

11/14/2022 4:30PM PA

# BOARD OF ALDERMAN REGULAR SESSION CITY HALL, 345 S. MAIN, BOLIVAR, MO 65613 TUESDAY, NOVEMBER 15th, 2022 at 6:30 p.m. AMENDED AGENDA 11/14/2022-4:30 p.m.

MEETING WILL BE RECORDED AND POSTED ON FACEBOOK - CITY OF BOLIVAR, MISSOURI

CALL TO ORDER
ROLL CALL
PLEDGE OF ALLEGIANCE
MOTION TO ADOPT AGENDA

1. PUBLIC HEARING: STREET NAME CHANGE REQUEST

#### 2. APPROVAL OF MINUTES:

October 3<sup>rd</sup>, 2022 Workshop; October 11th, 2022 Regular & Executive Session; October 18<sup>th</sup>, 2022 Workshop and Budget Workshop

3. BILLS & FINANCIAL REPORTS.

#### 4. ADMINISTRATOR REPORT:

- \*Investment Options Discussion
- \*New Hires Introduction: Joshua Nystrom, Police Officer; James Pruett, Parks Laborer; Wade Knepler, Police Clerk; Jessica Adams, Police Officer
- 5. MAYORAL APPOINTMENT: Introductions, Presentations, Resolutions, Proclamations,

A Resolution adopting the City of Bolivar 2022 Active Transportation Plan

Amended Agenda Request to address council item added 11/14/2022:

Request to Address Council, Catulpa Meadors

#### 6. OLD BUSINESS:

- a. Bill No. 2022-89: An ordinance electing changes under the Missouri Local Government Employees Retirement System.
- b. 2023 Budget Discussion

#### 7. NEW BUSINESS:

- a. Bill No. 2022-90: An ordinance changing the name of a city street currently knows as  $127^{th}$  Rd between 3100 block of Springfield Ave and  $460^{th}$  Rd/Hendrickson Street.
- b. Bill No. 2022-91: An ordinance ratifying contract with David Hankins for the Police Trainee Tuition Reimbursement Program.
- c. Bill No. 2022-92: An ordinance ratifying contract with Anthony Bolivar for the Police Trainee Tuition Reimbursement Program.
- d. Bill No. 2022-93: An ordinance ratifying contract with Wade Knepler for a Police Academy Recruitment Agreement.
- e. Bill No. 2022-94: An ordinance approving a contract amendment to the DCBC, LLC Economic Development Agreement.
- f. Bill No. 2022-95: An ordinance authorizing a contract amendment to the aviation services lease and agreement with Service Oriented Aviation Readiness, Inc.

#### #wherelibertyflows

If you have a need for special accommodations,
Please contact the City Clerk's office 24 hours prior to the meeting.



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- g. Bill No. 2022-96: An ordinance amending the Bolivar Municipal code by adding a new chapter 430 regarding stormwater drainage facilities standards and design.
- h. Bill No. 2022-97: An ordinance authorizing an agreement with KPM, CPA's for Audit Services, 2022 Audit.
- i. Bill No. 2022-98: An ordinance approving a final plat Simon Square Plat 3 Phase 2 in the City of Bolivar.
- j. Bill No. 2022-99: An ordinance changing the zoning classification for certain property generally located in the Frisco Trails Subdivision Lots 2, 3 and 4.
- k. Bill No. 2022-100: An ordinance changing the zoning classification for certain property generally located in the Fox Field Subdivision.
- l. School Zone speed limit change between Hartford and Hwy D: E Leonard, E Linden, E Forrest
- m. Roof Coating Bid review
- n. Municipal Code Chapters 700/701 Changes to Review

# Amended Agenda Item o. added 11/14/2022:

- o. Bill No. 2022-101: An ordinance calling for election Local Use Tax Ballot Question.
- 8. CALENDAR OF EVENTS: Regular Session December 13th, 2022; December 3rd, 2022 Christmas Parade and Food Truck Event;
- 9. EXECUTIVE SESSION: RSMo 610.021(1) Legal Actions, Cause of Action, or litigation involving a public governmental body and Any confidential or privileged communications between a public governmental body or its representatives and its attorney. RSMo 610.021(2) Leasing, Purchase or Sale of Real Estate by a public governmental body where Public knowledge of the transaction might adversely affect the legal consideration therefor.

#### 10. ADJOURNMENT:

\*IF UNABLE TO ACCESS FACEBOOK ACCOUNT, PLEASE CONTACT CITY CLERK FOR ADDITIONAL OPTIONS\*

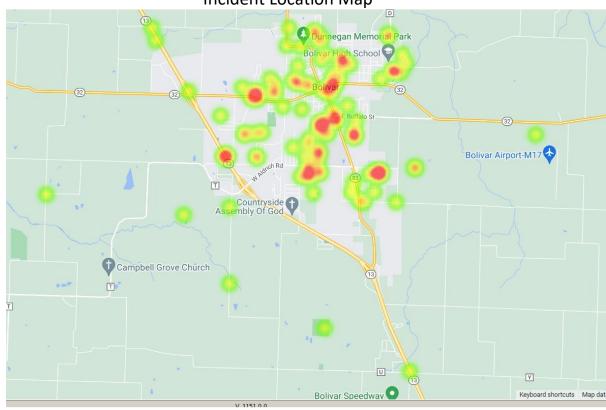


211 West Walnut ~ P.O. Box 9 ~ Bolivar, MO 65613 Phone 417-326-2489 ~ Fax 417-777-3513

# BCFD Council Report October 2022

Response Synopsys: October, 2022

**Incident Location Map** 



# **Response Time Analysis**

Busiest day of Month: Monday/Thursday/Saturday

Busiest hour of day: Noon

Busiest Shift of Month: B Shift

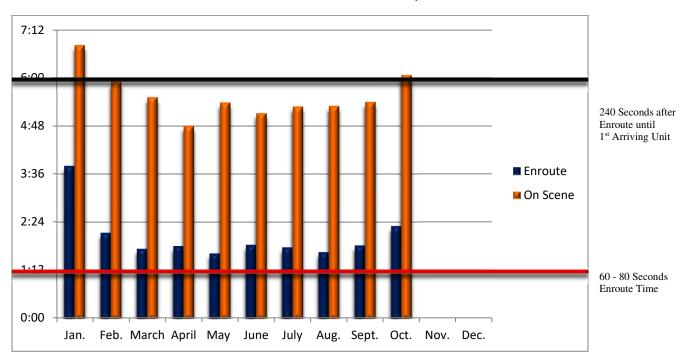
On Scene time in City(avg): 6 Min 4 sec/ 5 min 25 sec in City

Our Family helping to serve and protect the lives and property of your family!



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Average En-route and Response times of BCFD Fire Engines & Rescue Companies compared to NFPA Standards & BCFD Service Delivery Goals



<sup>\*\*</sup>This includes all mutual aid times, not just city limit responses\*\*

#### Events we participated in:

**BHS** football

SBU Football

Domino's partnership delivery

PCCS school lunch

Zion Lutheran Church Preschool

**KY3 Storm event** 

**ECLC Safety Day** 

S'More Fun Fridays

SBU Mud Tug

SBU Homecoming Parade

**BHS Homecoming Parade** 

Little Adventures Day Care

**Bolivar Chamber of Commerce Presentation** 

BIS School Concert, Public Safety Appreciation

Polk County Haz MIt plan meetings

**LEPC Meeting** 

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SMESO Meeting
Peer Support Training
Transportation Committee Meeting

#### October Totals:

15 PR events. >500 kids

Domino's Delivery: Gave out 15 smoke detectors and 6 batteries.

Halloween over 1000 kids.

S'more fun Fridays: Over 100 families

#### Training:

In October we had 8 members of BCFD attend a Driver Core/pumper/tender class in Branson. This class was held twice a week plus some Saturdays. This gets a majority of our full-time staff State certified for driver, which is on top of our in-house certification. They are now working on passing their state written exams.

# Significant Calls:

October was very busy as we had 12 grass fires, including two large grass fires on the edge of the city due to dry conditions. BCFD also responded to two fatality MVA's.

Overall October was a crazy month for BCFD with all the events. Our amazing staff handled all the calls/prs/events with professionalism and strength. We now start moving into cold weather season, which is typically where most structure fires occur. BCFD encourages everyone to have your furnace checked, don't use extension cords with space heaters, and have your flu's cleaned before you use them!

Happy Thanksgiving!

Submitted by Chief Brent Watkins

Our Family helping to serve and protect the lives and property of your family!

Bolivar, MO

This report was generated on 11/14/2022 3:06:24 PM



#### Incident Statistics

Zone(s): All Zones | Start Date: 10/01/2022 | End Date: 10/31/2022

Zone(s): All Zones   Start Date: 10/01/2022   End Date: 10/31/2022				
INCIDENT COUNT				
INCIDEN	INCIDENT TYPE		# INCIDENTS	
EN	<b>NS</b>	7	5	
FIF			4	
TO1			29	
	TOTAL TRANSPO	ORTS (N2 and N3)		
APPARATUS	# of APPARATUS TRANSPORTS	# of PATIENT TRANSPORTS	TOTAL # of PATIENT CONTACTS	
R 14	0	0	5	
R14	0	0	2	
TOTAL	0	0	7	
PRE-INCIDE	ENT VALUE	LOS	SES	
\$0.	00	\$0	\$0.00	
	CO CH	HECKS		
TOT	TOTAL			
	MUTUAL AID			
Aid 7	Aid Type		Total	
Aid Given			9	
Aid Received			2	
	OVERLAPP	PING CALLS		
# OVERL		% OVERLAPPING		
	25 19.38			
		ESPONSE TIME (Dispatch to A	•	
Station		MS	FIRE	
PSC	0:00	6:01	0:07:49	
Station 1	0:03	3:53		
	AVERAGE FOR ALL CALLS		0:06:04	
LIGH	TS AND SIREN - AVERAGE TU	IRNOUT TIME (Dispatch to Enr	oute)	
Station	EN	MS	FIRE	
PSC	0:02	2:31	0:03:41	
Station 1	0:00	0:53		
		GE FOR ALL CALLS	0:02:18	
AGE			N SCENE (MM:SS)	
Bolivar City Fir			:58	
20.104 0.19 1.110 2.000				



Bolivar, MO

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## Count of Incidents by Incident Type for Incident Status for Date Range

Incident Status(s): All Incident Statuses | Sort By: IncidentType | Start Date: 10/01/2022 | End Date: 10/31/2022

INCIDENT TYPE	# INCIDENTS
111 - Building fire	1
131 - Passenger vehicle fire	2
140 - Natural vegetation fire, other	12
142 - Brush or brush-and-grass mixture fire	2
311 - Medical assist, assist EMS crew	5
321 - EMS call, excluding vehicle accident with injury	59
322 - Motor vehicle accident with injuries	9
324 - Motor vehicle accident with no injuries.	2
500 - Service Call, other	5
554 - Assist invalid	14
611 - Dispatched & cancelled en route	4
651 - Smoke scare, odor of smoke	5
652 - Steam, vapor, fog or dust thought to be smoke	1
700 - False alarm or false call, other	2
745 - Alarm system activation, no fire - unintentional	5
900 - Special type of incident, other	1

**Total Incidents** 

129



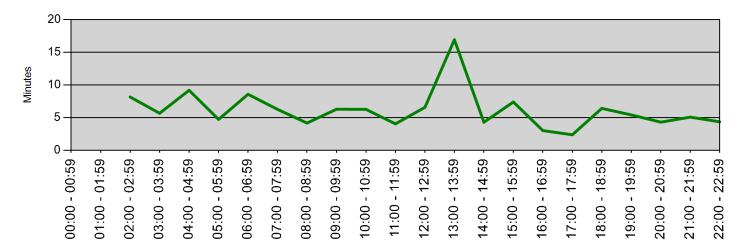
Bolivar, MO

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# Average Response Time per Apparatus for Hour Range for Day Range

StartDay: Sunday | StartTime: 00:00:00 | EndTime: 23:00:00 | EndDay: Saturday | StartDate: 10/01/2022 | EndDate: 10/31/2022



HOUR RANGE	APPARATUS	AVERAGE RESPONSE (minutes)
00:00 - 00:59	POV	0.00
00:00 - 00:59	R 14	5.53
01:00 - 01:59	R 14	No Calls
02:00 - 02:59	R 14	9.57
02:00 - 02:59	R14	5.37
03:00 - 03:59	R 14	4.00
03:00 - 03:59	R14	7.33
04:00 - 04:59	R 14	9.19
05:00 - 05:59	R 14	4.73
06:00 - 06:59	R 14	8.08
06:00 - 06:59	R14	9.57
07:00 - 07:59	C 1	19.52
07:00 - 07:59	E11	7.78
07:00 - 07:59	L12	2.51
07:00 - 07:59	R 14	4.41
07:00 - 07:59	R14	5.78
08:00 - 08:59	C 1	4.07
08:00 - 08:59	E11	3.77
08:00 - 08:59	L12	2.97
08:00 - 08:59	R 14	5.32
08:00 - 08:59	R14	3.37
09:00 - 09:59	E11	6.95
09:00 - 09:59	R 14	6.18
10:00 - 10:59	E11	2.70
10:00 - 10:59	L12	15.35

Average response time per Apparatus calculated from difference between DISPATCH and ENROUTE for the date, day of the week and hour range provided. Only REVIEWED incidents included.



HOUR RANGE	APPARATUS	AVERAGE RESPONSE (minutes)
10:00 - 10:59	R 14	6.61
10:00 - 10:59	R14	3.32
11:00 - 11:59	E11	4.57
11:00 - 11:59	R 14	3.88
12:00 - 12:59	B16	9.93
12:00 - 12:59	C 1	7.28
12:00 - 12:59	E11	5.52
12:00 - 12:59	E13	15.50
12:00 - 12:59	R 14	5.38
12:00 - 12:59	R14	6.15
13:00 - 13:59	B16	2.70
13:00 - 13:59	C 1	46.33
13:00 - 13:59	E13	33.20
13:00 - 13:59	R 14	5.03
13:00 - 13:59	R14	9.27
14:00 - 14:59	B16	0.00
14:00 - 14:59	C1	8.83
14:00 - 14:59	E11	7.60
14:00 - 14:59	L12	8.83
14:00 - 14:59	R 14	4.02
14:00 - 14:59	R14	2.77
15:00 - 15:59	B16	9.37
15:00 - 15:59	C 1	25.48
15:00 - 15:59	E11	3.96
15:00 - 15:59	L12	2.31
15:00 - 15:59	R 14	5.02
15:00 - 15:59	R14	1.67
16:00 - 16:59	E11	4.10
16:00 - 16:59	R 14	3.07
16:00 - 16:59	R14	1.87
17:00 - 17:59	C 1	0.00
17:00 - 17:59	C2	2.65
17:00 - 17:59	E11	1.67
17:00 - 17:59	R 14	3.57
17:00 - 17:59	R14	1.13
18:00 - 18:59	B16	5.75
18:00 - 18:59	C 1	7.43
18:00 - 18:59	E11	6.09
18:00 - 18:59	L12	7.08
18:00 - 18:59	R 14	6.25
19:00 - 19:59	E11	3.10
19:00 - 19:59	R 14	6.97
19:00 - 19:59	R14	4.45
20:00 - 20:59	E11	5.92
20.00 20.00	211	0.02

Average response time per Apparatus calculated from difference between DISPATCH and ENROUTE for the date, day of the week and hour range provided. Only REVIEWED incidents included.



HOUR RANGE	APPARATUS	AVERAGE RESPONSE (minutes)
20:00 - 20:59	L12	3.93
20:00 - 20:59	R 14	4.37
20:00 - 20:59	R14	3.30
21:00 - 21:59	E11	6.27
21:00 - 21:59	R 14	4.38
21:00 - 21:59	R14	5.30
22:00 - 22:59	R 14	4.22
22:00 - 22:59	R14	4.43

**Total Average Response Time:** 

6.66 minutes

# RESOLUTION NO. 2022-05 RESOLUTION ADOPTING THE BOLIVAR ACTIVE TRANSPORTATION PLAN

WHEREAS, it is in the best interest of the City of Bolivar to develop the active transportation plan to establish guidance for the future growth of the City and that promotes the health, safety, and welfare of the public; and

WHEREAS, the Southwest Missouri Council of Governments conducted extensive study and has developed a Active Transportation Plan for the City; and

WHEREAS, proper notice was published in the Bolivar Herald-Free Press, which has general circulation within the City of Bolivar, at least fifteen (15) days prior to the public hearing; and

WHEREAS, the Chairman of the Planning and Zoning Commission of Bolivar, Missouri called the meeting to order and opened a public hearing for the Bolivar Active Transportation Plan on November 10, 2022; and

WHEREAS, the report titled "Bolivar Active Transportation Plan", maps, and charts were discussed; and

WHEREAS, it was moved and seconded that the report titled "Bolivar Active Transportation Plan", maps, and charts contained therein, be approved as the Active Transportation Plan for the City of Bolivar, Missouri, and that copies be certified to the City Council and City Clerk, and that one (1) copy be made available in the office of the Polk County Recorder of Deeds; and

WHEREAS, the motion carried with 8 aye vote(s), 0 nay vote(s), and 1 abstention(s).

NOW, THEREFORE, BE IT RESOLVED by the Planning and Zoning Commission of the City of Bolivar, Missouri, that said Active Transportation Plan and all maps and charts included therein are hereby adopted.

Passed and Adopted by the Planning and Zoning Commission on this 10<sup>th</sup> day of November 2022.

Alexis Neal, Chairman, Bolivar, Missouri Planning and Zoning Commission

ATTEST:

Nathan Evans, Secretary, Bolivar, Missouri

Planning and Zoning Commission

\*\*\*

REQUEST TO AT COUNCIL MEETIN	DDRESS COUNCIL NG DATE / /
NAME: (atuloa" Talo" M	Neadors
3 201 2	A. I.
ADDRESS: 3245 Lilia	DITTE
WARD:	
PHONE: 417-298-4907	
E-MAIL: Catulpa Cagnail	· com
AGENDA ITEMS (Must be submitted 4 hours before the meeting)	or NON-AGENDA ITEMS (Must be submitted by 5 p.m. on
I wish to address Council about:	the Friday, prior to the meeting.)
	I wish to discuss the following:
<ul><li>☐ Amended Ordinance</li><li>☐ Emergency Ordinance</li></ul>	the mokin the
☐ 1st Reading ☐ Public Hearing	Girl Scout Park.
☐ Resolution	Ciast found needle
Within the category checked above I wish to	glassalcohol bottles
particularly address the following issue(s):	
Bill 202296	
	<del></del>
	The same statement of
I understand that my request is subject to the disc that I have only 5 minutes to speak. My commer	eretion of the Mayor and if my request is chosen ats should not be renetitive of any prior speaker
out should be new in nature. Opportunities to spe	ak may not be stacked and accumulated for the
same topic. Multiple parties with the same issue advocate their position. Decorum shall be mainta	nined and clapping, cheering, and other
potentially disruptive occurrences will not be tole following these guidelines. The Mayor may ceas	rated. The Mayor may dismiss any parties not e public comment at any time.
\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	A second second
the Mindesa	Data: 11 1/1-22

Signature

Date: 11-14-22 Time: 9:50

# **ORDINANCE COVER SHEET**

Bill No. 2022-96 Ordinance No. \_\_\_\_\_

# "AN ORDINANCE AMENDING THE BOLIVAR MUNICIPAL CODE BY ADDING A NEW CHAPTER 430 REGARDING STORMWATER DRAINAGE FACILITIES STANDARDS AND DESIGN."

Filed for public inspection on	·	
First reading In Full; By Title on		•
Second reading In Full; By Title on		·
Vote by the Board of Aldermen on	:	
Aye; Nay; Abstain		
Approved by the Mayor on	·	
Vetoed by the Mayor on	·	
Board of Aldermen Vote to Override Veto on		·
Aye;Nay;Abstain		
Bill Effective Date: .		

Ordinance No.	
---------------	--

# "AN ORDINANCE AMENDING THE BOLIVAR MUNICIPAL CODE BY ADDING A NEW CHAPTER 430 REGARDING STORMWATER DRAINAGE FACILITIES STANDARDS AND DESIGN."

Be it Ordained by the Board of Aldermen of the City of Bolivar, Missouri, as follows:

**Section I:** The City Code for the City of Bolivar, Missouri is hereby amended by adding a new Chapter 430, regarding regulations for stormwater drainage facilities standards and design, with such new Chapter to be read as follows:

"CHAPTER 430 – STORMWATER DRAINAGE REGULATIONS

#### Section 430.010 – General Provisions.

**A.** *Scope*. This Chapter 430 hereby sets forth the minimum standards for design of storm drainage facilities on public right-of-way and private property in the City of Bolivar, Missouri.

#### **B.** Authority.

- **1.** The provisions of this Chapter have been adopted by the Planning and Zoning Commission and the Board of Aldermen in accordance with the zoning text amendment procedures set forth in the Bolivar Municipal Code.
- **2.** Any development or grading begun after the date of passage of the criteria and standards set forth in this Chapter which does not comply with the requirements of this Chapter shall be deemed to be a municipal ordinance violation; and shall be subject to enforcement measures and penalties set forth in Municipal Code Section **100.220** General Penalty.

#### **C.** *Interpretations.*

- 1. Where any of the provisions of this Chapter may be unclear or ambiguous as they pertain to a particular site or situation, interpretations of the policies, criteria and standards set forth herein shall be made in writing by the Zoning Administrator.
- 2. Such written interpretations shall be kept on file for future reference for use in similar situations and shall be incorporated in subsequent revisions for the standards, if deemed necessary for general reference.

# **D.** Appeals.

- 1. Where disagreements may arise over the interpretation of the requirements set forth herein, appeals may be made to the Zoning Administrator upon written request.
- 2. Information and supporting documentation for the appeal shall be submitted with the request. The Zoning Administrator shall forward the information to the Public Works Director, or the City Engineer within three (3) business days following receipt of the information.
- **3.** In the event that the interpretation of this Chapter is disputed following informal review by the Zoning Administrator and City staff, any aggrieved person may appeal to the Board of Adjustments using the procedures as set forth in Section 425.030 of the Bolivar Municipal Code.
- **E.** Approvals and Permits Required.
- **1.** Grading permit. Storm drainage facilities may not be constructed or altered without review and approval of the plans by the City and issuance of a Grading Permit by the City for subdivisions or for commercial or other sites.
- **2.** National Pollutant Discharge Elimination System (NPDES) stormwater permit.
  - **a.** Provisions of the 1987 Clean Water Act require that certain stormwater discharges obtain an NPDES stormwater permit. In Missouri, these permits are administered by the Missouri Department of Natural Resources.
  - **b.** Federal rules for NPDES stormwater discharges are contained in 40 CFR Parts 122, 123 and 124 of the Code of Federal Regulations. State NPDES stormwater regulations are contained in 10 CSR 20-6.200 of the Code of State Regulations.
    - (1) For certain activities, which involve the discharge of dredged or fill materials into the waters of the United States a Department of the Army permit may be required as set forth in Section 404 of the Clean Water Act. Rules for 404 permits are contained in 33 CFR Parts 320 through 330 of the Code of Federal Regulations.

- (2) Determination of applicability for Section 404 requirements are generally made by the Kansas City District office of the Corps of Engineers.
- (3) A brochure regarding the Corps of Engineers regulatory program may be obtained from the Corps offices.

#### **F.** Coordination with Other Jurisdictions.

- 1. Where proposed storm drainage facilities are located on property adjoining to other local government jurisdictions, design of storm drainage facilities shall include provisions to receive or discharge storm water in accordance with the requirements of the adjoining jurisdiction, in addition to meeting City requirements.
- **2.** In these cases, two (2) additional sets of plans shall be submitted and will be forwarded to the adjoining jurisdiction for review and comment.
- **3.** No grading or construction of storm drainage facilities may commence without prior notification of the Missouri One Call utility warning system at 1-800-DIG-RITE, as required by law.
- **G.** Communications and Correspondence. Communications and correspondence regarding stormwater plan review, policies, design standards, criteria or drainage complaints shall be directed to the MS4 Coordinator at the City of Bolivar, 345 S. Main Ave., Bolivar, Missouri 65613.

## **H.** Ownership and Maintenance.

- **1.** *Improvements on public road right-of-way.* Storm drainage improvements on public right-of-way shall, upon acceptance of the constructed improvements, become the property of, and shall be maintained by, the City of Bolivar.
- **2.** *Improvements on private property.* 
  - **a.** Storm drainage improvements on private property shall be maintained by the owner of the lot upon which the improvements are located or by the Homeowners' Association for improvements located in common areas.

**b.** All such improvements which serve a drainage area shall be located in drainage easement and the public shall have such rights of access to repair or maintain such facilities as set forth in Section 415.030 of the Bolivar Municipal Code.

# Section 430.020 – Stormwater Planning and Design.

- **A.** Stormwater Management Goals. In order to ensure protection of the general health and welfare of the citizens of the City of Bolivar, planning and design of stormwater management measures shall meet the following goals:
- 1. Prevent damage to residential dwellings and other building structures from floodwaters.
- 2. Maintain emergency vehicle access to all areas during periods of high water.
- **3.** Prevent damage to roads, bridges, utilities, and other valuable components of the community's infrastructure from damage due to flood waters and erosion.
- **4.** Prevent degradation of surface and groundwater quality from storm water runoff; preserve and protect quality of the environment; and promote conservation of the City's natural resources.
- **5.** Minimize floodwater and erosion damage to lawns, recreational facilities, and other outdoors improvements.
- **6.** Minimize traffic hazards from runoff carried in streets and roads.
- 7. Comply with applicable State and Federal laws and regulations.
- **8.** Meet the foregoing goals in a manner which is cost effective and which minimizes the cost of housing and development while encouraging sound development practices.
- **9.** Encourage innovative and cost-effective planning and design of stormwater management facilities.
- 10. Encourage multiple purpose design of stormwater management facilities to provide opportunities for recreational use and other benefits to the community wherever possible. The standards and criteria set forth herein provide the minimum standards for planning and design of stormwater facilities. Where a particular plan or design may be found to be

in conflict with a specific standard, achievement of the goals set forth above will have precedence.

- **B.** General Planning and Design Principles.
- 1. The City of Bolivar recognizes that stormwater management is an important component of overall land use planning.
- 2. The City of Bolivar further recognizes that proper stormwater planning significantly reduces the long-term costs to the community both in terms of infrastructure cost and property losses due to flood damage. It is more cost effective to prevent flood damage by proper design and construction than to repair and remediate problems which have occurred through poor planning and design.
- **3.** The following general principles must be followed in preparing the grading and storm drainage plans for all development sites:

Recognize the existing drainage system. Proper planning of storm drainage facilities must begin with the recognition of the existing system and include necessary provisions for preserving or altering the existing system to meet the needs of proposed development or construction. The storm drainage system differs from other utility systems in very important ways:

- (1) There is an existing natural drainage system.
- (2) It is only needed when runoff occurs.
- (3) The capacity of the system varies greatly depending upon how much it rains.
- (4) The system does not have to be constructed of man-made components in order to function.
- **4.** Allow for increase in runoff rates due to future urbanization.
  - **a.** As areas urbanize, peak rates of runoff increase significantly. The City of Bolivar will require storage of increased volumes of urban runoff in order to minimize increases in flow rates as urbanization occurs. However, the cumulative effects of on-site detention are difficult to predict and control and development of comprehensive basin-wide runoff models to determine these effects does not appear likely in the foreseeable future.

- **b.** For this reason, design of storm drainage improvements must be based upon the assumption of fully urbanized conditions in the area under consideration. No reduction in peak flow rates due to detention unless an approved runoff model has been developed for the drainage basin under consideration. Any detention storage facilities whose effects are considered must be located within approved drainage easements.
- **5.** Provide for acceptance of runoff from upstream drainage areas.
  - **a.** Drainage easements or public right-of-way must extend to a point where the upstream drainage area is no greater than five (5) acres.
  - **b.** Drainage easements or public right-of-way must extend to the point where existing watercourses enter the site. Where the upstream drainage area is five (5) acres or greater, but does not discharge onto the site through a defined watercourse, the drainage easement shall extend to the point of lowest elevation.
- **6.** Provide a means to convey runoff across the site. Stormwater shall be conveyed across the site in a system of overland drainage ways and storm sewers. Overland drainage ways consist of streets, open channels, swales, and overland flow within drainage easements.
- 7. Discharge of runoff to downstream properties.
  - **a.** Concentrated runoff shall be discharged into existing watercourses, drainage easements, or public road rights-of-way. Where none of these exist, a drainage easement which extends to the nearest watercourse, drainage easement, or public road right-of-way must be obtained from the downstream property owner and proper provisions made for conveyance of the peak flow from the one percent (1%) annual probability (100-year) storm within the drainage easement.
  - **b.** Where concentrated flows are discharged to downstream properties proper provisions must be made to:
    - (1) Allow the flow to spread over the same area as would have occurred for the same rate of flow prior to the development, and
    - (2) Reduce the rate of velocity to rates at least equal to the predevelopment values at the same rate of flow.

- **8.** Assess potential downstream flooding problems.
  - **a.** Determine whether there are existing structures, which are subject to an unacceptable flooding hazard.
  - **b.** If areas having an unacceptable flooding hazard occur downstream of a development site, either on-site detention for peak flow control or mutually agreed off-site improvements will be required.
- **9.** Assess potential water quality impacts on receiving waters. Sediment, erosion and other water quality controls are required.
- **C.** *Drainage Easements*. All areas subject to inundation during the major storm must be included in drainage easements. Specific standards for drainage easements to be provided for storm sewers, open channels and detention facilities.

#### Section 430.030 – Stormwater Runoff Calculations.

- A. This Section outlines acceptable methods of determining stormwater runoff.
- 1. General guidelines.
  - **a.** The design storm runoff shall be analyzed using an approved hydrograph method.
- **2.** *Hydrograph methods.* 
  - a. Methodologies.
    - (1) The Corps of Engineers HEC-1 Flood Hydrograph Package and NRCS computer models are the preferred runoff models. Other models may be used with approval from the City Zoning Administrator.
    - (2) The runoff model must include the entire drainage basin upstream of the proposed development. The model shall be prepared in sufficient detail to ensure that peak runoff rates are reasonably accurate.
    - (3) The runoff model shall be developed for the following cases:

- (a) Case 1: Existing conditions in the drainage basin prior to development of the applicant's property.
- **(b)** Case 2: Existing conditions in the drainage basin with developed conditions on the applicant's property.
- (c) Case 3: Fully developed conditions in the entire drainage basin.

# **b.** Rainfall.

- (1) See the Point Precipitation Frequency Estimates data from Atlas 14 for City of Bolivar. Source data can be found at: https://hdsc.nws.noaa.gov/hdsc/pfds/pfds\_map\_cont.html?bkmrk=mo. If the above-referenced link is not available, the information can be obtained from the City's Zoning Administrator.
- (2) Rainfall shall be distributed in time using Huffs Distribution or the Pilgrim-Cordery Distribution adapted to local rainfall data (references NOAA Atlas 14 for Bolivar, Missouri as shown in the following table). Other distributions may be used upon approval from the City's Zoning Administrator.

**Pilgrim-Cordery Method Synthetic Rainfall Mass Curves** 

	<b>Cumulative Fraction of Storm Duration</b>			
<b>Cumulative Fraction of Depth</b>	1-Hour	2-Hour	3-Hour	4-Hour
.00	.00	.00	.00	.00
.05	.03	.03	.03	.02
.10	.07	.05	.05	.03
.15	.11	.10	.06	.05
.20	.14	.17	.09	.06
.25	.17	.22	.11	.08
.30	.23	.25	.13	.14
.35	.29	.27	.19	.20
.40	.35	.29	.31	.27
.45	.41	.30	.39	.33
.50	.47	.31	.44	.38
.55	.56	.41	.47	.47
.60	.65	.51	.54	.56

**Pilgrim-Cordery Method Synthetic Rainfall Mass Curves** 

Cumu	lative	Fraction	of Storm	Duration
<b>Valina</b>	iauve	rraction	or Storm	1701/211011

<b>Cumulative Fraction of Depth</b>	1-Hour	2-Hour	3-Hour	4-Hour
.65	.73	.60	.64	.64
.70	.82	.69	.70	.74
.75	.91	.78	.73	.83
.80	.93	.82	.81	.87
.85	.95	.87	.89	.90
.90	.97	.92	.94	.93
.95	.99	.96	.98	.97
1.00	1.00	1.00	1.00	1.00

## Section 430.040 – Stormwater Drainage Structures.

#### A. Inlets.

**1.** *Inlet locations*. Inlets shall be provided at locations and intervals and shall have a minimum inflow capacity such that maximum flooding depths set below are not exceeded for the specified storm; at all sump locations where ponding of water is not desired and where drainage cannot be released at the ground surface.

#### **2.** *Inlet interception capacities.*

- **a.** Inlet capacities shall be determined in accordance with the Federal Highway Administration HEC-12 Manual (reference 5).
- **b.** Nomographs and methods presented in the Neenah Inlet Grate Capacities report (reference 12) may also be used where applicable.
- **c.** The use of commercial software utilizing the methods of HEC-12 is acceptable. It is recommended that software be pre-approved for use by the City.
- **3.** Clogging factors. Clogging factors are not required to be considered in curb inlet capacities.

- **4.** Interception and bypass flow. It is generally not practical for inlets on slopes to intercept one hundred percent (100%) of the flow in gutters. Inlets must intercept sufficient flow to comply with street flooding depth requirements. Bypass flows shall be considered at each downstream inlet, until all flow has entered approved storm sewers or drainage ways.
- **5.** Allowable street depths. Urban streets are a necessary part of the City drainage system. The design for the collection and conveyance of storm water runoff is based on a reasonable frequency and degree of traffic interference. Depending on the street classification, (i.e., local, collector, etc.) portions of the street may be inundated during storm events. Drainage of streets are controlled by both minor and major storm events. The minor system is provided to intercept and convey nuisance flow. Flow depths are limited for the major storm to provide for access by emergency vehicles during most flood events. When the depths of flow exceed the criteria presented in this Section a storm sewer or open channel system is required.
  - a. General design guidelines.
    - (1) Allowable flow depths: Flow in the street is permitted with allowable depths of flow as follows:
    - (2) Local streets: Crown of the street for the runoff from a 5-year rainfall, top of curb for runoff from a 25-year rainfall. Runoff from a 100-year rainfall should be contained within the right-of-way.
    - (3) Collector streets: The equivalent of one (1) 10-foot driving lane must remain clear of water during a 5-year rainfall, top of curb for runoff from a 25-year rainfall. Runoff from a 100-year rainfall should be contained within the right-of-way.
    - (4) Minor Arterials and parkways: Two (2) 10-foot lanes must remain clear of water, one (1) in each direction, during a 5-year rainfall. Top of curb for runoff from a 25-year rainfall. Runoff from a 100-year rainfall should be contained within the right-of-way. Where allowable depths are exceeded a storm sewer system must remove the excess water.
    - (5) Major Arterials and parkways: Two (2) 10-foot lanes must remain clear of water, one (1) in each direction for the 25-year storm. For the

100-year storm, a maximum of six (6) inches at the crown, depth at the gutter shall not exceed eighteen (18) inches. Where allowable depths are exceeded a storm sewer system must remove the excess water.

**b.** Cross flow. Cross flow at intersections is permitted up to the following depth.

Street Classification	5-year Storm Allowable Depth	25-year Storm Allowable Depth
Local	6" in cross pan flow line	12" at gutter
Collector	No cross flow permitted	6" at gutter
Arterial or Parkway	No cross flow permitted	No cross flow permitted

**c.** *Hydraulics*. The allowable storm capacity of each street section with curb and gutter is calculated using the modified Manning's formula for both the 2-year and 25-year storm event.

 $Q = 0.56(Z/n) S^{1/2} d^{8/3}$ 

Where, Q = discharge in cubic feet per second

Z = cross slope of the street in feet per foot

d = depth of flow at the gutter in feet

S = longitudinal slope of the street in feet per foot

n = Manning's roughness coefficient

# **6.** *Types of inlets allowed.*

- a. Public streets.
  - (1) Curb opening inlets. Curb inlets shall be required along public streets with curb and gutter and shall be as required in the City of Bolivar "Construction Specifications for Public Improvements".
  - (2) Graded inlets. The use of grated inlets in streets will not be permitted. Where conditions are such that curb inlets cannot intercept the required rate of flow, necessary to control street flooding depth or to provide diversion of flow to detention, sedimentation or infiltration basins, "trench inlets" with veined grates may be specified with approval of the City.
  - (3) Other types of inlets will not be permitted unless approved by the City.

- **b.** Outside of public right-of-way. The type of inlets specified outside of public right-of-way is left to the discretion of the designer provided the following criteria are met:
  - (1) Maximum flooding depths for the major or minor storm as set forth above are not exceeded.
  - (2) General safety requirements set forth below are met.
  - (3) All inlets shall be depressed a minimum of two (2) inches below the surrounding grade to allow proper drainage to the inlet and prevent inadvertent ponding in the area around the inlet.
  - (4) Inlets in pavements shall be provided with a concrete apron.
- 7. General safety requirements. All inlet openings shall:
  - **a.** Provide for the safety of the public from being swept into the storm drainage system; the maximum allowable opening shall not exceed six (6) inches in width.
  - **b.** Be sufficiently small to prevent entry of debris which would clog the storm drainage system.
  - **c.** Be sized and oriented to provide for safety of pedestrians, bicyclists, etc.
- **B.** Storm Sewers.
- 1. Design criteria.
  - **a.** *Design storm frequency.* The storm sewer system, beginning at the upstream end with inlets, is required when allowable street depths are exceeded. Allowable street depths are specified above.
  - **b.** Construction materials. Storm sewers may be constructed using materials listed in the City of Bolivar's "Construction Specifications for Public Improvements".
  - **c.** Vertical alignment.
    - (1) The sewer grade shall be such that a minimum cover is maintained to withstand AASHTO HS-20 loading on the pipe. The minimum cover depends upon the pipe size, type and class and soil bedding condition, but

shall not be less than one (1) foot from the top of pipe to the finished grade at any point along the pipe. If the pipe encroaches on the street subgrade, approval is required. Manholes will be required whenever there is a change in size, direction, elevation grade and slope or where there is a junction of two (2) or more sewers. The maximum spacing between manholes for storm sewers (cross sectional area less than twenty-five (25) square feet) shall be four hundred (400) feet. For large storm sewers (cross sectional area greater than twenty-five (25) square feet), manholes for maintenance access need only be placed a minimum of every five hundred (500) feet; access to the laterals can be obtained from within the larger storm sewer.

- (2) The minimum clearance between storm sewer and water main (for new construction), either above or below shall be eighteen (18) inches. For clearances less than eighteen (18) inches, the waterline shall be constructed in accordance with Section 8.7 of Missouri Department of Natural Resources, Design Guide for Public Water Systems.
- (3) The minimum clearance between storm sewer and sanitary sewer (for new construction), either above or below, shall be eighteen (18) inches. In addition, when an existing sanitary sewer main lies above a storm sewer or within eighteen (18) inches below, the sanitary sewer shall have an impervious encasement or be constructed of structural sewer pipe for a minimum of ten (10) feet on each side of the storm sewer crossing.
- (4) Siphons or inverted siphons are not allowed in the storm sewer system.

## **d.** Horizontal alignment.

- (1) Storm sewer alignment between manholes shall be straight except when approved by the City. Approved curvilinear storm sewers may be constructed by using radius pipe. The radius requirement for pipe bends is dependent upon the manufacturer's specifications.
- (2) A minimum horizontal clearance of ten (10) feet is required between the outside diameter of water utilities and the outside diameter of storm sewer.

- (3) The permitted locations for storm sewer within a street right-of-way (ROW) are behind the curb. Storm sewer shall not be placed within pavement except where pipe crosses a roadway.
- **e.** *Pipe size.* For storm sewers less than fifty (50) feet in length the minimum allowable diameter is fifteen (15) inches. All other pipe shall have a minimum diameter of eighteen (18) inches.
- **f.** Storm sewer capacity and velocity.
  - (1) Storm sewers should be designed to meet the required street spread without surcharging the storm sewer.
  - (2) The maximum full flow velocity shall be less than fifteen (15) fps. Higher velocities may be approved by the City if the design includes adequate provisions for uplift forces, dynamic impact forces and abrasion. The minimum velocity in a pipe based on full flow shall be two and one-half (2.5) feet per second (fps) and the minimum slope shall be one-half percent (0.50%) to avoid excessive accumulations of sediment. The energy grade line (EGL) for the design flow shall be no more than six (6) inches below the final grade at manholes, inlets or other junctions. To ensure that this objective is achieved, the hydraulic grade line (HGL) and the energy grade line (EGL) shall be calculated by accounting for pipe friction losses and pipe form losses. Total hydraulic losses will include friction, expansion, contraction, bend, manhole and junction losses. The methods for estimating these losses are presented in the following Sections.
- **g.** Storm sewer outlets. All storm sewer outlets into open channels shall be constructed with a headwall and wingwalls or a flared-end section. Riprap or other approved material shall be provided on all outlets.
- **2.** *Easements*. Easements shall be provided for all storm sewers constructed in the City of Bolivar that are not located within public rights-of-way. The minimum easement widths are as follows:
  - **a.** For pipes forty-eight (48) inches or less in diameter or width the required easement width is fifteen (15) feet.

**b.** For pipes and boxes greater than forty-eight (48) inches in width the required easement width is fifteen (15) feet plus half the width of the proposed storm sewer.

**c.** Storm sewers greater than eight (8) feet in depth to the flow line require additional easement width at a rate of two (2) feet in width for every vertical foot greater than eight (8) feet.

**d.** All easements required for construction which are not included on the final plat shall be recorded and filed with the City prior to approval of the construction drawings.

C. Design Standards For Culverts.

**1.** Structural design. All culverts shall be designed to withstand an HS-20 loading in accordance with the design procedures of AASHTO "Standard Specifications for Highway Bridges". The designer shall also check the construction loads and utilize the most severe loading condition. The minimum allowable cover is one (1) foot.

**2.** Design capacity. Culverts shall be designed to pass a 25-year storm with one (1) foot of freeboard prior to overtopping the road or driveway.

**3.** *Headwater*. The maximum headwater for the major storm design flow shall be one and one-half (1.5) times the culvert diameter for round culverts or one and one-half (1.5) times the culvert rise dimension for shapes other than round.

**4.** *Inlet and outlet protection.* For road and driveway culverts larger than fifteen (15) inches, culverts are to be designed with protection at the inlet and outlet areas. Headwalls or end sections are to be located a sufficient distance from the edge of the shoulder or the back of walk to allow for a maximum slope of 3H:1V to the back of the structure. The type of outlet protection required is as follows:

V<7FPS 7FPS<V<15FPS

Minimum Riprap protection Riprap protection or Energy Dissipater

**5.** *Velocity limitations*. The maximum allowable discharge velocity is fifteen (15) feet per second.

**6.** Culvert hydraulics. It is recommended that the procedures outlined in the publication "Hydraulic Design of Highway Culverts" (reference 4) be used for the hydraulic design of culverts. Backwater calculations demonstrating the backwater effects of the culvert may be required.

# **D.** Design Standards For Bridges.

- **1.** Structural design. All bridges shall be designed to withstand an HS-20 loading in accordance with the design procedures of AASHTO "Standard Specifications for Highway Bridges" (reference 13). The designer shall also check the construction loads and utilize the most severe loading condition.
- **2.** Design capacity. Bridges shall be designed to pass the 100-year storm with one (1) foot of freeboard between the water surface and the bridge low chord.
- **3.** Backwater. "Backwater" is defined as the rise in the water surface due to the constriction created by the bridge approach road fills. The maximum backwater for the 100-storm design flow shall be one (1) foot.
- **4.** *Velocity limitations*. Discharge velocities through bridge openings shall be limited to fifteen (15) feet per second. Abutment and channel scour protection shall be provided at all bridges.
- **5.** Bridge hydraulics. All bridge hydraulics shall be evaluated using the procedures presented the publication "Hydraulics of Bridge Waterway" (reference 14). Backwater calculations demonstrating the effects of the bridge and approach fills compared to the existing flood stages shall be submitted for all bridges.
- **E.** Design Standards For Open Channels.

# 1. General design guidelines.

**a.** *Natural channels*. The hydraulic properties of natural channels vary along the channel reach and can be either controlled to the extent desired or altered to meet the given requirements. Natural channels used as part of the drainage system must be evaluated for the effects of increased peak flow, flow duration and volume of runoff due to urbanization.

- **b.** *Grass-lined channels*. Grass-lined channels are the most desirable of the artificial channels. The channel storage, lower velocities, and the greenbelt multiple use benefits obtained create significant advantages over other artificial channels. Unless existing development restricts the availability of right of way, channels lined with grass should be given preference over other artificial types. The minimum slope in a grass-lined channel shall be one percent (1.0%) unless a concrete low-flow channel is installed.
- **c.** Concrete-lined channels. Concrete-lined channels are sometimes required where right-of-way restrictions within existing development prohibit grass-lined channels. The lining must be designed to withstand the various forces and actions, which tend to overtop the bank, deteriorate the lining, erode the soil beneath the lining, and erode unlined areas. The minimum slope in a concrete-lined channel shall be one-half percent (0.50%).
- **d.** Rock-lined channels. Rock-lined channels are constructed from ordinary riprap or wire-enclosed riprap (gabions, etc.). The rock lining permits higher design velocity than for grass-lined channels. Rock linings will normally be used only for erosion control at culvert/storm sewer outlets, at sharp channel bends, at channel confluences, and at locally steepened channel sections.
- **e.** Other lining types. The use of fabrics and other synthetic materials for channel linings has increased over the past several years. Proposed improvements of this type will be reviewed on an individual basis as for applicability and performance.
- **2.** *Hydraulics*. An open channel is a conduit in which water flows with a free surface. The calculations for uniform and gradually varied flow are relatively straightforward and are based upon similar assumptions (e.g., parallel streamlines). The basic equations and computational procedures are presented in this Section.
  - **a.** *Uniform flow*. Open channel flow is said to be uniform if the depth of flow is the same at every section of the channel. For a given channel geometry, roughness, discharge and slope, there is only one possible depth, the normal depth. For a channel of uniform cross section, the water surface will be parallel to the channel bottom for uniform flow.
  - **b.** The computation of normal depth for uniform flow shall be based upon Manning's formula as follows:

$$Q = (1.49/n) AR^{2/3}S^{1/2}$$

Where, Q = Discharge in cubic feet per second (cfs)

n = Roughness coefficient (Table I)

A = Cross sectional flow area in square feet

R = Hydraulic radius, A/P, in feet

P = Wetted perimeter in feet

S = Slope of the energy grade line (EGL) in feet/foot

For channels with a uniform cross section the EGL slope and the bottom slope are assumed to be the same.

**c.** Critical flow. The design of earth or rock channels in the critical flow regime (Froude numbers from 0.9 to 1.2) is not permitted. The Froude number is defined as follows:

 $F = V/(gD)^{0.5}$ 

Where, F = Froude number

V = Velocity in feet per second (fps)

 $g = Acceleration of gravity, 32.2 \text{ ft/sec}^2$ 

D = Hydraulic depth in feet = A/T

A = Cross sectional flow area in square feet

T = Top width of flow area in feet

The Froude number shall be calculated for the design of all open channels.

- **d.** Gradually varied flow.
  - (1) The most common occurrence of gradually varied flow in storm drainage is the backwater created by culverts, storm sewer inlets or channel constrictions. For these conditions the flow depth will be greater than normal depth in the channel, and the water surface profile must be computed using backwater techniques.
  - (2) Backwater computations can be made using the methods presented in Chow (reference 1). Many computer programs are available for computation of backwater curves. The most widely used program is HecRas, Water Surface Profiles, developed by the U.S. Army Corps of Engineers (reference 2) and is the program recommended for backwater profile computations. Another program by the Federal Highway

Administration is WSPRO and is acceptable for use in backwater computations.

# 3. Design standards.

**a.** Flow velocity. Maximum flow velocities shall not exceed the following:

Channel Type	Max. Velocity
Grass-lined*	5 fps
Concrete	15 fps
Rock-Lined	10 fps

<sup>\*</sup>Refer to item f. below

**b.** *Maximum depth.* The maximum allowable channel depth of flow is three (3) feet for the design flow.

- **c.** Freeboard requirements.
  - (1) "Freeboard" is defined as the vertical distance between the computed water surface elevation for the design flow and the minimum top of bank elevation for a given cross section.
  - (2) For all channels one (1) foot minimum of freeboard is required.
  - (3) Freeboard shall be in addition to super elevation.
- **d.** *Curvature*. The minimum channel centerline radius shall be three (3) times the top width of the design flow.
- **e.** Super elevation. Super elevation shall be calculated for all curves. An approximation of the super elevation h may be calculated from the following formula:

$$H = V^2T/(gr)$$

Where,

h = Super elevation in feet

V = Velocity in fps

T = Top width of flow area in feet

 $G = Acceleration of gravity, 32.2 ft/sec^2$ 

r = radius of curvature in feet

Freeboard shall be measured above the super elevated water surface.

#### f. Grass channels.

- (1) Side slopes shall be three (3) (horizontal) to one (1) (vertical) or flatter. Steeper slopes may be used subject to additional erosion protection and approval from the City.
- (2) For design discharges greater than fifty (50) cubic feet per second (cfs), grade checks shall be provided at a maximum of two hundred (200) feet horizontal spacing.
- (3) Channel drops shall be provided as necessary to control the design velocities within acceptable limits.
- (4) Vertical drops may be used up to three (3) feet in height. Drops greater than three (3) feet shall be baffled chutes or similar structures.
- (5) The variation of "Manning's n" coefficient with the retardance and the product of mean velocity and hydraulic radius as shown in Figure 7.23 in reference 17 shall be used in the capacity calculations. Retardance curve C shall be used to determine the channel capacity, and retardance curve D shall be used to determine the velocity.

#### 4. Easements.

- **a.** Easements shall be provided for all open channels constructed in the City of Bolivar that are not located within public rights of way. The minimum easement width for open channels is the flow width inundated by a 100-year event plus fifteen (15) feet.
- **b.** All easements required for construction, which are not included on the final plat shall be recorded and filed with the City prior to approval of the construction drawings.

# Section 430.050 – Stormwater Detention Design.

# A. Purpose.

- 1. The primary goal of the City of Bolivar stormwater management program is to mitigate flood damage to residential, commercial, and public property.
- **B.** *Methods of Analysis.* Detailed analysis will be required for the design of detention facilities including, but not limited to:
- 1. In areas where residences or other structures located downstream of a development can be shown to have an imminent flooding hazard.
- 2. Residences or other structures will be defined as having an imminent flooding hazard when the lowest point at which surface runoff may gain entry is located at or below the estimated flooding level which would result from a storm with an annual probability of one percent (1%) or greater under conditions existing in the basin prior to development of the applicant's property (i.e., affected by the "100-year" storm).
- **3.** Consideration of downstream flooding problems will be limited to the area which may reasonably be expected to be significantly affected by runoff from the applicant's property.

#### **C.** *Alternatives to detention.*

- 1. Detention Facilities: Provision to provide detention may be waived in part or in whole provided one or more of the following are met:
  - a. Development is to discharge within a Federal Insurance Study defined 1% AP floodplain
  - **b.** Developer provides downstream improvements to meet the tributary area peak discharge requirements to the satisfaction of the City Engineer
  - c. Development cannot be fully and/or practically served by surface or underground detention facilities
  - **d.** It is shown that construction of detention facilities will result in an increase of peak flow in the drainageway

- 2. Fee in Lieu of Detention: A "fee in lieu of detention" is not automatic and will be considered on a case by-case basis. If detention requirements are waived for one of the above reasons, a "fee in lieu of detention" will be considered.
  - a. If detention requirement is waived for one on the above reasons, a fee in accordance with the following schedule will be applied.

Volume of Detention	Payment Rate
0 - 24,000 c.f.	\$1.50 per c.f.
24,001 c.f. – 100,000 c.f.	\$0.75 per c.f.
Greater than 100,000 c.f.	\$0.50 per c.f.

- b. The fee may be offset by the construction of downstream improvements. The downstream improvements must be approved by the City. Cost of the downstream improvements will be determined by the City Engineer.
- **3.** For the following development, detention is not required:
  - **a.** Additions to, improvements, and repair of existing single-family and duplex dwellings.
  - **b.** Construction of any buildings, structures, and/or appurtenant service roads, drives, and walks on a site having previously provided stormwater control as part of a larger unit of development.
  - c. Additions, remodeling, repair, replacement, and improvements to any existing structure or facility and appurtenances that does not cause an increased area of impervious surface on the site in excess of 1,000 square feet of that previously existing.
  - **d.** Construction of any one new single-family or duplex dwelling unit, irrespective of the site area on which the same may be situated.

## **D.** *Innovation in design.*

1. It is the desire of the City that detention facilities be designed and constructed in a manner to enhance aesthetic and environmental quality of the City as much as possible.

**2.** The City of Bolivar therefore encourages designs which utilize and enhance natural settings and minimize disturbance and destruction of wooded areas, natural channels, and wetlands.

# E. Interpretation.

- **1.** Interpretations of the detention policy will be made by the City Engineer or Zoning Administrator in writing.
- **2.** Appeals of the decisions of the City Engineer or Zoning Administrator may be had pursuant to Section 430.010 of this Chapter.
- F. Design Criteria.

#### 1. General.

- **a.** Detention facilities shall discharge into a drainage easement or public right-of-way.
- **b.** One (1) foot of freeboard shall be provided between the maximum water surface elevation from a one percent (1%) annual probability event and the minimum top of berm or wall elevation.
- **c.** Earthen embankment slopes steeper than three (3) horizontals to one (1) vertical (3H:1V) are not permitted.
- **d.** In certain instances, such as when the existing development conditions runoff from a watershed would exceed the capacity of the existing downstream facilities, detention basins (i.e., with a release rate at the capacity of the downstream facilities) for the stormwater runoff may be required by the City.
- **e.** Dry detention basins shall maintain a minimum bottom slope of two (2) feet per hundred (100) feet (two percent (2%)) to drain across grass. A minimum of 0.5% slope may be used if a trickle channel is installed.
- **f.** Trickle channels shall have the following requirements:
  - (1) a minimum slope of one-half (0.5) foot per hundred (100) feet (one-half percent (0.5%))

- (2) 4.0 feet or greater in width
- (3) Shall be constructed of six-inch stone or other porous medium.
- **g.** The maximum allowable depth of ponding for parking lot detention is twelve (12) inches, and its water surface elevation shall not exceed the elevation of the minimum top of berm or wall.
- **h.** Parking lot detention may not inundate more than ten percent (10%) of the total parking area.
- i. All parking lot detention areas shall have a minimum of two (2) signs posted identifying the detention pond area. The signs shall have a minimum area of one and one-half (1.5) square feet and contain the following message:

#### **WARNING:**

This area is a storm water detention pond and is subject to periodic flooding to a depth of twelve (12) inches.

**j.** The sign shall be reflective and have a minimum height of forty-eight (48) inches from the bottom of the sign to the parking space finished grade. Any suitable materials and geometry of the sign are permissible, subject to approval by the City.

### **2.** Detailed analysis.

- **a.** Detailed analysis shall be performed using hydrograph methodologies and reservoir routing techniques.
- **b.** The most common techniques are those developed by the Corps of Engineers and the Natural Resources Conservation Service (NRCS, formerly the Soil Conservation Service (SCS)). These methods are preferred, however other proven techniques will be accepted.
- **c.** Detention basins designed by detailed methods shall be designed on the basis of multiple storm recurrence frequencies to ensure that they function properly for both frequent storms and large infrequent storms.

- **d.** A minimum of three (4) recurrence frequencies, the fifty percent (50%), ten percent (10%), twenty-five percent (25%), and one percent (1%) annual probability storms (the "2-year, 10-year, 25-year and 100-year" storms) must be considered.
- **e.** The runoff model must include the entire drainage basin upstream of the proposed detention pond. The model shall be prepared in sufficient detail to ensure that peak runoff rates are reasonably accurate.
- **f.** The runoff model shall be developed for the following cases:
  - (1) Case 1: Existing conditions in the drainage basin prior to development of the applicant's property.
  - (2) Case 2: Existing conditions in the drainage basin with developed conditions on the applicant's property.
  - (3) Cases 1 and 2 are utilized to determine the required detention volume and the type of outlet structure to be provided and shall be analyzed for the three storm recurrence frequencies require above.
  - (4) The detention facility shall be designed such that peak outflow rates from the facility for Case 2 are no greater than the rates determined in Case 1 for each of the storm recurrence frequencies required above.
  - (5) The storage volume provided shall not be less than the difference in total runoff volume between Case 1 and Case 2.
  - (6) The overflow spillway shall be sized for the one percent (1%) annual probability (100-year) event, assuming the primary spillway is clogged.
  - (7) The overflow spillway will, in most cases, be combined with the outlet structure.
- **3.** *Submittals*. The following information must be submitted for detention ponds designed by detailed methods:
  - **a.** Information regarding analytical methods and software to be used, including:

- (1) Name of software to be used.
- (2) Type and distribution of precipitation input.
- (3) Method for determining precipitation losses.
- (4) Type of synthetic hydrograph.
- (5) Method for routing hydrographs.
- (6) Method used for reservoir routing.
- **b.** Map(s) showing sub-basin delineation, topography, presumed flow routes and pertinent points of interest; soil types; existing basin development conditions used in the model; fully developed conditions used in the model.
- c. Routing diagram for the runoff model.
- d. A summary of sub-basin characteristics used for program input.
- **e.** Stage-area or stage-storage characteristics for the basin in tabular or graphic form.
- **f.** Stage-discharge characteristics for the outlet structure and overflow spillway in tabular or graphic form; hydraulic data for weirs, orifices, and other components of the control structure.
- **g.** A printout of the input data file.
- **h.** A summary printout of program output, including plots of hydrographs. (These are intended to be the printer plots generated by the software.)
- **i.** Time of Concentration.
  - (1) NRCS Method. The preferred method for determining time of concentration shall be the method set forth in Chapter 3 of the Soil Conservation Service Technical Release No. 55, "Urban Hydrology for Small Watersheds", 2nd Edition, 1986.
  - (2) Other Methods.
    - (a) Time of concentration may also be calculated by other accepted methods providing reasonable results.

**(b)** The time of concentration used in the formula shall be determined based upon existing conditions.

### **4.** Control structures.

- **a.** Detention facilities designed by the simplified analysis shall be provided with obvious and effective outlet control structures. These outlet structures may include v-notch weirs or rectangular weirs, as well as pipe. Plan view and sections of the structure with adequate detail shall be included in plans.
- **b.** Sizing of a low-flow pipe shall be supported with calculations shown for the pipe rating curve and tailwater considerations.
- **c.** Low-flow pipes shall not be smaller than four (4) inches in diameter to minimize maintenance and operating problems, except in parking lot and roof detention where minimum size and configuration of opening shall be designed specifically for each condition.
- d. Overflow spillways will be required on all detention facilities.

### Section 430.060 – Grading, Sediment, and Erosion Control.

- **A.** Goals and Objectives. The goal of the regulation is to effectively minimize erosion and discharge of sediment by application of relatively simple and cost-effective Best Management Practices. Detention basin(s) should be constructed at the beginning of the project to maintain the goals. The following goals shall be met:
- 1. Minimize the area disturbed by construction at any given time.
- **2.** Stabilize disturbed areas as soon as possible by re-establishing sod, other forms of landscaping and completing proposed structures, pavements and storm drainage systems.
- 3. Provide for containment of sediment until areas are stabilized.
- **4.** Provide permanent erosion controls.
- **B.** General Design Guidelines. The following items must be considered in preparing a sediment and erosion control plan:

### 1. Temporary versus permanent controls.

- **a.** The greatest potential for soil erosion occurs during construction. Temporary controls are those that are provided for the purpose of controlling erosion and containing sediment until construction is complete.
- **b.** Temporary controls include straw or hay bale dikes, silt fences, erosion control blankets, etc., which are not needed after the area is stabilized.
- **c.** Permanent controls consist of riprap, concrete trickle channels, detention basins, etc., which will remain in place through the life of the development.
- **d.** It is possible for the same facility to serve both a temporary and permanent purpose. The difference between temporary and permanent erosion control should be clearly recognized in preparing a sediment and erosion control plan.

### 2. Sheet flow versus concentrated flow.

- **a.** In areas where runoff occurs primarily as sheet flow, containment of sediment is relatively simple. In these areas, straw or hay bales, silt fences and vegetative filter areas can be very effective.
- **b.** Where concentrations of flow occur containment of sediment becomes more difficult as the rate and volume of flow increase. In these areas more sophisticated controls such as sedimentation basins must be provided.
- **3.** *Slope*. Control of erosion becomes progressively more difficult as the slope of the ground increases. Areas with steeply sloping topography and cut and fill slopes must be given special consideration.
- **4.** *Soils and geologic setting.* Area soils and the geologic setting must be considered in preparing the plan and any special considerations deemed necessary for a particular site provided.
- **5.** Environmentally sensitive areas. Where construction occurs within the vicinity of permanent streams, springs, sinkholes, lakes or wetlands, special attention must be given to preventing discharge of sediment.

### C. Grading Permits.

- **1.** *Permit requirements.* Grading permits are required for all construction sites with the following exceptions:
  - **a.** Grading for single-family or duplex residences constructed in subdivisions where approved sediment and erosion controls have been constructed.
  - **b.** Emergency construction required repairing or replacing roads, utilities or other items affecting the general safety and well-being of the public.
  - **c.** For emergency construction sites which would otherwise be required to obtain a permit and for which remedial construction will take more than fourteen (14) calendar days, application for the permit must be made within three (3) calendar days from the start of construction.
  - **d.** The following activities, provided that they are not located within twenty-five (25) feet of a spring, sinkhole, wetland or watercourse:
    - (1) Gardening or landscaping normally associated with single-family residences that cover less than one-half (½) acre.
    - (2) Grading and repair of existing roads or driveways.
    - (3) Cleaning and routine maintenance of roadside ditches or utilities.
    - (4) Utility construction where the actual trench width is two (2) feet or less.
- **2.** *Permit procedure.* The following items must be received prior to issuance of a Grading Permit:
  - **a.** An approved grading, sediment and erosion control plan. The submittal and approval procedure is as follows for subdivisions, commercial and other sites.
    - (1) The sediment and erosion control plan shall be submitted for review along with the plans for the proposed improvements.

- (2) Grading permits for commercial, multi-family or major subdivisions will be issued by the Zoning Administrator after the project plans have been approved.
- **3.** *Plan requirements.* Plans must be prepared by and bear the seal of an engineer registered to practice in the State of Missouri. Plans will not be required in the following cases:
  - **a.** Grading associated solely with a single-family residence.
  - **b.** Grading or filling of less than one (1) acre (of overall plan development) if located outside of the allowable building areas and not located within twenty-five (25) feet of spring, sinkhole, wetland or watercourse. In these instances, a grading permit can be issued, providing an inspection of the site by a representative of the City does not reveal conditions that would warrant preparation of a detailed plan.

#### **D.** Other Permits.

- **1.** NPDES storm water permit. Effective October 1, 1992, construction sites where the area to be disturbed is five (5) acres or more must apply for a storm water discharge permit from the Missouri Department of Natural Resources. Permit requirements are set forth in 10 CSR 20-6.200 of the Missouri Clean Water Laws.
- **2.** "404" permit. Grading activities in streams or wetlands may require a Department of the Army Permit under Section 404 of the Clean Water Act.
- E. Design Standards and Criteria.

### 1. Grading.

- **a.** *Maximum grades*. Cut or fill slopes (excluding detention basins) shall not exceed four (4) to one (1).
- **b.** *Maximum height*. Cut or fill slopes shall not exceed fifteen (15) feet in vertical height unless a horizontal bench area at least five (5) feet in width is provided for each fifteen (15) feet in vertical height.
- **c.** *Minimum slope*. Slope in grassed areas (excluding detention basins) shall not be less than one percent (1%).

**d.** Construction specifications. Construction for streets must comply with specifications set forth by the City of Bolivar. For all other areas, construction specifications stating requirements for stripping, materials, subgrade compaction, placement of fills, moisture and density control, preparation and maintenance of subgrade must be included or referenced on the plans or accompanying specifications submitted.

### e. Spoil areas.

- (1) Broken concrete, asphalt and other spoil materials may not be buried in fills within proposed building or pavement areas.
- (2) Outside of proposed building and pavement areas, broken concrete or stone may be buried in fills, provided it is covered by a minimum of two (2) feet of earth.
- (3) Burying of other materials in fills is prohibited.
- **f.** Stockpile areas. Location of proposed stockpile areas shall be outlined on the plans and specifications for proper drainage included.
- **g.** *Borrow areas*. The proposed limits of temporary borrow areas shall be outlined in the plans and a proposed operating plan described on the grading plan. Temporary slopes in borrow areas may exceed the maximums set forth above. At the time that borrow operations are completed, the area shall be graded in accordance with the criteria set forth above and reseeded.

### 2. Sediment containment.

- **a.** Existing vegetative filter area. Existing vegetative filter areas may be used where:
  - (1) Unconcentrated sheet flow occurs.
  - (2) An area of existing vegetation a minimum of twenty-five (25) feet in width can be maintained between the area to be graded and a property line, watercourse, sinkhole, spring, wetland, or classified lake.

- (3) Existing ground slope is no greater than five (5) to one (1) (twenty percent (20%)).
- (4) The existing vegetative growth is of sufficient density and in sufficiently good condition to provide for filtration of sediment.
- (5) Vegetative filter areas are a temporary and permanent practice.
- **b.** Hay/straw bale dike or silt fence. Containment areas constructed of hay or straw bales or silt fence may be provided in areas where:
  - (1) Unconcentrated sheet flow occurs,
  - (2) An area of existing vegetation a minimum of twenty-five (25) feet in width cannot be maintained between the area to be graded and a property line, watercourse, sinkhole, spring, wetland or classified lake,
  - (3) Existing ground slope is no greater than five (5) to one (1) (twenty percent (20%)),
  - (4) Concentrated flow from an area no greater than one (1) acre occurs and a minimum volume of one thousand (1,000) cubic feet per acre is contained behind the dike. Either cereal grain straw or hay may be used for bale dikes. Straw/hay bale dikes shall be constructed with a minimum of six inches (6") of backfill on the upstream side and a minimum of four inches (4") of cut (embedment) below existing grade on the downstream side. Straw/hay bale dikes and silt fences are temporary practices.
- **c.** Temporary containment berms.
  - (1) Temporary containment berms may be provided for areas where concentrated flow from areas greater than one (1) acre and less than five (5) acres occurs. Temporary containment berms must contain a volume of one thousand (1,000) cubic feet per acre of drainage area.
  - (2) Temporary containment berms shall have a riprap outlet with a sediment filter. Details shall be included in the Stormwater Pollution & Prevention Plan (SWPPP).

(3) Temporary containment berms and accumulated sediment may be completely removed after the tributary area is stabilized and must be removed prior to final acceptance and release of escrow.

### d. Sediment basin.

(1) Sediment basins shall be provided for all areas where concentrated flow occurs from an area of five (5) or more acres. Sediment basins shall be designed to detain the runoff from one (1) inch of rainfall for a period of at least twenty-four (24) hours. Runoff shall be calculated using the methods contained in Chapter 2 of TR-55 (Reference 11), using the recommended curve number for newly graded areas from Table 2-2a.

Note: For construction sites in Bolivar, an average value of runoff volume from one (1) inch of rainfall is approximately one thousand two hundred (1,200) cubic feet per acre, using a Curve Number of 90, as indicative of a mixture of type B and C soils. This value may be used in sizing sediment basins or the runoff volume determined using the values from Figure 2-1 of TR-55.

- (2) Sediment basins shall be provided with an outflow structure consisting of:
  - (a) A flow restriction device which provides for the required detention time,
  - **(b)** An outfall pipe sized to carry the maximum estimated outflow rate,
  - (c) Protective structures at the pipe outlet to prevent crushing or damage of the end of the pipe,
  - (d) Protective structures to prevent blockage of the pipe with debris,
  - (e) Erosion protection at the pipe outlet.
- (3) An overflow spillway capable of discharging the peak flowrate for the four percent (4%) annual probability (25-year) storm while maintaining a minimum freeboard of one (1) foot.

- (4) Overflow spillways may be sodded where the depth of flow at the crest is limited to no greater than six (6) inches and outlet channel velocities do not exceed five (5) feet per second for the minor (5-year) storm.
- (5) Overflow spillways not meeting these restrictions must be constructed of riprap, concrete or other approved, non-erodible material.

### **3.** *Erosion protection.*

### a. Seeding and mulching.

(1) Permanent seeding. Permanent seeding, fertilizer and mulch shall be applied at the rates as follows or according to other specifications, which are approved with the Grading Permit.

	Rate of Pure Live Seed
Common Name	(Pounds per Acre
Kentucky 31 Fescue	100
Rye Grass	25
Kentucky Blue Grass	15
Creeping Red Fescue	<u>10</u>
	150 pounds

Commercial fertilizer containing not less than 1.0 lb of actual nitrogen per 1,000 square feet of area seeded. Provide nitrogen in form that will be available to the lawn during initial period of growth.

- (2) Permanent seeding seasons are from March 1 to June 15 and September 1 to October 30.
- (3) Mulching. Where slopes are less than four (4) to one (1), cereal grain mulch is required at the rate of one hundred (100) pounds per one thousand (1,000) square feet (four thousand five hundred (4,500) pounds per acre). Cereal grain mulch shall meet the requirements of Section 802 of the MHTD State Specifications for Type 1 mulch.

- (4) Where slopes are four (4) to one (1) or greater Type 3 mulch ("hydro mulch") meeting the requirements of Section 802 of the MHTD State Specifications shall be used.
- (5) Temporary seeding. Whenever grading operations are suspended for more than thirty (30) calendar days between permanent grass or seeding periods, all disturbed areas must be seeded. Temporary seeding season runs from May 15 to November 15.
- (6) Overseeding. During the winter season (November 15 to March 1) temporary seed and mulch shall be placed in on all completed areas or areas where grading is suspended for more than thirty (30) calendar days. During this period seed, mulch and soil amendments shall be applied at the following rates:

Fertilizer: 75% of specified quantity. Seed: 50% of specified quantity. Mulch: 100% of specified quantity.

Areas seeded during this period shall be reseeded and mulched during the next permanent seeding season according to seeding requirements.

- (7) Maintenance. Seeded areas must be maintained for one (1) year following permanent seeding.
- **b.** Cut and fill slopes. Cut and fill slopes shall be protected from erosion by construction of straw bale dikes, silt fences, diversion berms, or swales along the top of the slope.
  - (1) Where drainage must be carried down the slopes, pipe drains, concrete flumes, riprap chutes or other impervious areas must be provided. Suitable erosion control measures such as riprap stilling basins must be provided at the bottom of the slope.
  - (2) Diversions shall be maintained until permanent growth is firmly established on the slopes.
- **c.** Channels and swales. Permanent channels and swales shall be provided with a stabilized invert consisting of one of the following materials:

- (1) *Sod.* Where the average velocity of flow is five (5) feet per second or less and there is no base flow, the channel shall be lined with sod.
  - (a) For channels with a bottom width less than fifteen (15) feet, sod shall extend up the side slope to a minimum height of six (6) inches above the toe.
  - **(b)** Channels with a bottom width of fifteen (15) feet or greater, the center fifteen (15) feet shall be lined with sod and the remainder of the outer area seeded and mulched.
- **(2)** *Erosion control blanket*. Commercial erosion control blankets may be used in lieu of sod provided that samples are submitted and approved by the City. The guaranteed maintenance period shall be one (1) year.
- (3) Non-erosive lining. In grass channels where base flow occurs, a non-erosive low-flow channel of riprap or concrete must be provided. Low-flow channels shall have a minimum capacity of five (5) cubic feet per second. Other suitable non-erosive materials may be specified with approval of the City.
- (4) For channels which have an average velocity of five (5) feet per second or greater a non-erosive lining of riprap concrete or other approved material must be provided.
- **d.** Storm sewer and culvert outlets. Erosion protection shall be provided at storm sewer and culvert outlets. Minimum erosion protection shall consist of a concrete toe wall and non-erosive lining, meeting the City's specifications for public improvements.
  - (1) The required length of non-erosive lining will not be decreased where flared end sections or headwalls are provided unless calculations and data to support the decrease in length are submitted and approved.
  - (2) Non-erosive lining shall consist of riprap unless otherwise specified and approved. Field stone, gabions or riprap shall extend to the point at which average channel velocity for the peak flow rate from the minor (5-year) storm has decreased to five (5) feet per second maximum.

- **e.** Curb openings. Where drainage has been approved by the City to flow from paved areas to grass areas through curb openings erosion protection shall be provided with a minimum three foot (3') concrete apron that is recessed three inches (3") below pavement height.
- **f.** Ditch checks and drop structures. In grass channels grades and velocities may be controlled by use of ditch checks and drop structures. Riprap ditch checks may be required in natural channels where average velocity for the peak flow rate from the 5-year storm exceeds five (5) feet per second for post-development conditions.
- **g.** Spillways. Erosion protection must be provided at spillways and outlet structures for detention ponds. Erosion protection shall extend to the point where flow has stabilized and average velocity in the outlet channel is five (5) feet per second or less.

### **4.** Temporary construction entrance.

- **a.** A minimum of one (1) temporary construction entrance is required at each site. Additional temporary entrances may be provided if approved. The location of each construction entrance shall be shown on the plan.
- **b.** Only construction entrances designated on the sediment and erosion control plan may be used. Barricades shall be maintained if necessary to prevent access at other points until construction is complete.
- **c.** Construction entrances shall be constructed of crushed limestone meeting the following specifications:
  - (1) Construction entrances shall be a minimum of twenty-five (25) feet wide and fifty (50) feet long.
  - (2) Minimum thickness of crushed limestone surface shall be six (6) inches. Additional two (2) inch lifts of crushed limestone shall be added at the discretion of the County if the surface of the initial drive deteriorates or becomes too muddy to be effective.
  - (3) In locations where an existing drive or street extends at least fifty (50) feet into the site, the existing drive may be designated as the construction

entrance and construction of a new gravel entrance is not required, unless job conditions warrant as set forth in the preceding paragraph.

- **5.** Cleaning streets. Streets both interior and adjacent to the site shall be completely cleaned of sediment at the end of construction and prior to release of security.
- **6.** *Dust control*. The contractor will be required to use water trucks to water all roads and construction areas to minimize dust leaving the site when conditions warrant.
- **7.** Sequencing and scheduling. Costs of sediment and erosion control can be minimized if proper consideration is given to sequencing and scheduling construction. Any special sequencing and scheduling considerations should be noted in the grading plan. A detailed schedule must be received from the contractor at the Pre-Construction Conference.

### **Section 430.070 – Water Quality Protection.**

- **A.** *Introduction*. This section covers the design of Best Management Practices (BMPs) to minimize the adverse effects of urban stormwater runoff on the quality of receiving waters.
- 1. It is recognized that specific water quality standards, other than those contained in the Missouri Clean Water Laws, have not been developed or adopted for these receiving waters. The objective of this policy is not to meet specific reductions of targeted pollutants, but rather to provide a generally effective level of pollutant removal by using reasonable, cost effective measures. The goal is to minimize, to the maximum extent practical, adverse impacts on the quality of the receiving waters.
- 2. It is important to recognize that the structural Best Management Practices (BMPs) for which design guidance is given in this section represent only one aspect of stormwater quality management. The most effective means of managing stormwater quality lie in overall watershed planning and zoning controls, and other nonstructural practices which are generally beyond the control of an individual development.
- 3. Data from communities across the country has shown that, as the total impervious area in a watershed exceeds ten to fifteen percent (10-15%), water quality declines unless mitigative measures are taken. The most important management tool is to limit the impervious area in these watersheds to these values. While these limits may be attainable for the watershed as a whole, they may not be possible for individual development or sub-basins. Structural BMP's will be required for these developments.
- **B.** General Design Guidelines.

- 1. Minimize the amount of runoff. The total quantity of pollutants transported to receiving waters can be minimized most effectively by minimizing the amount of runoff. Both the quantity of runoff and the amount of pollutant wash-off can be minimized by reducing the amount of directly connected impervious area (DCIA). Impervious areas are considered connected when runoff travels directly from roofs, drives, pavement, and other impervious areas to street gutters, closed storm drains or concrete, or other impervious lined channels. Impervious areas are considered disconnected when runoff passes as sheet flow over grass areas, or through properly designed BMP's, prior to discharge from the site.
- 2. Maximize contact with grass and soil. The opportunity for pollutants to settle out is maximized by providing maximum contact with grass and soil. Directing runoff over vegetative filter strips and grass swales enhances settling of pollutants as the velocity of flow is reduced. Infiltration of runoff into the soil is also increased.
- 3. Maximize holding and settling time. According to ASCE (Reference F.1 of this section), the most effective runoff quality controls reduce the runoff peak and volume. The next most effective controls reduce peak runoff rates only. For small storms the runoff rate should not exceed the pre-project peak flow rate from the fifty percent (50%) AP (2-year) storm. Most obnoxious pollutants (exceptions include water soluble nutrients and metals) can be settled out. By reducing the rate of outflow and increasing the time of detention storage, settling of pollutants and infiltration of runoff is maximized.
- 4. Design for small, frequent storms. Drainage systems for flood control are designed for large, infrequent storm events. In contrast, stormwater quality controls must be designed for small, frequent storm events. Eighty to ninety percent (80%-90%) of all twenty-four (24) hour rainfalls are one inch (1") or less. Most pollutants are washed off in the "first flush", generally considered the first one-half inch (½") of runoff.
- 5. Utilize BMP's in series where possible. Performance monitoring of BMP's in Florida, Maryland, and Delaware has shown that the combined effect of providing several BMP's in a series can be much more effective in reducing the level of pollutants than providing a single BMP at the point of discharge. To the greatest extent practical, runoff should be directed first to vegetative filter strips, then to grass swales or channels, and then to extended detention basins, sand filters, etc.
- **6.** Incorporate both flood control and water quality objectives in designs, where practical. Incorporating both flood control and water quality criteria into a single stormwater management facility is not only possible but is encouraged. Whenever practical, combining several objectives, such as water quality enhancement and flood control, maximizes the cost-effectiveness of stormwater management facilities.
- **C.** Requirements. The following requirements will apply to all development.

- 1. Stormwater runoff from any new development for which the total impervious area exceeds ten percent (10%) of the total land area of the development must be directed through an extended wet or dry detention basin or other properly designed BMP prior to discharge from the site.
- 2. Runoff from fueling areas and other areas having a high concentration of pollutants will be required to be directed to a sand filter or other properly designed BMP which provides filtration as well as settling.
- 3. The required volume for capture and treatment shall be designed as the water quality capture volume (WQCV) and shall be determined as set forth in D.1 of this section.
- **4.** Detention storage must be provided to limit the peak flow rate from the fifty percent (50%) AP (2-year) storm to pre-project values. Detention facilities for peak flow control shall be designed as set forth in the *Stormwater Detention Design* section.
- **D.** Design Criteria.
- 1. Water Quality Capture Volume: Water quality BMPs shall be designed to capture the runoff from the one inch (1") 24-hour rainfall as well as to capture the first flush of pollutants from directly connected impervious areas within the proposed development.

The required water quality capture volume (WQCV) to be used in design of extended wet and dry detention basins and other BMPs whose design is based upon capture and treatment of storm water, shall be the greater of the following:

- i. the first one-half inch (½") of runoff from the directly connected impervious area (DCIA) in the development, or
- ii. the runoff resulting from total rainfall depth of one inch (1") in twenty-four (24) hours over the entire development.
- 2. Directly Connected Impervious Area: Impervious areas are considered connected when runoff travels directly from roofs, drives, pavement, and other impervious areas to street gutters, closed storm drains or concrete, or other impervious lined channels.

In order for an impervious area to be considered disconnected, runoff from the area must pass through a vegetative filter strip or other BMP meeting the requirements set forth in this section.

For determining the amount of impervious area, the following assumptions shall apply in the absence of more detailed data:

Single Family Lots:

Average roof area: 2500 square feet Average drive area: 800 square feet Average impervious area per lot: 3500 square feet

If gutter downspouts are directed to drain toward lawn areas, seventy-five percent (75%) of the roof area shall be considered disconnected.

Duplexes and Patio Homes:

Average roof area: 2500 square feet Average drive area: 1600 square feet Average impervious area per lot: 4500 square feet

If gutter downspouts are directed to drain toward lawn areas, seventy-five percent (75%) of the roof area shall be considered disconnected.

Multi-Family, Commercial and Other Areas:

The amount of impervious area contained in multi-family, commercial, office, and manufacturing developments shall be determined based upon the site plan for the development.

3. Vegetative Filter Strips: Vegetative filter strips consist either of areas of undisturbed vegetation in good condition, including trees, grass, sod or other vegetative cover which meets the objectives for this BMP, or areas where new vegetation has been established. Vegetative filter strips shall be provided in areas of sheet flow only. The hydraulic loading for filter strips shall not exceed 0.05 cubic feet per second (cfs) per lineal foot of filter strip length for the fifty percent (50%) AP (2-year) storm (equal to the runoff per unit width from a four hundred feet (400') length of impervious area).

The minimum width of the filter strip shall not be less than twenty percent (20%) of the length of the sheet flow from the upstream impervious surface, and in no case shall be less than six feet (6'). The slope along the width of the filter strip shall not exceed 4:1 (25%).

Typical details for vegetative filter strips are shown in Figure WQ1.

**4.** Grass Swales: Grass swales may be provided to convey runoff from vegetative filter strips and impervious areas to BMP's designed for capture and temporary storage of runoff. Design criteria for grass swales shall be as follows:

Maximum side slopes: 4:1.

Maximum longitudinal slope: 5%.

Minimum longitudinal slope: 1%.

Maximum velocity: Two feet (2') per second for peak flow from the fifty percent (50%) AP (2-year) storm.

Grass swales shall be lined with sod or seeded and covered with suitable erosion control blanket and mulch.

Typical details for grass swales are shown in Figure WQ2.

**5.** Extended Dry Detention Basins: Extended dry detention basins may be provided to capture and provide temporary storage for the required water quality capture volume. Extended dry detention basins shall be placed outside of the primary watercourses which allow off-site flows to pass through the development (i.e., "off-line") where possible.

Design criteria for extended dry detention basins shall be as follows:

Volume: Minimum volume shall be one hundred and twenty-five percent (125%) of the required water quality capture volume (WQCV). Detention basins for water quality may be combined with detention basins for flood control. Effects of the WQCV may be considered in the design for flood control.

Drain time: The WQCV shall be released over a minimum period of twenty four (24) hours and a maximum period of seventy-two (72) hours.

Outlet structure: Outlet structures shall consist of a perforated riser pipe, outlet pipe and gravel filter material as shown in Figures WQ3 and WQ4. The minimum allowable riser pipe diameter is eight inches (8"). The riser pipe shall be connected to an outlet pipe of equal of greater diameter. The outlet pipe shall have adequate capacity to carry the maximum rate of flow from the riser pipe. Material for the riser pipe shall be Schedule 40 PVC, ductile iron, or corrugated, galvanized metal.

A removable cap shall be provided at the top of the riser pipe. The cap shall have a one inch (1") diameter hole for air relief.

The outlet pipe shall be bedded in firmly compacted clay, free of stones. For dams exceeding ten feet (10') in height, an anti-seep collar shall be provided around the pipe.

Number of rows of perforations, number of perforations per row, and diameter of perforations for the riser pipe shall be specified on the plans. Perforation pattern shall be determined based upon orifice calculations to provide for release of the WQCV over the specified time. Perforations shall meet the following requirements:

Minimum perforation diameter: 1/4 inch Maximum perforation diameter: 1 inch Minimum number of holes per row: 4
Maximum number of holes per row: 8

Minimum row spacing: 4 inches
Maximum row spacing: 12 inches

Freeboard: Where the basin is to be utilized as a water quality BMP only, twelve inches (12") minimum freeboard shall be provided above the WCQV.

Forebay: It is preferred that a forebay be provided to dissipate energy from incoming flows and to trap settleable sediment entering the basin. The forebay should be separated from the remainder of the basin by an earth dike. The top of the dike shall be set six inches (6") above the stage of the WQCV. Outflow from the forebay to the basin shall be through a gravel filter as shown in Figure WQ5. The top of the gravel filter shall be set equal to the stage of the WQCV.

The volume of the forebay shall be a minimum of ten percent (10%) and a maximum of twenty percent (20%) of the WQCV. The volume of the forebay is considered to be part of the required WQCV, not additional volume.

General construction requirements: The optimal length to width ratio for a water quality detention basin is four (4). The length to width ratio should be no less than two (2). The minimum allowable length to width ratio is one (1). Side slopes, dams or dikes, and retaining walls shall meet the requirements of the *Stormwater Detention Design* section.

Overflow spillways: Where the basin is to be utilized as a water quality BMP only, a spillway or outlet structure meeting the requirements of the *Stormwater Detention Design* section and capable of passing the peak flow from a one percent (1%) AP (100-year) storm for the drainage area upstream of the basin shall be provided. The lowest point on the spillway or outlet structure shall be set at the top of the WCQV.

Trickle channels: Trickle channels shall be provided to provide grade control and to minimize chronic wet areas. Trickle channels shall be constructed of six inch (6") stone or other porous medium. A typical trickle channel cross section is shown in Figure WQ4.

A typical plan and section for extended dry detention basins are shown in Figure WO6.

**6.** Extended Wet Detention Basins: Extended wet detention basins may be provided to capture and provide temporary storage for the required water quality capture volume. Extended wet detention basins shall be placed outside of the primary watercourses which allow off-site flows to pass through the development (i.e., "off-line") where possible.

Design criteria for extended wet detention basins shall be the same as for extended dry detention basins, with the following exceptions:

The volume of the permanent pool should not be less than one (1) to one and one-half (1.5) times the WQCV.

A bench area (littoral zone) with a width of ten feet (10') shall be provided as shown in Figure WQ7. It is preferred that emergent aquatic vegetation be provided in this zone.

It is recommended that a minimum of twenty-five percent (25%) of the WQCV be provided in the upper eighteen inches (18") of depth. A maximum of fifty percent (50%) of the permanent pool volume shall be provided in the upper eighteen inches (18") of depth.

Depth of the principal portion of the permanent pool shall be a minimum of four feet (4').

It is preferred that a forebay meeting the same requirements as specified for dry detention basins, be provided.

Where perforated riser pipes are not encased in gravel, only corrugated metal or ductile iron pipe may be used.

Typical details for extended wet detention basins are shown in Figure WQ7.

7. Sand Filters: Runoff from fueling plazas, vehicle maintenance areas, solid waste storage or transfer areas, and other areas having potentially high concentrations of contaminants shall be passed through a sand filter prior to discharge to receiving waters.

Total impervious area draining to a sand filter will generally be one (1) acre or less. Sand filters shall be provided with a sedimentation chamber and a filtration chamber. Design of sand filters shall be based upon the Austin, Texas first flush filtration basin (full sedimentation design) as described in Debo and Reese pp. 596-598 (Reference F.2 of this section). A schematic cross section of a sand filter is shown in Figure WQ8.

- **8.** Other Structural BMPs: Constructed wetlands, porous pavements and other structural BMPs for which detailed design criteria can be documented in generally accepted literature can be provided in addition to, or in lieu of, the BMPs described above, provided the objectives of this section can be met. The use of infiltration basins and trenches is discouraged due to possible adverse impacts on groundwater.
- E. Operation and Maintenance.

- 1. The City provides no maintenance of water quality BMPs located on private property. Maintenance must be provided by the owner of the property upon which the BMP is located. Maintenance includes, but is not limited to, removal of debris, control of vegetation, removal of accumulated sediment when the WQCV volume has been reduced by twenty-five percent (25%) or more.
- 2. Extended detention basins and wetlands or other "capture and storage" BMPs shall be located within a single lot or property, within a designated drainage easement. Where BMPs are located in common areas or adjoining off-site areas, the property upon which the BMP is located shall remain in the ownership of the developer or property owners' association.
- **3.** Where a property owners' association is formed, restrictive covenants which provide for collection of fees for maintenance of the BMPs shall be filed in the office of the Polk County Recorder of Deeds. Restrictive covenants must be approved by the County legal counselor prior to filing of the final plat.

### F. References.

- 1. American Society of Civil Engineers, Manuals and Reports of Engineering Practice No. 77 (WEF Manual of Practice FD-20), Design & Construction of Urban Stormwater Management Systems, Chapter 12. American Society of Civil Engineers, New York, NY, 1992.
- **2.** Debo, T.N. and Reese, A.J., Municipal Stormwater Management, Chapter 13, Lewis Publishers, Boca Raton, FL, 1995.

**Section II:** In the event that any section, sentence, clause, phrase or portion of this Ordinance is held to be invalid by a court of competent jurisdiction, the remainder of the Ordinance shall continue in full force and effect, to the extent the remainder can be given effect without the invalid portion.

**Section III**: This Ordinance shall be in full force and effect from and after its passage by the Board of Aldermen and approval by the Mayor.

	Christopher Warwick, Mayor
ATTEST:	
Paula Henderson, City Cler	<u></u>

### **CERTIFICATION**

I, Paula Henderson, do her	reby certify that I am the duly appointed and actin	g City Clerk
for the City of Bolivar, M	Missouri; that the foregoing Ordinance No.	was
adopted by the Board or	Aldermen and thereafter approved by the Mayor	and became
effective on	, 2022; and that said Ordinance remains in fi	ull force and
effect, having never been a	altered, amended nor repealed.	
	Paula Henderson City Clerk	

### **ORDINANCE COVER SHEET**

Bill No. 2022-98

Ordinance No.
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# "AN ORDINANCE APPROVING FINAL PLAT OF SIMON SQUARE PLAT THREE PHASE TWO IN THE CITY OF BOLIVAR, MISSOURI."

Filed for public inspection on	·
First reading In Full; By Title on	
Second reading In Full; By Title on	·
Vote by the Board of Aldermen on	<b>:</b>
Aye; Nay; Abstain	
Approved by the Mayor on	•
Vetoed by the Mayor on	•
Board of Aldermen Vote to Override Veto on	
Aye; Abstain	
Bill Effective Date:	

Ordinance No.	
---------------	--

### "AN ORDINANCE APPROVING FINAL PLAT OF SIMON SQUARE PLAT THREE PHASE TWO IN THE CITY OF BOLIVAR, MISSOURI."

Be it Ordained by the Board of Aldermen of the City of Bolivar, Missouri, as follows:

WHEREAS, a public hearing was held with the Planning and Zoning Commission on the application for the final plat of Simon Square Plat 3 – Phase 2 - in the City of Bolivar, Missouri on November 10, 2022; and

WHEREAS, the Planning and Zoning Commission for the City of Bolivar, Missouri voted to recommend approval of the requested final plat; and

WHEREAS, all necessary preconditions have been satisfied regarding the preliminary platting of the proposed final plat as described herein.

NOW, THEREFORE, after considering all information submitted to the Planning and Zoning Commission and after considering all requirements of Chapter 415 of the Municipal Code for the City of Bolivar, Missouri, the Board of Aldermen states as follows:

**Section I**: Consistent with the recommendation of the Planning and Zoning Commission of the City of Bolivar on November 10, 2022 to approve the final plat of Simon Square Plat 3 – Phase 2 - in the City of Bolivar, the said final plat is hereby approved by the Board of Aldermen in the form attached hereto as Exhibit "A" and incorporated herein by reference.

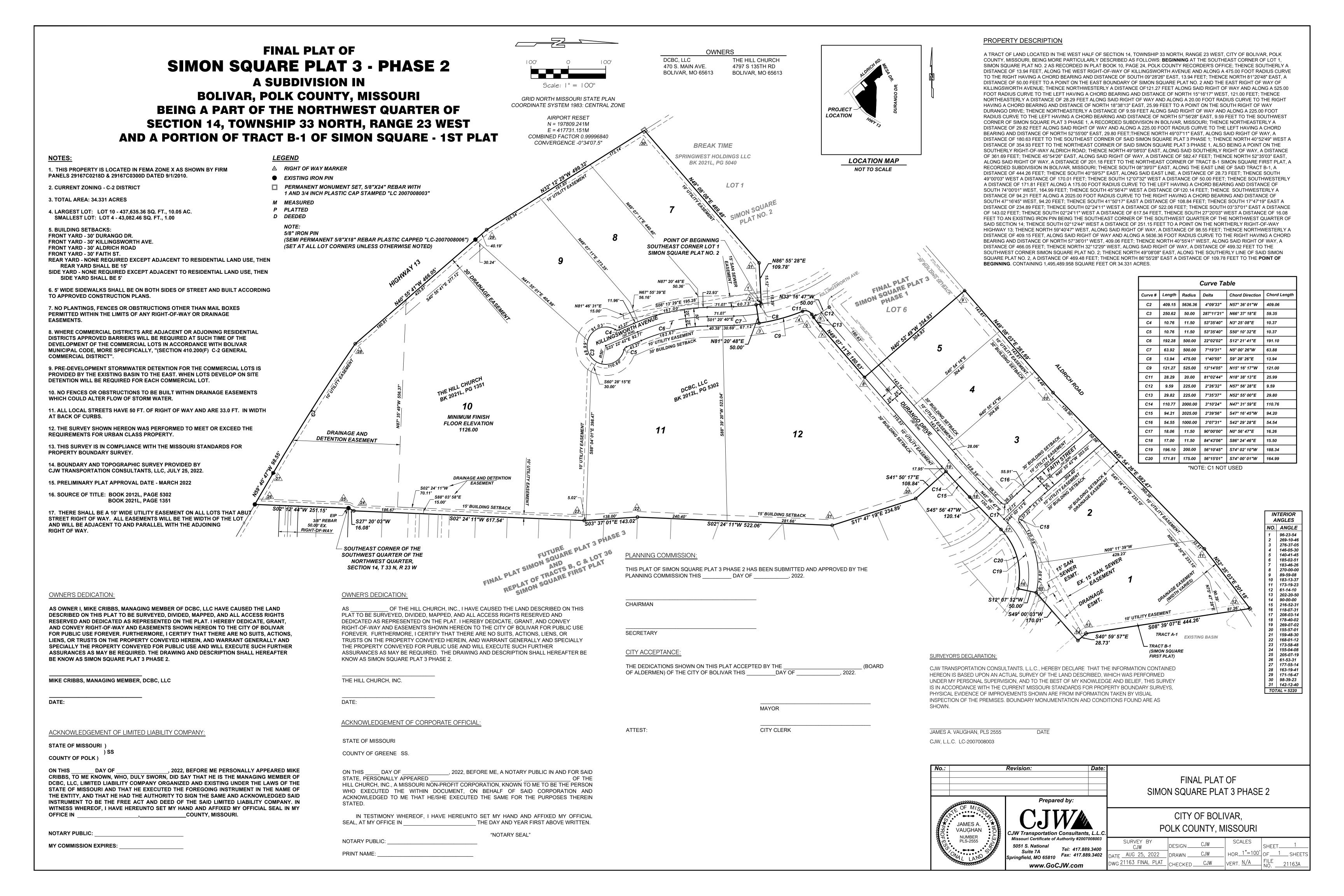
**Section II:** The final plat of Simon Square Plat 3 – Phase 2 - in the City of Bolivar as herein approved shall be executed filed with the Recorder's Office for Polk County, Missouri as required by applicable law as soon as is practical following the passage of this ordinance.

**Section III**: This Ordinance shall be in full force and effect from and after its passage by the Board of Aldermen and approval by the Mayor.

	Christopher Warwick, Mayor
ATTEST:	
Paula Henderson, City Cler	<u>k</u>

## **CERTIFICATION**

by certify that I am the duly appointed and acting	g City Clerk
issouri; that the foregoing Ordinance No.	was
ldermen and thereafter approved by the Mayor	and became
, 2022; and that said Ordinance remains in fu	all force and
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	issouri; that the foregoing Ordinance Noldermen and thereafter approved by the Mayor, 2022; and that said Ordinance remains in fu



### **ORDINANCE COVER SHEET**

Bill No. 2022-99

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w	annanc	e no.	

### "AN ORDINANCE CHANGING THE ZONING CLASSIFICATION FOR CERTAIN PROPERTY GENERALLY LOCATED IN THE FRISCO TRAILS MINOR SUBDIVISION IN THE CITY OF BOLIVAR."

Filed for public inspection on	_·
First reading In Full; By Title on	·
Second reading In Full; By Title on	·
Vote by the Board of Aldermen on	:
Aye; Abstain	
Approved by the Mayor on	•
Vetoed by the Mayor on	·
Board of Aldermen Vote to Override Veto on	
Aye; Nay; Abstain	
Bill Effective Date: .	

Ordinance No.	
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### "AN ORDINANCE CHANGING THE ZONING CLASSIFICATION FOR CERTAIN PROPERTY GENERALLY LOCATED IN THE FRISCO TRAILS MINOR SUBDIVISION IN THE CITY OF BOLIVAR."

Be it Ordained by the Board of Aldermen of the City of Bolivar, Missouri, as follows:

WHEREAS, a public hearing was held on the application for the changing of zoning classification with the Planning and Zoning Commission of the City of Bolivar on November 10, 2022 regarding the real estate identified herein below; and

WHEREAS, the Planning and Zoning Commission for the City of Bolivar, Missouri voted to recommend the requested zoning change; and

WHEREAS, the Planning and Zoning Commission for the City of Bolivar, Missouri hereby reports to the Board of Alderman, following hearing as set forth above, as follows:

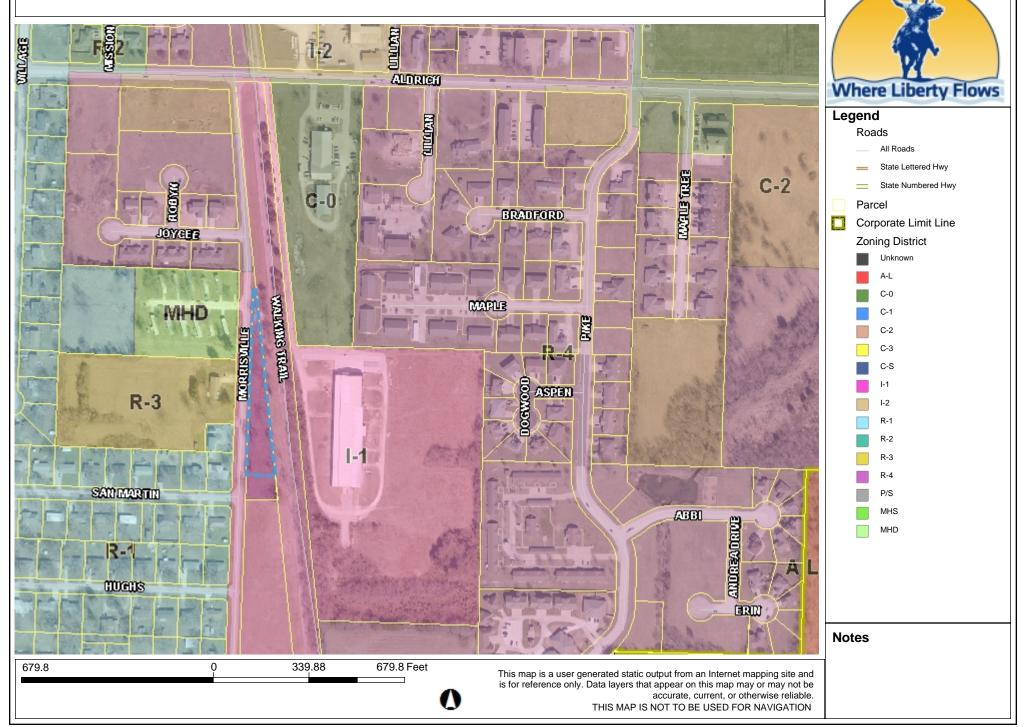
- (i) that the amendment of the zoning regulations as set forth herein is consistent with the intent and purposes of the City's zoning regulations, policies, and comprehensive plan; and
- (ii) that the real estate in question would be compatible with most uses that would be permitted on the property if it were reclassified; and
- (iii) that adequate sewer and water facilities and public services are available or otherwise could be provided to serve the residential use at the real estate in question; and
- (iv) that the proposed amendments would not correct any error in the application of the City's zoning regulations; and
- (v) that the proposed amendments are not recommended in part because of changed or changing conditions in the area; and the proposed amendment does not provide a disproportionately greater loss to the individual landowners relative to the public gain.

**Section I**: Consistent with the recommendation of the Planning and Zoning Commission of the City of Bolivar on November 10, 2022 to approve the zoning change application, after petition being filed by the record owners and duly held public hearing, the zoning classification for the following described property is hereby changed from R-4, Multiple Family Dwelling District, to C-2, General Commercial District.

Lots 2, 3, and 4 of the final plat of Frisco Trails, a Minor Subdivision in the City of Bolivar, Missouri.

<b>Section II</b> : This Ordinance shall be in full force and effect from and after its passage by the Board of Aldermen and approval by the Mayor.
Christopher Warwick, Mayor
ATTEST:
Paula Henderson, City Clerk
<u>CERTIFICATION</u>
I, Paula Henderson, do hereby certify that I am the duly appointed and acting City Clerk for the City of Bolivar, Missouri; that the foregoing Ordinance No was adopted by the Board or Aldermen and thereafter approved by the Mayor and became effective on, 2022; and that said Ordinance remains in full force and effect, having never been altered, amended nor repealed.
Paula Henderson, City Clerk

## Bolivar, MO



### **ORDINANCE COVER SHEET**

Bill No. 2022-100

Ordinance No.	Ora	linanc	e No.	
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# "AN ORDINANCE CHANGING THE ZONING CLASSIFICATION FOR CERTAIN PROPERTY GENERALLY LOCATED IN THE FOX FIELD SUBDIVISION IN THE CITY OF BOLIVAR."

Filed for public inspection on	<b>•</b>
First reading In Full; By Title on	·
Second reading In Full; By Title on	·
Vote by the Board of Aldermen on	:
Aye; Nay; Abstain	
Approved by the Mayor on	·
Vetoed by the Mayor on	•
Board of Aldermen Vote to Override Veto on	
Aye; Nay; Abstain	
Bill Effective Date: .	

Ordinance No.	
---------------	--

# "AN ORDINANCE CHANGING THE ZONING CLASSIFICATION FOR CERTAIN PROPERTY GENERALLY LOCATED IN THE FOX FIELD SUBDIVISION IN THE CITY OF BOLIVAR."

Be it Ordained by the Board of Aldermen of the City of Bolivar, Missouri, as follows:

WHEREAS, a public hearing was held on the application for the changing of zoning classification with the Planning and Zoning Commission of the City of Bolivar on November 10, 2022 regarding the real estate identified herein below; and

WHEREAS, the Planning and Zoning Commission for the City of Bolivar, Missouri voted to recommend the requested zoning change; and

WHEREAS, the Planning and Zoning Commission for the City of Bolivar, Missouri hereby reports to the Board of Alderman, following hearing as set forth above, as follows:

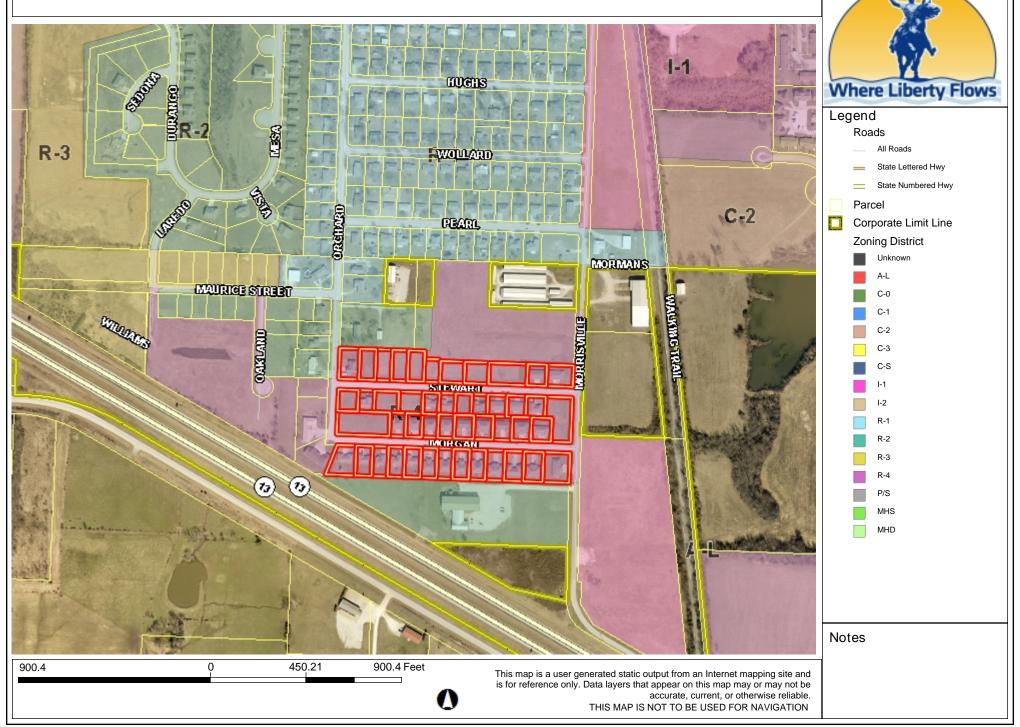
- (i) that the amendment of the zoning regulations as set forth herein is consistent with the intent and purposes of the City's zoning regulations, policies, and comprehensive plan; and
- (ii) that the real estate in question would be compatible with most uses that would be permitted on the property if it were reclassified; and
- (iii) that adequate sewer and water facilities and public services are available or otherwise could be provided to serve the residential use at the real estate in question; and
- (iv) that the proposed amendments would not correct any error in the application of the City's zoning regulations; and
- (v) that the proposed amendments are not recommended in part because of changed or changing conditions in the area; and the proposed amendment does not provide a disproportionately greater loss to the individual landowners relative to the public gain.

**Section I**: Consistent with the recommendation of the Planning and Zoning Commission of the City of Bolivar on November 10, 2022 to approve the zoning change application, after petition being filed by the City of Bolivar and duly held public hearing, the zoning classification for the following described property is hereby changed from R-4, Multiple Family Dwelling District, to R-3, Two Family Dwelling District.

Lots 1-51 of Fox Field Subdivision in the City of Bolivar, Missouri.

<b>Section II</b> : This Ordinance shall be in full force and effect from and after its passage by the Board of Aldermen and approval by the Mayor.
Christopher Warwick, Mayor
ATTEST:
Paula Henderson, City Clerk
<u>CERTIFICATION</u>
I, Paula Henderson, do hereby certify that I am the duly appointed and acting City Clerk for the City of Bolivar, Missouri; that the foregoing Ordinance No was adopted by the Board or Aldermen and thereafter approved by the Mayor and became effective on, 2022; and that said Ordinance remains in full force and effect, having never been altered, amended nor repealed.
Paula Henderson, City Clerk

## Bolivar, MO



### **ORDINANCE COVER SHEET**

Bill No. 2022-101

Ordi	nance	No.	
VI UI	пансе	TAU.	

# "AN ORDINANCE CALLING AN ELECTION IN THE CITY OF BOLIVAR, MISSOURI."

Filed for public inspection on	•
First reading In Full; By Title on	
Second reading In Full; By Title on	•
Vote by the Board of Aldermen on	:
Aye; Nay; Abstain	
Approved by the Mayor on	·
Vetoed by the Mayor on	•
Board of Aldermen Vote to Override Veto on	
Aye; Nay; Abstain	
Rill Effective Date	

## "AN ORDINANCE CALLING AN ELECTION IN THE CITY OF BOLIVAR, MISSOURI."

BE IT ORDAINED BY THE BOARD OF ALDERMEN OF THE CITY OF BOLIVAR, MISSOURI, AS FOLLOWS:

- **Section 1.** The Board of Aldermen finds it necessary and hereby declares its intent to ask the voters of the City of Bolivar, Missouri whether the City should enact a local use tax.
- **Section 2.** An election is hereby ordered to be held in the City of Bolivar, Missouri, on April 4, 2023, on the following question:

### **OUESTION**

Shall the City of Bolivar, Missouri impose a local use tax at the same rate as the total local sales tax rate, provided that if the local sales tax rate is reduced or raised by voter approval, the local use tax rate shall also be reduced or raised by the same action?

 $\square$  YES  $\square$  NO

If you are in favor of the question, place an "X" in the box opposite "YES." If you are opposed to the question, place an "X" in the box opposite "NO."

- **Section 3.** The form of the Notice of Election for said election, a copy of which is attached hereto and made a part hereof, is hereby approved.
- **Section 4.** The City Clerk is hereby authorized and directed to notify the County Clerk of Polk County, Missouri, of the adoption of this Ordinance no later than 4:00 P.M. on January 24, 2023, and to include in said notification all of the terms and provisions required by Chapter 115 of the Revised Statutes of Missouri, as amended.
  - **Section 5.** This Ordinance shall be in full force and effect from and after its passage.

	Christopher Warwick, Mayor
ATTEST:	
Paula Henderson, City Cle	mly

### **CERTIFICATION**

I, Paula Henderson, do h	ereby certify that I am the duly appoin	nted and acting City Clerk for the
City of Bolivar, Missouri	; that the foregoing Ordinance No	was adopted by the Board
or Aldermen and thereaft	er approved by the Mayor and became	e effective on
2021; and that said Ordin nor repealed.	ance remains in full force and effect, ha	aving never been altered, amended
	Paula Henderson, City Clerk	