

**“As-Built” Drawing Check List  
Drainage Requirements for Residential Construction**

Required “As-Built” Drainage Information for a Certificate of Occupancy

**A. As built Topographic Features**

- \_\_\_\_\_ 1. Sidewalks
- \_\_\_\_\_ 2. Driveways or other pavement including material
- \_\_\_\_\_ 3. All structures
- \_\_\_\_\_ 4. Drainage structures and pipes
- \_\_\_\_\_ 5. Berms and Swales
- \_\_\_\_\_ 6. Edge of road or curb and gutter
- \_\_\_\_\_ 7. Retaining walls
- \_\_\_\_\_ 8. Open Ditches
- \_\_\_\_\_ 9. Systems or solutions for floodplain volume mitigation, including the total volume of storage for each mitigation system/solution.
- \_\_\_\_\_ 10. All trees
- \_\_\_\_\_ 11. List of all impervious structures and materials including their associated area in square feet and lot coverage percentage.
- \_\_\_\_\_ 12. Memorial Villages Water Authority (MVWA) water and sanitary sewer utilities within Right-of-Way and/or easements adjacent to property
- \_\_\_\_\_ 13. Sanitary Sewer Cleanouts
- \_\_\_\_\_ 14. Meters/Meter Boxes
- \_\_\_\_\_ 15. Valves/Valves Boxes
- \_\_\_\_\_ 16. Sanitary Sewer Manholes
- \_\_\_\_\_ 17. Fire Hydrants
- \_\_\_\_\_ 18. Gas Meters
- \_\_\_\_\_ 19. AC Units
- \_\_\_\_\_ 20. Accessory Structures
- \_\_\_\_\_ 21. Fences

**B. “As-Built” Elevations Conforming with the Latest Approved Drainage Plan**

- \_\_\_\_\_ 1. Along lot perimeter and at grade breaks at a maximum spacing of 25 feet
- \_\_\_\_\_ 2. Grid throughout interior of lot including grade breaks at a maximum spacing
- \_\_\_\_\_ 3. Finished floor of all structures
- \_\_\_\_\_ 4. Finished grade adjacent to all structures
- \_\_\_\_\_ 5. Elevations from existing information checklist
- \_\_\_\_\_ 6. Drainage structure tops, pipe sizes, materials, and flowlines
- \_\_\_\_\_ 7. Retaining wall perimeter
- \_\_\_\_\_ 8. All trees, landscaping, and grass planted prior to performing as-built survey
- \_\_\_\_\_ 9. Final drainage inspection completed and passed by City drainage inspector prior to performing as-built survey.
- \_\_\_\_\_ 10. Nearest sanitary sewer manhole lid elevation

C. Information

\_\_\_\_\_ 1. Seal, Signature and Date of Registered Professional Land Surveyor, registered in the State of Texas.

I, \_\_\_\_\_, a Registered Professional Land Surveyor in the State of Texas, hereby certify that the provided information on this as-built correctly represents the facts found at the time of the survey made on the ground, under my supervision, and there are no apparent encroachments at the time of this survey unless shown or noted otherwise. There is \_\_\_\_\_ square feet of impervious coverage on the lot which is \_\_\_\_\_% of the lot.

\_\_\_\_\_  
(Date)

\_\_\_\_\_  
(Seal & Signature)

\_\_\_\_\_ 2. Seal, Signature and Date of Civil Engineer licensed as a Professional Engineer in the State of Texas including the following statement.

I, \_\_\_\_\_, a Licensed Professional Engineer in the State of Texas, have reviewed the "as-built" survey of this property and on the basis of that review state that it conforms to the design and intent of the Drainage Plan submitted for permit.

\_\_\_\_\_  
(Date)

\_\_\_\_\_  
(Seal & Signature)

\* Please note that the signature blocks that are required for the as-built are to be include on the as-built and not on a separate sheet.

D. Acknowledgement

We, \_\_\_\_\_ [Owner(s)] and \_\_\_\_\_ [Contractor], have reviewed the As-Built drainage requirements with the City Building Official and acknowledge these requirements set forth by the City of Piney Point Village. In addition to the above requirements, We, the Owner(s) and Contractor, also acknowledge that the As-Built must be submit to the City for review 4-6 weeks prior to a Certificate of Occupancy being issued and understand that the As-Built could be subject to field investigation/verification by the City Inspector. No exception will be made on the length of time required to review the plans.

X \_\_\_\_\_  
Owner

X \_\_\_\_\_  
Contractor

X \_\_\_\_\_  
Owner (print)

X \_\_\_\_\_  
Contractor (print)

***CITY OF PINEY POINT VILLAGE***  
**NEW CONSTRUCTION**

Address of Property: \_\_\_\_\_  
 Date: \_\_\_\_\_  
 Builder: \_\_\_\_\_  
 Builder's Contact Telephone Number: \_\_\_\_\_  
 Engineering Company: \_\_\_\_\_  
 Engineer: \_\_\_\_\_  
 Engineer's Contact Telephone Number: \_\_\_\_\_  
 Engineer's Mailing Address: \_\_\_\_\_  
 \_\_\_\_\_

**NEW CONSTRUCTION DRAINAGE - PLAN REQUIREMENTS -**

1. A Temporary Drainage Plan during Construction shall be submitted and approved, and shall conform to guidelines for Temporary Drainage Plan (separate requirements not listed on this sheet). Plans <b>will not</b> be approved without an approved temporary plan.	
2. The Drainage Plan shall demonstrate that positive drainage will occur on the lot.	
3. The Drainage Plan shall include all aspects of the anticipated development including but not limited to building foundation, patios, decks, swimming pools, drives, walks, landscaped areas, downspouts, drainage system, etc. The Drainage Plan shall show existing and finished grade elevations of all proposed paving and grading on the site and shall include existing and planned spot elevations at a maximum of 25-foot spacing covering the lot, including shots on 25-foot spacing along the perimeter of the lot, grid across the lot, and along the perimeter of all structures (i.e., building slabs, sidewalks, patios, driveways, decks, etc.).	
4. If roadside ditches in the right-of-way are to be disturbed (i.e. removal of existing driveway culverts), proposed ditch flow line and top of bank elevations must be provided on the drainage plan at a maximum of 25-foot spacing.	
5. The topographical survey shall show the location and existing elevations of roadways, <b>all trees on the lot</b> , all easements, all landscaping, storm and sanitary sewers. Proposed removal of any existing trees must be indicated on the drainage plan.	
6. The topographical survey must also include features in the right-of-way in front of adjacent properties including ditch flow line and top of bank elevations and storm sewer elevations (driveway culvert flow lines, storm sewer flow lines, inlet top of grates).	

7. The Drainage Plan shall be prepared under the supervision of a Registered Professional Engineer of the State of Texas. The plans shall be sealed and signed by Engineer.	
8. When a Drainage plan is to incorporate a retaining wall, a detail of the retaining wall will be required on the submitted plans.	
9. All driveways must be a minimum of 3-feet from the property line at the side yard to allow for drainage or grading.	
10. Engineer shall provide drainage area calculations using Atlas 14 rainfall data for a Harris County Region 2 2-Year storm event on the submitted plans. The runoff coefficient (C-value) used must be calculated using the following equation: $C = 0.6I_a + 0.2$ . ( $I_a$ = impervious area/total area) and must not be less than 0.40.	
11. All proposed drainage pipes shall be sloped to achieve a minimum velocity of 3ft/sec.	
12. No elevation changes shall occur around the perimeter of the property. Plan shall show existing and proposed elevations on 25-foot spacing along the perimeter of the property.	
13. Outfall flow line elevations and flow line of existing system shall be shown where proposed tie-in occurs.	
14. Culverts shall be able to convey a Harris County Region 2 2-year storm event using Atlas 14 rainfall data for all affected areas. The min. culvert size shall be 3.14 square feet (24-inch diameter) and shall be Reinforced Concrete.	
15. All driveway culverts shall have a minimum cover of 3-inches between top of pipe and bottom of pavement.	
16. Drainage of the lot may be obtained by surface or sub-surface means, or a combination of the two, as is appropriate and necessary to ensure that all runoff produced in a Harris County Region 2 2-year storm event using Atlas 14 rainfall data will drain into the street, ditch, storm sewer system, or a recorded drainage easement.	
17. The Contractor shall be responsible for implementation, maintenance, and inspection of storm water pollution prevention measurements including, but not limited to, erosion and sediment controls (reinforced filter-fabric fencing), waste collection and disposal, off-site vehicle trucking, and other practices consistent with state and local regulations. Hay bales will not be allowed to be used as sediment control devices.	
18. Note on plan "Any areas of grass within the City's right of way which are disturbed or dug up during construction shall be replaced with St. Augustine or grass which matches the grass removed."	
19. Note on plan "Any damage to existing roads, driveways, sidewalks, or other appurtenances within the City's right of way shall be saw cut, removed and replaced	

with material equal to or superior to existing material, and be installed in a manner acceptable to the City".	
20. Note "The Contractor shall maintain drainage during construction as to not adversely impact adjacent / neighboring properties during a Harris County Region 2 2-year storm event using Atlas 14 rainfall data".	
21. Note "Reinforced Filter-Fabric Fences may not be taken down until the builder receives approval from the City".	
22. Note "Any revisions to the originally approved drainage plans must be submitted to the City by the builder's Engineer that provided the original approved drainage plans. Resubmitted plans must be signed and sealed by the builder's Engineer".	
23. Note on plan "Any excavation in the drip-line of trees 20-inches in diameter and above must be completed by hand digging. No roots larger than 1-inch in diameter are permitted to be cut for construction of the drainage system."	
24. Note on plan "Roof drain tie-ins as a minimum shall be as follows: 1 per 4-inch drain line or 4 per 6-inch drain line. The design engineer shall determine the proper sizing as part of the permanent drainage plan."	
25. Note on plan "Proposed landscaping/planting areas along the perimeter of the property shall not impede storm water flow into and through swales or storm sewer inlets. No raised flower beds will be allowed along the perimeter of the property. No landscaping/planting will be permitted in proposed drainage swales."	
26. Note on plan "Pipe connections to inlets must be installed with a water-tight seal both on the outside face of inlet structure and the inside wall. It is recommended that inlet bottoms are grout filled to the proposed pipe flowlines to help facilitate flow conveyance."	
27. Note on plan "Proposed curb cuts and repairs must be inspected by drainage inspector prior to the concrete curb pour to ensure the cut and repair in the field matches the proposed detail shown on the drainage plan."	
28. Note on plan "If a drainage sump pump is proposed on the temporary drainage plan, the sump pump must be installed and operable to pass temporary drainage inspection."	
29. If storm sewer pipes are proposed in drainage plan, main pipes shall be minimum 6-inch PVC SDR 26. Drainage grate inlets to be a minimum of 12" x 12" along main line pipe.	
30. If storm sewer pipes are proposed on drainage plan, all pipes shall be labeled indicating the proposed length, material and flowline elevations. All proposed storm sewer inlets or junction boxes must be labeled with top of grate elevations and flow line elevations of pipes connected to the box.	
31. All inlet grates for proposed area drains as part of the drainage system must be fully exposed and may not be buried under gravel, landscaping, artificial turf, etc.	
32. If drainage swales are proposed as part of the drainage system, swales shall be a minimum of 6-inch deep from high bank to flow line.	
33. No drainage shall go into an adjacent private drainage system without a drainage easement recorded at the Harris County Clerk's office. (No private agreements	

between homeowners sharing drainage will be allowed unless recorded at County Clerk Office and approved by the City).	
34. All drainage systems that require a sump pump system must include a sump detail with a properly sized overflow pipe to convey 2-year storm event. The pump system does not need to be of a size to pump the storm itself and the pumping system shall be sized so as to not negatively impact the City's existing storm system and/or infrastructure.	
35. The engineer is to provide a force main separate from an overflow line (i.e. the force main is not allowed to discharge into the overflow pipe at any point.).	
36. An erosion control system shall be required at the outfall of the force discharge (Concrete apron, rip rap, etc.).	
37. Drainage system must include a clean-out, inlet or junction box at every bend to provide access for maintenance; the only exception may be where roof drains tie into the main system.	
38. When the design calls for a system to discharge through an existing concrete curb, the plan submitted must include a curb cut and repair detail. This detail will include No. 4 rebars doweled in both vertically and horizontally to the existing pavement and curb.	
39. Proposed tie-ins to existing storm sewers that have saddle inlets will not be allowed. The developer will replace the saddle inlet with a City of Houston Type A Inlet.	
40. Provide tie-in detail if using existing City inlet.	
41. French Drains are for landscape use only (i.e. flowerbeds) and not to be used in lieu of inlets in the permanent or temporary drainage plan.	
42. All drainage plans and as-built plans shall utilize the City Benchmark System. Please contact the City for information on the location and elevation of the closest benchmark. Please include the benchmark that was used for elevations on the submitted plan.	
43. Submitted plans shall be drawn to an engineer's scale and not to an architect's scale.	
44. All plans need to be oriented with North directed to the top or right of the page.	
45. If roof drains are to be tied into the drainage system, they must be shown in the drainage plan.	
46. Roof drain tie-ins as a minimum shall be as follows: 1 per 4-inch drain line or 4 per 6-inch drain line. The design engineer shall determine the proper sizing as part of the permanent drainage plan.	

<p>47. When building in the floodplain the surveyor or engineer must delineate the limits of the 500-year, 100-year floodplains and floodway as established by the Effective FEMA F.I.R.M. maps. 500-year and 100-year floodplain boundaries shall be based on the contour of the 500-year and 100-year flood elevations at the subject property.</p>	
<p>48. When building in the floodplain, plans must list the 500-year and 100-year flood elevations at the subject property as established by FEMA and Harris County Flood Control District.</p>	
<p>49. When building in the 500-year floodplain, plans must include a certificate of elevation.</p>	
<p>50. When building in the floodplain, plans must include cut and fill calculations to demonstrate no net fill within the 500-year floodplain below the 500-year flood elevation. The Engineer must provide cross sections showing the existing natural ground elevations, proposed finished grade elevations, and proposed structures to verify the proposed cut and fill mitigation calculations. Volume of proposed storm sewer pipes or drainage swales used for conveyance capacity for 2-year design storms may not also be used as cut volume for floodplain mitigation. Volume of proposed pools on the property may not be used as cut volume for floodplain mitigation.</p>	
<p>51. Per City Code of Ordinances Section 34-95: Encroachments are prohibited, including fill, new construction, substantial improvements and other development within the adopted regulatory floodway unless it has been demonstrated through hydrologic and hydraulic analyses performed in accordance with standard engineering practice that the proposed encroachment would not result in any increase in flood levels within the community during the occurrence of the base flood discharge.</p>	
<p>52. Per City Code of Ordinances Section 34-122 – Limitation on lot fill for property:</p> <ul style="list-style-type: none"> <li>a) The height to which any point on the lot can be filled, other than the foundation, shall be limited to no more than the amount needed to create a maximum elevation equal to a one percent slope from the existing top of curb, edge of road (if no curb exists), existing high bank or property lines (whichever is closer to the development) from all sides. The only exceptions to this requirement are: <ul style="list-style-type: none"> <li>1. The building foundation.</li> <li>2. The driveway, within a 30-foot, 180-degree outward facing arch, established from the building line of the main vehicle entrance to the garage, if the following requirements are met: <ul style="list-style-type: none"> <li>a. A curb is provided on the driveway perimeter adjacent to the property line.</li> <li>b. The driveway must be spaced a minimum of three feet from the property line.</li> <li>c. A means to drain the area between the edge of the driveway and property line shall be provide in accordance with city drainage criteria.</li> </ul> </li> </ul> </li> </ul>	

<p>b) In no case shall more than 12 inches of fill be allowed on any lot, other than the exceptions provided for in subsection 34-122(a) above.</p> <p>c) Existing elevations which are higher than the calculated elevations are not required to be cut to meet the requirements of this section. The calculation only applies to additional fill above the existing ground elevation (pre-construction elevations).</p> <p>d) All fill used on property located inside the 500-year flood plain shall comply with zero net fill requirements that are established in article III of this chapter.</p>	
53. Drainage Plans must be approved by Harris County Flood Control District (HCFCD) if the drainage system is proposed to discharge into a tributary of Buffalo Bayou.	
54. Plans must have all Memorial Villages Water Authority utilities shown in the Right-of-Way	
55. Drainage plans must be approved by Memorial Villages Water Authority (MVWA) prior to a building permit being issued to the builder for work performed in the right-of-way. Plans only entering the right-of-way to outfall into City facilities do not have to be approved by MVWA.	
56. Sump pumps proposed on temporary drainage plans must be completely installed and operable at the time of construction.	
57. Drainage plans must show finished floor elevation, garage finished floor elevation, and the elevations on the driveway adjacent to the garage. Garage finished floor elevation must coordinate with adjacent proposed driveway elevations.	
58. Finished floor elevation must be 12-inch above the nearest sanitary sewer manhole lid elevation. Elevation of nearest sanitary sewer manhole lid must be provided.	
59. Any excavation in the vicinity of trees 20-inches in diameter and above shall be completed by hand digging. Locations of hand digging around trees must be called out on the drainage plan.	
60. No drainage pipes shall be proposed within the drip-line of any trees that are either partially or completely located on an adjacent property.	
61. Drainage plans shall include a title block clearly indicating the engineering firm's contact information and scope of work (new house, house addition, new pool, etc.).	
62. Drainage plans must show all sanitary sewer clean outs on the property.	
63. Drainage plans must be submitted on paper with dimensions of either 34"X22" or 36"X24".	



***CITY OF PINEY POINT VILLAGE***  
**NEW POOL CONSTRUCTION**

Address of Property: \_\_\_\_\_  
 Date: \_\_\_\_\_  
 Builder: \_\_\_\_\_  
 Builder's Contact Telephone Number: \_\_\_\_\_  
 Engineering Company: \_\_\_\_\_  
 Engineer: \_\_\_\_\_  
 Engineer's Contact Telephone Number: \_\_\_\_\_  
 Engineer's Mailing Address: \_\_\_\_\_  
 \_\_\_\_\_

**NEW POOL CONSTRUCTION DRAINAGE: PLAN REQUIREMENTS –**

1. A Temporary Drainage Plan during Construction shall be submitted, approved, and shall conform to guidelines for Temporary Drainage Plan (separate requirements not listed on this sheet). Plans <b>will not</b> be approved without an approved temporary plan.	
2. The Drainage Plan shall demonstrate that positive drainage will occur on the lot.	
3. The Drainage Plan shall include all aspects of the anticipated development including but not limited to building foundation, patios, decks, swimming pools, drives, walks, landscaped areas, downspouts, drainage system, etc. The Drainage Plan shall show existing and finished grade elevations of all proposed paving and grading on the site and shall include existing and planned spot elevations at a maximum of twenty-five foot (25') spacing covering the lot, including shots on 25' spacing along the perimeter of the lot, grid across the lot, and along the perimeter of all structures (i.e., building slabs, sidewalks, patios, driveways, decks, etc.).	
4. If roadside ditches in the right-of-way are to be disturbed (i.e. removal of existing driveway culverts), proposed ditch flow line and top of bank elevations must be provided on the drainage plan at a maximum of 25-foot spacing.	
5. The topographical survey shall show the location and existing elevations of roadways, <b>all trees on the lot</b> , all easements, all landscaping, storm and sanitary sewers. Proposed removal of any existing trees must be indicated on the drainage plan.	
6. The Drainage Plan shall be prepared under the supervision of a Registered Professional Engineer of the State of Texas. The plans shall be sealed and signed by Engineer.	

7. When a Drainage plan is to incorporate a retaining wall, a detail of the retaining wall will be required on the submitted plans.	
8. Engineer shall provide drainage area calculations using Atlas 14 rainfall data for a Harris County Region 2 2-Year storm event on the submitted plans. The runoff coefficient (C-value) used must be calculated using the following equation: $C = 0.6I_a + 0.2$ . ( $I_a$ = impervious area/total area) and must not be less than 0.40.	
9. All proposed drainage pipes shall be sloped to achieve a minimum velocity of 3ft/sec.	
10. No elevation changes shall occur around the perimeter of the property. Plan shall show existing and proposed elevations on 25' spacing along the perimeter of the property.	
11. Outfall flow line elevations and flow line of existing system shall be shown where proposed tie-in occurs.	
12. Drainage of the lot may be obtained by surface or sub-surface means, or a combination of the two, as is appropriate and necessary to ensure that all runoff produced in a Harris County Region 2 2-year storm event using Atlas 14 rainfall data will drain into the street, ditch, storm sewer system, or a recorded drainage easement.	
13. The Contractor shall be responsible for implementation, maintenance, and inspection of storm water pollution prevention measurements including, but not limited to, erosion and sediment controls (reinforced filter-fabric fencing), waste collection and disposal, off-site vehicle trucking, and other practices consistent with state and local regulations. Hay bales will not be allowed to be used as sediment control devices.	
14. Note on plan "Any areas of grass within the City's right of way which are disturbed or dug up during construction shall be replaced with St. Augustine or grass which matches the grass removed."	
15. Note on plan "Any damage to existing roads, driveways, sidewalks, or other appurtenances within the City's right of way shall be saw cut, removed and replaced with material equal to or superior to existing material, and be installed in a manner acceptable to the City".	
16. Note "The Contractor shall maintain drainage during construction as to not adversely impact adjacent / neighboring properties during a Harris County Region 2 2-year storm event using Atlas 14 rainfall data".	
17. Note "Reinforce Filter-Fabric Fences may not be taken down until the builder receives approval from the City".	
18. Note "Any revisions to the originally approved drainage plans must be submitted to the City by the builder's Engineer that provided the original approved drainage plans. Resubmitted plans must be signed and sealed by the builder's Engineer".	
19. Note on plan "Any excavation in the drip-line of trees 20 inches in diameter and above must be completed by hand digging. No roots larger than 1 inch in diameter are permitted to be cut for construction of the drainage system."	

20. Note on plan "Roof drain tie-ins as a minimum shall be as follows: 1 per 4-inch drain line or 4 per 6-inch drain line. The design engineer shall determine the proper sizing as part of the permanent drainage plan."	
21. Note on plan "Proposed landscaping/planting areas along the perimeter of the property shall not impede storm water flow into and through swales or storm sewer inlets. No raised flower beds will be allowed along the perimeter of the property. No landscaping/planting will be permitted in proposed drainage swales."	
22. Note on plan "Pipe connections to inlets must be installed with a water-tight seal both on the outside face of inlet structure and the inside wall. It is recommended that inlet bottoms are grout filled to the proposed pipe flowlines to help facilitate flow conveyance."	
23. Note on plan "Proposed curb cuts and repairs must be inspected by drainage inspector prior to the concrete curb pour to ensure the cut and repair in the field matches the proposed detail shown on the drainage plan."	
24. Note on plan "If a drainage sump pump is proposed on the temporary drainage plan, the sump pump must be installed and operable to pass temporary drainage inspection."	
25. If storm sewer pipes are proposed in drainage plan, main pipes shall be minimum 6" PVC SDR 26. Drainage grate inlets to be a minimum of 12" x 12" along main line pipe.	
26. If storm sewer pipes are proposed on drainage plan, all pipes shall be labeled indicating the proposed length, material and flowline elevations. All proposed storm sewer inlets or junction boxes must be labeled with top of grate elevations and flow line elevations of pipes connected to the box.	
27. All inlet grates for proposed area drains as part of the drainage system must be fully exposed and may not be buried under gravel, landscaping, artificial turf, etc.	
28. If drainage swales are proposed as part of the drainage system, swales shall be a minimum of 6-inch deep from high bank to flow line.	
29. No drainage shall go into an adjacent private drainage system without a drainage easement recorded at the Harris County Clerk's office. (No private agreements between homeowners sharing drainage will be allowed unless recorded at County Clerk Office and approved by the City).	
30. All drainage systems that require a sump pump system must include a sump detail with a properly sized overflow pipe to convey 2-year storm event. The pump system does not need to be of a size to pump the storm itself and the pumping system shall be sized so as to not negatively impact the City's existing storm system and/or infrastructure.	
31. The engineer is to provide a force main completely separate from an overflow line (i.e. the force main is not allowed to discharge into the overflow pipe at any point.).	
32. An erosion control system shall be required at the outfall of the force discharge (Concrete apron, rip rap, etc.).	

33. Drainage system must include a clean-out, inlet or junction box at every bend so as to provide access for maintenance; the only exception may be where roof drains tie into the main system.	
34. When the design calls for a system to discharge through an existing concrete curb. The plan submitted must include a curb cut and repair detail. This detail will include No. 4 rebars doweled in both vertically and horizontally to the exiting pavement and curb.	
35. Proposed tie-ins to existing storm sewers that have saddle inlets will not be allowed. The developer will replace the saddle inlet with a City of Houston Type A Inlet.	
36. Provide tie-in detail if using existing City inlet.	
37. French Drains are for landscape use only (i.e. flowerbeds) and not to be used in lieu of inlets in the permanent or temporary drainage plan.	
38. All drainage plans and as-built plans shall utilize the City Benchmark System. Please contact the City for information on the location and elevation of the closest benchmark. Please include the benchmark that was used for elevations on the submitted plan.	
39. Submitted plans shall be drawn to an engineer's scale and not to an architect's scale.	
40. All plans need to be oriented with North directed to the top or right of the page.	
41. If roof drains are to be tied into the drainage system they must be shown in the drainage plan.	
42. Roof drain tie-ins as a minimum shall be as follows: 1 per 4-inch drain line or 4 per 6-inch drain line. The design engineer shall determine the proper sizing as part of the permanent drainage plan.	
43. When building in the floodplain the surveyor or engineer must delineate the limits of the 500-year and 100-year floodplains and floodway as established by the <b>Effective</b> FEMA F.I.R.M. maps as per Harris County Flood Control District. 500-year and 100-year floodplain boundaries shall be based on the contour of the 500-year and 100-year flood elevations at the subject property.	
44. When building in the floodplain, plans must list the 500-year and 100-year flood elevations at the subject property as established by FEMA and Harris County Flood Control District.	
45. When building in the floodplain, plans must include cut and fill calculations to demonstrate no net fill within the 500-year floodplain below the 500-year flood elevation. <b>The Engineer must provide cross sections showing the existing natural ground elevations, proposed finished grade elevations, and proposed structures to verify the proposed cut and fill mitigation calculations.</b> Volume of proposed storm sewer pipes or drainage swales used for conveyance capacity for 2-year design storms may not also be used as cut volume for floodplain mitigation. <b>Volume of</b>	

<p>proposed pools on the property may not be used as cut volume for floodplain mitigation.</p>	
<p>46. Per City Code of Ordinances Section 34-95: Encroachments are prohibited, including fill, new construction, substantial improvements and other development within the adopted regulatory floodway unless it has been demonstrated through hydrologic and hydraulic analyses performed in accordance with standard engineering practice that the proposed encroachment would not result in any increase in flood levels within the community during the occurrence of the base flood discharge.</p>	
<p>47. Per City Code of Ordinances Section 34-122 – Limitation on lot fill for property:</p> <ul style="list-style-type: none"> <li>a) The height to which any point on the lot can be filled, other than the foundation, shall be limited to no more than the amount needed to create a maximum elevation equal to a one percent slope from the existing top of curb, edge of road (if no curb exists), existing high bank or property lines (whichever is closer to the development) from all sides. The only exceptions to this requirement are: <ul style="list-style-type: none"> <li>1. The building foundation.</li> <li>2. The driveway, within a 30-foot, 180-degree outward facing arch, established from the building line of the main vehicle entrance to the garage, if the following requirements are met: <ul style="list-style-type: none"> <li>a. A curb is provided on the driveway perimeter adjacent to the property line.</li> <li>b. The driveway must be spaced a minimum of three feet from the property line.</li> <li>c. A means to drain the area between the edge of the driveway and property line shall be provide in accordance with city drainage criteria.</li> </ul> </li> </ul> </li> <li>b) In no case shall more than 12 inches of fill be allowed on any lot, other than the exceptions provided for in subsection 34-122(a) above.</li> <li>c) Existing elevations which are higher than the calculated elevations are not required to be cut to meet the requirements of this section. The calculation only applies to additional fill above the existing ground elevation (pre-construction elevations).</li> <li>d) All fill used on property located inside the 500-year flood plain shall comply with zero net fill requirements that are established in article III of this chapter.</li> </ul>	
<p>48. Drainage Plans must be approved by Harris County Flood Control District (HCFCD) if the drainage system is proposed to discharge into a tributary of Buffalo Bayou.</p>	
<p>49. Plans must have all Memorial Villages Water Authority utilities show in the Right-of-Way</p>	

50. Drainage plans must be approved by Memorial Villages Water Authority (MVWA) prior to a building permit being issued to the builder for work performed in the right-of-way. Plans only entering the right-of-way to outfall into City facilities do not have to be approved by MVWA.	
51. Sump pumps proposed on temporary drainage plans must be completely installed and operable at the time of construction.	
52. Any excavation in the vicinity of trees 20 inches in diameter and above shall be completed by hand digging. Locations of hand digging around trees must be called out on the drainage plan.	
53. No drainage pipes shall be proposed within the drip-line of any trees that are either partially or completely located on an adjacent property.	
54. Drainage plans shall include a title block clearly indicating the engineering firm's contact information and scope of work (new house, house addition, new pool, etc.).	
55. Drainage plans must show all sanitary sewer clean outs on the property.	
56. Drainage plans must be submitted on paper with dimensions of either 22"X34" or 24"X36".	

***CITY OF PINEY POINT VILLAGE***  
**TEMPORARY DRAINAGE PLAN DURING CONSTRUCTION**

Address of Property: \_\_\_\_\_  
 Date: \_\_\_\_\_  
 Builder: \_\_\_\_\_  
 Builder's Contact Telephone Number: \_\_\_\_\_  
 Engineering Company: \_\_\_\_\_  
 Engineer: \_\_\_\_\_  
 Engineer's Contact Telephone Number: \_\_\_\_\_  
 Engineer's Mailing Address: \_\_\_\_\_  
 \_\_\_\_\_

**TEMPORARY DRAINAGE PLAN DURING CONSTRUCTION: PLAN REQUIREMENTS –**

1. The Temporary Drainage Plan shall demonstrate that positive drainage will occur on the lot.	
2. The Temporary Drainage Plan shall include all aspects of the anticipated development including but not limited to building foundation, patios, decks, swimming pools, drives, walks, landscaped areas, downspouts, drainage system, etc. The Drainage Plan shall show existing and finished grade elevations of all proposed paving and grading on the site and shall include existing and planned spot elevations at a maximum of twenty-five foot (25') spacing covering the lot, including shot on 25' spacing along the perimeter of the lot, grid across the lot, and along the perimeter of all structures (i.e., building slabs, sidewalks, patios, driveways, decks, etc.).	
3. If roadside ditches in the right-of-way are to be disturbed (i.e. removal of existing driveway culverts), proposed ditch flow line and top of bank elevations must be provided on the drainage plan at a maximum of 25-foot spacing.	
4. The topographical survey shall show the location and existing elevations of roadways, <b>all trees on the lot</b> , all easements, all landscaping, storm and sanitary sewers. Proposed removal of any existing trees must be indicated on the drainage plan.	
5. The topographical survey must also include features in the right-of-way in front of adjacent properties including ditch flow line and top of bank elevations and storm sewer elevations (driveway culvert flow lines, storm sewer flow lines, inlet top of grates).	
6. The Drainage Plan shall be prepared under the supervision of a Registered Professional Engineer of the State of Texas. The plans shall be sealed and signed by Engineer.	

7. When a Temporary Drainage Plan is to incorporate a retaining wall, a detail of the retaining wall will be required on the submitted plans.	
8. Drainage of the lot may be obtained by surface or sub-surface means, or a combination of the two, as is appropriate and necessary to insure that all runoff produced in a City of Houston 2 year storm will drain into the street, ditch, storm sewer system, or a recorded drainage easement.	
9. Engineer shall provide drainage area calculations using Atlas 14 rainfall data for a Harris County Region 2 2-Year storm event on the submitted plans. The runoff coefficient (C-value) used must be calculated using the following equation: $C = 0.6I_a + 0.2$ . ( $I_a$ = impervious area/total area) and must not be less than 0.40.	
10. All proposed drainage pipes shall be sloped to achieve a minimum velocity of 3ft/sec.	
11. Outfall flow line elevations and flow line of existing system shall be shown where proposed tie-in occurs.	
12. Culverts shall be able to convey a Harris County Region 2 2-year storm event using Atlas 14 rainfall data for all affected areas. The min. culvert size shall be 3.14 square feet (24-inch diameter) and shall be Reinforced Concrete.	
13. All driveway culverts shall have a minimum cover of 3-inches between top of pipe and bottom of pavement.	
14. Drainage of the lot may be obtained by surface or sub-surface means, or a combination of the two, as is appropriate and necessary to ensure that all runoff produced in a Harris County Region 2 2-year storm event using Atlas 14 rainfall data will drain into the street, ditch, storm sewer system, or a recorded drainage easement.	
15. No drainage shall go into an adjacent private drainage system without a drainage easement recorded at the Harris County Clerk's office. (No private agreements between homeowners sharing drainage will be allowed unless recorded at County Clerk Office).	
16. Submitted plans shall be drawn to an engineer's scale and not to an architect's scale.	
17. No elevation changes shall occur around the perimeter of the property. Plan shall show existing and proposed elevations on 25' spacing along the perimeter of the property.	
18. The Contractor shall be responsible for implementation, maintenance, and inspection of storm water pollution prevention measurements including, but not limited to, erosion and sediment controls (reinforced filter-fabric fencing), waste collection and disposal, off-site vehicle trucking, and other practices consistent with state and local regulations. Hay bales will not be allowed to be used as sediment control devices.	
19. The Temporary Drainage Plan shall show inlet protection around all existing and proposed inlets that will be in use during construction.	



20. The Temporary Drainage Plan must show a reinforced filter fabric fence detail with wire mesh reinforcement.	
21. All plans need to be oriented with North directed to the top or right of the page.	
22. Note on plan "Any areas of grass within the City's right of way which are disturbed or dug up during construction shall be replaced with St. Augustine or grass which matches the grass removed."	
23. Note on plan "Any damage to existing roads, driveways, sidewalks, or other appurtenances within the City's right of way shall be saw cut, removed and replaced with material equal to or superior to existing material, and be installed in a manner acceptable to the City".	
24. Note "The Contractor shall maintain drainage during construction as to not adversely impact adjacent / neighboring properties during a Harris County Region 2 2-year storm event using Atlas 14 rainfall data".	
25. Note "Reinforce Filter-Fabric Fences may not be taken down until the builder receives approval from the City".	
26. Note on plan "Any excavation in the drip-line of trees 20 inches in diameter and above must be completed by hand digging. No roots larger than 1 inch in diameter are permitted to be cut for construction of the drainage system."	
27. Note on plan "Roof drain tie-ins as a minimum shall be as follows: 1 per 4-inch drain line or 4 per 6-inch drain line. The design engineer shall determine the proper sizing as part of the permanent drainage plan."	
28. Note on plan "Proposed landscaping/planting areas along the perimeter of the property shall not impede storm water flow into and through swales or storm sewer inlets. No raised flower beds will be allowed along the perimeter of the property. No landscaping/planting will be permitted in proposed drainage swales."	
29. Note on plan "Pipe connections to inlets must be installed with a water-tight seal both on the outside face of inlet structure and the inside wall. It is recommended that inlet bottoms are grout filled to the proposed pipe flowlines to help facilitate flow conveyance."	
30. Note on plan "Proposed curb cuts and repairs must be inspected by drainage inspector prior to the concrete curb pour to ensure the cut and repair in the field matches the proposed detail shown on the drainage plan."	
31. Note on plan "If a drainage sump pump is proposed on the temporary drainage plan, the sump pump must be installed and operable to pass temporary drainage inspection."	
32. If storm sewer pipes are proposed in the temporary drainage plan, main pipes shall be minimum 6" PVC SDR 26. Drainage grate inlets to be a minimum of 12" x 12" along main line pipe.	
33. If storm sewer pipes are proposed on drainage plan, all pipes shall be labeled indicating the proposed length, material and flowline elevations. All proposed storm sewer inlets or junction boxes must be labeled with top of grate elevations and flow line elevations of pipes connected to the box.	

34. All inlet grates for proposed area drains as part of the drainage system must be fully exposed and may not be buried under gravel, landscaping, artificial turf, etc.	
35. If drainage swales are proposed as part of the drainage system, swales shall be a minimum of 6-inch deep from high bank to flow line.	
36. All temporary drainage systems that require a sump pump system must include a sump detail with a properly sized overflow pipe to convey 2-year storm event. The pump system does not need to be of a size to pump the storm itself and the pumping system shall be sized so as to not negatively impact the City's existing storm system and/or infrastructure.	
37. The engineer is to provide a force main completely separate from an overflow line (i.e. the force main is not allowed to discharge into the overflow pipe at any point.).	
38. An erosion control system shall be required at the outfall of the force discharge (Concrete apron, rip rap, etc.).	
39. Drainage system must include a clean-out, inlet or junction box at every bend so as to provide access for maintenance; the only exception may be where roof drains tie into the main system.	
40. When the design calls for a system to discharge through an existing concrete curb. The plan submitted must include a curb cut and repair detail. This detail will include No. 4 rebars doweled in both vertically and horizontally to the exiting pavement and curb.	
41. Proposed tie-ins to existing storm sewers that have saddle inlets will not be allowed. The developer will replace the saddle inlet with a City of Houston Type A Inlet.	
42. Provide tie-in detail if using existing City inlet.	
43. All drainage plans and as-built plans shall utilize the City Benchmark System. Please contact the City for information on the location and elevation of the closest benchmark. Please include the benchmark that was used for elevations on the submitted plan.	
44. When building in the floodplain the surveyor or engineer must delineate the limits of the 500-year and 100-year floodplains and floodway as established by the <b>Effective</b> FEMA F.I.R.M. maps as per Harris County Flood Control District. 500-year and 100-year floodplain boundaries shall be based on the contour of the 500-year and 100-year flood elevations at the subject property.	
45. When building in the floodplain, plans must list the 500-year and 100-year flood elevations at the subject property as established by FEMA and Harris County Flood Control District.	
46. When building in the floodplain, plans must include cut and fill calculations to demonstrate no net fill within the 500-year floodplain below the 500-year flood elevation. <b>The Engineer must provide cross sections showing the existing natural ground elevations, proposed finished grade elevations, and proposed structures to</b>	

<p>verify the proposed cut and fill mitigation calculations. Volume of proposed storm sewer pipes or drainage swales used for conveyance capacity for 2-year design storms may not also be used as cut volume for floodplain mitigation. Volume of proposed pools on the property may not be used as cut volume for floodplain mitigation.</p>	
<p>47. Per City Code of Ordinances Section 34-95: Encroachments are prohibited, including fill, new construction, substantial improvements and other development within the adopted regulatory floodway unless it has been demonstrated through hydrologic and hydraulic analyses performed in accordance with standard engineering practice that the proposed encroachment would not result in any increase in flood levels within the community during the occurrence of the base flood discharge.</p>	
<p>48. Per City Code of Ordinances Section 34-122 – Limitation on lot fill for property:</p> <ul style="list-style-type: none"> <li>a) The height to which any point on the lot can be filled, other than the foundation, shall be limited to no more than the amount needed to create a maximum elevation equal to a one percent slope from the existing top of curb, edge of road (if no curb exists), existing high bank or property lines (whichever is closer to the development) from all sides. The only exceptions to this requirement are: <ul style="list-style-type: none"> <li>1. The building foundation.</li> <li>2. The driveway, within a 30-foot, 180-degree outward facing arch, established from the building line of the main vehicle entrance to the garage, if the following requirements are met: <ul style="list-style-type: none"> <li>a. A curb is provided on the driveway perimeter adjacent to the property line.</li> <li>b. The driveway must be spaced a minimum of three feet from the property line.</li> <li>c. A means to drain the area between the edge of the driveway and property line shall be provide in accordance with city drainage criteria.</li> </ul> </li> </ul> </li> <li>b) In no case shall more than 12 inches of fill be allowed on any lot, other than the exceptions provided for in subsection 34-122(a) above.</li> <li>c) Existing elevations which are higher than the calculated elevations are not required to be cut to meet the requirements of this section. The calculation only applies to additional fill above the existing ground elevation (pre-construction elevations).</li> <li>d) All fill used on property located inside the 500-year flood plain shall comply with zero net fill requirements that are established in article III of this chapter.</li> </ul>	
<p>49. Drainage Plans must be approved by Harris County Flood Control District (HCFCD) if the drainage system is proposed to discharge into a tributary of Buffalo Bayou.</p>	
<p>50. Plans must have all Memorial Villages Water Authority utilities show in the Right-of-Way</p>	
<p>51. Drainage plans must be approved by Memorial Villages Water Authority (MVWA) prior to a building permit being issued to the builder for work performed in the right-of-way. Plans only entering the right-of-way to outfall into City facilities do not have</p>	

to be approved by MVWA.	
52. Sump pumps proposed on temporary drainage plans must be completely installed and operable at the time of construction.	
53. Any excavation in the vicinity of trees 20 inches in diameter and above shall be completed by hand digging. Locations of hand digging around trees must be called out on the drainage plan.	
54. No drainage pipes shall be proposed within the drip-line of any trees that are either partially or completely located on an adjacent property.	
55. Temporary Drainage Plans shall include a title block clearly indicating the engineering firm's contact information and scope of work (new house, house addition, new pool, etc.).	
56. Drainage plans must be submitted on paper with dimensions of either 22"X34" or 24"X36".	

***CITY OF PINEY POINT VILLAGE***  
**Partial Construction**

Address of Property: \_\_\_\_\_  
 Date: \_\_\_\_\_  
 Builder: \_\_\_\_\_  
 Builder's Contact Telephone Number: \_\_\_\_\_  
 Engineering Company: \_\_\_\_\_  
 Engineer: \_\_\_\_\_  
 Engineer's Contact Telephone Number: \_\_\_\_\_  
 Engineer's Mailing Address: \_\_\_\_\_  
 \_\_\_\_\_

**PARTIAL CONSTRUCTION DRAINAGE: PLAN REQUIREMENTS –**

1. A Temporary Drainage Plan during Construction shall be submitted, approved, and shall conform to guidelines for Temporary Drainage Plan (separate requirements not listed on this sheet). Plans <b>will not</b> be approved without an approved temporary plan.	
2. The Drainage Plan shall demonstrate that positive drainage will occur on the lot.	
3. The Drainage Plan shall include all aspects of the anticipated development including but not limited to building foundation, patios, decks, swimming pools, drives, walks, landscaped areas, downspouts, drainage system, etc. The Drainage Plan shall show existing and finished grade elevations of all proposed paving and grading on the site and shall include existing and planned spot elevations at a maximum of twenty-five foot (25') spacing covering the lot, including shots on 25' spacing along the perimeter of the lot, grid across the lot, and along the perimeter of all structures (i.e., building slabs, sidewalks, patios, driveways, decks, etc.).	
4. If roadside ditches in the right-of-way are to be disturbed (i.e. removal of existing driveway culverts), proposed ditch flow line and top of bank elevations must be provided on the drainage plan at a maximum of 25-foot spacing.	
5. The topographical survey shall show the location and existing elevations of roadways, <b>all trees on the lot</b> , all easements, all landscaping, storm and sanitary sewers. Proposed removal of any existing trees must be indicated on the drainage plan.	
6. The topographical survey must also include features in the right-of-way in front of adjacent properties including ditch flow line and top of bank elevations and storm sewer elevations (driveway culvert flow lines, storm sewer flow lines, inlet top of grates).	

7. The Drainage Plan shall be prepared under the supervision of a Registered Professional Engineer of the State of Texas. The plans shall be sealed and signed by Engineer.	
8. When a Drainage plan is to incorporate a retaining wall, a detail of the retaining wall will be required on the submitted plans.	
9. All driveways must be a minimum of 3-feet from the property line at the side yard to allow for drainage or grading.	
10. Engineer shall provide drainage area calculations using Atlas 14 rainfall data for a Harris County Region 2 2-Year storm event on the submitted plans. The runoff coefficient (C-value) used must be calculated using the following equation: $C = 0.6I_a + 0.2$ . ( $I_a$ = impervious area/total area) and must not be less than 0.40.	
11. All proposed drainage pipes shall be sloped to achieve a minimum velocity of 3ft/sec.	
12. No elevation changes shall occur around the perimeter of the property. Plan shall show existing and proposed elevations on 25' spacing along the perimeter of the property.	
13. Outfall flow line elevations and flow line of existing system shall be shown where proposed tie-in occurs.	
14. Culverts shall be able to convey a Harris County Region 2 2-year storm event using Atlas 14 rainfall data for all affected areas. The min. culvert size shall be 3.14 square feet (24-inch diameter) and shall be Reinforced Concrete.	
15. All driveway culverts shall have a minimum cover of 3-inches between top of pipe and bottom of pavement.	
16. Drainage of the lot may be obtained by surface or sub-surface means, or a combination of the two, as is appropriate and necessary to ensure that all runoff produced in a Harris County Region 2 2-year storm event using Atlas 14 rainfall data will drain into the street, ditch, storm sewer system, or a recorded drainage easement.	
17. The Contractor shall be responsible for implementation, maintenance, and inspection of storm water pollution prevention measurements including, but not limited to, erosion and sediment controls (reinforced filter-fabric fencing), waste collection and disposal, off-site vehicle trucking, and other practices consistent with state and local regulations. Hay bales will not be allowed to be used as sediment control devices.	
18. Note on plan "Any areas of grass within the City's right of way which are disturbed or dug up during construction shall be replaced with St. Augustine or grass which matches the grass removed."	

19. Note on plan "Any damage to existing roads, driveways, sidewalks, or other appurtenances within the City's right of way shall be saw cut, removed and replaced with material equal to or superior to existing material, and be installed in a manner acceptable to the City".	
20. Note "The Contractor shall maintain drainage during construction as to not adversely impact adjacent / neighboring properties during a Harris County Region 2 2-year storm event using Atlas 14 rainfall data".	
21. Note "Reinforced Filter-Fabric Fences may not be taken down until the builder receives approval from the City".	
22. Note "Any revisions to the originally approved drainage plans must be submitted to the City by the builder's Engineer that provided the original approved drainage plans. Resubmitted plans must be signed and sealed by the builder's Engineer".	
23. Note on plan "Any excavation in the drip-line of trees 20 inches in diameter and above must be completed by hand digging. No roots larger than 1 inch in diameter are permitted to be cut for construction of the drainage system."	
24. Note on plan "Roof drain tie-ins as a minimum shall be as follows: 1 per 4-inch drain line or 4 per 6-inch drain line. The design engineer shall determine the proper sizing as part of the permanent drainage plan."	
25. Note on plan "Proposed landscaping/planting areas along the perimeter of the property shall not impede storm water flow into and through swales or storm sewer inlets. No raised flower beds will be allowed along the perimeter of the property. No landscaping/planting will be permitted in proposed drainage swales."	
26. Note on plan "Pipe connections to inlets must be installed with a water-tight seal both on the outside face of inlet structure and the inside wall. It is recommended that inlet bottoms are grout filled to the proposed pipe flowlines to help facilitate flow conveyance."	
27. Note on plan "Proposed curb cuts and repairs must be inspected by drainage inspector prior to the concrete curb pour to ensure the cut and repair in the field matches the proposed detail shown on the drainage plan."	
28. Note on plan "If a drainage sump pump is proposed on the temporary drainage plan, the sump pump must be installed and operable to pass temporary drainage inspection."	
29. If storm sewer pipes are proposed in drainage plan, main pipes shall be minimum 6" PVC SDR 26. Drainage grate inlets to be a minimum of 12" x 12" along main line pipe.	
30. If storm sewer pipes are proposed on drainage plan, all pipes shall be labeled indicating the proposed length, material and flowline elevations. All proposed storm sewer inlets or junction boxes must be labeled with top of grate elevations and flow line elevations of pipes connected to the box.	
31. All inlet grates for proposed area drains as part of the drainage system must be fully exposed and may not be buried under gravel, landscaping, artificial turf, etc.	
32. If drainage swales are proposed as part of the drainage system, swales shall be a minimum of 6-inch deep from high bank to flow line.	

33. No drainage shall go into an adjacent private drainage system without a drainage easement recorded at the Harris County Clerk's office. (No private agreements between homeowners sharing drainage will be allowed unless recorded at County Clerk Office and approved by the City).	
34. All drainage systems that require a sump pump system must include a sump detail with a properly sized overflow pipe to convey 2-year storm event. The pump system does not need to be of a size to pump the storm itself and the pumping system shall be sized so as to not negatively impact the City's existing storm system and/or infrastructure.	
35. The engineer is to provide a force main completely separate from an overflow line (i.e. the force main is not allowed to discharge into the overflow pipe at any point.).	
36. An erosion control system shall be required at the outfall of the force discharge (Concrete apron, rip rap, etc.).	
37. Drainage system must include a clean-out, inlet or junction box at every bend so as to provide access for maintenance; the only exception may be where roof drains tie into the main system.	
38. When the design calls for a system to discharge through an existing concrete curb. The plan submitted must include a curb cut and repair detail. This detail will include No. 4 rebars doweled in both vertically and horizontally to the exiting pavement and curb.	
39. Proposed tie-ins to existing storm sewers that have saddle inlets will not be allowed. The developer will replace the saddle inlet with a City of Houston Type A Inlet.	
40. Provide tie-in detail if using existing City inlet.	
41. French Drains are for landscape use only (i.e. flowerbeds) and not to be used in lieu of inlets in the permanent or temporary drainage plan.	
42. All drainage plans and as-built plans shall utilize the City Benchmark System. Please contact the City for information on the location and elevation of the closest benchmark. Please include the benchmark that was used for elevations on the submitted plan.	
43. Submitted plans shall be drawn to an engineer's scale and not to an architect's scale.	
44. All plans need to be oriented with North directed to the top or right of the page.	
45. If roof drains are to be tied into the drainage system they must be shown in the drainage plan.	
46. Roof drain tie-ins as a minimum shall be as follows: 1 per 4-inch drain line or 4 per 6-inch drain line. The design engineer shall determine the proper sizing as part of the permanent drainage plan.	



<p>47. When building in the floodplain the surveyor or engineer must delineate the limits of the 500-year and 100-year floodplains and floodway as established by the Effective FEMA F.I.R.M. maps as per Harris County Flood Control District. 500-year and 100-year floodplain boundaries shall be based on the contour of the 500-year and 100-year flood elevations at the subject property.</p>	
<p>48. When building in the floodplain, plans must list the 500-year and 100-year flood elevations at the subject property as established by FEMA and Harris County Flood Control District.</p>	
<p>49. When building in the 500-year floodplain, plans must include a certificate of elevation.</p>	
<p>50. When building in the floodplain, plans must include cut and fill calculations to demonstrate no net fill within the 500-year floodplain below the 500-year flood elevation. The Engineer must provide cross sections showing the existing natural ground elevations, proposed finished grade elevations, and proposed structures to verify the proposed cut and fill mitigation calculations. Volume of proposed storm sewer pipes or drainage swales used for conveyance capacity for 2-year design storms may not also be used as cut volume for floodplain mitigation. Volume of proposed pools on the property may not be used as cut volume for floodplain mitigation.</p>	
<p>51. Per City Code of Ordinances Section 34-95: Encroachments are prohibited, including fill, new construction, substantial improvements and other development within the adopted regulatory floodway unless it has been demonstrated through hydrologic and hydraulic analyses performed in accordance with standard engineering practice that the proposed encroachment would not result in any increase in flood levels within the community during the occurrence of the base flood discharge.</p>	
<p>52. Per City Code of Ordinances Section 34-122 – Limitation on lot fill for property:</p> <ol style="list-style-type: none"> <li>a) The height to which any point on the lot can be filled, other than the foundation, shall be limited to no more than the amount needed to create a maximum elevation equal to a one percent slope from the existing top of curb, edge of road (if no curb exists), existing high bank or property lines (whichever is closer to the development) from all sides. The only exceptions to this requirement are: <ol style="list-style-type: none"> <li>1. The building foundation.</li> <li>2. The driveway, within a 30-foot, 180-degree outward facing arch, established from the building line of the main vehicle entrance to the garage, if the following requirements are met: <ol style="list-style-type: none"> <li>a. A curb is provided on the driveway perimeter adjacent to the property line.</li> <li>b. The driveway must be spaced a minimum of three feet from the property line.</li> <li>c. A means to drain the area between the edge of the driveway and</li> </ol> </li> </ol> </li> </ol>	

<p>property line shall be provide in accordance with city drainage criteria.</p> <p>b) In no case shall more than 12 inches of fill be allowed on any lot, other than the exceptions provided for in subsection 34-122(a) above.</p> <p>c) Existing elevations which are higher than the calculated elevations are not required to be cut to meet the requirements of this section. The calculation only applies to additional fill above the existing ground elevation (pre-construction elevations).</p> <p>d) All fill used on property located inside the 500-year flood plain shall comply with zero net fill requirements that are established in article III of this chapter.</p>	
<p>53. Drainage Plans must be approved by Harris County Flood Control District (HCFCD) if the drainage system is proposed to discharge into a tributary of Buffalo Bayou.</p>	
<p>54. Plans must have all Memorial Villages Water Authority utilities show in the Right-of-Way</p>	
<p>55. Drainage plans must be approved by Memorial Villages Water Authority (MVWA) prior to a building permit being issued to the builder for work performed in the right-of-way. Plans only entering the right-of-way to outfall into City facilities do not have to be approved by MVWA.</p>	
<p>56. Sump pumps proposed on temporary drainage plans must be completely installed and operable at the time of construction.</p>	
<p>57. Any excavation in the vicinity of trees 20 inches in diameter and above shall be completed by hand digging. Locations of hand digging around trees must be called out on the drainage plan.</p>	
<p>58. No drainage pipes shall be proposed within the drip-line of any trees that are either partially or completely located on an adjacent property.</p>	
<p>59. Drainage plans shall include a title block clearly indicating the engineering firm's contact information and scope of work (new house, house addition, new pool, etc.).</p>	
<p>60. Drainage plans must show all sanitary sewer clean outs on the property.</p>	
<p>61. Drainage plans must be submitted on paper with dimensions of either 22"X34" or 24"X36".</p>	