falls off
- Maintenance workers have to get into the inlets and lift these baskets out manually to clean them
- Sediment filter fabric is not fastened to the inlet, it is folded over the top edges so it can fall off or fold over
- The filters are not fastened to each other, so floatables can bypass the filters through the gaps





# Current Inlets

- The City of Allen uses various types of inlets, including:
  - Combination Inlets
  - Grate Inlets
  - WYE Inlets
  - Curb Inlets (Most Common – pictured below) – makes up 60% of Allen's inlets



Inside view



P2 Filter

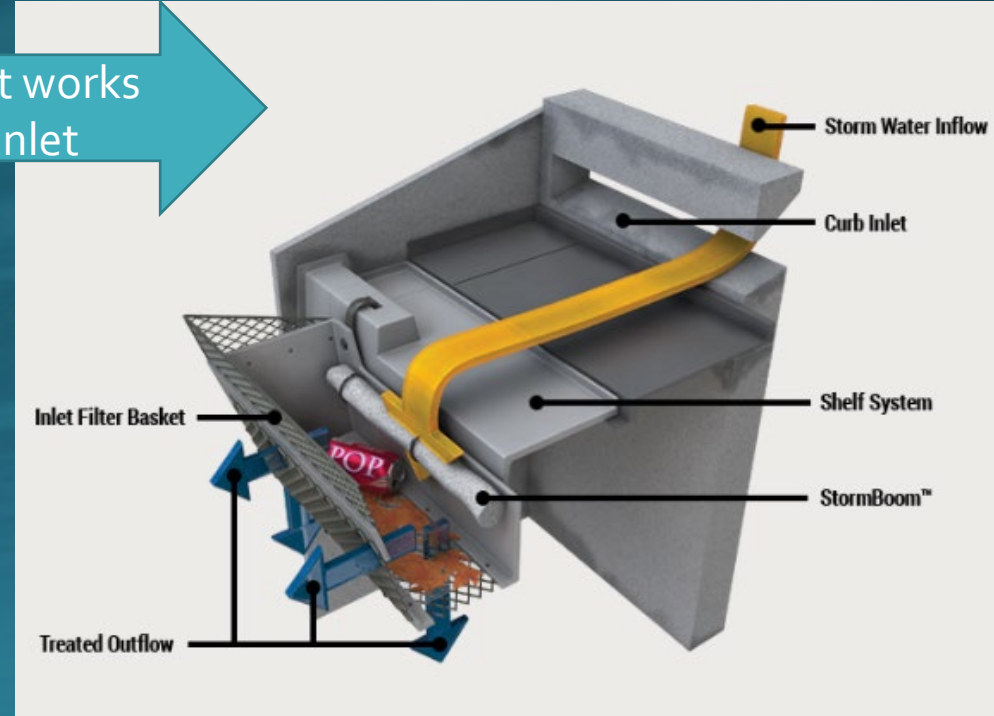


# Case Studies

## Oldcastle Infrastructure Curb Inlet Basket



How it works  
in Inlet



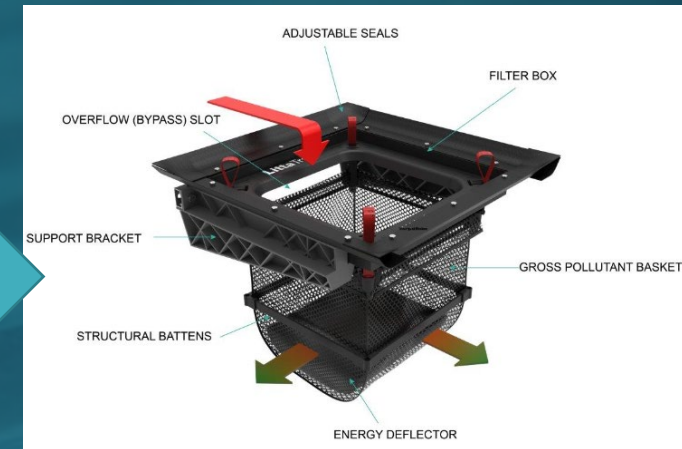
Made of marine-grade fiberglass and stainless steel for durability and longevity



# Case Studies



How it works  
in Inlet



1. Lift



2. Tip



3. Reuse

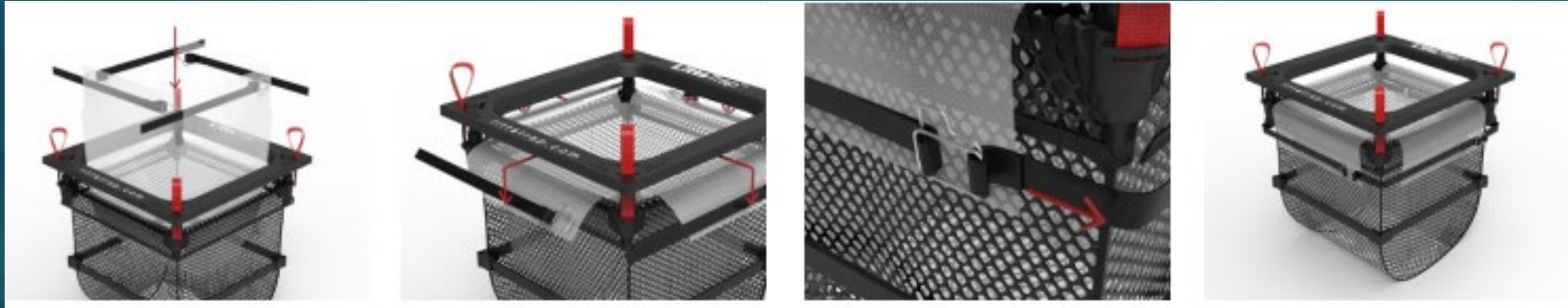
How it's  
cleaned



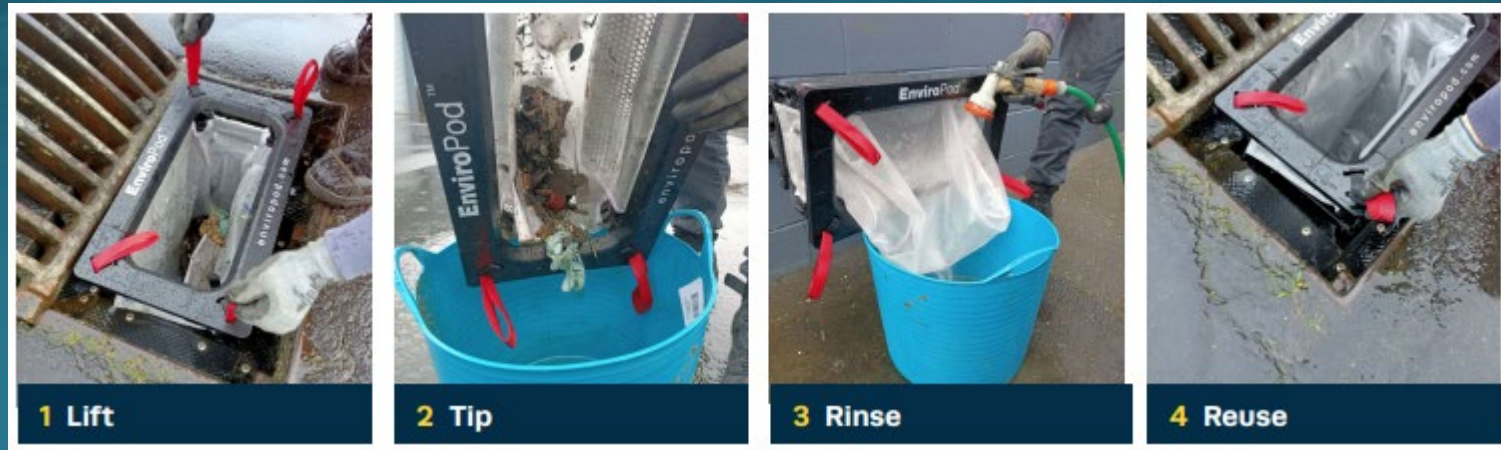
# Case Studies

## LittaTrap™

Sediment filter is made of nylon mesh

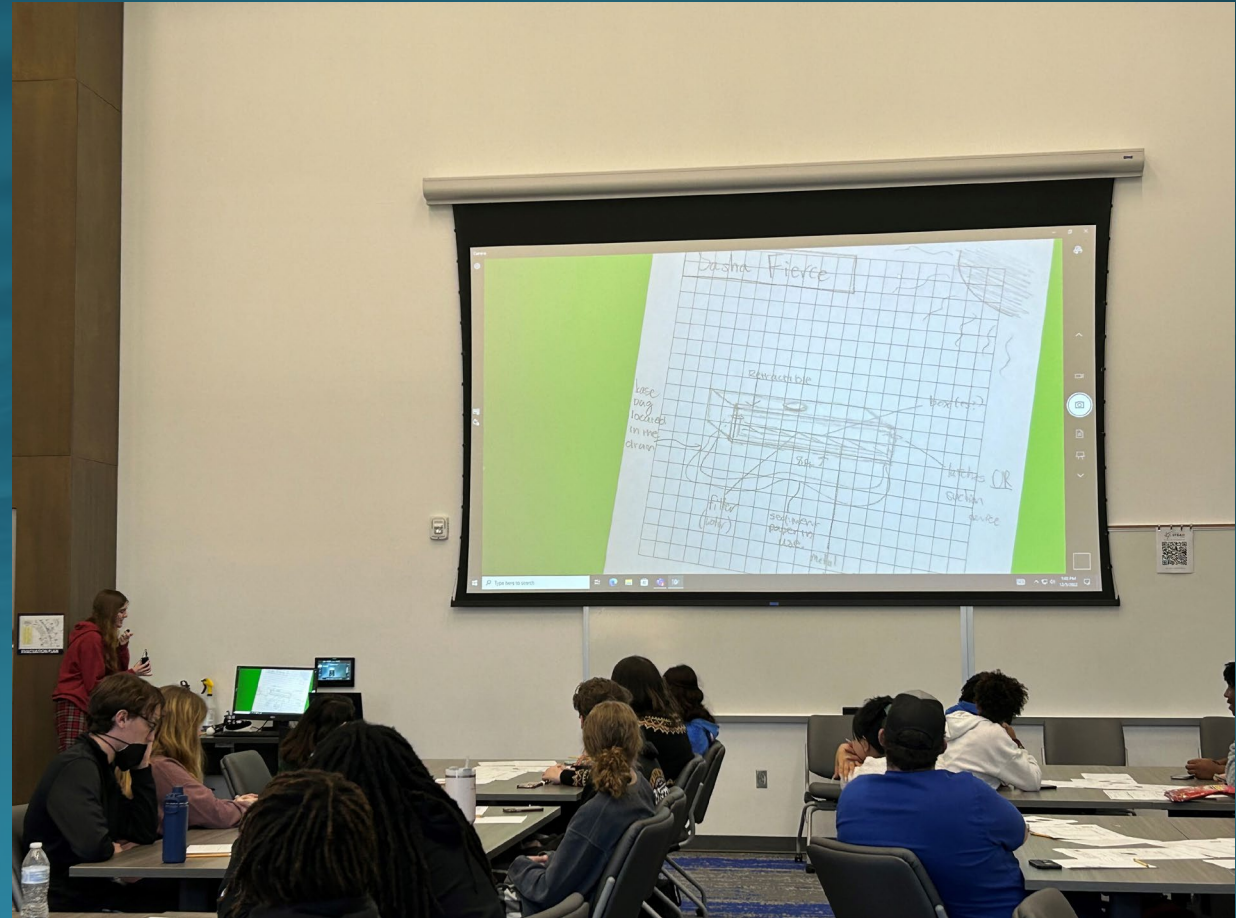


How it's cleaned





# Allen ISD Steam Center Workshop #1



# City of Allen Curb Inlet Details



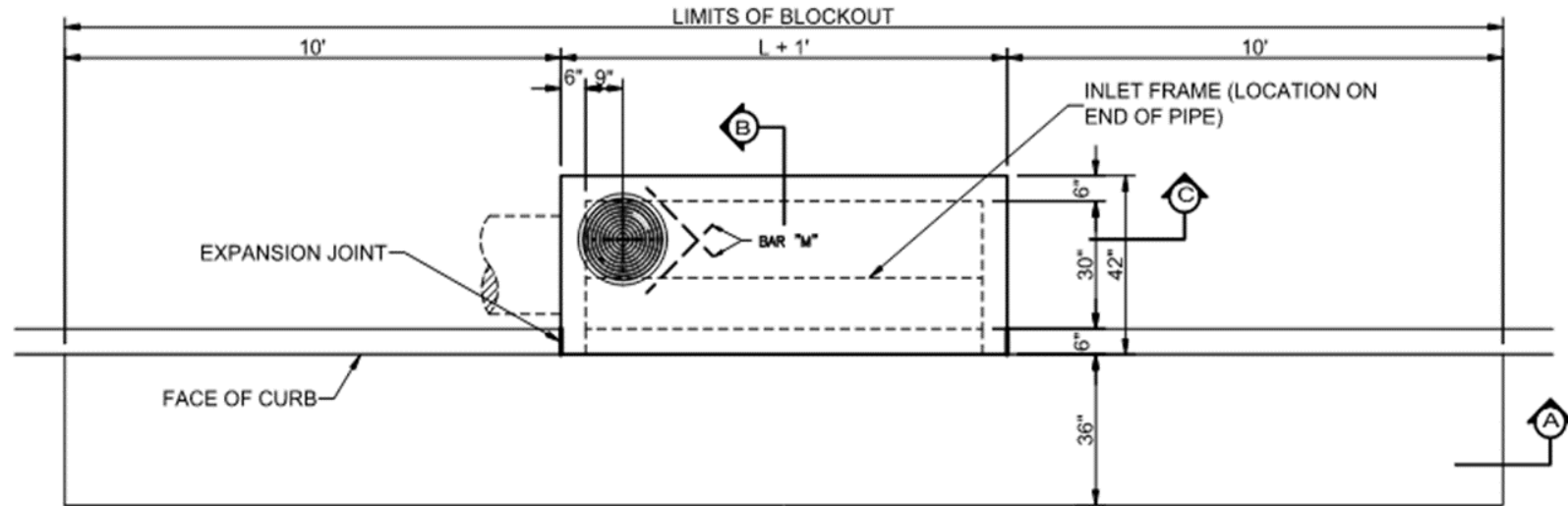
STANDARD CURB INLET  
4, 6, 8 AND 10 FEET INLETS

STANDARD CONSTRUCTION DETAILS  
STORM DRAINAGE

DATE:  
JULY 1991

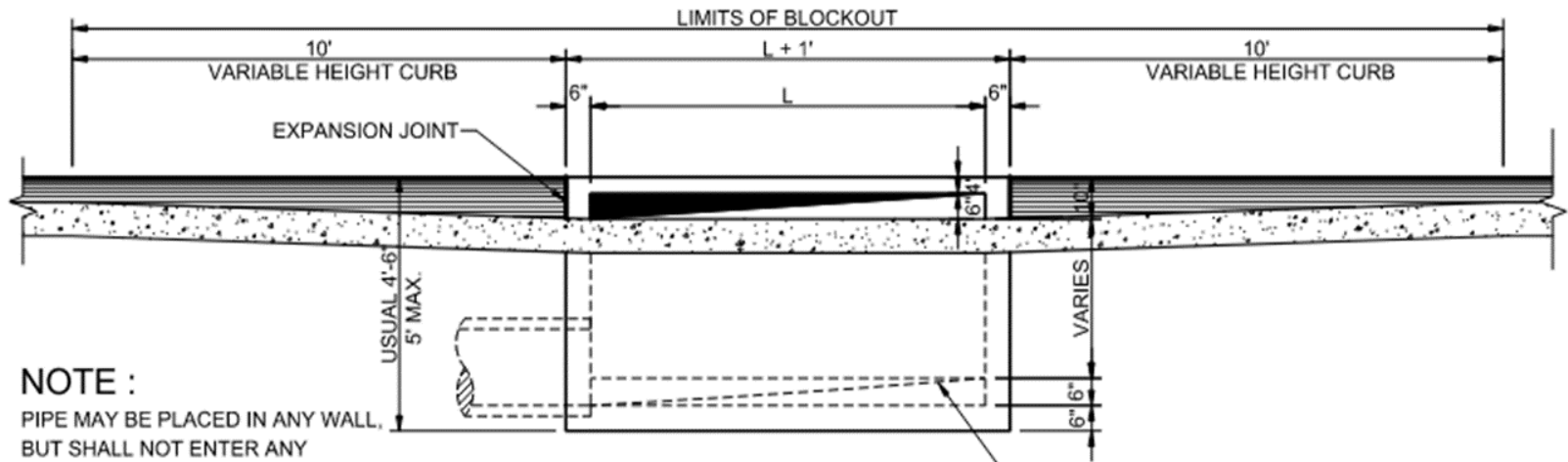
REV DATE:  
MAY 2017

SHEET:  
SD-D08



PLAN-STANDARD INLET

SCALE N.T.S.



SECTION A

SCALE N.T.S.

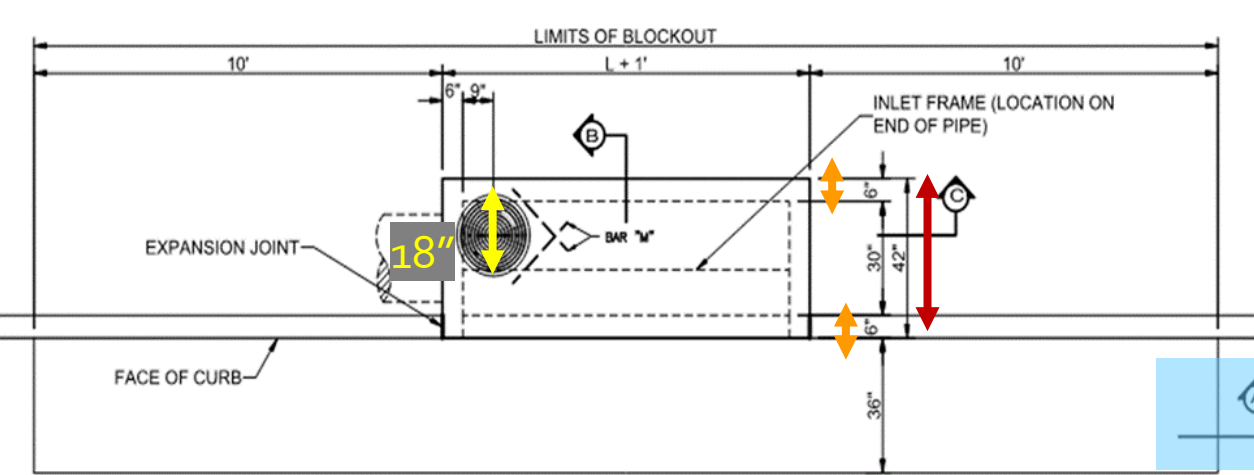
WARP TO SUIT CONDITIONS  
1/2" MORTAR FINISH, TROWELLED  
TO SMOOTH HARD SURFACE.

**NOTE :**

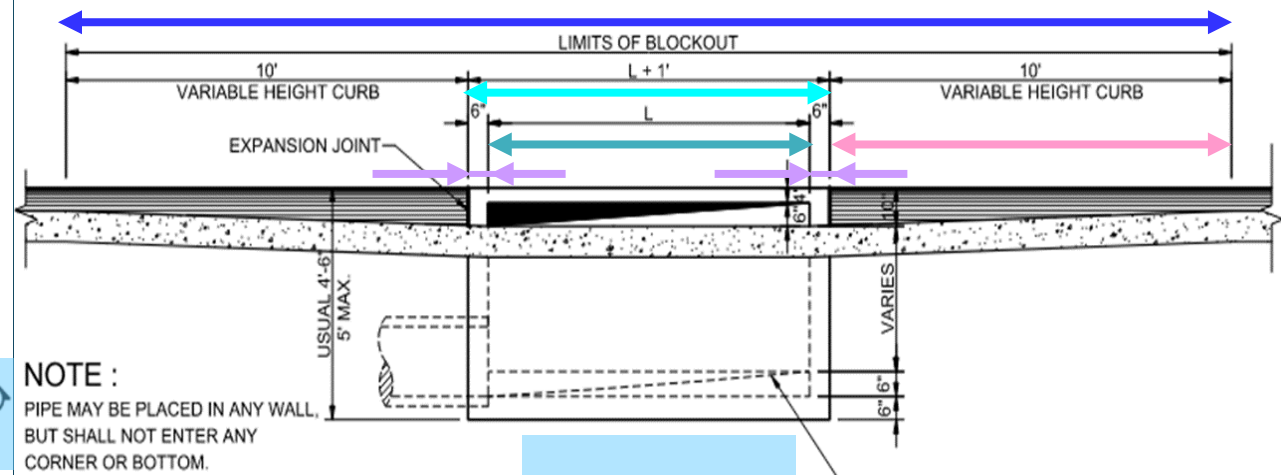
PIPE MAY BE PLACED IN ANY WALL,  
BUT SHALL NOT ENTER ANY  
CORNER OR BOTTOM.

REINFORCEMENT DETERMINED BY  
PAVING STANDARDS BASED UPON  
ROADWAY CLASSIFICATION.





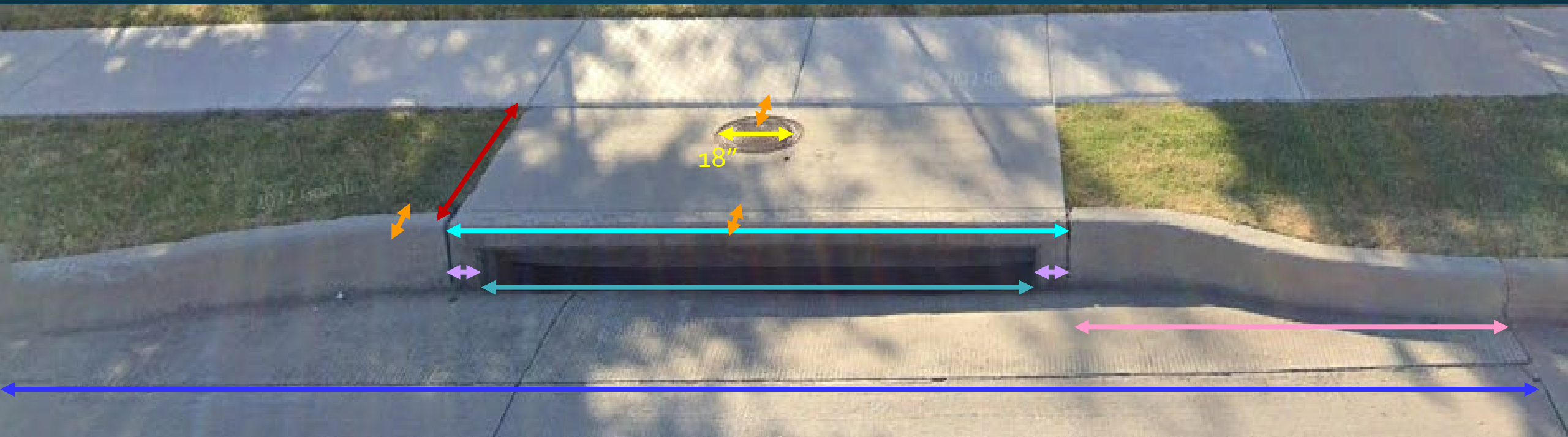
**PLAN-STANDARD INLET**  
SCALE N.T.S.

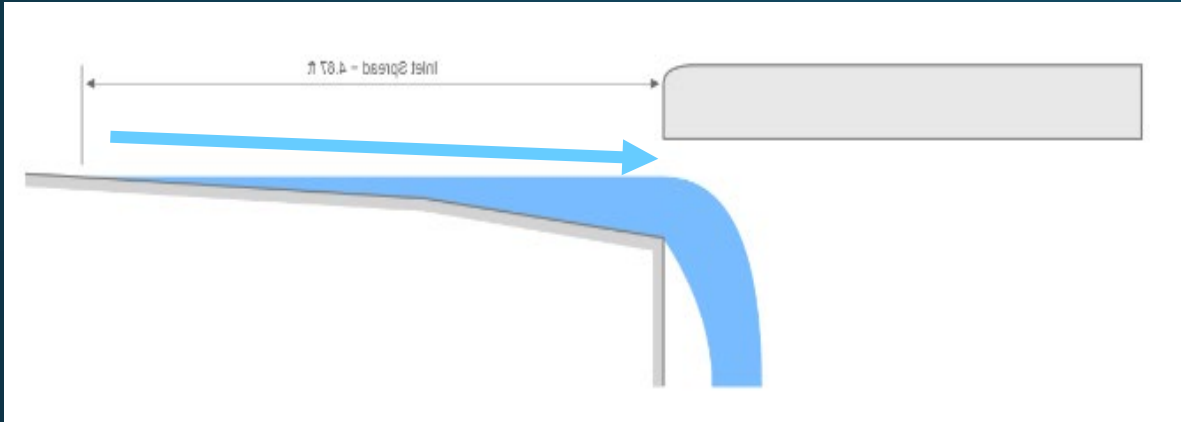


**SECTION A**  
SCALE N.T.S.

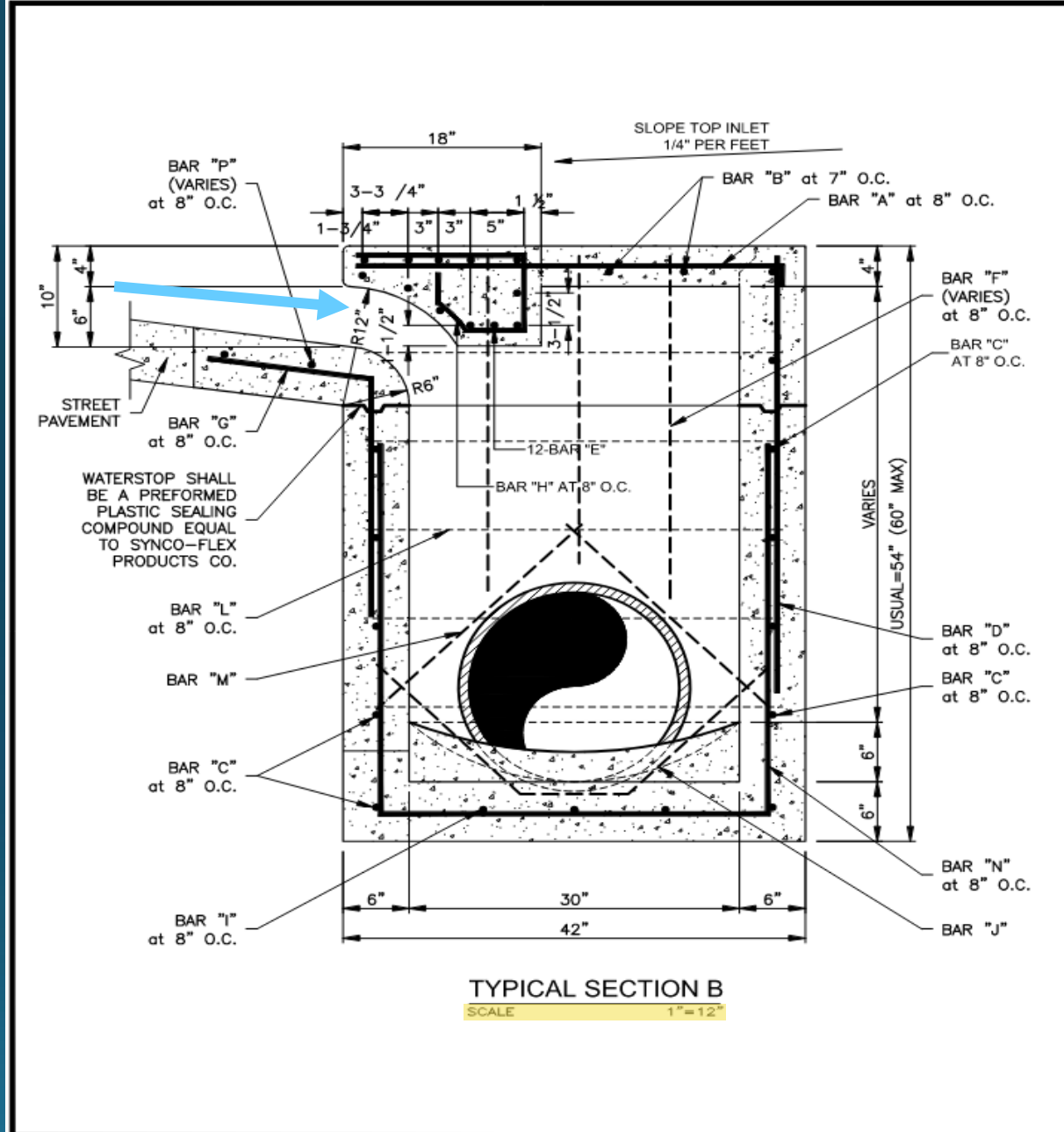
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WARP TO SUIT CONDITIONS  
1/2" MORTAR FINISH, TROWELLED  
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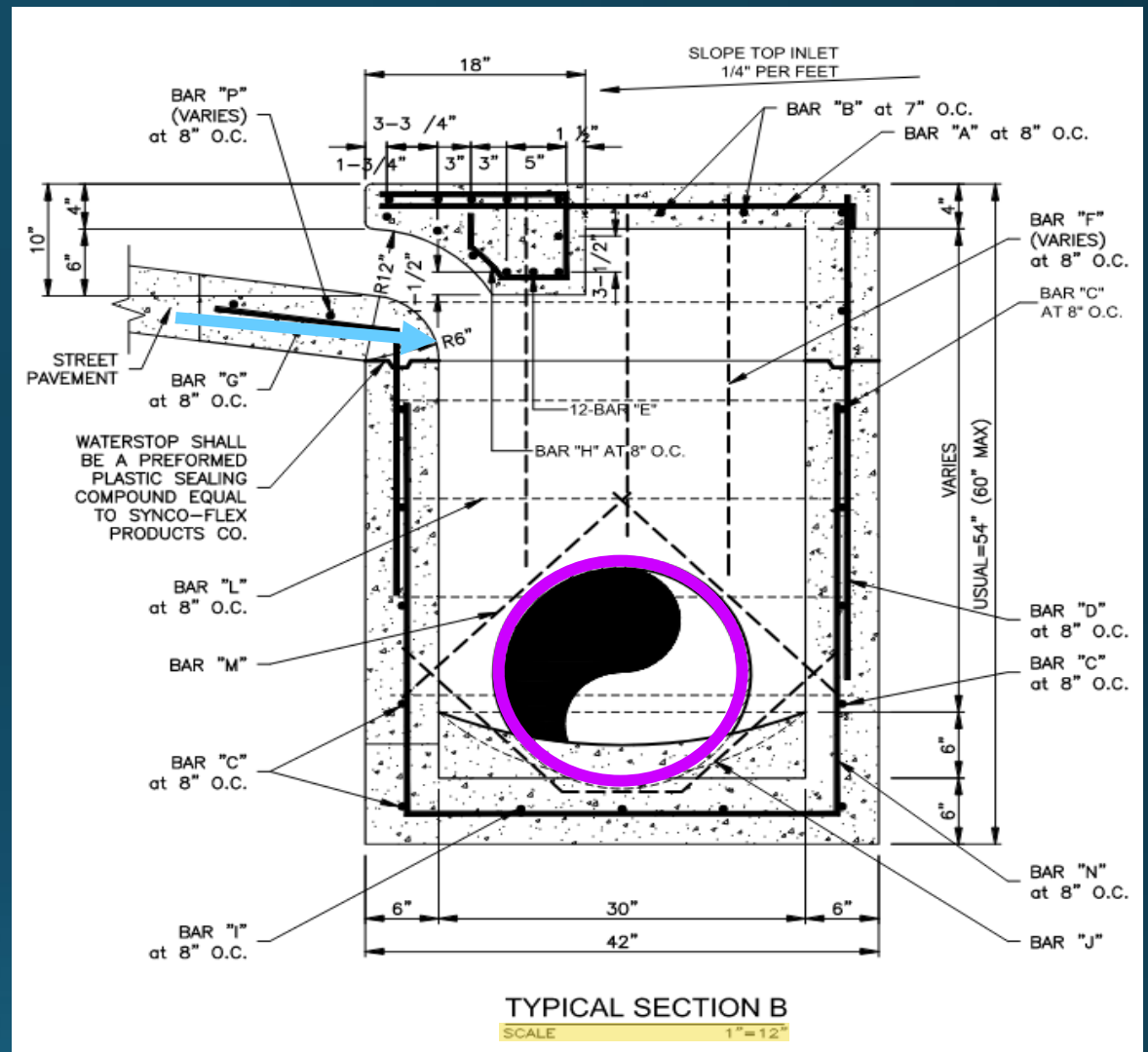
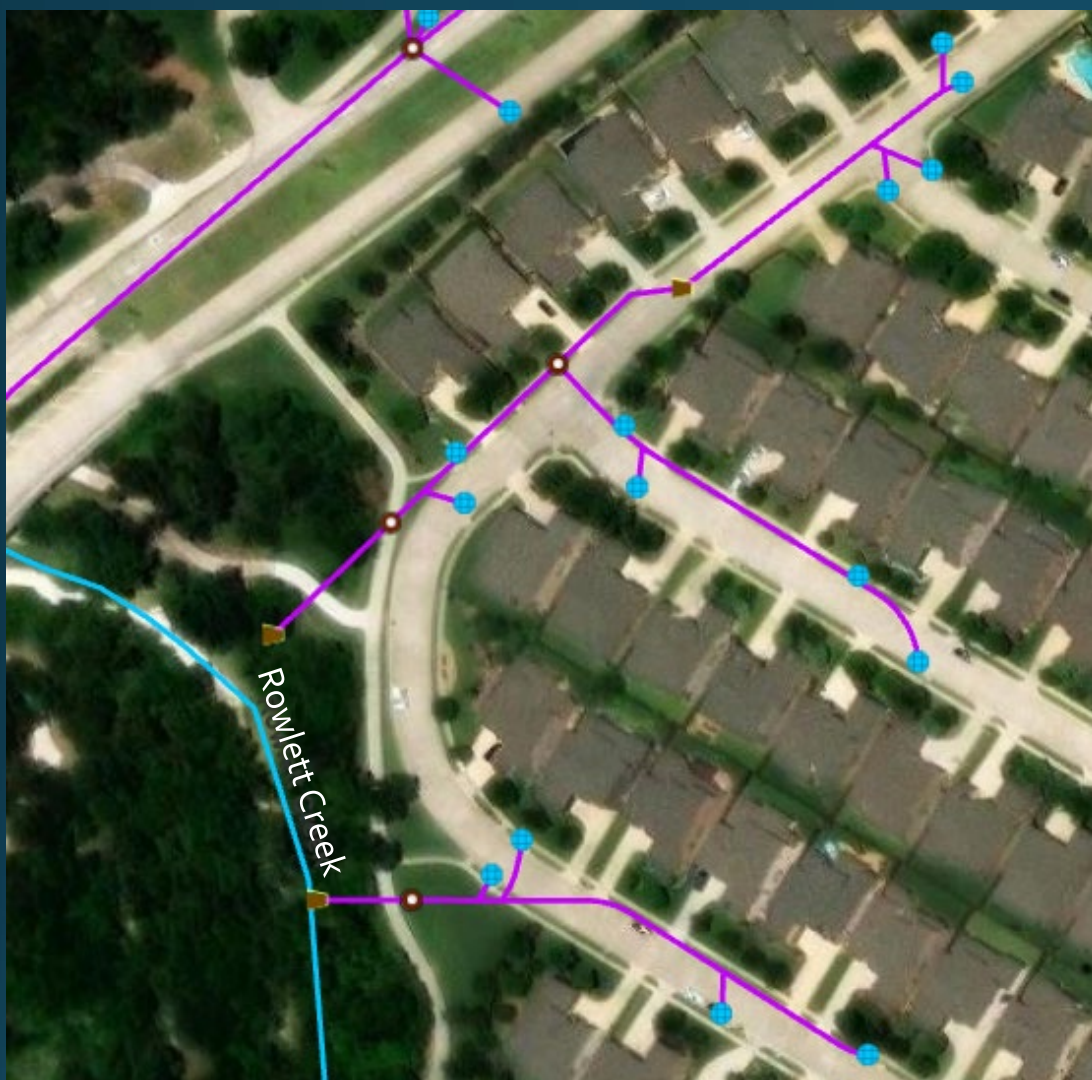




- Water flows into the inlet through the opening shown
- If the inlet is full of debris or the floatables collection system does not allow for bypass at higher flows, flooding could occur







Inlets connect to main or trunk lines which eventually tie into outfalls that carry stormwater runoff into streams and rivers

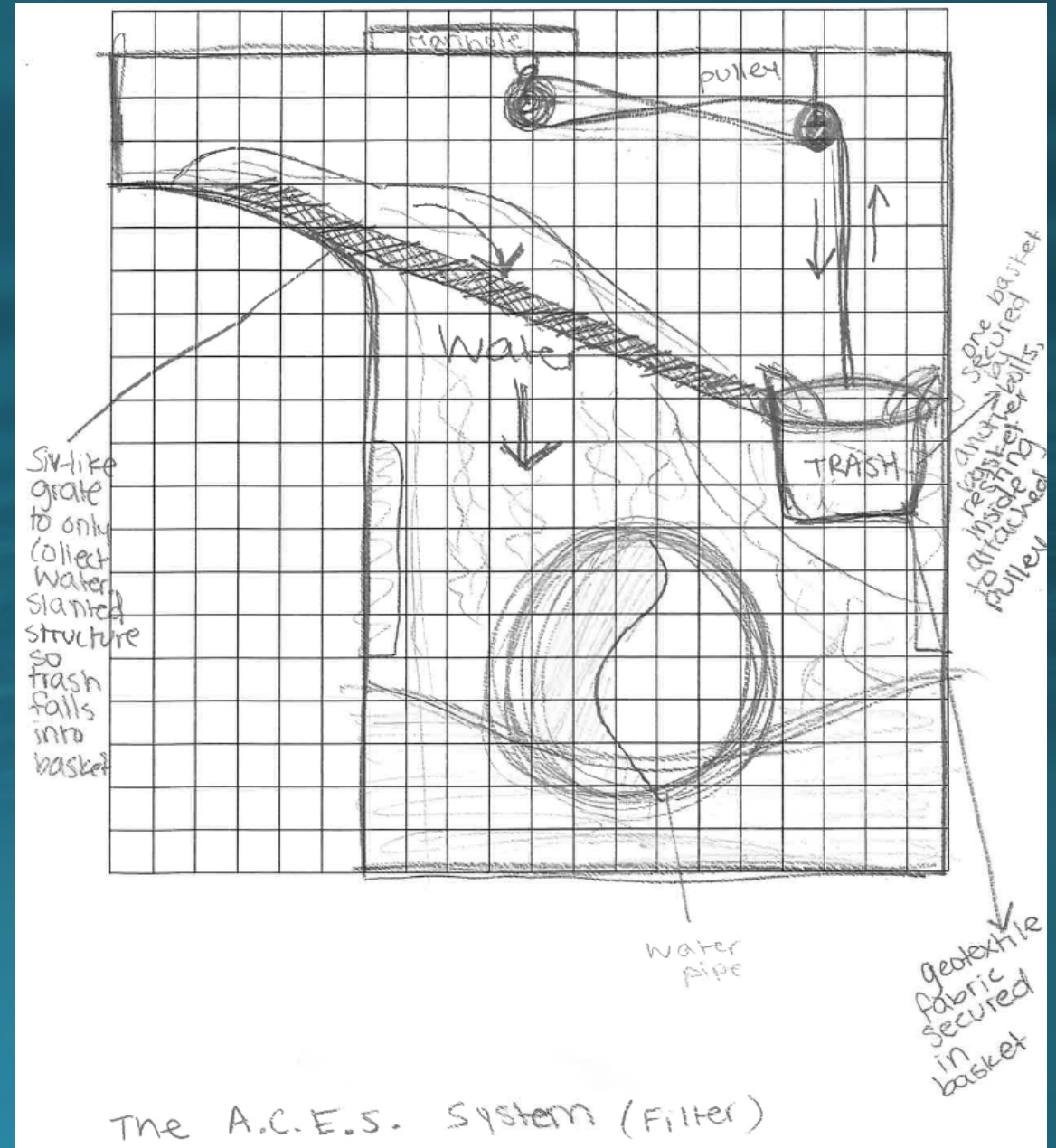
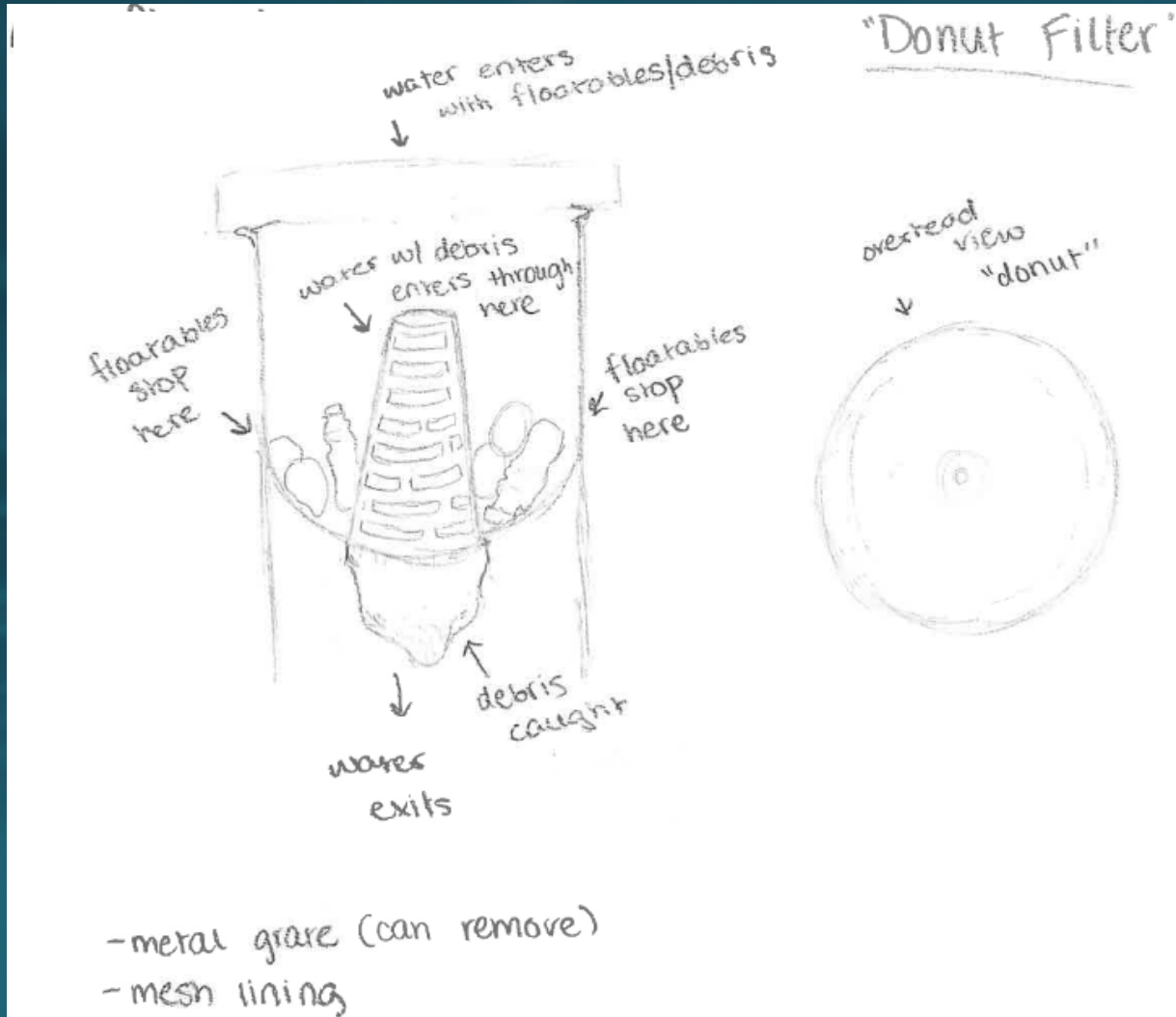
# Activity: Design an Inlet Filter

- Parameters for Design – Removable filter basket:
  - Must be original, cannot be too similar to an already existing design
  - Needs to be durable and use materials that can be easily sourced
  - Needs to fit inside current curb inlets (L = 8')
  - Needs to capture floatables without excessive clogging
    - Needs to have the option of an additional filter for sediment during construction phase
  - Needs to be manually removable through the standard 18" diameter manhole access
- Deliverable:
  - Sketch of design with dimensions labeled
  - Name for system
  - List materials used

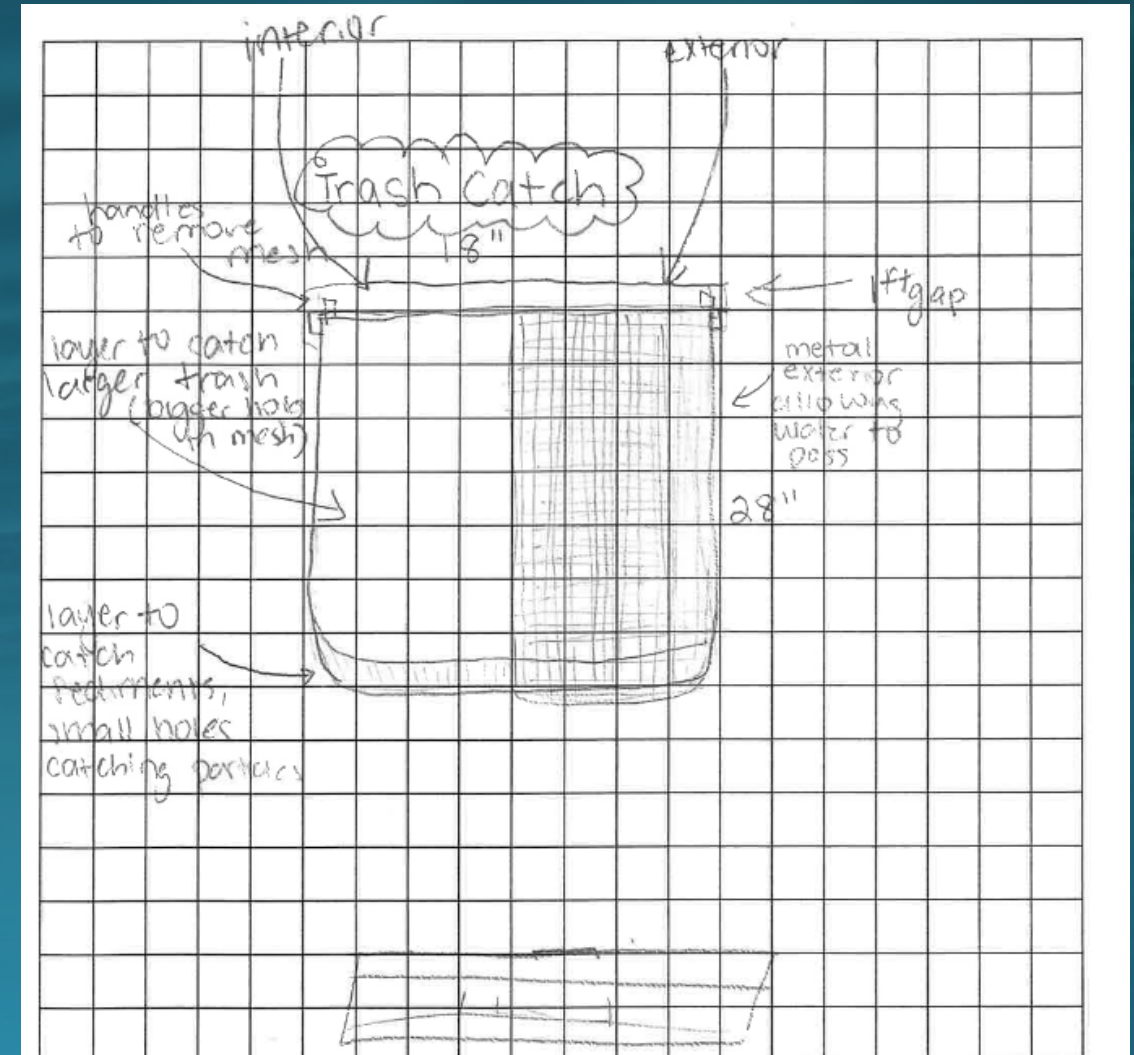
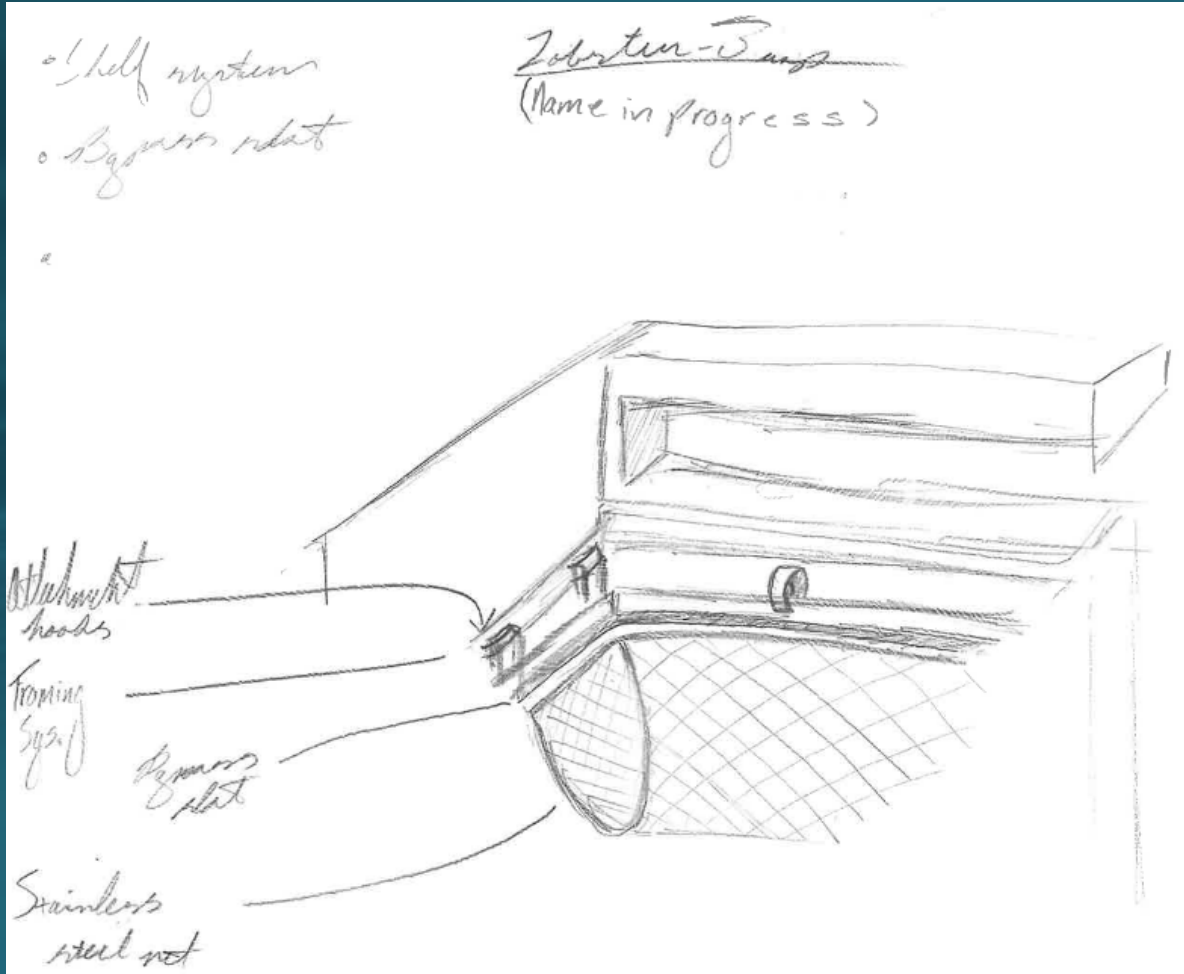




# Student Submissions

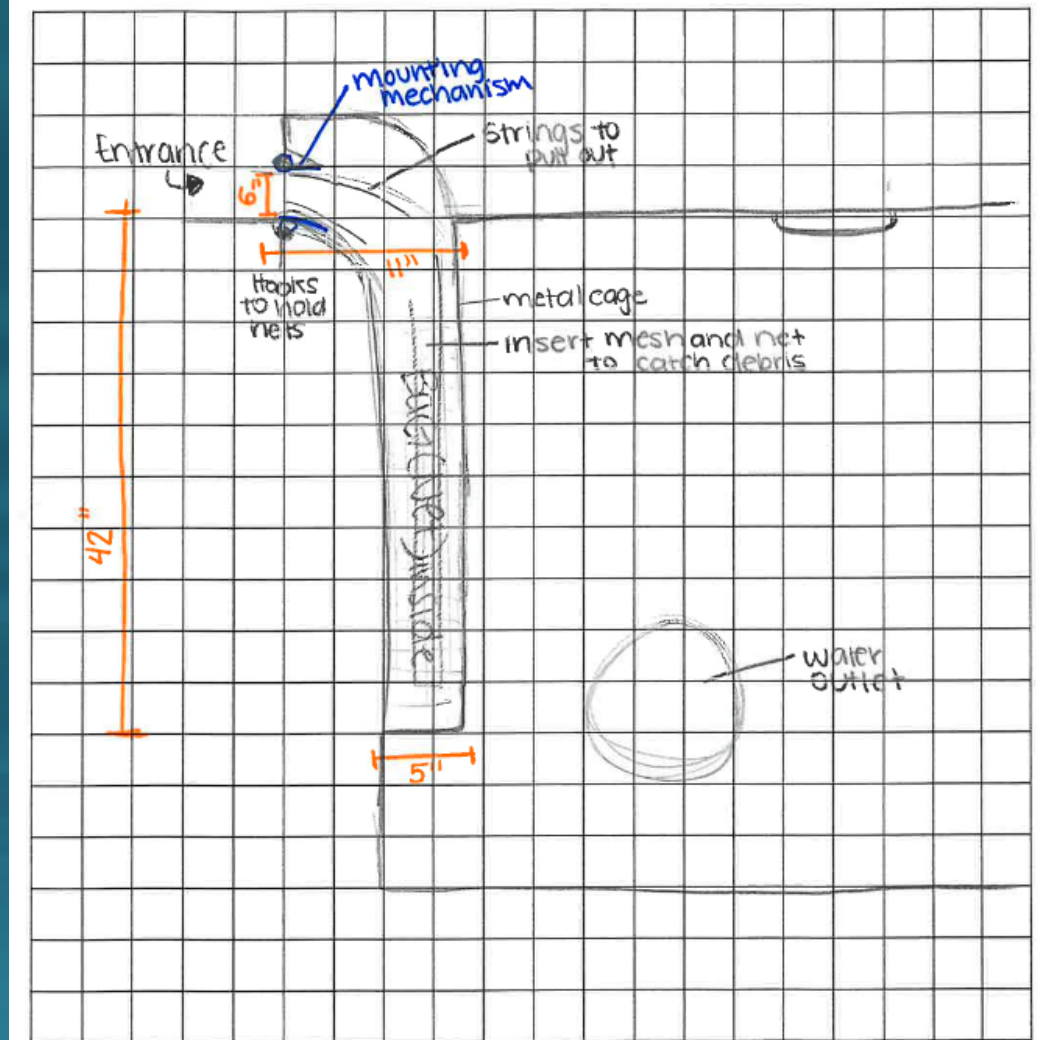
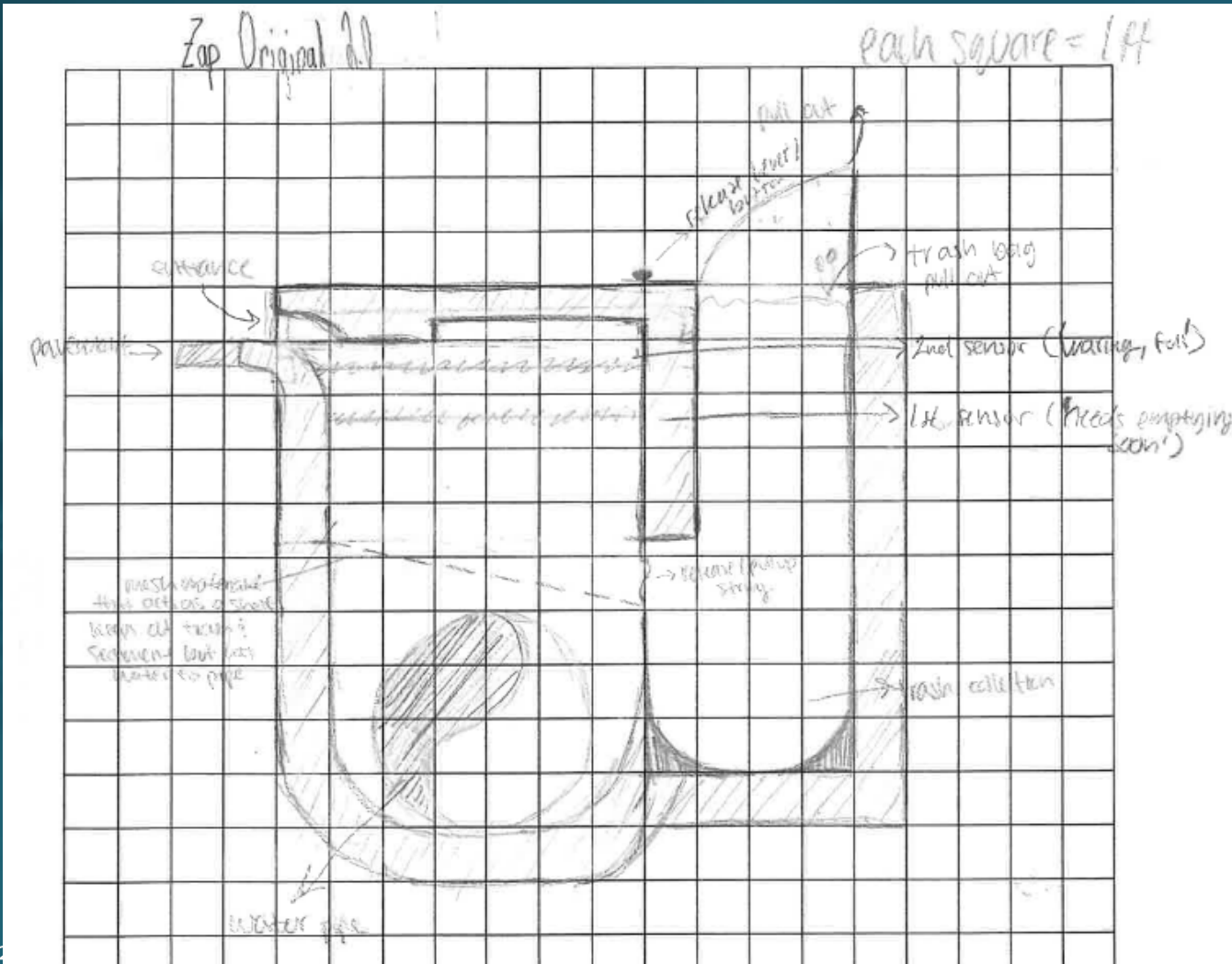


# Student Submissions





# Student Submissions



## Materials

- metal cage with ~~mesh~~ mounting (steel)
- Net (Nylon)
- Mesh Net Fine (metal)

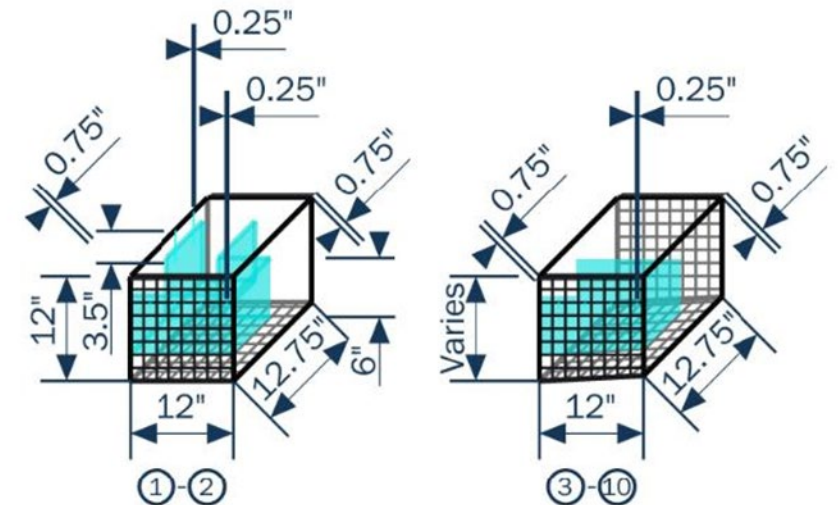
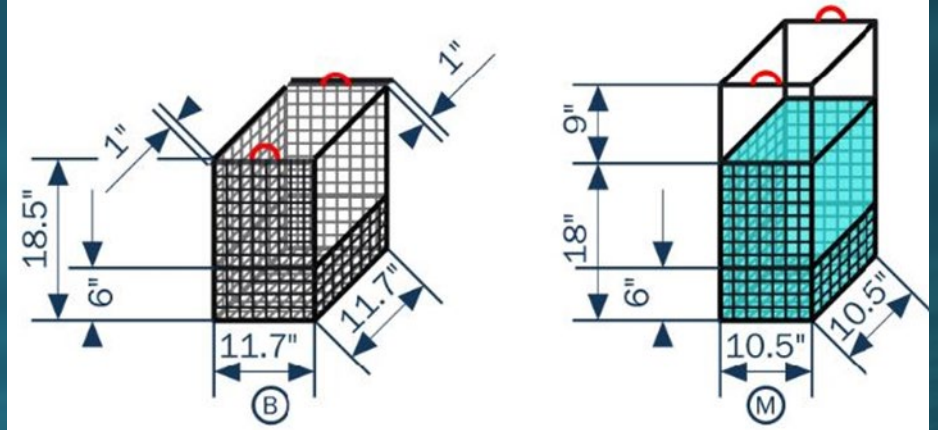
\* Bag/Net is separate from cage  
Similar to trash can

# Design Solution

## Modular Design

– variability based on inlet type

- Outer Basket
- Main basket
- Slanted Baskets
- Temporary HDPE Sediment Filters

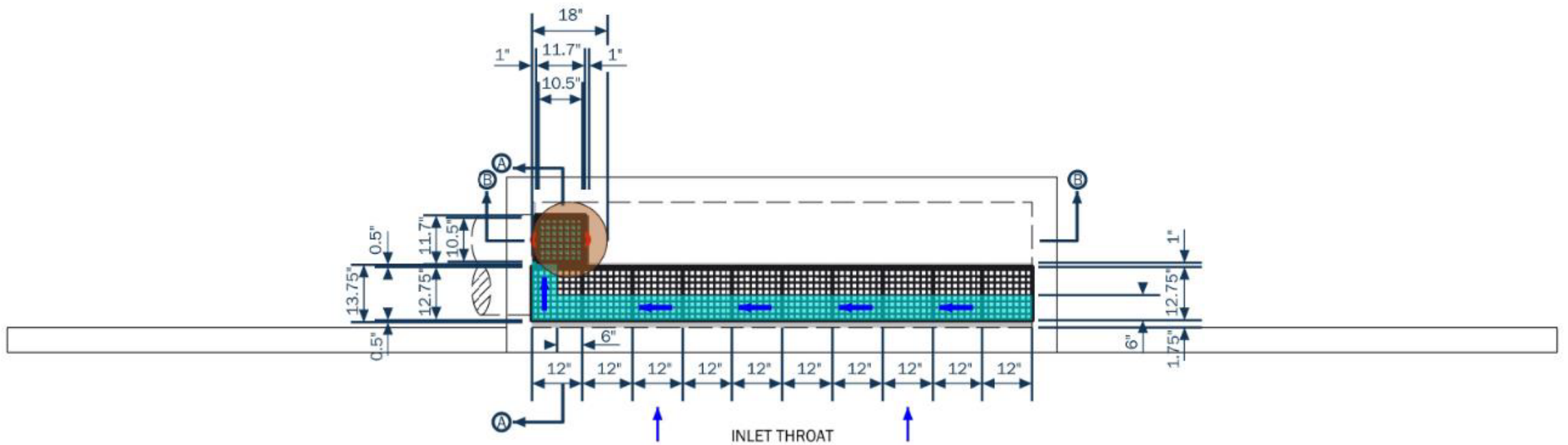


Basket 1 is open in the back with the corner sediment filter,  
Basket 2 is not with a straight filter



# Conceptual Design – Curb Inlets

PLAN-STANDARD CURB INLET FLOATABLES FILTER  
10' inlet shown with 24" connector pipe



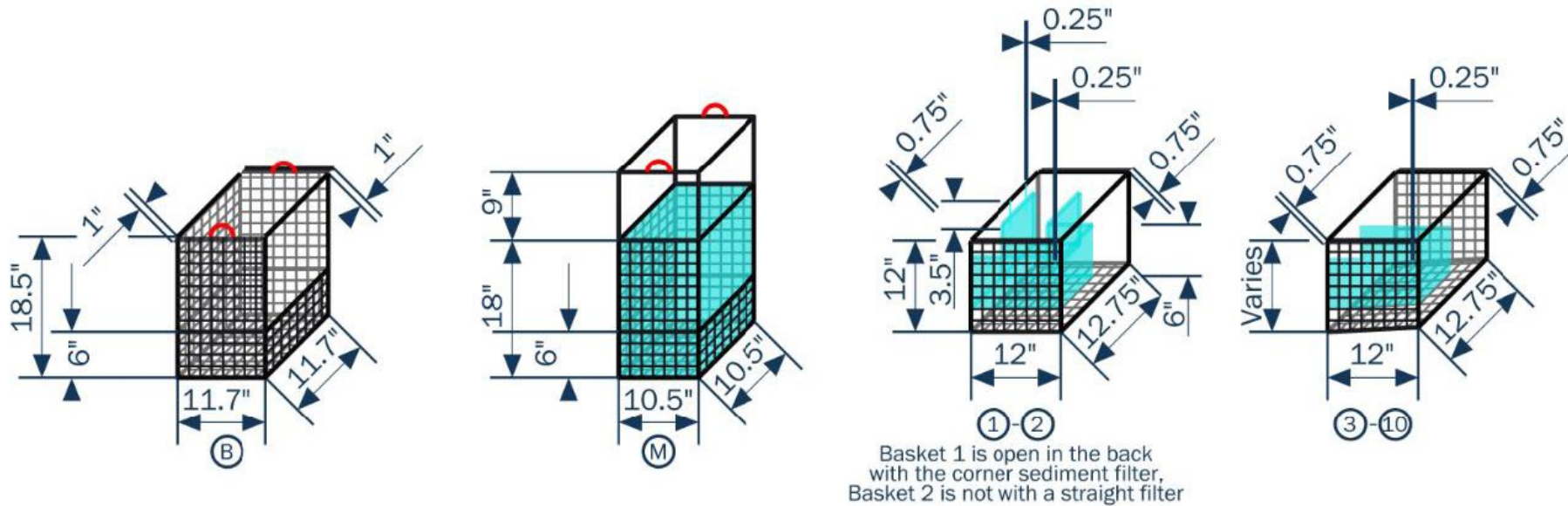




# Conceptual Design – Curb Inlets

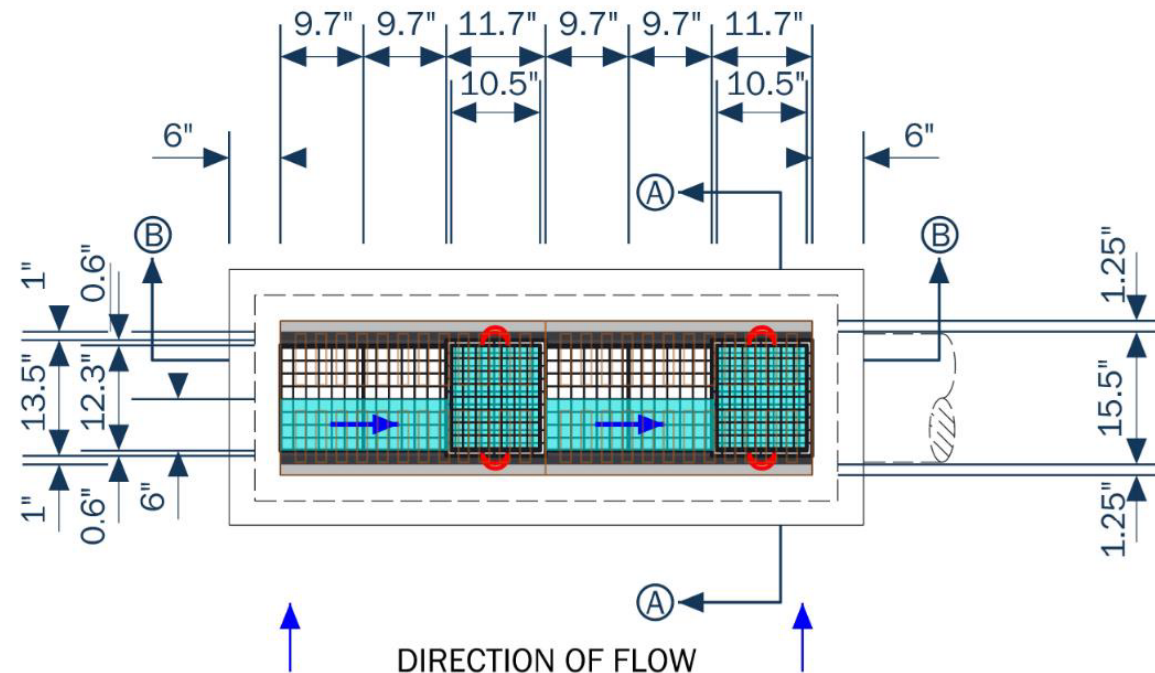
## 3D VIEW

Main basket with base basket and additional baskets with sediment filter shown



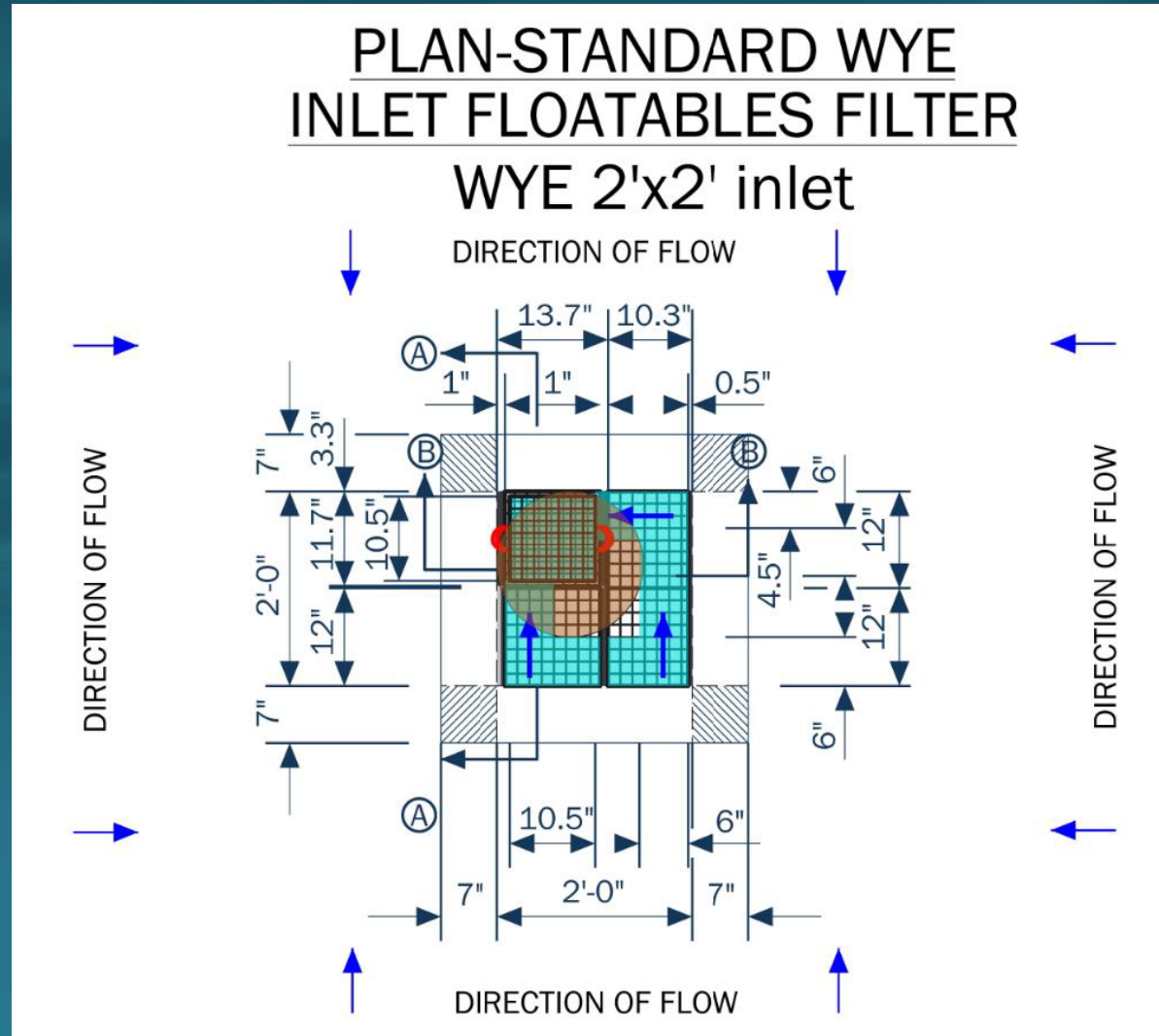
# Conceptual Design – Grate Inlets

## PLAN-STANDARD 2 GRATE INLET FLOATABLES FILTER 2 grate inlet with 15" connector pipe





# Conceptual Design – WYE Inlets





# Allen ISD Steam Center Workshop #2



# Activity 1: Overcoming Maintenance and Repair Challenges

- Brainstorm Challenges for the following:
  - Floatable and Sediment Removal
    - How much
    - How well
  - Maintenance
    - How to maintain
    - How often to clean out
    - How to check how full or for damage
  - Tracking how much is removed
    - Weighing removed floatables/sediment
  - Measuring how well the inlet functions
    - Hydraulic capacity
- Deliverable:
  - Possible challenges that could arise
  - Solutions to each of the challenges

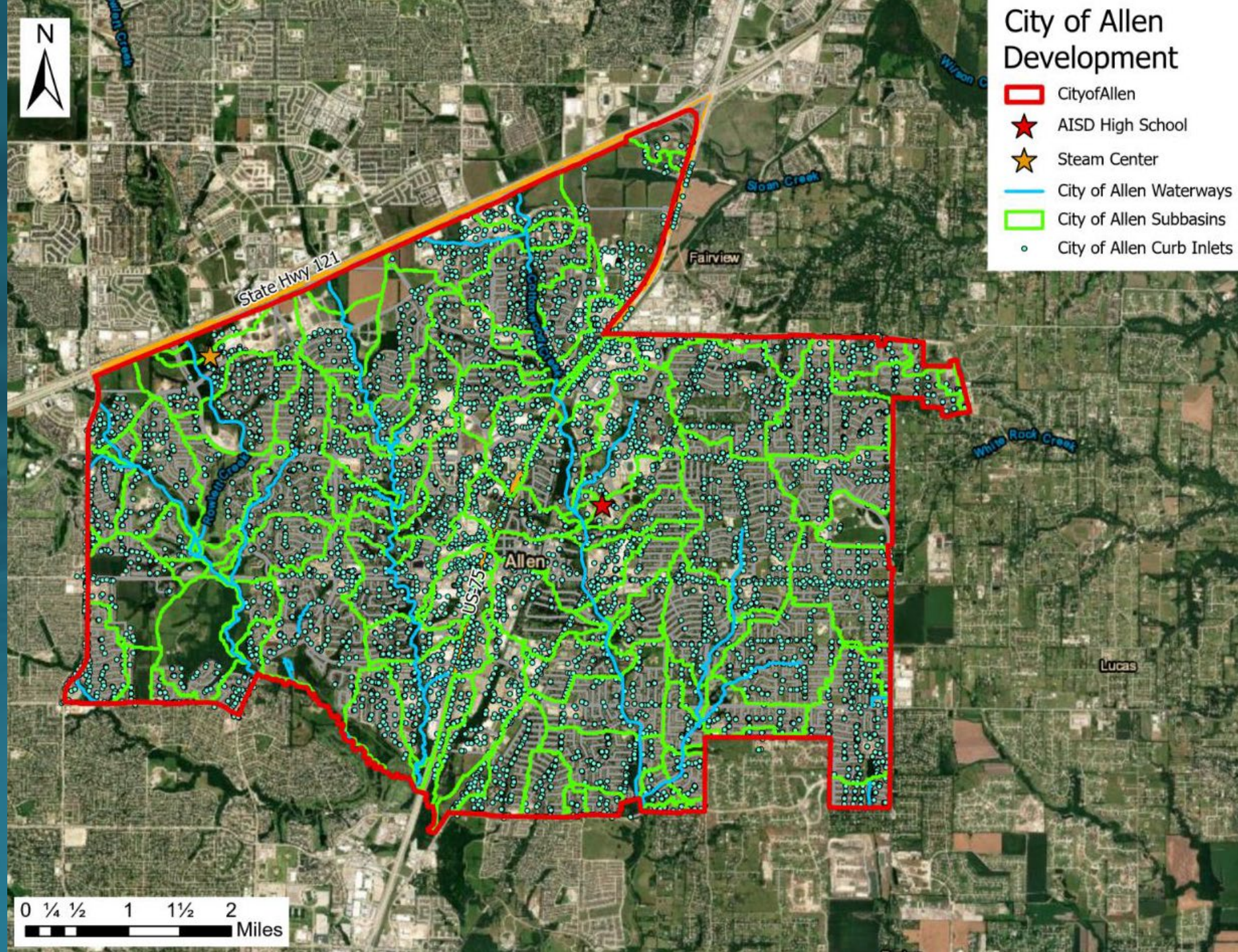


# Student Submissions for Potential Challenges & Solutions:

- Weight of baskets and debris to be removed by maintenance crews
  - Solution: Use of machinery for removal
  - Solution: Outlined procedure for removal to ensure safety of workers
- Determining frequency of maintenance
  - Solution: Trial and error
  - Solution: Beginning with higher frequency of maintenance and reducing as possible
- Availability of vacuuming/cleaning equipment
  - Solution: Acquisition of equipment by the city
  - Solution: Pre-scheduling rental to ensure availability
- How to store collected debris for weighing/recording
  - Solution: Garbage Bags
  - Solution: Storage containers of previously measured weight

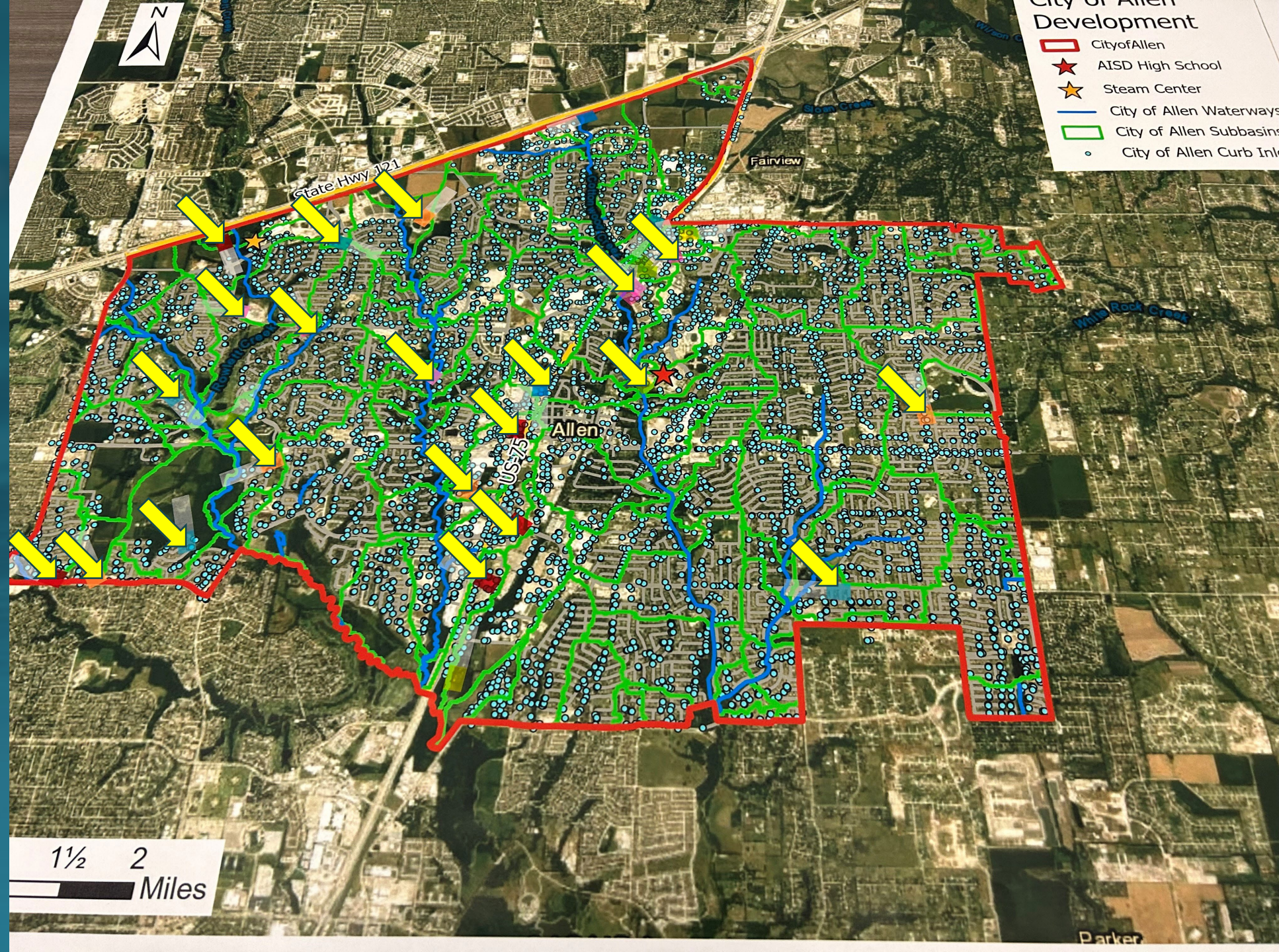


# Activity 2: Suggest two locations for the inlet floatables filters





# Student Submissions for Location Suggestions:





# Potential Future Steps & Lessons Learned

- Implementation in City of Allen
  - Pilot program at two locations
  - Maintenance assessment
  - Debris collection and measuring
- Lessons Learned & Challenges
  - Variety in BMPs
  - Variety in inlet structure
  - Material Costs
- BGG Grant
  - Allowed for development of design
  - Enabled City with a solution to meet stormwater permitting requirements

City of Allen & Huitt-Zollars – NCTCOG Blue Green Grey Grant

# QUESTIONS