12 October 2015

Shipper Mine Life Analysis

Prepared for DBCT Management

Executive summary

DBCT Management engaged Wood Mackenzie to provide an assessment of the weighted average life of the mines serviced by Dalrymple Bay Coal Terminal to assist with a draft access undertaking (DAU).

The weighted average life of mines serviced by DBCT was calculated using four different methods. The first two scenarios utilise the marketable production and marketable reserve data from Wood Mackenzie's Coal Supply Service. The other two scenarios are adjusted using company reserves compiled from publicly available information.

Scenario	Method	Outcome (years)
1	Weighted average mine life by average marketable production	20
2	Weighted average mine life by marketable reserves	25
3	Weighted average implied mine life by average production	26
4	Weighted average implied mine life by company reported reserves	35

This report also sets out Wood Mackenzie's current view of the metallurgical and thermal coal markets and considers the competitive positioning of mines within the Hay Point Catchment.

Global demand for seaborne metallurgical coal has increased from 180 Mt in 2000, to 287 Mt in 2014 (3.5% CAGR) and is forecast to continue increasing over the next 20 years to reach more than 405 Mt by 2035 (1.6% CAGR). Historical and forecast metallurgical coal demand is being driven by continued urbanisation and construction in China and India, with the majority of long term global growth expected to be driven by India.

Historically, a large portion of the incremental seaborne metallurgical coal supply has come from Australia, which we expect will continue given the political stability, high coal quality, cost advantage and incumbency. The United States, Canada and Russia will continue to be major metallurgical coal suppliers to the seaborne market, with some additional metallurgical coal supply forecast from new sources in Indonesia and Mozambique, both of which have relatively untested products in the market.

Global demand for seaborne thermal coal increased significantly from 340 Mt in 2000, to 960 Mt in 2014 (7.7% CAGR), largely due to China's rapid economic growth. Moving forward, seaborne thermal coal demand is forecast continue to grow, albeit at much slower rate of 2.6% (CAGR), increasing from 957 Mt in 2015 to 1,633 Mt in 2035. Much of this growth will be in developing areas of the Pacific Basin due to strong regional economic growth and expanding coal-fired power generation.

Overall demand growth will be led by power generation increases in China and India, which, combined, will account for nearly half of global seaborne demand by 2035. Incremental supply has historically

been dominated by Indonesia, followed by Australia, however going forward and into the longer term this relationship will swap with Australia positioned well to capture a large portion of the incremental demand, with supply expected to grow at a CAGR of 4.3% from 2015 to 2035 compared to 1.5% from Indonesia.

With 16.6 Bt of marketable thermal coal reserves and 7.7 Bt of marketable metallurgical coal reserves, Australia will continue to be one of largest coal producing countries in the world. Australian thermal coal production is forecast to increase significantly (from 270 Mt currently to 520 Mt by 2035) due to large scale project development, particularly in the currently under or un-developed Galilee and Surat basins in Queensland. Australian metallurgical coal is also expected to increase slightly from 180 Mt in 2015 to 226 Mt in 2035 (1.1% CAGR). While maintaining its positions as the largest metallurgical exporter, Australia's market share will drop slightly from 62% to 56%.

Historically (prior to 2000) the Pacific seaborne coal market was dominated by supply from Australia and demand into North East Asia. The last decade saw increased demand from China and India incentivising new supply from higher cost and/ or lower quality operations in other countries. Despite this competition, we expect Australian thermal coal will continue to be competitive in the seaborne market given quality and cost structures; it has a quality advantage over Indonesian coal, and a freight advantage over other suppliers on a delivered basis into North Asia. Similarly, we expect Australian metallurgical coal will continue to be competitive; while Russian and Canadian metallurgical coals are of comparable quality, they, like new supply from Mozambique are higher cost on a delivered basis to North Asia.

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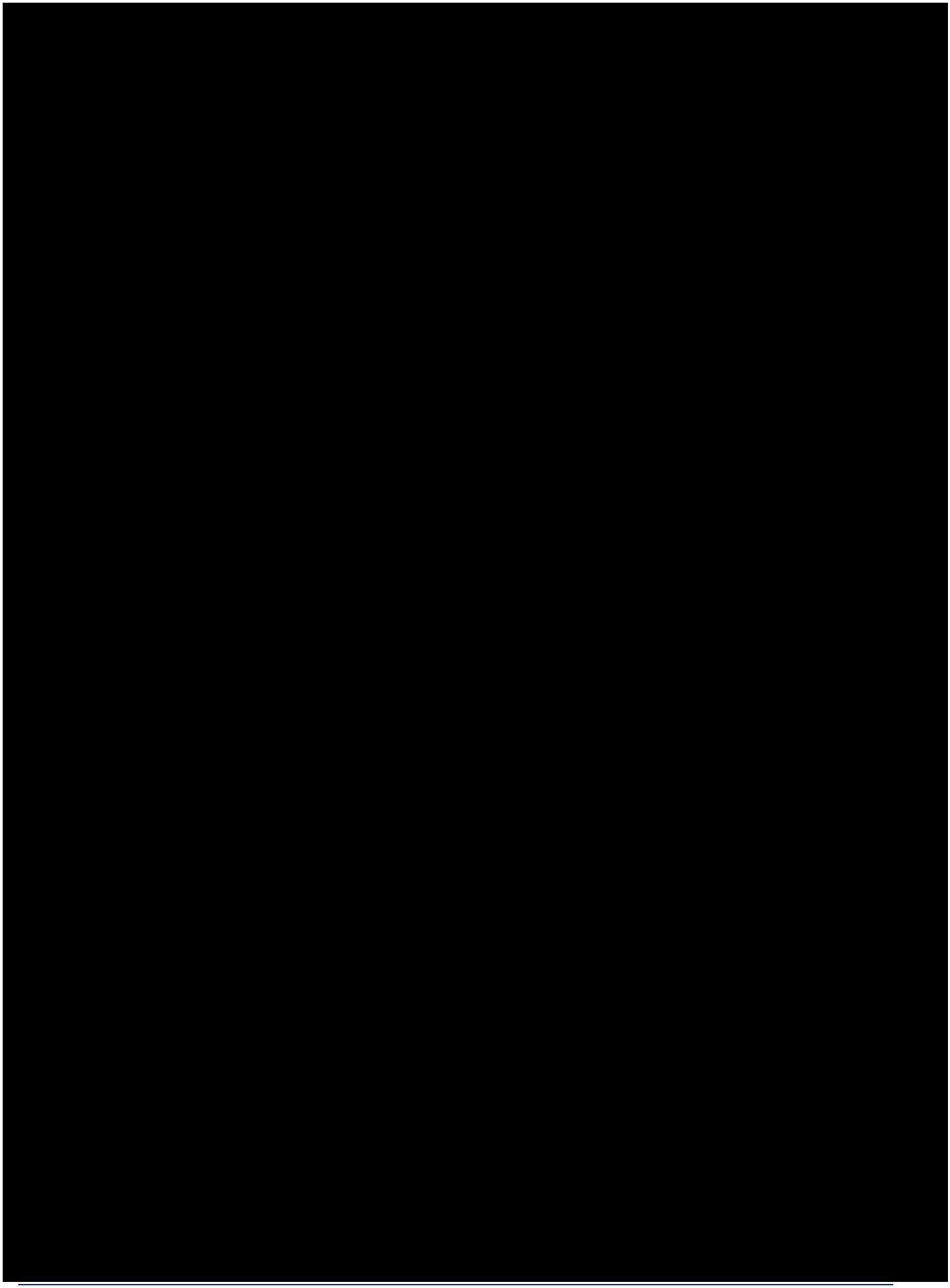
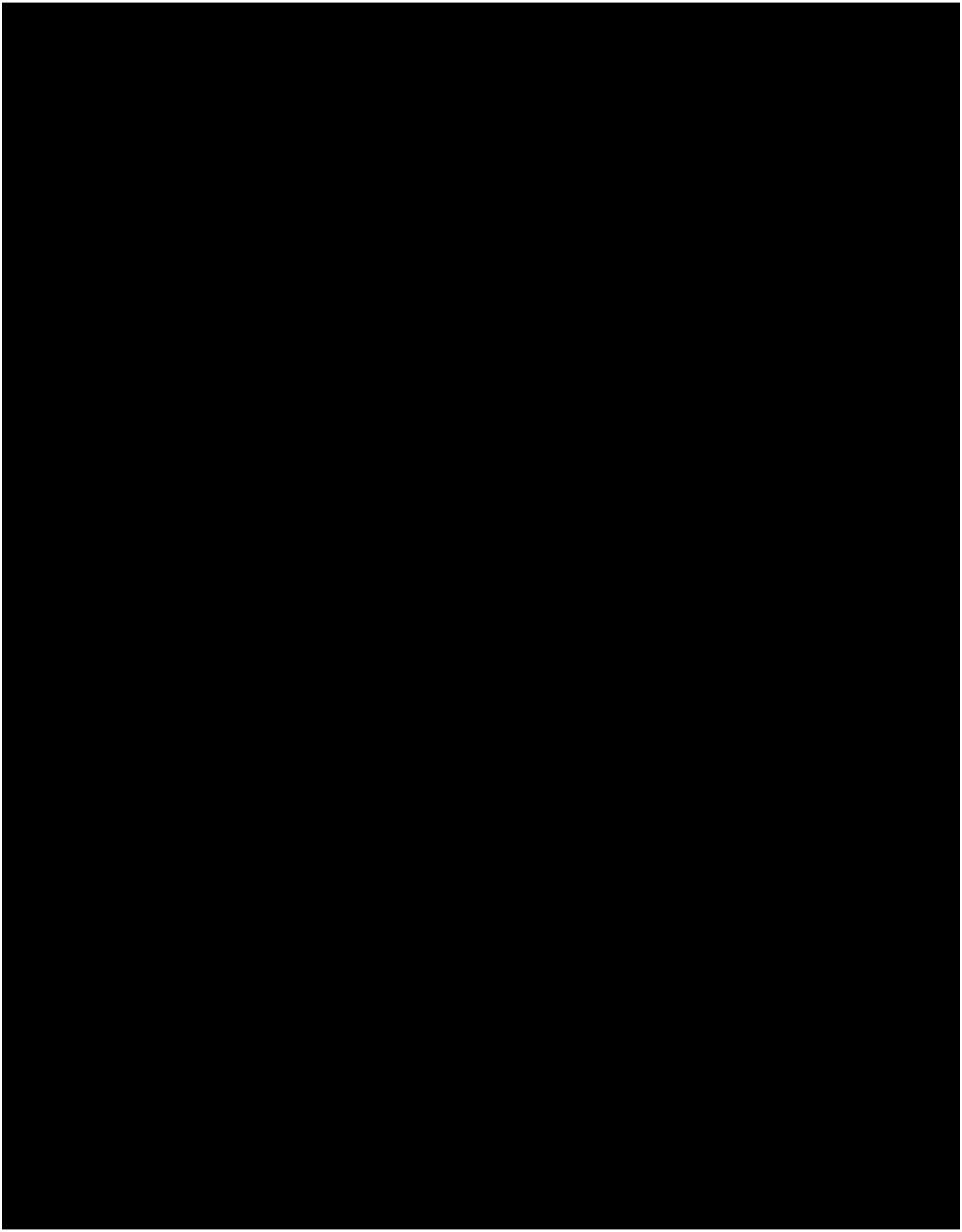
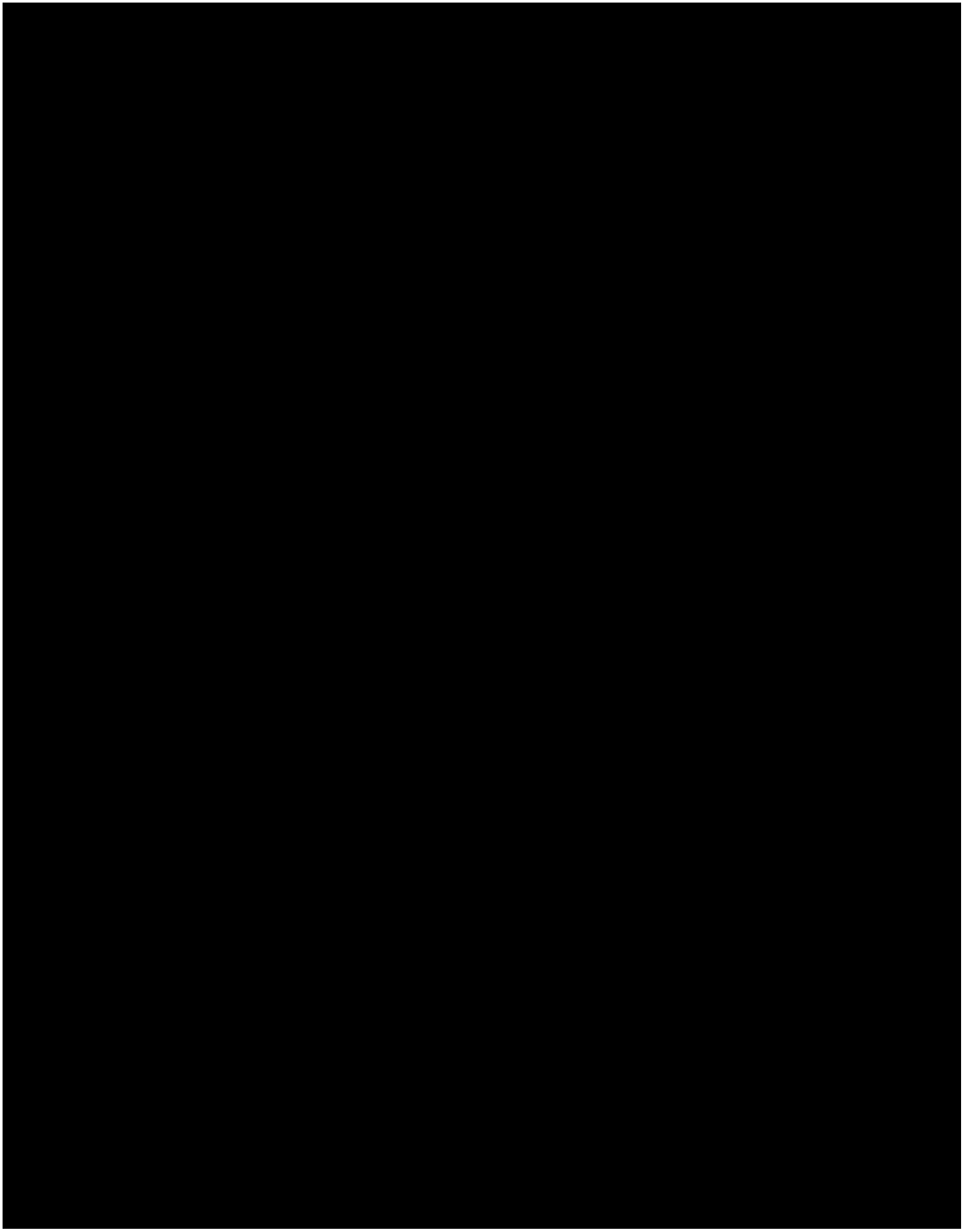
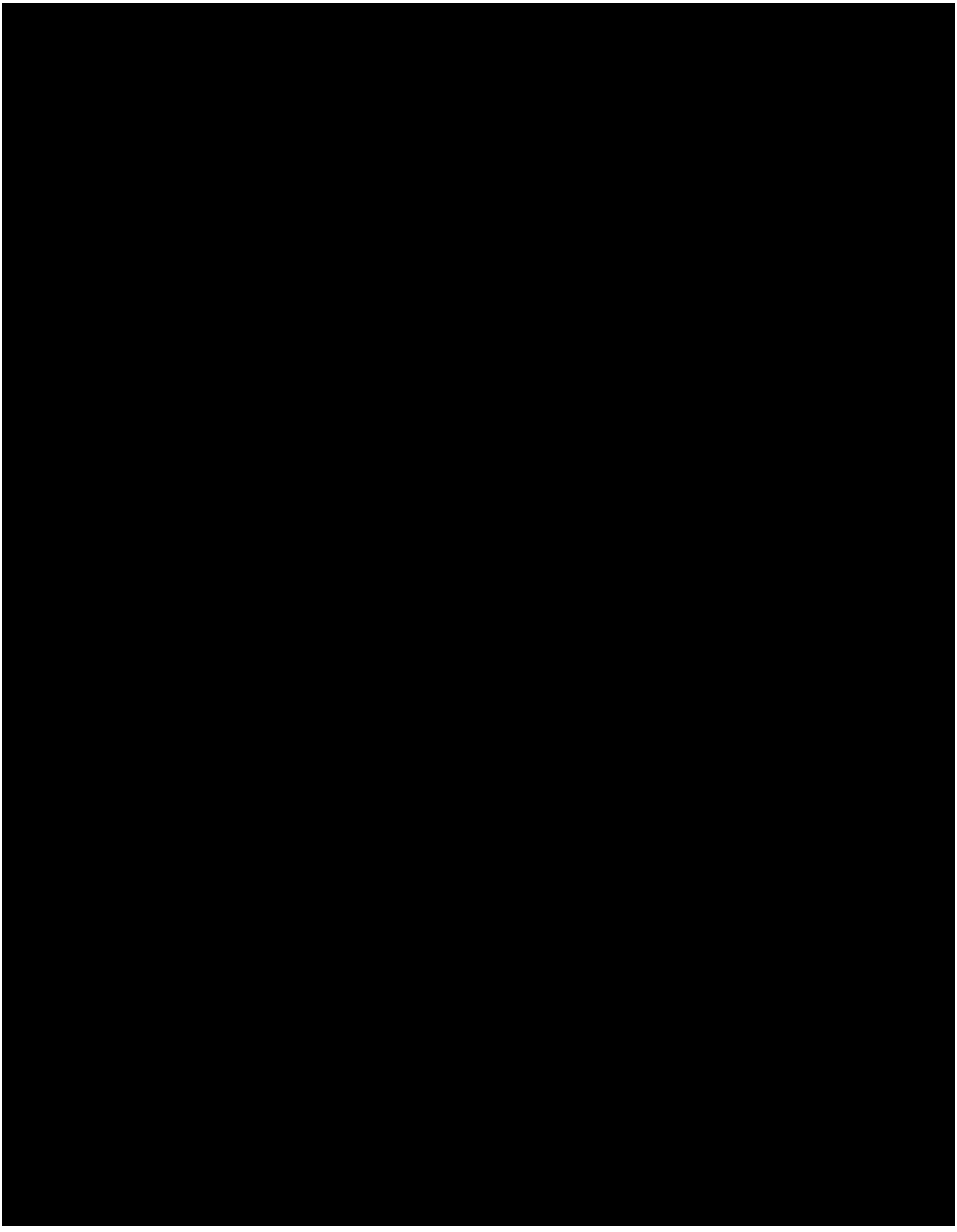
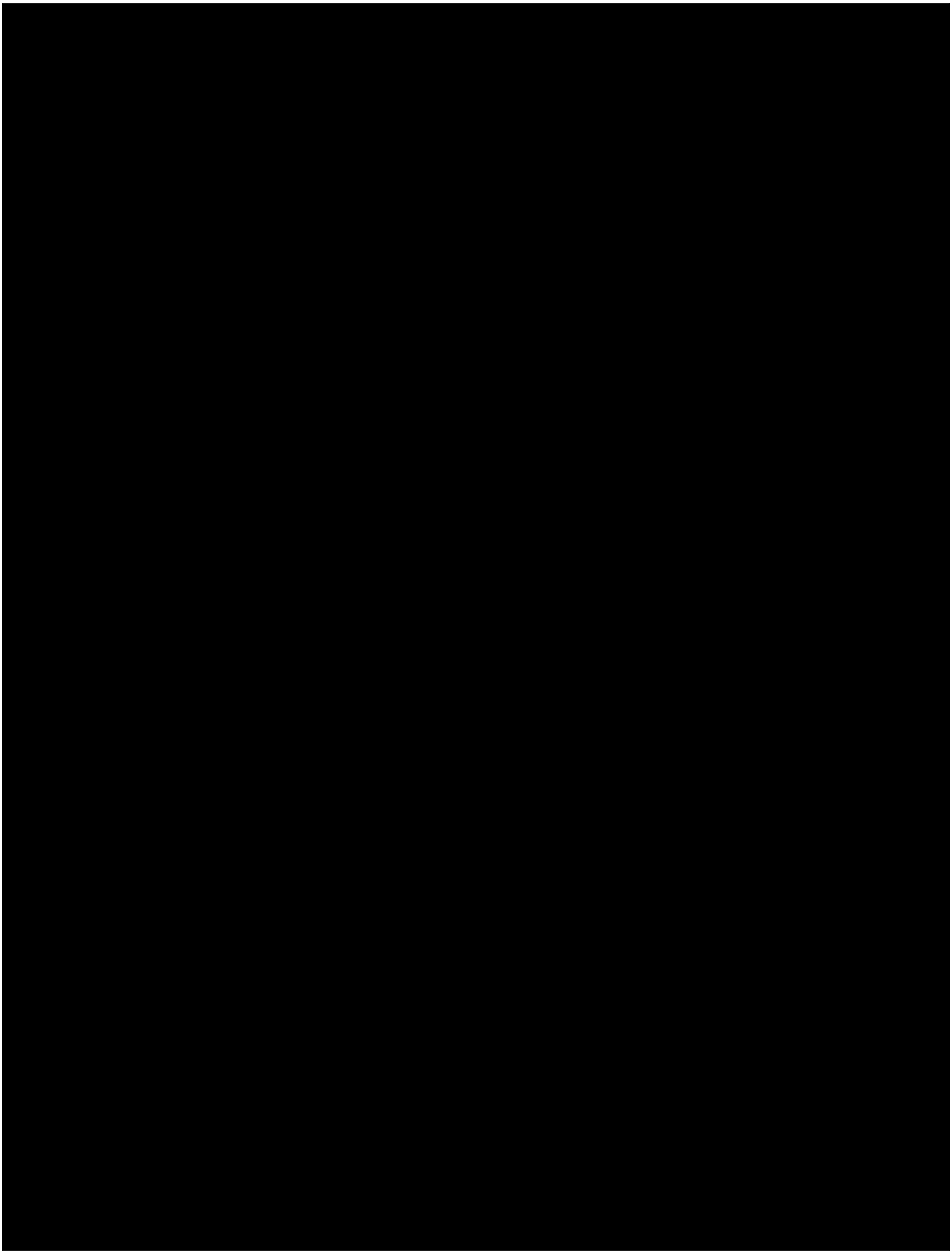
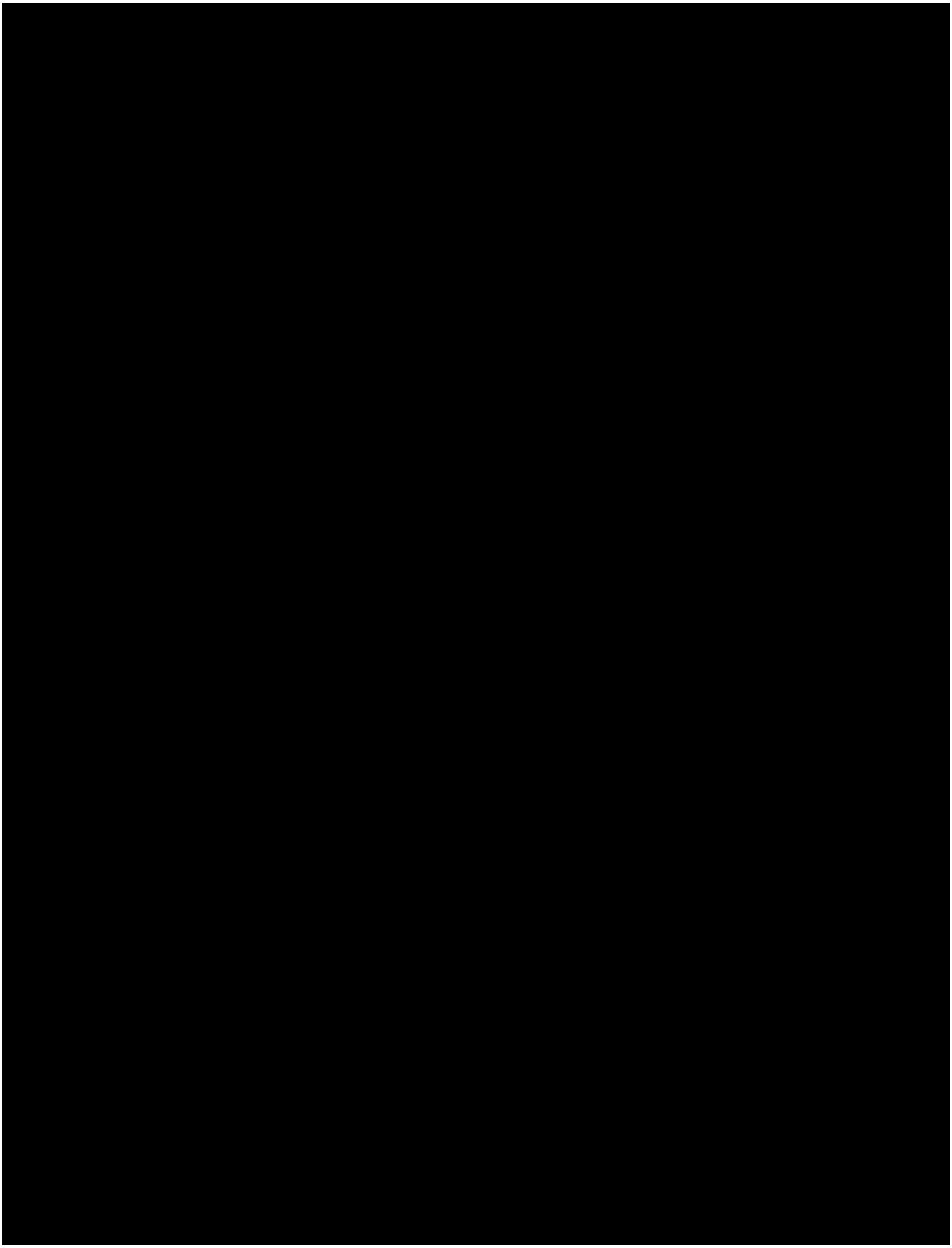


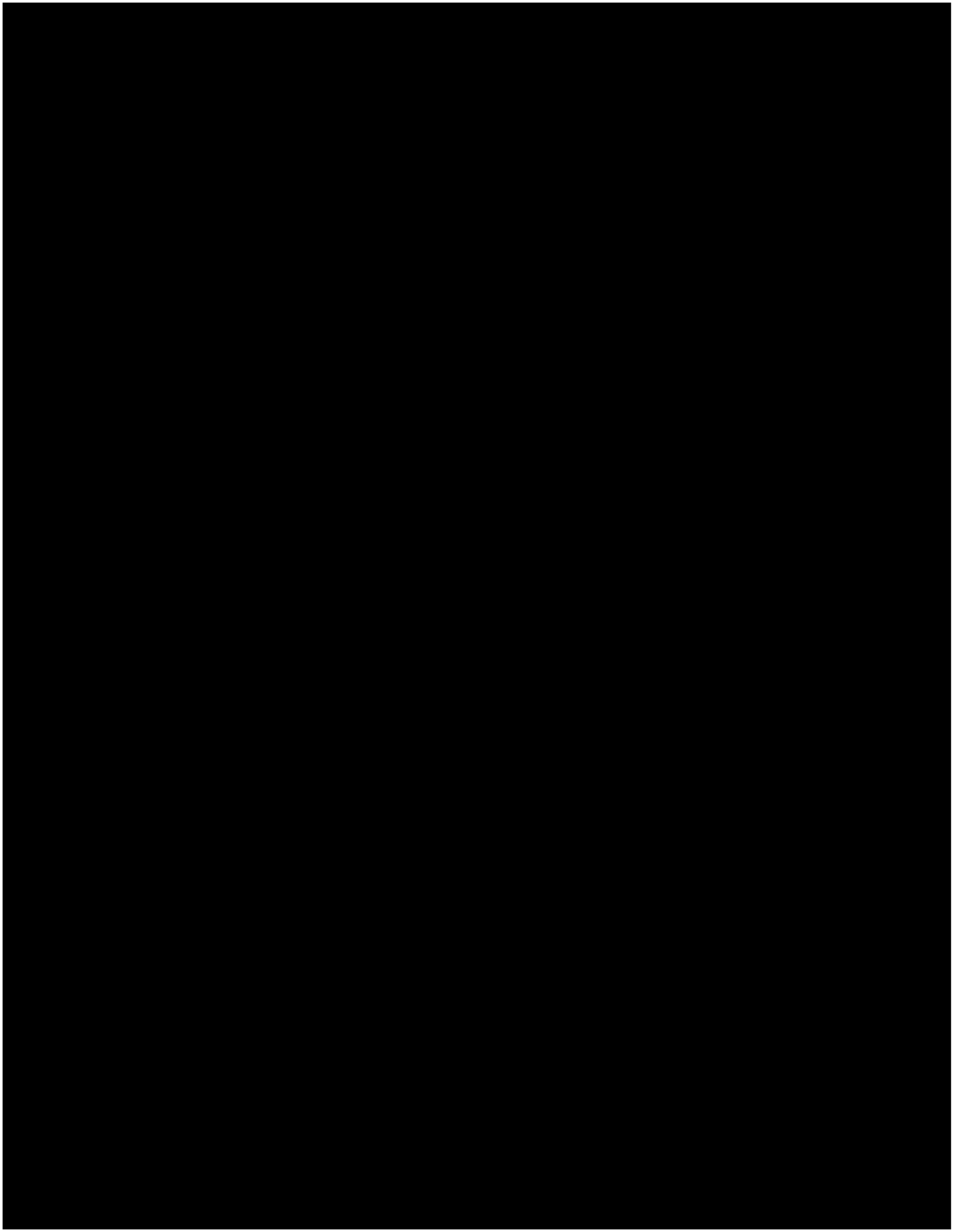


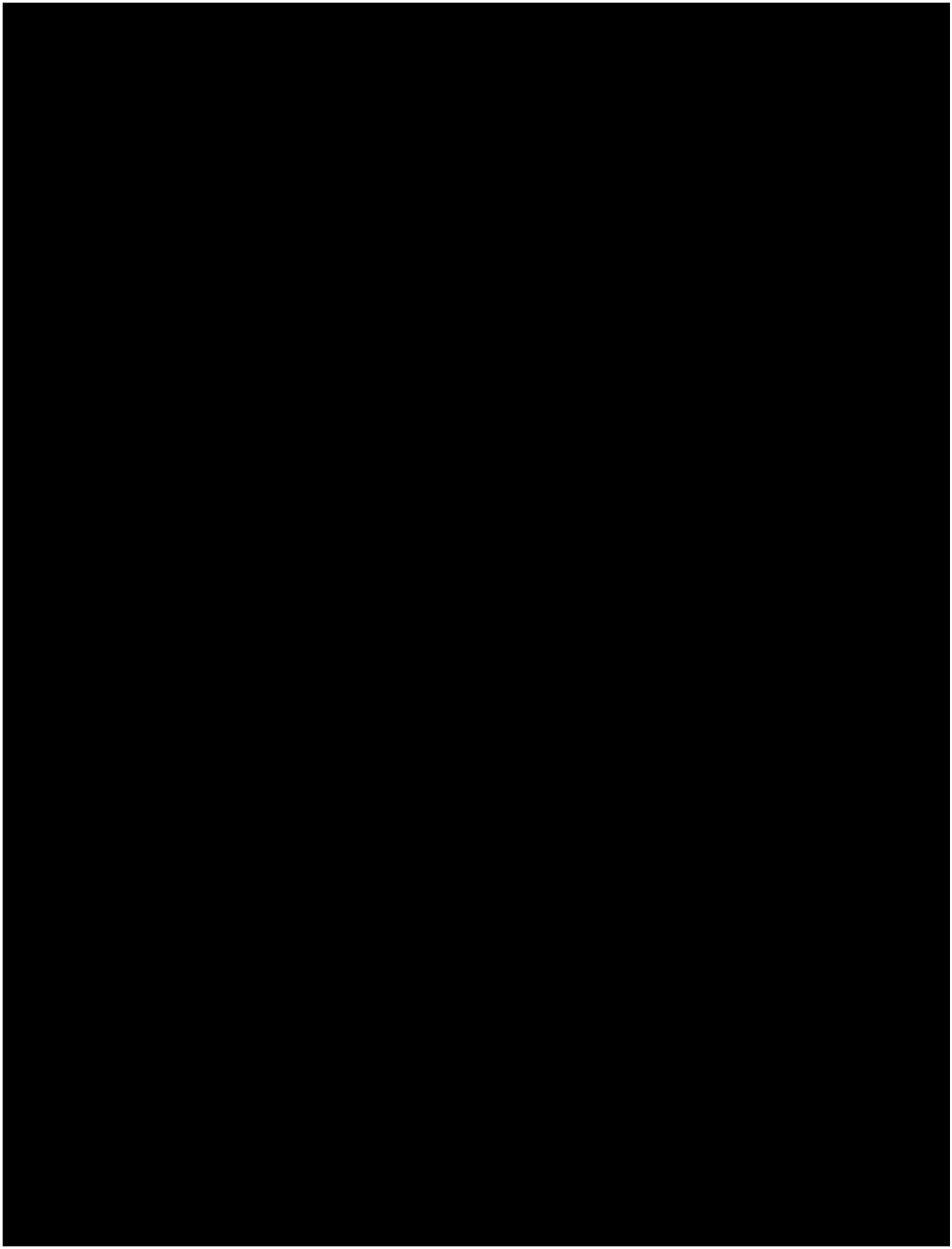


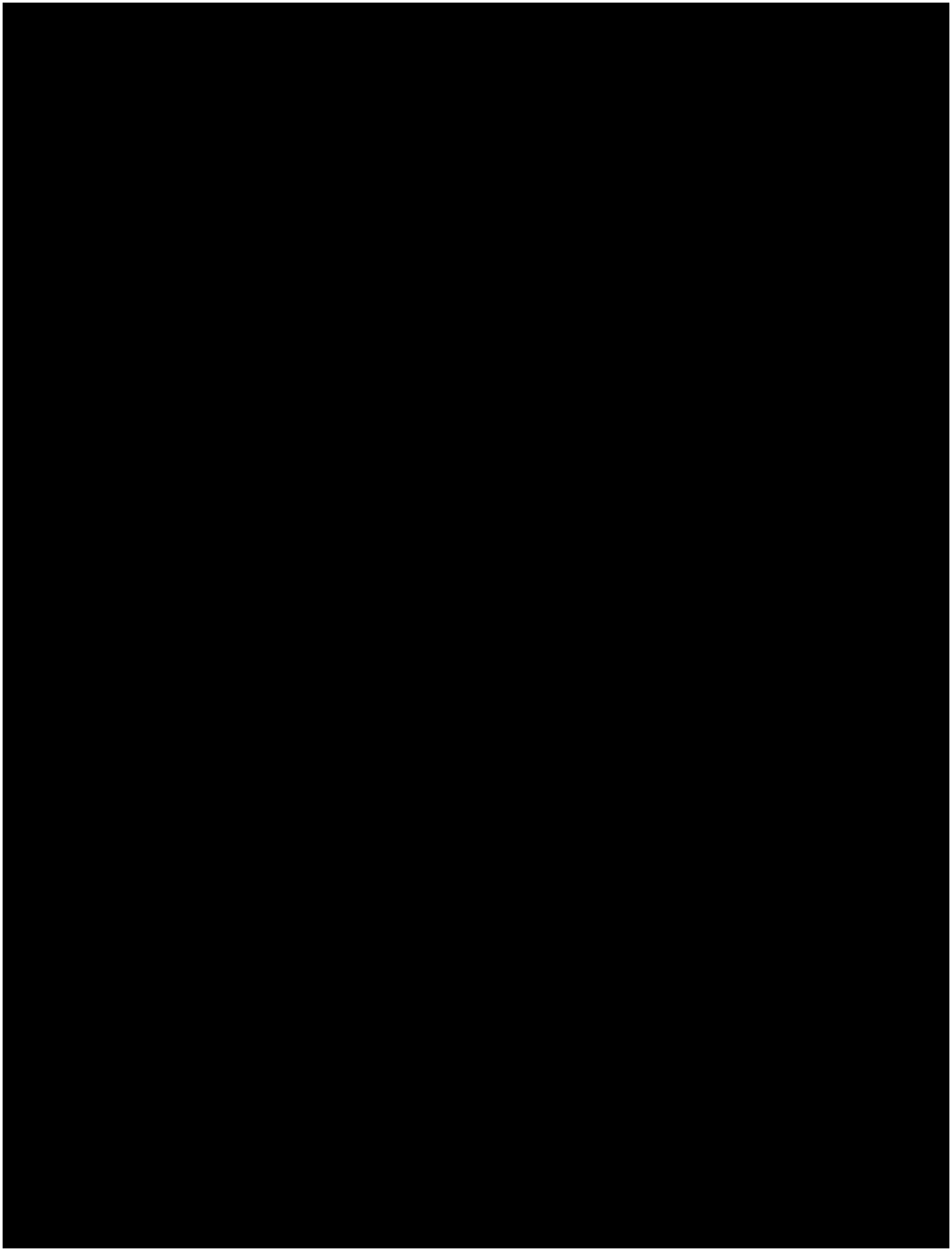


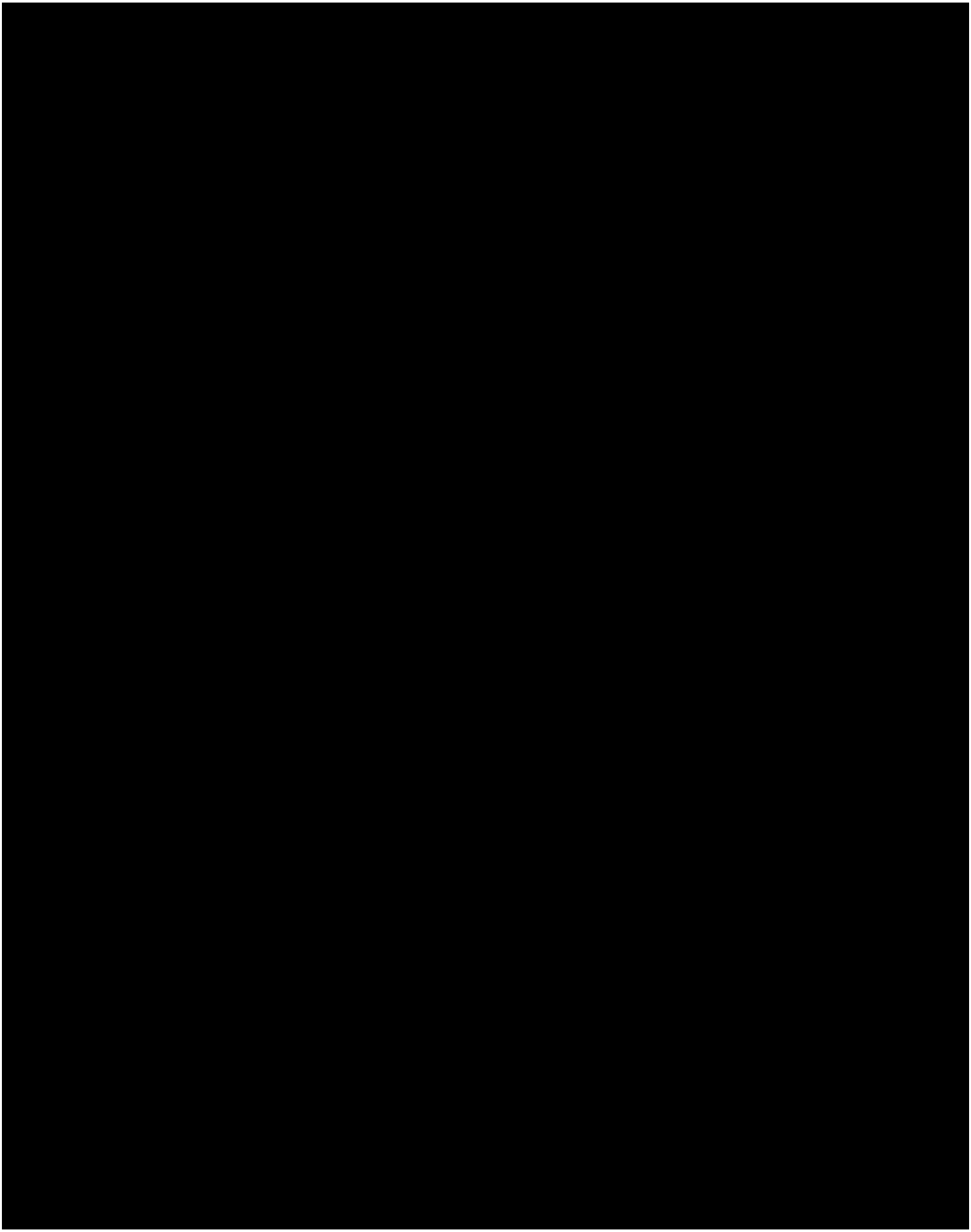


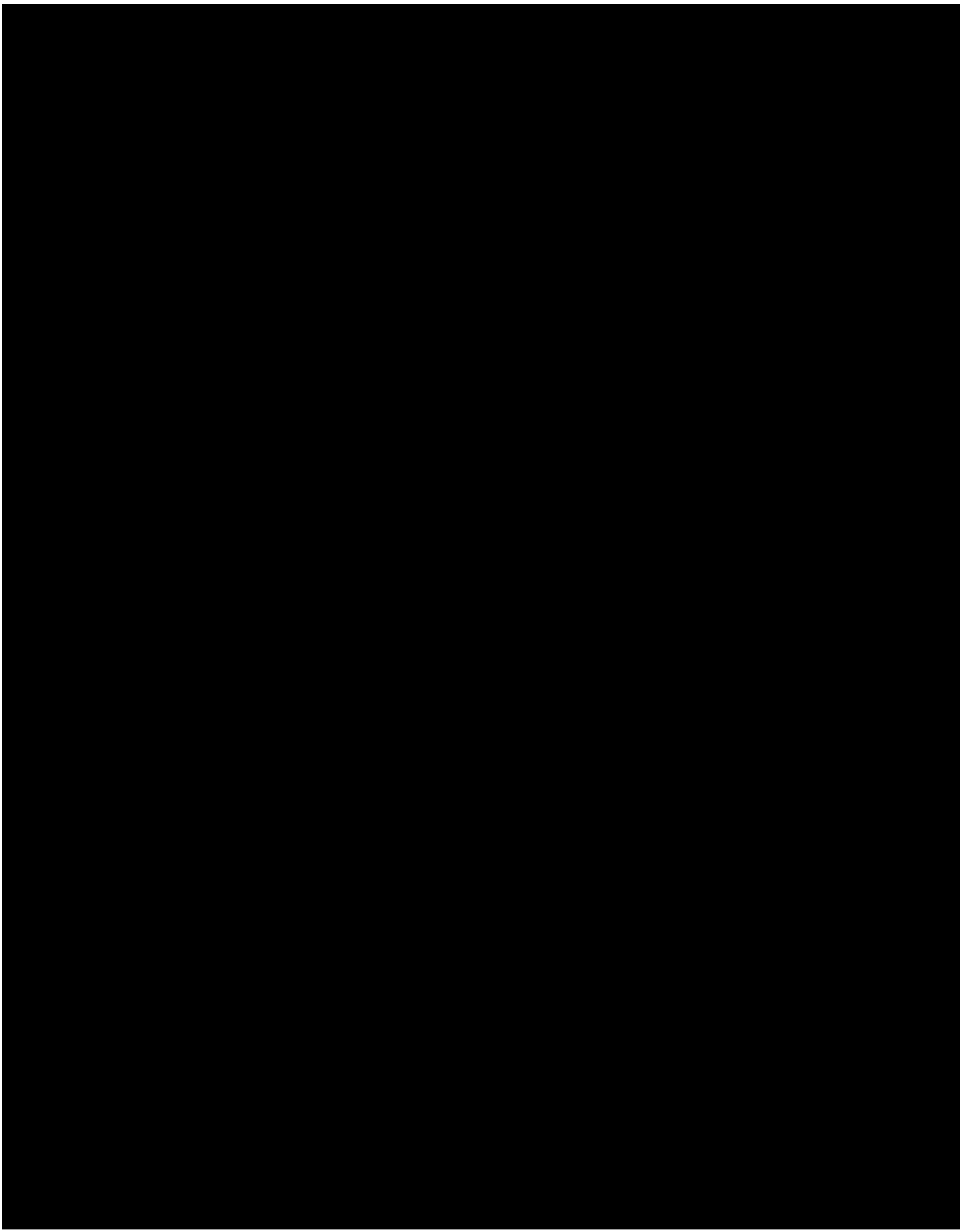


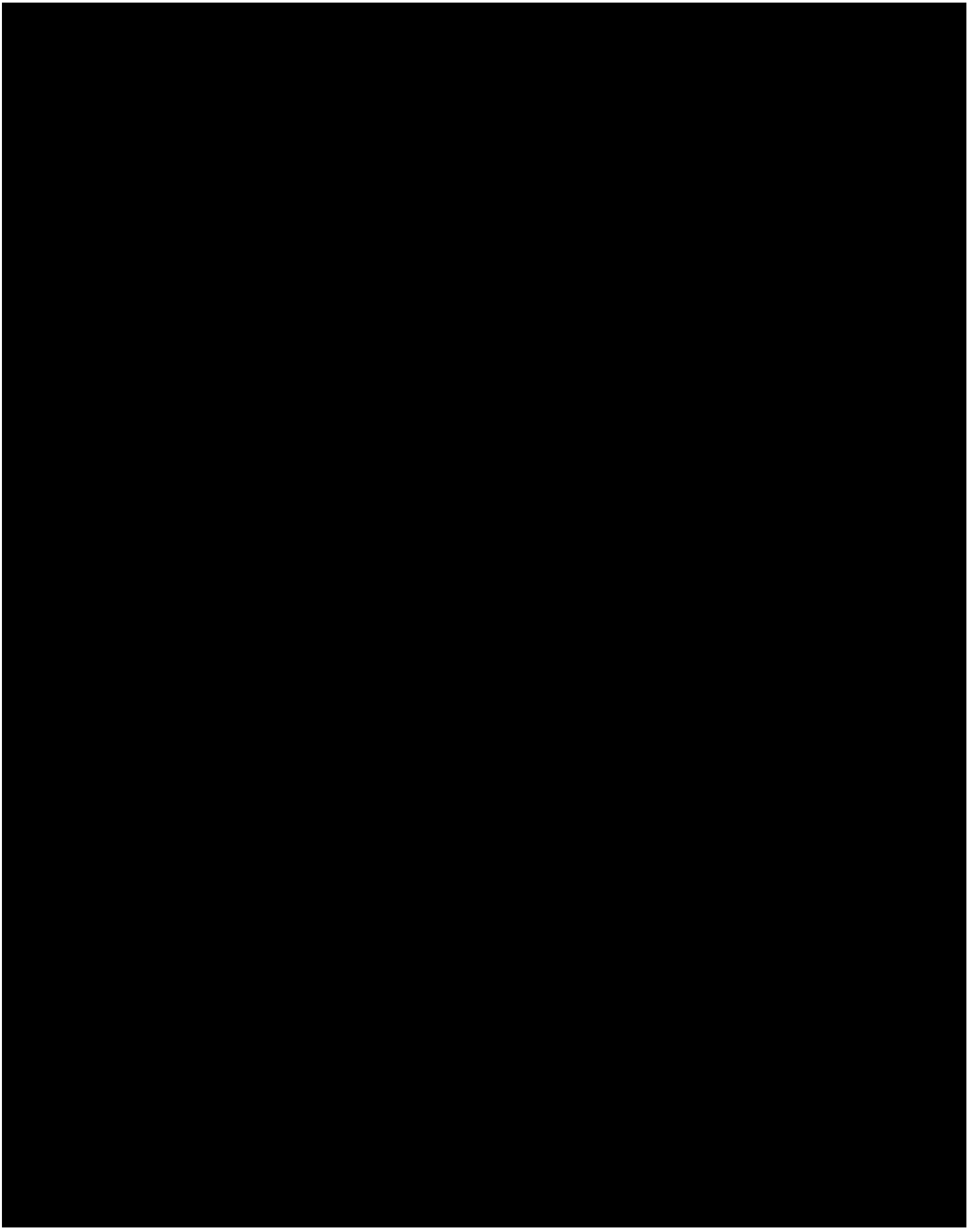


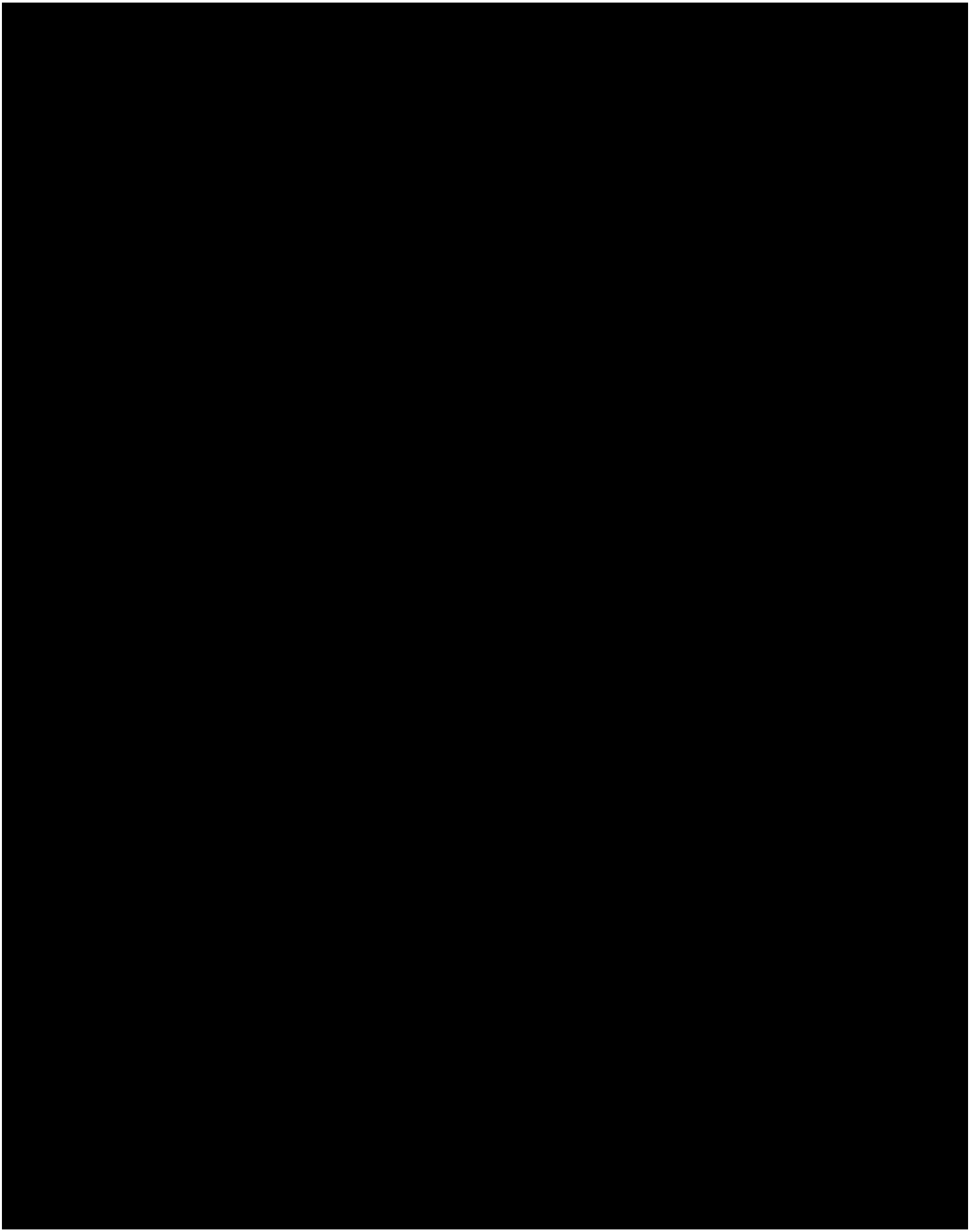


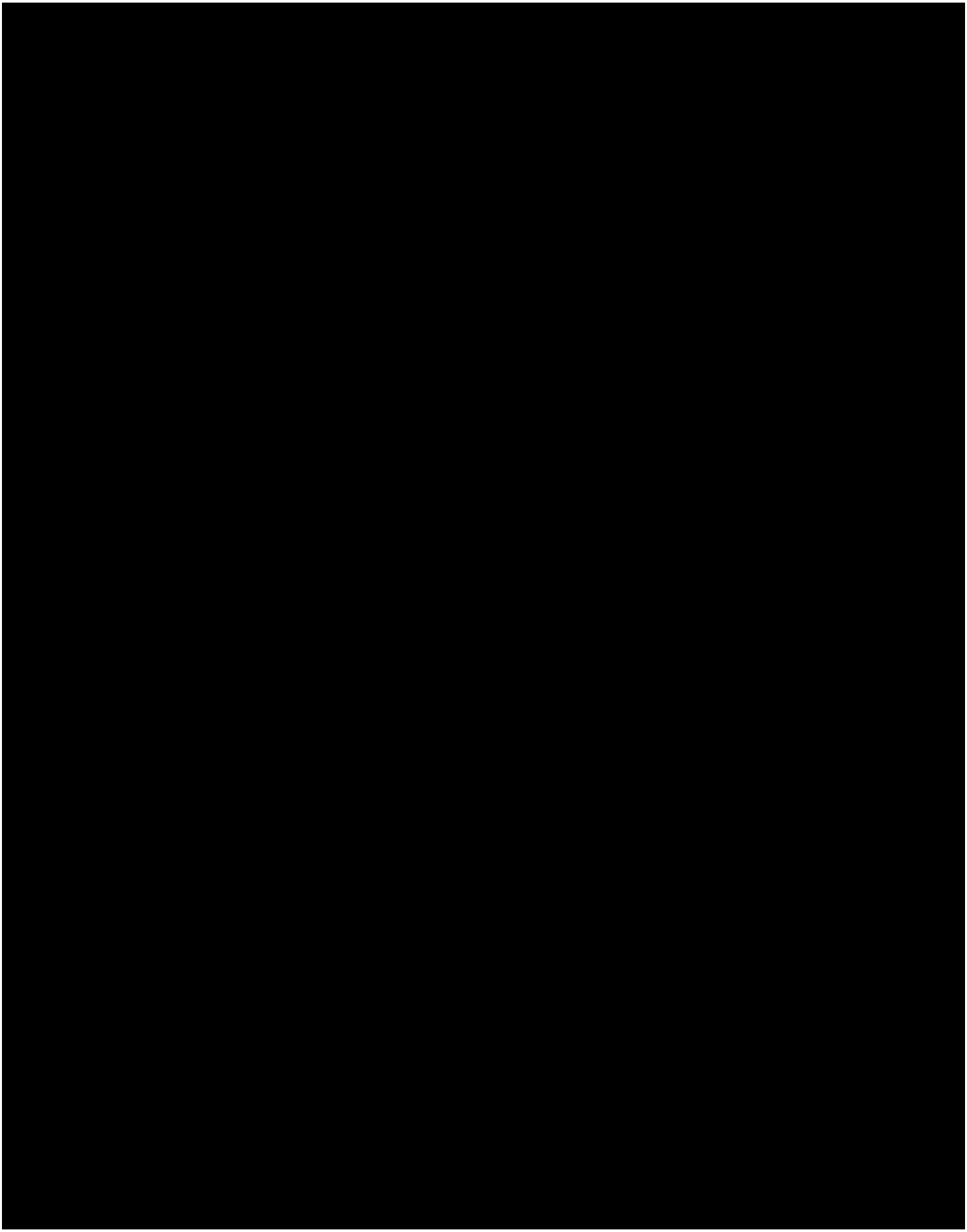


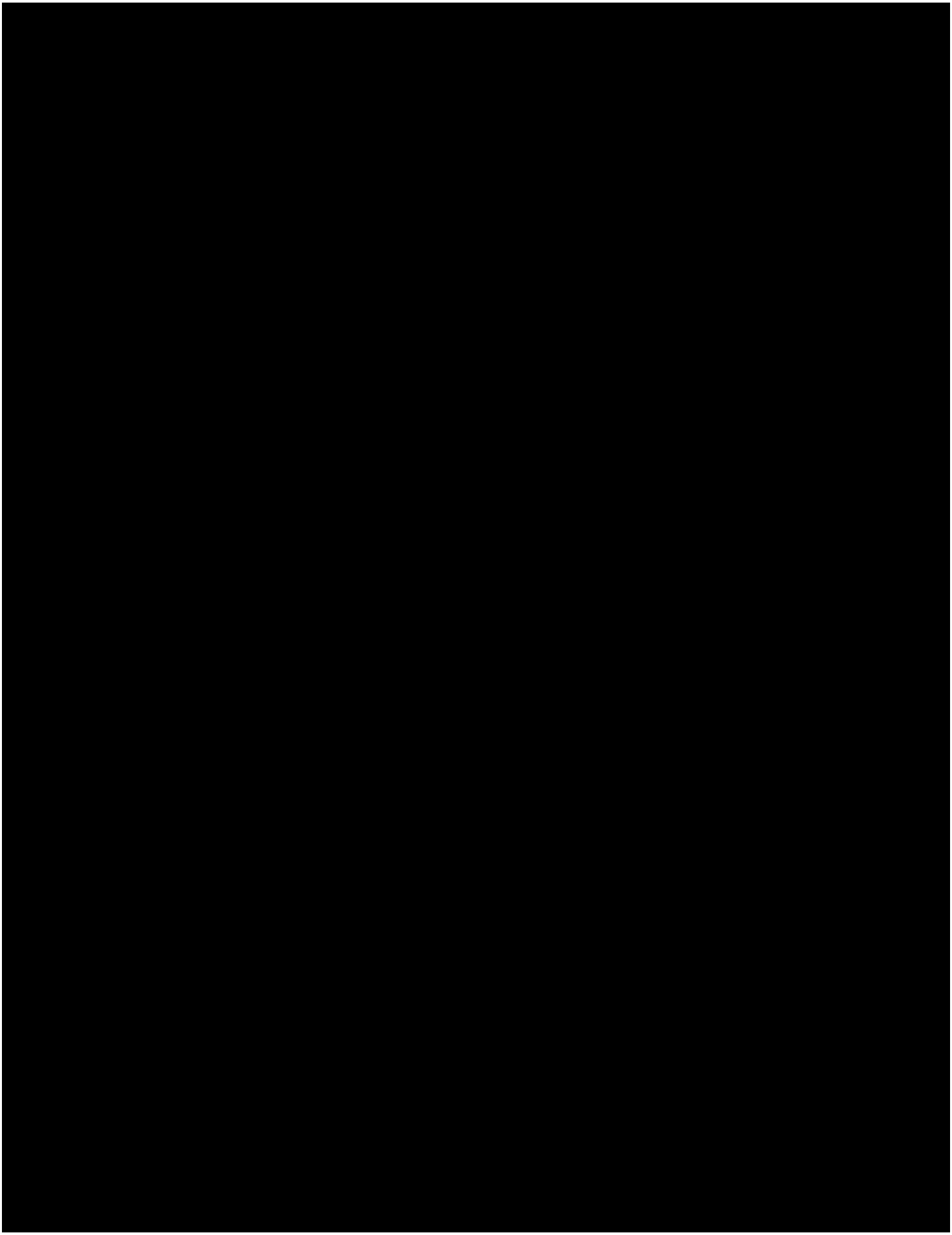












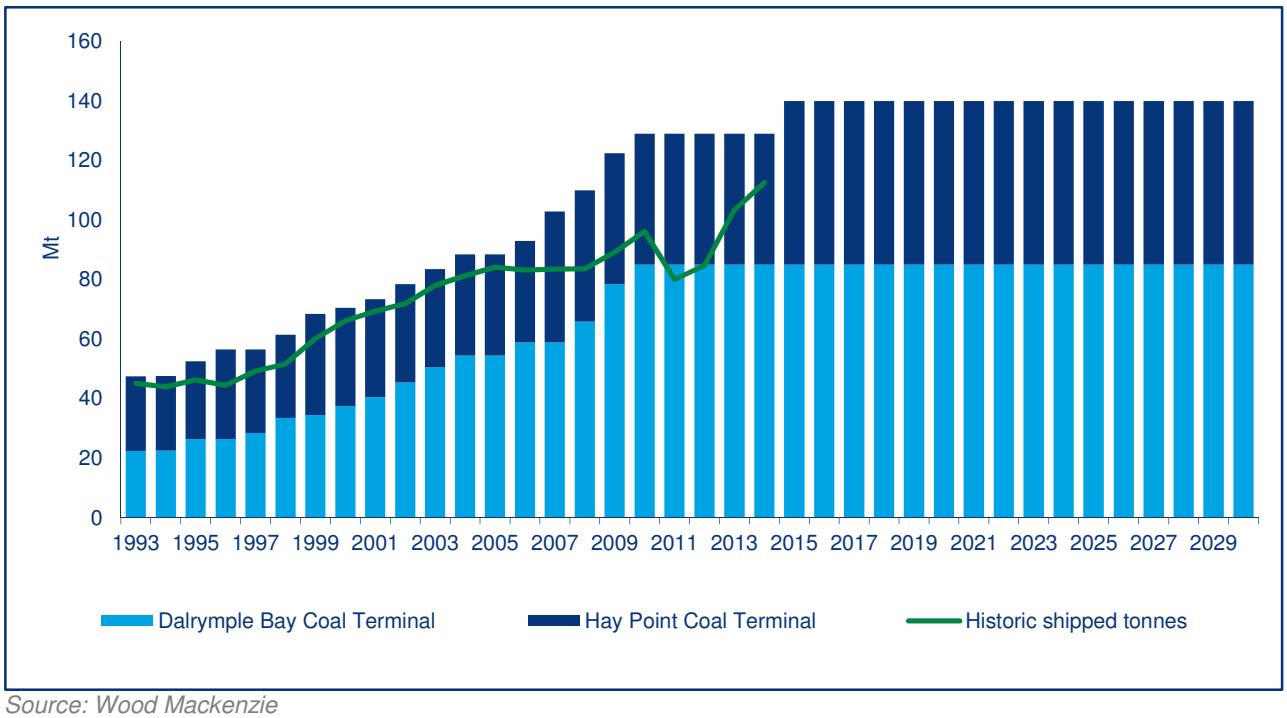
3 Hay Point Catchment Area

3.1 Port of Hay Point

The Port of Hay Point is located approximately 40 km south of Mackay in Queensland on Australia's east coast. The Port of Hay Point currently comprises two separate coal terminals: Dalrymple Bay Coal Terminal (DBCT) and Hay Point Coal Terminal (HPCT). DBCT is a multi-user coal export facility owned by the Queensland Government, leased to DBCT Management Pty Ltd and managed by Brookfield[3]. DBCT is one of the largest bulk export coal terminals with four coal loading berths and 85 Mtpa of capacity[4]. HPCT is owned and operated by BHP Billiton Mitsubishi Alliance (BMA), and used solely for BHP mines. HPCT recently increased its capacity from 44 to 55 Mtpa. Small scale expansions at existing terminals are possible, however any major coal export capacity expansions at Hay Point would likely be in the form of new terminals.

Port utilisation has remained below capacity, due mainly to rail capacity constraints on the Goonyella network and the impact of significant flooding in Queensland over 2010 and 2011. However, throughput recovered strongly in 2013 and increased to its highest level of 112 Mt in 2014 across DBCT and HPCT. Over the next ten years, exports out of Hay Point are expected to range from 100 to 115 Mtpa due to weaker metallurgical coal demand.

Figure 22 Port of Hay Point capacity and demand

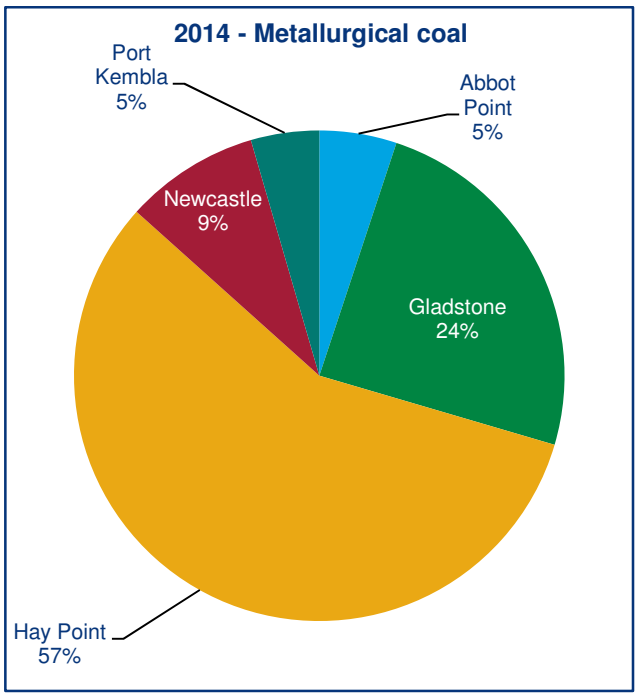


Source: Wood Mackenzie

In 2014, exports out of Hay Point accounted for 31% of Australia's total coal exports, second only to the Port of Newcastle at 40%. By coal type, Hay Point accounts for 57% of Australia's metallurgical coal exports (Figure 23) and 8% of Australia's thermal coal exports (Figure 24).

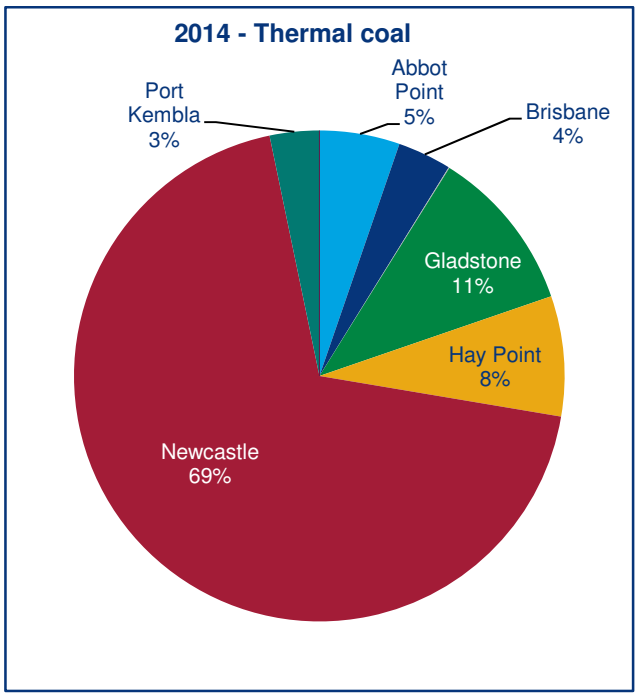
[3] *www.dbctm.com.au*
[4] *www.dbct.com.au*

Figure 23 Australian Metallurgical Coal Exports (2014)



Source: Wood Mackenzie

Figure 24 Australian Thermal Coal Exports (2014)



Source: Wood Mackenzie

3.2 Hay Point Catchment

Coal supply from Queensland is currently serviced through four ports (with six coal terminals) and a series of five major rail networks (Table 1).

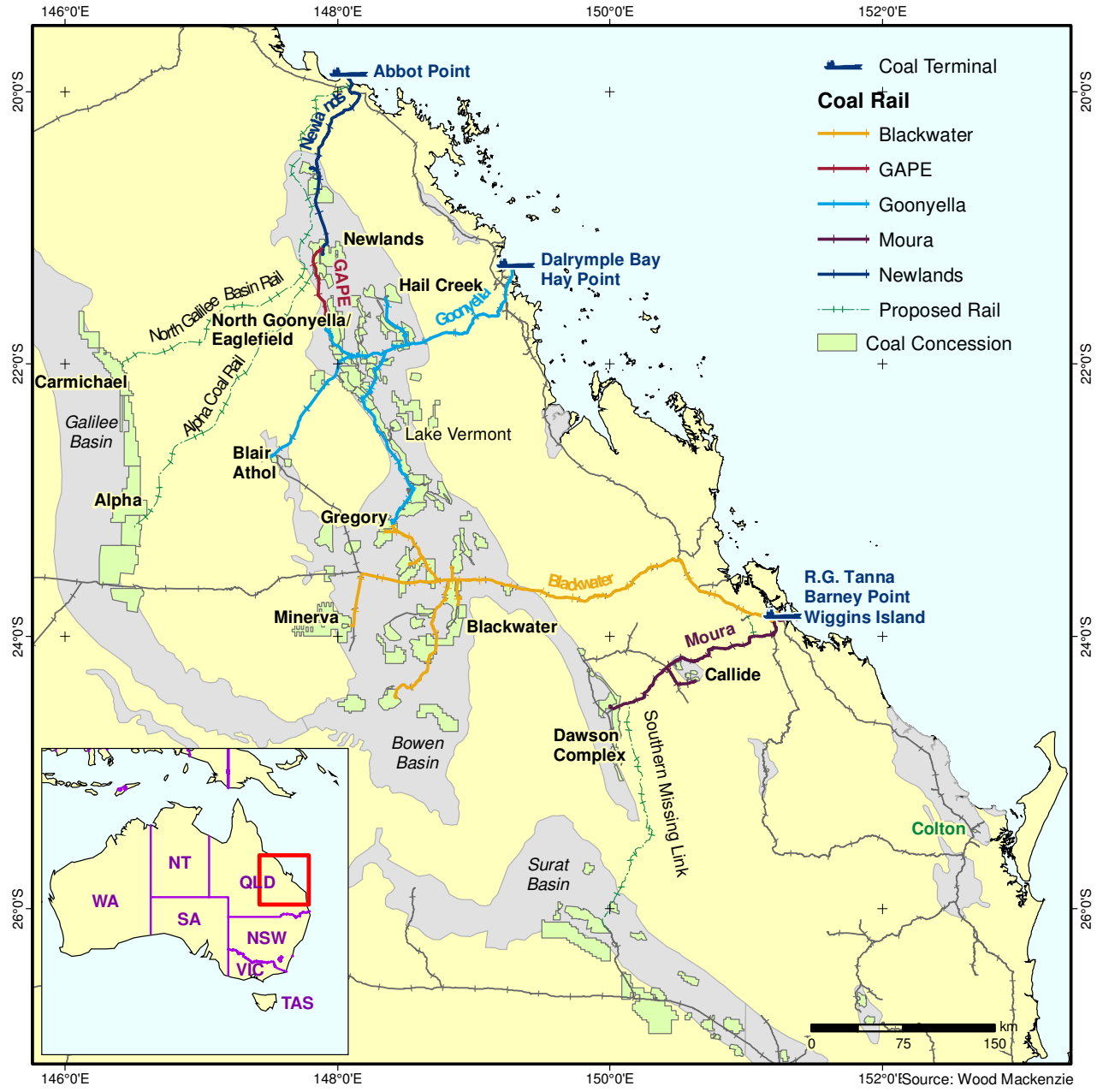
Table 1 Queensland Coal Export Infrastructure

Port	Terminal	Access	Capacity (Mt)	Main Servicing Rail Networks
Abbot Point	Terminal 1	Open	50	Newlands and GAPE
Hay Point	Dalrymple Bay Hay Point	Open BHP Captive	85 55	Goonyella
Gladstone	RG Tanna WICET Stage 1	Open Open	75 27	Blackwater and Moura
Brisbane	Fisherman Islands	Open	10	Western and South East

Source: Wood Mackenzie

Due to the geographical layout of Queensland infrastructure (Map 1), the primary catchment for Hay Point is comprised of mines which lie on the Goonyella rail network. However, the connectivity of the Goonyella and Blackwater networks allows for the possibility of mines at the southern end of the catchment to export out of the Port of Gladstone rather than Hay Point. Similarly, following the completion of the Goonyella to Abbot Point Expansion project (GAPE or Northern Missing Link), mines within the catchment can also export out of Abbot Point further north (e.g. Lake Vermont and Middlemount).

Map 1 Queensland Infrastructure



Source: Wood Mackenzie

3.3 Operations within the Hay Point Catchment

The Hay Point catchment includes mines within the central Bowen Basin. The Permian-aged Bowen Basin is one of the largest coal basins in the world with high quality bituminous coal deposits. The Bowen Basin has 1.9 Bt of thermal coal reserves[5] and 6.3 Bt of metallurgical coal reserves. The Bowen Basin is best known for its high quality, metallurgical hard coking coal (HCC). Additional thermal coal and pulverised coal injection (PCI) products are also produced from the Bowen Basin.

Within the Hay Point Catchment there are 25 operations, 13 projects and 10 closed or suspended mines spanning 15 different operating companies (Table 2). They include a mixture of surface and underground operations. The mines range from 150 to 300 kilometres rail distance to Hay Point.

[5]*Marketable reserves as of 01/01/2015. Wood Mackenzie defines marketable reserves as the commercially viable level of reserves representing the sum of future marketable production sold over the remaining life of the mine. Marketable production is the commercially viable level of production that is saleable.*

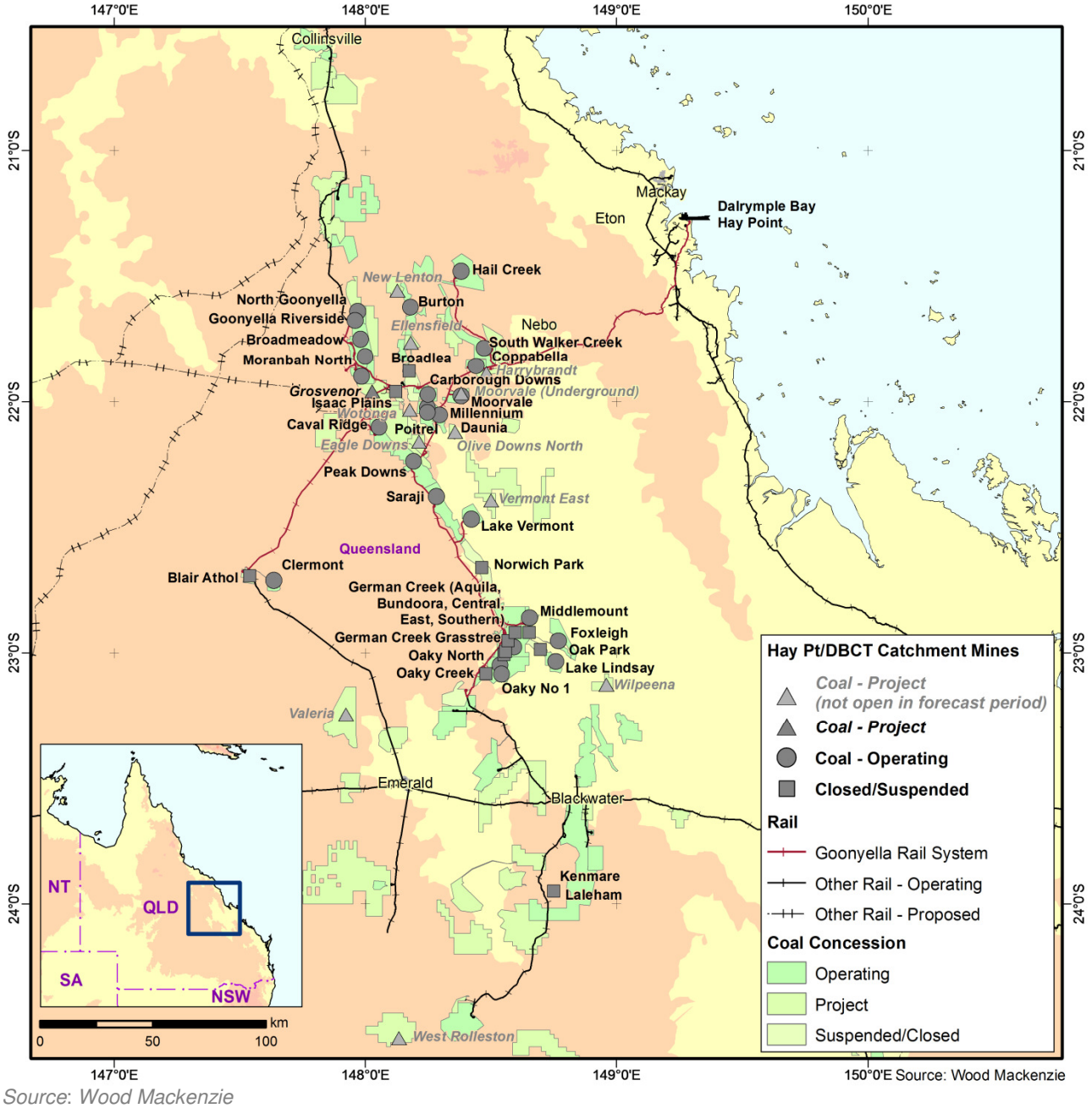
Table 2 Mines and Projects within the Hay Point Catchment

Operator	Mine	Type	Status	Used in Mine Life Analysis
Anglo American	Foxleigh	Surface	Operating	Yes
	German Creek Grasstree	Underground	Operating	Yes
	Grosvenor	Underground	Operating	Yes
	Lake Lindsay	Surface	Operating	Yes
	Moranbah North	Underground	Operating	Yes
	German Creek (Aquila, Bundoora, Central, East & Southern)	*Underground*	*Closed*	*No*
	Oak Park	*Surface*	*Closed 2014*	*No*
Baoshan Iron & Steel Co	*Wilpeena*	*Surface*	*Possible project – opens 2025*	*No*
BMA	Broadmeadow	Underground	Operating	Yes
	Caval Ridge	Surface	Operating	Yes
	Daunia	Surface	Operating	Yes
	Goonyella Riverside	Surface	Operating	Yes
	Norwich Park	Surface	Suspended – recommencing production 2020	Yes
	Peak Downs	Surface	Operating	Yes
	Saraji	Surface	Operating	Yes
	Laleham	*Surface*	*Closed 2001*	No
BMC	Poitrel	Surface	Operating	Yes
	South Walker Creek	Surface	Operating	Yes
Glencore	Clermont	Surface	Operating	Yes
	Oaky No 1	Underground	Operating	Yes
	Oaky North	Underground	Operating	Yes
	Oaky Creek	*Surface*	*Closed 2006*	No
Jellinbah	Lake Vermont	Surface	Operating - Exports through Hay Point and Abbot Point	Yes
Middlemount Coal	Middlemount	Surface	Operating - Exports through Hay Point and Abbot Point	Yes
New Hope	*New Lenton*	*Surface*	*Probable project – opens 2021*	No
Peabody	Burton	Surface	Operating	Yes
	Coppabella	Surface	Operating	Yes
	Millennium	Surface	Operating	Yes
	Moorvale	Surface	Operating	Yes
	North Goonyella	Underground	Operating	Yes
	Codrilla	*Surface*	*Possible project - Likely to export through Abbot Point - opens 2025*	*No*
	Eaglefield	*Surface*	*Closed 2015*	No
	Moorvale (Underground)	*Underground*	*Possible project – opens 2022*	No
	Olive Downs North	*Surface*	*Possible project – opens 2026*	No
	Vermont East	*Surface*	*Possible project – opens 2028*	No
	West Rolleston	*Surface*	*Possible project – opens 2023*	No
QCT Resources	*Kenmare*	*Surface*	*Closed 2002*	*No*
Rio Tinto	Hail Creek	Surface	Operating	Yes
	Blair Athol	*Surface*	*Closed 2012*	*No*
	Valeria	*Surface*	*Possible project – opens 2027*	*No*
Stanmore	*Isaac Plains*	*Surface*	*Closed 2012, Planning to reopen.*	*No*
	Wotonga	*Surface*	*Unclassified project*	*No*
U&D Mining	*Rockwood*	*Surface*	*Probable project - opens 2023*	*No*
Vale	Carborough Downs	Underground	Operating	Yes
	Broadlea	*Surface*	*Closed 2009*	No
	Eagle Downs	*Underground*	*Probable project – opens 2022*	*No*
	Ellensfield	*Underground*	*Probable project – opens 2025*	*No*

Operator	Mine	Type	Status	Used in Mine Life Analysis
Yanzhou	*Harrybrandt*	*Surface*	*Possible project – opens 2029*	No

Source: Wood Mackenzie

Map 2 Mines and Projects within the Hay Point Catchment



Source: Wood Mackenzie

3.3.1 Key companies

Anglo American

Anglo's Capcoal (German Creek and Lake Lindsay), Moranbah North, Foxleigh and Grosvenor mines currently use DBCT to export coal. Product coal from Capcoal and Foxleigh is road hauled to the German Creek load out facility and then railed 277 kilometres to DBCT. Grosvenor coal is conveyed to the Moranbah North rail load out facility which utilises the Goonyella system to transport coal 195 kilometres to DBCT.

Anglo's new Grosvenor mine is expected to ramp up to 4.5 Mtpa during the regulation period. Anglo's Lake Lindsay and Moranbah North will also slightly increase production. Mining at German Creek Grass tree is expected to cease in 2021

when reserves are exhausted. Production levels at Foxleigh will stay at 3 Mtpa during the regulation period. Anglo's net export production will increase from 20.4 Mtpa in 2016 to 21.6 Mtpa in 2021.

With the opening and ramp up of Grosvenor, Anglo's throughput is likely to reach its maximum capacity allocation at DBCT from 2017. We assume that Anglo will be able to secure additional capacity at DBCT, otherwise they will look to export additional tonnes through Abbot Point, which has a longer rail haul via the Northern Missing Link and the Newlands rail system.

BHP Billiton

Through its BHP Billiton Mitsubishi Alliance (BMA) and BHP Billiton Mitsui Coal (BMC), BHP Billiton is one of the largest producers within the Hay Point Catchment. All of the BMA and BMC assets export via their HPCT except for Poitrel and South Walker Creek which use DBCT.

BMA production levels will increase during the regulation period from 49 Mtpa in 2016 to 61.2 Mtpa in 2021, with Broadmeadow ramping up to 7 Mtpa, Caval Ridge increasing to 6.5 Mtpa, Peak Downs increasing to 17 Mtpa and Saraji increasing to 10.5 Mtpa. Norwich Park is also expected to reopen in 2020, starting at 1.5 Mtpa then reaching a steady state of 2.2 Mtpa by 2021. BMA's forecast production levels will exceed the 55 Mtpa capacity of HPCT, therefore there is potential BMA will look to DBCT to accommodate this gap.

BMC's South Walker Creek is also forecast to increase export production to 6 Mtpa and Poitrel will continue to produce 3.5 Mtpa.

Glencore

Glencore's large open cut coal mine, Clermont (25.05% ownership), and its underground Oaky Creek complex (55% ownership) export out of DBCT. Clermont coal is railed 278 kilometres to DBCT along the Goonyella rail system. We assume Clermont has 12 Mt of capacity allocation for this route with any production above this level being exported using the GAPE rail system and Abbot Point port.

Oaky No. 1 and Oaky North are both part of the Oaky Creek complex that rails coal 297 kilometres to DBCT. Small volumes from Oaky No. 1 and Oaky North are also exported through Gladstone (RG Tanna & Barney Point). Oaky No. 1 is expected to close in 2017. Glencore has no other projects in the central Bowen Basin/Hay Point Catchment.

Peabody

Peabody has six operations that use DBCT: Burton, Coppabella, North Goonyella, Middlemount, Millennium and Moorvale.

Peabody announced plans to reduce Burton's marketable production to target low cost reserves. As a result, we expect Burton's marketable output to decline from 1.7 Mtpa in 2014 to 1.1 Mtpa in 2015 and 0.9 Mtpa in 2016. We forecast production to cease at Burton in 2019. Coppabella is one of the closest mines to DBCT with only a 150 kilometre rail distance to the port. Although Peabody have announced production cuts at Coppabella and North Goonyella, we have forecast Coppabella to continue producing 4 Mtpa throughout the regulation period. With the expected closure of Eaglefield this year, we expect North Goonyella to increase production from 1.9 Mtpa in 2014 to 3.0 Mtpa by 2016. Product coal from North Goonyella is transported 215 kilometres to DBCT.

Millennium mine will also continue to produce approximately 3.5 Mtpa all of which will be exported out of DBCT. Moorvale product coal is railed 156 kilometres to DBCT. Moorvale surface reserves are expected to be exhausted in 2021, after which Peabody will move to mining at Moorvale (Underground) from 2022 onwards.

Including Moorvale (Underground) Peabody has four possible projects that are likely to use DBCT when they are developed (West Rolleston, Olive Downs North and Vermont East), all of which will be post 2021. Codrilla is another possible project expected to start in 2025, however it is likely that Codrilla product coal will be exported through Abbot Point.

Peabody has a 50% interest in the Middlemount open cut coal mine that opened in 2012. Middlemount currently exports 25% of its coal through DBCT using Peabody's allocation, with the other half via the longer transport route to Abbot Point.

Rio Tinto

Rio Tinto's large open cut mine, Hail Creek, exports out of DBCT and is forecast to increase production to 9.3 Mtpa in 2016 and 11 Mtpa in 2021. In addition to Hail Creek, Rio Tinto's possible project, Valeria, if developed, has infrastructure accessibility to DBCT. At a rail distance of 390 kilometres, this would be the longest transport route to DBCT.

Other Operations and Projects

Vale's Carborough Downs mine will export 2.6 Mtpa out of DBCT until 2020 when it is expected to close. Vale has two probable projects, Eagle Downs and Ellensfield, that are forecast to begin production in 2022 and 2025 respectively and would likely export out of DBCT.

Jellinbah used DBCT and Gladstone prior to completion of the Northern Missing Link. Since 2013 Lake Vermont exported from all three terminals with the bulk being shipped through Gladstone and Abbot Point. DBCT shipments have primarily been maintained to provide flexibility in meeting customer requirements.

Stanmore's recent acquisition of suspended mine Isaac Plains from Vale/Sumitomo and the Wotonga project from Millennium Coal (Peabody) may see them using DBCT again if they can restart mining at Isaac Plains.

New Hope's New Lenton project is the only project expected to be converted to a mine during the regulation period. New Lenton is forecast to begin production in 2021, starting at 1.2 Mtpa and ramping up to 3.3 Mtpa in 2023. New Hope is pursuing access to both DBCT and Abbot Point.

U&D Mining's probable project, Rockwood, Yanzhou's possible project, Harrybrandt, and Baoshan Iron & Steel Co possible project, Wilpeena, are located within the Hay Point Catchment but are not expected to begin operating until after the regulation period. There is a longer term potential that these future mines would look to access DBCT.

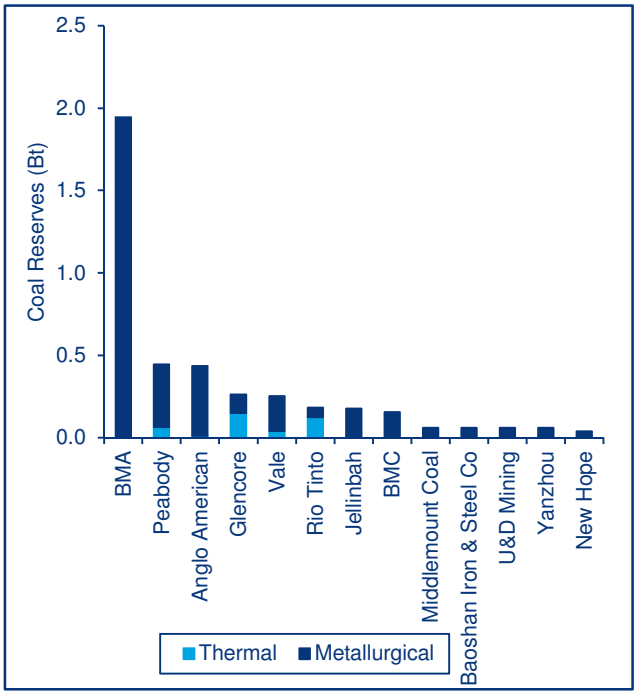
3.4 Reserves

Within the Hay Point Catchment, BMA has the largest reserve base with 1,944 Mt of marketable reserves. Goonyella Riverside is BMA's largest source of reserves with 429 Mt.

Peabody has 445 Mt of reserves with more than half coming from future projects. Anglo American has 435 Mt of reserves and Glencore has 262 Mt of reserves, all from currently operating mines. Vale has 253 Mt of reserves, a majority of which is held within projects. Rio Tinto has a large reserve base from Hail Creek and Valeria. Similarly all of Jellinbah's 176 Mt of reserves are from Lake Vermont. BMC and Middlemount have 155 Mt and 61 Mt of reserves, respectively, from their existing mines.

The remaining company reserves are from projects.

Figure 25 Hay Point Catchment marketable reserves by operator



Source: Wood Mackenzie

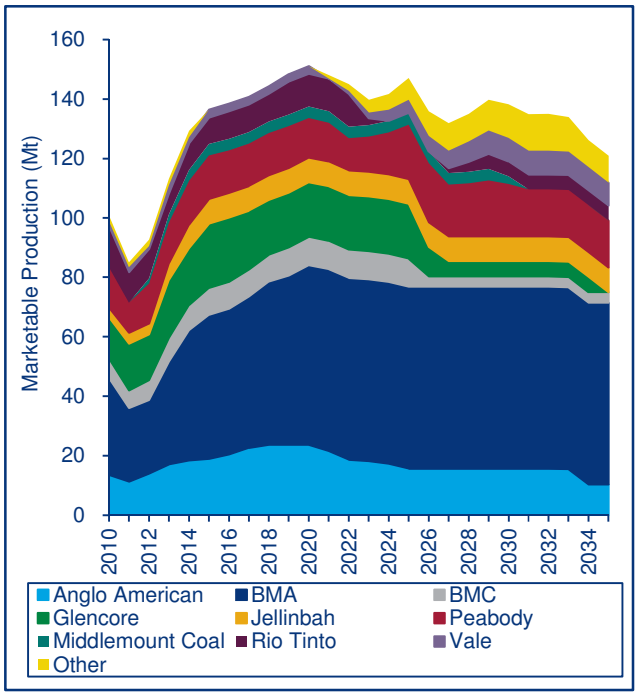
3.5 Production

All production in the Hay Point Catchment is exported to the seaborne market. Production in the Hay Point Catchment is expected to increase from 139 Mtpa in 2016 to 148 Mtpa in 2021. Forecast production by company and by product type are displayed in Figure 26 and Figure 27, respectively.

The large major mining companies, BHP Billiton, Anglo American, Glencore, Peabody, Rio Tinto and Vale will continue to dominate the production in the Hay Point Catchment.

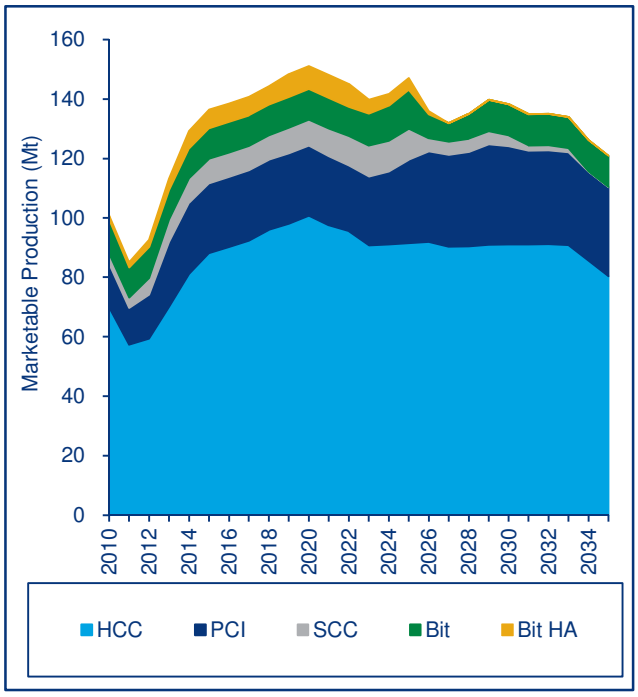
Metallurgical coal (HCC, PCI and SCC) will continue to be the main types of coal produced in the Hay Point Catchment.

Figure 26 Hay Point Catchment forecast marketable production by operator (2010–2035)



Source: Wood Mackenzie

Figure 27 Hay Point Catchment forecast marketable production by product (2010–2035)



Source: Wood Mackenzie

3.6 Cost and Margin Position

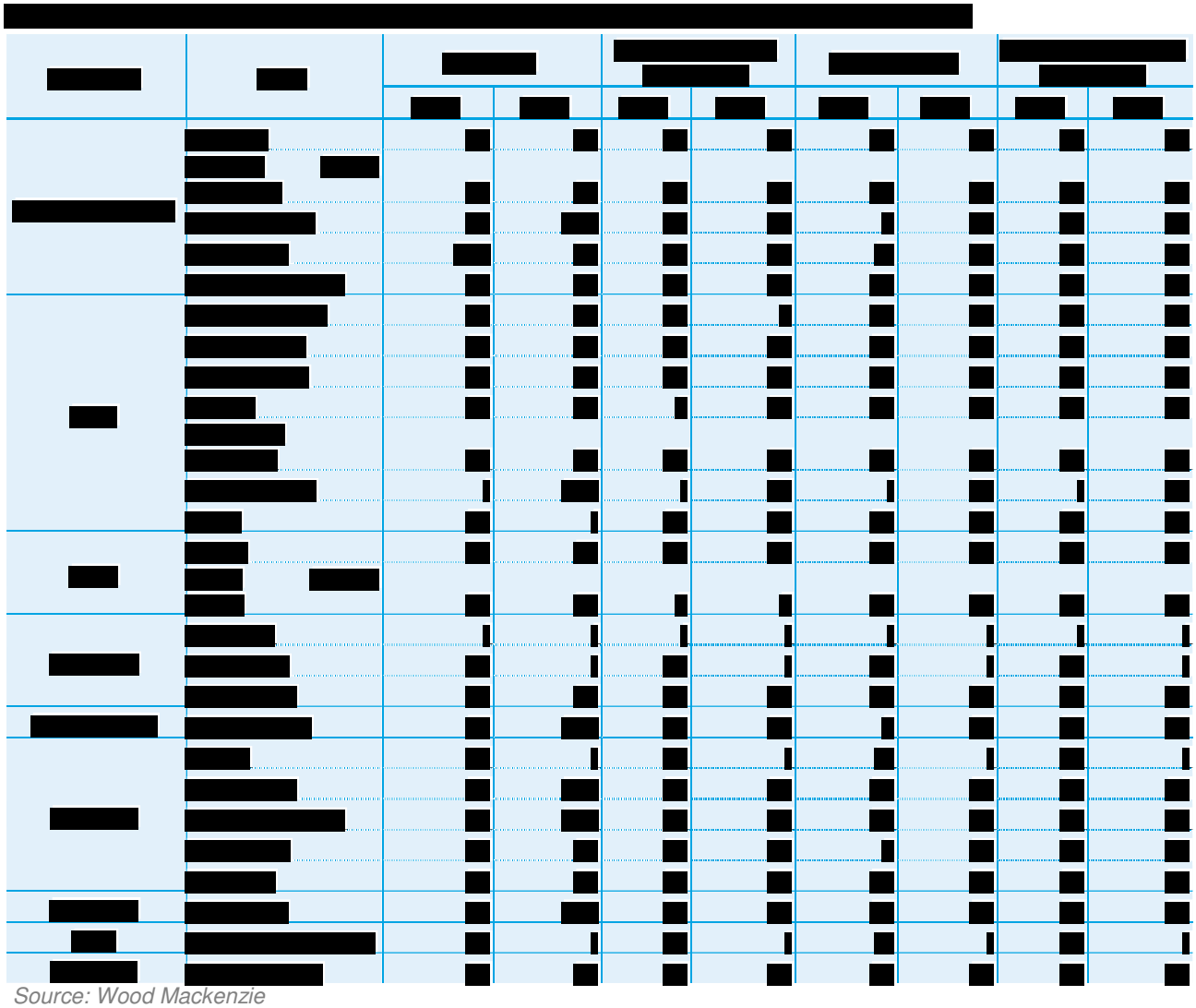
3.6.1 Metallurgical

The cost and margin positions of Hay Point Catchment metallurgical operations are tabulated in Table 3. Compared to other global seaborne metallurgical operations, a majority of operations within the Hay Point Catchment are cost competitive and running at positive margins.

It is important to note, that since 2012 Australian coal mines have implemented major cost cutting measures to combat the continued weakness in the seaborne export coal market. Costs have fallen due to higher output volumes, reductions in employee headcount, better utilisation of mining equipment, a decline in overheads, changes in product qualities, high-cost mine closures, and a move towards owner-operator status at some mines.

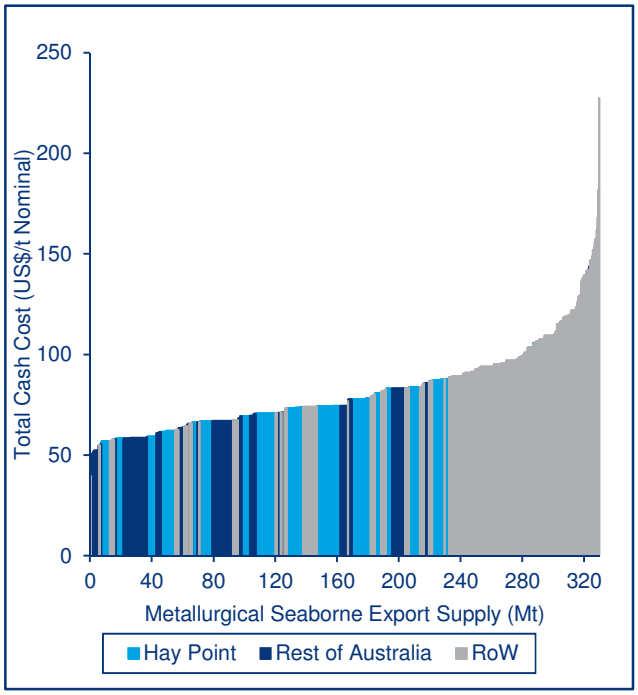
In 2016, Grosvenor sits high on the cost curve due to associated start up costs. Similarly Burton and Carborough Downs have a higher cost position because of their anticipated mine closures resulting in low production rates relative to capacity, low labour productivity and a relatively higher stripping ratios.

Please see below the cost and margin curves for global seaborne metallurgical coal for 2016 and 2021.



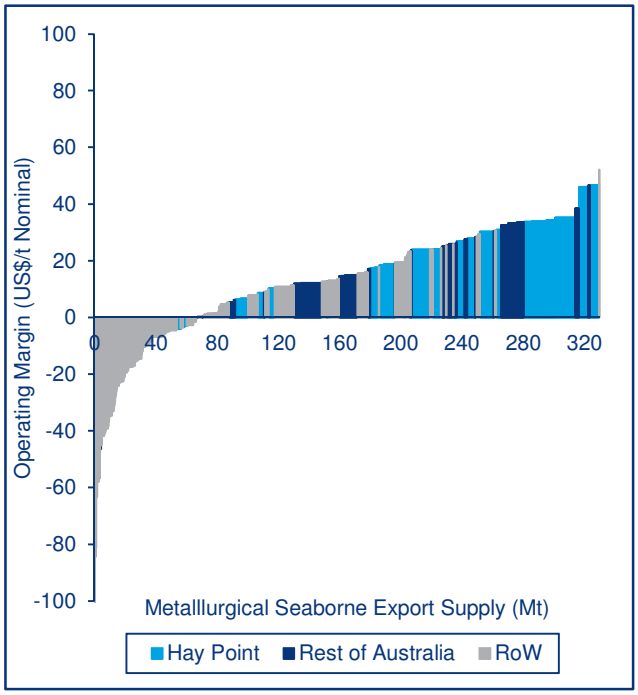
Source: Wood Mackenzie

Figure 28 2016 Global seaborne export metallurgical coal total cash costs (nominal US$ terms)



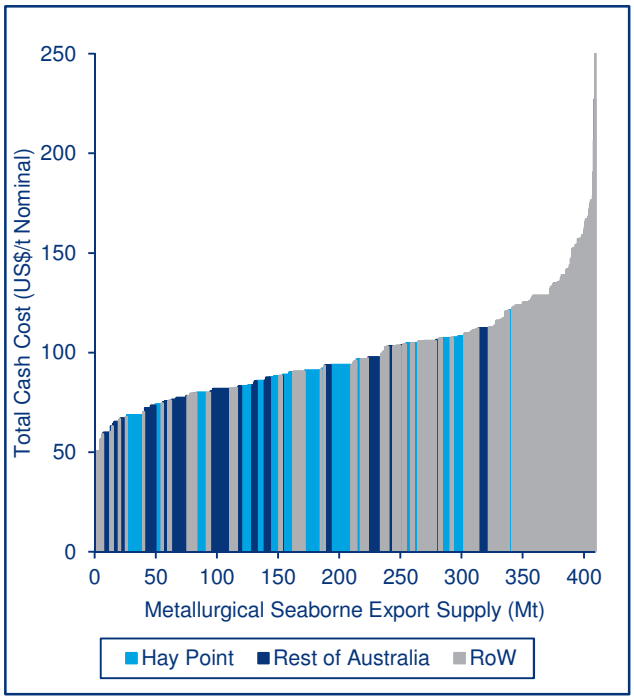
Source: Wood Mackenzie

Figure 29 2016 Global seaborne export metallurgical coal operating margins (nominal US$ terms) (US$108.1/t benchmark price)



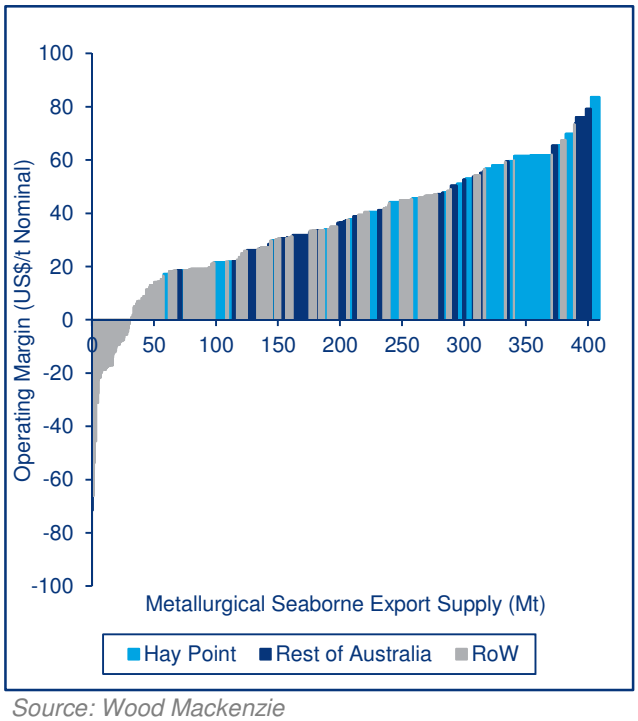
Source: Wood Mackenzie

Figure 30 2021 Global seaborne export metallurgical coal total cash costs (nominal US$ terms)



Source: Wood Mackenzie

Figure 31 2021 Global seaborne export metallurgical coal operating margins (nominal US$ terms) (US$155.7/t benchmark price)



Source: Wood Mackenzie

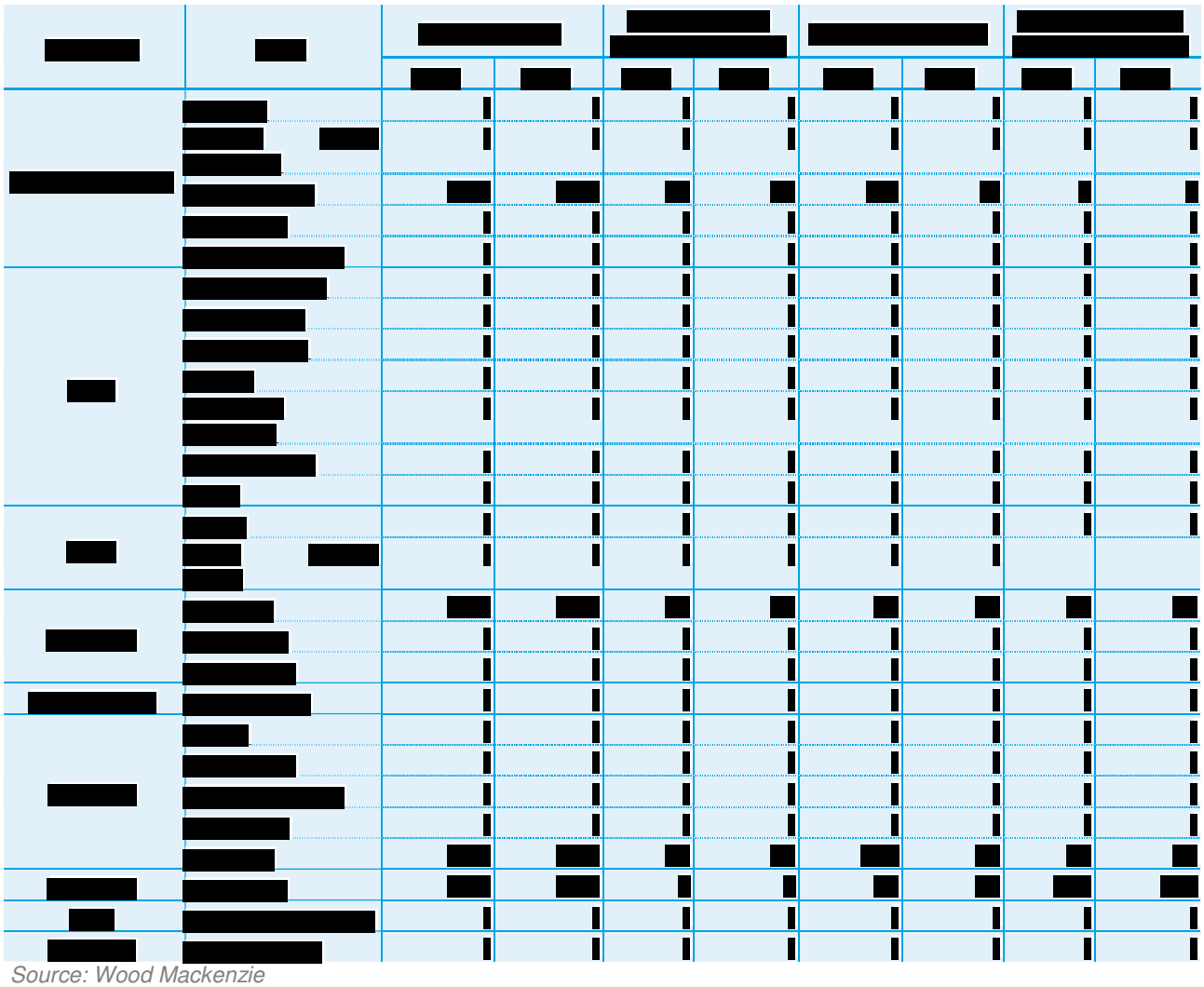
3.6.2 Thermal

The cost and margin position of Hay Point Catchment thermal operations are tabulated in Table 4. Anglo's Lake Lindsay and Peabody's Moorvale are both high cost mines, low margin mines. Conversely, Glencore's Clermont and Rio Tinto's Hail Creek are both very low cost, high margin thermal coal operations.

Clermont is a relatively low cost operation benefiting from a low average strip ratio and a high product yield as its coal products currently are only crushed and screened. There are no mining costs associated with the thermal coal product at Hail Creek as it only incurs processing and re-handling costs.

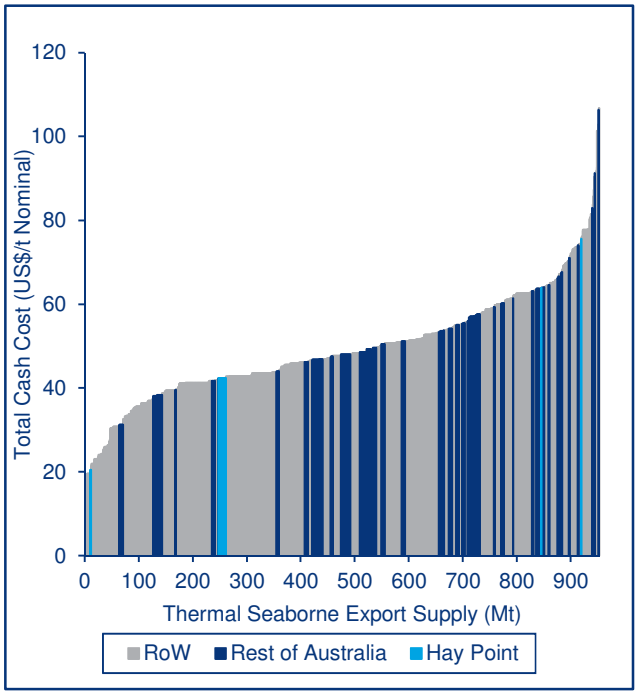
Please see below the cost and margin curves for global seaborne thermal coal for 2016 and 2021.

Table 4 Thermal Cost and Margin position of Hay Point Operations (nominal US$ terms)



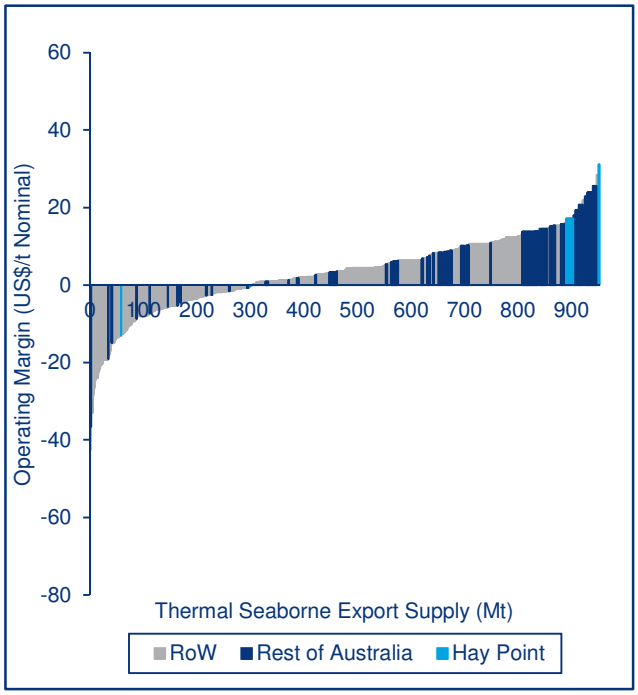
Source: Wood Mackenzie

Figure 32 2016 Global seaborne export thermal coal total cash costs (nominal US$ terms)



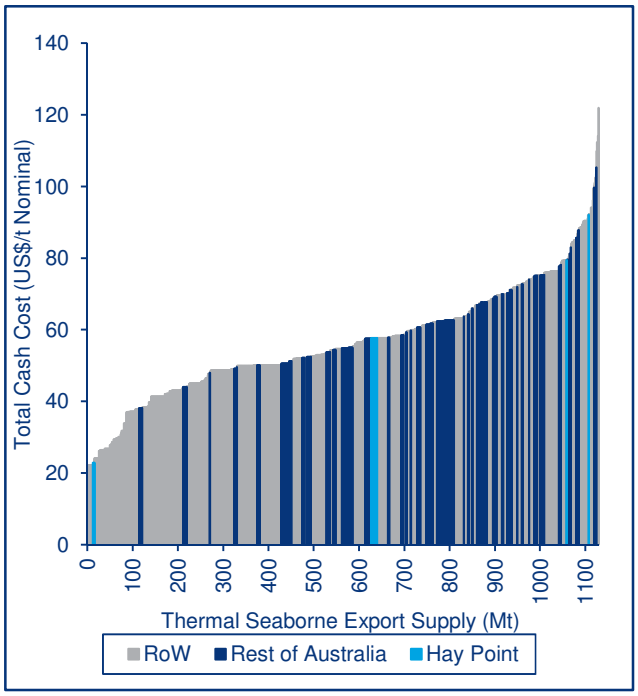
Source: Wood Mackenzie

Figure 33 2016 Global seaborne export thermal coal operating margins (nominal US$ terms) (US$63.6/t benchmark price)



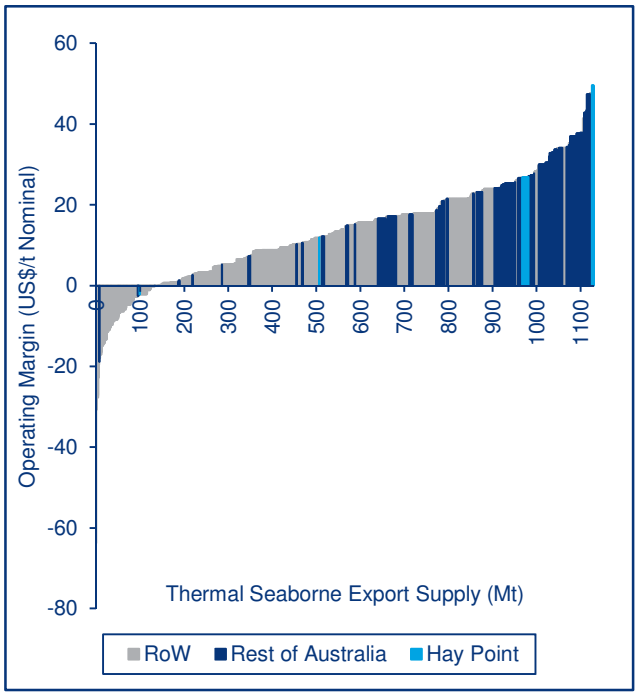
Source: Wood Mackenzie

Figure 34 2021 Global seaborne export thermal coal total cash costs (nominal US$ terms)



Source: Wood Mackenzie

Figure 35 2021 Global seaborne export thermal coal operating margins (nominal US$ terms) (US$91.5/t benchmark price)



Source: Wood Mackenzie

4 Mine Life Analysis

Of the 48 mines located within the Hay Point Catchment (Table 2 above), 26 operations were used in the mine life analysis. The excluded assets include 9 closed mines and 13 projects that are unlikely to open during the regulation period. BMA mines were included in the analysis because their production levels are expected to exceed the HPCT capacity, after which we assume they will look to use DBCT.

The weighted average life of mines serviced by DBCT was calculated using four different methods. The first two scenarios utilise the marketable production and marketable reserve data from Wood Mackenzie's Coal Supply Service. The other two scenarios are adjusted using company reserves compiled from publicly available information.

4.1 Mine life calculation using Wood Mackenzie marketable production

The production data provided in Table 5 was used to calculate a 'Weighted average mine life by average production' of 20 years. The following formula was used:

$$\frac{\sum(\text{Mine Life x Avg Prod}_{(2016-2021)})}{\sum(\text{Avg Prod}_{(2016-2021)})} = \frac{2973}{145} = 20$$

Table 5 WM marketable production data used to calculate the weighted average life of mines serviced by DBCT

Operator	Mine	Marketable Production for Export							Close year	Mine Life	Mine Life x Avg Prod
		2016	2017	2018	2019	2020	2021	Avg Prod (2016 - 2021)			
Anglo American	Foxleigh	3.0	3.0	3.0	3.0	3.0	3.0	3.0	2024	9	27
	German Creek Grasstree	5.0	5.0	5.0	5.0	5.0	3.0	4.7	2021	6	28
	Lake Lindsay	5.6	5.8	5.8	5.8	5.8	5.8	5.8	2038	23	133
	Grosvenor	1.5	3.5	4.5	4.5	4.5	4.5	3.8	2047	32	123
	Moranbah North	5.3	5.3	5.3	5.3	5.3	5.3	5.3	2033	18	95
BMA	Broadmeadow	6.0	6.0	7.0	7.0	7.0	7.0	6.7	2038	23	153
	Caval Ridge	6.0	6.5	6.5	6.5	6.5	6.5	6.4	2043	28	180
	Peak Downs	10.0	11.5	13.0	15.0	17.0	17.0	13.9	2048	33	459
	Daunia	5.0	5.0	5.0	5.0	5.0	5.0	5.0	2036	21	105
	Goonyella Riverside	13.0	13.0	13.0	13.0	13.0	13.0	13.0	2047	32	416
	Norwich Park	-	-	-	-	1.5	2.2	0.6	2037	17	10
	Saraji	9.0	9.0	10.5	10.5	10.5	10.5	10.0	2047	32	320
BMC	Poitrel	3.5	3.5	3.5	3.5	3.5	3.5	3.5	2040	25	88
	South Walker Creek	5.5	5.5	5.5	6.0	6.0	6.0	5.8	2025	10	58
Glencore	Clermont	13.2	13.2	13.2	13.2	13.2	13.2	13.2	2026	11	145
	Oaky No 1	3.3	1.4	-	-	-	-	0.8	2017	2	2
	Oaky North	5.2	5.2	5.2	5.2	5.2	5.2	5.2	2034	19	99
Middlemount	Middlemount	3.9	3.9	3.9	3.9	3.9	3.9	3.9	2030	15	58
Peabody	Burton	0.9	0.9	0.9	0.8	-	-	0.6	2019	4	2
	Coppabella	4.0	4.0	4.0	4.0	4.0	4.0	4.0	2030	15	60
	North Goonyella	3.0	3.0	3.0	3.0	3.0	3.0	3.0	2044	29	87
	Millennium	3.5	3.5	3.5	3.5	3.4	3.4	3.4	2027	12	41
	Moorvale	2.9	2.9	2.9	2.9	2.9	2.6	2.9	2021	6	17
Rio Tinto	Hail Creek	9.3	9.3	9.3	11.0	11.0	11.0	10.2	2023	8	81
Vale	Carborough Downs	2.6	2.6	2.6	2.6	2.6	-	2.2	2020	5	11
Jellinbah	Lake Vermont	8.3	8.3	8.3	8.3	8.3	8.3	8.3	2036	21	174
								145			**2,973**

Source: Wood Mackenzie

4.2 Mine life calculation using Wood Mackenzie marketable reserves

The reserves data provided in Table 6 was used to calculate a 'Weighted average mine life by marketable reserves' of 25 years. The following formula was used:

$$\frac{\sum(\text{Mine Life x Total Marketable Reserves})}{\sum(\text{Total Marketable Reserves})} = \frac{80{,}701}{3{,}227} = 25$$

Table 6 WM marketable reserve data used to calculate the weighted average life of mines serviced by DBCT

Operator	Mine	Marketable Reserves			Close year	Mine Life	Mine Life x Reserves
		Thermal	Metallurgical	Total			
Anglo American	Foxleigh	-	28.2	28.2	2024	9	254
	German Creek Grasstree	-	33.0	33.0	2021	6	198
	Lake Lindsay	12.2	123.6	135.8	2038	23	3124
	Grosvenor	-	137.3	137.3	2047	32	4394
	Moranbah North	-	100.2	100.2	2033	18	1804
BMA	Broadmeadow	-	164.5	164.5	2038	23	3784
	Caval Ridge	-	187.5	187.5	2043	28	5250
	Peak Downs	-	552.5	552.5	2048	33	18233
	Daunia	-	110.0	110.0	2036	21	2310
	Goonyella Riverside	-	429.0	429.0	2047	32	13728
	Norwich Park	-	38.9	38.9	2037	17	661
	Saraji	-	342.0	342.0	2047	32	10944
BMC	Poitrel	-	91.0	91.0	2040	25	2275
	South Walker Creek	-	64.0	64.0	2025	10	640
Glencore	Clermont	150.0	-	150.0	2026	11	1650
	Oaky No 1	-	8.0	8.0	2017	2	16
	Oaky North	-	104.0	104.0	2034	19	1976
Middlemount	Middlemount	-	60.9	60.9	2030	15	913
Peabody	Burton	-	4.6	4.6	2019	4	18
	Coppabella	-	61.8	61.8	2030	15	927
	North Goonyella	-	87.7	87.7	2044	29	2543
	Millennium	-	41.8	41.8	2027	12	502
	Moorvale	3.5	16.6	20.0	2021	6	120
Rio Tinto	Hail Creek	25.2	57.7	83.0	2023	8	664
Vale	Carborough Downs	-	15.7	15.7	2020	5	79
Jellinbah	Lake Vermont		176.0	176.0	2036	21	3696
				3,227			**80,701**

Source: Wood Mackenzie

4.3 Mine life calculation using company reported reserves

Using company reported reserves[6] (provided in Table 7) instead of Wood Mackenzie's marketable reserves results in a longer mine life calculation of 35 years. The following formula was used:

$$\frac{\sum(\text{Implied Mine Life x Total Company Reserves})}{\sum(\text{Total Company Reserves})} = \frac{152{,}515}{4{,}400} = 35$$

Where implied mine life =

$$\frac{\text{Total Company Reserves}}{\text{Avg Prod}_{(2016-2021)} \text{ from 4.1}}$$

[6] *Company reported reserves were compiled from publicly available information. They are typically JORC code compliant ore reserves from company websites or annual reports.*

Table 7 Company reserve data used to calculate the weighted average life of mines serviced by DBCT

Operator	Mine	Company Reserves (2014)			Implied Mine Life	Implied Mine Life x Reserves
		Proven	Probable	Total		
Anglo American	Foxleigh	0.5	19.3	19.8	7	131
	German Creek Grasstree	36.7	6.8	43.5	9	405
	Lake Lindsay	66.3	69.5	135.8	24	3198
	Grosvenor	29.1	163.8	192.9	43	8269
	Moranbah North	78.5	50.8	129.3	24	3154
BMA	Broadmeadow	43.0	160.0	203.0	30	6181
	Caval Ridge Peak Downs	492.0	548.0	1,040.0	28.1	29,256
	Daunia	88.0	50.0	138.0	28	3809
	Goonyella Riverside	321.0	224.0	545.0	42	22848
	Norwich Park	154.0	76.0	230.0	105	24045
	Saraji	386.0	153.0	539.0	51	27669
BMC	Poitrel	34.0	38.0	72.0	21	1481
	South Walker Creek	68.0	21.0	89.0	15	1378
Glencore	Clermont	140.0	5.0	145.0	11	1593
	Oaky No 1	5.0	6.0	11.0	14	154
	Oaky North	73.0	39.0	112.0	22	2412
Middlemount	Middlemount	69.0	27.0	96.0	25	2372
Peabody	Burton	9.0	-	9.0	15	139
	Coppabella	62.0	-	62.0	16	961
	North Goonyella	88.0	-	88.0	29	2581
	Millennium	42.0	-	42.0	12	512
	Moorvale	20.0	-	20.0	7	140
Rio Tinto	Hail Creek	107.0	72.0	179.0	16	2913
Vale	Carborough Downs	21.2	2.5	23.7	11	259
Jellinbah	Lake Vermont	235.0		235.0	28	6654
				4,400		**152,515**

4.4 Mine life calculation using Wood Mackenzie's marketable production and company reported reserves

Using company reported reserves[7] (provided in Table 7) instead of Wood Mackenzie's marketable reserves results in a longer mine life calculation of 35 years. The following formula was used:

$$\frac{\sum(\text{Implied Mine Life x Avg Prod}_{(2016-2021)})}{\sum(\text{Avg Prod}_{(2016-2021)})} = \frac{3{,}699}{145} = 26$$

[7] *Company reported reserves were compiled from publicly available information. They are typically JORC code compliant ore reserves from company websites or annual reports.*

Table 8 WM marketable production data and company reserve data used to calculate the weighted average life of mines serviced by DBCT

Operator	Mine	Avg Prod (2016 - 2021) from Section 4.1	Implied Mine Life from Section 4.3	Implied Mine Life x Avg Prod
Anglo American	Foxleigh	3.0	7	20
	German Creek Grasstree	4.7	9	44
	Lake Lindsay	5.8	24	136
	Grosvenor	3.8	43	164
	Moranbah North	5.3	24	129
BMA	Broadmeadow	6.7	30	203
	Caval Ridge	6.4	28	181
	Peak Downs	13.9	28	391
	Daunia	5.0	28	138
	Goonyella Riverside	13.0	42	545
	Norwich Park	0.6	105	64
	Saraji	10.0	51	513
BMC	Poitrel	3.5	21	72
	South Walker Creek	5.8	15	89
Glencore	Clermont	13.2	11	145
	Oaky No 1	0.8	14	11
	Oaky North	5.2	22	112
Middlemount	Middlemount	3.9	25	96
Peabody	Burton	0.6	15	9
	Coppabella	4.0	16	62
	North Goonyella	3.0	29	88
	Millennium	3.4	12	42
	Moorvale	2.9	7	20
Rio Tinto	Hail Creek	10.2	16	165
Vale	Carborough Downs	2.2	11	24
Jellinbah	Lake Vermont	8.3	28	235
		145		**3,699**

Appendix A: Coal market fundamentals

Coal is a widely distributed natural resource that is produced in numerous countries worldwide. Most coal is used in the country in which it was mined. China and the US in particular – the world's two largest coal producers – consume the majority of their coal domestically. Of the two methods of cross border trade, landborne and seaborne, the seaborne market is far more significant in terms of size – landborne coal trade is confined to just a few key areas: Russia, China and Eastern Europe. Despite its relatively small proportion of global coal production, the seaborne coal market is important for the Australian coal industry as the industry is strongly dependent on exports.

Coal mining is not a uniform process with methods of coal extraction dependent on local geographies, position of the coal seam, geological properties of the surrounding material and capital available for infrastructure. Open pit (also known as open cut or surface mining) involves the use of trucks and shovels or draglines. The volume of rock that must be removed to reach the subterranean coal seam is a key component of surface mining costs (often referred to as the strip ratio). Underground mining involves the use of longwalls or bord and pillar and is typically more expensive than surface mining. The coal market can be divided into two major sub-markets, thermal and metallurgical, based on the end-use of the coal:

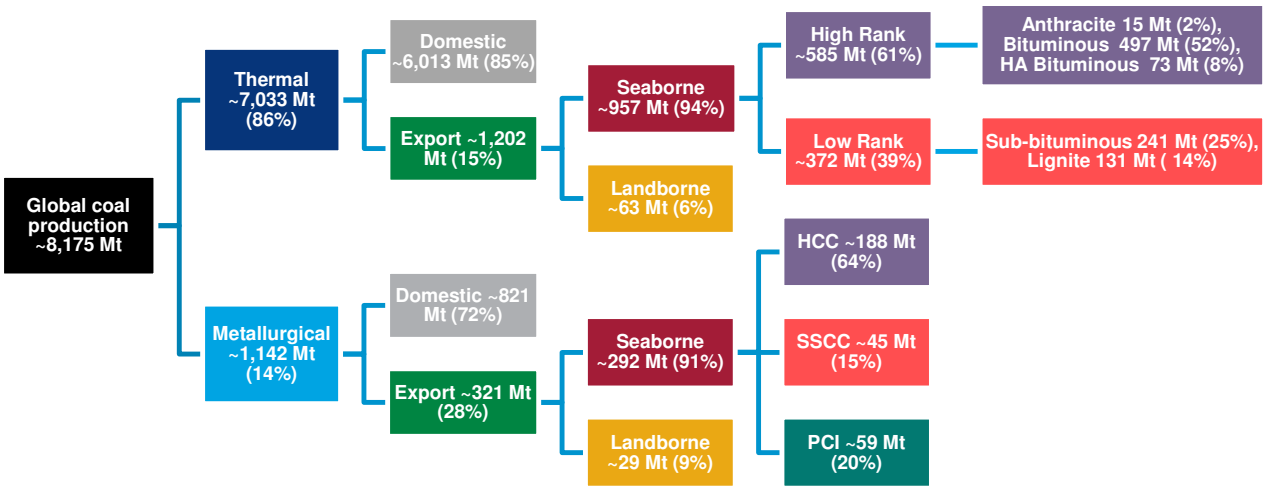
Thermal coal provides cheap and very reliable base load energy through combustion processes to produce steam for power generation, heating, and industrial applications such as cement manufacture. Thermal coal can be further sub-divided into different market tiers based on energy content. The following energy-based classifications (market rather than geological terms) for thermal coal are used in this report:

- **Bituminous** Specific energy > 5,400 kcal/kg (gross as received (gar))[8]
- **Sub-bituminous** Specific energy 4,500–5,400 kcal/kg (gar)
- **Low rank** Specific energy < 4,500 kcal/kg (gar)

Metallurgical coal is used in steel production. It is used either to produce coke, which is then fed into the top of the blast furnace along with the iron ore; or for pulverised coal injection (PCI), where the coal is injected directly into the base of the blast furnace. Metallurgical coal is classified based primarily on the strength of the coke it produces and is commonly graded into hard coking coal (HCC) which is the premium product and soft coking coals (SSCC).

For the most part, the markets for thermal and metallurgical coal operate independently of each other, although some degree of substitution between thermal coals and lower ranked metallurgical coals is possible. Thermal coal currently accounts for just under 75% of the total seaborne coal market.

Figure 36 2015 Estimated global coal production by market and end-use

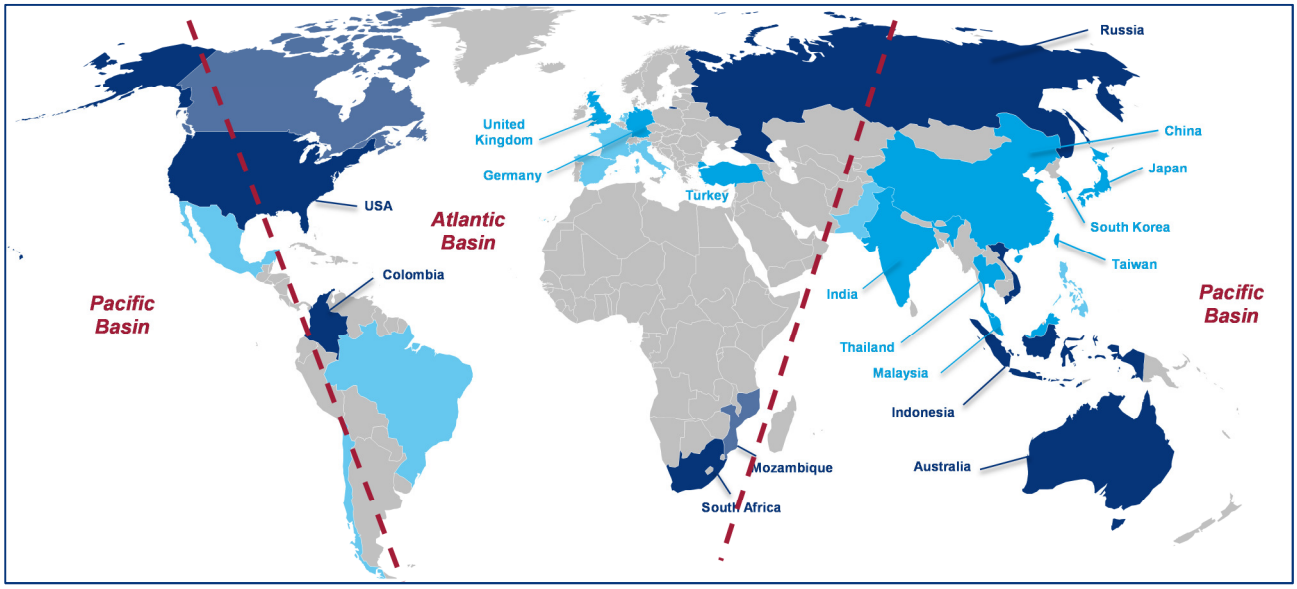


Source: Wood Mackenzie

[8] *Energy can be reported on a gross or net basis. Gross as received (gar) basis refers to energy of the coal sample calculated in the laboratory. This contrasts with net as received (nar) basis which is the recoverable energy, after combustion. The difference being the energy loss due to the moisture content within the coal which is evaporated as the coal is combusted. Gar is often referred to as the higher heating value and nar the lower heating value. Coal sales are specified on a gar or nar basis.*

The seaborne market for thermal coal can also be further divided into two sub-markets geographically, based around the Atlantic and Pacific Basins. The two markets are relatively segregated, primarily due to the relative cost of shipping between the two regions. However, some inter-basin trade does occur, either due to quality considerations or when freight and price differentials allow exporters to compete in non-traditional markets.

Map 3 Atlantic and Pacific basins



Source: Wood Mackenzie

Pacific Basin trade currently accounts for around 74% of the seaborne market, with Indonesia (43%) and Australia (20%) being the largest suppliers in 2014. The developed Asian economies of Japan, South Korea and Taiwan have traditionally been the principal Pacific Basin importers. However, growth in these markets has been limited in recent years and is instead concentrated in the developing economies of China, India and, to a lesser extent, Southeast Asia. In the Atlantic Basin, South Africa, Russia and Colombia are the largest producers, supplying coal primarily into the European market.

Historically, a certain amount of thermal coal from Australia, Indonesia and China has been exported into the European market. However, the net trade flow between the Pacific and Atlantic basins is now positive into the Pacific as traditional Atlantic Basin suppliers such as South Africa and Colombia are increasingly diverting coal exports away from Europe into high growth Asian markets.

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