Drain, Sewer and Septic

John A. Dolan, P.E., Rimkus Consulting Group
Steve Florence, CPCU, AIC, AIS, API, State Farm
Martin J. Frappolli, CPCU, FIDM, AIS, The Institutes
Property Technical Certification I—Core Property Adjusting Principles

Property Technical Certification II—Exterior Loss Adjusting

Details at www.TheInstitutes.org
Water

- Water inside a building
- Water outside a building
- Water that we want
- Water that we don’t want
Coverage Issues

• Claims issues follow coverage issues.
• What is covered?
• What is excluded?
• What are exceptions to the exclusions?
• How are policy definitions used to include or exclude coverage?
What Is a Flood?

A flood is:
A general and temporary condition of partial or complete inundation of two or more acres of normally dry land area or of two or more properties (at least one of which is your property) from:

- Overflow of inland or tidal waters
- Unusual and rapid accumulation or runoff of surface waters from any source
- Mudflow
Our Educational Objectives

For municipal sewer systems:

• List the common types
• Define common failures
• Determine causes of loss
• Determine functions that have failed
One Ancient Example—Rome’s Cloaca Maxima
Three Water Categories and Terms

- **White water** (Category 1)—fresh, potable water
- **Black water** (Category 3)—sewage water
- **Gray water** (Category 2)—the “in between” stuff
Drain-Related Causes of Loss

Water damage losses involving sumps, sewers, septic systems and drains are caused by a variety of drain failures.
Drain-Related Causes of Loss

1. Establish cause(s) of loss by process of elimination.
2. No drain-related losses if drain is functioning properly.
3. **THUS:** Use a process of elimination.

1. Multiple factors can cause a water damage loss.
2. Failures during heavy rains can involve multiple system defects that would not, by themselves, cause a drain failure.
3. **SIMPLY:** Examine individual causes of loss AND possible multiple-system failure.
Drain-Related Causes of Loss

The cause of loss portion of the adjuster's investigation will benefit from looking beyond the first identified drain failure.
Solving one drain problem may not be enough to prevent a future problem arising from a less-obvious drain problem.
Municipal Water Systems

Two types of municipal water systems:

- **Combined systems** (pre-1950)—combined sewage and storm water in the same drainage system
- **Separate systems** (post-1950)—developed as suburban expansion started to consume grassland and farms
Municipal Water Systems
The two most common types of wastewater treatment:

- **The septic system** is a closed system that is confined to the property.
- **The municipal wastewater treatment system** pipes untreated wastewater from the dwelling to a central treatment plant.
Ground and Storm Water Management

Two common systems for ground and storm water:

- Municipal storm systems
- Individual building drain systems
All of the following are reasons why the norm changed from combined municipal water systems to separate systems after 1950, EXCEPT:

A. High volume left it susceptible to sewage and storm back-up into homes and businesses.
B. Modern sewage treatment plants made it unnecessary.
C. It was harmful to the ecology and polluted streams and lakes.
D. Overflow of storm and ground water into a wastewater-treatment system can flush out untreated sewage.
Knowledge Check!

Which one of the following is a closed system confined to the property itself, consisting of an optional settling tank, a holding tank, a pipe leading to the drain field, and the drain field?

A. Sewage treatment plant
B. Municipal drainage system
C. Septic system
D. Individual building drain system
Wastewater treatment plants are common to municipalities with populations over 5,000.

- Wastewater is piped from buildings to underground sewer pipes that run under streets or sidewalks.
- If the developed area is situated at a lower elevation than the treatment plant, wastewater collects at a pumping station.
- Rising wastewater levels in the pumping station can trigger a reverse flow of wastewater.
- Unidirectional valves permit flow only in the direction of the treatment plant.
- Anti-reverse flow devices can also protect individual buildings.
Identifying Wastewater Source

- Identifying the source of wastewater at a loss site.
- Key is the quantity of wastewater involved in the loss.
- Were plumbing appliances continuously operated?
- Reverse flow from municipal system would have a virtually unlimited source of wastewater.
- A reverse-flow loss would resolve itself without corrective intervention by the building owner, such as roto-rooting the drainpipes.
- If the building owner shuts off the water supply to the building and wastewater continues to fill the interior low areas, the source is likely to be off premises.
Knowledge Check!

Describe the need for a pumping station in a municipal wastewater treatment system:

A. Needed for all treatment systems to get the wastewater to the treatment plant
B. Needed to separate the waste from the water in a combined system
C. Needed to prevent a reverse flow from occurring
D. Needed when the treatment plant is at a higher elevation than the community it serves
Knowledge Check!

All of the following are key factors in determining the source of wastewater that has flooded an insured premises, EXCEPT:

A. The quantity of the wastewater within the building
B. The odor of the wastewater in or outside the building
C. Situation impact when the building water is shut off
D. Corrective-action attempts by building owner
Septic Systems: The Basics

- Septic systems are self-contained and almost always located entirely on the insured premises.
- Systems are underground, above highest expected water table.
Common causes of septic system reverse flow are:

- Sewer gas buildup
- Flooding of the septic system (covered next)
Sewer gas occurs naturally during wastewater decomposition.
Sewer Gas

- Septic tank lid can become packed with impervious dirt.
- Methane gas can still vent unless the septic tank is overfilled.

Overfilled Septic Tank
Septic Tank Causes of Loss

- Trapped methane gas
- Flooding of the septic system

*Sewage backed up into drain field*
Methane Gas

- Trapped methane gas builds pressure and can blow back into the building through the plumbing fixtures.
- Methane eruptions occasionally can be violent, resulting in substantial damage to the interior of the building.
- Methane gas explosions are sudden and do not create a steady reverse flow of wastewater.
- Methane gas is flammable but rarely enters a building in sufficient quantities to present a fire hazard.
Septic Tank Causes of Loss

Flooding of the Septic System
- The most common cause of a reverse flow of wastewater.
- Defective construction or deterioration is likely.
- A repeat loss is likely unless the underlying cause is resolved.
All of the following circumstances can be associated with reverse flow in a septic system, EXCEPT:

A. Flooded drain field resulting from improper construction  
B. A deteriorated or damaged septic component  
C. Leaking faucets and toilet fixtures  
D. Buildup of methane gas
Knowledge Check!

Which of the following statements is not true about methane gas blow-back that occurs in septic systems?

A. It is gradual and can cause a sizeable, continuous backflow of wastewater.
B. It is flammable but rarely happens in sufficient quantities to present a fire hazard.
C. It is usually mild and creates a foul smell in the building.
D. It can occasionally cause a violent eruption and damage the building interior.
Sump Pumps

Explain the purpose of a sump pump and why it may fail.
Sump Pumps and the Water Table

- Common reasons for sump pump drain systems are near-surface water tables and flat terrain.
- Some geographic regions have high water tables.
- The water table is less affected by weather conditions than are rivers.
• Average water table lower than the lowest point in a basement or foundation wall
• Sump system developed to prevent flooding in basements and crawl spaces
• The sump pump is electrical.
• Debris can accumulate in the basin.
• Underground water pumped by the sump is considered gray water.
Sump pumps are needed for all of these reasons, EXCEPT:

A. To prevent backflow from municipal drainage systems
B. To alleviate hydrostatic pressure when there is underground water
C. To prevent flooding from a water table that has risen due to snow melts or rains
D. To drain the water from around the base of the foundation
Our Educational Objectives

• Describe how a municipal storm drain system works
• Explain hydrostatic pressure, its causes, and how it is prevented or relieved
• Differentiate gray water and black water and coverage issues that may come into play depending on the source of the water
Municipal Storm Drain Systems
Municipal Storm Drain Systems: The Basics

- Municipal storm drain systems channel runoff to nearby streams, rivers or lakes.
- During periods of heavy rainfall, some municipal storm drain systems can become filled to capacity. This is called surging.
Municipal Storm Drain Systems: The Basics

- During surging, water cannot exit the building into the municipal storm drain system. Water is forced back into the building via floor drains or sump well.
- In some cases, a reverse flow of water from the municipal system into the building's drain system can cause flooding of the basement.
- In extreme cases, foundation walls or concrete floors can be damaged if the water is held back by anti-reverse flow devices in the building's drain system.
Determining Water’s Origin

- Water entering building via floor drains or sump well: from municipal drain system or from the building's drain system?
- The municipality can indicate whether a potential breach in the system has caused a reverse flow.
Determining Water’s Origin

- If most area buildings suffer flooding from drains, the problem is caused by a reverse flow of the municipal drain system.
- If the problem is unique to a building, it is more likely that the cause is an overflow of water from the building's drain system.

![Diagram J](image)
Hydrostatic Pressure Damage: The Basics

• Buildings need drainage systems to channel groundwater and rainwater away from basements or foundation walls.
• Underground water creates hydrostatic pressure when it encounters a barrier such as a basement or foundation wall.
• Hydrostatic pressure can cause a foundation wall to collapse.
Building Drain Systems

Drain systems can be inside the foundation walls, outside the walls, or both.
Drain Systems

Sealed Sump Cover
- In areas where radon is of concern (see spec. 2.1)
- A sealed (gasketed) sump lid prevents the release of radon (if present) from the sump to the basement.

Sump Pump Removal of Water

Check Valve

Minimum Slope 1/2 in./ft.
Over Min 10-ft.

Discharge "To Daylight"
Drain Systems

- **Filter Fabric**
- **Coarse Gravel (no fines)**
- **Footing**
- **Perforated Drain Pipe**
- **Solid Drain Pipe**

Drain 'to daylight', rain harvest, or other approved disposal.

**Foundation Drainage Pipes - to daylight**
Hydrostatic Pressure Damage: The Basics

- Only way to relieve hydrostatic pressure is to drain water from wall before it accumulates.
- A drain field and proper backfill allow water to be channeled away from the building.
- A drainpipe is connected to a sump, drainage ditch, drain field or the municipal storm drain system.
Assessing Hydrostatic Pressure Damage

- Hydrostatic pressure can push cement block and even poured concrete walls into a building’s basement.

- Because such walls are almost always foundation walls, additional damage can occur, including total building collapse.
Assessing Hydrostatic Pressure Damage

- Attempts to stop water flow through drains can have catastrophic results.
- Concrete floors may be lifted and cracked by trapped water pressure.
- Check valves are intended to withstand a limited amount of water pressure for very short periods of time.
Another cause of hydrostatic pressure is improper drain tile installation (unsatisfactory backfill).

Washed sand or gravel is recommended for use as backfill.
The only effective way to relieve hydrostatic pressure is to

A. Drain the water away from the wall before it has the opportunity to build up.
B. Install a sump pump in the building to pump the water away from the building.
C. Create a larger space around the building filled with filtered sand and dirt so that the water is less concentrated.
D. Use check valves to reduce backflow.
Differentiate gray water and black water, and indicate the coverage issues that may come into play depending on the source of the water.
Gray Water (Category 2)

- Water that carries a significant degree of chemical, biological or physical contamination is considered Category 2 (gray) water.
- Sources that produce Category 2 damage include:
  - Aquarium water
  - Waterbed leaks
  - Toilet-bowl overflows that contain urine
  - Dishwasher discharge
  - Washing-machine discharge
  - Water that has entered a structure because of below-grade hydrostatic pressure
Gray Water (Category 2)

- Category 2 can rapidly degrade to Category 3 water once growth of microbes begins.
- Structures affected by Category 2 water require special procedures to be returned to a pre-loss condition.
Black Water (Category 3)

- Water intrusion from a grossly unsanitary source carrying pathogenic or disease-causing agents, or water that has dwelled in a structure long enough for microbe growth

- Examples of Category 3 sources include:
  - Discharge from toilets originating from beyond the toilet trap, such as from the sewer or septic system
  - Intrusions from the ground surface, such as floodwater
Black Water (Category 3)

- Many procedures are necessary to address cleanliness and safety when dealing with Category 3 water intrusions.
Black Water (Category 3)

Cleaning and decontamination procedures include the removal of all highly porous materials affected, such as carpet, underlay, wall board and insulation.
Drain System Failure

- Drain system failures can cause a variety of building and contents water damage.
- In some cases, a drain-system failure can have catastrophic results.
- Exclusionary language addresses the issue of "water which backs up through sewers or drains."
- Although water entering a building through a reverse flow can be excluded, water buildup caused by locked drains is not excluded by many policies' language.
- For this reason, you need to definitively identify the cause and source of the unwanted water problem.
Identifying the Source of Water Damage

• Storm water and groundwater is generally clear and odorless.
• Wastewater is neither clear nor odorless.
• Water damage resulting from plugged or dysfunctional drains is likely to be caused by an overflow of the plumbing or drain system, not a reverse flow.
The same types of physical damage can be the result of very different causes of loss. Some causes are covered by property policies, and some are not.
Assessing Water Damage

- In less extreme cases, typical water damage is confined to nonstructural loss, such as flooring, wall coverings and contents.
- The operative cause of loss phrase is "source of the water."
Assessing Water Damage

- Damage caused by overflow of water intended for collection and containment within the building's plumbing system is likely to be covered.
- Damage from water from an outside source that flows in reverse of its intended path is generally excluded.
- Many policies specifically exclude losses resulting from the overflow of water from sump wells, regardless of the source of that water.
Typical Homeowners Policy (HO-3) Language

Exclusions to Section I, Property coverages:

Losses caused by…
Water Damage…
Which includes “water or water-borne material below the surface of the ground, including water which exerts pressure or seeps or leaks through a building, sidewalk, driveway, foundation, swimming pool or other structure”
…caused by or resulting from human or animal forces or any act of nature
Water Back Up and Sump Discharge or Overflow Endorsement

Unendorsed homeowners policies exclude property coverage for water or waterborne materials that back up through sewers or drains or that overflow from a sump pump, pump or related equipment.

The Limited Water Back Up and Sump Discharge or Overflow Coverage endorsement (HO 04 95) adds this coverage back into the policy. Coverage is provided up to $5,000 for property covered under Section I—Property Coverages.

A special deductible of $250 applies to this endorsement and replaces any other deductible that might apply to the policy. The deductible does not apply to Coverage D—Loss of Use.
ISO Commercial Property Coverage Part

Causes of Loss—Broad Form

14. “Water damage”—accidental discharge or leakage from breaking apart or cracking of plumbing, heating, AC systems on premises is covered.

But the definition of “water damage” does not include discharge or leakage from a sump, including overflow from pump failure or excessive volumes of water.
ISO Commercial Property Coverage Part

Causes of Loss—Broad and Special Forms—Excluded Causes

“Water” — which includes:

- Flood
- Surface water
- Overflow of any body of water
- Mudslide or mudflow
- Water that backs up or overflows from a sewer, drain or sump
- Water under the ground surface pressing on or seeping through foundations, walls, floors, basements, doors, windows
ISO Commercial Property Endorsement CP 10 38 10 12

Discharge From Sewer, Drain Or Sump (Not Flood-Related)

• “We will pay for direct physical loss or damage to Covered Property, caused by or resulting from discharge of water or waterborne material from a sewer, drain or sump located on the described premises, provided such discharge is not induced by flood or flood-related conditions.”

• No coverage if the discharge results from insured’s failure to perform routine maintenance or repair to keep equipment in proper working condition.
A Relationship Business

• Insureds often expect that water losses are covered in the policy.
• Post-loss, they’re not in a happy mindset.
• Adjuster needs to manage expectations and have empathy.
• Not the time for a lecture on endorsements.
Thank You!

Webinar material based on:

Property Technical Certification I—Core Property Adjusting Principles

Property Technical Certification II—Exterior Loss Adjusting

Details at www.TheInstitutes.org