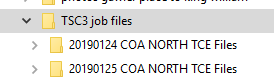
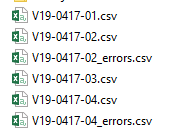
**Instructions on using the script “ER\_Process\_Survey.exe” to process TSC3 survey data:**

The “ER\_process\_survey.exe” script has been designed to automate some of the processing that is performed on the .csv output from a Trimble controller, before importing into CAD. It also has the option to rename photos from the original into a filename that includes the pothole ID.

* Copy all the survey data from the survey device, or from the Trimble connect website, into the folder “Job folder\04 Site Data\TSC3 job files”.
  + Ensure any images that are copied are retained in any relevant subfolders.   
    eg. If the images are stored on Trimble connect under “\job-data\img123.jpg”, ensure the “TSC3 job files” folder has a “\job-data\” sub folder.
* For each input survey csv file, copy to the “job folder\04 Site Data\” folder and rename each file sequentially according to the data archive, skipping a number after each input file  
  eg, first file “V19-1234-01”, second file “V19-1234-03”.
* Run the script file.
  + When prompted, select the input files to be used.   
    Order of file selection does not matter as the files will be sorted in numeric order.
  + If there are any photos to be copied and renamed, click yes at the prompt.   
    This will trigger two more folder selections.   
      
    1) The first is the root level of the photo file paths. If the images have been copied into a subfolder then the root is the top level of the file path.   
    eg, consider the following folder structure with images in both of the “2019…” folders  
      
    Selecting the “TSC3 Job files” folder is required when the image path in the survey data file is “20190124 COA NORTH TCE Files\img131.jpg”  
      
    2) the second is the output folder location.   
    It is recommended that an appropriate subfolder be created in the “06 Drawings and Deliverables” folder, such as “QLA\_PH\_photos”
* Once the script has run it will generate one output file for each input file, the output having one number higher than the input file. Any errors found in the process are saved to a separate error log for review. eg…   
     
  becomes  
  
* The output file contains all the input data with some modifications.   
  + Each point in the input file is replicated in the output file, unless the input point is not a survey code (PSM, SM, CHK, RES, STN, TEMP, Free) and the point ID is non-numeric.   
      
    Survey codes (PSM or SM) are renumbered from 100000. Other survey codes (CHK, RES, STN, TEMP, Free) are ignored.  
      
    Where point codes have a note but the note will not display in CAD, an extra NOTE point will be added to the file with numbering starting from 90000.

Points that have a note starting “Modified” have the note removed.  
When entering multiple files for processing, a point that has appeared in a previous file will be ignored – eg when the 2nd file is a continuation of the 1st file so the 2nd file contains duplicate points of the first.

* + If the point number has already been in use, or is lower than the current highest output, it will be renumbered to the next highest number. See below for more clarification.
  + The order of fields is as follows:  
    ***Point ID; Easting; Northing; Elevation; Code; Note; Original point ID.***
  + The original point ID is maintained in case the data needs to be traced back to its source.
  + Potholes have additional fields for insert into CAD, with the same fields as above and: ***Surface RL; Date; SUI Type; Material; Size; Additional Notes; Photo 1; Photo 2***  
      
    Some further fields are used for QA/QC and checking of data:  
    ***Taped depth; Surveyed Depth; depth difference; within tolerance; target height***  
      
    Taped depth: value recorded by surveyor  
    Surveyed depth: difference between QL-A elevation and POTSH elevation  
    Depth difference: difference between taped and surveyed depth  
    Tolerance check: OK if depth diff less than 0.05, otherwise CHECK  
    Target height: value recorded by surveyor
* Review the processed data.
  + Checking potholes requires looking at the processed data file and looking for any potholes where the Tolerance notes CHECK.   
    This is where the difference between the taped depth and surveyed depth is greater than 0.05m.   
    This requires discussion with the surveyor about possible reasons for the discrepancy.   
    There may be some situations where the issue is clear, such as soft soil ground or notes stating uneven SUI surface, but any irregularities need clarification.
  + Check the error file and resolve any errors listed.   
      
    The script is intended that any errors found can be rectified in the source / input files. Then delete the error files and re-run the script, until no error script is generated.   
      
    The following errors are checked by the script:
    - Duplicate Pothole ID’s in use (POT’s with same ID)
    - Duplicate Pothole Surface ID’s in use (POTSH’s with same ID)
    - Potholes with no corresponding POTSH – should this occur, the script will use the taped depth and Pothole elevation to calculate the surface height so there will still be some output, however the input data should be checked for missing information
    - Check if a note has been added to a code where CAD is not setup to handle a note for that point code. Eg putting a note on a LINE code.  
      When this error occurs an additional point is added to the file with the code NOTE.
    - Check if the code has any invalid codes.
    - Missing Photo files

\*\* WARNING about the use of Microsoft Excel for editing the raw data \*\*  
When Excel opens a csv file it automatically treats any number data as numbers and not as text. This means it will apply rounding automatically.   
This can affect the Pothole ID’s where ID’s are greater than 9.   
  
eg, if a pothole 1 has 12 conduits within, then the first may be labelled 1.1, then 1.2, etc to 1.9, 1.10, 1.11, 1.12.   
But when hole 1.10 is read by Excel, it will automatically round the data to 1.1, creating a duplicate with 1.1.   
  
If there are no edits occurring to the original CSV file then the script will not do this same rounding and it will not cause an issue.   
However, if the raw .csv file is edited for any reason in excel, then it will require checking if there are any potholes or trenches with many services. If they are numbered beyond single digits, then select the 1.10 cell and put a single quote mark in front of it and a zero at the end to force excel to treat it as text when you save it. Eg, ‘1.10  
  
Note that this will need to be done on both the POT and POTSH survey points.

* Photo output  
  Each pothole has 2 input photo files, A & B.   
  These photos are copied to the output folder and renamed:  
   QLA\_PH<ID><letter>  
  where   
  - “ID” is the pothole ID and   
  - “letter” is whether it is the first photo (A) or second photo (B)

Point Renumbering –why it was required

When dealing with survey data across multiple files there is a challenge in keeping the data sequential so that it will be imported into CAD correctly, as point order is critical for the action codes to work successfully.

When working on a single controller it is possible to create multiple data files and if the later files contain exact duplicates of earlier data that will be ignored, so it is not an issue.

But there are situations where multiple controllers may need to be used. Or the records are not clear about what is the next point number to use, and so sometimes duplicate point numbers can occur.

It is not practical to only re-number the duplicate point numbers. Consider the following example, with two files, each generating one line with the use of the LINE B code.

|  |  |
| --- | --- |
| File 1 |  |
| 10 | LINE B |
| 11 | LINE |
| 12 | LINE |

|  |  |
| --- | --- |
| File 2 |  |
| 8 | LINE B |
| 9 | LINE |
| 10 | LINE |
| 11 | LINE |

|  |  |
| --- | --- |
| 8 | LINE B |
| 9 | LINE |
| 10 | LINE B |
| 11 | LINE |
| 12 | LINE |
| 13 | LINE |
| 14 | LINE |

If you only renumber the duplicate points from File 2 (10,11 => 13,14) then it will append those two points onto the end of the file 1 line.

Whereas renumbering any new point to the next available number will result in the correct sequence being maintained. Eg, File 2 (8-11 => 13-16)

|  |  |
| --- | --- |
| 10 | LINE B |
| 11 | LINE |
| 12 | LINE |
| 13 | LINE B |
| 14 | LINE |
| 15 | LINE |
| 16 | LINE |

Current listing of valid survey codes:  
VOPA,VOPB,VOPC,VOPD,VOPZ,VTEA,VTEB,VTEC,VTED,VTEZ,VCOA,VCOB,VCOC,VCOD,VCOZ,VEEA,VEEB,VEEC,VEED,VEEZ,VOTA,VOTB,VOTC,VOTD,VOTZ,VTSA,VTSB,VTSC,VTSD,VTSZ,VTTA,VTTB,VTTC,VTTD,VTTZ,VSSA,VSSB,VSSC,VSSD,VSSZ,VHVA,VHVB,VHVC,VHVD,VHVZ,VELA,VELB,VELC,VELD,VELZ,VEAA,VEAB,VEAC,VEAD,VEAZ,VFSA,VFSB,VFSC,VFSD,VFSZ,VGAA,VGAB,VGAC,VGAD,VGAZ,VRWA,VRWB,VRWC,VRWD,VRWZ,VSEA,VSEB,VSEC,VSED,VSEZ,VSTA,VSTB,VSTC,VSTD,VSTZ,VUNA,VUNB,VUNC,VUND,VUNZ,VWAA,VWAB,VWAC,VWAD,VWAZ,BUSB,CC,CE,CLID,CMK,DLID,DP,EARR,EARS,ELID,EMK,EXTA,EXTM,FH,GL,GC,GLID,GM,GMK,GS,GV,ILID,IP,KO,LID,LIDC,LIDD,LIDE,LIDG,LIDI,LIDL,LIDS,LIDT,LIDW,MH,MHL,PBX,PP,PY,RWP,SEP,SLID,SPRK,STOB,SV,TBX,TLID,TMK,TP,TPIL,TS,UMK,UV,VENT,WLID,WM,WMK,WV,BB,TB,BED,BENC,BIN,BOL,BL,BG,BSHE,BSIG,BUSH,COMB,CR,DR,DD,DU,EB,EC,ED,EF,EG,EM,EP,ES,ET,EV,EW,LINE,F,FFL,FL,G,GUY,INV,JT,KB,DK,KC,KT,LP,LW,LWD,LY,LYD,MBX,MON,PHBX,POLE,POST,RA,RW,SIGN,SN,SOF,SH,ST,TK,TAP,TRAF,TREE,TDL,VB,WL,WB,WT,TWL,WLV,B,CONTINUE,END,C,H,V,SO,RPN,CPN,RPN,RT,X,BC,FC,CIR,POC,NOTE,POT,POTSH  
  
Though this list is subject to change as new codes are setup and corrections issued by the national survey manager.