MassDEP Drinking Water Program

Instructions for use of the Service Line Inventory Excel Workbook Template for Systems WITH Split Ownership of Service Lines

System Requirements

The Service Line Inventory Workbook has been tested to function on the following:

- Operating System: Windows 10
- Excel Version: Office 365, Excel version 2203 (Build 15028.20160)

Note, the Service Line Inventory Workbook is NOT compatible with the Macintosh version of Excel.

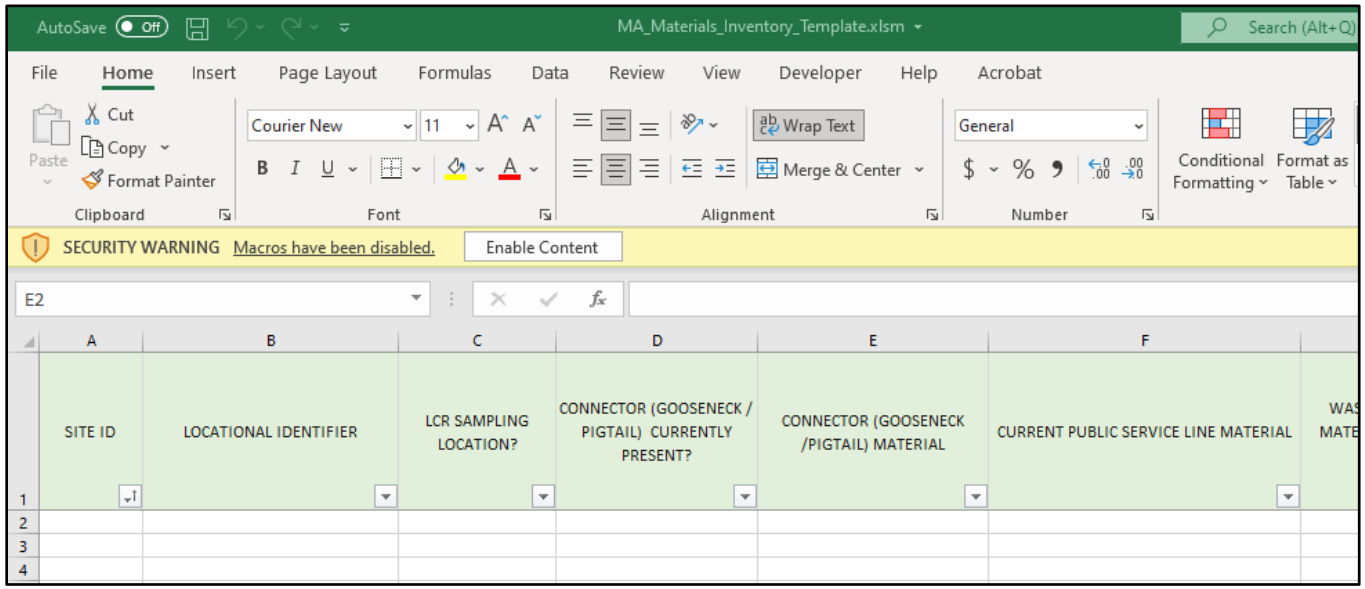
Download the Excel Service Line Inventory Workbook

You should download the most recent version of the Service Line Inventory Workbook from the mass.gov website at https://www.mass.gov/media/2480901.

Opening the File

Open the file by double-clicking the file. You will need to enable macros for the Service Line Inventory Workbook to function as designed. If you see an alert like the one pictured below, click on "Enable Content" to enable the macros to run.

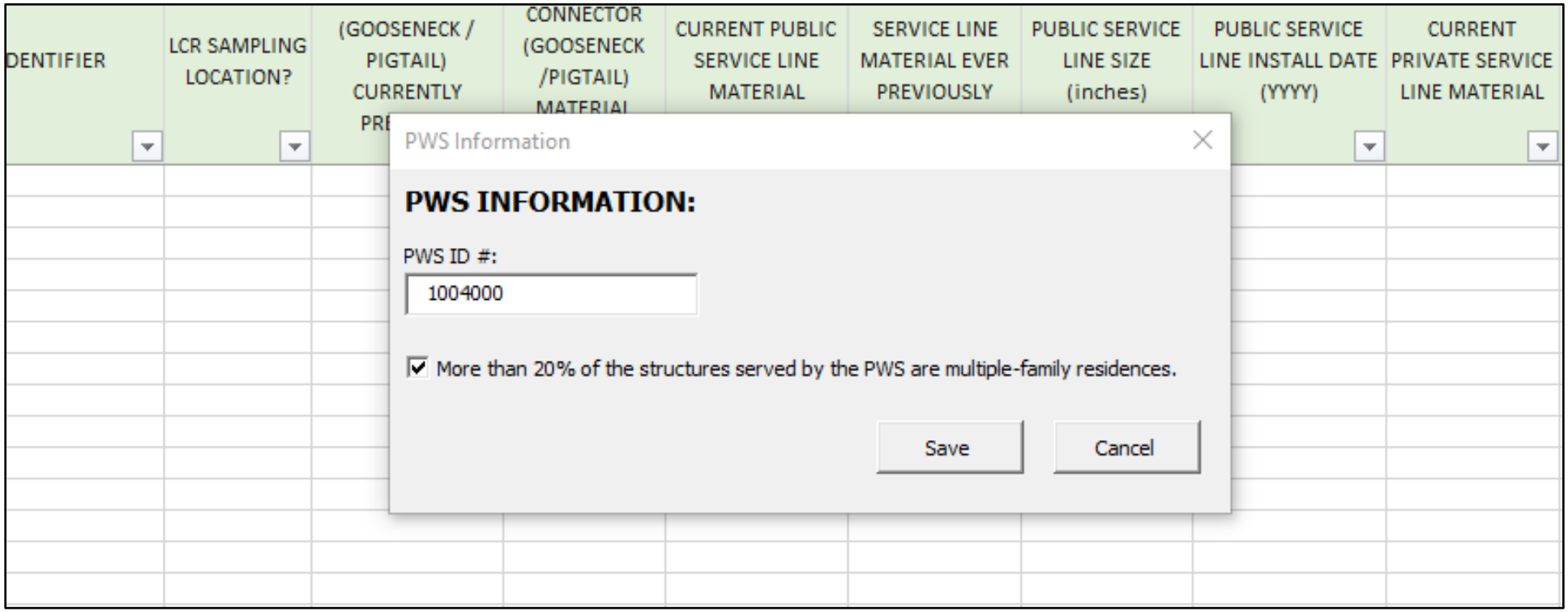
Figure 1 - Enable Macros



Initial Configuration of Settings

1. Right-click in any cell of the INVENTORY worksheet.
2. Select ***MassDEP – PWS Information*** from the context menu.
3. The PWS Information form (as seen below) will be displayed.
4. Enter your seven-digit PWS ID #. A list of all active public water systems, and their PWS ID #s, can be found on the Mass.gov website at https://www.mass.gov/media/831461. **This is a required field that must be filled out. This value is used in the export file that gets generated from this tool.**
5. If 20% or more of the structures served by the PWS are multi-family residences then select the checkbox, otherwise leave it unchecked. **It is important to answer this accurately. It will be used in the macro to calculate the sampling site tier on the INVENTORY worksheet.**
6. Click the Save button.

Figure 2 - Entering Your PWS Information

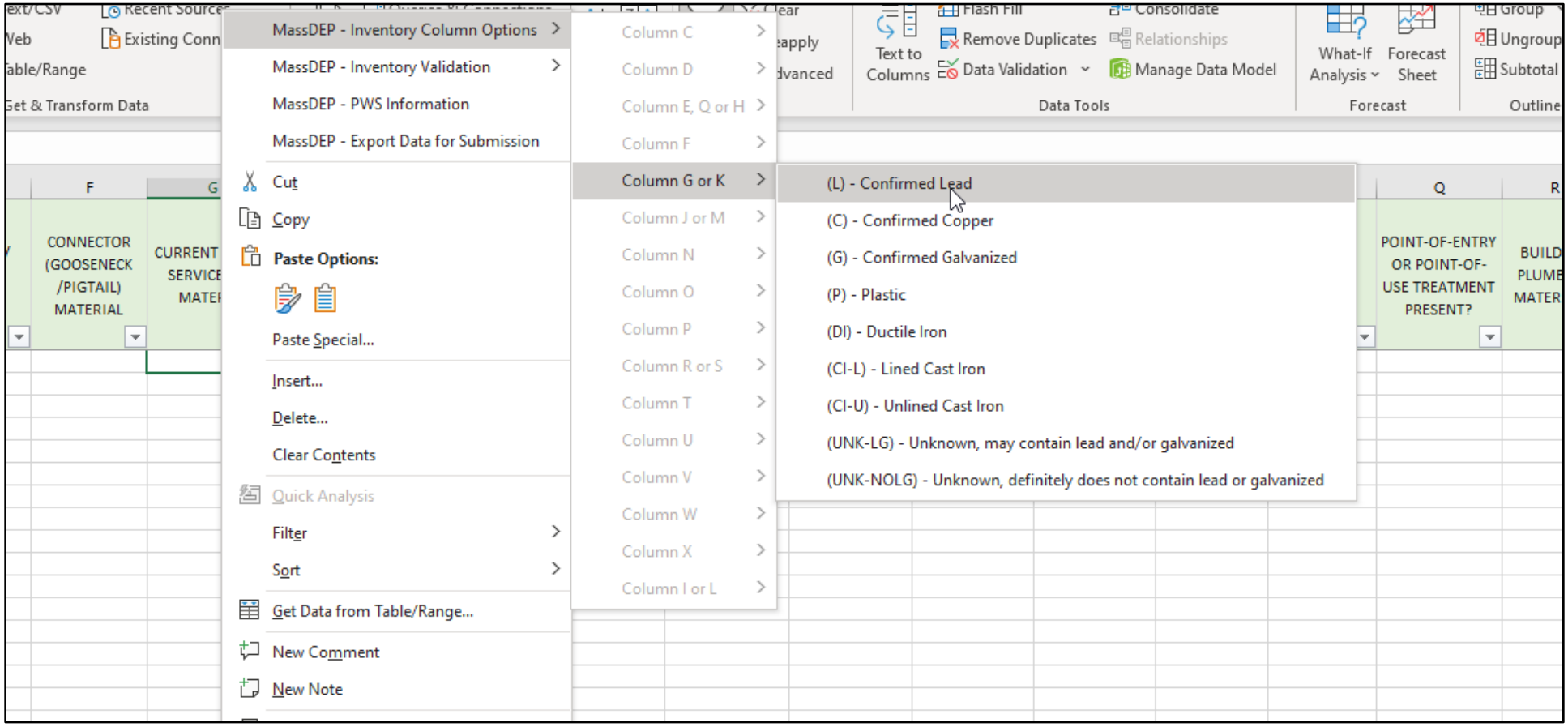


Populating Cell Values

Using the MassDEP – Inventory Column Options context menu

Most of the columns of the INVENTORY worksheet have a context menu from which valid values can be chosen, similar to selecting from a dropdown list. The context menu can be accessed by right-clicking in any cell from a row greater than row #2. From the context menu, hover over the **DEP: Inventory Col. Options** menu option, and then the column, and then select the applicable response, as seen below in Figure 3**. Only those options that are valid for the active/current cell will be selectable, all other options will be "greyed out".**

Figure 3- Column Options Context Menu



The table below lists the columns for which the Inventory Column Options context menu is available, along with the available values for the column. Some columns trigger calculations/actions and are denoted by ‡.

Column Letter	Column Name	Options in Context Menu	CSV Header Name	Data Column Description
Not Applicable	Not Applicable	Not Applicable	version	Leave this value blank if not using the Excel Materials Inventory Workbook from MassDEP Drinking Water Program.
Not Applicable	Not Applicable	Not Applicable	pws_id	The seven-digit PWS ID # of the system.
Not Applicable	Not Applicable	Not Applicable	mf_gt_twenty	If more than 20% of the structures served by the PWS are multiple family residences then “Y”, otherwise “N”.
A	SITE_ID	Not Applicable	site_id	See worksheet “COLUMN DEFINITIONS” of Inventory Workbook.
B	LOCATIONAL IDENTIFIER	Not Applicable	locational_identifier	See worksheet “COLUMN DEFINITIONS” of Inventory Workbook.
C	LCR SAMPLING LOCATION	YES NO	lcr_location	See worksheet “COLUMN DEFINITIONS” of Inventory Workbook.
D	CONNECTOR (GOOSENECK/PIGTAIL) CURRENTLY PRESENT?	(YES) – Yes, Known with Certainty (NO) – No, Known with Certainty (UNK) – Unknown, Not Known with Certainty	connector_present	See worksheet “COLUMN DEFINITIONS” of Inventory Workbook.
E	CONNECTOR (GOOSENECK/PIGTAIL) MATERIAL	(L) - Lead (C) - Copper (B) - Brass (S) - Steel (PVC) – Plastic (PVC) (HDPE) – Plastic (HDPE) (O) - Other, Does not contain lead or lead solder	connector_material	See worksheet “COLUMN DEFINITIONS” of Inventory Workbook.

Column Letter	Column Name	Options in Context Menu	CSV Header Name	Data Column Description
		(UNK-NOLG) - Unknown, definitely does not contain lead or galvanized		
F	CURRENT PUBLIC SERVICE LINE MATERIAL	(L) - Lead (C) - Copper (G) - Galvanized (PVC) – Plastic (PVC) (HDPE) – Plastic (HDPE) (DI) - Ductile Iron (CI-L) - Lined Cast Iron (CI-U) - Unlined Cast Iron (B) - Brass (UNK-LG) - Unknown, may contain lead and/or galvanized (UNK-NOLG) - Unknown, definitely does not contain lead or galvanized	current_public_sl_material	See worksheet “COLUMN DEFINITIONS” of Inventory Workbook.
G	WAS PUBLIC SERVICE LINE MATERIAL EVER PREVIOUSLY LEAD?	(YES) – Yes, Known with Certainty (NO) – No, Known with Certainty (UNK) – Unknown, Not Known with Certainty	public_sl_prev_lead	See worksheet “COLUMN DEFINITIONS” of Inventory Workbook.
H	PUBLIC SERVICE LINE SIZE	3/8” 1/2" 5/8” 3/4" 1” 1 1/4" 1 1/2" 1 3/4" 2” 3” 4” 5” 6” 8” 10” 12”	public_sl_size	See worksheet “COLUMN DEFINITIONS” of Inventory Workbook.

Column Letter	Column Name	Options in Context Menu	CSV Header Name	Data Column Description
		14” 16” (OTH) - Other		
I	PUBLIC SERVICE LINE INSTALL DATE	(PLB) - Pre lead ban (<= 1985) (ALB) - After lead ban (>= 1986)	public_sl_install_date	In addition to the context menu options: • Any four-digit year Any decade adhering to the format YYYY’s or YYYYs, e.g. 1920’s or 1920s See worksheet “COLUMN DEFINITIONS” of Inventory Workbook for additional information.
J	CURRENT PRIVATE SERVICE LINE MATERIAL	* See options for column F	current_private_sl_material	See worksheet “COLUMN DEFINITIONS” of Inventory Workbook.
K	PRIVATE SERVICE LINE SIZE	* See options for column H	private_sl_size	See worksheet “COLUMN DEFINITIONS” of Inventory Workbook.
L	PRIVATE SERVICE LINE INSTALL DATE	* See options for column I	private_sl_install_date	See worksheet “COLUMN DEFINITIONS” of Inventory Workbook.
M	ENTIRE SERVICE LINE CLASSFICIATION	‡ Calculate Entire Service Line	entire_service_line_classification	‡ This is an auto-calculated column. You can also manually trigger the calculation by selecting one or more of the cells in the column for ENTIRE SERVICE LINE CLASSIFICATION and then right-click. From the context menu select DEP: Inventory Col. Options > Column M > Calculate Entire Service Line.

Column Letter	Column Name	Options in Context Menu	CSV Header Name	Data Column Description
				*** We do not recommend typing values into this field, and instead use the "Calculate Entire Service Line" command to calculate the value for you.** See worksheet "COLUMN DEFINITIONS" of Inventory Workbook for additional information.
N	VERIFICATION METHOD	(F) - Field Inspection by PWS (V) - Records Review (A) - Statistical Analysis (C) - Customer Self-Identification (S) - Sequential Monitoring (O) - Other MassDEP-Approved Method	verification_method	If more than one method was used pick the most accurate/highest verification method. **Field Inspection by PWS**: This is considered the most accurate verification method that uses a physical and visual inspection by a trained staff person. Typically, at the time of meter replacement, service line replacement, or special inspections such as pot holing and vacuum excavation. **Records Review**: This verification method includes review of PWS current or past records. Including Tap/tie cards, distribution system main replacement or leak detection or any projects where service line material may have been recorded by PWS. Other potential sources of information in a community might include

Column Letter	Column Name	Options in Context Menu	CSV Header Name	Data Column Description
				plumbing and building permits, or inspectional services records, or year of construction. **Statistical Analysis**: This verification method a qualified consultant uses statistical modeling and machine learning to predict the presence of lead service lines saving time and resources looking for lead service lines. **Customer Self-Identification**: This verification method uses information collected from building occupants, and typically in includes photos of the service line. The MassDEP Crowdsourcing application or a similar software solution can be used to collect the and verify the information. **Sequential Monitoring**: This verification method can be used if the physical inspections, records review or statistical analysis are not feasible. This method employs a process of taking five 1-liter samples and analyzing the samples for lead to determine if the service line is likely lead.

Column Letter	Column Name	Options in Context Menu	CSV Header Name	Data Column Description
				Other MassDEP-Approved Method: Alternative methods. Examples – electrical resistance acoustic wave, eddy current, other technologies that may be developed. DEP can and will review these approaches for validity and accuracy. See worksheet "COLUMN DEFINITIONS" of Inventory Workbook for additional information.
O	OTHER MASSDEP APPROVED METHOD DESCRIPTION / ADDITIONAL VERIFICATION METHODS		other_verification_method	Describe the other MassDEP-Approved verification method or, if more than one verification method listed in Column N Options was used, then list the method(s) in this column. See worksheet "COLUMN DEFINITIONS" of Inventory Workbook for additional information.
P	BUILDING TYPE	(SF) - Single-Family (MF) - Multi-Family (SCH/CC) - School/Child Care (RES/CC) - Residential & In-Home Child Care (NONRES) - Nonresidential, Non-School, Non-Child Care (MIX) - Mixed Residential & Nonresidential (O) - Other	building_type	See worksheet "COLUMN DEFINITIONS" of Inventory Workbook.

Column Letter	Column Name	Options in Context Menu	CSV Header Name	Data Column Description
Q	POINT-OF-ENTRY OR POINT-OF-USE TREATMENT PRESENT?	(YES) - Yes, Known with Certainty (NO) - No, Known with Certainty (UNK) - Unknown, Not Known with Certainty	poe_pou_treatment	See worksheet "COLUMN DEFINITIONS" of Inventory Workbook.
R	BUILDING PLUMBING MATERIAL 1	(L) - Lead (C) - Copper (CLS) - Copper w/ Lead Solder (B) - Brass (PEX) - Cross-Linked Polyethylene (O) - Other, does not contain Lead or Lead Solder (UNK) - Unknown	building_plumbing_material_1	See worksheet "COLUMN DEFINITIONS" of Inventory Workbook.
S	BUILDING PLUMBING MATERIAL 2	* See options for column R	building_plumbing_material_2	See worksheet "COLUMN DEFINITIONS" of Inventory Workbook.
T	BUILDING PLUMBING MATERIAL INSTALL DATE	1910s 1920s 1930s 1940s 1950s 1960s 1970s (<= 1985) – Between 1980 and 1985 (>= 1986) – Between 1986 and 1989 1990s 2000s 2010s	building_plumbing_material_install_date	See worksheet "COLUMN DEFINITIONS" of Inventory Workbook.
U	SAMPLING PLAN LOCATION	(R) - Routine Site (A) - Alternative Site (N/A) - Not Applicable	sampling_plan_location	See worksheet "COLUMN DEFINITIONS" of Inventory Workbook.
V	SAMPLING SITE TIER	‡ Calculate Sampling Site Tier	tier	‡ This is an auto-calculated column. You can also manually trigger the calculation by selecting one or more of the cells in the column for SAMPLING SITE

Column Letter	Column Name	Options in Context Menu	CSV Header Name	Data Column Description
				TIER and then right-click. From the context menu select DEP: Inventory Col. Options > Column V > Calculate Sampling Site Tier. *** We do not recommend typing values into this field, and instead use the "Calculate Sampling Site Tier" command to calculate the value for you.** See worksheet "COLUMN DEFINITIONS" of Inventory Workbook for additional information.
W	REPLACED LSL PUBLIC OR PRIVATE SIDE?	(PUBLIC) - Yes, public side of LSL (PRIVATE) - Yes, private side of LSL (BOTH) - Yes, both public and private side of LSL	replaced_sl	See worksheet "COLUMN DEFINITIONS" of Inventory Workbook.
X	NEW REPLACED SERVICE LINE MATERIAL	(C) - Copper (P) - Plastic (OTH) - Other Material	replaced_material	See worksheet "COLUMN DEFINITIONS" of Inventory Workbook.
Y	LSL REPLACEMENT DATE		replacement_date	Any date adhering to the format mm/dd/yyyy, e.g. 05/08/2017 See worksheet "COLUMN DEFINITIONS" of Inventory Workbook for additional information.
Z	COMMENTS		comments	See worksheet "COLUMN DEFINITIONS" of Inventory Workbook.

Validating Data

Configure Validation Settings

Before validating the INVENTORY worksheet, you will need to configure your validation settings. Follow the steps below to configure your validation settings.

1. Right-click in any cell of the INVENTORY worksheet.
2. Select ***DEP: Inventory Validation*** from the context menu.
3. The Validation Settings form (Figure 4) will be displayed.
4. If you want all cells with errors to be highlighted select ***Highlight Invalid Cells.*** After you run validation all cells with invalid data will be filled with a light red color.
5. If you want to save a log file which includes information about all of the errors found on the INVENOTRY sheet, select ***Output Validation Errors to File***. This will open a prompt to select a folder where the validation errors log file will be saved (Figure 5). Navigate to a folder and then click the OK button. The folder path you selected will be displayed below the checkbox (Figure 6). The validation error log files are named *YYYY_MM_DD_HHMMSS*_inventory_errors.txt, where *YYYY* is the current four-digit year, *MM* is the two-digit current month, *DD* is the two-digit day of the month, *HHMMSS* is the time in 24 hour format.
6. Click the Save button.

Figure 4 - Inventory Validation Settings Form

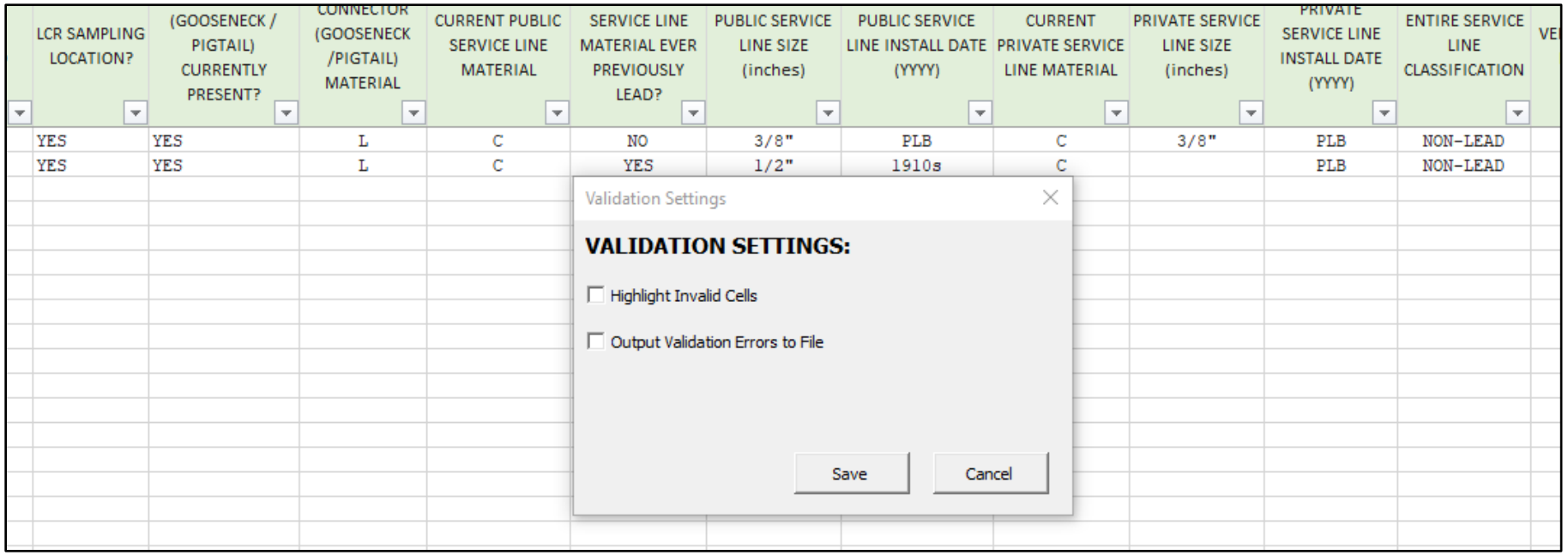


Figure 5 -Validation Settings - Save Output File

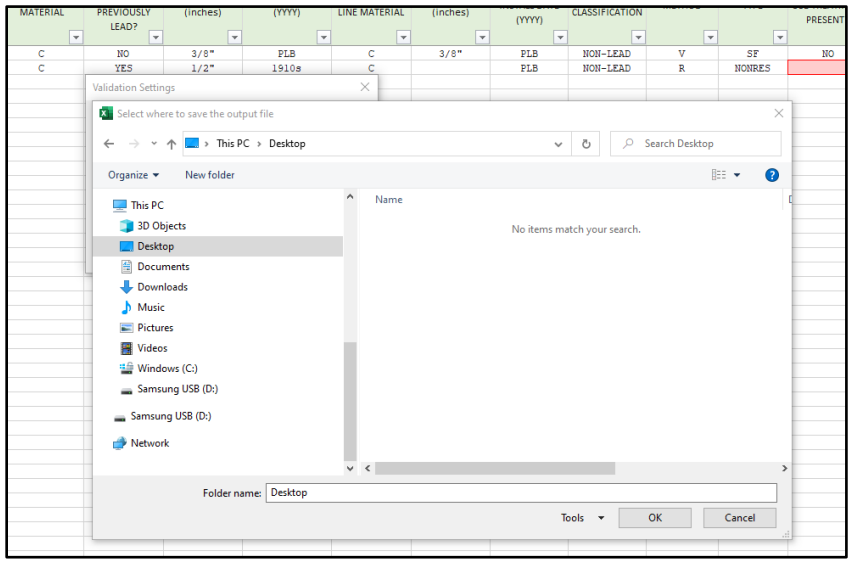
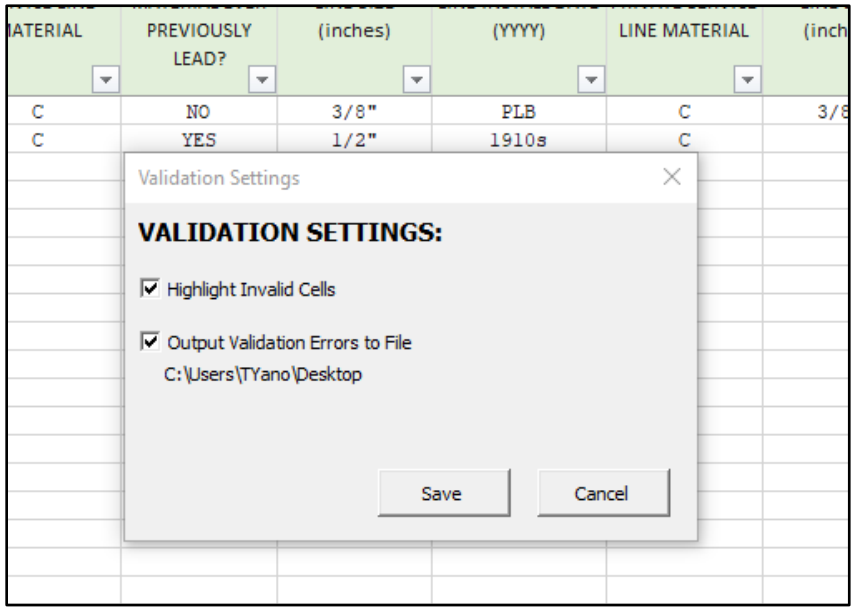


Figure 6 - Validation Settings - Output File Path

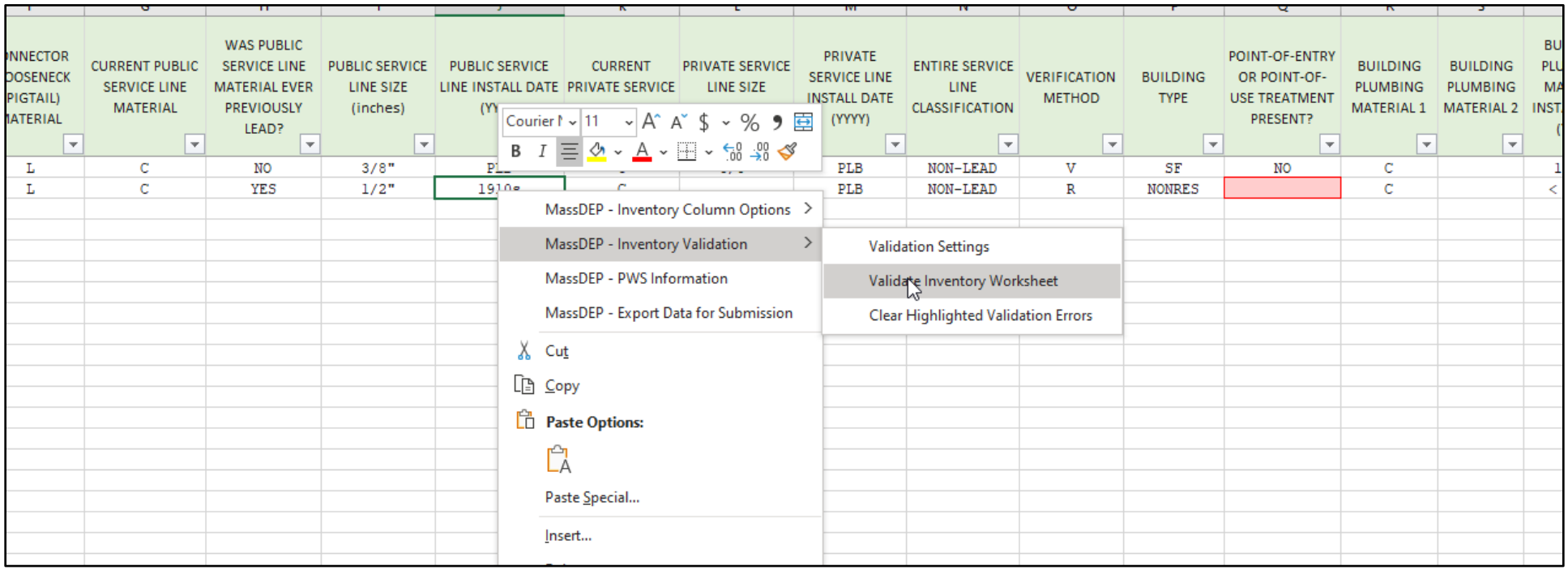


Run the Validation

To validate the INVENTORY worksheet:

1. Right-click in any cell of the INVENTORY worksheet to display the context menu.
2. Select ***DEP: Inventory Validation***
3. Select ***Validate Inventory Worksheet***. A progress indicator will show the percentage of rows that have been validated. The time it takes to complete the validation process will depend directly on the number of rows in the INVENTORY worksheet.
4. If you selected ***Highlight Invalid Cells*** in the Validation Settings then all cells with errors will be filled with a light red color.
5. If you selected ***Output Validation Errors*** to File the log file will contain detailed information about the errors found.

Figure 7 - Validate Inventory



Clear Highlighted Validation Errors

To clear the highlighted errors on the INVENTORY worksheet:

1. Right-click in any cell of the INVENTORY worksheet to display the context menu.

2. Select ***DEP: Inventory Validation***
3. Select ***Clear Highlighted Validation Errors***

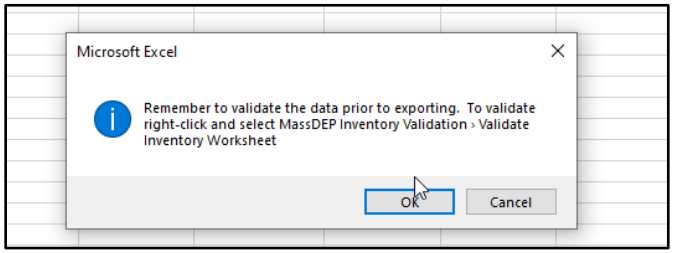
Exporting Data for Submission to MassDEP

Data to be submitted to MassDEP Drinking Water Program should be in a CSV file format. Be sure to validate your data prior to exporting and make sure to correct any validation errors. MassDEP Drinking Water Program will run validation on the file(s) you submit. Files that do not pass validation will not be accepted.

To export the INVENTORY data:

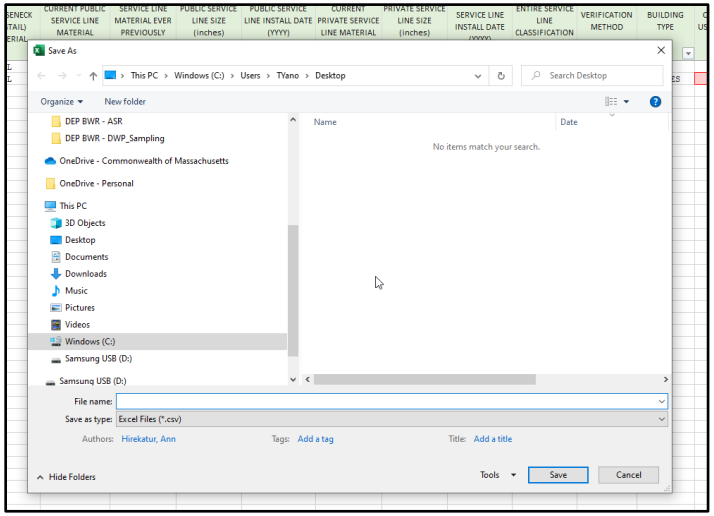
1. Right-click in any cell of the INVENTORY worksheet to open the context menu.
2. Select ***DEP: Export Data for Submission***
3. A pop-up will appear reminding you that data should be validated prior to exporting (Figure 8). If you have not yet validated then click the Cancel button, otherwise click the button labeled OK.

Figure 8 - Export Validation



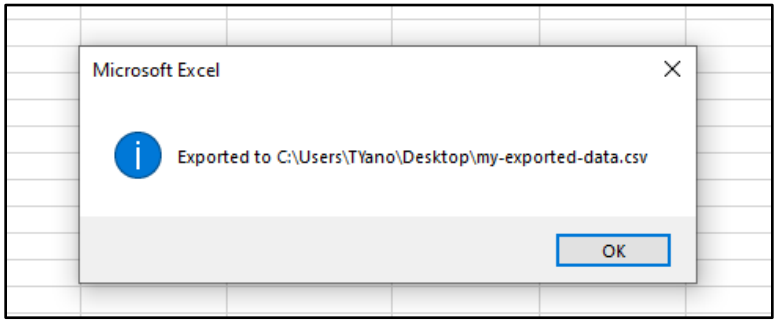
4. You will be prompted to provide a name for the CSV export file and to select a folder where the file will be saved (Figure 9).

Figure 9 - Export Save to Folder



5. If the export is successful, then a message will appear confirming the location where the file was saved (Figure 10).

Figure 10 - Export Success



Structure of CSV (Comma Separated Value) File

If you plan to use a method other than the one built into the Service Line Inventory Workbook to create the CSV file the header row and data structure of the CSV file must mirror the following:

```
version, pws_id, mf_gt_twenty, site_id, locational_identifier, lcr_location, connector_present, connector_material,
current_public_sl_material, public_sl_prev_lead, public_sl_size, public_sl_install_date, current_private_sl_material,
```

```
private_sl_size, private_sl_install_date, entire_service_line, verification_method, other_verification_method,
building_type, poe_pou_treatment, building_treatment_material_1, building_treatment_material_2,
building_plumbing_material_install_date, sampling_plan_location, tier, replaced_sl, replaced_material,
replacement_date, comments
```

The valid values for each "column" of data can be found in the table of section "***Populating Cell Values***" above. **Note, double-quotes must be used to enclose data.**

Tips and Notes

- The INVENTORY worksheet was designed to be as flexible as possible for a wide array of use cases. For example, a water system may already have the data in a dedicated database and would like to "feed" the data into the Service Line Inventory Workbook via automated scripts, while another water system may prefer to enter the data into the worksheet manually by typing or selecting options through the built-in menu system. To achieve this level of flexibility the workbook/worksheet(s) does not implement many protections to prevent the user from breaking the functionality of the workbook/worksheet(s). The following should be avoided:
    - Editing (including adding, deleting, and modifying) the header, i.e. first, row of the INVENTORY worksheet.
    - Inserting columns between the existing columns of the INVENTORY worksheet.
    - Deleting columns on the INVENTORY worksheet.
    - Modifying the name of existing worksheets.
    - Locking/unlocking the workbook and worksheets.
    - Adding, deleting, or modifying Named Ranges.

- Data can be copy/pasted, or populated via an automated process, into the INVENTORY worksheet from another data source. Be sure to keep the first row of the INVENTORY worksheet intact.

- If you have a lot of data and you notice the workbook becoming less responsive you may want to consider splitting the data into two or more workbooks. The data validation scripts go from one cell to another so the process can take a significant amount of time if there are thousands of rows.