# IMPROVEMENT PLAN APPLICATION CHECKLIST

All Improvement Plans submitted for a permit shall address the following items on the plans for review by the Department of Public Works. Applicants shall check off each item provided on the plans. Attach a separate letter explaining reasons why any item below is not provided for on the plans.

Project Name:_____

Project Location:_____

**General Information**

_____ 1. Address all conditions of the Planning and Zoning Commission approval.

_____ 2. All plan sheets shall be signed and sealed by a registered professional engineer.

_____ 3. All submitted plan sheets shall be 22"x34" in size.

_____ 4. Provide a location map of the site on the cover sheet with north indicated.

_____ 5. Indicate the USGS benchmark used for all survey data, and provide a basis for bearing to establish how north was determined.

_____ 6. List the City of Lake Saint Louis General Notes on the cover sheet.

_____ 7. Show the locations of all existing entrances on both sides of the street, within 300 feet of any proposed entrance.

_____ 8. Provide a copy of all recorded easements (both on and off-site) and right-of-way warranty deeds required with this development.

_____ 9. List all utility companies serving the development.

_____ 10. Locate the nearest existing fire hydrant and any proposed hydrants.

_____ 11. All utilities must be bored under existing City of Lake Saint Louis streets.

_____ 12. Show a temporary gravel wash down area located near the construction entrance and indicate on the plans that all trucks must be washed down prior to leaving the site. (Minimum 24' wide by 50' long)

_____ 13. Indicate on the plans that grades cannot exceed a 3:1 slope. Grades in excess of 4:1 must be labeled on plans.

_____ 14. Obtain a Land Disturbance Permit from the Missouri Department of Natural Resources on any site greater than one acre.

**Grading Plan**

_____ 1. Show existing topography and grade of the site at a contour interval of not more than two feet and the proposed final contour and finished grade elevation at intervals of not more than two feet.

_____ 2. Identify the property by lot lines and location, including dimensions; angles and size, correlated with the legal description of the property.

_____ 3. Show natural features such as trees, streams, rivers, lakes, drains, topography, and similar features. All topographic data shall directly relate to USGS data.

_____ 4. Show existing manmade features such as buildings, structures, easements, existing utilities such as water and sewer lines etc., excavations, bridges, culverts and drains.

_____ 5. Show the location of the site and its geographic relation to neighboring properties showing all adjacent buildings and roads within 100 feet.

_____ 6. Provide earthwork totals including total volumes of cut and fill on cubic yards.

_____ 7. All filled places under proposed storm and sanitary sewer and/or paved areas shall be compacted to 90% of maximum density as determined by the Modified Compaction Test AASHTO T-180.

_____ 8. All filled placed in proposed roads shall be compacted from the bottom of the fill up to 95% of maximum density as determined by the Standard Compaction Test AASHTO T-99. All tests shall be verified by a soils engineer concurrent with grading and backfilling operations.

_____ 9. Include a Storm Water Management Plan and Erosion/Sedimentation Control Plan stamped by a professional engineer per Chapter 60 of the current edition **Design Criteria for the Preparation of Improvement Plans** by Saint Charles County, MO.

_____ 10. Delineate wetlands subject to United States Army Corps of Engineers regulations. Appropriate documentation of coordination with the COE shall be provided.

_____ 11. All low places whether on-site or off-site should be graded to allow drainage (this may be accomplished with temporary ditches). Provide copies of signed off-site easements for work on adjacent properties.

_____ 12. Specify on the plans how the requirements of the Tree Preservation Ordinance will be met.

_____ 13. Add the following notes:

i. If the property is greater than one acre, a Land Disturbance Permit is required prior to commencing excavation operation. Provide a copy of approval from the Missouri Department of Natural Resources to the Public Works Department.

ii. Erosion and sedimentation control shall be the responsibility of the contractor. Additional erosion and sedimentation control may be required as directed by the City Engineer. (Ordinance 440.040 D.).

iii. When grading operations are completed or suspended vegetation in sufficient density to provide effective erosion control must be reestablished within 30 days. (Ordinance 440.050 D.).

iv. All mud and debris from construction site shall be kept off of City maintained streets. (Ordinance 440.060)

_____ 14. Sod shall be used in detention basins and swales unless velocities are excessive, (greater than 5 fps or where velocities are less than 2 fps causing deposition of soil particles) then concrete swales may be used. Sod placed on slopes steeper than 10% should be staked.

**Parking Lot**

_____ 1. Show number of parking spaces, including handicap spaces provided and number required.

_____ 2. Show standard dimensions for parking spaces. Standard 9' x 19', handicap spaces 11' wide with 5' adjacent hatched area by 19'. Provide elevations at the four corners of all handicap spaces.

_____ 3. Show access aisle dimensions.

_____ 4. Show placement of handicap spaces as being the closest spaces to the building. Also, show placement of handicap sign indicating a "$50 to $300 fine" for illegally parking in handicap space. (§ 355.100)

_____ 5. Show number of loading spaces required and show number provided. Show location of loading space.

_____ 6. Indicate pavement thickness and pavement detail for parking lot, including concrete curb detail.

_____ 7. Indicate pavement detail for concrete approach. 7" concrete with 6" aggregate base on prepared subgrade is required for commercial approach to the right of way line.

_____ 8. Show all setbacks and all existing easements.

_____ 9. Show spot elevations in the parking lot to clarify proposed drainage.

_____ 10. Place a note on the plans that handicap spaces and ramps cannot have a grade in excess of 2% in any direction.

_____ 11. Provide a parking lot lighting diagram showing a minimum of .25 footcandle luminescence throughout the entire paved parking lot.

_____ 12. Provide a copy of any proposed, required or recorded cross access easements and show the limits on the plan.

**Water Distribution and Sanitary Collection**

Contact Public Water Supply District No. 2 for design and construction standards.

_____ **1.** Provide a letter from Public Water Supply District No. 2 that states that there is enough treatment capacity for the proposed sanitary sewers and number of homes in the development.

**Streets and Sidewalks**

_____ 1. All entrance approaches are to be 7" concrete with 6" type 5 Aggregate Base.

_____ 2. Show typical joint details and spacing for construction of all public streets.

_____ 3. Show curb radii for all Minor Streets. The minimum pavement radius at intersecting streets is 32'.

_____ 4. Show right of way width and label all road classifications.

_____ 5. Provide roadway profile for each street within development. Show sidewalks along streets unless not required by ordinance.

_____ 6. Provide detectable warning surfaces for all curb ramps.

_____ 7. Provide a typical roadway section showing correct pavement and base thickness for the roadway functional classification.

_____ 8. Provide underdrains across the street at all curb inlet locations.

_____ 9. Prior to approval of the subdivision plat, a surety bond, an irrevocable letter of credit, cashier's check, or an escrow agreement is required for 100% of the cost of all public improvements including streets. Prior to submittal of letter of credit or surety bond to the Department of Community Development, the developer must first submit an estimate of the construction cost of the public improvements to the Department of Public Works.

_____ 10. Show location of street lighting. Street lighting shall be provided in subdivisions and on roadway improvement projects in accordance with Cuivre River specifications. Street lights are to be placed at regular intervals of 300 feet or less.

_____ 11. Include warping details for cul-de-sacs and intersections.

_____ 12. Include driveway locations in cul-de-sacs. In no event shall the maximum driveway width exceed 43% of the lot frontage.

_____ 13. Show the sight distance triangle for each intersection or commercial driveway. Plantings over 18" should not be used within the sight distance triangle.

**Stormwater (Maintenance/Repairs requiring excavation to existing sewers)** (Ordinance Chapter 151)

_____ 1. Obtain a boring and excavation permit from the Department of Public Works for work within existing right of way.

_____ 2. Indicate on plans how traffic control will be handled during construction.

_____ 3. Show pavement replacement limits, thickness and type of pavement removal. Note: all concrete replacement due to storm sewer or sanitary sewer repair should be removed and replaced to the nearest joint.

**Stormwater (New Construction)**

_____ 1. Label all storm sewers with regards to size, type and classification, ie 15" Reinforced Concrete Pipe, Class III, public or private.

_____ 2. Provide profiles of all storm sewer construction. Show slope of sewers, distance between structures, type of structure, utilities in profile view, type of backfill (ie flowable fill within the right of way).

_____ 3. Show a typical pipe cross section view of the storm sewer, backfill, and trench width. (All pipes shall be bedded in MSD Type 1 or Type 2 bedding unless otherwise directed by the engineer. (Ordinance 151.68)

_____ 4. Provide storm sewer hydraulic calculations for the 15 year, 20 minute storm on all proposed pipes. Include the hydraulic grade line on the storm sewer profile drawings.

_____ 5. Development along natural watercourses shall have residential lot lines, commercial or industrial improvements, parking areas and driveways setback from the top of the existing stream bank or the 15-year, twenty (20) minute water surface elevation where no established top of bank can be determined, all as provided by §425, Article IX-A. Protection of Riparian Corridors in the Municipal Code. In the case of subdivision plats, the watercourse and the above-mentioned setback area shall be preserved and made the responsibility of the subdivision trustees. In the case of a site plan, commercial, industrial or private site, the watercourse and the above-mentioned setback area shall be preserved and made the responsibility of the property owner(s). Permanent vegetation and existing ground elevation and grades within the above-mentioned setback area shall be left intact and undisturbed, except as permitted by §425, Article IX-A.

_____ 6. Provide an overland flow path for all stormsewers and drainageways to allow passage of the 100 year storm without inundation of any structures.

_____ 7. For flows greater than 3 cfs, area inlets or inlet manholes are required to intercept the gutter or swale flow unless part of a workable, recognized and approved BMP.

**Flood Hazard Reduction (Ordinance Chapter 445)**

_____ 1. Depict the appropriate flood hazard zones as shown on Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM) and reference the applicable FIRM panel number and date.

_____ 2. Indicate on plans the proximity of the proposed development to the floodplain or floodway.

_____ 3. If development (subdivision or commercial development) is adjacent to an area where base flood elevations have been provided, furnish hydraulic data for the creek showing the 100 year flood elevation and show the low floor and low sill elevations on the adjacent structures.

Check List for Review of Stormwater Detention

Project Name: _____

Location: _____

_____ 1. Check with City Staff for downstream problems.

_____ 2. Detention required if differential runoff, **per MSD Section 4.080.01.2(b)**, is greater than 2 cfs**.**

_____ 3. For building and parking lot additions, detention is required if there is existing detention. Check existing calculations to see if addition is covered.

_____ 4. No reduction in outfall pipe size permitted because of detention.

_____ 5. Basin located at or near lowest point of site such that on-site runoff will be directed to basin. In situations where Micro-Detention is provided with multiple in-line detention basins will be looked at case by case.

_____ 6. Offsite flows bypassed around basin.

_____ 7. Underground basin has adequate access for maintenance.

_____ 8. **Provide** means of visual inspection of **both sides of** low flow device from ground surface for underground basin.

_____ 9. Underground basin has volume and spillway capacity to pass/contain 100-year, 24-hour event with low flow blocked. **It is further recommended that the control structure have at least 2 openings, one above the other.**

_____ 10. Check flow capacity of downstream pipe with inlet control nomographs found in Hydraulic Design of Highway Culverts, U.S. Department of Transportation publication.

_____ 11. Check inlet control constants **as entered in the analysis to match the Hydraulic Design of Highway Culverts per US Department of Transportation.**

_____ 12. No underground basins allowed for residential projects.

_____ 13. TR-55 or similar SCS method used for hydrology; Type II rainfall distribution.

_____ 14. 2-year and 100-year, 24-hour rainfall amounts of **3.1"** and 7.2", respectively.

_____ 15. **Legible Detention Basin Area** maps showing flow paths used in time of concentration calculations and **CN values for existing and proposed conditions, 22" X 34" exhibits are preferred, (Existing Conditions Map is not applicable to a "Fixed" Release Rate Analysis).**

_____ 16. Elevations vs. Discharge table, including modeling data.

_____ 17. Elevation vs. Storage table.

_____ 18. Hydraulic gradeline calculations for incoming and outgoing pipes.

_____ 19. **Provide a copy of the SCS soils map and label site.**

_____ 20. Include a Geotechnical report for design of detention basin earth fills (if required by City Staff) This report should be signed, sealed and dated by a registered engineer in the state of Missouri.

_____ 21. Structural calculations may be required for control structure.

_____ 22. Details of control structure showing reinforcing except where standard inlets are used.

_____ 23. Minimum of 3 cross sections through basin for as-built calculations **tied to a baseline or known point or to Property Line.**

_____ 24. Incoming pipes should discharge at the toe of the slope in dry basins.

_____ 25. **Concrete Pilot** swale provided from incoming pipes to control structure.

_____ 26. **Concrete Pilot** swale is a minimum of 6 inches deep.

_____ 27. **Details for permanent erosion control for earthen swales with slopes greater than 3%.**

_____ 28. Minimum longitudinal slope **of concrete** swale is **2.0%,** slope called out on plan.

_____ 29. Bottom of basin is sloped a minimum of **2% laterally towards earthen swale and called out on plan.**

_____ 30. Rock blanket provided along outside of curved swale downstream of incoming pipe to prevent erosion.

_____ 31. Concrete headwall provided around **protruding** low flow pipe.

_____ 32. Trash rack provided for low flow openings less than 6" wide.

_____ 33. No railroad tie walls within ponding area of basin.

_____ 34. Maximum fluctuation above permanent pool is **6'**.

_____ 35. Maximum side slopes are 3:1 without fencing.

_____ 36. Dry basins and the fluctuating areas of lakes are to be sodded to the maximum high water elevation, call out on plan.

_____ 37. Control structures are to be reinforced concrete; no brick allowed; wall thickness is at least 8" w/one row of steel or 10" w/two rows of steel. Underground basins, as appropriate.

_____ 38. All basins should have a 6:1 access ramp.

_____ 39. No wetland mitigation in detention basin.

_____ 40. Maximum depth of water in a dry basin is 8' exceptions on a case-by-case basis.

_____ 41. Maximum depth of water in a parking lot is 8", 12" for truck parking lots.

_____ 42. Maximum ponding elevation calculated with low flow blocked and water ponded to sill of overflow structure.

_____ 43. Limits of maximum ponding are 30' horizontally and 2' vertically from a building; 10' horizontally and 1' vertically for parking lot detention.

_____ 44. Freeboard from top of berm to maximum ponding elevation is at least 1'.

_____ 45. Basin is located in common ground or easement dedicated to subdivision trustees.

_____ 46. Owners of the basin execute a Maintenance Agreement with the City.

_____ 47. Four foot high fence required if side slopes are steeper than 3:1. Fences must be approved by the Department of Community Development.

_____ 48. Low elevation of basin is above 15-yr, 20-min hydraulic elevation of receiving system; or detain whole storm and provide a backflow preventer (Tideflex**) normally installed inside of the outfall structure.**

_____ 49. Dams with a height of 35' or greater require MDNR approval.

_____ 50. Hydraulic calculations showing 100-year flow is conveyed to basin; calculations at ditch sections, sills of structures set above 100-yr elevation.

_____ 51. Smallest low flow opening is 3" diameter or 4" x 2" slot. However, special trashrack or opening protection may be required.

_____ 52. Detention cannot cross watershed boundary.

_____ 53. Discharge pipe into wet basin shall be a minimum of 3' above bottom, or flowline of pipe shall be no higher than the normal pool elevation.

_____ 54. **The report is sealed by a Missouri Professional Engineer**.

_____ 55. **The report has a Table of Contents, a summary and is bound.**

_____ 56. The starting hydraulic grade line for all incoming pipes shall be the 100 year – 24 hour blocked low flow water surface elevation, or an elevation approved by the City.

_____ 57. For some channel and wetlands work, a 404 and/or 401 permit may be required from the Corps and MoDNR, respectively.

_____ 58. Provide flood and creek bank studies signed, sealed and dated by a registered professional engineer as needed.

_____ 59. Show inflow calculations and data from all storm frequencies, signed, sealed and dated by a registered professional engineer in the state of Missouri (Detention Facilities)

_____ 60. Show flood areas and elevations on 100 year, 20 minute and 100 year, 24 hour storm event on the development plan.

_____ 61. Provide cross sections of the detention facility adequate to determine the volume of the detention facility.

_____ 62. A minimum of one (1) foot of freeboard shall be provided from the top of the basin to the maximum ponding elevation. The maximum ponding elevation shall be calculated based on a routing of the design storm (100-year, 24-hour event) assuming the low flow outlet is blocked with water ponded to the overflow structure's sill.

_____ _____

Signature of Applicant Date

_____ _____

Printed Name of Applicant Date