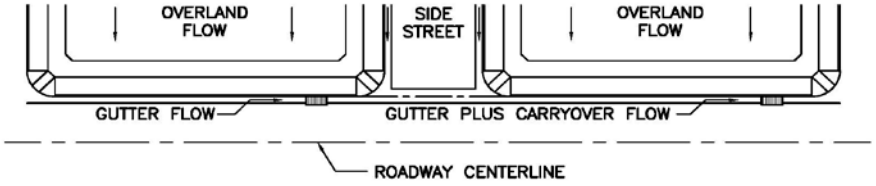
# INLET CALCULATIONS

Worksheet Protected

## DESIGN PEAK FLOW FOR ONE-HALF OF STREET OR GRASS-LINED CHANNEL BY THE RATIONAL METHOD

**Project:** 13-034.01 US 550 South Connection ~~SEIS Alternative Analysis~~

**Inlet ID:** ~~Basin AM-6, Inlet 97~~ Inlet 1035R




Show Details

**Design Flow:** ONLY if already determined through other methods:
(local peak flow for 1/2 of street OR grass-lined channel):

| | Minor Storm | Major Storm | |
|---|---|---|---|
| $*Q_{Known}$ = | 0.46 | 0.81 | cfs |

*** If you enter values in Row 14, skip the rest of this sheet and proceed to sheet Q-Allow or Area Inlet.**

<--- FILL IN THIS SECTION OR...

FILL IN THE SECTIONS BELOW. <---

**Geographic Information:** (Enter data in the blue cells):

| | | |
|---|---|---|
| Subcatchment Area = | | Acres |
| Percent Imperviousness = | | % |
| NRCS Soil Type = | | A, B, C, or D |

Site Type:
- Site is Urban
- Site is Non-Urban

Flows Developed For:
- Street Inlets
- Area Inlets in a Median

| | Slope (ft/ft) | Length (ft) |
|---|---|---|
| Overland Flow = | | |
| Channel Flow = | | |

**Rainfall Information:** Intensity I (inch/hr) = $C_1 * P_1 / ( C_2 + T_c ) ^ C_3$

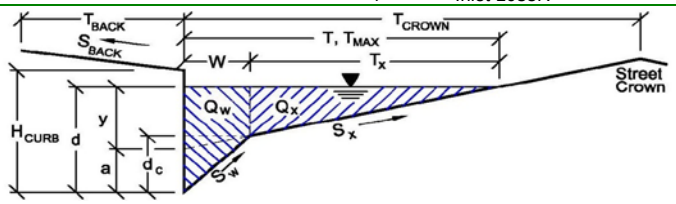
| | Minor Storm | Major Storm | |
|---|---|---|---|
| Design Storm Return Period, $T_r$ = | | | years |
| Return Period One-Hour Precipitation, $P_1$ = | | | inches |
| $C_1$ = | | | |
| $C_2$ = | | | |
| $C_3$ = | | | |
| User-Defined Storm Runoff Coefficient (leave this blank to accept a calculated value), C = | | | |
| User-Defined 5-yr. Runoff Coefficient (leave this blank to accept a calculated value), $C_5$ = | | | |
| **Bypass (Carry-Over) Flow from upstream Subcatchments, $Q_b$ =** | 0.0 | 0.3 | cfs |
| **Total Design Peak Flow, Q =** | 0.46 | 1.11 | cfs |

## ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

**(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)**

**Project:** 13-034.01 US 550 South Connection ~~SEIS Alternative Analysis~~

**Inlet ID:** ~~Basin AM-6, Inlet 97~~ Inlet 1035R




**Gutter Geometry (Enter data in the blue cells)**

| | | | |
|---|---|---|---|
| Maximum Allowable Width for Spread Behind Curb | $T_{BACK}$ = | 0.5 | ft |
| Side Slope Behind Curb (leave blank for no conveyance credit behind curb) | $S_{BACK}$ = | | ft/ft |
| Manning's Roughness Behind Curb (typically between 0.012 and 0.020) | $n_{BACK}$ = | 0.013 | |
| Height of Curb at Gutter Flow Line | $H_{CURB}$ = | 24.00 | inches |
| Distance from Curb Face to Street Crown | $T_{CROWN}$ = | 42.0 | ft |
| Gutter Width | W = | 8.00 | ft |
| Street Transverse Slope | $S_X$ = | 0.014 | ft/ft |
| Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft) | $S_W$ = | 0.014 | ft/ft |
| Street Longitudinal Slope - Enter 0 for sump condition | $S_O$ = | 0.020 | ft/ft |
| Manning's Roughness for Street Section (typically between 0.012 and 0.020) | $n_{STREET}$ = | 0.013 | |

| | | Minor Storm | Major Storm | |
|---|---|---|---|---|
| Max. Allowable Spread for Minor & Major Storm | $T_{MAX}$ = | 8.0 | 20.0 | ft |
| Max. Allowable Depth at Gutter Flowline for Minor & Major Storm | $d_{MAX}$ = | 6.0 | 12.0 | inches |
| Allow Flow Depth at Street Crown (leave blank for no) | | ☐ | ☐ | check = yes |

| | | Minor Storm | Major Storm | |
|---|---|---|---|---|
| **MINOR STORM Allowable Capacity is based on Spread Criterion** | | | | |
| **MAJOR STORM Allowable Capacity is based on Spread Criterion** | **$Q_{allow}$ =** | **1.23** | **14.2** | **cfs** |

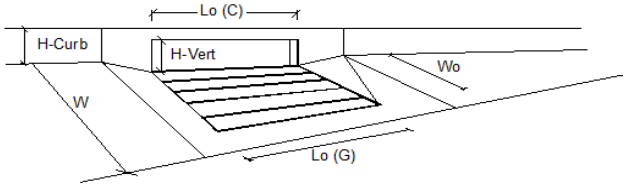
**Minor storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'**

**Major storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'**

# INLET ON A CONTINUOUS GRADE

**Project:** 13-034.01 US 550 South Connection ~~SEIS Alternative Analysis~~

**Inlet ID:** ~~Basin AM-6, Inlet 97~~ Inlet 1035R

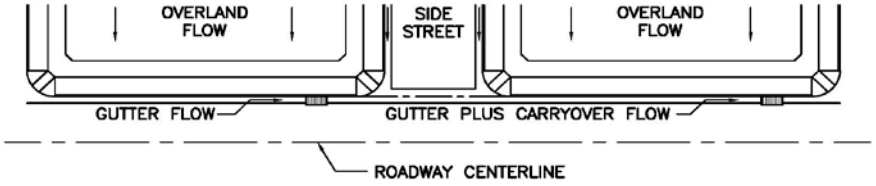



| Design Information (Input) | | MINOR | MAJOR | |
|---|---|---|---|---|
| Type of Inlet | Type = | Directional Cast Vane Grate | | |
| Local Depression (additional to continuous gutter depression 'a' from 'Q-Allow') | $a_{LOCAL}$ = | 0.0 | 0.0 | inches |
| Total Number of Units in the Inlet (Grate or Curb Opening) | No = | 1 | 1 | |
| Length of a Single Unit Inlet (Grate or Curb Opening) | $L_o$ = | 4.00 | 4.00 | ft |
| Width of a Unit Grate (cannot be greater than W from Q-Allow) | $W_o$ = | 2.00 | 2.00 | ft |
| Clogging Factor for a Single Unit Grate (typical min. value = 0.5) | $C_f$-G = | 0.50 | 0.50 | |
| Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1) | $C_f$-C = | N/A | N/A | |
| **Street Hydraulics: OK - Q < maximum allowable from sheet 'Q-Allow'** | | MINOR | MAJOR | |
| **Total Inlet Interception Capacity** | **Q =** | **0.35** | **0.54** | **cfs** |
| **Total Inlet Carry-Over Flow (flow bypassing inlet)** | **$Q_b$ =** | **0.11** | **0.57** | **cfs** |
| **Capture Percentage = $Q_a/Q_o$ =** | **C% =** | **76** | **49** | **%** |

Worksheet Protected

## DESIGN PEAK FLOW FOR ONE-HALF OF STREET OR GRASS-LINED CHANNEL BY THE RATIONAL METHOD

**Project:** 13-034.01 US 550 South Connection ~~SEIS Alternative Analysis~~
**Inlet ID:** ~~Basin AM-6, Inlet 95~~ Inlet 1033R




Show Details

**Design Flow:** ONLY if already determined through other methods:
(local peak flow for 1/2 of street OR grass-lined channel):

| | Minor Storm | Major Storm | |
|---|---|---|---|
| $*Q_{Known}$ = | 0.55 | 0.97 | cfs |

*** If you enter values in Row 14, skip the rest of this sheet and proceed to sheet Q-Allow or Area Inlet.**

<--- FILL IN THIS SECTION OR...

FILL IN THE SECTIONS BELOW. <---

**Geographic Information:** (Enter data in the blue cells):

| | | |
|---|---|---|
| Subcatchment Area = | | Acres |
| Percent Imperviousness = | | % |
| NRCS Soil Type = | | A, B, C, or D |

Site Type:
- Site is Urban
- Site is Non-Urban

Flows Developed For:
- Street Inlets
- Area Inlets in a Median

| | Slope (ft/ft) | Length (ft) |
|---|---|---|
| Overland Flow = | | |
| Channel Flow = | | |

**Rainfall Information:** Intensity I (inch/hr) = $C_1 * P_1 / ( C_2 + T_c ) ^ C_3$

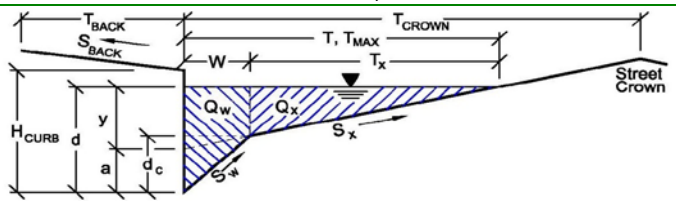
| | Minor Storm | Major Storm | |
|---|---|---|---|
| Design Storm Return Period, $T_r$ = | | | years |
| Return Period One-Hour Precipitation, $P_1$ = | | | inches |
| $C_1$ = | | | |
| $C_2$ = | | | |
| $C_3$ = | | | |
| User-Defined Storm Runoff Coefficient (leave this blank to accept a calculated value), C = | | | |
| User-Defined 5-yr. Runoff Coefficient (leave this blank to accept a calculated value), $C_5$ = | | | |
| **Bypass (Carry-Over) Flow from upstream Subcatchments, $Q_b$ =** | 0.0 | 1.0 | cfs |
| **Total Design Peak Flow, Q =** | 0.55 | 1.97 | cfs |

## ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

**(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)**

**Project:** **13-034.01 US 550 South Connection ~~SEIS Alternative Analysis~~**

**Inlet ID:** **~~Basin AM-6, Inlet 95~~** Inlet 1033R




**Gutter Geometry (Enter data in the blue cells)**

| | | | |
|---|---|---|---|
| Maximum Allowable Width for Spread Behind Curb | $T_{BACK}$ = | 0.5 | ft |
| Side Slope Behind Curb (leave blank for no conveyance credit behind curb) | $S_{BACK}$ = | | ft/ft |
| Manning's Roughness Behind Curb (typically between 0.012 and 0.020) | $n_{BACK}$ = | 0.013 | |
| Height of Curb at Gutter Flow Line | $H_{CURB}$ = | 6.00 | inches |
| Distance from Curb Face to Street Crown | $T_{CROWN}$ = | 42.0 | ft |
| Gutter Width | W = | 8.00 | ft |
| Street Transverse Slope | $S_X$ = | 0.032 | ft/ft |
| Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft) | $S_W$ = | 0.032 | ft/ft |
| Street Longitudinal Slope - Enter 0 for sump condition | $S_O$ = | 0.029 | ft/ft |
| Manning's Roughness for Street Section (typically between 0.012 and 0.020) | $n_{STREET}$ = | 0.013 | |

| | | Minor Storm | Major Storm | |
|---|---|---|---|---|
| Max. Allowable Spread for Minor & Major Storm | $T_{MAX}$ = | 8.0 | 20.0 | ft |
| Max. Allowable Depth at Gutter Flowline for Minor & Major Storm | $d_{MAX}$ = | 6.0 | 6.0 | inches |
| Allow Flow Depth at Street Crown (leave blank for no) | | ☐ | ☐ | check = yes |

**MINOR STORM Allowable Capacity is based on Spread Criterion**

**MAJOR STORM Allowable Capacity is based on Depth Criterion**

| | Minor Storm | Major Storm | |
|---|---|---|---|
| **$Q_{allow}$ =** | **6.00** | **27.8** | **cfs** |

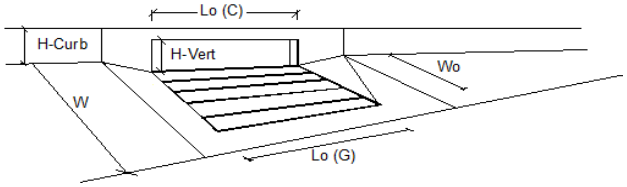
**Minor storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'**

**Major storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'**

# INLET ON A CONTINUOUS GRADE

**Project:** 13-034.01 US 550 South Connection ~~SEIS Alternative Analysis~~

**Inlet ID:** ~~Basin AM-6, Inlet 95~~ Inlet 1033R

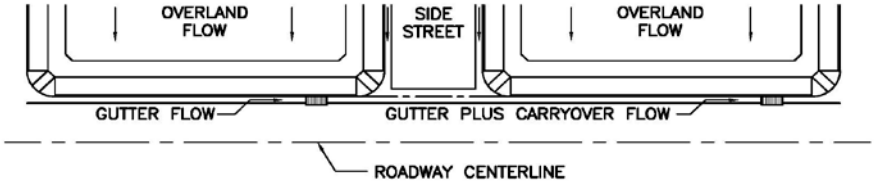



| Design Information (Input) | | MINOR | MAJOR | |
|---|---|---|---|---|
| Type of Inlet | Type = | Directional Cast Vane Grate | | |
| Local Depression (additional to continuous gutter depression 'a' from 'Q-Allow') | $a_{LOCAL}$ = | 0.0 | 0.0 | inches |
| Total Number of Units in the Inlet (Grate or Curb Opening) | No = | 1 | 1 | |
| Length of a Single Unit Inlet (Grate or Curb Opening) | $L_o$ = | 4.00 | 4.00 | ft |
| Width of a Unit Grate (cannot be greater than W from Q-Allow) | $W_o$ = | 2.00 | 2.00 | ft |
| Clogging Factor for a Single Unit Grate (typical min. value = 0.5) | $C_f$-G = | 0.50 | 0.50 | |
| Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1) | $C_f$-C = | N/A | N/A | |
| **Street Hydraulics: OK - Q < maximum allowable from sheet 'Q-Allow'** | | MINOR | MAJOR | |
| **Total Inlet Interception Capacity** | **Q =** | **-0.33** | **1.67** | **cfs** |
| **Total Inlet Carry-Over Flow (flow bypassing inlet)** | **$Q_b$ =** | **0.88** | **0.30** | **cfs** |
| **Capture Percentage = $Q_a/Q_o$ =** | **C% =** | **-59** | **85** | **%** |

Worksheet Protected

## DESIGN PEAK FLOW FOR ONE-HALF OF STREET OR GRASS-LINED CHANNEL BY THE RATIONAL METHOD

**Project:** 13-034.01 US 550 South Connection ~~SEIS Alternative Analysis~~
**Inlet ID:** ~~Basin AM-7, Inlet 88 & 86~~ Inlet 1027L & 1029LA




Show Details

**Design Flow:** ONLY if already determined through other methods:
(local peak flow for 1/2 of street OR grass-lined channel):

| | Minor Storm | Major Storm | |
|---|---|---|---|
| $*Q_{Known}$ = | 0.73 | 1.29 | cfs |

*** If you enter values in Row 14, skip the rest of this sheet and proceed to sheet Q-Allow or Area Inlet.**

<--- FILL IN THIS SECTION OR...

**Geographic Information:** (Enter data in the blue cells):

| | | |
|---|---|---|
| Subcatchment Area = | | Acres |
| Percent Imperviousness = | | % |
| NRCS Soil Type = | | A, B, C, or D |

Site Type:
- Site is Urban
- Site is Non-Urban

Flows Developed For:
- Street Inlets
- Area Inlets in a Median

| | Slope (ft/ft) | Length (ft) |
|---|---|---|
| Overland Flow = | | |
| Channel Flow = | | |

FILL IN THE SECTIONS BELOW. <---

**Rainfall Information:** Intensity I (inch/hr) = $C_1 * P_1 / ( C_2 + T_c ) ^ C_3$

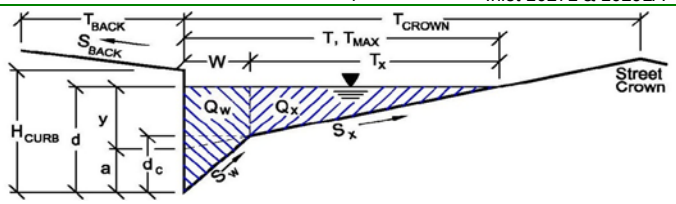
| | Minor Storm | Major Storm | |
|---|---|---|---|
| Design Storm Return Period, $T_r$ = | | | years |
| Return Period One-Hour Precipitation, $P_1$ = | | | inches |
| $C_1$ = | | | |
| $C_2$ = | | | |
| $C_3$ = | | | |
| User-Defined Storm Runoff Coefficient (leave this blank to accept a calculated value), C = | | | |
| User-Defined 5-yr. Runoff Coefficient (leave this blank to accept a calculated value), $C_5$ = | | | |
| **Bypass (Carry-Over) Flow from upstream Subcatchments, $Q_b$ =** | 0.0 | 0.0 | cfs |
| **Total Design Peak Flow, Q =** | 0.73 | 1.29 | cfs |

## ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

**(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)**

**Project:** 13-034.01 US 550 South Connection ~~SEIS Alternative Analysis~~

**Inlet ID:** ~~Basin AM-7, Inlet 88 & 86~~ Inlet 1027L & 1029LA




**Gutter Geometry (Enter data in the blue cells)**

| | | | |
|---|---|---|---|
| Maximum Allowable Width for Spread Behind Curb | $T_{BACK}$ = | 0.5 | ft |
| Side Slope Behind Curb (leave blank for no conveyance credit behind curb) | $S_{BACK}$ = | | ft/ft |
| Manning's Roughness Behind Curb (typically between 0.012 and 0.020) | $n_{BACK}$ = | 0.013 | |
| Height of Curb at Gutter Flow Line | $H_{CURB}$ = | 24.00 | inches |
| Distance from Curb Face to Street Crown | $T_{CROWN}$ = | 42.0 | ft |
| Gutter Width | W = | 8.00 | ft |
| Street Transverse Slope | $S_X$ = | 0.032 | ft/ft |
| Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft) | $S_W$ = | 0.032 | ft/ft |
| Street Longitudinal Slope - Enter 0 for sump condition | $S_O$ = | 0.011 | ft/ft |
| Manning's Roughness for Street Section (typically between 0.012 and 0.020) | $n_{STREET}$ = | 0.013 | |

| | | Minor Storm | Major Storm | |
|---|---|---|---|---|
| Max. Allowable Spread for Minor & Major Storm | $T_{MAX}$ = | 8.0 | 20.0 | ft |
| Max. Allowable Depth at Gutter Flowline for Minor & Major Storm | $d_{MAX}$ = | 6.0 | 12.0 | inches |
| Allow Flow Depth at Street Crown (leave blank for no) | | ☐ | ☐ | check = yes |

| | | Minor Storm | Major Storm | |
|---|---|---|---|---|
| **MINOR STORM Allowable Capacity is based on Spread Criterion** | | | | |
| **MAJOR STORM Allowable Capacity is based on Spread Criterion** | **$Q_{allow}$ =** | **3.55** | **40.9** | **cfs** |

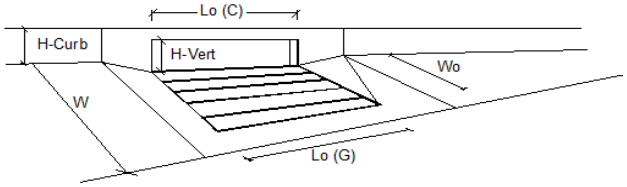
**Minor storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'**

**Major storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'**

## INLET ON A CONTINUOUS GRADE

**Project:** 13-034.01 US 550 South Connection ~~SEIS Alternative Analysis~~

**Inlet ID:** ~~Basin AM-7, Inlet 88 & 86~~ Inlet 1027L & 1029LA



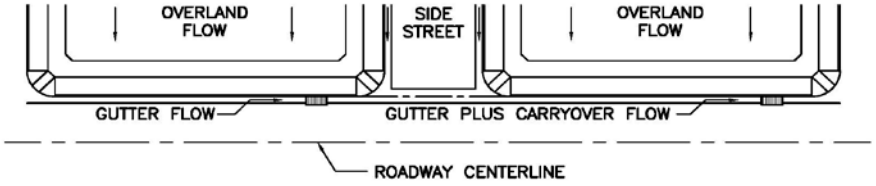

| **Design Information (Input)** | | MINOR | MAJOR | |
|---|---|---|---|---|
| Type of Inlet | Type = | Directional Cast Vane Grate | | |
| Local Depression (additional to continuous gutter depression 'a' from 'Q-Allow') | $a_{LOCAL}$ = | 0.0 | 0.0 | inches |
| Total Number of Units in the Inlet (Grate or Curb Opening) | No = | 1 | 1 | |
| Length of a Single Unit Inlet (Grate or Curb Opening) | $L_o$ = | 4.00 | 4.00 | ft |
| Width of a Unit Grate (cannot be greater than W from Q-Allow) | $W_o$ = | 2.00 | 2.00 | ft |
| Clogging Factor for a Single Unit Grate (typical min. value = 0.5) | $C_f$-G = | 0.50 | 0.50 | |
| Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1) | $C_f$-C = | N/A | N/A | |
| **Street Hydraulics: OK - Q < maximum allowable from sheet 'Q-Allow'** | | MINOR | MAJOR | |
| **Total Inlet Interception Capacity** | **Q =** | **0.73** | **1.02** | **cfs** |
| **Total Inlet Carry-Over Flow (flow bypassing inlet)** | **$Q_b$ =** | **0.00** | **0.27** | **cfs** |
| **Capture Percentage = $Q_a/Q_o$ =** | **C% =** | **100** | **79** | **%** |

Worksheet Protected

## DESIGN PEAK FLOW FOR ONE-HALF OF STREET OR GRASS-LINED CHANNEL BY THE RATIONAL METHOD

**Project:** 13-034.01 US 550 South Connection ~~SEIS Alternative Analysis~~

**Inlet ID:** ~~Basin AM-10, Inlet 83~~ Inlet 1021L




Show Details

**Design Flow:** ONLY if already determined through other methods:
(local peak flow for 1/2 of street OR grass-lined channel):

| | Minor Storm | Major Storm | |
|---|---|---|---|
| $*Q_{Known}$ = | 0.53 | 0.94 | cfs |

*** If you enter values in Row 14, skip the rest of this sheet and proceed to sheet Q-Allow or Area Inlet.**

<--- FILL IN THIS SECTION OR...

FILL IN THE SECTIONS BELOW. <---

**Geographic Information:** (Enter data in the blue cells):

| | | |
|---|---|---|
| Subcatchment Area = | | Acres |
| Percent Imperviousness = | | % |
| NRCS Soil Type = | | A, B, C, or D |

Site Type:
- Site is Urban
- Site is Non-Urban

Flows Developed For:
- Street Inlets
- Area Inlets in a Median

| | Slope (ft/ft) | Length (ft) |
|---|---|---|
| Overland Flow = | | |
| Channel Flow = | | |

**Rainfall Information:** Intensity I (inch/hr) = $C_1 * P_1 / ( C_2 + T_c ) ^ C_3$

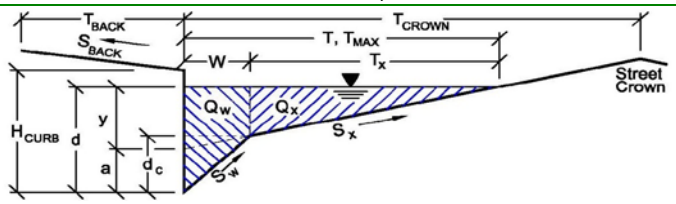
| | Minor Storm | Major Storm | |
|---|---|---|---|
| Design Storm Return Period, $T_r$ = | | | years |
| Return Period One-Hour Precipitation, $P_1$ = | | | inches |
| $C_1$ = | | | |
| $C_2$ = | | | |
| $C_3$ = | | | |
| User-Defined Storm Runoff Coefficient (leave this blank to accept a calculated value), C = | | | |
| User-Defined 5-yr. Runoff Coefficient (leave this blank to accept a calculated value), $C_5$ = | | | |
| **Bypass (Carry-Over) Flow from upstream Subcatchments, $Q_b$ =** | 0.0 | 0.0 | cfs |
| **Total Design Peak Flow, Q =** | 0.53 | 0.94 | cfs |

## ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

**(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)**

**Project:** **13-034.01 US 550 South Connection ~~SEIS Alternative Analysis~~**

**Inlet ID:** **~~Basin AM-10, Inlet 83~~** Inlet 1021L




**Gutter Geometry (Enter data in the blue cells)**

| | | | |
|---|---|---|---|
| Maximum Allowable Width for Spread Behind Curb | $T_{BACK}$ = | 0.5 | ft |
| Side Slope Behind Curb (leave blank for no conveyance credit behind curb) | $S_{BACK}$ = | | ft/ft |
| Manning's Roughness Behind Curb (typically between 0.012 and 0.020) | $n_{BACK}$ = | 0.013 | |
| Height of Curb at Gutter Flow Line | $H_{CURB}$ = | 24.00 | inches |
| Distance from Curb Face to Street Crown | $T_{CROWN}$ = | 42.0 | ft |
| Gutter Width | W = | 8.00 | ft |
| Street Transverse Slope | $S_X$ = | 0.032 | ft/ft |
| Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft) | $S_W$ = | 0.032 | ft/ft |
| Street Longitudinal Slope - Enter 0 for sump condition | $S_O$ = | 0.008 | ft/ft |
| Manning's Roughness for Street Section (typically between 0.012 and 0.020) | $n_{STREET}$ = | 0.013 | |

| | | Minor Storm | Major Storm | |
|---|---|---|---|---|
| Max. Allowable Spread for Minor & Major Storm | $T_{MAX}$ = | 8.0 | 20.0 | ft |
| Max. Allowable Depth at Gutter Flowline for Minor & Major Storm | $d_{MAX}$ = | 6.0 | 12.0 | inches |
| Allow Flow Depth at Street Crown (leave blank for no) | | ☐ | ☐ | check = yes |

| | | Minor Storm | Major Storm | |
|---|---|---|---|---|
| **MINOR STORM Allowable Capacity is based on Spread Criterion** | | | | |
| **MAJOR STORM Allowable Capacity is based on Spread Criterion** | **$Q_{allow}$ =** | **3.10** | **36.4** | **cfs** |

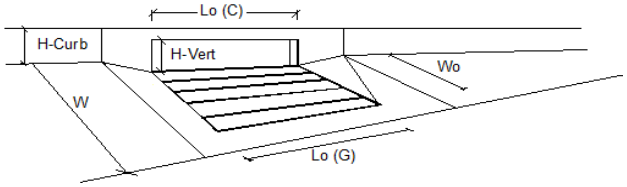
**Minor storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'**

**Major storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'**

# INLET ON A CONTINUOUS GRADE

**Project:** 13-034.01 US 550 South Connection ~~SEIS Alternative Analysis~~

**Inlet ID:** ~~Basin AM-10, Inlet 83~~ Inlet 1021L



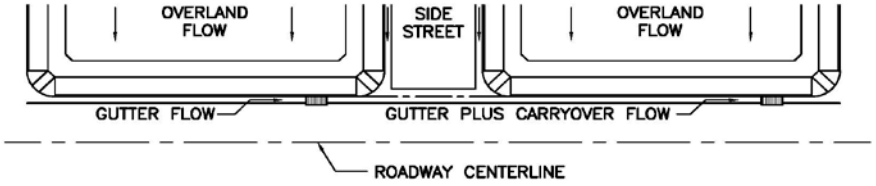

| Design Information (Input) | | MINOR | MAJOR | |
|---|---|---|---|---|
| Type of Inlet | Type = | Directional Cast Vane Grate | | |
| Local Depression (additional to continuous gutter depression 'a' from 'Q-Allow') | $a_{LOCAL}$ = | 0.0 | 0.0 | inches |
| Total Number of Units in the Inlet (Grate or Curb Opening) | No = | 1 | 1 | |
| Length of a Single Unit Inlet (Grate or Curb Opening) | $L_o$ = | 4.00 | 4.00 | ft |
| Width of a Unit Grate (cannot be greater than W from Q-Allow) | $W_o$ = | 2.00 | 2.00 | ft |
| Clogging Factor for a Single Unit Grate (typical min. value = 0.5) | $C_f$-G = | 0.50 | 0.50 | |
| Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1) | $C_f$-C = | N/A | N/A | |
| **Street Hydraulics: OK - Q < maximum allowable from sheet 'Q-Allow'** | | MINOR | MAJOR | |
| **Total Inlet Interception Capacity** | **Q =** | **0.53** | **0.88** | **cfs** |
| **Total Inlet Carry-Over Flow (flow bypassing inlet)** | **$Q_b$ =** | **0.00** | **0.06** | **cfs** |
| **Capture Percentage = $Q_a/Q_o$ =** | **C% =** | **100** | **93** | **%** |

Worksheet Protected

## DESIGN PEAK FLOW FOR ONE-HALF OF STREET OR GRASS-LINED CHANNEL BY THE RATIONAL METHOD

**Project:** 13-034.01 US 550 South Connection ~~SEIS Alternative Analysis~~

**Inlet ID:** ~~Basin AM-10, Inlet 79~~ Inlet 1019RA




Show Details

**Design Flow:** ONLY if already determined through other methods:
(local peak flow for 1/2 of street OR grass-lined channel):

| | Minor Storm | Major Storm | |
|---|---|---|---|
| $*Q_{Known}$ = | 0.65 | 1.14 | cfs |

*** If you enter values in Row 14, skip the rest of this sheet and proceed to sheet Q-Allow or Area Inlet.**

<--- FILL IN THIS SECTION OR...

FILL IN THE SECTIONS BELOW. <---

**Geographic Information:** (Enter data in the blue cells):

| | | |
|---|---|---|
| Subcatchment Area = | | Acres |
| Percent Imperviousness = | | % |
| NRCS Soil Type = | | A, B, C, or D |

Site Type:
- Site is Urban
- Site is Non-Urban

Flows Developed For:
- Street Inlets
- Area Inlets in a Median

| | Slope (ft/ft) | Length (ft) |
|---|---|---|
| Overland Flow = | | |
| Channel Flow = | | |

**Rainfall Information:** Intensity I (inch/hr) = $C_1 * P_1 / ( C_2 + T_c ) ^ C_3$

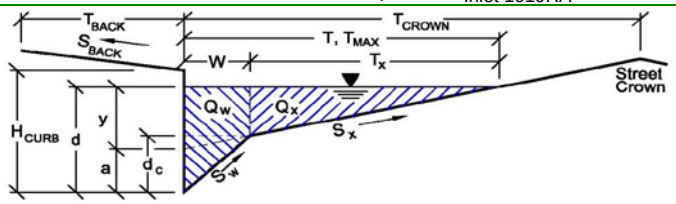
| | Minor Storm | Major Storm | |
|---|---|---|---|
| Design Storm Return Period, $T_r$ = | | | years |
| Return Period One-Hour Precipitation, $P_1$ = | | | inches |
| $C_1$ = | | | |
| $C_2$ = | | | |
| $C_3$ = | | | |
| User-Defined Storm Runoff Coefficient (leave this blank to accept a calculated value), C = | | | |
| User-Defined 5-yr. Runoff Coefficient (leave this blank to accept a calculated value), $C_5$ = | | | |
| **Bypass (Carry-Over) Flow from upstream Subcatchments, $Q_b$ =** | 0.0 | 0.0 | cfs |
| **Total Design Peak Flow, Q =** | 0.65 | 1.14 | cfs |

## ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

**(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)**

**Project:** **13-034.01 US 550 South Connection ~~SEIS Alternative Analysis~~**

**Inlet ID:** **~~Basin AM-10, Inlet 79~~** Inlet 1019RA




**Gutter Geometry (Enter data in the blue cells)**

| | | | |
|---|---|---|---|
| Maximum Allowable Width for Spread Behind Curb | $T_{BACK}$ = | 0.5 | ft |
| Side Slope Behind Curb (leave blank for no conveyance credit behind curb) | $S_{BACK}$ = | | ft/ft |
| Manning's Roughness Behind Curb (typically between 0.012 and 0.020) | $n_{BACK}$ = | 0.013 | |
| Height of Curb at Gutter Flow Line | $H_{CURB}$ = | 24.00 | inches |
| Distance from Curb Face to Street Crown | $T_{CROWN}$ = | 42.0 | ft |
| Gutter Width | W = | 8.00 | ft |
| Street Transverse Slope | $S_X$ = | 0.032 | ft/ft |
| Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft) | $S_W$ = | 0.032 | ft/ft |
| Street Longitudinal Slope - Enter 0 for sump condition | $S_O$ = | 0.010 | ft/ft |
| Manning's Roughness for Street Section (typically between 0.012 and 0.020) | $n_{STREET}$ = | 0.013 | |

| | | Minor Storm | Major Storm | |
|---|---|---|---|---|
| Max. Allowable Spread for Minor & Major Storm | $T_{MAX}$ = | 8.0 | 20.0 | ft |
| Max. Allowable Depth at Gutter Flowline for Minor & Major Storm | $d_{MAX}$ = | 6.0 | 12.0 | inches |
| Allow Flow Depth at Street Crown (leave blank for no) | | ☐ | ☐ | check = yes |

**MINOR STORM Allowable Capacity is based on Spread Criterion**

**MAJOR STORM Allowable Capacity is based on Spread Criterion**

| | Minor Storm | Major Storm | |
|---|---|---|---|
| **$Q_{allow}$ =** | **3.46** | **40.7** | **cfs** |

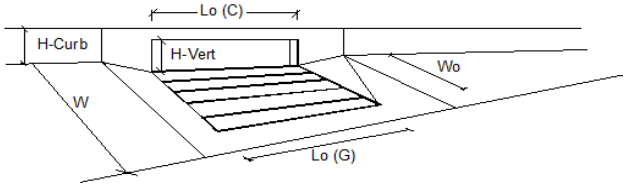
**Minor storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'**

**Major storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'**

# INLET ON A CONTINUOUS GRADE

**Project:** 13-034.01 US 550 South Connection ~~SEIS Alternative Analysis~~

**Inlet ID:** ~~Basin AM-10, Inlet 79~~ Inlet 1019RA



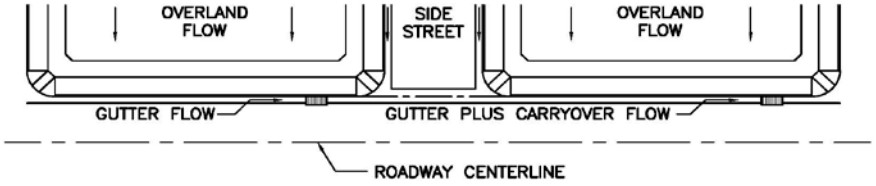

| Design Information (Input) | | MINOR | MAJOR | |
|---|---|---|---|---|
| Type of Inlet | Type = | Directional Cast Vane Grate | | |
| Local Depression (additional to continuous gutter depression 'a' from 'Q-Allow') | $a_{LOCAL}$ = | 0.0 | 0.0 | inches |
| Total Number of Units in the Inlet (Grate or Curb Opening) | No = | 1 | 1 | |
| Length of a Single Unit Inlet (Grate or Curb Opening) | $L_o$ = | 4.00 | 4.00 | ft |
| Width of a Unit Grate (cannot be greater than W from Q-Allow) | $W_o$ = | 2.00 | 2.00 | ft |
| Clogging Factor for a Single Unit Grate (typical min. value = 0.5) | $C_f$-G = | 0.50 | 0.50 | |
| Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1) | $C_f$-C = | N/A | N/A | |
| **Street Hydraulics: OK - Q < maximum allowable from sheet 'Q-Allow'** | | MINOR | MAJOR | |
| **Total Inlet Interception Capacity** | **Q =** | **0.65** | **0.98** | **cfs** |
| **Total Inlet Carry-Over Flow (flow bypassing inlet)** | **$Q_b$ =** | **0.00** | **0.16** | **cfs** |
| **Capture Percentage = $Q_a/Q_o$ =** | **C% =** | **100** | **86** | **%** |

Worksheet Protected

## DESIGN PEAK FLOW FOR ONE-HALF OF STREET OR GRASS-LINED CHANNEL BY THE RATIONAL METHOD

**Project:** 13-034.01 US 550 South Connection ~~SEIS Alternative Analysis~~

**Inlet ID:** ~~Basin AM-11, Inlet 72~~ Inlet 1012R




Show Details

**Design Flow:** ONLY if already determined through other methods:
(local peak flow for 1/2 of street OR grass-lined channel):

| | Minor Storm | Major Storm | |
|---|---|---|---|
| $*Q_{Known}$ = | 0.59 | 1.03 | cfs |

*** If you enter values in Row 14, skip the rest of this sheet and proceed to sheet Q-Allow or Area Inlet.**

<--- FILL IN THIS SECTION OR...

FILL IN THE SECTIONS BELOW. <---

**Geographic Information:** (Enter data in the blue cells):

| | | |
|---|---|---|
| Subcatchment Area = | | Acres |
| Percent Imperviousness = | | % |
| NRCS Soil Type = | | A, B, C, or D |

Site Type:
- Site is Urban
- Site is Non-Urban

Flows Developed For:
- Street Inlets
- Area Inlets in a Median

| | Slope (ft/ft) | Length (ft) |
|---|---|---|
| Overland Flow = | | |
| Channel Flow = | | |

**Rainfall Information:** Intensity I (inch/hr) = $C_1 * P_1 / ( C_2 + T_c ) ^ C_3$

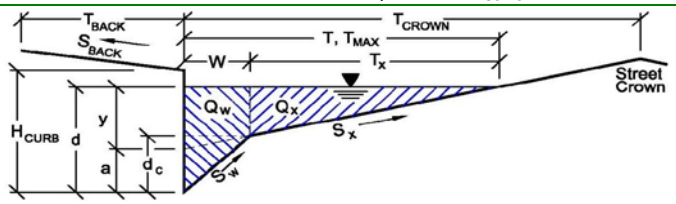
| | Minor Storm | Major Storm | |
|---|---|---|---|
| Design Storm Return Period, $T_r$ = | | | years |
| Return Period One-Hour Precipitation, $P_1$ = | | | inches |
| $C_1$ = | | | |
| $C_2$ = | | | |
| $C_3$ = | | | |
| User-Defined Storm Runoff Coefficient (leave this blank to accept a calculated value), C = | | | |
| User-Defined 5-yr. Runoff Coefficient (leave this blank to accept a calculated value), $C_5$ = | | | |
| **Bypass (Carry-Over) Flow from upstream Subcatchments, $Q_b$ =** | 0.0 | 1.0 | cfs |
| **Total Design Peak Flow, Q =** | 0.59 | 2.07 | cfs |

## ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

**(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)**

**Project:** 13-034.01 US 550 South Connection ~~SEIS Alternative Analysis~~

**Inlet ID:** ~~Basin AM-11, Inlet 72~~ Inlet 1012R




**Gutter Geometry (Enter data in the blue cells)**

| | | | |
|---|---|---|---|
| Maximum Allowable Width for Spread Behind Curb | $T_{BACK}$ = | 0.5 | ft |
| Side Slope Behind Curb (leave blank for no conveyance credit behind curb) | $S_{BACK}$ = | | ft/ft |
| Manning's Roughness Behind Curb (typically between 0.012 and 0.020) | $n_{BACK}$ = | 0.013 | |
| Height of Curb at Gutter Flow Line | $H_{CURB}$ = | 24.00 | inches |
| Distance from Curb Face to Street Crown | $T_{CROWN}$ = | 42.0 | ft |
| Gutter Width | W = | 8.00 | ft |
| Street Transverse Slope | $S_X$ = | 0.033 | ft/ft |
| Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft) | $S_W$ = | 0.033 | ft/ft |
| Street Longitudinal Slope - Enter 0 for sump condition | $S_O$ = | 0.022 | ft/ft |
| Manning's Roughness for Street Section (typically between 0.012 and 0.020) | $n_{STREET}$ = | 0.013 | |

| | | Minor Storm | Major Storm | |
|---|---|---|---|---|
| Max. Allowable Spread for Minor & Major Storm | $T_{MAX}$ = | 8.0 | 20.0 | ft |
| Max. Allowable Depth at Gutter Flowline for Minor & Major Storm | $d_{MAX}$ = | 6.0 | 12.0 | inches |
| Allow Flow Depth at Street Crown (leave blank for no) | | ☐ | ☐ | check = yes |

| | | Minor Storm | Major Storm | |
|---|---|---|---|---|
| **MINOR STORM Allowable Capacity is based on Spread Criterion** | | | | |
| **MAJOR STORM Allowable Capacity is based on Spread Criterion** | **$Q_{allow}$ =** | **5.49** | **63.2** | **cfs** |

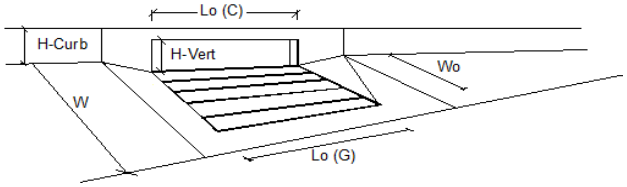
**Minor storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'**

**Major storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'**

# INLET ON A CONTINUOUS GRADE

**Project:** 13-034.01 US 550 South Connection ~~SEIS Alternative Analysis~~

**Inlet ID:** ~~Basin AM-11, Inlet 72~~ Inlet 1012R

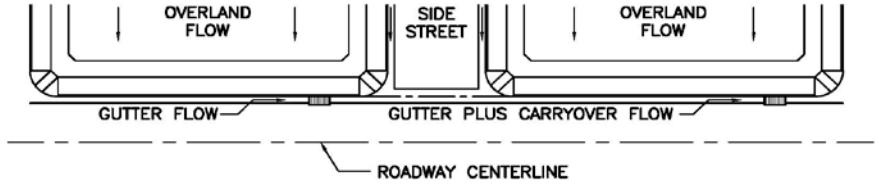



| Design Information (Input) | | MINOR | MAJOR | |
|---|---|---|---|---|
| Type of Inlet | Type = | Directional Cast Vane Grate | | |
| Local Depression (additional to continuous gutter depression 'a' from 'Q-Allow') | $a_{LOCAL}$ = | 0.0 | 0.0 | inches |
| Total Number of Units in the Inlet (Grate or Curb Opening) | No = | 1 | 1 | |
| Length of a Single Unit Inlet (Grate or Curb Opening) | $L_o$ = | 4.00 | 4.00 | ft |
| Width of a Unit Grate (cannot be greater than W from Q-Allow) | $W_o$ = | 2.00 | 2.00 | ft |
| Clogging Factor for a Single Unit Grate (typical min. value = 0.5) | $C_f$-G = | 0.50 | 0.50 | |
| Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1) | $C_f$-C = | N/A | N/A | |
| **Street Hydraulics: OK - Q < maximum allowable from sheet 'Q-Allow'** | | MINOR | MAJOR | |
| **Total Inlet Interception Capacity** | **Q =** | **-0.53** | **1.56** | **cfs** |
| **Total Inlet Carry-Over Flow (flow bypassing inlet)** | **$Q_b$ =** | **1.12** | **0.51** | **cfs** |
| **Capture Percentage = $Q_a/Q_o$ =** | **C% =** | **-90** | **75** | **%** |

Worksheet Protected

## DESIGN PEAK FLOW FOR ONE-HALF OF STREET OR GRASS-LINED CHANNEL BY THE RATIONAL METHOD

**Project:** 13-034.01 US 550 South Connection ~~SEIS Alternative Analysis~~
**Inlet ID:** ~~Basin AM-11, Inlet 71~~ Inlet 1010R




Show Details

**Design Flow:** ONLY if already determined through other methods:
(local peak flow for 1/2 of street OR grass-lined channel):

| | Minor Storm | Major Storm | |
|---|---|---|---|
| *$Q_{Known}$ = | 0.54 | 0.95 | cfs |

*** If you enter values in Row 14, skip the rest of this sheet and proceed to sheet Q-Allow or Area Inlet.**

<--- FILL IN THIS SECTION OR...

FILL IN THE SECTIONS BELOW. <---

**Geographic Information:** (Enter data in the blue cells):

| | | |
|---|---|---|
| Subcatchment Area = | | Acres |
| Percent Imperviousness = | | % |
| NRCS Soil Type = | | A, B, C, or D |

Site Type:
- Site is Urban
- Site is Non-Urban

Flows Developed For:
- Street Inlets
- Area Inlets in a Median

| | Slope (ft/ft) | Length (ft) |
|---|---|---|
| Overland Flow = | | |
| Channel Flow = | | |

**Rainfall Information:** Intensity I (inch/hr) = $C_1 * P_1 / ( C_2 + T_c ) ^ C_3$

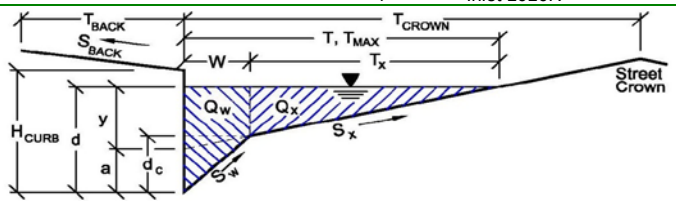
| | Minor Storm | Major Storm | |
|---|---|---|---|
| Design Storm Return Period, $T_r$ = | | | years |
| Return Period One-Hour Precipitation, $P_1$ = | | | inches |
| $C_1$ = | | | |
| $C_2$ = | | | |
| $C_3$ = | | | |
| User-Defined Storm Runoff Coefficient (leave this blank to accept a calculated value), C = | | | |
| User-Defined 5-yr. Runoff Coefficient (leave this blank to accept a calculated value), $C_5$ = | | | |
| **Bypass (Carry-Over) Flow from upstream Subcatchments, $Q_b$ =** | 0.0 | 0.5 | cfs |
| **Total Design Peak Flow, Q =** | 0.54 | 1.46 | cfs |

## ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

**(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)**

**Project:** **13-034.01 US 550 South Connection ~~SEIS Alternative Analysis~~**

**Inlet ID:** **~~Basin AM-11, Inlet 71~~** Inlet 1010R




**Gutter Geometry (Enter data in the blue cells)**

| | | | |
|---|---|---|---|
| Maximum Allowable Width for Spread Behind Curb | $T_{BACK}$ = | 0.5 | ft |
| Side Slope Behind Curb (leave blank for no conveyance credit behind curb) | $S_{BACK}$ = | | ft/ft |
| Manning's Roughness Behind Curb (typically between 0.012 and 0.020) | $n_{BACK}$ = | 0.013 | |
| Height of Curb at Gutter Flow Line | $H_{CURB}$ = | 24.00 | inches |
| Distance from Curb Face to Street Crown | $T_{CROWN}$ = | 42.0 | ft |
| Gutter Width | W = | 8.00 | ft |
| Street Transverse Slope | $S_X$ = | 0.015 | ft/ft |
| Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft) | $S_W$ = | 0.015 | ft/ft |
| Street Longitudinal Slope - Enter 0 for sump condition | $S_O$ = | 0.014 | ft/ft |
| Manning's Roughness for Street Section (typically between 0.012 and 0.020) | $n_{STREET}$ = | 0.013 | |

| | | Minor Storm | Major Storm | |
|---|---|---|---|---|
| Max. Allowable Spread for Minor & Major Storm | $T_{MAX}$ = | 8.0 | 20.0 | ft |
| Max. Allowable Depth at Gutter Flowline for Minor & Major Storm | $d_{MAX}$ = | 6.0 | 12.0 | inches |
| Allow Flow Depth at Street Crown (leave blank for no) | | ☐ | ☐ | check = yes |

| | | Minor Storm | Major Storm | |
|---|---|---|---|---|
| **MINOR STORM Allowable Capacity is based on Spread Criterion** | | | | |
| **MAJOR STORM Allowable Capacity is based on Spread Criterion** | **$Q_{allow}$ =** | **1.19** | **13.7** | **cfs** |

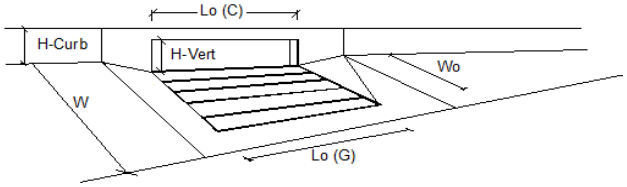
**Minor storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'**

**Major storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'**

# INLET ON A CONTINUOUS GRADE

**Project:** 13-034.01 US 550 South Connection ~~SEIS Alternative Analysis~~

**Inlet ID:** ~~Basin AM-11, Inlet 71~~ Inlet 1010R

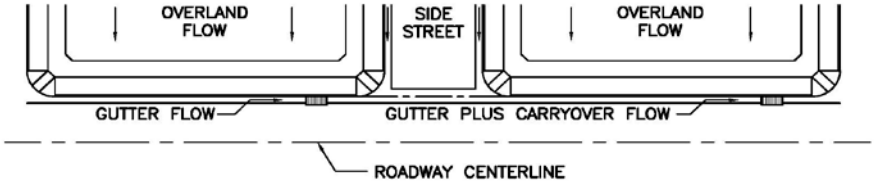



| Design Information (Input) | | MINOR | MAJOR | |
|---|---|---|---|---|
| Type of Inlet | Type = | Directional Cast Vane Grate | | |
| Local Depression (additional to continuous gutter depression 'a' from 'Q-Allow') | $a_{LOCAL}$ = | 0.0 | 0.0 | inches |
| Total Number of Units in the Inlet (Grate or Curb Opening) | No = | 1 | 1 | |
| Length of a Single Unit Inlet (Grate or Curb Opening) | $L_o$ = | 4.00 | 4.00 | ft |
| Width of a Unit Grate (cannot be greater than W from Q-Allow) | $W_o$ = | 2.00 | 2.00 | ft |
| Clogging Factor for a Single Unit Grate (typical min. value = 0.5) | $C_f$-G = | 0.50 | 0.50 | |
| Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1) | $C_f$-C = | N/A | N/A | |
| **Street Hydraulics: OK - Q < maximum allowable from sheet 'Q-Allow'** | | MINOR | MAJOR | |
| **Total Inlet Interception Capacity** | **Q =** | **0.37** | **0.67** | **cfs** |
| **Total Inlet Carry-Over Flow (flow bypassing inlet)** | **$Q_b$ =** | **0.17** | **0.79** | **cfs** |
| **Capture Percentage = $Q_a/Q_o$ =** | **C% =** | **68** | **46** | **%** |

Worksheet Protected

## DESIGN PEAK FLOW FOR ONE-HALF OF STREET OR GRASS-LINED CHANNEL BY THE RATIONAL METHOD

**Project:** 13-034.01 US 550 South Connection ~~SEIS Alternative Analysis~~
**Inlet ID:** ~~Basin AM-14, Inlet 66~~ Inlet 1007LB




Show Details

**Design Flow:** ONLY if already determined through other methods:
(local peak flow for 1/2 of street OR grass-lined channel):

| | Minor Storm | Major Storm | |
|---|---|---|---|
| *$Q_{Known}$ = | 2.06 | 3.63 | cfs |

*** If you enter values in Row 14, skip the rest of this sheet and proceed to sheet Q-Allow or Area Inlet.**

<--- FILL IN THIS SECTION OR...

**Geographic Information:** (Enter data in the blue cells):

FILL IN THE SECTIONS BELOW. <---

| | | |
|---|---|---|
| Subcatchment Area = | | Acres |
| Percent Imperviousness = | | % |
| NRCS Soil Type = | | A, B, C, or D |

Site Type:
- Site is Urban
- Site is Non-Urban

Flows Developed For:
- Street Inlets
- Area Inlets in a Median

| | Slope (ft/ft) | Length (ft) |
|---|---|---|
| Overland Flow = | | |
| Channel Flow = | | |

**Rainfall Information:** Intensity I (inch/hr) = $C_1 * P_1 / ( C_2 + T_c ) ^ C_3$

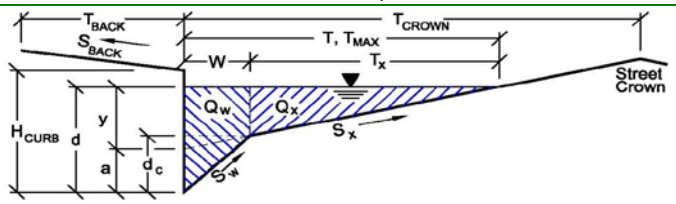
| | Minor Storm | Major Storm | |
|---|---|---|---|
| Design Storm Return Period, $T_r$ = | | | years |
| Return Period One-Hour Precipitation, $P_1$ = | | | inches |
| $C_1$ = | | | |
| $C_2$ = | | | |
| $C_3$ = | | | |
| User-Defined Storm Runoff Coefficient (leave this blank to accept a calculated value), C = | | | |
| User-Defined 5-yr. Runoff Coefficient (leave this blank to accept a calculated value), $C_5$ = | | | |
| **Bypass (Carry-Over) Flow from upstream Subcatchments, $Q_b$ =** | 0.0 | 0.0 | cfs |
| **Total Design Peak Flow, Q =** | 2.06 | 3.63 | cfs |

## ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

**(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)**

**Project:** **13-034.01 US 550 South Connection ~~SEIS Alternative Analysis~~**

**Inlet ID:** **~~Basin AM-14, Inlet 66~~** Inlet 1007LB




**Gutter Geometry (Enter data in the blue cells)**

| | | | |
|---|---|---|---|
| Maximum Allowable Width for Spread Behind Curb | $T_{BACK}$ = | 0.5 | ft |
| Side Slope Behind Curb (leave blank for no conveyance credit behind curb) | $S_{BACK}$ = | | ft/ft |
| Manning's Roughness Behind Curb (typically between 0.012 and 0.020) | $n_{BACK}$ = | 0.013 | |
| Height of Curb at Gutter Flow Line | $H_{CURB}$ = | 24.00 | inches |
| Distance from Curb Face to Street Crown | $T_{CROWN}$ = | 42.0 | ft |
| Gutter Width | W = | 8.00 | ft |
| Street Transverse Slope | $S_X$ = | 0.010 | ft/ft |
| Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft) | $S_W$ = | 0.010 | ft/ft |
| Street Longitudinal Slope - Enter 0 for sump condition | $S_O$ = | 0.000 | ft/ft |
| Manning's Roughness for Street Section (typically between 0.012 and 0.020) | $n_{STREET}$ = | 0.013 | |

| | | Minor Storm | Major Storm | |
|---|---|---|---|---|
| Max. Allowable Spread for Minor & Major Storm | $T_{MAX}$ = | 8.0 | 20.0 | ft |
| Max. Allowable Depth at Gutter Flowline for Minor & Major Storm | $d_{MAX}$ = | 6.0 | 12.0 | inches |
| Allow Flow Depth at Street Crown (leave blank for no) | | ☐ | ☐ | check = yes |

**MINOR STORM Allowable Capacity is based on Depth Criterion**

**MAJOR STORM Allowable Capacity is based on Depth Criterion**

| | Minor Storm | Major Storm | |
|---|---|---|---|
| $Q_{allow}$ = | **SUMP** | **SUMP** | **cfs** |

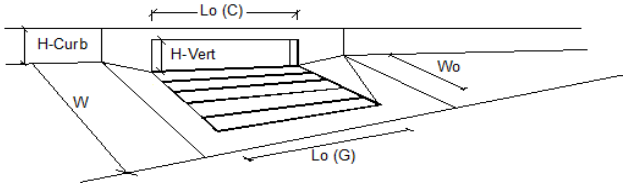
**Minor storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'**

**Major storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'**

# INLET ON A CONTINUOUS GRADE

**Project:** 13-034.01 US 550 South Connection ~~SEIS Alternative Analysis~~

**Inlet ID:** ~~Basin AM-14, Inlet 66~~ Inlet 1007LB



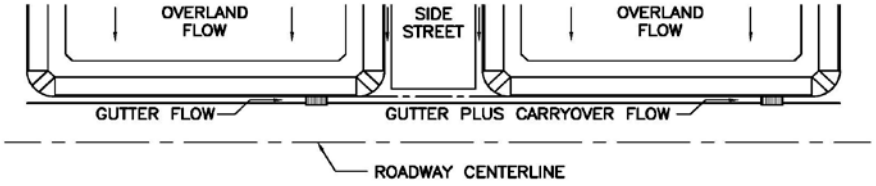

| Design Information (Input) | | MINOR | MAJOR | |
|---|---|---|---|---|
| Type of Inlet | Type = | Directional Cast Vane Grate | | |
| Local Depression (additional to continuous gutter depression 'a' from 'Q-Allow') | $a_{LOCAL}$ = | 0.0 | 0.0 | inches |
| Total Number of Units in the Inlet (Grate or Curb Opening) | No = | 1 | 1 | |
| Length of a Single Unit Inlet (Grate or Curb Opening) | $L_o$ = | 4.00 | 4.00 | ft |
| Width of a Unit Grate (cannot be greater than W from Q-Allow) | $W_o$ = | 2.00 | 2.00 | ft |
| Clogging Factor for a Single Unit Grate (typical min. value = 0.5) | $C_f$-G = | 0.50 | 0.50 | |
| Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1) | $C_f$-C = | N/A | N/A | |
| **Street Hydraulics: OK - Q < maximum allowable from sheet 'Q-Allow'** | | MINOR | MAJOR | |
| **Total Inlet Interception Capacity** | **Q =** | **0.37** | **0.67** | **cfs** |
| **Total Inlet Carry-Over Flow (flow bypassing inlet)** | **$Q_b$ =** | **1.69** | **2.96** | **cfs** |
| **Capture Percentage = $Q_a/Q_o$ =** | **C% =** | **18** | **18** | **%** |

Worksheet Protected

## DESIGN PEAK FLOW FOR ONE-HALF OF STREET OR GRASS-LINED CHANNEL BY THE RATIONAL METHOD

**Project:** 13-034.01 US 550 South Connection ~~SEIS Alternative Analysis~~

**Inlet ID:** ~~Basin AM-14, Inlet 59~~ Inlet 1003L




Show Details

**Design Flow:** ONLY if already determined through other methods:
(local peak flow for 1/2 of street OR grass-lined channel):

| | Minor Storm | Major Storm | |
|---|---|---|---|
| $*Q_{Known}$ = | 0.75 | 1.33 | cfs |

*** If you enter values in Row 14, skip the rest of this sheet and proceed to sheet Q-Allow or Area Inlet.**

<--- FILL IN THIS SECTION OR...

FILL IN THE SECTIONS BELOW. <---

**Geographic Information:** (Enter data in the blue cells):

| | | |
|---|---|---|
| Subcatchment Area = | | Acres |
| Percent Imperviousness = | | % |
| NRCS Soil Type = | | A, B, C, or D |

Site Type:
- Site is Urban
- Site is Non-Urban

Flows Developed For:
- Street Inlets
- Area Inlets in a Median

| | Slope (ft/ft) | Length (ft) |
|---|---|---|
| Overland Flow = | | |
| Channel Flow = | | |

**Rainfall Information:** Intensity I (inch/hr) = $C_1 * P_1 / ( C_2 + T_c ) ^ C_3$

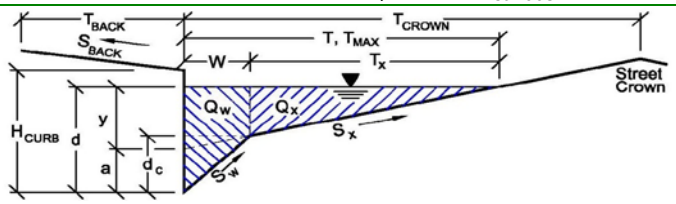
| | Minor Storm | Major Storm | |
|---|---|---|---|
| Design Storm Return Period, $T_r$ = | | | years |
| Return Period One-Hour Precipitation, $P_1$ = | | | inches |
| $C_1$ = | | | |
| $C_2$ = | | | |
| $C_3$ = | | | |
| User-Defined Storm Runoff Coefficient (leave this blank to accept a calculated value), C = | | | |
| User-Defined 5-yr. Runoff Coefficient (leave this blank to accept a calculated value), $C_5$ = | | | |
| **Bypass (Carry-Over) Flow from upstream Subcatchments, $Q_b$ =** | 0.0 | 0.0 | cfs |
| **Total Design Peak Flow, Q =** | 0.75 | 1.33 | cfs |

## ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

**(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)**

**Project:** 13-034.01 US 550 South Connection ~~SEIS Alternative Analysis~~

**Inlet ID:** ~~Basin AM-14, Inlet 59~~ Inlet 1003L




**Gutter Geometry (Enter data in the blue cells)**

| | | | |
|---|---|---|---|
| Maximum Allowable Width for Spread Behind Curb | $T_{BACK}$ = | 0.5 | ft |
| Side Slope Behind Curb (leave blank for no conveyance credit behind curb) | $S_{BACK}$ = | | ft/ft |
| Manning's Roughness Behind Curb (typically between 0.012 and 0.020) | $n_{BACK}$ = | 0.013 | |
| Height of Curb at Gutter Flow Line | $H_{CURB}$ = | 24.00 | inches |
| Distance from Curb Face to Street Crown | $T_{CROWN}$ = | 42.0 | ft |
| Gutter Width | W = | 8.00 | ft |
| Street Transverse Slope | $S_X$ = | 0.060 | ft/ft |
| Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft) | $S_W$ = | 0.060 | ft/ft |
| Street Longitudinal Slope - Enter 0 for sump condition | $S_O$ = | 0.015 | ft/ft |
| Manning's Roughness for Street Section (typically between 0.012 and 0.020) | $n_{STREET}$ = | 0.013 | |

| | | Minor Storm | Major Storm | |
|---|---|---|---|---|
| Max. Allowable Spread for Minor & Major Storm | $T_{MAX}$ = | 8.0 | 20.0 | ft |
| Max. Allowable Depth at Gutter Flowline for Minor & Major Storm | $d_{MAX}$ = | 6.0 | 12.0 | inches |
| Allow Flow Depth at Street Crown (leave blank for no) | | ☐ | ☐ | check = yes |

**MINOR STORM Allowable Capacity is based on Spread Criterion**

**MAJOR STORM Allowable Capacity is based on Depth Criterion**

| | Minor Storm | Major Storm | |
|---|---|---|---|
| $Q_{allow}$ = | **12.35** | **88.2** | **cfs** |

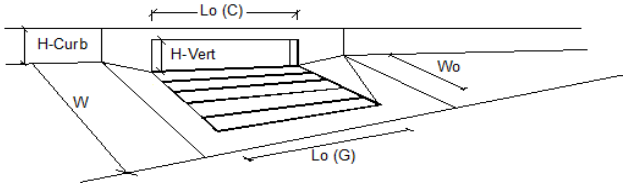
**Minor storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'**

**Major storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'**

# INLET ON A CONTINUOUS GRADE

**Project:** 13-034.01 US 550 South Connection ~~SEIS Alternative Analysis~~

**Inlet ID:** ~~Basin AM-14, Inlet 59~~ Inlet 1003L



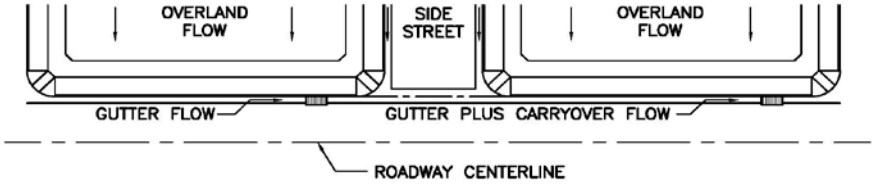

| Design Information (Input) | | MINOR | MAJOR | |
|---|---|---|---|---|
| Type of Inlet | Type = | Directional Cast Vane Grate | | |
| Local Depression (additional to continuous gutter depression 'a' from 'Q-Allow') | $a_{LOCAL}$ = | 0.0 | 0.0 | inches |
| Total Number of Units in the Inlet (Grate or Curb Opening) | No = | 1 | 1 | |
| Length of a Single Unit Inlet (Grate or Curb Opening) | $L_o$ = | 4.00 | 4.00 | ft |
| Width of a Unit Grate (cannot be greater than W from Q-Allow) | $W_o$ = | 2.00 | 2.00 | ft |
| Clogging Factor for a Single Unit Grate (typical min. value = 0.5) | $C_f$-G = | 0.50 | 0.50 | |
| Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1) | $C_f$-C = | N/A | N/A | |
| **Street Hydraulics: OK - Q < maximum allowable from sheet 'Q-Allow'** | | MINOR | MAJOR | |
| **Total Inlet Interception Capacity** | **Q =** | **-0.08** | **1.33** | **cfs** |
| **Total Inlet Carry-Over Flow (flow bypassing inlet)** | **$Q_b$ =** | **0.83** | **0.00** | **cfs** |
| **Capture Percentage = $Q_a/Q_o$ =** | **C% =** | **-11** | **100** | **%** |

Worksheet Protected

## DESIGN PEAK FLOW FOR ONE-HALF OF STREET OR GRASS-LINED CHANNEL BY THE RATIONAL METHOD

**Project:** 13-034.01 US 550 South Connection ~~SEIS Alternative Analysis~~

**Inlet ID:** ~~Basin AM-17, Inlet 40~~ Inlet 982R- changed to a Type C Inlet




Show Details

**Design Flow:** ONLY if already determined through other methods:
(local peak flow for 1/2 of street OR grass-lined channel):

| | Minor Storm | Major Storm | |
|---|---|---|---|
| $*Q_{Known}$ = | 0.23 | 0.46 | cfs |

*** If you enter values in Row 14, skip the rest of this sheet and proceed to sheet Q-Allow or Area Inlet.**

<--- FILL IN THIS SECTION OR...

FILL IN THE SECTIONS BELOW. <---

**Geographic Information:** (Enter data in the blue cells):

| | | |
|---|---|---|
| Subcatchment Area = | | Acres |
| Percent Imperviousness = | | % |
| NRCS Soil Type = | | A, B, C, or D |

Site Type:
- Site is Urban
- Site is Non-Urban

Flows Developed For:
- Street Inlets
- Area Inlets in a Median

| | Slope (ft/ft) | Length (ft) |
|---|---|---|
| Overland Flow = | | |
| Channel Flow = | | |

**Rainfall Information:** Intensity I (inch/hr) = $C_1 * P_1 / ( C_2 + T_c ) ^ C_3$

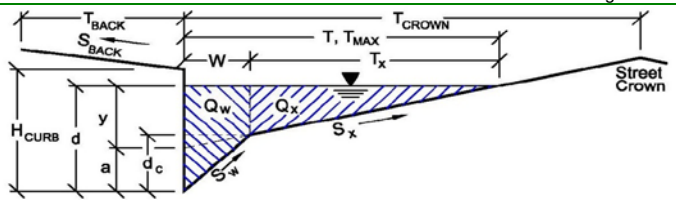
| | Minor Storm | Major Storm | |
|---|---|---|---|
| Design Storm Return Period, $T_r$ = | | | years |
| Return Period One-Hour Precipitation, $P_1$ = | | | inches |
| $C_1$ = | | | |
| $C_2$ = | | | |
| $C_3$ = | | | |
| User-Defined Storm Runoff Coefficient (leave this blank to accept a calculated value), C = | | | |
| User-Defined 5-yr. Runoff Coefficient (leave this blank to accept a calculated value), $C_5$ = | | | |
| **Bypass (Carry-Over) Flow from upstream Subcatchments, $Q_b$ =** | 0.0 | 0.0 | cfs |
| **Total Design Peak Flow, Q =** | 0.23 | 0.46 | cfs |

## ALLOWABLE CAPACITY FOR ONE-HALF OF STREET (Minor & Major Storm)

**(Based on Regulated Criteria for Maximum Allowable Flow Depth and Spread)**

**Project:** **13-034.01 US 550 South Connection ~~SEIS Alternative Analysis~~**

**Inlet ID:** **~~Basin AM-17, Inlet 40~~** Inlet 982R- changed to a Type C Inlet




**Gutter Geometry (Enter data in the blue cells)**

| | | | |
|---|---|---|---|
| Maximum Allowable Width for Spread Behind Curb | $T_{BACK}$ = | | ft |
| Side Slope Behind Curb (leave blank for no conveyance credit behind curb) | $S_{BACK}$ = | 0.000 | ft/ft |
| Manning's Roughness Behind Curb (typically between 0.012 and 0.020) | $n_{BACK}$ = | 0.013 | |
| Height of Curb at Gutter Flow Line | $H_{CURB}$ = | 11.00 | inches |
| Distance from Curb Face to Street Crown | $T_{CROWN}$ = | 35.0 | ft |
| Gutter Width | W = | 2.00 | ft |
| Street Transverse Slope | $S_X$ = | 0.167 | ft/ft |
| Gutter Cross Slope (typically 2 inches over 24 inches or 0.083 ft/ft) | $S_W$ = | 0.042 | ft/ft |
| Street Longitudinal Slope - Enter 0 for sump condition | $S_O$ = | 0.005 | ft/ft |
| Manning's Roughness for Street Section (typically between 0.012 and 0.020) | $n_{STREET}$ = | 0.013 | |

| | | Minor Storm | Major Storm | |
|---|---|---|---|---|
| Max. Allowable Spread for Minor & Major Storm | $T_{MAX}$ = | 7.0 | 35.0 | ft |
| Max. Allowable Depth at Gutter Flowline for Minor & Major Storm | $d_{MAX}$ = | 11.0 | 11.0 | inches |
| Allow Flow Depth at Street Crown (leave blank for no) | | ☐ | ☐ | check = yes |

| | | Minor Storm | Major Storm | |
|---|---|---|---|---|
| **MINOR STORM Allowable Capacity is based on Depth Criterion** | | | | |
| **MAJOR STORM Allowable Capacity is based on Depth Criterion** | **$Q_{allow}$ =** | **24.22** | **24.2** | **cfs** |

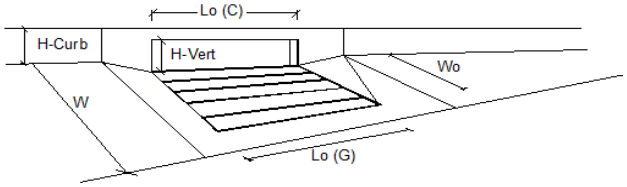
**Minor storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'**

**Major storm max. allowable capacity GOOD - greater than flow given on sheet 'Q-Peak'**

# INLET ON A CONTINUOUS GRADE

**Project:** 13-034.01 US 550 South Connection ~~SEIS Alternative Analysis~~

**Inlet ID:** ~~Basin AM-17, Inlet 40~~ Inlet 982R- changed to a Type C Inlet




| **Design Information (Input)** | | MINOR | MAJOR | |
|---|---|---|---|---|
| Type of Inlet | Type = | CDOT/Denver 13 Valley Grate | | |
| Local Depression (additional to continuous gutter depression 'a' from 'Q-Allow') | $a_{LOCAL}$ = | 2.0 | 2.0 | inches |
| Total Number of Units in the Inlet (Grate or Curb Opening) | No = | 1 | 1 | |
| Length of a Single Unit Inlet (Grate or Curb Opening) | $L_o$ = | 3.00 | 3.00 | ft |
| Width of a Unit Grate (cannot be greater than W from Q-Allow) | $W_o$ = | 1.73 | 1.73 | ft |
| Clogging Factor for a Single Unit Grate (typical min. value = 0.5) | $C_f$-G = | 0.50 | 0.50 | |
| Clogging Factor for a Single Unit Curb Opening (typical min. value = 0.1) | $C_f$-C = | N/A | N/A | |
| **Street Hydraulics: OK - Q < maximum allowable from sheet 'Q-Allow'** | | MINOR | MAJOR | |
| **Design Discharge for Half of Street (from Sheet *Q-Peak*)** | **$Q_o$ =** | 0.2 | 0.5 | cfs |
| Water Spread Width | T = | 2.3 | 2.5 | ft |
| Water Depth at Flowline (outside of local depression) | d = | 1.7 | 1.9 | inches |
| Water Depth at Street Crown (or at $T_{MAX}$) | $d_{CROWN}$ = | 0.0 | 0.0 | inches |
| Ratio of Gutter Flow to Design Flow | $E_o$ = | 1.491 | 0.986 | |
| Discharge outside the Gutter Section W, carried in Section $T_x$ | $Q_x$ = | 0.0 | 0.0 | cfs |
| Discharge within the Gutter Section W | $Q_w$ = | 0.3 | 0.5 | cfs |
| Discharge Behind the Curb Face | $Q_{BACK}$ = | 0.0 | 0.0 | cfs |
| Flow Area within the Gutter Section W | $A_W$ = | 0.20 | 0.25 | sq ft |
| Velocity within the Gutter Section W | $V_W$ = | 1.7 | 1.9 | fps |
| Water Depth for Design Condition | $d_{LOCAL}$ = | 3.7 | 3.9 | inches |
| **Grate Analysis (Calculated)** | | MINOR | MAJOR | |
| Total Length of Inlet Grate Opening | L = | 3.00 | 3.00 | ft |
| Ratio of Grate Flow to Design Flow | $E_{o\text{-}GRATE}$ = | 0.925 | 0.904 | |
| **Under No-Clogging Condition** | | MINOR | MAJOR | |
| Minimum Velocity Where Grate Splash-Over Begins | $V_o$ = | 1.56 | 1.56 | fps |
| Interception Rate of Frontal Flow | $R_f$ = | 0.98 | 0.97 | |
| Interception Rate of Side Flow | $R_x$ = | 0.84 | 0.81 | |
| Interception Capacity | $Q_i$ = | 0.3 | 0.4 | cfs |
| **Under Clogging Condition** | | MINOR | MAJOR | |
| Clogging Coefficient for Multiple-unit Grate Inlet | GrateCoef = | 1.00 | 1.00 | |
| Clogging Factor for Multiple-unit Grate Inlet | GrateClog = | 0.50 | 0.50 | |
| Effective (unclogged) Length of Multiple-unit Grate Inlet | $L_e$ = | 1.50 | 1.50 | ft |
| Minimum Velocity Where Grate Splash-Over Begins | $V_o$ = | 0.89 | 0.89 | fps |
| Interception Rate of Frontal Flow | $R_f$ = | 0.92 | 0.91 | |
| Interception Rate of Side Flow | $R_x$ = | 0.51 | 0.47 | |
| **Actual Interception Capacity** | **$Q_a$ =** | 0.2 | 0.4 | cfs |
| **Carry-Over Flow = $Q_o$-$Q_a$** (to be applied to curb opening or next d/s inlet) | **$Q_b$ =** | 0.0 | 0.1 | cfs |
| **Curb or Slotted Inlet Opening Analysis (Calculated)** | | MINOR | MAJOR | |
| Equivalent Slope $S_e$ (based on grate carry-over) | $S_e$ = | N/A | N/A | ft/ft |
| Required Length $L_T$ to Have 100% Interception | $L_T$ = | N/A | N/A | ft |
| **Under No-Clogging Condition** | | MINOR | MAJOR | |
| Effective Length of Curb Opening or Slotted Inlet (minimum of L, $L_T$) | L = | N/A | N/A | ft |
| Interception Capacity | $Q_i$ = | N/A | N/A | cfs |
| **Under Clogging Condition** | | MINOR | MAJOR | |
| Clogging Coefficient | CurbCoef = | N/A | N/A | |
| Clogging Factor for Multiple-unit Curb Opening or Slotted Inlet | CurbClog = | N/A | N/A | |
| Effective (Unclogged) Length | $L_e$ = | N/A | N/A | ft |
| **Actual Interception Capacity** | **$Q_a$ =** | N/A | N/A | cfs |
| **Carry-Over Flow = $Q_{b(GRATE)}$-$Q_a$** | **$Q_b$ =** | N/A | N/A | cfs |
| **Summary** | | MINOR | MAJOR | |
| **Total Inlet Interception Capacity** | **Q =** | **0.23** | **0.41** | **cfs** |
| **Total Inlet Carry-Over Flow (flow bypassing inlet)** | **$Q_b$ =** | **0.00** | **0.05** | **cfs** |
| **Capture Percentage = $Q_a$/$Q_o$ =** | **C% =** | **100** | **89** | **%** |

## HEC 22 Inlet Interception Capacity for Uniform Cross Slope

Muller Engineering Company  Date: 04/02/2014
Project Number: 13-034.01
Created by: KJG
Bridge Drains ~~93 & 92~~ Inlet 1032L &1032R

| | | | |
|---|---|---|---|
| **Grate Information** | | | |
| Width, W | 1.94 | ft | Width is perpendicular to flow direction |
| Length. L | 1 | | Length is parallel to flow direction |
| **Street Geometry** | | | |
| Manning's coefficient, n | 0.013 | | |
| Spreadwidth, T | 8 | ft | |
| Cross slope, Sx | 0.02 | ft/ft | |
| Longitudinal Slope, $S_L$ | 0.0321 | ft/ft | |
| Total Gutter Flow Rate, Q | 2.89 | cfs | (Equ 4-2) |
| Depth of flow, d | 0.16 | ft | (Equ 4-3) |
| Gutter Flow Velocity, V | 4.48 | ft/s | (Equ 4-13) |
| Frontal Flow:Gutter Flow, $E_0$ | 0.52 | | (Equ 4-4) |
| Initial Splash-over Velocity, Vo | 5.95 | ft/s | See Chart 5B |
| **Inlet Efficiency** | | | |
| Efficiency Frontal | | | |
| Flow Intercepted:Total Flow, $R_F$ | 1.00 | | (Equ 4-18) |
| Efficiency Side | | | |
| Flow Intercepted:Total Flow, $R_S$ | 0.009 | | (Equ 4-19) |
| Grate Efficiency, E | 0.53 | | (Equ 4-20) |
| **Adjustment for Gutter Width** | | | |
| Depressed Gutter Width | 1.94 | ft | |
| Depressed Gutter Length | 1 | ft | |
| Adjusted Grate Efficieny, E' | 0.53 | | (Equ 4-20a) |
| **Interception Capacity, $Q_i$** | 1.53 | cfs | (Equ 4-21) |

Add data
Do not edit

Equations come from Fedral Highway Administraions HEC-22, Third Edition

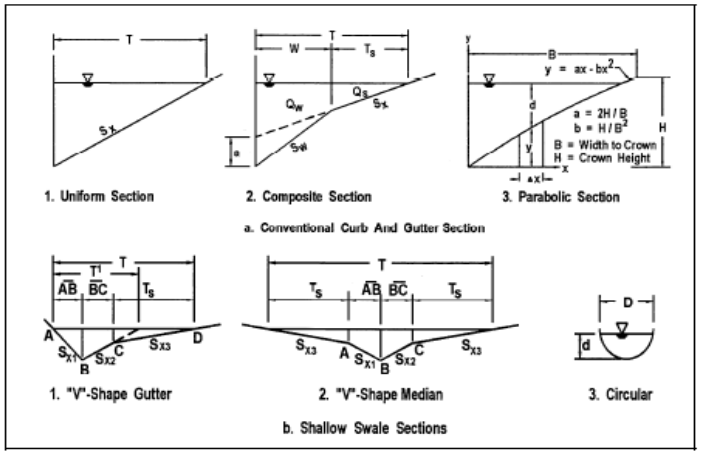



Figure 4-1. Typical gutter sections.

## HEC 22 Inlet Interception Capacity for Uniform Cross Slope

Muller Engineering Company  Date: 04/02/2014
Project Number: 13-034.01
Created by: KJG
Inlet ID: ~~BD-27 & BD-28~~ Inlet 1014L &1014R

| | | | |
|---|---|---|---|
| **Grate Information** | | | |
| Width, W | 1.94 | ft | Width is perpendicular to flow direction |
| Length. L | 1 | | Length is parallel to flow direction |
| Bridge Drains 75 & 74 | | | |
| **Street Geometry** | | | |
| Manning's coefficient, n | 0.013 | | |
| Spreadwidth, T | 8 | ft | |
| Cross slope, Sx | 0.0225 | ft/ft | |
| Longitudinal Slope, $S_L$ | 0.0321 | ft/ft | |
| Total Gutter Flow Rate, Q | 3.52 | cfs | (Equ 4-2) |
| Depth of flow, d | 0.18 | ft | (Equ 4-3) |
| Gutter Flow Velocity, V | 4.85 | ft/s | (Equ 4-13) |
| Frontal Flow:Gutter Flow, $E_0$ | 0.52 | | (Equ 4-4) |
| Initial Splash-over Velocity, Vo | 5.95 | ft/s | See Chart 5B |
| **Inlet Efficiency** | | | |
| Efficiency Frontal | | | |
| Flow Intercepted:Total Flow, $R_F$ | 1.00 | | (Equ 4-18) |
| Efficiency Side | | | |
| Flow Intercepted:Total Flow, $R_S$ | 0.009 | | (Equ 4-19) |
| Grate Efficiency, E | 0.53 | | (Equ 4-20) |
| **Adjustment for Gutter Width** | | | |
| Depressed Gutter Width | 1.94 | ft | |
| Depressed Gutter Length | 1 | ft | |
| Adjusted Grate Efficieny, E' | 0.53 | | (Equ 4-20a) |

| | | | |
|---|---|---|---|
| **Interception Capacity, $Q_i$** | 1.86 | cfs | (Equ 4-21) |

Add data
Do not edit

Equations come from Fedral Highway Administraions HEC-22, Third Edition

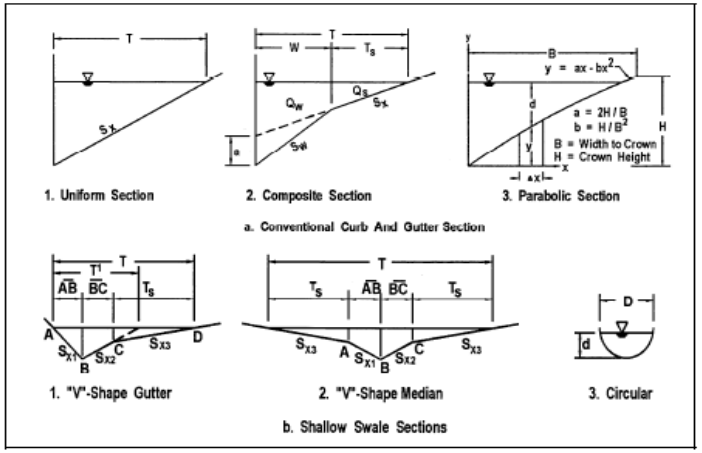



Figure 4-1. Typical gutter sections.