



**Brookshire-Katy
Drainage District
(BKDD)**

***Most Common Review
Comments***

***"How to Expedite Your Permit Review
& Approval"***

OVERVIEW & PURPOSE

This document informs applicants of our reviewers' most common review comments.

By carefully reviewing this document during the design process before the submittal, applicants can address many of the typical comments from the start, reducing the number of re-submittals and speeding up the permit review and approval process – our ultimate goal.

Moreover, applicants should review the Brookshire-Katy Drainage District (District) latest Rules and Regulations and all relevant information/ guidelines (found on the District's website under permit application and engineering documents) before submitting a package for review.

TABLE OF CONTENTS

1.	TOP PLAT COMMENTS	3
2.	TOP DRAINAGE PLAN COMMENTS	4
2.1.	General	4
2.2.	Drainage Area Maps	5
2.3.	Extreme Event.....	5
2.4.	Drainage - Backup Calculations.....	6
2.5.	Detention.....	7



1. TOP PLAT COMMENTS

1. Please review the BKDD website and ensure you are **using the latest signature block** for the Plat.
2. On Title, include Project Name, acreage, lots, reserves, blocks.
3. All existing and proposed **drainage easements and fee strips** should be delineated, called out, and recording information provided (deed recording vol. and page, clerk's file number, the grantee (e.g., BKDD, Harris County, TxDOT, City, Public, etc.), type (e.g., easement or fee strip)). If proposing drainage easements to BKDD, they should be called out on plans as "dedicated to Brookshire-Katy Drainage District via plat (or separate instrument)."
4. Also, a storm sewer/ drainage facility located within a **reserve** must be designated for drainage purposes, or a storm sewer easement must be provided. Please ID the specific use of the restricted reserve – see the sample below.
5. Neighboring properties (or lot and block number if a platted subdivision) and drainage facilities should be labeled, and recording information should be included.
6. If a floodplain is on the property, provide/label all floodplain boundaries on plans.
7. (if applicable) Provide LOMR document exhibits.
8. Add a note stating pipelines are/are not located within the boundaries of the Plat.
9. Name, address, and phone number of the surveyor that prepared the Plat and of the owner.
10. Add Surveyor certification signature block.

RESERVE "A"
RESTRICTED TO
STORM DRAINAGE
AND POND USE
7.532 ACRES



2. TOP DRAINAGE PLAN COMMENTS

2.1. General

2.1.1. Please review the BKDD website and ensure you are using the latest BKDD notes, standard construction details, and drainage/detention summary tables.

2.1.2. Fill adjacent to neighboring landowners & Interceptor Swales

- In areas where the proposed Development incorporates fill adjacent to neighboring landowners, fill material shall **NOT** be placed closer than ten (10) feet from the property lines unless agreed to in writing by the adjoining landowners.
- Furthermore, the Engineer shall implement grading and/ or perimeter runoff catchment devices (i.e., perimeter swales/ditches between the fill and property line) within its property to ensure that adjacent property parcels bordering the project site do not experience drainage flows that exceed pre-development conditions for storm events up to and including the ATLAS-14 100-year storm event. It is the liability and responsibility of the proposed Development to comply with Texas Water Code 11.086.
- The Engineer shall also provide a cross-section at every property line boundary. These cross-sections shall include the property lines, interceptor swale(s), the existing and proposed grades of the site, and adjacent properties.
- Ultimately, the Engineer must provide enough detail to prove that adjacent properties will have no adverse impacts.

2.1.3. If encroaching or crossing a pipeline easement, provide an encroachment agreement from the pipeline company before BKDD approval.

2.1.4. If applicable - Provide a letter from the District engineer certifying available detention and outfall capacity for the proposed Development.

2.1.5. Clearly show/ label existing and proposed Development. The proposed Development needs to be a darker line, and the existing needs to be lighter; if needed, add callouts to identify what is existing and proposed.

2.1.6. All existing and proposed **drainage easements and fee strips** should be delineated, called out, and recording information provided (deed recording vol. and page, clerk's file number, the grantee (i.e., BKDD, Harris County, TxDOT, City, Public, etc.), type (e.g., easement or fee strip)). If proposing drainage easements to BKDD, they should be called out on plans as "dedicated to Brookshire-Katy Drainage District via plat (or separate instrument)."

2.1.7. If discharging flow or proposing a driveway to a TxDOT road, a copy of the approved permit must be included with the plan review submittal. The first plan submittal will be reviewed without the permit. However, the second submittal will not be reviewed until a copy of the permit (access and discharge) is provided.



2.2. Drainage Area Maps

- 2.2.1. Are you proposing to place fill within the floodplain? If yes, provide cut/fill data to verify floodplain mitigation. You will need to coordinate with the applicable floodplain administrator for more information on a floodplain permit.
- 2.2.2. If there is a floodplain on the property, provide/ label all floodplain boundaries on plans.
- 2.2.3. Provide LOMR document exhibits.
- 2.2.4. Contours or spot elevations should be provided a minimum of 50' beyond the tract boundary to verify if there are off-site flows that need to be accounted for in your design.
- 2.2.5. The grading plan should provide adequate contours, spot elevation, and topographic information to verify and confirm overland sheet flows (off-site and on-site) through the proposed Development. If there are off-site flows, the drainage calculation should account for these flows accordingly.
- 2.2.6. A separate drainage service area map should be provided and include, at minimum, the following: 1) Delineate **existing and proposed (2-yr and 100-yr)** drainage areas (acres), including **offsite** contributing areas, 2) Overland and Extreme Event sheet flow direction arrows, 3) Provide callout that corresponds to the hydraulic calculation and includes the cumulative drainage area and flow (cfs) - be sure the legend states the cumulative is either the design event (2-yr) or the 100yr event runoff., 4) Location and labels for existing and proposed drainage/detention facilities (storm sewer, inlets, swales, pond, outfall, etc.).
- 2.2.7. No off-site sheet flow is allowed to adjacent properties; we need to show how the property will drain and demonstrate that drainage is not going on adjacent properties.

2.3. Extreme Event

- 2.3.1. How will the extreme event within your Development reach the regional pond or on-site detention basin (i.e., **emergency overflow swale**)? Show the location and details (cross-section, elevations, backup calculations, etc.) on the plan set.
- 2.3.2. The detention basin shall have a gravity **emergency spillway or overflow weir** in addition to the pipe outlet to protect structures from flooding in the event the capacity of the basin is exceeded.
- Emergency spillways should be graded to drain from the pond with a preferred slope of 1%.
 - If the spillway is not immediately adjacent to a receiving stream, obtain a flowage easement to provide a clear path for conveyance without affecting adjacent property owners.
- 2.3.3. Provide sizing calculations and details for **emergency overflow swale, spillway, or overflow weir**. They must be sized to convey 100-yr peak flow.



2.4. Drainage - Backup Calculations

- 2.4.1. Provide e, b, and d values used in rainfall intensity calculation used to design storm sewer and detention facilities. Confirm Atlas-14 coefficients from BKDD rules are being used in calculations.
- 2.4.2. Did you include a 1.25 frequency factor, C_f , for 100-yr calculations?
- 2.4.3. When using a **weighted C value**, provide backup calculations on how the weighted C was determined.
- 2.4.4. Provide formulas for the time of concentration and rainfall intensity.
- 2.4.5. Time of Concentration (T_c) - Provide calculations for T_c . Show the flow paths on existing and proposed drainage area maps.
- 2.4.6. Ensure that the hydraulic calculation clearly references the area/junctions on the drainage maps for easier review.
- 2.4.7. Starting HGLs (Tail Water) must be called out, and a note must be provided on plans on how it was determined. For unknown situations, please reference the table below. However, if the HGL at the connection point is known, please use whichever is higher.

Starting Water Surface Elevation and Hydraulic Gradient - Summary Table

If the outflow is into:	The hydraulic gradient shall be calculated using the following:	
	2-yr*	100-yr
Storm Sewer	Top of the outlet pipe, assuming pipes are connected at the soffit. If pipes are connected at the flow line, the top of the larger receiving pipe must be used. If a starting tailwater other than the top of the pipe is chosen, the consultant shall analyze the storm system from outfall at the receiving channel upstream to the point of interconnect to demonstrate the alternate starting HGL value.	2 feet above the top of the outlet pipe. If a starting tailwater other than 2 feet above the top of the pipe is chosen, the consultant shall analyze the storm system from outfall at the receiving channel upstream to the point of interconnect to demonstrate the alternate starting HGL value.
Roadside Ditch	Free outfall	Top of the outlet pipe
Channel	Free outfall	Top of the outlet pipe
Storm Sewer outfall to Detention Pond	Top of the outlet pipe	25-yr Pond water surface elevation (WSE)

* For the design storm, the hydraulic gradient shall at all times be below the gutter line



- 2.4.8. Hydraulic calculations should show that the HGL for the 2-yr storm is contained within the pipes. Provide grate/rim elevation data to verify the HGL is within the pipe system.
- 2.4.9. Hydraulic calculations should show that the HGL for the 100-yr storm is contained within site and does not exceed 1 ft above the top-of-curb. Provide top-of-curb elevation data to verify the HGL meets this requirement. If proposing a cascading effect down a street (evident by higher HGLs), provide calculation checks to justify. Recommend using the COH method.
- 2.4.10. Provide sizing calculations and detail for the restrictor/ outfall and compare/ tabulate with the maximum allowable discharge for each required storm.

2.5. Detention

- 2.5.1. If proposing detention/ retention ponds, a Detention Facilities Maintenance Agreement (DFMA) between the owner and District will be required. Please refer to the District website and contact the District Legal Counsel at: bkddlegal@johnsonpetrov.com for all details and required information.
- 2.5.2. Detention is based on the developed area; this includes any area where the land is being disturbed.
- 2.5.3. Swales that are used for detention must have a maintenance berm (MB).
- 2.5.4. Revise maintenance berm width. Refer to BKDD rules. Maintenance berm for detention basin/swale less than 2 feet deep can be 10 feet; anything deeper than 2 feet must have a MB of 20 feet.
- 2.5.5. Backslope swales and interceptor structures should be placed around the pond, within the berm, to capture the runoff and to prevent erosion of the bank's top.
- 2.5.6. Berms should grade to drain either away or towards the pond. A typical berm slope of 2% is preferred. Ponds greater than 6' deep should drain away from the pond. Ponds less than 6 feet deep will be allowed to drain towards the pond.
- 2.5.7. Provide detention pond X-section. Include (if applicable) TOB, TOE, pipe elevations, side slope, bottom slope, traverse slope, 2-,10-,25-,100-yr WSE, pumped/gravity elevations, and mitigation/detention elevations.
- 2.5.8. Label the pond top of bank, toe, and bottom, and call out elevations.
- 2.5.9. It is recommended that if the Development includes a detention facility, the geotechnical report provides recommendations for the design of the facility (i.e., short/long term drawdowns, slope stability, water table depths, the use of in-situ materials such as clay liner for wet ponds, etc.). A boring should be within the proposed detention site and a minimum of 10' below the proposed elevation.



2.5.10. Given your pond design of a 3:1 side slope (or greater than 6 ft in depth with wet bottom), please provide a Geotech report for our reference that includes an analysis of the detention pond. The report should analyze the side slopes for long and short-term drawdowns and slope stability since a 3:1 side slope is proposed. Borings for the report are recommended to be taken a minimum of 10' below the toe elevation of the pond.

2.5.11. Gate valves are not allowed on outfall pipes.

2.5.12. For pumped detention ponds, max allowable pump is 50% of the detention capacity.

2.5.13. If detention is pumped, provide pump curves and calculations for head loss through the system to verify pump size.

2.5.14. Please review the BKDD website and ensure you include the latest **Standard Construction Details** and all required **Detention Information and Summary** tables.

