



## Site Planning of Wastewater and Stormwater for Residential Construction

On-site management on rural lots

NYSDOS




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## Course Outline

- Intro
- Site and soil appraisal
- Consequences
- Regulations and guidance
  - NYSDOS Uniform Fire Prevention & Building Codes
  - Wastewater – NYSDOH, NYSDEC & MOU
  - Stormwater - NYSDEC

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## CEO's & Stormwater per DEC / DOS Stormwater Management Guidance Manual for Local officials (September, 2004)

[http://www.dec.ny.gov/docs/water\\_pdf/localch2a.pdf](http://www.dec.ny.gov/docs/water_pdf/localch2a.pdf)

*"Code Enforcement Officer...can make sure that a SWPPP is submitted by the applicant and also inspect construction/post-construction stormwater management practices."*

The DEC general permit requires that designated municipalities review stormwater plans (SWPPPs) and conduct inspection of stormwater control practices during and after construction. "NYS recommends that MS4s incorporate review of SWPPPs into local permitting reviews ..."

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## CEO's & Wastewater per DEC / DOH Memorandum of Understanding of 1984

DOH: New residential on-site wastewater systems <1,000 gpd and DOH-permitted facilities (restaurants, hotels, campgrounds, etc.) with <10,000 gpd

DEC: New residential systems and institutional, commercial & surface discharge over 1000 gpd, except above

Code Enforcement Officials: Conventional, commercial <1,000 gpd from non DOH-permitted facility (e.g.: warehouse, office, etc.) with LDP design


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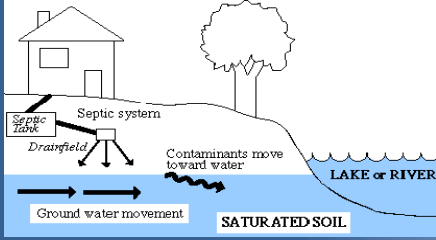
## Wastewater, Stormwater and Groundwater

- Stormwater and groundwater should not discharge to wastewater systems; untreated wastewater should not discharge to stormwater
- Many residences have inadequate co-management of these separate systems.


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## Ground & surface water contamination is caused by the poor wastewater treatment




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## General treatment process

Wastewater	Stormwater
<input type="checkbox"/> Collection	<input type="checkbox"/> Collection
<input type="checkbox"/> Primary (tank)	<input type="checkbox"/> Flow attenuation
<input type="checkbox"/> Secondary or advanced (soil)	<input type="checkbox"/> (Pre) Treatment
<input type="checkbox"/> Dispersal (subsurface)	<input type="checkbox"/> Dispersal (outfall, subsurface or diffuse flow)

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## On-Site Wastewater Treatment Conventional Systems




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## On site stormwater management



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## Site & Soil Appraisal

- Site Appraisal determines available area for treatment, discharge and infiltration. Look at boundaries, topography, use, surface features
- Soil Investigation determines type and size of system. Usually includes a deep hole, about 6 feet, and soil percolation tests. NRCS Soil Survey Reports, from County Soil Water Conservation District Office, describe soil in the general area, useful to estimate area hydrology but not in place of an evaluation of site soils


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## Site Appraisal

Determines limiting factors for the location of the treatment system

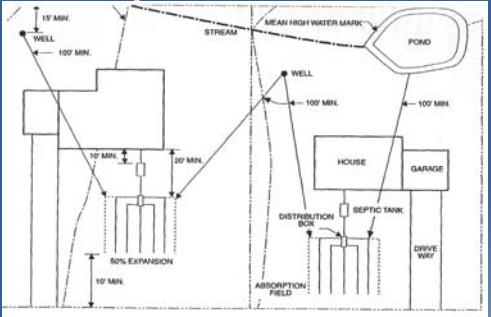
- Wetlands
- Flood Plain
- Slope
- Separation requirements
- Other: bedrock, drainage, easements
- Owner needs




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## Site separation distances



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## Soil Test Safety

The contractor / owner should:

- Contact local public utilities 2 working days before digging
- **CALL BEFORE YOU DIG** - Dial 811 Or 800-962-7962
- Know the location of water lines, electric, gas and property lines





What's wrong with this picture?



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## SOIL LIMITING LAYERS


- Seasonal water table
  - Groundwater
  - Soil mottling
  - Shallow root depth
- Impermeable strata
  - Bedrock
  - Dense soil - clay, silt (fragipan)
- Gravel and sand, too porous & fast

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## Soil Percolation Tests

- Measures how fast soil transmits water
- Determines type and size of possible technology
- Procedures / measurements are different for wastewater & stormwater regulation.
- Regulation require very specific procedures, since these are empirical tests.




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## Consequences of wastewater in stormwater

2008 NYS DEC 305(b) list of impaired waters: 43% of lakes/reservoirs, 34% of estuaries, 6% of streams /rivers

**Sources of Impairment for NY Waters Added in 2008**

Municipal/Urban Discharges	84%
Private Wastewater Systems	6%
Failing Septic Systems	6%
Agricultural Activities	4%



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## Overflow...




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## Consequences of stormwater in wastewater systems

- Wastewater treatment less effective
- Physical damage to the wastewater system
- Overflows create environmental / health issues
- Increases operation and repair costs
- May create a need for system expansion



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### Roof leader to wastewater system



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### Evidence of wastewater discharge to stormwater / groundwater

... from wastewater soil system (leach field, seepage pit, bed, mound) :

- Evidence of seepage?
- Area of lush vegetation beyond WW system?
- Surrounding topography directs stormwater to system?
- Odor?
- Leach lines not parallel with slope?
- Sump pump/footer drains/ roof leaders discharged on or near WW system?

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Distribution piping parallel to site contours conveys wastewater evenly to absorption system

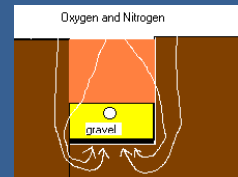
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### Other signs of damage to wastewater soil system

- Impermeable area over any part of leach area - structures (pool, deck, etc), driving, parking, paving
- Oversaturation of leach area



- Physical damage by extensive roots in leach area (tree or shrub), erosion, heavy equipment on system

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Thick grass with soft ground

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Dye Test to Locate Discharge of Untreated Wastewater




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### Dye test

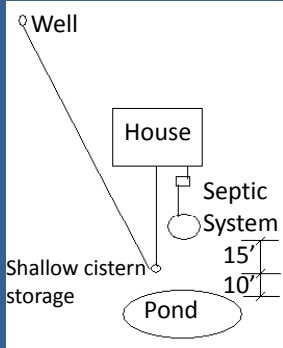


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### Problem site!



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### NYS Codes, Rules and Regulation

- NYSDOH – Regulates residential wastewater under 1000 gallons per day (gpd) per Appendix 75A, and DOH permitted facilities
- NYSDEC - Regulates all other wastewater over 1000 gpd (several standards), and stormwater thru SPDES permit
- NYSDOS – Wastewater & stormwater referenced in the Residential Code & Plumbing Codes, and fill gap for review of commercial systems under 1000 gpd (e.g.: warehouse, office, etc.) with LDP design

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### Local Jurisdictions

**Potential regulatory overlays:**

- MS4 regulatory mechanisms
- Local County sanitary codes
- Watershed protection agencies, rules and regulations
- Water/Sewer Districts
- Local zoning
- Other: NYCDEP, APA, etc.

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### DOH Fact Sheet

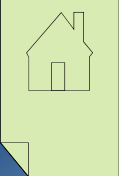
Need for Licensed Design Professional (LDP) - Residential On-Site Wastewater Treatment -1/13/04

**Developed by DOH with DOS and State Education**

**New Construction** requires LDP for all, and shall conform to DOH standards.

**Additions/Alterations** (replace home /increase flow), LDP shall evaluate existing & address

**Repairs/Replacement** should conform to DOH standards as possible; LDP required for new absorption area but no LDP needed if “Like-for-like” (septic tank, d-box)



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### New York State Dept. of Health (DOH)

- Individual Wastewater Systems– Appendix 75A & its handbook
- Individual Water Wells – Appendix 5B
- Fact sheets and field memos
- Waivers

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## NYSDOH APPENDIX 75-A

### Residential construction under 1000 GPD

- New construction
- Adding bedrooms
- Rebuilding
- Revisions

**Drop box system on slope**

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## NYSDOH Regulations and Technical Guidance

Appendix 75-A

Design Handbook ("Red Book")

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### Curtain drain to promote subsurface separation

**CURTAIN DRAIN TO INTERCEPT LATERALLY MOVING WATER TABLE CAUSED BY A SHALLOW, IMPERMEABLE LAYER**

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### Subsurface drainage at a flat site...

**UNDERDRAINS USED TO LOWER WATER TABLE**

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## Appendix 5-B, 5-D Standards for Water Supply Wells

Replaced the DOH "Rural Water Supply". Effective Nov. 23, 2005

Stipulates separation of well from wastewater and stormwater

Also see Individual Water Supply Fact Sheets #1-6:

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## Appendix 5-B Table 1 excerpts - Minimum Separation Distances

*(ADD 50% if water enters the well at under 50 feet below grade)*

- Septic Tank = 50 feet
- Septic Absorption Field = 100 feet
- Seepage Pit = 150 feet
- Stormwater recharge (roads & parking) = 100 feet
- Stream, lake, drainage ditch or wetland = 25 feet
- Land spreading manure, septage, or manure piles = 200 feet

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## NYS DEC

**New York State Dept. of Environmental Conservation (DEC)**

- **Wastewater – regulates other wastewater treatment. 1988 Standards for residential systems between 1,000 and 10,000 gpd and commercial systems.**
- **Stormwater – General Permit**

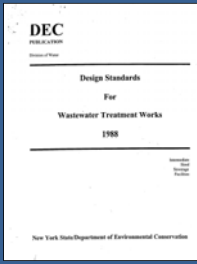
**(NYSDOH / NYSDEC MOU for wastewater)**



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## DEC Wastewater Regulation and Guidance

**'88 Standards**





- Treatment and separation distances are similar to Appendix 75-A
- Table 3 - design flows for several commercial facilities
- Includes grease trap design
- Includes surface discharge design, which requires a SPDES Permit
- DEC standards are being updated

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## DEC Storm Water Permit Overview

- A permit needed for stormwater discharge from Municipal Separate Storm Sewer Systems (MS4s), & for construction disturbing one or more acres. NYSDEC has two general SPDES permits, one for MS4s and one for construction activities.
- For the construction General Permit, coverage is by developing a stormwater plan and notifying DEC of intent to implement. Home construction on a single residential lot may use E&SC plan from Appendix E of "NYS Standards and Specifications for Erosion and Sediment Control"
- Designated MS4s must have a stormwater management program






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## Erosion and Sediment Control (E&SC) Basics

**Erosion Controls – Relatively easy and cost effective, prevents erosion by stabilizing soil stabilization and controlling runoff**

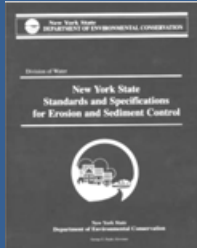
**Sediment Controls - Remove sediment from water before it leaves the site, can be expensive and challenging**






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## Erosion & Sediment Control Plan (ES&C) for Small Home Site Construction

- Small Home Site Construction on a single lot
- New York State Standards and Specifications for Erosion and Sediment Control – August 2005
- Appendix E – Erosion and Sediment Control Plan for Small Home Site Construction
- Minimum standards – local codes may be more stringent




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## Small Home Site Minimum Requirements

- Stabilize the construction entrance
- Stabilize denuded areas – mulch, temporary plantings
- Protect adjacent properties - silt fence, straw bale
- Protect areas of concentrated flow or drainage - check dam
- Maintain practices until site is stabilized
- Use other practices as required by the local authority(ies)

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Buffer strips protect sensitive environments – slopes, water, wetlands

**Figure E.3-Condition 3**  
Flow from the site is to water body with critical buffer area. Practices include stabilized entrance, Silt fence around soil pile and down slope of construction, preserve trees, vegetate, added practices as needed

**EROSION CONTROL PLAN LEGEND**

- PROPERTY LINE
- EXISTING DRAINAGE
- PROPOSED DRAINAGE
- LIMITS OF GRADING
- STRAW WATTLES
- SILT FENCE
- VEGETATION PROTECTION
- TREE PRESERVATION
- STABILIZED SOIL
- GRAVE

**NOTES**

1. In waterway stream, up to 10 percent, all fence and straw wattles may be used interchangeably.
2. Slopes exceeding 25 percent shall have all fence backed by straw bales for support.
3. Use additional practices as required by the local jurisdiction authority to mitigate effects of post construction runoff.

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Specs for standard practices

**Sample spec – Check Dam**

- Place stone as shown
- Space so top of dam is at elevation as next dam up flow
- Extend 1.5 feet beyond ditch edge
- Protect channel below lowest dam
- Maximum drainage area – 2 acres

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**Municipal Construction Site Inspection**  
**Per the DEC general permits:**

Weekly inspections are required under the Construction Permit

MS4s municipalities must conduct site inspections and municipalities should:

- Require a SWPPP for building permit issuance or subdivision/site plan review
- Withhold building permit or Certificate of Occupancy if site does not meet requirements or pass inspection

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**NYS DOS 2007 Uniform Codes - WW**

2007 Residential Code – Plumbing

§RP2602 INDIVIDUAL WATER SUPPLY AND SEWAGE DISPOSAL, §RP2602.1 - any building with plumbing fixtures shall be connected to an existing public sewer system if available, or when not available or feasible, to a private sewage disposal system.

See also NYS 2007 Plumbing Code Section 701.2

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**DOS Existing On-Site Wastewater**

**NYS 2007 Plumbing Code**

§P102.7 Existing installations. Plumbing systems lawfully in existence when code adopted are permitted to continue in accordance with the original design if no hazard to life, health or property is created.

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**DOS NYS 2007 Residential Code**


§RP2602.1.2 Individual sewage treatment system. Individual sewage treatment systems shall be constructed in conformance with the provisions of Appendix 75-A (Wastewater Treatment Standards-Individual Household Systems) of the New York State Department of Health, Sanitary Code (10 NYCRR)

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### DOS 2007§PC701.2 Individual sewage treatment system

1. Limits NYSDOH 75A to residences under 1000 gallons per day (GPD)
2. Stipulates that for flow over 1,000 GPD, use NYS DEC Design Standards for Wastewater Treatment Works - Intermediate Sized Sewerage Facilities – 1988

What about commercial systems under 1000 gpd??

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### DOS Stormwater requirements in 2007 Residential Code

Ch. 3 Building Planning §RR309.3 & 4 Garage and carports: Slope floor area for parking to a drain or main doorway.

§RR323 FLOOD-RESISTANT CONSTRUCTION, §RR323.1.6 Protection of water supply & sanitary sewage systems. Design sanitary sewage systems to minimize infiltration of floodwaters to systems & discharges from systems to floodwaters


Ch. 4 Foundations RR401.3 Drainage. Divert surface drainage to storm sewers or other approved collection so as to not create a hazard. Grade lots to drain surface water away from foundation walls, a minimum of 6 inches (152 mm) drop in the first 10 feet (3048 mm). Where this slope is not feasible, use a drain or swale.

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### DOS 2007§PC Chapter 11 Storm drainage

- Scope - materials, design, construction and installation of storm drainage
- §P1101.2 All roofs, paved areas, yards, etc. shall drain to a separate storm sewer, a combined sewer, or to an approved place of disposal. For 1-and 2-family dwellings where approved, storm water may discharge onto flat areas, such as streets or lawns, provided that the storm water flows away from the building.

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### Resource documents


New York State Uniform Fire Prevention and Building Code

Wastewater Resources

- NYSDOH Appendix 75-A and 75-A Handbook
- NYSDEC 1988 Standards for Intermediate Sized Sewerage Facilities
- USEPA Onsite and Clustered Wastewater Treatment Systems

NYSDEC Stormwater Toolbox , See <http://www.dec.ny.gov/chemical/8694.html>



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### New York Onsite Wastewater Treatment Training Network, Inc. (OTN)

- A organization of professionals and state agencies that provides standardized training for on-site wastewater treatment systems, funded by NYS DEC Non-Point Source Pollution Program
- Contact SUNY Delhi for information, 607-746- 4545



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### Thank you

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