Fiscal Year 21/22

QUARTER 3 REPORT

Strategic Resource Evaluation Study Highway Construction Materials

Contract BEC18

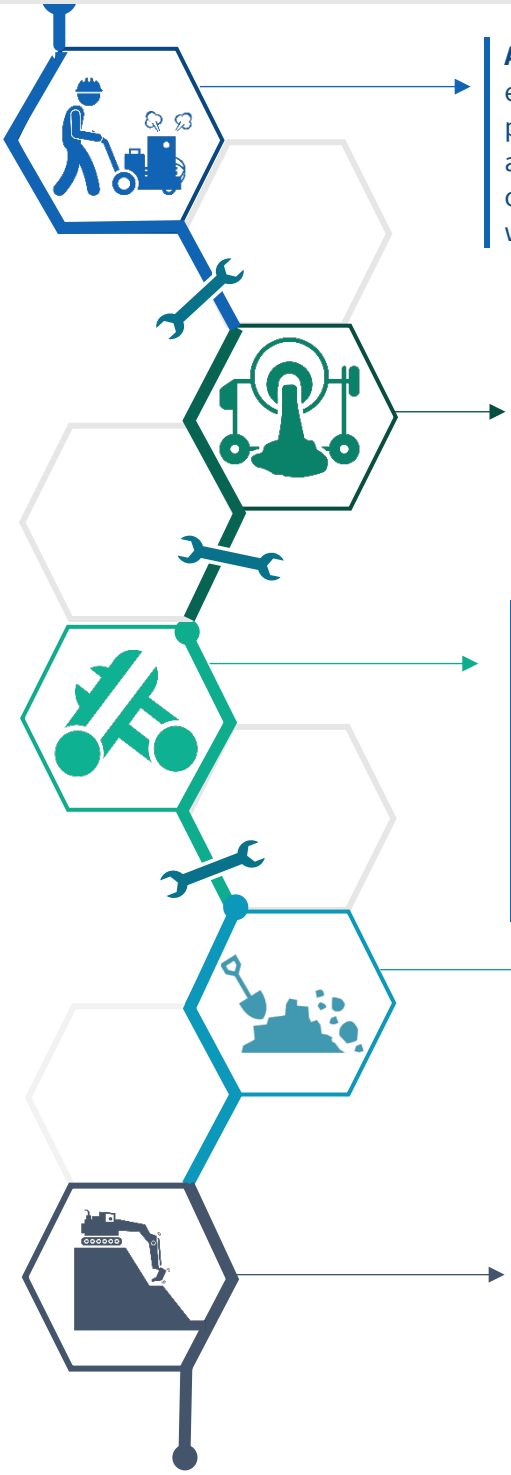
April 2022

The Balmoral Group

165 Lincoln Avenue
Winter Park, FL 32789

April 2022: Florida's Highway Construction Materials

Last quarter, the rumblings of geopolitical conflict threatened to worsen material costs and availability, and this quarter, the threat became reality. Florida's Highway Construction Materials Sector saw producer bid prices increase another 10% on average, as both energy and non-energy prices continue to rise at a wild pace. Supply chain disruptions originally caused by COVID and natural disasters that were expected to begin to ease were exacerbated by the Ukraine War. Potential effects of various war scenarios are described on the next page. Structural issues in labor and transportation remain bottlenecks for nearly every industry. FDOT has already shown leadership in allowing flexibility on specs and cost indices, and continued monitoring of bottlenecks will be critical to delivering its work program. Other DOTs have mostly been less proactive; examples are included in the **Appendix**.



Asphalt prices continue on the upper bound of expectations – refinery economics are discouraging increased binder production, raising binder prices; rail service issues are disrupting aggregate deliveries; polymer prices are up and expected to continue to rise. The Ukraine War is intensifying many of these factors. Short of a recession, there is no expectation that HMA prices will moderate this year.

Concrete pricing in FDOT bids moderated somewhat, but this is not expected to continue. Cement production was improving until the conflict started in Ukraine. Now, industry experts are projecting declines in the coming year largely due to the war, and despite increased demand for concrete heavy infrastructure and resiliency projects. Renewed increases in reinforcing steel costs since March are likely to lead to higher bid prices next quarter. Meanwhile, fly ash shortages continue, with little relief in sight. As with HMA, short of a recession, there are not good reasons why FDOT's bid costs would not increase over the next year.

Steel availability was expected to improve in 2022 but this week (4/25/22), the World Bank reported that the Ukraine War and post-COVID adjustments are altering global patterns of trade, production, and consumption in ways that will keep prices at historically high levels through the end of 2024, prompting "the largest commodity shock we've experienced since the 1970s". Major disruptions of steel and metal products manufacturing and shipments from the Ukraine/Russia region are curtailing global supply – a situation expected to last for years. More details on the next page.

Aggregate supply for construction is sufficient but cannot move around the state due to rail service issues, trucking shortages driven by lack of truckers, and energy costs. Prices have risen on the upper bound of expectations, and continued demand for infrastructure and resilience projects will keep prices high – short of a recession.

Earthwork prices had eased in 2022, but this quarter rose above expectations, driven by parts and equipment shortages, trucking issues and energy costs. These issues are not expected to be solved in the near term, so earthworks costs may remain elevated throughout 2022.

What does the Ukraine War have to do with FDOT?

The conflict presents several high probability risks: damage to infrastructure (pipelines, ports) including cyberattacks, financial sanctions and buyers shifting away from Russian crude and products, export frictions (access to Letters of Credit, insurance, higher tanker rates, access to ports), bans on imports, and so forth. Any one of these risks can disrupt normal trade flows, causing needed construction materials to not be available when they are needed, or at much higher cost. Even though FDOT uses American-produced goods, (1) many construction processes still rely on components that include plastics, resins or other elements (e.g., neon for computer chips) that ultimately originate from far-flung supplies of specialized materials, and (2) other sectors that rely on these imports are now forced to find new sources from a reduced supply pool. The result is an increase in prices for everyone.

What we know:

Economic Impacts will vary with length of conflict

Russia & Ukraine supply 1/7 of ship captains, 12% of global steel

Russia supplies critical metals (aluminum, titanium, nickel)

Crude scenarios forecast prices peaking in 2022 or 2023, then plateau to marginally higher than current average pricing of about $85/barrel. Binder prices volatile but snap back to close to current pricing.	Crude scenarios peak above $120/barrel, great volatility as world stage adjusts to new supply regime. Long-term prices reset on trajectory about 15% higher than current pricing.	Crude at highest prices spurs production, supply increases, constrains maximum price. Russian supply shunned, sells at discount, further neutralizing price pressure.
Metals, plastics, neon (for computer chips), petroleum-based products will continue to have upward price pressure; resolution of conflict will not resolve supply issues; public opinion won't allow resumption of normal trade with Russia and Ukraine's damage will take time to restore.	Extended disruption of metals, plastics, parts. and related materials. Reconfigured supply chains result in higher costs. Inefficient U.S. Ports system expected to be helped somewhat by Bipartisan Infrastructure Law, partly offset some losses. Estimated 9% drag on global economy. Amplified inflation.	Reconstruction efforts to rebuild Ukraine are estimated to cost $200-500 billion, a scale of concentrated construction efforts double the Marshall Plan ($135 billion in today's dollars) and China's 2008 Olympics and Yangtze River Dam ($80 billion), which created global constraints on cement, steel and other construction materials.

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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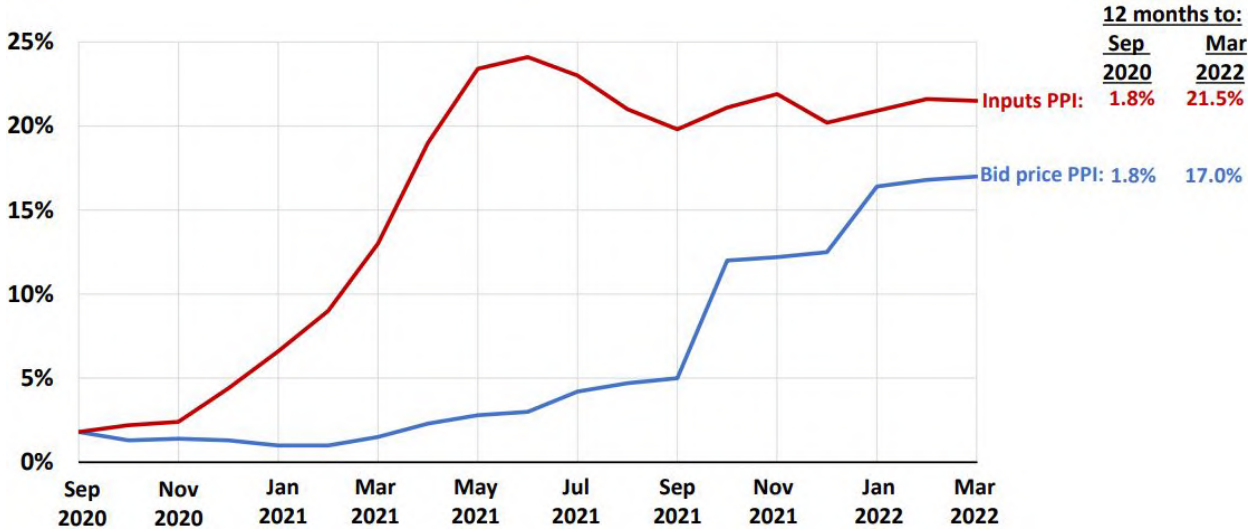
General Outlook for Highway Construction Materials

Input Costs vs. Bid Prices

The Associated General Contractors (AGC) reported that materials and services used in U.S. construction rose 22% year-over-year through March 2022. While bid prices were slowly increasing in 2021, the last months they have been catching up to inputs with increases of 17% year-over-year (**Figure 1**).

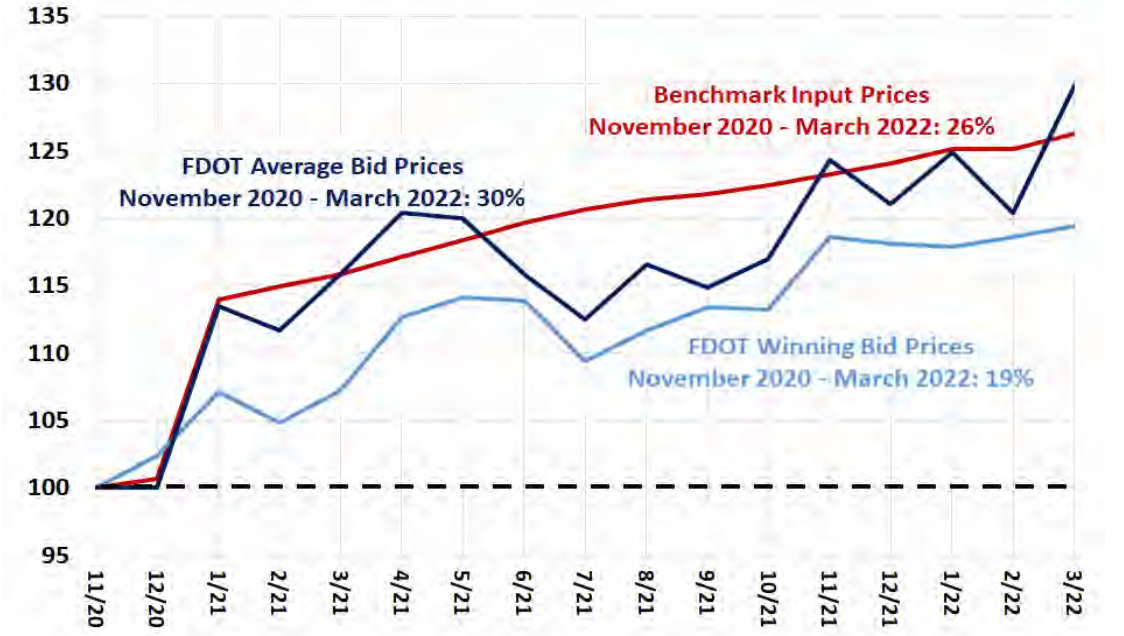
Figure 1. Change in U.S. Construction Input Costs and Bid Prices



Source: AGC.

In Florida, regional industry prices jumped in January of 2021 by about 15% compared to November 2020 levels (**Figure 2**). A year later, benchmark construction prices have risen another 11% to about 26% when comparing March 2022 to November 2020.

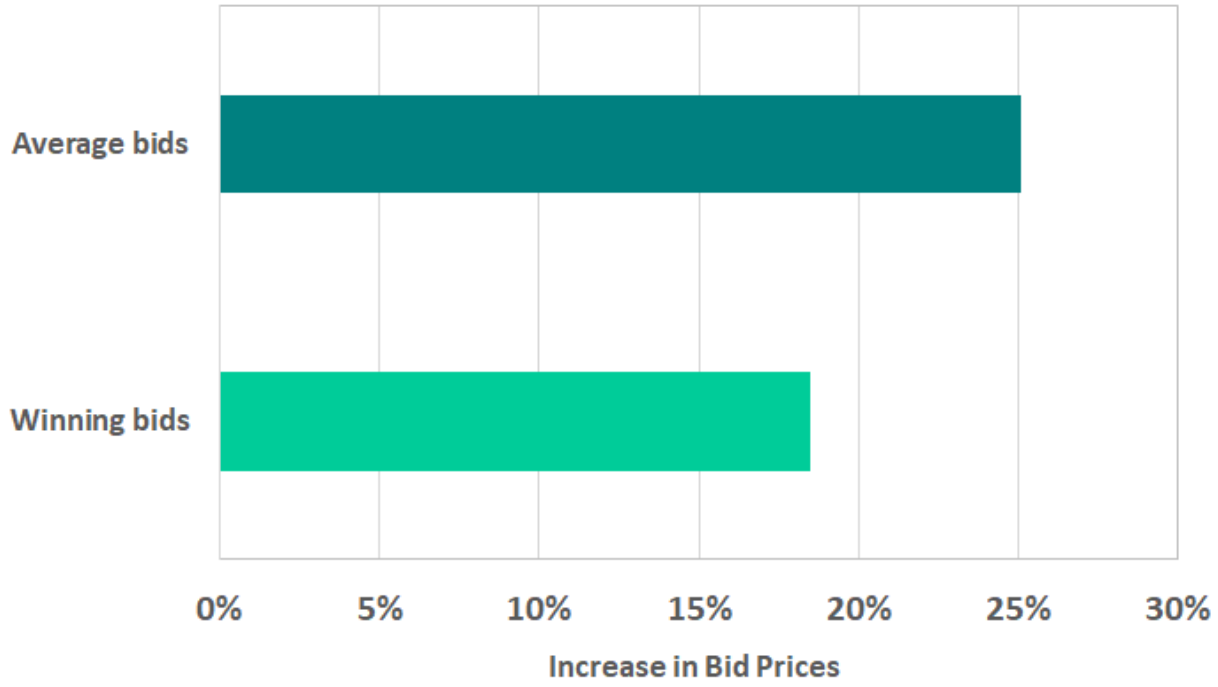
Figure 2. Florida Benchmark Input Costs vs FDOT Bid Prices



Source: Argus, ENR, FDOT, TBG Work Product.

For awarded (winning) FDOT bids, price increases across all materials have hovered 19% in March 2022 compared to November 2020. For all FDOT bids (meaning the average of all bids received), however, price increases have been much steeper on average, tracking closer to benchmark input costs. In March 2022, average bids across all materials have increased by 30% compared to November 2020. **Figure 3** shows a side-by-side comparison of winning and average bids across indexed material costs during the third quarter of fiscal year 2022. Monthly cost composition by material is provided in the **Appendix**.

Figure 3. FDOT Bid Increases, Jan. 2022 – Mar. 2022

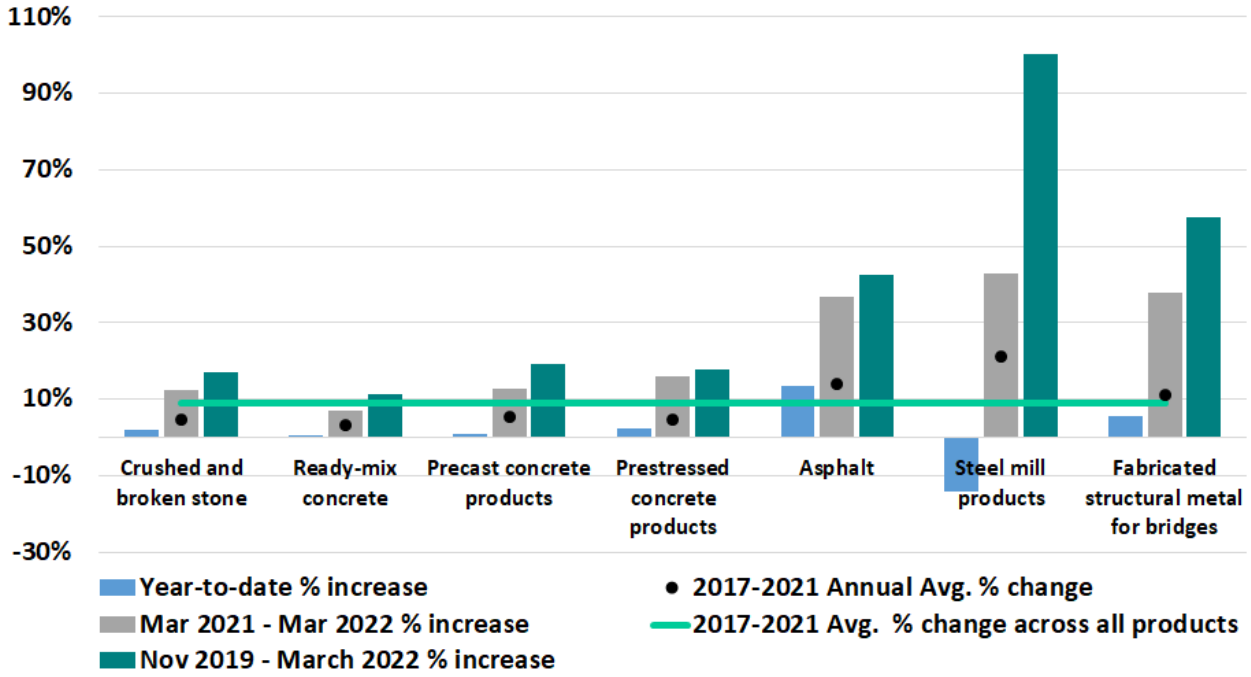


Source: Argus, ENR, FDOT, TBG Work Product.

The U.S. Bureau of Labor Statistics (BLS) releases monthly updates of the Producer Price Index (PPI) by commodity type. While the cost of steel mill products is still over 100% higher than November 2019 prices, costs have declined by 14% in the first three months of 2022. US Iron and steel scrap prices are $29.2% higher in March 2022 compared to the same month in 2021, while asphalt prices are 36.9% higher, year-over-year. Price increases for concrete products that may contain steel, such as prestressed items, are ranging between 12.9% to 15.9% higher compared to March 2021. Aggregate prices have crept up 12.4%.

Figure 4 illustrates select PPI in the U.S. for relevant commodity types, and the 5-year average for context.

Figure 4. U.S. Producer Price Index Percent Change by Commodity, March 2022



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

Funding

In April 2022, the White House released Buy America guidelines for projects that require funding from the recently passed infrastructure law. The guidelines indicate that "none of the funds made available for a Federal financial assistance program for infrastructure, including each deficient program, may be obligated for a project unless all of the iron, steel, manufactured products, and construction materials used in the project are produced in the United States."[1] Cement materials, aggregate materials and aggregate additives are exempt from this rule. Agencies could apply for a waiver based on public interest, material unavailability and if the project cost would increase by more than 25% due to the Buy America requirement.

The Florida legislature agreed on a record $112 billion budget for fiscal year 2022-23. The Department of Transportation has $12 billion allocated and around $11 billion would be for the work program. However, the governor has not signed it yet. The budget includes the one-month gas tax relief for October. The American Road & Transportation Builders Association (ARTBA) has tracked that four states have passed gas tax suspensions. They oppose these measures as they found that only 18% of a change in gas taxes are passed to consumers at pump stations.

Regulation

In recent weeks, there have been some regulatory changes that can affect the transportation construction industry:

- In November 2021, the EPA and Department of the Army signed their recent proposed rule to interpret 'waters of the United States' as it was defined prior to the 2015 Clean Water Act. The

[1] M-22-11 (whitehouse.gov)

ruling was published in the Federal Register on December 7, 2021. A Supreme Court judge recently revived the Navigable Waters Protection Rule that was repealed by the EPA and the Army Corps in 2021. However, the EPA and the Army Corps continue working on a new Water of the United States rule based on the pre-2015 regulations. The American Road & Transportation Builders Association (ARTBA) and the National Sand & Gravel Association (NSSGA) are asking the court to determine the extent of Federal authority under the Clean Water Act. These as well as ongoing court cases are expected to continue through 2023.

- The Council on Environmental Quality (CEQ) published the final Phase I rule that restores provisions in the National Environmental Policy Act (NEPA) that were changed in 2020. More changes are expected as the CEQ is working on Phase 2, which will include revisions to align with objectives highlighted in the January 2021 executive order "Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis."
- The House recently passed the Resilient America Act. Among other things, this bill would increase funding for infrastructure pre-disaster mitigation and water resource development projects. The National Ready Mixed Concrete Association reacted positively towards the bill. The bill now has to pass the Senate.

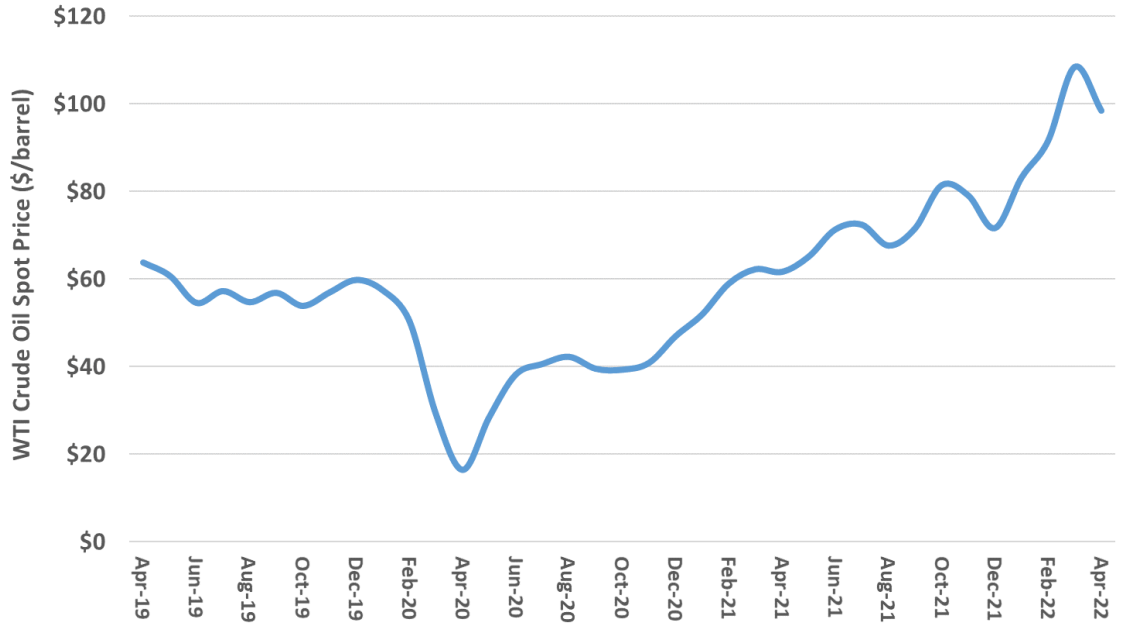
The following provides updates to initiatives of Florida's 2022 legislative session in Florida that were reported in the previous quarterly report:

- Construction Materials Mining – Bill introduced to limit ground vibrations and use of explosives for construction materials mining activities that are within 1 mile of residential areas. Bill failed to advance.
- Bill that would require government entities to require use of United States produced iron and steel for public works projects. This requirement would be exempt if there is not enough supply of the product or if the total costs increase by more than 20%. Bill failed to advance. However, as previously mentioned, material guidelines for projects under the infrastructure bill would need to meet similar requirements
- Inclusion of construction equipment owned by heavy equipment rental dealers under the term inventories for ad valorem taxes. Bill failed to advance.

Energy Prices

Monthly crude oil spot prices have averaged $99 per barrel in April 2022, a 60% increase from the same month in 2019 (**Figure 5**). Following declines in crude oil price futures in November and December, prices have gone back up by 37% since December with steep increases in February and March. The Ukraine War has raised concerns about the cost and supply of crude oil – Russia is the second largest crude exporter in the world. While the U.S. actually exports oil and is therefore not directly affected by disruption of Russian oil supply, oil is a global market. Reducing global supply increases the price of the remaining supply, and crude prices jumped immediately after the invasion of Ukraine.

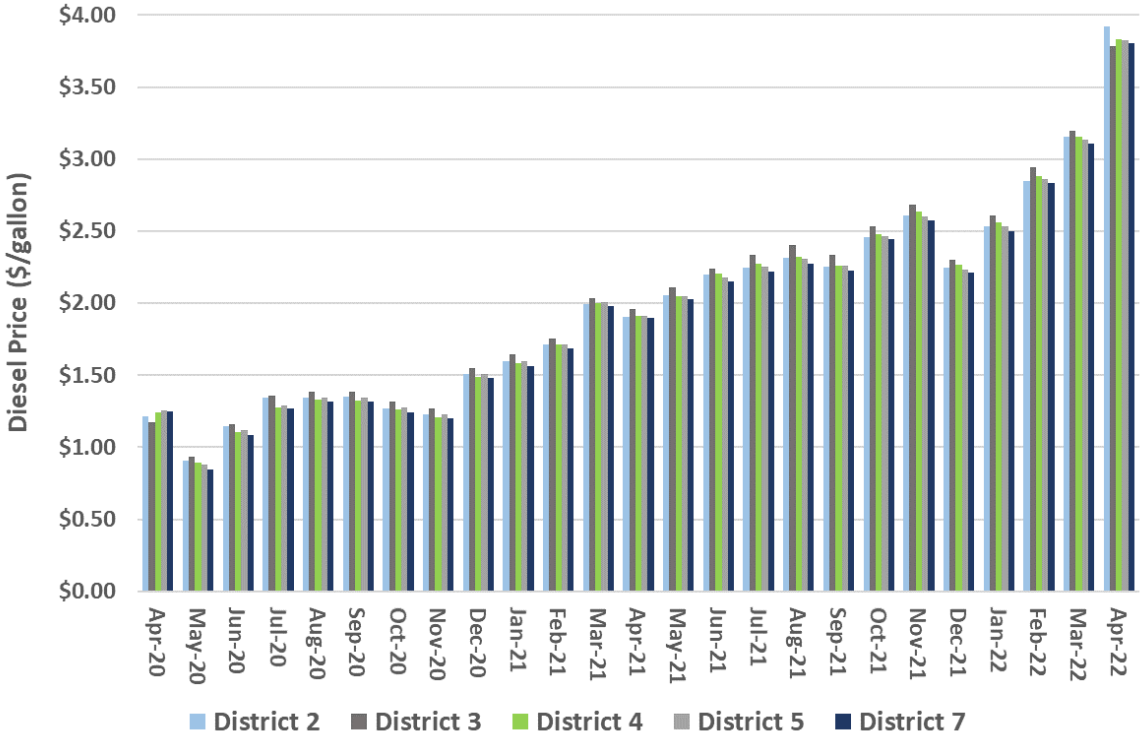
Figure 5. Monthly Crude Oil Price, Apr. 2019 to Apr. 2022



Source: EIA Average Monthly Spot Prices.

While diesel price quotes from suppliers at terminals around the state declined in December, prices have rapidly increased in 2022 in response to higher crude oil prices (**Figure 6**). Statewide, diesel prices now average $3.83 per gallon and all districts are above $3.5 per gallon.

Figure 6. Average Diesel Price by District, Apr. 2020 to Apr. 2022



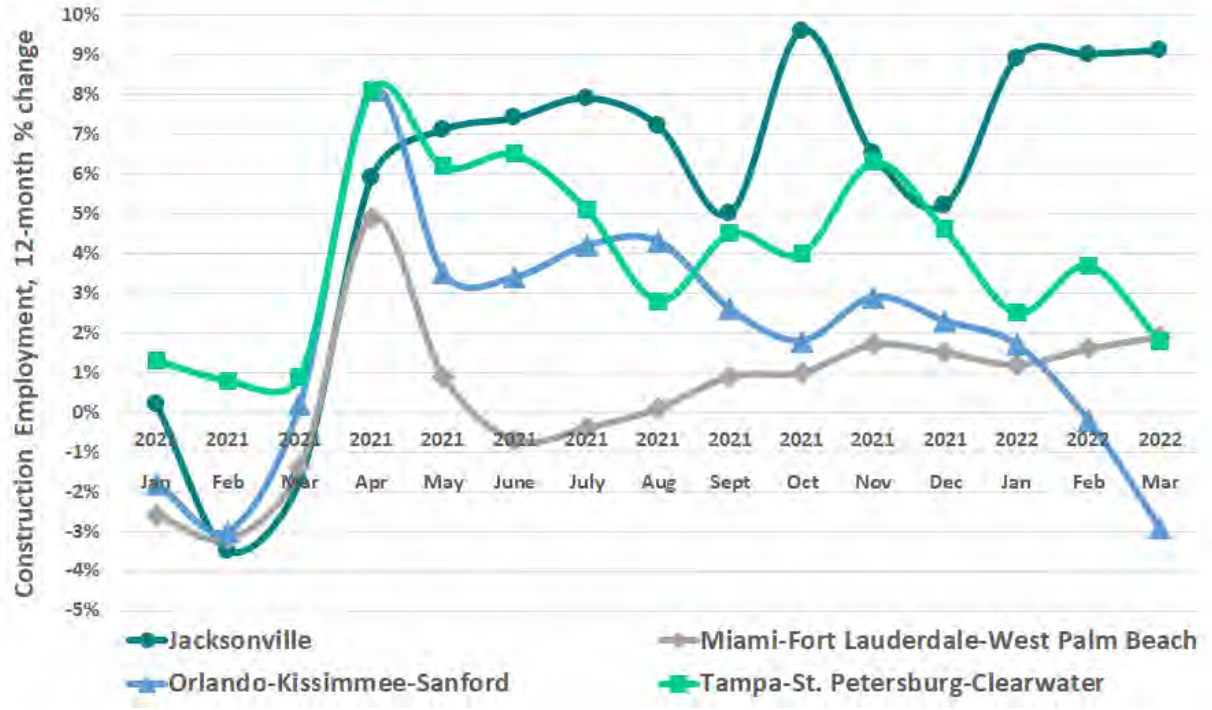
Source: FDOT, TBG Work Product (D1 and D6 terminals did not report data).

Background Data

Construction Employment

The U.S. added 431,000 jobs in March 2022, including more than 19,000 jobs in construction, returning nationwide construction employment to 2020 levels. Statewide construction employment increased 2.6% in March, year-over-year. At the metro level, construction employment growth has started to wane in recent months across the state, however (**Figure 7**). Jacksonville saw another massive 9.1% improvement in March, following a 9.0% increase in February. For the first time in a year, the Orlando metro area lost construction workers in February and March 2022. Construction employment in the Tampa and Miami metro areas rose by 1.8% and 1.9%, respectively, a much smaller bump than previous months.

Figure 7. Changes in Construction Employment in Major Florida Markets, Jan. 2021 – Mar. 2022

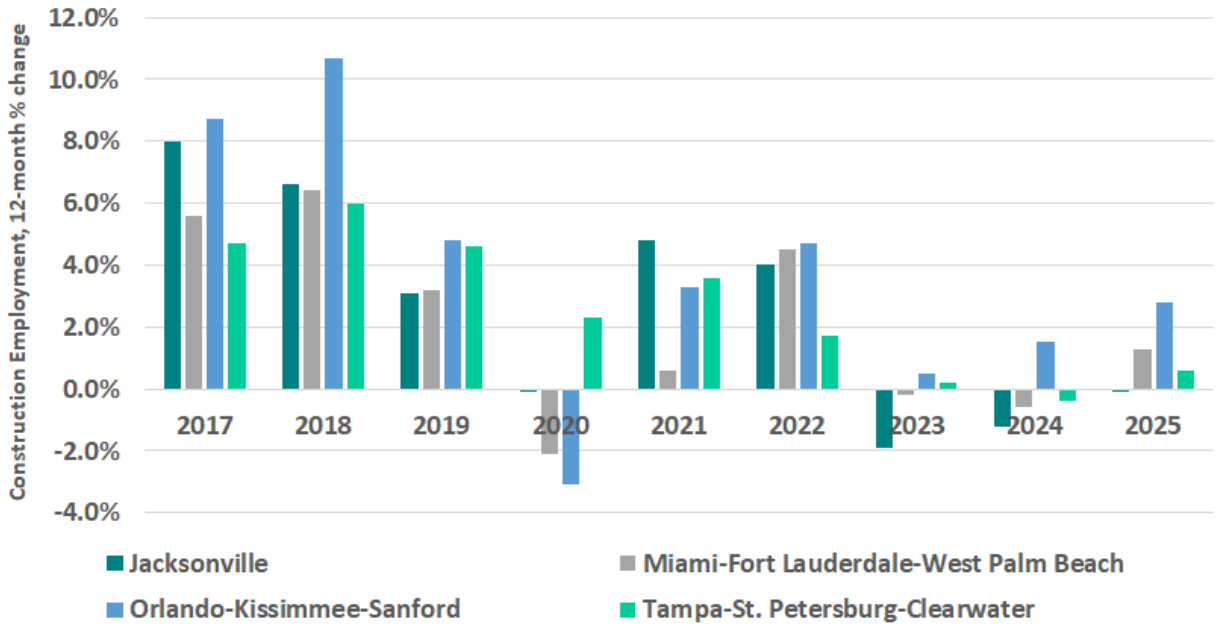


Source: US Bureau of Labor Statistics.

According to the Institute for Economic Forecasting's (IEF) Winter 2022 Florida & Metro Forecast, statewide construction employment is expected to average a growth rate of 2.5% in 2022, revised up from the previously reported drop of -1.1%. IEF expects construction employment growth to taper off in 2023 and remain low (less than 1%) through 2025 as current employment levels have returned to pre-pandemic levels. However, additional workers will be needed as increased funding for transportation and infrastructure projects boosts demand over the next few years.

At the metro level, IEF projects construction employment growth centered in central and south Florida throughout the forecast period (**Figure 8**).

Figure 8. Historical and Forecasted Changes in Employment in Major Florida Markets, 2017 - 2025



Source: UCF Institute for Economic Forecasting Winter 2022 Florida & Metro Forecast.

Inflation

In the first of a series of six planned interest rate hikes, the Federal Open Market Committee (FOMC) increased the baseline federal funds rate by 0.25 percentage points in March 2022 to a range of 0.25 to 0.5 percent. The move is intended to help fight rapid inflation in the US, which the committee projected at 4.3% in March 2022 (up from 2.6% in September 2021) (**Table 1**). In addition, the GDP growth projection for 2022 has fallen from 4% to 2.8%. It is notable that first quarter GDP shows a contraction for the U.S.; two quarters of contraction equal a recession. According to the updated projections, the Federal Reserve expects inflation to range between 2.0% to 5.5% over the next three years, with lower inflation expected in 2023 and 2024.

Table 1. FOMC Economic Projections, March 2022

Variable	Median				Range			
	2022	2023	2024	Long Run	2022	2023	2024	Long Run
Change in real GDP	2.8%	2.2%	2.0%	1.8%	2.1%-3.3%	2.0%-2.9%	1.5%-2.5%	1.6%-2.2%
September Projection	*4.0%*	*2.2%*	*2.0%*	*1.8%*	*3.2%-4.6%*	*1.8%-2.8%*	*1.7%-2.3%*	*1.6%-2.2%*
Unemployment Rate	3.5%	3.5%	3.6%	4.0%	3.1%-4.0%	3.1%-4.0%	3.1%-4.0%	3.5%-4.3%
September Projection	*3.5%*	*3.5%*	*3.5%*	*4.0%*	*3.0%-4.0%*	*2.8%-4.0%*	*3.1%-4.0%*	*3.5%-4.3%*
PCE Inflation[2]	4.3%	2.7%	2.3%	2.0%	3.7%-5.5%	2.2%-3.5%	2.0%-3.0%	2.0%
September Projection	*2.6%*	*2.3%*	*2.1%*	*2.0%*	*2.0%-3.2%*	*2.0%-2.5%*	*2.0%-2.2%*	*2.0%*
Core PCE inflation*	4.1%	2.6%	2.3%	3.9%-4.4%	2.0%-3.0%			
September Projection	*2.7%*	*2.3%*	*2.1%*	*2.5%-3.0%*	*2.0%-2.3%*			
Projected appropriate policy path								
Federal funds rate	1.9%	2.8%	2.8%	2.4%	1.4%-3.1%	2.1%-3.6%	2.1%-3.6%	2.0%-3.0%
September Projection	*0.9%*	*1.6%*	*2.1%*	*2.5%*	*0.4%-1.1%*	*1.1%-2.1%*	*1.9%-3.1%*	*2.0%-3.0%*

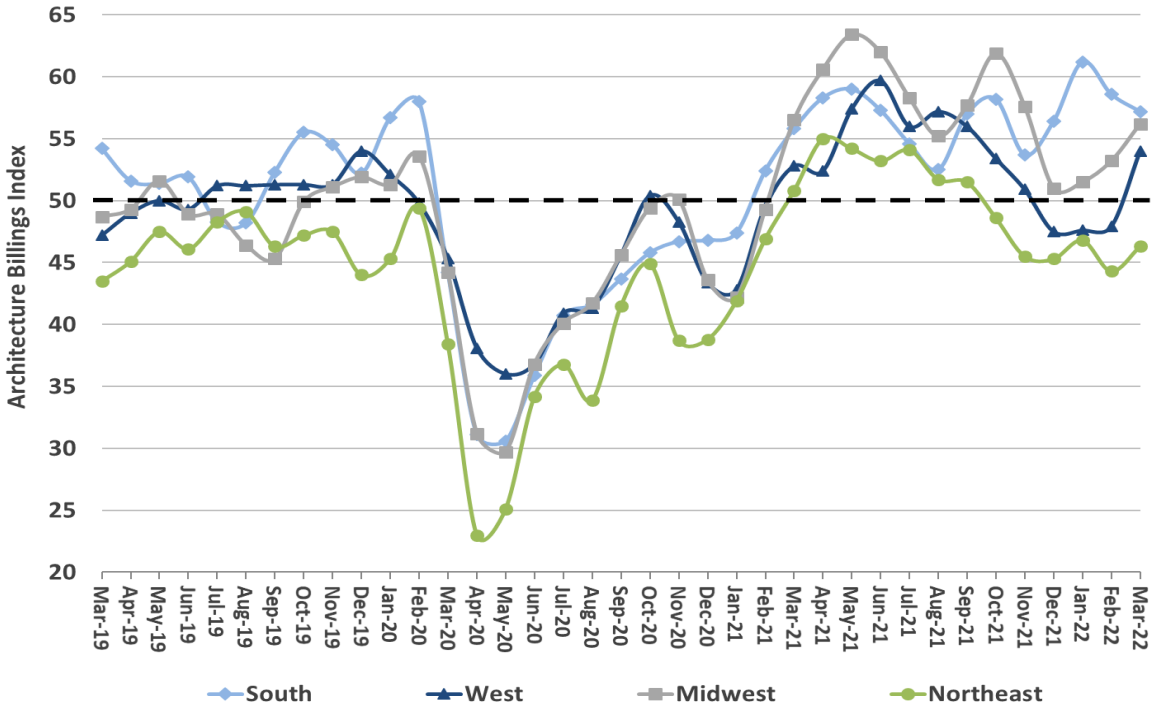
Source: Economic Projections were provided by Federal Reserve Board members and Federal Reserve Bank Presidents; federalreserve.gov.

[2] 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.

Production Capacity

The Architecture Billings Index (ABI)[3] is a lagging indicator (between 9 to 12 months) for nonresidential construction activity. Nationally, the ABI score was 58.0 in April, indicating that a majority of architecture firms were still seeing billings growth at their firms in the beginning of 2022. While the South region has the highest index, it is the only region that has dropped since January. (**Figure 9**). Continued cost increases and supply chain disruptions may be limiting economic recovery.

Figure 9. ABI Billings Index, Mar. 2019 – Mar. 2022



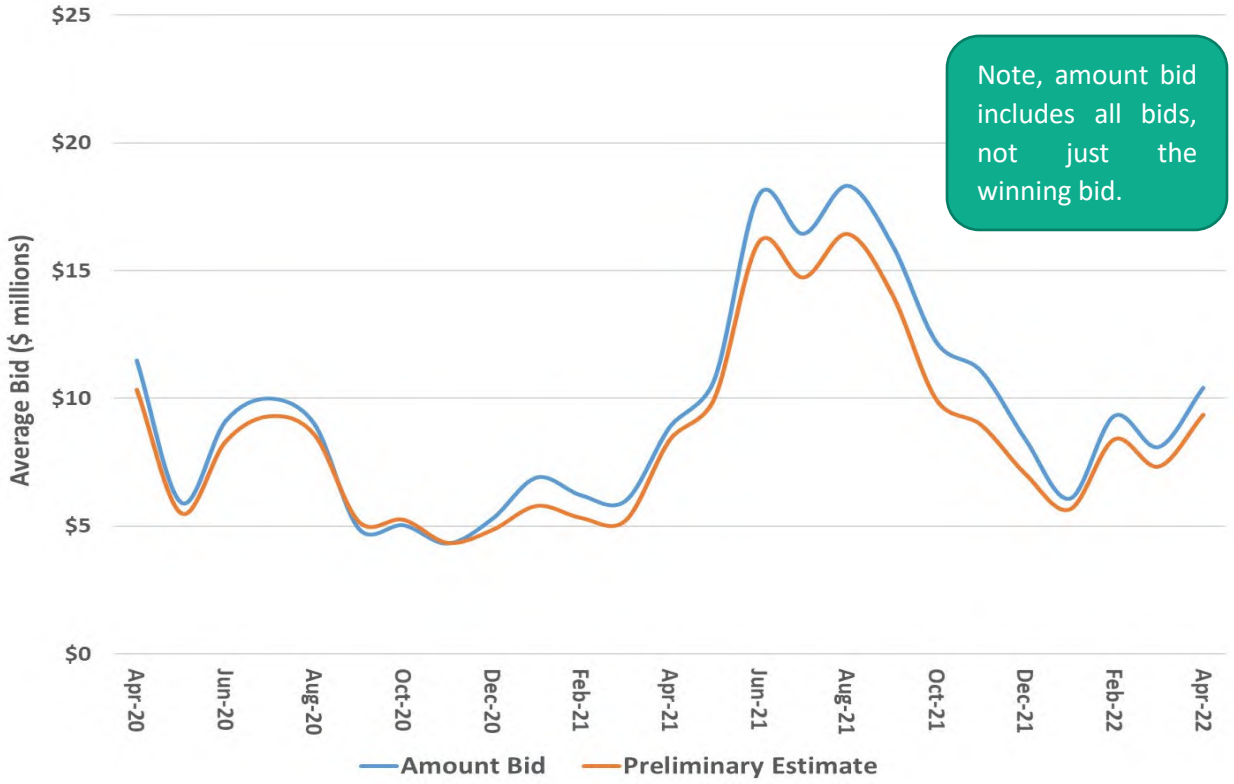
Source: American Institute of Architects, Architecture Billings Index.

Bid Data

In economic terms, the expected value is the average of all bids. In this analysis, the average of all bids, or the mean, is compared to the official preliminary estimate. In the first quarter of 2022, the average deviation of bids from the mean bid was 11% (similar to previous quarters), where District 3 had the largest deviations (17%) and District 2 the lowest (5%). Using a 3-month rolling average, the gap between the mean bid and the official preliminary estimate decreased in the first quarter of 2022 (10% higher than the official estimate) compared to the fourth quarter of 2021 (22% higher) and is at similar levels to the second and third quarter of 2021. (**Figure 10**). However, high value contracts appeared to be increasing the gap as excluding contracts $100 million or more from the analysis for the first quarter of 2022 show that the average of all bids were 5% higher instead of 10%.

[3] ABI Billings are considered a leading indicator, meaning that construction activity 6-12 months from now generally follows the current ABI billings activity. A score below 50 indicates declining firm billings.

Figure 10. Average Bid vs. Preliminary Estimate. 3-month Rolling Average



Source: FDOT; TBG Work Product.

Asphalt

Summary

- Binder prices have increased across all districts in 2022 with higher crude oil prices and higher production costs. These issues are not expected to ease in the short-term.
- Refining economics continue discouraging asphalt production including increased competition from other sectors for oil products, and the increased value of asphalt as a feedstock. These limit asphalt supply from the Gulf coast.
- Even though polymer prices declined in the fourth quarter of 2021, they are still significantly higher year-over-year. Publicly traded companies expect further increases for 2022. This contributes to increased asphalt costs.

FDOT Impacts

- Updated bid data shows that FDOT HMA prices are 6.8% higher through March 2022, which is a higher estimate from the previous quarter. Asphalt prices are still running over $120 per ton in 2022 amid crude oil price fluctuations and other input cost burdens.
- Supply is sufficient to meet demand, but severe rail issues are impacting aggregate availability, and current global market conditions could lead to tighter supply of binder.

Refining Activity

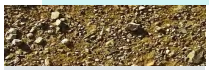
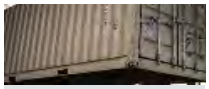
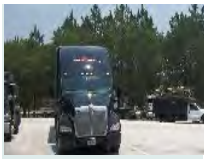
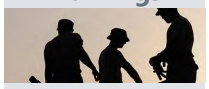
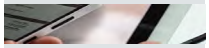
Asphalt refining is a concern as refining capacity decreased last year and while during the past week's utilization has returned to the 95% range, the current crude oil market disincentives asphalt production. The value of asphalt as a feedstock continues being higher, which limits supply. Additionally, it has been reported that some Gulf refiners used Russian imports as feedstock and while the amount is not significant one of the alternatives is increasing the use of asphalt as feedstock. Production costs will continue to be affected by higher crude oil prices and it is expected that refineries increase maintenance spending throughout 2022 as a result of these being postponed the past couple years. All these factors plus the start of the northern paving season, could limit asphalt supply.

IBISWorld estimates that revenues in the petroleum refining industry grew 42% in 2021 and is expected to grow 12% in 2022 due to higher energy needs, higher demand and higher crude oil prices. Of this, they estimate that 10% are from other products (which include products like asphalt and petrochemicals). The share of other products has continued to decrease the past 5 years. Beyond 2023 they expect annual revenue losses of 0.8%.

Supply Chain Variables for Asphalt Pavement Materials

Table 2 provides the current status of selected variables of interest that affect the asphalt supply chain.

Table 2. Supply Chain Summary: Asphalt Materials

 Aggregate	Sources for HMA are dominated by Georgia granite shipments and rock from South Florida Lake Belt mining area. Several HMA suppliers are vertically integrated to better manage their aggregate supply. There are no reports of issues with aggregate availability – but delivery is a separate issue – see Rail below. Florida's production growth continued in 2021 with crushed stone increasing 3% and construction aggregates 1%.	=
 Refinery Capacity	Refinery utilization in the Gulf Coast has recovered in the last weeks with utilization being between 90 and 95% in March and April. Production costs continue to be affected by higher crude oil prices, geopolitical factors and it is expected that refineries increase maintenance spending throughout 2022 as a result of these being postponed the past couple years. The crude oil market is expected to continue being volatile in the months ahead. No deal has been reached with Iran or Venezuela to repeal sanctions	↑
 Asphalt Binder	Unmodified (PG 67 & lower) asphalt binder prices increased 24% in 2022 and 33% year-over-year. Crude oil prices have increased and production costs have followed. Additionally, Argus reports that current market conditions continue incentivizing use as feedstock rather than to produce asphalt. Competition for material is expected to increase as the northern paving season starts and supply is tighter.	↑
 Polymers	With very few suppliers, polymers are a source of vulnerability. Earning releases continue showed a decline in Q4 prices compared to Q3, but they were significantly higher in 2021 and year-over-year across different chemicals segments. However, demand continues to be high and the recent volatility in the crude oil market can negatively impact pricing, availability and lead times as refiners adjust production. After 6 years of construction, Shell expects that the new petrochemical facility in Pennsylvania to be ready by year end. The facility will have an annual capacity of 1.6 million tons. Additional, reports indicate that It is likely that Alpek, Indorama Ventures and Far Eastern New Century will decide in May to go ahead with a 1.1 million tons per year polyester plant in Texas. On the other side, LyondellBasell announced that it will either sell or stop operations in its Houston refinery by 2024.	↑
 Imports	Cost of imports have risen and with U.S. sanctions against other countries still in place, there are limited import options. Data from the U.S. International Trade Commission shows almost 5,000 tons imported from Colombia and 459 tons from Venezuela in 2022. While reports indicate that imports from Europe and the Mediterranean are mostly unviable, tracking data showed a recent cargo from Turkey to Port Everglades. In general, prices are expected to increase.	↑
 Shipping	Marine fuel oils have increased and shipping rates continue being high, which have constrained imports from Europe and the Mediterranean. The Ukraine war has also disrupted supply routes. Shipping issues are not expected to ease in the short run.	↑
 Rail	More shippers have used rail rather than trucking to stockpile inventories due to a tight trucking market. In 2021, CSX shipments of asphalt products rose 9% vs. 2020 (revenues rose 6%). Fuel costs increased 51% in 2021 and on-time arrivals have followed the trend from previous reports at 66% (down from 77% in 2020). An Urgent Hearing into rail disruptions for aggregate shipment was held April 25-26 at the Surface Transportation Board, as extreme service issues have disrupted supply chains.	↑
 Trucking	Asphalt suppliers may continue to face driver shortages as demand for drivers from various industries continue to be high. Rapidly increasing diesel prices could remain high for some time. Bank of America and Freightwaves are cautioning that freight trucking volumes have recently decreased and spot rates, excluding fuel surcharges, have also decreased. Demand for freight trucking has decreased as shippers have to use excess inventory and companies truck fleet have increased. Even though competition is still high, this could potentially free up drivers for specialized trucking in the construction industry. According to the American Association of State Highway and Transportation Officials (AASHTO), more than 100 employers launched Registered Apprenticeship programs in 90 days, CDL licenses issued in January and February 2022 increased 112% compared to 2021.	↑
 Pavement Markings	Due to weather-related closures in Texas and Louisiana during February 2021 and plant closures in Mississippi and other states from Hurricane Ida in the second half of 2021, a nationwide shortage of paint, resin, and glass has persisted over the last twelve months and led to higher prices and tighter supply. Pavement Markings and other plastics-based/petroleum-based ancillary products are vulnerable to current supply chain issues and crude oil markets.	↑
 Labor	Skilled labor is an ongoing concern for asphalt plant operators and additional workers will be needed as increased funding for transportation and infrastructure projects boosts demand over the next few years. Statewide construction employment increased 2.6% in March, year-over-year. At the metro level, construction employment growth has started to wane in recent months across the state, however. Construction employment is expected to grow in 2022 and then grow by less than 1% through 2025.	↑
 Competition	According to FDOT's approved producer list there were two plants have been inactivated in 2022 (in Leesburg and Spring Hill) and a new plant in Panama City has been approved for crushed RAP. This is followed after two plants were approved in 2021. One in Lake Wales and another in Delray Beach. Additional plants would increase competition for FDOTs projects and could lower costs.	↓

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

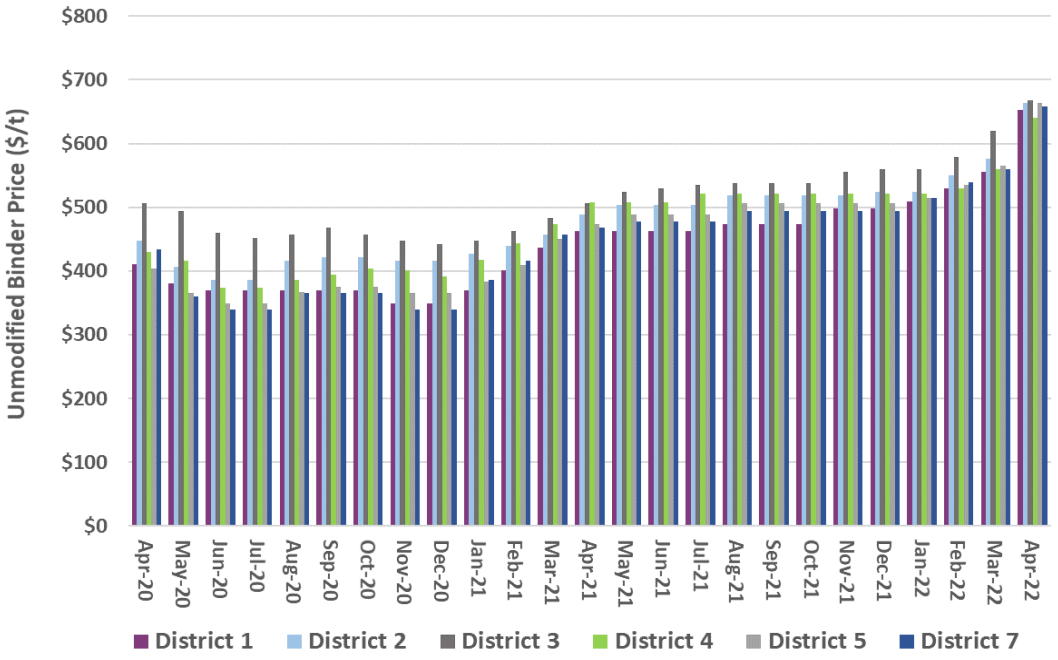
Asphalt Binder

With the Russian invasion to Ukraine, many countries have advocated for an increase crude oil production to mitigate higher prices. However, OPEC+ countries have not deviated from their scheduled monthly production increases as they argue that recent price increases are due to geopolitical factors rather than supply-demand issues. As such the group will continue increasing monthly production by 432,000 bpd. Additionally, countries have been struggling to meet their agreed quotas as spare capacity reduces and Argus estimates that they already are close to one million bpd short from their target.

Until the Great Recession, asphalt binder prices were closely correlated with crude oil prices. The deviation between asphalt binder and crude continues to widen, with binder price increases outpacing oil prices. Increases in rack binder prices[4] have been similar around the state in 2022, all increasing to a midpoint price above $600 per ton. Comparing to the first week of January, rack prices are up 26% in Miami and Tampa, 25% in Panama City and 23% in Jacksonville. Through April 2022, statewide PG-67 prices have increased 33% to $642 per ton, year-over-year and 24% year to date. Similarly, PG-76 binder prices increased 30% year-over-year to $757 per ton.

Where available, the average prices for unmodified (**Figure 11**) and modified (**Figure 12**) 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 are up between 26% to 41% in all FDOT districts year-over-year and all but District (which is already the highest) had at least a 15% increase between April and March 2022. Modified binder prices are also up between 26% to 34% year-over-year.

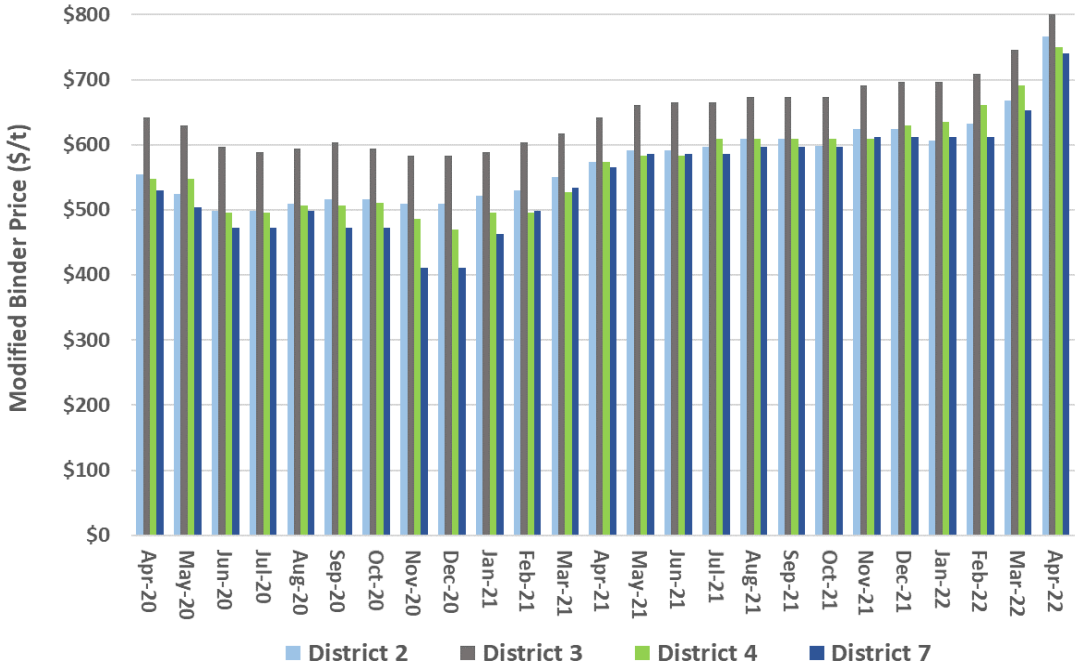
Figure 11. Unmodified Binder Price by District, Apr. 2020 to Apr. 2022



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

[4] 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.

Figure 12. Modified Binder Price by District, Apr. 2020 to Apr. 2022



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

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. After rising 3.6% in fiscal year 2021, asphalt prices have increased by a further 6.8% in fiscal year 2022 through March (**Table 3**). Besides lingering pandemic supply chain disruptions, the war in Ukraine has caused stress on key markets that affect asphalt costs like crude oil.

Table 3. HMA Price, 2018 - 2022

Fiscal Year	2018	2019	2020	2021	2022*
Price HMA, $/t	$104.01	$109.63	$109.83	$113.81	$121.50
Percent Change, y-o-y	2.2%	5.4%	0.2%	3.6%	6.8%

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

Forecast

HMA prices are projected in **Table 4** 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.

According to both the Office of Economic and Demographic Research and the Institute for Economic Forecasting, the outlook for Florida gross state product (GSP), an important factor in FDOT HMA costs, could hit 9% growth by the close of 2022. Updated forecasts for the third quarter estimate Florida GSP growth at about 9.2% in 2022 and between 2.0% to 5.5% over the rest of the five-year work program period, with lower growth in later years. It should be noted that this week (4/25/22), national GDP was reported as having actually contracted during the quarter. A slowdown in Florida housing starts is still

projected for 2022 and beyond, potentially freeing up resources for other industries like highway construction.

With updated input variable forecasts, the best estimate of asphalt pricing shows a 6.3% change in costs between 2021 and 2022 (compared to 7.5% in the previous quarter), ending at about $142 per ton by 2026. The trajectory of the price projection is about 2% lower than the previous report. The upper bound is calculated to hit $158 per ton by 2026 because of revisions in GSP, housing, crude oil projections, and construction employment growth. The lower bound reflects continued disruptions to the macro economy leading to a potential recession (**Figure 13**).

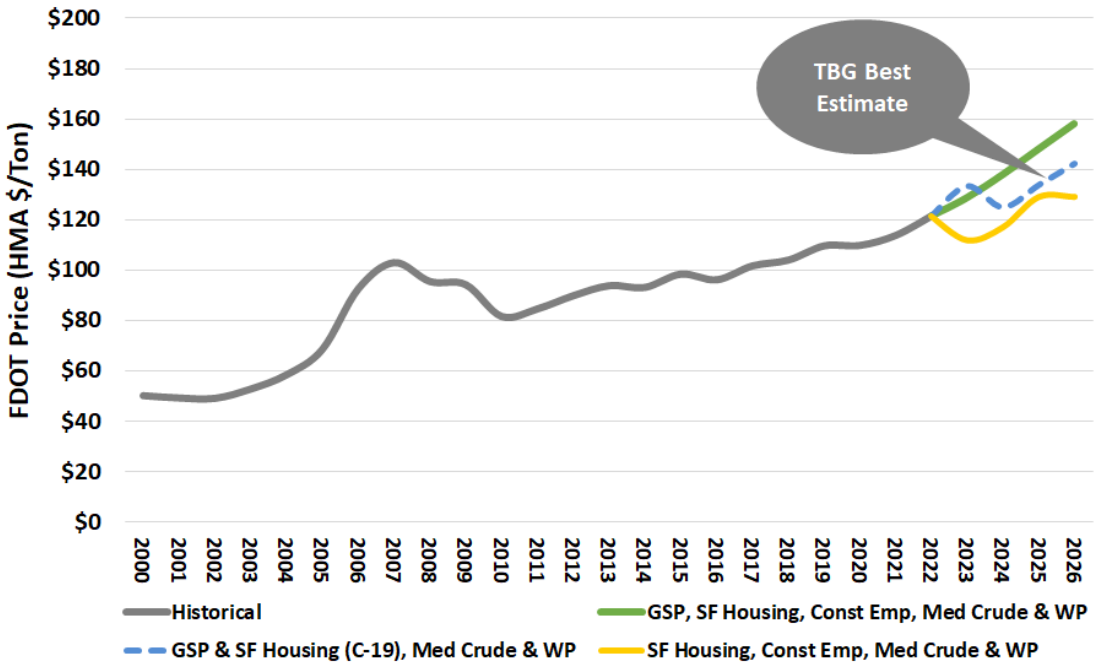
Table 4. HMA Price Forecast Results, 2022 - 2026

Fiscal Year	2022	2023	2024	2025	2026
Price HMA, $/Tons	$121.50	$133.50	$125.15	$133.95	$142.43
Annual Percent Change	6.8%	9.9%	-6.3%	7.0%	6.3%

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

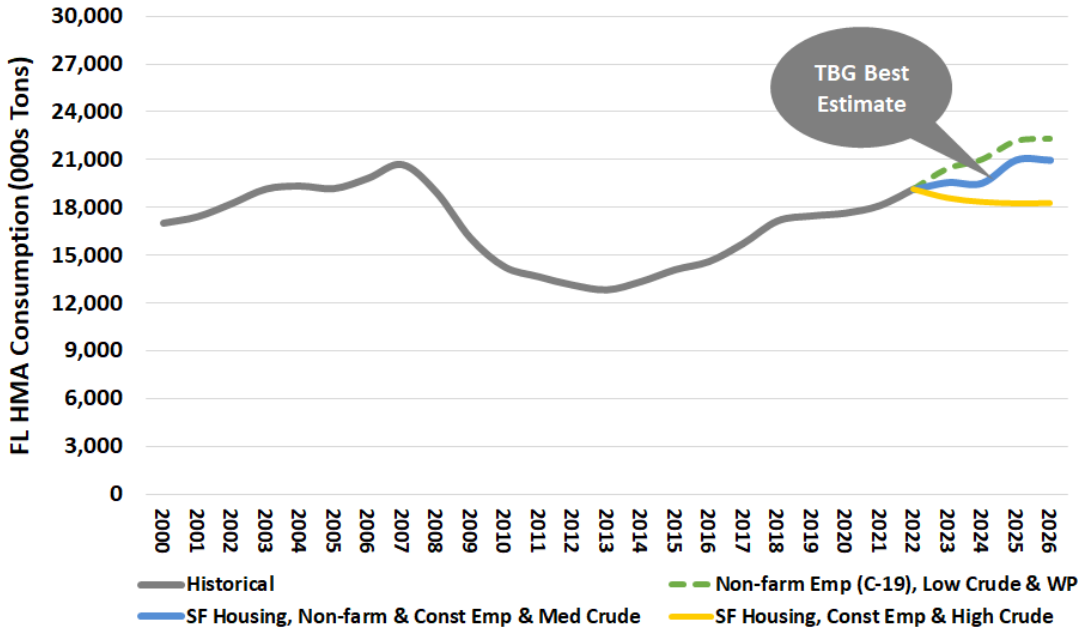
Figure 14 provides a forecast of total Florida HMA consumption over the work program given current data. The best estimate is based on current economic outlooks, which show declines in single family housing starts, improvements in overall non-farm and construction employment, and medium crude pricing. The upper bound offsets slowdowns in the housing market with increased demand from other sectors, such as resiliency work. If crude oil and other markets continue to be unstable, the trajectory would likely shift downward, following the lower bound.

Figure 13. HMA Price, 2022 Forecast



Source: TBG calculated from data provided by FDOT Estimates Office, various industry sources. Historical pricing reflects actual bids and not adjusted for time. (Variable descriptions available in the **Appendix**.)

Figure 14. HMA Consumption, 2022 Forecast



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

Concrete

Summary

- Cement consumption is growth was looking up in 2022 and beyond until the conflict started in Ukraine. Now, industry expects are projecting declines in 2023 despite increased demand for concrete heavy infrastructure and resiliency projects.
- Although cement producers are operating at a high capacity utilization rate, driver shortages and skilled labor recruitment remain top issues for concrete suppliers.

FDOT Impacts

- Renewed increases in reinforcing steel costs since March began may lead to higher bid prices from concrete heavy projects.
- With Boral exiting the US fly ash market, a long-term solution for spot shortages has become less likely in the short term.
- The Federal Reserve's rate hikes began this quarter, and despite the increases being small, they have already made noticeable impacts to mortgage prices. This could affect Florida construction.

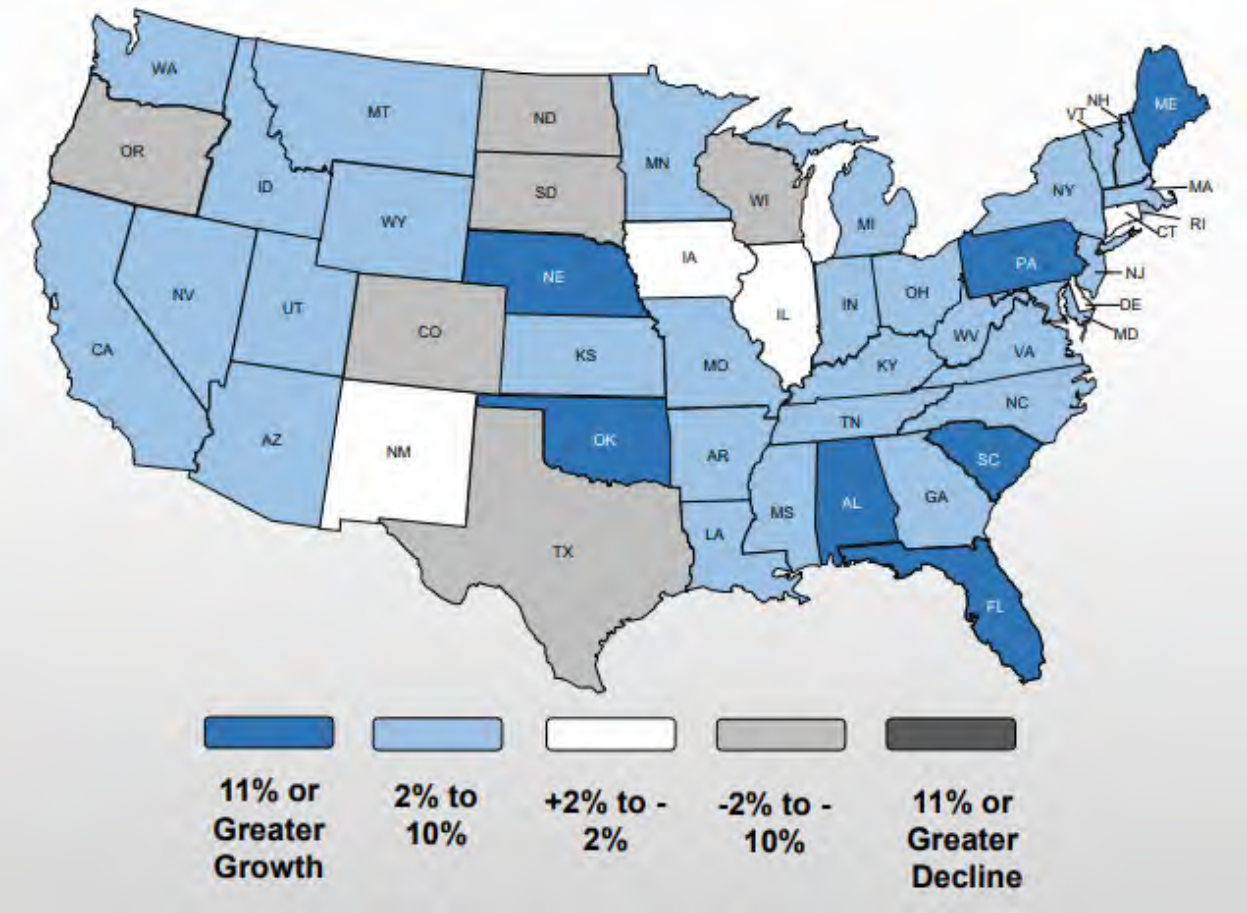
General Trends

According to PCA, the industry will continue to see a release of pent up demand due to declines in pandemic cases since the last quarter. Reduction in mask mandates have also contributed to an increase in demand as the US transitions to a "new normal," supporting stronger activity as the economy opens up. Labor force participation is projected to grow due to greater availability of workers, though a shortage of skilled labor is still an issue. In 2021, the Portland Cement Association (PCA) estimated that cement consumption rose by more than 11% in Florida, indicating strong demand in the Sunshine State (**Figure 15**). Nationwide, cement consumption grew by 4%.

An unexpected turn that has been affecting cement prices and consumption has been the Russia-Ukraine War, in which the global supply chain has taken a hit, impairing supply-chain improvements. Production and distribution of many raw materials have been depressed as a result, further disrupting the global supply chain. Due to this new contributing factor, PCA reports several potential forecast scenarios in which cement consumption growth expands or slows down through 2026 (**Figure 16**).

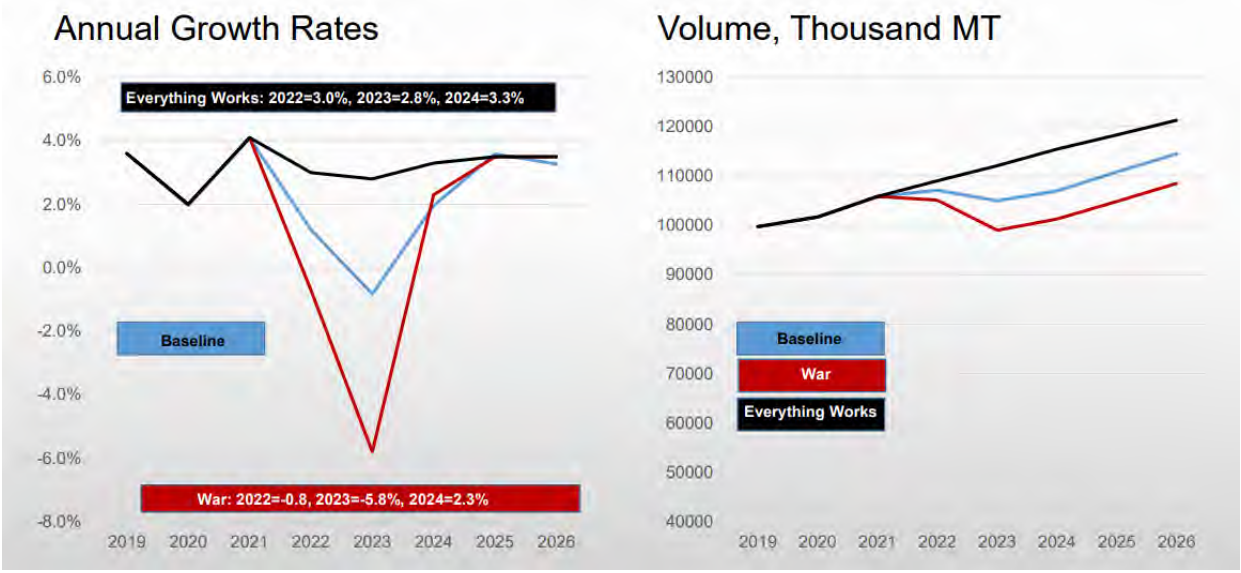
If the Russia invasion is contained to Ukraine, baseline cement consumption is expected to decline in 2023 by about -1% before rebounding to just under 4% by 2026. In the worst-case war scenario, PCA forecasts consumption to decline by -5.8% in 2023. The unlikely third scenario, which includes a quick diplomatic solution in Ukraine and drastically reduced COVID numbers, shows little change to cement consumption through 2026. Production is similarly projected by PCA, with declines expected due to higher inflation and lower global growth.

Figure 15. Change in Cement Consumption by State, 2021



Source: Portland Cement Association.

Figure 16. Portland Cement Association's Spring 2022 Forecast

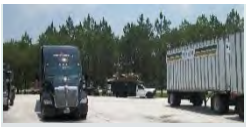


Source: Portland Cement Association.

Supply Chain Variables for Concrete Materials

Table 5 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.

Table 5. Structural Concrete Supply Chain Variables & Current Status

 Cement	Demand continues to grow as domestic construction activity is expected to remain elevated due to pandemic recovery. Cement prices are experiencing pressure due to increasing sand and water scarcity concerns. Publicly traded companies have stated that demand is exceeding the manufacturing process.	↑
 Aggregate	Aggregate supply is sufficient and Florida production of crushed stone increased 3% in 2021. Aggregate prices have increased due to supply chain issues such as driver shortages, rail disruption and parts shortages for equipment, increasing fuel costs and producers reporting increment price increases to cover inflation. Logistics issues are expected to continue.	↑
 Fly Ash	Titan America's expansion of the Port Tampa Bay Terminal is underway and is still expected to be completed at the start of 2023. Fly ash supplies are constrained and will continue to be.	↑
 Rail	Depending on location in the state, rail is the primary transportation for aggregates. In 2021, CSX shipments of asphalt products rose 7% vs. 2020 (revenues rose 13%), but decline 3% with respect to 2019. Fuel costs increased 51% in 2021 and on-time arrivals have followed the trend from previous reports at 66% (down from 77% in 2020). There have been extensive service issues reported with rail services from different industries.	↑
 Truck	Publicly traded companies continue to report that trucking availability is limited and transport costs are rising. Producers continue to report a lack of mixer drivers and other CDL drivers to meet demand.	↑
 Labor	Publicly traded companies continue to report increasing costs for labor. PCA reports that labor force participation is expected to increase with the decrease in pandemic cases and loosening of mask mandates.	↑
 Competition	Cement producers are still operating at high utilization levels. On November 2021, New South Construction Supply (Headquartered in South Carolina) acquired Increte of North Florida (located in Jacksonville) to enter the Florida market. They supply concrete construction materials.	=

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

Fly Ash

With the unification of Eco Material Technologies and Australia's Boral Ltd.'s North American fly ash business, the $755 million deal has been cited by officials to enable a greater positive impact on the environment by repurposing harmful waste into carbon-reducing products. Repurposing initiatives like the Eco Material Technologies acquisition are paving the way for the fly ash market to grow. Eco Material is one of the leading producers of sustainable cement in the country and with the increase of their practices; it opens more job opportunities for potential employees in the industry. However, this is a longer-term play, and not expected to resolve Florida's fly ash shortages in the short run.

Titan America's investment into Port Tampa Bay's terminal is still underway with an expected early 2023 finish time. This hefty investment into the Florida port will increase capacity for a greater amount of bulk and cementitious materials including fly ash.

Current Pricing

According to FDOT lettings data, concrete prices reached record levels in fiscal year 2021, but have since declined by 16.5% through March 2022 (**Table 6**). However, reinforcing steel costs, which affect some concrete products, may be further cause for concern through 2023. Although reinforcing steel costs had begun to decline before the invasion of Ukraine, prices have since skyrocketed. Transportation and distribution issues are keeping cement prices high as well.

Table 6. Concrete Price, 2017 - 2022

Fiscal Year	2017	2018	2019	2020	2021	2022*
Price Concrete, $/CY	$608.14	$708.11	$746.88	$722.69	$926.47	$773.66
Annual Percent Change	-8%	16%	5%	-3%	28%	-16.5%

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

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. In addition to the recent cost increases for crude oil and diesel fuel, supply chain disruptions centered in the transportation industry have persisted this quarter, making it difficult to truck or rail aggregate, cement, and other inputs across the state. As a result, updated forecast puts concrete prices between $733 to $907 per cubic yard through 2026. **Table 7** provides the updated forecast average price for concrete.

The best estimate currently considers a scenario with increased GSP and construction employment, medium crude costs, and work program funding. The lower bound scenario indicates reduced demand over the five-year work program along with lower input costs. The trajectory of the price projection could be shifted toward the upper bound if high crude and cement prices are sustained through the five-year work program (**Figure 17**).

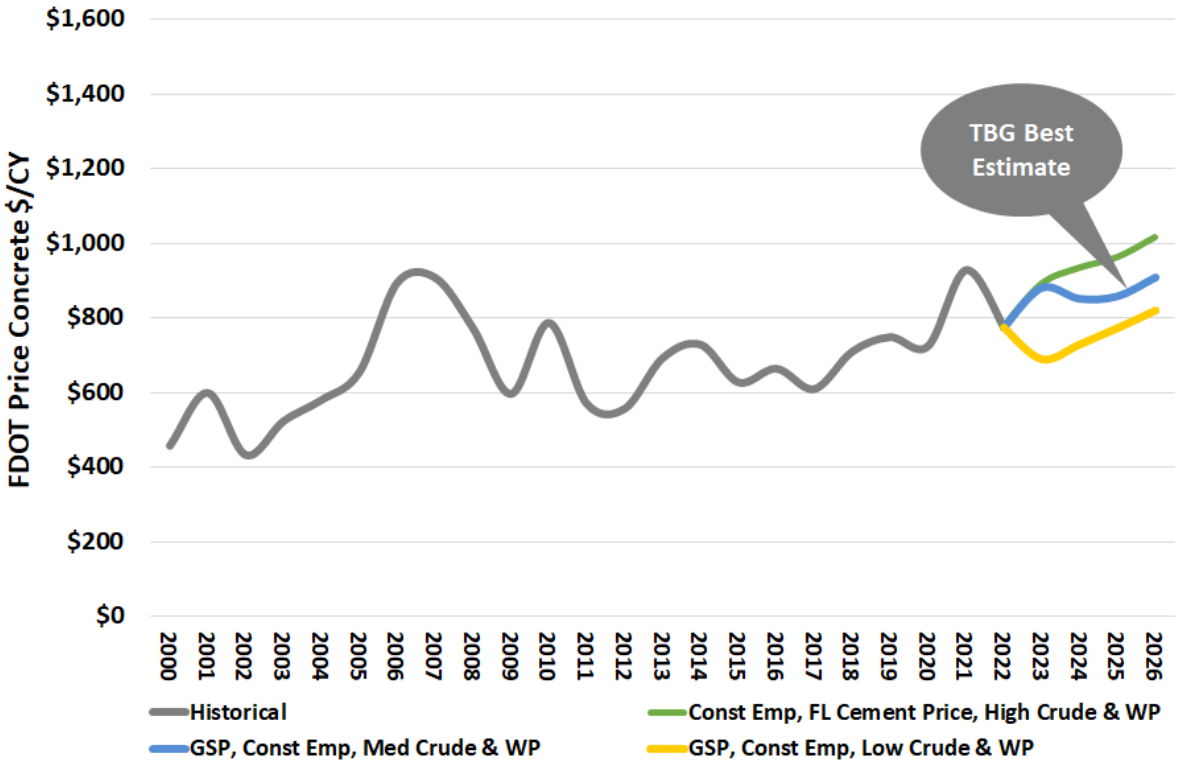
Table 7. Concrete Price Forecast Results, 2022 - 2026

Fiscal Year	2022	2023	2024	2025	2026
Price Concrete, $/CY	$733.66	$879.77	$850.55	$857.49	$907.24
Annual Percent Change	-16%	14%	-3%	1%	6%

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

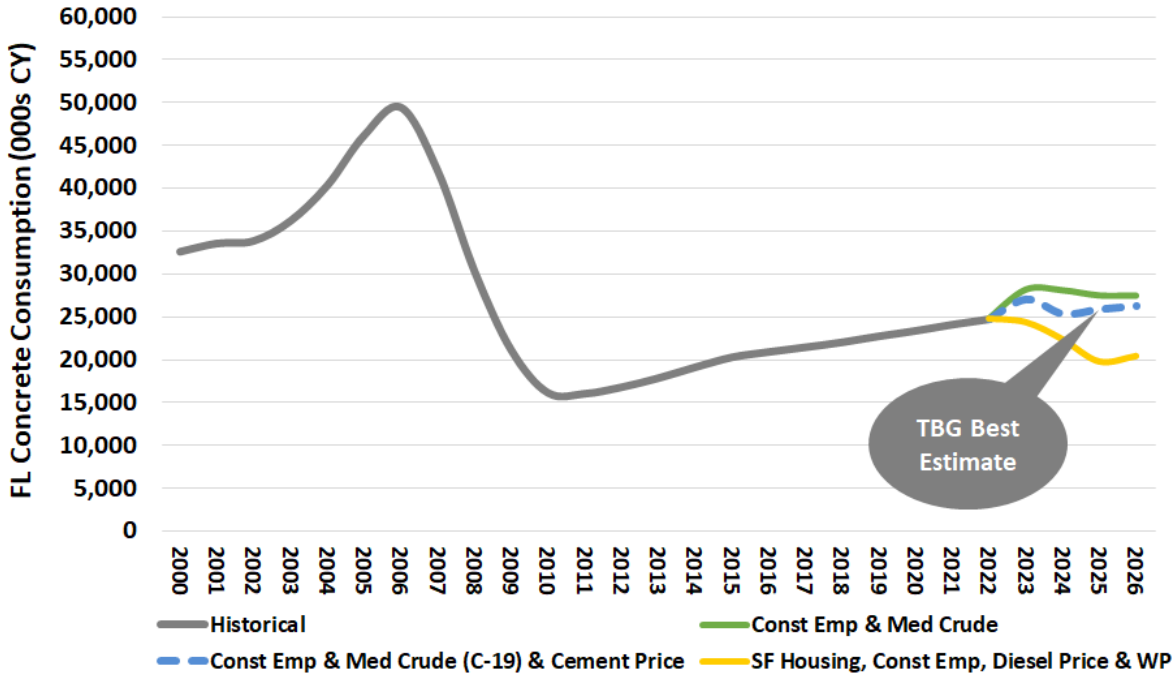
Figure 18 shows the output of several quantity models forecasting statewide consumption of concrete. The scenario identified as the best estimate shows a bump in concrete consumption due to pent-up demand. The projection includes rising but still pandemic constrained construction employment and crude oil pricing, as well as cement prices and work program funding. Increased resiliency and federal infrastructure funding over the next couple years is expected to sustain concrete consumption, however, it is possible that the conflict in Ukraine may put divert some resources away from highway construction.

Figure 17. Concrete Price, 2022 Forecast



Source: TBG calculated from data provided by FDOT Estimates Office, various industry sources. Historical pricing reflects actual bids and not adjusted for time. (Variable descriptions available in the **Appendix**.)

Figure 18. Concrete Consumption, 2022 Forecast



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

Steel

Summary

- Supply for steel remains tight amid high domestic demand.
- Global steel demand continues to be impacted by China's Zero-COVID strategy along with worsening conditions in eastern Europe.
- Global iron ore and crude oil prices have risen due to the conflict in Ukraine as well.
- Aluminum, stainless steel, and other metals prices are expected to continue to increase.

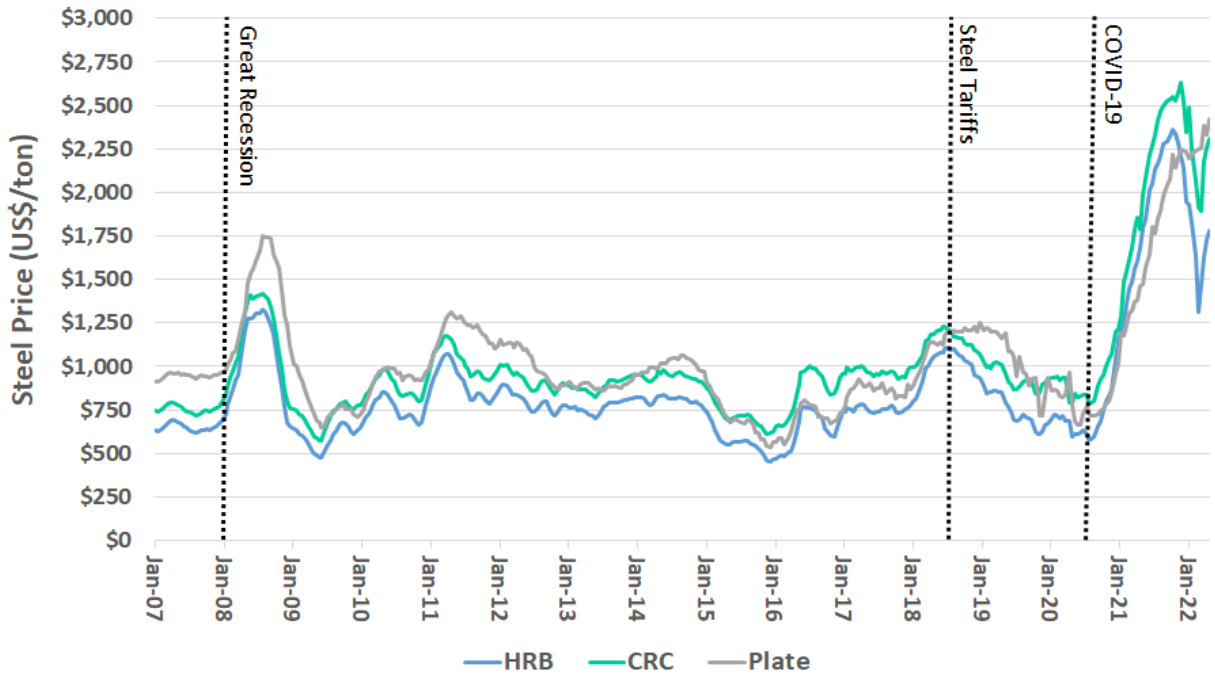
FDOT Impacts

- After a slight decline in the first two months of the year, fabricators report that material costs have risen about 10% on average due to the conflict in Ukraine.
- Fabricators expect bid prices to rise by an equivalent amount in response.
- Labor constraints and lead times continue to impact project development and increase costs.

General Trends

At the beginning of the quarter, steel prices saw a decline as was expected. However, the conflict in Ukraine has caused steel prices to increase once again (**Figure 19**). US steel mills that anticipated to come online this year have faced struggles due to unforeseen mechanical issues. Achieving market moderation may not happen in 2023. Furthermore, additional capacity is expected to grow in 2023 and next as major steel continue with building new state-of-the-art mills throughout the country. With the addition of the new steel mills, domestic capacity will hold up much better in times of economic downturn.

Figure 19. U.S. Steel Pricing, Jan. 2007 – April. 2022

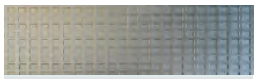


Source: AISI Weekly Raw Steel Production.

Supply Chain Variables for Steel Materials

Table 8 provides an overview of supply chain variables and a summary of their current status.

Table 8. Supply Chain Variables for Structural Steel

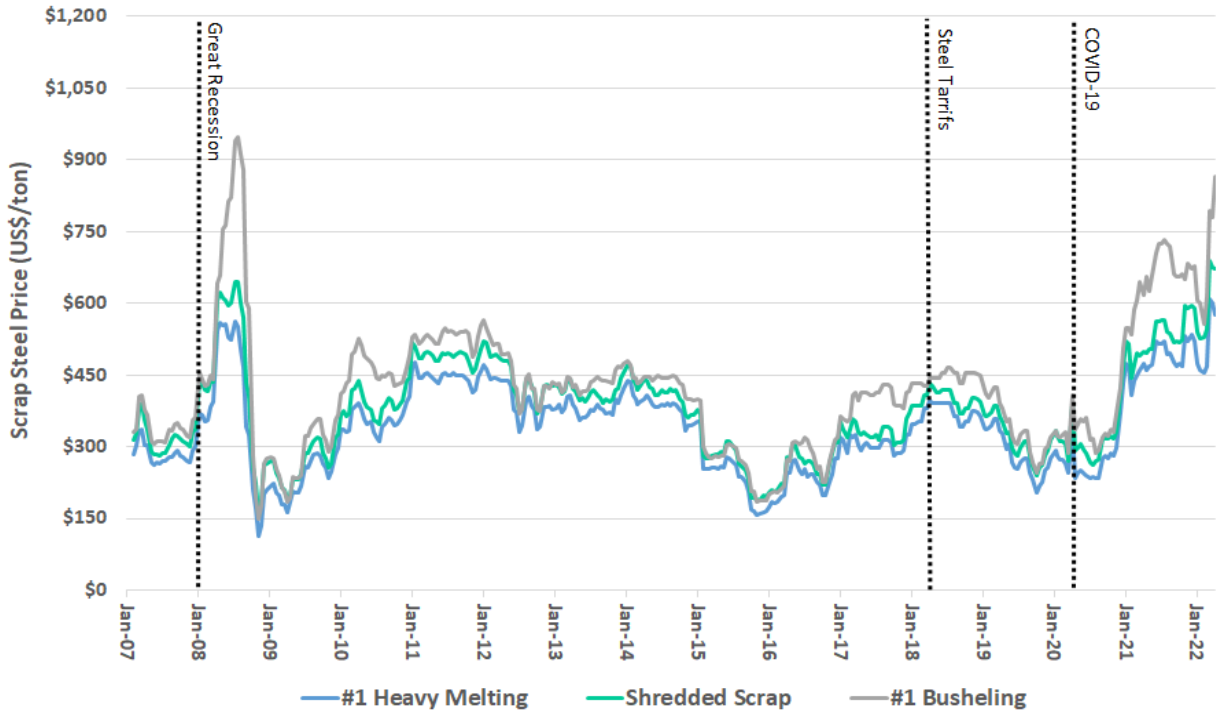
 Raw Materials	Raw materials prices were beginning to decline in early 2022, but have since rebounded due to the war in Ukraine. Aluminum and stainless steel prices are expected to continue to increase despite weakened demand from China. Crude oil, iron ore, and zinc prices have become unstable once again as well.	↑
 Scrap Steel	Scrap prices have continued to soar, as demand remains high. Scrap prices have followed steel prices, as expected, in which prices seemed as if they were facing a downward trend in recent months until the conflict in Ukraine shifted gears.	↑
 Galvanizing Steel	As projected, zinc prices have increased during the first quarter and as of March this year, prices reached $1.69 per pound. Producers are reporting long lead times and price increases for galvanized products.	↑
 China	China's domestic demand for steel has continued to slow due to the country's economic rebalancing efforts. In order to meet their 5.5% GDP target, the Chinese government has expressed interest in infrastructure investment to boost their economy after facing their worst Covid-19 outbreak since early 2020, which has made growth slower than normal.	↓
 Transportation	Transportation is a factor at all stages of steel production. FDOT products are primarily delivered through ship or truck and fabricators have cited issues with longer than usual lead times. The cost of transportation continues to rise as fuel prices continue to increase.	↑
 Rail	Other material markets are reporting issues with rail, but steel producers have not cited rail issues as a significant problem.	=
 Milling Capacity	With the construction of new plants by major steel companies Nucor and U.S. Steel, milling capacity is expected to grow in the coming years. Capacity utilization rate for the week ending on April 23rd, 2022 was 1.784 million net tons, with a capacity utilization rate of 81.7%. This is down 2.7% compared to last year's capacity utilization rate around this time.	=
 Labor	Labor costs are still high for producers. Fabricators report increasing wage scales in an attempt to secure a stable workforce, but climbing material costs may make it impossible for some smaller producers to compete.	↑
 Competition	Currently, competition is not in a place to bring down FDOT's costs. Consolidation of companies is trending and inventory is low.	↑

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

Scrap Steel

As shown in **Figure 20**, scrap steel prices had started to cool before the invasion of Ukraine. Since then, prices have become erratic. Since February 2022, scrap steel prices have risen between 28% to 40% in just one month. So far in April 2022, busheling scrap prices are up another 8%. As scrap supply dwindles from Russia and Ukraine due to the conflict, the US may be further affected.

Figure 20. Scrap Steel Price – USA, Delivered to Steel Plant (Jan. 2007 – Apr. 2022)



Source: SteelBenchmarker.
Notes: AMM scrap price data, Jan 2002 – Jan 2007; SteelBenchmarker data begins Feb. 2007.

Steel Survey

The most recent survey of FDOT fabricators showed the impact of the war in Ukraine as steel prices across the board rose in March 2022 (**Table 9**). The highest reported increases were in steel pipe and structural steel products. In addition, fabricators note that overhead signs costs had increased 31% on average, with an additional 13% increase expected in April. Round bar and rebar prices have cooled in March, but producers predict a 13% increase by the end of next quarter.

Anecdotally, steel mill production levels are not keeping pace with consumption levels, resulting in depleted inventories. Further, steel mills are reportedly having trucking issues and are unable to ship materials once produced, affecting lead times downstream. In addition to material costs, fabricators report increasing their wage scales in order to maintain a stable work force.

Table 9. April Steel Producer Survey Results

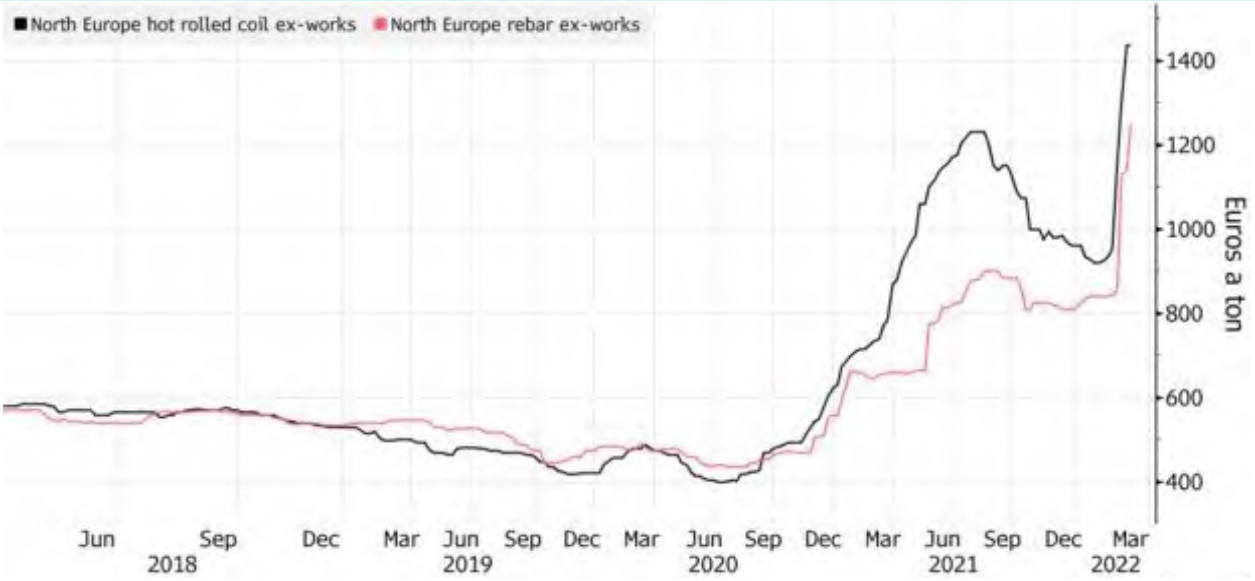
Material	Structural Steel	Steel Plate	Steel Pipe	Round Bar	Square Tubing	Galvanizing
Price Change, March 2022	12%	8%	17%	3%	5%	3%
Expected Price Change, April 2022	10%	8%	11%	8%	11%	6%
Expected Price Change Next Quarter (End of June)	13%	18%	8%	13%	16%	13%
Bid Price Change, March 2022	8%	13%	3%	13%	13%	8%
Production Change, March 2022	-17%	-11%	-37%	3%	-3%	-14%
Expected Production Change, April 2022	-3%	-11%	-17%	3%	-3%	-14%
Expected Prod. Change Next Quarter (End of June)	19%	8%	-3%	3%	-3%	3%

Source: TBG Work Product

Europe

Due to sanctions imposed on Russia, the availability of steel has been decreased in Europe. The World Steel Association estimates that Russia produced about 3.9% of global supply in 2021. On the other hand, while a nominal amount of pig iron and steel are still being produced in Ukraine, many of the country's steel mills and production facilities have been damaged or destroyed in the war. Coupled with shuttered ports in the Black Sea, supply is not currently being exported from this area of the world. According to Bloomberg, key steel prices in Europe have hit an all-time high (**Figure 21**).

Figure 21. Steel Prices in Europe, Jan. 2018 to Mar. 2022



Source: Bloomberg.

China

China's steel demand is expected to be flat throughout 2022 according to CFRA's latest Metals & Mining Industry Survey. Reportedly, steel output is expected to remain below 2021 levels due to China's pledge to reduce steel production in order to achieve "Olympic blue" skies. As a result, the country's 5.5% GDP growth target for 2022 is now likely unachievable. In addition to pollution controls, recent COVID-19

lockdowns have stalled steel demand recovery in China. The lockdown measures have led to a major backlog of cargo and ships in the world's largest container port in Shanghai.

Current Pricing

Based on FDOT bid data, reinforcing steel prices are up 17% in fiscal year 2022 through March 2022 (**Table 10**). Reinforcing steel costs have continued increasing this fiscal year, following a 37% jump in prices in 2021. Structural steel prices, on the other hand, have risen an additional 27% through March 2022. This escalation is on top of the 51% rise in structural steel prices seen in fiscal year 2021. High steel costs are likely to persist into 2023 due to domestic and global supply chain disruptions.

Table 10. Steel Price, 2017 – 2022

Fiscal Year	2017	2018	2019	2020	2021	2022*
Price Structural Steel, $/lb.	$2.80	$4.41	$2.79	$2.55	$3.84	$4.86
Annual Percent Change	-45%	57%	-37%	-9%	51%	27%
Price Reinforcing Steel, $/lb.	$0.81	$0.96	$1.00	$0.88	$1.20	$1.40
Annual Percent Change	-6%	19%	4%	-12%	37%	17%

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

Forecast

For the third quarter of 2022, regression modeling was performed using pay item data, supply chain variables, and other macroeconomic indicators to identify models that best predicted FDOT's structural and reinforcing steel costs. With bid data through March 2022, projections for structural steel are predicated on continued disruptions in the supply chain.

The model considered most likely at this writing estimates the average price for structural steel sees an increase in costs in 2023 before declining to $4.85 per pound by 2026. Price increases that once seem temporary are likely to stick around, at least partially, for the foreseeable future. The upper bound considers additional shocks to the steel industry that may arise in 2022, including impacts from the war in Ukraine. The lower bound relies on lower energy costs, indicating decreased market demand.

For Reinforcing Steel, zinc and coal costs and another, or worsening, major event is considered in the upper bound estimate. The best estimate takes stable construction employment and medium crude prices into account, with prices ending at $1.32 per pound by the end of the work program. Although less likely, constrained construction employment and economic activity would drive the price of reinforcing steel to the lower bound of $1.26 per pound by 2026.

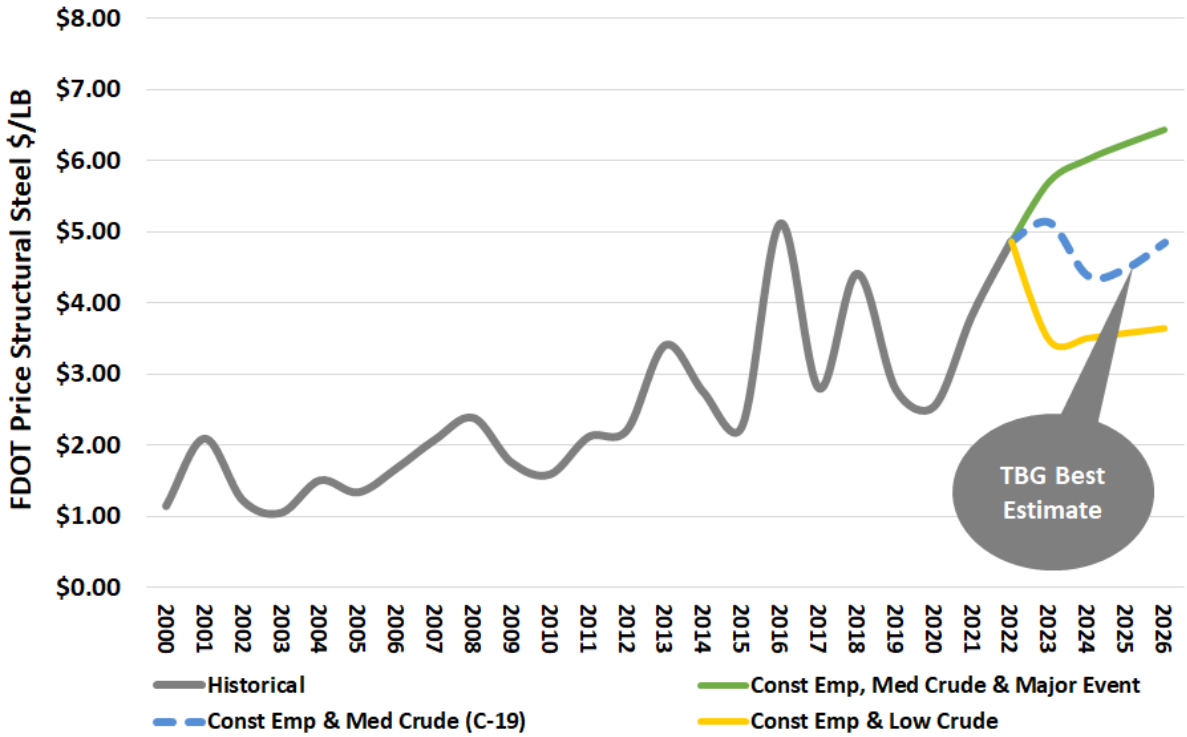
Table 11 provides the forecast average price for structural and reinforcing steel. **Figure 22** and **Figure 23** show the output of several price models and the scenario identified as best estimate for structural steel and reinforcing steel, respectively.

Table 11. Steel Price Forecast Results, 2022 - 2026

Fiscal Year	2022	2023	2024	2025	2026
Price Structural Steel, $/lb.	$4.86	$5.13	$4.39	$4.50	$4.85
Annual Percent Change	27%	6%	-14%	2%	8%
Price Reinforcing Steel, $/lb.	$1.40	$1.49	$1.23	$1.28	$1.32
Annual Percent Change	17%	6%	-17%	4%	3%

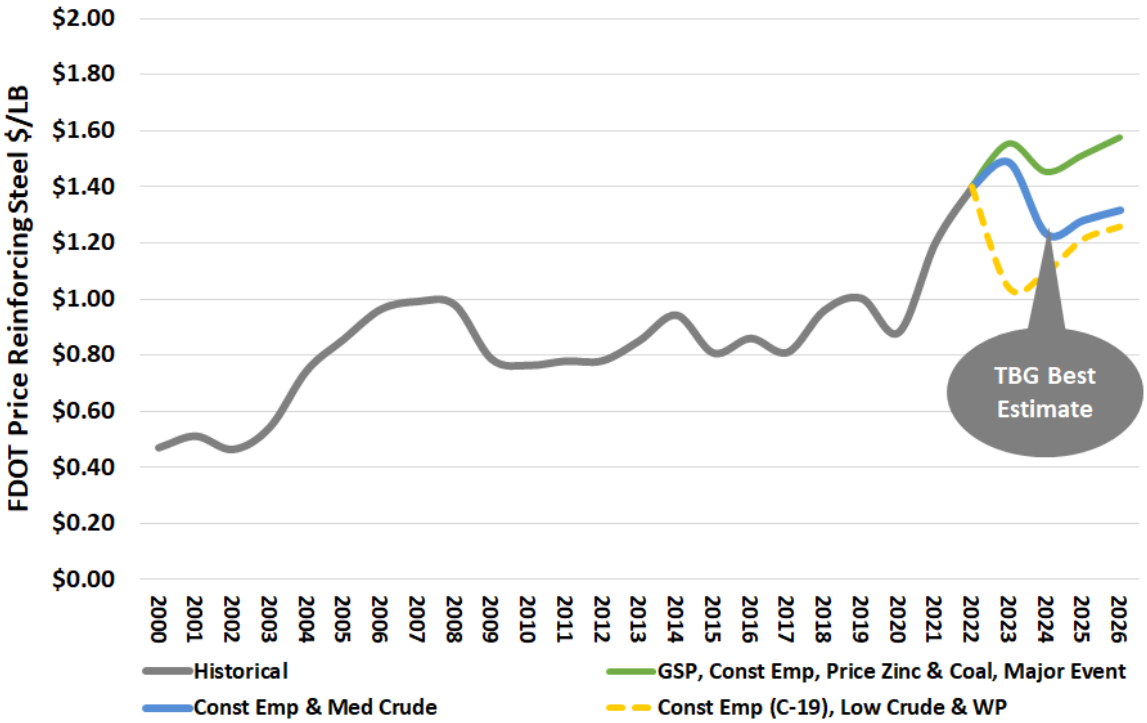
Source: TBG calculated from data provided by FDOT Estimates Office, various industry sources.

Figure 22. Structural Steel Price, 2022 Forecast



Source: TBG calculated from data provided by FDOT Estimates Office, various industry sources. Historical pricing reflects actual bids and not adjusted for time. (Variable descriptions available in the **Appendix**.)

Figure 23. Reinforcing Steel Price, 2022 Forecast



Source: TBG calculated from data provided by FDOT Estimates Office, various industry sources. Historical pricing reflects actual bids and not adjusted for time. (Variable descriptions available in the **Appendix**.

Aggregate

Summary

- Florida production increased in 2021 at a slower pace than the national growth. Aggregate base prices have increased 6% in fiscal year 2022.
- The aggregate industry has a positive outlook for 2022, with steeper price increases compared to 2021
- Changes to environmental regulations are a top concern for producers. Labor has been an ongoing issue and is not expected to ease in the short term.

FDOT Impacts

- Although aggregate supply is sufficient to meet demand, bottlenecks in transportation and distribution are impacting timely delivery of material as rail cars that would normally move aggregates in Florida are stuck in other states.
- Higher fuel costs, driver shortages, and increased equipment part delays are continuing to impact project site delivery windows and lead times.
- Permitting concerns are also an issue for producers.

General Industry Update

The USGS[5] has released estimates of construction aggregate produced for consumption for 2021. Overall, USGS reports that Florida's crushed stone production rose 3% year-over-year to 94.9 million tons and construction aggregates production rose 1% year-over-year to 21.7 million tons. Both sectors had significant production growth in the fourth quarter of 2021. U.S. crushed stone and construction aggregates had a higher production growth of 5% and 6% in 2021, respectively.

Publicly traded companies reported full-year 2021 results as well as guidance for 2022. The aggregate sector of the companies continued reporting strong results, aligned with their expectations. In 2021, all companies had higher shipments (1%-8% across different geographies in North America) as well as higher prices (2% to 5%). In the fourth quarter of 2021, they all saw faster price increases as high as 9% compared to the fourth quarter of 2020. For 2022, all expect another strong year and some reported being booked for most of the year. In terms of volume, expectations have some variation as they range from 1% growth to 10% growth. In terms of pricing, expectations are similar, with bigger increases between 5-8%.

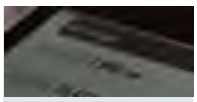
Rock Products released its 2022 survey of aggregate producers covering a variety of topic. Aligned with other reports, the majority of respondents are optimistic about 2022, with only 3% having a pessimistic outlook for the aggregate industry. Additionally, 62% plan to spend more than $1 million in capital spending (half of these expect to invest more than $5 million), which they report is a significant increase from last year. In terms of capacity, 66% indicated they have adequate reserves from future production. However, the top 3 concerns in the industry are: labor, environmental regulations and permitting.

[5] United States Geological Society

Supply Chain Variables for Aggregate

Table 12 provides current status of selected supply chain variables.

Table 12. Aggregate Supply Chain Variables

 Raw Materials	While shortages of aggregate sources have not been a concern for the industry, supply chain disruptions will continue affecting aggregate producers. No changes during this quarter. The Rebuilding Our Communities by Keeping aggregates Sustainable (ROCKS) Act, which aggregate associations have been pushing for in the past 2 years, was included in the infrastructure bill.	=
 Access to Land	Access to land with suitable deposits is key to cost-effective material extraction for FDOT Aggregate. While the EPA and the Army Corps are working on a new water of the United States rule based of the pre-2015 regulations, a Supreme Court judge revived the Navigable Waters Protection Rule. Additionally, the NEPA rule that requires to evaluate indirect and cumulative impacts is being restored. Both are seen negatively within the industry and these issues are expected to continue through next year, so industry and developers should tread carefully. Aggregate producers see changes in environmental regulations as one of the main concerns for 2022.	=
 Rail	The poor and deteriorating service faced by freight rail shippers has critically put a strain on companies to successfully supply customers and build projects around the country. Rail is the primary transportation for aggregates, from Georgia, and from Lake Belt to Central and Northeast Florida. In 2021, aggregate shipments declined 3% compared to 2020 but revenues increased by 3%. This decline was due to fewer shipments of sand and gravel. Fuel costs increased 51% in 2021 and on-time arrivals have followed the trend from previous reports at 66% (down from 77% in 2020). Aggregate producers are reporting issues with rail services.	↑
 Trucking	Constrained truck/driver availability is a major cost factor. While rates are still high, these have recently declined but fuel prices have increased, increasing trucking costs. Bank of America and Freightwaves are cautioning that freight trucking volumes have recently decreased and spot rates, excluding fuel surcharges, have also decreased. Demand for freight trucking has decreased as shippers have to use excess inventory and companies truck fleet have increased. Even though competition is still high, this could potentially free up drivers for specialized trucking in the construction industry. According to the American Association of State Highway and Transportation Officials (AASHTO), more than 100 employers launched Registered Apprenticeship programs in 90 days, CDL licenses issued in January and February 2022 increased 112% compared to 2021.	↑
 Labor	Labor demand has been increasing since the recovery in aggregate demand. Employment needs for local, state, & municipal projects, and shrinkages of skilled labor in the U.S southeast are likely to decrease long-term supply of labor and thus increase the competition for worker power. Statewide construction employment increased 2.6% in March, year-over-year. At the metro level, construction employment growth has started to wane in recent months across the state, however. Labor is still the main concern for aggregate producers for 2022.	↑
 Competition	Competition has been steady. FDOT's approved list shows 2 terminals approved in 2022, an additional is under review in Daytona and 4 mines are under review (one in Alabama and the others in Florida). Additional facilities would increase competition for FDOTs projects and could lower costs. In 2022, there is a mine in Alabama under review. Additionally, a terminal facility in District 3 was inactivated in December 2021.	=
 Capital Costs	No changes during this quarter. Even though it is expected that the Fed will increase interest rates throughout 2022, aggregate producers indicating larger investments for new equipment and maintenance for 2022 with guidance that the infrastructure bill provides over the next years. Reports continue showing that producers are seeing longer lead times and shortages for equipment parts.	↑

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

Regulations

A Supreme Court judge revived the Navigable Waters Protection Rule that was repealed by the EPA and the Army Corps at the end of 2021. Several lawmakers and industry organizations, including ARTBA and the NSSGA, are against the use of a broad definition as they believe it would slow the permitting process and are supporting the petitioners in the Sackett v. EPA case to know the extent of Federal authority under the Clean Water Act. In the meantime, the EPA and the Army Corps are working to develop a new water of the United States rule based of the pre-2015 regulations. Both of these things are expected to continue through 2023. These changes could cause permit delays for aggregate producers. Industry organizations have also voiced opposition the recent changes to NEPA, as mentioned elsewhere in the report. Similar to the Water of the U.S. definition update, producers argue changes will slow projects.

Rail

The Surface Transportation Board (STB) held public hearings on "Urgent Issues in Freight Rail Service". See **Appendix** for documents related to Urgent Rail Hearing at the U.S. Surface Transportation Board. The NSSGA submitted comments on rail issues members of the organization are facing. Overall, issues converge towards railroads cutting or providing inconsistent service, price increases with minimal notice, longer and slower transit times and lack of transparency. Anecdotal consequences from producers in the brief are additional trucking costs of $500,000 in 2022 for shipments that should have been sent via rail. At the hearing, the Chairman indicated that one of the reasons for the rail issues is that railroads have cut 29% of the workforce over the past six years. CSX's executives have indicated that congestions are focused on yards and terminals and they expect performance to improve in the second half of 2022 as crews that have been in training are deployed.

Additionally, the Port of Savannah reported having its busiest February and given that volumes have been increasing for more than a year, they are expediting $538 million in projects to increase capacity by 60%. According to a Maersk executive during an interview, congestion issues on the east coast were driven by storage capacity.

Current Pricing

Based on FDOT bid data, aggregate base prices are up 6% through March 2022 (**Table 13**). Following declines through the first six months of fiscal year 2022, the Florida aggregate market continues increasing since 2019. Trucking and labor issues still abound and may cause further bottlenecks in 2022 for transportation and distribution of material.

Table 13. Aggregate Base Price, 2017 – 2022

Fiscal Year	2017	2018	2019	2020	2021	2022*
Price Aggregate Base, $/Ton	$43.55	$38.40	$37.92	$46.54	$50.59	$53.74
Annual Percent Change	15%	-12%	-1%	23%	9%	6%

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

Forecast

In this quarterly update, regression modeling was performed to estimate aggregate base costs using pay item data, supply chain variables, and other macroeconomic indicators. The most likely trajectory sees

continued construction employment growth, medium crude oil costs, and a strong FDOT work program through 2026. With updated bid data through March 2022, aggregate prices are over $50 per ton, driving the best estimate up across the next five years to $58 per ton by 2026.

An upper bound with unconstrained construction employment, crushed stone pricing, and rising energy costs results in a huge spike in prices, but given the trajectory prior to 2020, this scenario seems less likely. The lower bound sees initial price drops in the unlikely event that energy costs drop off in the next couple years.

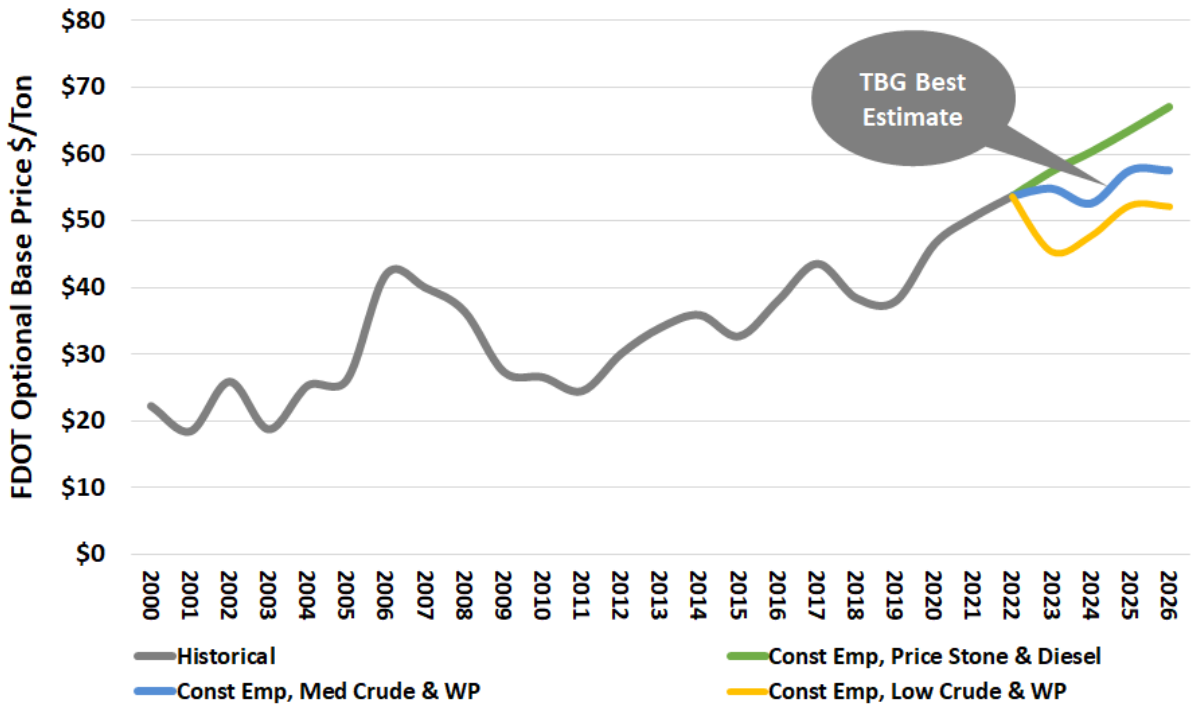
Table 14 provides the best forecast average price for aggregate base this writing, while **Figure 24** shows the output of the price models discussed herein.

Table 14. Aggregate Base Price Forecast Results, 2022 - 2026

Fiscal Year	2022	2023	2024	2025	2026
Price Aggregate Base, $/Ton	$53.74	$54.83	$52.60	$57.61	$57.59
Annual Percent Change	6%	2%	-4%	10%	0%

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

Figure 24. Aggregate Base Price, 2022 Forecast



Source: TBG calculated from data provided by FDOT Estimates Office, various industry sources. Historical pricing reflects actual bids and not adjusted for time. (Variable descriptions available in the **Appendix**.)

Earthworks

Summary

- Earthmoving equipment costs continue increasing. With high demand and supply chain issues, prices are not considered to be at their peak.
- Earthworks prices have increased 4% in fiscal year 2022. Prices continue being significantly higher compared to pre-2019.

FDOT Impacts

- Competition for truck drivers continues to be a constraint statewide, causing longer lead times at project sites.
- Higher fuel prices are leading to higher costs. Although domestic oil production has capacity, fuel prices are not expected to come down for some time due to global market instability.

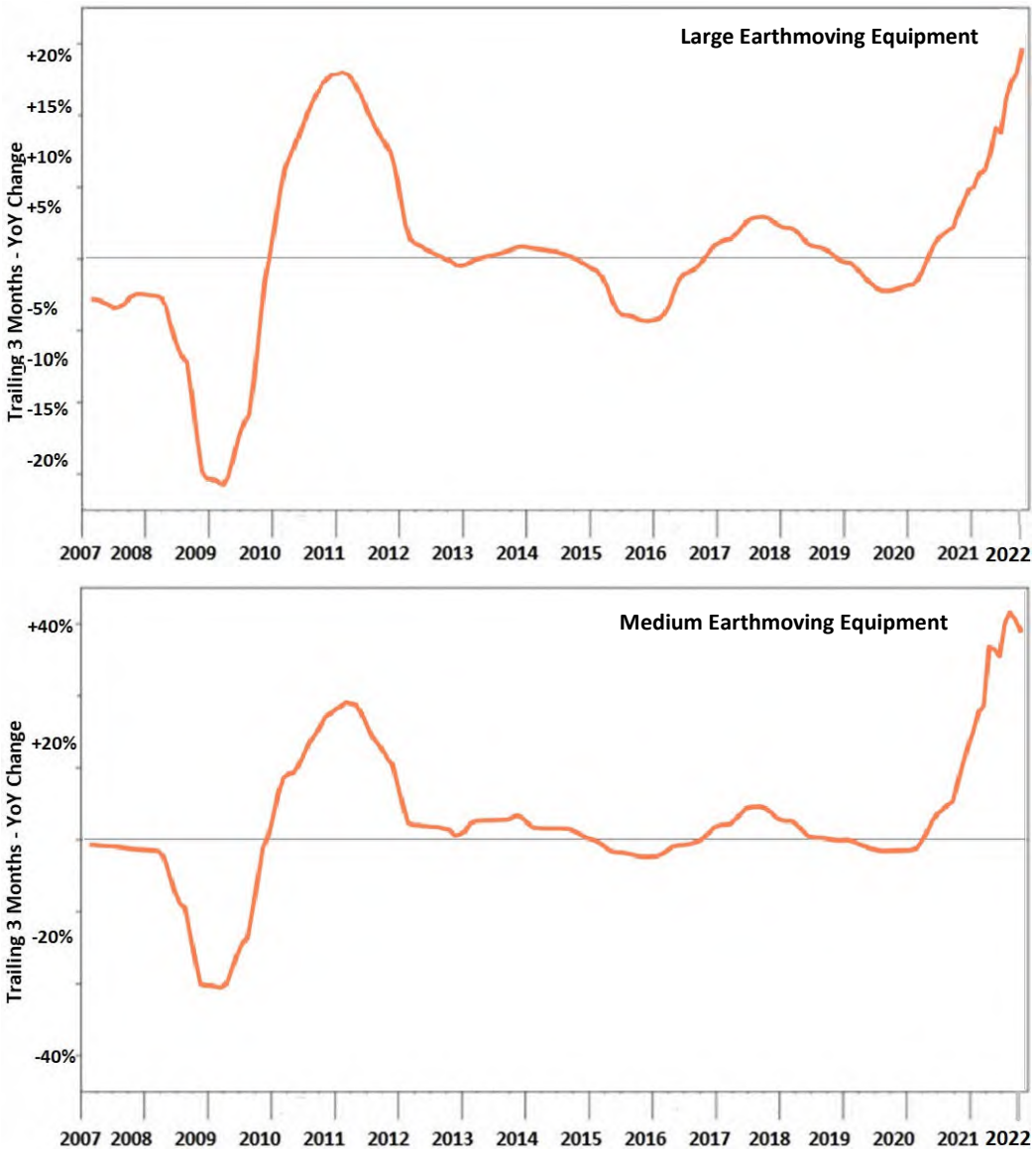
General Trends

Trucking and labor costs are the main factors in this sector. As mentioned throughout the report, the labor market for driver and equipment operators continues to be tight and is not expected to ease in the near term. While there are ongoing efforts by the federal government to expand the pool of drivers and expedite the process of issuing CDLs (CDL licenses issued in January and February 2022 increased 112% compared to 2021), elevated competition for drivers will continue to put upward pressure on wages to attract labor. Fuel costs have also increased significantly in the past months and while there are efforts to try lower these, they will remain high as long as volatility in the global crude oil market continues. Equipment costs have also increased significantly this past year and there are no signs that these are close to their peak, so all these factors will continue contributing to higher trucking costs.

Equipment

Inflationary pressures that have been affecting other sectors are also present in the construction equipment industry. The March 2022 percent change used equipment market trends report released by Ritchie Bros. Auctioneers continue showing significant price increases across all categories seen at the end of 2021. For instance, the price indices for medium and large earthmoving equipment sold in the U.S. for the quarter ending in March 2022 continued the upward trend by increasing 42% and 19%, respectively (**Figure 25**). Truck tractors (+63%) and vocational trucks (+45%) continue seeing the highest price increases.

Figure 25. Percent Change in Price Indexes for Large and Medium Earthmoving Equipment



Source: Ritchie & Bros. Used Equipment Market Report.

In February, at the auction in Orlando they saw a slight change in the trend of equipment from previous report. They report that purchased equipment was younger, with less hours and much higher prices as dealer inventory increased. For example, between November and February articulated dump trucks sold were 15 years old, 9,900 hours at a median price of $60,000; at the Orlando auction the median age was 7 years, 8,800 hours at $125,000. Another example is with loader backhoes. They went from 10 years old, 4,200 hours used at $31,000 in the prior 3 months, to 10 years old, 2,700 hours used at $35,000. High demand will continue to be predominant in the market and it was seen at the auction with international buyers comprising as much as 46% of the purchases for some of the equipment and in other cases out-of-state purchases were as high as 78%.

These pricing trends are not expected to ease in the short-term. While the industry does not see signs that prices for new and used equipment are at their peak, they are hopeful that prices slowdown or reach their peak at some point in 2022 as new inventory enters the market.

Current Pricing

Based on updated FDOT lettings data, earthworks prices are up 4% through March 2022 (**Table 15**). Besides the ongoing truck driver shortage, higher fuel costs and equipment costs are also relevant factor. Material suppliers in most industries are reporting a lack of parts and scrap metals to repair equipment and are now having to turn to renting equipment instead, adding additional cost to their operations.

Table 15. Earthwork Price, 2017 – 2022

Fiscal Year	2017	2018	2019	2020	2021	2022*
Price Earthwork, $/Ton	$6.95	$7.66	$5.90	$8.39	$12.87	$13.39
Annual Percent Change	0%	10%	-23%	42%	53%	4%

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

Forecast

Regression modeling was performed to estimate Earthworks costs using pay item data, supply chain variables, and other macroeconomic indicators. The best estimate for earthwork prices includes improved construction employment and moderate housing starts, along with medium crude prices at this time. Updated historical lettings for fiscal year 2022 produced a starting price of $13.39 per ton for the projection period, 24% higher than previously reported. The selected forecast shows earthwork costs declining in 2024, but rising by 2% through the end of the work program given current pricing trends. With earthmoving and other heavy equipment costs continuing to cause bottlenecks, elevated prices may be expected until those issues are resolved.

An upper bound that includes rising crushed stone prices, a parallel cost, show earthwork prices reaching as much as $16.43 per ton by 2026. On the other hand, lower demand and energy costs may reduce earthwork prices to the lower bound.

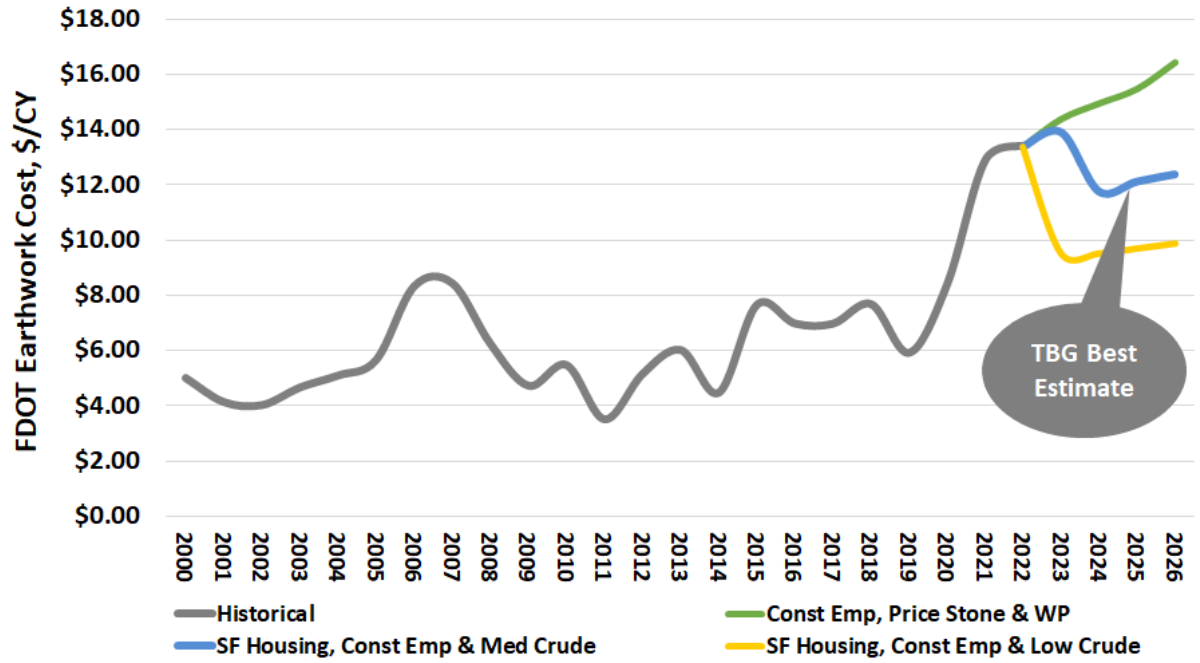
Table 16 provides the forecast average price for earthworks through 2026. **Figure 26** shows the output of potential price models and the scenario identified as best estimate for earthworks.

Table 16. Earthwork Price Forecast Results, 2022 - 2026

Fiscal Year	2022	2023	2024	2025	2026
Price Earthwork, $/Ton	$13.39	$13.92	$11.76	$12.12	$12.38
Annual Price Change	4%	4%	-16%	3%	2%

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

Figure 26. Earthwork Price, 2022 Forecast

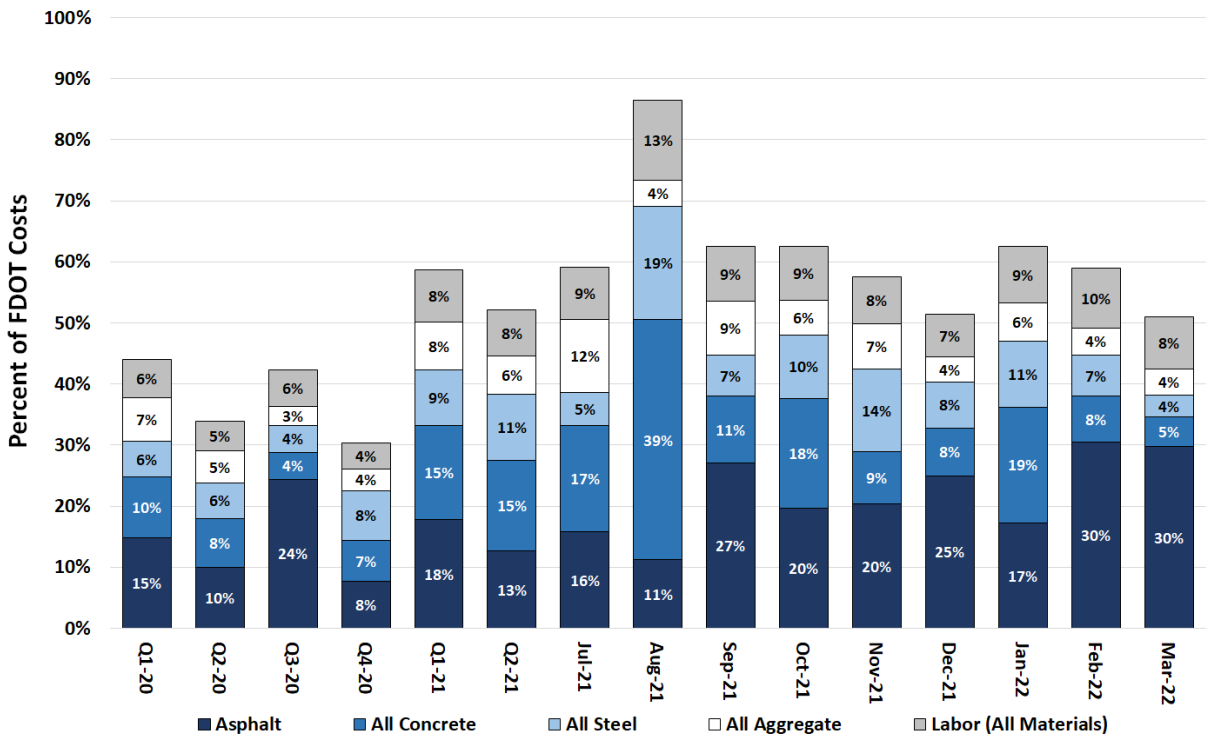


Source: TBG calculated from data provided by FDOT Estimates Office, various industry sources. Historical pricing reflects actual bids and not adjusted for time. (Variable descriptions available in the **Appendix**.)

Appendix

Tracking FDOT's costs by month shows how the cost composition may shift depending on project type, scheduling, and material costs (**Table A-1**). Aggregate, concrete and steel costs as a share of total costs moderated in March 2021 according to preliminary data. However, steel costs are expected to remain elevated throughout 2022, which may also affect concrete products with steel components. Asphalt costs are the largest share of total FDOT costs in the most recent month of data. Labor costs remained consistent as statewide construction labor is back to pre-pandemic levels.

Table A-1. Monthly Cost Composition



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

A list of variables used in the updated forecasts is available in **Table A-2**.

Table A-2. Forecast Variable Descriptions

Variable Reference	Description
Const Emp	FL construction employment.
Diesel	Average diesel price.
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).
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.
Non-farm Emp	FL Non-Farm employment.
Price Binder	Average price of HMA binder (PG-76 & higher).

Variable Reference	Description
Price Cement	Average price of cement.
Price Coal	Average price of coal.
Price Iron Ore	Average price of iron ore.
Price Stone	Average price of crushed stone.
SF Housing	FL Single-Family housing starts.
WP	FDOT Five-Year Work Program.
C-19	Refers to COVID-19; some variables adjusted for pandemic impacts.

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.

Table A- 3. 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 A-4. 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

Concrete Pay Item Number				
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
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

Concrete Pay Item Number				
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
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
0425 1312	0430172138	0455 3 2	0649 21 6	0715 4132
0425 1315	0430173112	0455 3 3	0649 21 7	0715 4133

Concrete Pay Item Number				
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
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

Concrete Pay Item Number				
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
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

Concrete Pay Item Number				
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 A-5. 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
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

Steel Pay Item Number				
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
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

Steel Pay Item Number				
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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
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

Steel Pay Item Number				
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
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
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0460 1 4	0649435009	0715 4 22	0730 76303	2715111204
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0460 1 7	0649611001	0715 4 25	0730 76306	2715111212
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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

Steel Pay Item Number				
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
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
0460 3411	0649921101	0715 5 11	1645150118	2715414114
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
0460 5	0659103	0715 7 21	2415 1 5	2715474112
0460 5 1	0659104	0715 7 31	2415 1 6	2715475109
0460 6	0659106	0715 7 41	2415 1 8	2715475112
0460 6 1	0659107	0715 7 42	2415 1 9	2715475114
0460 6 2	0659108	0715 10 2	2415 2 5	2715476106
0460 6 3	0659110	0715 19 11	2415 2 6	2715476206
0460 7	0659111	0715 19 12	2435 22372	2715511105
0460 9 3	0659112	0715 19 13	2435424639	2715511106
0460 10	0659113	0715 19 51	2455 3 1	2715511107
0460 10 7	0659114	0715 19 60	2455 3 2	2715511108
0460 11	0659118	0715 19111	2455 3 3	2715511109
0460 12	0659120	0715 19112	2455 3 4	2715511110
0460 16 1	0659301	0715 19113	2455 3 5	2715511111
0460 70 1	0659303	0715 19119	2455 3 8	2715511112
0460 70 2	0659306	0715 19121	2455 4 6	2715511113
0460 70 3	0659307	0715 19122	2455 4 8	2715511114
0460 71 1	0659310	0715 19123	2455 7 3	2715511115

Steel Pay Item Number				
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
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
0460 98 2	0685155	0715 21 2	2455 8 9	2715511311
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
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

Steel Pay Item Number				
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
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

Steel Pay Item Number				
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
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

Steel Pay Item Number				
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
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 A-6. 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

Aggregate Pay Item Number				
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
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 A-7. 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	

BEFORE THE

SURFACE TRANSPORTATION BOARD

Docket No. EP 770

URGENT ISSUES IN FREIGHT SERVICE

NATIONAL STONE, SAND AND GRAVEL ASSOCIATION COMMENTS ON URGENT ISSUES IN FREIGHT SERVICE

Submitted via e-filing at www.stb.gov.

The National Stone, Sand & Gravel Association ("NSSGA") submits these written comments to the Surface Transportation Board ("STB" or "Board") pursuant to the April 7, 2022, Notice from the STB in the proceeding referenced above, which permits "written comments by any other interested person" concerning freight service.

NSSGA is the leading voice and advocate for the aggregates industry. Our members are stone, sand, and gravel producers and the equipment manufacturers and service providers who support them. NSSGA's member companies produce more than 90 percent of the crushed stone and 70 percent of the sand and gravel consumed annually in the United States. Aggregates are the building block that builds towns and cities and the connections in between. The industry is synonymous with infrastructure, homes, schools, hospitals, and every community. Aggregates play a crucial role in everything we touch - housing, roads, railways, bridges, tunnels, ports, water supply, sewers, electrical grids, and telecommunications.

As a result, NSSGA members will play a crucial role in the success of the Infrastructure Investment and Jobs Act ("IIJA") that became effective on November 15, 2021. The IIJA will help rebuild America's roads, bridges, ports and rail and all infrastructure projects funded under this historic legislation. It will strengthen supply chains by making long overdue improvements for the nation's ports, airports, rail, and roads. The aggregates industry will supply the materials needed to make these necessary projects happen. In addition, NSSGA members build the foundations of our communities. Aggregates are the key building material used to construct affordable housing, new businesses, medical centers, schools, and every building in between.

NSSGA members use freight rail to supply aggregates, particularly in fast growing metropolitan areas. The Association of American Railroads ("AAR") estimates that freight rail moved 1.1 million rail cars of stone, sand, and gravel in 2020. The potential demand for freight rail to move aggregate is likely to increase, for several reasons: First, the demand for products is increasing, and demand will further increase as the IIJA is implemented and additional money is invested in America's long neglected infrastructure. The demand is and will be in and around

"metropolitan" areas. Second, there is insufficient supply to meet existing and future demand for product, and there are limits on the ability to develop additional stone, sand, and gravel operations in metropolitan areas with high demand. Areas of high population growth andaggregates demand areas generally lack available land and reserves for development as quarries, and because of state and local land use regulations and the ever present "NIMBY" issues, which increase the costs and materially delay the development of new aggregate production in heavily populated areas, aggregate producers will seek rural areas for future production. In addition, high population growth areas are generally located along the sunbelt of the U.S. which lacks the necessary geology to produce quality building aggregates. The result is that producers are and will become more dependent on rail, particularly unit trains, to provide aggregates from quarries farther from infrastructure projects and growing communities.

The NSSGA applauds the STB for recognizing the need for the April 26 and 27, 2022 hearing on "Urgent Issues in Freight Rail Service" and its willingness to accept written comments from interested parties. As explained in the preceding paragraphs, the NSSGA and its members are interested parties and appreciate the opportunity to submit these comments. We hope that the testimony at the hearing and the comments submitted lead to policy changes to improve freight rail service so that infrastructure projects and the American economy can reach its full potential.

The comments from NSSGA members regarding freight rail service can be summed up in a short phrase – "it is the worst that it has ever been". The specific concerns are service and price (particularly price in connection with poor and deteriorating service).

- Members report that railroads are cutting service, e.g., going from 4 days a week to 2, going from 5 days a week to 2, and so on. These service changes are made even when there are agreements in place to provide, for example, 5 days of service. The railroads make these service changes with little advanced notice, and these changes are not the result of a "negotiation" between the railroad and the aggregate shipper – the railroad unilaterally announces a change in service, with limited advance notice. The reduction in service is a consistent story that our members report.
- We have reports from members that railroads don't provide sufficient power to support the size of the trains.
- Poor rail service has generated longer than planned transit times, which has created a need for more railcars. The slower the trains move, the more cars you need to keep up with business. This has produced increased costs for shippers.
- Members report that scheduled service is increasingly inconsistent. For example, a member reported that its agreed switching days are Tuesdays and Thursdays. However, the railroad that services the facility does not comply with its agreement and comes whenever it chooses, without notice and without consistency from week to week, e.g., it may come on Monday, or it may come Wednesday and Saturday. We have heard similar complaints from multiple members. The impact that the railroads' failure to move empty and loaded cars pursuant to a schedule – missing scheduled service and seemingly providing service randomly – causes facility disruption and temporary shutdowns.
- We understand from members that rail service at one facility was stopped for between 30 and 60 days because of a damaged switch, and that the failure of the railroad to serve the facility almost caused the facility to shut down. Fortunately, an alternative switch was

available, which averted the facility shutdown. The railroad took about 6 months to repair the damaged switch.

- The service that is provided is increasingly slow. For example, in the case of unit trains, members report that the days to turn a unit train are increasing, in some cases taking more than twice as long today as it did previously. We have similar complaints from multiple members. There are many reasons for the delays, including the fact that railroad staffing is inadequate to meet the demands of freight rail shippers. We have also heard incidences of specific problems – for example, railroads directing cars to the wrong switch point – that cause and exacerbate delays.
- One of the shocking things that we hear from members is that the **railroads know that they are providing poor service and admit it**. The railroads admit to freight rail shippers that they are in many cases *providing a fraction of the contracted service*, and apparently have no concern in doing so.
- We have heard from members that railroads are picking "winners and losers" in the marketplace by deciding which of two competitors' cars to move. The railroad's decision making on which of two competitors to favor with service is not transparent; from the perspective of the aggregate company that didn't get service, the railroad arbitrarily decided to favor its competitor.
- In conjunction with the decline in service, the railroads are increasing prices. Again, these price increases are in the form of railroad-dictated price increases with minimal notice. Furthermore, these price increases are "excessive", i.e., greater than any price increase warranted by inflation or the railroads' needs for revenue adequacy.
- We have heard from members that railroads are imposing pricing to discourage rail shipments from facilities, i.e., railroads are attempting to "demarket" facilities, with the potential result that facilities will have to reduce production (or, in extreme cases which have not yet been reported, but are possible given railroad pricing, shut down.)
- As an addendum to this list of service issues, we have attached a "case study" from member companies describing in detail the service problems they have confronted and the consequences of these service problems to their operations and the operations of their customers. The addendum is incorporated into and is a part of our comments.

It is worth noting that most of the NSSGA members who ship via freight rail are "captive" to the railroad that services the facility. If "Railroad A" cuts services and increases prices, there is no "Railroad B" to go to as potential competitive service. Additionally, truck is not a shipping option in these cases, as it is generally not economic to ship via truck the distances that aggregate ships by rail. The percentage of NSSGA member facilities that are "captive" varies; for some companies, it is 100%, for all that ship by rail a majority of facilities are captive.

The consequences of poor and declining rail service and unwarranted price increases for aggregate shippers are delay and increased cost for essential infrastructure projects. We have already heard from members examples of specific infrastructure projects that have been delayed because of poor freight rail service. Poor service is leading to critically low to no inventory available at terminals for state and federal infrastructure projects across the country. Shipment delays continue to strain many projects, such as state DOT roads and bridges, airport resurfacing, hospital builds, and other critical infrastructure projects. If poor freight rail service continues, the

success of the IIJA is at risk; as one of our members stated, "new infrastructure projects under the law [IIJA] will not get sourced if this keeps up".

We have focused on the impact of poor freight rail service on infrastructure investment and the fact that the current state of freight rail puts the success of the IIJA at risk. The NSSGA also represents industrial sand companies, the companies that provide the essential raw materials for the manufacture of glass, shape metal products (made in foundries), ceramics and other goods that we take for granted, but that are essential to our standard of living. Industrial sand is also used as a proppant in the production of oil & gas from shale; the United States **cannot produce oil and natural gas sufficiently to meet its needs (and the needs of others who may rely on Russian supplies) without industrial sand as a proppant**. While the oil & gas industry would prefer to source its sand proppants as close to the wells as possible, it is often dependent on sand proppant shipped via rail, particularly from the Upper Midwest, to bring wells into production. The entire supply chain associated with a range of businesses, whether glass manufacturing or oil & gas production, is at risk because of poor rail service, and costs that businesses incur (and ultimately the prices that consumers will pay) are negatively impacted by poor rail service and unwarranted price increases.

The NSSGA supports several steps that the STB can take to help alleviate the urgent service problems in freight rail. For example, the NSSGA supports the expanded availability of reciprocal switching, which would provide at least some competition and alternatives for freight rail shippers, and which would (presumably) result in improved service. We also support the STB's effort (STB Docket No. 767) to collect data on first mile/last mile rail movement, establish metrics and make first mile/last mile data more transparent to shippers. The NSSGA also supports increased use of the STB's powers to investigate freight rail service issues and issue fines where appropriate and pursue regulatory solutions.

In conclusion, the NSSGA again commends the STB for conducting the hearing and accepting written comments on "Urgent Issues in Freight Service". We urge the STB to take prompt action to help alleviate the crisis currently confronting freight rail shippers.

Respectfully submitted,

/s/ Michael Johnson
President and CEO, NSSGA
On behalf of NSSGA

April 22, 2022

Addendum

Case study of specific railroad situations experienced by members

A member has many plants on the CSX, two of those plants are scheduled to be switched three days per week. There were multiple weeks in 2021 during which the CSX did not show up at all during the week, zero switches. This lack of service shut down plants and resulted in customers being forced to send in trucks to keep their continuous processes up and running. In 2022 the service has "improved" where we have not gone an entire week without service, but service is still very unreliable. The CSX rarely shows up on the scheduled switch days. Often, they come in for a switch but either only take loads or only drop off empties. In these cases, plants have been forced to shut down due to receiving only a partial switch. In March at one facility, the CSX gave us a full switch on the correct day 2 out of 14 planned days. We received 7 partial switches. The switches arrived between the hours of 9 AM and 4 PM which also hurts our productivity not knowing when in the day they will arrive. We've worked countless weekend overtime hours at our CSX plants either expecting them to come with a make-up switch that does not happen, or to load customer trucks because of railroad failures. The CSX's lack of precision in their operations has been very costly to us and our customers. In 2021, this member's customers paid over $1.5M for emergency trucks to cover shipments that should've been carried by the CSX. YTD in 2022, customers have incurred over $500k in emergency trucking costs attributed to CSX service.

Norfolk Southern's (NS) performance in the State of New York also is adversely affecting companies' operations. Multiple customers that have seen average transit times on loaded cars increase by seven days. A customer advised that they spent $500,000 in Q1 2022 on unplanned trucks because of failures in freight rail service. The customer has a continuous process, so a seven-day disruption in supply caused by the NS forces them to use trucks to keep running.

The Union Pacific has (UP) been a company's most reliable carrier the last nine months. They have been competent at servicing the plants, the only problem being that transit times have crept up a couple of days. Then, in April, the UP called and informed the company that that at midnight the next business day they wanted the company to curtail shipments by 40%! The UP was not able to explain why this was happening to the company, how they cameup with the 40% reduction or how it would work mechanically. They stated that the company would only be able to ship a set number of cars per day but were not able to answer how that would work considering that the plants all had varying switch days. One plant is only switched once per week and their output exceeded the daily limit. On the date the curtailment was set to begin, the UP called and said the curtailment was going to be delayed by a week so they could better answer customer questions. Then, the UP called and said they no longer planned to curtail thecompany's shipments. However, the company had just leased 300 additional cars for the UP business,which is seeing a forecasted surge in demand. The UP informed us that if we brought these cars online, we could be subject to embargo. At this time, they are not able to tell us when we could start shipping these additional carloads. The company estimates that it is losing $1.7M in revenue each month until the UP allows it to increase its shipments to the forecasted levels. A forecast that was

shared with the UP at the start of the year, this is planned growth, yet they are not able to handle it.

In early Q4 2021, A member company started sharing with the BNSF its forecast for 2022. Towards the end of the quarter, the company informed them of its plans to expand its capacity to capture demand and started leasing additional railcars to move the products. The company also committed to a contract with Minimum Volume Commitments (MVC). That contract requires the company to ship a minimum number of cars or face stiff penalties. However, the railroad was not willing to provide any commitment of service. In 2020, the company paid a multi-million dollar penalty for missing one of these BNSF MVC's during the global pandemic. This demonstrated that the BNSF is willing to enforce these penalties when we fall short. Yet the company is currently losing millions of dollars a month due to their lack of service and have no recourse.

In February 2022, a member company started to see shipments on the BNSF be delayed by 48 hours. The BNSF they revealed that they were going to do a "Network Reset" which would be completed by April of 2022. Shipments started to be delayed by 48 – 96 hours, and the companies' plants were starting to frequently shut down due to lack of empties or loads not being pulled. The narrative soon changed, and the BNSF was now communicating it would be early June before they could return to normal service levels. In April 2022, the BNSF announced that the "network reset" would now last until the end of September! The service levels have been so poor in April that the company is losing its current levels of business. Delays now are up to a week, and weekend service has been particularly poor causing the company to lose many hours at our plants. The company has spent over $500,000 in trucking to keep customers running in April and estimate at least
$250,000 will be spent in May. The company cancelled a capital expansion project due to the BNSF not being able to handle additional volume. YTD, the company has lost $2M in revenue due to BNSF service. The impact will increase significantly the longer that the BNSF cannot serve the forecasted volume. A forecast was shared with the BNSF months in advance, and it is consistently updated and provided to them. The company business heading west travels great distances so replacing rail service with trucks is not possible. Until the BNSF can get their operations in order, the company cannot move our products.

Appendix – Cost Escalation Clauses

The Balmoral Group reached out in April 2022 to states that previously responded to an AASHTO 2019 survey regarding Cost Escalation Clauses specifically to inquire about any new clauses or clauses for steel or metal products. Where information was obtained, the status is noted below.

Cost Escalation Clauses Status		
STATE	**STEEL**	**NOTES**
California	None Comment: Industry is in the process of making a proposal to Caltrans for a Steel price adjustment compensation specification.	As of March 2022, some contractors are now interested in expanding the indexing clauses. The agency has created a working group and are looking into what items should be indexed and how to make adjustments to future contracts.
Connecticut	We no longer offer a price adjustment for reinforcing steel on projects. Active projects with these items are still honored.	
Illinois	Yes, Started Jan 21, 2006 Index: Consumer Buying Price indices for Shredded Auto Scrap (Chicago) and No. 1 Heavy Melt (Chicago) as published by the American Metal Market (AMM) Trigger Value: 5% Opt-in clause: yes Web reference: https://idot.illinois.gov/Assets/uploads/files/Doing-Business/Specialty-Lists/Highways/Design-&-Environment/BDE-Special-Provisions/Nov-7-2014-Letting/80127.pdf Comments: for specific steel pay items with a contract value greater than $10,000 Effective 04-02-2004, Revised 01-01-2022	Price Indices for Fuel, Bituminous, and Steel: https://idot.illinois.gov/doing-business/procurements/construction-services/construction-bulletins/transportation-bulletin/price-indices
Massachusetts	Yes, see NOTES. Index: MassDOT-Highway Division developed index from producer prices (Poten & Partners Asphalt Weekly Monitor). Trigger Value: 5%, see NOTES. Opt-in clause: No. Web reference: Yes - https://www.mass.gov/service-details/2019-massdot-contract-price-adjustments Comments: Used on contracts with >1,000 tons of HMA.	State legislation enacted on 08/08/2008 requires the use of price adjustment clauses for fuel - both diesel and gasoline, asphalt, concrete and steel - both structural and reinforcing. It requires price adjustments be made on a monthly basis when the monthly cost change exceeds+/- 5%. Specifications have been developed by MassDOT-Highway

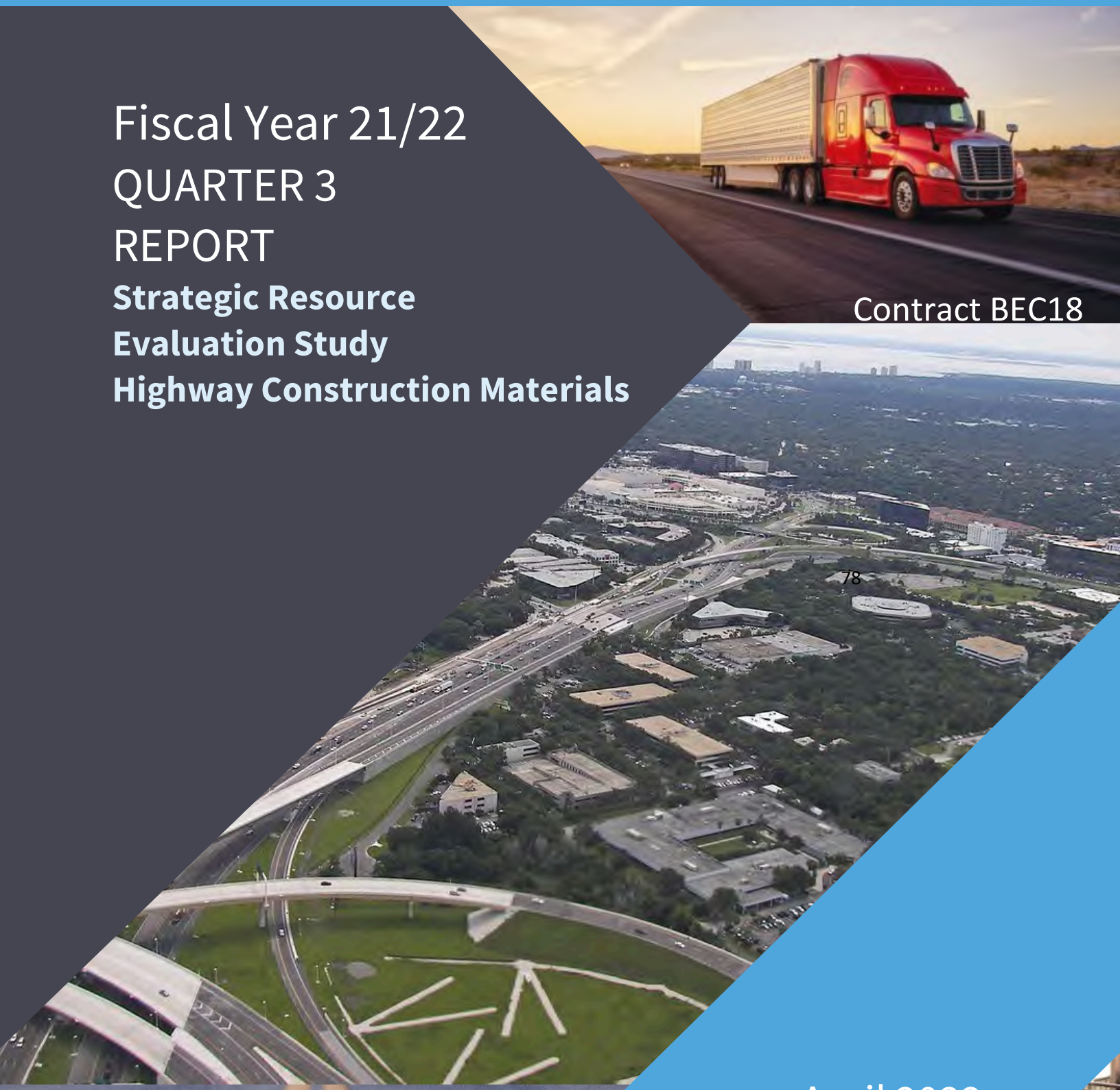
STATE	STEEL	NOTES
		Division for all six commodities.
Minnesota	None - Comments: Previously had language but have not used it in our contracts since 2008.	none
Nebraska	Yes, Index: Average of the Consumer Buying Price Indices for Shredded Auto Scrap (Chicago) and No. 1 Heavy Melt (Chicago) published by AMM (NDOT S1-43-0704) Trigger Value: ? Opt-in clause: Yes Web reference: ? Comments:	none
Nevada	Yes, Index: ENR - 20-city avg for Grade 60, #4 Reinforcing Bars and Hot rolled carbon steel plate. Trigger Value: +/- 10% of BP Opt-in clause: ? Web reference: ? Comments:	Fuel & Steel clauses must be in contract, then requested to enact by contractor. Fuel is retroactive. Steel escalation will only apply from the period of time the unusual price for steel began until the end of the contract. Asphalt Esc is from the beginning of contract to the end. Clauses allow for increase or decrease. BP (Benchmark Price at time of bid opening)
New Jersey	On selected projects Index: USDOL - PPI for Semifinished Steel Mill Products WPU 101702 Trigger Value: 15% Opt-in clause: No Web reference: not available Comments: NJDOT has incorporated a steel price adjustment for only one contract (bid on 8/7/08). The price adjustment applies only to structural steel and reinforcement steel. NJDOT intends to selectively use this provision on very large projects having significant steel quantities.	AC and Fuel Clauses in the Std Spec for adj over 5% change but less than 50% change in index

STATE	STEEL	NOTES
New York	Yes, Index: Producer Price Index for Semifinished Steel Mill Products (WPU 101702) from Bureau of Labor Statistics; Trigger Value: percent change greater than 5%, Opt-in clause: Contractor must opt-in and identify materials to apply adjustment to within 30 days of award (Section 698 of Standard Specifications) Web reference: https://www.dot.ny.gov/main/business-center/contractors/construction-division/fuel-asphalt-steel-price-adjustments Comments:	none
Ohio	Yes, Index: Steel Producers and AMM index Trigger Value: 10% min Opt-in clause: No Web reference: http://www.dot.state.oh.us/Divisions/ConstructionMgt/Specification%20Files/PN525_04202018_for_2019.pdf Comments: PN 525	none
Oregon	Yes, Index: BLS Final IDWPUSISTEEL1, PPI, non-seasonally adjusted index. Trigger Value:10% Opt-in clause: Yes Comments: Yes - Started October 2005. Selected steel bid items only.	None
Pennsylvania	Yes, Index: based on Bureau of Labor Statistics Producer Price Index for "Semi-Finished Steel Mill Products" Trigger Value: +/-5% Opt-in clause: YES Web reference: N/A Comments: N/A	We switched from OPIS to DTN FastRacks for our Diesel Fuel wholesale values.
Puerto Rico	None	Steel clause implemented approx. On 06/04
Rhode Island	Yes as of 7/20/18. This applies to structural steel and rebar. Index: Bureau of Labor Statistics (BLS) PPI just prior to the first date the NOTICE TO CONTRACTORS is advertised in the public press.Trigger Value: 5% variation in indeces. Opt-in clause: No, only applies when specified in contract.	none

STATE	STEEL	NOTES
Utah	Yes For the following: 1. Steel Girders including structural bolts, metal attachments, and structural steel in sign supports 2. Concrete Reinforcing Rebar 3. Steel Pipe Piling/Steel H-PilingIndex: ? Trigger Value: Invoked by contractor any time during the project Opt-in clause: Yes Web reference: http://www.dot.state.ut.us/main/f?p=100:pg:52578146952782023 23:::1:T,V:1708, Comments: This is currently added by special provision in the original contract and uses the http://www.thesteelindex.com, http://ww.crumonitor.com, and http://enr.construction.com/features/conEco/default-city.asp indexes	none
Washington	Yes. Design-Bid-Build. Index: Trigger Value: 10% Opt-in clause: No Web reference: http://www.wsdot.wa.gov/publications/fulltext/projectdev/gspspdf/ 1-09.3.OPT2.FR1.PDF Comments: Implemented August 2008. Applies to all projects greater than 200 working days with non-proprietary walls, and ped or vehicle bridges. Adjustments applied to Structural Steel and Reinforcing Steel, may be credit or payment. For 2015 the specification was updated; a major change in the update was to move to a Bureau of Labor and Statistics producer price index (WPUSISTEEL1) for the steel price. There is not an escalation clause for Design-Build projects.	-
Wyoming	Yes, Index: monthly index price for steel ($ per ton) based on data obtained from the U.S. Department of Labor (USDOL), Bureau of Labor Statistics, which publishes monthly Producer Price Index (PPI) values for various commodities. The index price for steel is based on the PPI value posted by USDOL for "Semi-finished Steel Mill Products" (Series ID WPU101702). Opt-in clause: no Web reference: wwwftp://wydot-filestore.dot.state.wy.us/Construction/2010SupplementalSpecifications Comments: See SS-100K	

Fiscal Year 21/22
QUARTER 3
REPORT

Strategic Resource Evaluation Study Highway Construction Materials



Contract BEC18

April 2022

The Balmoral Group

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