

https://drive.google.com/drive/folders/1He3KtzMKUP99p74u0LjtIxp_AqEhnR5y?usp=sharing

We will use **EPA SWMM 5.1.014** version

1. install visual studio 2017: <https://visualstudio.microsoft.com/vs/older-downloads/>

Still want an older version?

Select a product below and click on the download button to log in to your Visual Studio (MSDN) subscription or [join the free Dev Essentials program](#), to gain older versions.

[Expand All](#) [Collapse All](#)

> 2019

∨ 2017

Visual Studio 2017 and other Products

To download any product from the following list, click the download button and log in with your Visual Studio Subscription account when prompted. If you don't have a Visual Studio Subscription, you can create one for free by clicking on "Create a new Microsoft account" on the login page.

[Download](#)

-> choose 2017 version, **Visual Studio Community 2017** (version 15.9)

Visual Studio Community 2017 (version 15.9)

No key required Info Release date: 08/Nov/2021 x64 Multiple Lang... EXE [Download](#)

-> make sure to mark the package:

Modifying — Visual Studio Community 2017 — 15.9.41

[Workloads](#) [Individual components](#) [Language packs](#) [Installation locations](#)

Windows (3)



.NET desktop development
Build WPF, Windows Forms, and console applications using C#, Visual Basic, and F#.



Desktop development with C++
Build Windows desktop applications using the Microsoft C++ toolset, ATL, or MFC.



Universal Windows Platform development
Create applications for the Universal Windows Platform with C#, VB, JavaScript, or optionally C++.



-> Then, install and restart the computer:

2. Download cmake: <https://cmake.org/download/>

Platform	Files
Windows x64 Installer: Installer tool has changed. Uninstall CMake 3.4 or lower first!	cmake-3.22.0-windows-x86_64.msi
Windows x64 ZIP	cmake-3.22.0-windows-x86_64.zip

3. Download windows 10 SDK: <https://developer.microsoft.com/en-us/windows/downloads/sdk-archive/>

Choose Windows 10 SDK, version 1903 (10.0.18362.1):

Windows 10

Release			
Windows 10 SDK version 2104 (10.0.20348.0)	Primarily intended for Windows Server development. For desktop development, see the release notes for changes you may benefit from by updating.	INSTALL SDK >	DOWNLOAD .ISO >
Windows 10 SDK, version 2004 (10.0.19041.0)	Released in conjunction with Windows 10, version 2004. Includes servicing updates 10.0.19041.685. Updated 12/16/20 See details	INSTALL SDK >	DOWNLOAD .ISO >
<u>Windows 10 SDK, version 1903 (10.0.18362.1)</u>	Released in conjunction with Windows 10, version 1903.	<u>INSTALL SDK ></u>	DOWNLOAD .ISO >

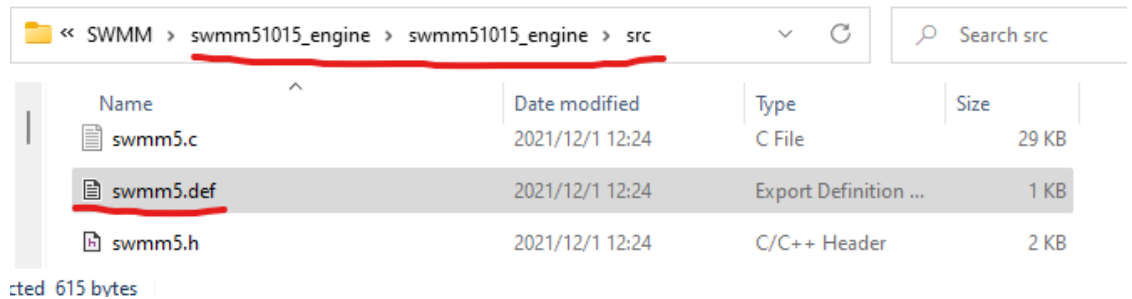
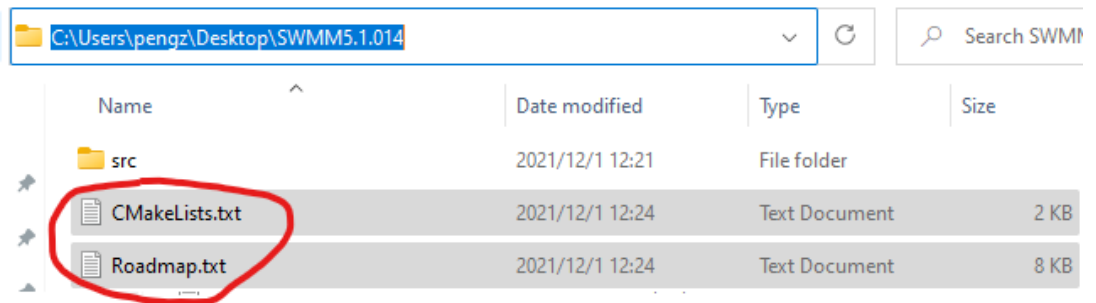
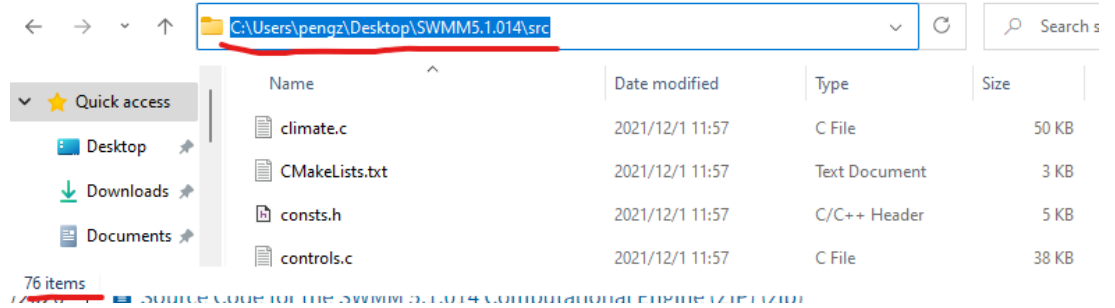
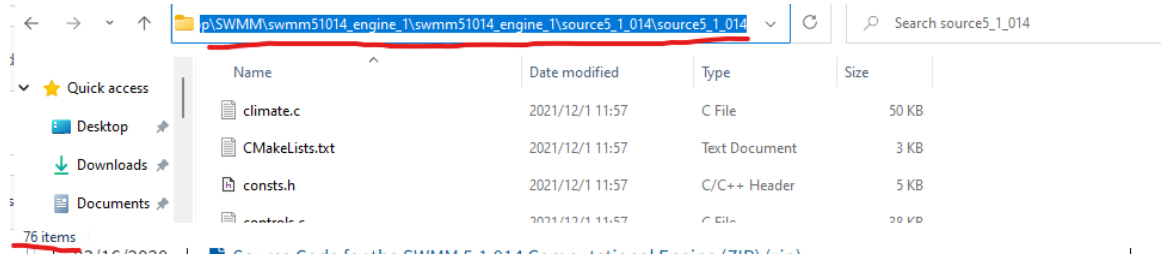
After installing SDK, restart the computer.

4. Build SWMM 5.1.014:
 - 1) For some computer settings or different versions of VS. The EPA SWMM 5.1.014 is hard to build at VS2017. So, the addition process is needed for build SWMM 5.1.014 at VS2017:
 - a. Download SWMM 5.1.014 and SWMM 5.1.015. <https://www.epa.gov/water-research/storm-water-management-model-swmm>
5.1.015 provide better cmake compile support on SV2017. Here, we will use **cmake file public at 5.1.015**, and **source code at 5.1.014**.

Source Codes and Bug Fixes

Date	Description
7/20/2020	SWMM 5.1.015 Updates and Bug Fixes (TXT).(txt)
7/20/2020	Source Code for the SWMM 5.1.015 Computational Engine (ZIP).(zip)
7/20/2020	Source code for the SWMM 5.1.015 Graphical User Interface (ZIP).(zip)
02/18/2020	SWMM 5 Updates and Bug Fixes (TXT).(txt)
03/16/2020	Source Code for the SWMM 5.1.014 Computational Engine (ZIP).(zip)
02/18/2020	Source code for the SWMM 5.1.014 Graphical User Interface (ZIP).(zip)

- b. Extract file



This PC > Desktop > SWMM5.1.014 > src

Name	Date modified	Type	Size
swmm5.c	2021/12/1 11:57	C File	29 KB
swmm5.def	2021/12/1 12:24	Export Definition ...	1 KB
swmm5.h	2021/12/1 11:57	C/C++ Header	2 KB

```
swmm5.def - Notepad
File Edit Format View Help
LIBRARY SWMM5.DLL

EXPORTS
swmm_close           = _swmm_close@0
swmm_end             = _swmm_end@0
swmm_getError        = _swmm_getError@8
swmm_getMassBalErr  = _swmm_getMassBalErr@12
swmm_getVersion     = _swmm_getVersion@0
swmm_getWarnings    = _swmm_getWarnings@0
swmm_open            = _swmm_open@12
swmm_report          = _swmm_report@0
swmm_run             = _swmm_run@12
swmm_start           = _swmm_start@4
swmm_step            = _swmm_step@4

Ln 14, Col 44    100%    Windows (CRLF)    UTF-8
```

5. Build SWMM 5.1.014. Open Command prompt, find the file location (use the command: cd FilePath (the path for "SWMM5.1.014" folder) and use the following commands:

cmake --version

- 1) mkdir build
- 2) cd build
- 3) cmake ..
- 4) cmake --build . --config Release

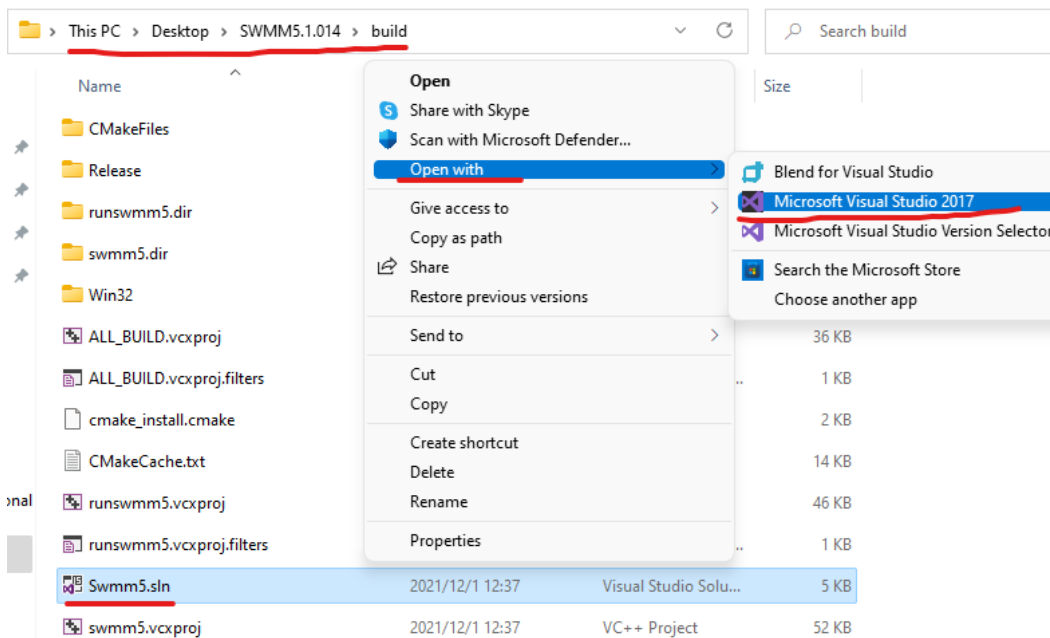
```
Command Prompt
Microsoft Windows [Version 10.0.22000.318]
(c) Microsoft Corporation. All rights reserved.

C:\Users\pengz>cd C:\Users\pengz\Desktop\SWMM5.1.014
C:\Users\pengz\Desktop\SWMM5.1.014>mkdir build
C:\Users\pengz\Desktop\SWMM5.1.014>cd build
C:\Users\pengz\Desktop\SWMM5.1.014\build>cmake ..
-- Building for: Visual Studio 15 2017
-- The C compiler identification is MSVC 19.16.27045.0
-- Detecting C compiler ABI info
-- Detecting C compiler ABI info - done
-- Check for working C compiler: C:/Program Files (x86)/Microsoft Visual Studio/2017/Community/VC/bin/Hostx86/x86/cl.exe - skipped
-- Detecting C compile features
-- Detecting C compile features - done
-- Found OpenMP_C: -openmp (found version "2.0")
-- Found OpenMP: TRUE (found version "2.0")
-- Configuring with swmm5.def mapping
-- Configuring done
-- Generating done
-- Build files have been written to: C:/Users/pengz/Desktop/SWMM5.1.014/build

C:\Users\pengz\Desktop\SWMM5.1.014\build>cmake --build . --config Release
Microsoft (R) Build Engine version 15.9.21+g9002d45bc3 for .NET Framework
Copyright (C) Microsoft Corporation. All rights reserved.
```

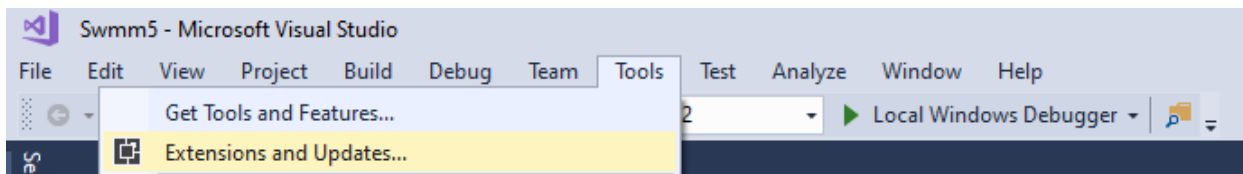
6. In

“SWMM5.1.014” folder, then go into the “build” folder, right-click Swmm5.exe, open with VS2017:

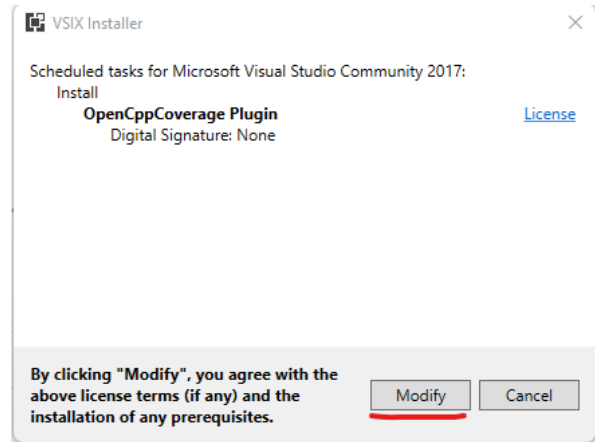
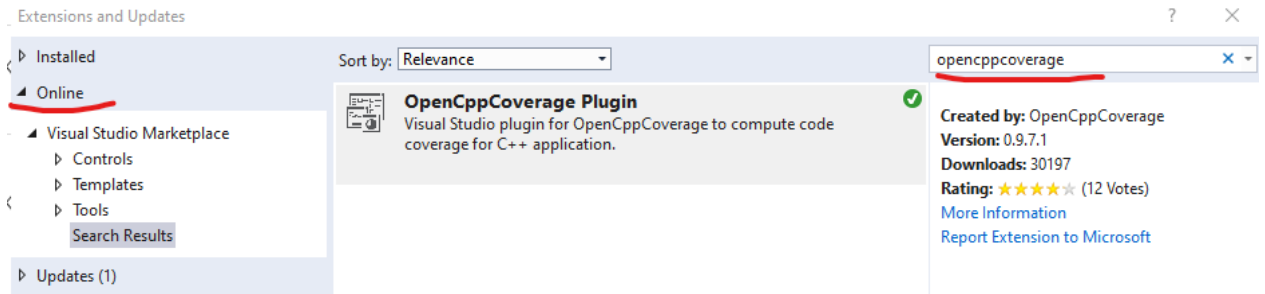


7. Install OpenCppCoverage Plugin:

1) click Tools -> Extensions and Updates...



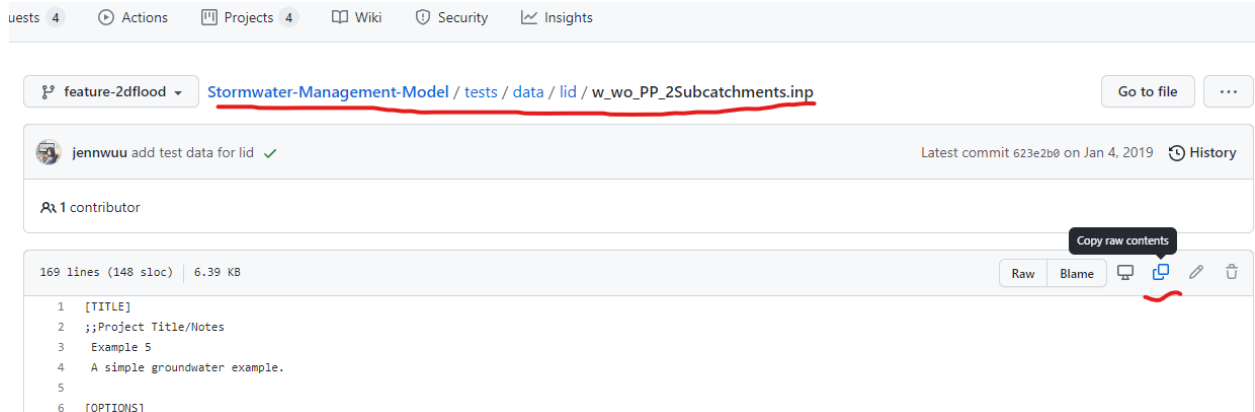
2) Choose “Online”, and type “opencppcoverage” at the search bar, then install plugin,



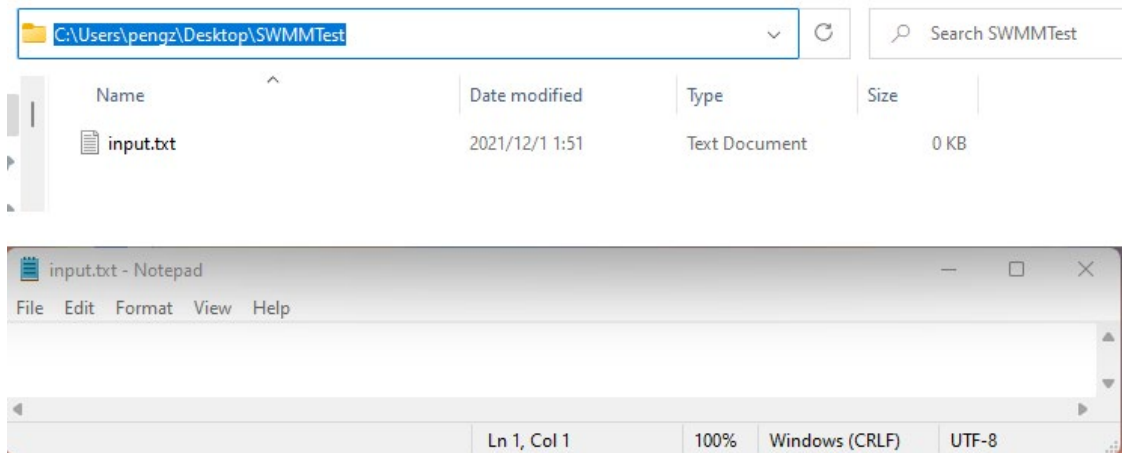
8. Prepare input file:

- 1) Go the link: <https://github.com/OpenWaterAnalytics/Stormwater-Management-Model> (this link list on Table 1) and branches “feature-2dflood”, direct link: <https://github.com/OpenWaterAnalytics/Stormwater-Management-Model/tree/feature-2dflood>

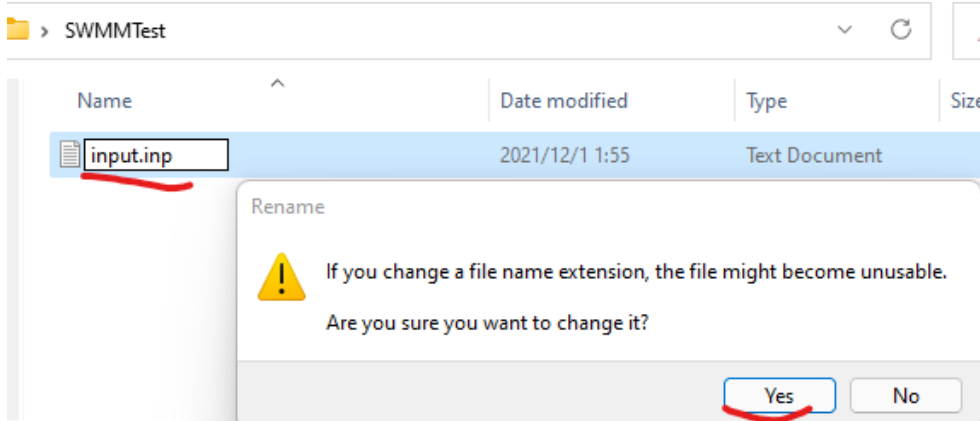
- 2) At Folder “tests”, we can find the unit tests and a folder “data” for the input file. The format of SWMM input file is .inp file. Choose one of .inp file, open, and click copy the raw code.



- 3) Go to desktop, create a folder named “SWMMTest”, and create a new TXT file, we can name it “input”

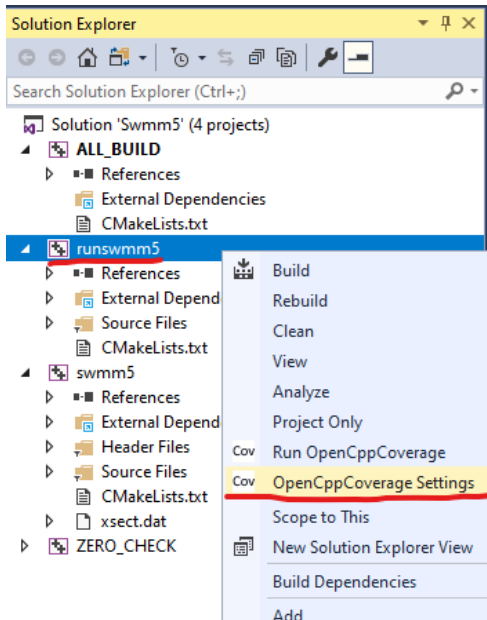


- 4) Paste code from 2) on TXT file, then we need to change the file type from .txt to .inp



9. Run OpenCppCoverage:

1) In VS2017, at solution explorer, right click runswmm5, choose OpenCppCoverage Settings

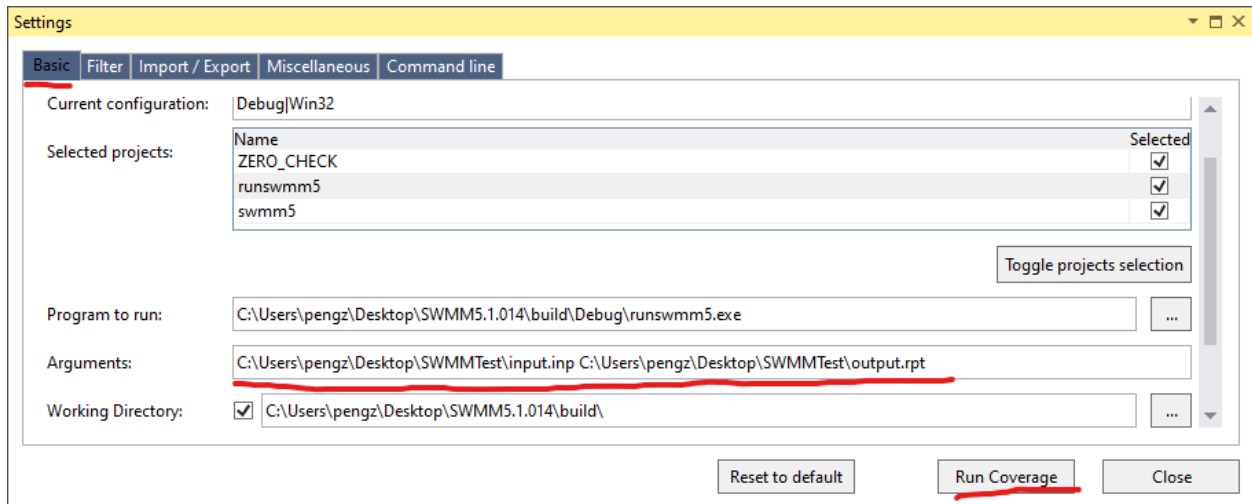


2) In setting box -> basic -> rolling down and edit arguments: (Format: input blank output)

C:\Users\pengz\Desktop\SWMMTest\input.inp
C:\Users\pengz\Desktop\SWMMTest\output.rpt

Here, we use "input.inp" as input file, at set SWMM output file name as "output.rpt"





















Click Run Coverage



The image shows the 'Coverage' window in Visual Studio. The 'Filter' is empty, and 'Display coverage' is checked. The table below shows the coverage data for the 'runswmm5.exe' project.

	Coverage	Covered line	Uncovered line	Total line
runswmm5.exe	25%	4172	12448	16620
C:\Users\pengz\Desktop\SWMM5.1.014\build\Debug\swmm5.dll	25%	4149	12432	16581
C:\Users\pengz\Desktop\SWMM5.1.014\build\Debug\runswmm5.exe	59%	23	16	39

Click “+” for detail of coverage:

Coverage				
Filter: <input type="text"/>	<input checked="" type="checkbox"/> Display coverage			
	Coverage	Covered line	Uncovered line	Total line
 c:\users\pengz\desktop\swmm5.1.014\src\lidproc.c	 37%	213	358	571
 c:\users\pengz\desktop\swmm5.1.014\src\massbal.c	 42%	191	260	451
 c:\users\pengz\desktop\swmm5.1.014\src\runoff.c	 44%	83	106	189
 c:\users\pengz\desktop\swmm5.1.014\src\routing.c	 45%	156	192	348
 c:\users\pengz\desktop\swmm5.1.014\src\input.c	 45%	170	209	379
 c:\users\pengz\desktop\swmm5.1.014\src\error.c	 58%	7	5	12
 c:\users\pengz\desktop\swmm5.1.014\src\gage.c	 59%	142	97	239
 c:\users\pengz\desktop\swmm5.1.014\src\output.c	 63%	269	156	425
 c:\users\pengz\desktop\swmm5.1.014\src\datetime.c	 68%	132	62	194
 c:\users\pengz\desktop\swmm5.1.014\src\mempool.c	 69%	37	17	54