Biofuel Development Opportunity Zone Rating Grenada, MS
Date of Issue: April 11, 2024
Rating Grade: **'A'**

A
High Quality

Rating Parameters:

Category	Rated Quantity	Delivered Price	BDO Zone Size
Pulpwood	1,250,000 bdt/yr	$50-$60/bdt	75-mi drive distance
Sawmill residues	400,000 bdt/yr	$50-$70/bdt	from Duck Hill, MS
Forest residues	200,000 bdt/yr	$50-$60/bdt	

BDO Zone Assets

- **1.85 million bone dry tons (bdt) of woody biomass available in the BDO Zone at low risk, including 1.25 million bdt of pulpwood, 0.4 million bdt of sawmill residues, and 0.2 million bdt of forest residues.**
- **Legacy of private forest ownership and forest operations providing strong support for local biofuel developments.**
- **Excellent greenfield location for a new facility in an industrial park with all utilities, access to rail, road, and air transportation, and extensive land available for expansion and storage.**

BDO Zone Liabilities

- **Labor challenges that will require sustained training and retention efforts to scale up.**
- **Increasing transportation costs due to high truck insurance rates and truck driver shortages.**
- **Potential housing challenges for new project employees.**

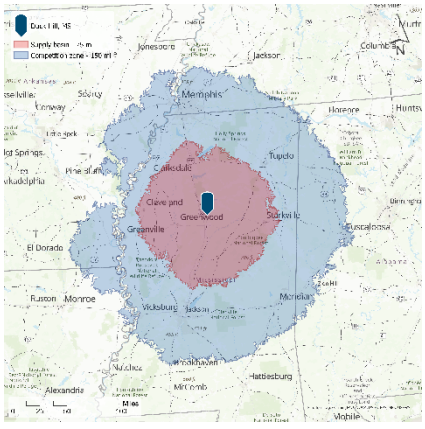
Rating Grade

The Grenada, MS, Biofuel Development Opportunity Zone is rated 'A,' or 'low' risk.

Risk Rating Grades are defined as follows: AAA (*extremely low*), AA (*very low*), A (*low*), BBB (*low-moderate*), BB (*moderate*), B (*moderate-high*), and C (*high*).

'A' ratings denote high prospective viability of Feedstock Supply and Infrastructure and low expectations of default risk in the Zone. Capacity to support new biobased plant operations is considered strong. This capacity may, nevertheless, be more vulnerable to labor shortages and increasing transportation costs.

Grenada, MS BDO Zone



Scoring & Rating Methodology

In assessing the biomass supply chain risk for the Biofuel Development Opportunity (BDO) Zone, 88 Risk Indicators from the US Standards for Biomass Supply Chain Risk (BSCR) were applied. These BDO Zone Risk Indicators are the subset of BSCR Risk Indicators applicable to evaluating feedstock risk within a BDO Zone.

Feedstock quantities are expressed in bone-dry tons per year (bdt/yr), which is a ton of woody residue with a moisture content of 0% (wet basis). Feedstock costs are expressed in United States dollars (USD). Maximum transport distance is based on a 75-mile driving distance from the center point (Duck Hill, MS).

The BDO Zone rating is based on an aggregation of the scores assigned to each BDO Zone Risk Indicator (RI) assessed in this report. First, each BDO Zone Risk Indicator is given a **Raw Risk Likelihood (RRL)** score, which denotes the likelihood of a risk to future BDO Zone projects due to the Risk Indicator. RRL Scores are scaled as either *very low* (2), *low* (4), *medium* (6), *high* (8), or *very high* (10).

Each BDO Zone Risk Indicator is given a **Raw Risk Impact (RRI)** score, which denotes the impact on a future BDO Zone project due to the Risk Indicator. RRI scores are

scaled as either *very low* (2), *low* (4), *medium* (6), *high* (8), or *very high* (10). Impact level scores are based on the impact level of a risk on the successful development and deployment of a BDO Zone project with no mitigation measures.

The **Gross Risk Indicator (GRI)** score is then calculated as the product of the RRL and the RRI scores. For example, if an indicator is assigned a RRL of 2 and a RRI of 8, the GRI for this risk indicator is 2 $\times$ 8 = 16.

If the analyst deems that a typical bio-based project could put in place economically reasonable measures or best practices that mitigate either the likelihood (RRL) or the impact (RRI), or both, then the GRI will be notched accordingly.

The **Loaded RI** score for each Risk Indicator is the product of the GRI score and any notched scores. Loaded RIs are the final score for a Risk Indicator.

Loaded RI scores of 4 are deemed *very low risk*; scores between 4 and 16 are deemed *low risk*; scores between 16 and 36 are deemed *medium risk*; scores between 36 and 64 are deemed *high risk*; and scores of 64 and greater are deemed *very high risk*.

The total risk rating for the BDO Zone is the average of all Loaded RI scores. The score for the Grenada BDO Zone is ***18.7 out of 100, resulting in an 'A' designation***.

All scoring and rationale for each Risk Indicator are provided in Appendix B.

Analyst Notes

The Grenada BDO Zone, defined by a driving distance of 75 miles from Duck Hill, MS, spans 31 counties and includes approximately 6 million acres of forest land.

There is a strong history of forest land ownership, logging, and wood processing in the Grenada BDO Zone, which has proven resilient in the post-COVID years.

There are 271 logging companies in the BDO Zone, comprised of one to five logging crews and owning truck fleets ready to provide fiber to a potential new entrant. The BDO Zone is attractive to new industry entrants due to the large volumes of pulpwood, sawmill residues, and forest residues potentially available.

It was concluded that proponents of new bio-projects in the Grenada BDO Zone could confidently have access to:

1.25 million bdt/year of pulpwood produced predominantly from thinning operations highly desired by the forest owners in the region.

200,000 bdt/year of forest residues comprised of stem tops that are presently utilized in small quantities, but deserve better use than being piled and burnt.

400,000 bdt/year of sawmill residues currently delivered to pulp and pellet mills located outside the BDO Zone.

Much of the equipment and experience relevant to woody biomass supply chains are already present in the region. Scale-up to the rated quantities can be achieved within 2-years, with investments incentivized through favorable off-take agreements and collaborative training developed jointly by the proponents and local logging companies.

BDO Zone Assets

With 1.85 million bone dry tons (bdt) of woody biomass available in the BDO Zone at low risk it may come as no surprise that the Grenada BDO Zone is an area of excellent biomass supply opportunities.

In addition, the engaging forest business attitude, rooted in a decades-long legacy of private forest ownership and forest operations, provides strong support for local biofuel developments.

The forestry companies in the area are the strongest supporters of a new project and are open to off-take agreements to invest in new equipment and train new crews.

Likewise, forest owners are looking forward to thinning their pine plantations that have been put on hold for too long. Local and state politicians are also on board as they strive to attract new bio-based businesses to the region.

BDO Zone Liabilities

Due to the vast volumes of potentially available woody biomass, significant scale-up efforts will be needed.

One of the identified liabilities was the shortage of skilled labor. A collaborative training program could be developed at the local college between the local industry, the Mississippi Loggers Association, the Mississippi Forestry Commission, and the new entrant. While training opportunities can indeed mitigate the labor shortage identified at both local and state levels, the risk for a new entrant to secure skilled labor is moderate-high.

Similarly, local outreach indicated a scale-up challenge to secure truck drivers at the current insurance rates and with a three-year experience requirement. These challenges could be overcome through the implementation of Bill SB2294, which waves the commercial driver's license tests to military members and veterans.

Lack of housing was also identified, although some local resources exist to mitigate them (e.g., new apartment complex construction, rentals). However, existing housing seems insufficient to support a significant increase in demand triggered by a new entrant.

Infrastructure Profile

Grenada County offers an excellent greenfield location to a new facility in an industrial park with 3-phase power, water, sewage, garbage collection, high-speed fiber optic internet, access to rail, major highways, and air transportation, and extensive land available for expansion and storage. The site comprises two 100 ac lots located in an industrial park, just north of the Town of Grenada, which offers good health care and education opportunities (i.e., all levels of education from K-12 to university and vocational programs).

Project Director

Marian Marinescu
Senior Analyst
Ecostrat Inc.
Marian.Marinescu@ecostrat.com

Technical Advisor and Reviewer

Mahmood Ebadian
Director of Advisory Services
Ecostrat Inc.
mahmood@ecostrat.com

Technical Contact

Marcin Lewandowski
Senior Director, Operations & Risk
Ecostrat Inc.
marcin@ecostrat.com

Business Contact

Jordan R. Solomon
President & CEO
Ecostrat Inc.
jordan.solomon@ecostrat.com

Figure 1: Risk Indicators (Sorted by Risk Level)

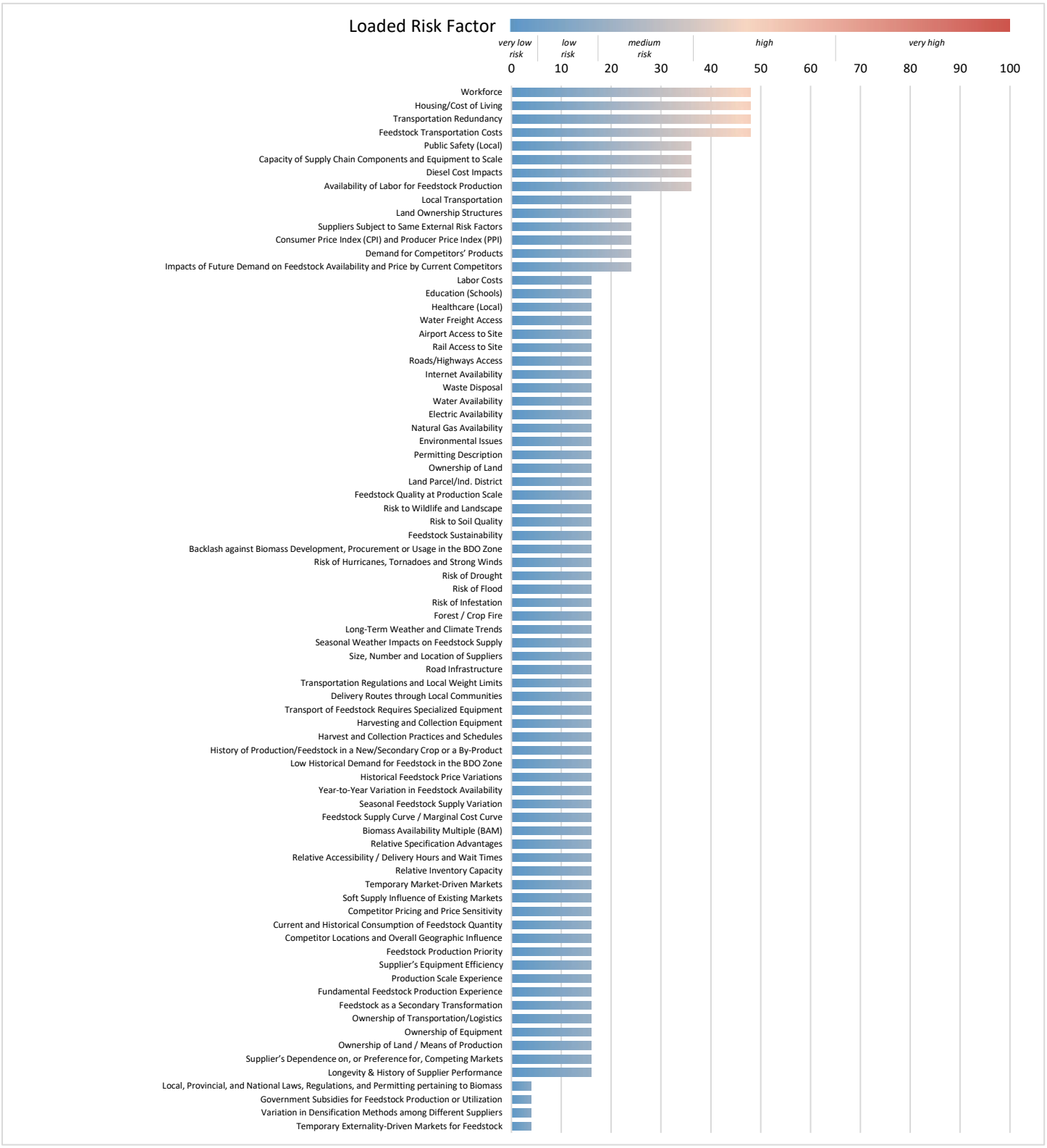


Table 1: Risk Indicators and Associated Scores

	Feedstock Supply Chain Risk Indicators	Raw Risk Likelihood	Raw Risk Impact	Gross Risk Indicator	Mitigation /Notching	Loaded RI Score
	Category 1.0: Supplier Risk					
1.1.1	Longevity & History of Supplier Performance	4	4	16	NN	16
1.2.1	Supplier's Dependence on, or Preference for, Competing Markets	4	4	16	NN	16
1.3.1	Ownership of Land / Means of Production	4	4	16	NN	16
1.3.2	Ownership of Equipment	4	4	16	NN	16
1.3.3	Ownership of Transportation/Logistics	4	4	16	NN	16
1.3.4	Feedstock as a Secondary Transformation	4	4	16	NN	16
1.4.1	Fundamental Feedstock Production Experience	4	4	16	NN	16
1.4.2	Production Scale Experience	4	4	16	NN	16
1.5.1	Supplier's Equipment Efficiency	4	4	16	NN	16
1.6.1	Feedstock Production Priority	4	4	16	NN	16
	Category 2.0: Competitor Risk					
2.1.1	Competitor Locations and Overall Geographic Influence	4	4	16	NN	16
2.1.2	Current and Historical Consumption of Feedstock Quantity	4	4	16	NN	16
2.1.3	Competitor Pricing and Price Sensitivity	4	4	16	NN	16
2.1.4	Impacts of Future Demand on Feedstock Availability and Price by Current Competitors	6	4	24	NN	24
2.1.5	Soft Supply Influence of Existing Markets	4	4	16	NN	16
2.1.6	Temporary Market-Driven Markets	4	4	16	NN	16
2.2.1	Relative Inventory Capacity	4	4	16	NN	16
2.2.2	Relative Accessibility / Delivery Hours and Wait Times	4	4	16	NN	16
2.2.3	Relative Specification Advantages	4	4	16	NN	16
2.2.4	Demand for Competitors' Products	6	4	24	NN	24
	Category 3.0: Supply Chain Risk					
3.1.1	Biomass Availability Multiple (BAM)	4	4	16	NN	16
3.1.2	Feedstock Supply Curve / Marginal Cost Curve	4	4	16	NN	16
3.1.3	Seasonal Feedstock Supply Variation	4	4	16	NN	16
3.1.4	Year-to-Year Variation in Feedstock Availability	4	4	16	NN	16
3.2.1	Historical Feedstock Price Variations	4	4	16	NN	16
3.2.2	Low Historical Demand for Feedstock in the BDO Zone	4	4	16	NN	16
3.2.3	History of Production/Feedstock in a New/Secondary Crop or a By-Product	4	4	16	NN	16
3.3.1	Consumer Price Index (CPI) and Producer Price Index (PPI)	6	4	24	NN	24
3.3.2	Currency Risk	NR	NR	NR	NR	NR
3.3.3	Border Risk	NR	NR	NR	NR	NR
3.3.4	Temporary Externality-Driven Markets for Feedstock	2	2	4	NN	4
3.4.1	Harvest and Collection Practices and Schedules	4	4	16	NN	16
3.4.2	Harvesting and Collection Equipment	4	4	16	NN	16
3.4.3	Variation in Densification Methods among Different Suppliers	2	2	4	NN	4
3.4.4	Availability of Labor for Feedstock Production	6	6	36	NN	36
3.5.1	Feedstock Transportation Costs	6	8	48	NN	48
3.5.2	Diesel Cost Impacts	6	6	36	NN	36
3.5.3	Transport of Feedstock Requires Specialized Equipment	4	4	16	NN	16
3.5.4	Delivery Routes through Local Communities	4	4	16	NN	16
3.5.5	Transportation Regulations and Local Weight Limits	4	4	16	NN	16
3.5.6	Road Infrastructure	4	4	16	NN	16
3.5.7	Transportation Redundancy	6	8	48	NN	48
3.6.1	Size, Number, and Location of Suppliers	4	4	16	NN	16
3.6.2	Suppliers Subject to Same External Risk Factors	4	6	24	NN	24
3.6.3	Land Ownership Structures	4	6	24	NN	24
3.7.1	Seasonal Weather Impacts on Feedstock Supply	4	4	16	NN	16
3.7.2	Long-Term Weather and Climate Trends	4	4	16	NN	16
3.7.3	Forest / Crop Fire	4	4	16	NN	16
3.7.4	Risk of Infestation	4	4	16	NN	16
3.7.5	Risk of Hail	NR	NR	NR	NR	NR
3.7.6	Risk of Flood	4	4	16	NN	16
3.7.7	Risk of Drought	4	4	16	NN	16
3.7.8	Risk of Hurricanes, Tornadoes, and Strong Winds	4	4	16	NN	16
3.7.9	Risk of Low Temperatures	NR	NR	NR	NR	NR
3.8.1	Government Subsidies for Feedstock Production or Utilization	2	2	4	NN	4
3.8.2	Local, Provincial, and National Laws, Regulations, and Permitting pertaining to Biomass	2	2	4	NN	4
3.8.3	Backlash against Biomass Development, Procurement or Usage in the BDO Zone	4	4	16	NN	16
3.8.4	Consent of, and Cooperation with, Indigenous Communities and First Nations	NR	NR	NR	NR	NR

3.8.5	Food Security Concerns	NR	NR	NR	NR	NR
3.9.1	Feedstock Sustainability	4	4	16	NN	16
3.9.2	Risk to Soil Quality	4	4	16	NN	16
3.9.3	Risk to Surface and Groundwater	NR	NR	NR	NR	NR
3.9.4	Water Use	NR	NR	NR	NR	NR
3.9.5	Pesticide Risk to Human and Ecosystem Health	NR	NR	NR	NR	NR
3.9.6	Risk to Wildlife and Landscape	4	4	16	NN	16
3.9.7	Biomass Classified as Genetically Modified Organism (GMO)	NR	NR	NR	NR	NR
	Category 4.0: Feedstock Scale-up Risk					
4.1.1	Feedstock Quality at Production Scale	4	4	16	NN	16
4.1.2	Capacity of Supply Chain Components and Equipment to Scale	6	6	36	NN	36
	Category 5.0: Infrastructure					
5.1.1	Land Parcel/Ind. District	4	4	16	NN	16
5.1.2	Ownership of Land	4	4	16	NN	16
5.1.3	Permitting Description	4	4	16	NN	16
5.1.4	Environmental Issues	4	4	16	NN	16
5.2.1	Natural Gas Availability	4	4	16	NN	16
5.2.2	Electric Availability	4	4	16	NN	16
5.2.3	Water Availability	4	4	16	NN	16
5.2.4	Waste Disposal	4	4	16	NN	16
5.2.5	Internet Availability	4	4	16	NN	16
5.3.1	Roads/Highways Access	4	4	16	NN	16
5.3.2	Rail Access to Site	4	4	16	NN	16
5.3.3	Airport Access to Site	4	4	16	NN	16
5.3.4	Water Freight Access	4	4	16	NN	16
5.4.1	Healthcare (Local)	4	4	16	NN	16
5.4.2	Education (Schools)	4	4	16	NN	16
5.4.3	Local Transportation	6	4	24	NN	24
5.4.4	Public Safety (Local)	6	6	36	NN	36
5.4.5	Housing/Cost of Living	6	8	48	NN	48
5.5.1	Workforce	6	8	48	NN	48
5.5.2	Labor Costs	4	4	16	NN	16
					Average	**18.7**



Grenada, MS BDO Zone Independent Review Committee (IRC)

Matthew Harrison – CEO, President & Director, Greater Grenada Partnership, Grenada Chamber of Commerce
Allyson Coleman – Position, Greater Grenada Partnership, Grenada Chamber of Commerce
Chris Hathcock – SVP, Grenada State Bank
Brad Branscome – SVP, Guaranty Bank
Jared Sleeth – Director of Sales and Marketing, Gulf and Atlantic Rail & Grenada Rail
Casey Anderson – Executive Director, Mississippi Forestry Association
John Auel – Certifications Programs Coordinator, Mississippi Forestry Association
Kevin Harrison – Owner, Harrison Logging
Mitch Sones – Owner, Timberland Harvesters
Wade Byars – Owner, Byars Logging

APPENDIX A: BIOMASS AVAILABILITY AND PRICING

This section assesses the availability and pricing of woody biomass as feedstock for bioenergy, biofuels, and other bio-based products in Grenada, Mississippi (MS), as a BDO Zone region. The center point for the woody biomass availability assessment is Duck Hill, MS.

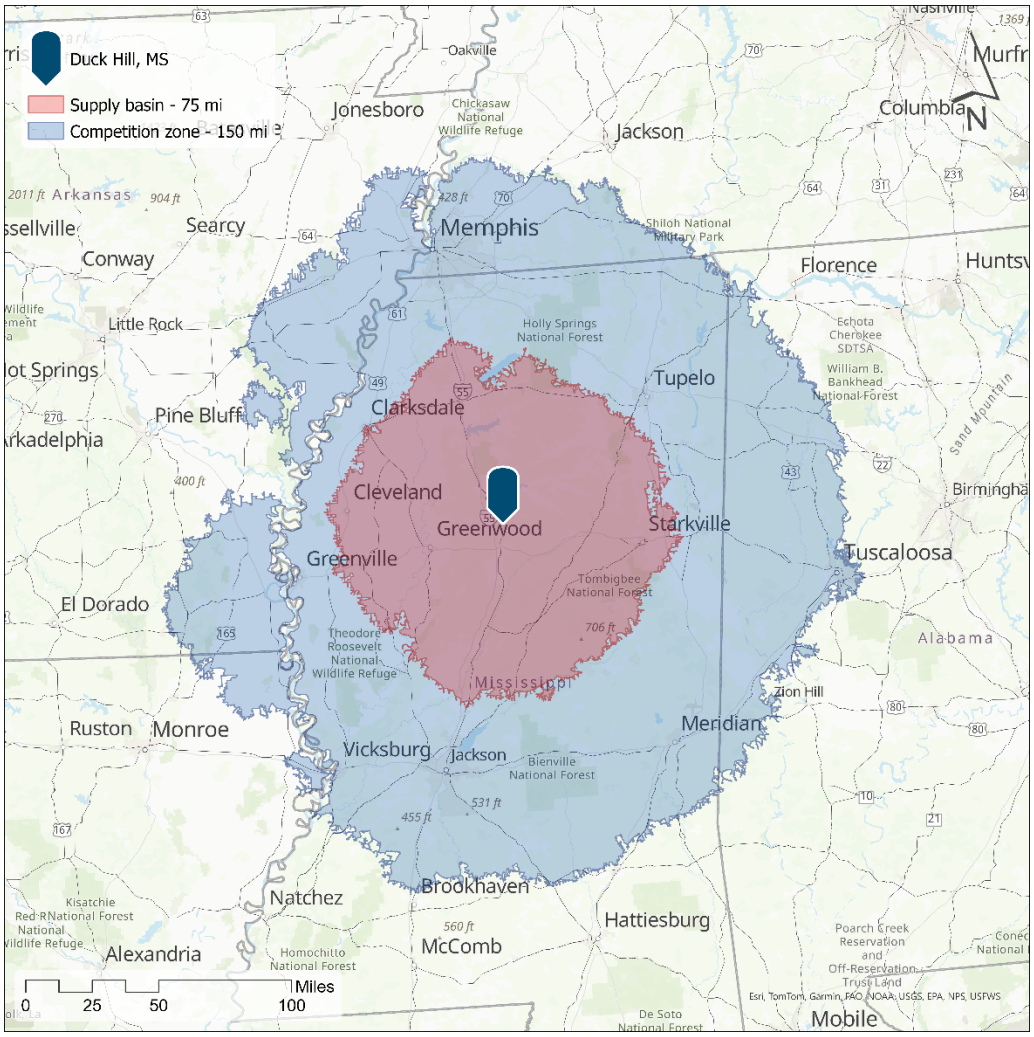
OVERVIEW

The forest land in the State of Mississippi was estimated at 19.2 million acres (2021), or approximately 62% of the total state area. Approximately 90% of the forests are privately owned by non-industrial public landowners (72%) and timber investment management organizations (18%); the remainder consists of federal, state, and local ownership/management (10%).[1]

Map A-1 shows the Grenada BDO Zone and Competition Zone. The BDO Zone is defined by the driving distance of 75 miles from the center point of the BDO Zone (Duck Hill, MS). This is where woody biomass will most likely be sourced for a new project. The Competition Zone is defined by a driving distance of 150 miles from the BDO Zone center point. This is the area where other biomass users are located and currently operating that could compete for available biomass in the supply zone, impacting the availability of woody biomass for future biomass projects located in the BDO Zone. The Grenada BDO Zone spans over 31 counties and includes an area of approx. 6 million acres of forest land, of which 2.5 million acres of softwood tree species (Loblolly/Shortleaf pine), 3 million acres of hardwood species (white and red oak, ash, beech sweetgum, cottonwood, poplar, hickory, and others), and the remainder of mixed softwood and hardwood forests.[2]

[1] researchgate.net/publication/222249892_Evaluating_forest_management_intensity_A_comparison_among_major_forest_landowner_types
[2] texasforestinfo.tamu.edu/tsa/ (Southern Timber Supply Analysis Report generated on January 29, 2024, available upon request)

Map A-1: Map of the BDO Zone and Competition Zone with Duck Hill as the center point.



There is a long history of forest land ownership, logging, and wood processing in the Grenada BDO Zone, which has proven resilient despite the economic hardships of the past three years. Pride of forest land ownership is a legacy in the Grenada BDO Zone. Many forestlands are Sustainable Forestry Initiative (SFI) and Forest Stewardship Council (FSC) certified, and approximately 900 private forests are American Tree Farm System (ATFS) certified.[3] There are 271 logging companies[4] in the BDO Zone, comprised of 1-5 logging crews and owning truck fleets (two or more trucks) ready to provide fiber to a potential new entrant. According to the Greater Grenada Partnership, interest in locating a woody biomass facility in Grenada has been steadily increasing in the past 2-3 years. The BDO Zone is attractive due to the large volumes of pulpwood, sawmill residues, and forest residues potentially available here.

The rated feedstock quantities presented in this report were determined by estimating the potential amount of each woody biomass type (i.e., pulpwood, forest residues, and sawmill residues) that are produced within the Grenada BDO Zone and subtracting the expected demand for woody biomass in the Competition Zone. A Biomass Availability Multiple

[3] extension.msstate.edu/content/harvest-forest-products and personal communication with local forester (Jan. 30, 2024)
[4] www.mfaplm.com

(BAM) further reduced the estimated amounts based on informed supply chain constraints (e.g., operational, accessibility, and market constraints).

Thus, the resulting rated feedstock quantities are conservative, low-risk estimates of availability for new projects. The price range associated with each rated quantity was determined through market analysis and confirmed/adjusted by outreach. These price ranges reflect the anticipated price that a new project proponent would have to pay to secure the rated quantity of biomass.

Woody Biomass Types

The following are the definitions of the three biomass types rated in this report:

Pulpwood: Roundwood, including but not limited to thinning material, that is not currently utilized in the production of pulp and paper products, lumber, and other value-added wood products.

Forest residues (tops): Sections of tree stems that cannot be processed into merchantable logs (i.e., sawlogs or pulp logs); these include stem tops with a butt diameter of less than 3 inches as well as unmerchantable material. The current practice in the BDO Zone is that forest residues/stem tops are loaded onto logging trucks and comminuted (ground or chipped) at terminal yards (i.e., pulp mill or pellet mill wood rooms). Alternatively, mobile chippers and/or grinders could be employed to comminute them before transportation, but would require additional investments.

Sawmill residues: Byproducts of sawmill operations, produced from conversion of sawlogs into finished wood products such as lumber and engineered wood. A typical lumber mill converts approximately 40-60% of sawlogs into lumber. The remaining portion of sawn timber is transformed into sawmill residues: wood chips, sawdust, shavings, and bark/hog fuel.

Supply Analysis

Analysis and outreach confirmed that all three woody biomass types are available for new bio-projects, as follows:

Pulpwood

The Grenada BDO Zone is a prime producer of both hardwood and softwood sawlogs and pulp logs. Clearcutting,[5] full tree harvesting, and transportation are the preferred harvesting practices, as high efficiencies can be obtained. However, the US South is also the home of the most extensive pine plantations in the world. Thus, to reach maximum growth, these plantations must be thinned[6] at least two times before the highest value is obtained at the age of 30-35 years or older. Sometimes, forest landowners may delay the harvest of even-aged loblolly pine for 10 years for an expected price premium of $5 per ton, 20 years for $18 per ton, and 30 years for $38 per ton.[7] Thinning practices ensure a healthy tree succession and generate a significant volume of pulpwood.

In the past few years, pulpwood customers have either closed or curtailed their production capacities. Moreover, current pulpwood customers operate on a daily quota system, creating logistical and economic challenges for loggers and forest owners. This challenging local pulpwood market has forced many forest owners to delay thinning their pine plantations

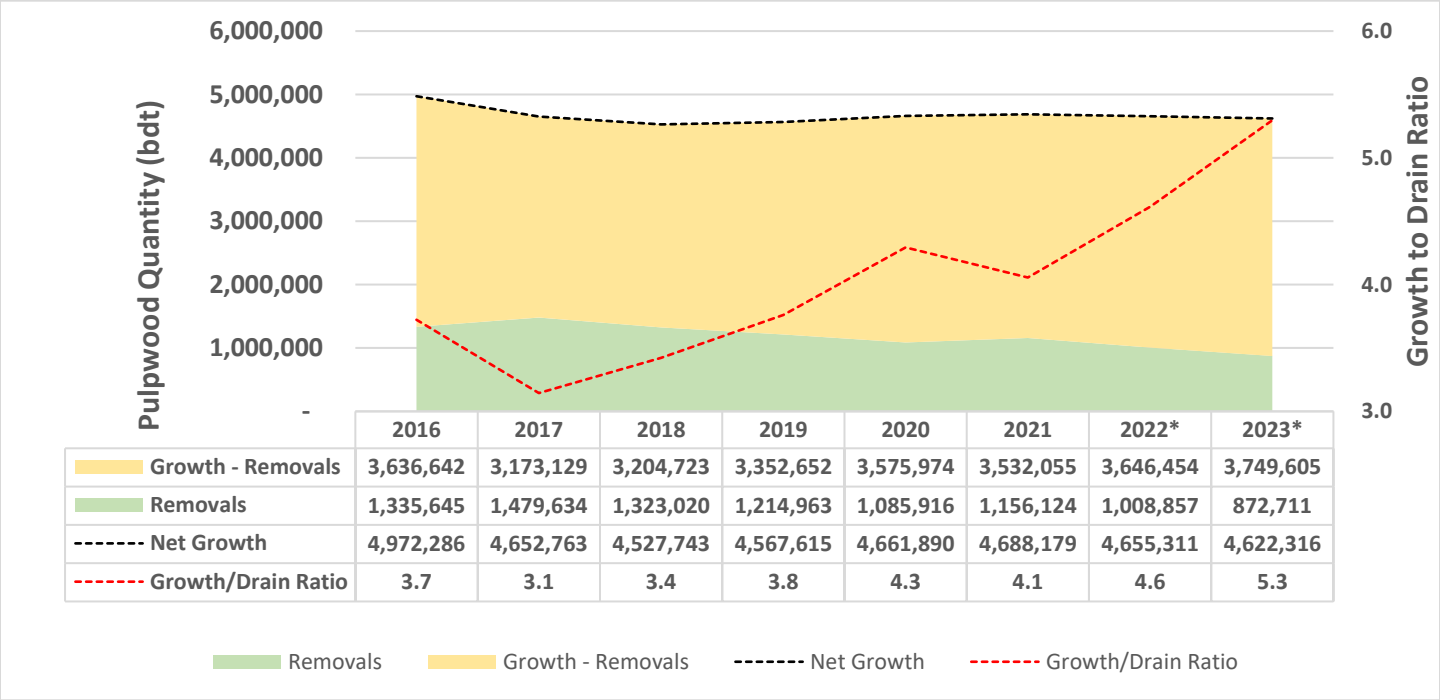
[5] Clearcutting: a timber harvesting practice where most of the trees in a given area are harvested at the same time.
[6] Thinning: removal of a portion of the trees in a young forest stand/plantation to reduce its density (trees/ac); thus, allowing the remaining trees to have access to more water, minerals, and sunlight and to achieve better growth rates.
[7] www.cfr.msstate.edu/news/news_article.asp?guid=726#:~:text=Conventional%20rotation%20or%20optimal%20harvest,grows%2C%20the%20better%20the%20wood. (Accessed February 8, 2024)

by more than 5 years in some instances. Other forest owners decided to not thin at all, or to incur profit losses by thinning at very low stumpage prices below $1/ton.[8]

Figures A-1 and A-2 and Table C-1 (in Appendix C) show this significant drop in pulpwood harvesting since 2017, especially in softwood species. While the net growth of pulpwood size trees has slowly increased, the pulpwood removals decreased dramatically, resulting in a growth-to-drain ratio of 5.3[9] and a pulpwood technical availability of 3.75 million bdt/year with a 60/40 softwood/hardwood proportion.

Sustainable harvesting practices constrain harvesting the entire technically available pulpwood quantity (i.e., net growth minus removals). A third of this quantity, or 1,250,000 bdt, would provide a realistic and practical opportunity for a new pulpwood customer such as pellet, engineered wood products, or biofuel facilities, while maintaining a sustainable growth to drain ratio above 1.5. Loggers and forest owners in the Grenada BDO Zone anticipate that the additional amount of pulpwood harvest would be beneficial. A major benefit would be extending their work schedule from an average of 3-4 days per week to a full week, especially if medium- and long-term agreements were drafted with the new project proponent(s).

Figure A-1: Historical pulpwood net growth, removals, and growth-to-drain ratio in the Grenada BDO Zone.[10]

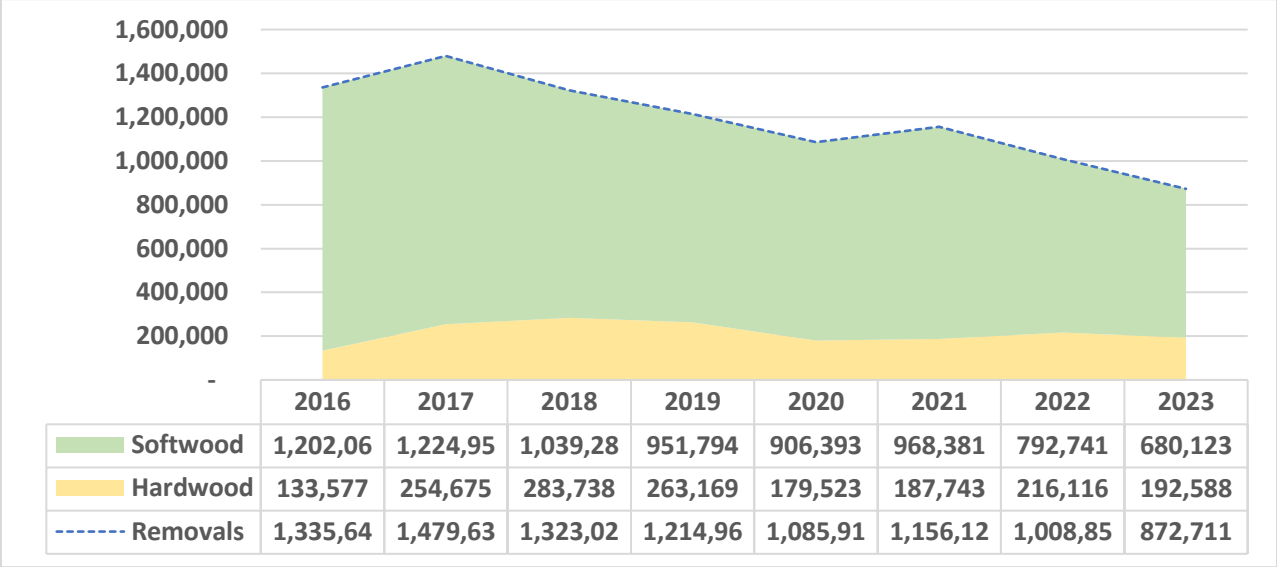


	2016	2017	2018	2019	2020	2021	2022*	2023*
Growth - Removals	3,636,642	3,173,129	3,204,723	3,352,652	3,575,974	3,532,055	3,646,454	3,749,605
Removals	1,335,645	1,479,634	1,323,020	1,214,963	1,085,916	1,156,124	1,008,857	872,711
Net Growth	4,972,286	4,652,763	4,527,743	4,567,615	4,661,890	4,688,179	4,655,311	4,622,316
Growth/Drain Ratio	3.7	3.1	3.4	3.8	4.3	4.1	4.6	5.3

* Net growth quantities for 2022 and 2023 were forecasted based on the historical trend (2016-2021)

[8] Personal communication with local loggers
[9] A net growth value five times larger than that of removals
[10] Sources: Removals Pulpwood (2016-23): extension.msstate.edu/content/harvest-forest-products; Average Net Growth (2016-2021): apps.fs.usda.gov/fiadb-api/evalidator; Average Net Growth (2022-23): forecasted

Figure A-2: Historical pulpwood removals by major species group in the Grenada BDO Zone.[11]



	2016	2017	2018	2019	2020	2021	2022	2023
Softwood	1,202,06	1,224,95	1,039,28	951,794	906,393	968,381	792,741	680,123
Hardwood	133,577	254,675	283,738	263,169	179,523	187,743	216,116	192,588
Removals	1,335,64	1,479,63	1,323,02	1,214,96	1,085,91	1,156,12	1,008,85	872,711

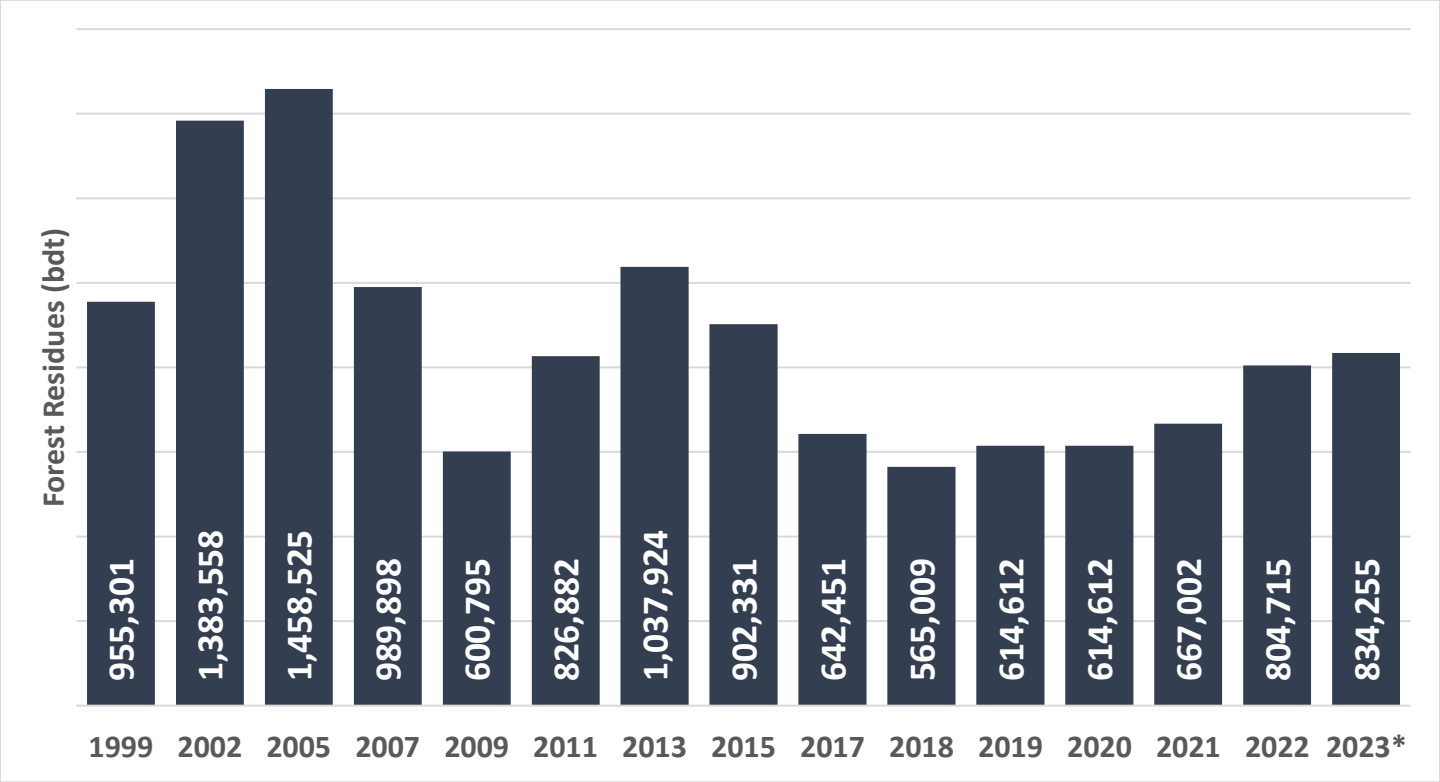
Forest residues (tops)

Figure A-3 and Table C-2 (Appendix C) suggest that, in the past decade, a significant increase in fiber recovery has occurred, mostly as a result of highly efficient harvesting equipment such as mechanized harvesters being employed by local logging operators. This increase in recovery resulted in a significant drop in the waste factor[12] from 0.25 in 2002 to 0.15 in 2022 (Table C-2). A technically available quantity of forest residues in the Grenada BDO Zone of approximately 834,000 bdt, 70/30 softwood/hardwood proportion, was forecasted based on the 1999-2022 values.

The current practice of recovering only a small quantity of stem tops as furnish for the local pulp and paper industry and a short-lived history of grinding/chipping operations in the BDO Zone supported the decision to reduce the rated quantity of forest residues to a quarter of the technical available quantity. As forest residue utilization increases in the region, it is likely that in-woods grinding operations could start developing and more forest residue quantities could be generated and utilized. However, loggers in the Grenada BDO Zone are unlikely to invest in grinding equipment without long-term supply agreements.

[11] extension.msstate.edu/content/harvest-forest-products.
[12] Waste factor is the ratio between the weight of forest residues and weight of harvested timber.

Figure A-3: Historical forest residue quantities produced in the Grenada BDO Zone.[13]



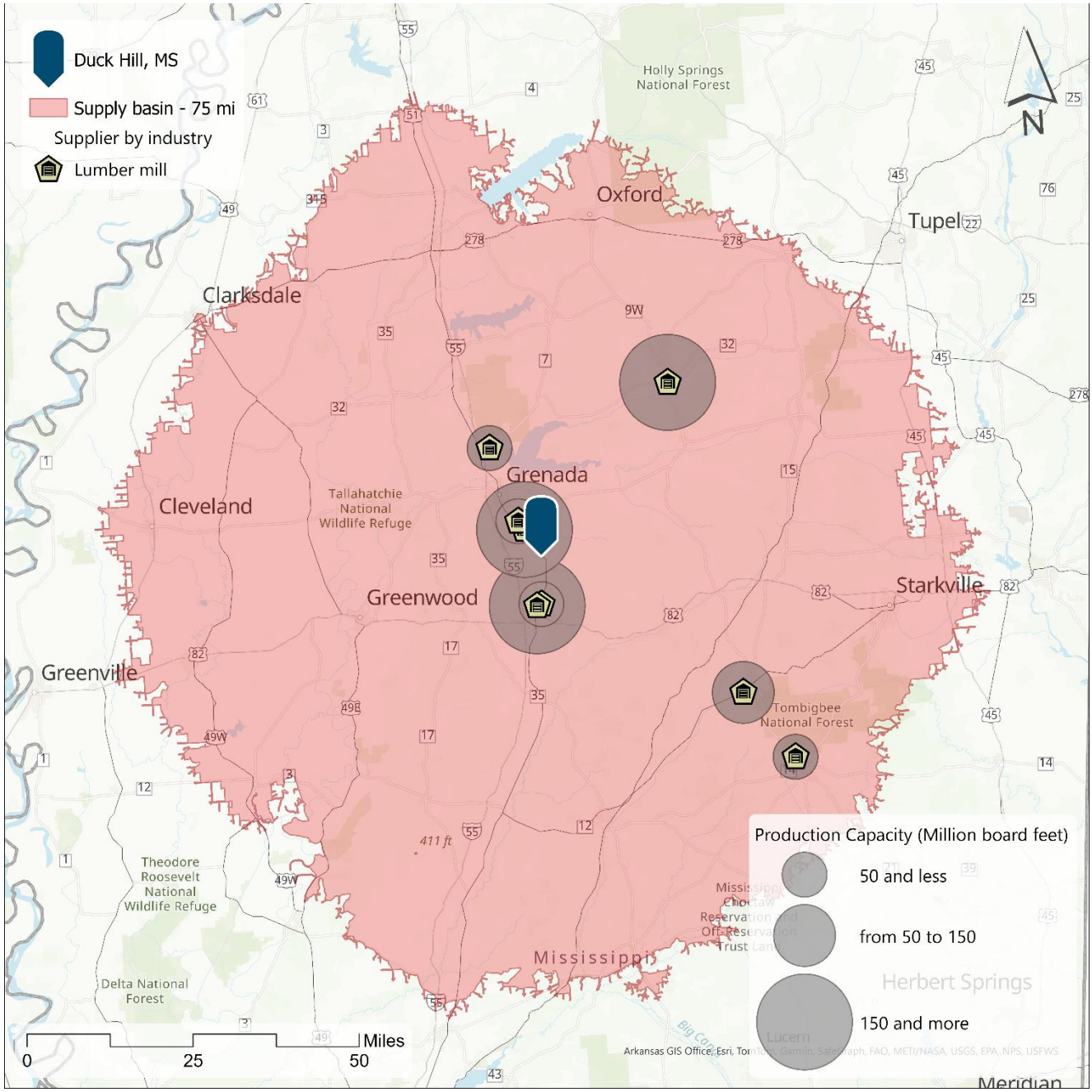
* Quantity in 2023 was forecasted based on historical quantities (2017-2022)

[13] www.fs.usda.gov/research/products/dataandtools/tools/timber-products-output-tpo-interactive-reporting-tool

Sawmill residues

Eight sawmills in the Grenada BDO Zone (Map A-2) range in capacity between 5 MMBF and 310 MMBF. The smaller sawmills below 20 MMBF are hardwood mills, while the largest ones above 100 MMBF are softwood mills. There are also four smaller mills that manufacture posts and ties in addition to some lumber products.

Map A-2. Map of operational sawmilling facilities in the Grenada BDO Zone.



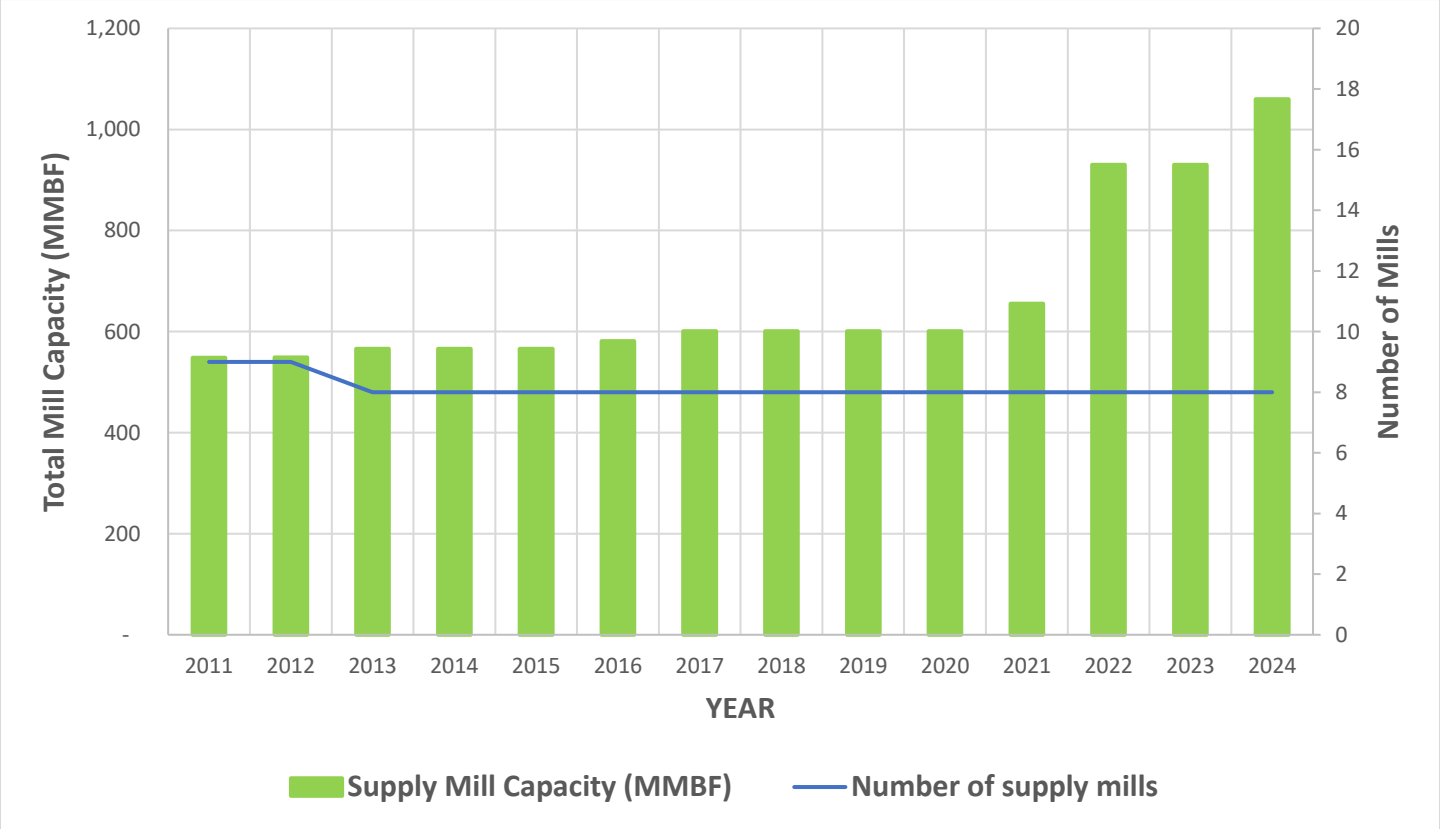
Note: Legend values (MMBF) express capacity of sawmilling facility according to the most recent Forisk data available (Q4-2023).

Despite the closure of three small sawmills in the preceding decade, two larger sawmills have been opened (40 MMBF in 2021 and 300 MMBF in 2022), more than compensating for capacity losses. In addition, one large sawmill more than doubled its capacity in 2024 from 120 MMBF to 250 MMBF.

Figure A-4 indicates that the above events led to a significant increase in sawmill capacity by more than 40% in just the past three years. Local pulp and pellet mills took advantage of these excess quantities of sawmill residues to the detriment of pulpwood volumes (see pulpwood discussion above).

The sawmill residue supply analysis, combined with and confirmed by the outreach, estimated that approximately 1.2 million bdt of sawmill residues could be generated in the Grenada BDO Zone (Table A-1). Currently, the vast majority of sawmill residues generated in the Grenada BDOZ are subject to contractual agreements with regional pulpwood and pellet mills. However, the supply/competition analysis and outreach interviews indicated that at least a third of this quantity may be available to a new entrant under a mutually beneficial off-take agreement.

Figure A-4. Historical sawmilling capacity (MMBF) and number of sawmills in Grenada BDO Zone.[14]



[14] forisk.com/product/north-american-forest-industry-capacity-database/

Table A-1: Sawmill residue production estimates in the Grenada BDO Zone.[15]

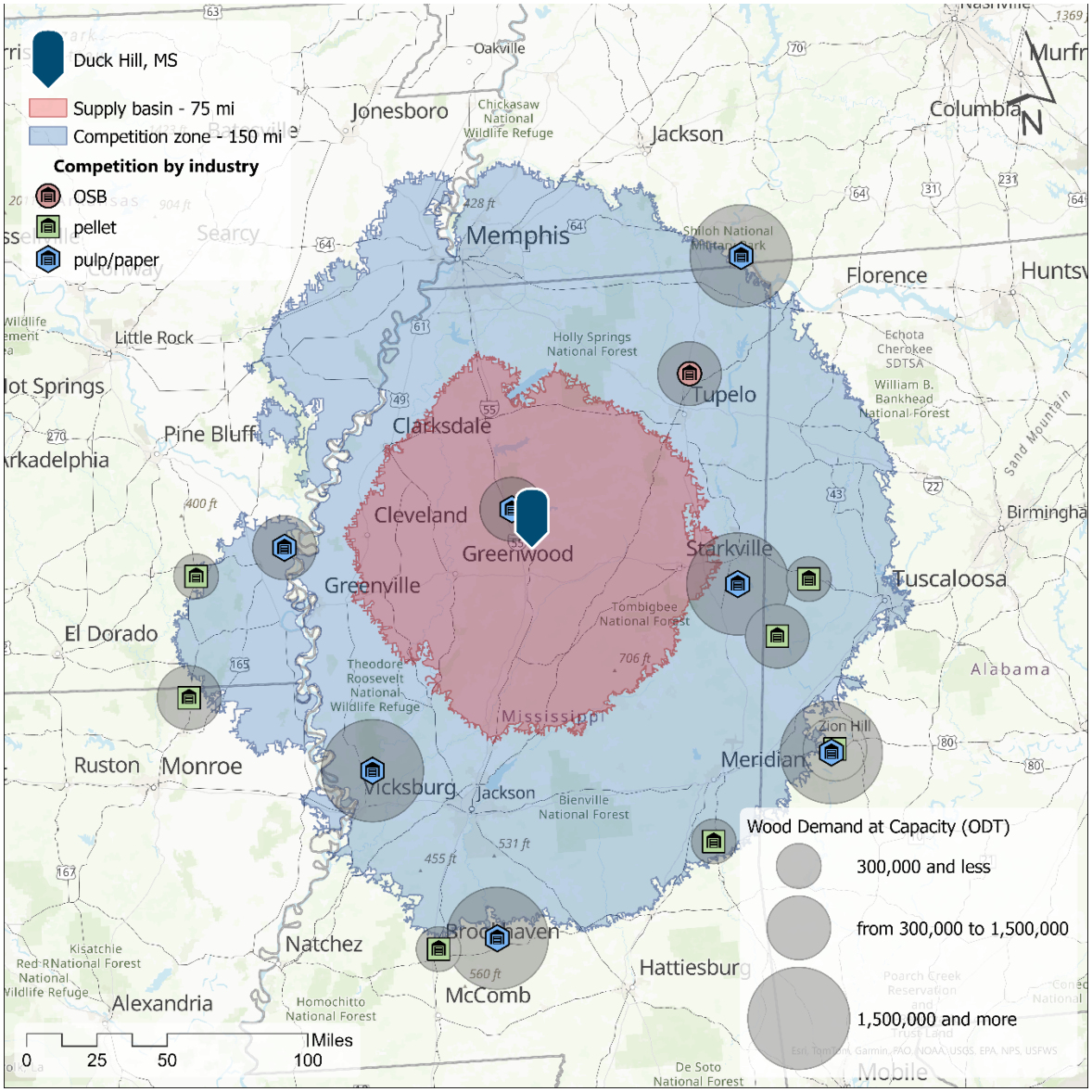
Supplier products	**Sawlog-to-biomass conversion factor** (% of input sawlog volume)	**Total biomass amount in BDO Zone** (bdt/yr)
Wood chips	33%	700,000
Sawdust	5%	100,000
Shavings	7%	150,000
Bark/Hog fuel	11%	250,000
Total	**56%**	**1,200,000**

[15] forisk.com/product/north-american-forest-industry-capacity-database/ and Ecostrat sawmill residue calculator

Competition Analysis

There are currently fifteen consumers of sawmill residues and pulpwood inside or in the proximity of the Grenada BDO Competition Zone (Map A-3): one OSB mill, seven pulp and paper mills, and seven pellet mills. Map A-3 indicates both the location and the input demand range of these facilities. There are currently two pulp and paper mills in the BDO Zone that have a significant competition impact on the fiber supply from the Grenada BDO Zone. One is located inside and the other just outside the BDO Zone. However, due to the current oversupply of woody biomass in the Grenada BDO Zone, it is not unlikely that sawmill residues and pulpwood will travel 100 miles or more to reach these competitors.

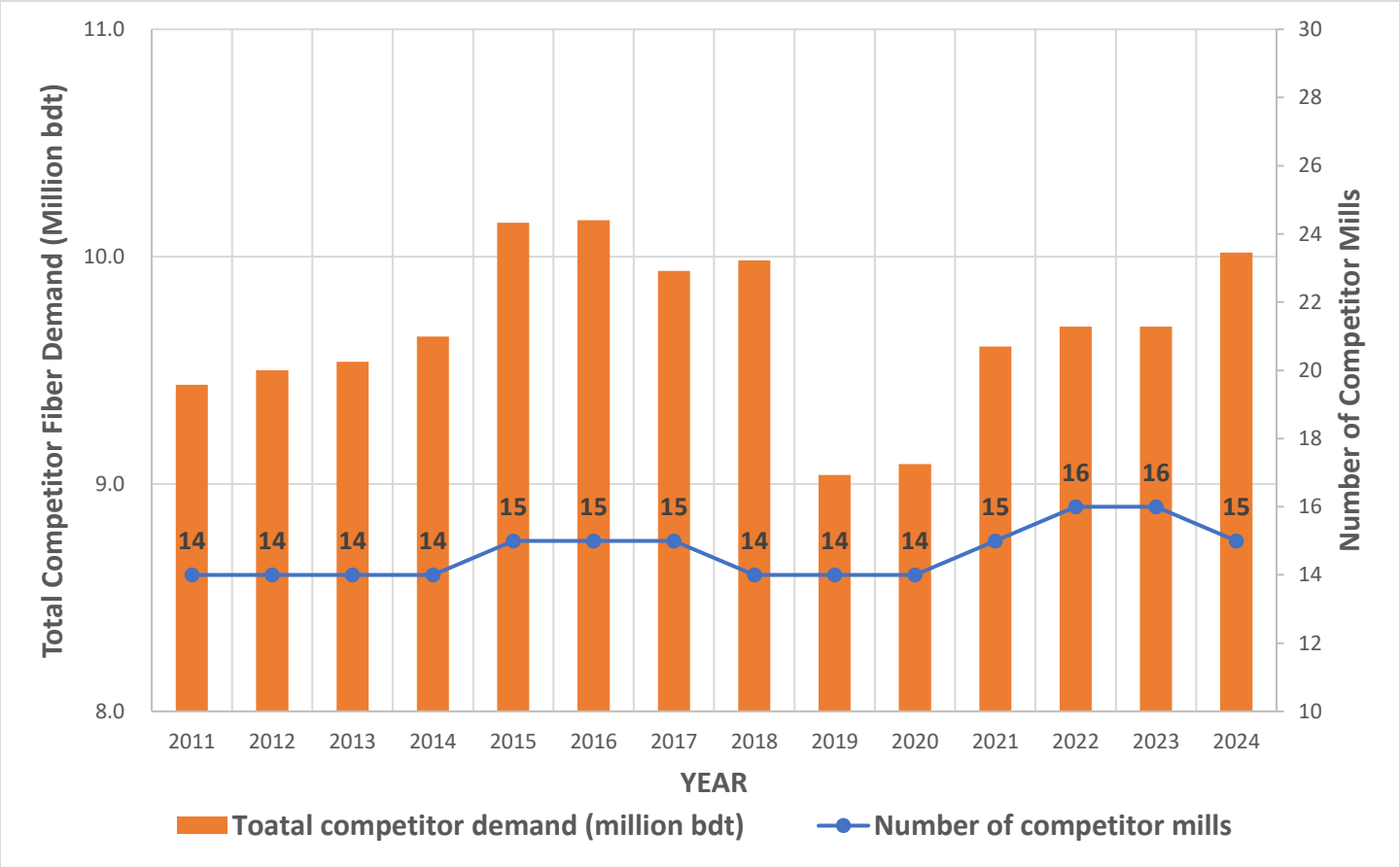
Map A-3. Map of competitors for woody biomass in the Competition Zone.



Note: Legend values express amounts of wood inputs required by each competitor facility according to the most recent Forisk data available (Q4-2023).

Competition for wood fiber has increased in recent years. Since 2012, three new pellet plants have started operations and many existing competitors have increased capacity (Figure A-5). There are also three planned facilities that could significantly increase regional demand for the rated quantities of feedstock. One announcement is especially relevant to the current rating as it is planned to be located in the center of the Grenada BDO Zone. However, as the supply analysis indicated, this BDO Zone has the potential to supply biomass to not just one but multiple new entrants. Figure A-5 shows that the developments described above significantly reduced the wood intake volumes in 2019 and 2020. However, in 2024 the total wood intake of approximately 10 million bdt has rebounded to pre-pandemic levels of 2017-18.

Figure A-5. Historical fiber demand and number of competitor mills.[16]



A distance-based supply/competition methodology[17] estimated that 687,500 bdt/yr (Table A-2) is supplied from the Grenada BDO Zone to the 15 customers in the Competition Zone. The large difference between the total wood intake and distance adjusted supply was attributed to the fact that the majority of competitors are located on the outskirts of the Competition Zone and would have little influence on the long-term supply from the BDO Zone (Map A-3).

An assumption commonly attributed to the pellet and pulp and paper industry and corroborated during outreach was that competitors will first target the sawmill residues to meet their fiber demands. Consequently, it could be safely assumed that approx. 520,000 bdt/yr of sawmill residues out of 1.2 million bdt/yr generated were accessible to a new entrant.

[16] forisk.com/product/north-american-forest-industry-capacity-database/
[17] Methodology in which the further a competitor is located from the center of the supply area, the smaller its demand from the supply area is estimated.

However, a thorough fiber supply analysis and off-take agreements undertaken by the new entrant will be necessary to firm up a realistic sawmilling residue availability.

Table A-2. Woody biomass demand by competitor category.[18]

Competitor category	Feedstock demand (bdt/yr)	Feedstock demand from the BDO Zone* (bdt/yr)	Feedstock types
Pulp and paper	7,500,000	631,000	Sawmill chips, pulpwood, forest residue (tops)
Wood pellet	2,200,000	16,500	Sawdust, chips, shavings, pulpwood, forest residue (tops)
OSB	400,000	40,000	Pulpwood
Total	**10,100,000**	**687,500**	

* Adjusted proportionally to the distance from Duck Hill, MS, to each competitor.

RATED QUANTITIES AND PRICING

Table A-3 presents technical and rated estimate quantities of pulpwood, forest residues (tops), and sawmill residues. The Biomass Availability Multiple (BAM) allows for a conservative quantity redundancy that ensures a comfortable degree of confidence to investors that the project-ready estimates are realistic, credible, and achievable.

The larger BAM factors for pulpwood and forest residues than for sawmill residues were assigned to account for uncertainty in the accuracy of existing inventory, scale-up readiness, historical harvesting practices, and volumes, and sudden changes in supply and demand, as follows:

- The **BAM of 3** for pulpwood was selected to provide a realistic pulpwood quantity to a new customer, such as pellet, engineered wood products, or biofuel facilities while maintaining a sustainable growth to drain ratio above 1.5. The resulting rated pulpwood quantity is also similar to the quantity that the former OSB mill in Duck Hill consumed and which current logging companies used to supply. Moreover, this BAM factor ensures a safe room for a new entrant to expand or for multiple new entrants to compete.

- The **BAM of 4** for forest residues was triggered by the current practice of recovering only a small quantity of stem tops as furnish for the local pulp and paper industry and a short-lived history of grinding/chipping operations in the area. This BAM factor allows for sufficient room to expand, especially if long term agreements result in investments in grinding and chipping equipment.

- The **BAM of 1.3** for sawmill residues was the result of the supply/competition analysis and outreach interviews, which indicated that at least a third of the sawmill residue quantity generated in the BDO Zone could be available to a new entrant under mutually beneficial off-take agreements.

[18] forisk.com/product/north-american-forest-industry-capacity-database/ and Ecostrat distance adjusted woody biomass demand calculator

Table A-3: Potential and rated quantities of woody biomass available for future biomass projects.[19]

Biomass types	Technical Quantity (bdt/yr)	Rated Quantity (bdt/yr)	Biomass Availability Multiple (BAM)
Pulpwood	3,750,000	1,250,000	3.0
Forest residues (tops)	800,000	200,000	4.0
Sawmill residues	520,000	400,000[20]	1.3

Table A-4 presents price ranges of pulpwood, forest residues (tops), and sawmill residues delivered up to 45 miles from Duck Hill, MS. These price ranges were estimated based on a combination of market pricing (Timber Mart South Q4-2024) and local outreach validation. The delivered price range for sawmill residues reflects the differences in price between lowest/hog fuel price and highest/shavings price. No additional transportation cost was added as the largest sawmills are located within 45-mile driving distance from Duck Hill and currently deliver to customers outside the BDO Zone. Pulpwood and forest residue delivered price ranges include transportation costs for hauling logs 45 miles and 75 miles, respectively, to Duck Hill (Figure C-4). Note that these price ranges are subject to change, and a new entrant will have to engage in a competitive pricing and/or off-take agreement process with local suppliers/loggers to secure the rated quantities.

Table A-4: Market and local price ranges for pulpwood, forest residues, and sawmill residues in the BDO Zone.[21]

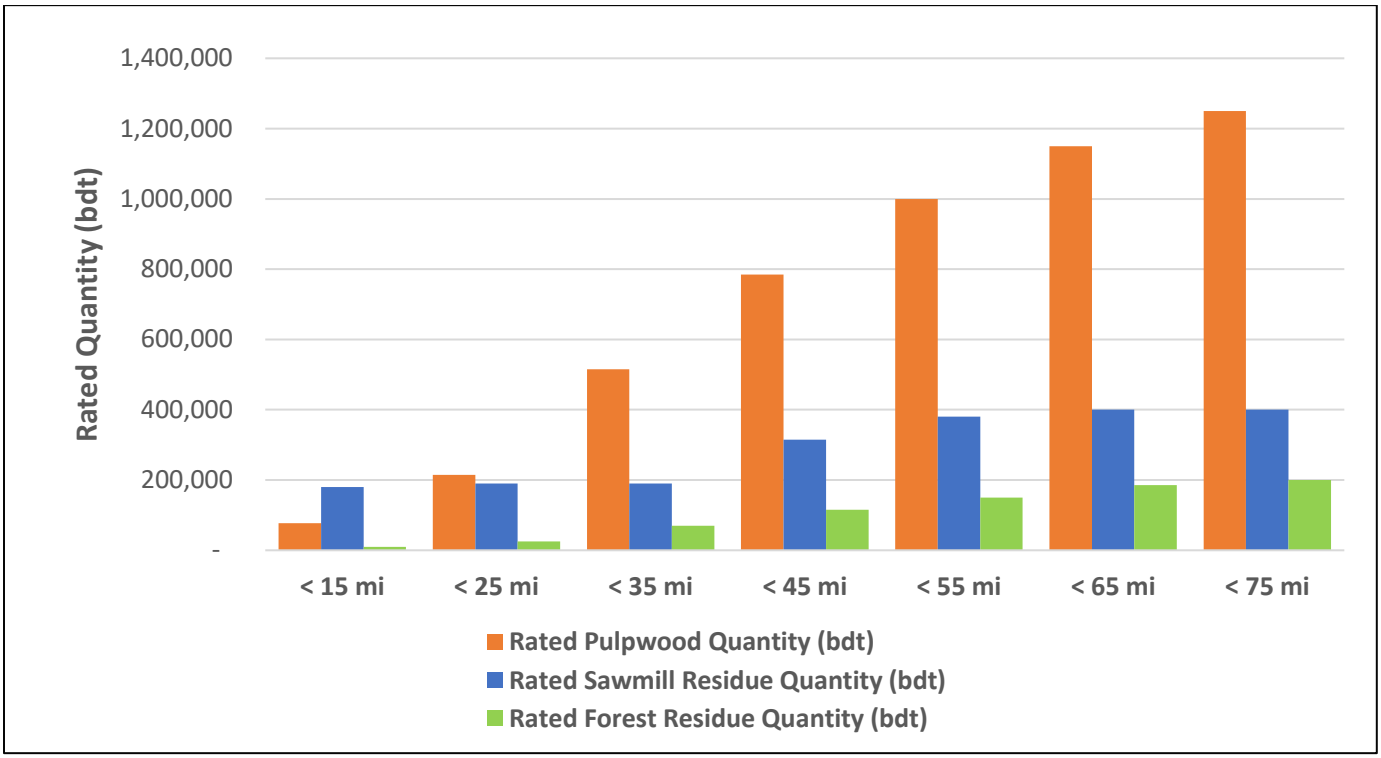
Biomass type	Price Range (delivered to Duck Hill, MS) ($/bdt)*
Pulpwood	50-60
Forest residues (tops)	50-60**
Sawmill residues	45-70

* Prices were converted from $ per green ton to $ per bdt, assuming a moisture content of 50% for all residue types except for shavings, which were assumed to have an average moisture content (wet basis) of 20%.
** Stem tops are currently accepted in small quantities (one load/day) by local pulp mills for the same price as pulpwood.

To better understand the availability of these feedstock types at 10-mile distance increments from Duck Hill, MS, supply curves were constructed for the rated quantities of pulpwood, forest residues, and sawmill residues presented above (Figure A-6). The graph indicates that approximately 60% of the rated pulpwood and forest residue, and 80% of sawmill residue quantities are available within the 45-mile drive distance at the lower price ranges, while the rest are located up to 75-mile drive distance at higher price ranges (Figure C-4).

[19] Sources: www.fs.usda.gov/research/products/dataandtools/tools/timber-products-output-tpo-interactive-reporting-tool; extension.msstate.edu/content/harvest-forest-products; apps.fs.usda.gov/fiadb-api/evalidator; forisk.com/product/north-american-forest-industry-capacity-database/; Ecostrat sawmilling residue calculator
[20] The same proportion of wood chips, sawdust, shavings, and hog fuel was assumed for the rated quantity as presented in Table A-1.
[21] www.timbermart-south.com; Personal communication with local logging and sawmilling operators

Figure A-6. Distance-based supply curve of rated quantities in the Grenada BDO Zone.[22]



Pulpwood Rated Quantity and Price

The rated quantity of **pulpwood** selected for the analysis was **1,250,000 bdt/yr** (Table A-3), and the price range for pulpwood delivered for an average transport distance of 45 miles and maximum distance of 75 miles was estimated to be **$50-$60/bdt** (Table A-4). Currently, due to low demand for pulpwood and a system of daily quotas in the BDO Zone, pulpwood suppliers must deliver to distances in excess of 150 miles for a similar delivered price. A new facility with demand for pulpwood in the BDO Zone would have a location advantage.

Outreach estimated that, if a new project located in the Grenada BDO Zone was able to utilize the rated quantity, approximately 25 logging crews[23] and 90 logging trucks[24] would be necessary to supply this amount. Local logging operators communicated that this high-level scale-up estimate was realistic and achievable either by training, hiring, and retaining new operators or assigning full-time crews to thinning activities.

In terms of logging and transportation capacity in the region, logging companies are currently operating at 60-70% capacity.[25] Trucking fleets seem sufficient to address any spot increases in demand by either hiring trucks from other operators or local transportation companies. Outreach also confirmed that the average logging operations in the Grenada BDO Zone own on average, 2-3 logging trucks. Thus, considering that there are 271 logging companies in the BDO Zone, there seems to be appropriate transportation capacity for the rated quantities.

[22] extension.msstate.edu/content/harvest-forest-products; Ecostrat supply curve calculator
[23] Estimates converted from green tons, as follows: 75 load/wk./crew x 28 t/load = 2,000 t/wk./crew = 1,000 bdt/wk./crew
[24] Estimates converted from green tons as follows: 28 t/load/truck x 4 loads/day/truck x 250 days/yr = 28,000 t/yr/truck = 14,000 bdt/yr/truck
[25] Personal communications with local logging companies

The local college in Grenada offers vocational courses that could be tailored toward logging equipment and truck operator certificates. A model for this program could be the ongoing Logging Equipment Operator Academy, currently hosted at Hinds Community College in Raymond, MS. It is a cooperative effort between the Mississippi Loggers Association and the Mississippi Forestry Commission. The program uses simulators to train students, and had one of the first rubber-tire feller buncher simulators developed by John Deere. Students also get a chance to operate real equipment on the adjacent Mississippi Forestry Commission training area. Students also acquire the Professional Logging Manager Qualification, the Sustainable Forestry Initiative (SFI) training, which loggers are required to have in order to work on certified land and to deliver to certified mills. The first simulator utilized was a standalone unit, and cumbersome to move. Now the program uses several desktop computers, which can be transported between sites more easily. Program graduates will still need some on the job training from the loggers who hire them, but it significantly reduces the overall training time and cost to acquire solid applicable skills.

The only scale-up challenge that logging operators highlighted was that of securing truck drivers at the current insurance rates and the condition of a three-year experience to drive logging trucks. However, these challenges could be partially overcome through the implementation of Bill SB2294, which waves the commercial driver's license tests to military members and veterans. In addition, the 271 logging companies in the Grenada BDO Zone are currently looking for new opportunities to supply additional volumes of pulpwood and are committed to overcoming these labor shortages.

Forest Residues Rated Quantity and Price Range

The rated quantity of **forest residues (tops)** selected for the analysis was **200,000 bdt/yr** (Table A-3), and the price range for forest residues (tops) delivered for an average transport distance of 45 miles and up to 75 miles was estimated to be **$50-$60/bdt** (Table A-4). However, if investments in grinding equipment occurred as a result of long-term off-take agreements, the price range for ground/chipped forest residuals may increase to $60-$70/bdt to offset investments in chippers/grinders. As more volumes of ground/chipped forest residues become available, these prices could decrease in the long run.

If a new project located in the Grenada BDO Zone were able to utilize the rated quantity of forest residues (tops), the same challenges would apply as for pulpwood (see above). That is because only stem tops would be transported to the project location, which would not negatively affect the current logging operation practices. Moreover, significant quality improvements and cost savings may be achieved if the tops were decked neatly and seasoned at the roadside after logging. Also, if the length limit allowed, whole stems with tops attached may be transported to the mill, further reducing both harvesting and transportation costs. However, because forest residue removal, grinding, and utilization do not have a strong history in the Grenada BDO Zone, a BAM of 4 was applied.

Sawmill Residues Rated Quantity and Price

The rated quantity of **sawmill residues** is **400,000 bdt/yr** (Table A-3), and the price range for an average transport distance of 45 miles was estimated to be **$45-$70/bdt** (Table A-4) and reflects the differences in price between bark/hog fuel and shavings. These prices were corroborated between outreach and the most current market prices (Timber Mart South Q4-2023 prices) and are subject to change. They reflect the willingness of some local sawmills in the Grenada BDO Zone to supply a portion of their by-products to a new entrant. However, if a new project located in the Grenada BDO Zone was able to utilize the rated quantity of sawmill residues, a mutually agreeable off-take agreement would be necessary. No challenges were identified in terms of transportation capacity to the project location, as sawmills in the Grenada BDO Zone are currently managing their deliveries well, often to facilities located outside the BDO Zone.

APPENDIX B: RISK INDICATOR SCORING METRICS

CATEGORY 1.0: SUPPLIER RISK

1.1 Risk Factor: Credit-Worthiness/Future Solvency of Suppliers

1.1.1 Longevity & History of Supplier Performance

Rationale: Number of years in business is a positive indicator of future solvency. Historical performance is an indicator of future performance.

Risk Information: The Grenada BDO Zone has a strong history of forest land ownership, logging, and wood processing/sawmilling. Despite the economic hardships of the past three years, it has proven resilient. Pride of forest land ownership is a legacy in the Grenada BDO Zone, as many forestlands are SFI and FSC certified, and approximately 900 private forests are American Tree Farm System (ATFS) certified.

There are 271 logging companies in the BDO Zone, comprised of 1-5 logging crews and owning truck fleets (2-3 trucks per crew on average) ready to provide fiber to a potential new entrant. There are also eight sawmills in the Grenada BDO Zone ranging in capacity between 5 MMBF and 310 MMBF, which currently supply 1.2 million bdt of sawmill residues to customers within and outside the BDO Zone.

Raw Risk Likelihood (RRL) The risk likelihood is deemed *low*, therefore the RRL is 4 out of 10.	**Score** **4**
Raw Risk Impact (RRI) The risk impact is deemed *low*, therefore the RRI is 4 out of 10.	**Score** **4**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL × RRI) is 16 out of 100.	**Score** **16**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) × GRI Score) is 16 out of 100.	**Score** **16**

1.2 Risk Factor: Conflicts of Interest/Vested Interest with Competing Market(s)

1.2.1 Suppliers' Dependence on, or Preference for, Competing Markets

Rationale: Suppliers may have a vested interest or preference to supply to specific competitors for biomass feedstock. Preferences may be due to historical, long-term, or personal relationships, less stringent feedstock quality requirements, more flexible operating hours by competing markets, or supplier's dependences on competing markets to accept or purchase other products/by-products. During periods of feedstock shortage such suppliers may be more likely to allocate the scarce supply to a competitor resulting in supply disruptions for the Issuer.

Risk Information: As presented in Appendix A**,** there is currently an oversupply of pulpwood and forest residues and a significant supply of sawmill residues produced in the BDO Zone. All large competitors are located on the outskirts of the Competition Zone, which triggers challenging economics for the loggers and sawmills to supply them. The risk of competition due to increased or new fiber consumption in the Grenada BDO Zone is very well mitigated by healthy BAM factors and thus was deemed low.

Raw Risk Likelihood (RRL) The risk likelihood is deemed *low*, therefore the RRL is 4 out of 10.	**Score** **4**
Raw Risk Impact (RRI) The risk impact is deemed *low*, therefore the RRI is 4 out of 10.	**Score** **4**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL × RRI) is 16 out of 100.	**Score** **16**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) × GRI Score) is 16 out of 100.	**Score** **16**

1.3 Risk Factor: Supplier Control Over Production and Transportation

1.3.1 Ownership of Land/Means of Production

Rationale: Suppliers that own land where feedstock is produced, or a production facility, tend to have better control of supply chains and present lower degrees of supply risk.

Risk Information: Approximately 90% of the forests are privately owned, and the BDO Zone is attractive due to the large volumes of pulpwood, sawmill residues, and forest residues potentially available here. The US South is also home to the most extensive pine plantations in the world. To reach maximum growth, these plantations must be thinned at least two times until the final clearcut. There is no market in the BDO Zone for the rated quantities of woody residues. Additional amounts of pulpwood and forest residue harvest would be beneficial to both loggers and local private forest owners.

Raw Risk Likelihood (RRL) The risk likelihood is deemed *low*, therefore the RRL is 4 out of 10.	**Score** **4**
Raw Risk Impact (RRI) The risk impact is deemed *low*, therefore the RRI is 4 out of 10.	**Score** **4**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL × RRI) is 16 out of 100.	**Score** **16**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) × GRI Score) is 16 out of 100.	**Score** **16**

1.3.2 Ownership of Equipment

Rationale: In most cases, suppliers which own or lease equipment for harvest, collection and processing feedstock are lower risk than those who are not. For example, third-party harvesting equipment may not be available when required.

Short harvest windows may be missed if a farmer and contractor cannot schedule harvest times that are convenient and quantity shortages can result. However, in some circumstances reliance on third-party equipment to harvest or produce feedstock can decrease supply chain risk. For example, when harvesting agricultural residues such as corn stover, the use of a third-party company with standard equipment specializing in harvesting, collection and transportation may decrease quality variations (e.g., ash content) of final feedstock.
Risk Information: Harvesting and transportation equipment is owned by logging companies and sawmills (i.e., chip vans) with decades of experience in planning and executing harvest and transportation operations. Approximately 25 logging crews and 90 trucks would be needed to supply the rated quantities of pulpwood and forest residues, which is achievable by training/hiring new operators and investing in additional equipment, if necessary, or assigning full-time crews to thinning activities. However, these challenges could be overcome considering that there are 271 logging companies in the Grenada BDO Zone, and an amiable off-take agreement would entice and support investing in new equipment.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed *low*, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed *low*, therefore the RRI is 4 out of 10.	**4**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL × RRI) is 16 out of 100.	**16**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) × GRI Score) is 16 out of 100.	**16**

1.3.3 Ownership of Transportation/Logistics

Rationale: In most cases, suppliers that own or lease transportation equipment necessary to transport biomass from forest or field are lower risk than those who do not. However, in some circumstances, reliance on third parties to transport biomass is common practice and does not contribute to risk.
Risk Information: There are 271 logging companies in the BDO Zone, several of which own their own fleet of logging trucks (on average, 2-3 trucks per crew). Sawmills also own or hire chip vans to supply sawmill residues to various customers. In addition, logging operation owners communicated their strong willingness to invest in new equipment, including logging trucks, if an off-take agreement was issued.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed *low*, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed *low*, therefore the RRI is 4 out of 10.	**4**

Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL × RRI) is 16 out of 100.	**16**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) × GRI Score) is 16 out of 100.	**16**

1.3.4 Feedstock as a Secondary Transformation

Rationale: A secondary transformation dependent upon the production of primary products, e.g., forest residues, corn stover, bark, or sawmill chips (unless from a dedicated chip mill) are all secondary transformations of a primary product.

Risks are higher if feedstock is a secondary transformation of a primary, more valuable product. It may not be economical for suppliers to produce biomass on its own, in the absence of markets for the primary product. For example, a supplier may produce dimensional lumber as its primary product and wood chips as a by-product, therefore relying on the health of the housing market for production levels. If the demand for dimensional lumber drops, so can the availability of sawmill residues.

In case of agricultural feedstocks such as corn stover, the feedstock is a by-product of a primary crop. Since the primary crop is significantly more lucrative than the residue, it will be a priority for the producer. If production of the primary crop requires resources to be taken away from the production of secondary crop (e.g., in case of shorter harvesting windows due to weather), the secondary feedstock supply will suffer. In times of stretched resources, suppliers may also perceive harvesting and collection of the feedstock as a nuisance, potentially decreasing production levels.

Understanding the economic drivers for suppliers' primary product can help gauge risk levels for secondary transformation biomass products.

Risk Information: Sawmilling and forest residues are the only by-products of a secondary transformation, lumber manufacturing, and logging, respectively, while pulpwood is a product of logging. As Figure A-4 indicates, sawmilling capacity in the BDO Zone has been increasing significantly; thus, increasing volumes of sawmill residues are expected. Likewise, availability of forest residues from current harvesting activities seems to be stabilizing at around 800,000 bdt/yr (Figure A-3) despite the current drop in pulpwood harvesting.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed *low*, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed *low*, therefore the RRI is 4 out of 10.	**4**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL × RRI) is 16 out of 100.	**16**

Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) × GRI Score) is 16 out of 100.	**16**

1.4 Risk Factor: Supplier Experience

1.4.1 Fundamental Feedstock Production Experience

Rationale: Risk is higher when suppliers have limited experience with planting/growing/harvesting/ processing and/or collecting biomass. Limited experience may be common for stover or forest residue supply chains where farmers or forestry producers may have no previous experience.

Risk Information: Logging companies in the BDO Zone have been active in the region for generations and are capable of sustaining significant growth if an opportunity arises. Likewise, the sawmilling industry in the area has been stable for the past 12 years and gained additional capacity in the past three years (Figure A-4). The only activity that does not have historical support is the removal and utilization of forest residues, except for smaller quantities of stem tops. However, that expertise can be scaled up and/or augmented with grinding and/or chipping operations if a serious off-take agreement for forest residues is achieved.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed *low*, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed *low*, therefore the RRI is 4 out of 10.	**4**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL × RRI) is 16 out of 100.	**16**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) × GRI Score) is 16 out of 100.	**16**

1.4.2 Production Scale Experience

Rationale: Scale-up entails risk. Risk is higher when suppliers have limited experience with the production of the quantity of feedstock required.

Risk Information: There are 271 logging companies in the BDO Zone, some of which supplied pulp logs for the former OSB mill in Grenada that consumed the rated quantity. While scale-up may require some investments in new equipment, especially for single-crew logging operations, there is general support for large-scale projects, especially if off-take agreements for the rated quantity were put in place in advance.

Raw Risk Likelihood (RRL) The risk likelihood is deemed *low*, therefore the RRL is 4 out of 10.	**Score** **4**
Raw Risk Impact (RRI) The risk impact is deemed *low*, therefore the RRI is 4 out of 10.	**Score** **4**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL × RRI) is 16 out of 100.	**Score** **16**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) × GRI Score) is 16 out of 100.	**Score** **16**

1.5 Risk Factor: Supplier Harvesting/Collection/Processing Capacity

1.5.1 Supplier's Equipment Efficiency

Rationale: Equipment efficiency significantly influences supplier's feedstock production capacity. Understanding supplier's equipment capability enables understanding of their ability to produce feedstock of suitable quality.

Risk Information: Logging crews in the area indicated high harvest productivity (60-80 loads/week) and preference to dedicate high productivity crews to thinning operations, which require less maintenance costs due to the more forgiving nature of the thinning operations. While pulpwood demand and harvest levels in the last five years have dropped (Figure A-2), the total harvesting in the BDO Zone has remained constant (Table C2) due to investments in high-productivity equipment. Outreach indicated that logging companies have become more efficient due to employing mechanized equipment. Some of the logging operators indicated that they would also be willing to invest in grinding and transportation equipment for the recovery of forest residues, as some did in the past, but only if a serious off-take agreement was put in place.

Raw Risk Likelihood (RRL) The risk likelihood is deemed *low*, therefore the RRL is 4 out of 10.	**Score** **4**
Raw Risk Impact (RRI) The risk impact is deemed *low*, therefore the RRI is 4 out of 10.	**Score** **4**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL × RRI) is 16 out of 100.	**Score** **16**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) × GRI Score) is 16 out of 100.	**Score** **16**

1.6 Risk Factor: Supplier Motivation

1.6.1 Feedstock Production Priority

Rationale: When biomass feedstock is a secondary or non-core line of business, or when it is a by-product or a residue from a more valuable primary product, then suppliers may not put in sufficient effort for consistent production. Risk of breach increases when production and/or delivery of feedstock compromises a supplier's ability to make a primary product.

When biomass feedstock is a by-product of another main higher margin or main product (e.g., corn stover (e.g., corn) or forest residues (e.g., pulpwood)) supply may not be a top priority for a supplier.

Risk Information: Sawmill residues have priority over pulpwood and forest residues due to their proximity, pricing, and consistent quality. However, this situation poses no risk over the availability of large volumes of pulpwood and forest residues located in the BDO Zone in case future biomass projects need to use a mix of these biomass resources. All of these biomass resources will be produced as long as there are healthy and sustainable forest practices, businesses, and sawlog harvesting, which is the case in the BDO Zone.

Raw Risk Likelihood (RRL) The risk likelihood is deemed *low*, therefore the RRL is 4 out of 10.	**Score** **4**
Raw Risk Impact (RRI) The risk impact is deemed *low*, therefore the RRI is 4 out of 10.	**Score** **4**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL × RRI) is 16 out of 100.	**Score** **16**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) × GRI Score) is 16 out of 100.	**Score** **16**

CATEGORY 2.0: COMPETITOR RISK

2.1 Risk Factor: Influence on Feedstock Supply of Existing Markets

2.1.1 Competitor Locations and Overall Geographical Influence

Rationale: Competitors' locations relative to siting locations within a BDO Zone can affect the viability of procuring feedstock and the cost of that feedstock. Accurate and detailed competitor mapping provides an understanding of the geographical influence a competitor may have on new plants within a BDO Zone, including competitive advantages such as short hauling.

Risk Information: Currently, there is only one medium-size competitor (Map A-3) and three over 100 MMBF mills in the Grenada BDO Zone (Map A-2), which suggests that sawmill residues may be available to a new entrant capable of signing an off-take agreement with these sawmills. In addition, there is a potential oversupply of pulpwood that can be harvested from thinning operations that are sought after by local forest owners. All large competitors are located on the outskirts of the Competition Zone, which likely meets most of their demands from outside the BDO Zone. Forest residues, while not historically recovered, can also contribute positively to the fiber basket, especially during price fluctuations or severe natural events.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed *low*, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed *low*, therefore the RRI is 4 out of 10.	**4**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL × RRI) is 16 out of 100.	**16**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) × GRI Score) is 16 out of 100.	**16**

2.1.2 Current and Historical Consumption of Feedstock Quantity

Rationale: Clear understanding of feedstock consumption by key competitors for each rated type of feedstock in the BDO Zone is essential to quantifying competitor risk.

Understanding current consumption and historical trends of feedstock utilization can provide valuable information about feedstock price elasticity during shortages, and insight into events that may impact future supply conditions. It can enable more accurate estimates of the sensitivity of feedstock availability to potential future consumption levels or to the impact of external events (e.g., weather events, structural economic changes, seasonality, or policy change).

Risk Information: The Grenada Competition Zone has experienced closing or production curtailments of three large competitor mills, but also the opening of three pellet mills (Figure A-5). Also, some competitors increased their capacity and wood intake in the past few years. Three facilities were announced and could potentially start production within the next three years. However, Table A-2 indicated that the total biomass demand from the 15 existing competitors, significantly less than 10% of biomass, would be supplied from the Grenada BDO Zone. In addition, generous BAM factors ensure that, even with the assumption of an additional large-scale competitor, sufficient fiber is available in the Grenada BDO Zone to support a new commercial project at the rated quantities.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed *low*, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed *low*, therefore the RRI is 4 out of 10.	**4**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL × RRI) is 16 out of 100.	**16**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**Notch** **NN**

Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) × GRI Score) is 16 out of 100.	**16**

2.1.3 Competitor Pricing and Price Sensitivity

Rationale: Understanding how much competitors pay (or receive) for different feedstock types is an essential step to determining competitiveness of Issuer and to accurate assessment of the delivered cost range in the BDO Zone rating.

Current and historical prices paid/received by competitors provide insight into their procurement behaviors and exert pressure on suppliers in the BDO Zone. Such as ability/willingness to pay premiums for feedstock during times of feedstock shortage or reduce prices (or cut off deliveries) during gluts. Competitors that have an ability to offer higher prices for feedstock during feedstock shortages can pose significant risk to Issuer.

Knowledge of competitor pricing and price sensitivity is also an essential prerequisite to formulating a feedstock cost curve which can enable predictions of feedstock redundancy, i.e., how much feedstock could become available at different pricing levels (see Category 3–Supply Chain Risk 3.1.3).

Risk Information: Existing competitors in the BDO Zone have traditionally been in control of their supply and pricing, especially during the current daily quota system. The price ranges presented here ($50-60/bdt for pulpwood and forest residues and $45-70/bdt for sawmill residues) were corroborated with both market and outreach data/information and reflect realistic delivered prices that a new entrant could trust at the time this report was issued. Moving forward, the new entrants should consider the price forecasts (Figures C-1, C-2, C-3) and should undertake a rigorous market analysis before any off-take agreement is signed. Outreach indicated that the current quota strategy that competitors employ in the BDO Zone would almost guarantee that a new entrant would have access to the rated quantities at the above prices. A low risk was deemed reasonable.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed *low*, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed *low*, therefore the RRI is 4 out of 10.	**4**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL × RRI) is 16 out of 100.	**16**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) × GRI Score) is 16 out of 100.	**16**

2.1.4 Impacts of Future Demand on Feedstock Availability and Price by Current Competitors

Rationale: Feedstock utilization in a BDO Zone can change over time. Expansion of feedstock demand by current competitors can put additional pressure on feedstock and can lead to higher prices, feedstock disruptions, shortages or supplier breach or other types of supply chain disruption.

If current markets for feedstock have been publicly signaling the potential for increased demand for feedstock (in the case of a sawmill adding a shift, or pulp mill potentially expanding into production of renewable chemicals, for example),

high interest in a supply zone can make suppliers overconfident, leading to a supplier-controlled market where short-term contracting becomes the norm and supply chain reliability is compromised for the Issuer. If and when it occurs, increased demand on feedstock may decrease availability and increase cost for new plants within the BDO Zone.
Risk Information: The current major competitor in the Grenada BDO Zone is the pulp mill; its fiber demand was already captured in the supply/competitor analysis presented in Appendix A. There is no information available to suggest any concern that this demand will increase. However, several companies, particularly pellet producers, have been interested in operating in the BDO Zone to take advantage of the wealth of fiber available here. However, outreach suggested that none of these facilities, at the time this report was issued, have attempted any off-take agreements or serious discussions with local suppliers. However, even with the addition of a large competitor, the healthy BAM factor applied to the available quantities deems the risk of this indicator to a low/medium rating.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed *medium*, therefore the RRL is 6 out of 10.	**6**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed *low*, therefore the RRI is 4 out of 10.	**4**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL × RRI) is 24 out of 100.	**24**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) × GRI Score) is 24 out of 100.	**24**

2.1.5 Soft Supply Influence of Existing Markets

Rationale: In some cases, existing markets for feedstock may be able to exert high degrees of pressure over local suppliers, effectively enabling control feedstock, especially during times of shortage. This control can derive from qualitative or "soft" factors such as long previous relationships between local suppliers and existing markets for feedstock.
Risk Information: Despite the local competitor preferences for offtake agreements and quotas (see 2.1.5), the risk that existing suppliers of sawmill residues and pulpwood will prioritize existing customers is low. Currently, and for a while now, the suppliers in the Grenada BDO Zone have had to overextend their deliveries to locations exceeding a 100-mile radius, thus cutting deeply into their bottom lines. Outreach indicated that suppliers (both sawmills and logging companies) have been waiting for an opportunity to deliver their supply locally to a new entrant within a 75-mile driving distance.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed *low*, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed *low*, therefore the RRI is 4 out of 10.	**4**

Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL × RRI) is 16 out of 100.	**16**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) × GRI Score) is 16 out of 100.	**16**

2.1.6 Temporary Market-Driven Markets

Rationale: Alternative, non-traditional, market-driven competitors for feedstock can drive feedstock demand in unusual circumstances. A BDO Zone Rating Issuer based on corn stover as a feedstock, for example, would not typically compete with higher-end animal feed markets due to quality issues. However, in times of significant hay shortage (e.g., during drought), farmers use corn stover in place of hay, driving the price of feedstock and decreasing availability for bio-projects.[26]

Risk Information: A review and analysis of the quarterly feedstock prices for pulpwood, shavings, hog fuel, and whole tree chips does not indicate any seasonal variation in pricing. In addition, no temporary markets were found for the woody biomass in the BDO Zone.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed *low*, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed *low*, therefore the RRI is 4 out of 10.	**4**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL × RRI) is 16 out of 100.	**16**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) × GRI Score) is 16 out of 100.	**16**

2.2 Risk Factor: Specific Competitors' Competitive Advantage

2.2.1 Relative Inventory Capacity

Rationale: The more inventory a competing biomass facility is able to store, the more competitively pressure it can exert on supply. Ability to store large inventories allows competitors to purchase inventory when the prices are low, potentially giving it an economic advantage. Additionally, the ability to store inventory during feedstock supply surpluses can enable competitors to continue to intake feedstock when the Issuers plant (with lesser inventory capacity)

[26] Bergtold, 2018.

may be forced to put suppliers on quota. Larger inventory capacity on the part of competing markets thereby creates supplier loyalty and can make it more difficult for new projects to secure supply without paying a significant premium.
Risk Information: Competitors do have storing capacity, but for a while have resorted to (in the language of logging operators) transferring their log yard capacities to the loggers by implementing a quota system. However, in the event of returning to the traditional log yard strategy, there is a low likelihood that competitors could store significant amounts of pulpwood and sawmill residues for long periods of time. This likelihood becomes more apparent as, currently, there is just one medium size competitor in the BDO Zone.

Raw Risk Likelihood (RRL) The risk likelihood is deemed *low*, therefore the RRL is 4 out of 10.	**Score** **4**
Raw Risk Impact (RRI) The risk impact is deemed *low*, therefore the RRI is 4 out of 10.	**Score** **4**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL × RRI) is 16 out of 100.	**Score** **16**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) × GRI Score) is 16 out of 100.	**Score** **16**

2.2.2 Relative Accessibility/Delivery Hours and Wait Times

Rationale: The value attributed by suppliers to local competing markets for biomass is often directly related to the degree of flexibility the market provides in terms of delivery hours, and the more efficiently discharge can occur.
Risk Information: For a while now, competitors have imposed delivery time windows and/or quotas. This is likely to provide advantages to new entrants seeking to procure fiber, as the regional fleet will have greater availability compared to the current situation.

Raw Risk Likelihood (RRL) The risk likelihood is deemed *low*, therefore the RRL is 4 out of 10.	**Score** **4**
Raw Risk Impact (RRI) The risk impact is deemed *low*, therefore the RRI is 4 out of 10.	**Score** **4**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL × RRI) is 16 out of 100.	**Score** **16**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) × GRI Score) is **16** out of 100.	**Score** **16**

2.2.3 Relative Specification Advantages

Rationale: When choosing a market for biomass feedstock, suppliers not only look at price, but also at relative quality requirements or specifications. It is important to understand feedstock quality specifications for competing markets within the BDO Zone in order to accurately quantify the risk that competitors can exert on the Issuer's supply chain.

Risk Information: Pellet mills, biofuel plants, cogeneration, and biopower facilities are generally capable of utilizing all the rated feedstock types presented in this report without major quality concerns. High moisture content and soil/rock contamination in chipped/ground forest residues can cause problems during energy and product conversions, but these issues are generally manageable and are normally addressed by new bio-projects in their quality control systems. However, utilizing stem tops would provide an appropriate feedstock for most applications. Generally, the ability of competitors in the region to utilize woody residues is not viewed as a significant risk due to the existing oversupply.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed *low*, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed *low*, therefore the RRI is 4 out of 10.	**4**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL × RRI) is 16 out of 100.	**16**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) × GRI Score) is 16 out of 100.	**16**

2.2.4 Demand for Competitors' Products

Rationale: Increased demand for competitor's final product can cause an increased demand for feedstock by the competitor. For example, an increased demand for wood pellets due to high energy prices in Europe or for biofuels due to a favorable clean fuels policy can cause increased pellet/biofuel production by competing markets. Thereby driving demand for feedstock within a BDO Zone.

Risk Information: Final product markets of relevance in the region include wood pellets, engineered wood products, and advanced biofuels. Sustainable policies that incentivize the global pellet trade and recent announcements of new pellet mills indicate that this trend will continue into the foreseeable future, potentially leading to increased demand for fiber. Continued growth in global wood pellet markets and scarcity of low-cost pellet feedstock constitute, however, a low risk to new bio-projects in the Grenada BDO Zone, especially due to the large and diverse fiber basket that exists in the BDO Zone.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed *medium*, therefore the RRL is 6 out of 10.	**6**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed *low*, therefore the RRI is 4 out of 10.	**4**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL × RRI) is 24 out of 100.	**24**

Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) × GRI Score) is 24 out of 100.	**24**

CATEGORY 3.0: SUPPLY CHAIN RISK

3.1 Risk Factor: Feedstock Availability

3.1.1 Biomass Availability Multiple (BAM)

Rationale: Biomass Availability Multiple (BAM) indicates the degree of redundancy in an Issuer's supply chain in relation to the rated quantity in the BDO Zone. BAM is the mean ratio of biomass feedstock available to a project, in relation to delivered cost, divided by the Issuer's mean rated quantity. BAM is a strong indicator of supply chain resilience when stressed by supply shortage and/or supplier breach. BAMs of 1.5 or higher are generally signals of lower feedstock risk for new projects in BDO Zones.

Risk Information: The Biomass Availability Multiple (BAM) allows for a conservative quantity redundancy that ensures investors a higher degree of confidence that the project-ready estimates are achievable. Table A-3 showed that the use of larger BAM factors for pulpwood (3.0) and forest residues (4.0) than for sawmill residues (1.3) was justified by the number of variables that affected availability, other than price, such as: accuracy of existing inventory (FIA data), scale-up readiness, historical harvesting practices and volumes, and sudden changes in supply and demand.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed *low*, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed *low*, therefore the RRI is 4 out of 10.	**4**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL × RRI) is 16 out of 100.	**16**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) × GRI Score) is 16 out of 100.	**16**

3.1.2 Feedstock Supply Curve/Marginal Cost Curve

Rationale: The greater the feasible transport distance, the more feedstock is accessible to the Issuer, but at a higher delivered cost. The feedstock supply curve, sometimes referred to as the marginal cost curve, is a function of feedstock availability over its cost which is primarily, but not exclusively, a function of distance. The feedstock supply curve is used

to determine the availability of redundant feedstock at various price points, and the cost of replacing feedstock with substitutes located at different distances.

Feedstock cost curves are useful in determining supply chain resilience; they provide information about the cost of feedstock availability in times of supply disturbance. Biomass supply chains are prone to supply disturbances over time; suppliers can become insolvent, or weather events can temporarily disrupt feedstock availability. When a disturbance occurs, the Issuer may need to source replacement feedstock from different suppliers at different locations and costs. A biomass supply curve indicates quantities of feedstock available at various price levels from suppliers generally located further away than core supplier.

Risk Information: Supply curves were constructed for pulpwood, forest residue, and sawmill residue rated quantities (Figure A-6) to better understand the availability of these two feedstock types at 10-mile distance increments from Duck Hill, MS. The graph indicates that approximately 60% of the rated pulpwood and forest residue, and 80% of sawmill residue quantities are available within the 45-mile drive distance at the lower price ranges, while the rest are located up to a 75-mile drive distance at the upper price ranges (Figure C-4). Considering that currently these feedstock types travel distances in excess of 100 miles to reach customers, rated quantities delivered up to 75 miles are preferred; therefore, a low risk was assigned.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed *low*, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed *low*, therefore the RRI is 4 out of 10.	**4**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL × RRI) is 16 out of 100.	**16**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) × GRI Score) is 16 out of 100.	**16**

3.1.3 Seasonal Feedstock Supply Variation

Rationale: Biomass supply can present significant seasonal supply variations. Seasonal supply variations combined with limitations associated with longer-distance transportation and storage can lead to BDO Zone biomass supply imbalances[27] and can manifest in shortages and higher costs for Issuers.

Risk Information: Logging operations are occasionally being shut down or on hold for a few days during the rainy season (early spring). Outreach indicated that, in order to minimize this negative effect, logging operations put the operations on hold for a day and move them to a different harvesting site if the rain extends beyond one or two days. Otherwise, there were no major seasonal variations noted.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed *low*, therefore the RRL is 4 out of 10.	**4**

[27] Golecha & Gan 2016.

Raw Risk Impact (RRI) The risk impact is deemed *low*, therefore the RRI is 4 out of 10.	**Score** **4**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL × RRI) is 16 out of 100.	**Score** **16**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) × GRI Score) is 16 out of 100.	**Score** **16**

3.1.4 Year-to-Year Variation in Feedstock Availability

Rationale: Biomass can have significant year-to-year supply variations due to variability in yield from biomass harvesting operations, particularly with agricultural biomass.

Risk Information: As Figure A-4 presented, there were no significant variations in total sawmilling capacity except in the last three years when the capacity increased by more than 30%, which benefits the sawmilling residue availability for a new project in the BDO Zone. While pulpwood harvesting has decreased over time, total harvest has remained stable. A new project could take advantage of the logging extra capacity to secure the rated quantities of pulpwood and forest residues (tops).

Raw Risk Likelihood (RRL) The risk likelihood is deemed *low*, therefore the RRL is 4 out of 10.	**Score** **4**
Raw Risk Impact (RRI) The risk impact is deemed *low*, therefore the RRI is 4 out of 10.	**Score** **4**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL × RRI) is 16 out of 100.	**Score** **16**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) × GRI Score) is 16 out of 100.	**Score** **16**

3.2 Risk Factor: Historical Issues

3.2.1 Historical Feedstock Price Variations

Rationale: If volatility is shown in the historical feedstock price, then the risk of future price fluctuation is elevated. If feedstock prices have historically exceeded the price at which the Issuer would have to cease operations or breach a financial covenant (i.e., the "red line" feedstock cost), then mitigation measures should be put in place.

Risk Information: As Figures C-1, C-2, and C-3 showed, market prices for sawmill residues and pulpwood will slowly continue to grow steadily, but at levels that should not create significant concerns for a new buyer. Also, there is only one competitor in the BDO Zone, which does not seem to impact price volatility for pulpwood and sawmill residues significantly. There is currently no market for forest residues other than small quantities delivered to the local pulp mill, so there is minimal risk of price volatility for forest residues. The overall price volatility risk was therefore deemed low.
Raw Risk Likelihood (RRL) **Score** The risk likelihood is deemed *low*, therefore the RRL is 4 out of 10. **4**
Raw Risk Impact (RRI) **Score** The risk impact is deemed *low*, therefore the RRI is 4 out of 10. **4**
Gross Risk Indicator (GRI) **Score** The Gross Risk Indicator (RRL × RRI) is 16 out of 100. **16**
Mitigation/Notching **Notch** *RRL Mitigation (Notch)* **NN** No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).
Loaded RI Score **Score** The Loaded RI Score ((1-Total Notch) × GRI Score) is 16 out of 100. **16**

3.2.2 Low Historical Demand for Feedstock in the BDO Zone

Rationale: If Issuer BDO Zone does not have history of developed, large-scale feedstock procurement, suppliers may not have sufficient expertise in feedstock production to ensure reliable supply, especially in early years. This can be particularly true for forest residues where typically the infrastructure for collection, processing and delivery is immature. Where supply chains are not well-established, risk can be mitigated when new bio-based plants control a higher degree of feedstock processing. For example, if a BDO Zone rating is issued for clean wood chips and the historical demand in the Zone has been exclusively for pulpwood, then supply chain risk will be decreased for new bio-based plants that intake of pulpwood and manage log debarking and chipping internally. Rather than requiring inexperienced suppliers to deliver debarked wood chips.
Risk Information: As presented throughout this report, there is a long history of supplying large quantities of all three feedstock types in the BDO Zone. Local suppliers still remember when they used to supply similar quantities to facilities in the Grenada BDO Zone and are ready to bring that memory back to life. Risk is low.
Raw Risk Likelihood (RRL) **Score** The risk likelihood is deemed *low*, therefore the RRL is 4 out of 10. **4**
Raw Risk Impact (RRI) **Score** The risk impact is deemed *low*, therefore the RRI is 4 out of 10. **4**
Gross Risk Indicator (GRI) **Score** The Gross Risk Indicator (RRL × RRI) is 16 out of 100. **16**

Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) × GRI Score) is 16 out of 100.	**16**

3.2.3 History of Production/Feedstock is a New/Secondary Crop or a Byproduct

Rationale: If feedstock is a new/secondary crop or a by-product, suppliers may either lack sufficient experience to mitigate risk, or be unable to react to such risk. Secondary crop or by-product producers may be less likely to prioritize production.

For new crop types, inexperience in planting, harvest, collection, and yield data may pose higher levels of risk.

If feedstock is a secondary transformation (i.e., wheat straw, corn stover, or forest residue), then production can be subject to variables beyond suppliers' control (e.g., changing demand for sawtimber, or primary crop prices).

Risk Information: The ability for new bio-projects to secure the rated quantities is not expected to be adversely affected by changes in lumber or pulpwood markets due to the high BAM values. Moreover, historical data indicates that sawmilling capacities will continue to grow, while reductions in pulp mill productions would leave ample opportunities for new entrants to take advantage of pulpwood volumes.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed *low*, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed *low*, therefore the RRI is 4 out of 10.	**4**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL × RRI) is 16 out of 100.	**16**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) × GRI Score) is 16 out of 100.	**16**

3.3 Risk Factor: Non-Weather Based Externalities

3.3.1 Consumer Price Index (CPI) and Producer Price Index (PPI)

Rationale: CPI and PPI can impact feedstock cost of harvest and collection over time. Sensitivities to worst case scenarios should be run.

Risk Information: The biomass project developers consider the changes in goods and services prices due to factors such as inflation and changes in interest rates in their business models. However, temporary significant rises in CPI and PPI,

as seen in 2020-2022 due to the pandemic and global supply chain destructions, can have a medium impact on the biomass delivery prices, but we expect the CPI and PPI to reach a steady status as the economic situation is gradually improving in the county and the region. Figures C-6 and C-7 suggest a medium risk/low impact rating due to some fluctuations in both CPI and PPI in the past five years.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed *medium*, therefore the RRL is 6 out of 10.	**6**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed *low*, therefore the RRI is 4 out of 10.	**4**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL × RRI) is 24 out of 100.	**24**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) × GRI Score) is 24 out of 100.	**24**

3.3.2 Currency Risk

Rationale: Where feedstock is purchased in a currency different than that which a new bio-based plant with locate in a BDO Zone, currency exchange rates and volatility can constitute risk exposure. BDO Zones that cross the US-Canada border, for example, which intake feedstock from both countries are exposed to such currency risk.

Risk Information: Not relevant to this BDO Zone.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed *not relevant*, therefore the RRL is not rated.	**NR**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed *not relevant*, therefore the RRI is not rated.	**NR**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL × RRI) is not rated.	**NR**
Mitigation/Notching	**Notch**
The Total Notch (RRL Notch × RRI Notch) is not rated.	**NR**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) × GRI Score) is not rated.	**NR**

3.3.3 Border Risk

Rationale: Where feedstock is transported cross-border to another country, risk exposure to border closures and crossing delays becomes present. The availability of trucks willing to do cross-border runs is limited, which can decrease supply chain flexibility and resilience. Plants near the US-Canada border which intake feedstock from both countries are exposed to these risks.

Risk Information: Not relevant to this BDO Zone.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed *not relevant*, therefore the RRL is not rated.	**NR**

Raw Risk Impact (RRI) The risk impact is deemed *not relevant*, therefore the RRI is not rated.	**Score** **NR**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL × RRI) is not rated.	**Score** **NR**
Mitigation/Notching The Total Notch (RRL Notch × RRI Notch) is not rated.	**Notch** **NR**
Loaded RI Score The Loaded RI Score ((1-Total Notch) × GRI Score) is not rated.	**Score** **NR**

3.3.4 Temporary Externality-Driven Markets for Feedstock

Rationale: Alternative, non-traditional, externality-driven competitors for feedstock can drive feedstock demand (and cost) in unusual circumstances. For example, an Issuer using corn stover as a feedstock would not typically compete with the higher-end animal feed market. However, in times of significant hay shortage (e.g., during drought), farmers may use corn stover as hay replacement, driving the price of stover feedstock and decreasing its availability for bio-projects.[28]

Risk Information: None identified.

Raw Risk Likelihood (RRL) The risk likelihood is deemed *very low*, therefore the RRL is 2 out of 10.	**Score** **2**
Raw Risk Impact (RRI) The risk impact is deemed *very low*, therefore the RRI is 2 out of 10.	**Score** **2**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL × RRI) is 4 out of 100.	**Score** **4**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) × GRI Score) is 4 out of 100.	**Score** **4**

3.4 Risk Factor: Risks Related to Feedstock Production, Harvest and Collection

3.4.1 Harvest & Collection Practices & Schedules

Rationale: Differences in harvest timing and practices used can create risk to both the quantity and quality of feedstock. For example, feedstock harvested by different suppliers in different windows can undergo varying levels of exposure to sun, wind, and moisture, leading to variations in delivered feedstock quality.

For example, agricultural feedstocks and energy crops have optimal harvesting windows to ensure minimal moisture content. In certain BDO Zones these harvesting windows may coincide with heightened weather risk such as frost or rain.

[28] Bergtold, 2018.

For forestry biomass, unsightly clear cuts, and slash piles (even on plantation forests and especially when located near communities) can provoke unwanted public backlash even when suitable and sustainable replanting regimes are followed.

Risk Information: Due to a long history of forest ownership, logging, and wood processing in the Grenada BDO Zone, sustained support exists from the public, government, and other organizations for current and new forestry-related activities. Variations in humidity exist between species and seasons, but the industry is well-adapted to address them appropriately.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed *low*, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed *low*, therefore the RRI is 4 out of 10.	**4**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL × RRI) is 16 out of 100.	**16**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) × GRI Score) is 16 out of 100.	**16**

3.4.2 Harvesting & Collection Equipment

Rationale: Different types of harvesting and collection equipment used by suppliers in a BDO Zone can have a significant impact on the quality and availability of feedstock. Use of different types and combinations of harvesting, collection and processing equipment among suppliers can lead to non-homogeneous feedstock. Equipment that is not designed specifically for biomass cultivation, harvesting and collection, can increase feedstock quality risks.

Relevant equipment should be specified for the sake of product consistency and risk reduction.

Risk Information: Forest operations in the region are fully mechanized and involve the use of conventional forestry equipment, including harvesters/delimbers, skidders, and loaders. Commercial thinning is common in the region and is expected to become more prevalent if a new pulpwood customer enters the market. Grinding and transportation operations/contractors of comminuted forest residues do not exist in the region, but the harvesting of stem tops can be accommodated by current practices/equipment. Equipment constraints are not expected to impact the ability of existing contractors to recover the rated quantities.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed *low*, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed *low*, therefore the RRI is 4 out of 10.	**4**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL × RRI) is 16 out of 100.	**16**

Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) × GRI Score) is 16 out of 100.	**16**

3.4.3 Variation in Densification Methods Among Different Suppliers

Rationale: The shape and density of the unit in which feedstock is supplied can impact feedstock cost and quality. Standard feedstock densification modes for biomass consist of round or square bales, pellets, cubes, chips, or grindings. The size of wood fiber processed in a grinder is less homogenous than if a chipper is used.

Bales of different densities can absorb moisture at different rates. In certain cases, round bales have been viewed as problematic due to their uneven moisture content distribution.[29]

Risk Information: No densification methods exist. Risk is low. Woody biomass in the BDO Zone is produced in formats acceptable by the biomass processing and conversion companies.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed *very low*, therefore the RRL is 2 out of 10.	**2**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed *very low*, therefore the RRI is 2 out of 10.	**2**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL × RRI) is 4 out of 100.	**4**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) × GRI Score) is 4 out of 100.	**4**

3.4.4 Availability of Labor for Feedstock Production

Rationale: Skilled labor shortages can be difficult to remedy in the short-term. Availability of suitable labor in an area can impact the ability to procure sufficient feedstock quantities on required schedules. Labor risks are higher where supply chains are not yet active; or for Issuer's for whom large feedstock requirements, or development of new (or expanded) supply chains, demand significant additions to the local labor force.

Risk Information: Approximately 25 logging crews and 90 logging trucks would be necessary to supply the rated pulpwood and forest residue quantities, an estimate which local logging operators suggested to be realistic and achievable either by training/hiring new operators (in case of single crew operations) or assigning full-time crews to

[29] Huhnke, 2018.

thinning activities (in case of multiple crew operators). In terms of logging and transportation capacity in the region, logging companies are currently operating at 60-70% capacity.

The local college in Grenada offers vocational courses that could be tailored toward logging equipment and truck operator certificates. A model for this program could be the ongoing Logging Equipment Operator Academy, currently hosted out of Hinds Community College in Raymond, MS. It is a cooperative effort between the Mississippi Loggers Association and the Mississippi Forestry Commission. The program uses simulators to train students, and had one of the first rubber-tire feller buncher simulators developed by John Deere. Students also get a chance to operate real equipment on the adjacent Mississippi Forestry Commission training area. Students also acquire the Professional Logging Manager Qualification, the Sustainable Forestry Initiative (SFI) training, which loggers are required to have in order to work on certified land and to deliver to certified mills. The first simulator utilized was a standalone unit, and cumbersome to move. Now the program uses several desktop computers, which can be transported between sites more easily. Program graduates will still need some on the job training from the loggers who hire them, but it significantly reduces the overall training time to acquire solid applicable skills.

The only scale-up challenge that logging operators highlighted is that of securing drivers at the current insurance rates and with the condition of a three-year experience to drive logging trucks. However, these challenges could be overcome through the implementation of Bill SB2294 which waves the commercial driver license tests to military members and veterans and that there are 271 logging companies in the Grenada BDO Zone that are currently looking for new opportunities to supply additional volumes of pulpwood.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed *medium*, therefore the RRL is 6 out of 10.	**6**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed *medium*, therefore the RRI is 6 out of 10.	**6**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL × RRI) is 36 out of 100.	**36**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) × GRI Score) is 36 out of 100.	**36**

3.5 Risk Factor: Transportation

3.5.1 Feedstock Transportation Costs

Rationale: Transportation can be one of the most significant cost components of biomass supply chains. The average transport cost and percentage of total feedstock cost attributable to transport should be known.

Transport distances of 80-120 km for biomass feedstocks are typical but larger distances can be common. Where average transport distance from suppliers to Issuer is high, the supply chain is subject to greater sensitivities to risks, such as increases in diesel cost, weather impacts, mechanical breakdown, and by the demand for scarce feedstock from competitors closer to the source.

Understanding average transport distance can help flag higher-risk BDO Zones where transport distance materially exceeds the average.
Risk Information: Transportation costs account for 20-50% of the total biomass delivered price depending on the type of biomass, the distribution of the biomass in the BDO Zone, and the supply and demand dynamics in the region. Supply curves presented in Figure A-6 indicate that approximately 60% of the rated pulpwood and forest residue and 80% of sawmill residue quantities are available within the 45-mile drive distance at the lower price ranges, while the rest are located up to 75-mile drive distance at the higher price ranges. However, depending on the size of the biomass demand for future biomass projects, the transportation scale-up may require a capital investment that could result in higher transportation costs. In addition to the large volume of biomass that needs to be transported, the shortage of drivers and high insurance rates grant a medium-high risk to this indicator.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed *medium*, therefore the RRL is 6 out of 10.	**6**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed *high*, therefore the RRI is 8 out of 10.	**8**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL × RRI) is 48 out of 100.	**48**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) × GRI Score) is 48 out of 100.	**48**

3.5.2 Diesel Cost Impacts

Rationale: Changes in diesel cost impact transport cost over time. Sensitivities to worst case scenarios should be run.
Risk Information: Figure C-5 indicates an increasing diesel cost in the region, although prices have dropped considerably from $4.6/gal to $3.6/gal since 2022. Fuel costs are impacting the overall costs of delivered biomass significantly; thus, fuel price volatility is always a concern for biomass projects given the relatively low bulk density of biomass resources such as wood shavings and forest residues and long transportation distances, which could negatively affect the supply chain reliability and price stability. In this case, however, a medium risk was considered acceptable as prices seem to stabilize, while the trend is that they are still increasing, and a majority of biomass resources are available within a 45-mile drive distance of the center point.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed *medium*, therefore the RRL is 6 out of 10.	**6**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed *medium*, therefore the RRI is 6 out of 10.	**6**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL × RRI) is 36 out of 100.	**36**

Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) × GRI Score) is 36 out of 100.	**36**

3.5.3 Transportation of Feedstock Requires Specialized Equipment

Rationale: Requirements for specialized transport equipment (e.g., walking-floor trailers) can increase supply chain risk. Where there is low availability in required transportation equipment, equipment owners have increased leverage over transportation prices and supply chain resiliency can be lower.

Risk Information: Transporting sawmill residues with chip vans seems to pose limited challenges as sawmills in the Grenada BDO Zone are currently managing their deliveries well, often to facilities located outside the 75-mile BDO Zone. Likewise, pulpwood and forest residues (tops) will not require specialized equipment.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed *low*, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed *low*, therefore the RRI is 4 out of 10.	**4**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL × RRI) is 16 out of 100.	**16**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) × GRI Score) is 16 out of 100.	**16**

3.5.4 Delivery Routes through Local Communities

Rationale: Transportation of biomass can become a nuisance to local communities, especially if a large number of trucks pass through residential and school areas. Local communities often have power to force regulations regarding truck transport, impeding the ability BDO Zone suppliers to transport feedstock.

Risk Information: The Grenada BDO Zone has a long history of forestry and wood processing; outreach has confirmed that the two major industrial transportation types in the area are forestry (logging) and farming (hay), and the local population is familiar with them. Moreover, there is support for forestry in this area as many forest owners reside in the BDO Zone. In addition, forest operations have communicated that they try to maintain secondary and tertiary roads, when necessary, by bringing in gravel and grading the roads.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed *low*, therefore the RRL is 4 out of 10.	**4**

Raw Risk Impact (RRI) The risk impact is deemed *low*, therefore the RRI is 4 out of 10.	**Score** **4**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL × RRI) is 16 out of 100.	**Score** **16**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) × GRI Score) is 16 out of 100.	**Score** **16**

3.5.5 Transportation Regulations & Local Weight Limits

Rationale: In many BDO Zones, transportation is regulated based on seasonal road conditions. These regulations (e.g., "frost laws") often take the form of weight restrictions or limits on the number of trucks allowed on roads. Such regulations can impede the project's ability to source sufficient feedstock or increase the cost of doing so at certain times of the year.

Risk Information: Logging operators have communicated that the vast majority of roads are accessible to them; the only access condition is a road maintenance fee for some roads close to towns. No risks associated with this indicator have been identified.

Raw Risk Likelihood (RRL) The risk likelihood is deemed *low*, therefore the RRL is 4 out of 10.	**Score** **4**
Raw Risk Impact (RRI) The risk impact is deemed *low*, therefore the RRI is 4 out of 10.	**Score** **4**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL × RRI) is 16 out of 100.	**Score** **16**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) × GRI Score) is 16 out of 100.	**Score** **16**

3.5.6 Road Infrastructure

Rationale: Feedstock cost and availability can be a function of road infrastructure, in particular the accessibility the infrastructure provides to feedstock. Issues with road networks will translate directly to risks to feedstock supply.

Risk Information: Forest operations have communicated that the road network is satisfactory to reach every harvesting location, and they try to maintain secondary and tertiary roads, when necessary, by bringing in gravel and grading the

roads. No issues were reported regarding the road surface quality. No risks associated with this indicator have been identified.	
Raw Risk Likelihood (RRL) The risk likelihood is deemed *low*, therefore the RRL is 4 out of 10.	**Score** **4**
Raw Risk Impact (RRI) The risk impact is deemed *low*, therefore the RRI is 4 out of 10.	**Score** **4**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL × RRI) is 16 out of 100.	**Score** **16**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) × GRI Score) is 16 out of 100.	**Score** **16**

3.5.7 Transportation Redundancy

Rationale: Transport equipment redundancy is important for dealing with seasonally variable feedstock supplies as well as the risk of equipment breakdowns.

Risk Information: Redundancy exists in the region as many logging operators are used to collaborating with each other to make up for extra equipment demand. Approximately 90 logging trucks would be necessary to supply the rated quantities of pulpwood and forest residues (tops), an estimate that local logging operators suggested to be realistic and achievable either by training/hiring new operators (in case of single crew operations) or assigning full-time crews to thinning activities (in case of multiple crew operators). Outreach indicated that the existing trucking fleet seemed relatively sufficient to address any spot increases in demand by either hiring trucks from other operators or local transportation companies (Appendix A).

Another scale-up challenge that logging operators highlighted is that of securing drivers at the current insurance rates and with the condition of a three-year experience to drive logging trucks. However, these challenges could be overcome through the implementation of Bill SB2294, which waves the commercial driver license tests to military members and veterans. Moreover, there are 271 logging companies in the Grenada BDO Zone that are currently looking for new opportunities to supply additional volumes of pulpwood and capable of overcoming labor shortages. In addition, vocational courses could be tailored toward logging equipment and truck operator certificates. All things considered, the large volume of biomass that needs to be transported, the shortage of drivers, and high insurance rates grant a medium-high risk of this indicator.

Raw Risk Likelihood (RRL) The risk likelihood is deemed *medium*, therefore the RRL is 6 out of 10.	**Score** **6**
Raw Risk Impact (RRI) The risk impact is deemed *high*, therefore the RRI is 8 out of 10.	**Score** **8**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL × RRI) is 48 out of 100.	**Score** **48**

Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) × GRI Score) is 48 out of 100.	**48**

3.6 Risk Factor: Supply Chain Resiliency

3.6.1 Size, Number and Location of Suppliers

Rationale: In general, a supply portfolio involving multiple suppliers of various sizes (and from multiple BDO Zones) is important for ensuring steady and uninterrupted feedstock supply with minimal price fluctuations. If a small number of large suppliers provides a high proportion of total feedstock, a disruption or supplier breach will have greater impact on the supply chain. In such cases the risk of disruption is lower, but the impact of those disruptions is higher. Conversely, many small suppliers are less likely to have the capacity to withstand internal disruptions and thus may be more likely to breach. Here, risk of disruption is higher, but their likely impact is lower. The number of suppliers as well as the ratio of small to large suppliers should be optimized.

There is no pre-determined number or optimal ratio of suppliers, although having too many or too few can both pose higher degrees of risk.

Risk Information: There are 271 logging companies in the BDO Zone, comprised of 1-5 logging crews and owning truck fleets (2-3 trucks on average per crew) ready to provide fiber to a potential new entrant. Also, there are eight sawmills in the Grenada BDO Zone (Map A-2), ranging in capacity between 5 MMBF and 310 MMBF. The smaller sawmills (< 20 MMBF) are hardwood mills, while the largest ones (>100 MMBF) are softwood mills. There are also four smaller mills that manufacture posts and ties in addition to some lumber products. The existing suppliers have the capability to meet the biomass demand of future biomass projects if these projects can afford to pay the rated pricing for each biomass type.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed *low*, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed *low*, therefore the RRI is 4 out of 10.	**4**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL × RRI) is 16 out of 100.	**16**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) × GRI Score) is 16 out of 100.	**16**

3.6.2 Suppliers Subject to Same External Risk Factors

Rationale: When a single risk event can impact the feedstock production ability of all (or most) suppliers, then feedstock risk is higher and supply chain resiliency is lower. Resilience is maximized when biomass supply chains exhibit diversity in spatial location (i.e., geography), production practices and other elements of supply chain structures such that the impact of single high-risk events have varying impacts on suppliers.

Risk Information: Variations in sawmilling capacities have traditionally been well mitigated by increased harvesting of pulpwood logs by the existing biomass users, such as pulp and paper mills and pellet producers. This strategy is expected to continue and can successfully mitigate periods of significant drops in sawmilling residue supply.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed *low*, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed *medium*, therefore the RRI is 6 out of 10.	**6**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL × RRI) is 24 out of 100.	**24**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) × GRI Score) is 24 out of 100.	**24**

3.6.3 Land Ownership Structures

Rationale: The ownership (or control) of the land base on which feedstock is produced can have significant impact on Issuer's feedstock risks. Risk of long-term variation in stumpage cost for wood fiber (i.e., the cost that one pays to a landowner for the right to cut and purchase their wood fiber) for example are much higher in the US where >90% of the land is private, and thus stumpage cost is determined on a competitive auction basis. Conversely, in Canada >90% of the land is owned by the Crown and stumpage is allocated by the government.

Risk Information: Approximately 90% of the forests in the region are privately owned by non-industrial public landowners. Currently, stumpage rates for pulpwood are very low ($1-$3/ton), which triggers the forest owners to delay thinning their plantations. Harvesting the rated quantity would remedy this situation and increase the stumpage prices for pulpwood. Loggers in the Grenada BDO Zone anticipate that the additional amount of pulpwood harvest would be very welcomed by local forest owners. Thus, land ownership does not pose a significant but a low to medium risk for pulpwood and forest residue supply.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed *low*, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed *medium*, therefore the RRI is 6 out of 10.	**6**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL × RRI) is 24 out of 100.	**24**

Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) × GRI Score) is 24 out of 100.	**24**

3.7 Risk Factor: Climate and Natural Risks

3.7.1 Seasonal Weather Impacts on Feedstock Supply

Rationale: Seasonal weather impacts are defined as those deriving from natural weather variations (i.e., spring thaws, rainy seasons, or dry seasons – as opposed to from singular weather events like fires, droughts, or hurricanes). Seasonal weather changes can be a significant risk factor affecting feedstock availability, quality, and price.

Given the major influence that weather has on multiple aspects of growing, harvesting, and transporting biomass, it is difficult to predict the availability of biomass at a specific location at different points in the future with a high degree of certainty. However, it is still possible, using past data and statistical models, to generate reasonable upper/lower bound estimates of biomass production in any given year in a wider supply zone. Such estimates are important in assessing feedstock risk and enable accurate assessment of the efficacy of Issuer's mitigation methods.

Risk Information: Logging operations are occasionally being shut down or put on hold for a few days during the rainy season (early spring). Outreach indicated that, in order to minimize this negative effect, logging operations put the operations on hold for a day and move them to a different harvesting site if the rain extends beyond one or two days. No other concerns were noted. Severe weather events such as hurricanes were noted only in the southern part of the state and are not currently affecting the BDO zone. Logging companies are aware of and compliant with the Best Management Practices that were developed at the state level,[30] which minimize the impact of weather-related events.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed *low*, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed *low*, therefore the RRI is 4 out of 10.	**4**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL × RRI) is 16 out of 100.	**16**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) × GRI Score) is 16 out of 100.	**16**

[30] mfc.ms.gov/wp-content/uploads/2020/03/Entire_bmp_2008-7-24_2.pdf

3.7.2 Long-Term Weather and Climate Trends

Rationale: In certain BDO Zones, climatic trends and significant potential changes to future weather patterns can create feedstock risk.

Risk Information: No long-term weather concerns were found in this region to threaten the long-term availability of forest biomass resources and the supply chains.

Raw Risk Likelihood (RRL) The risk likelihood is deemed *low*, therefore the RRL is 4 out of 10.	**Score** **4**
Raw Risk Impact (RRI) The risk impact is deemed *low*, therefore the RRI is 4 out of 10.	**Score** **4**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL × RRI) is 16 out of 100.	**Score** **16**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) × GRI Score) is 16 out of 100.	**Score** **16**

3.7.3 Forest/Crop Fire

Rationale: Forest/crop fires, especially when occurring at large-scale, destroy feedstock and create shortages.

Fire-prone conditions are predicted to increase across Canada. This could potentially result in a doubling of the amount of area burned by the end of this century compared with amounts burned in recent decades. Boreal forests, which have been historically greatly influenced by fire, will likely be especially affected by this change.

Other climate change impacts that could add damaged or dead-wood to the forest fuel load (e.g., as a result of insect outbreaks, ice storms, or high winds) may increase the risk of fire activity. New research is aimed at refining these climate change estimates of fire activity, and at investigating adaptation strategies and options to deal with future fire occurrence. There is growing consensus that as wildfire activity increases, fire agency suppression efforts will be increasingly strained. However, analyses of fire history suggest that it is the effect of climate variability on precipitation regimes that is the primary reason for the decreasing fire activity in the southern BDO Zone of Canada.

Risk Information: Most wildfires happen in US states west of the Mississippi River with low annual rainfall. The threat of wildfires in Mississippi is highest between February and March because the weather is dry, hot, and windy, and the humidity levels are low. When such weather conditions exist, the US National Weather Service (NWS) issues a Red Flag Warning. In addition, the Mississippi Forestry Commission (MFC) approves immediate burn bans for some or all counties. This ban strictly prohibits outdoor burning or burning debris for the entire period the ban is in place. During this period, the MFC will monitor the weather and lift the ban on counties with improved weather conditions and vice versa.[31] Outreach found no concerns that forest fires in the BDO Zone would be a threat to the rated quantity of woody biomass resources and the supporting supply chains.

Raw Risk Likelihood (RRL) The risk likelihood is deemed *low*, therefore the RRL is 4 out of 10.	**Score** **4**

[31] mississippi.emergencyresponseguide.org/wildfire

Raw Risk Impact (RRI)	**Score**
The risk impact is deemed *low*, therefore the RRI is 4 out of 10.	**4**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL × RRI) is 16 out of 100.	**16**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) × GRI Score) is 16 out of 100.	**16**

3.7.4 Risk of Infestation

Rationale: Risk of future infestation, including its estimated consequences on feedstock supply, should be calculated into the overall risk profile.

Since forest insect populations are influenced by environmental conditions, future changes in climate can be expected to significantly alter the outbreak dynamics of certain forest insect species. In some cases, larger and more frequent insect outbreaks may occur, but in other cases recurring outbreaks may be disrupted or diminished. As climate continues to change, we can expect more situations, particularly at the margins of tree ranges, where sub-optimal conditions for tree growth and reduced tree vigor can lead to outbreaks of forest insects.

Risk Information: Southern pine beetle (SPB) infestations, in particular, have long been associated with high stand density. Treatments such as thinning to reduce pine density offer the most promising and long-lasting means of preventing these conditions. Outreach indicated that incidences of the southern pine beetle were noted in the southern part of the state but did not affect the BDO Zone. However, mitigation actions were taken in the south to isolate the problem, and in 2022, the State issued a Guide to Southern Pine Beetle Cost-Share for pine thinning operations,[32] which local logging companies use in case of local outbreaks.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed *low*, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed *low*, therefore the RRI is 4 out of 10.	**4**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL × RRI) is 16 out of 100.	**16**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**Notch** **NN**

[32] www.mfc.ms.gov/wp-content/uploads/2021/12/SPB-2022-Guide-to-Thinning-Cost-Share-Mississippi.pdf

Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) × GRI Score) is 16 out of 100.	**16**

3.7.5 Risk of Hail

Rationale: Hail has negligible impact of forestry biomass but is one of the principal destroyers of agricultural crops in North America.

There is much uncertainty about the effects of anthropogenic climate change on the frequency and severity of extreme weather events like hailstorms and their subsequent economic losses. Some studies indicate a strong positive relationship between hailstorm activity and hailstorm damage, as predicted by minimum temperatures using simple correlations. This relationship suggests that hailstorm damage may increase in the future if global warming leads to further temperature increase.

Risk Information: Not relevant to this BDO Zone.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed *not relevant*, therefore the RRL is not rated.	**NR**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed *not relevant*, therefore the RRI is not rated.	**NR**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL × RRI) is not rated.	**NR**
Mitigation/Notching	**Notch**
The Total Notch (RRL Notch × RRI Notch) is not rated.	**NR**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) × GRI Score) is not rated.	**NR**

3.7.6 Risk of Flood

Rationale: Floods can cause catastrophic disruption and delay in feedstock supply. Where there is high risk of flood and thus negative impact to feedstock supply, the BDO Zone rating should account for this risk.

Risk Information: Outreach indicated no risk of large-scale floods. Flash floods are occurring but are usually well mitigated by experienced operators.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed *low*, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed *low*, therefore the RRI is 4 out of 10.	**4**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL × RRI) is 16 out of 100.	**16**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) × GRI Score) is 16 out of 100.	**16**

3.7.7 Risk of Drought

Rationale: Droughts can cause significant disruptions to feedstock supplies across entire BDO Zones for extended periods of time, especially in case of agricultural residues and energy crops. Parts of Western Canada are experiencing more frequent and severe droughts, and scientists expect drought to affect new areas across Canada going forward.

Tree species are adapted to specific moisture conditions. Having less water available through drought has a range of negative impacts on the health of forest ecosystems. Direct impacts include reduced growth, increased tree mortality and failure to regenerate. Indirect impacts include reduced ability to defend against insects and disease, and increased fire risk. These impacts can affect the availability of wood fiber for an Issuer.

Risk Information: Drought periods exist in which the forest fire risk increases; however, in the Grenada BDO Zone, no risk associated with drought was flagged.

Raw Risk Likelihood (RRL) The risk likelihood is deemed *low*, therefore the RRL is 4 out of 10.	**Score** **4**
Raw Risk Impact (RRI) The risk impact is deemed *low*, therefore the RRI is 4 out of 10.	**Score** **4**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL × RRI) is 16 out of 100.	**Score** **16**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) × GRI Score) is 16 out of 100.	**Score** **16**

3.7.8 Risk of Hurricanes, Tornadoes and Strong Winds

Rationale: Hurricanes, tornadoes, and strong winds can destroy timber stands, crops, and feedstock piles. They can also delay forestry and agricultural operations. Hurricanes and tornadoes can indirectly cause temporary shortages of available transportation as available trucking moves to handle higher value disaster related contracts. For example, Katrina cleanup limited availability of live-bottom trailers in the North and South-East of the US for several months as truckers shifted operations to handle more lucrative government contracts.

Although scientists are uncertain whether climate change will lead to an increase in the number of hurricanes, warmer ocean temperatures and higher sea levels are expected to intensify their impacts.

Recent analyses conclude that the strongest hurricanes occurring in some BDO Zones including the North Atlantic have increased in intensity over the past two to three decades.

Risk Information: Hurricanes and strong winds occur mostly in the southern part of the state. Low risk in the BDO Zone.

Raw Risk Likelihood (RRL) The risk likelihood is deemed *low*, therefore the RRL is 4 out of 10.	**Score** **4**
Raw Risk Impact (RRI) The risk impact is deemed *low*, therefore the RRI is 4 out of 10.	**Score** **4**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL × RRI) is 16 out of 100.	**Score** **16**

Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) × GRI Score) is 16 out of 100.	**16**

3.7.9 Risk of Low Temperatures

Rationale: Low temperatures can cause crop failure, leading to shortages of biomass. Additionally, low temperatures can have adverse impacts on the operations of feedstock processing equipment in Northern BDO Zones.

Risk Information: Not relevant to this BDO Zone.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed *not relevant*, therefore the RRL is not rated.	**NR**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed *not relevant*, therefore the RRI is not rated.	**NR**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL × RRI) is not rated.	**NR**
Mitigation/Notching	**Notch**
The Total Notch (RRL Notch × RRI Notch) is not rated.	**NR**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) × GRI Score) is not rated.	**NR**

3.8 Risk Factor: Political and Social

3.8.1 Government Subsidies for Feedstock Production or Utilization

Rationale: Feedstock that is directly subsidized though government programs can pose greater long-term risk than feedstock that is not. Subsidies may be subject to amendment or repeal, sometimes with minimal notice.

NOTE: This risk indicator refers to direct feedstock subsidies only; it does not apply to government subsidies that pertain indirectly to the operations of the Issuer such as Loan Guarantees or to the markets for products produced by the Issuer.

Risk Information: Local and state political environment is supportive of the use of fiber in the Grenada BDO Zone; however, no subsidies exist.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed *very low*, therefore the RRL is 2 out of 10.	**2**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed *very low*, therefore the RRI is 2 out of 10.	**2**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL × RRI) is 4 out of 100.	**4**

Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) × GRI Score) is 4 out of 100.	**4**

3.8.2 Local, Provincial, & National Laws, Regulations, & Permitting Pertaining to Biomass

Rationale: Feedstock whose production is directly dependent on local, provincial, or national laws or government regulations can pose greater long-term risk than feedstock that is not, since laws and regulations may be subject to amendment or repeal.

If utilization of biomass requires specific permits (i.e., percentage removal of forest residues or corn stover, allowable cut limits, air emission, storage permits, rights-of-way, overweight permits for trucks, cross-border permitting for shipment of biomass, chain of custody, or certification of sustainability) then likelihood of obtaining such permits and/or complying with permitting requirements should be examined.

Risk Information: The State of Mississippi has been an advocate for retaining wood fiber in the state to increase the number of businesses and employment in the forestry and manufacturing sectors. According to the Greater Grenada Partnership, interest in locating a woody biomass facility in Grenada has been steadily increasing in the past 2-3 years; the BDO Zone is attractive due to the large volumes of pulpwood, sawmill residues, and forest residues potentially available here. Moreover, local forest owners and logging companies are looking forward to new developments.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed *very low*, therefore the RRL is 2 out of 10.	**2**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed *very low*, therefore the RRI is 2 out of 10.	**2**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL × RRI) is 4 out of 100.	**4**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) × GRI Score) is 4 out of 100.	**4**

3.8.3 Backlash Against Biomass Development, Procurement or Usage in the Region

Rationale: Public backlash against biomass development in the Issuer BDO Zone can directly impact Issuer's ability to procure, transport, trans-load, store, or utilize feedstock by affecting local policies, regulations, and Issuer's ability to obtain necessary permitting.

Risk Information: While some out-of-state NGOs criticized the use of woody biomass for pellets, our outreach indicated a strong support for utilization of all three feedstock types in the region. Moreover, the long tradition of forest ownership and forest operations in the BDO Zone maintains a low risk of such backlashes occurring here.	
Raw Risk Likelihood (RRL) The risk likelihood is deemed *low*, therefore the RRL is 4 out of 10.	**Score** **4**
Raw Risk Impact (RRI) The risk impact is deemed *low*, therefore the RRI is 4 out of 10.	**Score** **4**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL × RRI) is 16 out of 100.	**Score** **16**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) × GRI Score) is 16 out of 100.	**Score** **16**

3.8.4 Consent of, and Cooperation with, Indigenous Communities and First Nations

Rationale: Where new project development on or near Indigenous or First Nation land, or where near Indigenous or First Nations exert influence over feedstock producing areas, consent of, and cooperation with, Indigenous communities and First Nations decreases Issuer risk.	
Risk Information: Not relevant to this BDO Zone.	
Raw Risk Likelihood (RRL) The risk likelihood is deemed *not relevant*, therefore the RRL is not rated.	**Score** **NR**
Raw Risk Impact (RRI) The risk impact is deemed *not relevant*, therefore the RRI is not rated.	**Score** **NR**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL × RRI) is not rated.	**Score** **NR**
Mitigation/Notching The Total Notch (RRL Notch × RRI Notch) is not rated.	**Notch** **NR**
Loaded RI Score The Loaded RI Score ((1-Total Notch) × GRI Score) is not rated.	**Score** **NR**

3.8.5 Food Security Concerns

Rationale: Despite the fact that any significant correlation between food prices and biofuel production is unclear, claims that biofuel production has driven up food prices, taken food from communities or had a negative impact on land use can fuel public backlash. For example, removal of biomass may raise public concerns relating to food security if Issuer feedstock requires the use of land that would otherwise be used for growing food.	
Risk Information: Not relevant to this BDO Zone.	
Raw Risk Likelihood (RRL) The risk likelihood is deemed *not relevant*, therefore the RRL is not rated.	**Score** **NR**

Raw Risk Impact (RRI) The risk impact is deemed *not relevant*, therefore the RRI is not rated.	**Score** **NR**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL × RRI) is not rated.	**Score** **NR**
Mitigation/Notching The Total Notch (RRL Notch × RRI Notch) is not rated.	**Notch** **NR**
Loaded RI Score The Loaded RI Score ((1-Total Notch) × GRI Score) is not rated.	**Score** **NR**

3.9 Risk Factor: Sustainability and Environmental Concern

3.9.1 Feedstock Sustainability

Rationale: Public concerns about sustainability of feedstock production can jeopardize biomass feedstock operations. Sustainability certification schemes should be utilized where applicable to ensure that feedstock comes from sustainable sources.

Canada leads all countries with 166 million hectares of certified forests, a figure that is nearly four times more than second place United States at 47 million hectares.

Risk Information: The Grenada BDO Zone has a strong history of forest land ownership, logging, and wood processing. Pride of forest land ownership is a legacy, as many forestlands are SFI and FSC certified and approx. 900 private forests are American Tree Farm System (ATFS) certified. Moreover, even if the rated quantities were utilized, a sustainable growth-to-removal ratio of above 1.5 remains. As thinning operations increase the growth of the remaining trees, more long-lived sustainable products will be produced, thus embodying more carbon for a long time.

Raw Risk Likelihood (RRL) The risk likelihood is deemed *low*, therefore the RRL is 4 out of 10.	**Score** **4**
Raw Risk Impact (RRI) The risk impact is deemed *low*, therefore the RRI is 4 out of 10.	**Score** **4**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL × RRI) is 16 out of 100.	**Score** **16**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) × GRI Score) is 16 out of 100.	**Score** **16**

3.9.2 Risk to Soil Quality

Rationale: Soil sustainability can be defined as management of soil in a way that does not exert any negative or irreparable effects either on the soil itself or any other systems. There is a diversity of approaches to soil sustainability in jurisdictional guidelines for forest biomass harvesting and production. For different feedstock types, there are also different thresholds at which feedstock removal causes significant negative consequences on soil.

Poor soil quality that negatively impacts the long-term sustainability of the feedstock can entail long-term feedstock risk. Sub-optimal soil management can leave exposed soil post residue-harvest which can lead to soil wash-off and soil carbon loss from precipitation and wind. Over-harvesting of biomass also depletes the carbon stock in the soil and creates a negative feedback loop which can degrade the soil and its nutrients.
Risk Information: Harvesting practices associated with thinning operations are, for the large part, done in such a way as not to affect negatively the remaining forest. Forest residuals, when removed, have a recovery rate of below 60%; thus, the remaining portion is spread back in the cutting block to provide the necessary nutrients and soil protection.
Raw Risk Likelihood (RRL) — **Score**
The risk likelihood is deemed *low*, therefore the RRL is 4 out of 10. — **4**
Raw Risk Impact (RRI) — **Score**
The risk impact is deemed *low*, therefore the RRI is 4 out of 10. — **4**
Gross Risk Indicator (GRI) — **Score**
The Gross Risk Indicator (RRL × RRI) is 16 out of 100. — **16**
Mitigation/Notching — **Notch**
RRL Mitigation (Notch) — **NN** No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).
Loaded RI Score — **Score**
The Loaded RI Score ((1-Total Notch) × GRI Score) is 16 out of 100. — **16**

3.9.3 Risk to Surface and Groundwater

Rationale: Excessive nutrient runoff from biomass feedstock production can accumulate in surface waters and result in algal blooms and hypoxia which can lead to habitat loss for aquatic species higher up the food chain and alter aquatic ecosystem food webs. Damage to aquatic ecosystems can cause social and regulatory backlash. Water intake issues can also increase risk.
Risk Information: Not relevant to this BDO Zone.
Raw Risk Likelihood (RRL) — **Score**
The risk likelihood is deemed *not relevant*, therefore the RRL is not rated. — **NR**
Raw Risk Impact (RRI) — **Score**
The risk impact is deemed *not relevant*, therefore the RRI is not rated. — **NR**
Gross Risk Indicator (GRI) — **Score**
The Gross Risk Indicator (RRL × RRI) is not rated. — **NR**
Mitigation/Notching — **Notch**
The Total Notch (RRL Notch × RRI Notch) is not rated. — **NR**
Loaded RI Score — **Score**
The Loaded RI Score ((1-Total Notch) × GRI Score) is not rated. — **NR**

3.9.4 Water Use

Rationale: Biomass feedstock operations can have significant impacts on the hydrological flux (infiltration, groundwater recharge, interception, and transpiration) of ecosystems. This can lead to water shortages, lower yields, and backlash from regulatory bodies if management plans are not properly instituted.

Risk Information: Not relevant to this BDO Zone.	
Raw Risk Likelihood (RRL) The risk likelihood is deemed *not relevant*, therefore the RRL is not rated.	**Score** **NR**
Raw Risk Impact (RRI) The risk impact is deemed *not relevant*, therefore the RRI is not rated.	**Score** **NR**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL × RRI) is not rated.	**Score** **NR**
Mitigation/Notching The Total Notch (RRL Notch × RRI Notch) is not rated.	**Notch** **NR**
Loaded RI Score The Loaded RI Score ((1-Total Notch) × GRI Score) is not rated.	**Score** **NR**

3.9.5 Pesticide Risk to Human and Ecosystem Health

Rationale: Application of pesticides (i.e., herbicides, fungicides, and insecticides) on agricultural and forest landscapes can result in adverse health effects for humans and ecosystems. If pesticide application is required in feedstock production, the impact must be considered in the BDO Zone rating.	
Risk Information: Not relevant to this BDO Zone.	
Raw Risk Likelihood (RRL) The risk likelihood is deemed *not relevant*, therefore the RRL is not rated.	**Score** **NR**
Raw Risk Impact (RRI) The risk impact is deemed *not relevant*, therefore the RRI is not rated.	**Score** **NR**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL × RRI) is not rated.	**Score** **NR**
Mitigation/Notching The Total Notch (RRL Notch × RRI Notch) is not rated.	**Notch** **NR**
Loaded RI Score The Loaded RI Score ((1-Total Notch) × GRI Score) is not rated.	**Score** **NR**

3.9.6 Risk to Wildlife and Landscape

Rationale: Biomass production and supply chain operations with negative impacts on wildlife and landscape are at a greater long-term risk of encountering project setbacks and disruptions.	
Risk Information: While some conservationists have voiced concerns that the removal of forest residues could affect the long-term viability of small mammal populations, soil stability, and nutrient availability, more than 30% of the total volume of forest residues is not removed from logging sites. This amount is more than sufficient to sustain both wildlife and soil health needs. As far as thinning operations are concerned, when done properly, they do not negatively affect the forest wildlife and landscape.	
Raw Risk Likelihood (RRL) The risk likelihood is deemed *low*, therefore the RRL is 4 out of 10.	**Score** **4**
Raw Risk Impact (RRI) The risk impact is deemed *low*, therefore the RRI is 4 out of 10.	**Score** **4**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL × RRI) is 16 out of 100.	**Score** **16**

Mitigation/Notching	Notch
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) × GRI Score) is 16 out of 100.	**16**

3.9.7 Biomass Classified as Genetically Modified Organism (GMO)

Rationale: There are various risks associated with GMOs such as migration or dispersion across the landscape, which can generate community backlash and create supply chain risk. GMOs can also be heavily regulated. If planning to grow or procure GMO feedstocks, especially purpose-grown energy crops, it is important to understand the risks.

Risk Information: Not relevant to this BDO Zone.

Raw Risk Likelihood (RRL)	Score
The risk likelihood is deemed *not relevant*, therefore the RRL is not rated.	**NR**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed *not relevant*, therefore the RRI is not rated.	**NR**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL × RRI) is not rated.	**NR**
Mitigation/Notching	**Notch**
The Total Notch (RRL Notch × RRI Notch) is not rated.	**NR**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) × GRI Score) is not rated.	**NR**

CATEGORY 4.0 FEEDSTOCK SCALE-UP RISK

4.1 Risk Factor: Feedstock Scale-Up

4.1.1 Feedstock Quality at Production Scale

Rationale: The physical and chemical properties of feedstock used in lab, pilot and field testing can fail to be representative of feedstock generated by large-scale operations.

It is important to conduct tests on feedstock representative of that which will be produced by large-scale operations. Failure to adequately test the full range of parameter values can result in severe problems during scale-up.

Risk Information: For sawmilling and forest residues, significant risks associated with feedstock quality were not foreseen if proper feedstock management practices were followed. This includes allowing forest residue to dry before comminution, reducing soil and rock contamination through proper handling, and careful piling/decking of residue. When implemented, grinding operations are aware of the need to maintain feedstock quality for their clients. However, a quality control plan that incentivizes maintaining and improving feedstock quality is recommended. The existing suppliers have already been providing woody biomass to the pulp and paper mills and pellet producers, each with their own quality specifications.

Raw Risk Likelihood (RRL)	Score
The risk likelihood is deemed *low*, therefore the RRL is 4 out of 10.	**4**

Raw Risk Impact (RRI)	**Score**
The risk impact is deemed *low*, therefore the RRI is 4 out of 10.	**4**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL × RRI) is 16 out of 100.	**16**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) × GRI Score) is 16 out of 100.	**16**

4.1.2 Capacity of Supply Chain Components & Equipment to Scale

Rationale: Scale-up risk increases if supply chain components, or underlying feedstock infrastructure necessary for these components, cannot scale to handle Issuer feedstock requirements and throughput capacity. Capacity to scale should be demonstrated.

Risk Information: Approximately 25 logging crews and 90 logging trucks would be necessary to supply the rated pulpwood and forest residue quantities, an estimate which local logging operators suggested to be realistic and achievable either by training/hiring new operators (in case of single crew operations) or assigning full-time crews to thinning activities (in case of multiple crew operators). In terms of logging and transportation capacity in the region, logging companies are currently operating at 60-70% capacity. Training programs could be developed at the local college where vocational programs already exist. The other scale-up challenge that logging operators highlighted is that of securing drivers at the current insurance rates and with the condition of a three-year experience to drive logging trucks. However, these challenges could be overcome by implementing Bill SB2294, training, and collaboration with the new entrant to provide mutually agreeable off-take agreements that incentivize investment in new equipment.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed *medium*, therefore the RRL is 6 out of 10.	**6**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed *medium*, therefore the RRI is 6 out of 10.	**6**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL × RRI) is 36 out of 100.	**36**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) × GRI Score) is 36 out of 100.	**36**

CATEGORY 5.0: INFRASTRUCTURE RISKS

5.1 Risk Factor: Physical Infrastructure

5.1.1 Land Parcel/Ind. District

Risk Information: Two greenfield sites (Map C-1 in Appendix C) of 115 ac and 100 ac, respectively, are available just north of Grenada, MS, at the intersection of Interstate 55 and Hwy 7. The two sites are part of the Business and Technology Park North, Grenada County, a project awarded recently $4.3 million for development.[33] The sites are located on each side of the existing industrial road and can be aggregated/subdivided, and more acreage can be made available. The sites are zoned industrial. There are no restrictive obstacles to the development of a new bio-industry.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed *low*, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed *low*, therefore the RRI is 4 out of 10.	**4**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL × RRI) is 16 out of 100.	**16**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) × GRI Score) is 16 out of 100.	**16**

5.1.2 Ownership of Land

Risk Information: The two parcels are owned by Grenada County and can be leased or purchased.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed *low*, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed *low*, therefore the RRI is 4 out of 10.	**4**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL × RRI) is 16 out of 100.	**16**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) × GRI Score) is 16 out of 100.	**16**

[33] https://businessfacilities.com/mississippi-earmarks-nearly-17m-for-industrial-site-development

5.1.3 Permitting Description

Risk Information: Sites are in an industrial park; thus, permitting is expected to be between one and six months, depending on the nature of the business being permitted. Nearby businesses already permitted: Milwaukee and Lennox.

Raw Risk Likelihood (RRL) The risk likelihood is deemed *low*, therefore the RRL is 4 out of 10.	**Score** **4**
Raw Risk Impact (RRI) The risk impact is deemed *low*, therefore the RRI is 4 out of 10.	**Score** **4**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL × RRI) is 16 out of 100.	**Score** **16**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) × GRI Score) is 16 out of 100.	**Score** **16**

5.1.4 Environmental Issues

Risk Information: The site has been issued a Clean Environmentally Safe 1 rating. Also, the industrial park is located ¼ mile from the pulp mill; thus, no emission challenges are expected. Flood zone A (creek) exists on the west side of each property line (Map C-1) but should not affect the industrial park use. No major environmental issues associated with the site exist.

Raw Risk Likelihood (RRL) The risk likelihood is deemed *low*, therefore the RRL is 4 out of 10.	**Score** **4**
Raw Risk Impact (RRI) The risk impact is deemed *low*, therefore the RRI is 4 out of 10.	**Score** **4**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL × RRI) is 16 out of 100.	**Score** **16**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) × GRI Score) is 16 out of 100.	**Score** **16**

5.2 Risk Factor: Utilities

5.2.1 Natural Gas Availability

Risk Information: Natural gas is provided by Atmos at the property line through a 100-psi pipeline.

Raw Risk Likelihood (RRL) The risk likelihood is deemed *low*, therefore the RRL is 4 out of 10.	**Score** **4**
Raw Risk Impact (RRI) The risk impact is deemed *low*, therefore the RRI is 4 out of 10.	**Score** **4**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL × RRI) is 16 out of 100.	**Score** **16**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) × GRI Score) is 16 out of 100.	**Score** **16**

5.2.2 Electric Availability

Risk Information: Three-phase power is available at the property line by Entergy (40 MW) and TV (25 MW). Entergy can increase power to 80 MW on the new substation, and further increases can be accommodated by the company.	
Raw Risk Likelihood (RRL) The risk likelihood is deemed *low*, therefore the RRL is 4 out of 10.	**Score** **4**
Raw Risk Impact (RRI) The risk impact is deemed *low*, therefore the RRI is 4 out of 10.	**Score** **4**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL × RRI) is 16 out of 100.	**Score** **16**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) × GRI Score) is 16 out of 100.	**Score** **16**

5.2.3 Water Availability

Risk Information: Water and gravity sewer available at property line; managed by GT&Y Utility District. A 500,000-gallon water tank is located in the vicinity with 100% capacity available to serve new customers. Waste water is through the City of Grenada (3.4 million gallon per day capacity) with 1.2 million gallons available.	
Raw Risk Likelihood (RRL) The risk likelihood is deemed *low*, therefore the RRL is 4 out of 10.	**Score** **4**
Raw Risk Impact (RRI) The risk impact is deemed *low*, therefore the RRI is 4 out of 10.	**Score** **4**

Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL × RRI) is 16 out of 100.	**Score** **16**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) × GRI Score) is 16 out of 100.	**Score** **16**

5.2.4 Waste Disposal

Risk Information: Industrial waste collection by Qwest Management in Grenada. Commercial dumpsters from 2 to 8 yards are available. Roll-off container dumpsters are also available.

Raw Risk Likelihood (RRL) The risk likelihood is deemed *low*, therefore the RRL is 4 out of 10.	**Score** **4**
Raw Risk Impact (RRI) The risk impact is deemed *low*, therefore the RRI is 4 out of 10.	**Score** **4**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL × RRI) is 16 out of 100.	**Score** **16**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) × GRI Score) is 16 out of 100.	**Score** **16**

5.2.5 Internet Availability

Risk Information: 100 G Fiber optic high-speed internet is available at the site, provided by Sparklight (Map C-1)

Raw Risk Likelihood (RRL) The risk likelihood is deemed *low*, therefore the RRL is 4 out of 10.	**Score** **4**
Raw Risk Impact (RRI) The risk impact is deemed *low*, therefore the RRI is 4 out of 10.	**Score** **4**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL × RRI) is 16 out of 100.	**Score** **16**

Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) × GRI Score) is 16 out of 100.	**16**

5.3 Risk Factor: Transportation/Logistics

5.3.1 Road/Highway Access

Risk Information: An industrial four-lane north-south connection to I-55 is available to both lots. I-55 is a major highway that gives access to various logistic possibilities (water, rail, road, and air freight).

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed *low*, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed *low*, therefore the RRI is 4 out of 10.	**4**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL × RRI) is 16 out of 100.	**16**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) × GRI Score) is 16 out of 100.	**16**

5.3.2 Rail Access

Risk Information: Grenada railway line is located on the east side of the industrial park. A rail spur serves one 10-acre lot with a 50K sq ft site pad built and one 36-acre site with a 200K sq ft pad. The new sites would need to have the rail spur extended 1,000 yards. Grenada Railroad (GRYR) connects Memphis to Jackson and is operated by Gulf & Atlantic Railways, LLC[34] - an independent railroad holding and rail services management company headquartered in Jacksonville, Florida. The company provides daily interchanges in Memphis and Canton to other rail companies. Also, it connects several sawmills that can provide valuable feedstock. 24/7 service is available that connects this location to ports of Baton Rouge, New Orleans, Mobile, and Pascagoula. Typical service delivery is within 24 hours of inbound interchange.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed *low*, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed *low*, therefore the RRI is 4 out of 10.	**4**

[34] garailways.com

Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL × RRI) is 16 out of 100.	**16**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) × GRI Score) is 16 out of 100.	**16**

5.3.3 Airport Access

Risk Information: The site is located less than 5 miles from the Grenada Regional Airport. It provides airport management, aviation fuel, aircraft parking (ramp or tiedown), hangar leasing/sales, passenger terminal and lounge, rental cars delivered, courtesy transportation, pilots lounge/snooze room, and computerized weather. The latest comment by a pilot suggested that the runway has been recently resurfaced.[35] The closest international airport is Jackson-Medgar Wiley Evers International Airport in Jackson, MS, located 117 miles south of Grenada.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed *low*, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed *low*, therefore the RRI is 4 out of 10.	**4**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL × RRI) is 16 out of 100.	**16**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) × GRI Score) is 16 out of 100.	**16**

5.3.4 Water Freight Access

Risk Information: No water freight in the BDO Zone exists, but the existing forest companies are using established rail lines to move their products outside the region.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed *low*, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed *low*, therefore the RRI is 4 out of 10.	**4**

[35] www.airnav.com/airport/KGNF/A

Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL × RRI) is 16 out of 100.	**16**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) × GRI Score) is 16 out of 100.	**16**

5.4 Risk Factor: Social Infrastructure

5.4.1 Healthcare (Local)

Risk Information: Grenada is home to the University of Mississippi Medical Center Hospital and several healthcare clinics. Ambulance service is available in less than 30 minutes from the site. UMMC Grenada is a community hospital and part of the University of Mississippi Medical Center. The hospital offers care to Grenada and surrounding communities and is backed by the state's only academic medical center. It provides more than 20 kinds of specialized care. UMMC Grenada earned an "A" Hospital Safety Grade from The Leapfrog Group, a national nonprofit watchdog that sets standards for excellence in patient care. An "A" Grade is the group's top score for patient safety.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed *low*, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed *low*, therefore the RRI is 4 out of 10.	**4**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL × RRI) is 16 out of 100.	**16**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) × GRI Score) is 16 out of 100.	**16**

5.4.2 Education (Schools)

Risk Information: Grenada has all systems of education available, from K-12, adult learning, and university education (University of Mississippi). The Grenada Career and Education Center offers vocational courses that could provide transferable skills. In addition, the project proponent could collaborate with the center to develop courses specific to the nature of the work needed. A model for this program could be the ongoing Logging Equipment Operator Academy, currently hosted out of Hinds Community College in Raymond, MS. It is a cooperative effort between the Mississippi Loggers Association and the Mississippi Forestry Commission. The program uses simulators to train students, and had one of the first rubber-tire feller buncher simulators developed by John Deere. Students also get a chance to operate

real equipment on the adjacent Mississippi Forestry Commission training area. Students also acquire the Professional Logging Manager Qualification, the Sustainable Forestry Initiative (SFI) training, which loggers are required to have in order to work on certified land and to deliver to certified mills. The first simulator utilized was a standalone unit, and cumbersome to move. Now the program uses several desktop computers, which can be transported between sites more easily. Program graduates will still need some on the job training from the loggers who hire them, but it significantly reduces the overall training time to acquire solid applicable skills.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed *low*, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed *low*, therefore the RRI is 4 out of 10.	**4**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL × RRI) is 16 out of 100.	**16**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) × GRI Score) is 16 out of 100.	**16**

5.4.3 Local Transportation

Risk Information: No public transportation was identified. However, the industrial park is located in the vicinity of the Town of Grenada, and the new entrant, in conjunction with the existing businesses (Milwaukee, Lenox), could collaborate on developing a shuttle for their employees.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed *medium*, therefore the RRL is 6 out of 10.	**6**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed *low*, therefore the RRI is 4 out of 10.	**4**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL × RRI) is 24 out of 100.	**24**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) × GRI Score) is 24 out of 100.	**24**

5.4.4 Public Safety (Local)

Risk Information: The Grenada Fire Department has four fire stations, three engine companies, and a ladder company. The department has 46 full-time personnel, 25 volunteers, and the best-trained firefighters in the state. The Department covers an area of 30.5 square miles and maintains a Class IV Mississippi State Fire Insurance Rating.

In 2022, the crime rate in Mississippi was 245, way below the national rate of 380.[36] However, Granada County has experienced an increase in crime reported since 2018, from 19 to 56 in 2022. There is an established Police Department in Grenada, which helps the community develop Crime Stoppers and Neighborhood Watch programs to reduce the incidence of crimes.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed *medium*, therefore the RRL is 6 out of 10.	**6**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed *medium*, therefore the RRI is 6 out of 10.	**6**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL × RRI) is 36 out of 100.	**36**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) × GRI Score) is 36 out of 100.	**36**

5.4.5 Housing/Cost of Living

Risk Information: Outreach indicated a shortage of housing in Grenada. However, a quick Realtor.com search generated 59 single-family properties for sale in the price range between $29,000 (fixer-uppers) and $615,000 (high-end). The search also produced only 5 apartments (in houses) ranging in price between $700 and $1,000/month. The median house price in Mississippi is around $250,000.[37] A 90-unit apartment/townhouse complex is being built (2 bedroom/1 bath units), but it is 6 months to a year until being able to house people. Housing will be a significant issue for a new entrant and must be addressed with utmost urgency before building a facility. Thus, the rating was assigned medium/high risk.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed *medium*, therefore the RRL is 6 out of 10.	**6**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed *high*, therefore the RRI is 8 out of 10.	**8**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL × RRI) is 48 out of 100.	**48**

[36] cde.ucr.cjis.gov/LATEST/webapp/#/pages/explorer/crime/crime-trend
[37] www.rockethomes.com/blog/housing-market/median-home-price-by-state

Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) × GRI Score) is 48 out of 100.	**48**

5.5 Risk Factor: Labor

5.5.1 Workforce

Risk Information: While labor shortages were reported in the area, Grenada currently has over 150 job applicants per month.[38] The average unemployment rate in 2023 in Grenada County was 3.6%, slightly higher than the state average rate of 3.2%. All forestry professionals interviewed communicated that they have had difficulties recruiting skilled workforce for their logging crews. This situation seems to be more critical for the smaller logging companies that are unable to provide full benefits (e.g., paid vacation, health insurance, etc.) to their employees. All those interviewed suggested and supported a collaborative training program at the local college between the local industry and the new entrant (See RI 5.4.2). Both the local college and local staffing agency are willing to train, connect to programs, or develop job seekers for forestry-related positions, as needed. While training opportunities can indeed mitigate the labor shortage identified at both local and state levels, the risk for a new entrant to secure skilled labor was deemed medium-high.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed *medium*, therefore the RRL is 6 out of 10.	**6**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed *high*, therefore the RRI is 8 out of 10.	**8**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL × RRI) is 48 out of 100.	**48**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) × GRI Score) is 48 out of 100.	**48**

5.5.2 Labor Costs

Risk Information: Based on a new survey, Grenada County is seeing an average median household income of $40,100. As a side note, household income was $32,862 in 2018, a 25% increase. By comparison, household incomes are $71,824 in Madison County, $67,038 in Desoto County, and $50,222 in Lafayette County. Post-COVID, the local starting wages are (sample size 3000+ employees in the Grenada micro industrial market): $17-$19/hr. (average $17.50/hr.) full-time; $13-

[38] Grenada Chamber of Commerce

$15/hr. (average $14.50/hr.) part-time. At a 60-mile radius, the average salary rate increases to approx. $20/hr. Labor costs suggest a low-risk level.	
Raw Risk Likelihood (RRL) The risk likelihood is deemed *low*, therefore the RRL is 4 out of 10.	**Score** **4**
Raw Risk Impact (RRI) The risk impact is deemed *low*, therefore the RRI is 4 out of 10.	**Score** **4**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL × RRI) is 16 out of 100.	**Score** **16**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch × RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) × GRI Score) is 16 out of 100.	**Score** **16**

APPENDIX C: TABLES AND FIGURES

Table C-1. Historical pulpwood net growth, removals, and growth/drain ratio per species group in the Grenada BDO Zone.[39]

Net Growth	2016	2017	2018	2019	2020	2021	2022	2023
Hardwood	1,478,454	1,486,954	1,463,400	1,539,856	1,630,011	1,720,643	1,745,464	1,770,284
Softwood	3,493,832	3,165,810	3,064,343	3,027,759	3,031,879	2,967,536	2,909,848	2,852,032
Total	**4,972,286**	**4,652,763**	**4,527,743**	**4,567,615**	**4,661,890**	**4,688,179**	**4,655,311**	**4,622,316**
Removals	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022***	**2023***
Hardwood	133,577	254,675	283,738	263,169	179,523	187,743	216,116	192,588
Softwood	1,202,068	1,224,959	1,039,281	951,794	906,393	968,381	792,741	680,123
Total	**1,335,645**	**1,479,634**	**1,323,020**	**1,214,963**	**1,085,916**	**1,156,124**	**1,008,857**	**872,711**
Growth - Removals	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
Hardwood	1,344,877	1,232,279	1,179,661	1,276,687	1,450,488	1,532,900	1,529,348	1,577,696
Softwood	2,291,764	1,940,851	2,025,062	2,075,965	2,125,486	1,999,155	2,117,107	2,171,910
Total	**3,636,642**	**3,173,129**	**3,204,723**	**3,352,652**	**3,575,974**	**3,532,055**	**3,646,454**	**3,749,605**
Growth/Drain Ratio	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
Hardwood	11.1	5.8	5.2	5.9	9.1	9.2	8.1	9.2
Softwood	2.9	2.6	2.9	3.2	3.3	3.1	3.7	4.2
Total	**3.7**	**3.1**	**3.4**	**3.8**	**4.3**	**4.1**	**4.6**	**5.3**

* Net growth forecasted for 2023-2024 from historical trend (2016-2021)

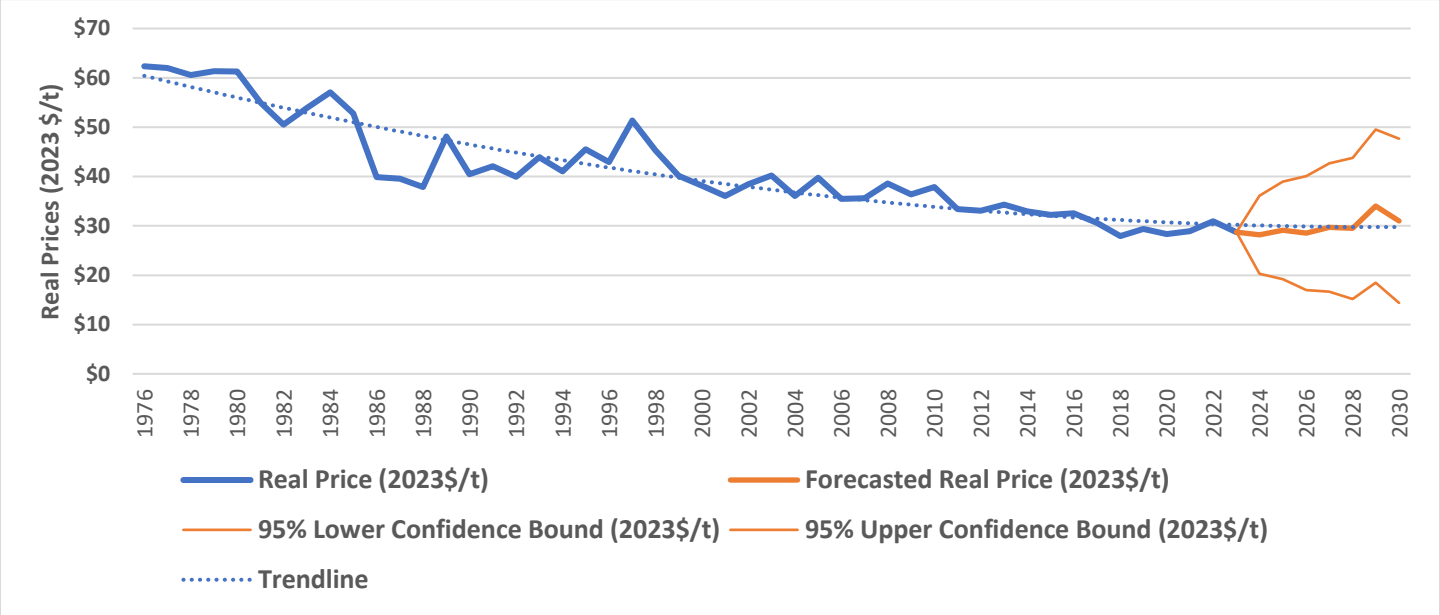
Table C-2. Historical forest residue quantities produced in the Grenada BDO Zone.[40]

YEARS	1999	2002	2005	2007	2009	2011	2013	2015	2017	2018	2019	2020	2021	2022	2023*
Hardwood	627,512	777,723	676,832	663,245	330,170	508,482	604,559	510,597	318,009	290,655	223,688	223,688	244,081	265,273	
Softwood	327,789	605,835	781,693	326,653	270,625	318,400	433,364	391,734	324,441	274,354	390,924	390,924	422,921	539,442	
TOTAL FOREST RESIDUES (bdt)	**955,301**	**1,383,558**	**1,458,525**	**989,898**	**600,795**	**826,882**	**1,037,924**	**902,331**	**642,451**	**565,009**	**614,612**	**614,612**	**667,002**	**804,715**	**834,255**
TOTAL HARVEST (bdt)	**5,072,272**	**5,502,483**	**5,766,915**	**4,614,192**	**3,331,658**	**3,719,938**	**4,198,519**	**3,966,756**	**4,363,546**	**4,482,921**	**4,026,152**	**3,944,257**	**4,298,794**	**5,322,343**	
Residue factor**	**0.19**	**0.25**	**0.25**	**0.21**	**0.18**	**0.22**	**0.25**	**0.23**	**0.15**	**0.13**	**0.15**	**0.16**	**0.16**	**0.15**	

* Forecasted based on the historical trend (2017-2022)
** Residue factor = total forest residue (bdt) /total harvest (bdt)

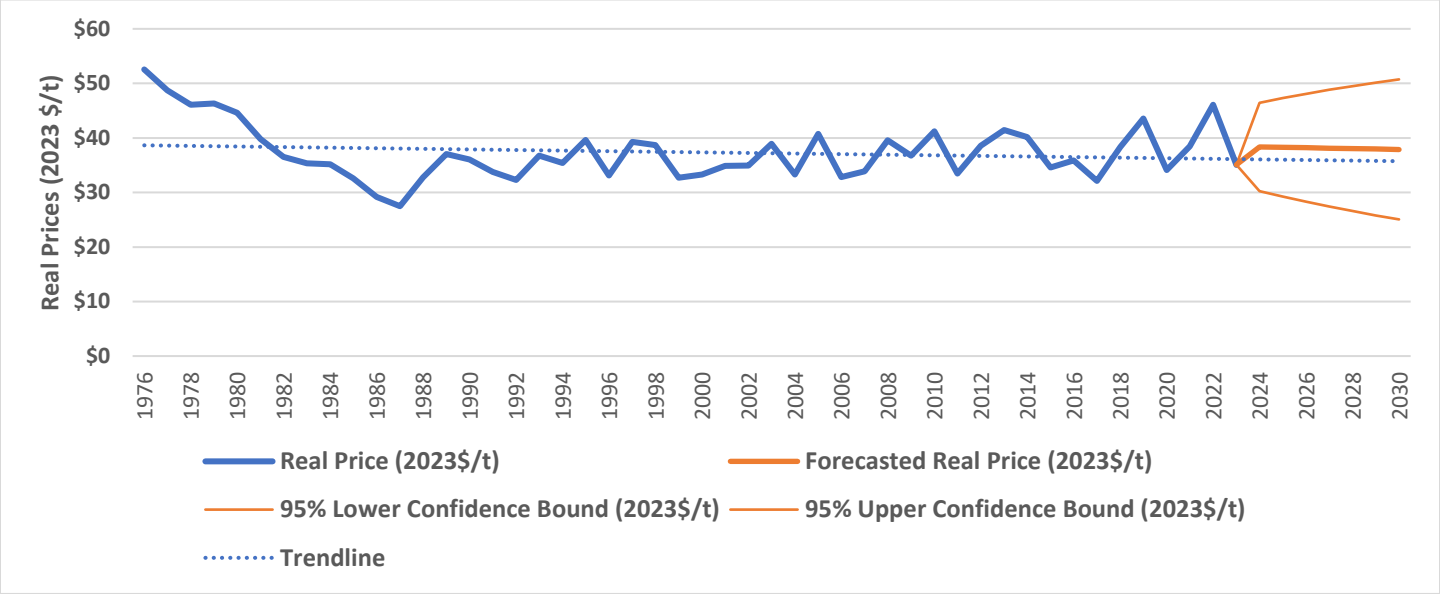
[39] Removals Pulpwood (2016-23): extension.msstate.edu/content/harvest-forest-products; Average Net Growth (2016-2021): apps.fs.usda.gov/fiadb-api/evalidator; Average Net Growth (2022-23): forecasted
[40] www.fs.usda.gov/research/products/dataandtools/tools/timber-products-output-tpo-interactive-reporting-tool

Figure C-1. Historical and forecasted real-term price (delivered) of softwood pulpwood (2023 $/t)



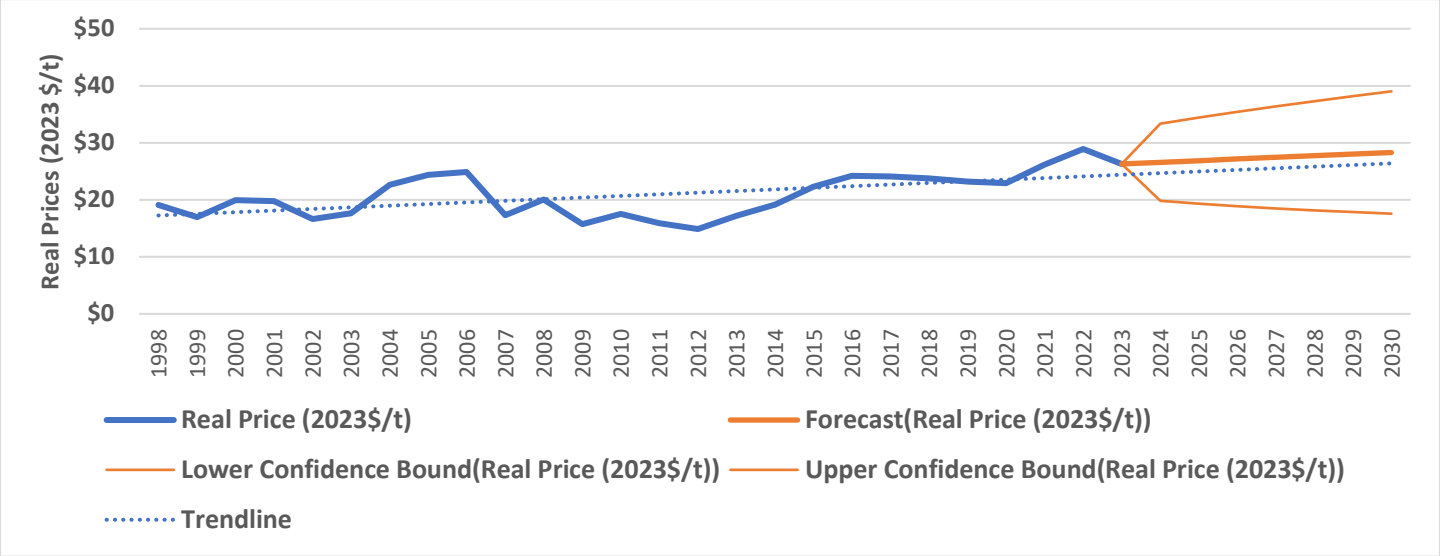
Source: Timber Mart South 2023; Ecostrat forecast

Figure C-2. Historical and forecasted real-term price (delivered) of hardwood pulpwood (2023 $/t)



Source: Timber Mart South 2023; Ecostrat forecast

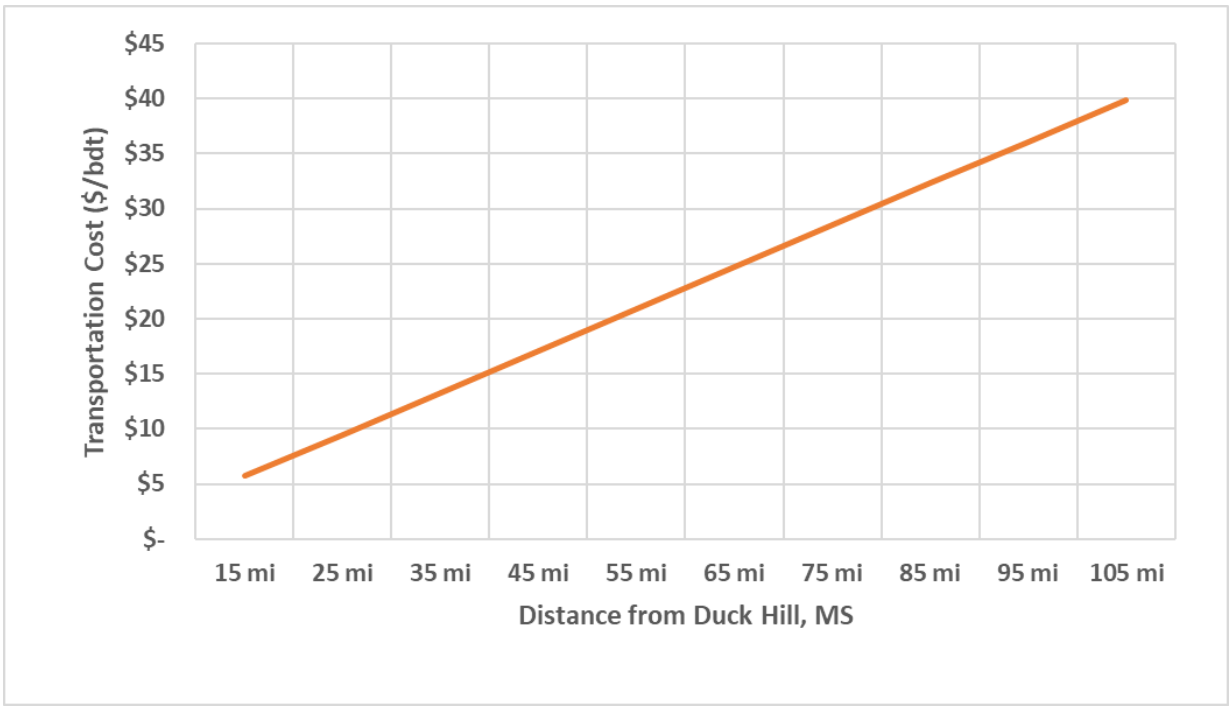
Figure C-3. Historical and forecasted real-term price (FOB) of sawmill residues (process residuals) (2023 $/t)



Source: Timber Mart South 2023; Ecostrat forecast

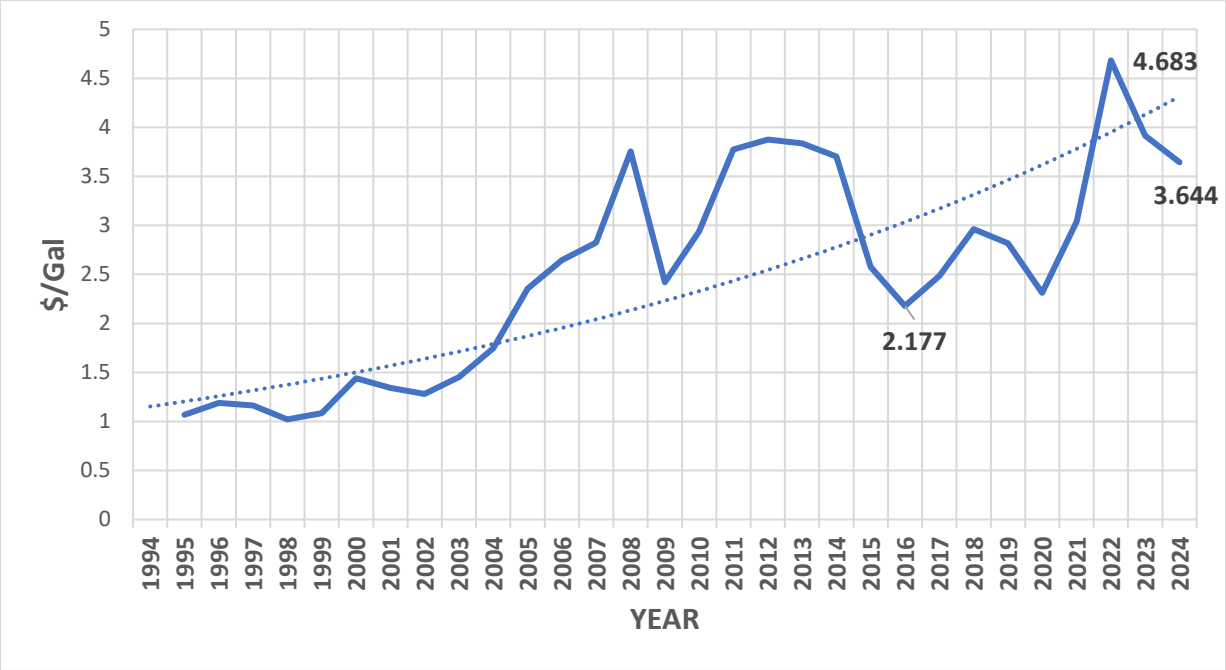
Figure C-4 shows transportation costs at 10-mile increment and are based on the most current rate of $0.19 per ton per loaded mile (Timber Mart South - Biomass, Logging Rates, & Species Detail - 4th Quarter 2023)

Figure C-4. Transportation costs ($/bdt) by distance from Duck Hill, MS.[41]



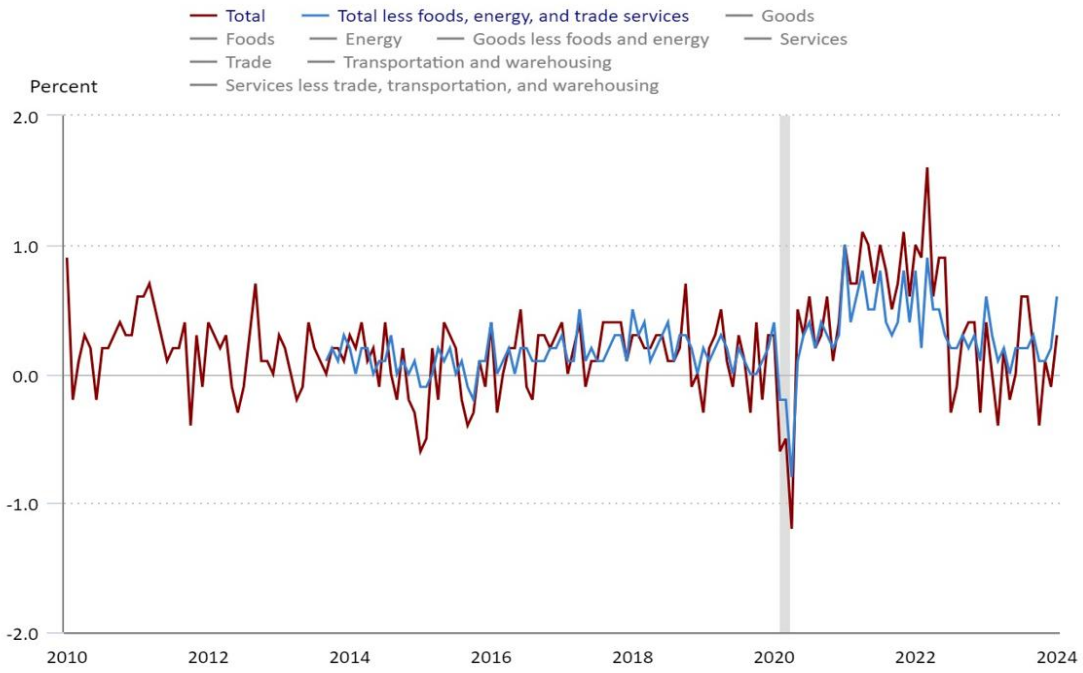
[41] www.timbermart-south.com and Ecostrat transportation calculator

Figure C- 5. Historical diesel prices ($/gal) and trendline in the Gulf Coast Region (1994-2024).[42]



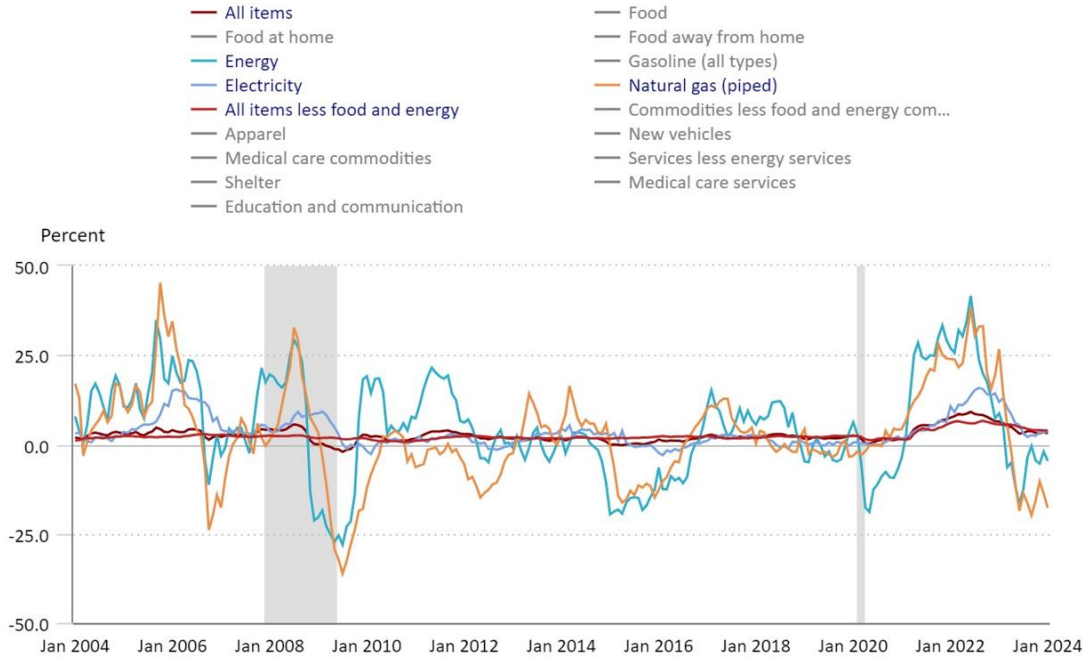
[42] www.eia.gov

Figure C-6. Producer Price Index (2010-2024)



Source: U.S. Bureau of Labor Statistics.

Figure C-7. Consumer Price Index (2004-2024)



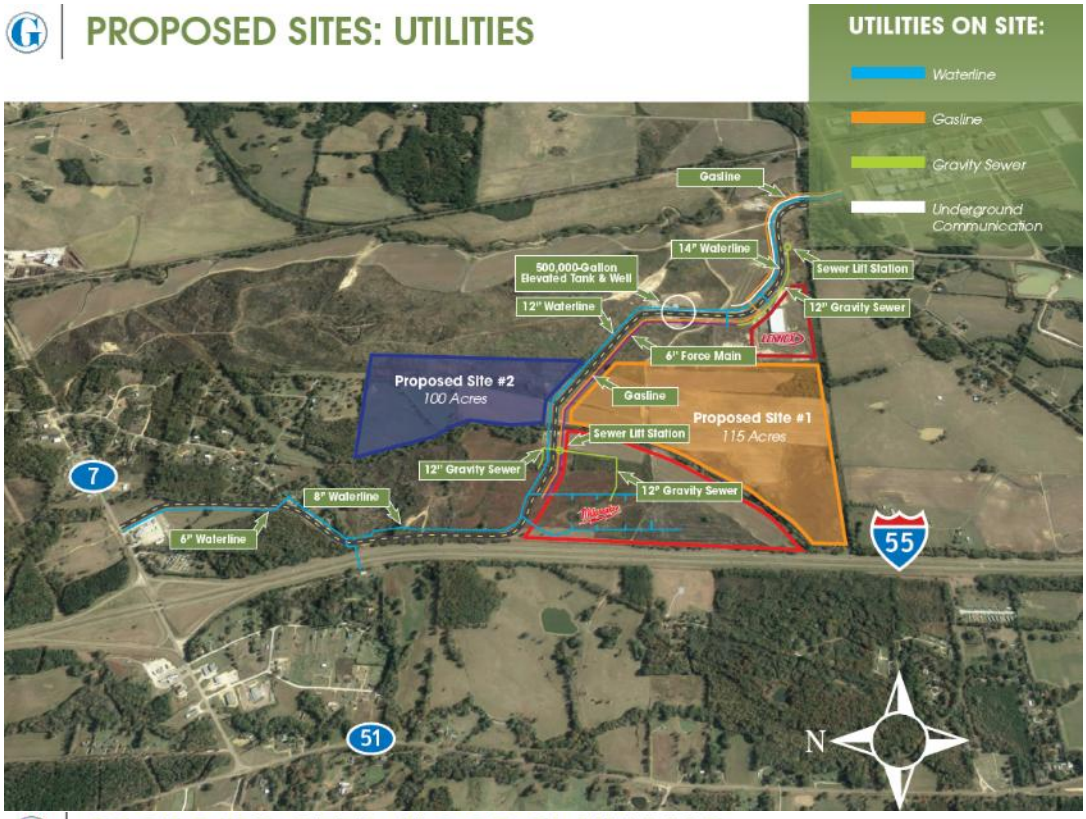
Source: U.S. Bureau of Labor Statistics.

Map C-1. Map of proposed sites and available utilities.[43]

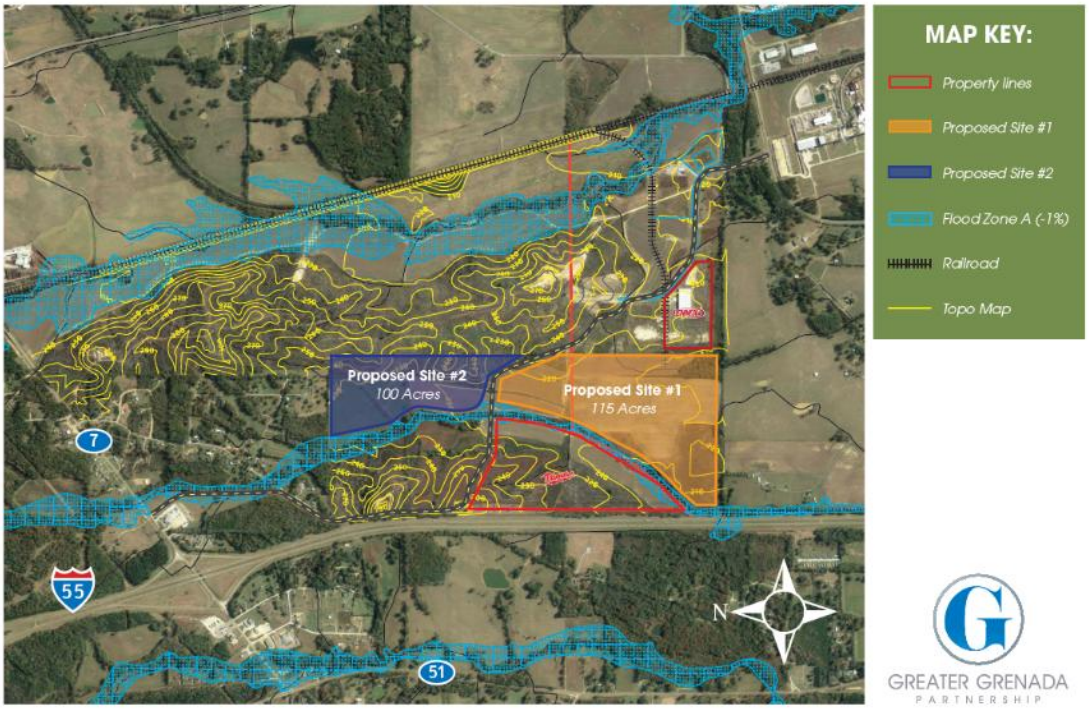


[43] Source: Greater Grenada Partnership

PROPOSED SITES: UTILITIES



PROPOSED SITES: FLOOD PLAIN MAP




PROPOSED SITE #1: 115 Acres
UTILITIES ON SITE:
entergy Electrical
ATMOS energy Gas
GT&Y Utility District Water
Water/Sewer
Sparklight 100G Fiber
500,000-Gallon Water Tank
Grenada Railway
New Rail Spur
Industrial Four Lane Road
for north and south connections to I55
LENNOX
Milwaukee
Proposed Site #1
115 Acres
N
55


PROPOSED SITE #1: 115 Acres
UTILITIES ON SITE:
entergy Electrical
ATMOS energy Gas
GT&Y Utility District Water
Water/Sewer
Sparklight 100G Fiber
55
Milwaukee
500,000-Gallon Water Tank
Proposed Site #1
115 Acres
LENNOX
Industrial Four Lane Road
for north and south connections to I55
N


PROPOSED SITE #2: 100 Acres
UTILITIES ON SITE:
entergy Electrical
ATMOS energy Gas
GT&Y Utility District Water
Water/Sewer
Sparklight 100G Fiber
Grenada Railway Line
Memphis to Jackson
Proposed Site #2
100 Acres
Industrial Four Lane Road
for north and south connections to I55
55
N


PROPOSED SITE #2: 100 Acres
UTILITIES ON SITE:
entergy Electrical
ATMOS energy Gas
GT&Y Utility District Water
Water/Sewer
Sparklight 100G Fiber
500,000-Gallon Water Tank
LENNOX
55
Proposed Site #1
115 Acres
Industrial Four Lane Road
for north and south connections to I55
Milwaukee
Proposed Site #2
100 Acres
N

APPENDIX E: LEGAL DISCLAIMER

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