Staff Report

TO: City Council

FROM: Robert L. Vestal, Public Works Director

DATE: December 3, 2024

SUBJECT: Truck Route Viability

Description Presentation on the viability of existing roads along the designated truck routes.

Background and Analysis:

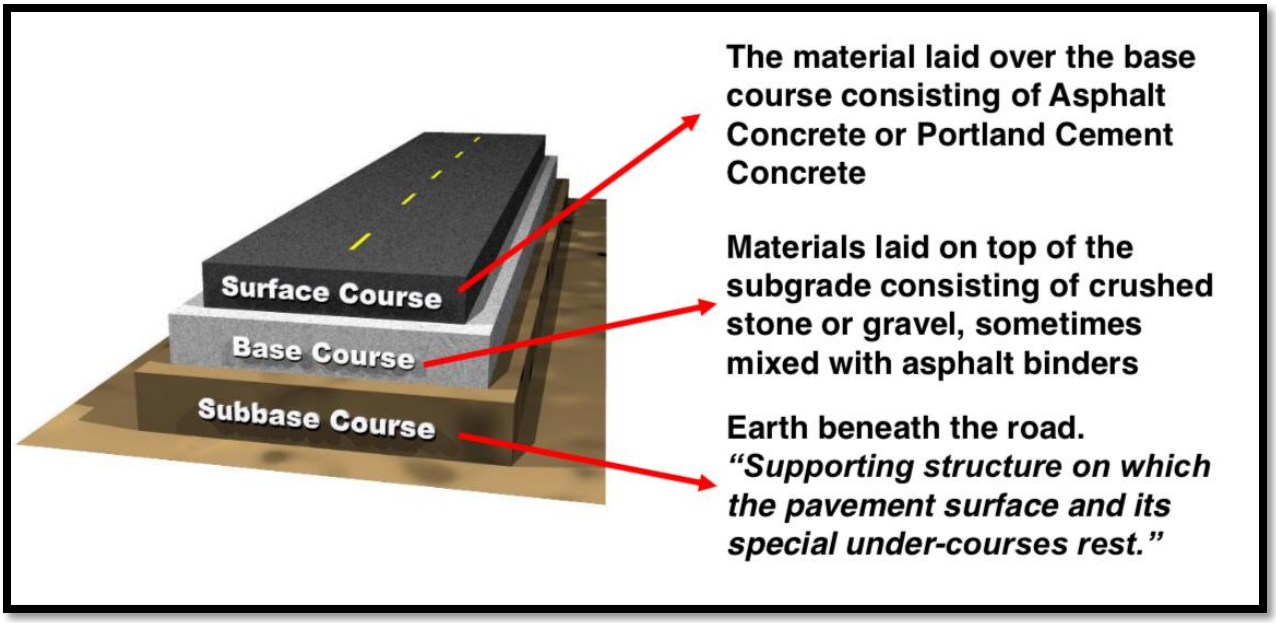
This item was requested by Council Member Voigt to provide information on the viability of existing roads along the designated truck routes.

Pavements are engineered to carry the truck traffic loads expected during the pavement design life. Truck traffic, which includes transit vehicles, trucks and truck-trailer vehicles, is the primary factor affecting pavement design life and its serviceability. Passenger cars and pickups are considered to have negligible effect when determining traffic loads that damage the pavement.

Pavement design life for new construction and reconstructed roads should be a minimum of 20 years. However, pavement design life varies depending on the structural section, traffic volume, and loading.

STRUCTURAL SECTION

The structural section of a road consists of a subbase or subgrade course, base course, and asphalt surface course.



Subgrade

The subgrade is the native soil, scarified to a minimum depth of six inches and compacted to a relative compaction of 90%. The best soil for roads is a mix of gravel and sand due to its inherent strength and stability. The worst soil for roads is silts and clays due to its ability to expand when exposed to moisture. Beaumont has a high percentage of clay.

Base Course

The base course consists of angular rock and sand with a specific grading (mix). It is placed directly over the subgrade and compacted to a relative compaction of 95%. The thickness is based on the empirical formula. A general rule of thumb is that the base course should be approximately twice the thickness of the asphalt course.

Asphalt Surface Course

The Hot Mix Asphalt (HMA) consists of a mixture of asphalt binder and a graded aggregate ranging from coarse to very fine particles. The binder is a Performance Graded (PG) system. Performance grading is based on the concept that asphalt binder properties should be related to the conditions under which the binder is used. PG asphalt binders are selected to meet expected climatic conditions as well as traffic speed and volume adjustments.

Therefore, the PG system uses a common set of tests to measure physical properties of the binder that can be directly related to field performance of the pavement at its service

temperatures. For example, a binder identified as PG 64-10 must meet performance criteria at an average seven-day maximum pavement temperature of 64°C and also at a minimum pavement temperature of –10°C. Beaumont historically used a PG 64-10 but has recently switched to a PG70-10 binder for better hot weather performance.

The asphalt surface is placed on top of the base course and is compacted to a density of 95% of a sample, which is compacted via a specific standardized test. The thickness is based on the empirical formula.

GENERAL PLAN AND RIVERSIDE COUNTY TRANSPORTATION DEPARTMENT (RCTD) STANDARDS

The City's 2040 General Plan- Mobility plan classifies the roads within the City as Local, Collector, Secondary, Major, and Arterials. For each classification, the RCTD standards provide a corresponding TI value and minimum structural sections. These values are useful for planning and analysis purposes and establishing minimum design standards. The following table is from Section 8.05, RCTD standards:

Road Type	Traffic Index	Minimum Structural Section [1,2] Thickness (feet)
Access Road [3]	5.5	0.25' AC / 0.50' AB
Short Local Street [4]	5.5	0.25' AC / 0.50' AB
Exterior & Local Street [4]	5.5	0.25' AC / 0.50' AB
Enhanced Local Street at School or Park	6.5	0.30' AC / 0.50' AB
Collector	7.0	0.35' AC / 0.50' AB
Industrial Collector	8.0	0.40' AC / 0.50' AB
Secondary Highway	8.5	0.45' AC / 0.50' AB
Major Highway	9.0	0.45' AC / 0.50' AB
Mountain Arterial Highway	9.5	0.50' AC / 0.50' AB
Arterial Highway	9.5	0.50' AC / 0.50' AB
Urban Arterial Highway	10.0	0.55' AC / 0.50' AB
Expressway	11.0	0.60' AC / 0.50' AB

RESULTS

City staff analyzed record plans and obtained the design structural section thicknesses for each Truck Route segment. The thicknesses were then compared to the corresponding road classification, TI, and minimum thicknesses. The following table shows the results:

Street	*Classification*	*Asphalt Thickness*	*Base Thickness*	*Meets Minimum*
1st Street	Major	2.5"	8"	NO
4th Street	Major	4.5"	10"	YES
Beaumont Avenue	Collector	5"	6"	YES
Cherry Avenue	Secondary	5"	7"	YES
Luis Estrada Road	Local	4"	8"	YES
Oak Valley Parkway	Arterial	5"	11"	YES
Pennsylvania Avenue	Major	6"	15"	YES
Potrero Avenue	Arterial	4.5"	10"	NO
Veile Avenue	Arterial	2.5"	4"	NO

The results indicate that First Street, Potrero Avenue, and Veile Avenue do not meet the minimum asphalt thickness. One solution is to mill the existing streets and place a thicker overlay to meet the desired thickness. However, with Veile Avenue and First Street, there is a concern that the minimum base thickness is not sufficient due to the streets receiving increased truck traffic in the future.

Therefore, City staff is recommending that future projects that will impact truck routes with truck traffic be conditioned to explore the structural sections of the affected roads via core drilling and provide thickness recommendations. Additionally, each project will be required to contribute a fair share to the repair based on its impact versus the cumulative truck traffic. The City will then develop a CIP project to perform the work.

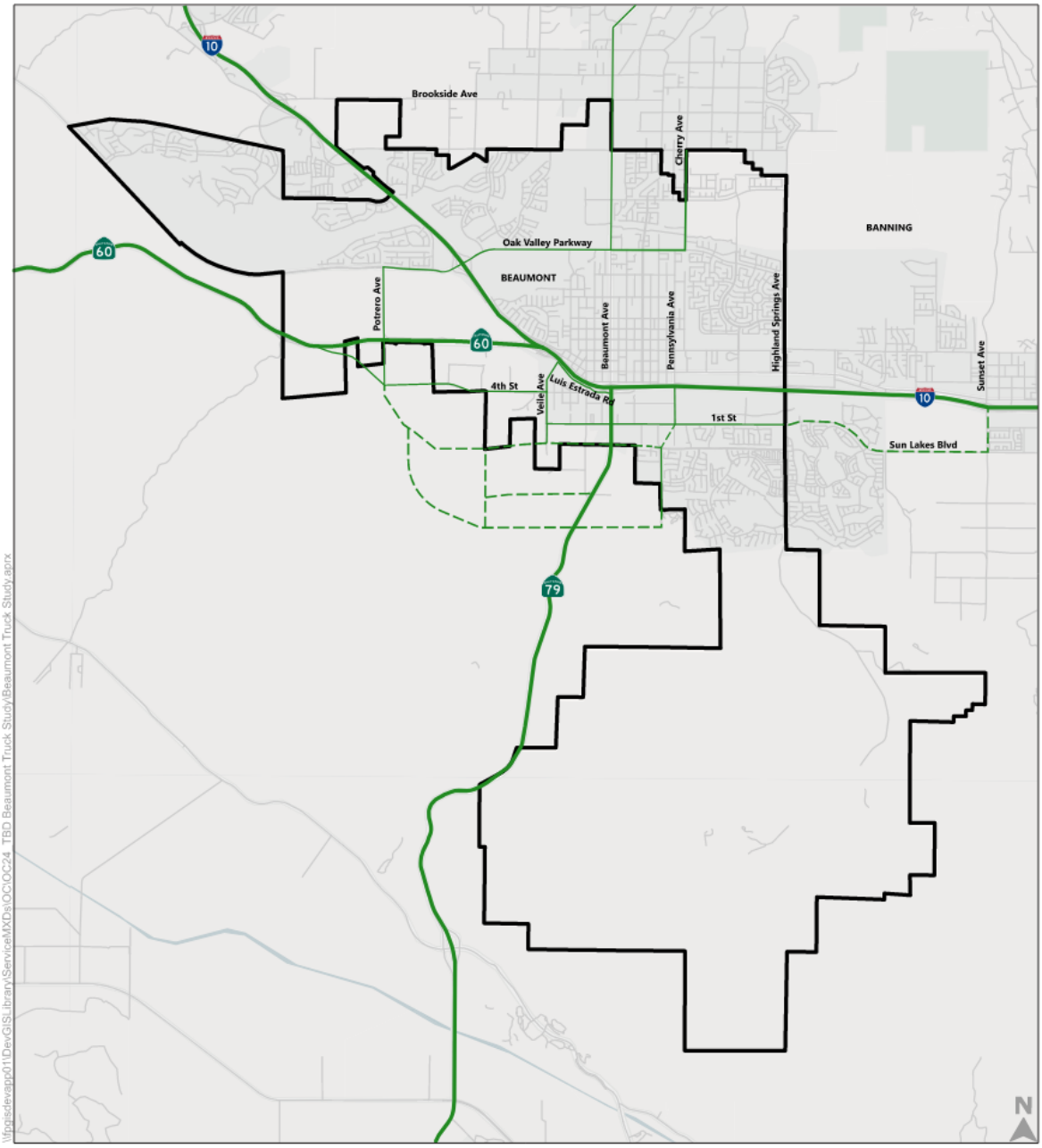


Figure 1 - Truck Routes

Fiscal Impact:

The estimated cost to prepare this staff report is $1,500.

There is no fiscal impact associated with this report.

Recommended Action:

Receive and file.