

		AGENDA ITEM EXECUTIVE SUMMARY					
		Title:	Recommendation to Approve Modifications to the St. Charles Engineering Design and Inspection Policy Manual				
		Presenter:	James J. Bernahl				
<i>Please check appropriate box:</i>							
	Government Operations		X	Government Services 11.25.13			
	Planning & Development			City Council			
	Public Hearing						
Estimated Cost:	\$0	Budgeted:	YES	X	NO		
If NO, please explain how item will be funded:							
Executive Summary:							
<p>Staff has previously made a presentation on the new St Charles Engineering Design and Inspection Policy Manual. This manual was developed among the engineers in Community Development, Public Works, and Public Works Operational Divisions. During that presentation, staff made the recommendation that the City Council adopt this manual to help consolidate the most current City Design and Inspection Guidelines. As part of the adoption of this manual and to assure that the City Council is aware of any changes made to this policy manual, Staff, on an as needed or annual basis will present any changes to the manual for City Council approval. Although many of these changes to the manual would be considered minimal in nature (e.g. New State Highway Manual, Revised MUTCD Manual, etc.) this approach will assure that the City Council is aware of any modifications.</p> <p>As you may recall, the reasoning for the development of this manual was to create an updated and consolidated location for all approved Engineering Design and Inspection Guidelines for current residents, potential developers, as well as staff for reference. By consolidating all of these requirements into one manual it is staff's hope that this will help reduce these types of frequent changes to the City Code and thus create a more consistent and efficient resource for the residents, potential developers, and staff.</p>							
Attachments: <i>(please list)</i>							
Copy of modifications Made to the Policy Manual in 2013 (will be available by website posting date of 11.22.13)							
Recommendation / Suggested Action <i>(briefly explain):</i>							
Recommendation to Approve Modifications to the St. Charles Engineering Design and Inspection Policy Manual							
<i>For office use only:</i>		<i>Agenda Item Number: 4.b</i>					

STANDARD ENGINEERING DETAILS

Revisions / Updates

November 14, 2013

ITEM	DESCRIPTION	CURRENT DATE	REVISIONS NOTES
A-1	CHIMNEY SEAL	3/31/2009	
A-2	SANITARY MANHOLE	7/27/2010	
A-3	COPPER WATER SERVICE CONNECTION	11/12/2013	Updated per Water Division, no lead components
A-4	SANITARY SEWER CONNECTION TO EXISTING MANHOLE	3/31/2009	
A-5	PVC PIPE TRENCH	3/26/2013	Note Number 4, storm under 15" dia. to be PVC pipe
A-6	RCP & DIP TRENCH	3/26/2013	Note Number 4, storm under 15" dia. to be PVC pipe
A-7	THRUST BLOCK INSTALLATION	3/2/2011	Note Number 1, degree of bend
A-8	SERVICE BOX IN PAVED AREA	3/31/2009	
B-1	VALVE VAULT	11/12/2013	Updated per Water Division, no steps in vault
B-2	PRESSURE CONNECTION	11/12/2013	Updated per Water Division, no steps in vault
B-3	TYPE A & B STORM MANHOLE	7/27/2010	
B-4	TYPE A & B STORM MANHOLE WITH RESTRICTOR	7/27/2010	
B-5	TYPE A & B CATCH BASIN	7/27/2010	
B-6	HYDRANT INSTALLATION	11/19/2009	
B-7	DROP MANHOLE	3/31/2009	
B-8	RESTRICTOR STRUCTURE	10/25/2011	Removed min 3" diameter restrictor, 18" min sump added
C-1	SUMP PUMP DISCHARGE CONNECTION	3/31/2009	
C-2	SANITARY & STORM SERVICE	12/8/2010	
C-3	STABILIZED CONSTRUCTION ENTRANCE	3/31/2009	
C-4	OVERFLOW (WEIR) STRUCTURE	3/31/2009	
C-5	STRAW BALE FILTER (VOID)	N/A	
C-6	EROSION CONTROL BLANKET (VOID)	N/A	
C-7	WATER MAIN RESTRAINT	3/31/2009	
C-8	MOUNTABLE CURB & GUTTER	9/30/2010	
D-1	BRICK PAVING IN ROADWAY	1/18/2012	Detail added as part of 2012 MFT project
D-2	MINIMUM PAVEMENT (VOID)	N/A	
D-3	PAVEMENT PATCH	12/8/2010	
D-4	MINIMUM PAVEMENT	2/3/2010	
D-5	B6.12 COMBINATION CURB & GUTTER	10/22/2010	
D-6	PIPE UNDERDRAIN	1/20/2011	Underdrains shown as diagonals across street
D-7	STANDARD COVER	11/19/2009	
D-8	BRICK PAVING	3/31/2009	

STANDARD ENGINEERING DETAILS

Revisions / Updates

November 14, 2013

ITEM	DESCRIPTION	CURRENT DATE	REVISIONS NOTES
E-1	TYPE A INLET	3/31/2009	
E-2	TYPE C CATCH BASIN	8/18/2010	
E-3	DRIVEWAY	11/1/2013	Updated per changes to City Code
E-4	WATER MAIN CROSSING	3/31/2009	
E-5	CONCRETE WALK JOINTS	3/31/2009	
E-6	FRAME AND LID ADJUSTMENT WITH CONCRETE COLLAR	12/8/2010	
E-7	PLANTING GUIDELINES	3/31/2009	
E-8	PIPE UNDERDRAIN (VOID)	N/A	
F-1	CONCENTRIC CUL-DE-SAC	4/2/2013	New detail per Engineering Design & Inspection Manual
F-2	ECCENTRIC CUL-DE-SAC	4/2/2013	New detail per Engineering Design & Inspection Manual
F-3	TEMPORARY TOPSOIL STOCKPILE	3/31/2009	
F-4	B6.18 CURB & GUTTER FOR R-3250 CURB INLET	3/31/2009	
F-5	BUTTERFLY VALVE VAULT	11/12/2013	Updated per Water Division, no steps in vault
F-6	LOT GRADING GUIDELINES	3/31/2009	
F-7	STANDARD PLANTING PARKWAY DETAIL	9/12/2012	New detail per Community Development
F-8	PIT-SET METER VAULT (VOID)	N/A	
G-1	B6.18 COMBINATION CURB & GUTTER	10/22/2010	
G-2	SIDEWALK AT CURB & GUTTER	3/31/2009	
G-3	PIPE COUPLING	3/31/2009	
G-4	CASING PIPE	11/12/2013	Updated per Water Division, end boots
G-5	B4.12 COMBINATION CURB & GUTTER	10/22/2010	
G-6	EROSION CONTROL	4/3/2013	Updated per Illinois Urban Manual web site
G-7	RESTRICTOR STRUCTURE (VOID)	N/A	
G-8	SILT FENCE (VOID)	N/A	

LEGEND

REVISED IN 2013

SECTION IV

WATER SYSTEM

- A. DESIGN RESTRICTIONS**
- B. DESIGN REQUIREMENTS**
- C. MATERIALS**

A: Design Restrictions:

- 1) Dead End Water Main: The construction of dead end water main will not be permitted. Where dead end mains cannot be avoided on a temporary basis, a fire hydrant shall be placed at the end.
- 2) Pipe Compound: Pipe compound will not be permitted in any water main construction, including service connections. A general note to this effect shall be included in the Final Engineering Plans.

B: Design Requirements:

- 1) Tunneling: Augering or directional drilling will be required at all roadway crossings unless otherwise permitted by the City of St Charles appropriate Engineering Division. Steel casing and “Cascade” spacers shall be utilized exclusively. Following completion of the auger, the casing shall be filled with pea gravel or sand, the ends shall be blocked and mortared shut, or have “End Boots installed.
- 2) Cover Depth: All water main, hydrant leads, and services must have a minimum cover of five (5) feet, and a maximum cover of (10) feet. Variations from these standards will require approval of appropriate Engineering Division.
- 3) Fire Flows: Fire flows shall be calculated at a twenty (20) psi residual pressure and shall be available for a minimum four (4) hour continuous duration for flows above 2,000 gpm, and a two (2) hour continuous duration for flows below 2,000 gpm. Appropriate water pressure and flow must be provided in accordance with the St. Charles Municipal Code, Ord. 15.28.060:
 - Single family Detached Residential: 1,000 - 1,500 gpm
 - Town / Row or Cluster Housing: 1,500 - 2,000 gpm
 - Apartment Type Construction: 3,000 - 4,000 gpm
 - Industrial & Storage: 3,000 - 5,000 gpm
 - Research & Development Laboratories: 3,000 - 4,000 gpm
 - Business & Commercial Areas: 3,000 - 4,500 gpm
 - Mercantile Centers: 3,000 - 6,000 gpm
 - Assembly & Education: 3,000 - 5,000 gpm
 - Health Care & Institutional: 3,000 - 4,000 gpm
- 4) Hydrant Leads: All hydrant leads must be constructed of DIWM CL 52 with a minimum diameter of 6”. Where hydrant leads are longer than 100’, 8” diameter DIWM will be required.
- 5) Hydrant Spacing: Hydrants must be placed at a minimum of 400-foot intervals, and may not be less than five (5) feet from the back of curb. No buildable area shall be farther than 300’ from a fire

hydrant, and a minimum of one hydrant shall be located at each intersection. For larger projects, hydrants shall be proposed at high points for air release. All hydrant locations shall be coordinated with the City of St. Charles Fire Department and appropriate Engineering Division.

- 6) Horizontal and Vertical Separation: - Watermains and Sewer horizontal and vertical separations shall conform to the latest version of the “Standard Specifications for Water & Sewer Construction in Illinois. Reference to these standard and specification should be made when it is impossible to meet separation requirements for casing pipe requirements (refer to standard casing pipe detail).
- 7) Abandoning and Replacing Existing Services: All existing services shall be abandoned at the corporation stop (close corporation stop, cut services, and install copper disk). Existing services should be replaced from the new main to the B-Box if service is lead. If service is copper, it should be cut and tapped into the new main. Approved trench backfill material is to be placed where any trench lies within (3) feet of the edge of pavement, curb, or sidewalk. It is assumed all lines are lead and must be replaced to B-Box.
- 8) Interruption of Water Usage: Water services may only be interrupted when the transfer of services to the new main takes place. Services shall be transferred subsequent to testing and chlorination of the proposed main. The contractor shall contact the St. Charles Water Division at 1-630-377-4405 prior to transfer of service. Residents and Businesses must be informed a minimum of 24 hours in advance of any interruption by the City of St. Charles Water Division staff.
- 9) Services, Domestic: Domestic water services shall be provided **provided?** to each lot. The minimum size for domestic services is (1) inch. Once installed all services extending to the City right-of-way limits shall be located utilizing a 2” x 4” wooden stake painted blue.
- 10) Services, Fire Protection: Where fire protection services are required, separate domestic and fire protection services shall be provided. Each service must have an independent tie into the public water main.
- 11) Thrust Blocking: Preformed concrete block thrust blocking shall be provided at all bends greater than 10 degrees, at all mechanical joint connections, and at all fire hydrants (refer to city thrust blocking detail).
- 12) Trench Backfill: All utility and service trenches within (3) feet of paved surfaces, or at a distance specified by the Engineer, shall be backfilled with CA-7 (Virgin Crushed Limestone). FA-6 (clean beach sand) material shall be used in all other unpaved locations. All Backfill material shall be properly compacted unless otherwise directed by the appropriate Engineering Division. Backfill under existing pavements, where an open cut of the pavement has been approved, shall be Flowable Fill that meets the IDOT standards of Controlled Low Strength Material (CLSM) Mixture #1. No fly ash will be permitted in this mix (refer to City pipe trench detail).
- 13) Valve Spacing: Right-hand closing resilient wedge gate valves at intervals not over 600 feet intervals.

- 14) Valve Vaults: Valve vaults are to be precast reinforced concrete, eccentric type (refer to standard detail and materials section for sizing specifications). A maximum of (8-inches) of adjusting rings shall be used.
- 15) Frame and Covers: All valve vault structures shall have a Neenah Foundry Company R-1713 frame and type “B” Lid with concealed pick hole. Lids shall be furnished with “City of St. Charles - Water” cast into the top surface (refer to City standard detail).
- 16) Water Main, Minimum Size: The minimum size for any public water main shall be 8” (with the exception of hydrant laterals that may be 6”, (see design requirement #3 above for fire flow considerations).
- 17) Separation: A ten-foot horizontal separation shall be maintained between water mains and appurtenances, and all other utilities, public or private.
- 18) Appurtenance Separation: Water appurtenances shall be a minimum of (20) feet from permanent structures; this applies to any structure that may require a building permit (i.e. retaining walls, pools, shed, garages, etc.)
- 19) Dead Ends: Dead end water mains longer than 300’ should not be permitted. The water system must be extended, as a minimum, to the limits of the development and looped wherever possible. Note on all plans which mains are to be public and private.
- 20) Adjustment of Structures: All adjustments to valve vaults shall be made with precast concrete adjusting rings not to exceed a maximum of eight (8) inches overall in height. Watertight valve vaults shall be provided for each valve. Barrel sections shall be seated using (2) butyl rubber strips per tongue and groove section. Valve vaults are to be precast reinforced concrete, concentric type (refer to standard detail and materials section for sizing specifications). After final adjustments have been made, all joints in precast structures shall be mortared. The mortar shall be composed of one part cement to three parts sand, by volume, based on dry metals and shall be thoroughly wetted before laying. Vaults may only be extended to a maximum of 23” from the surface to the inside flare of the manhole cone section.
- 21) Connecting to Existing Water Mains: Connection to the end of an existing a water main shall be with a valve only. No new water main should be connected to the existing water main unless the new water main can be pressure tested separately. Connection to an existing water main shall be done by pressure connection only unless authorized by the appropriate Engineering Division. Pressure connection and valve shall be located within the valve vault. No pressure connection shall be within 3 feet of an existing water main joint. If pressure connection cannot be done, use a cut in sleeve and tee connection. All fittings will be swabbed out with a chlorine solution of at least 50 mg/L. A City Representative must test this solution.
- 22) Service Taps: Service taps to water mains are not permitted until after bacteriological sampling and analysis has been completed to the satisfaction of the appropriate Engineering Division. No water service connection shall be made by any person or firm other than a State

of Illinois licensed contractor, with a State of Illinois licensed plumber on the job, bonded with the City.

- 23) Landscaping: Landscape plantings shall not interfere with operation and maintenance of water appurtenances. Trees shall be placed no closer than (10) feet from any structure(s).
- 24) Fire Hydrants: Fire hydrants shall be installed with a maximum of one extension kit used, and a maximum extension of 36". Fire hydrant extension kits must be of the same manufacture as the hydrant, and must be installed according to the manufacturers specifications using original manufacturers parts.
- 25) Joint Restraint: All mechanical joint fittings shall have restraining glands installed. Restraint device shall be Uni-flange by Ford Company or Mega-lug by EBAA Iron. Push joint pipe restraint shall be Field Lock Gaskets by US Pipe or Series 1700 Mega-lug or Series 1390 Pipe Restraint by Ford. Lengths of pipe restraint shall be determined from manufacturers installation specifications (refer to watermain restraint detail).

C: Materials:

1) Corporation Stops:

a. Compression fittings.

- i. Mueller B-25008-N ($\frac{3}{4}$ "-1"-1 ½"-2")
- ii. Ford
 1. FB1000-4-Q-NL 1"
 2. FB1000-6-Q-NL 1 ½"
 3. FB 1000-7-Q-NL 2"
- iii. A. Y. McDonald 74701-BQ (1", 1 ½", 2")
- iv. Q Series Brass

2) Curb Stops:

a. Compression fittings.

- i. Mueller B-25155-N ($\frac{3}{4}$ "-1"-1 ½"-2")
- ii. Ford
 1. B-44-444-Q-NL 1"
 2. B44-666-Q-NL 1 ½"
 3. B-44-777-Q-NL 2"
- iii. A. Y. McDonald 76104-Q (1", 1 ½", 2")
- iv. Q Series Brass

3) Curb Box: (Minneapolis pattern, lid marked "WATER")

4) Buffalo Type:

- a. For 1" thru 2", Mueller H-10300 Copper service
- b. A. Y. McDonald, 5615 1 ¼"

5) Fire Hydrant:

a. Approved Models: (Refer to standard Fire Hydrant Detail)

- i. Mueller Super Centurion 200
- ii. Waterous Pacer Model WB-67-250
- iii. Clow Medallion
- iv. All hydrants shall have:
 1. 6" mechanical joint connection
 2. 5 1/4" valve opening
 3. 5" cover over hydrant lateral
 4. 6" valve on lateral
 5. "Hydrafinder" standard hydrant locator, installed
 6. Valve box shall have a valve box stabilizer installed *
*(Valve box adaptor #2 type A, as made by Adaptor, Inc. or approved equal)

6) Fire Hydrant Paint: Safety Red, Sherwin Williams 'Shercryl' 6403-31922, B66R300

7) Bolts Placed Underground: All below grade factory installed bolts and fasteners shall be 304-grade stainless steel.

8) Valves: 4" through 16" diameter" Right-hand closing Resilient Wedge gate valves, conforming to AWWA Standard C-509 as manufactured by the Clow Corporation, Waterous Company or approved equal. All below grade factory installed bolts and fasteners shall be 304-grade stainless steel.

9) Valve Vaults: Watertight valve vaults shall be provided for each valve. Barrel sections shall be sealed using a butyl rubber or rubber strip (Refer to City standard valve vault detail).

- a. 3" through 6" valves..... Min. 4' inside diameter vault minimum
- b. 8" and larger valves..... Min. 5' inside diameter vault minimum
- c. Pressure Taps..... Min. 5' inside diameter vault minimum
- d. Valve Vault Lid..... Neenah R-1712, Type B or approved equal
- e. The word "WATER" shall be cast into the surface of the lid.
- f. Vaults are not required for hydrant auxiliary valves except when a pressure tap for a hydrant lateral is in a roadway.
- ~~g. Water main with a bury depth greater than 6.0' shall have steps installed in valve vaults.~~

10) Watermain Pipes:

- a. Ductile Iron Class 52, conforming to AWWA Standard C-151.
 - i. Cement Lining, conforming to AWWA Standard C-104.
 - ii. Mechanical or push-on joints shall conform to AWWA Standard C-111.
 - iii. At minimum, Type 3 laying conditions shall be provided, conforming to AWWA Standard C-600 (Attached).

- b. All watermains shall be encased in a High Density polyethylene encasement with its material specifications and installation method in accordance with ANSI.AWWA C105/A21.5, ASTM A674, using “Method A” installation.
- c. All side yard and rear yard water mains not directly adjacent to public roadways or paved surfaces shall be Ductile Iron Pipe, Class 55 with a type 5 laying condition.
- d. Brass Wedges shall be installed to provide electrical conductivity.

11) Joint Restraint: All mechanical joint fittings shall have restraining glands installed. Restraint device shall be Uni-flange by Ford Company or Mega-lug by EBAA Iron. Push joint pipe restraint shall be Field Lock Gaskets by US Pipe or Series 1700 Mega-lug or Series 1390 Pipe Restraint by Ford. Lengths of pipe restraint shall be determined from manufacturers installation specifications (refer to watermain restraint detail).

12) Copper Service Lines:

- a. One-inch diameter minimum
- b. Type K copper tubing
- c. Compression fittings only

1-inch service connections only may be connected utilize the direct tap methods to 6-inch mains and larger only. If there is insufficient diameter water main to install a direct tap, then a saddle tap shall be allowed. Service taps of 1 ¼”, 1 ½,” & 2” require the use of a tapping saddle. Saddles shall be full circle, 304-grade stainless steel, with nylon washers and Nitrile gasket, as manufactured by Smith-Blair; model #372, or approved equal.

13) Tapping Sleeves:

- a. 4” through 8” diameter:
 - i. Romac SST-945 stainless steel or approved equal or Smith – Blair 665 stainless steel or approved equal, or Mueller H-615 cast iron or approved equal.
- b. 10” and larger diameter:
 - i. Mueller H-615 cast iron or approved equal.
 - ii. Flange fasteners shall be 304-grade stainless steel.

14) Casing pipe: Carrier pipe shall be centered within a casing by use of model CCS stainless steel ~~e~~Casing ~~s~~Spacers as manufactured by Cascade Waterworks Mfg. Of Yorkville, Illinois or prior approved equal. Fill casing pipe void with sand and ~~brick at ends or~~ install eEnd ~~b~~Boots as manufactured by Cascade Waterworks Mfg. Of Yorkville, Illinois.

15) Ductile Service Lines:

- a. Fire:
 - i. The first O. S. & Y. valve on the inside of the building must be in place for pressure testing, chlorination and sampling.
 - ii. Testing against flanges will not be allowed.
- b. Domestic:
 - i. The first permanent valve on the inside of the building must be in place for pressure testing, chlorination and sampling.

ii. Testing against flanges will not be allowed.