



PDS

Planning and Development
Services of Kenton County

DATE: August 25, 2026
TO: Kenton County Planning Commission Members
FROM: Steven J. Neltner, PE, Director of Infrastructure Engineering
SUBJECT: Proposed Subdivision Regulation Edits for the September 3, 2026 Meeting

Enclosed herein, please find the proposed edits to the Kenton County Subdivision Regulations. These edits have been developed, reviewed, and approved by the Kenton County Planning Commission's Subdivision Regulations Committee and discussed during the KCPC public hearing on August 6, 2026.

PDS and the Subdivision Regulations Committee are recommending approximately 14 changes across 10 sections and details of the Kenton County Subdivision Regulations. A breakdown of each edit, along with the proposed changes, is attached to this memo for review. Highlighted in yellow and underlined text is proposed to be added to the Regulations. Highlighted in grey and ~~striketrough~~ is proposed to be deleted from the Regulations.

The proposed changes affect the following sections of the Kenton County Subdivision Regulations: 4.3-2, 4.6-2, 4.6-3, 4.7-2, 4.7-5, and 6.2-7, as well as Appendix A, Details 2, 3, 16, and 23.

The Committee met with PDS throughout Spring and Summer 2026 to discuss the proposed edits and considers them a positive improvement to the regulations. Staff will be prepared to address your comments and/or questions regarding the proposed revisions. If you need additional information prior to that time, please do not hesitate to contact me by telephone at (859) 392-7067 or by email at SNeltner@pdskc.org.

CC: KCPC Members
Mr. Matt Smith, KCPC Attorney

Proposed Subdivision Regulation Revisions — KCPC Meeting August 6, 2026

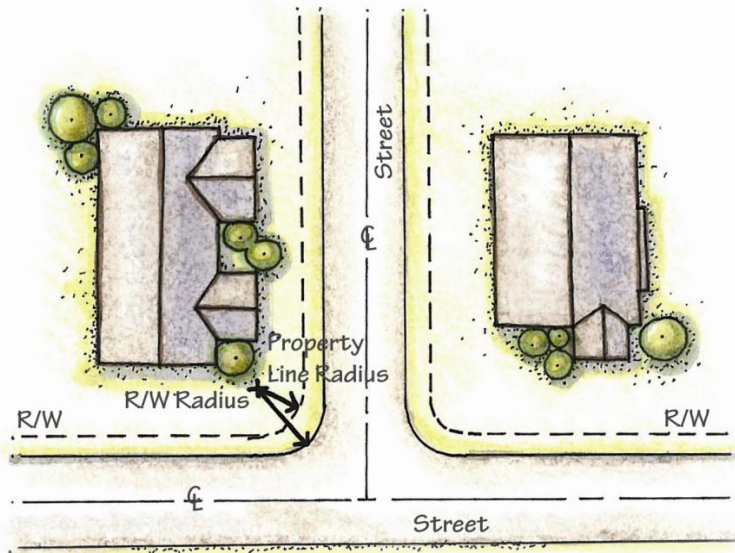
Section # in Regulations	Current Language	Proposed Change	Reason / Notes
#1 Sec. 4.6-2(11) Cold Weather Requirements	Cold weather requirements appear only in the street pavement section (4.6-2).	Move requirements to Sec. 4.6-1(I.) General Requirements. (See pp.3 & 6 proposed edits)	Cold weather requirements apply to all concrete work. Moving to General Requirements ensures they are not overlooked for curb & gutter pours and sidewalks.
#2 & #3 Sec. 4.6-2(C) Street Pavement Requirements	3 cylinders per day's pour; 1 tested at 7 days, 2 tested at 28 days.	5 cylinders per day's pour; 1 tested at 7 days, 3 tested at 28 days + 1 hold cylinder. (See p.4 proposed edits)	Aligns ACI 318 / ASTM C172. Industry standard and ACI for mix used in Sub Regs, testing company making 4"x8" cylinder sizes (not 6"x12"). 1 x 7-day, 3 x 28-day, 1 hold is standard for the 4x8 cylinders.
#4 & #5 Sec. 4.6-3(G) Curb & Gutter (Asphalt Streets)	3 cylinders per day's pour; 2 tested at 28 days.	5 cylinders per day's pour; 3 tested at 28 days + 1 hold cylinders. (See p.9 proposed edits)	Mirrors edit #1 & #2 — creates consistent ACI 318 testing standard across all concrete pours including curb & gutter.
#6 Sec. 6.2-7(C) Proofroll	Dual-axle dump truck, fully loaded with clayey soils or aggregate.	Tri-axle dump truck, fully loaded with clayey soils or aggregate; load must weigh a minimum of 18 tons. (See p.14 proposed edits)	Upgrades vehicle requirement to tri-axle for greater load and what is being used in the field. Minimum 18-ton threshold added to establish a clear, enforceable standard.
#7 Fig. A.1-B Detail #2 Deep Trench	#57 stone with compacted earth placed directly over top — no geotextile fabric specified.	Non-woven geotextile fabric placed between #57 stone and backfill material. (See p.15 proposed edits)	Fabric prevents migration of fines into stone, preserving drainage performance and trench integrity over time.
#8 Fig. A.1-B Detail #2 Trench Backfill under Pavement	Title reads: "Proposed Street Cross Section at Paired Catch Basin Crossing"	Revised to: "Proposed Street Cross Section at Paired Drainage Structures under the Street" (See p.15 proposed edits)	Title update reflects broader applicability — detail applies to all drainage structures under the street, not only catch basins.
#9 Sec. 4.3-2 Storm Water Drainage System	No minimum cover depth specified for pipes installed under a public street.	All pipes require minimum 3 ft of cover from top of pipe to final surface. (See p.1 and 15 proposed edits)	Establishes a clear minimum to protect pipes from load damage and prevent premature failure under street pavement.
#10 Fig. A.1-R Detail 16 Curb Inlet — Asphalt Blockout	Expansion material not shown against box culvert in curb inlet detail drawing.	Expansion material placed directly against curb inlet — concrete contact shown in detail. (See p.18 proposed edits)	Corrects detail to reflect proper construction practice at concrete-to-metal at curb inlet.
#11 Detail #3 / Detail #23 Concrete Street Edge Drain	No sand specified around edge drain in concrete street detail.	Sand installed above and around edge drain per updated detail. (See pp.16 & 19 proposed edits)	Sand bedding improves drainage flow into edge drain and aligns with the other details for the edge drain
#12, 13 & 14 Sec. 4.7-5 Asphalt Thickness & Tacking	Base (1"): 3–5" / Intermediate (0.75"): 2.25–4.5" / Tack: 0.05 gal/sq yd — no type distinction or seasonal restriction.	Base: 3–4.5" / Intermediate: 2.25–3.5" / Non-tracking: 0.08 gal/sq yd / Hot tack: 0.10 gal/sq yd; min 40°F road temp. (See pp.11 & 12 proposed edits)	Aligns PDS thicknesses and tack coat rates with current KYTC standards. Seasonal temp restriction addresses application failures in cold weather.

Proposed Subdivision Regulation Revisions — KCPC Meeting August 6, 2026

Subdivision Regulation vs. KYTC — Asphalt Specification Comparison Items 12-14 above (items in blue differ from KYTC standard)

Category	Item	Current PDS Sub Regs	KYTC Standard
Thickness	Base (1.00")	3–5"	3.00–4.50"
	Intermediate (0.75")	2 1/4–4 1/2"	2.25–3.50"
Tack coat	Non-tracking rate	Coverage rate - 0.05 gal/sq yd	Coverage rate - 0.08 gal/sq yd
	Hot tack rate	Not specified	Coverage rate - 0.10 gal/sq yd
	Non-tracking conditions	Not specified	Min 40°F road temp
RAP content	Hot tack conditions	Not specified	Conform to asphalt mixture limitations
	Surface max	25%	0–20%
	Base max	30%	0–20%; up to 30% with anti-stripping agent
	RAP + RAS combined	Allowed	RAS is Not permitted (was allowed in 2012 KYTC manual) RAS – recycled asphalt shingles
Laying temp	Out of truck	200–330°F	210–330°F

Figure 4.2-E: Illustration of property line location at Street intersections



4.2-15 Public Sites

Where a proposed park, recreational area, open space, school site, or other public uses identified in the Comprehensive Plan is located in whole or in part within a proposed Subdivision, Staff may require a reservation for the purchase of such ground by an applicable public body not to exceed two years as a condition precedent to Preliminary Plat approval.

Section 4.3: Public Utilities

4.3-1 Purpose

This chapter fulfills the infrastructure requirements of Kentucky Revised Statutes (KRS) 100.273 through 100.292. These public utility standards assure a necessary component of harmonious, progressive, and aesthetically-pleasing development is addressed. They contribute to healthy and dynamic neighborhoods where residents can live, work, shop, and play. Furthermore, they promote the health, safety, and general welfare of the public in Kenton County. To further these more general purposes, this section:

- A. Establishes the adequacy of existing and proposed stormwater, wastewater and water supply facilities as a factor to be considered when reviewing proposed Subdivisions;
- B. Sets forth minimum standards for stormwater Drainage systems, sanitary sewer and water systems, and the extent to which they shall be provided;
- C. Ensures that new Lots are provided access to essential public utilities when they are available; and
- D. Promotes the ability of fire departments to fight fires by requiring minimum fire flows and adequate provision of fire hydrants.

4.3-2 Storm Water Drainage Systems

All storm water Drainage systems shall comply with the Northern Kentucky Regional Storm Water Management Program Rules and Regulations of the local jurisdiction having stormwater management authority.

- A. The local jurisdiction having stormwater management authority shall perform the plan review of the storm water Drainage system(s) and issue the appropriate permit(s) for any development that disturbs one acre of land or greater, or for disturbances of less than one acre when that disturbance is part of a larger overall development.
- B. Development that does not disturb one acre of land or greater will be subject to the requirement of plan reviews and/or permits through these regulations and/or the applicable zoning ordinance.
- C. Any proposed Subdivision that requires submission of a grading plan or improvement drawing to Staff shall receive grading plan or improvement drawing approval prior to the commencement of any earth moving operations.

- b. There shall be no reduction in thickness for Concrete pavements below those shown in Table 4.4-2: Required Subdivision Street Thicknesses.
- c. Alternative pavement designs shall not be permitted for:
 - i. in situ soils with CBR values greater than 3;
 - ii. undercut and replaced subgrade soils; or
 - iii. crushed stone base and geotextile/geogrid subgrade improvements.

D. All pipes under any roadway shall have at least 3' of cover from top of the pipe to final surface of the public roadway (See Figure A.1-B Detail#2)

[Ord. # [PC2104-0004](#), Adding street thickness parameters for Light Commercial Pavement. Changes the name of Commercial/Industrial pavement to Heavy Commercial/Industrial.]

4.4-3 Pavement and Pavement Drainage Construction Details

[Appendix A: Standard Construction Drawings](#) contains important construction details that are a part of these specifications for the pavement, pavement [Drainage](#) system, and other utility construction within the Right of Way that can impact pavement performance. Proper construction execution of the details in [Appendix A: Standard Construction Drawings](#) is important to good pavement performance. For discussion of the background of the reasoning behind these details, see [Appendix C: Engineers Committee Final Report](#).

Section 4.5: Use of Aggregates Within the Right-of-way

4.5-1 Aggregate Specifications

Table 4.5-1 indicates the specifications for the various aggregate types and their uses in improvement construction within the [Street Right-of-way](#). All aggregates must pass all [KYTC](#) aggregate requirements for their intended use as set out in Section 800 of the KYTC Standard Specifications for Road and Bridge Construction, latest edition.

Table 4.5-1: Aggregate Specification Table	
KYTC Specification	Use Within Right-of-way
Pipe Bedding Sand	Bed and cover for deep sanitary sewer and storm sewer
Concrete Sand	Concrete mix and bed and cover for waterline and power and communication utilities
DGA	Backfill for waterline and power and communication utilities under the Street
No. 57 Crushed Limestone	Concrete pavement aggregate and catch basins crossover construction
No. 57 Gravel	Allowable aggregate for all Concrete not used in Concrete pavement and Concrete Curb and gutter
No. 8 Gravel	Allowable aggregate for all Concrete
No. 467 Crushed Limestone	Required aggregate for Concrete pavements
Crushed Stone Base	Base material for Asphalt pavements with stone base
Asphalt Aggregates See Table 4.7-1 in 4.7-2, Mixture Designation and Design	Asphalt pavement aggregate must meet requirements in Section 400 of the KYTC Road and Bridge Manual, latest edition, except where noted otherwise in this specification.

All aggregates must pass all KYTC aggregate requirements for their intended use as set out in Section 800 of the KYTC Standard Specifications for Road and Bridge Construction, latest edition.

Effective on: 12/1/2022

Section 4.6: Portland Cement Concrete (Concrete) Infrastructure

4.6-1 General Requirement

A. Materials

Portland cement, water, aggregates, air entraining agents, and admixtures to reduce water, retard set, etc. shall satisfy the material specifications of, and be proportioned, batched, delivered, and cured in accordance with, the Portland Cement Association (PCA), Design and Control of Concrete Mixtures, latest edition, except as noted otherwise in these

B. Mix Design

Concrete mix design will vary depending on the intended use, as spelled out in Subsections [4.6-2\(A\)](#), [4.6-3\(A\)](#), and [4.6-4\(A\)](#).

C. Fly Ash

No fly ash is allowed in the Concrete mix.

D. Strength

Finished Concrete shall attain a minimum compressive strength at 28 days of 4,000 pounds per square inch. If pavement does not reach 4,000 psi after 28 days, a Guarantee must be posted by the Applicant covering the portions of the concrete not meeting strength according to [Section 3.4](#), Guarantees for Improvements, of these Regulations. If after six months, the concrete is still not achieving full strength, the Applicant will be responsible to remove and replace the deficient concrete. Any additional concrete testing required as part of this provision is the sole responsibility of the Applicant. Pavement must remain closed to ALL traffic, including construction traffic, for a period of 72 hours after placement.

E. Ready Mix Suppliers

All Concrete Ready Mix must be provided by Ready Mix plants listed on the KYTC List of Approved Materials (LAM) as a qualified producer. All Ready Mix Concrete suppliers shall submit to the Staff in January of each year, or at least 72 hours before placement of concrete, mix design verifications for all Concrete mixes that will be supplied during that year for use in Subdivision improvements. This includes any potential mix designs that may be used during cold weather operations.

F. Delivery and Discharge

Concrete shall be delivered and discharged from a truck mixer or agitator truck within the periods specified in Table 4.6-1. Delivery tickets shall have this time clearly shown and be checked for conformance by the Staff. Delivery tickets shall also show the date of the delivery, the Concrete mix supplied, and the design compressive strength. All delivery tickets shall be delivered to Staff. Any Concrete which is not plastic and workable when placed shall be rejected.

Table 4.6-1: Maximum Concrete Discharge Time	
Air Temperature	Maximum Discharge Time
Up to 85 degrees Fahrenheit	1.5 hours
More than 85 degrees Fahrenheit	1 hour

G. Curing

Concrete shall be cured in accordance with Section 601.03.17 of the KYTC specification.

H. Expansion and Isolation Joints

Expansion and Isolation Joint material used herein shall be preformed one inch thick material, the full depth of the Concrete, and shall conform to KYTC specifications and current, applicable Standard Drawings for use in Concrete pavements.

I. Cold Weather Requirements:

Ambient air temperature must be at least 40 degrees F and rising for the placement of concrete unless a mix design incorporating a cold weather accelerant has been certified by the Plant and approved by PDS.

Concrete temperature must be between 50 degrees F and 90 degrees F at the time of placement. Maintain a minimum surface concrete temperature of 45 degrees F for 3 calendar days after placement and at a minimum surface concrete temperature of 40 degrees F for an additional four calendar days unless acceptable cylinder strength is achieved.

Do not place concrete in contact with any material coated with frost or have a temperature of 32 degrees F or lower. When using artificial heat, do not allow surface temperature of concrete to exceed 90 degrees F and ensure that the concrete is maintaining adequate moisture within the enclosure.

[Ord. # [PC2104-0004](#), Eliminates the need for Ready Mix Supplier to supply to PDS Staff an executed original of KYTC Form TC-64-764/09 2011 "Certification of Compliance for Freeze Thaw Resistant Concrete Aggregate" for the aggregate used in Concrete mixes.]

Effective on: 12/1/2022

4.6-2 Street Pavement Requirements

A. Concrete Mix Design Requirements

1. Aggregates for Concrete Street pavement shall be **EITHER** a blend of No. 467 crushed limestone, No. 8 gravel and concrete sand **OR** a blend of No. 57 crushed limestone, No. 4 crushed limestone, No. 8 gravel and concrete sand.
2. The No. 467 crushed limestone aggregate shall meet the gradation limits shown in Table 4.6-2.

Table 4.6-2: No. 467 Gradation Limits	
Sieve Size	Percent Passing
2"	100
1½"	93-98*
1"	----
¾"	35-70
½"	----
⅜"	10-30
#4	0-5
#8	----
*Note that the specified percent passing the 1½" sieve differs from Section 800 of the KYTC Road and Bridge Manual, latest edition, for No. 467 gradation. The No. 467 crushed limestone for Street pavement in the Regulation must have 2% to 7% retained on the 1½" sieve.	

3. Gradation of the No. 57 crushed limestone, No. 4 crushed limestone, No. 8 gravel and the concrete sand shall meet the requirements of Section 800 of the KYTC Standard Specifications for Road and Bridge Construction, latest edition.
4. Minimum cement factor shall be 564 pounds per cubic yard.
5. Minimum compressive strength at 28 days shall be 4,000 psi.
6. Maximum water / cement ratio shall be 0.45.
7. Air entrainment shall be 6% ± 2%.
8. Maximum slump without mid-range water reducer shall be 4-inches.
9. Maximum slump with mid-range water reducer shall be 7-inches.
10. Workability factor shall be between 38 high to 33 low.
11. Coarseness factor shall be between 73 high to 68 low.

B. Thickness Requirements

Pavement thicknesses for various classifications of Streets shall be as shown in Table 4.4-2: Required Subdivision Street Thicknesses. Various critical Concrete pavement design and construction details that shall be used in Concrete Subdivision pavements are shown in Appendix A: Standard Construction Drawings.

C. Testing Requirements

1. One set of ~~three~~ **five** test cylinders shall be made for each day's placement of Street. An additional set of ~~three~~ **five** test cylinders shall be made for each additional 100 cubic yards of placement. One slump, air entrainment and temperature test shall be performed for each set of Concrete test cylinders.
2. One cylinder shall be tested for compressive strength at no later than seven days, **three cylinders at 28 days, and one cylinder for a hold to be broken at 56 days if the 28 day average does not make strength.** ~~and two cylinders at 28 days.~~
3. Part of the plastic Concrete sample used for the test cylinders shall be washed to visually confirm that crushed limestone coarse aggregate was used in the Concrete mix.
4. All Concrete testing shall be performed by a Qualified Materials Testing firm in accord with applicable ASTM specifications, latest editions. The results of all Concrete testing are required to be provided to Staff by the Developer prior to the approval of a Final Plat.

D. Reinforcing Steel

The use of continuous reinforced concrete pavements is not required for residential pavements. Reinforcing steel for transverse and longitudinal load transfer shall be required for Heavy Commercial/Industrial applications as detailed below in subsection F.

1. Bent bars are not considered reinforcing steel in the contents of this section.
2. The use of wire mesh in concrete pavements is prohibited.

E. Placement

1. Formwork

- a. Fixed forms shall have a depth equal to or greater than the thickness of the pavement.
- b. Forms shall be of such cross-sections and strength and so secured as to resist the pressure of the Concrete when placed, and the impact and vibration of any equipment which they support, without springing or settlement.

2. Setting

The Subgrade under the forms shall be compacted and shaped so that the form set shall provide the specified elevation.

3. Grade and Alignment

The alignment and grade elevation of the forms shall be checked by the Contractor immediately ahead of Concrete placement and corrections made when necessary.

4. Placement Method

- a. All Concrete placement shall conform to ACI Specifications, latest edition.
- b. The Concrete shall be mixed in quantities required for immediate use and shall be deposited on the Subgrade to the required depth and width of the construction lane in successive batches and in a continuous operation. The terminus of a continuous pour shall be a Construction Joint per Figure A.1-N: Detail #12.
- c. The Concrete shall be placed as uniformly as possible in order to minimize the amount of additional spreading necessary.
- d. The Concrete shall be vibrated and consolidated with suitable tools while being placed so that the formation of voids or honeycomb pockets is prevented.
- e. Concrete shall not be placed around manholes or other structures until they have been brought to the required grade and alignment.
- f. Additional tamping and compaction of surrounding fill material may be required after raising manholes.

5. Consolidating and Finishing

- a. Concrete pavement shall be struck off and consolidated with a mechanical finishing machine, vibrating screed, slipform paver, or by hand-finishing methods such that, after consolidation and final finishing, it shall be at the elevation shown on the approved plans.
- b. The finishing method shall incorporate a screed, which will consolidate the Concrete by pressure, vibration, or both.
- c. The Concrete shall be brought to a true and even surface, free from rock pockets.
- d. Hand-finishing tools shall be kept available for use in case the mechanical finishing machine breaks down.
- e. When hand finishing, the pavement shall be struck off and consolidated by a vibrating screed to the elevation as shown on the plans. When the forward motion of the vibrating screen is stopped, the vibrator shall be shut off and not be allowed to idle on the Concrete.

6. Scraping and Straight Edging

- a. The Inspector may require that the pavement be scraped with a straightedge with a minimum width of six feet, equipped with handles long enough to permit it to be operated from the edge of the pavement.
- b. When irregularities with the surface elevation are discovered, they shall be corrected by adding or removing Concrete. All disturbed areas shall be floated with a wooden or metal float not less than four feet long and not less than six inches wide and straight edged.

7. Edging

Before final finishing is completed and before the Concrete has taken its initial set, the edges of the slab and Curb shall be carefully finished with an edger.

8. Final Surface Finish for Residential Pavements

- a. The final surface of the Concrete pavement and Curb shall have a uniform gritty texture at the grades and cross-sections shown on the plans.
- b. A burlap drag or medium broom shall be used as the final finishing method for Concrete pavement.
- c. A burlap drag finish shall have a minimum width of at least three feet and have a length that is long enough to cover the entire pavement width.

- d. The burlap drag shall be pulled forward across the pavement in the direction in which the pavement is being placed.
 - e. A broom finish shall be drawn transversely across the pavement using overlapping strokes to produce surface corrugations of uniform appearance approximately $\frac{1}{16}$ th inch in depth.
 - f. Curbs shall be finished using the same method as the pavement.
9. Final Surface Finish for Light & Heavy Commercial/Industrial Pavements
- a. Finishing shall conform to KYTC Standard Specifications, section 501.03.13 - Finishing, subsections A-H.
 - b. Curing shall conform to KYTC Standard Specifications, section 501.03.15.
10. Integral Curb
- a. Curbs shall be constructed monolithically with pavement extrusion equipment or hand formed prior to the finishing operation.
 - b. The integral barrier and sloped Curb shall be constructed with or prior to the finished paving operation. Special care shall be taken so that the Curb construction does not create a "cold joint."
 - c. Curbs placed immediately following the paving operation shall be sufficiently consolidated with the paving slab and shall not contain voids within or along the back face of the Curb.
 - d. Integral barrier Curbs along the edges of Street pavement shall contain depressed Curbs not less than 1-3/4 inches above the gutter line at all Driveway entrances and at such other locations as designed on the approved plans.
 - e. When barrier Curb is used, the Curb may be sawed horizontally to facilitate residential Driveways, approaches, and Sidewalks.

11. Cold Weather Requirements:

- ~~a. Ambient air temperature must be at least 40 degrees F and rising for the placement of concrete unless a mix design incorporating a cold weather accelerant has been certified by the Plant and approved by PDS.~~
- ~~b. Concrete temperature must be between 50 degrees F and 90 degrees F at the time of placement. Maintain a minimum surface concrete temperature of 45 degrees F for 3 calendar days after placement and at a minimum surface concrete temperature of 40 degrees F for an additional four calendar days unless acceptable cylinder strength is achieved.~~
- ~~c. Do not place concrete in contact with any material coated with frost or have a temperature of 32 degrees F or lower. When using artificial heat, do not allow surface temperature of concrete to exceed 90 degrees F and ensure that the concrete is maintaining adequate moisture within the enclosure.~~

F. Concrete Street Pavement Joints

1. Contraction Joints

- a. Contraction joints for residential pavements shall be placed a maximum of 15 feet on center. Contraction joints for Light Commercial pavements shall be placed a maximum of 10 feet on center. Contraction joints for Heavy Commercial/Industrial pavements shall be placed a maximum of 12 feet on center. Light & Heavy Commercial/Industrial pavements shall have sawed transverse Contraction/Expansion Joints that are cut perpendicular to the centerline across the full width of the pavement. Light & Heavy Commercial/Industrial pavements shall be constructed with smooth, epoxy coated dowels or approved load transfer assemblies at mid-slab height and in accordance with KYTC Standard Drawing No. RPS-020-14 at contraction/expansion joints. All residential pavements shall have tooled or sawed Contraction Joints without a dowel requirement. Residential pavement transverse Contraction Joints shall be skewed (except at intersections, paired catch basins and in Cul-de-sacs). See Figure A.1-O: Detail #13.
- b. Sawed joints shall be equal to a depth of one-third (1/3) of the pavement thickness continuous across the slab.
- c. The timing of the installation of joints shall conform to ACI specifications, latest edition.
- d. Contraction Joints cut into fresh concrete with a jointing tool shall be equal to a depth of one-third (1/3) of the pavement thickness continuous across the slab. The use of jointing tools shall not be permitted on Light & Heavy Commercial/Industrial Pavements.

2. Expansion Joints

There shall be no Expansion Joints in any pavements except at bridge abutments and where required by construction details in Figure A.1-R: Detail #16, Figure A.1-S: Detail #17, Figure A.1-T: Detail #18, Figure A.1-U: Detail #19, and Figure A.1-V: Detail #20.

3. Longitudinal Joints in Residential Pavements

- a. All pavements wider than 15 feet require Longitudinal Joints. Longitudinal Joints may be Construction Joints or tooled/sawed joints.
- b. Longitudinal Construction Joints will require 18 inches long #4 deformed bars embedded into each slab at the mid-slab height, no more than four feet on center and no closer than 18 inches to each Contraction Joint.
- c. Bent bars may be inserted into fresh Concrete before its initial set.
- d. Bent bars shall not be straightened until the Concrete has cured sufficiently to enable bending without fracture of the Concrete slab.

4. Longitudinal Joints in Light & Heavy Commerical/Industrial Pavements

- a. All pavements wider than 15 feet require longitudinal joints. Longitudinal joints may be construction joints or sawed joints. The use of jointing tools shall not be permitted.
- b. Longitudinal joints shall be constructed according to KYTC Standard Drawing No. RPS-010-11.

5. Other Pavement Joints

Other Contraction Joints and Isolation Joints shall be constructed per Figure A.1-N: Detail #12.

G. Manholes and On-Street Inlets

Manholes, on-Street inlets, and water valves encountered in the areas to be paved shall be raised or lowered to the surface of the new pavement. On-Street inlets may be separated from the pavement and Curb by boxing out around the inlet. Details for Joint construction at manholes and catch basins are in Figure A.1-P: Detail #14, Figure A.1-Q: Detail #15, and Figure A.1-R: Detail #16.

H. Protection and Opening to Traffic

1. Traffic shall be prohibited from the pavement until the Concrete has attained a compressive strength of 3,500 pounds per square inch.
2. Prohibited traffic shall include Contractor's vehicles.
3. Prior to opening to public traffic, the Developer is responsible for completing, curing and sealing the pavement, including box outs, backfilling the Street, sealing the joints and cleaning the pavement of all debris.

I. Concrete Pavement Lugs

The purpose of pavement lugs in Subdivision pavements is to provide some additional resistance to Contraction Joints separating during repeated expansion and contraction cycles over the life of the pavement in certain open ended and relatively steep downhill pavement conditions. In these open ended and downhill conditions, resistance to pavement lengthening at contraction joints is substantially reduced as compared to Contraction Joints in long stretches relatively straight pavement. In the long, relatively straight streets, the repetitive adjacent slabs help keep the contraction joints from separating during repeated expansion and contraction cycles. Those conditions which shall require lugs are related to the geometry of the Streets and are as follows (see Figure A.1-J: Detail #8, Figure A.1-K: Detail #9, and Figure A.1-L: Detail #10). Concrete pavement lugs shall not be installed in Light & Heavy Commercial/Industrial pavement applications.

1. The ends of Cul-de-sacs where the Street grade approaching the Cul-de-sac decreases more than 20 feet vertically, at an average grade of more than six percent, before there is a change in direction of Street Drainage. In this condition, install a lug near the end of the Cul-de-sac across the extension of the two lanes of pavement.
2. At T-intersections, place a lug on the intersecting street near the intersection, where grade on the intersecting Street is going up from the intersection more than 20 feet vertically, at an average grade of more than six percent, before there is a change in the Drainage direction.
3. On the main line of a Street pavement where the pavement is going straight and downhill more than 20 feet vertically, at an average grade of more than six percent and the direction of centerline deflects horizontally by more than 30 degrees, place a lug just uphill of the start of the horizontal curve.
 - a. Lugs shall be placed at least 20 feet uphill from any shallow utility excavation transverse to the pavement.
4. The Design Engineer may add other lugs in conditions he considers critical to Contraction Joint integrity.

5. Lug locations are to be shown on construction design and as-built drawings.

J. Joint Sealing Compound

1. Joint sealing compound shall conform to the following standard designations:

- a. Hot-poured elastic type, as specified by AASHTO, latest edition; or
- b. Silicone rubber sealant type (non-sag, self-leveling, or rapid cure) conforming to the KYTC Department of Highways Standard Specifications for Road and Bridge Construction, latest edition; or
- c. An approved equal, as determined and approved by Staff.

2. The application of joint sealant is prohibited at temperatures below 40 degrees Fahrenheit.

[Ord. # PC2104-0004, Addresses pavement construction specifications specific to the Light Commercial and Heavy Commercial/Industrial Pavement sections including Reinforcing Steel, Final Surface Finish, Contraction Joints, Longitudinal Pavements, & Concrete Pavement Lugs.]

Effective on: 12/1/2022

4.6-3 Concrete Curb and Gutter Requirements for Asphalt Streets

A. Concrete Mix Design Requirements

1. Aggregates for Concrete Curb and Gutter shall be a blend of No. 57 crushed limestone, No. 8 gravel and concrete sand.
2. Gradation of the No. 57 crushed limestone, the No. 8 gravel and the concrete sand shall meet the requirements of Section 800 of the KYTC Road and Bridge Manual, latest edition.
3. Minimum cement factor shall be 564 pounds per cubic yard.
4. Minimum compressive strength at 28 days shall be 4,000 psi.
5. Maximum water / cement ratio shall be 0.45.
6. Air entrainment shall be 6% ± 2%.
7. Maximum slump without mid-range water reducer shall be 4-inches.
8. Maximum slump with mid-range water reducer shall be 7-inches.
9. Workability factor shall be between 40 high to 35 low.
10. Coarseness factor shall be between 63 high to 58 low.

B. Curb Design

1. 24-inch wide Concrete Curb and gutter shall be used for all Streets Types with Asphalt pavements.
2. The Developer may choose between using the sloped Curb or the six inch barrier Curb profile shown in Figure A.1-H: Detail #7.
3. All Streets serving industrial/commercial developments shall use the six inch barrier Curb.

C. Concrete Curb over Asphalt Base

Concrete Curb over Asphalt base shall be a minimum of six inches thick at the Curb apron. Concrete Curb over crushed stone base shall be a minimum of seven inches thick at the Curb apron.

D. Expansion Joints

1. Expansion Joints shall be placed in Concrete Curbs at each side of Curb inlet catch basins.
2. Two ¾-inch diameter, 18-inch long smooth dowels with expansion caps shall be placed in each Expansion Joint location.
3. Expansion material must go completely through the Curb cross section, preventing Concrete to Concrete contact. See Figure A.1-R: Detail #16.

E. Contraction Joints

Contraction Joints shall be installed in the Curb at a spacing of no more than 10 feet on center.

F. Standard Details

Details for Concrete Curb and gutter are shown in the exhibits in Figure A.1-H: Detail #7 and Figure A.1-I: Detail #7A.

G. Testing Requirements

1. One set of ~~three~~ **five** test cylinders shall be made for each day's placement of Street. An additional set of ~~three~~ **five** test cylinders shall be made for each additional 100 cubic yards of placement. One slump, air entrainment and temperature test shall be performed for each set of Concrete test cylinders.
2. One cylinder shall be tested for compressive strength at no later than seven days, **three cylinders at 28 days, and one cylinder for a hold to be broken at 56 days if the 28 day average does not make strength.** ~~and two cylinders at 28 days.~~
3. Part of the plastic Concrete sample used for the test cylinders shall be washed to visually confirm that crushed limestone coarse aggregate was used in the Concrete mix.
4. All Concrete testing shall be performed by a Qualified Materials Testing firm in accord with applicable ASTM specifications, latest editions. The results of all Concrete testing are required to be provided to Staff by the materials testing firm prior to the approval of a Final Plat.

4.6-4 Concrete Public Sidewalks, Pathways, Driveway Aprons and Other Infrastructure Uses Not Specified Elsewhere in These Regulations

A. Concrete Mix Design Requirements

1. Aggregates shall be a blend of No. 57 gravel or crushed limestone, No. 8 gravel and concrete sand .
2. Gradation of the No. 57 gravel or crushed limestone, the No. 8 gravel and the concrete sand shall meet the requirements of Section 800 of the KYTC Road and Bridge Manual, latest edition.
3. Minimum cement factor shall be 564 pounds per cubic yard.
4. Minimum compressive strength at 28 days shall be 4,000 psi.
5. Maximum water / cement ratio shall be 0.45.
6. Air entrainment shall be 6% ± 2%.
7. Maximum slump without mid-range water reducer shall be 4-inches.
8. Maximum slump with mid-range water reducer shall be 7-inches.
9. Workability factor shall be between 40 high to 35 low.
10. Coarseness factor shall be between 63 high to 58 low.

B. Subgrade

1. Subgrade for Sidewalks, pathways, and Driveway aprons shall be non-organic and consist of natural clay or sand soils.
2. Clay soils must be knit together without any loose clay soils. Any material used to finish grade Subgrade shall be bank run sand, KYTC crushed limestone DGA, or crushed recycled Concrete.
3. Any granular material in excess of two inches thick shall be compacted with a vibrating plate compactor or equivalent.
4. No gravel and no other crushed limestone gradation will be used for finish grade fill material.

C. Thickness Requirements

1. Concrete for public Sidewalks and pathways shall be a minimum of four inches thick.
2. Residential Driveway aprons shall be a minimum of five inches thick.
3. Commercial and industrial Driveway aprons shall be a minimum of seven inches thick.

D. Drive/Apron Requirements

Required Driveway apron layouts and construction details, including required Expansion Joint thickness and location, are shown in Appendix A: Standard Construction Drawings. Special care must be taken during construction to make sure there is no Concrete-to-Concrete contact under all Expansion Joints.

E. Edge Drain Installation

When installing Driveway aprons, special care must be taken not to damage the edge drain installed on the outside of the Curb. If the edge drain is damaged, the damaged section must be properly replaced to assure water flow through the edge drain.

F. Contraction Joint Spacing

For Sidewalks, the maximum spacing of Contraction Joints shall not exceed five feet, except when the Sidewalk or pathway is wider than five feet when the spacing shall not exceed the width of the slab.

Section 4.7: Asphalt Concrete (Asphalt) Paving Mixture and Construction Specifications

4.7-1 General

- A. All Subdivision Streets in Kenton County Subdivisions shall be constructed in accordance with the latest edition of the KYTC Roadway Manual, Division 400, except where noted otherwise in this specification.
- B. All Contractors must be prequalified by KYTC or demonstrate experience and success on similar projects in order to perform this work.
- C. All construction materials incorporated into the work shall conform to the requirements set forth in the KYTC Roadway Manual.
- D. The Contractor shall notify Staff of the intent to start the project within 24 hours of beginning production.

4.7-2 Mixture Designation and Design

A. Volumetric Mix Design

The Contractor shall perform the volumetric mix design according to AASHTO R35 and conforming to AASHTO M323 and utilize 50 gyrations.

B. Mix Design Submittal

On an annual basis, or at least 72 hours prior to the start of production, the Contractor shall submit the mix design to the Staff and the Applicant's Qualified Material Testing Lab for review. This includes any mixes that may be used for cold weather placement.

C. Aggregate Gradation

Aggregate gradations for base, intermediate and surface mixtures shall conform to KYTC Roadway Manual Division 400 and Table 4.7-1.

Table 4.7-1: Aggregate Gradations			
Sieve Size	1.0 Base Mixture	0.75 Intermediate Mixture	Surface Mixture
1½"	100	--	--
1"	90-100	100	--
¾"	<90	90-100	--
½"	--	<90	100
⅜"	--	--	90-100
#4	--	--	<70
#8	19-45	23-49	25-55
#16	--	--	--
#200	1-7	2-8	2-10

D. Voids in Mineral Aggregate (VMA), Asphalt Content (AC) and Air Voids (AV)

VMA, AC and AV for residential streets shall be as specified in Table 4.7-2 and for commercial / industrial streets as specified in Table 4.7-3.

Table 4.7-2: VMA, AC and AV for Residential Streets			
	Minimum VMA	Minimum AC	AV
Base Mixture	12%	4%	4%
Intermediate Mixture	13%	4.3%	4%
Surface Mixture	14%	5.4%	3%

Table 4.7-3: VMA, AC and AV for Commercial / Industrial Streets

	Minimum VMA	Minimum AC	AV
Base Mixture	12%	4%	4%
Intermediate Mixture	13%	4.3%	4%
Surface Mixture	14%	5.4%	4%

E. Remaining Mix Design

The remaining mix design shall conform to the applicable KYTC mix designations Class 2 BASE 0.75D PG64-22 or Class 2 BASE 1.0D PG64-22 "Base and Intermediate Mixture" and Class 2 SURF 0.38D PG64-22 "Surface Mixture".

F. Recycled Asphalt Pavement and Recycled Asphalt Shingles

Recycled Asphalt Pavement (RAP) may be used but is limited to ~~25~~ **20** percent of the mixture by weight in the surface and **20 percent of the mixture by weight in the base unless the use of supplement with Anti-Stripping Agent, then the maximum is allowable is 30 percent.** ~~and 30 percent of the mixture by weight in the base. Recycled Asphalt Shingles (RAS) may be used but is limited to 3.0 percent of the mixture by weight. However, when combined, the total amount of RAP and RAS may not exceed 25 percent in the surface and 30 percent in the base with no more than three percent RAS. Warm mix Asphalt technology is allowed on a permissive base similar to the KYTC Standard Specifications. See Table 4.7-4.~~

Table 4.7-4: Maximum Recycled RAP and RAS in Asphalt Pavement

	Maximum RAP	Maximum RAS	Maximum RAP and RAS
Base Mixture	30% 20% / * 30%	3%	30%
Intermediate Mixture	30% 20% / * 30%	3%	30%
Surface Mixture	25% 20%	3%	25%

*With the use of supplement with Anit-Stripping Agent, then the maximum allowable is 30 percent.

Effective on: 12/1/2022

4.7-3 Plant Mix Operation

A. Plant Requirements

1. All Asphalt mixing plants shall conform to KYTC standards.
2. Maximum asphalt temperature during plant operations is 330° F.
3. Minimum asphalt temperature in the truck at the plant is 220° F.

B. Plant Testing Requirements

1. The Contractor shall monitor the plant production and perform quality control testing at the Asphalt mixing plant.
2. Staff shall be provided access to the facility during production and may be present to observe sampling and testing by the Contractor personnel.
3. A minimum of one test shall be performed per day of paving and additional tests shall be performed for each 1,000 tons produced.
 - a. The Contractor may perform additional testing as desired to control mix properties.
 - b. When multiple test samples are obtained, the average value of those results shall be used for acceptance.
 - c. At the start of production on the project, the first sample shall be obtained after a minimum of 50 tons have been loaded.
 - d. Samples shall be tested for conformance to gradation and Asphalt content requirements (AASHTO T164 & AASHTO T30).
 - e. Testing results from any offsite laboratory testing shall be reported to Staff, the applicant and the Qualified Material Testing Lab within 24 hours.

4.7-4 Minimum and Maximum Lift Thicknesses

Minimum and maximum thicknesses for asphalt lifts are indicated in Table 4.7-5.

Table 4.7-5: Minimum and Maximum Lift Thicknesses

	Minimum Lift	Maximum Lift
Base	3"	5" 4.5"
Intermediate	2¼"	4½" 3.5"
Surface	1¼"	1¼"

4.7-5 Placement Procedures

A. General

1. All Contractors must be prequalified by KYTC or demonstrate experience and success on similar projects in order to perform this work.
2. Immediately before placing Asphalt materials, remove loose and deleterious materials using a power broom or street sweeping equipment.

B. Subgrade

1. Asphalt placement is prohibited on subgrade with free water on the surface.
2. Pavement Subgrade cross slopes shall vary from 3.7 percent to 5 percent depending on the applicable Street cross section.

C. Overlay

1. A tack coat shall be evenly applied across the width of the lane at a rate of ~~0.05 gallons per square yard~~ **0.08 gallons per square yard for non-tracking and 0.1 gallons per square yard for asphalt hot tacking.** Adjust spray bars as necessary to avoid streaks.
2. **Placement of non-tracking tack ensure the roadway temperature is a minimum of 40 Degrees F and rising. Placement of asphalt tack coat shall conform to the temperature limitations of asphalt mixture.**
3. A tack coat is not required when placing Asphalt base mixtures on granular base layers.
4. When Asphalt surface abuts a barrier Curb or similar vertical surface, the abutting surface shall be tack coated prior to construction of the Asphalt course.

D. Equipment

1. The Contractor shall furnish dump trucks with clean, smooth metal beds to transport materials and shall use approved and environmentally friendly release agents.
2. Use of diesel fuel is strictly prohibited in truck beds.
3. Sufficient trucks should be scheduled to allow for a continuous paving operation without significant delays between trucks.
4. The Contractor shall furnish a self-propelled paver with the capacity of spreading and finishing all courses to the indicated widths, depths, line, grade and cross section, with a smooth finish, uniform in density and texture.
5. Rollers must also be self-propelled and capable of reversing smoothly. Steel wheel rollers must be equipped with adjustable scrapers, spray bars, and/or wetting pads to keep wheels clean at all times.
6. Hand tampers may also be used in tight areas inaccessible by rollers.

E. Temperatures for Asphalt, Ambient Air and Subgrade

1. Do not place Asphalt mixtures when the ambient air temperature and existing surface temperatures on the project are less than those specified below or when weather conditions otherwise prevent the proper handling or finishing of the Asphalt mixtures.
 - a. Minimum ambient air and existing surface temperature shall be 35° F (and rising) prior to placement of Asphalt Base Mixture.
 - b. Minimum ambient air and surface temperature shall be 40° F (and rising) prior to placement of Asphalt Surface Mixture:
2. The maximum temperature of the mixture shall not exceed 330° F at any time, and the minimum temperature (measured in the truck at the project site) shall not fall below ~~200~~ **210° F** for all mixtures.
3. Compaction efforts shall be completed before the Roadway mix temperature falls below 150° F.

F. Application of Asphalt Mixes

1. All courses shall be placed and spread as continuously as possible, keeping the number of joints to a minimum.

2. The longitudinal joint in the final surface course shall be placed along the dividing line between the lanes.
3. Best paving practices shall be utilized to ensure the proper amount of material at the joint and to make the same number of passes over the joint as the middle of the mat.
4. The finished Joint shall be smooth and tight and free from voids or coarse material.

G. Surface Course Application

1. The surface course application shall be provided no later than 12 months from the date the base Asphalt was placed.
2. Prior to the surface course application, Staff shall inspect the Asphalt base course. Damage to the Asphalt base course that will affect the structural integrity or future maintainability of the pavement section shall be repaired prior to placement of the surface course.
3. Damage to Curb and gutter sections identified by Staff that will affect the structural integrity and/or future maintainability of the Curb and gutter shall be removed and replaced prior to the placement of surface Asphalt course.
4. The surface course shall be compacted to between $\frac{1}{8}$ " and $\frac{1}{2}$ " above adjacent Concrete Curb apron.
5. The pavement surface cross slope shall generally be three percent at the discretion of PDS Staff.
6. The joint between Curb and gutter and Asphalt pavements shall be sealed in accord with Subsection 4.7-7: Joint Sealing.

Effective on: 12/1/2022

4.7-6 Density Testing Requirements

A. Sampling

All base and surface Asphalt and aggregate materials shall be sampled, tested, and reported by a Qualified Material Testing Lab in accordance with the KYTC Roadway Manual Division 400.

B. Testing Frequency and Results

1. Density tests shall be performed at least every 150 feet along each lane of asphalt placed.
2. At the discretion of Staff, a quality assurance check (including cores) of the sampling and testing may be required if deficiencies are suspected.
3. Asphalt base and surface courses shall be compacted to an average density of between 90 and 97 percent of solid volume.
4. Density testing shall be per ASTM D2950 "Density of Bituminous Concrete In Place by Nuclear Density Methods" or ASTM D7113 "Density of Bituminous Mixtures In Place by Electromagnetic Surface Contact Methods".

4.7-7 Joint Sealing

A. Compound Material

The Joint Sealing Compound shall conform to the following standard designations:

1. Hot-Poured Elastic Type, as specified by AASHTO, latest edition; or
2. Silicone Rubber Sealant Type (Non-Sag, Self-Leveling, or Rapid Cure) conforming to the KYTC Roadway Manual, latest edition; or
3. An approved equal, as determined and approved by Staff.
4. The use of AC-20 as joint sealant is prohibited.

B. Air Temperature

The application of joint sealant is prohibited at air temperatures below 40° F.

C. Application

1. Joint Sealant shall be applied to all Joints abutting the Asphalt, which includes the Joint between the base Asphalt and the Curb if the surface course is not going to be applied immediately.
2. Joint sealant shall be applied to the Curb line immediately upon placement of the surface Asphalt.

4. The Subgrade shall be shaped to plan elevation and cross-section and checked by the Staff inspector for conformity with the cross section shown on the approved Improvement Drawings immediately prior to placing the pavement. Pavement shall not be placed on any part of the Subgrade which does not conform to the cross section shown on the approved Improvement Drawings.

C. Final Subgrade Proofrolling

1. Proofrolling is the final test to be performed immediately prior to beginning the paving operations.
2. Prior to the placement of pavement materials and after confirming proper density and moisture content of the Subgrade soils, all Street Subgrades shall be proofrolled to test the stability and uniformity of Subgrade materials.
3. ~~Proofrolling shall be performed with a dual axle dump truck fully loaded with clayey soils or aggregate.~~ **Proofrolling shall be performed with a tri-axle dump truck fully loaded either with clayey soils or aggregate which the load must weigh a minimum of 18 tons.**
4. Proofrolling shall be performed at walking speed with at least two passes made in each drive lane direction with the outside wheel generally traveling along the inside line of the future Curb during one pass, and the wheel-paths offset one-half of the truck width during the second pass to maximize subgrade coverage. Extra proofroll passes shall be made at the discretion of the Staff inspector.
 - a. Where proofrolling indicates areas of soft or unsuitable Subgrade soils or areas of non-uniform Subgrade stability, the area shall be delineated and repaired.
 - b. Areas of soft or unsuitable Subgrade soils or areas of non-uniform Subgrade stability shall be identified by observing Pumping and/or Rutting (See Definitions Subsection 2.3-95: Pumping (or deflection) and Subsection 2.3-102: Rutting).
 - c. Rutting in excess of one inch in depth shall be deemed a Subgrade failure requiring Subgrade repair.
 - d. Pumping or deflection of less than one inch is acceptable so long as the Subgrade soil rebounds back to its original position after the wheel load passes. Pumping or deflection greater than one inch or areas of permanent deflections shall be deemed a Subgrade failure requiring Subgrade repair.
 - e. For larger areas of subgrade proofroll failure, the alternative pavement design procedures in Subsection 4.4-2(B) can be implemented by the Applicant.
5. Subgrade repairs shall be performed by scarifying, aerating and recompacting the Subgrade soils. As an alternative, the failed Subgrade soils can be removed and replaced with properly compacted soils capable of producing the required CBR value.
6. In all cases, repaired areas shall be retested for compaction and proofrolled again before proceeding with the placement of pavement materials. Rutting can typically be repaired by scarifying, aerating, and recompacting, while areas of pumping will more likely require a more significant repair with depth often including the removal and replacement of unsuitable Subgrade materials.

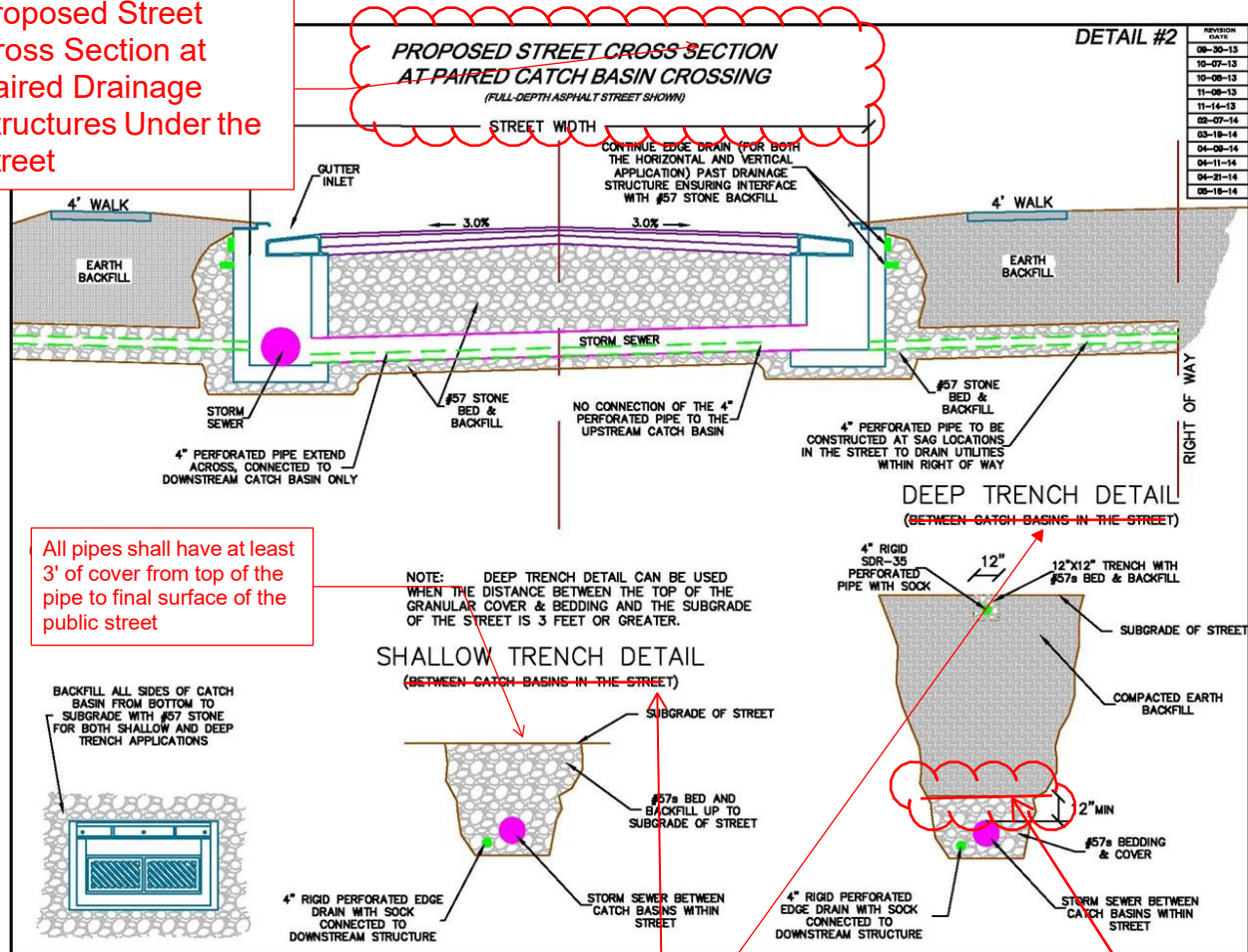
D. Final Subgrade Inspection Testing and Reporting Requirements

1. Both the Staff inspector and the Geotechnical Technician have final Subgrade review, testing, and reporting responsibilities.
2. The Geotechnical Engineer shall provide soil testing to develop an opinion of adequate bearing characteristics of the final Subgrade soils. Those tests will include, but are not limited to, moisture content testing, density testing, and verification of soil types being adequate to produce the required CBR values for the pavement. Moisture content testing, density testing, and verification of soil types being adequate to produce the required CBR values for the pavement shall be performed by the Geotechnical Engineer at intervals no less than one test per 100 lineal feet of Street for Streets of 500 lineal feet or less, or one test per 200 lineal feet for Streets over 500 lineal feet.
3. The Geotechnical Technician and the Staff Inspector shall review the proofrolling described in Subsection 6.2-7(C): Final Subgrade Proofrolling and determine whether the Subgrade passes the proofroll.
4. Paving operations shall only be permitted to begin after passing inspection results are achieved from Subsection 6.2-7: Street Pavement Subgrade, Subsection 6.2-7(C): Final Subgrade Proofrolling, and Clause 6.2-7(D)(2). Inspection reports referenced in Clause 6.2-7(D)(1) and Clause 6.2-7(D)(2) shall be placed in the Staff project file and Staff shall make their inspection records available to the Developer.
5. Street paving shall occur within 30 hours after passing inspection results are achieved from Clause 6.2-7(D)(1) and Clause 6.2-7(D)(2). A ¼ inch rain event or sub-freezing temperature occurrence between a passing proofroll

Street paving shall void the proofroll and geotechnical testing and shall require re-evaluation.

Figure A.1-B:Detail #2

Proposed Street
Cross Section at
Paired Drainage
Structures Under the
Street



All pipes shall have at least
3' of cover from top of the
pipe to final surface of the
public street

Between Drainage
Structures In The
Street

non-woven geotextile
fabric between #57 stone
and compacted earth
backfill

Figure A.1-C: Detail #3

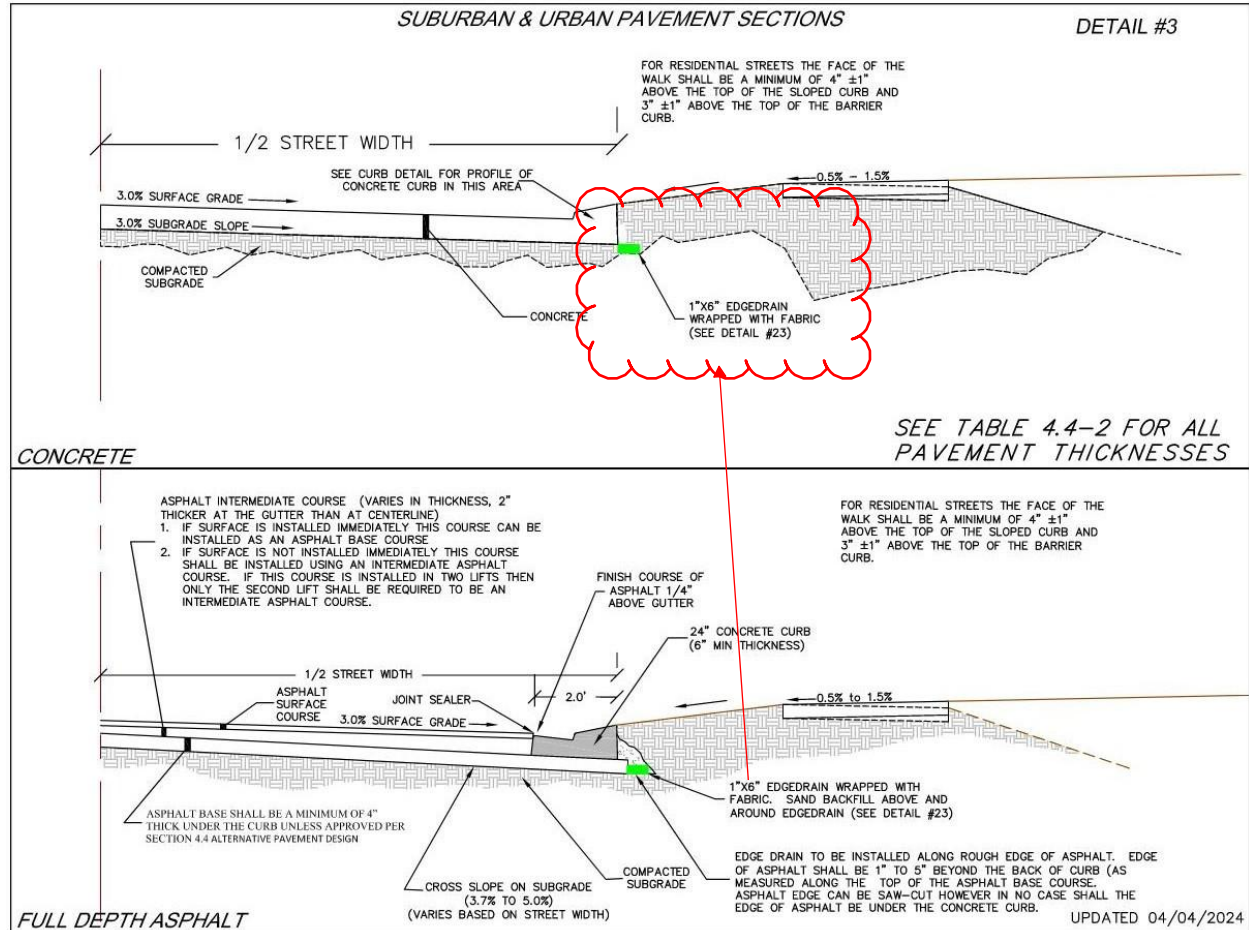


Figure A.1-R: Detail #16

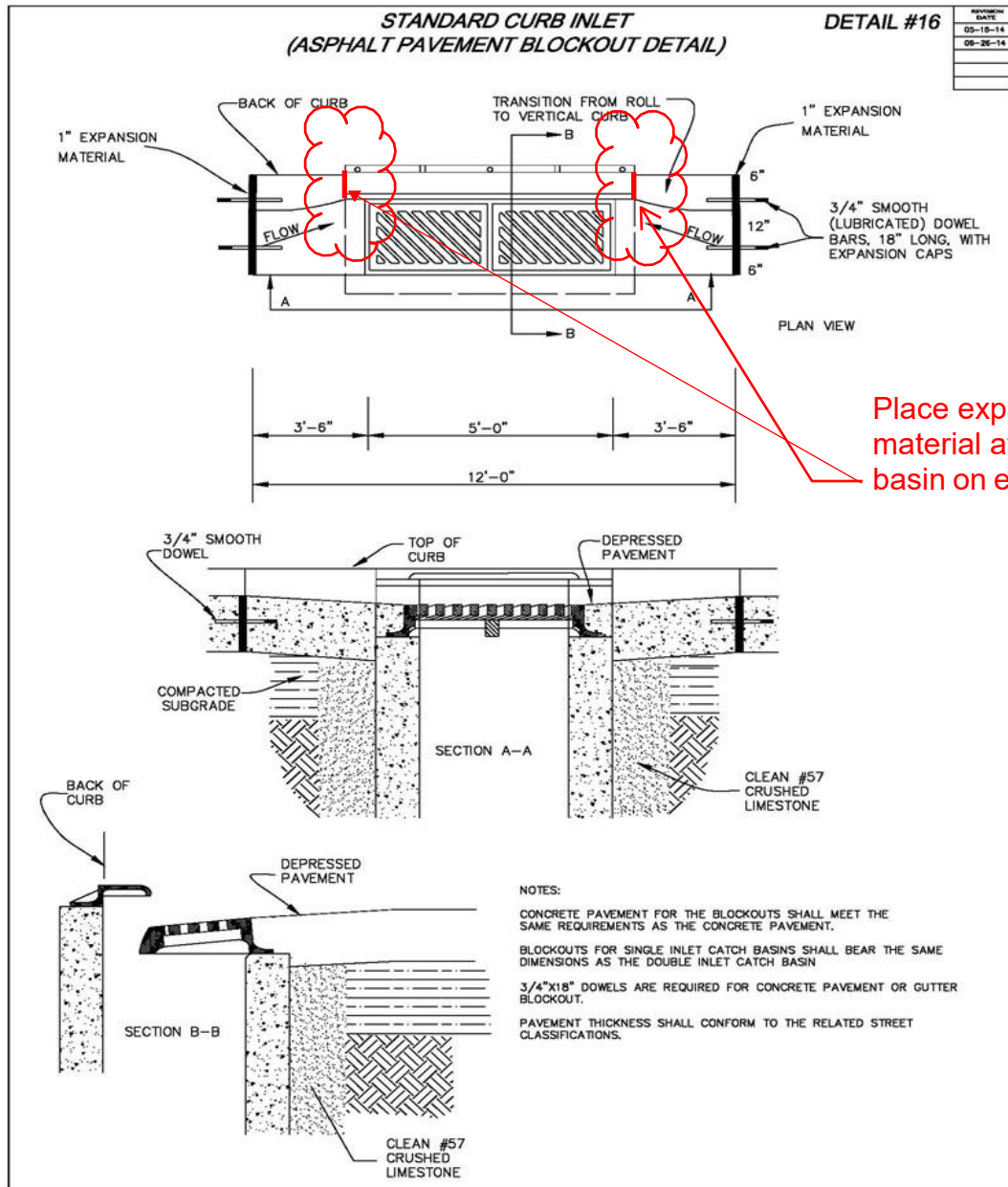


Figure A.1-Y: Detail #23

