Fiscal Year 22/23

FINAL REPORT

Strategic Resource Evaluation Study Highway Construction Materials

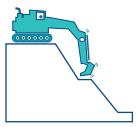
Contract BEC18

July 2023

The Balmoral Group

165 Lincoln Avenue
Winter Park, FL 32789

OVERVIEW ➤ FLORIDA'S HIGHWAY CONSTRUCTION MATERIALS

Construction Material	Status
 ASPHALT	**Record high asphalt bids continued in Fiscal Year 2022-23 (FY 2023), but forecasts show some moderation.** Contractors report resource bottlenecks, particularly with aggregate and in areas where very large projects dominate the market. Fiscal year-end bids support contractor reports of double-digit price increases, reflecting their pricing power. Ambitious work program funding is expected to support high prices, but economic reports of peak Florida growth may support more price competition and slight relief over the next two years.
 CONCRETE	**Structural concrete prices reflect shocking increases – 45% year-over-year - but forecasts show the trajectory flattening.** Cement volumes have declined with the housing slowdown, and there is new capacity for fly ash alternatives alongside increases in fly ash production. Aggregate issues continue to frustrate production, and concrete producers expect continued supply constraints to support price increases for the rest of the calendar year.
 STEEL	**Steel and metal products have seen lead times and price declines in recent months.** While the Ukraine War continues to affect supply chains and global demand, and producers report adjusting material sources, production has declined as mills anticipate further economic slowdown. Skilled labor shortages continue to affect production capacity; structural steel prices are expected to increase but at a more moderate rate over the next two years. Reinforcing steel is expected to decline significantly in 2024, reflecting slowdowns in other sectors.
 AGGREGATE	**Widespread aggregate logistics and local source disruptions and intense demand for material have supported double digit price increases that are expected to continue.** Multiple new sources have come online for the Florida Department of Transportation (FDOT) and are offsetting some of the reported labor, rail, trucking, and permitting issues. Producers implemented the promised price increases over the past two quarters successfully, and the higher charges are showing up in FDOT bids. In spite of the slowdown in the residential sector, the industry is optimistic for the rest of 2023 as long as demand from the public infrastructure and non-residential sectors remains strong.
 EARTHWORK	**Earthwork input costs are uniformly down, but costs are still up dramatically relative to pre-COVID prices, supported by increased demand.** Intense infrastructure spending continues to prop up historically high prices, despite the housing slowdown that traditionally has constrained earthwork bids.

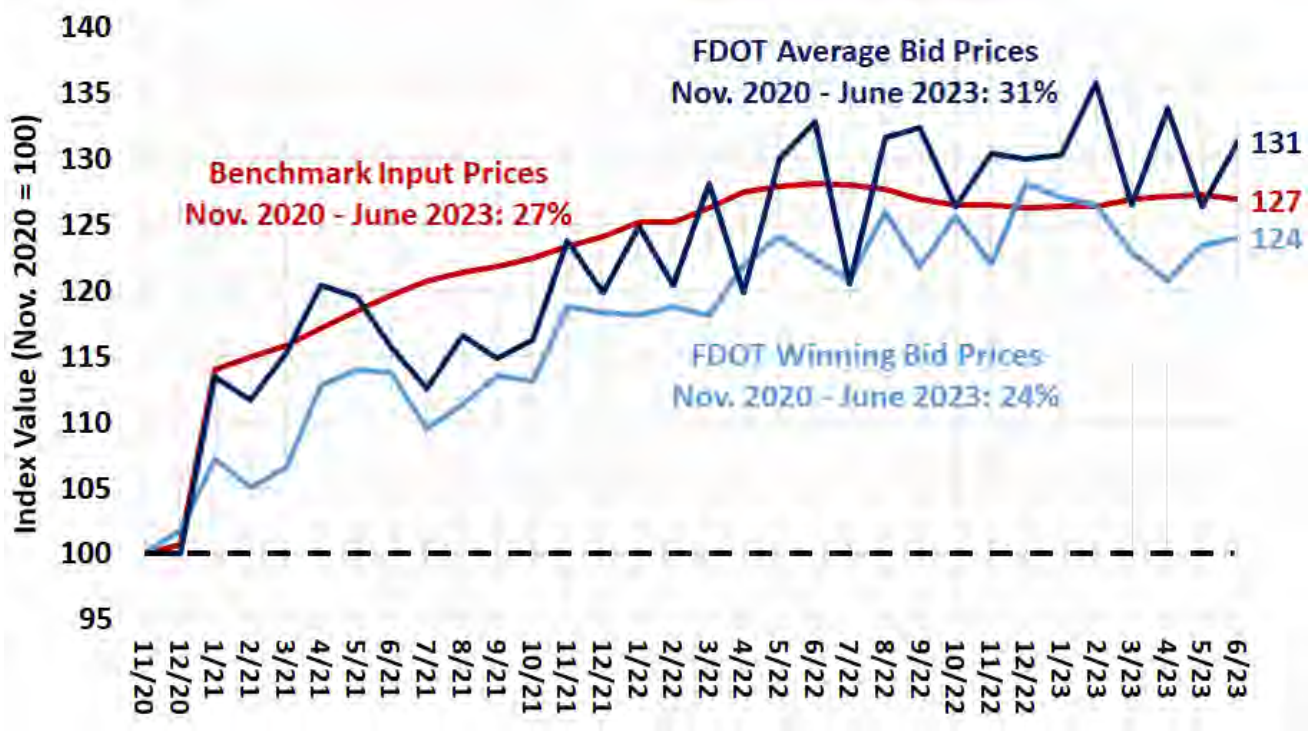
FDOT Cost Index

The FDOT Cost Index is calculated by assessing awarded and average bids since November 2020. The share of aggregate, asphalt, concrete, and steel dollars spent on FDOT projects is compared to a baseline index that is calculated from regional industry prices; see **Figure 1**.

Winning contractor bids and benchmark input prices converged earlier in 2023, but have since moderated compared to the benchmark. Average bid prices, on the other hand, ended the year 4% higher than the benchmark input price index. Winning bids are now 24% higher than November 2020 prices, while benchmark input prices are 27% higher. FDOT's bid prices have been affected by record high asphalt, aggregate, and concrete costs. However, the range between the average bid price index (calculated from all bids) and the winning bid price index widened over the last few months, indicating competition for FDOT contracts has improved.

Figure 1. Florida Benchmark Input Prices vs FDOT Bid Prices

Source: TBG calculated from data provided by FDOT Office of the Work Program and Budget, TBG Work Product.



Disclaimer

The opinions, findings, and conclusions expressed in this publication are those of the authors and not necessarily those of the State of Florida Department of Transportation

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INTRODUCTION

The Florida Department of Transportation commissioned The Balmoral Group (TBG) to evaluate the availability and costs of critical highway construction materials in Florida. The evaluation includes an analysis of existing and planned supply of these materials, and an estimate of future costs and quantity requirements FDOT will face in fulfilling its five-year work program. Materials in the analysis include the bituminous, cement, steel, aggregate and earthwork markets. An annual assessment of the materials markets and significant trends affecting FDOT's supply availability and costs is included in this report.

The report is organized as follows:

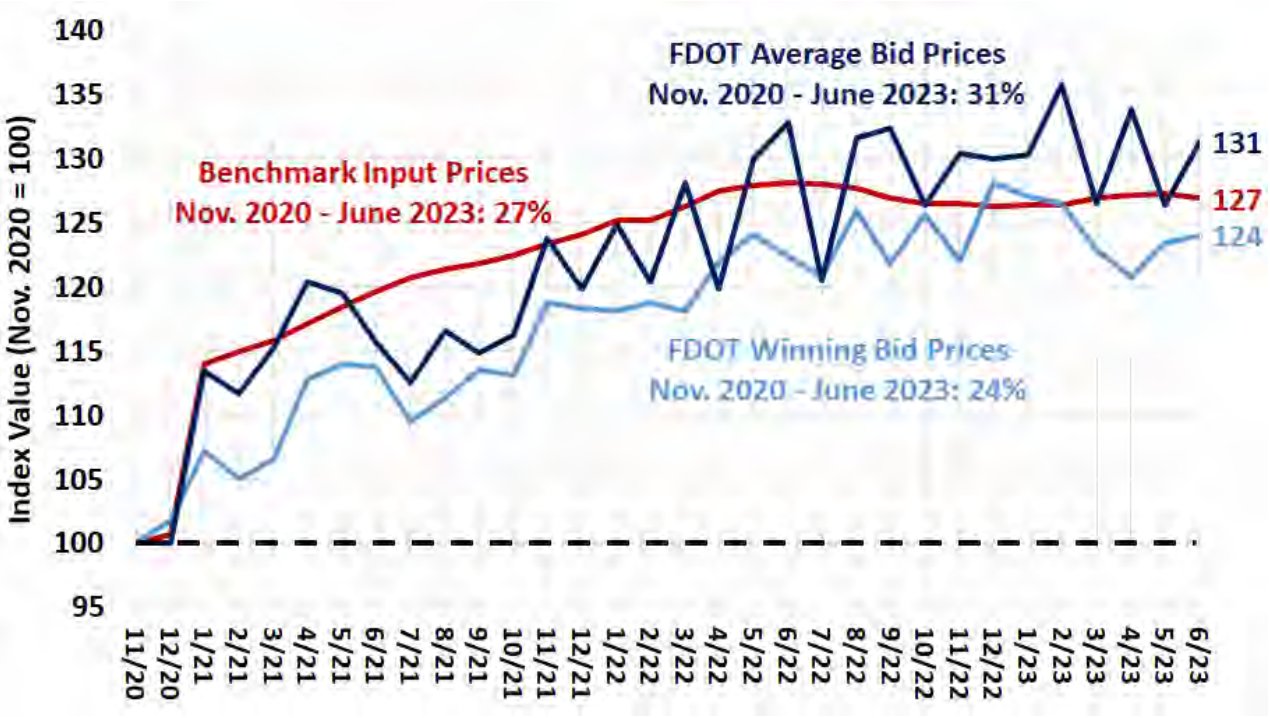
- **General Economic Landscape** for highway construction materials,
- **Work Program Work Mix** allocation and materials quantities estimates,
- **Material-specific findings** for supply chain variables, including
    - raw material sources,
    - existing and likely future transport and distribution methods,
    - potential impact of external forces including global markets, technological change, foreign materials, and environmental regulatory or permitting issues, as relevant,
    - forecasts of likely Florida supply and FDOT costs for the five-year work plan, and
    - GIS maps of existing supplier locations.

GENERAL OUTLOOK ➤ HIGHWAY CONSTRUCTION MATERIALS

Input Costs vs. Bid Prices

In Florida, regional input prices through June 2023 are up by about 27% compared to November 2020 levels (**Figure 2**). For awarded (winning) FDOT bids, price increases across all materials have increased about 24% during the same time period, reflecting a gap of about 3% - almost the same as one year ago, when the gap was 2%. For all FDOT bids (meaning the average of all bids received), price increases have tracked higher, at 31% - exceeding benchmark input costs virtually continuously for nearly one year at this point. Monthly cost composition by material is provided in **Appendix A**, along with an update on the Bureau of Labor Statistics (BLS) Producer Price Index (PPI).

Figure 2. Florida Benchmark Input Price vs FDOT Bid Prices

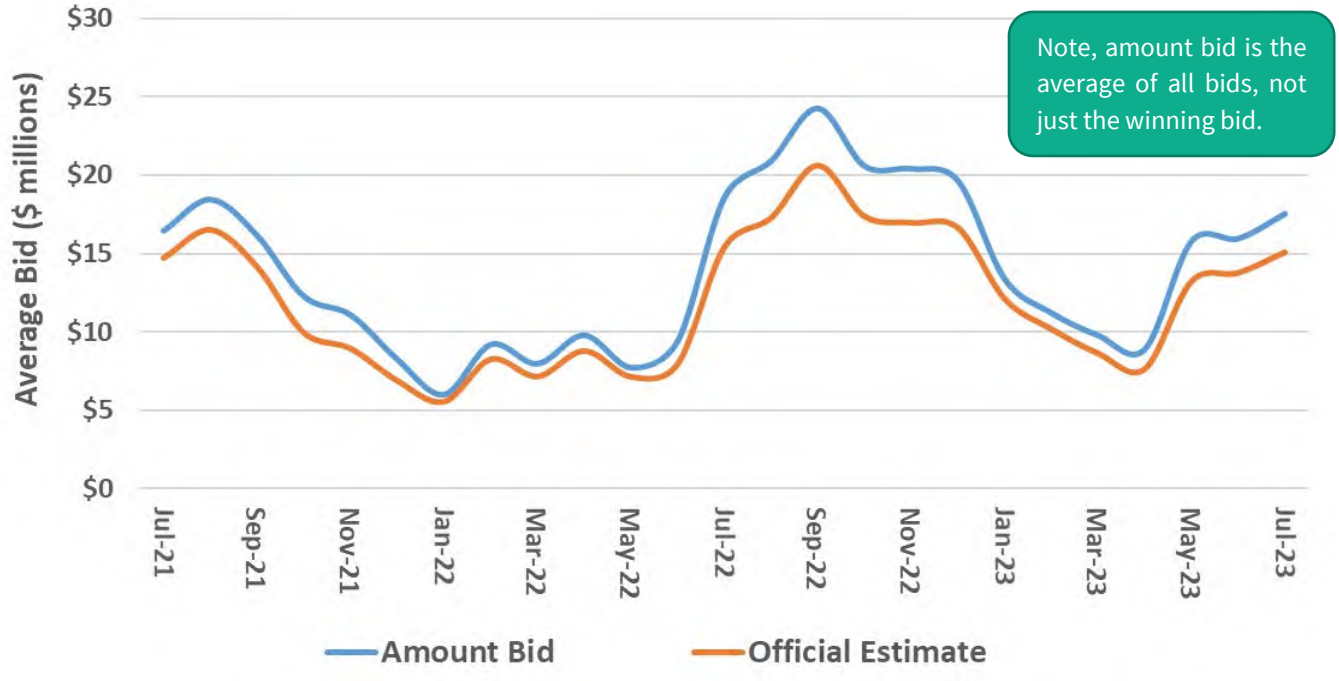


Source: TBG work product, calculated from data provided by FDOT Office of the Work Program and Budget and industry data.

Bid Data

Average bids provide insight to market trends; in economic terms, the expected value of a contract or project is the average of all bids. In this analysis, the average of all bids, or the mean, is compared to the official preliminary estimate. Using a 3-month rolling average, in the fourth quarter of Fiscal Year 2022-23 (FY 2023), the average deviation of all bids from the mean of all official preliminary estimates was 17%; higher than the previous quarter, but with similar patterns seen in earlier quarters (**Figure 3**). Excluding contracts exceeding an official estimate of $100 million from the analysis finds similar results, with bids being 16% higher than the official estimate. **Table 1** illustrates the average deviation from the mean bid by District.

Figure 3. Average Bid vs. Official Estimate. 3-month Rolling Average



Source: FDOT; TBG Work Product.

Table 1. Average Deviation from the Mean Bid by District

FY	District 1	District 2	District 3	District 4	District 5	District 6	District 7	District 8
1Q 2022	9%	15%	13%	10%	9%	9%	9%	0%
2Q 2022	10%	10%	11%	13%	10%	8%	16%	4%
3Q 2022	7%	5%	17%	9%	13%	11%	14%	5%
4Q 2022	9%	12%	15%	9%	8%	8%	13%	6%
1Q 2023	9%	13%	16%	12%	12%	14%	9%	9%
2Q 2023	10%	10%	8%	9%	14%	11%	5%	5%
3Q 2023	10%	12%	14%	7%	12%	9%	19%	4%
4Q 2023	10%	7%	14%	10%	9%	9%	9%	11%

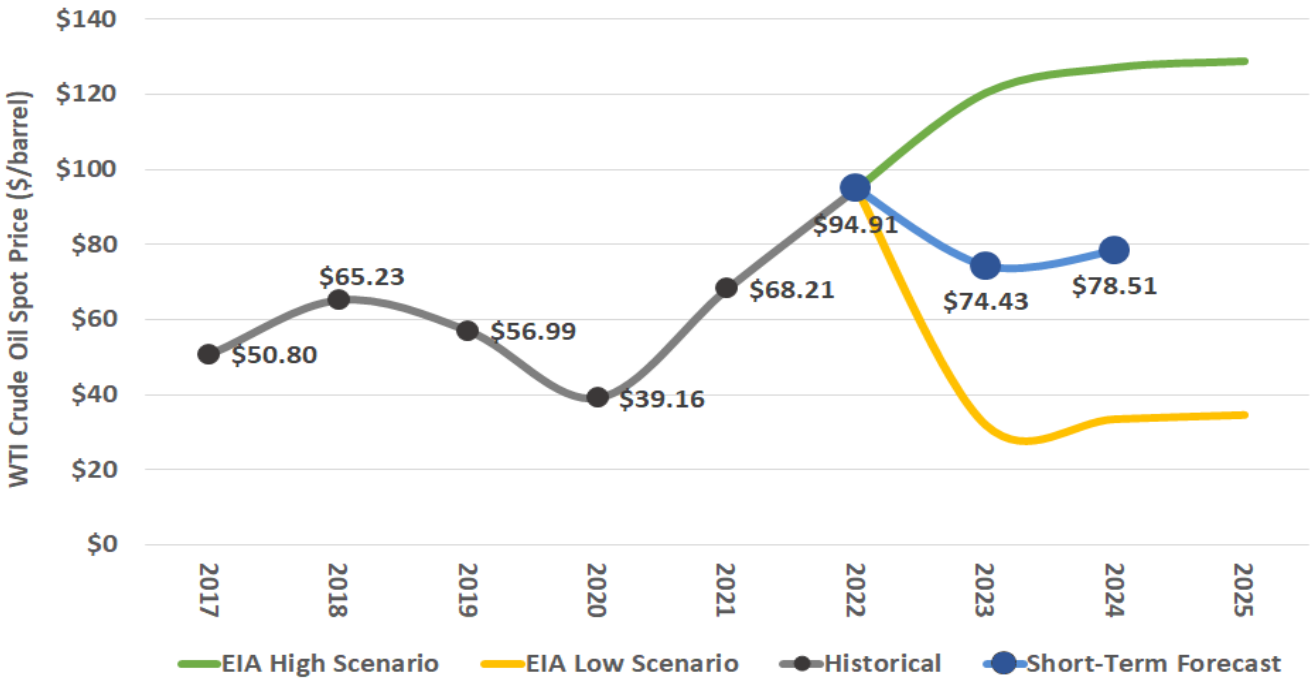
Source: FDOT; TBG Work Product

Energy Prices

The U.S. Energy Information Administration (EIA) July 2023 Short-term Outlook forecasts lower prices for 2023, but higher for 2024. EIA expects prices to be at $74 per barrel by year-end, a 22% decline from 2022 (**Figure 4**). For 2024, EIA estimates a slight increase to $79 per barrel under current economic conditions. As of this writing, prices declined 1% in July 2023 compared to the previous month. Year-over-year, crude oil prices are down 31%.

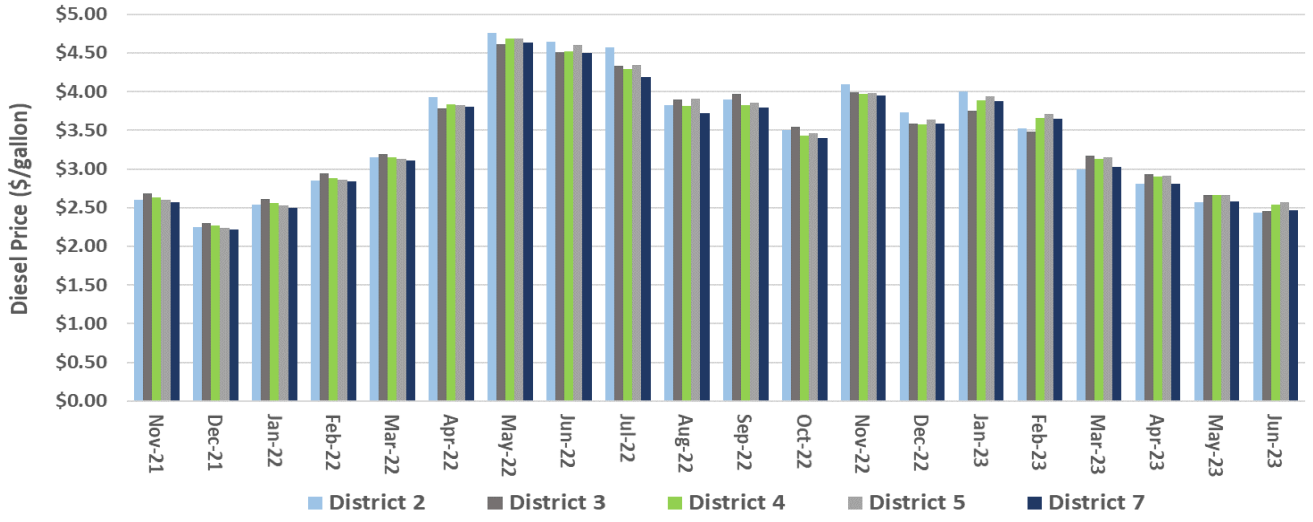
Diesel price quotes from suppliers at terminals around the state eased throughout the year. On average, prices in June 2023 were $2.49 per gallon, which is a 45% decline year-over-year (**Figure 5**). In June 2023, prices in all districts ranged between $2.47 and $2.57 per gallon. Statewide, the Fuel and Bituminous Average Price Index for diesel decreased 32% in 2023 through June and 42% year-over-year.

Figure 4. Monthly Crude Oil Price, 2017 to 2025



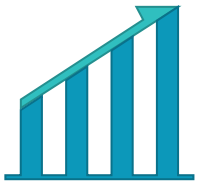
Source: EIA Annual Energy Outlook and Short-term Forecast.

Figure 5. Average Diesel Price by District



Source: FDOT, TBG Work Product (D1 and D6 terminals did not report data).

Inflation



The Federal Open Market Committee (FOMC) released revised economic projections in June 2023, increasing GDP estimates in 2023 from 0.4% in March to 1% last month. Inflation estimates, on the other hand, are now estimated to be slightly higher at 3.9%, up from 3.6% in March (**Table 2**). However, inflation is still expected to ease in 2024 to 2.6%, followed by 2.2% in 2025.

Table 2. FOMC Economic Projections, June 2023

Variable	Median				Range			
	2023	2024	2025	Long Run	2023	2024	2025	Long Run
Change in real GDP	1.0%	1.1%	1.8%	1.8%	0.5%–2.0%	0.5%–2.2%	1.5%–2.2%	1.6%–2.5%
March Projection	0.4%	1.2%	1.9%	1.8%	-0.2%-1.3%	0.3%–2.0%	1.5%–2.2%	1.6%–2.5%
Unemploy-ment Rate	4.1%	4.5%	4.5%	4.0%	3.9%–4.5%	4.0%–5.0%	3.8%–4.9%	3.5%–4.4%
March Projection	4.5%	4.6%	4.6%	4.0%	3.9%–4.8%	4.0%–5.2%	3.8%–4.9%	3.5%–4.7%
CE Inflation[1]	3.2%	2.5%	2.1%	2.0%	2.9%–4.1%	2.1%–3.5%	2.0%–3.0%	2.0%
March Projection	3.3%	2.5%	2.1%	2.0%	2.8%–4.1%	2.0%–3.5%	2.0%–3.0%	2.0%
Core PCE inflation[1]	3.9%	2.6%	2.2%	-	3.6%–4.5%	2.2%–3.6%	2.0%–3.0%	-
March Projection	3.6%	2.6%	2.1%	-	3.5%–4.1%	2.1%–3.1%	2.0%–3.0%	-
Projected appropriate policy path								
Federal funds rate	5.6%	4.6%	3.4%	2.5%	5.1%–6.1%	3.6%–5.9%	2.4%–5.6%	2.4%–3.6%
March Projection	5.1%	4.3%	3.1%	2.5%	4.9%–5.9%	3.4%–5.6%	2.4%–5.6%	2.4%–3.6%

Source: Economic Projections were provided by Federal Reserve Board members and Federal Reserve Bank Presidents.

Legislation and Regulations

State and federal funding and regulatory changes are expected to increase demand for, or otherwise impact highway construction materials resources:

[1] PCE inflation and core PCE inflation are the percentage rates of change in, respectively, the price index for personal consumption expenditures (PCE) and the price index for PCE excluding food and energy.

USE OF PHOSPHOGYPSUM AS AGGREGATE

Governor DeSantis signed HB 1191 which requires FDOT to conduct a study to evaluate whether phosphogypsum can be used as aggregate material in road construction. If the material is seen as a viable alternative to road base, it would require approval from the U.S. Environmental Protection Agency (EPA) as it is currently prohibited for road construction projects. Therefore, this would not be a short-term solution for aggregate supply.

WATERS OF THE UNITED STATES

As reported in the previous quarterly report, a Federal judge blocked the rule from taking effect in 24 states (Florida is included). Additionally, in May 2023, the Supreme Court ruled against the EPA in the Sackett v. EPA case, which struck down the revised definition of the rule published in January 2023. The EPA and the Army Corps indicated that they plan to have a revised rule by September 1st. As a result, uncertainty is expected to continue over the upcoming months.

MOVING FLORIDA FORWARD

Florida's 2023-2024 final budget includes $4 billion from the Moving Forward Initiative to accelerate major construction projects.

IMMIGRATION

SB 1718 went into effect July 1st, 2023. This bill requires employers with 25 or more employees to use E-Verify as well as increase penalties for those who don't comply. Using Census Data, the Migration Policy Institute estimated in 2019 that 109,000 undocumented workers were part of the construction industry.

DEBT CEILING BILL

The recently enacted Fiscal Responsibility Act of 2023 includes provisions that affect environmental reviews under the National Environmental Policy Act (NEPA). They narrow the scope and impose a two-year time limit for environmental impact statements and one-year for environmental assessments.

OTHER NEWS

The House and Senate passed their version of funding for the U.S. Department of Transportation for FY 2024. It is unlikely that they reconcile both versions before the August break and the deadline to approve funding is September 30th.

The Office of Economic and Demographic Research estimates that Florida's Revenue will peak in FY 2023 at $46.3 billion and marginally decline to $45.3 billion for FY 2024.

In other States, the Texas Legislature passed SB 2196, which orders a study to identify and map the State's aggregate resources and deposits. These must also be updated at least once every 10 years.

WATER RESOURCES DEVELOPMENT ACT

In December 2022, Congress reauthorized the Water Resources Development Act, which allows the U.S. Army Corps of Engineers to complete water infrastructure improvement studies and construction projects. In the authorized projects list, Florida has four for hurricane and storm damage risk reduction (in Monroe, Miami Dade, Okaloosa and Pinellas counties) and an additional in the Indian River Lagoon. The total value of these is close to $9 billion and as such, these projects increase competition for resources.

BUY AMERICA WAIVERS

In January 2023, the U.S. DOT issued two new Buy America waiver proposals after the six-month waivers expired on November 10th. The first one proposes to waive the requirements for iron and steel, manufactured products, and construction materials for de minimis costs, small grants, and minor components. The second one waives the requirements for contracts entered into before November 10, 2022 or for projects that were solicited before May 14, 2022 and entered into contract before March 10, 2023. Asphalt, cement, and aggregate materials are exempt from the requirements.

DRONE BANS

Starting April 5th, 2023, the Unmanned Aerial Systems (UAS) Minimum Security Requirements rule went into effect. This rule forbids Florida government agencies from purchasing or using drones from manufacturers in a foreign country of concern. China, which is where many drones in use were sourced from, is part of the list.

TRUCKING

Two bills were introduced in May 2023 in relation to increase the pool of drivers. H.R.3013, the LICENSE Act, which would make permanent two DOT waivers to allow skills test examiners to also administer the CDL knowledge test, and to administer a driving skills test to any applicant regardless of the applicants' state of domicile or training. Also, H.R.3408 DRIVE Safe Integrity Act, aims to relax some of the requirements to the Safe Driver Apprenticeship Pilot Program that have disincentivized carriers to participate. The American Trucking Association supports both.

Production Capacity

Table 3 provides a summary of both in-state and out-of-state plant counts for the primary materials types. The current inventory shows that all materials saw an increase of producers in FY 2023. The number of asphalt producers increased by 3%, aggregate and steel increased by 4% and concrete had the largest increase with 5%.

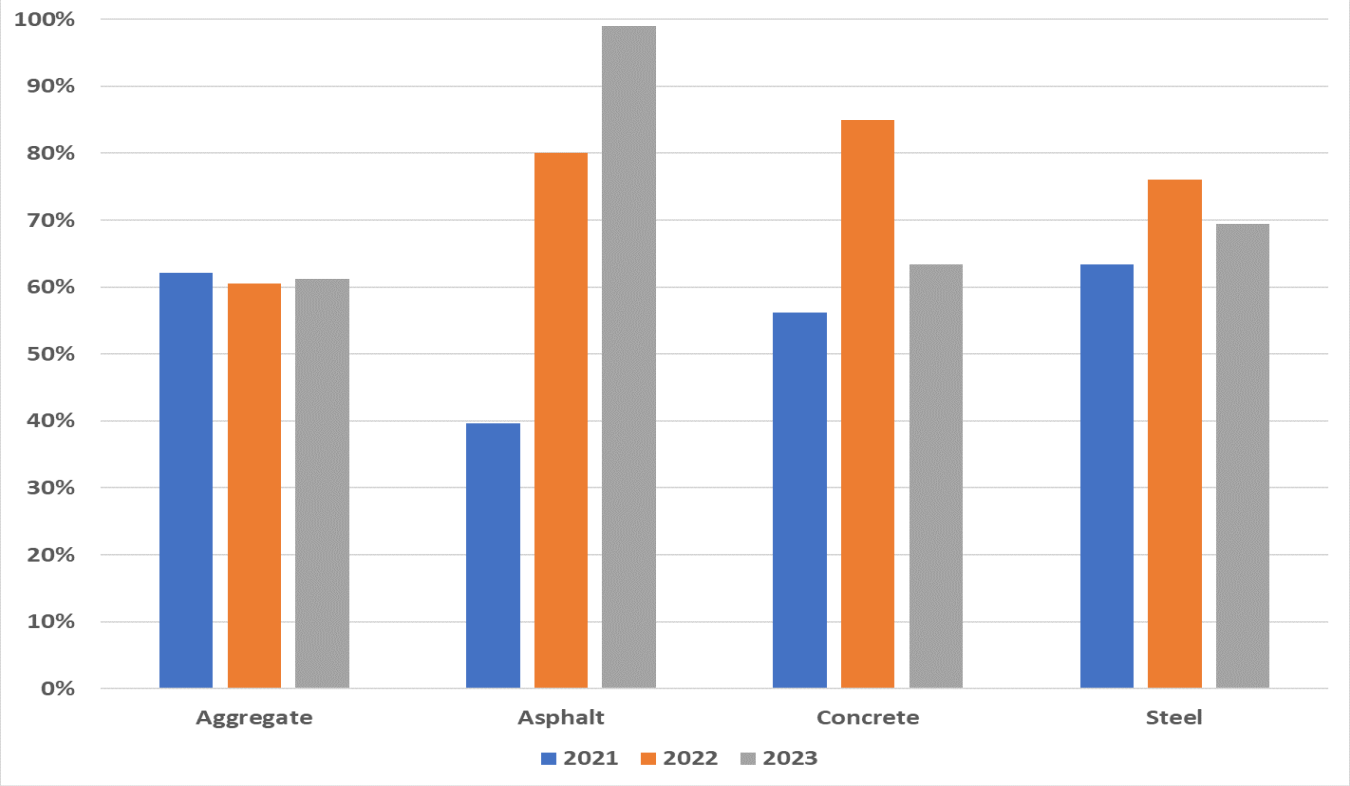
Table 3. Number of Producers by Material

Material Type	2012	2020	2021	2022	2023
Aggregate	188	236	238	243	252
Asphalt	109	115	116	120	123
Concrete (Ready-mix Plants)	327	486	494	496	519
Steel	135	112	113	121	126

Source: FDOT Approved Producer List, 2023 as of July 5th

In the 2023 TBG survey, FDOT made up about 26% of all aggregate work (up from 17% in 2022 and up from 25% in 2021) and 7% of all steel work (down from 13% in 2022 and 17% in 2021). **Figure 6** illustrates the changes in producers' capacity utilization rates. Aggregate and steel remained stable around 60-70%, while concrete had a slight decline. Asphalt in 2023 is close to 100% due to limited responses. However, it can be expected that producers are operating at high rates as funding has increased since last year.

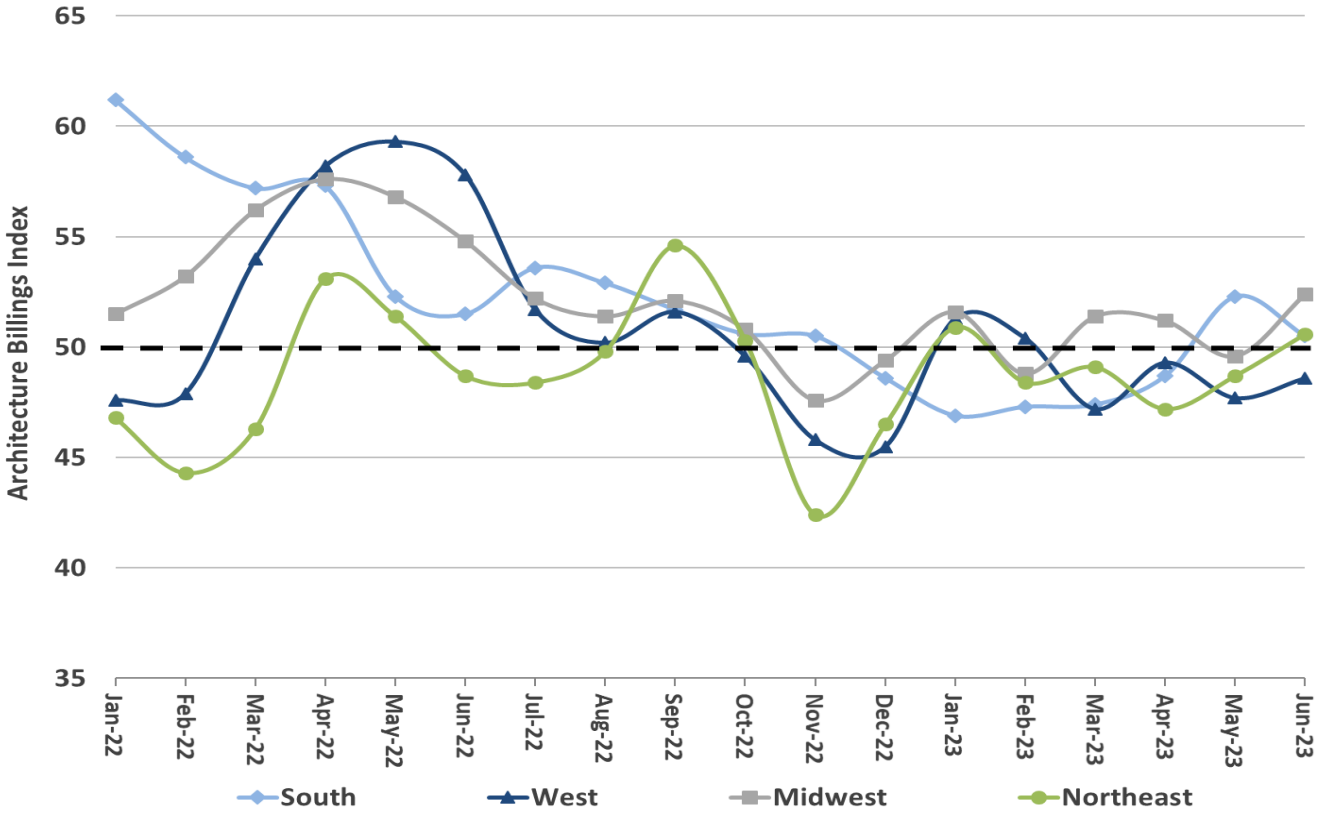
Figure 6. Capacity Utilization Rates



Source: TBG Survey

The Architecture Billings Index (ABI) is a leading indicator for nonresidential construction activity. [2] Nationally, the index was 50.1 in June, indicating that a slight majority of architecture firms saw increasing billings at their firms (**Figure 7**). Since December 2022, the ABI has stayed around 50 in all regions. While the southern region was the only one consistently below 50 since November 2022, it has increased above 50 for the last two months, indicating an improvement in business conditions.

Figure 7. ABI Billings Index, Jan. 2022 – June 2023



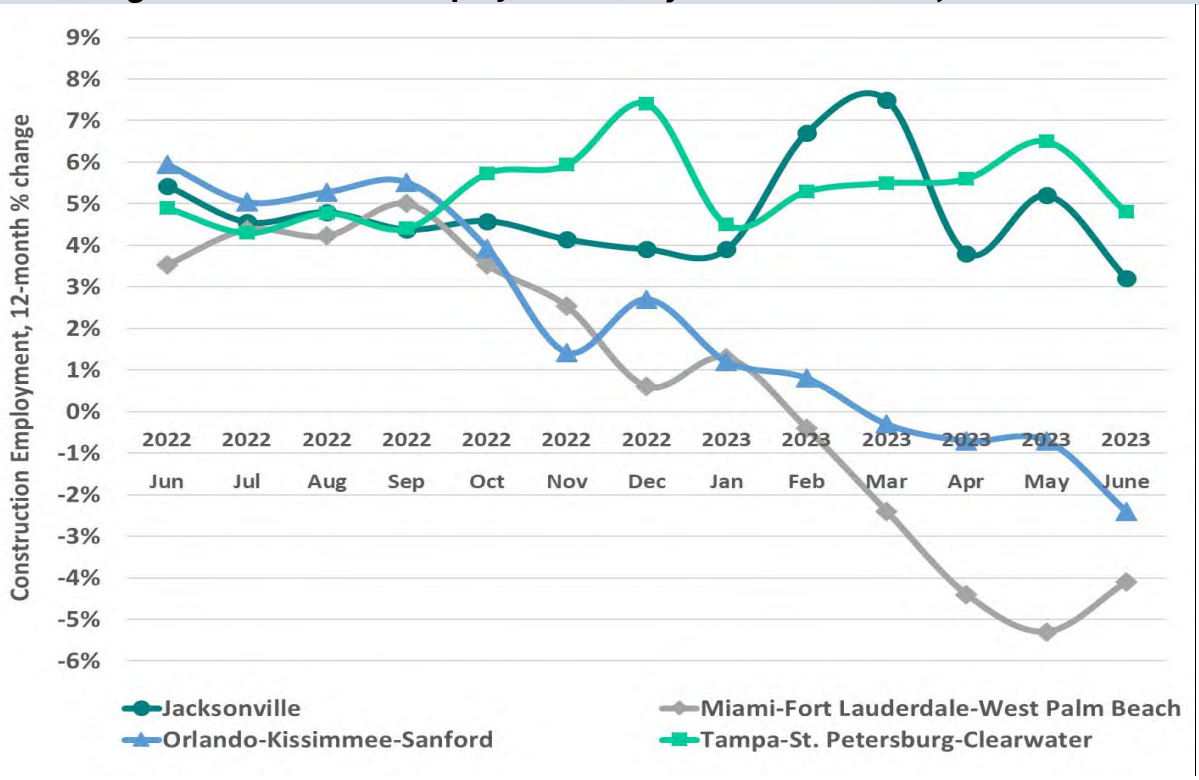
Source: American Institute of Architects, Architecture Billings Index

Construction Employment

Statewide construction employment slowed in June 2023 to 1% higher than the same month last year (**Figure 8**). However, metro areas had different growth patterns. While activity in the Tampa and Jacksonville metro areas remained high, they slightly retreated from May's estimates. Construction employment declines in the Miami and Orlando metro areas persisted. The declines in these cities are potentially due to workforce availability e.g., increasingly unaffordable housing. As mentioned in the legislation section, SB 1718 went into effect on July 1st. As changes in labor availability across the state are expected by labor lawyers and others, the situation warrants monitoring to mitigate potential impacts from competing sectors, labor cost increases, and project delays.

[2] ABI Billings are considered a leading indicator, meaning that construction activity 9-12 months from now generally follows the current ABI billings activity. A score below 50 indicates declining firm billings.

Figure 8. Changes in Construction Employment in Major Florida Markets, June 2022 – June 2023



Source: Bureau of Labor Statistics.

Additional information on economic conditions is provided in **Appendix A**.

Rail

Issues in rail have continued through this past fiscal year with different kinds of disruptions including lengthy negotiations between railroads and labor unions, Seminole Gulf Railway's closures in some areas in District 1 due to hurricane damages as well as service disruption.[3] CSX's employee counts have continued increasing in an attempt to improve service. In July 2023, the company averaged 7,523 train and engine employees, a 7% increase year-over-year. In regards to operating performance, they have improved compared to 2022, but producers continue reporting issues with reliability and service. Through July 2023, terminal dwell time in Jacksonville decreased 17% to 19.9 hours and 30% in Waycross, GA to 24.1 hours.[4] The overall system dwell time in 2023 was 19.6 hours, so while Jacksonville is comparable, delays in Waycross are higher.

Higher dwell times means that it takes more time to get material out of the station, which could lead to project delays.

[3] Traffic usually includes a variety of building materials such as lumber, rebar, and aggregates and carries 2,500 carloads of freight annually

[4] Average amount of time in hours between car arrival to and departure from the yard

On recent news, Canadian Pacific Kansas City (CPKC), CSX and Genesee & Wyoming railroads reached an agreement to establish a direct CPKC-CSX interchange connection in Alabama. CPKC and CSX would each acquire or operate portions of the 168-mile Meridian & Bigbee Railroad to establish a new freight corridor that connects Mexico, Texas and the U.S. Southeast. If this transaction is completed, it would provide producers, especially in the Northwest side of the State, with the possibility to access to new markets by rail.

WORK PROGRAM ➤ **HIGHWAY CONSTRUCTION**

A summary of FDOT's Five-year Work Program (including P3 projects) by Work Mix Type is shown in **Table 4**. The Work Program totals in fiscal years 2027 and 2028 reflect approximately $1.5 billion (each year) in allocations for Resurfacing and Bridge Repair projects that are not yet programmed.

On the roadway maintenance side, resurfacing projects continue to lead projected allocations from FY 2024 to 2028. Similarly, Add Lanes construction funding is expected to exceed $1 billion for four of the five work program years. Work Mix Types follow typical allocations, though New Bridge/Bridge Replace project expenditures are expected to increase in FY 2027 for bridge repairs and replacements in Duval County and others. Concrete requirements for FDOT are expected to increase substantially in FY 2027 as a result.

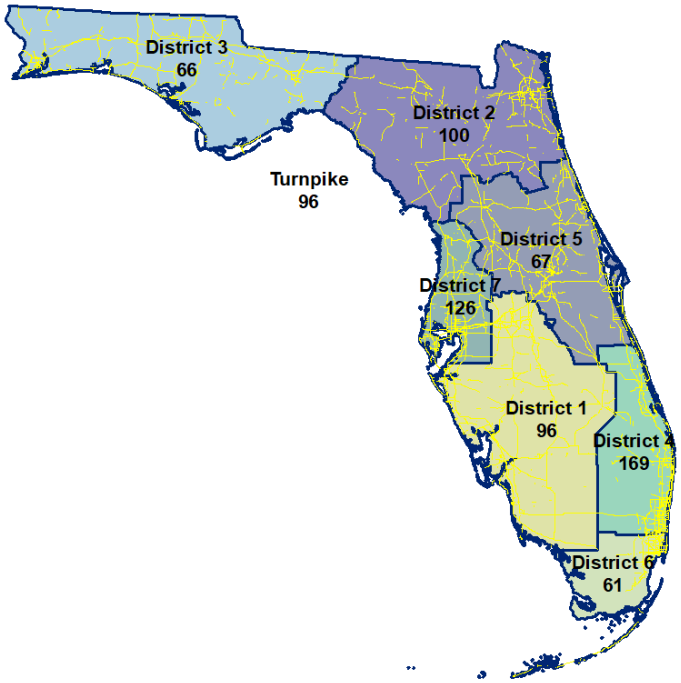
Table 4. Work Program Dollar Allocation by Work Mix Type (in thousands)

Work Mix Type	2024	2025	2026	2027	2028
Add Lanes	$2,566,095	$2,004,906	$1,497,617	$697,493	$1,384,141
Bikepath	$90,042	$70,310	$54,565	$28,096	$45,467
Bridge Replace/New	$552,035	$162,540	$516,065	$739,078	$408,314
Drainage	$193,949	$3,583	$6,202	$44,079	$13,305
Guardrail	$23,288	$19,207	$15,785	$12,782	$14,106
Interchange	$1,570,921	$307,034	$81,720	$507,881	$494,303
Intersection	$62,692	$32,835	$10,203	$58,884	$12,494
ITS	$84,326	$26,310	$9,761	$2,564	$15,477
Landscaping	$47,218	$71,142	$35,759	$16,610	$12,354
Miscellaneous	$175,516	$91,156	$99,450	$39,183	$17,045
New Road	$30,809	$745,210	$275,067	$32,236	$33,205
Resurfacing	$1,542,059	$1,652,024	$1,607,216	$1,355,991	$1,368,919
Rigidpave	$16,866	$71,899	$41,648	$27,673	$32,808
Signing/Pavement Markings	$17,638	$2,539	$3,988	$1,123	$3,361
Toll Plaza	$87,843	$42,414	$38,867	$14,201	$43,429
Traff Ops	$49,044	$44,782	$31,843	$16,735	$24,257
Widen/Resurface	$36,940	$7,849	$0	$5,466	$0
Total Work Program	**$7,147,279**	**$5,355,741**	**$4,325,756**	**$3,600,074**	**$3,922,985**

Source: TBG calculated from data provided by FDOT Office of the Work Program and Budget.

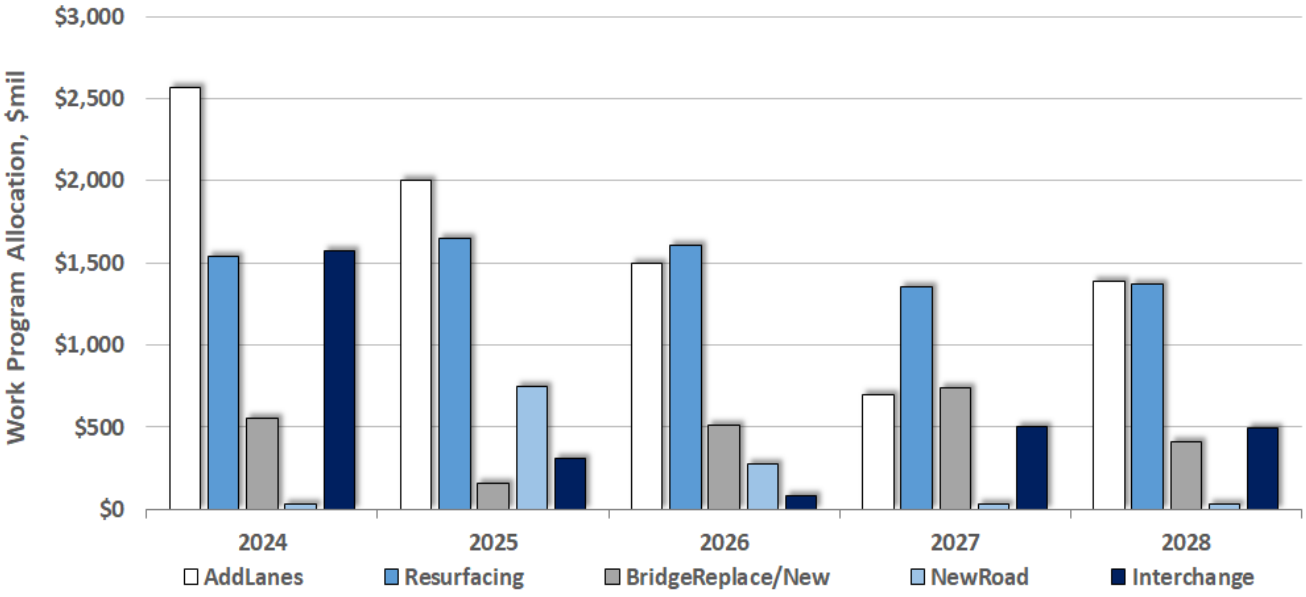
Figure 9 shows projects identified by the FDOT Five-year Work Program and bridge counts derived from Work Program data by district. **Figure 10** provides a comparison by Work Mix type of allocated work program funds for major projects over the five-year work program.

Figure 9. Work Program Bridges Count Estimates by District



Source: TBG calculated from data provided by FDOT Office of Program Management

Figure 10. Work Program Allocation by Work Mix Type, Average Allocation > $250 million



Source: TBG calculated from data provided by FDOT Office of the Work Program and Budget.

Estimates of Future Quantities

Materials quantity estimates are provided in **Table 5**. Funding is currently front-loaded into FY 2024 at a record high of $7.1 billion before declining to about $4 billion for the last three years of the work program.

Table 5. FDOT Future Material Requirements

Material	Units	2024	2025	2026	2027	2028
FDOT Work Program[5]	$ millions	$7,100	$5,285	$4,290	$3,583	$3,911
Asphalt	000s TN	6,494	6,214	5,641	5,444	5,788
Concrete						
Structural Concrete	000s CY	1,496	452	1,364	2,197	1,282
Ancillary Concrete		1,207	874	609	399	610
Total Concrete		2,704	1,326	1,972	2,596	1,892
Steel						
Reinforcing Steel	TNs	20,630	14,764	11,524	9,256	9,713
Structural Steel		25,886	18,526	14,461	11,615	12,187
Other Steel		131,635	94,208	73,536	59,063	61,976
Total Steel		178,151	127,498	99,521	79,933	83,876
Aggregate						
Base Material/Other Aggregate	000s TN	3,444	2,647	2,086	1,691	2,219
Aggregate for Asphalt[6]		4,682	4,390	3,904	3,728	3,921
Aggregate for Concrete		3,705	1,817	2,703	3,557	2,592
Total Aggregate		11,831	8,854	8,692	8,975	8,732

Source: Calculated by TBG, from FDOT Work Program & Estimates data.

Based on survey/interview results and data from current year lab volumes received for testing by FDOT, estimates of likely scenarios for binder demand were prepared. **Table 6** provides a breakdown by type of binder demand for the five-year work program.

Table 6. FDOT Future Requirements of Asphalt Binder

Asphalt Binder (Tons)	2024	2025	2026	2027	2028
PG 52-28	34,872	34,731	32,148	28,639	28,546
PG 58-22	52,986	52,065	47,884	43,825	44,692
PG 67-22	4,720	4,516	4,100	3,957	4,207
PG 76-22 (PMA)	178,304	165,174	147,478	145,904	157,661
High Polymer	13,733	15,865	15,639	16,285	18,583

Source: Calculated by TBG, from FDOT Work Program & Estimates and SMO data.

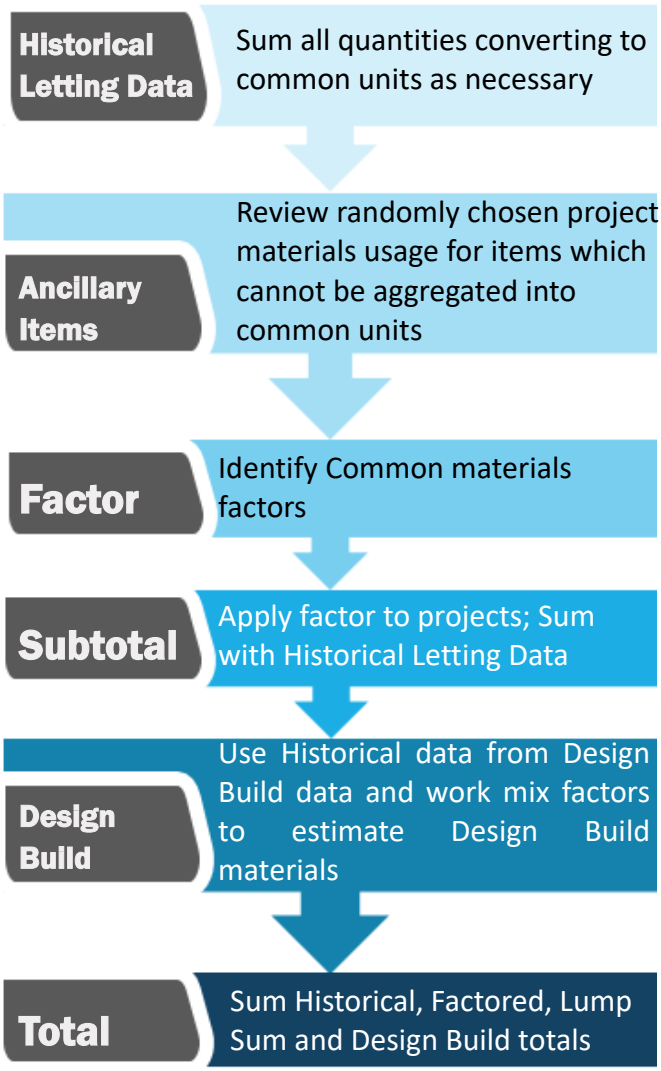
[5] Excluding landscaping. Refer to **Table 4** for landscaping allocations.

[6] The latest FDOT data shows that reclaimed asphalt pavement (RAP) usage has increased to about 22% of total asphalt as of fiscal year 2023. The share of aggregate in asphalt is 75% and binder is about 4%. This analysis assumes that RAP usage will continue to increase by 1-2% annually over the next few years due to aggregate shortages and higher prices.

FDOT Data

Future quantities are estimated for the five-year work program (**Figure 11**). Historical Lettings and LRE data are received from the FDOT Offices of Work Program and Budget and Program Management/Estimates. Historical Lettings data contains pay item level lettings data from July 2009 through June 2023 (FDOT fiscal years 2010 – 2023) and LRE pay-item level data from July 2023 through June 2028 (fiscal years 2024 – 2028). FDOT Work Program and P3 data was received from the Office of Work Program and includes 1,901 unique projects.

Figure 11. Basis of Calculations



Quantities are estimated using a factor approach. The factors were calculated by Balmoral economists and roadway engineers after evaluating several statistical relationships, including historical share of dollars spent for different project types, length of project and other variables depending on work mix type. The factors were originally created in 2007 from pay item data and most recently updated using pay item data through 2023 for the current study.

Raw Five-year Work Program data includes work mix level dollars for fiscal years 2024 – 2028. LRE data provided to Balmoral contains 1,501 unique projects. LRE price estimates for 2024 through 2028 were based on project types and used in conjunction with Work Program dollars to estimate future material quantities.

ASPHALT

Summary

- Asphalt producers expect to raise prices by double digits through calendar year-end 2023.
- Binder prices had significant year-over-year declines, but stagnated mid-year.
- Producers continue reporting issues securing raw materials as major projects are absorbing large amounts of resources and causing bottlenecks. Labor and aggregate availability were cited as concerns to meet production.
- Producers indicated no issues securing polymer.

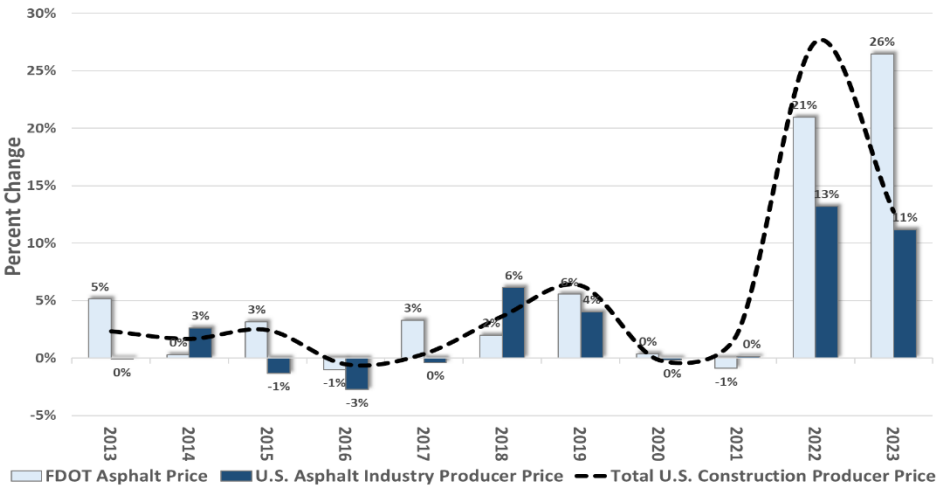
FDOT Impacts

- Continued high demand is expected to keep asphalt bids high.
- Year-end Weighted Average Prices for FY 2023 show a 26.5% increase in FDOT HMA bid price estimates, with some slight declines in FY 2024 and 2025. Consumption is expected to be around 18 million tons, or relatively flat, reflecting the downturn in housing but uptick in infrastructure and resilience spending around the state.
- The number of asphalt producers in FDOT's approved producer list and the Florida Department of Environmental Protection's (FDEP) air permitted facility list continued increasing this year. However, given the high demand that currently exists, it's unlikely that a few additional suppliers will help to lower FDOT's costs.

General Trends

Nationally, while construction producer prices fluctuated between -3% to 6% in most years, they drastically increased in calendar year 2022 and have slightly eased in 2023. Meanwhile, FDOT's asphalt prices also drastically increased 13% in 2022. A comparison of changes in producer prices since 2013 as well as FDOT's asphalt price is provided in **Figure 12**. Producers didn't indicate price increases due to Buy America requirements, so the increases are due to ongoing market conditions.

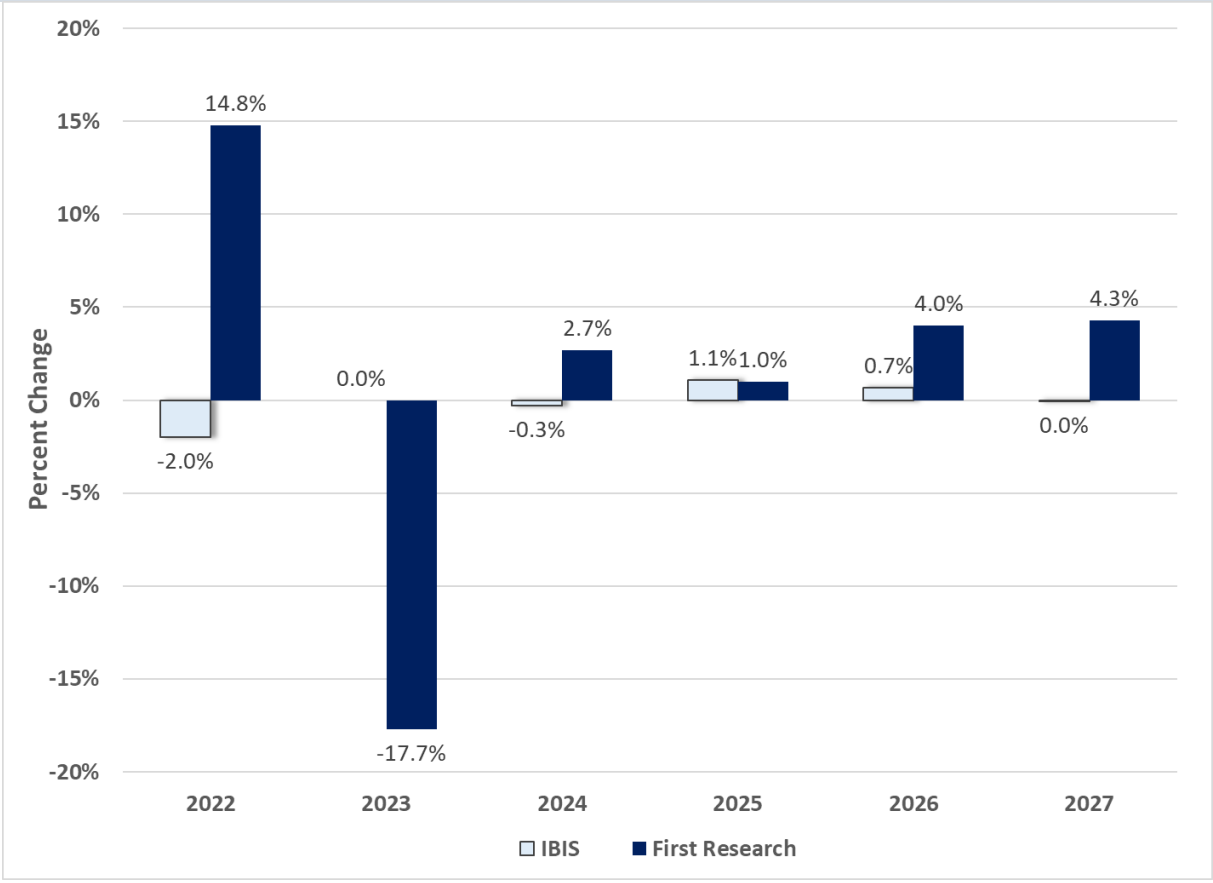
Figure 12. Change in Producer Prices, Asphalt Industry



Source: FDOT, U.S. Federal Reserve.

Recent revenue projections through calendar year 2027 differ in the growth rate for the asphalt industry. While some expect slow growth around 1% at most, others show wildly varying growth closer to 4% after rapid growth and contractions in recent years (**Figure 13**). Florida tends to have a hangover effect from the rest of the U.S., and projected infrastructure spending, including additional funding included in the work program, would tend to support higher growth estimates for the next two years. Higher spending on infrastructure has also changed where manufactured asphalt is used. According to IBISWorld (IBIS), while in calendar years 2021 and 2022 19-20% of asphalt produced was for road projects, in 2023 the share increased to 29%. As competing sectors like residential construction slowdown, this share may continue increasing.

Figure 13. Asphalt Manufacturing Industry Revenue Outlook



Source: IBIS January 2023 Asphalt Manufacturing Report; First Research Industry Report June 2023.

FDOT is testing mix designs containing varying amounts of RAP to offset aggregate costs and supply issues without sacrificing quality. New asphalt mixes are also being tested by other states. The Missouri Department of Transportation and researchers from the Mizzou Asphalt Pavement and Innovation Lab are testing the effectiveness of using nine types of recycled materials along a section of I-155. Materials include three different types of polyethylene and ground tire rubber.

SUPPLY CHAIN VARIABLES ➤ **ASPHALT PAVEMENT MATERIALS**

Table 7 provides the current status of selected variables of interest. **Table 8** provides a summary of relevant variables that have been found in the past to influence FDOT's costs at a statistically significant level from 2014 - 2023.

Table 7. Supply Chain Summary: Asphalt Materials

 Aggregate	The U.S. Geological Survey (USGS) reported that Florida's crushed stone production rose 11% in calendar year 2022 and 1% during the Q1 of calendar year 2023. Securing raw materials in a reliable manner is still a regional issue. Producers continue indicating that aggregate availability is causing bottlenecks. Interviews from previous reports indicated shortages of #57 and #89 stone to be a major concern in the northern half of the state.	↑
 Refinery Capacity	Excluding the weather-related disruptions that took place in December 2022 and carried early into 2023, refinery utilization in the Gulf Coast has stayed around the mid 90% point. Costs declined from highs seen in calendar year 2022 with lower fuel prices, but they will continue to be affected by geopolitical factors, such as Organization of the Petroleum Exporting Countries (OPEC+) production quotas announcements. According to the Oil & Gas Journal, refinery capacity in the U.S. for asphalt production was unchanged in 2022 and according to EIA's annual capacity report U.S. refinery capacity grew 1% in 2023. In November 2022, the U.S. eased sanctions on Venezuela, allowing Chevron to import Venezuelan oil.	↑
 Asphalt Binder	Unmodified (PG 67 & lower) asphalt binder prices continue declining. In calendar year 2023, they have declined 5% and since July 2022 they declined 19%. Rack binder prices in Jacksonville, Miami and Tampa declined 20%, 21% and 23% year-over-year, respectively. Global oil supply-demand dynamics are changing with Russian oil sanctions. As mentioned in previous reports the EIA estimated that asphalt supplied to the East Coast rose 9% in 2022, indicating high demand for resources. Through April 2023, asphalt production in the Gulf Coast declined 12% year-over-year.	↑
 Polymers	With very few suppliers, polymers are a source of vulnerability. U.S. production of resins declined 6% in May 2023 vs. May 2022. Year-to-date production decreased 1% year-over-year. The Chemical Regional Production Index rose slightly in May 2023 from February still showing a positive trend in chemicals production. However, there is uncertainty in the industry for the second half of 2023. Reference prices and volumes from Q1 of calendar year 2023 earnings of a publicly traded polymer producer continued seeing double digit declines (up to 34% year-over-year). The average cost per ton of ethylene production also declined 30% quarter-over-quarter and declined 48% since Q2 of calendar year 2022. Producers have not indicated issues finding polymers.	↑

 Imports	Reports indicate that congestion at ports has decreased significantly and is no longer an issue in many cases. Data from the U.S. International Trade Commission shows that imports of bitumen products to ports that service the Florida market declined 12%. In 2023 through May, imports decreased 20% year-over-year. Countries of origin include Canada, Colombia and Spain. If producers are able to find product locally, then they are less exposed to issues with freight. For instance, competition for Jones Act ships is expected to increase as exports of renewable diesel from the Gulf coast are expected to increase in 2023. This would increase competition and shipping prices for barges from the Gulf Coast to Florida.	↓
 Rail	In Q1 of calendar year 2023, tons and revenues of asphalt products shipped by CSX, regardless of the destination, increased by 25% and 30% year-over-year, respectively. However, in Q1 of calendar year 2022 CSX hadn't completed the acquisition of Pan Am Railways, which occurred the following quarter. Compared to Q4 of calendar year 2022, tons and revenues increased by 12% and 14%. These indicate that price increases seen in 2022 haven't eased. Earlier in the year, CSX opened discussions with Miami-Dade officials about potentially adding freight lines back to 26 miles of now dormant lines. Anecdotally, a producer noted longer periods of empty material yards.	↑
 Trucking	Asphalt suppliers continue facing issues with trucking. Fuel costs are one major factor. While diesel prices had significant declines in 2023 as they are down 31% year-over-year, prices are still high compared to year prior 2022. Trucker shortages persist, but there are no reports that it is getting worse as overall demand in the economy has decreased.	↑
 Pavement Markings	As mentioned in the polymers section, the Chemical Regional Production Index rose in May 2023, but production of coatings, adhesives and other specialty chemicals was lower. However, for the remaining of 2023, demand and production of chemicals is expected to slow down (including products such as basic chemicals and agricultural chemicals). Specialty products such as coatings are expected to be flat in 2023. Overall, pavement markings and other plastics-based/petroleum-based ancillary products remain vulnerable to current supply chain issues and volatility in crude oil markets.	↑
 Labor	Finding skilled labor is an ongoing concern for asphalt plant operators. Producers indicated labor availability as of the reasons the industry may struggle to meet demand. Statewide construction employment has slowed down, but conditions vary by region in the state.	↑
 Competition	The number of producers in FDOT's approved list increased 3% in FY 2023 to 123 and asphalt plants in FDEP's air permitted list rose by 2%. Additional plants would increase competition for FDOT projects. As demand is high, this is not expected to help bring down costs in the near term. Additionally, IBIS reported that the share of asphalt that goes towards road construction projects rose in calendar year 2023 as funding has become more available. In 2022 it was 20% and has increased to 29% in 2023.	↓

↑ Exerting negative influence on FDOT's costs; monitor.
= Currently stable; not influencing FDOT's costs.
↓ Exerting positive influence on FDOT's costs.

Table 8. Historical Asphalt Data, 2014 –2023

*(Maximum values indicated with *)*

Asphalt	Units	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Crude Oil (WTI Spot Price)[1]	$/Barrel	$93.17	$48.66	$43.29	$50.80	$65.23	$56.99	$39.16	$68.13	$94.90*	$74.55
Total Chinese Imports[2]	$/Billions	$1,959	$1,680	$1,588	$1,844	$2,136	$2,078	$2,066	$2,687	$2,714	$2,775*
Refinery Capacity for U.S. Refineries[3]	000s Tons/Year	31,803	31,933	37,803	44,316*	41,811	39,405	38,555	38,969	38,969	37,995
Florida Diesel Prices[4]	$/Gallon	$3.00	$1.84	$1.44	$1.78	$2.22	$2.04	$1.78	$2.15	$3.73*	$3.05
Estimated FDOT HMA Requirements[5]	000s of Tons	3,138	3,862	4,337	2,979	4,115	6,033	3,982	3,731	4,831	7,010*
Estimated Statewide HMA Produced[6]	000s of Tons	13,687	14,442	14,727	16,710	17,546	17,339	17,907	18,282	18,440*	18,282
FDOT's Estimated Consumption of HMA Production[7]	%	22.92%	26.74%	29.45%	17.83%	23.45%	34.79%	22.23%	20.41%	26.20%	38.35%*
FL Heavy & Civil Engineering Employees/ All FL Construction Employees[8]	%	12.56%	12.28%	12.33%	12.90%	12.45%	12.73%	13.10%*	12.88%	12.76%	12.65%
FL Construction Employees/All FL Non-Farm Employees[8]	%	5.08%	5.33%	5.65%	5.89%	6.16%	6.32%	6.61%*	6.48%	6.38%	6.25%
Annual FDOT Work Program Allocation[9]	Billions of $	$3.29	$3.18	$3.51	$4.00	$3.82	$3.83	$3.72	$2.66	$4.17	$5.42*
Asphalt Binder Imports into Ports Serving Florida[10]	Tons	120,932	312,817*	169,918	227,656	204,525	183,255	226,507	86,109	75,486	80,796
Average Asphalt Binder Price[11]	$/Ton	$748.99	$602.30	$450.45	$460.74	$610.86	$641.94	$566.62	$600.52	$804.13*	$771.28
FDOT HMA Cost[12]	$/Ton	$96.61	$99.66	$98.66	$101.90	$103.91	$109.68	$110.10	$109.11	$131.97	$166.92*

Sources: 1. EIA – Annual Average Spot Price. 2. WTO's World Trade Statistical Review. 3. EIA, Oil & Gas Journal. 4. FDOT Construction Office. 5. Calculated, from data provided by FDOT Estimates Office. 6. Historical FDEP and EIA forecast. 7. Calculated from 5 & 6. 8. Bureau of Labor Statistics - State and Local Employment. Workers in the agriculture sector are excluded from government and industry estimates due to conflicting seasonality and difficulty in measuring self-employment, hobby farms, and undocumented workers.[7] 9. FDOT Office of Work Program. 10. U.S. International Trade Commission (I.T.C) . 11. FDOT Office of Construction, Fuel and Bituminous Price Index; Modified Binders 76 & Higher. 12. Calculated weighted average, from data provided by FDOT Estimates Office.

[7] https://www.stlouisfed.org/open-vault/2019/july/nonfarm-payrolls-why-farmers-not-included

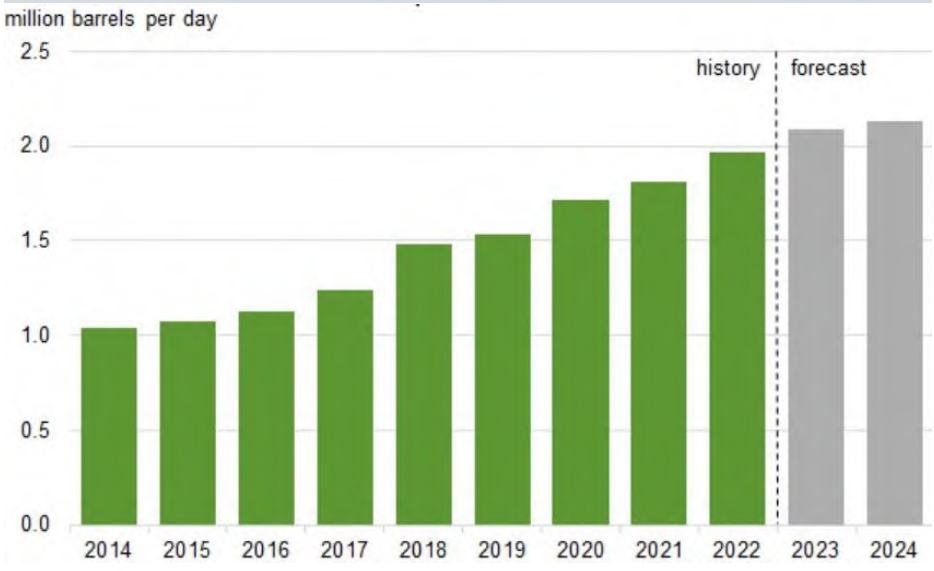
Aggregate

Aggregate sources for HMA are dominated by Georgia granite shipments and rock from the South Florida Lake Belt mining area. Statewide production increased in calendar year 2022 by 11% increasing production to about 104 million tons, and production in the Lake Belt region increased (3%) for the first time in three years. However, availability and costs are a concern for producers. Securing raw materials in a reliable manner is still a regional issue. For instance, previous interviews indicated shortages of 57 and 89 stone to be a major concern in the northern half of the state with suspended shipments reported in other parts of the state. In the meantime, aggregate producers have implemented multiple double-digit price increases during the year, which increases costs for asphalt producers. Similar to last year's responses, asphalt producers in the 2023 survey indicated aggregate availability as the main reason for issues with industry meeting demand. Asphalt producers use of fine versus coarse aggregates was close to a 50-50 share. Further information can be found in the Aggregate section.

Polymers

U.S. ethane consumption (the main feedstock used for petrochemical production) grew 9% in 2022 to 1.97 million barrels per day (**Figure 14**). The EIA expects consumption to reach 2.1 million barrels per day in 2023. U.S. ethylene production grew 4% in 2022. New ethylene cracker capacity was added in 2022 with plants in Port Arthur, Texas and Monaca, Pennsylvania. The EIA sees growth slowing down as no new capacity is expected. Ethylene is part of the process to make different types of polymers, so costs will affect polymer prices. As mentioned in the supply chain table, prices for polymers had double-digit declines. Argus reported that U.S. PVC prices hit a 5-month low in May 2023 due to lower demand. Lower prices will benefit asphalt producers, which have not indicated issues securing polymers. Whether prices continue declining or rise again for the rest of 2023 will depend on demand. Because the number of suppliers is low, suppliers hold pricing power and this is still a point of vulnerability.

Figure 14. U.S. Ethane Consumption

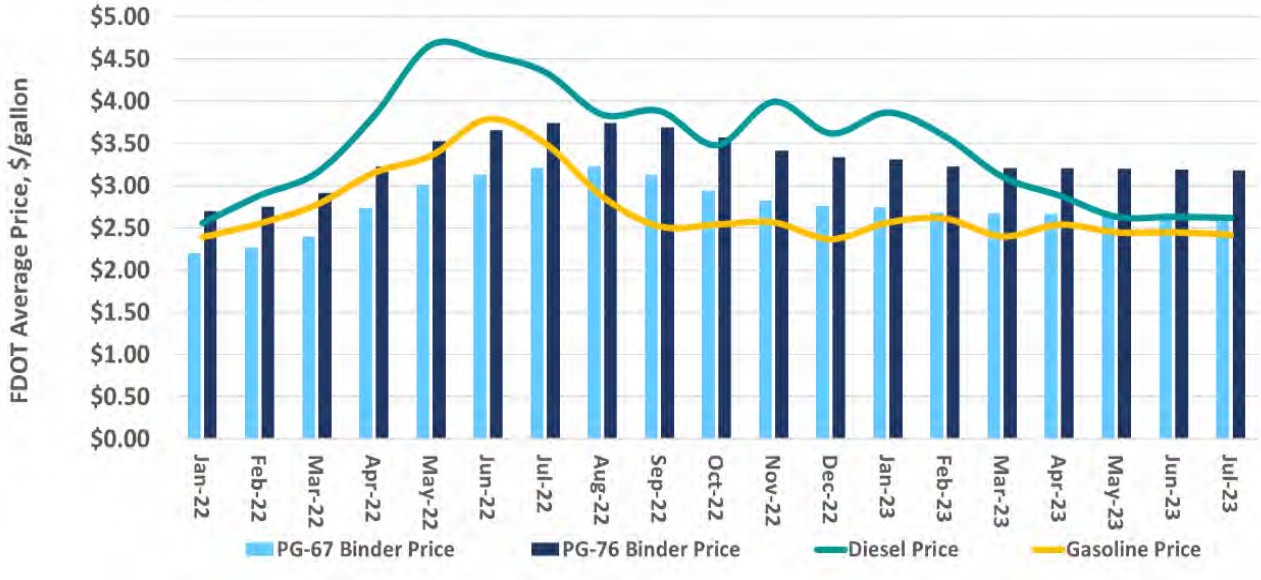


Source: Source: EIA June 2023 Petroleum Supply Monthly.

Asphalt Binder

FDOT fuel prices have declined significantly in calendar year 2023, compared to the summer of 2022 (**Figure 15**). However, the rate at which they have declined has plateau since April 2023. Although the EIA lowered the 2023 forecast for fuel prices, binder costs have not declined at the same rate. Demand for asphalt paving is likely to continue climbing over the next few years due to significant increases in infrastructure funding at the Federal and State level, supporting higher prices. In July 2023, rack binder prices declined 20% in Jacksonville to $603 per ton, declined 21% in Miami to $590 per ton and 23% in Tampa to $573 per ton. [8]

Figure 15. FDOT Fuel and Asphalt Binder Prices, Jan. 2022 – Jul. 2023



Source: Source: TBG Work Product, FDOT Fuel & Bits Index.

Producers indicated that they have, on average, seen a 16% price increase from suppliers since January 2023 (lower than the 33% seen last year). As expected, they have also passed the majority to customers when they have the possibility to do so. As a result, producers also expect bid prices to rise for the remaining of 2023.

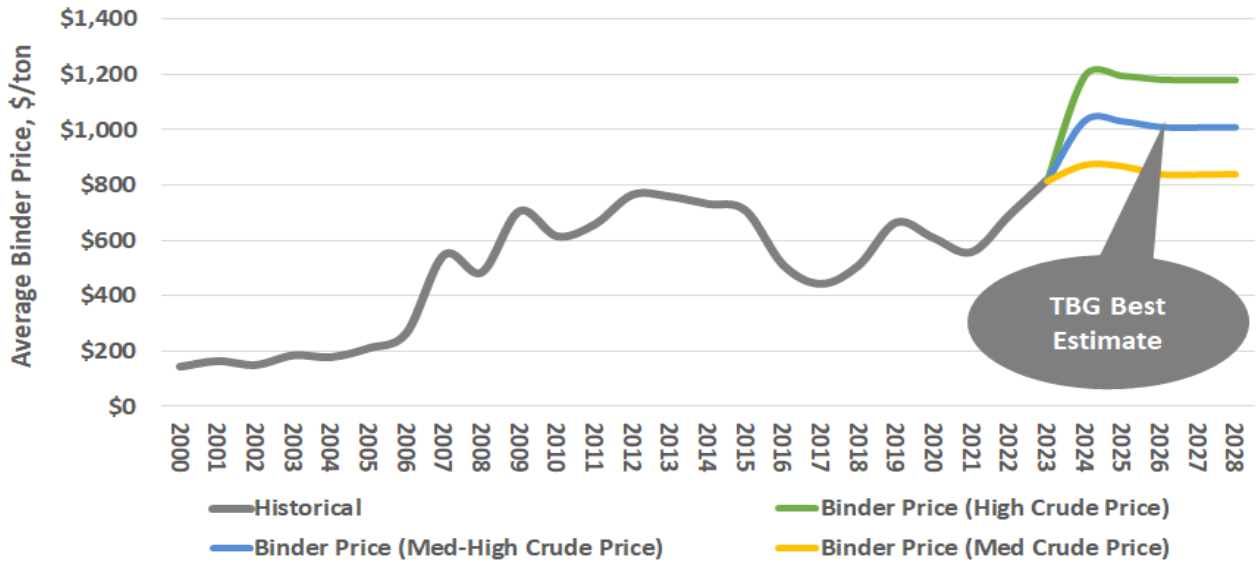
In April 2023, OPEC+ announced that they will cut production by 1.66 million barrels per day through December 2023. This was on top of the 2 million barrel per day reduction announced in October 2022. Additionally, in July 2023, Saudi Arabia and Russia announced additional voluntary cuts of 1 million and 500 thousand barrels per day at least until August.

Using a variety of models for fit, average historical FDOT binder prices were forecasted to 2028 under medium to high crude oil price scenarios. A low crude price scenario is considered unlikely at this time, barring a major recession or major hit to Florida's economy. As asphalt binder prices

[8] Argus' asphalt rack prices reflect trades of different grades of asphalt within a defined region, which include where the seller commits to deliver to the buyer's truck, typically at a truck-loading rack.

continue to lag behind decreases in crude oil costs, the middle scenario is the current best estimate. Statewide binder price outlooks are shown in **Figure 16**.

Figure 16. FDOT Average Binder Cost, FY 2023 Q3 Forecast



Source: TBG calculated from FDOT Fuel & Bits Index.

Imports

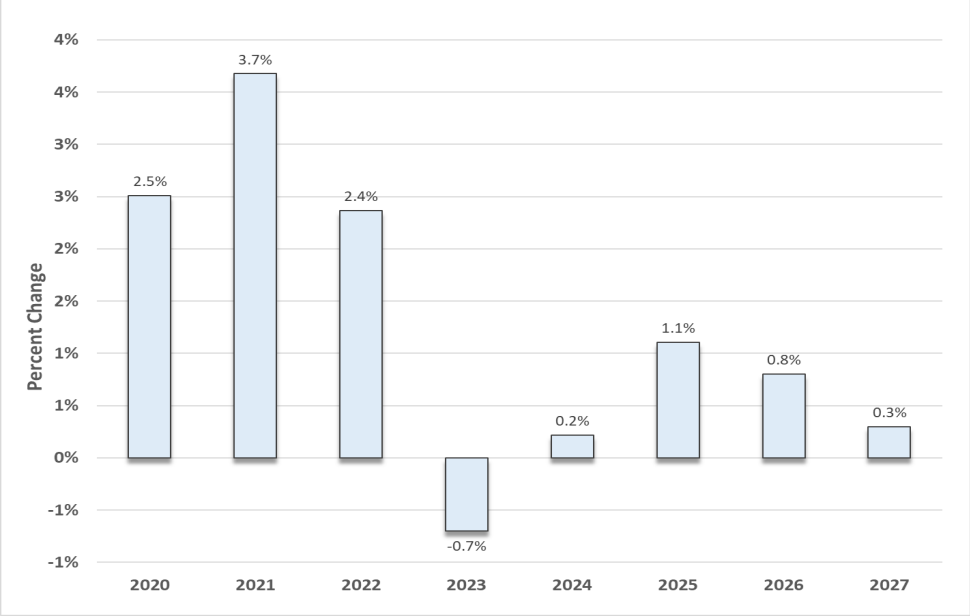
Even though demand is high and shipping costs declined throughout the year, imports didn't increase. As reported in the supply chain table, they declined 12% in 2022 and in 2023 they are still down. The main countries of origin throughout the year were Canada, Colombia, Spain, Turkey and Venezuela. In November 2022, the U.S. eased sanctions on Venezuela, allowing Chevron to import Venezuelan oil. Producers have not indicated issues with binder availability, which indicates that they have been able to source material in a reliable way. If there have been disruptions, these were more weather-related. This could be explained as reports indicate that refiners produced heavier crudes in 2022, which in return results in more binder production.

Labor

Availability of skilled labor has been a challenge for the asphalt industry in recent years. In TBG's 2023 survey, producers anticipate the industry having difficulties meeting demand, which has been the trend in past years surveys. Finding labor continues being an issue highlighted by producers; however, they didn't indicate that it has gotten worse.

Figure 17 shows national trends in employment growth. Employment for the asphalt sector as a whole grew 2% in calendar year 2022 and after a contraction of less than 1% in 2023, is expected to grow at an average rate of less than 1% annually up to 2027, with wages showing a similar pattern.

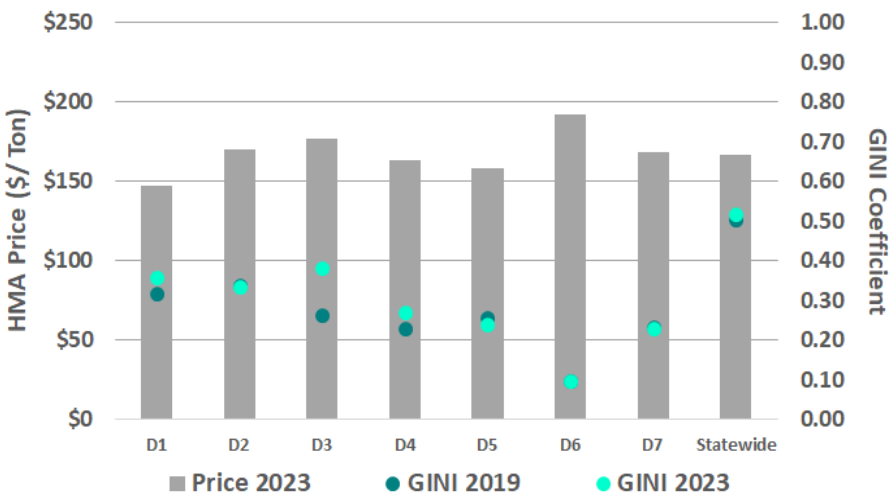
Figure 17. Asphalt Industry Employment Growth



Source: IBIS Industry Reports, Asphalt Manufacturing, January 2023.

Competition

Figure 18. HMA Price and Market Share by District



Source: FDOT, TBG Work Product.

FDOT's HMA costs vary by District across Florida, which reflects varying levels of work program as well as competition. **Figure 18** compares the current level of competition in each District currently and in 2019 (pre-pandemic), including the price and market share across Florida.[9] Most districts showed no major changes between FY 2022 and 2023, with the exception of District 3, which became slightly less competitive in FY 2023.

The statewide Gini coefficient estimates market competition for all plant activity in Florida, aggregated to the company level. When added up statewide, 16% of the companies account for

[9] A measure of competition is the Gini coefficient; if market share is perfectly distributed, the Gini coefficient would be 0 (perfect equality), and if monopoly conditions exist, the Gini would be 1 (perfect inequality) – the higher the Gini, the less competitive the industry.

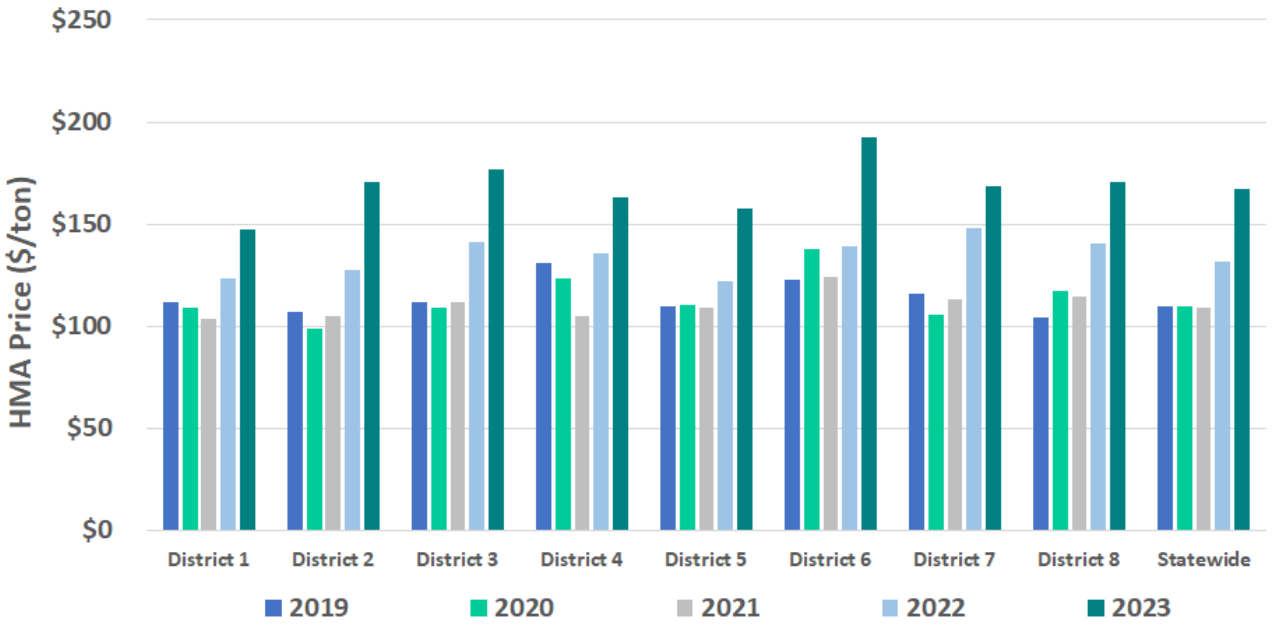
59% of active plants, the same as activity in FY 2022. This consolidation of owners leads to a higher statewide Gini coefficient than seen in the Districts, since the entire list of companies is considered instead of being divided relatively more evenly over the Districts.

The majority of plants are situated in Central to Northeast Florida. **Figure 20** shows the dispersion of active asphalt plants across the State, based on permit activity and/or survey updates. Additionally, FDEP's air permitted facilities list shows 105 active plants (2 more than last year) and 2 plants under construction in Newberry (District 2) and Plant City (District 7). Last year, the air construction permit for the plant in Plant City was extended to 2024. Documents indicate that the company expected to start construction late in 2022 or early 2023.

Current Pricing

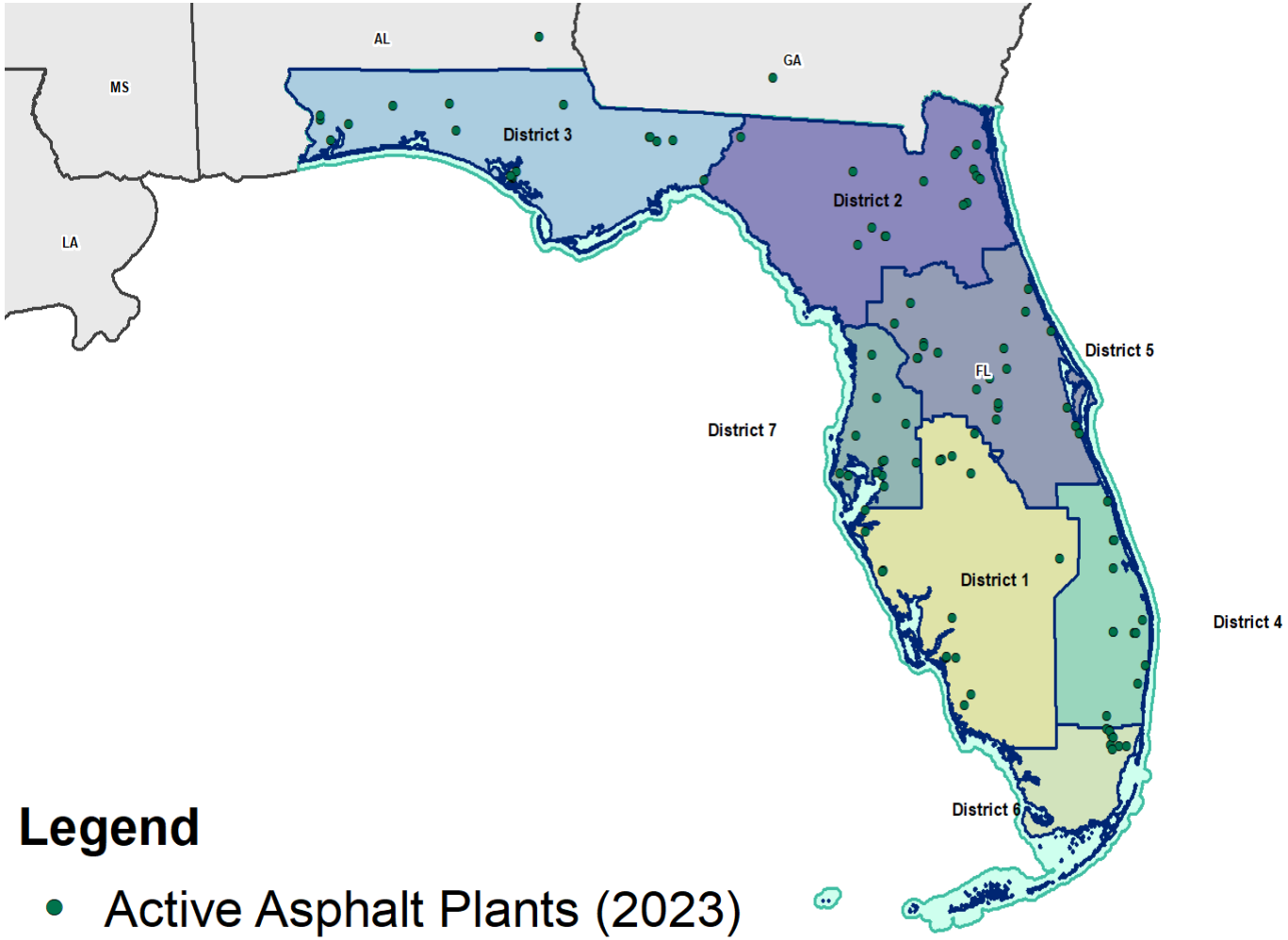
FDOT's HMA costs reflect a unique combination of asphalt binder costs, FDOT-specific requirements regarding manufacturing and installation, and non-FDOT competition for contractors and materials. Asphalt prices ended FY 2023 at record highs, rising 26% to $167 per ton according to year-end bid data. Since 2019, weighted average HMA prices have risen between 25% to 59% in all districts. In FY 2023, all districts were above $140 per ton. Districts 6 and 3 have the highest prices, surpassing $170 per ton. (**Figure 19**).

Figure 19. HMA Price by District, Dollars per Ton



Source: TBG calculated from data provided by FDOT Estimates Office.

Figure 20. Active FDOT- Approved Asphalt Producer Facilities



Source: TBG, prepared from data provided by FDOT Office of Program Management.

Material Quantities

Balmoral has forecast FDOT's HMA Future Requirements, based on LRE and Work Program data. HMA Projections are shown in **Table 9**.

Total asphalt requirements for the Five-year Work Program are shown in **Figure 21** by District, with and without Turnpike allocation. Quantities are estimated using a factor approach as discussed in the FDOT Data section. The factors were calculated by Balmoral economists and roadway engineers after evaluating several statistical relationships, including historical share of dollars spent on HMA for different project types.

Table 9. FDOT Future Requirements of Hot Mix Asphalt (in thousands)

District	2024	2025	2026	2027	2028
D1	659	736	924	821	763
D2	883	1,294	569	808	663
D3	720	745	586	535	523
D4	1,081	573	520	825	708
D5	597	860	978	701	763
D6	481	351	330	306	191
D7	759	571	781	408	766
D8	1,314	1,083	953	1,040	1,412
Total Tons	**6,494**	**6,214**	**5,641**	**5,444**	**5,788**

Source: TBG calculated from data provided by FDOT Office of the Work Program & Budget.

Asphalt Forecast

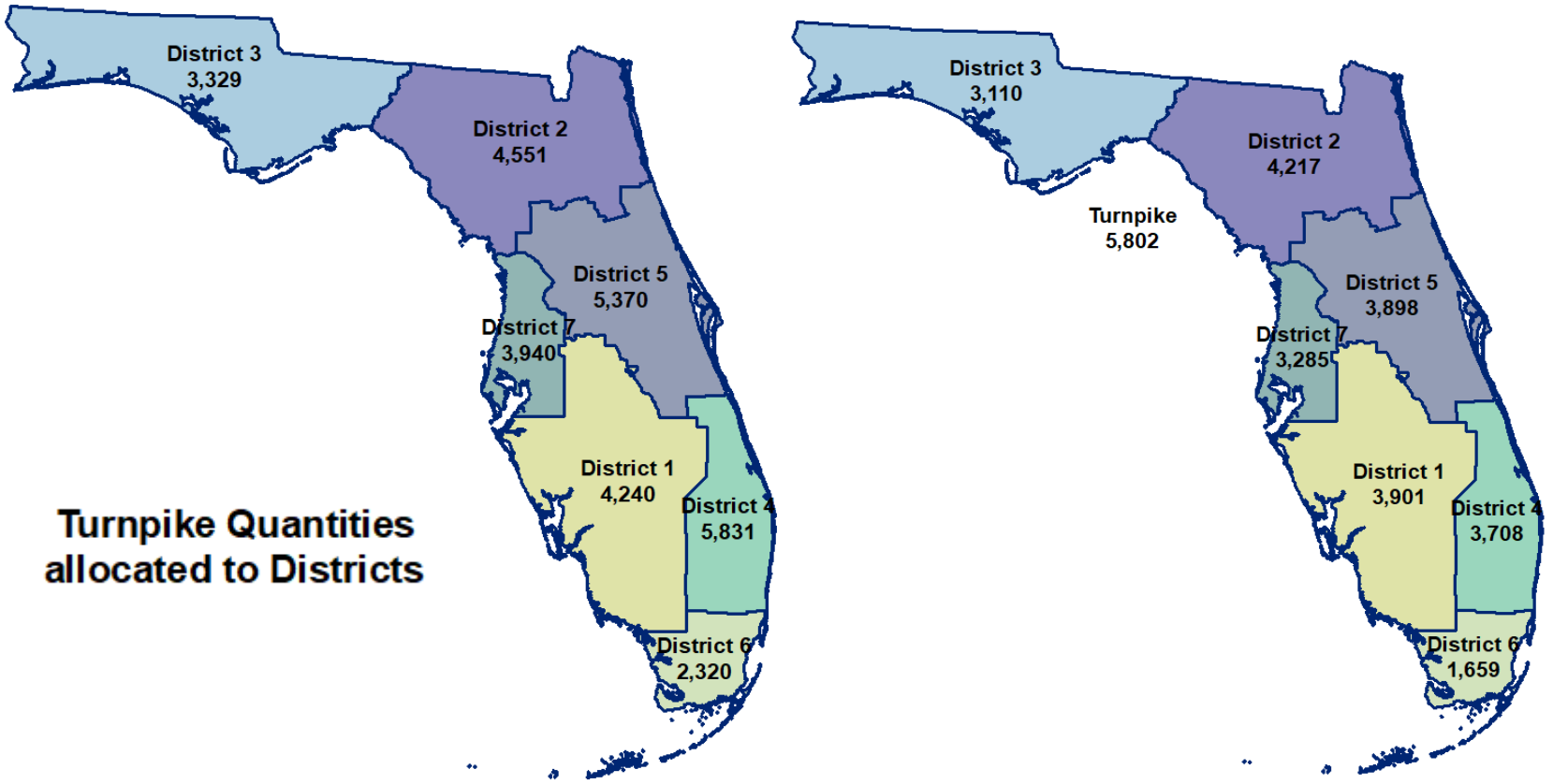
Asphalt prices are projected in **Table 10** for the five-year construction work program. Regression modeling was performed using pay item data, supply chain variables, and other macroeconomic indicators to identify models that best predicted FDOT's materials costs and quantities.

Table 10. HMA Price Forecast Results

Year	2023	2024	2025	2026	2027	2028
Price HMA, $/Tons	$166.92	$161.83	$159.75	$162.56	$167.21	$177.82
Percent Change, %	26.5%	-3.0%	-1.3%	1.8%	2.9%	6.3%

Source: TBG calculated from data provided by FDOT Estimates Office, various industry sources.

Figure 21. Total Asphalt Quantities for Five-year Work Program (000s of Tons)



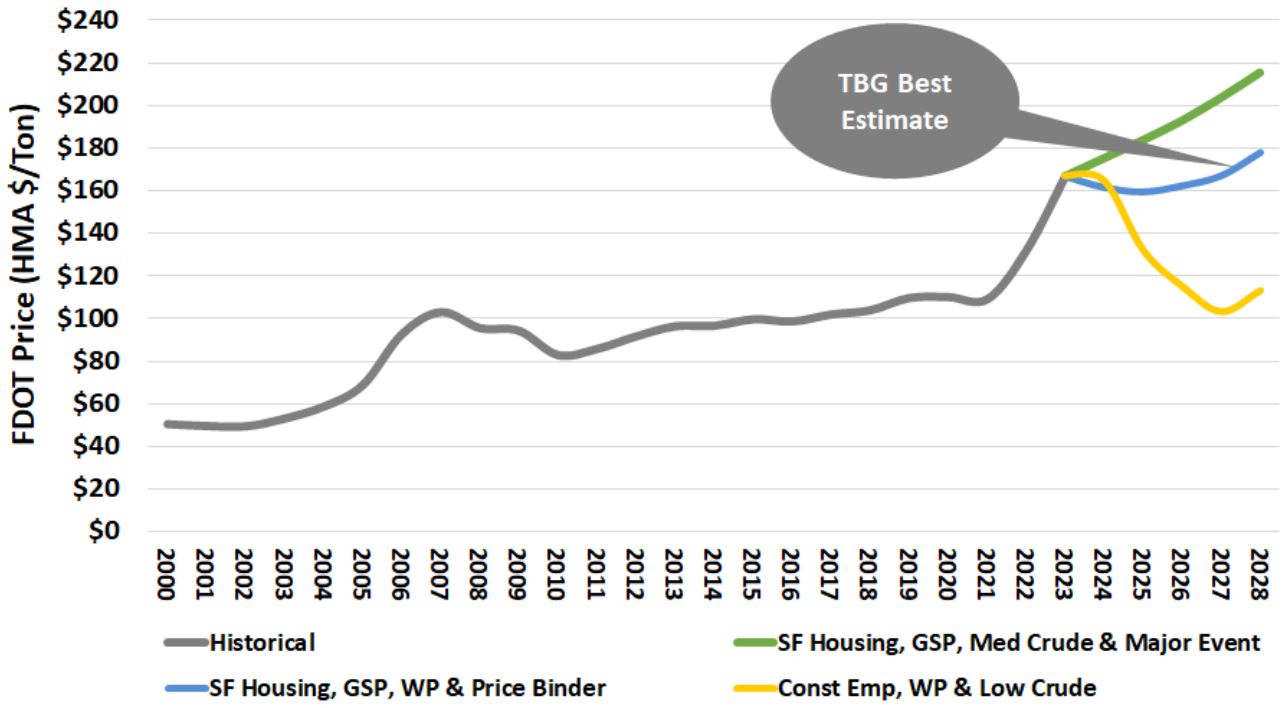
Source: TBG calculated from data provided by FDOT Office of Program Management.

Previous forecasts expected a jump in asphalt costs during the fiscal year-end, which occurred. With updated work program data, housing starts, employment data, and binder prices, asphalt price forecasts show best fit with continued high prices through the end of the five-year work program. With work program funding, Florida economic growth, and binder costs all increasing, with a substantial increase in FY 2028 (12% in work program and 7% GSP increase compared to FY 2027), demand is expected to keep prices high in the near-term.

A lower bound, where prices retreat to pre-pandemic levels, reflects much lower crude prices and forecasted construction employment; this scenario would require a substantial economic correction that few economists currently predict.[10] The upper bound is supported by a medium crude projection, continued Florida macroeconomic growth, and significant disruption such as another geopolitical, supply chain or major storm event.

Figure 22 shows the potential range of estimates over the five-year work program.

Figure 22. HMA Price, 2023 Forecast

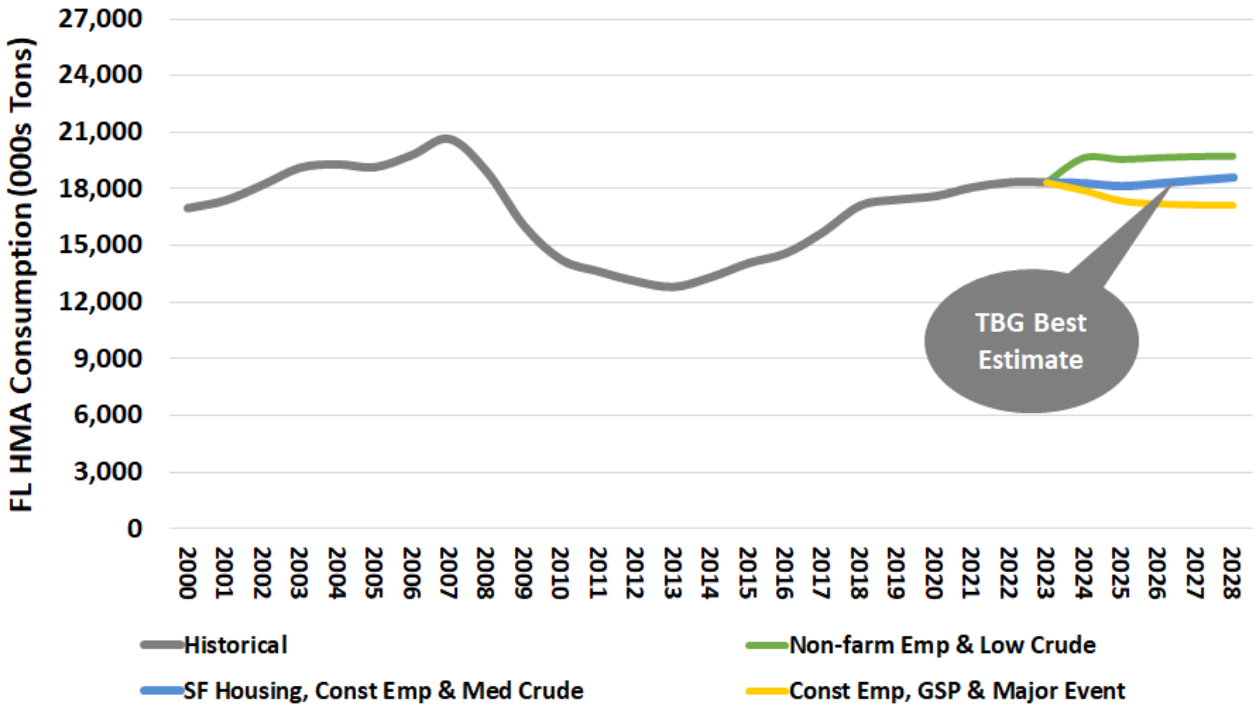


Source: TBG calculated from data provided by FDOT Estimates Office, various industry sources.

[10] NABE July 2023 Quarterly Business Conditions Survey.

Figure 23 provides a forecast of Florida HMA consumption. The best estimate is based on current economic outlooks, which show stable employment, medium crude oil price projections, and moderating housing starts. If recessionary factors come into play, the trajectory would shift downward, following the lower bound. Given the record infrastructure funding at the local, state, and federal level, this scenario is considered unlikely at this time. The upper bound takes increased labor availability and lower fuel costs into account and would allow for additional production.

Figure 23. Florida HMA Consumption, 2023 Forecast



Source: TBG calculated from data provided by FDOT Estimates Office, various industry sources.

CONCRETE

Summary

- Cement volumes declined due to slowdown in some sectors and weather-related issue at the start of calendar year 2023.
- Prices have continued increasing year-over-year. Further price increases are expected for calendar year 2023.
- According to new data, fly ash production increased in 2021 (the most recent data available). However, producers continue facing issues. It is still expected that more coal-fueled plants will close within the next few years, decreasing availability. Recently, a new slag cement facility was inaugurated in Port Canaveral, which can help producers as a fly ash alternative.
- Clinker capacity was unchanged, with utilization rates estimated at 71%.

FDOT Impacts

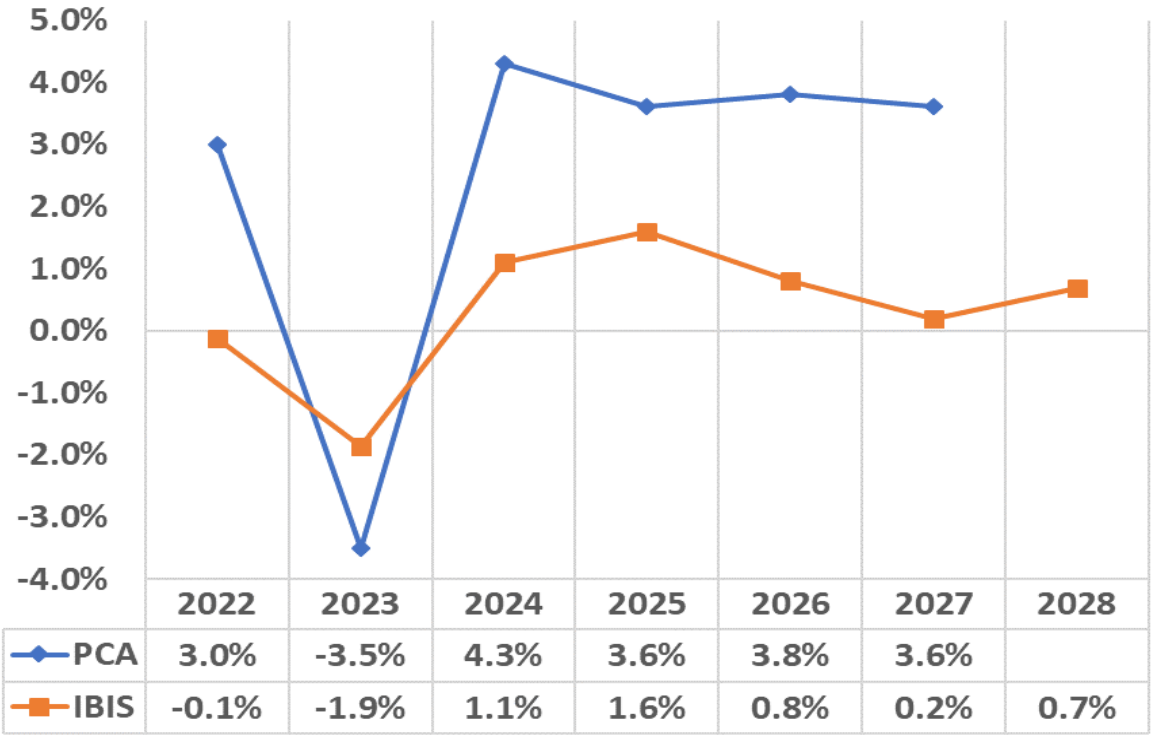
- Prices for FY 2023 reflected increases of 45% year-over-year as a result of continued strong work program, anticipated price increases for aggregate, and ongoing labor constraints.
- FDOT Work Program concrete requirements are estimated to average around 2 million cubic yards, with a significant increase for FY 2024.
- There is no clear trend on whether producers think the industry will have issues in meeting demand, but they expect bid prices to increase, on average, 13% by end of the calendar year.

General Trends

Figure 24 shows the U.S. cement consumption forecasts from the Portland Cement Association (PCA) and IBIS through calendar year 2028. The PCA Fall 2022 forecast expects a big increase of 4.3% for the year 2024 and then tapering off till 2028 with average of 3.7%. The bounce back is expected from the heavy fall in 2023 (-3.5%) as some sectors in construction cool down. IBIS February 2023 forecasts are based off domestic demand.[11] These show a smaller contraction in 2023 and then an annual growth of 1%. Overall, increases in construction are expected with the available federal and state funding for highways, roads, bridges, etc. PCA previously estimated that the five-year federal Infrastructure Program will necessitate about 46 million metric tons of cement.

[11] Estimated by adding industry revenues with imports and subtracting exports

Figure 24. U.S. Cement Consumption Forecasts



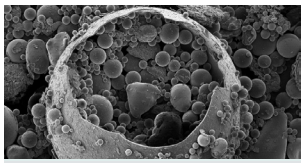
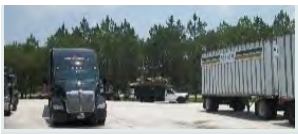
	2022	2023	2024	2025	2026	2027	2028
PCA	3.0%	-3.5%	4.3%	3.6%	3.8%	3.6%	
IBIS	-0.1%	-1.9%	1.1%	1.6%	0.8%	0.2%	0.7%

Source: PCA Fall 2022 Forecast; IBIS U.S. Cement Manufacturing Forecast Feb. 2023.

SUPPLY CHAIN VARIABLES ➤ **CONCRETE MATERIALS**

Table 11 provides an overview of supply chain variables and a summary of their current status; items with current issues are further detailed in the subsequent text. Current and historical data has been prepared for selected variables that have historically influenced FDOT's costs for concrete products, including ready-mix and precast products. **Table 12** provides selected data for the period 2014 - 2023.

Table 11. Structural Concrete Supply Chain Variables & Current Status

 Cement	During Q1 of calendar year 2023, cement prices reported by publicly traded companies showed significant increases as some announced price increases staring January, 2023. Year-over-year, prices were as high as 32%. Volumes were mixed as they ranged between -19% and +7%. As for factors affecting demand they all recognize demand from some sectors like residential softening as well as bad weather. For instance, Cemex estimated that 60% of their declined of cement shipments can be attributed to adverse weather conditions. Additionally, another price increase in 2023 is expected for some suppliers. Interviews indicated that cement is still the preferred option to replace fly ash, with additional capacity expected as new projects came online in 2023.	↑
 Aggregate	Aggregate availability, increased pricing, and transportation has been an issue throughout the year. These are expected to continue. General issues are covered in the Aggregate section.	↑
 Fly Ash	Fly ash costs increased during the year. Even though the most recent available data showed an increase in production, supply issues continue. However, they have not worsened. This is also the perception producers have, recurring supply issues, but the same as last year. While no coal-fired power plants closed during FY 2023, a few are expected in 2024 and 2025.	↑
 Rail	As with other industries, producers had to deal with rail reliability issues this past year. In Q1 of calendar year 2023, overall tons and revenues of concrete products shipped by CSX increased by 9% and 22% year-over-year, respectively. However, in Q1 of calendar year 2022 CSX hadn't completed the acquisition of Pan Am Railways, which occurred the following quarter. Compared to Q4 of calendar year 2022, tons and revenues increased by 5% and 8%. Price increases seem to be similar to the other materials, but shipment increases are lower, reflecting a slowdown.	↑
 Truck	While trucking availability has improved and spot rates have declined, some producers indicate issues finding trucking. Diesel prices had significant declines, with a 31% year-over-year decline. However, prices are still high compared to year prior 2022.	↑
 Labor	Producers continue reporting issues with finding skilled labor. Statewide construction employment still grew in June 2023, but growth rates have slowed down. Conditions are across the State.	↑
 Competition	In FY 2023, the number of plants in FDOT's producer approved list rose by 4.6%, the most of the materials in this report. Smaller suppliers reported difficulties in securing materials throughout the year. Larger firms with longer relationships who are able to order product in larger quantities appear to be taking precedence. This situation could lead to less competition in the long run.	↑

↑ Exerting negative influence on FDOT's costs; monitor.
= Currently stable; not influencing FDOT's costs.
↓ Exerting positive influence on FDOT's costs.

Table 12. Historical Concrete Data, 2014 – 2023

*(Maximum values indicated with *)*

Concrete	Units	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Total Chinese Imports[1]	Billions of $	$1,959	$1,680	$1,588	$1,844	$2,136	$2,078	$2,066	$2,687	$2,714	$2,775*
Florida Diesel Prices[2]	$/Gallon	$3.00	$1.84	$1.44	$1.78	$2.22	$2.04	$1.78	$2.15	$3.73*	$3.05
Florida Portland Cement Year End Stocks[3]	000s of Tons	360	338	322	307	493*	390	275	268	269	271
U.S. Portland Cement Capacity[3]	000s of Tons	121,000	121,000	118,967	121,000	121,000	123,000	123,000	123,000	123,000	123,000*
Average Price of Portland Cement, U.S.[3]	$/Ton	$89.94	$95.07	$99.88	$104.70	$105.65	$102.10	$112.52	$117.97	$117.97*	$107.00
Average Price of Portland Cement, Florida[3]	$/Ton	$82.37	$91.00	$92.96	$97.71	$99.13	$103.34	$103.09	$107.21	$116.64*	$105.80
Florida Cement Production[3]	000s of Tons	5,496	6,060	6,455	6,548	7,035	7,053	6,951	7,557	7,589	7,809*
Florida Cement Capacity[3]	000s of Tons	10,767	11,130*	8,447	8,447	8,447	8,527	8,527	9,622	9,622	9,622
Florida Ready-Mix Production[4]	000s of Cubic Yards	12,952	13,858	14,829	15,081	15,714	15,305	14,571	16,072	17,647	18,158*
Annual FDOT Work Program Allocation[5]	Billions of $	$3.29	$3.18	$3.51	$4.00	$3.82	$3.83	$3.72	$2.66	$4.17	$5.42*
Cement Imports Serving Florida[9]	000s of Tons	662	799	1,385	1,319	1,635	1,962	2,155	3,402	4,572	6,140*
Estimated FDOT Concrete Consumption[6]	000s of Cubic Yards	1,318	1,405	1,626	1,832*	1,614	1,256	1,079	619	1,028	1,114
Estimated Statewide Concrete Consumption[7]	000s of Cubic Yards	19,969	20,642	21,199	21,750	22,359	23,164	23,628	24,596	24,670*	23,807
FDOT Structural Concrete Cost[8]	$/Cubic Yard	$727.03	$625.70	$635.70	$608.14	$708.11	$746.88	$722.69	$926.47	$829.82	$1,206.11*

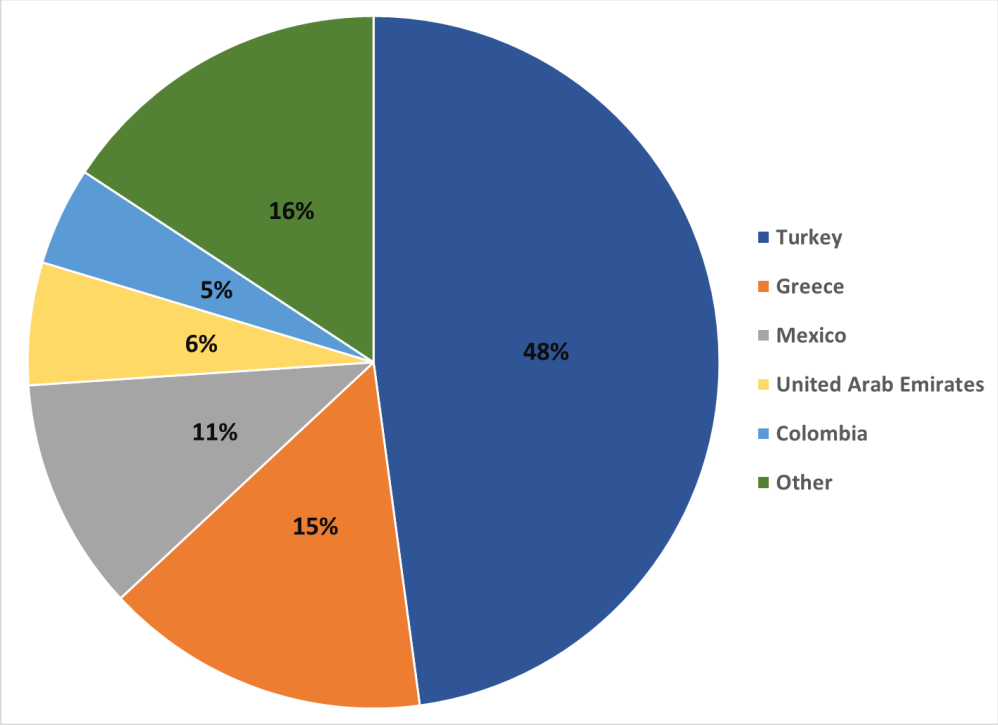
Sources: 1. WTO's World Trade Statistical Review. 2. FDOT Construction Office. 3. USGS; reported U.S. price change was 0% in 2022. 4. PCA, First Research. 5. FDOT Office of Work Program. 6. Calculated, from data provided by FDOT Estimates Office. 7. PCA and USGS. 8. Calculated weighted average, from data provided by FDOT Estimates Office. 9. US ITC

Cement

Earlier in the year Titan indicated that they expect the expansion of its terminal in Tampa, which began late in 2021 and includes the construction of a new 70,000-ton capacity dome, to be completed during the second half of 2023. This will help to increase supply for markets in Florida. Additionally, Cemex recently commissioned a new 225-ton cement unloader at the Port of Palm Beach.

Florida's Cement production in calendar year 2022 only grew by 0.4% according to the U.S. Geological Survey (USGS). In calendar year 2023, production declined 7% through April. This is consistent with declines reported by publicly traded companies, which are summarized in the supply chain table. Anecdotally, a producer indicated a 30% reduction in production due to cement shortages. On the other hand, USGS estimates that there were 10 million tons shipped to Florida in calendar year 2022 and 3.1 million through April 2023, a 3% decline year-over-year. Reviewing data from the U.S. International Trade Commission between 2021 and 2023, almost half of the imports to districts that service the Florida market were from Turkey. In 2022 the share was even higher, as 57% originated from Turkey. Greece and Mexico followed Turkey. These three comprised almost 75% of the imports between the review period. **Figure 25** illustrates imports by country of origin between 2021 and 2023.

Figure 25. Cement Imports by Country of Origin, 2021-2023 Average



Source: TBG Work Product, U.S. International Trade Commission.

Clinker Capacity

An analysis of FDEP Air Permits was conducted to identify changes to statewide clinker capacity through July 2023 (**Table 13**). There were no changes to clinker capacity in FY 2023. Two

inactive kilns at CEMEX Brooksville North could increase annual capacity by an additional 1.56 million tons if they were to become operational in the future. However, the current Title V air operation permit is set to expire in December 2023 with no records of applications for a new one. The USGS estimated clinker production in Florida for 2022 at 6.79 million tons, which represents a utilization rate of 71%.

Table 13. Active Cement Kilns in Florida (Reported Capacity)

Plant Name		Current Clinker Capacity	
		tons/hour	tons/year
Suwannee American Cement Sumterville Plant		135	1,186,250
American Cement Suwannee Plant		120	965,425
Argos Newberry Cement Plant	**Kiln #1**	125	880,000
	Kiln #2	125	1,095,000
CEMEX Brooksville South	**Kiln #1**	83	727,800
	Kiln #2	156	1,277,500
CEMEX Miami Cement Plant		169	1,300,000
Titan Florida Pennsuco Cement Plant		250	2,190,000
Total Producing in 2021		**1,163**	**9,621,975**

Source: FDEP, TBG Work Product

Fly Ash

Fly ash availability continues to be tight as coal-powered plants close or convert their power generating units to natural gas. In calendar year 2022, Crist Plant (now called the Gulf Clean Energy Center) in Escambia County was converted to natural gas and one of Big Bend Plant's coal units in Hillsborough County was retired in April 2023. Big Bend Plant still has an active coal unit. According to EIA records, no coal-fired power plants are planned for retirement in 2023. While it was previously reported that Seminole Electric was expected to shutter one of their coal-fired units for a natural gas-fired plant in 2023, the new shutdown date is January 2024. The next planned coal power shutdown is December 2025 at Orlando Utilities Commission Stanton Energy Center. Producers indicated that fly ash issues this year continued, but were the same as last year.

In May 2023, Heidelberg Materials completed the acquisition of the SEFA Group. Headquartered in South Carolina, the company is the largest recycler of harvested fly ash in the U.S. Per the release statement, they supply fly ash to 800 concrete plants in 13 states, including Florida.

Table 14 provides a synopsis of likely impacts by FDOT district. Districts with access to the remaining coal-fired power plants in Florida are less impacted by in-state fly ash shortages. As such, Districts 3, 4 and 6 are more highly impacted from shortages due to a lack of local coal capacity (**Figure 26**). Further, the next scheduled coal-fired unit closures are in Orange and Putnam counties, which will affect concrete producers in Districts 2 and 5. Many producers have already created partnerships with out-of-state or international suppliers of fly ash to

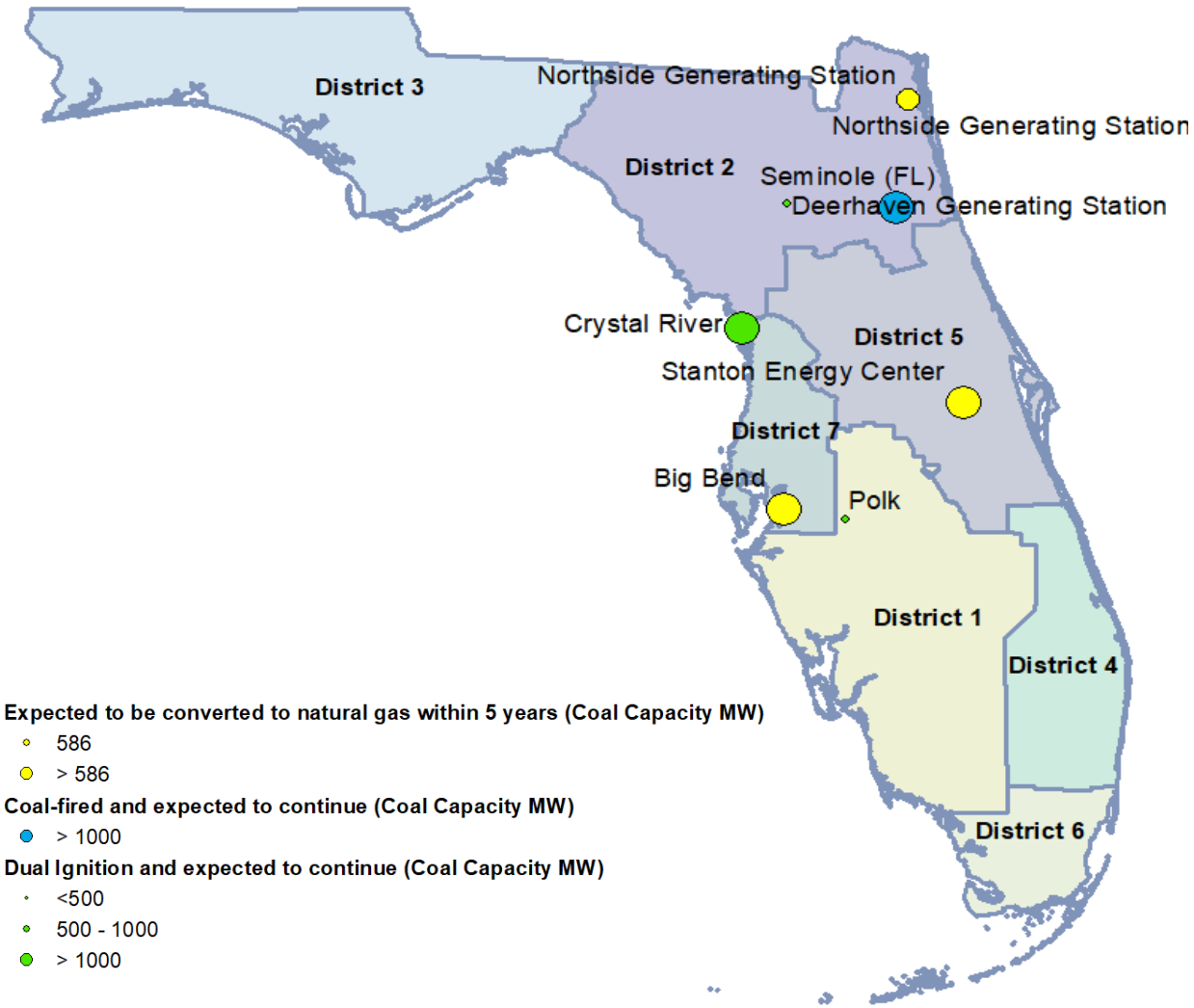
offset shortages. This practice will likely become the norm for most producers if shipping in fly ash remains cheaper than using alternative materials.

Table 14. Projected Impact from Potential Fly Ash Sources by District

District	All Concrete Plants*	Impact from Fly Ash Shortages
1	89	Medium
2	66	Low
3	77	High
4	73	High
5	109	Medium
6	60	High
7	43	Low
Total	**519**	

Source: Estimated, The Balmoral Group 2023. *Includes both active and idle plants.

Figure 26. Coal-Fired Power Plant Capacity



Source: FDEP, TBG Work Product.

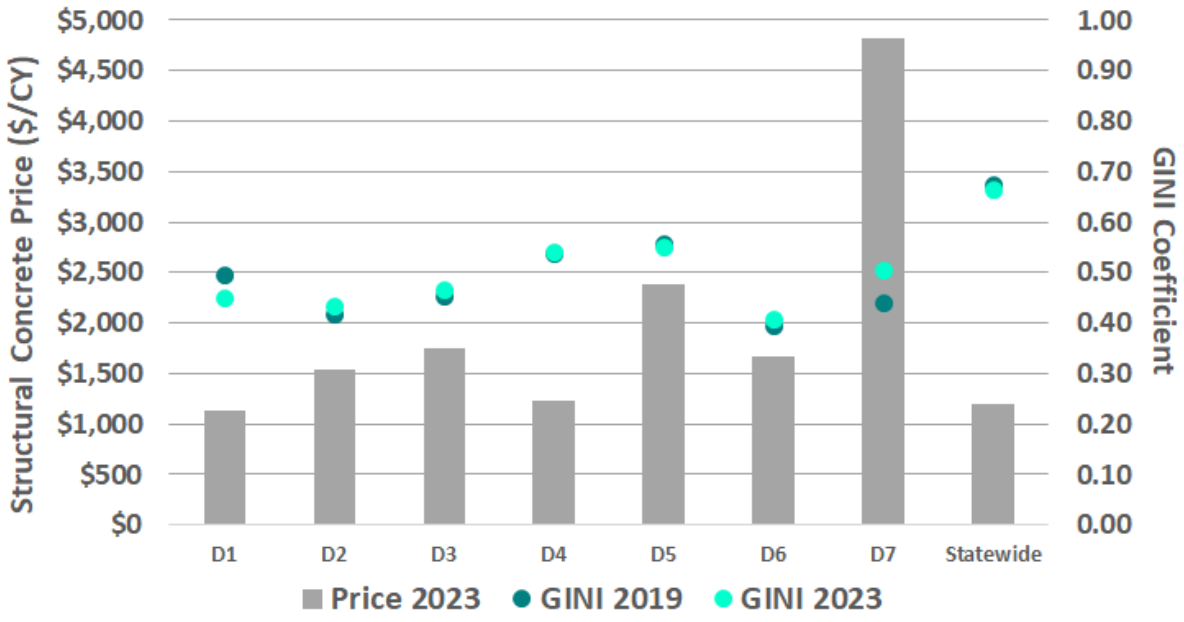
Alternatives to Fly Ash

Fly ash is not being used by some producers at all due to cost and availability. Instead, producers are increasingly using slag or just straight cement. Additionally, Heidelberg Materials opened its upgraded slag cement plant and terminal at Port Canaveral. The expansion includes a new roller press which increases its grinding capacity by more than 25%. As producers have reported that alternatives are more expensive than fly ash, additional capacity will help to increase supply and lower costs. Cargo statistics from Port Canaveral shows that in FY 2022 there were 740,558 tons of slag/sand cargo, a 10% increase year-over-year. Another less used alternative by producers is silica fume. This option is more expensive and time consuming too. Anecdotally, a producer indicated that alternatives to fly ash increase production time by two hours per linear foot. Until supply increases and costs decline, producers will continue to look for alternatives to fly ash or be forced to limit production all together.

Competition

Concrete producers did not note significant changes in competition from other sectors, but some saw increased competition for a smaller pool of materials. There are over 500 FDOT-approved ready-mix plants in Florida, providing substantial competition at the plant level. Statewide, 10% of the companies account for 68% of active plants. The Gini coefficient, a metric of diffuse versus concentrated market power based on ownership shares, is shown for FDOT approved concrete suppliers by district in **Figure 27**. Most districts show minimal changes between FY 2019 and 2023, with a slight decrease in competition in District 7.

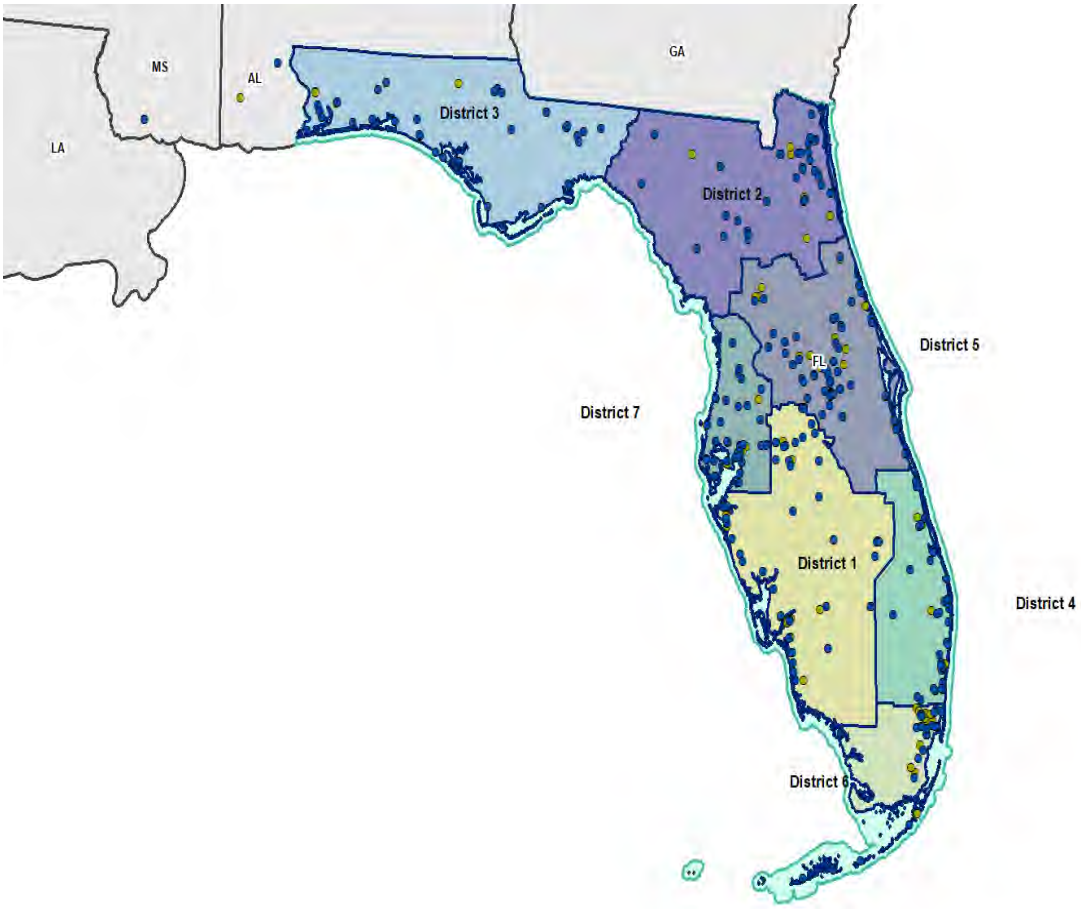
Figure 27. Concrete Competition Gini by District



Source: FDOT, TBG Work Product; limited bids for District 7 in 2023 (n = 3).

Figure 28 provides a location map of active approved concrete plants in Florida and adjacent states. Cemex is still by far the largest firm, controlling about 87 active plants in 2023. Argos Ready Mix owns the second most active plants at 45 locations, while Titan America has 35 active plants.

Figure 28. Ready-Mix Plants 2023



Legend

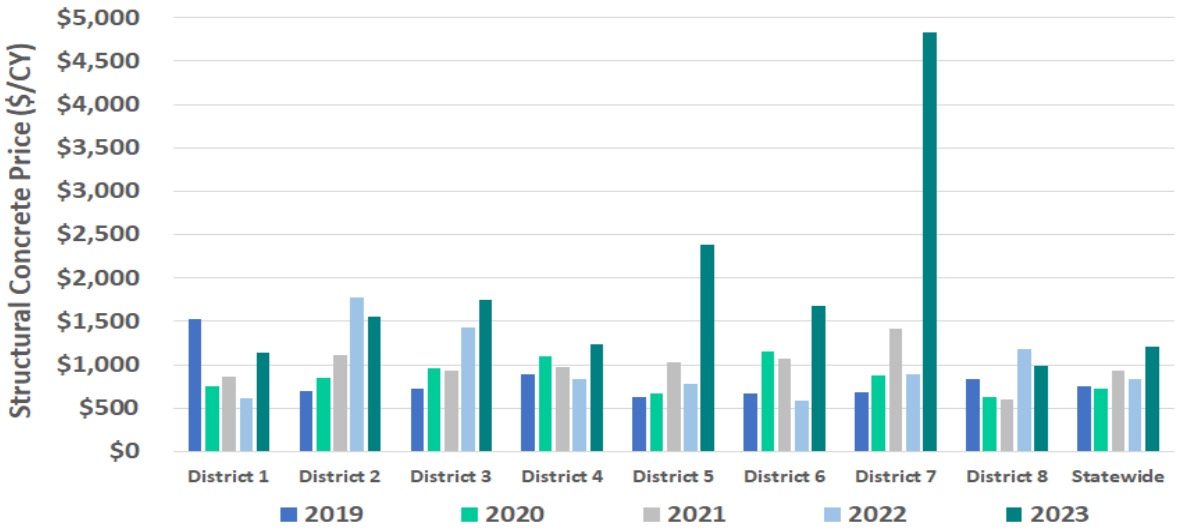
- Active Structural Concrete Plants (2023)
- Active Precast Concrete Plants (2023)

Source: FDOT, TBG Work Product

Current Pricing

According to FDOT lettings data, concrete prices reached record levels in FY 2023 (**Figure 29**). Besides District 7, which had limited bids to calculate prices, Districts 5 and 6 had the steepest price increase in FY 2023 likely due to increased demand and constrained labor supply. Aggregate, fly ash, and cement spot shortages are expected to persist into FY 2024, while reinforcing steel costs continue to be an issue for some precast suppliers. While there has been downward movement on US inflation and fuel costs in the last few weeks, major market corrections are not anticipated anytime soon.

Figure 29. Structural Concrete Prices by District



Source: TBG calculated from data provided by FDOT Estimates Office; limited bids for District 7 in 2023 (n = 3).

Material Quantities

Preliminary estimates of materials quantities for the FDOT work program were prepared from Estimates Office data. Quantities are estimated using a factor approach. The factors were calculated by Balmoral economists and roadway engineers after evaluating several statistical relationships, including historical share of dollars spent on concrete for different project types.

FDOT Work Program requirements are estimated to average around 2 million cubic yards throughout the Five-Year Work Program (**Table 15**). A large uptick in concrete requirements are projected for FY 2024 and 2027 when several large add lanes and bridge projects begin construction.

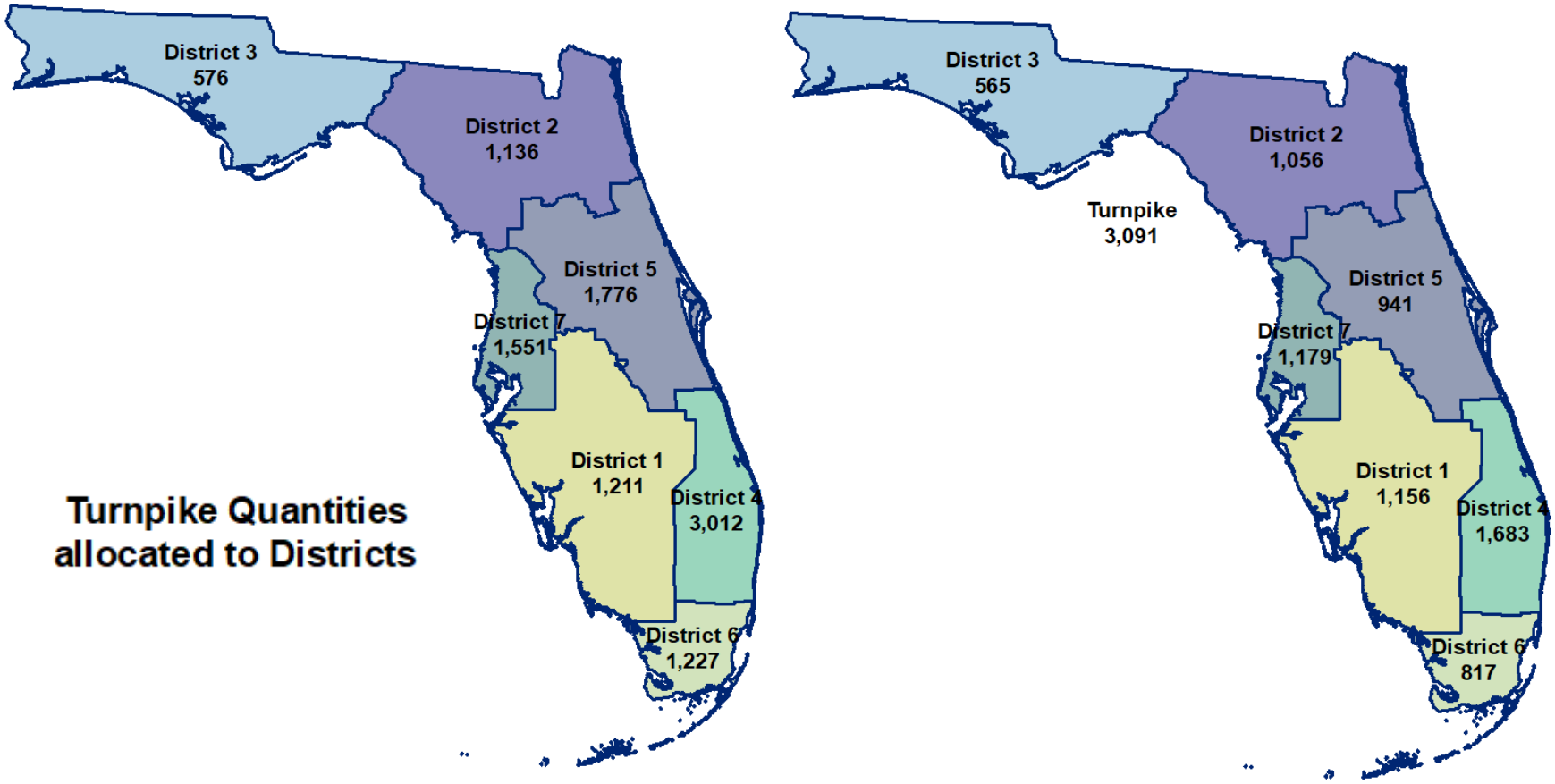
Table 16 shows future FDOT concrete requirements by District. Differences in demand by District are reflected in pricing. **Figure 30** shows the distribution of materials requirements for the entire Five-year Work Program by District.

Table 15. FDOT Future Concrete Requirements (in thousands)

Year	2024	2025	2026	2027	2028
Structural Concrete	1,496	452	1,364	2,197	1,282
Ancillary Concrete	1,207	874	609	399	610
Total Cubic Yards	**2,704**	**1,326**	**1,972**	**2,596**	**1,892**

Source: TBG calculated from data provided by FDOT Office of the Work Program Budget.

Figure 30. Total Concrete Quantities for Five-year Work Program (000s Cubic Yards)



Source: TBG calculated from data provided by FDOT Office of Program Management.

Table 16. FDOT Future Concrete Requirements by District (in thousands)					
District	**2024**	**2025**	**2026**	**2027**	**2028**
D1	128	43	192	567	227
D2	202	328	223	205	99
D3	309	38	114	38	67
D4	489	125	193	561	315
D5	178	96	185	322	159
D6	304	108	227	123	55
D7	278	108	267	159	367
D8	816	479	572	620	604
Total Cubic Yards	**2,704**	**1,326**	**1,972**	**2,596**	**1,892**

Source: TBG calculated from data provided by FDOT Office of the Work Program Budget.

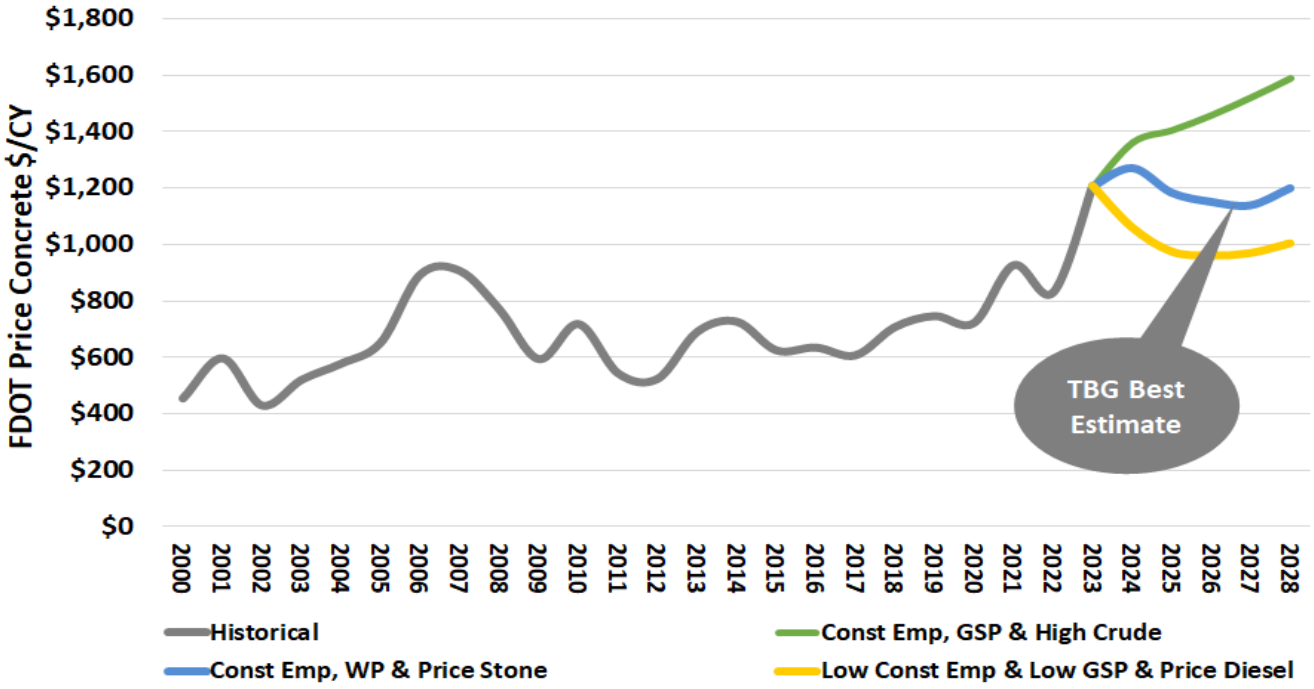
Concrete Forecast

Regression modeling was performed using pay item data, supply chain variables, and other macroeconomic indicators to identify models that best predicted FDOT's materials costs and quantities. **Table 17** provides the updated forecast average price for concrete. Previous forecasts expected fiscal year weighted average prices to end up around $1,018 in FY 2023, but bid prices have increased in the past quarter, bringing prices up to $1,271 per cubic yard. Concrete price forecasts reflect the impact of a continued strong work program, anticipated price increases for aggregate, and ongoing labor pool constraints for a best estimate trajectory that is effectively flat, wobbling around current prices over the five years (**Figure 31**). A lower bound reverts to pre-pandemic conditions, with flat diesel prices, lower macroeconomic activity (lower Florida growth) and declines in overall Florida construction activity. The upper bound reflects continued growth in GSP and higher crude prices. **Figure 32** shows the output of several quantity models forecasting statewide consumption of concrete and the scenario identified as the best estimate.

Table 17. Concrete Price Forecast Results						
Year	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**
Price Concrete, $/CY	$1,206.11	$1,271.26	$1,184.33	$1,152.86	$1,140.68	$1,200.41
Percent Change, %	45.3%	5.4%	-6.8%	-2.7%	-1.1%	5.2%

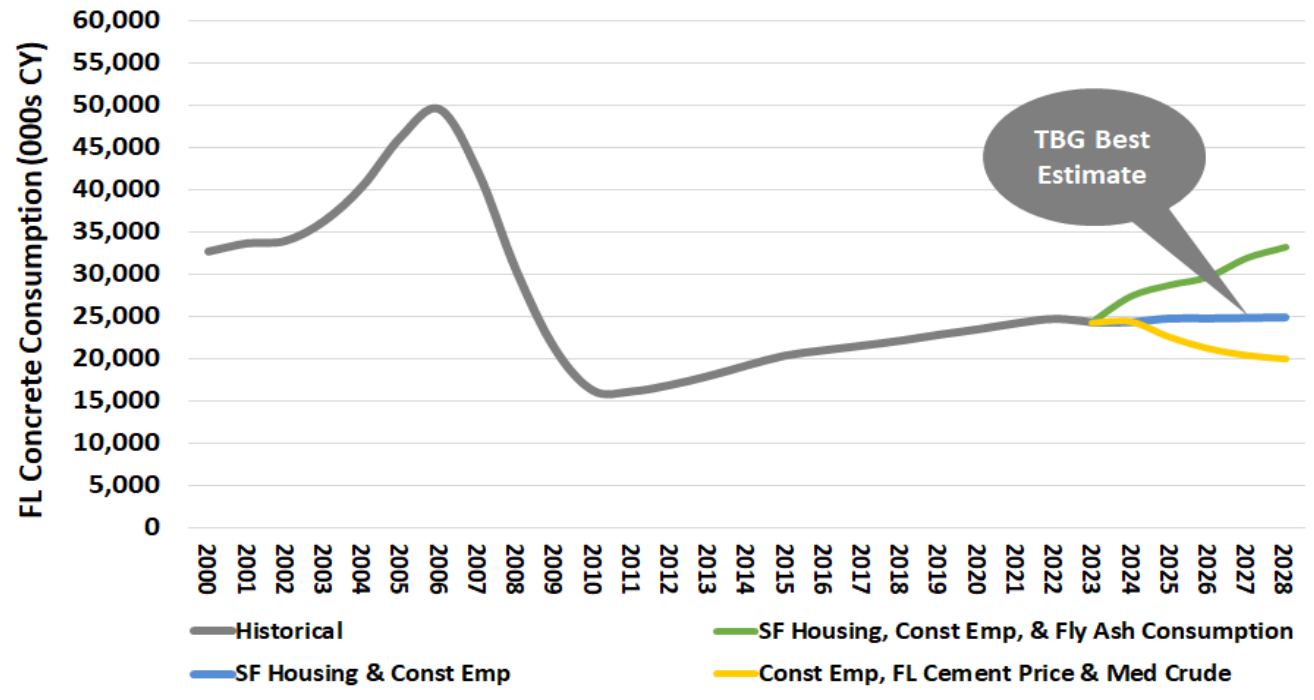
Source: TBG calculated from data provided by FDOT Estimates Office, various industry sources.

Figure 31. Concrete Price, 2023 Forecast



Source: TBG calculated from data provided by FDOT Estimates Office, various industry source.

Figure 32. Florida Concrete Consumption, 2023 Forecast



Source: TBG calculated from data provided by FDOT Estimates Office, various industry source

STEEL

Summary

- Prices for different steel products declined year-over-year after they increased early in calendar year 2023 against the expectations of producers. Most producers can only secure spot prices for raw materials.
- Nationally, steel production and utilization rates are down year-over-year. Mills have been adjusting production over demand concerns, which has negatively affected producers' production capabilities. Ukraine War impacts continue to create global instability in metals markets with some producers changing where they source materials from or which materials they use. Overall, global volatility will continue affecting prices.
- Lead times have improved. Finding skilled labor is an ongoing issue for producers.

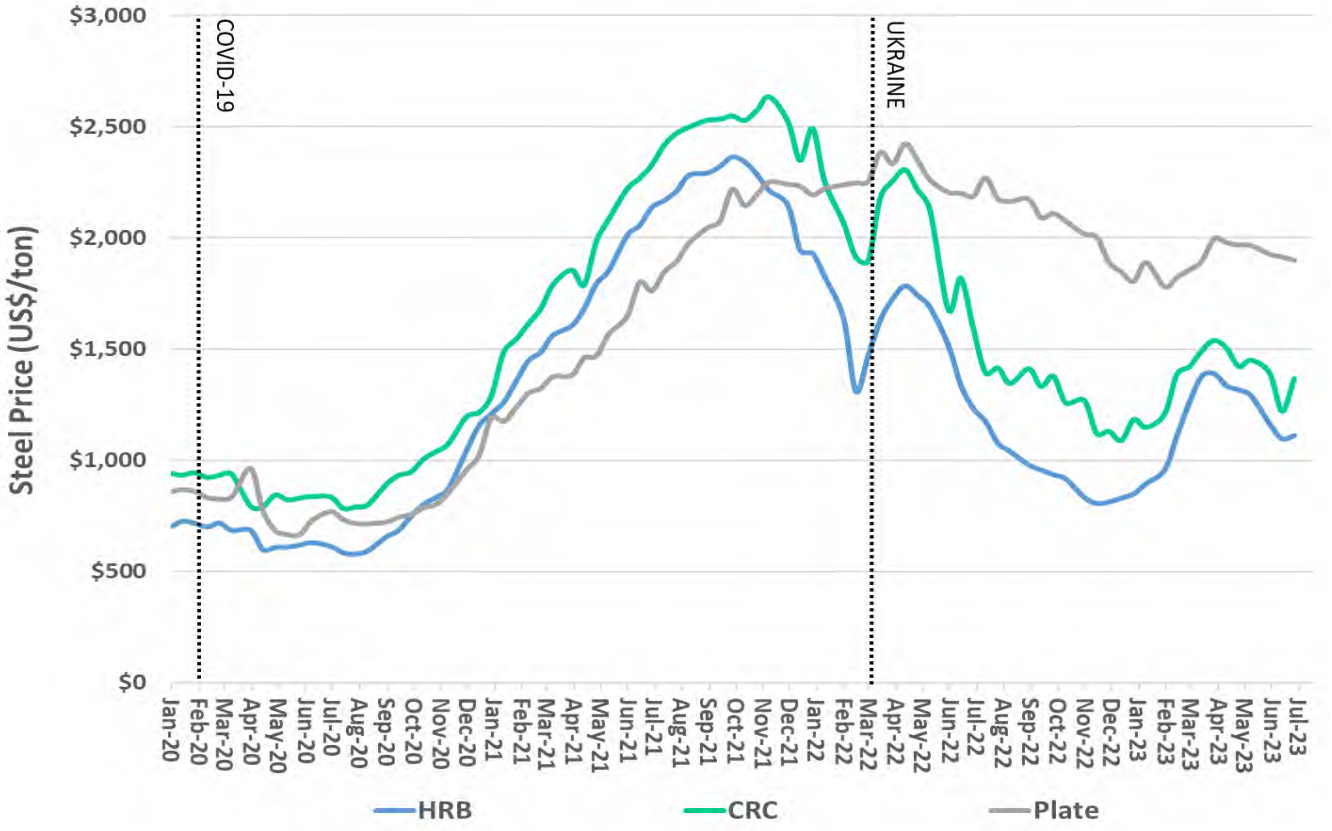
FDOT Impacts

- Structural steel is expected to be down 21% in FY 2023 and then increase 2.6% the next two years. On the other hand, reinforcing steel is expected to increase 2% in FY 2023, decline 12% in FY 2024, and show slight growth afterwards.
- When possible, producers are still passing the majority of cost increases and have tried to include cost escalation clauses.
- Work program quantities see a significant increase in FY 2024 due to major projects expected to start.

General Trends

Steel prices declined for most part of calendar year 2022 and then they had a rebound early in 2023, something that some producers didn't expect (**Figure 33**). Price changes have varied by product. US hot-rolled band prices are down 10% in July 2023, year-over-year, but are up 31% since January 2023. Cold-rolled coil prices and steel plate are down 14% and 13% year-over-year, respectively. However, while cold-rolled coil prices are up 16% since January 2023, steel plate prices are only up 5%. In its April 2023 Outlook, the World Steel Association (WSA) expects worldwide steel demand to increase 2.3% in 2023 and 1.7% in 2024. For the U.S., they expect growth of 1.3% in calendar year 2023, highlighting the increases in interest rates as a factor that will limit construction activity and growth. For 2024, they expect a 2.5% increase.

Figure 33. U.S. Steel Pricing, Jan. 2020 – July 2023



Source: AISI Weekly Raw Steel Production.

SUPPLY CHAIN VARIABLES ➤ **STEEL**

Table 18 shows a summary of select variables that impact the steel supply chain and their current status, followed by historical variables in **Table 19**.

Table 18. Supply Chain Variables for Structural Steel

 Raw Materials	Prices for hot-rolled steel increased 12% in February 2023 year-over-year. While prices were on a downward trend for most of calendar year 2022, they began increasing once again in 2023. Rebar prices have followed a similar trend, but at a smaller scale. Prices increased 6% year-over-year. Iron ore prices saw an opposite trend, declining 7% in 2023 and 13% year-over-year. Lead times have improved year-over-year. While last year producers indicated lead times were between 2 and 15 weeks, this year they were only as high as 5 weeks	↑
 Scrap Steel	Scrap steel prices declined 24% in calendar year 2022 and while they unexpectedly began 2023 on the rise again, they declined in recent weeks, following the perception of some producers in previous quarterly reports, where price increases under current market conditions were unsustainable and as such, temporary. The Ukraine war has forced some producers to shift away from pig iron supplies to use more shredded scrap metal during production.	↑
 Galvanizing Steel	Global zinc prices have continued decreasing. In calendar year 2023 through June they decreased 28% and year-over-year they decreased 35%. Interviews indicate that lead times have improved. Some producers in the U.S. indicated they were forced to make substitutions in production and material sourcing due to the Ukraine war.	↑
 China	As with other products, Chinese steel prices increased early in calendar year 2023 but have eased since April. As of July 2023, prices in 2023 declined 10% to an average of $521 per ton, a 16% decline year-over-year. China's domestic demand for steel is expected to continue increasing in 2023 due to government issued measures to stimulate the real estate sector and easing COVID restrictions. In spite of these, China's crude steel production has struggled to ramp up. As of May 2023, production was down 7% year-over-year.	↑
 Transportation	Overall costs for producers remain higher than in the past. Diesel prices had significant declines, with a 31% year-over-year decline. However, prices are still high compared to year prior 2022. Constrained truck/driver availability continues. Interviews indicated that transportation has not gotten worse.	↑
 Rail	Trucking is the preferred method for transportation of finished product, but raw materials are delivered by rail to some fabricators. Other sectors continue	↑

	having reliability issues with rail.	
 Milling Capacity	Nationally, capacity utilization rates in calendar year 2022 averaged 79%, a 3% decline from 2021. Year-to-date production is down 3% to 47.6 million net ton and capacity utilization averaged 76%. Mills' decisions to idle or restart plants have caused disruptions in production and prices for producers.	=
 Labor	Producers continue struggling to find skilled labor and this has prevented some from increasing production. Labor costs have increased in an attempt to attract workers. Anecdotally, some producers indicated that if it weren't for labor issues, their sales would have been 10% to 20% higher.	↑
 Competition	In FY 2023, the number of steel plants in FDOT's producer approved list rose 4.1%. 80% of the additions came from out-of-state plants. Supply has fluctuated throughout the year and prices have been volatile even though some sectors in the economy have slowed down. Steel products will continue being influenced by global markets.	=

↑	Exerting negative influence on FDOT's costs; monitor.
=	Currently stable; not influencing FDOT's costs.
↓	Exerting positive influence on FDOT's costs.

Table 19. Historical Steel Data, 2014 – 2023

*(Maximum values indicated with *, No data available indicated with **)*

Steel	Units	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
U.S. Price of Iron Ore[1]	$/Ton	$77.91	$73.65	$66.32	$71.25	$84.37	$84.31	$98.79	$146.69*	$108.86	$103.21
U.S. Price of Coal[2]	$/Ton	$151.38	$153.65	$118.31	$130.89	$149.42	$118.19	$114.34	$112.44	$154.30	$161.20*
Total Chinese Imports[3]	Billions of $	$1,959	$1,680	$1,588	$1,844	$2,136	$2,078	$2,066	$2,687	$2,714	$2,775*
Domestic Milling Capacity[4]	Million Tons	125.40*	124.0	122.7	121.6	122.2	120.8	119.6	124.1	120.5	121.8
World Steel Production[5]	Million Tons	1,810	1,750	1,773	1,858	1,973	2,031	2,021	2,099*	2,011	2,044
Steel Production Used in Construction[4]	%	23.45%*	17.95%	19.77%	19.22%	19.85%	20.26%	20.34%	19.11%	19.89%	20.15%
Florida Diesel Prices[6]	$/Gallon	$3.00	$1.84	$1.44	$1.78	$2.22	$2.04	$1.78	$2.15	$3.73*	$3.05
FL Construction Employees/All FL Non-Farm Employees[7]	%	5.1%	5.3%	5.6%	5.9%	6.16%	6.32%	6.61%*	6.48%	6.38%	6.25%
U.S. Price of Zinc[8]	Cents/lb.	$107.12	$95.54	$101.37	$139.28	$141.05	$124.13	$110.79	$145.85	$190.19*	$174.02
World Price of Zinc[8]	Cents/lb.	$98.05	$87.64	$94.82	$131.25	$132.66	$115.60	$102.71	$136.29	$158.05*	$137.88
Annual FDOT Work Program Allocation[9]	Billions of $	$3.29	$3.18	$3.51	$4.00	$3.82	$3.83	$3.72	$2.66	$4.17	$5.42*
Estimated FDOT Reinforcing Steel Consumption[10]	Tons	11,675	12,617	16,322	15,313	17,266	16,059	11,504	9,426	19,487*	8,286
FDOT Reinforcing Steel Cost[10]	$/lb.	$0.94	$0.81	$0.86	$0.81	$0.97	$1.00	$0.88	$1.20	$1.49	$1.52*
Estimated FDOT Structural Steel Consumption[10]	Tons	10,969	18,292	10,105	28,654*	10,993	17,808	14,743	14,077	12,497	21,035
FDOT Structural Steel Cost[10]	$/lb.	$2.75	$2.27	$3.99	$2.75	$4.31	$2.79	$2.55	$3.84	$4.47*	$3.51

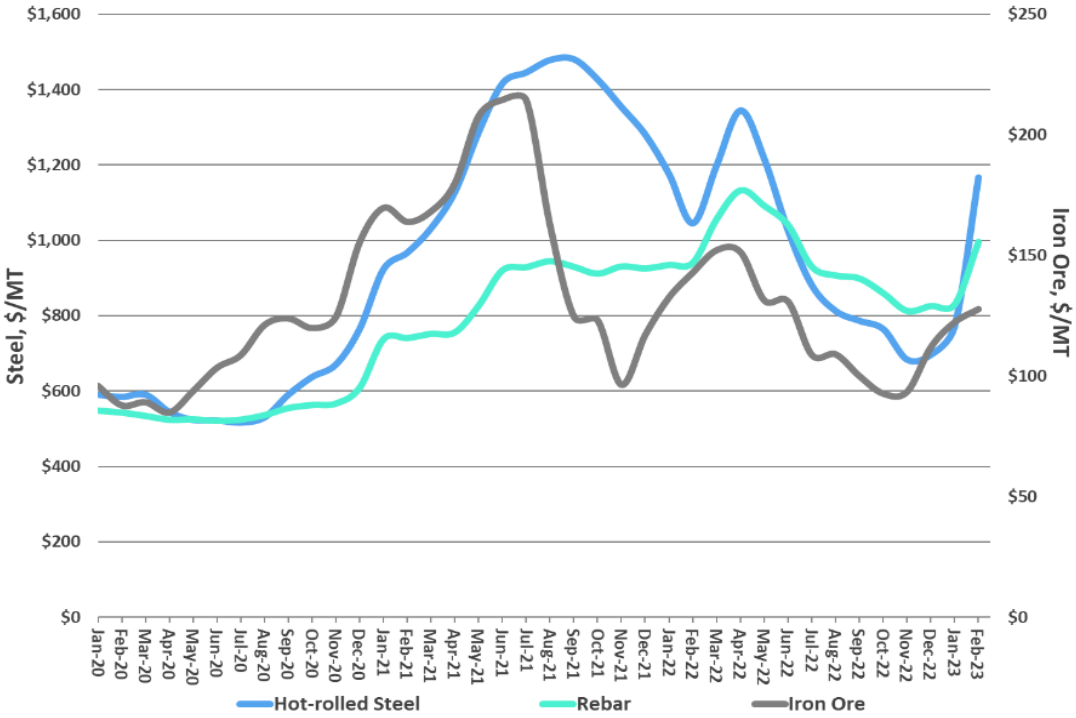
Sources: 1. USGS, World Bank. 2. EIA. 3. WTO's World Trade Statistical Review. 4. Standard & Poor's Metals Industry Survey. 5. World Steel Association. 6. FDOT State Construction Office. 7. Bureau of Labor Statistics. Workers in the agriculture sector are excluded from government and industry estimates due to conflicting seasonality and difficulty in measuring self-employment, hobby farms, and undocumented workers.[12] 8. USGS. 9. FDOT Office of Work Program. 10. Calculated, from data provided by FDOT Estimates Office.

[12] https://www.stlouisfed.org/open-vault/2019/july/nonfarm-payrolls-why-farmers-not-included

Raw Materials & Scrap Steel

Sourcing raw materials remains an issue for the industry as mills have reduced production and costs for different types of materials remain high. In TBG's 2023 survey, producers reported similar trends on prices, with the majority reporting that they can only lock spot prices for raw materials. Overall, prices have followed similar patterns as other steel products. In February 2023, hot-rolled steel prices had a significant increase, 12%, year-over-year, and 123% higher compared to February 2019. Similarly, rebar prices were 6% higher year-over-year and 90% from pre-pandemic levels. On the other hand, iron ore prices decreased 13% through June 2023 compared to one year earlier (**Figure 34**).

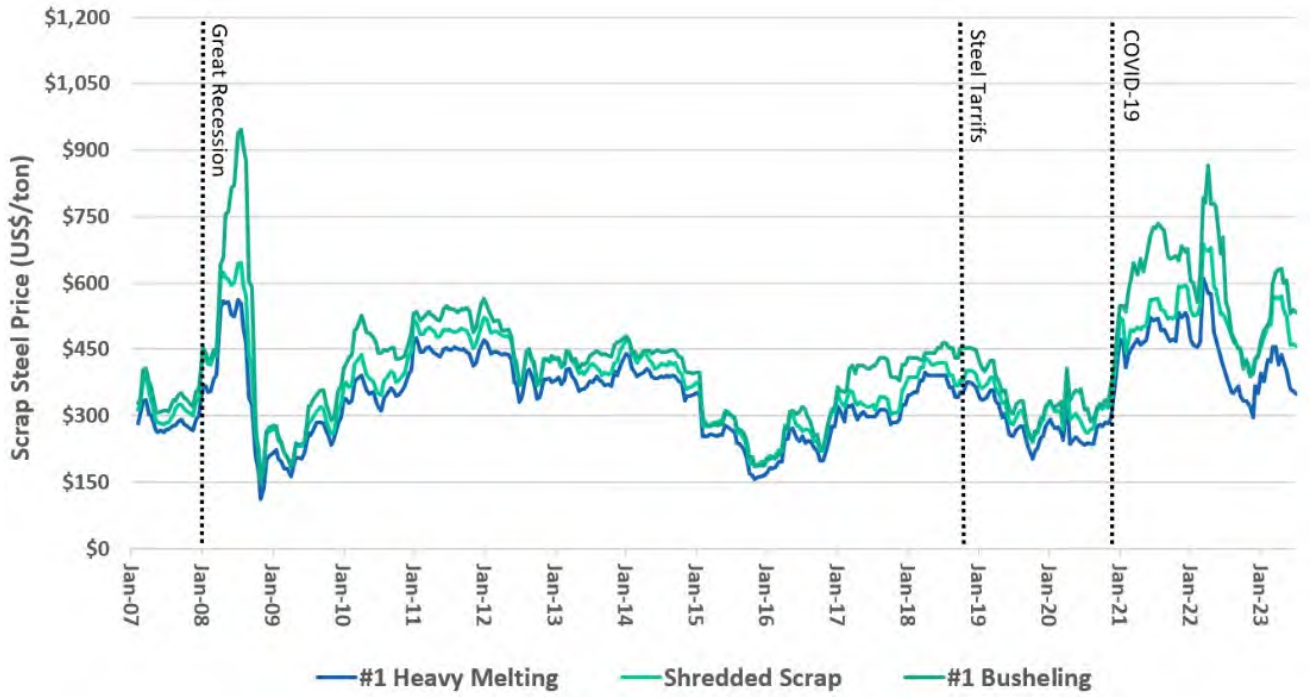
Figure 34. Historical Hot-rolled Steel and Iron Ore Prices



Source: World Bank, MEPS.

After rising sharply throughout 2021 and 2022, scrap steel prices have declined in FY 2023 (**Figure 35**). However, June 2023 prices are still elevated compared to pre-pandemic levels for Heavy Melting Scrap (42%), Shredded Scrap (64%), and #1 Busheling Shredded Scrap (83%). Compared to June of 2022, prices are down 14%, 13%, and 23% for Heavy Melting Scrap, Shredded Scrap, and #1 Busheling Shredded Scrap, respectively.

Figure 35. Scrap Steel Prices, January 2007 – July 2023

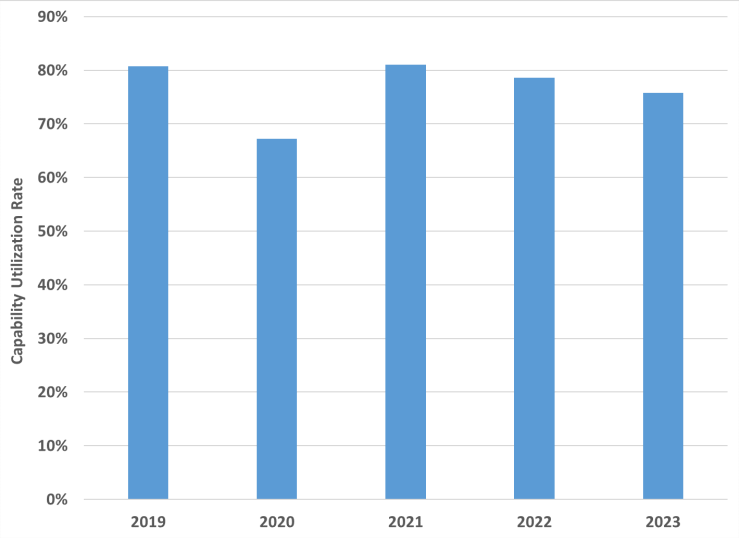


Source: Steelbenchmarker.

Capacity Utilization

U.S. steel capacity utilization declined to 76% in calendar year 2023 based on data through July, continuing the slight declines in utilization rates in 2022. Utilization rates have declined 6% since the rebound seen in 2021 (**Figure 36**). The declines are explained with uncertainty with the economy slowing down and demand weakening, so producers tried to avoid excess inventory. For example, late in 2022 U.S. Steel decided to temporarily idle two blast furnaces (in Pennsylvania and Indiana) due to market conditions; however, both were restarted in April 2023 as the company felt that conditions improved. These changing conditions are impacting fabricators' production capacity as well as increase costs. Other companies announced new or expansion projects of mills in different parts of the country. With these additions, domestic capacity should be more robust in times of economic upheaval.

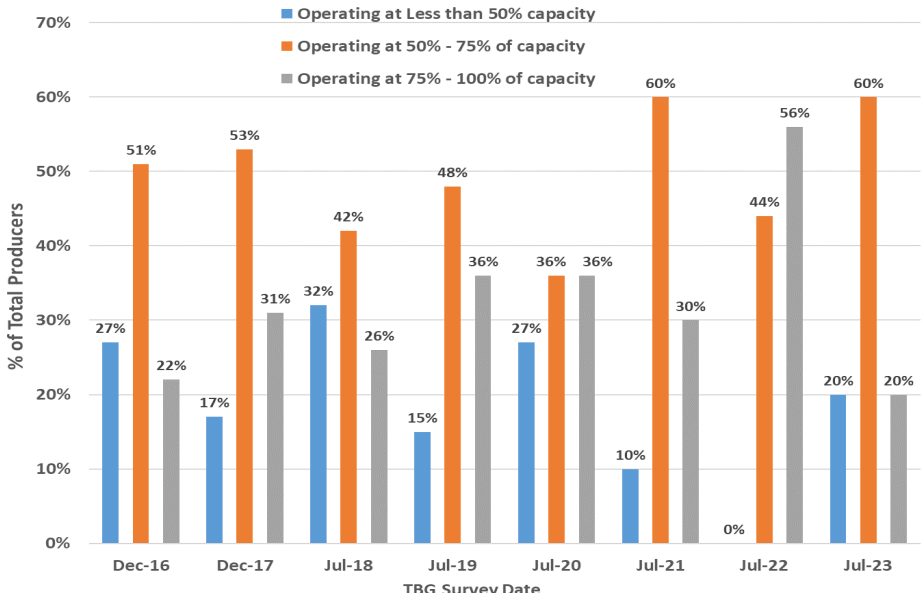
Figure 36. U.S. Steel Production Capacity



Source: American Iron and Steel Institute Weekly Steel Production. 2023 through July 15th.

Based on a limited number of responses, Florida steel fabricators were operating at a slightly lower capacity than previous years. This year's survey operating capacity was at 67% compared to last year's 76% (**Figure 37**). This is consistent with the slowdown reported in the overall steel sector industry. Disruptions in the supply chain, costs, and labor issues persist.

Figure 37. Survey Respondents' Operating Capacity: Florida Steel Fabricators

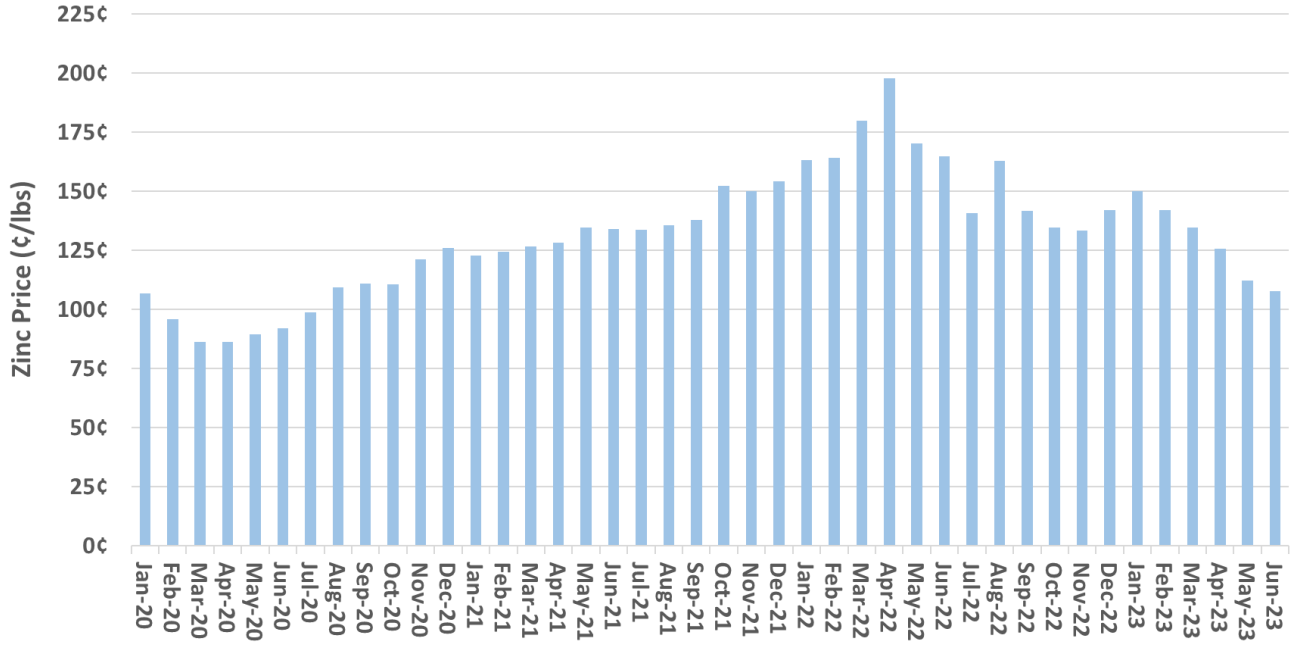


Source: TBG Survey; updated July 2023.

Galvanizing Materials

World zinc prices peaked in April 2022 at $1.98 cents per pound, but have since declined to $1.08 cents per pound (**Figure 38**). Year-over-year, zinc prices are 35% lower than June 2022. Compared to June 2019, zinc prices are up 17%. As a result, if the economy slows down, prices for galvanized products like bolts and hardware could drop further. Producers didn't indicate supply issues with zinc or other ancillary products.

Figure 38. Zinc Prices, Jan. 2019 – June 2023



Source: World Bank.

Trade

U.S. exports continued increasing in calendar year 2022 by 2% according to the most recent data from the International Trade Administration (**Table 20**). Imports after increasing 43% in calendar year 2021, they had a slight decline of 2% in 2022. This as some plants where restarted throughout 2021 and 2022 to meet increased post-COVID increased demand. Semi-finished products had the largest decline for exports and imports in 2022, while pipes and tubes, and long products had the largest increases for exports and imports, respectively.

Table 20. U.S. Exports and Imports of Steel Mill Products, By Group

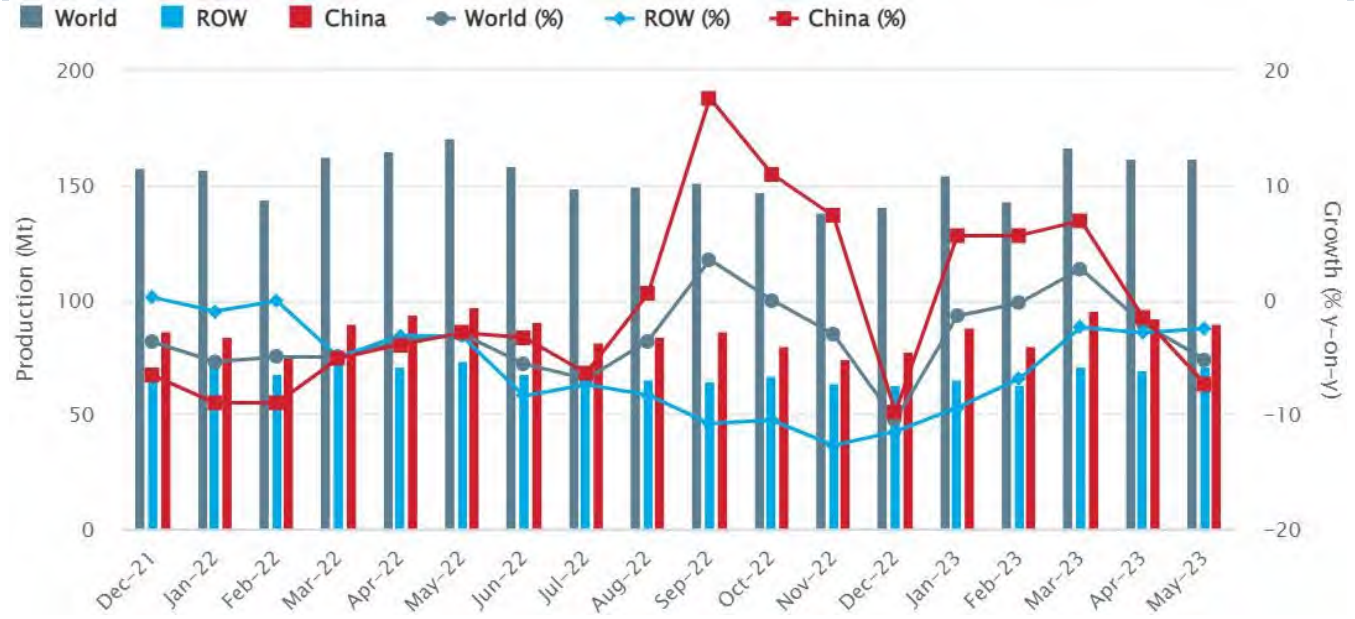
Products (000s of metric tons)	2018	2019	2020	2021	2022	2023*
Exports						
Flat	4,741	4,383	4,034	5,069	5,097	2,306
Semi-Finished	68	60	119	146	107	135
Pipe and Tube	993	756	608	675	795	348
Long	1,866	1,332	1,304	1,633	1,661	728
Stainless	705	468	342	384	387	164
Other	68	50	22	47	61	24
Total Exports	**8,441**	**7,049**	**6,429**	**7,954**	**8,107**	**3,705**
Imports						
Flat	11,057	8,793	7,501	11,171	11,080	3,789
Semi-Finished	7,127	6,126	5,146	7,509	4,900	2,423
Pipe and Tube	5,023	4,285	3,588	4,772	5,503	1,966
Long	6,422	5,371	3,046	3,951	5,373	2,511
Stainless	979	777	705	1,154	1,139	395
Other	23	48	47	20	17	7
Total Imports	**30,632**	**25,401**	**20,032**	**28,577**	**28,011**	**11,092**

Source: U.S. Census, International Trade Administration; * Data through May for Exports and Imports.

China

According to the WSA, global crude steel production was 161.6 million metric tons in May 2023, a 5.2% decrease compared to May 2022 (**Figure 39**). Of the total, China produced 90.1 million metric tons, or 56% of global steel in May 2023, down 7%, year-over-year. China's domestic demand for steel and iron ore have suffered as a result of economic slowdown. Production dropped below 80 million tons between October-December 2022. Measures to stimulate the real estate sector and easing strict COVID measures have yet to make an impact, but they are expected to increase demand for steel. Steel demand in China is expected to grow 2% in 2023 and be flat in 2024. The WSA also expects China's steel demand will decrease in the future if the country shifts to become more consumption driven.

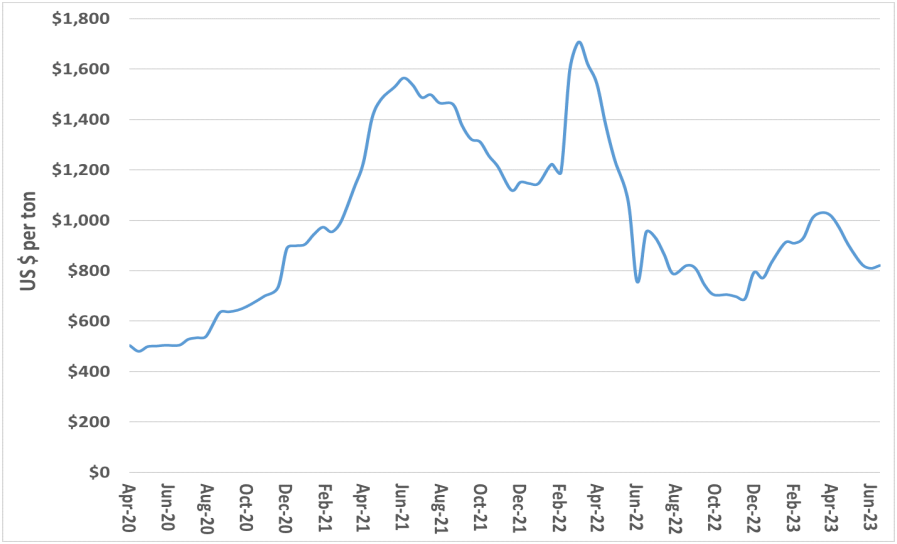
Figure 39. Crude Steel Production, China versus the Rest of the World



Source: World Steel Association.

Europe

Figure 40. HRB Steel Prices in Western Europe, Apr. 2020 to



Source: TBG Work Product, SteelBenchmarker.

Crude steel production was down 11.2% for European Union member nations in May 2023 compared to the same month last year and was down 10.4% year-to-date. However, steel production in Russia and other eastern European nations, including Ukraine, increased 11.5% in May 2023 and decreased 3.8% year-to-date. By comparison, North America production was down only 3.7% last month. Even though prices in Europe rose between January and April 2023, they have continued falling since then. In July 2023, Hot-Rolled Band (HRB) prices were 14% lower over a year ago. For most of 2022 and now in 2023, prices fell quickly as European economies weakened as well as impacts from the Ukraine war (**Figure 40**). Due to disruptions of the Ukraine war some producers in the U.S. indicated that they had to adjust their mixes or find new sources for materials.

Competition

Despite a bump in approved facilities over the last few years, the pool of fabricators grew from 102 in FY 2022 to 107 in FY 2023; they are still significantly lower compared to 135 in 2012 (**Table 21**). The overall number of bridge fabricators has been below 30 since 2020 and the number of sign structure fabricators has remained stable, while miscellaneous metal providers have decreased to 25 suppliers. **Table 22** summarizes FDOT approved steel facility concentration by location. Steel fabricators serving FDOT can be found in nearly every state, but are largely concentrated in the eastern half of the country due to transportation costs.

Table 21. FDOT Approved Steel Facilities by Type

Location and Type	2012	2023
Florida		
Bridge	5	6
Guardrail	0	0
Miscellaneous Metal	16	17
Sign Structures	6	6
Out of State		
Bridge	32	26
Guardrail	11	7
Miscellaneous Metal	44	25
Sign Structures	21	20
Total	**135**	**107**

Source: FDOT Approved Producer List, 2023 as of July 5th. Note: *Excludes Florida plants.

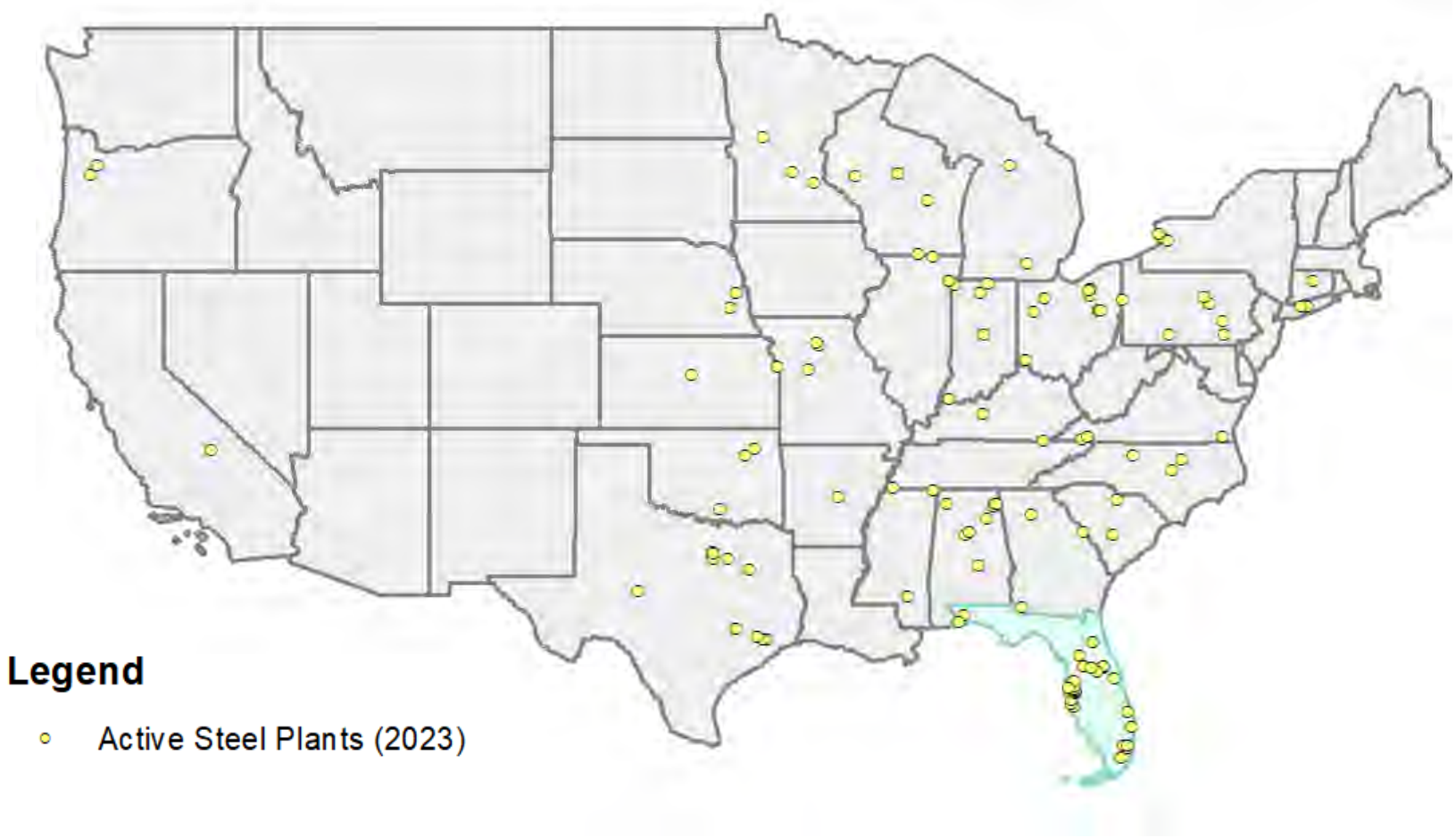
Table 22. FDOT Approved Steel Facilities by Location

Location	2012	2023
Local		
Florida	27	29
National		
East Coast*	29	27
Midwest	41	28
Gulf Coast	30	21
Rocky Mountains	3	0
West Coast	3	2
Outside U.S.		
Canada	2	0
Total	**135**	**107**

Source: FDOT Approved Producer List, 2023 as of July 5th. Note: *Excludes Florida plants.

Figure 41 maps prequalified FDOT steel plant locations as of July 5, 2023.

Figure 41. FDOT Approved Steel Producer Facilities

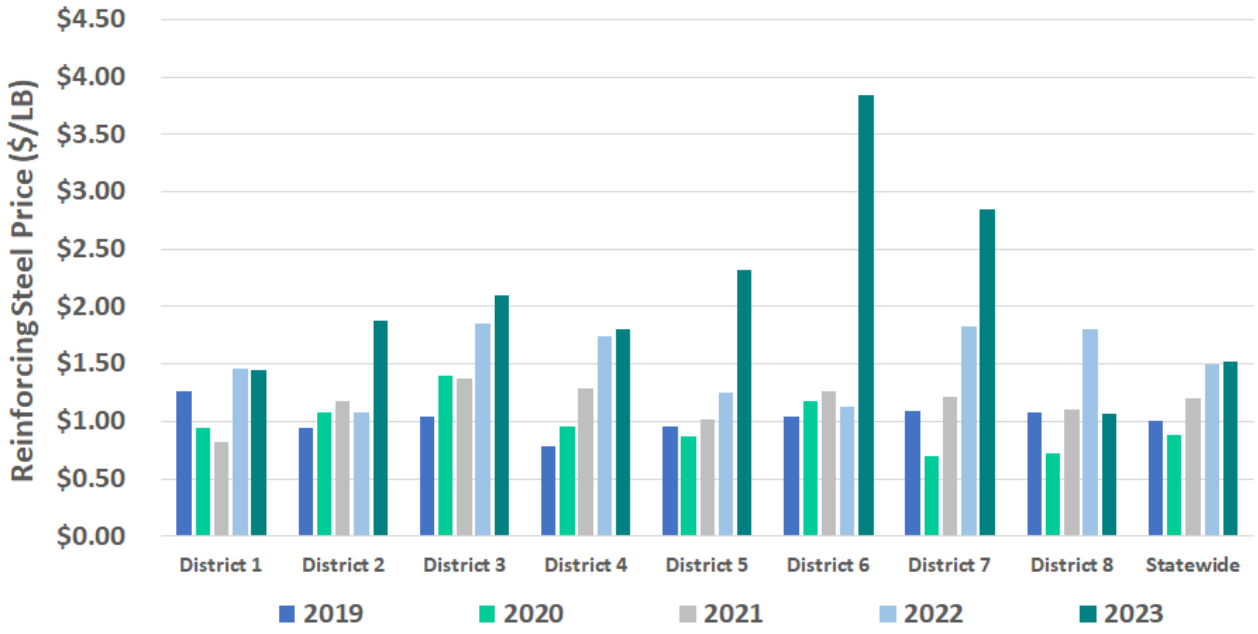


Source: FDOT, TBG Work Product

Current Pricing

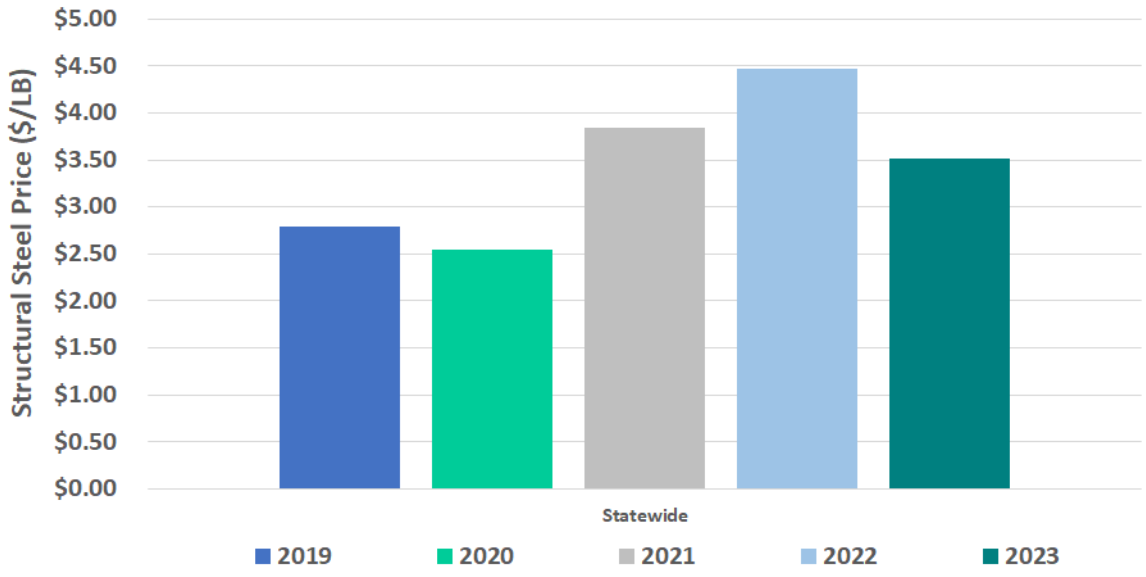
Figure 42 shows price variation in the last 5 years by district for reinforcing steel. Districts 6 and 7 saw the highest prices in FY 2023. Based on FDOT bid prices, statewide reinforcing steel prices were up 2% in FY 2023 compared to FY 2022. **Figure 43** shows structural steel price variation over the last 5 years. Statewide structural steel prices declined 21% in FY 2023 compared to the previous year. Insufficient bid data exists to break structural steel costs down by district.

Figure 42. Reinforcing Steel Prices by District



Source: TBG calculated from data provided by FDOT Estimates Office.

Figure 43. Statewide Structural Steel Prices



Source: TBG calculated from data provided by FDOT Estimates Office.

Material Quantities

Materials quantities estimates have been prepared for Reinforcing and Structural Steel. FDOT's overall steel consumption has been found to hold a valid statistical relationship with overall FDOT expenditures. However, there is potential for substantially higher quantities of steel and metal products to be considered, and an additional line item labelled Other Steel material is included in the Future Quantities tables herein. The "Other Steel" category is estimated from all pay items that have a steel or metal product component, that are outside reinforcing and structural steel pay items. There are about 2,250 steel pay items currently under consideration, with an accompanying total dollar amount of more than $242 million in FY 2023. This total represents FDOT's exposure to global market fluctuations.

Reinforcing and Structural Steel quantities are estimated using historical ratios. Statewide results are in **Table 23**, while results by District are provided in **Table 24**.

Table 23. FDOT Future Steel Material Requirements

FY	2024	2025	2026	2027	2028
Reinforcing Steel	20,630	14,764	11,524	9,256	9,713
Structural Steel	25,886	18,526	14,461	11,615	12,187
Other Steel	131,635	94,208	73,536	59,063	61,976
Total Tons	**178,151**	**127,498**	**99,521**	**79,933**	**83,876**

Source: TBG calculated from data provided by FDOT Office of Program Management.

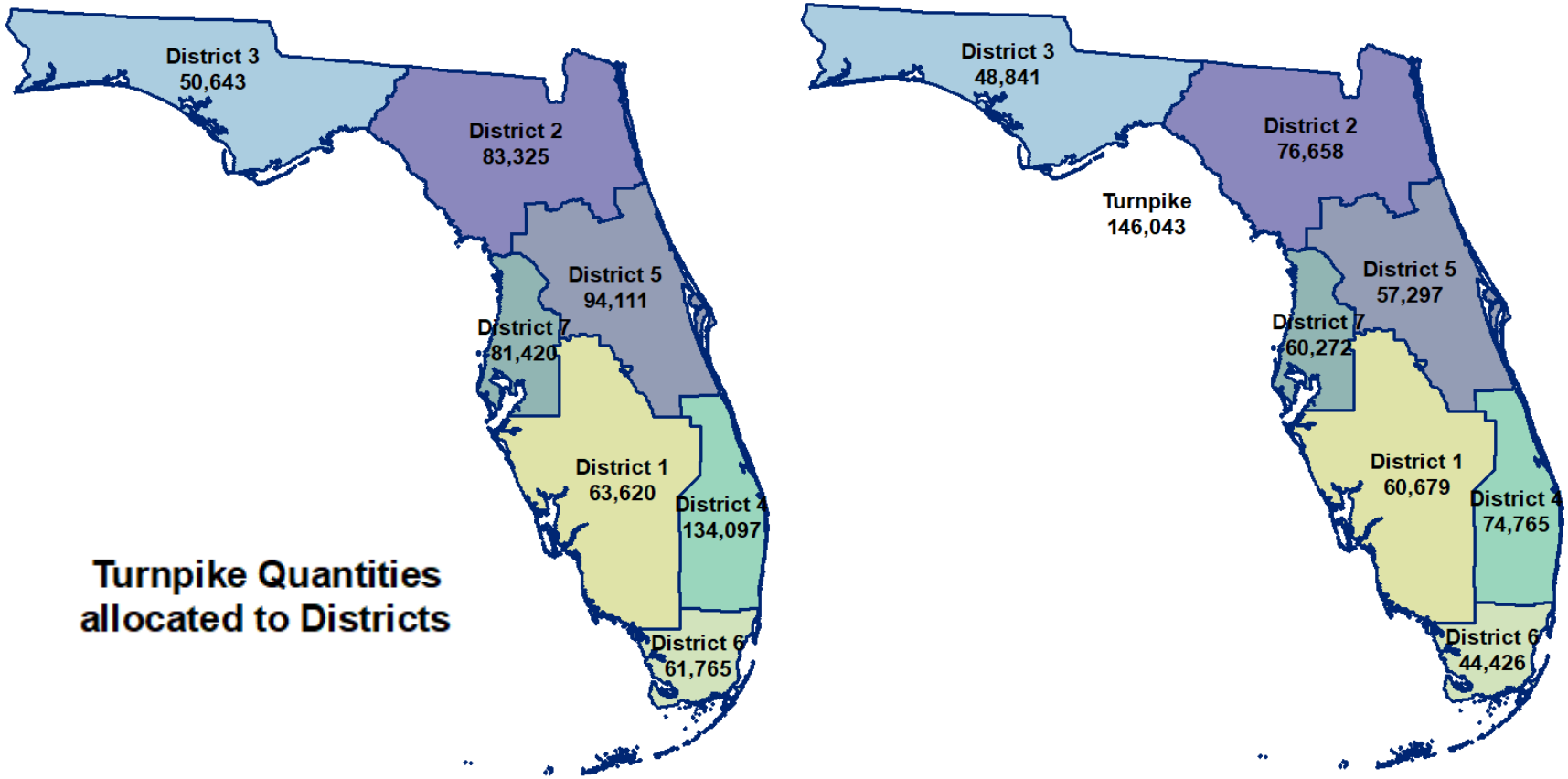
Table 24. FDOT Future Steel Material Requirements by District

District	2024	2025	2026	2027	2028
D1	12,555	8,880	12,113	15,865	11,266
D2	16,441	28,813	12,088	10,034	9,280
D3	21,710	8,652	7,327	5,556	5,596
D4	30,490	12,301	10,140	10,868	10,966
D5	14,057	12,916	11,823	9,898	8,603
D6	16,197	8,134	8,952	7,676	3,466
D7	18,702	11,083	12,623	5,070	12,794
D8	47,997	36,720	24,455	14,966	21,905
Total Tons	**178,151**	**127,498**	**99,521**	**79,933**	**83,876**

Source: TBG calculated from data provided by FDOT Office of the Work Program Budget.

Figure 44 shows total FDOT steel requirements over the Five-year Work Program.

Figure 44. Total Steel Quantities for Five-year Work Program (Tons)



Source: TBG calculated from data provided by FDOT Office of Program Management.

Steel Forecast

Prices and consumption are forecast for the five-year work program. Regression modeling was performed using pay item data, supply chain variables, and other macroeconomic indicators to identify models that best predicted FDOT's materials costs. **Table 25** provides the forecast average price for structural and reinforcing steel.

Previous forecasts found that global conditions (crude prices) and Florida markets (construction employment) were driving FDOT structural steel costs with bid prices expected to achieve a weighted average price of $3.96 per pound in FY 2024. With updated projections across crude prices and macroeconomic conditions, the revised FY 2024 estimate declined to $3.60 per pound. In the moderate scenario, which is considered best estimate, weighted average prices for structural steel are driven by iron and zinc prices and GSP. Both commodities are forecast to fluctuate but essentially end up flat over the five-year work program, while GSP reflects moderate annual growth. In the lower bound, Florida growth does not influence the trajectory, and the flatter commodity prices restrain price growth. In the upper bound, coal prices, which are a driver for steel manufacturing, and Florida's continued growth support ongoing price escalation.

Previous forecasts estimated reinforcing steel weighted average prices for FY 2024 of about $1.39 per pound. With updated data, the forecasted price in FY 2024 is now $1.34 per pound. Reinforcing Steel has been at peak pricing for two years, and is expected to flatten slightly from recent records. With continued construction employment constrained by labor supply and medium crude oil price projections, price growth would revert to more long-term historical growth of about 3% annually. An upper bound of 8% growth in GSP considers Florida's continued expansion, while a lower bound is supported by lower input prices, namely crude oil in the low-price scenario.

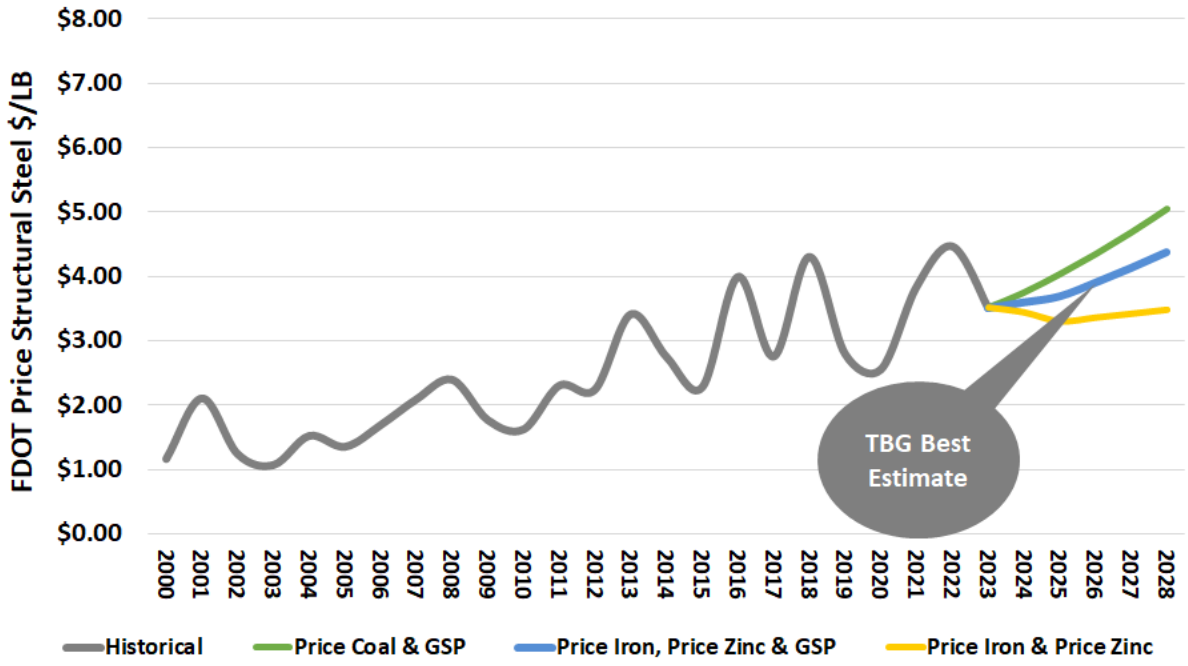
Table 25. Steel Price Forecast Results

Year	2023	2024	2025	2026	2027	2028
Price Structural Steel, $/lb.	$3.51	$3.60	$3.70	$3.91	$4.14	$4.38
Percent Change, %	-21.4%	2.6%	2.6%	5.8%	5.8%	5.9%
Price Reinforcing Steel, $/lb.	$1.52	$1.34	$1.35	$1.37	$1.40	$1.44
Percent Change, %	2.2%	-12.0%	0.9%	0.9%	2.5%	3.0%

Source: TBG calculated from data provided by FDOT Estimates Office, various industry sources.

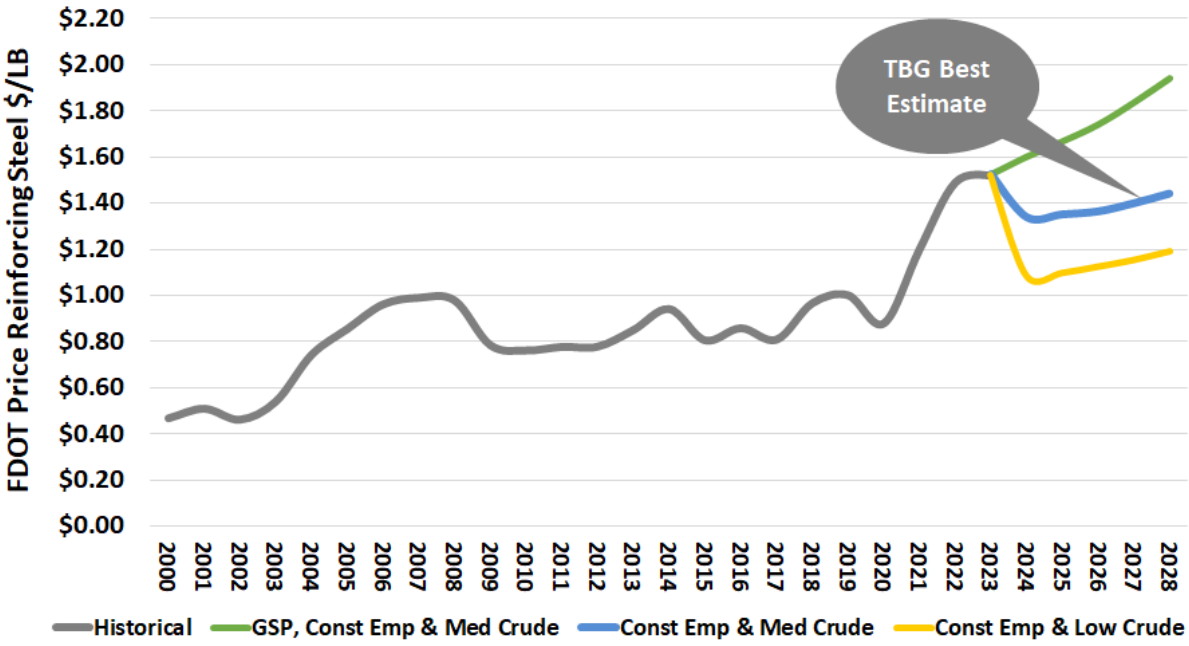
Figure 45 and **Figure 46** show the output of several price models and the scenario identified as best estimate for structural steel and reinforcing steel, respectively.

Figure 45. Structural Steel Price, 2023 Forecast



Source: TBG calculated from data provided by FDOT Estimates Office, various industry sources.
(Variable descriptions available in the **Appendix**.)

Figure 46. Reinforcing Steel Price, 2023 Forecast



Source: TBG calculated from data provided by FDOT Estimates Office, various industry sources.
(Variable descriptions available in the **Appendix)**

AGGREGATE

Summary

- Demand for aggregate material continues to be high. Crushed stone production in Florida increased by 11% in calendar year 2022, a higher increase when compared to the national production, and began 2023 with a 1% increase. Producers' capacity utilization was unchanged year-over-year.
- Prices had double-digit increases and are expected to continue like that as producers implement multiple increases during the year.
- In spite of slowdown in the residential sector, the industry is optimistic for the rest of 2023 as long as demand from public infrastructure and non-residential remain strong.

FDOT Impacts

- FDOT's aggregate base prices are expected to increase 14% in FY 2023, with further increases in FY 2024 at which point they begin to ease. High demand and less supply are the main causes for these.
- Supply issues are still causing bottlenecks. Additional overseas supply has increased with new sources in Canada and a minor source in Jamaica. However, Vulcan's situation has extended for over a year with no clear resolution and represents significant losses in material quantities. Producers can't always source product within range of projects, leading to increased costs. On average, producers shipped materials 43 miles from the plant to the project.
- Labor, rail, trucking and permitting issues were cited by producers as reasons that cause bottlenecks. However, none were reported to be getting worse.

General Trends

According to quarterly data released by the USGS, crushed stone production in Florida for calendar year 2022 was 104,249 million tons. During the first three months of 2023, production rose 1.4%, which is similar to national growth at 1.7%. Quarterly reports from publicly traded companies showed that in the first quarter of calendar year 2023, aggregate shipments for different regions were down between 1% and 15%. With HB 1191 signed into law, which requires FDOT to conduct a study to evaluate whether phosphogypsum can be used as aggregate material in road construction, 89% of producers in the 2023 survey didn't see this affecting product sales. Phosphogypsum could become a supplement to aggregate base, but only in the long-term if it's seen as a viable alternative and the EPA approves the use as road base.

Prices from publicly traded companies continued showing significant increases (between 20% and 30%). They expect demand from the residential sector to continue weakening, but the non-residential

and public infrastructure will continue being solid. This is consistent with producers' perception in the 2023 survey, where they expect bid prices to increase, on average, 22%.

Respondents in the 2023 survey expected a higher share of FDOT work than they did for 2022. On average, the share of FDOT work in 2023 is expected to be 32%. The share for non-FDOT roadway and non-roadway is 34% each. In 2023, about the same share of producers (60%) anticipate the industry having issues to meet demand. The reasons are widespread over aggregate availability as well as labor, trucking and permitting issues.

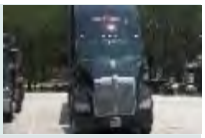
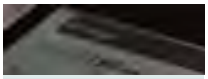
Overall, the percent of capacity used didn't change, as the averages in 2022 and 2023 was 61%. More producers have higher utilization rates as 63% of producers are at 80% or more capacity. Uncertainty over economic conditions was more evident in this year's survey. While in 2022 90% of producers indicated intentions to expand capacity in the next 5 years, in 2023 it was 60% of respondents.

SUPPLY CHAIN VARIABLES ➤ **AGGREGATE**

Table 26 provides current status of selected supply chain variables, and **Table 27** provides historical data for variables impacting FDOT's aggregate costs.

Table 26. Aggregate Supply Chain Variables

 Raw Materials	The USGS reported that Florida's crushed stone production rose 11% in calendar year 2022 and 1.4% during the first quarter of calendar year 2023. Nationally, production rose 1.7% over the same period. This year, new sources for aggregate material included Jamaica and Canada. However, Vulcan's legal battle with the Mexican government has continued impacting Florida's aggregate supply. In 2022, Florida had approximately 1 million tons less of imports because of the dispute.	↑
 Access to Land	Access to land with suitable deposits is key to cost-effective material extraction for FDOT Aggregate. As mentioned elsewhere in the report, everything that's going on with the WOTUS rule as well as changes in relation to permitting and emissions creates uncertainty in the industry. 71% of producers in this year's survey indicated environmental regulations or land use rules are creating production issues. The likelihood of these affecting production over the next five years is 40%.	=
 Rail	Rail is the primary transportation for aggregates from Georgia, and from Lake Belt to Central and Northeast Florida. In the first three months of calendar year 2023, tons and revenues of aggregate products shipped increased by 22% and 30% year-over-year, respectively. However, in Q1 of calendar year 2022, CSX hadn't completed the acquisition of Pan Am Railways, which occurred the following quarter. Compared to the last three months of calendar year 2022,	↑

	tons and revenues increased by 5% and 17%, which continue indicating significantly higher prices. However, these statistics are for CSX's whole system as location specific data is not available. Producers had to deal with rail reliability issues throughout the year.	
 Trucking	Constrained truck/driver availability was reported by producers on this year's survey. On average, producers shipped materials 43 miles from the plant to the project and there have been reports that producers had to truck product from farther away due to regional supply constraints. Fuel is the other major factor in trucking. Diesel prices had significant declines, with a 31% year-over-year decline. However, prices are still high compared to year prior 2022.	↑
 Labor	Labor demand is high as elevated aggregate demand continues across different construction sectors. Some producers continue struggling with finding qualified candidates to fill positions. Statewide construction employment has continued increasing year-over-year, but growth is slowing down. Nationally, stone mining and quarrying employment was up 1% in 2023. IBIS forecasts that stone mining employment in Florida will grow 0.3% annually through calendar year 2027.	↑
 Competition	In FY 2023, aggregate producers in FDOT's producer approved list rose by 3.7%. Although not currently approved for FDOT work, interviews during quarterly reports indicated formation of a new pit in District 1 (Lee County). However, this source alone is not enough to address local or statewide supply issues as it was mentioned as being temporary and limited in size.	=
 Capital Costs	Higher interest rates increase acquisitions costs. Reports indicate that issues with equipment and parts are more related on how long it takes manufactures to fabricate them rather than port backlogs or shipping costs. Even though there is a more cautious approach in the industry, which has increased the interest on rentals, some indicate the need to place orders now for 2024.	↑

↑ Exerting negative influence on FDOT's costs; monitor.
= Currently stable; not influencing FDOT's costs.
↓ Exerting positive influence on FDOT's costs.

Table 27. Historical Aggregate Data, 2014 – 2023

*(Maximum values indicated with *)*

Aggregate	Units	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Crude Oil (WTI Spot Price)[1]	$/Barrel	$93.17	$48.66	$43.29	$50.80	$65.23	$57.00	$39.16	$68.13	$94.90*	$74.72
Total Chinese Imports[2]	Billions of $	$1,959	$1,680	$1,588	$1,844	$2,136	$2,078	$2,066	$2,687	$2,714	$2,775*
Florida Diesel Prices[3]	$/Gallon	$3.00	$1.84	$1.44	$1.78	$2.22	$2.04	$1.78	$2.15	$3.73*	$3.05
USGS Estimated Florida Statewide Crushed Stone Produced or Used[4]	000s of Tons	63,585	74,275	80,446	83,532	83,642	95,764	101,384	93,560	104,249	107,085*
USGS Average Florida Crushed Stone Price[4]	$/Ton	$10.71	$10.80	$11.55	$11.89	$11.92	$12.01	$12.43	$14.43*	$13.81	$14.23
FL Heavy & Civil Engineering Employees/ All FL Construction Employees[5]	%	12.56%	12.28%	12.33%	12.90%	12.45%	12.73%	13.10%*	12.88%	12.76%	12.65%
FL Construction Employees/All FL Non-Farm Employees[5]	%	5.08%	5.33%	5.65%	5.89%	6.16%	6.32%	6.61%*	6.48%	6.38%	6.25%
Average Hourly Earnings Stone Mining and Quarrying[5]	$/Hour	$21.28	$20.65	$21.41	$22.14	$23.44	$26.50	$26.33	$26.21	$27.07	$27.41*
Annual FDOT Work Program Allocation[6]	Billions of $	$3.29	$3.18	$3.51	$4.00	$3.82	$3.83	$3.72	$2.66	$4.17	$5.42*
Crushed Stone Imports into Ports Serving Florida[7]	000s of Tons	6,501	6,604	6,311	7,387	8,185	8,484*	8,483	8,346	8,361	3,042
FDOT Aggregate Base Weighted Average Price[8]	$/Square Yard	$15.47	$14.86	$16.55	$18.11	$16.39	$16.45	$19.53	$20.01	$23.11	$26.32*
FDOT Earthwork Weighted Average Price[8]	$/Cubic Yard	$4.46	$7.64	$6.97	$6.95	$6.08	$5.90	$8.39	$8.26	$13.84*	$11.31

Sources: 1. EIA – Annual Average Spot Price. 2. WTO's World Trade Statistical Review. 3. FDOT Construction Office. 4. US Geological Survey; 2023 estimated. 5. U.S. Bureau of Labor Statistics. Workers in the agriculture sector are excluded from government and industry estimates due to conflicting seasonality and difficulty in measuring self-employment, hobby farms, and undocumented workers.[13] 6. FDOT Office of Work Program. 7. U.S. I.T.C.; calendar year 2023 through May. 8. Calculated from FDOT Estimates Office data.

[13] https://www.stlouisfed.org/open-vault/2019/july/nonfarm-payrolls-why-farmers-not-included

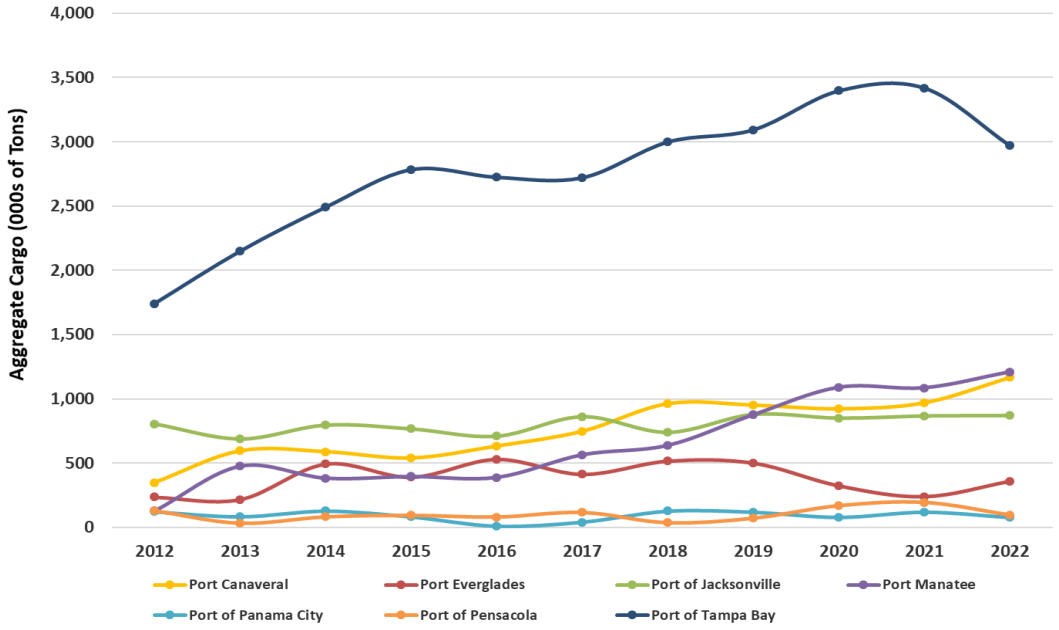
Raw Materials

Aggregate sources for FDOT are pre-approved mining locations throughout Florida, Georgia, Alabama and a few offshore sites, including Mexico, Nova Scotia, Newfoundland, New Brunswick, the Caribbean, and Central America. Rock suitable for FDOT specs shipped by US companies through Canadian ports could expand aggregate supply without violating the Jones Act, which prohibits foreign built or flagged ships from coastwise trading within the US.

During the year, new sources for aggregate material were announced by different ports. In January 2023, Port of Canaveral announced a new service to import 400,000-800,000 metric tons of aggregate per year from Canada and the Port of Panama City receiving cargo from Jamaica to meet regional demand. Additionally, Cemex's acquisition of Atlantic Minerals Limited in Newfoundland, Canada is expected to increase aggregate reserves for the U.S. market by 20% and Vulcan reported the acquisition of a quarry in Honduras that transports additional material to the Gulf coast. However, Vulcan's situation in Mexico has constrained Florida's aggregate supply. The producer's legal battle with the Mexican government[14] resulted in the mine closure in May 2022 and is not expected to be reopened in the near-term.

Import data for incoming aggregate has been compiled from each Port's annual report **Figure 47**. Overall, aggregate imports fell by 2% in FY 2022. The decline is explained by the Port of Tampa, which declined 13% due to lower shipments of limestone, as it handles the largest amounts of aggregate cargo

Figure 47. Aggregate Cargo through Florida Ports



Sources: 1. Canaveral Port Authority Comprehensive Financial Annual Report. 2. Port Everglades Annual Commerce Report, U.S. Army Corps of Engineers Annual Waterborne Commerce of the United States. 3. Jacksonville Port Authority Historical Bulk Information. 4. Manatee Port Authority Annual Financial Report. 5. U.S. Army Corps of Engineers Annual Waterborne Commerce of the United States. 6. Port Tampa Bay Comprehensive Annual Financial Report.

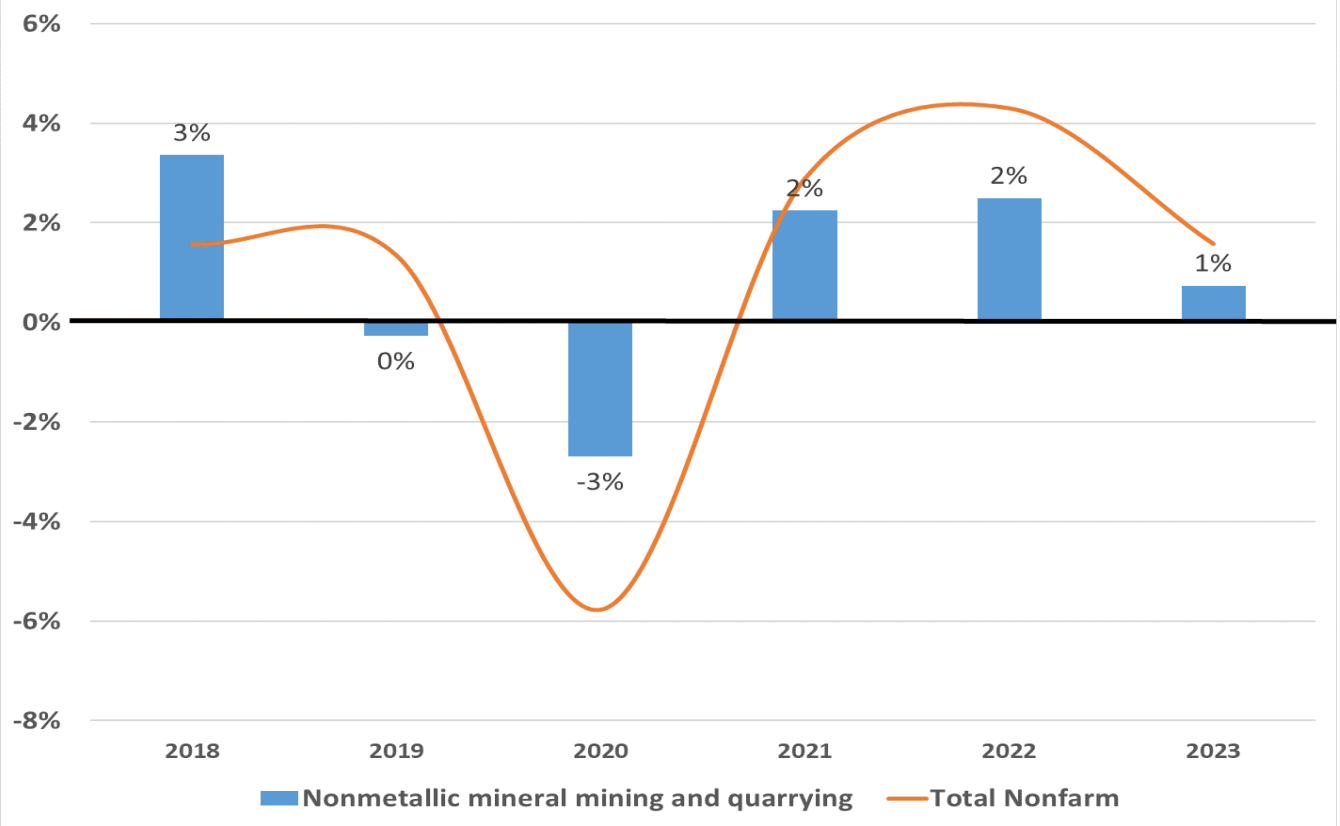
[14] The legal battle began in 2019, ICSID Case No. ARB/19/1.

by a significant margin. Other ports like Port Canaveral, Port Everglades and Port of Manatee increased cargo in 2022.

Labor

The recovery in demand for aggregate has increased demand for labor over the last few years. Nationally, employment in the non-metallic mineral mining grew 2% in calendar year 2022 and it has increased 1% in calendar year 2023. Both slightly lower than the overall growth of total nonfarm employment (**Figure 48**).

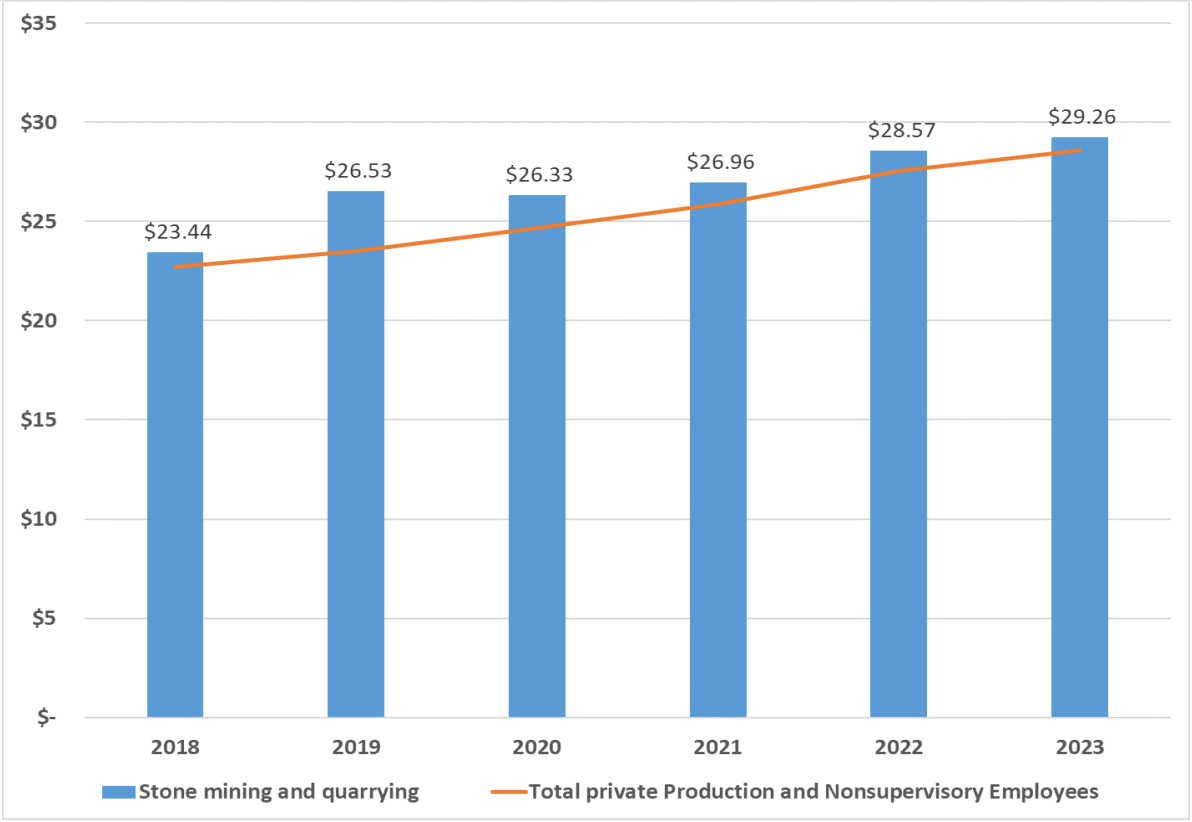
Figure 48. Aggregate Industry Employment Growth



Source: Bureau of Labor Statistics.

Average hourly wages increased 6% in 2022 to $28.6 after a few years of them being stagnant at about $26.50 (**Figure 49**). Wages are not expected to go down, as in some cases producers continue reporting struggles to find labor. Interviews and the survey highlighted that labor shortages persist, but that these were unchanged from a year ago.

Figure 49. Aggregate Industry Average Hourly Wages



Source: Bureau of Labor Statistics.

Lake Belt

The Lake Belt region of South Florida is an important source of aggregate for FDOT. Aggregate production in Lake Belt rose in FY 2022 by 3%, negating the decrease seen in FY 2021. The per ton mitigation fee rate that mines must pay in the Miami-Dade County Lake Belt Area to extract limerock and sand have decreased from a peak of $0.45 in FY 2013 to $0.05 since FY 2018 (**Table 28)**.

Table 28. Lake Belt Fee Rates, 2013 – 2022

Fiscal Year	Per-Ton Fee Rate	Total Collections	Percent Change	Total Tons Extracted	Percent Change
2012-13	0.45	$14,084,101	103%	31,298,003	103%
2013-14	0.45	$14,237,681	1%	31,639,292	1%
2014-15	0.45	$13,811,791	-3%	30,692,868	-3%
2015-16	0.25	$13,937,265	1%	55,749,058	82%
2016-17	0.15	$7,724,044	-45%	51,493,627	-8%
2017-18	0.05	$4,027,804	-48%	80,556,081	56%
2018-19	0.05	$2,042,183	-49%	40,843,667	-49%
2019-20	0.05	$1,962,442	-4%	39,248,843	-4%
2020-21	0.05	$1,911,975	-3%	38,239,490	-3%
2021-22	0.05	$1,963,552	3%	39,271,040	3%

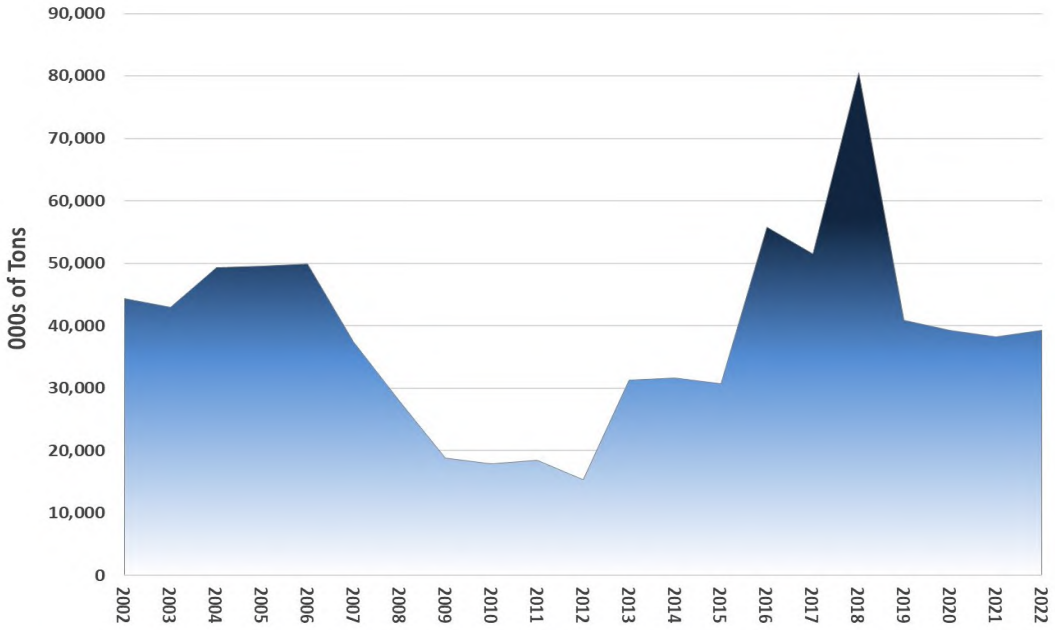
Source: FL DOR.

Figure 50 provides a snapshot of production over the past 20 years, followed by **Figure 51**, which shows production on a monthly basis for the same timeframe.

Production in the Lake Belt Region has risen slightly since FY 2021, with production being over 39 million tons in FY 2022 (a 3% increase compared to FY 2021).

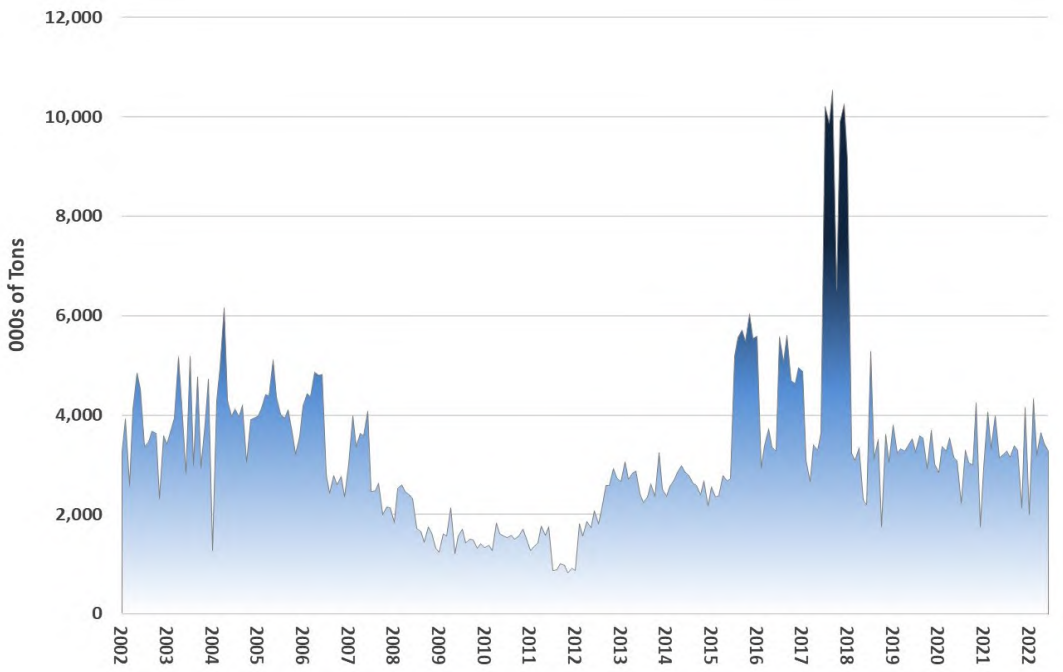
Figure 52 provides a comparison of Lake Belt production to other Florida production of crushed stone. While FY 2018 exceeded peak production in the Lake Belt region, production since then has stabilized around 40%.

Figure 50. Annual Lake Belt Production, 2002 – 2022



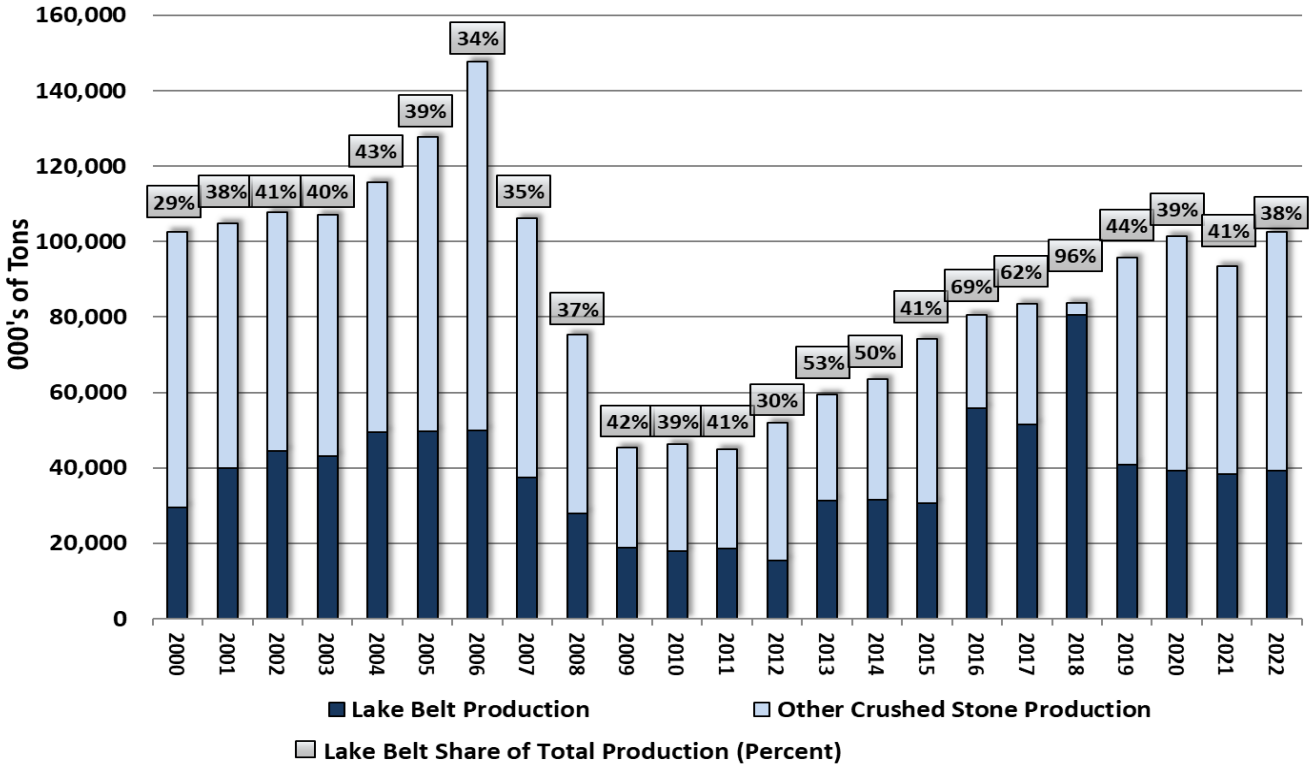
Source: FL DOR.

Figure 51. Monthly Lake Belt Production, January 2002 - June 2022



Source: FL DOR.

Figure 52. Crushed Stone Produced or Consumed in Florida, by Region (1,000 Tons)

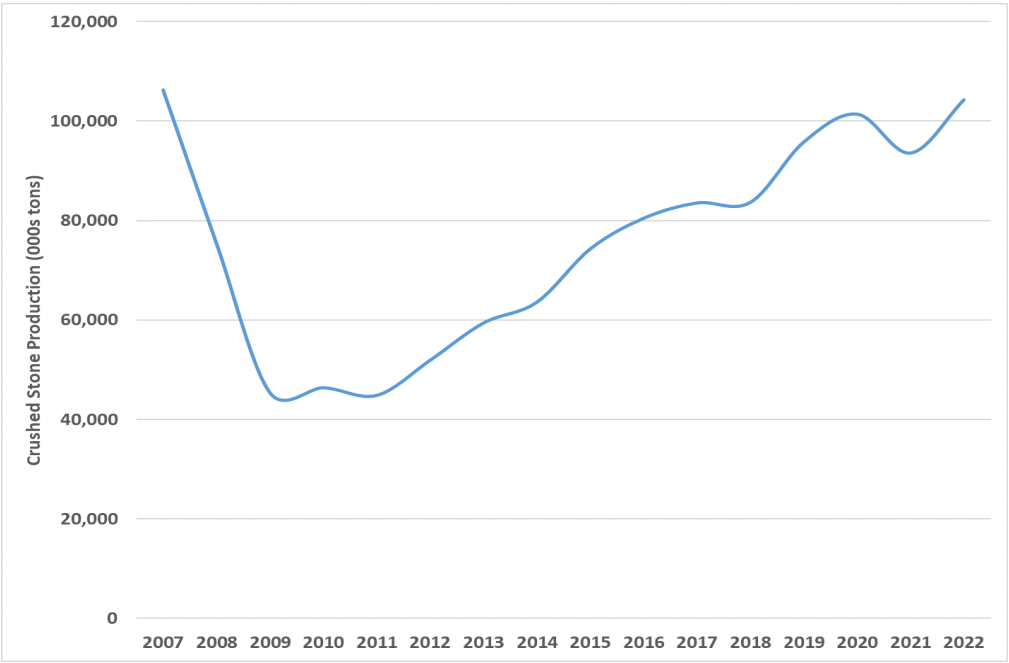


Source: USGS and FDOR.

Crushed Stone Production Trends

Overall, Florida's crushed stone production surpassed 100 million tons in calendar year 2022 after a slight decline in 2021. Florida's crushed stone production rose by 11%, which was a higher growth rate than the national average (**Figure 53**). During first quarter of calendar year 2023, Florida's crushed stone production grew by 1%; slightly lower than the overall U.S. production growth, which was 1.7%.

Figure 53. Florida Crushed Stone Production



Sources: USGS.

According to Dodge & Analytics, in calendar year 2022, 22% of U.S. aggregate demand was for residential work, 24% for non-residential and 53% non-building work. Their forecasts estimate that the share of residential will decrease through 2027, while non-building will increase. How much of the non-building is for roadway is unknown, but some publicly traded companies release annual information of shipments by sector.

A few references for calendar year 2022 include: Vulcan's share of shipments for highway projects was 22%; Martin Marietta indicated that sales for public infrastructure was 35% and CRH's share in the Americas was 50%. For the most part these shares have been consistent throughout the years for these companies. Producer responses in the 2023 TBG survey indicated that 34% of their production went to FDOT work, however this share has varied by year.

Forecasting to calendar year 2030 using different construction forecasts, the average aggregate production in Florida would be around 130 million tons. [15] By 2028, the average would be 121 million tons. If Vulcan's share of shipments is used as a lower bound estimate, this would represent 26.7 million tons for roadway projects. The estimated quantities of aggregate material in FDOT's Work Program would represent 33% of this total.

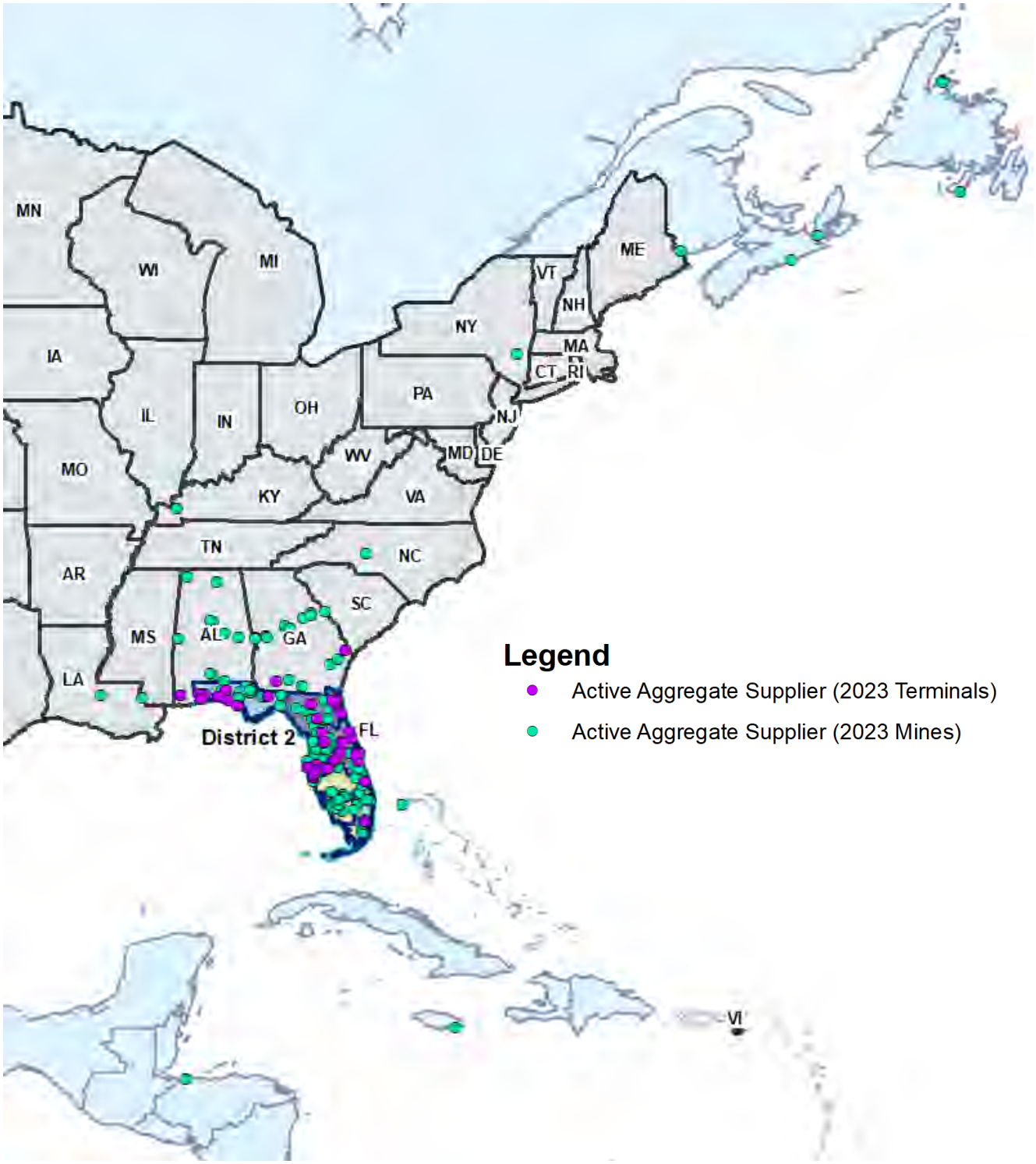
Figure 54 maps FDOT approved aggregate mines and terminals in Florida, other states, and sources from outside the U.S. Shipments from other states are most often sent to terminals by rail, while overseas supply is shipped to seaport terminals around Florida, most notably the Port of Tampa Bay.

According to data from the U.S. International Trade Commission, crushed stone imports from Mexico to Tampa were 400 thousand tons in calendar year 2022, almost a million tons less than 2021. Since no resolution is expected in 2023, this equates to a loss of about 2 million tons of aggregate imports annually in 2023 and beyond.

As expected, this loss of supply would increase demand for local sources, which are already in high demand. Therefore, while current consumption rates are trending above the 20-year average, the slowdown in the housing sector has helped to adjust overall demand. Long-term, however, imports will likely need to increase.

[15] Dodge & Analytics U.S. Construction Aggregate Demand, EDR's February 2023 long run construction forecasts, First Research's nonmetallic mineral mining, and UCF's Spring 2023 Florida forecast

Figure 54. Aggregate Approved Facilities

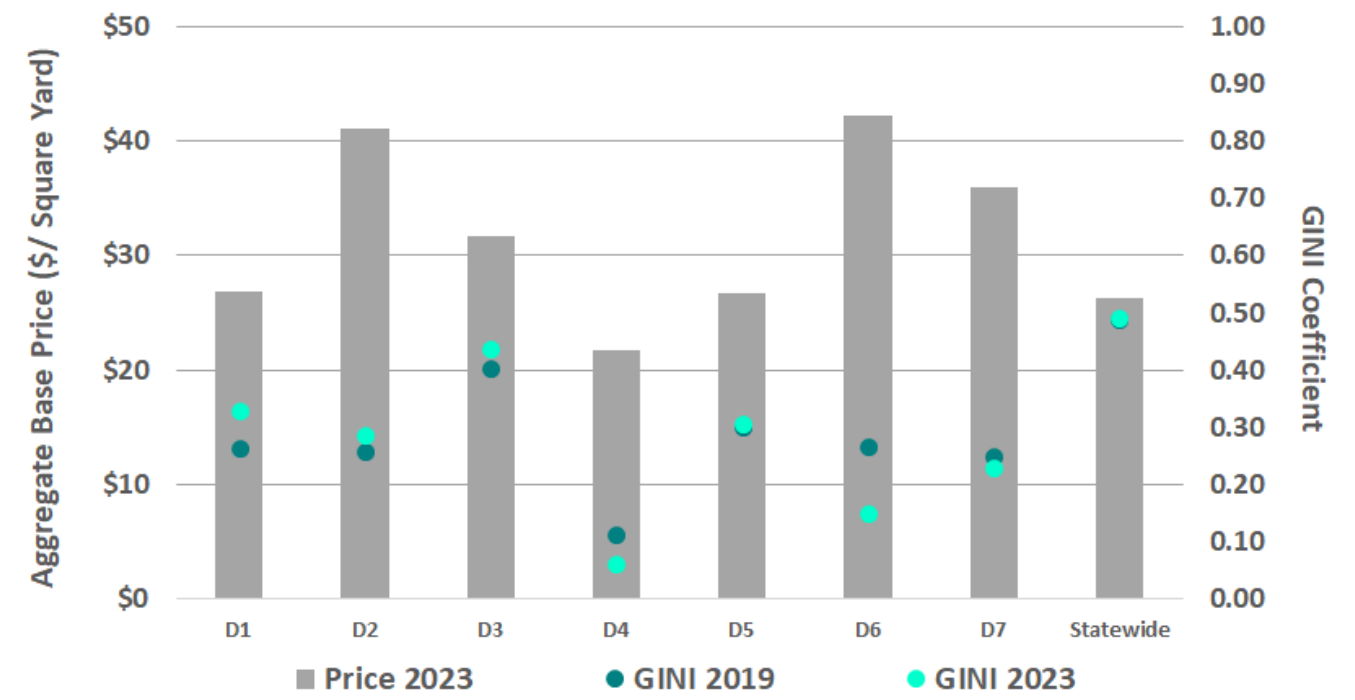


Source: FDOT; TBG Work Product.

Competition

Producers did not report significant changes in competition within this past year. Statewide, 8% of the firms control 48% of the plants, about the same as the 45% seen in FY 2022. **Figure 55** shows that the aggregate industry has become more competitive compared to 2019 in several districts (Districts 4, 6, and 7). Districts 1, 2, and 3 were slightly less competitive in FY 2023 compared to four years ago as smaller producers were bought out by larger firms or closed, increasing industry consolidation. Differences in demand are reflected in pricing.

Figure 55. Aggregate Competition Gini by District

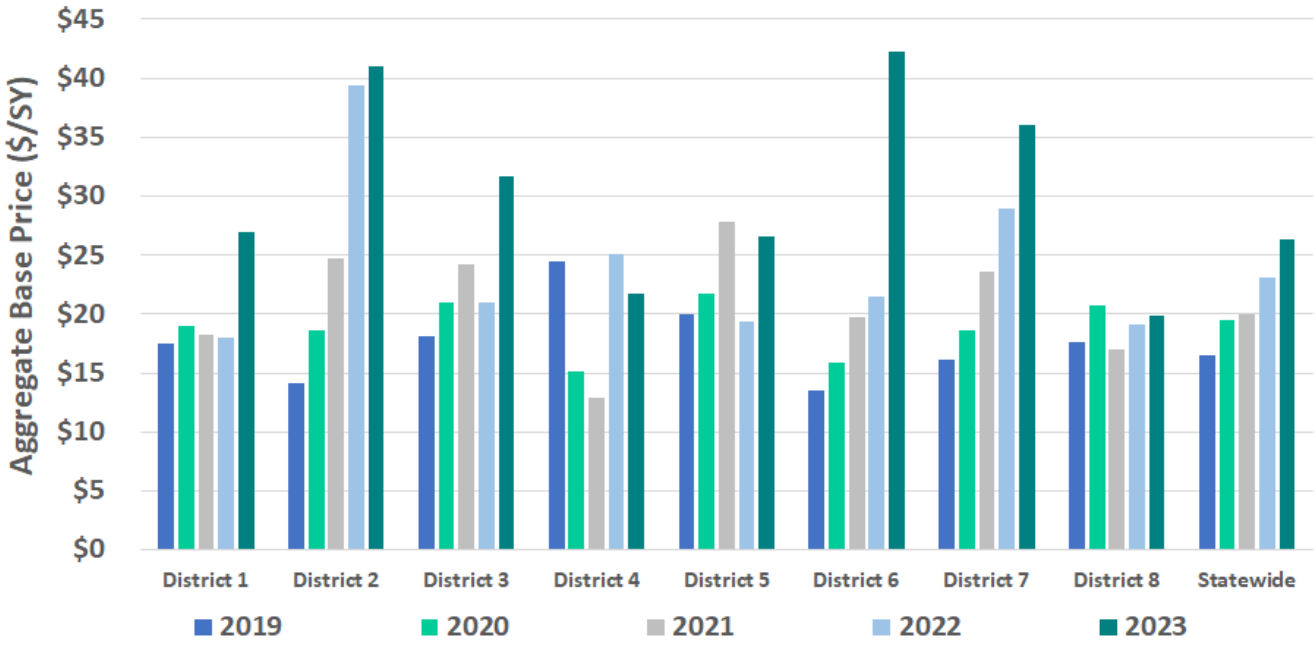


Source: FDOT, TBG Work Product. Price is a composite of optional base and earth works.

Current Pricing

Based on FDOT bid data, aggregate base prices are up 14% in FY 2023. High prices are being experienced in several districts because of material, skilled labor, and driver shortages (**Figure 56**). Price pressures picked up over the last fiscal year in District 6 because of continued high demand and in District 7 due to the closure of a major mine in Mexico. Producer interviews indicate higher prices are expected into FY 2024.

Figure 56. Aggregate Base Price by District, 2019 – 2023



Source: TBG calculated from data provided by FDOT Estimates Office, various industry sources.

Material Quantities

Materials requirements have been estimated for the five-year work program. Pay item data from 1994 forward was evaluated to calculate the share of project expenditures attributable to aggregate within asphalt and concrete quantities, as well as pure base requirements. **Table 29** provides the results statewide. Future FDOT aggregate requirements by District are shown in **Table 30**.

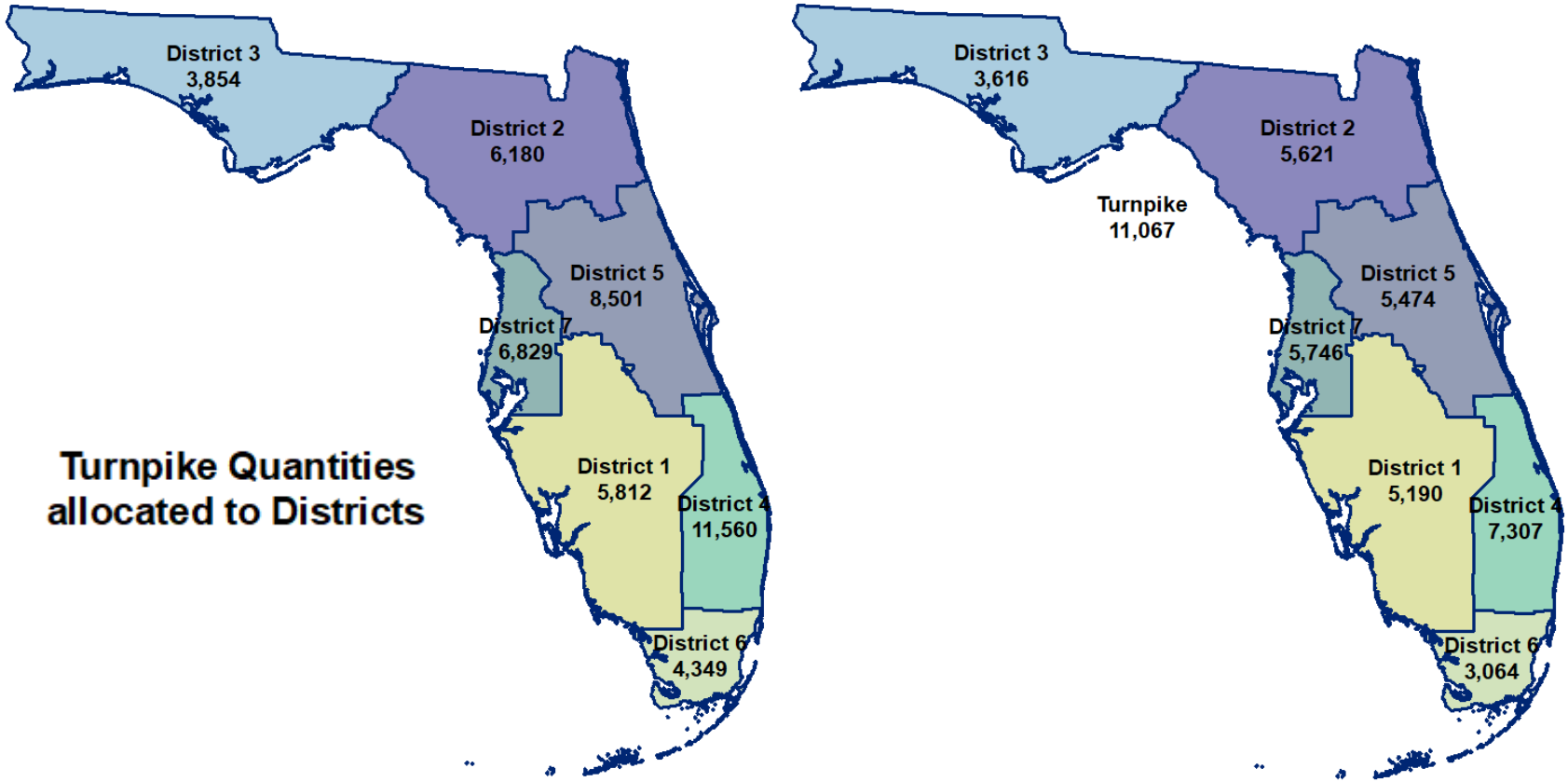
FDOT demand for aggregate for Base, Asphalt, and Concrete is expected to average 9.4 million tons annually over the five-year work program. Total demand of FDOT's five-year Work Program for aggregate is about 47 million tons. Total FDOT aggregate requirements for the five-year Work Program by District are shown in **Figure 57**.

Table 29. FDOT Future Aggregate Material Requirements (in thousands)

Year	2024	2025	2026	2027	2028
Base Material and Other Aggregate	3,444	2,647	2,086	1,691	2,219
Aggregate for Asphalt	4,682	4,390	3,904	3,728	3,921
Aggregate for Concrete	3,705	1,817	2,703	3,557	2,592
Total Tons	**11,831**	**8,854**	**8,692**	**8,975**	**8,732**

Source: TBG calculated from data provided by FDOT Office of Work Program and Budget.

Figure 57. Total Aggregates Quantities for Five-year Work Program (000s Tons)



Source: TBG calculated from data provided by FDOT Office of Program Management.

Table 30. FDOT Future Aggregate Material Requirements by District (in thousands)					
District	**2024**	**2025**	**2026**	**2027**	**2028**
D1	940	760	1,115	1,440	935
D2	1,296	1,948	867	937	573
D3	1,275	758	679	425	480
D4	1,911	1,020	1,046	1,957	1,373
D5	976	1,054	1,231	1,141	1,073
D6	972	508	659	695	230
D7	1,370	816	1,276	552	1,731
D8	3,092	1,989	1,819	1,829	2,338
Total Tons	**11,831**	**8,854**	**8,692**	**8,975**	**8,732**

Source: TBG calculated from data provided by FDOT Office of the Work Program Budget.

Aggregate Base-Course Forecast

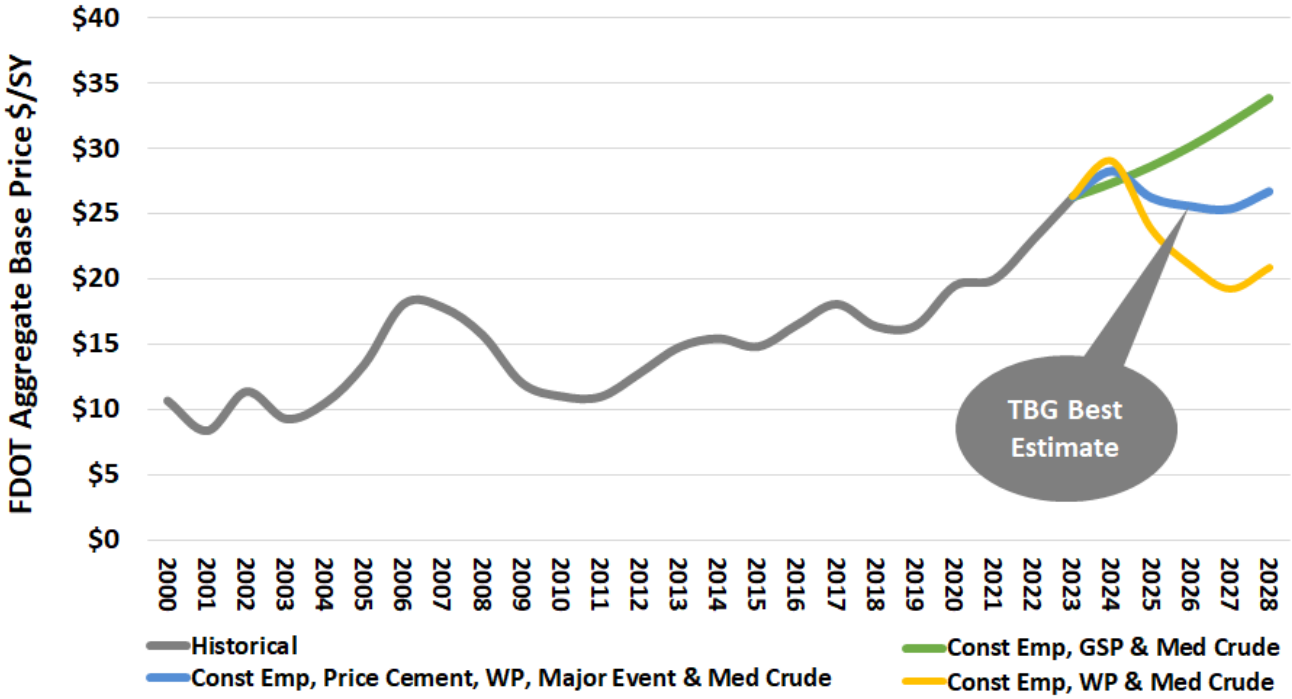
Regression modeling was performed to estimate aggregate base costs using pay item data, Work Program funding, and supply chain variables and other macroeconomic indicators. **Table 31** provides the forecast average price for aggregate base. **Figure 58** shows the output of several price models and the scenario identified as best estimate for aggregate base.

Previous estimates anticipated a 14.6% increase in FY 2023 aggregate base prices, while actual data updated through the last quarter show that prices ended the fiscal year 13.9% higher. The most likely trajectory takes construction employment growth, cement and crude oil pricing, FDOT work program funding, and major events into account, supporting prices above $25 per square yard through FY 2028. An upper bound with unconstrained economic growth and energy costs results in prices that are double the 20-year average by FY 2028; this scenario is considered less likely as supply chain disruptions are ironed out. Finally, the lower bound model would yield aggregate base prices closer to historical norms throughout the five-year work program.

Table 31. Aggregate Base Price Forecast Results						
Year	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**
Price Aggregate Base, $/SY	$26.32	$28.31	$26.26	$25.61	$25.39	$26.74
Percent Change, %	13.9%	7.5%	-7.2%	-2.5%	-0.8%	5.3%

Source: TBG calculated from data provided by FDOT Estimates Office, various industry sources.

Figure 58. Aggregate Base Price, 2023 Forecast



Source: TBG calculated from data provided by FDOT Estimates Office, various industry sources.
(Variable descriptions available in the **Appendix**.)

EARTHWORK

Summary

- Truck driver employment in Florida continues to increase, although drivers are still in short supply.
- Diesel prices have declined significantly in calendar year 2023, but are still high compared to 2022. Forecasts for 2024 show prices are expected to decrease further. Lower housing development and lower fuel costs would drive earthwork costs down, but intensive infrastructure demand is supporting higher prices.
- Equipment and truck costs have continued declining as availability has increased.

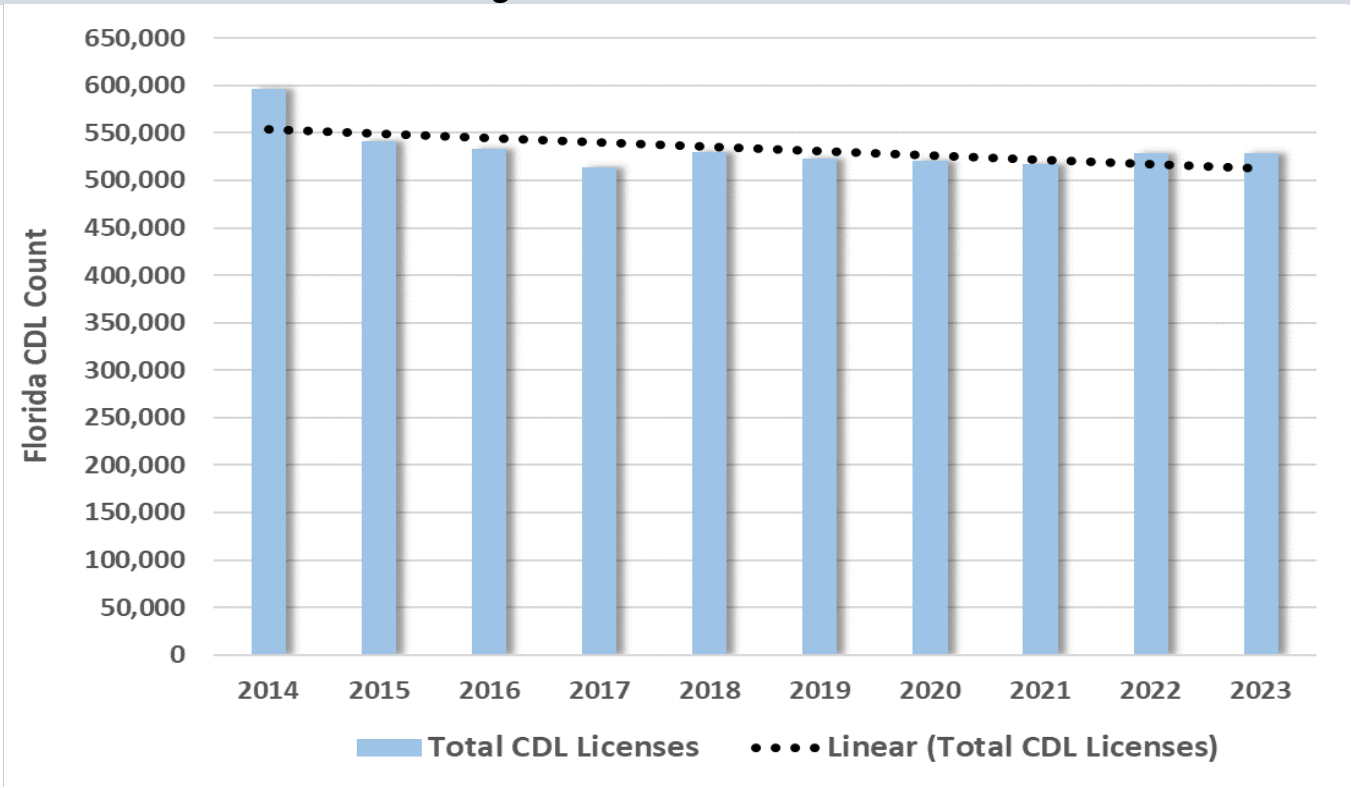
FDOT Impacts

- FY 2023 prices fell by 9.5% compared to the previous fiscal year. Prices are expected to continue declining in FY 2024 and then moderately increase for the remaining of the work program.
- Continued infrastructure funding will constrain bid prices from falling to pre-COVID levels, barring recessionary conditions.

General Trends

Trucking and labor costs are the main factors in this sector. As mentioned throughout the report, the labor market for driver and equipment operators improved over a year ago, but shortages persist. Additionally, the Safe Driver Apprenticeship Pilot Program, developed by the Federal Motor Carrier Safety Administration, has drawn criticisms from the American Trucking Association due to the strict requirements. There are 17 companies in the U.S. that are providing opportunities under the program and data from the Department of Labor shows that the number of heavy truck drivers apprentices in the U.S. has had marginal variations between FY 2020 and FY 2023, averaging 9,122 during that timeframe. In 2022, CDLs in Florida have increased by 2%. While totals by license type have not been released for 2023, the total number of licenses issued decreased (1%) for the first time since 2012. However, the share of CDLs have remained at 3% for the past five years, regardless of changes in total licenses (**Figure 59**).

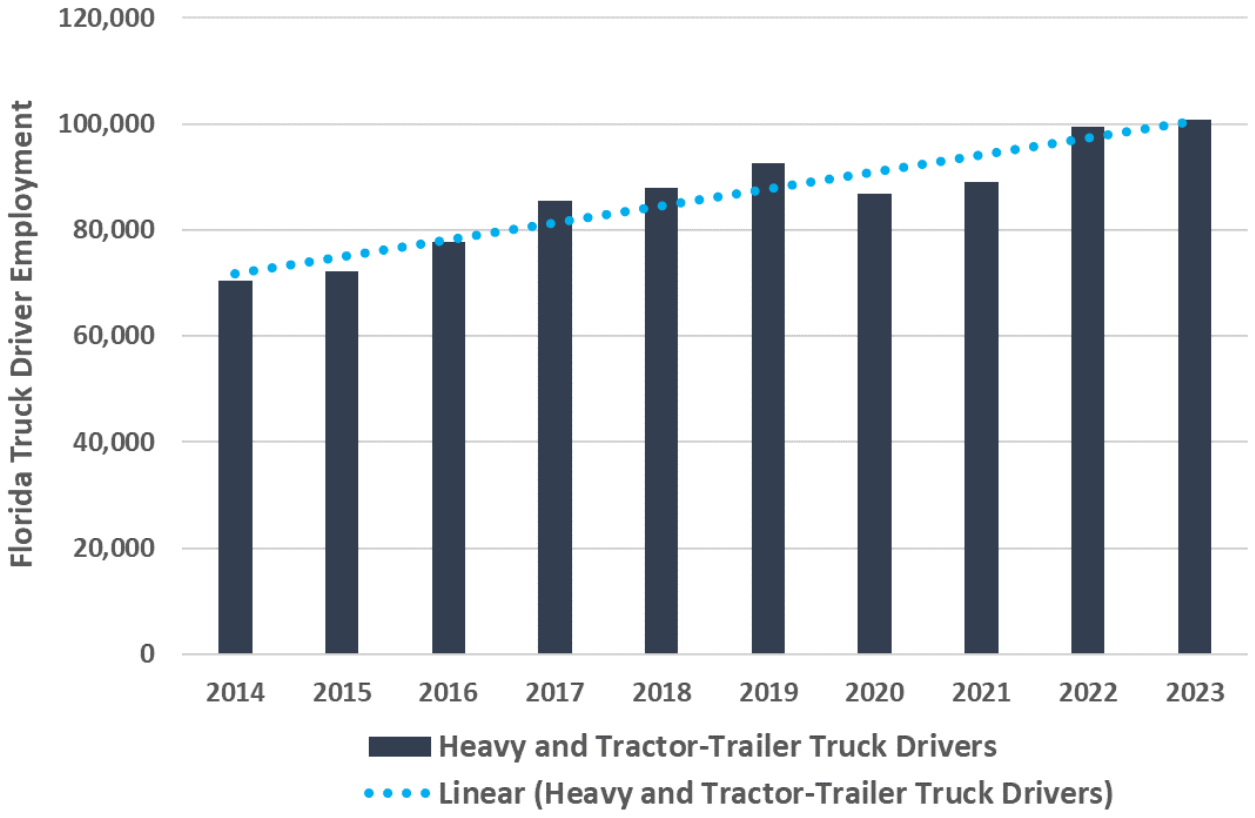
Figure 59. Florida CDL Counts



Source: FLHSMV.

The BLS recently released the May 2022 Occupational Employment and Wage Statistics (OEWS) estimates. Heavy and tractor-trailer truck driver employment accounts for approximately 57.6% of truck transportation according to BLS. Overall, employment in Florida grew 11.8% in 2022, while growth in 2023 was at a much lower rate of 1% (**Figure 60**). Driver availability has reportedly improved for some sectors, and diesel prices have declined significantly year-to-date, which lowers costs for contractors. Prices for used trucks also declined, which lowers contractor's replacement costs. All the changes could benefit FDOT's costs. However, these could be offset if contractors are forced to move product for longer distances.

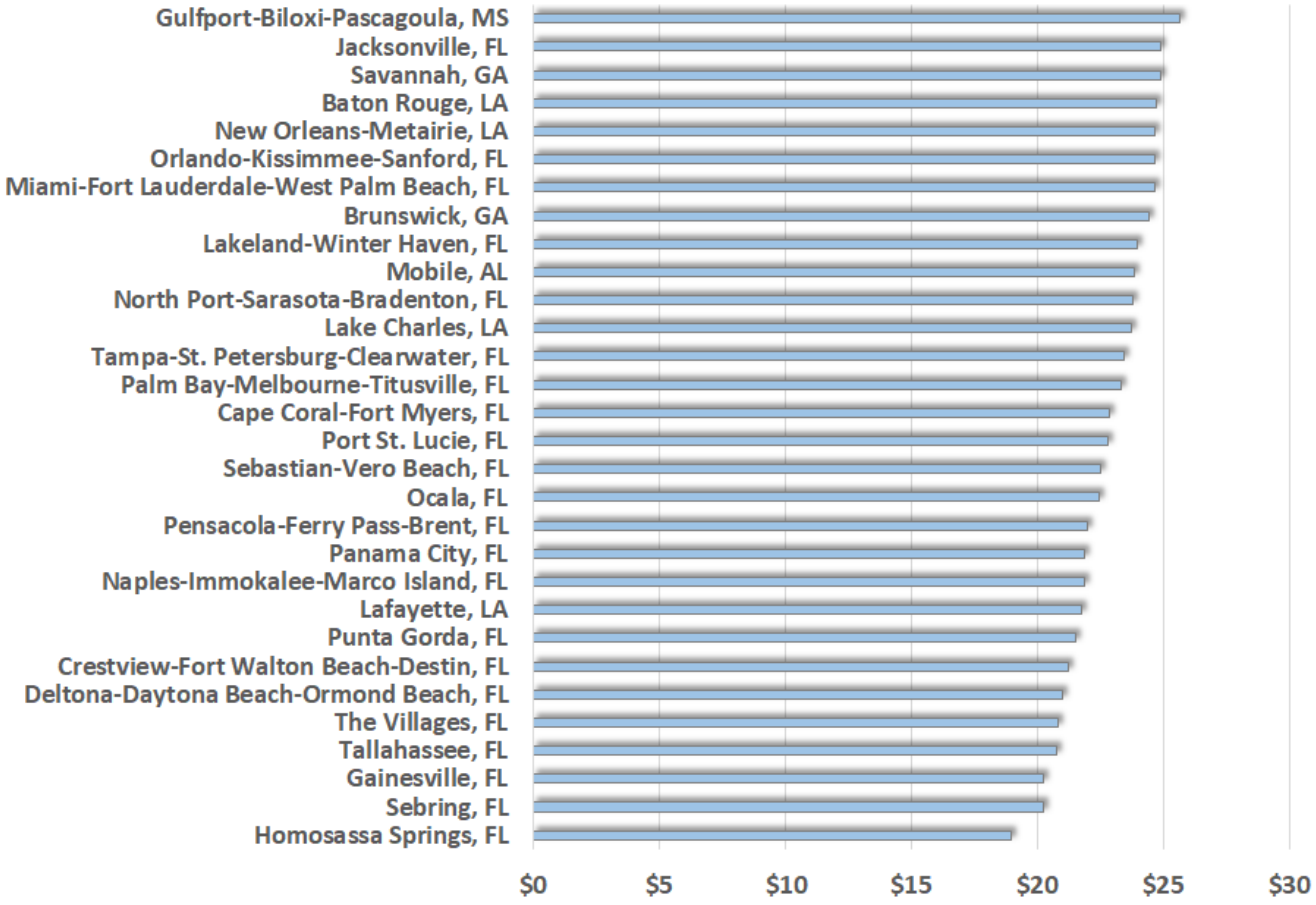
Figure 60. Florida Truck Transportation and Driver Employment, 2014 – 2023



Source: TBG work product, BLS OEWS May 2022.

Comparing Florida Metropolitan Areas with port cities and high trucking activity to similar locations in other states, the average hourly wage for heavy truck drivers in Florida is slightly behind. Metro areas in other states averaged $22.8 per hour, while metro areas in Florida averaged $22.2 per hour. However, year-over-year growth rates were higher in Florida. While most of the metro areas in Florida grew between 4% and 12%, most of the metro areas in the analysis grew by less than 5%. **Figure 61** illustrates the mean hourly wages for heavy truck drivers by metro area.

Figure 61. Hourly Average Wage for Heavy Truck Drivers by Metropolitan Area, 2022

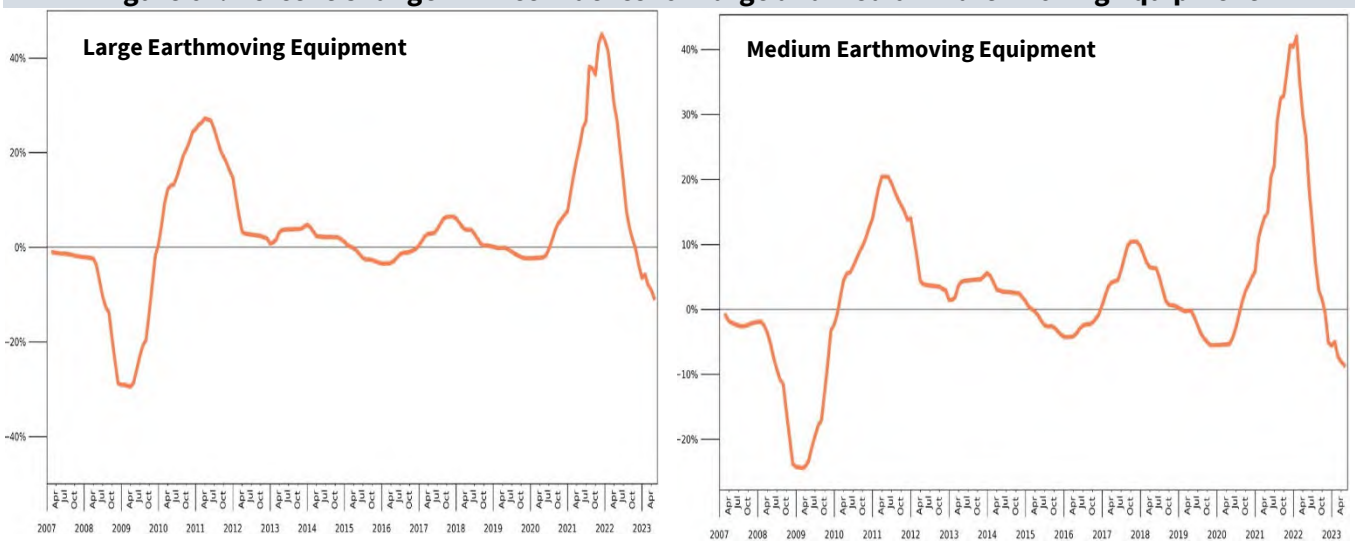


Source: BLS Occupational Employment Statistics May 2022.

Earthmoving Equipment

Inflationary pressures that have been affecting other sectors are also present in the construction equipment industry. The June 2023 used equipment market trends report released by Ritchie Bros. shows that prices for used large and medium earthmoving equipment continued declining. Large and medium earthmoving equipment fell 2% and 11% year-over-year, respectively (**Figure 62**).

Figure 62. Percent Change in Price Indexes for Large and Medium Earthmoving Equipment

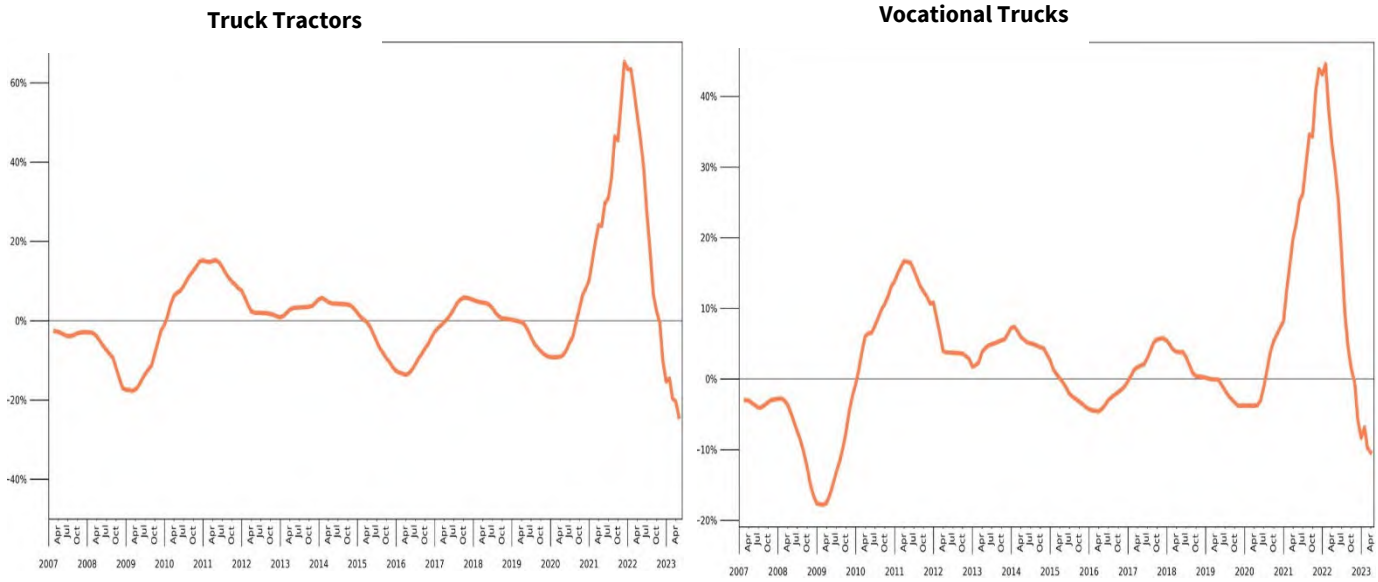


Source: Ritchie & Bros. Used Equipment Market Report.

Trucking

Used trucks prices have had larger declines in 2023. The 3-month average costs of truck tractors and vocational trucks were down 24% and 12% year-over-year, respectively (**Figure 63**). [16] The amount of trucks being sold has increased as spot rates have declined.

Figure 63. Percent Change in Price Indexes for Truck Tractors and Vocational Trucks



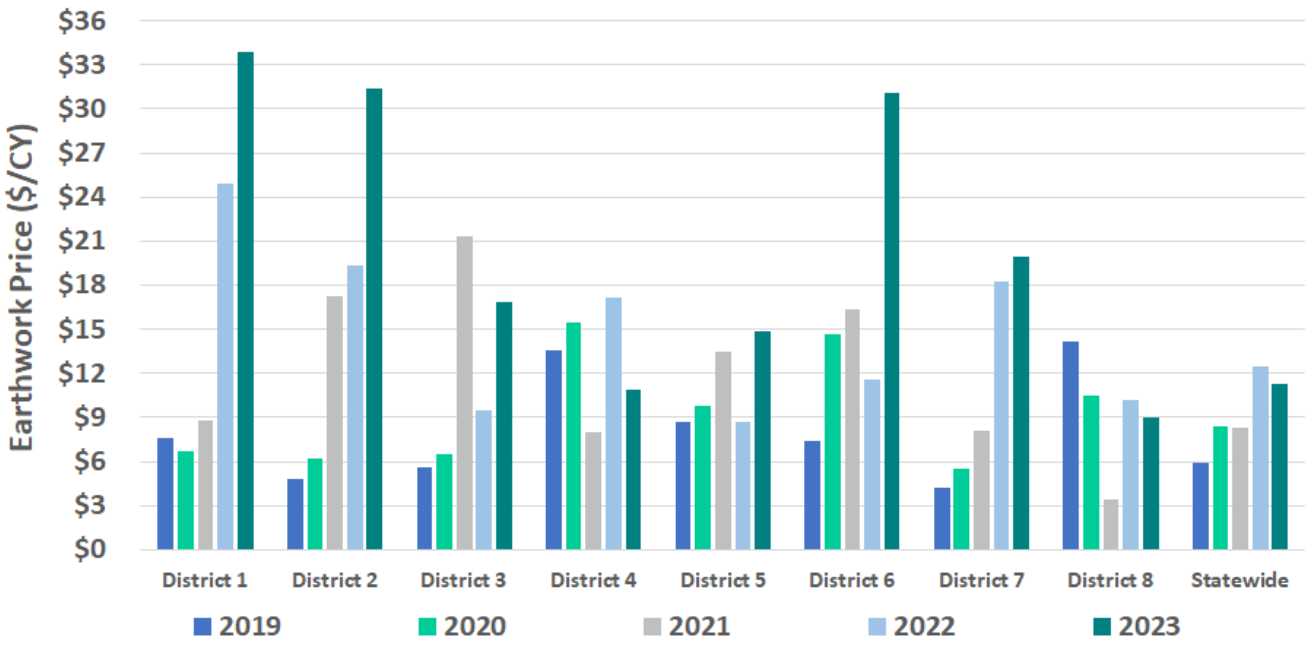
Source: Ritchie & Bros. Used Equipment Market Report.

[16] Including bulk hauling, heavy hauling, and other construction vehicles

Current Pricing

Following a significant increase in FY 2022 (51%), earthwork prices are down 9% for fiscal year-end 2023. Shortages in labor availability continues to be an issue, but declines in fuel prices and equipment costs have relieved some pricing pressure. Based on district-level data, earthwork prices are ranging higher in districts with increased transportation costs and construction demand (**Figure 64**).

Figure 64. Earthwork Price by District, 2019 – 2023



Source: TBG calculated from data provided by FDOT Estimates Office, various industry sources.

Earthwork Forecast

Regression modeling was performed to estimate Earthwork costs using pay item data, supply chain variables and other macroeconomic indicators. **Table 32** provides the forecast average price for earthwork. **Figure 65** shows the output of potential price models and the scenario identified as best estimate for earthwork.

Previous forecasts anticipated flat pricing for FY 2023 through the end of the work program. With updated bid prices and economic and fuel data, the revised forecast estimates prices may still remain flat, but at a lower starting point. In the Best Estimates scenario, costs are expected to continue declining in FY 2024 – with supply chain issues beginning to resolve – then resuming cost increases of about 2% annually for the rest of the work program. The trajectory follows similar patterns to the prior forecast, driven by decreasing competition from housing, changes in employment levels, and continued moderation of fuel costs.

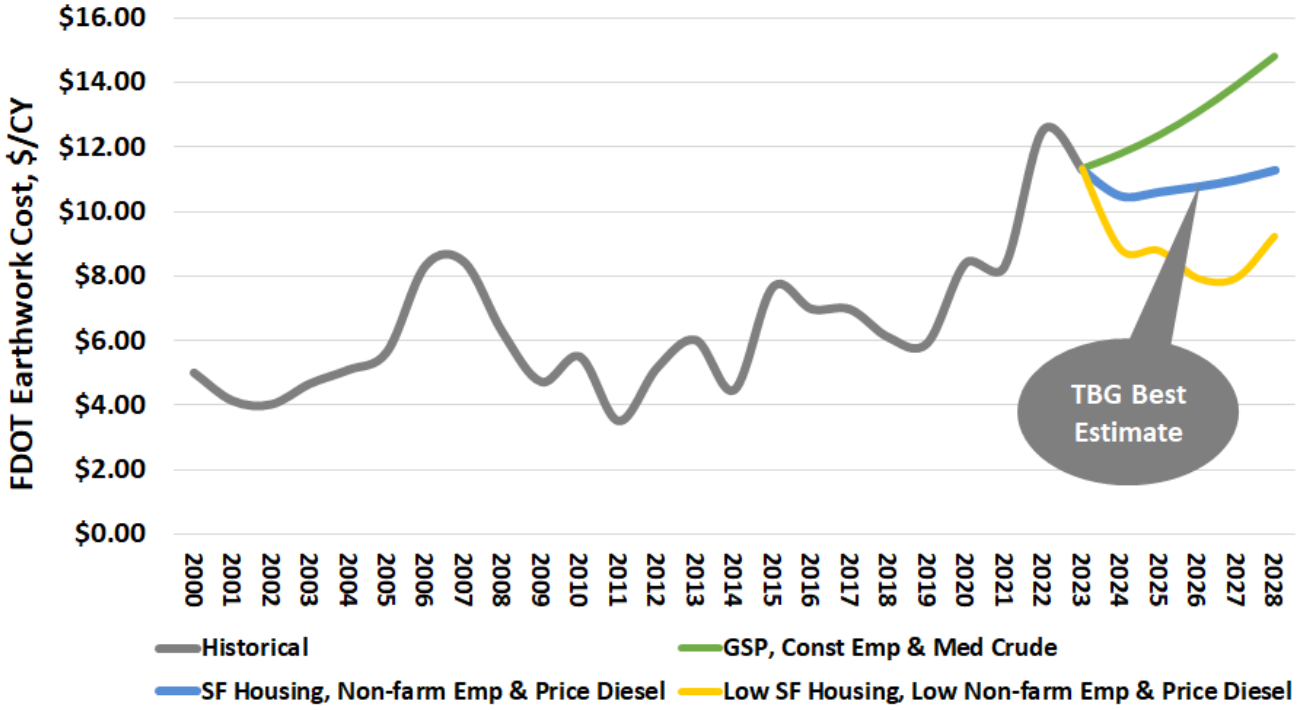
Continued infrastructure funding will constrain bid prices from falling to pre-COVID levels, barring recessionary conditions. In the lower bound, reduced housing and employment drive costs down, while the upper bound is driven by economic growth and industry demand.

Table 32. Earthwork Price Forecast Results

Year	2023	2024	2025	2026	2027	2028
Price Earthwork, $/CY	$11.31	$10.49	$10.61	$10.77	$10.98	$11.29
Percent Change, %	-9.5%	-7.3%	1.2%	1.5%	2.0%	2.7%

Source: TBG calculated from data provided by FDOT Estimates Office, various industry sources.

Figure 65. Earthwork Price Estimates, 2023 Forecast



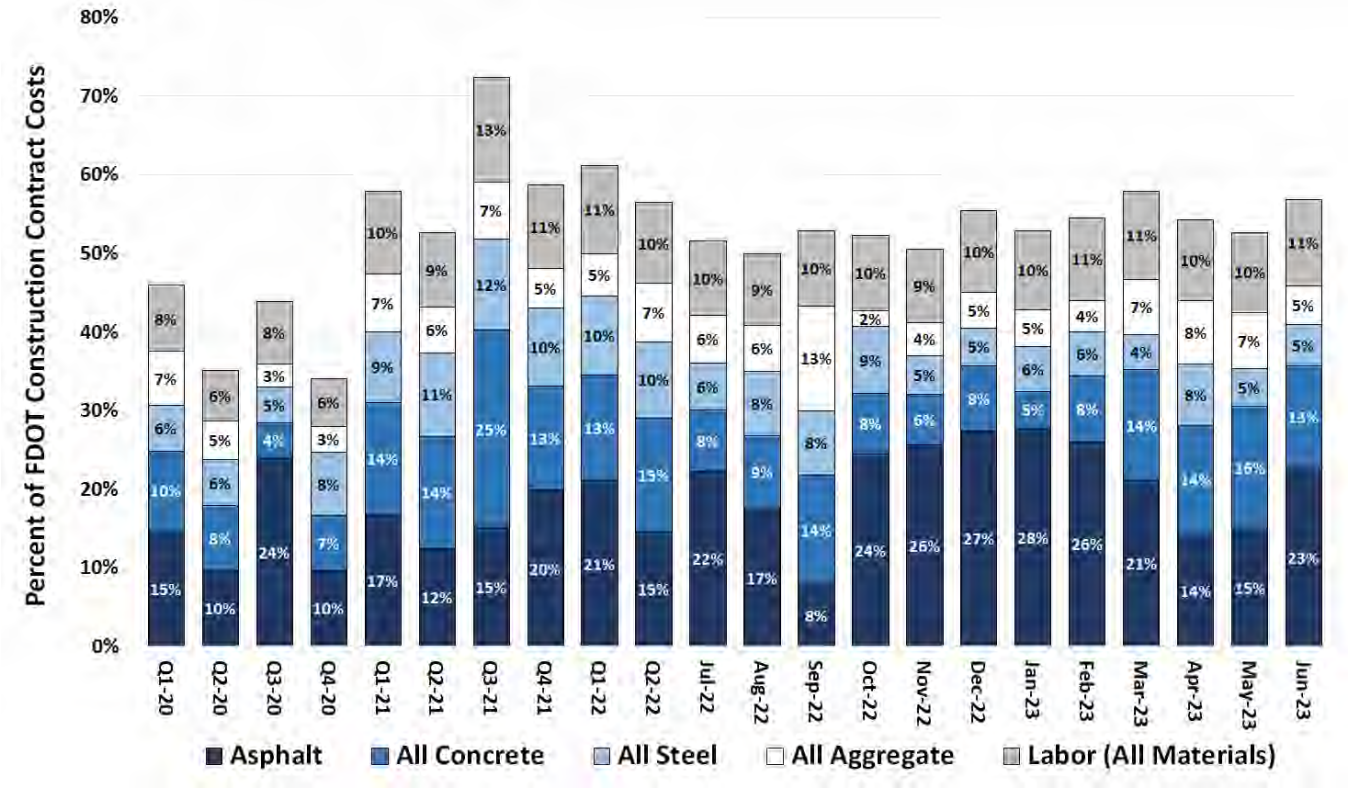
Source: TBG calculated from data provided by FDOT Estimates Office, various industry sources.
(Variable descriptions available in the Appendix.)

APPENDIX A ➤ UNDERLYING ECONOMIC CONDITIONS

FDOT Cost Composition

Tracking FDOT's costs by month shows how the cost composition may shift depending on project type, scheduling, and material costs (**Figure A-1**). Concrete and steel costs as a share of total costs were stable but historically high from March through June 2023. Aggregate costs as a share of total costs retreated to 2020 levels through March 2023, but have since increased. Asphalt costs, which typically maintain the historical majority of total dollars, saw a large decline in April and May before reaching over 20% of total costs in June 2023 according to preliminary data. Labor costs have remained stable over the last few months at about 10-11%, indicating that the labor market has reached a new normal.

Figure A- 1. Monthly Cost Composition



Source: TBG calculated from data provided by FDOT Estimates Office.

Newly published industry data summarizing changes in wage shares from 2020 through 2023 was used to update the assumptions underlying the cost composition chart (**Table A-1**). The changes were not major, but the new data shows a more accurate level of monthly labor activity for each material sector over the last four years. Material cost shares were adjusted accordingly, with most changing only slightly.

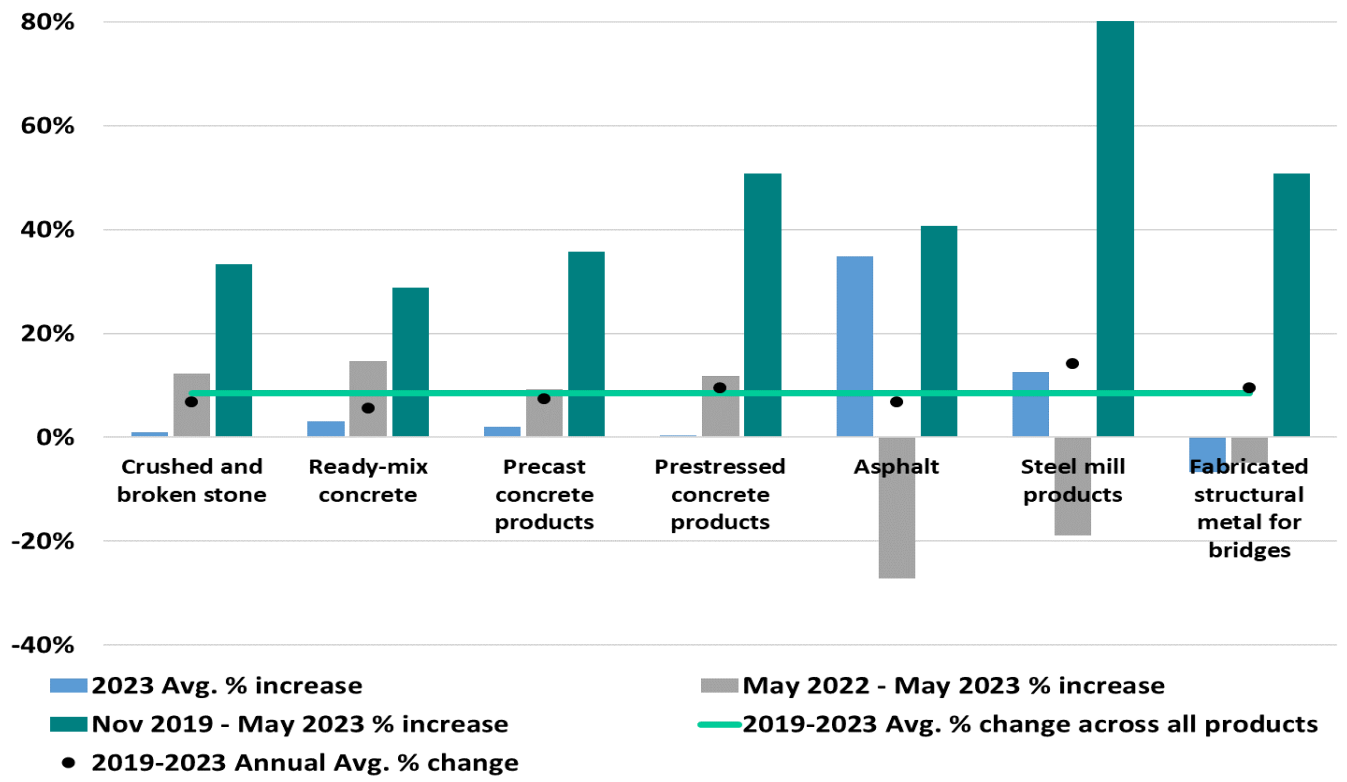
Table A- 1. Average Industry Wage Cost as a % of Revenue				
	2020	2021	2022	2023
Aggregate	17.76%	17.43%	16.95%	17.15%
Asphalt	18.46%	18.82%	19.28%	19.56%
Concrete	20.55%	20.62%	20.74%	21.10%
Steel	14.42%	13.10%	13.34%	13.66%

Source: TBG Work Product; IBIS Reports

U.S. Inflation

Another measure of inflation for the construction industry is the BLS PPI by commodity type. Nationally, a 7% average increase has been seen across all commodities in calendar year 2023, with asphalt having the largest (35%). Structural metal for bridges has declined 7% (blue bars in the graph). Year-over-year, crushed stone, ready-mix and precast have increased by 13% in the U.S., while asphalt (refinery production), steel mill products, and structural metal for bridges have all declined by 27%, 19%, and 5%, respectively. [17] **Figure A-2** illustrates select PPI in the U.S. for relevant commodity types.

Figure A- 2. Producer Price Index Percent Change by Commodity



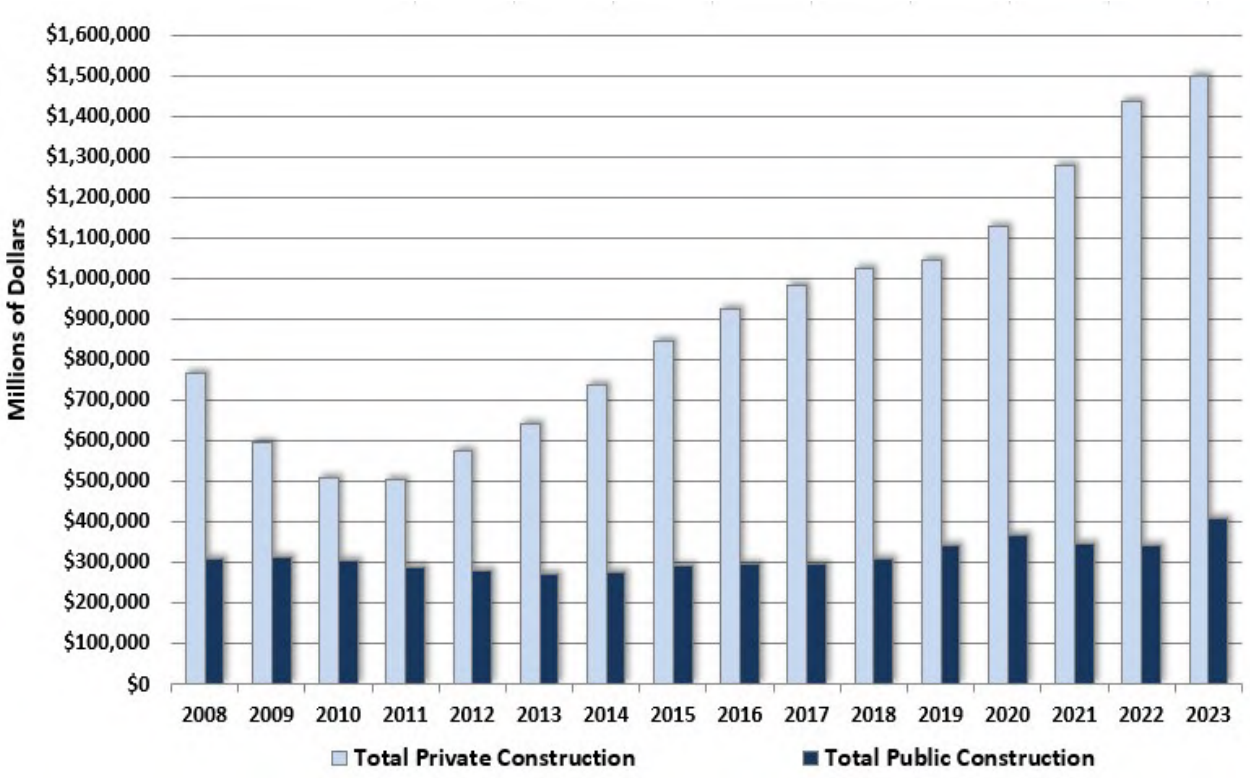
Source: BLS (Producer Price Index, not seasonally adjusted); TBG Work Product.

[17] As a processed good for intermediate demand; i.e. asphalt used at refineries as an input by producers and not the final prices seen by FDOT.

U.S. Construction Market

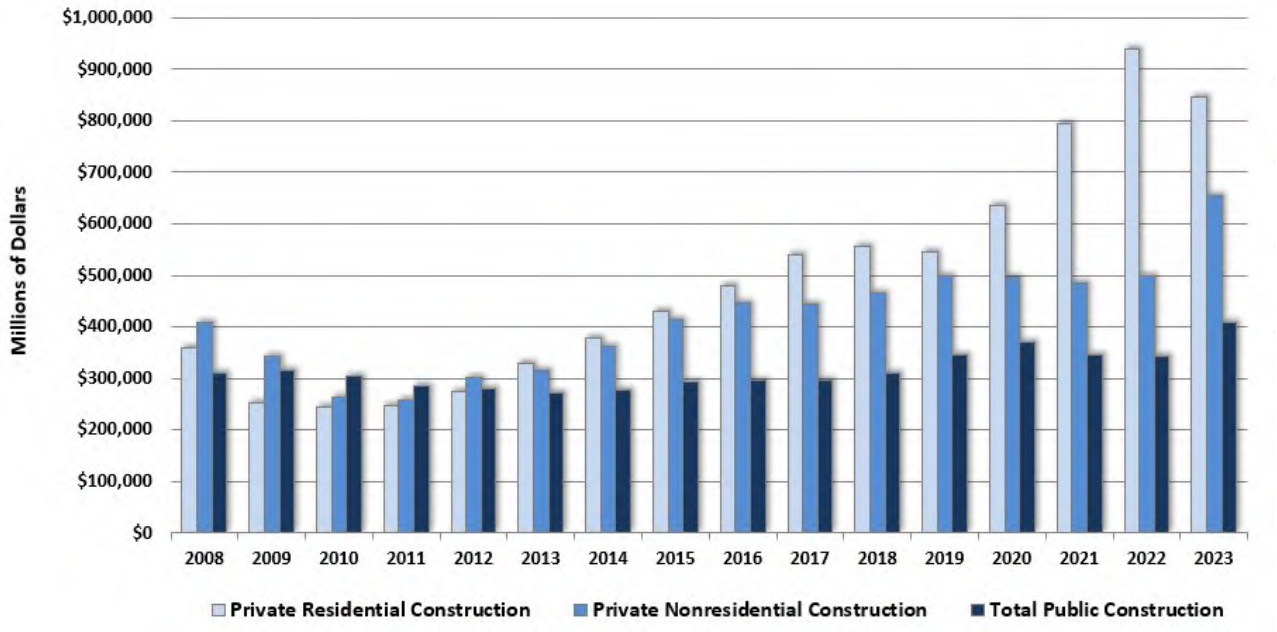
Nationally, private construction expenditures increased 12% in 2022, followed by an additional 5% in 2023. Public construction fell 1% in 2022, but has increased 19% as funding has increased (**Figure A-3**). On the other hand, residential construction had the largest increase in 2021 (25%) and in 2022 (18%), but has fallen 10% in 2023; while non-residential construction fell 2% in 2021, increased 2% increase in 2022 and has increased significantly (32%) in 2023 (**Figure A-4**).

Figure A- 3. U.S. Construction Put in Place, 2008 – 2023



Source: U.S. Census Bureau.

Figure A- 4. Residential Construction Put in Place, 2008 – 2023

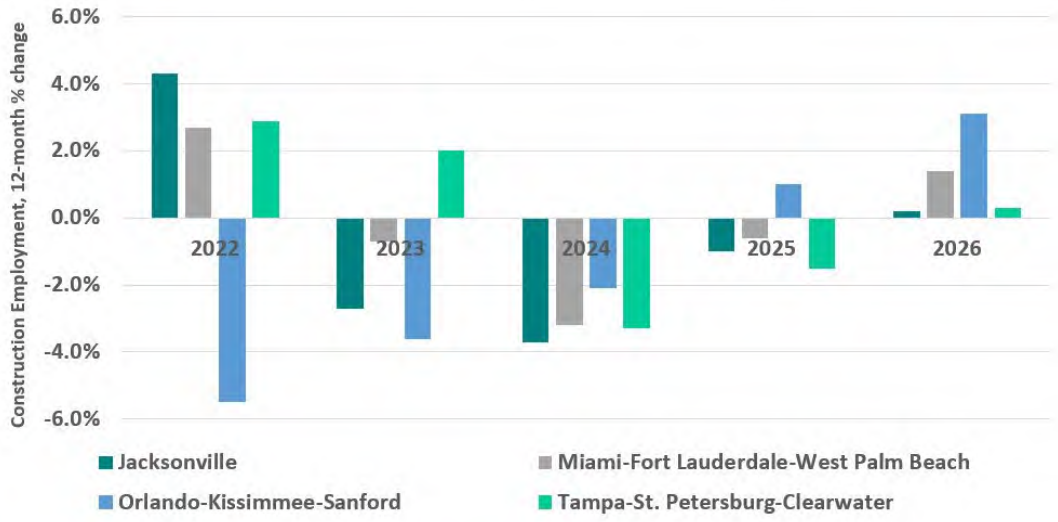


Source: U.S. Census Bureau.

Construction Employment Forecast

According to the Institute for Economic Forecasting's (IEF) most recent Florida & Metro Forecast, statewide construction employment grew by 3% in 2022, revised upward from the previously reported 2%. IEF expects construction employment growth to decline over the next three years, with 2023 estimated to fall by 0.6%, 2024 by 4% and 2025 by 1.6%. At the metro level, IEF projects construction employment declines in most major markets throughout the forecast period, with the largest overall losses seen in 2023 and 2024 (**Figure A-5**).

Figure A- 5. Historical and Forecasted Changes in Employment in Major Florida Markets, 2022 - 2026

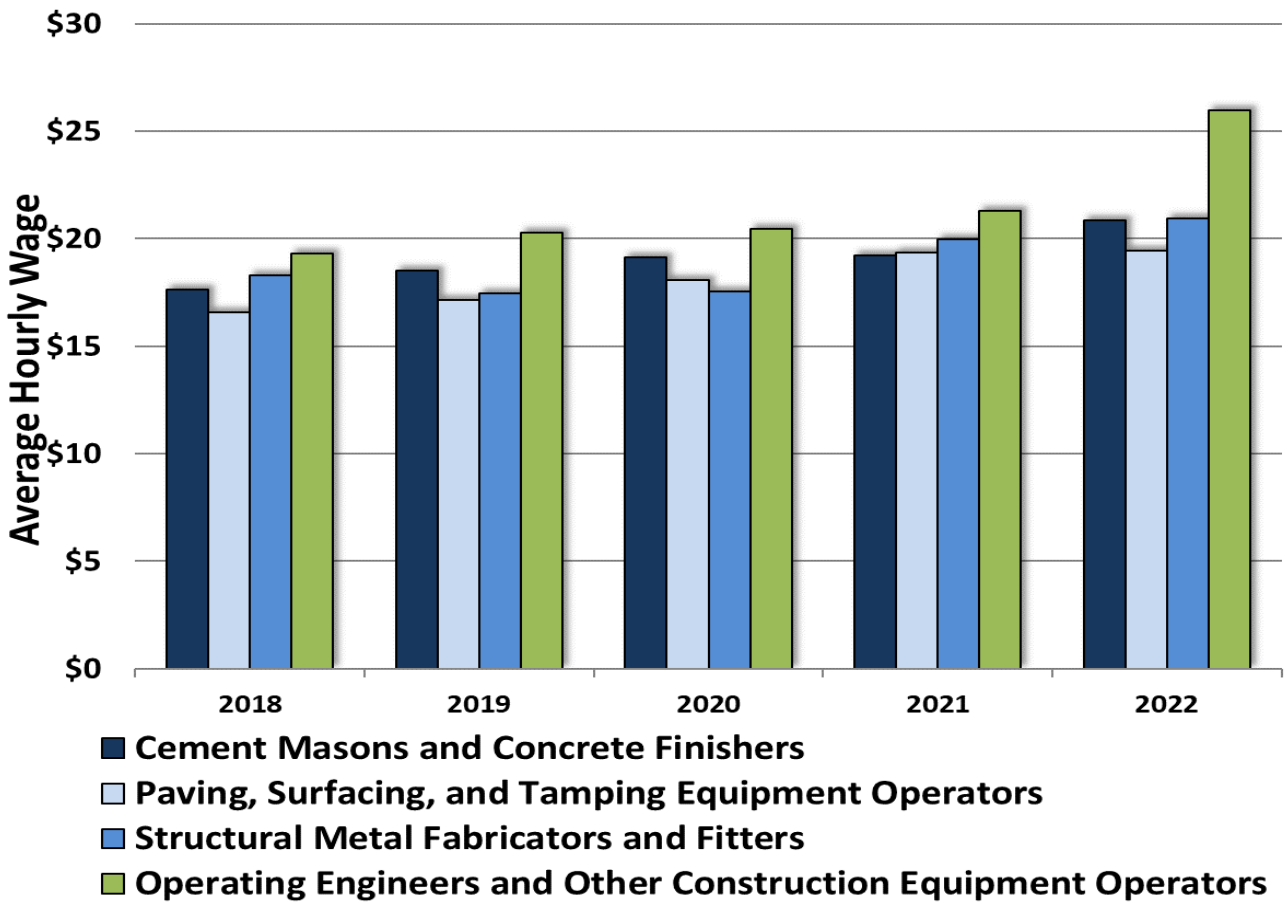


Source: UCF Institute for Economic Forecasting Winter 2023 Florida & Metro Forecast.

Relative Wages by Sector

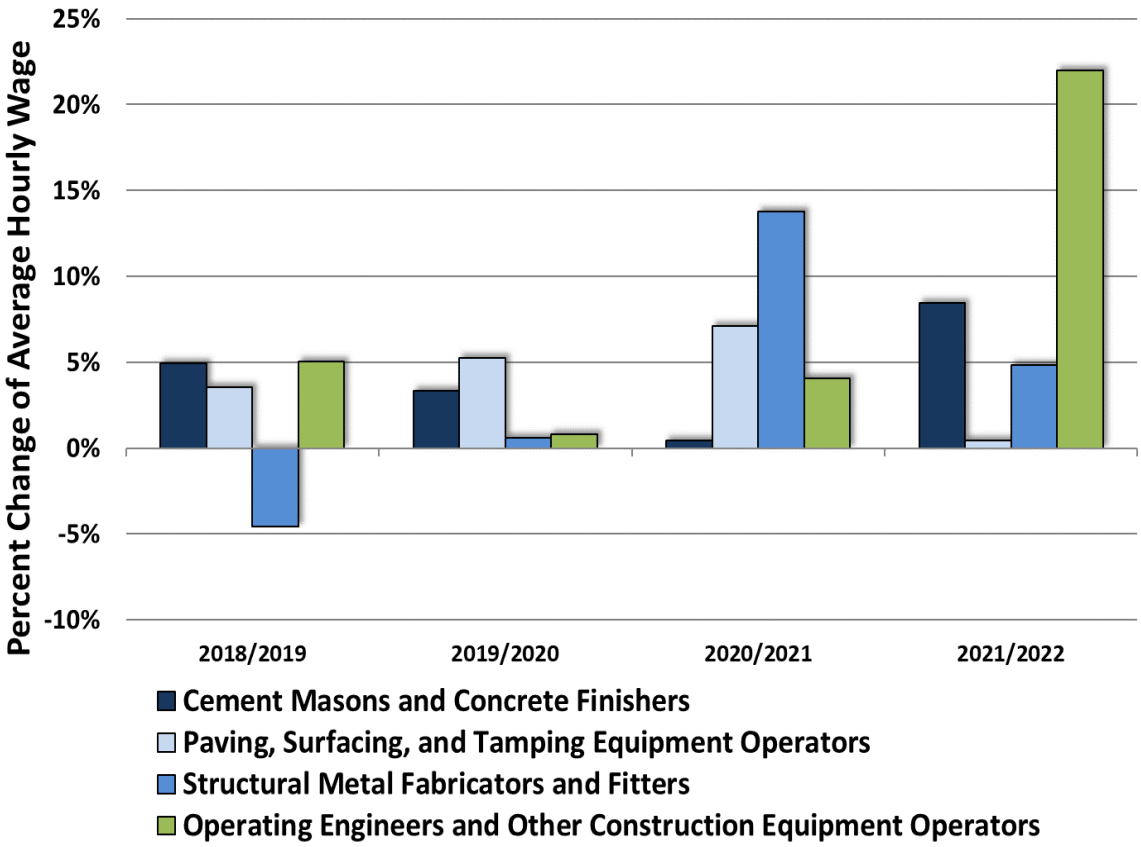
Florida average hourly wages are shown by material sector for primary labor types in **Figure A-6**, along with the annual change in wages in **Figure A-7**. In 2022, operating engineers and other construction equipment operators grew the most (22%). Workers in other industries also saw an increase in wages, but at a smaller rate. Wages for cement masons and concrete finishers grew 8%, structural metal fabricators grew 5% and workers in the asphalt industry grew 0.5%. Note, this data was just released for May 2022, which is the most recent available at this level of detail.

Figure A- 6. Hourly Wage Rates for Key Workers in Florida, 2018 – 2022



Source: U.S. Bureau of Labor Statistics.

Figure A-7. Change in Hourly Wage Rates for Key Workers in Florida, 2018 – 2022

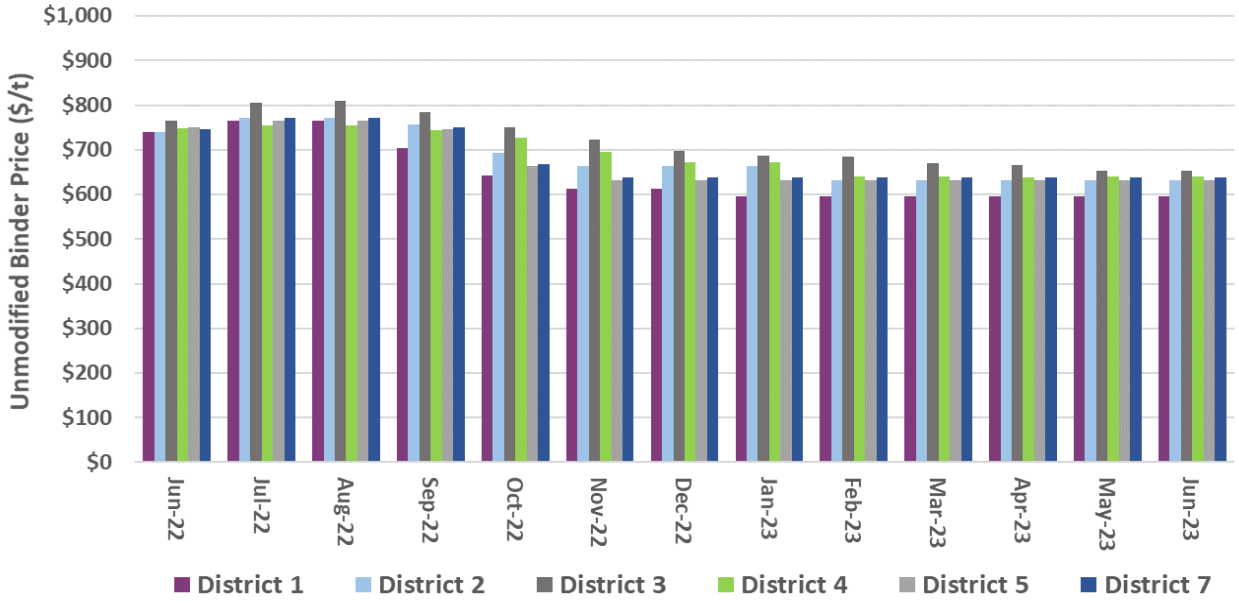


Source: U.S. Bureau of Labor Statistics

Binder Prices by District

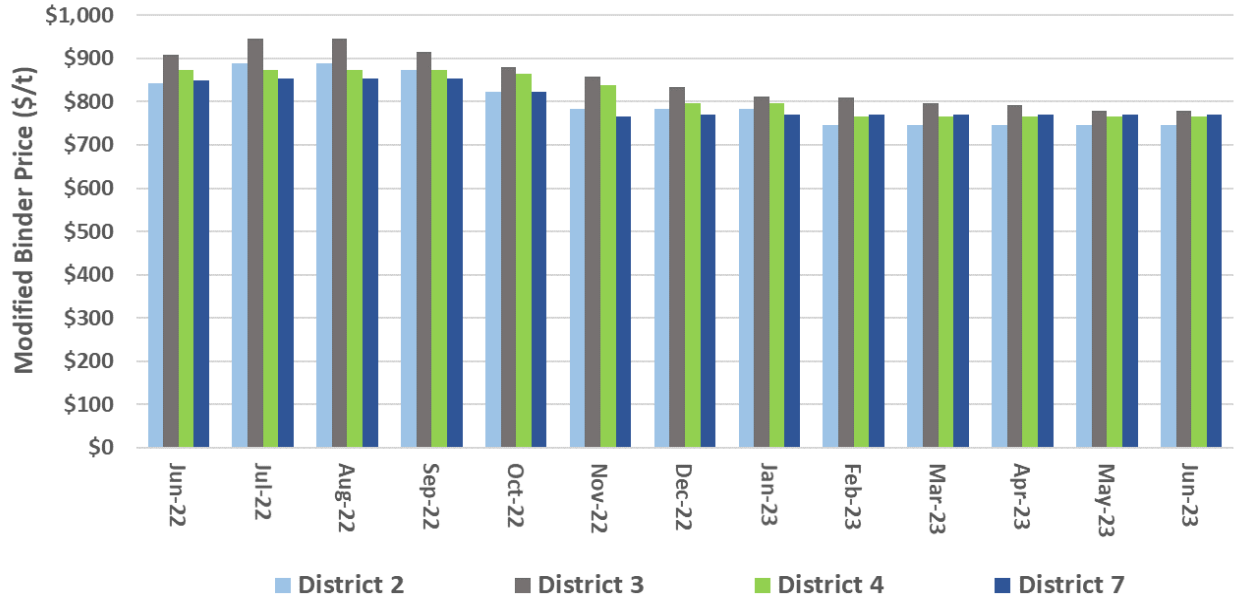
Where available, the average prices for unmodified (**Figure A-8**) and modified (**Figure A-9**) binder were calculated from monthly terminal price quotes at the district level. Unmodified binder is the average of PG 52-28 and PG 58-22 prices, while modified binder is a quote for the price of PG 76-22 (PMA) in the dataset. Unmodified binder prices fell in all districts between 14% and 19% year-over-year, but they have been flat since January 2023. Modified binder prices show similar patterns, with prices decreasing in all district between 9% and 14% year-over-year. Prices in Districts 2, 3, and 4 have declined 4-5% since January 2023, while they were flat in District 7.

Figure A- 8. Unmodified Binder Price by District



Source: FDOT, TBG Work Product (D6 terminals did not report data).

Figure A- 9. Modified Binder Price by District



Source: FDOT, TBG Work Product (D1, D5, and D6 terminals did not report data).

APPENDIX B – FORECAST DETAILS

A description of the variables used in forecasting are provided in **Table B-1**.

Table B- 1. Forecast Variable Descriptions

Variable Reference	Description
Const Emp	Baseline FL construction employment forecast.
FL Cement Price	Average price of cement in Florida.
Fly Ash Consumption	U.S. consumption of fly ash as a share of total production.
GSP	FL Gross State Product.
Historical	Historical pricing or quantity.
Housing Starts	FL housing starts.
Low/Med/High Crude	Average crude price (low, medium, or high forecast).
Low Const Emp	Lower (less optimistic) FL construction employment forecast.
Low Non-farm Emp[18]	Lower (less optimistic) FL total non-farm employment forecast.
Low SF Housing	Lower (less optimistic) FL Single-Family housing starts forecast.
Major Event	Major geo-political, health, or weather-related events that strongly affect market forces; i.e. 9/11, the Great Recession, Hurricane Katrina, the COVID-19 pandemic, and the war in Ukraine.
Non-farm Emp[18]	FL Non-Farm employment.
Price Binder	Average price of HMA binder (PG-76 & higher).
Price Coal	Average price of coal.
Price Diesel	Average diesel price.
Price Iron	Average price of iron ore.
Price Stone	Average price of crushed stone.
Price Zinc	Average price of crushed stone.
SF Housing	FL Single-Family housing starts.
US Cement Price	Average price of cement in the U.S.
WP	FDOT Five-Year Work Program.

Pay items that are partially or wholly used in the analysis are listed in the next five tables by material type. It should be noted that the lists may include some pay items that are no longer in use by FDOT, or are not represented in the lettings data every year, but are retained for historical record.

[18] Workers in the agriculture sector are excluded from government and industry estimates due to conflicting seasonality and difficulty in measuring self-employment, hobby farms, and undocumented workers. https://www.stlouisfed.org/open-vault/2019/july/nonfarm-payrolls-why-farmers-not-included

Table B- 2. Asphalt Pay Items

Asphalt Pay Item Number				
0102 2200	0334 1 52	0337 7 22	0337 7 48	0337 7 93
0286 2	0334 1 53	0337 7 23	0337 7 54	0337 7 94
0287 1	0334 1 54	0337 7 24	0337 7 55	0339 1
0305 1	0334 1 55	0337 7 25	0337 7 58	0341 70
0315 1	0334 1 56	0337 7 26	0337 7 71	0525 1
0334 1 11	0334 1 57	0337 7 29	0337 7 72	0908333 1
0334 1 12	0334 1 58	0337 7 30	0337 7 73	0909335 1
0334 1 13	0334 1100	0337 7 31	0337 7 74	0909335 2
0334 1 14	0334 1101	0337 7 32	0337 7 80	0911325 1
0334 1 15	0334 1102	0337 7 33	0337 7 81	0914337 2
0334 1 22	0334 1103	0337 7 35	0337 7 82	0914337 4
0334 1 23	0334 1104	0337 7 40	0337 7 83	0914337 5
0334 1 24	0334 1105	0337 7 41	0337 7 85	
0334 1 25	0334 1106	0337 7 42	0337 7 88	
0334 1 33	0334 1107	0337 7 43	0337 7 90	
0334 1 34	0337 7 5	0337 7 45	0337 7 91	

Table B- 3. Concrete Pay Items

Concrete Pay Item Number				
0173 79 1	0425 1584	0430721504	0521 8 1	0700 10122
0350 1 1	0425 1585	0430830	0521 8 2	0700 10123
0350 1 3	0425 1587	0430982120	0521 8 3	0700 10124
0350 1 4	0425 1589	0430982121	0521 8 4	0700 21 11
0350 1 5	0425 1601	0430982123	0521 8 5	0700 21 12
0350 1 8	0425 1602	0430982125	0521 8 6	0700 21 13
0350 1 10	0425 1603	0430982129	0521 8 20	0700 21 14
0350 1 11	0425 1604	0430982133	0521 72 2	0700 21 15
0350 1 12	0425 1605	0430982138	0521 72 3	0700 21 16
0350 1 13	0425 1609	0430982140	0521 72 4	0700 21 17
0350 1 14	0425 1611	0430982141	0521 72 5	0700 21 31
0350 1 20	0425 1619	0430982142	0521 72 6	0700 21 32
0350 2 3	0425 1701	0430982143	0521 72 7	0700 21 33
0350 2 10	0425 1702	0430982144	0521 72 10	0700 21 34
0350 3 1	0425 1703	0430982145	0521 72 11	0700 21 35
0350 3 2	0425 1704	0430982501	0521 72 20	0700 21 36
0350 3 3	0425 1705	0430982502	0521 72 21	0700 22121
0350 3 5	0425 1711	0430982505	0521 72 22	0700 22122
0350 3 7	0425 1712	0430982506	0521 72 23	0700 22123
0350 3 8	0425 1713	0430982510	0522 1	0700 22124
0350 3 9	0425 1714	0430982519	0522 2	0700 22131

Concrete Pay Item Number				
0350 3 10	0425 1715	0430982623	0522 3	0700 22132
0350 3 11	0425 1719	0430982625	0522 4	0700 22133
0350 3 12	0425 1725	0430982629	0524 1 1	0700 22134
0350 3 13	0425 1801	0430982633	0524 1 2	0700 22141
0350 3 14	0425 1802	0430982638	0524 1 3	0700 22142
0350 3 17	0425 1803	0430982640	0524 1 4	0700 22143
0350 4 1	0425 1804	0430982641	0524 1 19	0700 22144
0350 4 5	0425 1805	0430982642	0524 1 29	0700 22154
0350 4 11	0425 1811	0430982643	0524 1 49	0700 22220
0350 4 13	0425 1812	0430982645	0524 2 1	0700 22250
0350 30 5	0425 1813	0430984120	0524 2 2	0700 23111
0350 30 13	0425 1814	0430984121	0524 2 4	0700 23112
0353 70	0425 1815	0430984123	0524 2 29	0700 23113
0400 0 11	0425 1841	0430984125	0524 2 49	0700 23114
0400 0 13	0425 1842	0430984129	0524 3	0700 23121
0400 1 1	0425 1843	0430984133	0526 1 1	0700 23122
0400 1 2	0425 1844	0430984138	0526 1 2	0700 23123
0400 1 11	0425 1845	0430984140	0530 4 4	0700 23131
0400 1 15	0425 1851	0430984141	0530 4 9	0700 23132
0400 1 25	0425 1852	0430984142	0530 78	0700 23133
0400 2 1	0425 1853	0430984143	0534 72101	0700 23142
0400 2 2	0425 1855	0430984144	0534 73	0700 23143
0400 2 4	0425 1861	0430984147	0536 7 3	0700 23144
0400 2 5	0425 1863	0430984504	0542 70	0700 23210
0400 2 8	0425 1865	0430984623	0547 70 1	0700 23220
0400 2 10	0425 1881	0430984625	0547 70 2	0700 38045
0400 2 11	0425 1882	0430984629	0548 12	0700 38056
0400 2 12	0425 1883	0430984633	0548 14	0700 38057
0400 2 24	0425 1884	0430984638	0548 20	0700 38063
0400 2 25	0425 1885	0430984640	0641 1	0700 38064
0400 2 41	0425 1887	0430984641	0641 2 11	0700 38065
0400 2 46	0425 1891	0430984642	0641 2 12	0700 38066
0400 2 47	0425 1892	0430984645	0641 2 13	0700 38068
0400 3 1	0425 1893	0430990	0641 2 14	0700 38086
0400 3 8	0425 1894	0430991	0641 2 15	0700 38097
0400 3 20	0425 1895	0450 1 1	0641 2 16	0700 39 23
0400 4 1	0425 1899	0450 1 2	0641 2 17	0700 39 26
0400 4 2	0425 1901	0450 1 3	0641 2 18	0700 39 27
0400 4 4	0425 1902	0450 1 5	0641 2 19	0700 39 36
0400 4 5	0425 1903	0450 1 7	0641 3163	0700 39 37
0400 4 6	0425 1904	0450 1 78	0641 3169	0700 39 43

Concrete Pay Item Number				
0400 4 8	0425 1905	0450 1124	0641 3175	0700 39 46
0400 4 11	0425 1909	0450 1130	0641 3180	0700 41 10
0400 4 22	0425 1910	0450 1201	0641 3186	0700 41 11
0400 4 24	0425 2 41	0450 1202	0641 3263	0700 43055
0400 4 25	0425 2 42	0450 1203	0641 3269	0700 44066
0400 4 40	0425 2 43	0450 1250	0641 3275	0700 45 32
0400 4 41	0425 2 61	0450 1251	0641 3286	0714 1123
0400 4 47	0425 2 62	0450 2 36	0641 14150	0715 4 11
0400 6	0425 2 63	0450 2 45	0641 14152	0715 4 12
0400 8 5	0425 2 71	0450 2 54	0641 14154	0715 4 13
0400 8 25	0425 2 72	0450 2 63	0641 14156	0715 4 14
0400 8 39	0425 2 73	0450 2 72	0641 14158	0715 4 15
0400 8106	0425 2 91	0450 2 78	0641 15150	0715 4 21
0400 8107	0425 2 92	0450 2 84	0641 15152	0715 4 23
0400 10	0425 2 93	0450 2 96	0641 15154	0715 4 24
0400 32	0425 2101	0450 3 11	0641 15156	0715 4 25
0400 72	0425 2102	0450 3 15	0641 15158	0715 4 31
0400153	0425 2103	0450 3 21	0641 17150	0715 4 32
0404 1	0425 2110	0450 3 25	0641 17152	0715 4 33
0404 5 11	0425 3 41	0450 3 26	0641 17154	0715 4 42
0404 5 12	0425 3 42	0450 3 66	0641 17156	0715 4 50
0404 5 22	0425 3 43	0450 3 76	0641 17158	0715 4011
0404 5 25	0425 3 61	0450 3 91	0641 45150	0715 4012
0405 70 1	0425 3 62	0450 3 95	0641 45152	0715 4013
0405 70 2	0425 3 63	0450 4 4	0646 1 11	0715 4019
0405 71	0425 3 81	0450 5	0646 2115	0715 4021
0407 1 11	0425 3 82	0450 6	0649 1 10	0715 4022
0407 1 21	0425 3 83	0450 6 25	0649 1 11	0715 4023
0407 1 52	0425 3 91	0450 8 12	0649 1 12	0715 4029
0425 1201	0425 3 92	0450 8 13	0649 1 13	0715 4031
0425 1202	0425 11	0450 8 21	0649 1 14	0715 4032
0425 1203	0425 78	0450 8 22	0649 1 15	0715 4033
0425 1204	0430141504	0450 8 23	0649 1 16	0715 4111
0425 1205	0430171103	0450 8 24	0649 1 17	0715 4112
0425 1209	0430171104	0450 8 33	0649 2150	0715 4113
0425 1211	0430171125	0450 82	0649 2170	0715 4119
0425 1212	0430171140	0450 83 1	0649 2250	0715 4121
0425 1213	0430171141	0450 88 15	0649 2255	0715 4122
0425 1214	0430171142	0450 88 18	0649 21 1	0715 4123
0425 1215	0430172102	0450 88 20	0649 21 3	0715 4129
0425 1311	0430172125	0455 3 1	0649 21 4	0715 4131

Concrete Pay Item Number				
0425 1312	0430172138	0455 3 2	0649 21 6	0715 4132
0425 1315	0430173112	0455 3 3	0649 21 7	0715 4133
0425 1319	0430173115	0455 3 4	0649 21 8	0715 4139
0425 1321	0430173118	0455 3 5	0649 21 9	0715 4300
0425 1322	0430173124	0455 3 6	0649 21 10	0715 10 2
0425 1325	0430173130	0455 3 8	0649 21 12	0715 19 13
0425 1329	0430173136	0455 4 1	0649 21 13	0715 19111
0425 1331	0430173218	0455 4 2	0649 21 14	0715 19112
0425 1332	0430174112	0455 4 3	0649 21 15	0715 19113
0425 1335	0430174115	0455 4 4	0649 21 17	0715 19119
0425 1341	0430174118	0455 4 5	0649 21 18	0715 19121
0425 1342	0430174124	0455 4 6	0649 21 19	0715 19122
0425 1345	0430174129	0455 14 2	0649 21 20	0715 19123
0425 1349	0430174130	0455 14 3	0649 21 21	0715 19131
0425 1351	0430174136	0455 14 4	0649 21 24	0715 19132
0425 1352	0430174142	0455 14 5	0649 21 26	0715 19133
0425 1355	0430174148	0455 14 23	0649 21 27	0715 19300
0425 1359	0430174154	0455 14 24	0649 31101	0715511315
0425 1361	0430174160	0455 34 2	0649 31102	0715511320
0425 1362	0430174172	0455 34 3	0649 31103	0715511325
0425 1365	0430174215	0455 34 4	0649 31104	0715511330
0425 1369	0430174218	0455 34 5	0649 31105	0715511335
0425 1411	0430174224	0455 34 6	0649 31106	0715511340
0425 1412	0430174230	0455 34 8	0649 31107	0715511345
0425 1415	0430174236	0455 34 23	0649 31108	0715511350
0425 1419	0430174242	0455 34 25	0649 31109	0715512315
0425 1421	0430174248	0455 34203	0649 31110	0715512325
0425 1422	0430175101	0455 34205	0649 31111	0715512330
0425 1425	0430175102	0455 34301	0649 31112	0715512340
0425 1431	0430175103	0455 88 1	0649 31113	0715512350
0425 1432	0430175104	0455 88 2	0649 31114	0715516315
0425 1435	0430175105	0455 88 3	0649 31115	0715516320
0425 1441	0430175112	0455 88 4	0649 31116	0715516325
0425 1442	0430175115	0455 88 5	0649 31117	0715516330
0425 1445	0430175118	0455 88 6	0649 31118	0715516345
0425 1451	0430175124	0455 88 7	0649 31119	0715517325
0425 1452	0430175130	0455 88 8	0649 31201	0715518315
0425 1455	0430175136	0455 88 12	0649 31202	0715518330
0425 1459	0430175142	0455 88 15	0649 31203	0751 32 11
0425 1461	0430175148	0455 88 19	0649 31204	0751 32 12
0425 1462	0430175154	0455 88 20	0649 31205	0751 32 13

Concrete Pay Item Number				
0425 1465	0430175160	0455 88 21	0649 31206	0751 32 14
0425 1469	0430175166	0455112 1	0649 31207	0751 32 15
0425 1471	0430175172	0455112 3	0649 31208	0785 1 11
0425 1472	0430175184	0455112 4	0649 31209	0785 1 13
0425 1473	0430175201	0455112 5	0649 31210	0905455343
0425 1474	0430175202	0455112 6	0649 31211	0905455345
0425 1475	0430175203	0455143 3	0649 31212	0908350 1
0425 1479	0430175215	0455143 4	0649 31213	0908350 2
0425 1481	0430175218	0455143 5	0649 31214	0908350 3
0425 1483	0430175224	0455143 6	0649 31215	0913548 1
0425 1484	0430175230	0455143 23	0649 31216	2425 1415
0425 1485	0430175236	0455143 25	0649 31217	2425 1435
0425 1489	0430175242	0455143203	0649 31218	2425 1455
0425 1501	0430175248	0455143205	0649 31219	2425 1465
0425 1502	0430175254	0455143301	0649 31299	2425 1515
0425 1503	0430175260	0519 78	0649 31301	2425 1715
0425 1504	0430175266	0520 1 7	0649 31302	2430984504
0425 1505	0430175272	0520 1 8	0649 31303	2455 3 1
0425 1511	0430200 23	0520 1 10	0649 31304	2455 3 2
0425 1512	0430200 25	0520 1 11	0649 31305	2455 3 3
0425 1513	0430200 29	0520 1 12	0649 31306	2455 3 4
0425 1514	0430200 33	0520 2 1	0649 31307	2455 3 5
0425 1515	0430200 38	0520 2 2	0649 31308	2455 3 8
0425 1519	0430200 40	0520 2 4	0649 31309	2455 4 6
0425 1521	0430200 41	0520 2 5	0649 31310	2455 4 8
0425 1522	0430200 42	0520 2 8	0649 31311	2455 14 3
0425 1523	0430200 43	0520 2 9	0649 31312	2455 14 5
0425 1524	0430600125	0520 3	0649 31313	2455 14 11
0425 1525	0430602123	0520 5 11	0649 31314	2455 14 12
0425 1529	0430602125	0520 5 12	0649 31315	2455 34 2
0425 1531	0430602129	0520 5 16	0649 31316	2455 34 3
0425 1532	0430610123	0520 5 21	0649 31317	2455 34 4
0425 1533	0430610125	0520 5 22	0649 31318	2455 34 5
0425 1534	0430610129	0520 5 26	0649 31319	2455 34 6
0425 1535	0430610133	0520 5 41	0649 31999	2455 36 1
0425 1541	0430610225	0520 5 42	0649 33000	2455 88 2
0425 1542	0430610325	0520 5 46	0649415003	2455 88 3
0425 1543	0430610329	0520 5 51	0649417006	2455 88 4
0425 1544	0430611023	0520 6	0659109	2455 88 5
0425 1545	0430611025	0520 70	0659309	2455 88 6
0425 1547	0430611029	0521 1	0700 2 11	2455 88 7

Concrete Pay Item Number				
0425 1549	0430611123	0521 1 1	0700 2 12	2455 88 8
0425 1551	0430611125	0521 5 1	0700 2 13	2455 88 9
0425 1552	0430611129	0521 5 2	0700 2 14	2455 88 20
0425 1553	0430611133	0521 5 3	0700 2 15	2455140 11
0425 1554	0430611223	0521 5 4	0700 2 16	2455140 12
0425 1555	0430611225	0521 5 5	0700 2 17	2455140 13
0425 1557	0430611229	0521 5 6	0700 2 18	2455140 14
0425 1559	0430611233	0521 5 7	0700 2 50	2455140 15
0425 1561	0430611323	0521 5 8	0700 4111	2455140 43
0425 1562	0430611325	0521 5 9	0700 4112	2455140 44
0425 1563	0430611329	0521 5 10	0700 4113	2455140 56
0425 1564	0430611333	0521 5 11	0700 4114	2455143 2
0425 1565	0430612025	0521 5 13	0700 4122	2455143 3
0425 1569	0430612029	0521 5 20	0700 4123	2455143 4
0425 1571	0430612033	0521 6 1	0700 4124	2455143 5
0425 1572	0430613025	0521 6 2	0700 4125	2455143 6
0425 1573	0430613029	0521 6 3	0700 4126	2455145 1
0425 1574	0430613033	0521 6 11	0700 4127	2659109
0425 1575	0430613125	0521 6 12	0700 4128	2659309
0425 1579	0430613129	0521 6 31	0700 4132	
0425 1581	0430613225	0521 6 32	0700 10115	
0425 1582	0430613229	0521 6 34	0700 10116	
0425 1583	0430613325	0521 7 1	0700 10121	

Table B- 4. Steel Pay Items

Steel Pay Item Number				
0415 1 1	0649 31108	0700 38056	0715516240	2649121202
0415 1 10	0649 31109	0700 38057	0715516315	2649122102
0415 1 11	0649 31110	0700 38058	0715516320	2649122203
0415 1 12	0649 31111	0700 38063	0715516330	2649122212
0415 1 13	0649 31112	0700 38064	0715516340	2649122304
0415 1 2	0649 31113	0700 38065	0715516435	2649122512
0415 1 3	0649 31114	0700 38066	0715516615	2649123103
0415 1 4	0649 31115	0700 38068	0715517125	2649123105
0415 1 5	0649 31116	0700 38075	0715517135	2649123204
0415 1 6	0649 31117	0700 38086	0715517150	2649123205
0415 1 7	0649 31118	0700 38097	0715517325	2649123305
0415 1 8	0649 31119	0700 39 23	0715518120	2649124105
0415 1 9	0649 31199	0700 39 24	0715518130	2649124205
0415 2 4	0649 31201	0700 39 25	0715518140	2649124306
0415 2 5	0649 31202	0700 39 26	0715518145	2649124312

Steel Pay Item Number				
0415 2 6	0649 31203	0700 39 27	0715518150	2649124407
0415 2 9	0649 31204	0700 39 36	0715518315	2649125512
0435 22250	0649 31205	0700 39 37	0715521135	2649131008
0435 22359	0649 31206	0700 39 43	0715521140	2649132009
0435 22369	0649 31207	0700 39 44	0715521145	2649133010
0435 22445	0649 31208	0700 39 46	0715521150	2649134011
0435 22484	0649 31209	0700 39 47	0715521340	2649135012
0435 32856	0649 31210	0700 39 57	0715522140	2649135512
0435 52 1	0649 31211	0700 39 74	0715526120	2649141101
0435 52 2	0649 31212	0700 41 10	0715530100	2649143102
0435413537	0649 31213	0700 41 11	0715530101	2649145012
0435422439	0649 31214	0700 43055	0715530102	2649145512
0435522224	0649 31215	0700 44066	0715530103	2649311001
0435725675	0649 31216	0700 45 32	0715530104	2649313003
0451 70	0649 31217	0700 48 12	0715536115	2649314004
0455 3 1	0649 31218	0700 48 13	0715536340	2649345012
0455 3 2	0649 31219	0700 48 14	0715540000	2649345512
0455 3 3	0649 31299	0700 48 15	0715550000	2649411001
0455 3 4	0649 31301	0700 48 17	0715560000	2649412002
0455 3 5	0649 31302	0700 48 18	0715561140	2649413002
0455 3 6	0649 31303	0700 48 19	0715571145	2649415003
0455 3 8	0649 31304	0700 48 22	0715571150	2649416004
0455 4 1	0649 31305	0700 48 28	0715572145	2649417006
0455 4 2	0649 31306	0700 48 32	0715572150	2649422203
0455 4 3	0649 31307	0700 48 33	0715573135	2649425203
0455 4 4	0649 31308	0700 48 34	0715573140	2649425504
0455 4 5	0649 31309	0700 48 35	0715573145	2649426504
0455 4 6	0649 31310	0700 48 38	0715573150	2649440
0455 7 2	0649 31311	0700 48 39	0715574140	2649515003
0455 7 4	0649 31312	0700 48 52	0715574145	2649516004
0455 7 5	0649 31313	0700 48 53	0715574150	2649517006
0455 7 6	0649 31314	0700 48 54	0715575115	2649540
0455 7 9	0649 31315	0700 48 55	0715575125	2649711001
0455 7 34	0649 31316	0700 48 56	0715575130	2649713002
0455 8 2	0649 31317	0700 48 57	0715575135	2649715003
0455 8 4	0649 31318	0700 48 58	0715575140	2649716004
0455 8 5	0649 31319	0700 48 59	0715575145	2649717006
0455 8 6	0649 31399	0700 70	0715575150	2649721101
0455 8 9	0649 31999	0700 82	0715575210	2649723102
0455 8 34	0649 32000	0700 83	0715576135	2649724403
0455 14 2	0649 33000	0700 89 2	0715576140	2649725504

Steel Pay Item Number				
0455 14 3	0649 34000	0700 89111	0715576145	2649726504
0455 14 4	0649 36100	0700 89113	0715576150	2649731007
0455 14 5	0649 36300	0700 89121	0715577115	2649733008
0455 14 24	0649 36500	0700 89123	0715577130	2649735009
0455 17 1	0649 36700	0700 89131	0715577145	2649736010
0455 17 2	0649 38 3	0700 89141	0715577150	2649737006
0455 17 3	0649 38000	0700 89143	0715578150	2649740
0455 17 4	0649 40101	0700 90 11	0715611201	2650 51511
0455 17 5	0649111001	0700 90 12	0715611401	2650 51512
0455 17 13	0649111008	0700 90 13	0715612102	2650 51513
0455 17 14	0649112002	0700 90 14	0715612202	2650 51521
0455 17 16	0649112009	0714 1123	0715612302	2659101
0455 17 34	0649112012	0715 1 11	0715612402	2659103
0455 17 40	0649113003	0715 1 12	0715614404	2659106
0455 34 2	0649113010	0715 1 13	0715615402	2659107
0455 34 3	0649114004	0715 1 14	0715616306	2659108
0455 34 4	0649114011	0715 1 15	0715616406	2659109
0455 34 5	0649114012	0715 1 16	0715619309	2659110
0455 34 6	0649115012	0715 1 19	0715619409	2659112
0455 34 8	0649121202	0715 1 40	0715621403	2659118
0455 34 23	0649121212	0715 1 50	0715622104	2659119
0455 34 25	0649121303	0715 1 60	0715622204	2659120
0455 34203	0649121412	0715 1 70	0715622304	2659307
0455 34205	0649122102	0715 1 80	0715622404	2659308
0455 34301	0649122203	0715 1110	0715623405	2659309
0455 35 4	0649123103	0715 1111	0715624204	2676110501
0455 35 5	0649123203	0715 1112	0715624304	2715 2123
0455 35 6	0649123204	0715 1113	0715624404	2715 2131
0455 35 7	0649123303	0715 1114	0715624406	2715 2132
0455 35 8	0649123305	0715 1115	0715625107	2715 2133
0455 35 9	0649123312	0715 1116	0715625307	2715 2222
0455 35 20	0649124105	0715 1117	0715625407	2715 2231
0455 35 21	0649124205	0715 1118	0715626408	2715 2232
0455 35 22	0649124306	0715 1119	0715627409	2715 2233
0455 35 23	0649125212	0715 1121	0715628410	2715 2321
0455 39	0649125412	0715 1122	0715631305	2715 2322
0455 81	0649125512	0715 1123	0715631401	2715 2331
0455 81101	0649131001	0715 1124	0715631405	2715 2332
0455 81102	0649131008	0715 1125	0715632406	2715 2333
0455 81104	0649132009	0715 1128	0715636406	2715 2431
0455 81105	0649133010	0715 1129	0715637411	2715 2432

Steel Pay Item Number				
0455 81106	0649133011	0715 1131	0715712402	2715 2433
0455 87	0649134011	0715 1132	0730 76101	2715 2522
0455107 1	0649135012	0715 1135	0730 76102	2715 2532
0455107 2	0649141012	0715 1137	0730 76103	2715 5 11
0455107 3	0649142012	0715 1138	0730 76104	2715 5 12
0455107 4	0649145012	0715 1148	0730 76105	2715 7 11
0455107 5	0649145512	0715 2 11	0730 76106	2715 7 12
0455107 6	0649211008	0715 2 12	0730 76107	2715 11111
0455107 7	0649212009	0715 2 13	0730 76108	2715 11112
0455107 8	0649213010	0715 2121	0730 76109	2715 11113
0455107 18	0649214011	0715 2125	0730 76110	2715 11115
0455107 20	0649222102	0715 2131	0730 76111	2715 11116
0455107 21	0649222203	0715 2132	0730 76112	2715 11118
0455108	0649223103	0715 2133	0730 76113	2715 11119
0455112 1	0649223204	0715 2134	0730 76114	2715 11123
0455112 3	0649335012	0715 2135	0730 76116	2715 11124
0455112 4	0649411001	0715 2136	0730 76117	2715 11125
0455112 5	0649411003	0715 2221	0730 76119	2715 11126
0455120 3	0649411011	0715 2225	0730 76122	2715 11128
0455120 5	0649412002	0715 2231	0730 76123	2715 11129
0455120 6	0649413002	0715 2232	0730 76124	2715 11137
0455120 7	0649413003	0715 2233	0730 76125	2715 11138
0455120 8	0649413011	0715 2234	0730 76126	2715 11139
0455127 1	0649414002	0715 2235	0730 76130	2715 11212
0455133	0649415003	0715 2236	0730 76131	2715 11218
0455133 1	0649415011	0715 2237	0730 76201	2715 11219
0455133 2	0649416004	0715 2238	0730 76203	2715 11228
0455133 3	0649416011	0715 2321	0730 76204	2715 34 1
0455134	0649416604	0715 2322	0730 76205	2715 35 1
0455140 11	0649417006	0715 2325	0730 76206	2715 91 24
0455140 12	0649421101	0715 2331	0730 76207	2715 91 25
0455140 13	0649423102	0715 2332	0730 76208	2715 91 30
0455140 14	0649423103	0715 2333	0730 76209	2715 91 36
0455140 15	0649423305	0715 2334	0730 76210	2715 91 37
0455140 25	0649424403	0715 2335	0730 76211	2715 96 24
0455140 54	0649425203	0715 2336	0730 76212	2715 96 36
0455140 56	0649425211	0715 2337	0730 76213	2715 96 37
0455140 61	0649425404	0715 2425	0730 76214	2715111101
0455140 90	0649425504	0715 2433	0730 76216	2715111102
0455144 4	0649426204	0715 2434	0730 76217	2715111103
0455144 5	0649426404	0715 2435	0730 76219	2715111104

Steel Pay Item Number				
0455144 6	0649426504	0715 2436	0730 76221	2715111105
0455144 8	0649426605	0715 2437	0730 76222	2715111106
0455144 9	0649427211	0715 2438	0730 76223	2715111107
0455144 20	0649427405	0715 2535	0730 76224	2715111108
0455144 21	0649427411	0715 4 11	0730 76225	2715111109
0455144 22	0649427511	0715 4 12	0730 76226	2715111110
0455144 23	0649427604	0715 4 13	0730 76227	2715111111
0460 1 1	0649427611	0715 4 14	0730 76229	2715111112
0460 1 2	0649431007	0715 4 15	0730 76230	2715111114
0460 1 3	0649433008	0715 4 21	0730 76232	2715111203
0460 1 4	0649435009	0715 4 22	0730 76303	2715111204
0460 1 5	0649436010	0715 4 23	0730 76304	2715111205
0460 1 6	0649440	0715 4 24	0730 76305	2715111209
0460 1 7	0649611001	0715 4 25	0730 76306	2715111212
0460 1 9	0649613002	0715 4 31	0730 76503	2715111604
0460 1 11	0649615003	0715 4 32	0730 76504	2715111610
0460 1 12	0649616004	0715 4 33	0730 76505	2715111615
0460 1 13	0649617006	0715 4 35	0730 76506	2715191 20
0460 1 15	0649633011	0715 4 41	0730 76507	2715191 24
0460 1 17	0649640	0715 4 42	0730 77 01	2715191 25
0460 2 1	0649711001	0715 4 60	0730 77 03	2715191 30
0460 2 2	0649711007	0715 4 70	0730 77 04	2715191 31
0460 2 3	0649712001	0715 4 71	0730 77 05	2715191 32
0460 2 4	0649713002	0715 4011	0730 77 06	2715191 34
0460 2 5	0649713003	0715 4012	0730 77 07	2715191 36
0460 2 6	0649713011	0715 4013	0730 77 09	2715191 37
0460 2 7	0649714002	0715 4019	0730 77 10	2715191 40
0460 2 12	0649715003	0715 4021	0730 77 11	2715191 42
0460 2 13	0649715008	0715 4022	0730 77 13	2715191 43
0460 2 15	0649715009	0715 4023	0730 77 16	2715191 46
0460 2 17	0649716004	0715 4029	0730 77 19	2715411104
0460 2 18	0649717006	0715 4031	0730 77 23	2715411109
0460 2 19	0649721101	0715 4032	0730 77 25	2715411112
0460 2 20	0649723102	0715 4033	0730 82	2715411113
0460 3101	0649724403	0715 4111	0730 83 4	2715411114
0460 3103	0649725203	0715 4112	0730 83 6	2715411115
0460 3104	0649725404	0715 4113	0730 84 4	2715411212
0460 3105	0649725504	0715 4119	0730 88	2715411214
0460 3106	0649726204	0715 4121	0825132210	2715411309
0460 3107	0649726404	0715 4122	0905455343	2715411312
0460 3108	0649726504	0715 4123	0905455345	2715411314

Steel Pay Item Number				
0460 3109	0649726605	0715 4129	1634151409	2715411315
0460 3301	0649731007	0715 4131	1634151605	2715411316
0460 3306	0649733008	0715 4132	1635134415	2715412106
0460 3401	0649735009	0715 4133	1635141415	2715412112
0460 3402	0649736010	0715 4139	1635141507	2715412114
0460 3405	0649740	0715 4300	1635148455	2715412209
0460 3406	0649745011	0715 4400	1644536 91	2715413112
0460 3408	0649915003	0715 4600	1645150109	2715413114
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0460 3606	0649924403	0715 5 12	1645150139	2715415112
0460 3704	0649926605	0715 5 21	1649110107	2715415209
0460 3801	0650 4152	0715 5 30	1649150106	2715416103
0460 3802	0650 51511	0715 5 31	1649150135	2715416105
0460 3803	0650 51512	0715 5 32	1694715	2715416106
0460 3804	0650 51513	0715 5 40	1715132 2	2715416112
0460 3805	0650 51521	0715 5 50	2415 1 1	2715416114
0460 3806	0650 51522	0715 5 51	2415 1 2	2715416115
0460 3808	0659101	0715 7 11	2415 1 3	2715416304
0460 3811	0659102	0715 7 12	2415 1 4	2715416604
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0460 6	0659106	0715 7 41	2415 1 8	2715475112
0460 6 1	0659107	0715 7 42	2415 1 9	2715475114
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0460 70 3	0659307	0715 19122	2455 4 8	2715511114
0460 71 1	0659310	0715 19123	2455 7 3	2715511115
0460 71 2	0659312	0715 19129	2455 7 6	2715511206
0460 71 4	0659313	0715 19131	2455 7 7	2715511208
0460 73	0659318	0715 19132	2455 7 9	2715511212
0460 81	0659407	0715 19133	2455 7 22	2715511213
0460 81 1	0670114151	0715 19300	2455 7 35	2715511217

Steel Pay Item Number				
0460 88	0676110503	0715 19600	2455 8 3	2715511303
0460 95	0676130504	0715 20 4	2455 8 6	2715511305
0460 98 1	0676140504	0715 21 1	2455 8 7	2715511309
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0460101	0685156	0715 26 1	2455 8 22	2715511314
0460101111	0685157	0715 26 2	2455 8 35	2715511315
0460101114	0685158	0715 34 1	2455 14 3	2715511316
0460101121	0685360	0715 35 1	2455 14 5	2715511512
0460101122	0700 1 11	0715 36 12	2455 14 11	2715511608
0460101123	0700 1 12	0715 36 13	2455 14 12	2715511609
0460101124	0700 1 13	0715 36 62	2455 17 1	2715512105
0460101221	0700 1 14	0715 36100	2455 17 2	2715512106
0460101321	0700 1 18	0715 36101	2455 17 4	2715512109
0460101411	0700 1 21	0715 36102	2455 17 5	2715512111
0460101421	0700 1 22	0715 36103	2455 17 16	2715512112
0460104	0700 1 23	0715 37 1	2455 17 33	2715512113
0460106	0700 1 25	0715 37 5	2455 17 35	2715512114
0460108 1	0700 1 31	0715 50	2455 17 40	2715512115
0460108 2	0700 1 32	0715 51	2455 34 2	2715512223
0460110 1	0700 1 33	0715 52 1	2455 34 3	2715512309
0460111 3	0700 1 40	0715 52 2	2455 34 4	2715512315
0460111 11	0700 1 74	0715 91 80	2455 34 5	2715512316
0460111 12	0700 2 11	0715 91 85	2455 34 6	2715512609
0460111 13	0700 2 12	0715 91100	2455 35 4	2715513106
0460111 14	0700 2 13	0715 91110	2455 35 5	2715513107
0460112	0700 2 14	0715 91120	2455 35 6	2715513108
0460113 12	0700 2 15	0715 91130	2455 35 9	2715513109
0460113 13	0700 2 16	0715 91140	2455 35 22	2715513110
0460113 14	0700 2 17	0715 91150	2455 35 23	2715513111
0460113 15	0700 2 18	0715 91160	2455 36 1	2715513112
0460113 16	0700 2 40	0715 93100	2455 87	2715513113
0460113 17	0700 2 50	0715 93120	2455107 1	2715513114
0460113 19	0700 2 60	0715 95100	2455107 3	2715513115
0460114 11	0700 2 80	0715 95120	2455107 4	2715513205
0460114 12	0700 3101	0715 96100	2455107 5	2715513609
0460114 13	0700 3102	0715191 60	2455107 6	2715514107
0460114 14	0700 3103	0715191 65	2455107 7	2715514109
0460114 15	0700 3104	0715191 70	2455120 1	2715514112
0460114 16	0700 3105	0715191 80	2455121 1	2715514114
0460114 17	0700 3106	0715191100	2455121 3	2715514115
0460114 19	0700 3107	0715191120	2455121 4	2715515107

Steel Pay Item Number				
0460115 1	0700 3108	0715191125	2455121 5	2715515109
0460116	0700 3109	0715191130	2455133	2715515112
0460119101	0700 3201	0715191140	2455133 1	2715515114
0460120101	0700 3202	0715191150	2455133 2	2715515115
0460120103	0700 3203	0715193100	2455140 11	2715515202
0460121 11	0700 3204	0715193120	2455140 12	2715515205
0460121 12	0700 3205	0715195 80	2455140 13	2715515207
0460121 13	0700 3206	0715195100	2455140 14	2715515212
0460121 14	0700 3207	0715195120	2455140 15	2715515405
0460121 43	0700 3208	0715196 80	2455140 43	2715515609
0460121 50	0700 3209	0715196100	2455140 44	2715516103
0504 1 1	0700 3210	0715196120	2455140 56	2715516104
0504 1 2	0700 3211	0715411115	2455143 2	2715516105
0504 1 5	0700 3224	0715411120	2455143 3	2715516106
0504 1 10	0700 3225	0715411125	2455143 4	2715516109
0504 2	0700 3226	0715411130	2455143 5	2715516110
0515 1 1	0700 3227	0715411135	2455143 6	2715516112
0515 1 2	0700 3228	0715411140	2455144 4	2715516114
0515 1 3	0700 3229	0715411145	2455144 5	2715516115
0515 1 4	0700 3231	0715411150	2455144 9	2715516203
0515 1 5	0700 3236	0715411230	2455144 22	2715516204
0515 2101	0700 3237	0715411235	2455144 23	2715516305
0515 2102	0700 3238	0715411240	2455145 1	2715516403
0515 2111	0700 3239	0715411320	2460 1 1	2715516603
0515 2201	0700 3240	0715411335	2460 1 4	2715516604
0515 2202	0700 3241	0715411340	2460 1 5	2715517104
0515 2203	0700 3242	0715411345	2460 1 7	2715517106
0515 2211	0700 3245	0715411350	2460 1 12	2715517208
0515 2212	0700 3248	0715411415	2460 1 13	2715517405
0515 2213	0700 3301	0715411545	2460 1 15	2715521105
0515 2221	0700 3302	0715412120	2460 1 18	2715521107
0515 2231	0700 3303	0715412130	2460 2 1	2715521109
0515 2301	0700 3304	0715412135	2460 2 2	2715521111
0515 2302	0700 3401	0715412140	2460 2 3	2715521112
0515 2303	0700 3402	0715412145	2460 2 4	2715521212
0515 2311	0700 3403	0715412150	2460 2 5	2715521309
0515 2313	0700 3404	0715412230	2460 2 6	2715521315
0515 2321	0700 3405	0715412240	2460 2 7	2715522109
0515 2351	0700 3406	0715412350	2460 2 9	2715522112
0515 2403	0700 3407	0715412545	2460 2 11	2715522315
0515 2419	0700 3408	0715413125	2460 2 12	2715523109

Steel Pay Item Number				
0515 3 1	0700 4111	0715413130	2460 2 13	2715523112
0515 3 2	0700 4112	0715413135	2460 2 15	2715523115
0515 4 1	0700 4113	0715413140	2460 2 16	2715525109
0515 4 2	0700 4114	0715413145	2460 2 17	2715525112
0536 1 0	0700 4121	0715413150	2460 3101	2715525405
0536 1 1	0700 4122	0715414135	2460 3103	2715526104
0536 1 2	0700 4123	0715414140	2460 3104	2715526115
0536 1 3	0700 4124	0715414145	2460 3105	2715526305
0536 1 4	0700 4125	0715414150	2460 3106	2715526603
0536 1 5	0700 4126	0715415140	2460 3108	2715527405
0536 1 6	0700 4127	0715415145	2460 3304	2715531112
0536 1 8	0700 4128	0715415150	2460 3307	2715535107
0536 1 9	0700 4132	0715416110	2460 3401	2715536104
0536 1 10	0700 4140	0715416115	2460 3402	2715536305
0536 1 11	0700 4512	0715416120	2460 5	2715536306
0536 1 12	0700 5 11	0715416135	2460 6	2715571109
0536 2	0700 5 21	0715416140	2460 70 1	2715573109
0536 6	0700 5 22	0715416145	2460 70 2	2715573114
0536 7	0700 6 21	0715416150	2460 70 3	2715573115
0536 7 1	0700 6 22	0715416315	2460 71 2	2715574112
0536 7 2	0700 7131	0715416320	2460 73	2715575104
0536 7 3	0700 7132	0715416545	2460 81	2715575107
0536 7 4	0700 7500	0715416610	2460 81 1	2715575109
0536 8	0700 7600	0715416615	2460101121	2715575111
0536 8 1	0700 8115	0715421320	2460101122	2715575112
0536 8 3	0700 8132	0715422145	2460101124	2715575114
0536 8 4	0700 8134	0715426315	2460101211	2715575115
0536 8 5	0700 8135	0715426320	2460101311	2715575206
0536 8 6	0700 8136	0715431145	2460108 2	2715575208
0536 9	0700 8216	0715436315	2460111 11	2715576104
0536 75	0700 8221	0715436320	2460111 12	2715577112
0536 76	0700 8400	0715440000	2460111 13	2715577114
0536 82	0700 9117	0715450000	2460111 14	2715577115
0536 83 1	0700 9137	0715461145	2460112	2715612302
0536 83 4	0700 9400	0715461545	2460113 11	2715612402
0536 84	0700 9500	0715471130	2460113 12	2715614404
0536 85	0700 9600	0715472140	2460113 13	2715616406
0536 85 22	0700 10115	0715473145	2460113 14	2715622404
0536 85 24	0700 10116	0715474135	2460113 15	2715624206
0536 85 25	0700 10121	0715474140	2460113 16	2715625107
0536 85 26	0700 10122	0715474145	2460113 17	2715631405

Steel Pay Item Number				
0536 85 27	0700 10123	0715475125	2460113 18	2715632406
0536 86	0700 10124	0715475130	2460113 19	2715636406
0536 88	0700 10130	0715475135	2460114 11	2715712302
0536 90	0700 10140	0715475140	2460114 12	2715732406
0536 91	0700 11111	0715475145	2460114 13	2730 76101
0649 1 10	0700 11112	0715475150	2460114 14	2730 76102
0649 1 11	0700 11121	0715476135	2460114 15	2730 76103
0649 1 12	0700 11131	0715476615	2460114 16	2730 76104
0649 1 13	0700 11132	0715500 1	2460114 17	2730 76105
0649 1 14	0700 11141	0715500 2	2460114 18	2730 76106
0649 1 15	0700 11142	0715500 3	2460114 19	2730 76107
0649 1 16	0700 11151	0715500 30	2460120103	2730 76108
0649 1 17	0700 11152	0715500100	2504 1 1	2730 76109
0649 1 61	0700 11161	0715511115	2504 1 2	2730 76110
0649 1 62	0700 11162	0715511120	2504 1 4	2730 76111
0649 1 63	0700 11222	0715511125	2504 1 5	2730 76113
0649 1 65	0700 11231	0715511130	2504 1 10	2730 76114
0649 1040	0700 11241	0715511135	2504 2	2730 76116
0649 1046	0700 11251	0715511140	2515 1 1	2730 76119
0649 1101	0700 11261	0715511145	2515 1 2	2730 76122
0649 1102	0700 11262	0715511150	2515 1 3	2730 76123
0649 1146	0700 11263	0715511220	2515 1 4	2730 76124
0649 1230	0700 11321	0715511225	2515 2 22	2730 76125
0649 1232	0700 11391	0715511230	2515 2201	2730 76201
0649 1234	0700 12 11	0715511240	2515 2202	2730 76202
0649 1236	0700 12 12	0715511315	2515 2301	2730 76203
0649 1332	0700 12 21	0715511320	2515 2302	2730 76204
0649 1336	0700 12 22	0715511325	2515 2303	2730 76205
0649 1338	0700 12 31	0715511330	2536 1 1	2730 76206
0649 1340	0700 12 32	0715511335	2536 1 2	2730 76207
0649 1436	0700 20 11	0715511340	2536 1 3	2730 76208
0649 1438	0700 20 12	0715511345	2536 1 5	2730 76210
0649 1440	0700 20 13	0715511350	2536 1 6	2730 76211
0649 1536	0700 20 14	0715511435	2536 1 8	2730 76213
0649 1540	0700 20 15	0715511535	2536 1 9	2730 76214
0649 1640	0700 20 18	0715511540	2536 2	2730 76215
0649 1646	0700 20 19	0715511550	2536 6	2730 76216
0649 1734	0700 20 21	0715511610	2536 7	2730 76217
0649 1738	0700 20 22	0715511615	2536 8	2730 76218
0649 2150	0700 20 31	0715511735	2536 8 1	2730 76219
0649 2170	0700 20 32	0715511740	2536 8 5	2730 76220

Steel Pay Item Number				
0649 2250	0700 20 51	0715512120	2536 8 6	2730 76221
0649 2255	0700 20 52	0715512125	2536 9	2730 76222
0649 2605	0700 21 11	0715512130	2536 75	2730 76223
0649 11 1	0700 21 12	0715512140	2536 76	2730 76224
0649 11001	0700 21 13	0715512145	2536 82	2730 76225
0649 11160	0700 21 14	0715512150	2536 83 1	2730 76226
0649 20	0700 21 15	0715512155	2536 85 1	2730 76228
0649 21 1	0700 21 16	0715512160	2536 85 2	2730 76229
0649 21 3	0700 21 17	0715512220	2536 85 4	2730 76230
0649 21 4	0700 21 31	0715512315	2536 85 5	2730 76307
0649 21 5	0700 21 32	0715512325	2536 85 6	2730 76503
0649 21 6	0700 21 33	0715512330	2536 85 7	2730 76507
0649 21 7	0700 21 34	0715512340	2536 85 8	2730 77 01
0649 21 8	0700 21 35	0715512350	2536 85 9	2730 77 02
0649 21 9	0700 21 36	0715512610	2536 85 10	2730 77 03
0649 21 10	0700 22121	0715512615	2536 85 12	2730 77 04
0649 21 11	0700 22122	0715513125	2536 85 13	2730 77 05
0649 21 12	0700 22123	0715513130	2536 85 22	2730 77 06
0649 21 13	0700 22124	0715513135	2536 85 24	2730 77 09
0649 21 14	0700 22131	0715513140	2536 85 25	2730 77 11
0649 21 15	0700 22132	0715513145	2536 85 26	2730 77 12
0649 21 16	0700 22133	0715513150	2550 75041	2730 77 13
0649 21 17	0700 22134	0715513435	2550 75042	2730 77 14
0649 21 18	0700 22141	0715514120	2649 1024	2730 77 16
0649 21 19	0700 22142	0715514125	2649 1044	2730 77 19
0649 21 20	0700 22143	0715514130	2649 1046	2730 77 22
0649 21 21	0700 22144	0715514135	2649 1050	2730 77 23
0649 21 22	0700 22154	0715514140	2649 1438	2730 77 25
0649 21 23	0700 22220	0715514145	2649 1440	2825132110
0649 21 24	0700 22250	0715514150	2649 1442	2825132210
0649 21 25	0700 23111	0715514325	2649 1536	2825136120
0649 21 26	0700 23112	0715515115	2649 1538	2825136210
0649 21 27	0700 23113	0715515120	2649 1636	2825136220
0649 21101	0700 23114	0715515125	2649 1638	2825141210
0649 21102	0700 23121	0715515130	2649 1644	2825142210
0649 21103	0700 23122	0715515135	2649 1646	2825151210
0649 21104	0700 23123	0715515140	2649 11001	3050120415
0649 21105	0700 23124	0715515145	2649111001	3050130415
0649 21106	0700 23131	0715515150	2649111002	3050150411
0649 21108	0700 23132	0715515225	2649111003	3050150419
0649 22 3	0700 23133	0715515250	2649111004	3622536301

Steel Pay Item Number				
0649 26 1	0700 23134	0715516110	2649111012	3633131415
0649 26 3	0700 23142	0715516115	2649112002	3633145505
0649 26 5	0700 23143	0715516120	2649112012	3634141415
0649 26 7	0700 23144	0715516125	2649113003	3635122415
0649 31101	0700 23210	0715516130	2649113004	3637151606
0649 31102	0700 23220	0715516135	2649114004	3637151615
0649 31103	0700 38033	0715516140	2649115004	3637700
0649 31104	0700 38036	0715516145	2649115005	3644600
0649 31105	0700 38044	0715516150	2649115012	3694715
0649 31106	0700 38045	0715516155	2649115512	E460111900
0649 31107	0700 38048	0715516210	2649121101	

Table B- 5. Aggregate Pay Items

Aggregate Pay Item Number				
0121 70	0285701007	0285707994	0285714527	0547 70 3
0125 3	0285701031	0285708283	0285714538	0443 71 1
0210 1 1	0285701032	0285708287	0285715567	0443 72 10
0210 1 8	0285701701	0285708295	0285715982	0443 72 11
0210 1 9	0285702047	0285708991	0285716606	0443 72 12
0210 2	0285702055	0285709327	0285716610	0443 72 13
0285701	0285702999	0285709335	0285716615	0443 72 14
0285702	0285703087	0285709338	0285716631	0443 72 20
0285703	0285703095	0285709352	0285716632	0142 70
0285704	0285703703	0285709709	0285716716	0160 4
0285705	0285703984	0285709989	0285716980	0102 3
0285706	0285703998	0285709990	0285716981	0162 1 11
0285707	0285704123	0285710363	0530 1	0162 1 12
0285708	0285704127	0285710367	0530 1 1	0162 1 21
0285709	0285704152	0285710392	0530 1 2	0162 1 33
0285710	0285704704	0285710983	0530 3 3	0173 77 1
0285711	0285704985	0285711407	0530 3 4	0173 77 2
0285712	0285705166	0285711711	0530 3 5	0173 77 3
0285713	0285705167	0285711986	0530 3 8	0286 1
0285714	0285705170	0285711987	0530 3 9	0288001
0285715	0285705997	0285712441	0530 5 2	0520 7 1
0285716	0285706201	0285712443	0530 74	0530 5 1
0285720	0285706203	0285712447	0530 76 2	0530 5 12
0285721	0285706207	0285712458	0530 76 3	0549 3
0285722	0285706208	0285712472	0530 76 4	0823 11 6
0285724	0285706216	0285712712	0530 76 5	0823 11 8
0285726	0285707247	0285713481	0530 77 2	0823 11 12

Aggregate Pay Item Number				
0285729	0285707250	0285713487	0530 77 3	0520 7 2
0285730	0285707255	0285713498	0530 77 4	
0285701001	0285707272	0285714521	0547 70 1	
0285701003	0285707993	0285714523	0547 70 2	

Table B- 6. Earthwork Pay Items

Earthwork Pay Item Number				
0120 71	0120 6	0120 1900	0120 5	0120 6900
0120 72	0120 2 2	0120 3	0120 6101	0120 11
0120 73	0102 2300	0120 4	0120 6102	
0120 74	0120 1	0120 4900	0120 6103	

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