Closed Circuit Television Inspection Specifications Sanitary and Storm Sewers

Prepared by Engineering Infrastructure – October 2021

Waterloo City Centre | 100 Regina Street South, Waterloo, ON N2J 4A8 | P. 519.886.1550 | F. 519.747.8760 | TTY. 1.866.786.3941

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GENERAL

Scope

These specifications cover the requirements for inspecting new and existing sanitary sewers, storm sewers using closed-circuit television.

References

These specifications refers to the following standards, specifications or publications:

Region of Waterloo and Area Municipal Design Guidelines and Supplemental Specifications for Municipal Services (DGSSMS)
Ontario Provincial Standard Specifications OPSS 409 Closed Circuit Television Inspection of Pipes
NASSCO National Association of Sewer Service Companies
PACP Pipeline Assessment and Certification Program
LACP Lateral Assessment and Certification Program
MACP Manhole Assessment and Certification Program

Definitions

CCTV Survey means the televised inspection of sewers using closed circuit television.
MH means the Maintenance Hole or Manhole
Drainage Structure means a catch basin, maintenance hole, or ditch inlet
Main means the storm, sanitary, water mains, or other accessible conduit pipe culverts
Sewer Section means the length of main connecting two (2) maintenance holes
MPEG means movie photographic experts group.
Digital Data Storage Device means non-volatile devices such as USB flash drives, SSD solid state drives.

Scheduling of Work

The Contract Administrator will schedule the sequence of work with priorities given to the inspection of proposed construction projects. The City reserves the right to make additions or deletions as necessary. No payment shall be made for movement from location to location or travel time to the city.

The Contractor shall give City staff advance notice of the locations and types of work to be done on a daily basis by 9:00 a.m., including starting and finishing times. The Contract Administrator shall be notified immediately if no work is to be done. In the case of lost time due to inclement weather, excessive fogging within the sewers, breakdown, late arrival, etc., the Contractor will only be paid for actual completed inspections.
When the City requires the services of the Contractor, a maximum of one-week interval between the request for services and arrival of the Contractor in the City of Waterloo will be allowed, unless an emergency dictates otherwise.

The City requires that the Contractor commence work on the contract for a trial period of three days in which time the quality of the reports and videos will be reviewed and any necessary changes or short comings will be amended. This is to ensure that the quality of the product is satisfactory and that both parties understand what is expected. The City will provide the locations that will be used for this trial period. Based on this trial, the City reserves the right to continue with or revoke the remainder of the contract.

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The sections of sewer to be cleaned and televised through this contract will be located primarily within the paved areas of the public right-of-way; however, there may be some sewer sections that are located within public easements on private property. The successful bidder will be responsible to coordinate and gain access to any and all sewer sections and will be responsible for any restoration.
The cost of the survey television inspection located within public easements shall not be paid separately, but shall be included in the other price items in the contract.

For lateral inspection the contractor is responsible for contacting the homeowners and scheduling all appointments when necessary. The City will provide a listing and map of the sewer laterals to be video inspected to the successful contractor. The listing will contain the homeowner's address, name and telephone number where available, to assist the contractor in the scheduling of appointments.
Submit a sample inspection report and digital MPEG video recordings at least two weeks prior to beginning the inspection work, for the City staff's review.
The inspection can take place from the clean out located in the basement towards the main or from the main using a main launch camera towards the house. In either case the starting point and direction shall be clearly noted on the video inspection and report.
Flush clean sewer mains prior to use main launch camera for lateral CCTV inspections from the main.
Clean or ream any minor obstructions from the lateral in order to obtain a complete video inspection of the laterals.
Video inspect and record conditions of the laterals. It is not unusual for laterals to have localized restrictions down to 2".

Changes, errors or mistakes made by the contractor or his agents, workers or employees, either through carelessness or otherwise, must be rectified by the contractor, at his own expense.
In all cases of misunderstanding and disputes, verbal arrangements will not be considered. If any changes are made to the contract, written documentation containing the signatures of both parties must be produced.

Traffic Control

The Contractor shall erect all necessary signs, flashers, and warning devices, all properly positioned for the safe control of traffic and execution of the work. All devices shall be in accordance to the current Highway Traffic Act, the Ontario Ministry of Labour Regulations and the Ontario Traffic Manual Book 7 –Temporary Conditions (Field or Office Edition).

Interference to the normal flow of traffic shall be kept to a minimum. Where possible, equipment shall be located so that a single lane of traffic is maintained at all times. No road is to be closed by the Contractor. Contractors are permitted to work on City streets between the hours of 7:00a.m. to 7:00p.m. and on Regional roads between 9:00a.m. to 3:00p.m.

All works on Regional Roads require a work permit 48 hours before commencing work during the 9:00am to 3:00pm timeframe. Hours of work outside of the daytime hours indicated will require 11 days notice. Contact the Contract Administrator prior to start of work.
Some work may be required between midnight and 6:00a.m. on streets with high traffic flow and where traffic reductions are not permitted.

The cost of maintenance of traffic shall be incidental to the contract and not measured for payment.
The cost of all traffic control devices and Paid Duty Officer shall not be paid separately, but shall be included in the other price items in the contract.

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SEWER CLEANING

Intent

The intent of sewer cleaning is to remove foreign materials from the sewer and restore the sewer to a minimum 95% of original capacity immediately prior to CCTV inspection.

It is recognized that there are conditions such as broken pipe and major blockages where cleaning cannot be accomplished or that additional damage could result if cleaning were attempted or continued. Should such conditions be encountered, the Contractor will not be required to clean these specific sections.

If in the course of normal cleaning operations, damage does occur from unforeseen circumstances, the Contractor will not be held responsible, providing that reasonable care was used.

Cleaning

Designated sewer sections will be cleaned using a combination unit equipment that shall have a selection of two or more high-velocity jet nozzles, approved by the City. The nozzles shall be capable of producing a scouring action in all sizes of pipe. The combination unit shall include a water tank, debris tank, suction mechanism and hydraulically driven hose reel.

Cleaning equipment shall be capable of removing dirt, grease, rocks, sand, and other materials and obstructions from the sewer lines and manholes by the use of a vacuum system. The Contractor shall be required to make as many passes as necessary with a minimum of three (3) to restore the sewer to a minimum of 95% of the original capacity to ensure easy passage of the camera through the entire line.

If cleaning of an entire section cannot be successfully performed from one manhole, it can be assumed an obstruction is present and cleaning efforts will cease and further investigations done.

Use of Hydrants and Water

Fire hydrants shall not be used without obtaining a hydrant use permit. When water from the fire hydrant is necessary to avoid delay in normal working procedures, the water shall be conserved and not to be used unnecessarily. In case of a fire no hydrant shall be obstructed, in the area served by the hydrant.

Operation of both public and private hydrants shall comply with the City of Waterloo standard operating procedure. See Appendix "F". When hydrants are opened, they should be slowly flushed free of rust, and should always be allowed to drain after being used. The Contractor may use water from the list of approved City hydrants (see **Appendix "E"**) only after obtaining permission from the Contract Administrator. Any damage to hydrants resulting from misuse shall be the responsibility of the Contractor.

Water Hammer- To reduce the risk of damage to the water mains, (from the destructive forces of water hammer), City staff will install a gate valve on the hydrant port once the permit is issued. The Contractor must install a double check or reduced pressure type back flow prevention device after the gate valve and before the supply hose. The back flow prevention device must be available at all the times in the truck during the contract period for viewing, upon request by City forces. The back flow prevention device must have a tag attached indicating it has been certified within the past year in accordance with the latest edition of CAN/CSA B64.10. Water hoses connected to hydrants should not be laid across the road and exposed to vehicular traffic, without the protection of a ramp.

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A Hydrant Use Permit MUST be obtained for Authorized use. Contact PWS Water Services Customer Service Representative for Hydrant Use Permit by telephone at 519-747-8613 or in person at the Waterloo Service Centre located at 265 Lexington Court. Bylaw 90-62 enforced.
The hydrants assigned by the Contract Administrator **Appendix "E"** are to be used only. The Contractor is responsible for obtaining the necessary hydrant use permit and having it available for viewing while the hydrant is being used.

Cleaning Precautions

During cleaning operations, satisfactory precautions shall be taken so that the water pressure created does not damage or cause flooding of public or private property. When possible, the flow of sewage in the sewer shall be utilized to aid in the cleaning process. In older sections of the City, it may be necessary to reduce pressures to less than 1000 PSI to prevent water damage to homes. A maximum pressure of 1800 PSI will be used to prevent damage to the sewer lines. The Contractor is responsible for any flooding caused by his flushing operation and must respond immediately to any complaints received.

Recovery of Equipment

Every reasonable precaution shall be made to ensure equipment does not become stuck in the sewer. Should this occur, the City will make no payment for lost time. The Contractor shall be responsible for all costs associated with recovering the equipment. If it is determined that the Contractor is not at fault, the above shall not apply and the City will perform any work required to excavate the equipment.

If at any time, the nozzle and hose of cleaning equipment becomes stuck in a pipe section due to structural defects, Contractors may be required to cut the hose so it can be left in place until excavation is done and the equipment is retrieved. There will be no extra payment for this work.

Material Removal

Debris such as dirt, sand, rocks, grease and other solid or semi-solid material, which is a result of cleaning, shall be removed at the downstream manhole of the section being cleaned. Passing material from manhole to manhole shall not be permitted due to the risk of a line plugging. This material will be removed using the vacuum system on the combination unit. At the end of each day, back flush the last section of sewer cleaned to ensure no buildup of debris has occurred. Operators are required to decant liquid waste at the last manhole prior to disposal of the solid sludge ONLY at the approved dump site.

Disposal of Material

In accordance with all applicable regulatory standards, such as the Environmental Protection Act and subject to all terms and conditions related to Waste Management, and also in particular the O. Reg 406/19, the contractor will be responsible for the complete removal and disposal off site, of all materials flushed, scraped, or cut out of the sewer service pipeline or main line sewer.
Flushing and abandoning of debris in main sewer or sewer lateral is not permitted.
The Contractor shall submit its MOE licence with the bid.
Prior to the commencement of the contract, the Contractor shall notify the Contract Administrator of the disposal site(s).
The contractor shall also provide the Contract Administrator with documentation, such as weigh scale tickets, attached to all relevant invoices, indicating discharge quantities, pertinent dates and discharge location(s).
To improve work efficiency the City may provide a dumpsite for all materials removed from City of Waterloo sewers during the cleaning operation, if available. This is the only permitted disposal site within the City of Waterloo during the contract period. In such of a situation the materials are not to remain at this temporary site more than 30 days unless permission is given by the City.

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The Contractor must have a special permit from the Ministry of Environment to transport and haul waste material outside of the City of Waterloo. If the need does arise, the Contract Administrator shall be provided with a copy of the C of A or Environmental Compliance Approval (ECA).
Operators are required to decant approximately 75% of liquid waste at the last manhole prior to disposal of the remaining solid sludge at the approved dump site. The dump site is provided as a convenience for all Operators. Inform the Contract Administrator when the dumpsite is filled to approximately 75% of capacity.

Reaming

The City requests CCTV Contractors to have the capability to remove obstructions. This may be achieved by flail reaming or by robotic cutting. Flail reaming will not be allowed for the removal of intruding vitrified clay laterals. These are to be removed by robotic cutting. This item will be paid on a per hour basis.

Re-inspection

If in the opinion of the Contract Administrator, it is determined that re-inspection is required as a result of inadequate cleaning, the Contractor shall re-clean and re-inspect the sewer at no additional cost to the City.

Acceptance

Acceptance of sewer line cleaning shall be made upon the successful completion of the television inspection and shall be to the satisfaction of the Contract Administrator. If CCTV inspections show the cleaning to be unacceptable, the Contractor is required to re-clean and re-inspect the sewer until accepted by the Contract Administrator. Once approved, payment will be issued.

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INSPECTION

Sewer Main Inspection

Prior to commencing the inspection of a sewer section, the linear distance between the inside walls of the maintenance holes at each end of the section shall be measured, using a steel tape.

Prior to commencing an inspection, the Contractor shall de-water the sewer section to ensure that the full diameter of the pipe is visible, where indicated in the Schedule of Unit Price. Flow in the pipes will be controlled to a maximum depth of 20% of the pipe diameter to permit viewing of the pipe walls. The method of control shall be outlined to the City of Waterloo and accepted prior to the commencement of work. The Contractor shall maintain the flow, where required, of all sewers, drains, and house or inlet connections encountered during the progress of the work and if necessary provide by-pass pumping.

The maximum speed of the camera during the inspection shall be 9 meters/minute. Where a structural defect identified as a fractured, broken, missing or collapsed pipe is encountered, the camera shall be stopped and rotated to permit inspection of the defect at an angle of 90 degrees. The camera shall be stopped to ensure accurate recording of all defects or drain connections.

The camera lens shall be kept clean at all times. No inspection of a sewer shall proceed while the camera lens is dirty (i.e. it impairs the operators' ability to accurately encode features).

The sewer section shall be kept clear of fog during the inspection. No inspection of a sewer shall proceed while fog is present in the pipe.

The chainage shall commence at the inside wall of the starting maintenance hole and shall be accurate to within 1.0 percent of the length of the sewer as compared to the steel tape measurement. If the chainage is not accurate to within this limit, the inspection will be rejected. The chainage indicator shall be adjusted to indicate the chainage of a point on the wall of a sewer as it passes the periphery of the picture. The inside wall of the maintenance hole at each end of the sewer section shall be clearly visible on the inspection videotape.

Maintenance Hole Inspection

The aim of the CCTV inspection is to collect all the necessary information on the manhole and pipe details, based on the information that can be obtained at the time of inspection.
The Contractor shall be responsible for completing the inspection in accordance with NASSCO MACP standard at the level of detail described in **Appendix "A"** for all manholes on sewer sections inspected during the Contract. The manhole inspection sheet will be provided by the City and includes, but not limited to the location, service type, material, scoring of the manhole condition etc. The inspection database along with the videos and reports are to be submitted bi-weekly.

Sequence of Work

The CCTV inspection of the sewer shall be carried out as follows:

The sewer shall be dewatered to ensure that the full diameter of the sewer is visible during the inspection, where included in the Schedule of unit prices;

Manhole Inspection to follow.

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Sewer inspection using CCTV equipment in accordance with OPS 409.06 specifications;

At the start of each survey use a video overlay system to clearly display the "on screen display for the start of each sewer section" on the monitor and video recording, as described in **Appendix "C"** for a minimum of 10 seconds.

The digital media storage device containing data files, videos and the summary reports shall be submitted to the Contract Administrator as stated in section "Video and Data Submission Requirements", and are to be labeled as shown on Number 2 of **Appendix "C"** for maintenance & rehabilitation projects. For Subdivision reference see **Appendix "D"**.

The Contractor must have the ability to respond to emergency requests for inspections and/or flushing/cleaning works within (4) hours of verbal notification during the period of the Contract.

Reversal and Abandonment of Survey

When the CCTV camera, during the course of sewer inspection (survey), is obstructed in its progression from maintenance hole to maintenance hole, then a reversal must be performed, where the survey is paused and resumed from the opposite maintenance hole. If such a survey abandonment occurs, the Contract Administrator MUST immediately be notified by the Contractor. Abandonment of the survey of the sewer length may be considered in any following circumstances:

Inability to maintain picture quality due to condition of the sewer;
Risk to the contractor's equipment;
Inability to locate the maintenance hole;
Inability to gain access to the maintenance holes once located;

Recovery of Equipment

Every reasonable precaution shall be made to ensure equipment does not become stuck in the sewer. Should this occur, the City will make no payment for lost time. The Contractor shall be responsible for all costs associated with recovering the equipment. If it is determined that the Contractor is not at fault, the above shall not apply and the City will perform any work required to excavate the equipment.

Standby Time

The Contractor will indicate the amount per hour to be charged for standby time if unable to proceed with cleaning and CCTV inspections due to circumstances beyond his control. The Contractor is to notify the Contract Administrator immediately if on standby time.

Contact Phone Number

The Contractor shall provide to the Contract Administrator a mobile telephone number for direct contact to the flushing and CCTV trucks.

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Flow Control & By-Pass Pumping

When interruptions of sewer section flows are necessary to effectively conduct inspections, the Contractor shall, subject to the approval of the City, control flows using plugging and blocking methods.

The City reserves the right, when necessary, to request bypassing and de-watering of a sewer to be inspected. The Contractor will be responsible for any damage to public or private property resulting from the bypass operation or lack thereof.

A sewer line plug shall be inserted into the line at a manhole upstream from the section to be inspected. The plug shall be designed so that all or any portion of the sewage flows can be released during the inspection. Flows shall be reduced in order to inspect the pipe invert. Sewage levels upstream of the plugged section shall be monitored at all times. After the work is completed, flows shall be restored to normal.

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VIDEO AND DATA SUBMISSION REQUIREMENTS

Deliverables

The storage device shall contain electronic data that can be imported into the City's "CTspec" Sewer Pipe condition Analysis program in "sewer.mdb" format data file described within **Appendix "B"** and the supporting videos and an electronic copy of the inspection reports in MS word format.

Each CCTV inspection submitted shall be accompanied by an electronic PDF format sewer inspection report generated from the sewer.mdb file.

The structure of the reports shall be as required by the Contract Administrator. The PDF reports shall be included on the digital media storage device, along with the video files and sewer.mdb file.

Prior to the regular contract submission of CCTV inspections and reports, the Contractor shall submit a trial inspection report containing the PDF, MPEG-4 and mdb formats for approval by the Contract Administrator.

Code the sewer condition in accordance with the requirements of NASSCO.
The City has added the following codes to be used in remarks:
Lateral codes to include - Black Pipe (BLT), Vitrified Clay (VLT), Concrete (CLT), Asbestos Cement (ALT), Poly-Vinyl Chloride (PLT) and Buried Manhole (BMH)

Provide one copy of the hard copy report and an electronic copy of the inspection report.

The report is to begin with a front cover & an index as described in **Appendix "C"** for maintenance & rehabilitation projects.
For Subdivision reference see **Appendix "D"**.

The report is to be prepared during the sewer inspection and each survey will have its own report and a video file. The report will be in book form with mounted colour photographs. Revised copies of the maps, as noted in The Scope of Work, are to be attached to the reports.

The manhole inspection video(s) and data shall be in its separate folder sorted by sequential order "not hidden in folders". This MH folder may contain multiple manhole inspection videos and each manhole inspection MPEG.4 file shall be named by the manhole name provided by the City.

Conduct all manhole inspections in accordance with the following:
Inspect from the top of the manhole frame to the bottom of the manhole at the centerline elevation of the existing sewer.
Position a graduated survey rod in the manhole that will be visible during the entire inspection to indicate distance.
Block ambient light to reduce lens flare and poor contrast during the inspection.
Ensure the frame of the manhole is visible at the start of the inspection. Keep the picture in focus during the inspection from the point of observation to a minimum of two riser diameters ahead. Stop camera for 2 seconds at major defects and connections.
Rotate and pan the camera to provide a perpendicular view of all major defects and connections. Major defects to include but not be limited to cracked and deformed risers or barrels, displaced bricks, holes, large displaced joints, missing or damaged gaskets between manhole sections, missing bricks or concrete, missing mortar.
Rotate and pan the camera a full 360 degrees at the following locations.

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300 mm below the frame and cover. Ensure the base of the frame is clearly visible.
300mm below the base-to-riser flat top or conical reducer joint.
300 mm below the top of the base joint.
The centerline of incoming existing sewers.
Contractor may be required to perform sewer and manhole inspections where the Engineer has determined the specified tolerance requirements have not been satisfied.

The Annual CCTV Contractor shall submit the inspection reports binders to the Contract Administrator on a bi-weekly basis for review.

For City and Regional road rehabilitation projects the inspection reports shall be submitted to the Contract Administrator within 10 working days of the completion of the fieldwork.

Inspection Vehicle

The inspection vehicle shall contain a separate area for viewing, recording and controlling the CCTV operation. Proper seating accommodation shall be provided to enable two people, in addition to the operator, to clearly view the screen of the monitor screen, which displays the inspection work in the sewer as such work proceeds. All equipment utilized within the sewer shall be stored outside the viewing, recording and control area.

The Contractor shall equip the inspection units and crew supervisor with a cellular telephone utilizing Ontario telephone numbers and will provide the Contract Administrator with the cellular telephone numbers.

Inspection and Equipment

The CCTV camera used the inspections shall be colour, pan, tilt and zoom view type capable of radial rotation of 360°, lateral rotation of 270°, and producing a continuous picture resolution.

Self-propelled rubber tired or crawler tractor capable of passing over minor surface imperfections including but not limited to broken joints and solid debris up to 40 mm in height.

The cameras shall be equipped with a self-contained, adjustable, directed light source compatible with the lens angle and dispersed to create even distribution of the light around the pipe perimeter without the loss of contrast, flare out of picture or shadowing.

The camera shall be self-propelled. The mounting of the camera shall be adjustable such that the central axis of the camera lies at a point equidistant between the invert and overt of the pipe during inspection of the sewer. In the case of egg shaped sewers, the camera lens must be positioned vertically above the invert at a height two thirds of the vertical dimension of the sewer. In all instances, when transporting the camera through the sewer the camera lens must be positioned on, and looking along the central axis of the sewer. For more information on camera start position and focal length corrections, see Section 6.5.3 of CSA – Technical Guide Visual Inspection of Sewer Pipe PLUS 4012-10.

Float or skid for mounting the video camera and towing it through sewers where the condition of the sewer prevents the use of a tractor. Obtain the Contract Administrator's approval before using a skid or float. Position the towing equipment

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in a manner that will not impede the view of the sewer from the camera and ensure the float or skid is stable enough to provide a smooth progress and steady video recording.

Transport equipment and cable shall be capable of inspecting a minimum of 500 metres of sewer from a single access point and the complete inspection of the sewer from the centre of the start maintenance hole to the centre of the finish maintenance hole. For large diameter and trunk sewers the minimum length of cable shall be 1000 metres.

A remote reading counter shall be used to measure distance travelled from the starting maintenance hole wall and measurements shall be recorded in metres to the nearest 100 mm.

Transport equipment shall be capable of adjustable camera height, in such a way that the camera is always position in the springline of the pipe.

For maintenance hole inspection a full 360° horizontal and vertical manhole imaging technology is preferred.

Recording Resolution

Provide a minimum resolution of 640 x 480 @29.97 frames per second for digital MPEG video playback.

Confirm recording resolution if requested by the Contract Administrator by recording a RETMA type resolution chart as follows:

a) Set up camera and accessories for the recording to simulate an actual inspection, for example, video signal routed through the cable reel and video overlay system.

b) Record camera being introduced and reaching its final position for the test.

c) Resolution chart shall fill the monitor screen.

d) Resolution chart shall be illuminated evenly and uniformly without reflection and illumination source shall accurately simulate the lighting used in the sewer inspections.

e) Record test for a minimum of 30 seconds.

f) Identify the camera on the recording.

g) Perform the test at the start of digital recording.

Digital Video Recorder

Digital video recorders shall be able to capture in colour from the live video source with MPEG-4 format. Minimum recorded

video resolution shall be 640 x 480 @29.97 frames per second .

The compression technology (codec) used in creating the MPEG4 digital video recordings shall be fully compatible with all the mainstream video players listed below:

• Windows Media Player, Windows and Mac

• Apple QuickTime Player, Windows and Mac

• Video LAV VLC Player, Windows and Mac

Video files that do not play properly and completely on all the above players will not be accepted and will require re-doing the CCTV inspection or other corrective procedure. Ensure that the entire inspection of a particular sewer or maintenance hole is

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contained on the same digital media storage device. Record reverse set-up inspections of a sewer immediately after the original inspection where possible.

Qualifications for Inspection and Coding

Provide a minimum of one operator on the site at all times with each inspection unit who holds a valid certificate from NASSCO for PACP, MACP & LACP or an equivalent industry recognized alternate training program acceptable to the Contract Administrator. Ensure that each operator is fully trained in all aspects of sewer inspection and capable of making accurate observations and recording all conditions that may be encountered in the sewers and the maintenance holes.

Perform inspection work only when PACP, MACP & LACP certified operators are on site. PACP certificates shall be available on site at all times.

Perform condition coding using operators who hold a valid certificate from the NASSCO PACP, MACP & LACP Qualification or an alternate training program acceptable to the Contract Administrator.

Submit a valid copy of the NASSCO PACP, MACP & LACP Operators Certificate for each operator to the Contract Administrator a 10 Working Days prior to the commencement of the inspection work. Operators shall have been certified or re-certified within five years prior to the start of the Contract.

Sewer Condition Coding

The CCTV inspection shall include condition, feature and defect classification coding according to the National Association of Sewer Service Companies (NASSCO) Pipeline Assessment Certification Program (PACP, MACP & LACP). Flow type, start and finish depths to be identified in the inspection report.

Sewer Inspection Standards and Defect Coding

CCTV inspection and defect coding shall be carried out by NASSCO PACP, MACP & LACP certified operators. New operators and operators with an expired PACP certification over three years must provide sufficient evidence of training by an approved entity such as an individual or association that has been approved by the Contract Administrator.

The Contract Administrator may at any time during this contract specify a form of training or certification to be undertaken by inspection operators based on the current standard or any other industry standard the City adopts in the future.

Coding Accuracy

Coding accuracy will be a function of the number of defects or construction features not recorded or omitted and the correctness of the coding and classification recorded. Coding accuracy will satisfy the following requirements.

- Header accuracy – 95%
- Detail accuracy – 85%

Contractor to implement a formal coding accuracy verification system before starting the work.

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Verify coding accuracy on a random basis on a minimum of 10% of the inspection reports. Submit coding accuracy checks with the corresponding video recording.

Perform accuracy verification for each operator for each week working and submit the results to the Contract Administrator for review. Operators failing to meet the accuracy requirements on two occasions will not be permitted to code on the remainder of the Contract until they have successfully re-attained the NASSCO Level of Qualification for PACP Operators.

Re-code inspections not satisfying the accuracy requirements and verify the accuracy of the inspection immediately preceding and following the non-compliant inspection. Repeat the process until the proceeding and subsequent inspections meet the accuracy requirements.

Data Requirements for Pipes and Maintenance Holes

A summary of the data requirements is provided as follows:

Asset IDs to be used will follow City of Waterloo nomenclature of ENTIDs for pipes and ENTNAMES for MHs. Example: 110001 and FWL-1

Video Resolution - Minimum recorded video resolution must be 640 x 480 @29.97 frames per second

Video Format of digital CCTV - MPEG4

Measurement to be Metric System for all measurements and settings.

Timestamp Time and date to be 24 hr military format for all settings.

Database/Data Standard/Data Structure to be Microsoft Access Database conforming to NASSCO data model.

Video and photographs names will follow the ctf file structure provided by the city for CTspec compliant contractors. Contractors without CTspec licences will ensure each digital video file (MPEG4) contains a file name with a maximum of 5 characters in accordance with **Appendix "G"**.

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Data Requirements for Laterals

A summary of the data requirements for laterals is provided as follows:

Asset IDs to be used will follow City of Waterloo nomenclature of ENTIDs for pipes .

Video and photographs names will follow the ctf file structure provided by the city for CTspec compliant contractors.

Contractors without CTspec licences will ensure each digital video file (MPEG4) contains a file name in accordance with Appendix "G" .

Video Resolution Minimum recorded video resolution must be 640 x 480 @29.97 frames per second .
Video Format of digital CCTV MPEG4

Measurement to be Metric System for all measurements and settings.

Timestamp Time and date to be 24 hr military format for all settings

Cable Calibration

The cable calibration distance is the distance between the Manhole wall and the periphery of the camera's view. This distance is unique for specific pipe diameters and specific camera set-ups.
The camera is placed inside a pipe of a given diameter so that the back of the camera is zeroed at the MH wall.
For each crew (camera / crawler / float combination) and for each new sewer size and / or shape, the cable calibration distance must be measured. This may also be done above ground with sample pipe sizes laying around the shop.

The cable calibration distance is the intersection point between the camera's widest horizontal viewing angle and the pipe's side periphery (03 and 09 o'clock) when the camera is level and looking forward.

Where possible, the camera should be far enough back in the MH to start an inspection at the manhole wall. The Access Point and Water Level are noted at 0.0 metres. A perspective view or a panned view of the pipe connection at the manhole should be obtained. The CCTV inspection continues into the pipe until the back of the camera is in line with the manhole wall. The cable distance is then set to the cable calibration distance for the size of pipe being surveyed. Any observations recorded between the manhole wall and the cable calibration distance may be estimated or set to 0.0 metres.

All defects are to be circumferentially located based on the side periphery only.
Therefore, distances of defects must be observed and logged at the edge of the screen raster image most preferably, at the side periphery as observations measured from the obvert or invert may introduce errors, especially within non - circular pipe.

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Uncharted Assets Naming Convention

Newly found manholes will be assigned Asset IDs by referencing the downstream manhole and an alpha character starting with "A". Example FWL-1A,

Split pipe segments will be assigned an Asset ID by adding a numeric suffix to the original pipe asset id. Example 110020-1, 110020-2 after one new manhole is found

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PAYMENT

Report and invoice submissions are to be made at the end of the project each year. Progress payments can be arranged at the end of each month. Progress payments will be processed after all of the following have been submitted, reviewed and approved by the Contract Administrator:

Hard copy inspection reports with Manhole inspection sheets.

Pipe and Manhole inspection videos with electronic data on digital media storage device.
Note: Use separate folders for Pipes, MHs, Video and databases.

Where reaming is required, payment will be issued for complete inspections only, with an additional hourly payment for the reaming. Payment will not be issued for partial inspections where reaming is required.

Payment for cleaning and flushing of sewers shall be made at the unit rate in the Schedule of Unit Prices and shall include all labour and equipment necessary for the work requirement. Payment of cleaning and flushing shall be based on steel tape measurement of the sewer section being cleaned.

Payment for all equipment, labour and materials required for the inspection of sewers and the preparation and supply of video inspection records and for the preparation and supply of reports shall be at the unit rate provided in the Schedule of Unit Prices for the diameter of sewer being inspected. Measurement for a CCTV inspection of pipelines is in meters measured on the ground surface from the centre of one drainage structure to the centre of another adjacent drainage structure or outlet/ inlet end of a pipe sewer.

In the event that an inspection must be terminated due to a blockage or collapsed pipe, payment will be based on the actual length of the sewer inspected, as determined from the chainage indication of the videotape.

The unit prices quoted on the Schedule of Unit Prices shall include all costs associated with the reducing of the flow in the sewer using plugging or blocking methods and removal of fog, when required.

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CONSULTANT / DEVELOPER START OF MAINTENANCE / FINAL INSPECTIONS OF NEW SUBDIVISIONS

Each year there are a number of "New Subdivisions" requiring beginning of maintenance & final CCTV inspections of the 2 year "maintenance period". The City of Waterloo prefers that these inspections be carried out by the City's current annual CCTV Inspection contractor. If a Contractor, other than the City's current annual CCTV Inspection contractor is used, they must first submit documentation to the Contract Administrator prior to commencement of the project, which proves that they are capable of meeting the requirements of this specification. Regardless of what contractor is used, the City of Waterloo Sanitary & Storm Sewer Main Closed Circuit Television (CCTV) Inspection and Cleaning Specification must be adhered to.

Copies of the reports, including, hard copies and media storage are to be sent directly to Developers or their representatives to review & correct deficiencies before submitting to the City of Waterloo.
Should repairs be required, the Developer's Engineer is to provide repair methodology for City's approval and re-video is required after approval is granted.
Sanitary sewer CCTV information (hard copy & electronic copy) are to be submitted separate of the Storm sewer CCTV information (hard copy & electronic copy).

Labeling for these reports is to be in accordance with **Appendix "D"**.

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APPENDIX
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APPENDIX A

SEWER MANHOLE INSPECTION REPORT

Date: _____ Dd/mm/yyyy **Weather:** _____ **Atmospheric Readings:**

LFL _____

Inspector: _____ O2 _____

City of Waterloo Manhole Number _____ H2S _____

Municipal Address (closest to manhole): _____

Location:	Road	Side walk	Boulevard	Easement	
Type of Flow:	Sanitary	Storm	Combined		
Manhole Type:	Straight Through	Intersection	Top End	Catchbasin Manhole	
Depth of Manhole (metres)		(from top of casting to centre of channel)			
Size of Manhole (mm)					

CONDITION AND MATERIAL

Manhole Material:	Precast	Cast in Place	Brick	Lined	
Manhole Condition:	Surface Damage	Cracked	Fractured	Broken	
	Joint Displaced	Mortar Missing	Bricks Missing	Debris	
Benching:	None	Surface Damage	Cracked	Fractured	
	Broken	Joint Displaced	Mortar Missing	Bricks Missing	Debris
Drop Structure	Yes	No	Inside	Outside	
Steps:	None	Missing	Broken		
Safety Landings:	Yes	No			
Manhole Pan Required	Yes	No			
Frame/Cover:	Loose	Poor Access	Buried	Damaged	
Adjustment type and height	None	Moduloc	Concrete	Metal	Other
Casting protruding above roadway:		Yes	No		
Casting depressed greater than 5cm in roadway:			Yes No		
Infiltration:	Seeper	Dripper	Runner	Gusher	Litres per minute(estimate)
Repairs Required:	Yes	No	Immediate	Heavy Debris	Benching / Major Structural
Digital Picture Taken	Yes	No			

Overall Score of Manhole _____ (1 to 10 scale - with 1 not acceptable and 10 very good condition)

Comments: _____

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Appendix A **Lateral Information Sheet**

Project:					Job #:		
From Street			To Street				
House No.	Street Name				Res. Indus.	Multi Com.	
Main Size Water:	San:	Lateral connection is on sewer section between		MH#	and MH#		
Owner Name					Phone Number		
Tenant Name					Phone Number		
Date of Inspection					**Inspected by**		

Service Locations

Location of	Distance	Indicate foundation corner	Size (mm)	Material	Approx. Length *(1)*	Depth at: Main	Depth at: House
Water S.							
Sanitary S.							
Storm Sewer							
Cleanout							
Sump Pump							

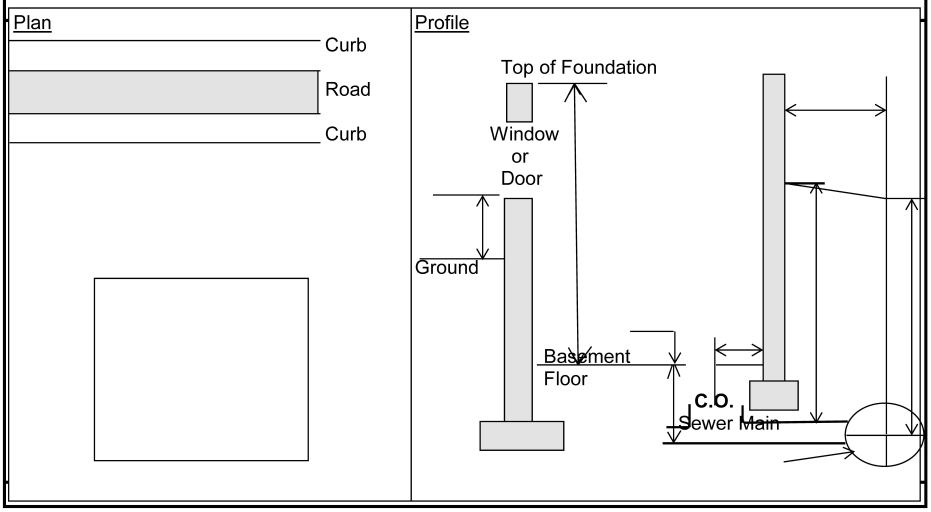
Remarks *(2)*

Service Details

Type of Service	Dimensions	Basement Depth *(3)*	Invert Depth *(4)*	Connection WYE	Connection TEE	Remarks *(5)*
Cleanout						
Sump Pit						

*Note facing Home, All measurements (metric) are to be right or left of a foundation corner and indicate which corner.
(1) Cleanout to Main
(2) Note evidence of weeping tile connections and approximate location, observations, through floor or wall, etc.
(3) Distance from top of foundation wall to basement floor
(4) Distance from basement floor to invert
(5) Access points (dimensions), restrictions, extent of flooring (carpeted) etc., access to basement (smallest doorway) etc.

Property Information (Drawing) Include measurements for Sanitary and Water Service, driveway material and any landscape features.



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Appendix B

CCTV Data Transfer "Sewer.mdb" Data Specification and Inspection Rules

Overview:

(To be read in conjunction with other related documentation, i.e. Client Instructions or the PACP, MACP, LACP Manual):

Database shall be a NASSCO-PACP, MACP, and LACP (Current Version 7) Certified Access Database.

General Reporting Notes

Mains

- Inspection Company Name, Inspector Name and his Certificate number, Reviewer Name and his Certificate number
- Date and accurate time of the inspection
- Street Name
- Direction of survey
- Pipe material, sizes and shape
- Recheck the accuracy of the Pipe ID and Manhole Names, as these are the "keys" to the whole inspection.
- Project number, Media Label
- Inspection Status
- Location
- Pre-cleaning and Date of Cleaning
- Weather
- Purpose of inspection
- Inspection Technology Used
- Depth of the start and finish Manhole, but as a minimum the start Manhole Depth
- If the finish Manhole cannot be found then enter a sensible distance (100 m as an example) and not the distance of the abandonment. If estimated then just enter the text "Tot Len" in comments.
- If a buried or uncharted Manhole is encountered then the inspection report MUST be finished with the MH/FH codes. In the case of an un-identified Manhole being found then the numbering of the Manhole MUST be as advised by the client prior to the start of the inspection contract.
- Don't just makeup the number. Make the position of the uncharted Manhole, with its number, on the site plan also making it obvious.
- If the inspection is abandoned and then inspected from the other direction then the current inspection must be finished using SA (plus a reason for the inspection being abandoned, SA) and a new header must be started.
- If the inspection is not going to be carried out from the other Manhole, in the case of a SA, then the header sheet MUST still be completed as if the inspection was to take place, with the reason for failing to carry out the inspection. See the separate "No Access Instructions" appended to these guidelines.

Determine prior to start of the contract, what text (data) the client wants displayed on the monitor (hence recorded). See "CCTV Video Title Screen Information" and "CCTV Continuous on Screen Display Information". Appendixes C and D.

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Maintenance Holes

- Inspection Company Name, Inspector Name and his Certificate number, Reviewer Name and his Certificate number
- Date and accurate time of the inspection
- Street Name
- Project number, Media Label
- Manhole Use
- Access Type
- Location
- Surface Type
- Depth (Rim to Downstream Invert)
- Inspection Level of Detail- according to Appendix A
- Inspection Status
- Location
- Pre-cleaning and Date of Cleaning
- Weather
- Purpose of inspection
- Inspection Technology Used
- Start maintenance hole inspection above ground pointing the camera to a recognizible permanent feature (building, hydro pole)

Laterals

- Inspection Company Name, Inspector Name and his Certificate number, Reviewer Name and his Certificate number
- Date and accurate time of the inspection
- Street Name
- Direction of survey
- Pipe material, sizes and shape
- Recheck the accuracy of the Pipe ID and/or Manhole Names, Lateral ID as well the Clean Out Address Name, as these are the "keys" to the whole inspection.
- Project number, Media Label
- Inspection Status
- Location

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- Pre-cleaning and Date of Cleaning
- Weather
- Purpose of inspection
- A total length (Total Length field) must be entered estimated either from the plan or by measured length on the surface between Pipe/MHs and Clean Out. It is fully understood that, in the case of a Survey Abandoned, the total footage is an estimate.
- Inspection Technology Used
- Colour photos of the front of the lot from the road with traffic cones showing the delineation of the lateral between the main and the front of the house. Colour photo of the clean out with the house civic number on it.

Detail Information

(To be read in conjunction with other related documentation, i.e. Clients Instructions or the PACP, MACP, LACP Manual):

- Each inspection Report must only contain one inspection hence, in the case of survey abandonment or buried or uncharted Manholes being encountered, a new header and a Detail must be completed. The above are essential for the validation of the data and to tie the data in with the mapping systems.
- When a defect or feature is encountered the camera must be stopped just prior to the defect/feature so that it can be clearly seen.
- The defect/feature must be recorded for a sufficient amount of time to enable the assessment of the observation, without recourse to using the "pause" facility.
- A video digit must be entered against the defect/feature in the format of time elapse into videotape. The format is: s: seconds (explained above).
- If the defect span for more than 3 feet or is repetitive over a number of joints (i.e. ELJ, Encrustation Light at Joint) then a start flag (S1, S2 etc., sequentially up to S9 then SA, SB…SZ! can be used) can be entered against the code at the start footage. When the defect finishes the appropriate finish flag, the flag is inserted against the defect at the finish footage and the same flag number is used to finish the defect off (S1 must finish with an F1 and so on). This will aid the Rig Manager in reporting repeating defects without having to enter the code at every joint footage or every 3 feet.
- Note: The defect that has a start flag against can change its position (i.e. a FL or CL) but not its magnitude (i.e. you cannot start with CL and finish with FL) You must "close", or finish, the defect with the appropriate finish flag and then start the new defect with an UNUSED (in the current inspection) start flag.
- If the inspection was abandoned (SA) then a reason for the abandonment MUST be entered in the remarks column against the SA code. The description of the reason for the survey abandoned should contain the appropriate defect code that has caused the abandonment (i.e. if due to an intruding connection) then the end of the report would read:

1102	342.8	CNI	04	11	02

All defects and features MUST have the relevant support data (i.e. JN/CN must have sizes and positions).

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Appendix C

ANNUAL CONTRACTS

Sewer Inspection Title for Report– Front Cover

1st Line	City of Waterloo – 2020 Sanitary Sewer CCTV Inspections
2nd Line	Contract No. - (Ref: **Appendix G)** Ex. 2020 Reports to begin at 20A01
3rd Line	Map No – (City Sanitary Atlas Map #) Provided by Contract Administrator
4th Line	Digital Media Storage Device No- (Ref: **Appendix G)**
5th Line	Street Names

Page 2 of Report – CCTV Inspection Report / Digital Media Storage Device Video Index

1st Line	Digital Media Storage Device Number
2nd Line	Date
3rd Line	Street Name
4th Line	Start MH Finish MH
5th Line	Use (Sanitary or Storm)

Digital Media Storage Device

Sewer Inspection Title for Digital Media Storage Device- Label

1st Line Digital Media Storage Device No

VIDEO's

CCTV Video Title Screen Information

Inspection of the sewer shall not proceed while the information screen is being displayed.

While the camera is stationary at the beginning of the section, the following should appear on the screen for a minimum of 10 seconds at the start of all inspections:

CCTV Contractor: Drain Ltd

Contract No.: RFT20-01 *Date*: 13 May 2020 *Time*: 14:21:00

Street: William St Sewer *Use*: SS

From/To MH ID: FWL-2 > FWL-1

Survey Direction: U *Height*: 300 mm

Material: PVC *Width*: 300 mm

Segment Length: 67.2 m *Pre-Cleaning:* H

Weather: Dry

Cable calibration Distance: 0.5 m

For Laterals
CCTV Contractor: Drain Ltd
Contract No: PT-08
Date, Time of inspection: 13 May 2020 Time: 14:21:00
Location /Street Name: 125 King St
From/To: MH/Pipe to CO
Survey Direction: U
Sewer Size: 150 mm
Material: P.V.C

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CCTV Continuous on Screen Display Information

Upon commencement of, and throughout the inspection, the following information shall be continuously displayed on-screen and captured on the screen;

While the camera is travelling at no more than 9 meters per minute these headings shall appear at the bottom left hand corner of the screen:

Street: William St Sewer Use: SS

From/To MH ID: FWL-2 > FWL-1

Survey Direction: U

Footage: Distance from MH wall

For Laterals

Survey Direction: U

Footage: Distance from MH/Pipe/Clenout

During pipe inspection, where possible, the CCTV camera shall be used to perform an internal scan of uncharted maintenance holes found. .

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Appendix D

SUBDIVISION REPORTS

Sewer Inspection Title for Report – Front Cover

1st Line	City of Waterloo
2nd Line	Subdivision Name, Stage, & Phase
3rd Line	Consulting Firm's Name
4th Line	Digital Media Storage Device Number (Ref: **Appendix "G"**)
5th Line	Indicate Start or End of Maintenance Period

Page 2 of Report – CCTV Inspection Report/Digital Media Storage Device Video Index

1st Line	Digital Media Storage Device Number
2nd Line	Date
3rd Line	Street Name(s)
4th Line	Start MH Finish MH
5th Line	Use (Sanitary or Storm)

Digital Media Storage Device

Sewer Inspection Title for Digital Media Storage Device- Label

1st Line Digital Media Storage Device No

VIDEO's

CCTV Video Title Screen Information

Inspection of the sewer shall not proceed while the information screen is being displayed.

While the camera is stationary at the beginning of the section, the following should appear on the screen for a minimum of 10 seconds at the start of all inspections:

CCTV Contractor: Drain Ltd

Contract No.: RFT20-01 *Date*: 13 May 2020 *Time*: 14:21:00

Street: William St Sewer *Use*: SS

From/To MH ID: FWL-2 > FWL-1

Survey Direction: U *Height*: 300 mm

Material: PVC *Width*: 300 mm

Segment Length: 67.2 m *Pre-Cleaning*: H

Weather: Dry

Cable calibration Distance: 0.5 m

For Laterals

CCTV Contractor: Drain Ltd
Contract No: PT-08
Date, Time of inspection: 13 May 2020 Time: 14:21:00
Location /Street Name: 125 King St
From/To: MH/Pipe to CO
Survey Direction: U
Sewer Size: 150 mm
Material: P.V.C

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CCTV Continuous on Screen Display Information

Upon commencement of, and throughout the inspection, the following information shall be continuously displayed on-screen and captured on the screen;

While the camera is travelling at no more than 9 meters per minute these headings shall appear at the bottom left hand corner of the screen:

Street: William St Sewer Use: SS

From/To MH ID: FWL-2 > FWL-1

Survey Direction: U

Footage: Distance from MH wall

<u>For Laterals</u>
Survey Direction: U
Footage: Distance from MH/Pipe/Clenout

During pipe inspection, where possible, the CCTV camera shall be used to perform an internal scan of uncharted maintenance holes found.

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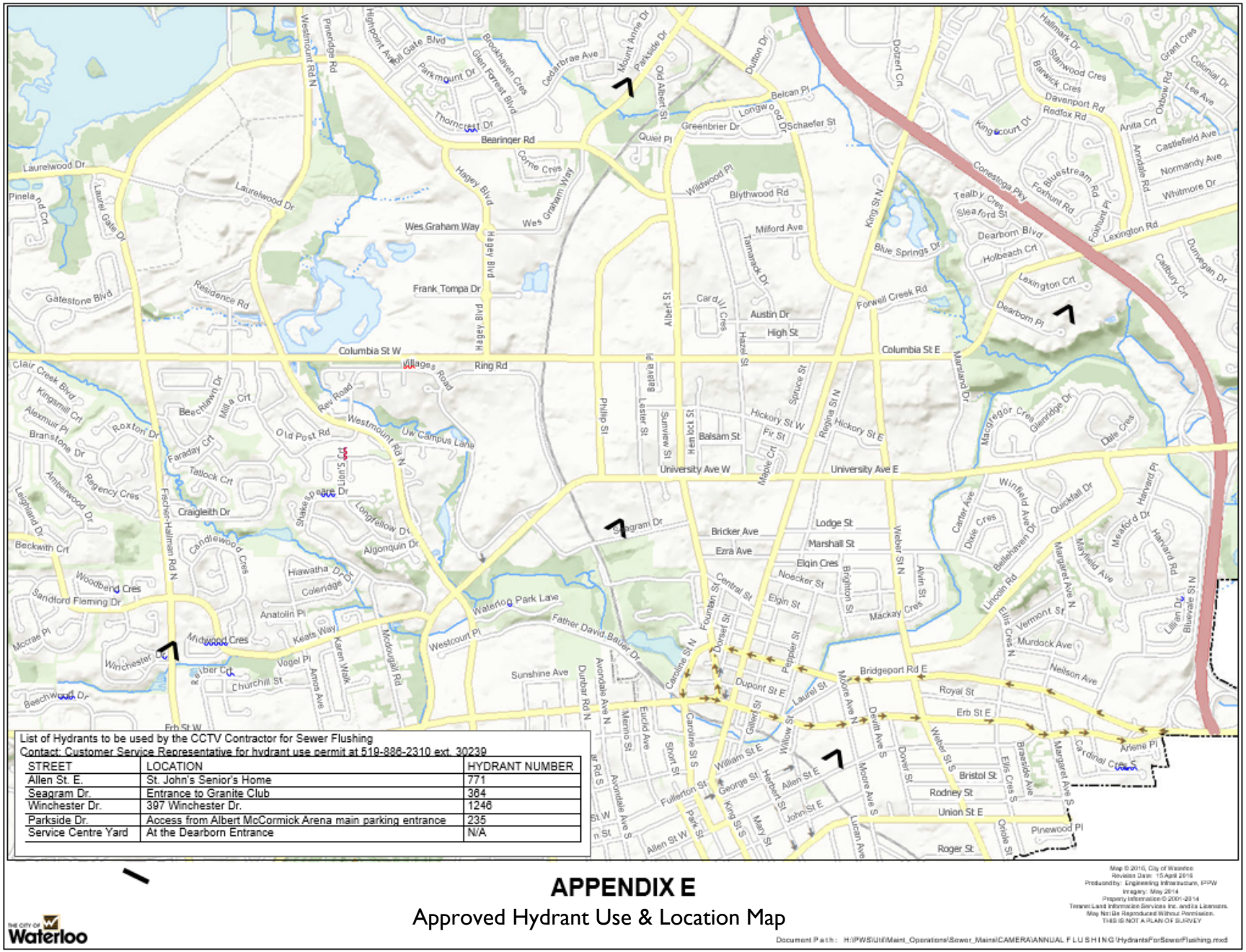

List of Hydrants to be used by the CCTV Contractor for Sewer Flushing
Contact: Customer Service Representative for hydrant use permit at 519-886-2310 ext. 30239

STREET	LOCATION	HYDRANT NUMBER
Allen St. E.	St. John's Senior's Home	771
Seagram Dr.	Entrance to Granite Club	364
Winchester Dr.	397 Winchester Dr.	1246
Parkside Dr.	Access from Albert McCormick Arena main parking entrance	235
Service Centre Yard	At the Dearborn Entrance	N/A

APPENDIX E

Approved Hydrant Use & Location Map

Document Path: H:\PWS\Util\Maint_Operations\Sewer_Mains\CAMERA\ANNUAL FLUSHING\HydrantsForSewerFlushing.mxd

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Appendix F

Approved Hydrant Use & Location Map

A Hydrant Use Permit **MUST** be obtained for Authorized use. Contact PWS Water Services Customer Service Representative for Hydrant Use Permit by telephone at 519-747-8613 or in person at the Waterloo Service Centre located at 265 Lexington Court. Bylaw 90-62 enforced.

1. **Pick-up hydrant gate valve HANDLE from Customer Service Representative before start of job.**
2. **Remove hydrant cap from the backflow prevention device.**
3. **Connect your fire hose or connection to the backflow prevention device & operate gate valve as needed.**
4. **When water use is completed, close gate valve & disconnect your hose connection from the backflow device. (DO NOT LEAVE HANDLE ON GATE VALVE UNATTENDED)**
5. **Replace hydrant cap on the end of the backflow device.**
6. **Return hydrant gate valve HANDLE at the end of the contract or job completion. (If lost, or not returned, you will be invoiced for a full gate valve replacement cost.)**
7. **Special provisions for hydrant use must be made during the colder or freezing times of the year. Contact the Customer Service Representative for proper use of hydrant during this type of cold weather.**

Contact the Customer Service Representative if there is any damage or problems with the use of the authorized hydrant.

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Appendix G
Digital Media Storage Device and Video (MPEG.4)
File Numbering Procedure for CCTV Inspections

Note
This Appendix shall be read in conjunction with Appendix B

The following information is provided to assist in the submission of CCTV requirements to the City of Waterloo.

CCTV information is to be submitted in electronic format as a combined package on the Digital Media Storage Device along with the reports and databases. Sanitary information **MUST** BE submitted separate from the storm and will NOT be accepted combined on one Digital Media Storage Device.

Important

The following format must be followed when electronically naming the recordable media using MPEG.4 video file(s). In order to correctly link video MPEG.4(s) to the database file, the inventory number used in naming the Digital Media Storage Device and MPEG.4 file(s) MUST reflect on the sewer.mdb data file in appropriate fields (refer to **Appendix B**)

The CCTV information is to be submitted on Digital Media Storage Device, using the following INVENTORY assignment format:

Column A	Column B	Column C	Column D	Column E	Column F
2	0	R	0	1	A

(ex. 20R01A for sanitary and 20R51A for storm)

Column A & B - Represent the year of Inspection (use the last two numerals of year)
Column C - Represents one of three options:
The Annual Maintenance contract will be assigned letter "A".
The Rehabilitation project will be assigned letter "R".
The Subdivision Consulting Firm/Developer numerical code. Table 1 on page 34.
Column D & E - Represents two pieces of information:

- Sanitary inspections numbers represent 01 to 49 - The sequence numbering for sanitary is to begin with "01" in each year and progress to a maximum of "49" for each project assignment, stage and/or phase.
- Storm Water inspection numbers represent 51 to 99. The sequence numbering for storm is to begin with "51" in each year and progress to a maximum of "99" for each project assignment, stage and/or phase.

Column F - Represents a letter to be assigned for subsequent videos in alphabetical order.

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Table 1 - Consulting Firm/Developer numerical code

Name	Full Name of Company	Company Assigned Number
Braun	Braun Consultants	1
IBI	IBI Group	2
MTE	MTE Consultants Inc.	3
PEIL	Planning & Engineering Initiatives Ltd.	4
STANTEC	States Consulting Ltd.	5
Earth Tech	Earth Tech (Canada) Inc.	6
Meritech	Meritech Engineering	7

Each Subdivision stage or part of stage or phase must use the same sequence number but indicate that it is the "start of maintenance" or "final of maintenance" on the Digital Media Storage Device.

If any developers consultant is not included in Table 1 above, contact the IPPW Infrastructure Engineering, City of Waterloo at 519 886-1550 ext. 78251 to obtain next available code number.

Each package will include the following:

- Data Files - NASSCO PACP/MACP/LACP compliant Sewer.mdb (Current Version 7)
- Video files - Pipe & Manhole (MPEG4 - is preferred as it takes less space)
- Reports - MS Word Format or PDF electronic reports, etc. noting defects and observations encountered during the inspection
- OPTIONAL DRAWINGS - (phases and stages marked overall servicing/grading of development phase "6" drawings).

Lateral CCTV information is to be submitted on Digital Media Storage Device, using the following INVENTORY assignment format:

Column A	Column B	Column C	Column D	Column E	Column F	Column G
L	2	0	R	0	1	A

Column A - Represents Lateral

Column B & C - Represent the year of Inspection (use the last two numerals of year)

Column D - Represents one of three options:

The Annual CCTV inspection contract will be assigned letter "A".
The Rehabilitation project will be assigned letter "R".
The Annual Maintenance/Pipe Bursting contract will be assigned the letter "P".

Column E & F - Represents two pieces of information:

- Numbers 01 to 49 represent sanitary inspections. The sequence numbering for sanitary is to begin with "01" in each year - and progress to a maximum of "49"
- Numbers 51 to 99 represent Storm water inspections. The sequence numbering for storm is to begin with "51" in each year and progress to a maximum of "99" for each project assignment

Column G - Represents a letter to be assigned for subsequent videos in alphabetical order.

If you have any comments or concerns with this process, please contact the Infrastructure Engineering Analyst by telephone at 519 886-1550

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Subdivision\Capital Project CCTV Submission Checklist

Note: Submisions not meeting the following steps will be returned to the Consultant/Developer

Subdivision Name: _____ Stage:_____ Phase: _____

Consultant Company: _____

Start of two year Maintenance Submission ☐ End of two year Maintenance Submission ☐

Road Reconstruction ☐

City Approved CCTV Contractor **Contact City of Waterloo Contract Administrator – 519-886-1550 ext.78251**	Yes ☐	No ☐
Sanitary & Storm submissions are provided separately **If not, provide separate Reports and Electronic Data**	Yes ☐	No ☐
City's Standard Manhole nomenclature used **If not, complete as per Engineering Manual**	Yes ☐	No ☐
Manhole Inspection Forms completed Sanitary Lateral Information Sheet completed **If not, complete as per CCTV Spec Appendix "A"**	Yes ☐ Yes ☐	No ☐ No ☐
Pipe, Lateral & Manhole Inspection video completed **If not, complete as per CCTV specification**	Yes ☐	No ☐
All repairs have been completed **If not, repair (optional see Deficiency Acceptance Guide)**	Yes ☐	No ☐
Package properly labelled **If not, complete as per CCTV specification Appendix "D" & "G"**	Yes ☐	No ☐
As Recorded overall Drawings in package **If not, submit**	Yes ☐	No ☐

Date: _____ Name: _____

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