



**Serving the Seamless Gutter Industry Since 1972**

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[www.senox.com](http://www.senox.com)



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# Ray Burgess

A.A.S. – CFM

- **retired Chief Building Official**
- **licensed Plumbing Inspector**
- **licensed Master Plumber**
- **Certified Floodplain Manager**



**Serving the Seamless Gutter Industry Since 1972**

- strictly servicing the seamless gutter industry
- 10 company owned branches
- supplying over 31+ cities in 10+ states
- serving independent wholesalers coast to coast



# Aluminum Specifications

- 5" or 6" seamless aluminum gutters are made from 3105 Alloy, with a H-15 Tensile strength.
- Come standard with a 50 year paint warranty.
- roll formed seamless-ly on site?



# Seamless Gutters ?

- 25 colors of aluminum
- 16 oz  $\frac{3}{4}$  hard copper
- Galvalume plus





# Seamless Gutters ?

- **Corner to corner, no seams, no joints, no leaks!**



# Senox Code Outreach

- R801.3 code outreach
- Expansive soils
- Foundation Drainage
- Liability Education
- Roof Drainage Engineering
- Installation Best Practices
- Going “Green”
- Rain barrel Program
- Texas Administrative Code



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# Senox Code Outreach Program Goals

- To inform your local contractors, local officials, and home owners about the existing codes and standards.
- Create installation standards for architects, engineers, building officials, builders, gutter contractors, and consumers.



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# ?

## **How the International Residential Code R801.3 relates to:**

- **Architects/Engineers**
- **Building Officials**
- **Home builders**
- **Gutter contractors**
- **Home owners**
- **Foundation repair contractors**

# International Residential Code 2006

## Chapter 4 Foundations

- R401.3 Drainage. Surface drainage shall be diverted to a storm sewer conveyance or other approved point of collection so as not to create a hazard. Lots shall be graded to drain surface water away from foundation walls. The grad shall fall a minimum of 6 inches (152mm) within the first 10 feet (3048 mm)



## How the Texas Administrative Code

- Title 22            Examining Boards
- Part 23            Texas Real Estate Commission
- Chapter 535    General Provisions
- Subchapter R   Real Estate Inspectors
- Rule 535.228   Standards of Practice:  
inspection Guidelines for Structural Systems

# Residential Building Code

- Residential building codes already in place that specify a system that carries rainwater away from the residential structure.



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# Texas Administrative Code

## TREC Inspection

- Foundations: The inspector shall:
  - Report as in need of repair conditions or symptoms that may indicate the possibility of water penetration that are present and visible, such as improper grading around foundation walls or plumbing leaks; and
  - Report as in need of repair conditions that are present and visible and may be adversely affecting foundation performance, such as erosion or water ponding.

# Texas Administrative Code

## TREC Inspection

- Continued:
  - Roof, roof structure and attic. The inspector shall:
    - Report as in need of repair deficiencies in visible installed gutter and downspout systems

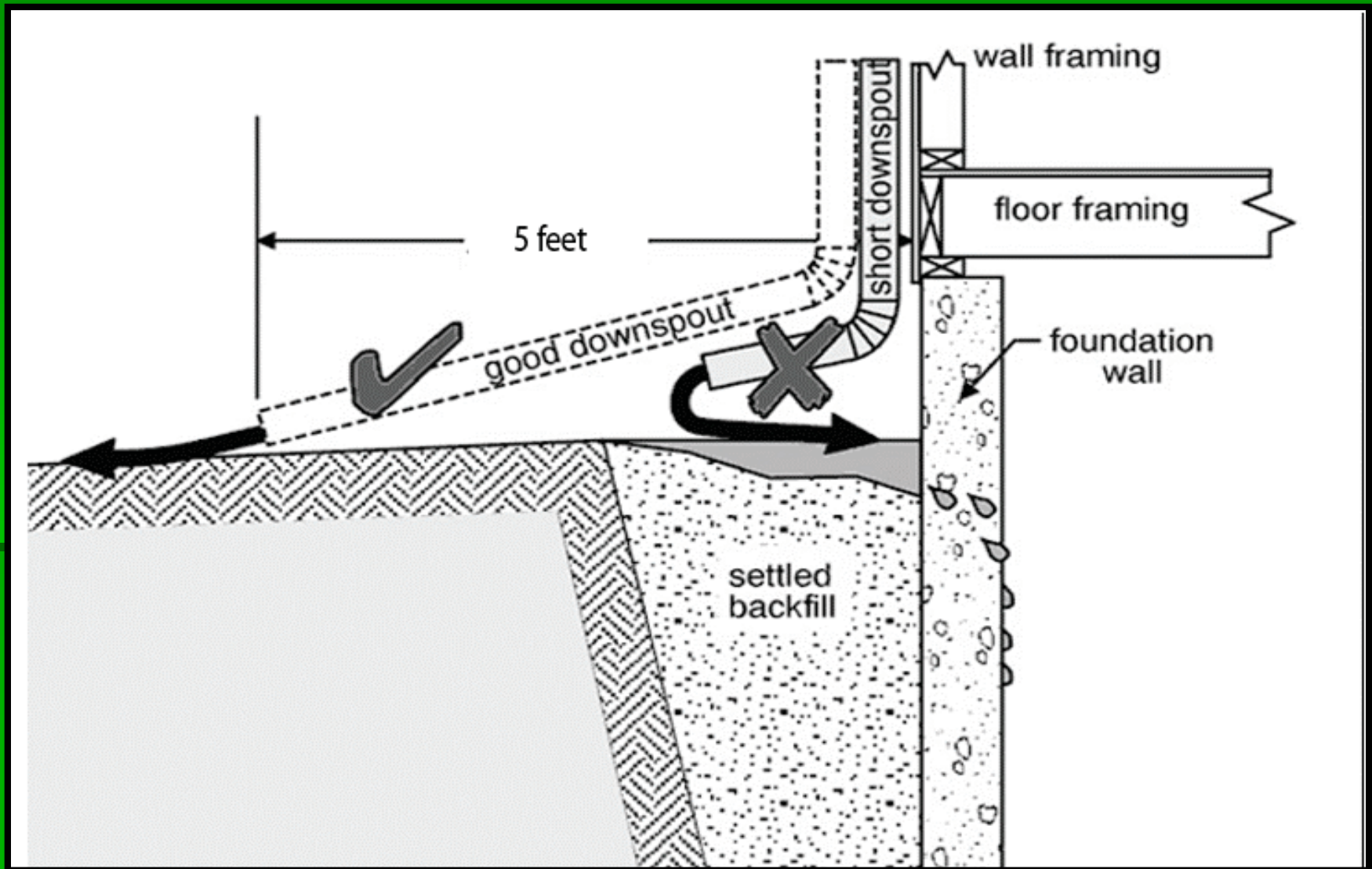
# **International Residential Code 2006**

## **Ch. 8 Roof-Ceiling Construction Section R801**

- **R801.3 Roof Drainage**

**“In areas where expansive or collapsible soils are known to exist, all dwellings shall have a controlled method of water disposal from roofs that will collect and discharge roof drainage to the ground surface at least 5 feet from foundation walls or to an approved drainage system.**

# Proper Roof Drainage Discharge



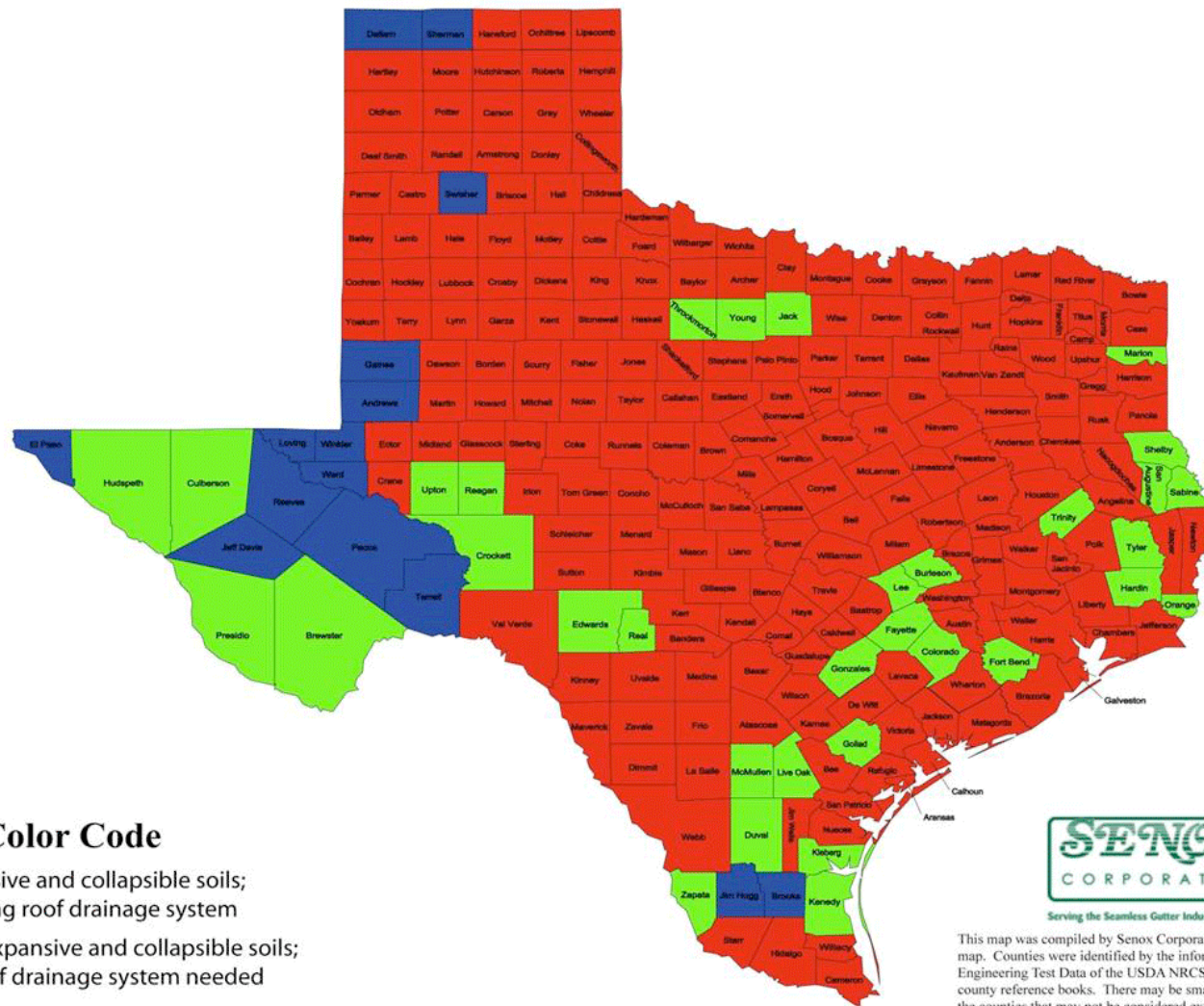


## Texas Soils

- Texas is cursed with having more than its share of expansive soils. These soils absorb large amounts of water and expand in volume, causing the ground beneath a structure to heave.
- The presence of these soils, also called reactive soils, is not always readily apparent due to layers of topsoil and dense vegetation.

# Expansive Soils in Texas

## SOIL MAP OF TEXAS COUNTIES NEEDING ROOF DRAINAGE SYSTEMS



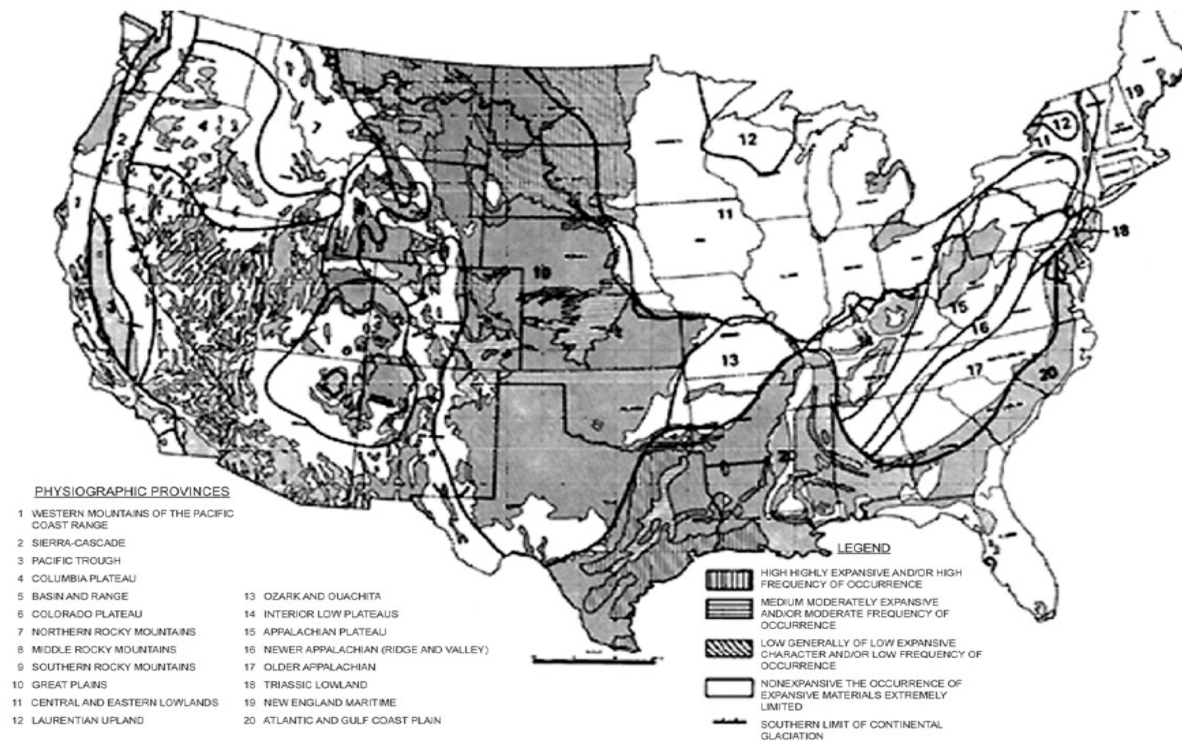
This map was compiled by Senox Corporation as a general reference map. Counties were identified by the information provided in the Engineering Test Data of the USDA NRCS Soil Survey of Texas county reference books. There may be small pockets of soils within the counties that may not be considered expansive or non-expansive. For detailed information about a specific site you need to conduct soil testing or locate the site on the Soil Survey maps to find the specific soil series and its attributes.

# IRC 2000 Commentary

## Volume I

- Saturated expansive or collapsible soils can lead to foundation failures because their additional loads are imposed on the foundation wall. To minimize the potential for the soil adjacent to the foundation wall to become saturated due to roof drainage, the code requires that the roof drain 5 feet away from the foundation.

# Soils That May Expand Up To 1,500%

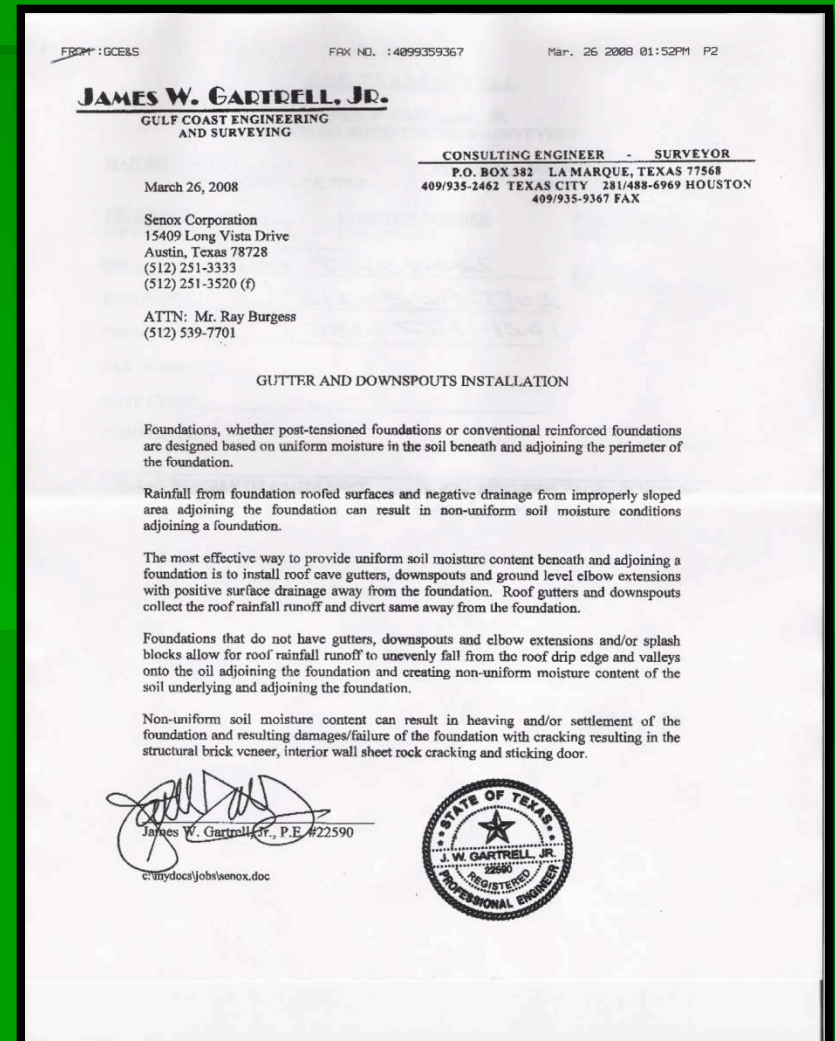


Source: U.S. Army Corps of Engineers "Occurrence & Distribution of Potentially Expansive Materials in the United States" (1977)



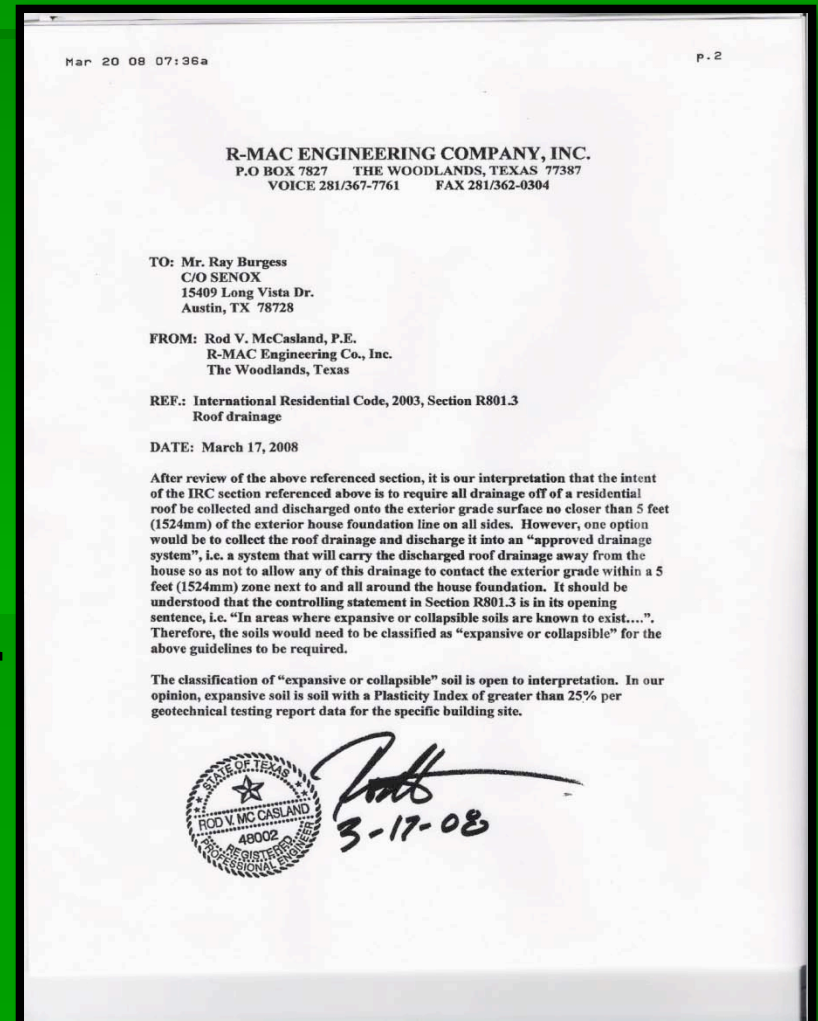
# P.E. Opinion

- In the opinion of a P.E. “the most effective way to provide uniform moisture control... is to install roof eave gutters, downspouts, and ground level elbow extensions...”.



# P.E. Opinion

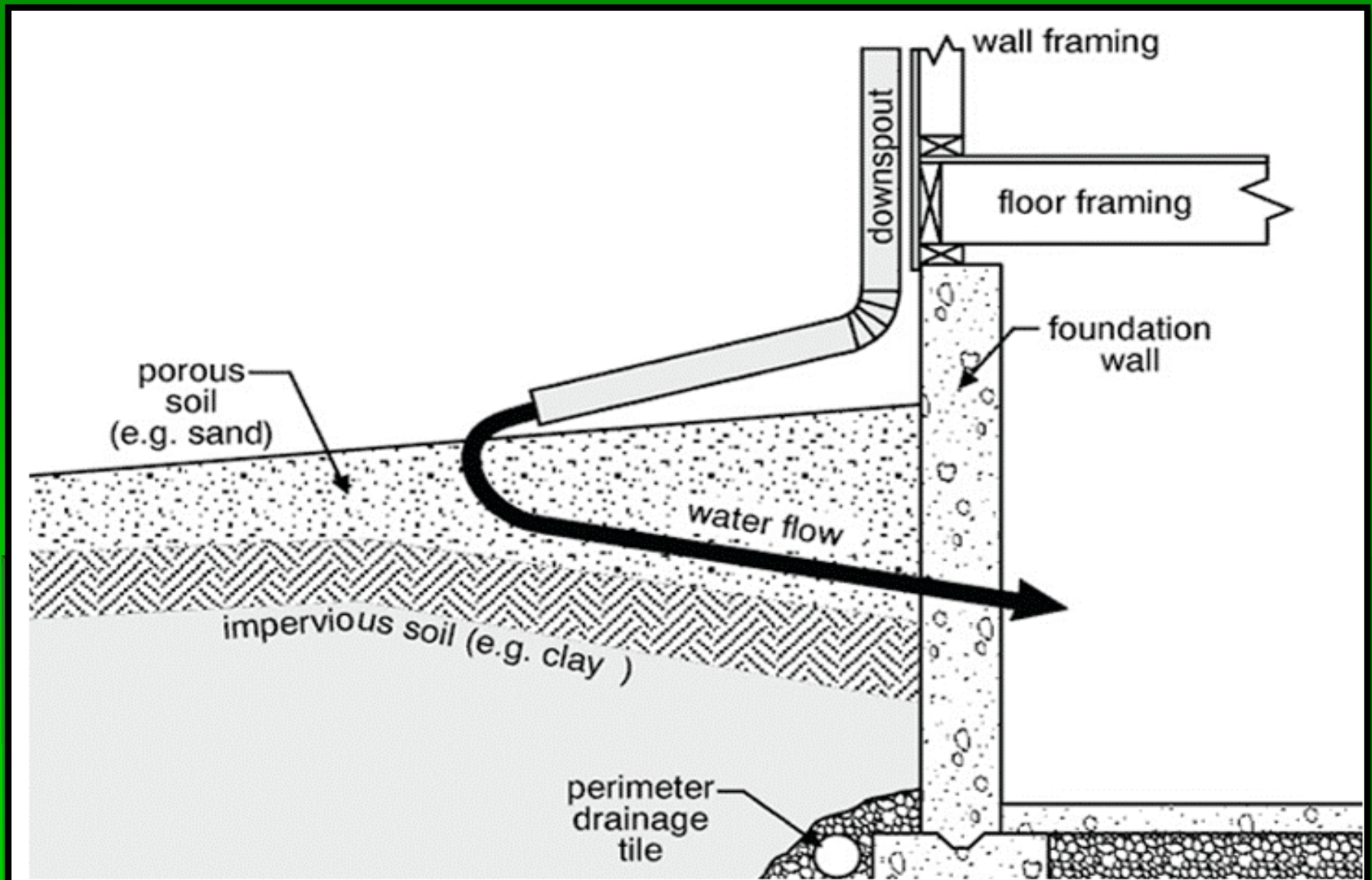
- In addition “non uniform soil moisture content can result in heaving”.
- Which is due to over-saturation of the soil cause by expansion of the molecules in the soil.



## ➡<sub>3</sub> Foundation Failures due Swelling/Reactive soils

- Expanding soil can make a structure's foundation "float", causing interior and exterior walls to crack and, at worst, the foundation's structural integrity to fail.
- To protect foundations on swelling soils roof drainage must be carried away from the soil closest to the foundation.
- This prevents the soils from becoming saturated and creating an unstable environment for the foundation.

# Backflow Prevention





# Cracked Foundations

- Texas - #1 state for foundation failures
- 70% of homes in Texas have no gutters for protection
- Average cost of foundation repair is \$5825 dollars
- Prevention of cracked foundations by use of a full wrap gutter system discharging 5ft



# Ruined Garage Doors

- Caused by splashes back from uncontrolled rainwater
- Makes metal doors rust
- Unsightly
- Dangerous
- Expensive to replace



# Foundation Performance Association

- Foundation Performance Association (FPA) is a professional organization dedicated to advancing the knowledge and professional standards of light foundation design, engineering, construction, inspection and repair.
- Is a non profit organization
- [www.foundationperformance.org](http://www.foundationperformance.org)

# FRA Foundation Repair Association

- A study of failed foundations (ADSC 2000) estimates that the cost of foundation repairs is over 12.5 billion dollars annually
- The most common cause of foundation problems/failures is poor maintenance.
- The primary function of good drainage is to prevent ponding near, or intrusion of water, under the structure, which would increase seasonal moisture fluctuations, or migration of water.

# FRA Foundation Repair Association

## Earth Perimeters

- Reverse or negative drainage will cause ponding of water during precipitation or heavy irrigation
- The type of vegetation may dictate a greater slope to avoid over saturation of the critical perimeter soil.



# Take a Stand!

- Its time to take a stand on a major issue involving most home in Texas.

**HELP  
PROTECT  
TEXAS  
FOUNDATIONS**



## **Survey of Liability in the Gulf Coast**

- **In an effort to quantify the potential liability from foundation failures Senox has gathered information from various cities and foundation repair companies.**
- **This information has been combined to show the potential liability to the municipal tax base.**
- **Identify those professional organization working to address the problem.**

# **Survey of Liability in the Gulf Coast**

- **According to the foundation repair industry only 50% of home with damaged foundation seek repairs.**

# Texas Survey

- Survey of foundation repair permits in Gulf Coast areas
- Total Population 186,000
- 285 Permits
- Average cost of repair \$5,825.00
- Repair cost \$1,660,267.00

	City of League City	City of Missouri City	City of Friendswood	City of Laporte
Population	58,000	65,000	29,000	24,000
# Permits	54	84	34	113
Estimated Cost of Repairs	\$321,540.00	\$ 439,915.00	\$172,475.00	\$726,337.00

# Potential Lost Revenue

based on survey in Gulf Coast Area

- Using the surveys' calculated total repair cost of 1.6 million, divided by the estimated mean home value of 200k, the potential lost revenue for the Gulf Coast Area is equivalent to 8.3 homes.
- Using the city tax rate of .65 cents per \$100 dollar valuation, the tax loss per home would be appx \$1300.
- Which means the total lost revenue potential for this survey area is approximately \$10,790.00 per year.



# **Central Appraisal District Evaluations - CAD**

- **Homeowners may appeal appraisal values due to:**
- **Documenting cracked walls and foundations,**
- **Repair estimates from foundation repair companies,**
- **Documenting inadequate site drainage,**
- **Exterior building conditions.**

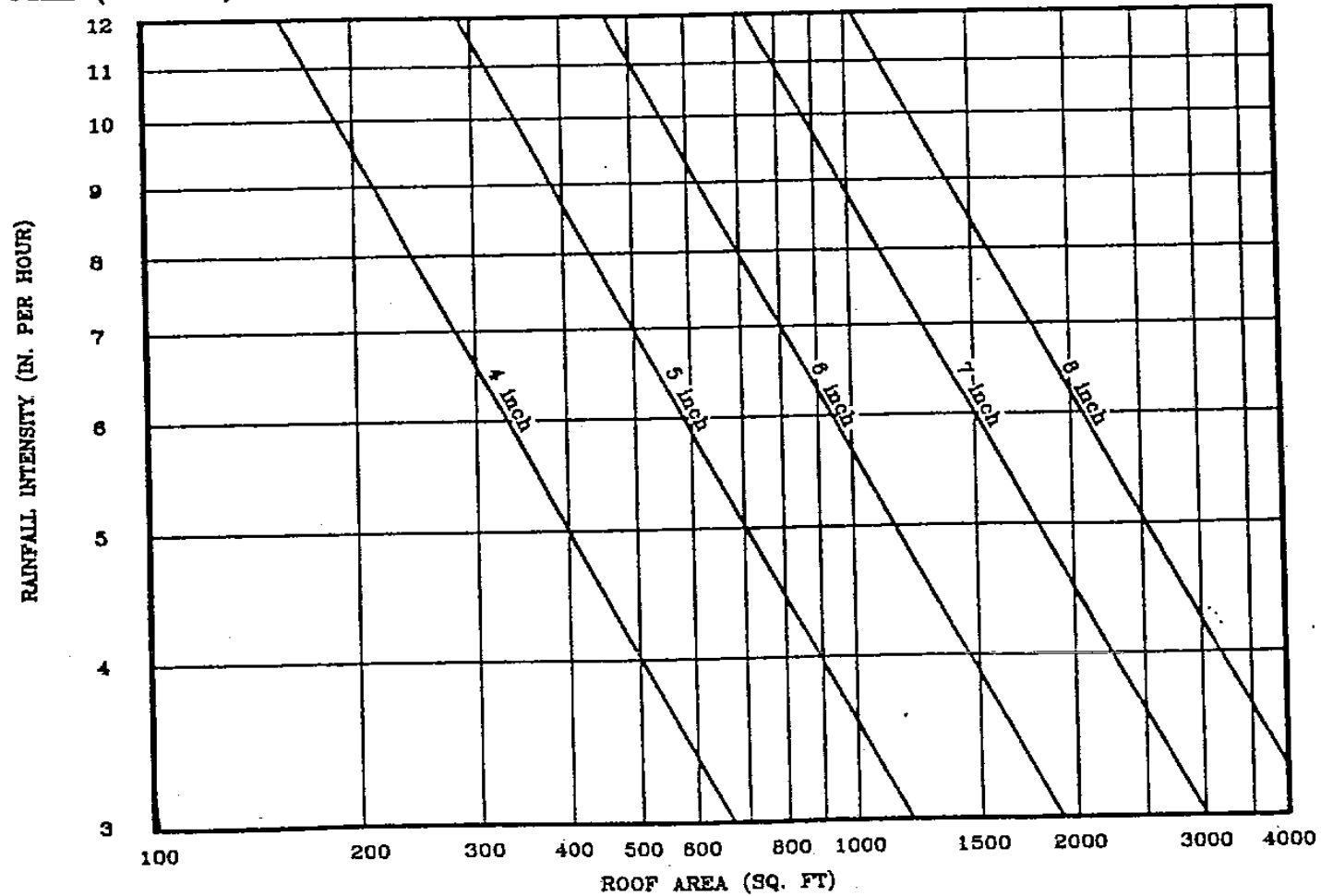


## Proper Gutter Sizing

- A 3" rainfall per hour on a 1200 sq ft roof would require a 5" gutter.
- With the same 3" rainfall per hour on a 2100 sq ft roof would require 6" gutters.
- The industry currently support seamless gutter up to 7" of capacity
- Proper gutter sizing calculation assume no less than 1/32" of fall per foot gutter.

# Rainfall Intensity

OGEE (K STYLE) AND QUARTER ROUND GUTTER SIZING

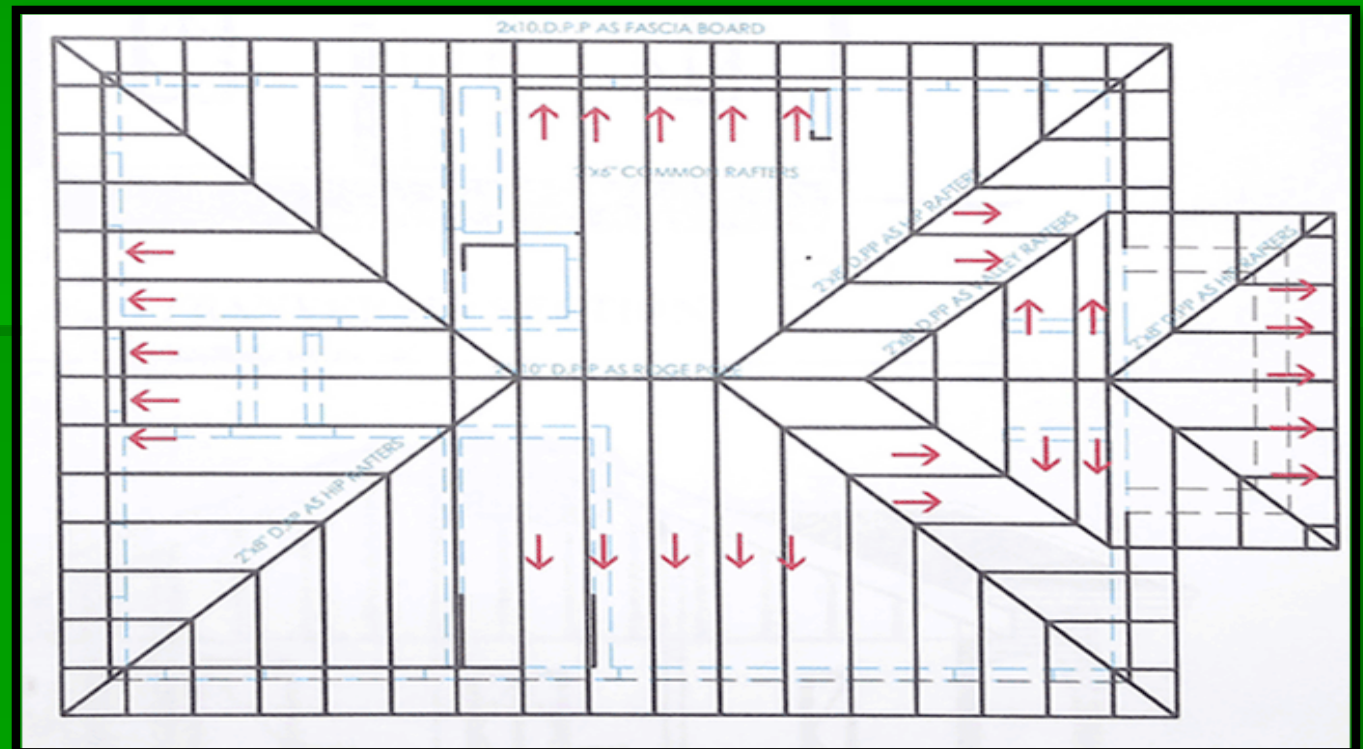


# Downspout Sizing

- Based on the 25 year rainfall intensity the minimum sizing of downspout is 1 sq in of downspout for every 100 sq ft of roof.
- On a 1200 sq ft roof the calculated minimum downspout would be 1.
- But, because the spacing cannot exceed a lateral distance of over 30 feet. The number of required downspouts would be 2.

# Roof Drainage Calculations

- A consideration, gable roofs may distort roof drainage calculations.

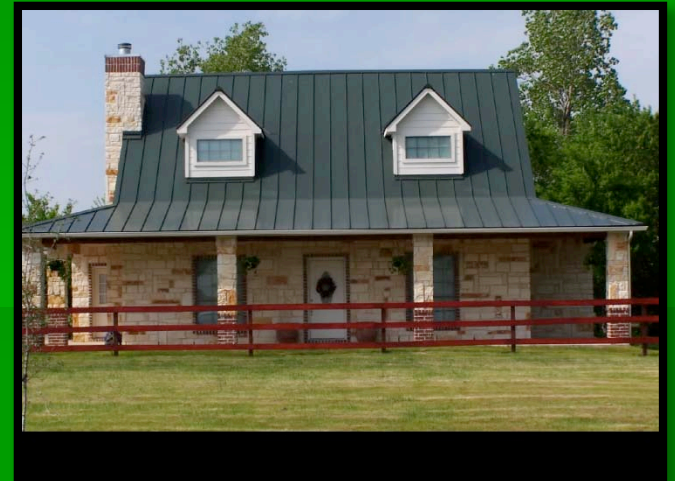


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# Roof Drainage Calculations

- Different types of roof texture may effect gutter sizing calculations.

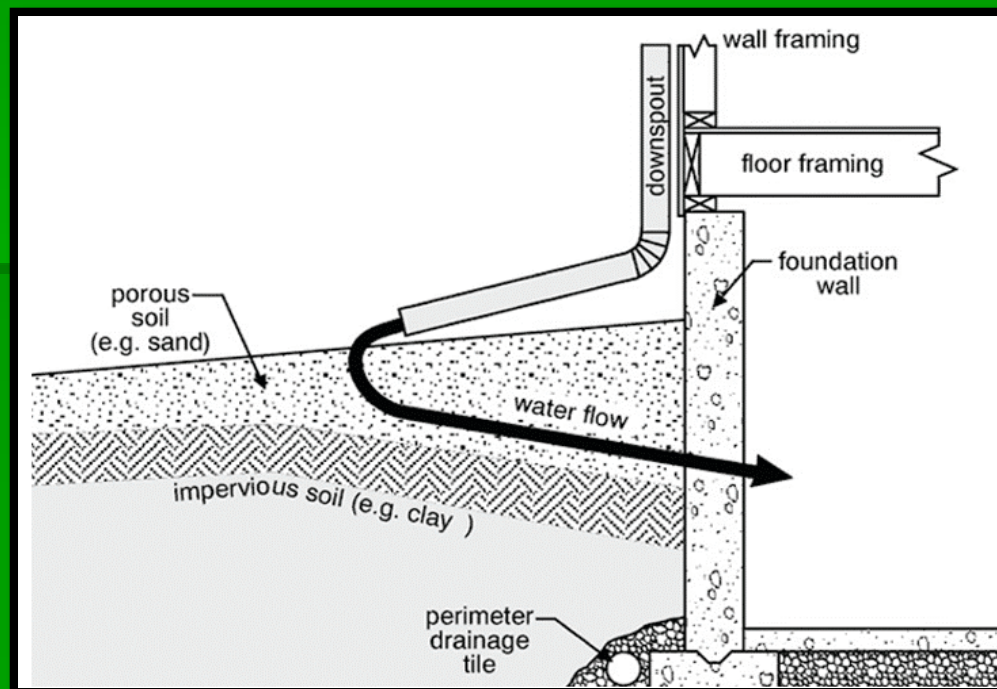


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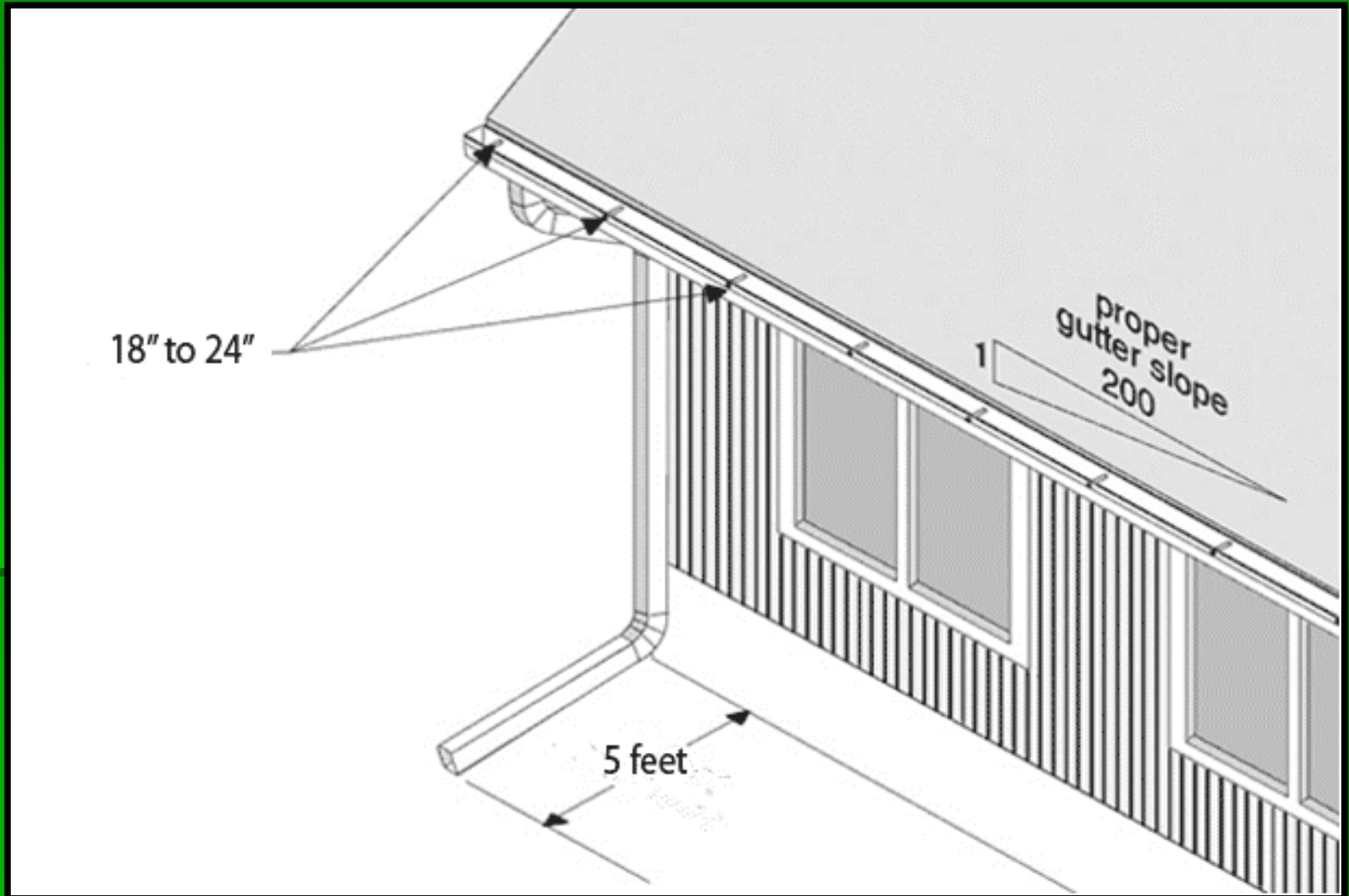


# Best Management Practices

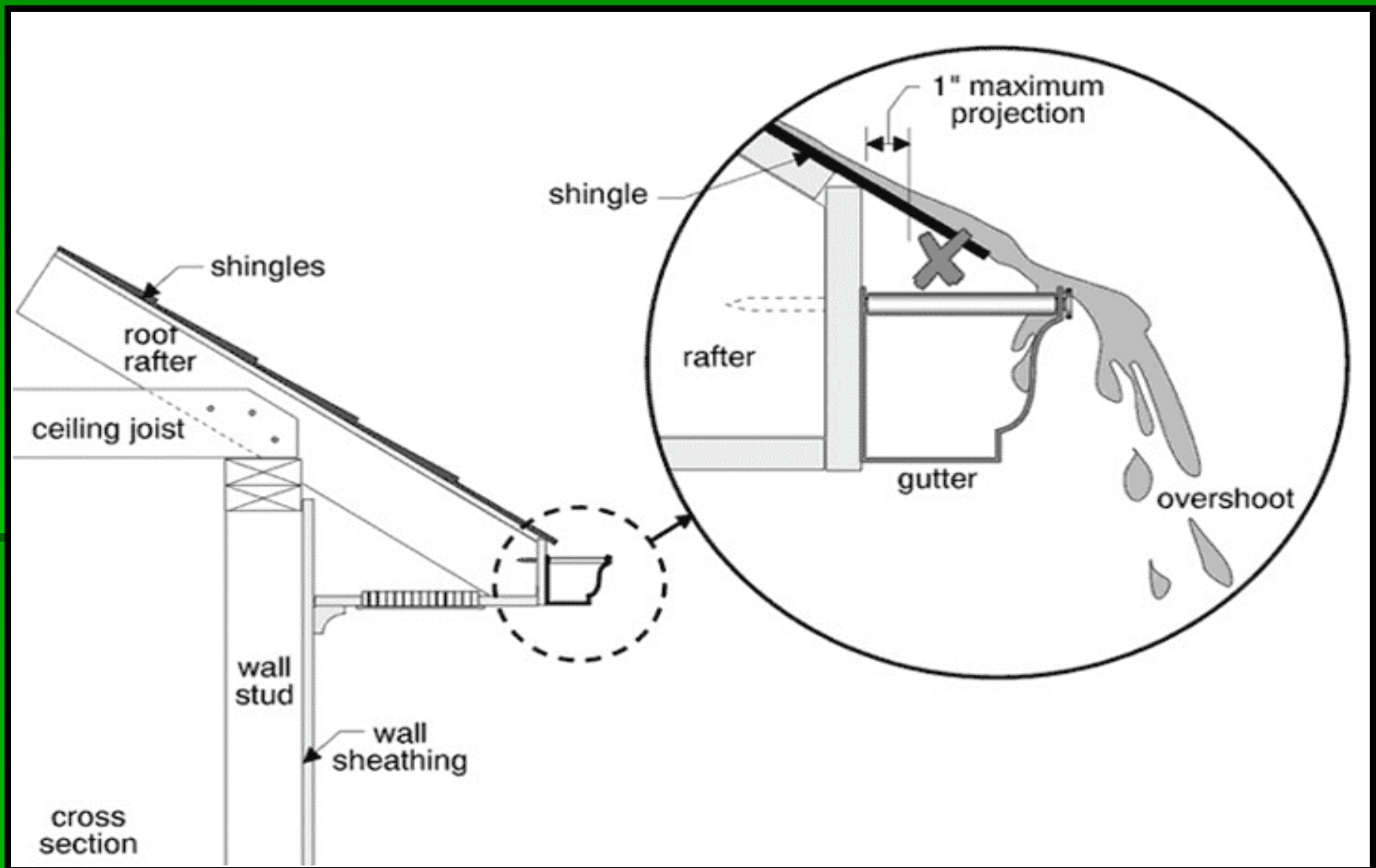
- Senox Corporation is in the process of developing installation standards and a set of best management practices.



# Seamless Gutter BMP's

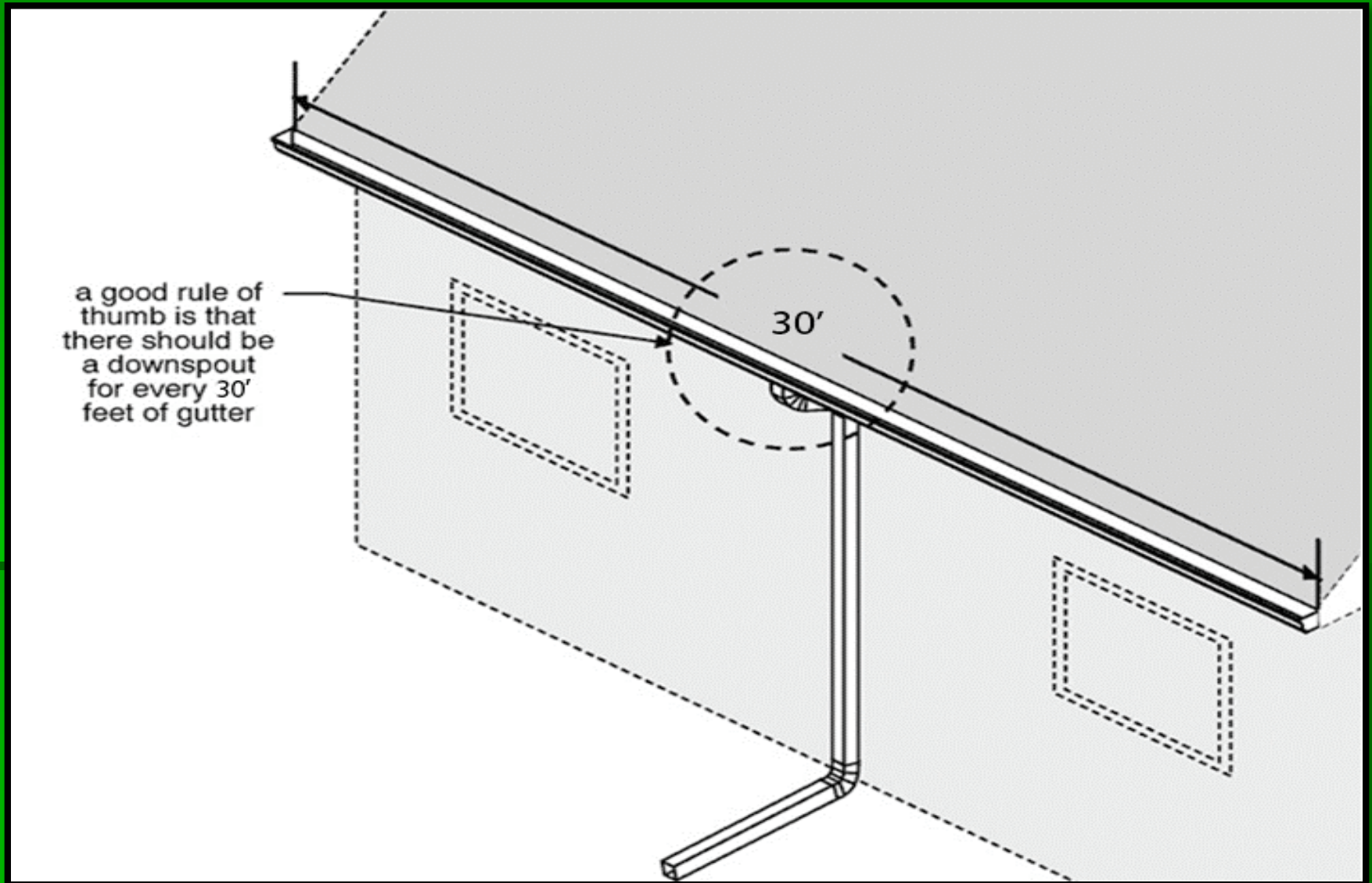


# Excess Shingle Overhang



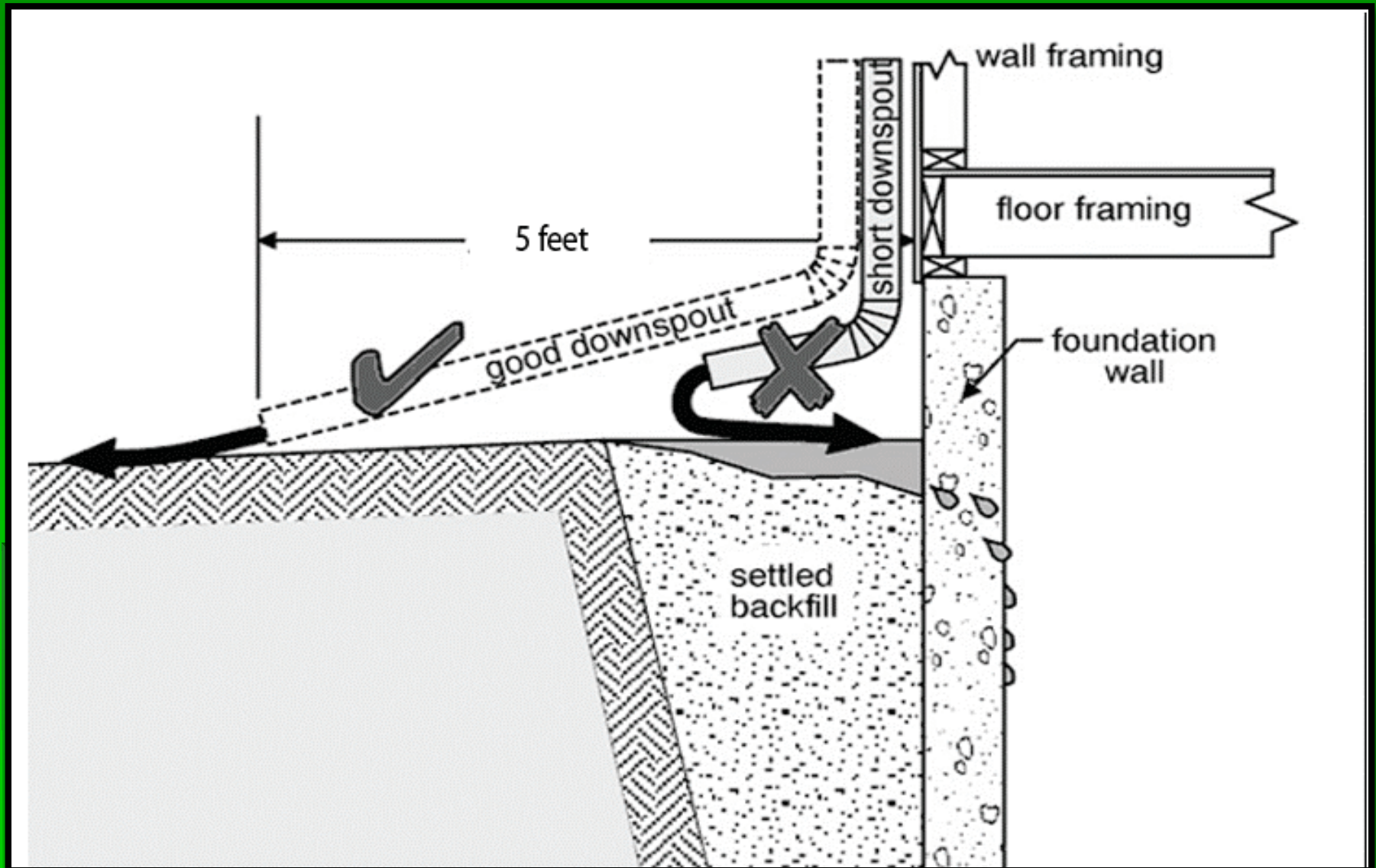


# Downspout Placement





# Proper Downspout Extensions

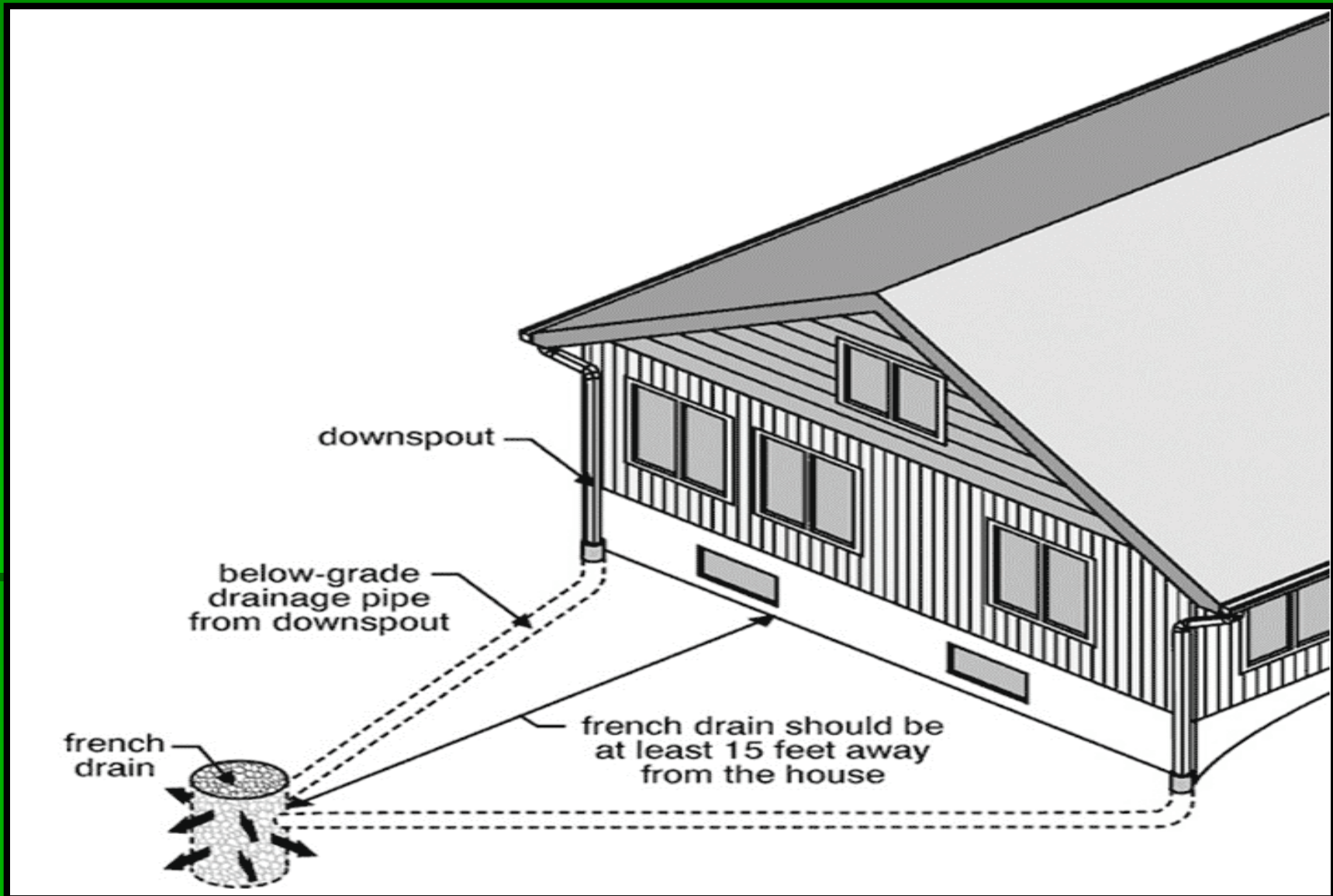


# Underground Downspout Extensions

- The preferred method for an underground downspout extension system is to use a square to round ADS adapter, available in either 2x3 or 3x4.
- Running black corrugated ADS pipe 5' feet away from foundations with an optional pop up emitter.



# French Drain





# Poly Splash Blocks

- The function of a splash block is prevent erosion at the foundation at the point of discharge.



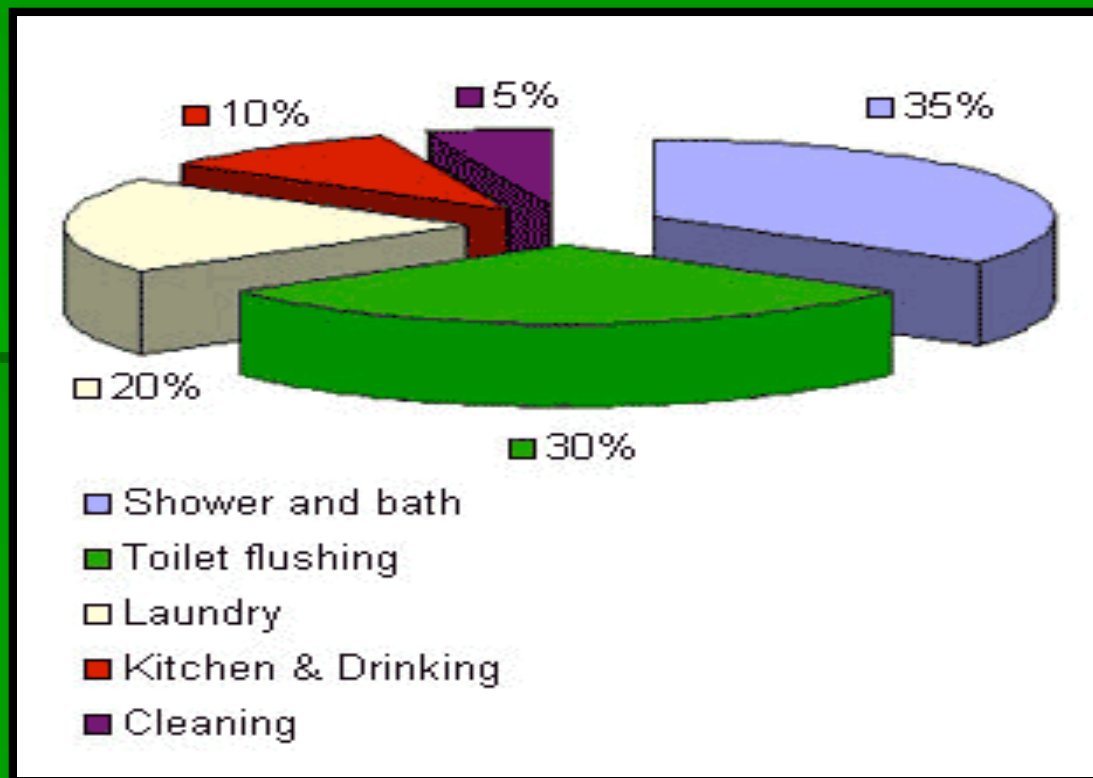
# Drip Edge Flashing

- Rotting fascia can occur when drip edge is not installed or is not installed properly over the gutter.



## 7 → Going “Green” with Gutters

- Senox is going green through the development of rain water harvesting products to help water conservation.



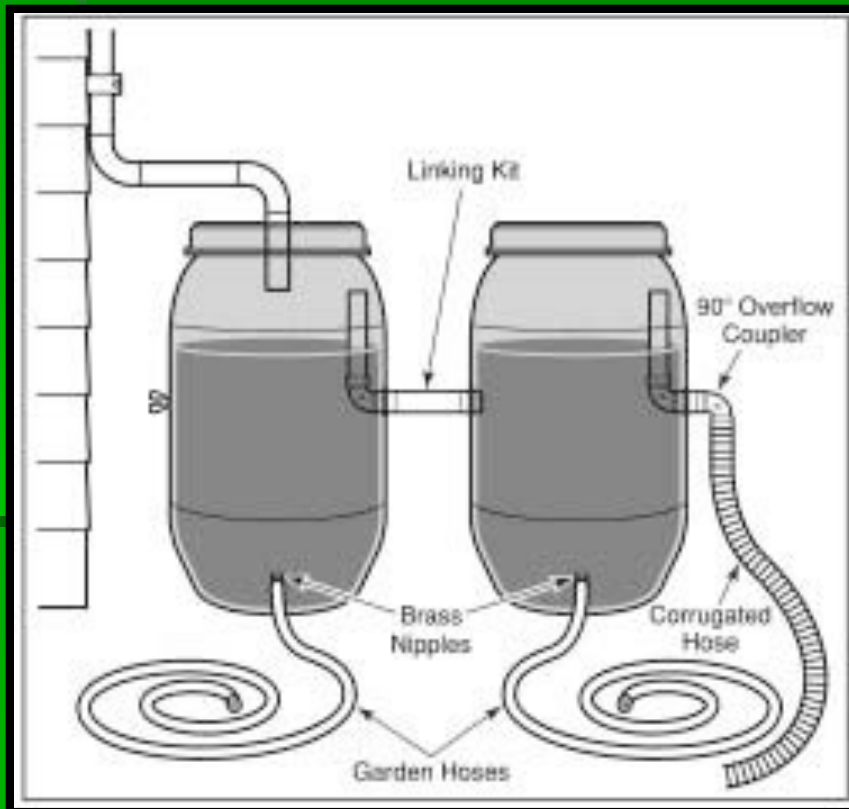


# 8 ➔ Spruce Creek Rainbarrel

- 54 Gallon, weight 20 lbs
- 36" H x 23" W
- Screened water intake port
- Brass threaded spigot
- Screened automatic overflow
- Easily connect two or more rainbarrels, through overflow valve.
- 1/4" thick, UV protected polyethylene
- 5 year materials warranty



# Connect TWO or more!



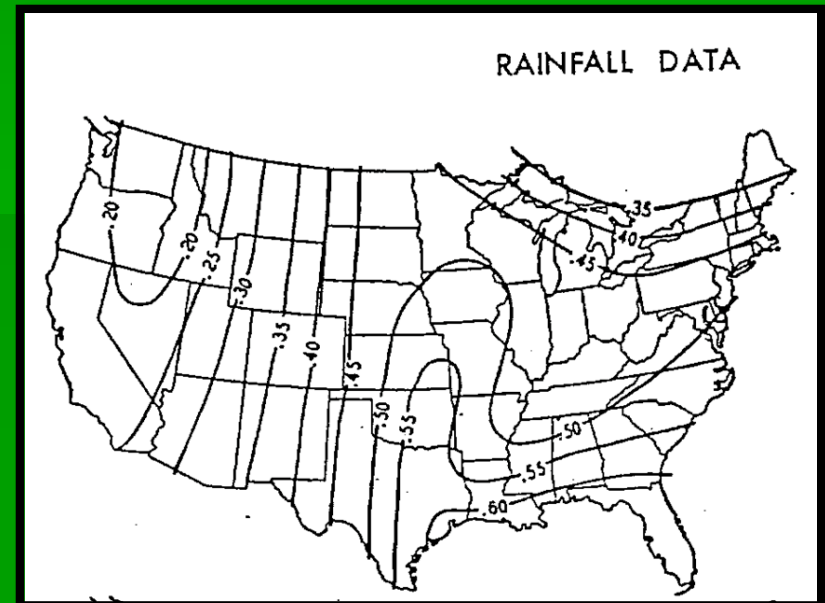
# Municipal Rainbarrel Program

- Example, City of Austin cost sharing program to home owners.
- Consumer cost \$60.
- Retail cost appx \$250.
- Required 5 year service.
- An additional rebate up to \$500 for a rainwater harvesting system.
- Water closet replacement program.



# Rain Water Harvesting

- In Texas, if you have a roof area of 2,500 square feet and a yearly average rainfall of 32 inches, you can collect almost 45,000 gallons of rainwater in a typical year.
- Rainwater harvesting is a viable method to achieve sustainability with regards to water resources.





# Rainwater Harvesting - RWH

- Rainwater has a nearly neutral pH of 0.
- An estimated 10,000 RWH systems are in use in the United States.
- RWH systems are exempt from state sales tax and property tax.
- RWH can reduce storm water run-off.
- Cost competitive with rural well system.



# Questions ?



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# Thank You!

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