IN THE MATTER OF AN ARBITRATION UNDER CHAPTER ELEVEN OF THE NORTH AMERICAN FREE TRADE AGREEMENT AND THE UNCITRAL RULES OF 1976

-between-

WILLIAM RALPH CLAYTON, WILLIAM RICHARD CLAYTON, DOUGLAS CLAYTON, DANIEL CLAYTON AND BILCON OF DELAWARE, INC.

-and-

GOVERNMENT OF CANADA

Expert Report of

Darrell B. Chodorow

09 June 2017

THE Brattle GROUP

Table of Contents

I. Introduction 1
- A. Assignment 3
- B. Qualifications 3
- C. Materials Considered 4
- D. Summary of Conclusions 4
  - 1. Analysis of Historical Development Expenditures on the Project 5
  - 2. Mr. Rosen's Estimate of Lost Profits 6
  - 3. Potential Profits from Whites Point as of the Breach Date 8
  - 4. Loss Accounting for Mitigation 9

II. BNS' Description of the Whites Point Project 10
- A. Project History 10
- B. Project Facilities and Capital Costs 11
- C. Expected Project Life, Production Volume, and Sales 13
- D. Whites Point Operating Schedule and Labor Force 15
- E. Prices 16

III. Evaluation of the Historical Costs to Develop the Project 16
- A. JRP-Related Costs 18
- B. Total Development Costs through 22 October 2007 19
- C. The Buxton Statement's "Net Damages" Calculation Overstates Historical Expenditures on Whites Point 20
- D. The Breach Was Not the Sole Reason for Any Loss of These Historical Costs 21

IV. Market Indicators of the Value for the Whites Point Project from Actual and Proposed Transactions 22
- A. NSE's Offer to Sell a Stake in Whites Point in February 2002 Contingent on Permitting 22
- B. BNS' Acquisition of a Stake in Whites Point in April 2002 24
- C. BNS' Purchase of NSE's Stake in the Project in 2004 Without a Permit 26
- D. [redacted] Offer to Purchase the Project in 2007 Contingent on Permitting 27

V. The Claimants' Estimate of Damages Is Unreliable 29
- A. Mr. Rosen's Lost Profits Calculation 29
- B. Key Inputs to Mr. Rosen's DCF Are Uncertain and Untested Since Whites Point Lacked an Operating History and Pre-Feasibility Analysis 30
- C. Mr. Rosen's Lost Profits Far Exceed Contemporaneous Evidence of Whites Point's Value and the Claimants' Requested Relief 31

D. Mr. Rosen Does Not Value the Loss at the Breach Date 35
1. Mr. Rosen Does Not Consider Mitigation Opportunities 36
2. Mr. Rosen Does Not Value Lost Profits as of the Breach Date 38
3. Mr. Rosen Assumes with Certainty that Whites Point Would Have Received Its Permits 40
E. Mr. Rosen's Calculations Are Premised on Unreliable Assumptions 41
1. Many Assumptions Adopted by Mr. Rosen from Other Witnesses Are Inconsistent with the Whites Point EIS or Earlier Planning Documents 42
2. Mr. Rosen's Discount Rate Is Estimated Incorrectly 45
3. Mr. Rosen's Prices Are Calculated Incorrectly and Ignore the Impact of Competition 47
a. Mr. Rosen's 2011 to 2015 Prices for Traditional Aggregates and Screenings 48
b. Mr. Rosen's 2016 to 2060 Prices for Traditional Aggregates and Screenings 51
c. Prices for Grits to Amboy Aggregates 53
4. Mr. Rosen Relies on Freight Costs that Are Materially Understated 54
F. Mr. Rosen's DCF Analysis Significantly Understates Operating and Construction Costs 54
1. Operating and Maintenance Costs Included in Mr. Rosen's DCF Are Understated 54
a. Mr. Rosen's Assumed Costs Are Unsupported and Inconsistent with the EIS 55
b. Mr. Rosen's Assumed Costs Fail to Accurately Reflect the Quarry's Total Production 55
c. Mr. Rosen's Assumed Costs Are Incomplete 56
2. Mr. Rosen's Assumed Capital Costs Are Understated 57
VI. The Value of Potential Profits from Whites Point But-For the Breach 58
A. The Potential Profits from Whites Point Were Subject to Significant Uncertainty Immediately Prior to the Breach 59
B. Methodology for Valuing the Potential Profits from a Fully Permitted Whites Point Project as of 22 October 2007 60
1. Project Life 61
2. Production and Sales Volumes 61
3. Prices 62
4. Freight Costs 64
5. Other Operating Costs 64
6. Project Capital Expenditures and Maintenance Costs 65

7. Reclamation and Decommissioning Costs 65
8. Foreign Exchange Rate 65
9. Discount Rate 66
C. DCF Valuation of Potential Cash Flows from Whites Point as of the Breach Date 66
D. Comparison to Market-Based Evidence 67
E. Accounting for the Risk of Permitting 70
VII. The Loss Based on My Alternative DCF Analysis Given Mitigation Opportunities 73
VIII. Pre-Award Interest and Tax Gross-Up 76
A. Pre-Award Interest 76
1. Mr. Rosen's Pre-Award Interest Calculation Is Methodologically Flawed 77
B. Gross-Up for Taxes 79
IX. Conclusions 80
X. Declaration 81
Appendix A: Resume
Appendix B: Materials Considered
Appendix C: Historical Costs
Appendix D: Discounted Cash Flow Analysis of Potential Profits
Appendix E: Discounted Cash Flow Analysis—Project Delay
Appendix F: Market Data and Comparisons
Appendix G: Discount Rate as of 22 October 2007
Appendix H: The Pre-Award Interest Rate

I. Introduction

1. My name is Darrell B. Chodorow. I have been retained by counsel for the Government of Canada (the "Respondent") in its dispute with William Ralph Clayton, William Richard Clayton, Douglas Clayton, Daniel Clayton, and Bilcon of Delaware, Inc. (collectively, the "Claimants"). The dispute relates to the proposed construction and operation of an aggregates quarry and marine loading terminal on Digby Neck in Nova Scotia ("Whites Point" or the "Project") by Bilcon of Nova Scotia ("BNS").

2. In preparing my report, I understand that:

   a. BNS undertook the development of the Whites Point quarry project on Digby Neck in Nova Scotia.

   b. The proposed project was subject to an environmental assessment under the federal law of Canada and under the law of the province of Nova Scotia.

   c. The federal government of Canada and the provincial government of Nova Scotia constituted a Joint Review Panel ("JRP") to conduct the required environmental assessments.

   d. On 22 October 2007 the JRP issued its report, "recommend[ing] that the Minister of Environment and Labour (Nova Scotia) reject the proposal made by Bilcon of Nova Scotia to create the Whites Point Quarry and Marine Terminal and recommend[ing] to the Government of Canada that the Project is likely to cause significant adverse environmental effects that, in the opinion of the Panel, cannot be justified in the circumstances."[1]

   e. On 20 November 2007 the Minister for the Department of Environment and Labour of Nova Scotia informed BNS that "following careful consideration of the Panel's Report…[he had] determined that the proposed Project poses the threat of unacceptable and significant adverse effects to the existing and future environmental, social and cultural conditions influencing the lives of individuals and families in the adjacent communities [and that t]herefore, in accordance with the authority provided

[1] **R-212**, Environmental Assessment of the Whites Point Quarry and Marine Terminal Project, Joint Review Panel Report, October 2007, p. 4 ("JRP Report").

by Section 40 of the *Environment Act*, the proposed Whites Point Quarry and Marine Terminal is not approved."[2]

f. On 17 December 2007 the Federal Government indicated that it "accept[ed] the conclusion of the Joint Review Panel that the Project is likely to cause significant adverse environmental effects that cannot be justified in the circumstances" and decided that "under subsection 37(1) of CEAA, DFO and TC shall not exercise any power or perform any duty or function conferred on it by or under any Act of Parliament that would permit the Project to be carried out in whole or in part."[3]

g. On 26 May 2008, the Claimants filed a Notice of Arbitration claiming that the environmental assessment of its project was a violation of the terms of Chapter 11 of the North American Free Trade Agreement ("NAFTA").[4] This filing was amended on 3 December 2009.[5]

h. On 17 March 2015, the Tribunal issued its Award on Jurisdiction and Liability (the "Phase 1 Award") in which a majority found that Canada had breached its obligations under Chapter 11 of NAFTA.[6] The majority of the Tribunal stated that "[t]he basis of liability under Chapter Eleven is that, after all the specific encouragement the Investors and their investment had received from government to pursue the project, and after all the resources placed in preparing and presenting their environmental assessment case, the Investors and their investment were not afforded a fair

---

2 **R-331**, Letter from Nova Scotia Department of Environment and Labour Office of the Minister to Paul G. Buxton, Re: Whites Point Quarry and Marine Terminal, 20 November 2007.

3 **R-383**, The Government of Canada's Response to the Environmental Assessment Report of the Joint Review Panel on the Whites Point Quarry and Marine Terminal Project, 17 December 2007, p. 2.

4 Notice of Arbitration under the Arbitration Rules of the United Nations Commission on International Trade Law and the North American Free Trade Agreement, *William Ralph Clayton, William Richard Clayton, Douglas Clayton, Daniel Clayton and Bilcon of Delaware, Inc. v. Government of Canada,* 26 May 2008 ("Notice of Arbitration").

5 Amended Statement of Claim, *William Ralph Clayton, William Richard Clayton, Douglas Clayton, Daniel Clayton and Bilcon of Delaware, Inc. v. Government of Canada*, 3 December 2009.

6 Award on Jurisdiction and Liability, *William Ralph Clayton, William Richard Clayton, Douglas Clayton, Daniel Clayton and Bilcon of Delaware, Inc. v. Government of Canada*, 17 March 2015, ¶ 11 and ¶ 742 ("Award on Jurisdiction and Liability").

opportunity to have the specifics of that case considered, assessed and decided in accordance with applicable laws."[7]

A. ASSIGNMENT

3. The Claimants seek US$443.4 million in compensation based on the 15 December 2016 Expert Report of Howard Rosen (the "Rosen Report"). This amount is comprised of US$298.2 million in lost profits, US$145.1 million for a tax gross-up, and US$0.1 million in pre-award interest.[8] I have been asked by counsel for the Government of Canada to:

   a. Evaluate the historical investment costs related to the JRP process and the Project, including the reliability of the Claimants' estimate of "Net Damages" based on historical costs presented in the 13 December 2016 Witness Statement of Paul Buxton (the "Buxton Statement");[9]

   b. Evaluate market indicators of the value of the project between 2002 and 2007;

   c. Evaluate the reliability of the findings of the Rosen Report regarding the Project's alleged lost profits, which assumes with certainty that the Project would have received permits;

   d. Offer an alternative Discounted Cash Flow ("DCF") valuation of the Project's profits immediately prior to the breach; and

   e. Consider the effects on that alternative valuation of potential mitigation through the judicial review process.

4. I have set out in greater detail below the assumptions I was asked to make with respect to each task.

B. QUALIFICATIONS

5. I am a Principal of The Brattle Group, an international economic consultancy with offices in Australia, Canada, Italy, Spain, the U.K., and the U.S. I have over twenty years of experience in analyzing economic damages, with a focus on international arbitration. I

---

[7] Award on Jurisdiction and Liability, ¶ 603 (emphasis in original).

[8] Rosen Report, 15 December 2016, ¶ 2. 7.

[9] Witness Statement of Paul Buxton, 13 December 2016; **C-1030**, Whites Point Quarry and Marine Terminal Project Expenses, 13 December 2016.

have acted as an expert providing testimony in breach of contract, intellectual property, antitrust, and valuation disputes in a variety of industries. I have testified in ICC, AAA, and ad hoc arbitrations and in U.S. District Court, U.S. Tax Court, the Delaware Court of Chancery, and the District Court of Cyprus. I have submitted expert reports on damages in ICSID and LCIA arbitrations, and have also advised clients in arbitrations before PCA and AISCC tribunals. I have been identified as a leading expert in quantum of damages in the Who's Who Legal Consulting Experts Guide.

6. Over the course of my career, I have advised clients on quantum of damages and valuation in numerous litigation and advisory matters. I have valued businesses, intellectual property, hard assets, contracts, and financial assets. My experience covers a wide variety of industries including agriculture, basic materials, construction, consumer products, electricity, financial services, infrastructure, manufacturing, oil and gas, pharmaceuticals, technology, transportation, and telecommunications. My experience includes matters involving the valuation of mining assets and advising a client in an investor-state arbitration over the expropriation of a business with cement, concrete, and aggregates assets.

7. I hold an M.B.A. from Yale University, where I served as a teaching assistant for a graduate-level course in financial accounting. I hold a B.A. in economics from Brandeis University, where I served as a teaching assistant for a course in economics. My resume is attached as Appendix A.

C. MATERIALS CONSIDERED

8. Materials considered in the preparation of this report are contained in Appendix B.

D. SUMMARY OF CONCLUSIONS

9. The Government of Canada was found to have breached its obligations under Chapter 11 of NAFTA when the JRP issued its report in October 2007. Even without the breach, there was considerable uncertainty at that time regarding the future profitability of Whites Point. The Project was still under development, and therefore lacked any operating history to calibrate key assumptions that were central to the profitability of the Project, such as production levels, prices, operating and maintenance costs, and capital expenditures. The size of the basalt deposit had not undergone feasibility or pre-feasibility studies to demonstrate economic viability. The Claimants did not have any contemporaneous forecasts of the Project's future revenues and costs. Most importantly, I understand that

the Project faced permitting risks that could have prevented Whites Point from reaching commercial operations even absent the breach. Under these circumstances, there was significant uncertainty regarding the future profitability of the Project in the event that it ever reached commercial operations.

1. Analysis of Historical Development Expenditures on the Project

10. I have been asked to prepare two quantifications of the historical expenditures to develop the Project. The first quantification tabulates costs associated with the JRP, whose report the Tribunal found to be in breach of Chapter 11 of NAFTA. This amount is based on costs incurred from November 2004 through October 2007, the period from when the JRP was constituted until the breach date. Based on data from 150 exhibits provided by the Claimants, I estimate that BNS spent approximately [redacted] on the JRP process.

11. The second quantification includes all of BNS' expenditures to develop the Project. These expenditures include amounts from April 2002 through October 2007, the period from when BNS was formed through the breach date. I estimate that these costs total C$[redacted]

12. The Claimants have presented their own "Net Damages" calculation based on the amount they claim was spent on Whites Point. The Claimants present a one-page summary that shows total expenditures of [redacted]. I have been asked to analyze the reliability of this calculation; however, the Claimants' calculation lacks any support tying the summary to the 150 exhibits that Claimants state are the basis for the claimed expenditures. I have therefore been unable to conduct a thorough assessment of the Claimants' "Net Damages" calculation. Nonetheless, I have concluded that their calculation raises basic reliability concerns because the [redacted] they claim appears to exceed the sum of the total expenditures contained in the 150 exhibits they provided. In addition, this figure may include expenditures [redacted]

13. With respect to both the Claimants' historical cost calculation and mine, I have been instructed that the Claimants are obligated to provide evidence that payments were actually made in the form of receipts and invoices. Most of the costs included in both the Claimants' analysis and mine lack such support. Exclusion of unsubstantiated payments in both the Claimants' calculation and mine results in significantly lower historical cost amounts. I estimate the substantiated costs related to the JRP to total [redacted], and the substantiated costs related to the entire project to be [redacted]

14. Moreover, because the Claimants had the opportunity to mitigate the effects of the breach through a judicial review which would have allowed them to obtain a non-breaching JRP report, the breach did not render the historical investments valueless.

2. Mr. Rosen's Estimate of Lost Profits

15. Mr. Rosen's report also quantifies damages based on lost profits. To do so, Mr. Rosen conducts a DCF analysis which results in an estimate of lost profits of US$298 million before his additions for pre-award interest and tax gross-up.

16. The results of a DCF analysis are only as reliable as its inputs. Given the lack of operational history, feasibility studies, pre-feasibility studies, or contemporaneous forecasts of the Project's future revenues and costs to calibrate the DCF's inputs, there is significant uncertainty about the potential profits from the Project. It is useful to compare Mr. Rosen's results with available market indications of Whites Point's value from transactions and offers for the property. The highest indicator of Whites Point's value is [redacted], less than 15% of the value that Mr. Rosen calculates for Whites Point's lost profits. These material differences are due to a number of methodological flaws and unreasonable assumptions that cause Mr. Rosen to overstate lost profits.

17. Mr. Rosen's DCF analysis contains a number of methodological flaws.

- *Mr. Rosen's analysis ignores mitigation.* Mr. Rosen calculates lost profits as if the Project was fully expropriated, valuing Whites Point at zero after the breach. I have been instructed that the Claimants had an opportunity to mitigate the impact of the breach on the Project's value through a judicial review. If so, the ability to pursue this mitigation opportunity would have minimized the Claimants' loss. Mr. Rosen provides no consideration to mitigation opportunities, and therefore overstates Claimants' loss.
- *Mr. Rosen does not value the loss as of the breach date.* Where DCF analysis can be used reliably, a claimant's loss would be the present value of lost profits due to the breach as of the breach date. Had Mr. Rosen determined the value of the loss on the breach date, his value would have been reduced by approximately 40%.
- *Mr. Rosen ignores permitting risk.* Counsel for the Claimants instructed Mr. Rosen to assess lost profits assuming that Whites Point started operating in 2011. Implicit in this instruction is that the Project would have received its permits with certainty but for the breach. The inability to obtain permits would result in

a value of zero for the Project. I have been instructed that, but for the breach, Whites Point still faced permitting risk. If so, Mr. Rosen's valuation overstates the value of Whites Point, potentially by a significant amount.

18. Mr. Rosen also calculates lost profits using numerous assumptions that are different from those that BNS communicated in its Environmental Impact Statement ("EIS") and reflected in other contemporaneous documents, and these differences inflate his estimate of lost profits. For example, the EIS and other contemporaneous planning documents reflected an expectation that Whites Point would produce 2.0 million tons of aggregates annually. Mr. Rosen assumes that the Project would achieve annual output of [redacted], resulting in an overestimate of lost revenues. Similarly, Mr. Rosen uses a freight cost that assumes [redacted] These are two of many examples. In effect, Mr. Rosen is valuing a project that is substantially different from the Whites Point operations envisioned and documented prior to the breach.

19. Mr. Rosen's assumptions raise concerns beyond just how they differ from contemporaneous expectations. In some cases, Mr. Rosen's assumptions defy basic economic logic. Mr. Rosen assumes that Whites Point would have [redacted]

20. The operating costs that Mr. Rosen adopts from the Claimants' fact witness, Mr. Fougere, are too low. As discussed in the Expert Report of S-C Market Analytics, the Claimants' [redacted], and are therefore understated. Moreover, the costs assumed by Mr. Rosen do not reflect all costs. For example, the Claimants' expert Mr. Oram opines that Whites Point would incur certain environmental monitoring costs to comply with its assumed permit obligations. The costs that Mr. Rosen incorporates from Mr. Fougere do not include these monitoring costs, and Mr. Rosen does not account for them separately. Other costs are also missing from Mr. Rosen's analysis. The presence of such errors raises a fundamental concern about the

reliability of the cost assumptions relied upon by Mr. Rosen, which have not been tested against actual performance, because Whites Point has never operated, or benchmarked against any third-party quarry costs.

21. The combination of flawed methodology and unreliable assumptions cause Mr. Rosen's estimate of lost profits to be economically unreasonable and systematically overstated. Such concerns explain why Mr. Rosen's estimate of lost profits is between 5 and 43 times higher than prior indications of Whites Point's value.

3. Potential Profits from Whites Point as of the Breach Date

22. I have been asked to apply the DCF method to value the profits of Whites Point as of the breach date, excluding the effect of the breach.

23. It is difficult to forecast Whites Point's expected profits as of the breach date. The Project lacked an operating history and contemporaneous studies of economic feasibility. I am instructed that Whites Point faced permitting risk even absent the breach. The economic environment for aggregates was also difficult, with declining demand and falling stock prices for publicly traded aggregates producers in the lead-up to the global financial crisis. As a result of this uncertainty, I refer to the profits estimated in this analysis as the potential profits.

24. Although I use the same basic DCF structure as Mr. Rosen, my implementation addresses many of the key concerns with his analysis:

- I analyze the effects of the breach at the time of the breach, while Mr. Rosen's analysis is based on his view of the market outlook as it existed nearly 10 years later (2016 vs. 2007).
- I adopt assumptions that are consistent with the operations of the Project as described by BNS in the EIS and other contemporaneous documents. For example, I assume annual Whites Point output to be consistent with the 2 million tons-per-year described in the EIS and I use a freight rate that reflects the 40,000 ton cargo size.
- I account for the basic principles of economics. Prices used in my analysis recognize that competition from new sources of supply like Whites Point will drive prices downward. Also, my long-term price forecast recognizes that suppliers respond to high prices and profit margins by building additional supply capacity, which drives profitability toward normal levels.

- I adjust operating costs to correct the understated costs used by Mr. Rosen because of missing costs and unreasonable assumptions.

25. Assuming, like Mr. Rosen's DCF analysis, that the Project would have been permitted with certainty, the present value of potential profits from Whites Point as of the breach date, excluding the effects of the breach, is US$8.7 million. Unlike Mr. Rosen's assessment, this value is consistent with the range of the market indications of the Project's value.

26. As noted above, I have been instructed that Whites Point would have faced permitting risk even absent the breach. Permitting risk would have reduced the present value of the potential profits from Whites Point. I do not have the expertise to estimate the likelihood that Whites Point would have received permits absent the breach. However, I demonstrate how the likelihood of permitting could be used to derive the present value of potential profits but for the breach, to account for permitting risk.

4. Loss Accounting for Mitigation

27. Although I have been asked to quantify the present value of potential profits from Whites Point as of the breach date, it is my opinion that this value does not measure the loss. An assessment of the loss must account for mitigation opportunities. I have been instructed that the Claimants could have mitigated the effects of the breach through a judicial review to obtain a non-breaching JRP report.

28. Assuming that the Claimants could have mitigated the effects of the breach through a judicial review, the breach did not destroy the full value of Whites Point. Rather, it would have potentially reduced the value of the Project in two ways: (1) it would have deferred the Project's ability to start commercial operations; and (2) it would have required additional procedural costs. Near-term market conditions in the shipping industry were extremely tight, making expected freight costs very high in the near-term. Deferring the start of commercial operations while the Claimants pursued mitigation would not have reduced the value of Whites Point as of the breach date because the deferral [redacted] Therefore, the harm from the breach would have been limited to the added procedural costs necessary to pursue judicial review and obtain a non-breaching JRP report. I estimate these costs to be US$1,151,046, which reflects the damages after accounting for mitigation.

II. BNS' Description of the Whites Point Project

29. The value of Whites Point is a function of its key characteristics. BNS proposed to build and operate a basalt quarry, a stone crushing operation, and a ship-loading terminal.[10] BNS filed an EIS in 2006 to obtain approval for the project.[11] The EIS described the history of the project, its intended operational and commercial aspects, and BNS' opinions about the environmental and economic impacts of the project.[12]

A. PROJECT HISTORY

30. The original proponent of the Project was Nova Stone Exporters Inc. ("Nova Stone" or "NSE"), a Nova Scotia company.[13] In April 2002, Nova Stone received a conditional permit from the Government of Nova Scotia to operate a quarry of 3.9 hectares ("ha") at the Whites Point location.[14] Because the proposed project was less than 4 ha, it did not require an environmental assessment under Nova Scotia law.[15] To proceed with the smaller project, NSE had to satisfy the Federal Department of Fisheries and Oceans that blasting at the site would not have an adverse effect on marine mammals.[16] I understand that NSE was never able to do so, and thus, that no quarrying activity ever took place.

31. In April 2002, NSE formed the Global Quarry Products ("GQP") partnership with BNS to develop a larger quarry and a marine terminal to allow water-borne sales on this same site.[17] The proposed quarry size was 152 ha, the size of the quarry proposed in the EIS.[18]

---

10 **C-1046**, Whites Point Quarry Pro Forma Statement of Operations, 7 December 2016, p. 2.

11 **R-581**, Whites Point Quarry & Marine Terminal, Revised Project Description, November 2006 ("Revised Project Description").

12 **R-581**, Revised Project Description.

13 **R-87**, Nova Stone Approval to Construct and Operate a Quarry at or Near Little River, Digby County, 30 April 2002 ("Nova Stone Approval").

14 **R-87**, Nova Stone Approval; Award on Jurisdiction and Liability, ¶ 12.

15 Award on Jurisdiction and Liability, ¶ 12.

16 **R-87**, Nova Stone Approval, p. 10.

17 **R-575**, Whites Point Quarry & Marine Terminal, Environmental Impact Statement, Volume I – Plain Language Summary, 31 March 2006, p. 8 ("EIS – Volume I"); **C-22**, Partnership Agreement between Nova Stone Exporters Inc. and Bilcon of Nova Scotia, April 2002.

18 **C-637**, Bilcon's Responses to Comments on the EIS – Vol. III—Comments on the EIS-Whites Point Quarry and Marine Terminal Project, Environmental Impact Statement, 9.3.6.2 Analysis, p. 26.

32. I understand that the larger project required an environmental assessment ("EA") under Nova Scotia law.[19] I also understand that the marine terminal and effects on marine life and transportation in the Bay of Fundy required a federal EA.[20] The project was referred to the JRP, with the panel constituted on 3 November 2004.[21] BNS states that NSE withdrew from the Project because of the additional cost and extended timeframe associated with the JRP.[22] NSE sold its stake in the partnership to BNS on 1 April 2004, including [redacted][23] GQP was dissolved on 1 April 2004, and the project was pursued by BNS alone.[24]

33. BNS submitted its EIS dated 31 March 2006 to the JRP.[25] The EIS contained a detailed project description explaining the purpose of the Project, potential alternatives, land requirements, the Project timeline and life, and information about the Project's construction and operations.[26] In November 2006, BNS submitted a revised version of this project description which included further information about the proposed Project.[27]

B. PROJECT FACILITIES AND CAPITAL COSTS

34. The Project was to be comprised of on-shore quarrying and processing facilities and a marine loading terminal. The onshore operations would be conducted over an area of 152

---

19 Affidavit of Bob Petrie, 1 December 2011, ¶ 4.

20 **R-73**, Letter from Minister of Fisheries and Oceans Robert G. Thibault to Minister of Environment David Anderson, 26 June 2003.

21 **R-27**, *Agreement Concerning the Establishment of a Joint Review Panel for the Whites Point Quarry and Marine Terminal Project between the Minister of the Environment, Canada and the Minister of the Environment and Labour, Nova Scotia*, Terms of Reference for the Joint Review Panel, p. 2 and Part II, 3 November 2004.

22 **R-575**, EIS – Volume I, p. 8.

23 The lease sold was for 142 ha (350 acres). **C-23**, Agreement Between Bilcon and Nova Stone, 1 April 2004, p. 1. BNS expanded the lease to 380 acres on 1 May 2004. **C-21**, Lease Agreement between Bilcon of Nova Scotia and Jason R. Lineberger, Lida C. Lineberger, John A. Johnson, and Joan L. Johnson, with Schedule A and Schedule B, 1 May 2004, p. 1. The consideration paid by BNS is discussed in Section IV.B.1.

24 Award on Jurisdiction and Liability, ¶ 113.

25 **C-1**, Whites Point Quarry & Marine Terminal, Environmental Impact Statement, 31 March 2006.

26 **R-575**, EIS – Volume I.

27 **R-581**, Revised Project Description.

ha, of which 120 ha was to be quarried.[28] BNS stated that it did not anticipate an expansion of the production area.[29]

35. Quarrying operations would start with the extraction of rock by drilling and blasting in the quarrying area.[30] The extracted rock would then be transported to the processing plant area, where it would be crushed, screened, washed, and stockpiled.[31] Carrying out this plan required the installation of a processing plant, upgrades to the roads and utilities, and the development of a compound area and environmental structures.[32]

36. Mr. John Wall states that [redacted] when BNS filed its EIS in March 2006.[33] This version of the design was known as "Revision D."[34] Mr. Wall also noted that there were subsequent changes that altered Revision D.[35] The EIS contained an estimate that the capital costs associated with the processing plant and the other upgrades would be about [redacted].[36] According to Mr. Wall, this was a preliminary estimate prepared in 2004, which was long before the completion of the site design plan on which the EIS was based.[37] The expected capital cost for the actual site design underlying the EIS was significantly higher. The analysis presented in the 8 December 2016 Witness Statement of Michael G. Washer, retained by the Claimants, opined that the capital costs associated with Revision D and the other upgrades would have been [redacted].[38]

---

28 **R-581**, Revised Project Description, p. 6.

29 **R-581**, Revised Project Description, p. 106.

30 **R-581**, Revised Project Description, p. 6.

31 **R-581**, Revised Project Description, p. 6.

32 **R-581**, Revised Project Description, p. 71.

33 Witness Statement of John Wall, 8 December 2016, ¶ 51.

34 Witness Statement of John Wall, ¶ 51.

35 Witness Statement of John Wall, ¶ 54.

36 **R-581**, Revised Project Description, p. 71. The document does not state the currency, but marine terminal capex is in Canadian dollars, so I assume the same is true for plant infrastructure capex.

37 Witness Statement of John Wall, ¶ 58.

38 Witness Statement of Michael G. Washer, 8 December 2016, ¶¶ 10-11.

37. The Project would have required mobile equipment, such as loaders, excavators, and a drill rig, which the EIS estimated would cost [redacted].[39] This figure was similar to the cost estimate of [redacted] for the mobile equipment in Mr. Washer's 2016 statement.[40]

38. The planned Project included a marine terminal for loading the aggregates onto a bulk carrier to reach markets.[41] The marine infrastructure included conveyors to move the aggregates for loading, a radial arm ship loader, mooring dolphins, and buoys.[42] The EIS indicated a capital cost of [redacted] as of 2006 based on a cost estimate by Seabulk Systems Inc.[43] The full cost of the marine terminal infrastructure would have been higher because Seabulk's estimate [redacted].[44] The Witness Statement of William Richard Clayton states that the total budgeted cost for the marine terminal was [redacted][45]

C. EXPECTED PROJECT LIFE, PRODUCTION VOLUME, AND SALES

39. BNS stated in the EIS that Whites Point would have a project life of 50 years.[46] The EIS divided the Project's life into construction, operations, and decommissioning activities. The first two years of the Project's life involved construction of the facility, with operations starting in the latter part of the second year.[47] Quarrying operations would continue through year 49.[48] The final year of the Project's life would include production using mobile crushing and screening equipment and site decommissioning.[49]

---

39 **R-581**, Revised Project Description, p. 71.

40 Witness Statement of Michael G. Washer, ¶ 12.

41 **R-581,** Revised Project Description, p. 102.

42 **R-581,** Revised Project Description, p. 71.

43 **C-1005**, Bilcon of Nova Scotia/Seabulk Systems Inc., White's Point Quarry Ship Loading Facility Construction Cost Estimate, March 2006, p. 4.

44 **C-1005**, Bilcon of Nova Scotia/Seabulk Systems Inc., White's Point Quarry Ship Loading Facility Construction Cost Estimate, p. 4; **R-581,** Revised Project Description, p. 52.

45 Witness Statement of William Richard Clayton, 15 December 2016, ¶ 25. The statement does not indicate the currency, but it is applied in Mr. Rosen's model as if it is denominated in Canadian dollars (**C-1095**, FTI Native DCF Model, 15 December 2016, Schedule 5).

46 **R-581,** Revised Project Description, p. 6.

47 **R-581,** Revised Project Description, pp. 52 and 102.

48 **R-581,** Revised Project Description, pp. 52-54.

49 **R-581,** Revised Project Description, pp. 55 and 72.

40. BNS stated in the EIS that Whites Point would achieve annual production of 2.0 million tons-per-year.[50] This output would be comprised of crushed stone of various types, grits, and sand, although the exact proportions were not stated.[51] The EIS stated that "[a]t the present time, Clayton does not anticipate a future demand in excess of two million metric tons a year from the White Point site."[52] The EIS also highlighted that the capacity of the Project was designed around this 2 million ton production volume:

    - "The design annual production and shipment of all aggregates is 2,000,000 tons.… The capacity of the production line will be 48,000 tons per week thus allowing flexibility in shipments to provide the required 2,000,000 tons."[53]
    - "The Whites Point quarry is a small, basalt rock quarry designed to produce 40,000 tons of aggregate per week and approximately 2 million tons per year over a 50 year project life."[54]

41. In 2005, it was estimated that Whites Point had a deposit of about 100 million tons of basalt.[55] Given the anticipated sales described in the EIS, the 50-year life would have roughly exhausted the estimated deposit at Whites Point.[56] However, BNS had not conducted testing necessary to determine the amount of the Whites Point deposit with reasonable prospects of economically viable extraction in accordance with standards from the Canadian Institute of Mining, Metallurgy and Petroleum ("CIM").[57]

42. The 2.0 million tons-per-year were expected to be loaded onto vessels approximately weekly. Shipments were anticipated to be approximately 40,000 tons-per-cargo, but the carrying capacity of the vessels was approximately 45,000 tons.[58] The JRP Report noted

---

50 **R-581,** Revised Project Description, p. 40.

51 **R-581,** Revised Project Description, p. 40.

52 **R-581**, Revised Project Description, p. 137.

53 **R-581,** Revised Project Description, p. 135.

54 **R-581,** Revised Project Description, p. 24.

55 First Expert Report of Mercator Geological Services (Michael Cullen), 17 November 2016, § 14.16.

56 Production of 2.0 million tons-per-year over an operating life of 48.5 years (50 years less 1.5 years of construction) would exhaust 97 million tons of the 100 million ton basalt deposit.

57 First Expert Report of Mercator Geological Services (Michael Cullen), §§ 14.1 and 14.16.

58 **R-581,** Revised Project Description, pp. 6, 40, and 137.

that Whites Point expected to have between 44 and 50 vessel loadings per year.[59] This is consistent with BNS' stated cargo size of 40,000 tons, or potentially up to 45,000 tons, although the EIS did not describe cargoes as large as 45,000.[60] Each loading was expected to take between 10 and 12 hours.[61]

43. BNS stated in the EIS that the destination market for Whites Point aggregates was New Jersey.[62] The intended buyer was Clayton Concrete Block and Sand, which had most of its facilities located in southern New Jersey.[63] BNS stated that the need for Whites Point arose because transporting stone from the quarries in northern New Jersey to Clayton's facilities in southern New Jersey would likely be cost-prohibitive.[64] While the EIS discusses primarily the supply of southern New Jersey, there is one mention of shipments to a port in the Northern New Jersey area.[65] While the EIS never described any intention to deliver Whites Point aggregates to a New York port, it is noted that the aggregates should meet the quality requirements for both the New Jersey and New York State departments of transportation.[66]

D. WHITES POINT OPERATING SCHEDULE AND LABOR FORCE

44. Wages and salaries described in the EIS were based on the assumption of two shifts.[67] The first shift would be 20 employees working 8 hours-per-day for six days a week on production operations for 44 weeks and performing maintenance during an 8 week

---

59 **R-212**, JRP Report, p. 1.

60 This is calculated as 44 loadings × 45,000 tons-per-cargo = 1.98 million tons-per-year; 50 loadings x 40,000 tons-per-cargo = 2.0 million tons-per-year.

61 **R-579**, Whites Point Quarry & Marine Terminal, Environmental Impact Statement, Volume VI, 31 March 2006, Chapter 9.1 – Physical Environment & Impact Analysis, p. 76 ("EIS – Volume VI"); **R-581**, Revised Project Description, p. 98.

62 **R-581**, Revised Project Description, p. 6.

63 **R-581**, Revised Project Description, p. 7; **R-575**, EIS – Volume I, p. 4.

64 **R-581**, Revised Project Description, p. 16.

65 **R-581**, Revised Project Description, p. 21.

66 **R-581**, Revised Project Description, p. 15.

67 **C-637**, Bilcon's Responses to Comments on the EIS - Vol III – Comments on the EIS-Whites Point Quarry and Marine Terminal Project, Environmental Impact Statement, 9.3.6 Human Health and Wellness and Socio-Cultural Environment, 12 February 2007, p. 20.

shutdown.[68] The second shift would have 14 employees working 8 hours a day, six days a week, for the quarry's 44 week production period.[69]

E. PRICES

45. The EIS itself did not report any information about prices that Whites Point would receive from selling its products to Clayton Concrete Block and Sand in New Jersey. The Claimants did provide information about stone prices in response to an undertaking during the JRP process. In June 2007, the Claimants stated that "[s]tone price in New Jersey is $6.23 - $10.00 per ton USD, NYC is $18.50 to $19.00 per ton USD - FOB point of sale."[70] A 2004 business plan prepared by Clayton Concrete indicated that the Claimants expected Whites Point to deliver stone to New Jersey and receive a delivered price of [redacted] on its sales, roughly consistent with the New Jersey stone price referenced by the Claimants during the JRP.[71]

III. Evaluation of the Historical Costs to Develop the Project

46. BNS spent money in an attempt to develop Whites Point. I have been asked to quantify the historical amounts expended on the Project in two ways:

    a. I quantify expenditures directly related to the preparation and presentation of the EA to the JRP. I have been instructed by counsel to define the JRP-related EA costs as those incurred from 3 November 2004, when the JRP was constituted, through 22 October 2007, when the JRP issued its report.[72]

---

68 **R-581**, Revised Project Description, p. 96; Witness Statement of John Wall, ¶ 55.

69 **R-581**, Revised Project Description, p. 96; Witness Statement of John Wall, ¶ 55.

70 **C-445**, Bilcon's Response to Undertaking #12, 22 June 2007.

71 **R-717**, Business Plan for Whites Point Quarry, Prepared by Clayton Concrete, April 2004, pp. BIL012505-6. [redacted]

72 For the purpose of my analysis, I assume that all costs incurred by the Claimants prior to 22 October 2007 are included in cost summaries prepared 28 October 2007 and earlier. If the Claimants can provide evidence that subsequent invoices were for work conducted prior to 22 October 2007, I will update my analysis accordingly.

b. I quantify total expenditures on the Project from the incorporation of BNS on 24 April 2002[73] through the date the JRP report was issued.

47. The Claimants filed with their opening Damages Memorial a similar calculation attached to the witness statement of Mr. Paul Buxton, the former Project Manager for Whites Point. Mr. Buxton presents a one-page calculation of "net damages" that purports to show the historical amounts expended on the Project.[74] I have been asked to evaluate the reliability of this calculation.

48. To support Mr. Buxton's net damages calculation, the Claimants have produced 150 exhibits that contain information about expenditures on the Project.[75] To tabulate the historical expenditures, I developed a dataset containing the date, service provider, cost description, and cost amount for each expenditure in the documents identified by the Claimants. This dataset is attached in Appendix C.[76]

49. Based on a review of cost descriptions, the Claimants' Memorial (which identified individuals and firms that contributed to the EA process), and instructions from counsel where it was not clear how to categorize an expense, I allocated costs into four categories: (1) Consulting Experts; (2) Panel Costs; (3) Office & Operations; and (4) Payments to acquire Nova Stone's stake in GQP.[77] This dataset serves as the basis for my assessment of historical expenditures.

50. I understand from counsel that the Claimants are obligated to provide evidence that payments were actually made in the form of receipts and invoices in order to be included in a damages calculation based on historical costs. I therefore tabulated the historical costs excluding the items without such evidence of payment, in addition to calculating the total

---

73 **C-11**, Certificate of incorporation for BNS, 24 April 2002.

74 **C-1030**, Whites Point Quarry and Marine Terminal Project Expenses.

75 **C-1342**, Letter from Gregory Nash re: Procedural Order No. 22, 10 March 2017, p. 8 (identifying Exhibits C-1169 through C-1318 as the source materials underlying C-1030).

76 See Appendix C, Table C.5 and Table C.6.

77 I excluded from my calculations any "foreign withholding taxes." I understand the burden for these taxes would have been borne by BNS employees rather than BNS itself. While BNS may have initially paid these taxes, I have seen no evidence that BNS was not reimbursed as expected for such taxes. I will amend my calculations if such evidence is presented. The total amount of the foreign withholding tax identified in Exhibits C-1169 through C-1318 was no more than C$40,000. See Appendix C, Table C.5 and Table C.6.

as listed. I also exclude costs from documents where there was evidence that [redacted][78] These totals are reported as "BNS Total Costs" and "Substantiated Costs" in Table 1 and Table 2.

A. JRP-RELATED COSTS

51. I calculated the costs directly related to the JRP process by adding the following categories of cost line items in Appendix C, Table C.5 for the period 3 November 2004, when the JRP was constituted, through 22 October 2007, when the JRP issued its report:

- Payments to individuals and firms contributing to the EA ("Consulting Experts");[79]
- Payments to government entities for the JRP itself and related costs ("Panel Costs");[80] and
- Payments for office and operational expenses ("Office & Operations"), excluding certain cost items that I have been instructed were not related to the JRP process.[81]

52. My review of invoices and cost summaries presented by the Claimants in this matter indicates the sum of all line items in these categories is [redacted]. The sum of BNS' cost to prepare and present the EA to the JRP on Whites Point during the JRP process is [redacted], with the Substantiated Costs being [redacted], as shown below in Table 1.

---

78 In specific cases, it is clear that the total statement was paid by William Clayton on behalf of Ralph Clayton & Sons from the presence of the check attached to the statement. These cases are identified in Appendix C, Table C.5.

79 See Appendix C, Table C.6. These refer to costs incurred by the hire of consulting experts for use in environmental assessment or the JRP process.

80 See Appendix C, Table C.6. This includes all payments to the Canadian Environmental Assessment Agency and the Nova Scotia Department of Environment and Labour.

81 See Appendix C, Table C.6. Quarry costs that are non-essential to the JRP process are allocated to "Non-EA Quarry Costs" and excluded from this group.

Table 1: JRP-Related EA Costs in Canadian Dollars (Nov. 2004–Oct. 2007)

		Total Costs	BNS Total Costs	Substantiated Costs
[1]	Consulting Experts	[redacted]		
[2]	Panel Costs			
[3]	Office & Operations			
[4]	Total Investment Cost			

Source: Appendix C, Table C.2.

B. TOTAL DEVELOPMENT COSTS THROUGH 22 OCTOBER 2007

53. I calculated the total costs of the Project from 24 April 2002,[82] when BNS was incorporated, to 22 October 2007 when the JRP issued its report and recommendations. This analysis includes all costs from Appendix C, Table C.5 for the following cost categories:

- Consulting Experts;
- Panel Costs;
- Office & Operations; and
- Payments to buy NSE's stake in GQP in April 2004 (the "2004 GQP Purchase").[83]

As shown in Table 2, the sum of all expenditures from the date of BNS' formation to 22 October 2007 is [redacted]. The sum of all of BNS' expenditures in the same date range is [redacted], with the Substantiated Costs being C[redacted]

[82] The earliest document identified by the Claimants as the source materials is from May 2002.

[83] I discuss the GQP transaction in greater detail in Section IV.

Table 2: Total Historical Costs in Canadian Dollars (Apr 2002–Oct 2007)

		Total Costs	BNS Total Costs	Substantiated Costs
[1]	Consulting Experts	[redacted]		
[2]	Panel Costs			
[3]	Office & Operations			
[4]	2004 GQP Purchase			
[5]	Total Investment Costs			

Source: Appendix C, Table C.1.

C. THE BUXTON STATEMENT'S "NET DAMAGES" CALCULATION OVERSTATES HISTORICAL EXPENDITURES ON WHITES POINT

54. In his witness statement, Mr. Buxton computes what he refers to as a "net damages" of [redacted] million relating to Whites Point.[84] Mr. Buxton asserts his figure is a [redacted], and he describes it as [redacted]."[85] I have been asked to evaluate whether Mr. Buxton's calculation reflects a reliable measure of the historical cost of the Project.

55. Mr. Buxton's calculation purports to calculate historical expenditures based on 150 different exhibits.[86] These exhibits contain information about thousands of different line items. The Claimants have provided no detail underlying Mr. Buxton's net damages calculation, only the one page summary. Without access to detailed information of the type in Appendix C that underlies my historical cost analysis, I cannot fully evaluate the reliability of Mr. Buxton's estimate.

56. Mr. Buxton's net damages summary reflects [redacted] neither of which is identified as one of the Claimants in the Statement of

---

[84] **C-1030,** Whites Point Quarry and Marine Terminal Project Expenses. While not explicitly stated, Mr. Buxton's figures appear to be in Canadian dollars as are the bulk of costs in the underlying materials in Exhibits C-1169 through C-1318.

[85] Buxton Statement, ¶ 33.

[86] See Appendix C, Table C.5.

Claim or the Claimants' Damages Memorial, over two time periods: [redacted][88]

57. Using the data provided in the supporting materials for Mr. Buxton's calculations as identified in Exhibit C-1342, I have attempted to replicate his analysis.[89] Even if all costs contained in my dataset (Appendix C, Table C.5) created from these exhibits were summed, the total is less than the amount in Mr. Buxton's net damages calculation.

58. Mr. Buxton's calculation also raises a concern because [redacted] There is no description of its relationship to BNS.

D. The Breach Was Not the Sole Reason for Any Loss of These Historical Costs

59. Mr. Buxton appears to characterize past amounts expended for project development and the JRP process as damages to the Claimants.[90] Such a characterization implies that the breach was the sole reason that BNS was not able to proceed with the Project and recover these historical costs.

60. First, I have been instructed that even without the breach, Whites Point faced the risk that it would not be able to obtain the permits and approvals necessary to build and operate the quarry.[91] Based on this instruction, there is uncertainty as to whether these historical costs had value even absent the breach.

61. Second, I have been instructed that the Claimants had a legal right to pursue a judicial review of the JRP report.[92] If this instruction is accurate, the breach did not destroy all the

---

87 **C-1030**, Whites Point Quarry and Marine Terminal Project Expenses. Mr. Buxton's calculation includes consultant costs, office staff, project/quarry manager, office expenditure, quarry construction, public information program, public relations, and JRP costs. His calculation excludes the "No Claim" category.

88 **C-1030**, Whites Point Quarry and Marine Terminal Project Expenses.

89 **C-1342**, Letter from Gregory Nash re: Procedural Order No. 22, p. 8.

90 **C-1030**, Whites Point Quarry and Marine Terminal Project Expenses.

91 **RE-3**, Expert Report of Robert G. Connelly, 9 June 2017, ¶ 101; **RE-4**, Report of Peter Geddes, 9 June 2017, ¶ 13.

92 **RE-6**, Expert Report of the Honourable John M. Evans, 9 June 2017, ¶ 76.

value that may have been created from these historical expenditures. Some portion of this value would have remained in the event of a favorable outcome of a judicial review. For example, studies conducted for the JRP may have required updating rather than a full reassessment from scratch. Similarly, costs associated with the planning and design of the Whites Point facility would have retained value if the Project were to pursue a judicial review and ultimately be permitted. Thus, benefits from the historical expenditures may have been retained if the Claimants had sought to reverse the breach through judicial review.

IV. Market Indicators of the Value for the Whites Point Project from Actual and Proposed Transactions

62. There are several market indications of Whites Point's value prior to 22 October 2007. These indications include: (1) [redacted] 2) BNS' April 2002 acquisition of a stake in Whites Point; (3) BNS' 2004 purchase of NSE's stake in Whites Point; and (4) an offer from [redacted] to purchase a fully permitted Whites Point quarry [redacted] These indications range from [redacted].[93]

63. These indicators are not directly comparable to each other, or to the condition of the Project just before the breach, because they reflect different stages of development and assumptions about permitting. The offers, in particular, must be analyzed with care because they do not reflect completed transactions. Nonetheless, these indicators provide some insight into the value of Whites Point.

A. [redacted]

[redacted]

[93] These amounts are determined in accordance with the discussions that follow.

[94] **R-718**, Letter from [redacted] Inc. to Bill Clayton, [redacted].

[redacted]

[redacted] [redacted]

[redacted] [redacted]

[redacted] [redacted]

[redacted] [redacted]

[redacted] [redacted]

[redacted] [redacted]

[95] **R-718**, Letter from [redacted]. to Bill Clayton, ¶¶ 1, 3-4, and 6. The description indicates [redacted]

[96] **R-718**, Letter from [redacted] to Bill Clayton, ¶ 3. The description indicated that [redacted]

[97] **R-718**, Letter from [redacted] to Bill Clayton, ¶¶ 4, 6.

[98] **R-718**, Letter from [redacted]. to Bill Clayton, ¶¶ 5, 8.

[99] **R-718**, Letter from [redacted] to Bill Clayton.

[100] Expert Report of Mercator Geological Services (Michael Cullen), § 14.16.

68. [redacted]

B. BNS' ACQUISITION OF A STAKE IN WHITES POINT IN APRIL 2002

69. NSE and BNS formed a [redacted] partnership on 24 April 2002 to develop Whites Point with production of at least 2 million tons-per-year.[101] The partnership was named Global Quarry Products ("GQP"). The partnership agreement defined the contributions each party would make to GQP and how its profits would be split based on the terms of the letter of intent.[102]

70. [redacted]

71. [redacted]

---

[101] **R-575**, EIS – Volume I, p. 8; **C-22**, Partnership Agreement, April 2002, p. 000436; **C-5**, Letter of Intent from Bilcon to Nova Stone Exporters Inc., 28 March 2002, ¶ 3; **C-23**, Agreement between Bilcon of Nova Scotia Corporation and Nova Stone Exporters, Inc., p.1.

[102] **C-5**, Letter of Intent from Bilcon to Nova Stone Exporters Inc.; **C-22**, Partnership Agreement.

[103] **C-5**, Letter of Intent from Bilcon to Nova Stone Exporters Inc., ¶ 3. The Letter of Intent does not specify the currency of values listed in the letter. However, related documents including the lease referenced in the Letter of Intent (Exhibit **C-5**) and the 2004 Sale Agreement (Exhibit **C-23**) present all values in US currency. I therefore assume that values in the Letter of Intent are also in U.S. currency.

[104] The intention was for a 152 hectare quarry, although the lease was for 350 acres (or about 142 hectares). Claimants' Memorial (Jurisdiction and Liability Phase), 25 July 2011, ¶ 45; **C-19**, Aggregate Lease Agreement, 3 April 2002, p. 1.

[105] **C-5**, Letter of Intent from Bilcon to Nova Stone Exporters Inc., ¶ 4.

c. [redacted]

d. [redacted]

72. All of the above contributions from NSE and BNS were made to GQP. At the end of the process, BNS would own a [redacted] stake in a business that held the assets contributed by both parties. Assuming that NSE was successful in permitting the project, BNS would have owned a [redacted] stake in the lease and permits for the GQP quarry, which also made investments in equipment and startup activities along with the cash contributed.

73. With these terms, it is possible to estimate the implied valuation of the quarry based on the amount of BNS' consideration. For [redacted] in cash contributed to GQP, BNS would own a [redacted] stake in the cash or investments made with the cash. Therefore, the effective cost to BNS of the [redacted] contribution was [redacted] × [redacted]

74. BNS also granted NSE the right to the first [redacted] in cash flow from operations of the quarry, after which all profits would be [redacted] Absent BNS' agreeing to this term, the first [redacted] in cash distributed from GQP would have been split equally between the partners, with [redacted] going to each. Therefore, BNS' agreement to this provision was the equivalent to foregoing the right to its first [redacted] in cash flows from operations.

75. Thus, BNS would pay a total of [redacted] to acquire a [redacted] stake in a fully permitted Whites Point quarry with expected annual production of 2 million tons and in which some of the construction costs have previously been funded with cash contributed by BNS. A [redacted] stake in the fully permitted quarry before any construction costs would therefore have cost BNS less than [redacted], implying a value for the full quarry of less than [redacted]

---

[106] **C-5**, Letter of Intent from Bilcon to Nova Stone Exporters Inc., ¶ 5. This was implemented by giving NSE a [redacted] interest in the first [redacted]

[107] This is equal to [redacted] plus [redacted], although the present value of these contributions would be less than [redacted]

[redacted] The value implied by this transaction was therefore less than half of the [redacted] value implied by NSE's original offer described above.

76. The terms of BNS' entry into GQP recognized permitting risk. BNS sought to protect itself against this risk by limiting the amount it had to inject into GQP to [redacted] prior to the receipt of permits, as noted above. If permits were not received by the end of 2002, BNS had the right to dissolve the partnership or elect to participate in a different NSE quarry project in Nova Scotia.[108]

C. BNS' Purchase of NSE's Stake in the Project in 2004 Without a Permit

77. The next indication of value for Whites Point comes from BNS' purchase of NSE's interest in GQP on 1 April 2004.[109] According to the terms of the dissolution, NSE agreed to sell its [redacted] interest in GQP in return for the sum of:

a. [redacted]

[redacted]

[redacted]

[redacted]

---

[108] **C-5**, Letter of Intent from Bilcon to Nova Stone Exporters Inc., ¶ 6.

[109] **C-23**, Agreement between Bilcon of Nova Scotia Corporation and Nova Stone Exporters, Inc.

[110] The financial statements of GQP from 1 April 2004 indicate a capital balance of [redacted] for BNS. **R-719**, Financial Statements of Global Quarry Products, 1 April 2004, p. 5. Given this differential, it appears that [redacted]

[111] See **C-23**, Agreement Between Bilcon of Nova Scotia Corporation and Nova Stone Exporters, Inc., ¶ 4(d). I have seen no confirmation of this payment.

78. In total, these four components of compensation amounted to an estimated [redacted] or less.[112] Given this compensation for a [redacted] stake, the implied value for Whites Point on this date was approximately [redacted] or less.[113]

79. By 2004, both NSE and BNS had two years of experience with Whites Point and would likely have had some understanding of the Project's potential value and potential regulatory obstacles to commercializing the site. While this indication of Whites Point's value is notably lower than those before or after, I have not seen anything in the record to suggest that Nova Stone was compelled to sell its stake to BNS at a below-market price. In the absence of evidence to the contrary, it remains a relevant indicator of the value of the Project subject to the JRP process. The fact that this valuation is significantly lower than what BNS originally agreed to pay for its [redacted] stake in 2002 (as discussed in the prior section) suggests that the quarry had a low value if permitted and/or that the permitting risk was perceived to be high.

D. [redacted] OFFER TO PURCHASE THE PROJECT [redacted]

80. [redacted] the Claimants received an offer to purchase Whites Point from [redacted] The offer was described in a [redacted] letter from [redacted] to Mr. William Clayton.[114] The letter was sent at the request of Mr. Clayton, who asked [redacted] to memorialize a meeting in [redacted] stated that [redacted] expressed interest in purchasing Whites Point at the meeting. The letter states that [redacted] The offer was [redacted] I am aware of no other documents that memorialize the offer referenced in this letter.

---

[112] The four components of compensation for NSE's [redacted] interest in GQP sum to [redacted]. This is equivalent to [redacted] based on Bloomberg's exchange rate of 1.3722 from the end of April 2004. See Appendix C, Table C.7.

[113] [redacted]

[114] **R-590**, Letter from [redacted] to William Clayton, [redacted] While not explicitly stated, the figures in this letter are assumed to be in U.S. dollars.

81. The offer provides information about [redacted]

82. I also note that there is reason to believe that [redacted] As noted by Mr. Wick, an expert on behalf of the Claimants, [redacted] was recognized in the expert report prepared on behalf of the Government of Canada by S-C Market Analytics (the "SCMA Report"), a firm with expertise in market analysis for aggregates and concrete. The SCMA Report explains that [redacted]

---

115 **RE-8**, Expert Report of SC Market Analytics, 9 June 2017, ¶¶ 16 and 29; First Expert Report of John T. Boyd Company (Michael F. Wick), 5 December 2016, Section 7.1.

116 **R-590**, Letter from [redacted]. to William Clayton, [redacted]

117 First Expert Report of John T. Boyd Company (Michael F. Wick), Section 7.1.

118 **RE-8**, Expert Report of SC Market Analytics, ¶ 40.

[redacted]

V. The Claimants' Estimate of Damages Is Unreliable

83. Mr. Rosen calculates lost profits of US$298 million. His calculation is premised on the assumption that, but for the breach, Whites Point would have been a fully permitted quarry and started operations in 2011. Mr. Rosen translates this lost profit estimate into total damages of US$443.4 million with adjustments for pre-award interest and a tax gross-up, which I discuss separately in Section VIII. I have been asked to evaluate the reasonableness of this claim. In doing so, I have been instructed to assume that:

    a. The damages should make the Claimants whole for the effects of the breach as of 22 October 2007, the date when the JRP completed its report.

    b. Absent the breach, there remained uncertainty as to whether Whites Point would be able to obtain the permits and approvals necessary to build and operate the quarry.

    c. The Claimants had a legal right to pursue a judicial review of the JRP process, which would have allowed them to challenge the JRP report findings.

    d. The operational characterizations of Whites Point made by the Claimants during the project planning and environmental assessment stages were an accurate representation of their expectations at the time.

84. I find Mr. Rosen's conclusions about the value of Whites Point to be unreliable for reasons discussed below.

A. Mr. Rosen's Lost Profits Calculation

85. Mr. Rosen's lost profits estimate of US$298.2 million is comprised of two components: "Future Lost Profits" and "Past Lost Profits." Future Lost Profits were estimated to be US$271.2 million based on a DCF analysis of cash flows from 2017 to 2060, when the facility would be decommissioned.[119] The future cash flows are all discounted to 31 December 2016. Mr. Rosen's Future Lost Profits calculation is equivalent to a valuation of the "but-for" quarry as of 31 December 2016 using Mr. Rosen's regulatory, financial, and operational assumptions.

[119] Rosen Report, Figure 2.1 and ¶¶ 5.5, 5.6, and **C-1095**, FTI Native DCF Model.

86. Past Lost Profits were estimated to be US$27.0 million from 2008 through 2016. The past lost profits reflect assumed construction and permitting from 2008 to 2010, followed by operations from 2011 to 2016.[120]

B. KEY INPUTS TO MR. ROSEN'S DCF ARE UNCERTAIN AND UNTESTED SINCE WHITES POINT LACKED AN OPERATING HISTORY AND PRE-FEASIBILITY ANALYSIS

87. The fundamental source of value for an asset is its ability to generate cash flows. DCF analysis values an asset based on its expected ability to generate future cash flows. The DCF method starts with a forecast of expected cash flows based on assumptions about future output, prices, costs, capital expenditures, and general macroeconomic conditions. The cash flows are then discounted to determine their net present value using a discount rate that compensates for the time value of money and risks from the perspective of a well-diversified investor.

88. DCF analysis is commonly used, but its results can be highly sensitive to the input assumptions. In such cases, the outcome of a DCF analysis is only as reliable as the underlying assumptions.

89. At the date of the breach, the Project was still in the early stage of development. Mr. Cullen, a geologist who prepared an expert report on behalf of the Claimants, states that he was asked in 2015 to prepare an analysis of the Whites Point basalt resources in accordance with the CIM Definition Standards for Mineral Resources and Mineral Reserves (the "CIM Standards").[121] Mr. Cullen notes, however, that the Whites Point site has never been subjected to the type of feasibility or pre-feasibility studies necessary to determine whether the resources identified at the site were economically viable and could therefore be categorized as reserves.[122] This includes the further analysis conducted during 2015 and 2016 by Mr. Cullen himself.

90. In addition to lacking a feasibility or pre-feasibility study, Whites Point lacks an operating history, which can often be useful for calibrating key DCF assumptions. In the absence of feasibility and pre-feasibility studies and actual performance data, it may be possible to use contemporaneous forecasts of prices, output, operating costs, and construction costs

---

120 Rosen Report, Figure 5.9, and **C-1095**, FTI Native DCF Model.

121 First Expert Report of Mercator Geological Services (Michael Cullen), § 1.0.

122 First Expert Report of Mercator Geological Services (Michael Cullen), § 14.1.

developed to assess the economic viability of the Project. However, the Claimants have been unable to provide any such forecasts other than a one-year *pro forma* income calculation for 2006 prepared in April 2004, more than three years before the breach date.[123] Therefore, many of the key inputs to Mr. Rosen's DCF analysis of Whites Point remain uncertain, untested, and unsupported by contemporaneous documents and analysis.

91. As discussed further below, Whites Point faced permitting risk even absent the breach, which could have prevented the Project from ever reaching commercial operations.

C. MR. ROSEN'S LOST PROFITS FAR EXCEED CONTEMPORANEOUS EVIDENCE OF WHITES POINT'S VALUE AND THE CLAIMANTS' REQUESTED RELIEF

92. Mr. Rosen applied a DCF analysis to calculate the lost profits of Whites Point at US$298 million before pre-award interest or gross-up for taxes.[124] As noted above, a DCF analysis is only as accurate as the forecasts and inputs it relies on. Given the lack of feasibility studies, pre-feasibility studies, or contemporaneous forecasts to evaluate Mr. Rosen's assumptions, it is useful to assess this valuation in the context of the market indications of the value of Whites Point discussed above as well as the Claimants' own original request for relief in this arbitration.[125]

93. As explained in Section IV above, the market indications of value were comprised of offers to transact a stake in Whites Point as well as the actual transactions of stakes in the Project. Although these indicators vary with respect to timing and the state of permitting, they can still provide insight into the value of the Project. Figure 1 compares Mr. Rosen's valuation to these market indications of value.[126] Mr. Rosen's valuation is between 7 and 150 times higher than these market indications of value. The most contemporaneous market

---

123 **R-717**, Business Plan for Whites Point Quarry, Prepared by Clayton Concrete, April 2004. The EIS did include some estimates of capital costs, but the Claimants themselves did not deem these to be sufficiently reliable to be relied upon in this proceeding.

124 Rosen Report, ¶ 6.9.

125 It is often useful to evaluate market evidence for insights into the valuation, such as comparable transactions or comparable firms. Identifying comparables can be a challenge due to differences in quarry location, rock type, stage of development, and other site-specific factors. I reviewed transaction data available through S&P Capital IQ and Bloomberg and have been unable to identify any reasonable comparables aside from these market indicators for Whites Point itself.

126 [redacted]

indicator, the [redacted] offer made [redacted] before the breach, was [redacted].[127]

Figure 1: Market Indicators of Whites Point Value vs. Rosen

Sources: Appendix F, Table F.3.

94. The market indicators presented above are separated in time from Mr. Rosen's valuation date, and the values may not be comparable due to shifts in market conditions over time. I control for this difference using an indexation approach based on the total equity returns (from both dividends and changes in share prices) of publicly traded aggregates producers. The index is based on the two large publicly traded companies that focus on aggregates production in North America: Martin Marietta and Vulcan Materials.[128] The method assumes that the value implied by the market indicators would have increased or decreased in tandem with the equity returns of Martin Marietta and Vulcan Materials. The index is

[127] As was noted in Section IV.A, an offer does not necessarily reflect fair market value.

[128] Mr. Rosen's sample of comparable companies includes other producers, but these other companies have less of an aggregates focus. Also, I use a market-value weighted index, which is how many stock market indices are calculated, but the use of a simple average would lead to the same conclusions.

used to move the market indicators forward in time to Mr. Rosen's 31 December 2016 valuation date. The original and indexed market indicators are presented in Figure 2.

Figure 2: Market Indicators of Whites Point Adjusted to Rosen Valuation Date

Source: Appendix F, Table F.3.

95. Even with the adjustment, Mr. Rosen's valuation is between [redacted] (US$298 million/[redacted] and [redacted] (US$298 million/[redacted]) times higher than the market indications. For example, the BNS purchase of NSE's stake in GQP implied that Whites Point had a total value of [redacted] in 2004.[129] If they had instead [redacted][130] Mr. Rosen's valuation, however, implies that BNS' stake in Whites Point would have increased in value to US$298 million, a return of [redacted].[131] Even the highest of the market indicators, the [redacted] offer, would have increased to only [redacted] by December 2016, and this

[129] See Section IV.C.

[130] See Appendix F, Table F.3.

[131] See Appendix F, Table F.3.

offer was [redacted] Thus, Mr. Rosen's valuation of Whites Point is far higher than the market indications of value for the Project, including those indications that were[redacted].

96. It is instructive to compare Mr. Rosen's valuation to the relief the Claimants requested in their Statement of Claim. On 30 January 2009, the Statement of Claim sought "[d]amages of not less than US$101 million" before pre-award interest and gross-up.[132] This amount was reiterated in their Amended Statement of Claim.[133] Mr. Rosen's US$298 million valuation is approximately three times the previously claimed damages amount.[134]

97. Further, in my experience, figures quoted in statements of claim are sometimes used more in an attempt to anchor damages than to accurately reflect loss. The commercial assessments done by the Claimants prior to the breach would therefore be a useful tool to understand the Claimants' request for relief and assess why Mr. Rosen's estimate of lost profits is so much higher. In the course of developing Whites Point, the Claimants stated that they conducted assessments of the Project's profitability. According to William Richard Clayton:

> [redacted] We could afford it, and we were convinced that it was a profitable opportunity.[135]

98. I asked counsel for the Respondent to request documents from the Claimants that contained any assessments of the value and potential profitability of the Project.[136] I

---

132 Statement of Claim, *William Ralph Clayton, William Richard Clayton, Douglas Clayton, Daniel Clayton and Bilcon of Delaware, Inc. v. Government of Canada*, 30 January 2009, ¶ 42. I note that this claimed damage was lower than the damage that the Claimants initially put into their 26 May 2008 Notice of Arbitration, which claimed a loss of US$188 million before pre-award interest and tax gross-up. Notice of Arbitration, ¶ 40. I do not know the rationale underlying the Claimants' decision to reduce this amount.

133 Amended Statement of Claim, *William Ralph Clayton, William Richard Clayton, Douglas Clayton, Daniel Clayton and Bilcon of Delaware, Inc. v. Government of Canada*, 3 December 2009, ¶ 42.

134 Rosen Report, ¶ 6.9.

135 Witness Statement of William Richard Clayton, 15 December 2016, ¶ 28.

136 **R-720**, Document Production Requests of the Government of Canada, 10 February 2016. See, *e.g.*, Document Request No. 5: "All documents relating to the Claimants' business plans for the Whites Point project, including but not limited to: a. Internal plans or financial models for purposes of investment analysis/ approval/authorization, and all supporting documentation, data, and schedules."

Continued on next page

reviewed the materials provided in response and found that the Claimants did not provide any such documents apart from the 2004 Business Plan, which was prepared more than three years before the breach date.

99. The 2004 Business Plan describes a project with significantly lower profitability than Mr. Rosen's model. The plan includes a *pro-forma* income statement for 2006 that projected Earnings Before Interest, Taxes, and Depreciation and Amortization ("EBITDA") of [redacted].[137] Mr. Rosen's DCF calculated EBITDA that was substantially higher [redacted]) during the first 3 years when Whites Point would be producing [redacted][138]

100. The inconsistency between Mr. Rosen's valuation and other contemporaneous evidence suggests that Mr. Rosen's estimate of lost profits is significantly overstated. As I discuss in the following sections, I find that Mr. Rosen's DCF overstates the losses for a variety of reasons, which generally fall into two categories. First, Mr. Rosen's approach does not value the loss as of the breach date. Second, Mr. Rosen's analysis relies upon a variety of assumptions that are inconsistent with stated expectations for the Project or economically unreasonable.

D. MR. ROSEN DOES NOT VALUE THE LOSS AT THE BREACH DATE

101. I have been instructed that the appropriate legal standard for damages in this case is to compensate for the economic loss as of the date of the breach. To comply with this legal standard, a damages methodology must provide compensation for the loss in the value of the Project resulting from the breach *as of the date of the breach*. Mr. Rosen's methodology fails to meet this standard in three ways: (1) Mr. Rosen does not account for the Claimants' opportunity to mitigate the effects of the breach; (2) Mr. Rosen does not

---

Continued from previous page

Document Request No. 32: "All documents relating to the value of the Whites Point project including but not limited to: a. Independent valuations.…"

[137] EBITDA is a standard profitability measure, and a proxy for cash flows from operations. It is calculated as [redacted] less total expenses of [redacted] plus interest expense of [redacted] which equals [redacted] This is converted to US dollars at the plan's exchange rate of [redacted] **R-719**, Business Plan for Whites Point Quarry, Prepared by Clayton Concrete, April 2004.

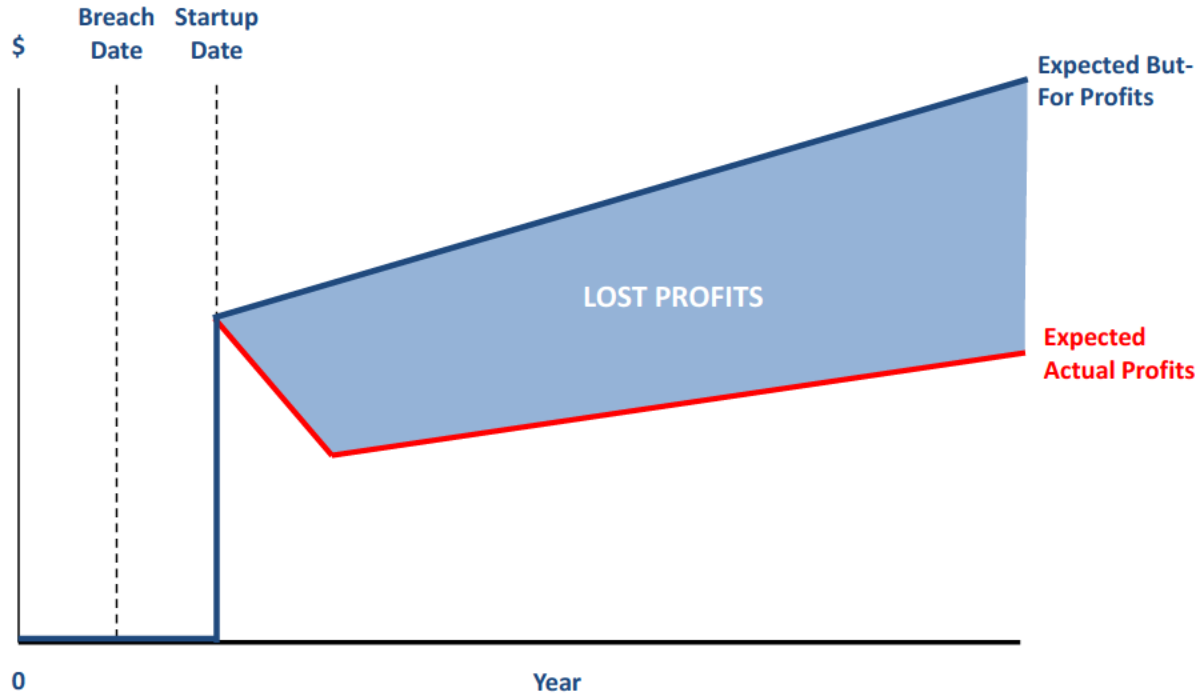
[138] Rosen Report, Schedule 1. EBITDA is equal to Cash Flows Before Income Taxes plus Interest Expense.

measure the value of the Project's lost profits as of the breach date; and (3) Mr. Rosen does not account for permitting risk faced by Whites Point.

1. Mr. Rosen Does Not Consider Mitigation Opportunities

102. Figure 3 illustrates the basic lost profits methodology. The figure shows the profits that a hypothetical asset would have been expected to generate absent the bad act (the expected "but-for" profits) and the profits with the bad act (the expected "actual" profits). The difference between these two profit streams reflects the lost profits resulting from the bad act.[139]

Figure 3: The Lost Profits Methodology



103. Mr. Rosen's analysis derives a projection of Whites Point's but-for profits. He makes no similar projection of actual world profits—the lost profits estimated by Mr. Rosen simply equal his projection of but-for profits. Implicit in this approach is that the breach caused the actual world profits of Whites Point to be zero, as illustrated in Figure 4.

[139] Prior to the start of commercial operations, BNS would have experienced negative cash flows to pay for construction costs. To illustrate the lost profits concept as it applies here, I simplify the illustration by ignoring upfront construction costs.

Figure 4: Mr. Rosen's Expropriation-Style Damages

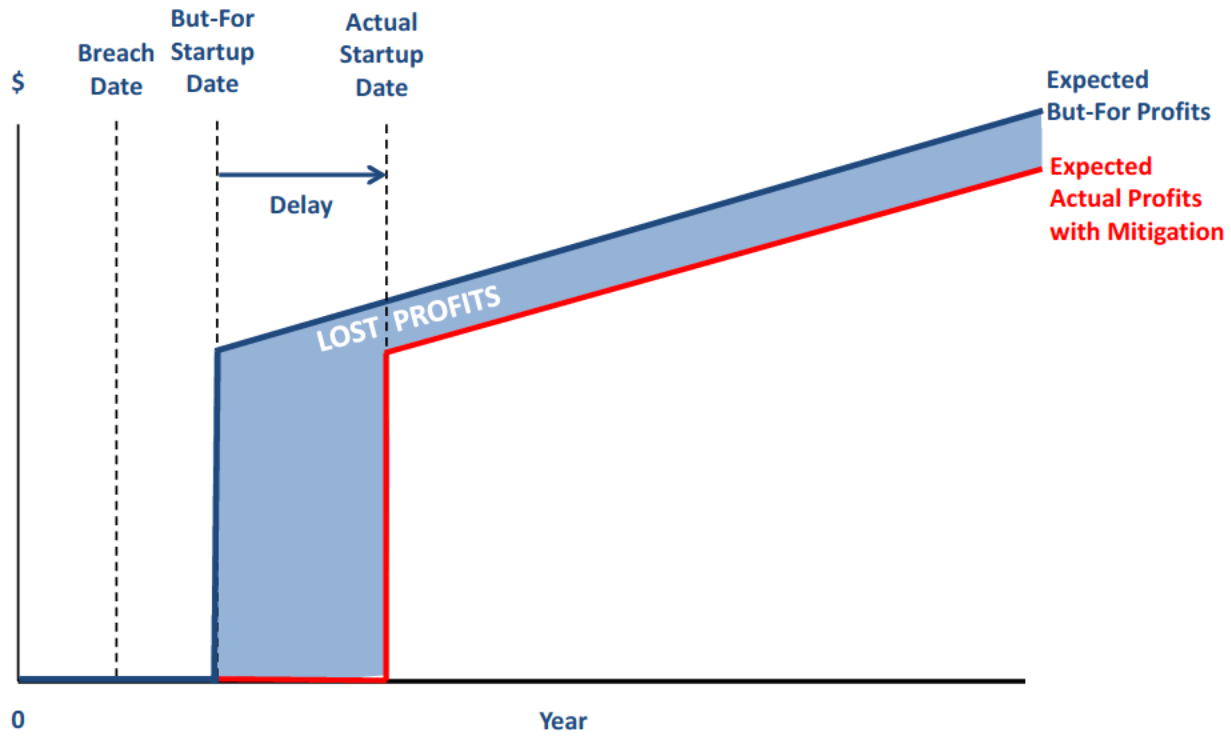
104. In effect, Mr. Rosen has calculated damages as if the Government of Canada expropriated the Project when the JRP report was issued. I understand that the Claimants did not bring an expropriation claim. Mr. Rosen's expropriation-style damages calculation can be economically reasonable only if the impact of the breach could not be mitigated, causing the value of the Project to be zero. However, I understand that the Claimants had the ability to appeal the JRP decision through a judicial review.[140] If the Claimants could have resolved the breach through a judicial review, the full profits from the Project would not have been lost, as Mr. Rosen assumes, but rather delayed. The impact of a deferral on the Claimants' loss is illustrated in Figure 5.[141] If the Claimants had the ability to pursue this avenue and resolve the breach, Mr. Rosen's expropriation-style damages approach will overstate the loss because it fails to consider mitigation. I discuss mitigation further in Section VII.

---

[140] **RE-6**, Expert Report of the Honourable John M. Evans, ¶¶ 90-91.

[141] While not explicitly depicted in the illustration, the Claimants would likely have incurred some procedural costs that would be added into damages.

Figure 5: Lost Profits Adjusted to Account for Mitigation



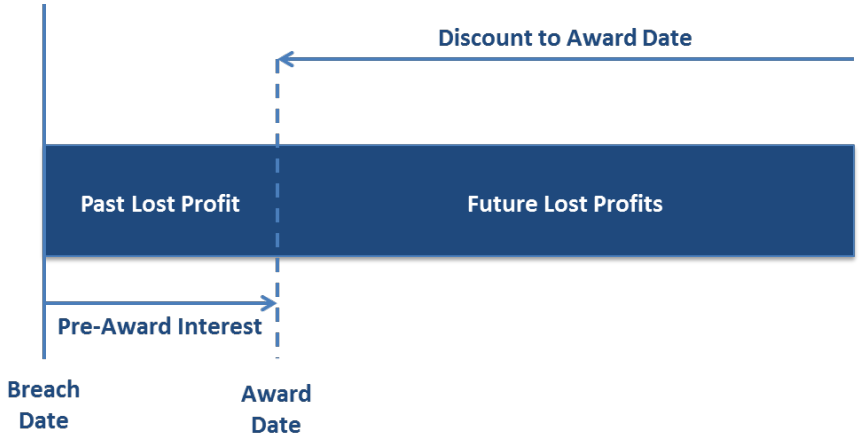
2. Mr. Rosen Does Not Value Lost Profits as of the Breach Date

105. Where a DCF can be used to reliably measure lost profits, I have been instructed that the relevant measure of loss would be the value of lost profits as of the breach date. This value is determined by discounting the stream of lost profits to the breach date. Where pre-award interest is legally appropriate, the loss in value as of the breach date should then be adjusted to account for pre-award interest from the breach date to the award date. I illustrate this approach in Figure 6.

Figure 6: Valuing the Losses as of the Breach Date

106. Mr. Rosen's analysis does not reflect the loss as of the breach date. His approach is shown in Figure 7. Mr. Rosen's estimate of "Past Lost Profits" from 2008 to 2016 is not discounted at all—it is only brought forward to December 2016 with pre-award interest.[142] The "Future Lost Profits" from 2017 and beyond were discounted to determine their value as of December 2016, not the breach date.

Figure 7: Rosen Methodology for Valuing the Claimants' Loss



107. Mr. Rosen's alternative approach to discounting has a substantial impact on the results of his analysis. I illustrate the impact of Mr. Rosen's decision not to evaluate the loss as of the breach date in Table 3. Changing only a single aspect of Mr. Rosen's analysis—moving the valuation date from his report date to the breach date—causes the resulting estimate of lost profits to decline from US$298 million to US$170 million. Had Mr. Rosen valued the loss as of the breach date and then applied his pre-award interest calculation, the resulting estimate of damages would therefore have been significantly lower.[143] This illustration demonstrates that Mr. Rosen's analysis calculates lost profits that are far beyond the loss as of the breach date.

---

[142] Mr. Rosen's approach to calculating pre-award contains an important methodological flaw, which I discuss later. Mr. Rosen has only included pre-award interest through the end of 2016.

[143] This figure cannot be stated with certainty because Mr. Rosen would likely have used a different discount rate on this earlier date.

Table 3: Illustration of Discounting of Mr. Rosen's Lost Profits to Breach Date

	Total ($US)
Rosen Lost Profits	$298,166,905
Discounted to Breach Date	$170,222,014
Difference	$127,944,892
% Reduction	43%

Source & Notes: Appendix F, Table F.7. Mr. Rosen's calculation is modified by changing the valuation date from 31 December 2016 to the breach date of 22 October 2007. No other modifications are made in this illustrative example.

108. The illustration above does not reflect my view of BNS' lost profits for reasons that I discuss later.

3. Mr. Rosen Assumes with Certainty that Whites Point Would Have Received Its Permits

109. Immediately prior to the breach, Whites Point was an unpermitted quarry project. Its ability to generate profits was dependent entirely on obtaining permits. Permitting risk is therefore a substantial consideration in assessing lost profits. The impact of permitting on profits was explicitly recognized in the [redacted]).[144]

110. Mr. Rosen states that he has "been instructed that absent the Respondent's unlawful breaches of the Treaty, the Investors would have constructed and operated the Whites Point project."[145] Consistent with this instruction, Mr. Rosen did not account for any permitting risk when estimating damages.

111. If Whites Point faced permitting risk even absent the breach, Mr. Rosen's analysis will overstate lost profits. I am instructed that the JRP may have recommended against the Project for reasons other than those that the Tribunal determined to breach NAFTA.[146] I am also instructed that a favorable JRP report would not guarantee permitting[147] and that the Tribunal did not find that a decision by the Governments to withhold permits for the

---

144 See Section IV.D.

145 Rosen Report, ¶ 4.3.

146 **RE-1**, Expert Report of Lesley Griffiths, ¶¶ 16, 62 (e), pp. 44-45 (Conclusion Text), 63 (Conclusion Text), ¶ 154; **RE-2**, Expert Report of Tony Blouin, ¶¶ 12, 120.

147 **RE-3**, Expert Report of Robert G. Connelly, ¶ 74; **RE-4**, Report of Peter Geddes, ¶¶ 17, 24.

Project would have been a breach NAFTA. If either of these instructions is correct, Mr. Rosen's assumption that Whites Point would be permitted with certainty causes him to overstate damages.

E. MR. ROSEN'S CALCULATIONS ARE PREMISED ON UNRELIABLE ASSUMPTIONS

112. As noted in Section V.B, given the lack of operating history, the early stage of development, and the lack of contemporaneous forecasts, Mr. Rosen's calculation adopts key assumptions from the reports of fact witnesses and expert witnesses submitted by the Claimants. These assumptions include: project start date, capital expenditures, aggregates sales prices and volumes, quarry operating and maintenance costs, freight costs, and reclamation and decommissioning costs.[148] In addition, Mr. Rosen's DCF analysis contains a number of other explicit or implicit assumptions shown in the table below.

Table 4: Assumptions Made Mr. Rosen

Topic	Assumption
Permitting Risk	Mr. Rosen assumes that Whites Point would have been permitted with certainty but for the breach.
Valuation Date	Mr. Rosen assumes that damages should be based on the value of Whites Point as of the end of 2016, not as of the breach date.
Discount Rate	Mr. Rosen assumes a discount rate based on conditions as of 15 November 2016 rather than the breach date.
Exchange Rate	Mr. Rosen assumes an exchange rate that reflects conditions as of 15 November 2016 rather than the breach date.
Prices and Costs	Mr. Rosen assumes that prices and costs beyond 2016 will increase with inflation.
Competition	Mr. Rosen implicitly assumes that the addition of new supplies would not have any impact on the expected stone prices.

Source: Rosen Report, ¶¶ 2.1, 5.20, 5.28, 5.31, 5.52, and Schedule 13.

113. Concerns with Mr. Rosen's assumptions about permitting risk and the valuation date were discussed in Section V.D above. I now assess the reliability of the other assumptions driving Mr. Rosen's DCF results, including those he adopted from others.

[148] Rosen Report, ¶¶ 5.4, 5.8, 9.1.

1. Many Assumptions Adopted by Mr. Rosen from Other Witnesses Are Inconsistent with the Whites Point EIS or Earlier Planning Documents

114. The assumptions that Mr. Rosen adopts from other experts are inconsistent with BNS statements during the JRP process or earlier planning documents.

115. *Project Life.* During the JRP process, BNS characterized the Project as having a 50-year life, which included the time for construction, operations, and decommissioning.[149] Mr. Rosen's DCF analysis uses a 54-year project life comprised of construction (2008 to 2010), operations (2011 to 2060), and decommissioning in 2061.[150]

116. *Resources.* [redacted].[151] Mineral resources are defined by CIM as a concentration of material of economic interest with reasonable prospects of eventual economic extraction.[152] [redacted]

117. *Annual Production.* BNS stated that the annual production would remain flat at approximately 2.0 million tons-per-year during the JRP process.[155] In contrast, Mr. Rosen adopts the assumption that production volumes would [redacted] and extending beyond the 50-year project life assumed in the EIS (discussed above).[156] Figure 8 compares production volumes that BNS described in the EIS to those assumed by Mr. Rosen. Total aggregates sales reflected in Mr. Rosen's analysis

---

149 See Section II.C and **R-581**, Revised Project Description, p. 52.

150 Rosen Report, ¶¶ 5.4-5.6.

151 Case Number 4 in First Expert Report of Mercator Geological Services (Michael Cullen), Table 14.7.

152 **R-721**, CIM Definition Standards – For Mineral Resources and Mineral Reserves, Prepared by the CIM Standing Committee on Reserve Definitions, 27 November 2010, p. 4.

153 First Expert Report of Mercator Geological Services (Michael Cullen), 17 November 2016, § 12.1.

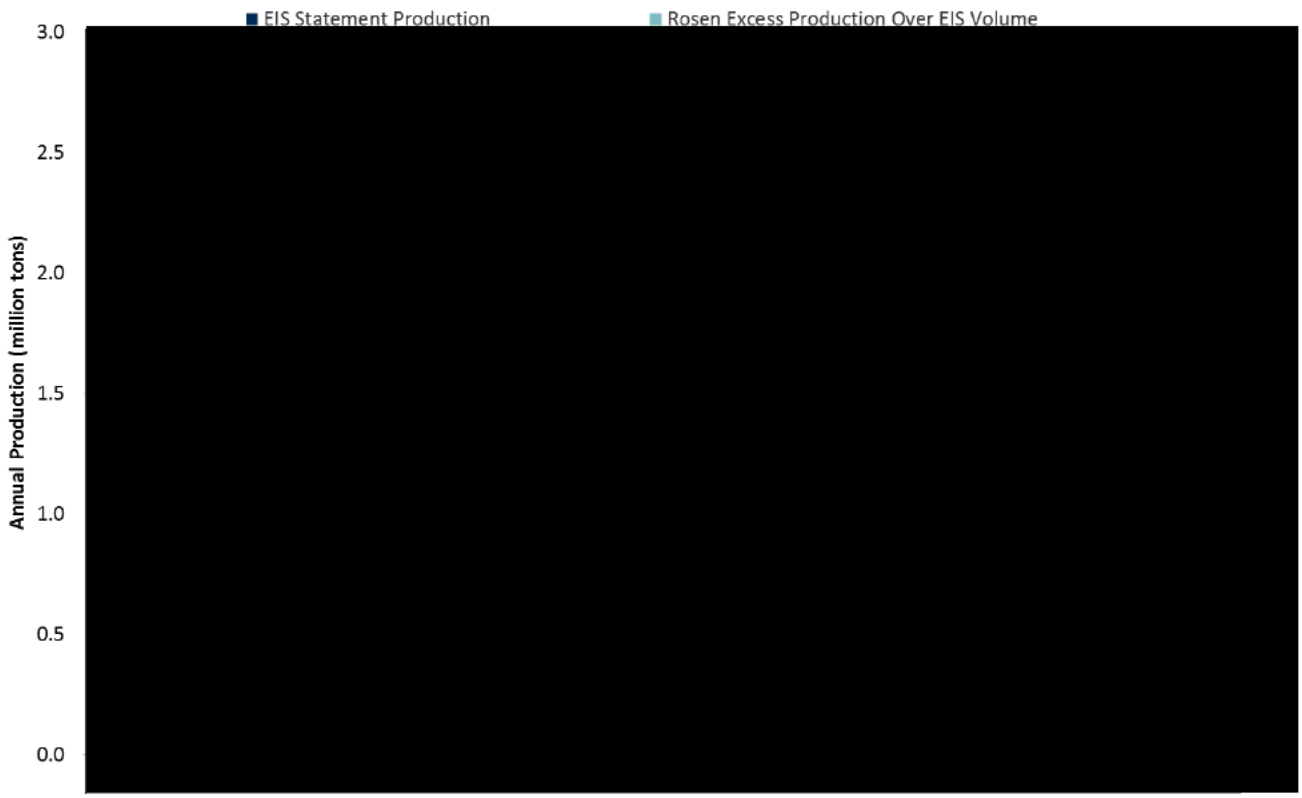
154 First Expert Report of Michael Cullen, ¶ 14.16; **R-581**, Revised Project Description, p. 96. Implied reserves equal 50 years x 2 million tons/year.

155 See Section II.C.

156 Rosen Report, ¶ 5.8.

amounts to about [redacted] of the Project's total deposit size of roughly 100 million tons suggested in the JRP process.

Figure 8: Assumed Annual Whites Point Production—Rosen vs. EIS



Source: Appendix F, Table F.8.

118. Importantly, Mr. Rosen assumes that the volumes used in his report would have been produced with certainty. However, there is uncertainty associated with the volume of economically viable reserves on the site. In fact, Mr. Cullen states that to his knowledge, there have been no feasibility studies or even pre-feasibility studies conducted to demonstrate that the resources he has identified would have been economically viable.[158] Mr. Rosen's analysis nonetheless assumes this to be the case.

119. *Markets Served.* The EIS stated that BNS planned to ship aggregates quarried at Whites Point to the Clayton Concrete Block and Sand facilities in New Jersey, most of which were

---

[157] Rosen Report, Schedule 1. This figure reflects the sum of annual production volumes from 2011 to 2060.

[158] First Expert Report of Mercator Geological Services (Michael Cullen), § 14.1.

located in southern New Jersey.[159] Mr. Rosen's DCF analysis relies on price, market conditions, and delivery location assumptions adopted from the Witness Statement of Mr. Tom Dooley.[160] In contrast to statements in the EIS, Mr. Dooley states that Whites Point aggregates (including screenings) would have been delivered primarily to [redacted] facilities in New York City, with a small amount of grits being delivered [redacted] in northern New Jersey.[161] The delivery location matters because, as BNS noted during the EIS process, stone prices may be very different in these two markets.[162] The relative prices for aggregates in New York and New Jersey are analyzed in the SCMA Report, which found that New York prices were slightly higher than New Jersey prices in 2007, but that the premium in New York increased materially thereafter.[163]

120. In addition to being inconsistent with the EIS, I see no evidence that [redacted] sales would have been able to support the sales volumes Mr. Rosen adopted from Mr. Dooley. The Claimants have not provided any contemporaneous forecasts that would support Mr. Dooley's assumed volumes. [redacted][164] When asked for evidence that [redacted] the Claimants were able to provide no evidence.[165] In fact, [redacted].[166]

---

159 See Section II.C and **R-581**, Revised Project Description, pp. 6–7 and 15–16.

160 Rosen Report, ¶ 5.20.

161 **C-1002**, Revenue Matrix Summary, 2011-2015, 9 December 2016.

162 **C-445**, Bilcon's Response to Undertaking #12. The Claimants note a higher price per ton for New York City stone, compared to New Jersey.

163 **RE-8**, Expert Report of SC Market Analytics, ¶¶ 2 and 87.

164 In 2012, Mr. Rosen assumes [redacted] (Rosen Report, ¶ 5.11, based on **C-1002**, Revenue Matrix Summary, 2011-2015). In contrast, [redacted] (**C-1026**, [redacted] Confidential Information Memorandum, January 2014, p. 17).

165 **R-720**, Document Production Requests of the Government of Canada, 10 February 2016. See Document Request Number 21: "All documents relating to the Claimants' inability or difficulties in acquiring aggregates from alternative sources, or the expected inability to do so in the future.…"

166 [redacted] (**C-1025**, [redacted], p. 6). However, it is clear that [redacted] (*e.g.*, [redacted]

Continued on next page

121. *Shipping Costs.* [redacted] The result of this assumption is a material understatement of the freight costs used in Mr. Rosen's analysis, as discussed in the Expert Report of Dr. Arlie Sterling of Marsoft prepared on behalf of the Government of Canada.[170]

122. *Labor Costs.* Mr. Rosen's labor costs were based on an analysis prepared for the purposes of this arbitration.[171] The assumptions underlying the labor cost relied upon by Mr. Rosen are inconsistent with BNS plans reflected in the EIS and planning documents. Rather than assuming the 44 week production period reflected in the EIS, Mr. Rosen's labor costs reflect only [redacted].[173]

2. Mr. Rosen's Discount Rate Is Estimated Incorrectly

123. Mr. Rosen has prepared his DCF analysis of post-2016 cash flows in real-dollar terms (*i.e.*, net of expected inflation).[174] Cash flows in real dollars must be discounted using a discount rate that is also net of inflation. Mr. Rosen's real discount rate is calculated incorrectly because his analysis contains many methodological flaws.

Continued from previous page

[redacted] (**C-1026**, [redacted] Confidential Information Memorandum, January 2014, p. 17).

167 **R-575**, EIS – Volume I, p. 4.

168 Rosen Report, ¶ 5.21.

169 **C-1108**, Morrison Calculation of Shipping Rates, 9 December 2016.

170 **RE-7**, Expert Report of Arlie G. Sterling, Marsoft, Inc., 9 June 2017, ¶¶ 47-49 and Figure 4.

171 **C-1010**, Whites Point Operating Costs, 2011-2015.

172 [redacted] **C-1342**, Letter from Gregory Nash to Tribunal, p. 9; **C-1010**, Whites Point Operating Costs, 2011-2015.

173 **R-717**, Business Plan for Whites Point Quarry, Prepared by Clayton Concrete, April 2004, p. 7; see Appendix F, Table F.9 for an illustration of these differences.

174 For example, Mr. Rosen's [redacted] Rosen Report, ¶ 5.18. See also **C-1095,** FTI Native DCF Model.

124. *Mr. Rosen uses a flawed estimate the cost of borrowing.* Mr. Rosen uses a debt cost of 6.48%, which he states is the average cost of debt across the comparable companies as of his valuation date.[175] Mr. Rosen calculated this rate by [redacted]"[176] It reflects the interest rate that the companies paid to borrow in the past. However, discount rates are forward-looking measures, while embedded interest rates are backward-looking. Mr. Rosen should have used forward-looking debt yields in his discount rate analysis. Embedded cost of debt can be notoriously unreliable, as highlighted by Mr. Rosen's own numbers, which show [redacted]

125. *Mr. Rosen uses an incorrect approach to adjust his betas for leverage.* The risk of a stock in comparison to the overall stock market, known as the stock's "beta," depends upon how much debt a company has. To control for differences in debt levels (*i.e.*, leverage) among his sample companies, Mr. Rosen uses trailing 5-year unlevered betas, which remove the effects of company-specific leverage on the betas.[178] To control for debt levels correctly, Mr. Rosen should have removed from his 5-year betas the average company-specific leverage based on the 5-year period over which betas are measured. However, Mr. Rosen derived his unlevered 5-year betas by considering only leverage that existed for his comparable companies at a single point in time—November 2016—rather than an average of the leverage over the full 5-year period.[179] Thus, Mr. Rosen's derivation of unlevered betas is incorrect.

126. *Mr. Rosen uses an incorrect formula to convert his nominal discount rate into a real discount rate.* Mr. Rosen calculates the real discount rate by subtracting his assumed

---

175 Rosen Report, ¶ A4.37.

176 **C-1095**, FTI Native DCF Model.

177 **C-1095**, FTI Native DCF Model.

178 Rosen Report, ¶ A4.21.

179 Rosen Report, Schedule 15. The November 2016 leverage should be used to re-lever Mr. Rosen's unlevered beta, but not to determine the unlevered beta itself.

inflation rate from his nominal discount rate. The proper method for deriving the real discount rate, known as the Fisher equation, is depicted in the formula below.[180]

Figure 9: Fisher Equation for Calculating the Real Discount Rate

$$Real\ Discount\ Rate\ = \frac{(1 + Nominal\ Discount\ Rate)}{(1 + Inflation\ Rate)} - 1$$

127. *Mr. Rosen uses an unreasonable inflation rate assumption to derive his real discount rate.* To calculate his real discount rate, Mr. Rosen uses a projection of inflation rates for 2017 and 2018, which reflects only expectations about near-term inflation.[181] The inflation expectation built into the discount rate, however, is a longer-term inflation rate. Mr. Rosen should therefore have used an inflation rate that reflects inflation expectations over the longer term.

3. Mr. Rosen's Prices Are Calculated Incorrectly and Ignore the Impact of Competition

128. An essential ingredient for any valuation of Whites Point is the prices at which the quarry would have sold its output. Mr. Rosen assumes [redacted].[182]

129. The source of Mr. Rosen's delivered price assumption for traditional aggregates and screenings for the period from 2011 to 2015 is Mr. Dooley, who was the Sales and Marketing Manager for NYSS.[183] Mr. Dooley's assumed prices are [redacted].[184] For grits, Mr. Rosen adopts from Mr. Forestieri a price assumption which purports to be [redacted]

---

180 See, for instance, discussion of nominal and real rates and Fisher equation in **R-722**, Richard A. Brealey, Stewart C. Myers, & Franklin Allen, *Principles of Corporate Finance* (New York, NY: McGraw-Hill/Irwin, 2011), 10th ed., p. 63.

181 Rosen Report, ¶ A4.43.

182 **C-1095,** FTI Native DCF Model. Schedule 3.

183 Rosen Report, ¶ 5.17; Witness Statement of Tom Dooley, ¶ 1; **C-1095**, FTI Native DCF Model, Schedule 3.

184 **C-1342**, Letter from Gregory Nash to Tribunal, p. 10; **C-1025**, Supply Agreement Between NYSS and Martin Marietta Materials, p. 1.

[redacted] Beyond 2015, Mr. Rosen states that no geography-specific forecasts were available, so he simply assumes aggregates and grits prices will increase with inflation.[186]

130. It was economically unreasonable for Mr. Rosen to adopt these price assumptions. These prices fail to consider the basic economic effect of competition from new supplies on market prices, including new supplies from Whites Point itself. Mr. Rosen has therefore significantly overstated prices.

a. Mr. Rosen's 2011 to 2015 Prices for Traditional Aggregates and Screenings

131. In the actual world, [redacted] Mr. Rosen adopts these assumed prices, which are overstated because of a key methodological flaw.

132. Mr. Rosen's implicit assumption that [redacted] is economically unreasonable. Mr. Rosen fails to recognize that market conditions in the but-for world would have been different. Figure 10 shows the actual imports of crushed stone[189] from Canada to the U.S. Atlantic Coast as the dark blue portion of each bar. The light blue portion of this bar reflects the increase in aggregates supplies that would have been available if Whites Point had been present in the market and making the sales that Mr. Rosen assumes it would have made. In each year from 2011 to 2015, the supply of aggregates from Canada would have [redacted] if Whites Point had been operating. These impacts are estimated conservatively because import

---

185 **C-1342**, Letter from Gregory Nash to Tribunal, p. 10; Witness Statement of Joe Forestieri, 13 December 2016, ¶ 21.

186 Rosen Report, ¶¶ 5.19-5.20.

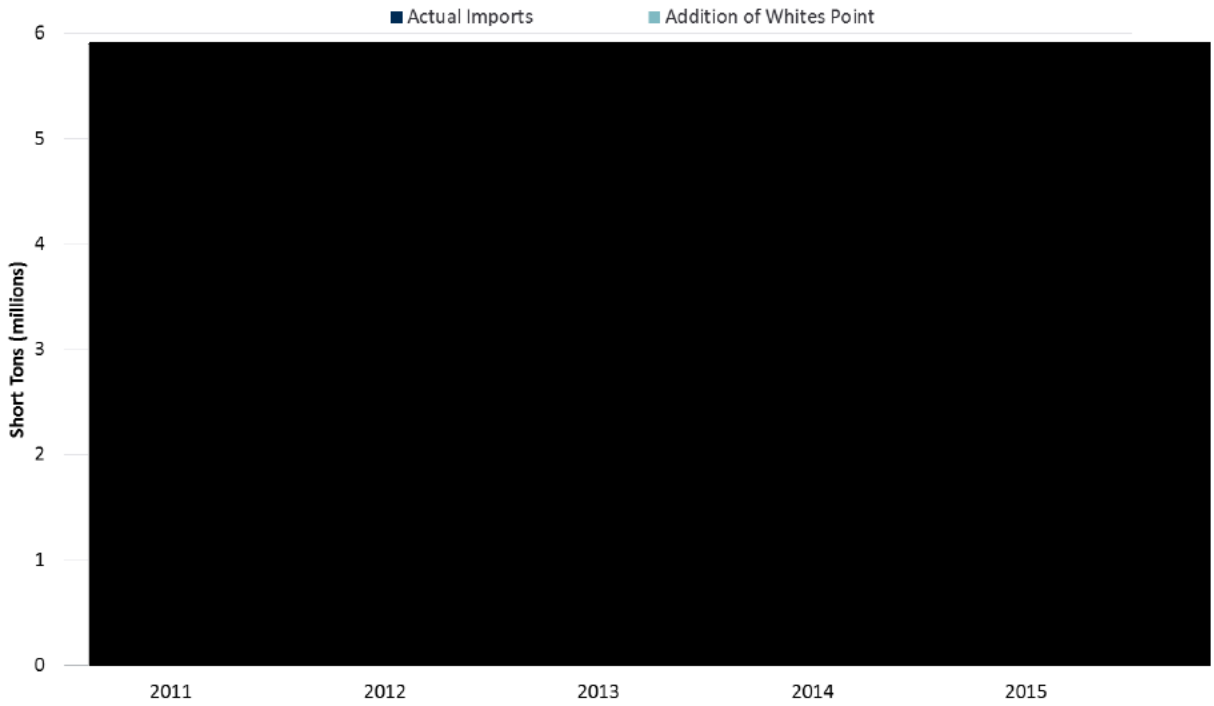
187 Witness Statement of Tom Dooley, ¶¶ 79-83.

188 Witness Statement of Tom Dooley, ¶ 97.

189 I define crushed stone here using the same six-digit harmonized tariff code cited by the Claimants. **C-1046**, Whites Point Quarry Pro Forma Statement of Operations, p. 3.

volumes include some aggregate types that are unlikely to compete with aggregates from Whites Point.[190]

Figure 10: Impact of Whites Point on U.S. Atlantic Coast Imports of Crushed Stone from Canada



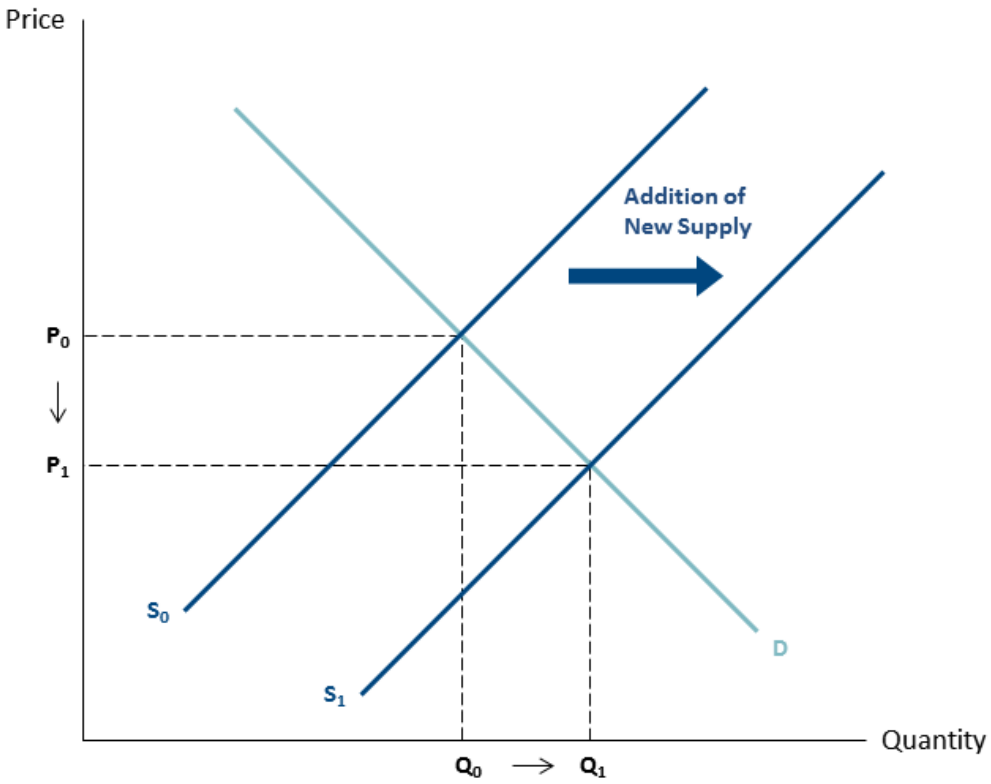
Source & Notes: Appendix F, Table F.1. Percentages report the production volume with the addition of Whites Point, as a percentage of actual imports.

133. Basic economic logic dictates that price is a function of supply and demand, with the price being set at the point where the supply curve and the demand curve meet. Figure 11 illustrates the impact of new sources of supply on prices in basic economic terms. Added supply capacity would cause an outward shift of the supply curve from S_0 to S_1. The new supplies would change the intersection of the supply and demand curve, resulting in a decrease in price from P_0 to P_1. Mr. Rosen's assumed prices do not account for the downward impact that an increase in available supplies from Canada would have on prices. Therefore, the actual world prices that Mr. Rosen assumes Whites Point would have earned between 2011 and 2015 exceed the but-for prices that would have existed if Whites Point had been operating.

---

[190] The HTS Code 25.17.10 includes different types of stone than basalt (*e.g.,* limestone, sub-category 20), as well as sizes of stone not planned to be produced by Whites Point. See "Harmonized Tariff Schedule of the United States (2017)," Section V: Mineral Products, Chapter 25, p. 4, accessed 6 June 2017, https://hts.usitc.gov/current.

Figure 11: Increase in Supply Causes Reduction in Price



134. The impact of competition on prices for aggregates is highlighted by the characterization of the industry by Claimants' own witness as [redacted][191] [redacted] However, Mr. Rosen provides no consideration to such competitive effects in developing his price forecast.

191 Witness Statement of Tom Dooley, ¶ 84.

192 Witness Statement of Tom Dooley, ¶ 84.

193 Witness Statement of Tom Dooley, ¶ 80.

136. The SCMA Report analyzed the impact of competition from additional aggregates supplies on near-term prices. Consistent with the basic economic forces described above, SCMA concluded that added supplies from Whites Point would have had a material downward impact on prices. According to SCMA, [redacted] However, SCMA notes that the introduction of aggregates from Whites Point would have created excess supplies available to serve New York City at a time when demand was declining and in a market where demand is fixed (*i.e.*, lower prices would not increase demand). Thus, SCMA concluded that the added competition would result in lower prices as aggregates from Whites Point would compete to take away market share [redacted] and other suppliers already serving the market. SCMA projected that competitive effects would cause [redacted]

137. I also note that the Whites Point aggregates may have [redacted] to other aggregates, all else equal. SCMA states that the aggregates from Whites Point would have had some [redacted] which may have justified a further discount to the prices forecast by SCMA.[195]

b. Mr. Rosen's 2016 to 2060 Prices for Traditional Aggregates and Screenings

138. Mr. Rosen states that there is no price forecast available beyond 2015.[196] In the absence of any such forecast, Mr. Rosen simply assumes that the 2015 price from [redacted] would have increased with inflation through 2060.[197] Again, this approach contains flaws that result in an economically unreasonable price forecast from 2016 to 2060.

---

194 **RE-8**, Expert Report of SC Market Analytics, ¶ 80 and Appendix III.

195 **RE-8**, Expert Report of SC Market Analytics, ¶ 81 and Appendix III.

196 Rosen Report, ¶ 5.19.

197 Rosen Report, ¶ 5.20.

139. First, the 2015 anchor price to which the 2016 to 2060 price forecast is tied is flawed. As discussed in the prior section, the 2015 price fails to consider even the basic impact of competition from new supplies and does not reflect differences in product quality, which may have resulted in lower prices for Whites Point aggregates.

140. Second, Mr. Rosen's assumption that aggregates prices would grow at inflation from 2015 to 2060 is also economically unreasonable. The future prices of any good are a function of supply and demand conditions and competitive dynamics. When prices allow suppliers to earn high levels of profit, existing and potentially new suppliers have incentives to expand existing capacity or build new capacity. The addition of supplies will cause prices to escalate at a slower rate, or potentially fall. The opposite is true when prices are low—suppliers will halt or defer the addition of new capacity, and potentially close existing capacity, causing prices to increase. Over time, the effects of entry or withdrawal of supply capacity will move an industry toward its long-run equilibrium price, which reflects the state where suppliers will earn normal returns for the addition of new capacity. At long-run equilibrium, an assumption that prices will grow with inflation is more reasonable. However, Mr. Rosen assumes that prices will grow from 2015 forward based on inflation without ever analyzing how his assumed 2015 price relates to the long-run equilibrium price or giving any consideration to changes in supply.

141. If Mr. Rosen had considered the potential for new entry, he would have found that there were already new projects in Eastern Canada that were in the planning phase and able to serve the New York market. For example, Vulcan was developing the Black Point quarry in Nova Scotia. The quarry was expected to export up to 5 million tons of aggregates per year to the U.S.[198]

142. Another example is Belleoram. Continental Stone had been developing the project in Newfoundland at the time the Whites Point JRP report was filed, although development stopped due to the global financial crisis.[199] In 2014, Continental Stone expressed an

---

[198] **C-1092**, Vulcan Materials Company, Black Point Quarry Project Environmental Impact Statement, February 2015, pp. 4-5, 24.

[199] **R-723**, Clayton Hunt, "Company Still Interested in Belleoram Rock Quarry" *The Gander Beacon*, 20 October 2014, accessed 2 November 2016.

intention to restart development of the Belleoram quarry project in Newfoundland.[200] The proposed quarry would allow production of 2 million tons-per-year of crushed granite for waterborne export, with a potential for expansion to 6 million tons-per-year.[201]

143. The SCMA Report has quantified the effects of competition and market conditions on prices. The SCMA Report forecasts that prices would decline [redacted] However, SCMA found that [redacted].[202]

144. Market prices from 2016 to 2060 are a central factor driving Mr. Rosen's valuation of Whites Point. However, Mr. Rosen has not conducted any analysis of potential competition in the industry to attempt to understand the direction of prices beyond 2015. Without considering any such factors, Mr. Rosen's long-term price forecast is speculative and biased upwards because he fails to account for the effects of competition. Mr. Rosen's valuation is therefore overstated.

c. Prices for Grits to Amboy Aggregates

145. Mr. Rosen's price forecast for grits is based on what Mr. Forestieri states are [redacted] Exhibits provided by Claimants on 5 May 2017 purport to be the source of Mr. Forestieri's prices.[204] Although I have not been able to identify the specific calculation of these prices, it appears that [redacted]

---

200 **R-724**, Continental Stone Limited, "Environmental Assessment Registration Document", Newfoundland and Labrador Department of the Environment and Conservation, October 2014, accessed 1 November 2016, http://www.env.gov.nl.ca/env/env_assessment/projects/Y2014/1767/1767_reg_document.pdf.

201 In an appendix to Continental Stone's October 2014 Environmental Assessment Registration Document, AMEC notes that the "projected normal production rate…is 2,000,000 tonnes annually with an expansion capacity up to 6,000,000 tonnes annually." **R-724**, Continental Stone Limited, "Environmental Assessment Registration Document", Newfoundland and Labrador Department of the Environment and Conservation, March 2008, accessed 1 November 2016, Appendix 1, p. 7, http://www.env.gov.nl.ca/env/env_assessment/projects/Y2014/1767/1767_reg_document.pdf.

202 **RE-8**, Expert Report of SC Market Analytics, ¶ 80 and Appendix III.

203 Witness Statement of Joe Forestieri, ¶ 21.

204 **C-1343**, Letter from Nash Johnston re: Procedural Order No. 23, 5 May 2017, p. 2.

[redacted].[205] The SCMA Report accepts the forecast of grits prices used by the Claimants as reasonable.[206]

4. Mr. Rosen Relies on Freight Costs that Are Materially Understated

146. Mr. Rosen uses a forecast of freight costs that are unreasonably low. As discussed above in Section V.E.1, Mr. Rosen adopts a freight cost forecast from Mr. Morrison that assumes a [redacted] However, this is only one of a number of errors that cause the freight rates assumed by Mr. Rosen to be substantially understated, as described in the Expert Report of Dr. Sterling. These errors include [redacted].[207] Each of these errors depresses the freight rate used in Mr. Rosen's DCF model. Given the importance of freight costs to the profitability of Whites Point, these errors lead to a substantial overstatement of lost profits by Mr. Rosen.

F. MR. ROSEN'S DCF ANALYSIS SIGNIFICANTLY UNDERSTATES OPERATING AND CONSTRUCTION COSTS

147. Mr. Rosen adopts all of his operating and maintenance cost and capital expenditures from other experts or witnesses presented by the Claimants. As I discuss below, these costs are understated, causing him to overstate the profitability of Whites Point.

1. Operating and Maintenance Costs Included in Mr. Rosen's DCF Are Understated

148. Mr. Rosen's projections of Whites Point's but-for operating costs from 2011 to 2015 are contained in Exhibits C-1010 and C-1046.[208] Mr. Rosen uses the 2015 costs from these exhibits as an anchor point, assuming that the 2015 costs will grow at inflation

---

[205] **C-1361**, Amboy Aggregates – Highlighted Spreadsheet of Grits Purchased by Amboy Aggregates Between 2001-2014, 2016.

[206] **RE-8**, Expert Report of SC Market Analytics, ¶ 16 and Appendix III.

[207] **RE-7**, Expert Report of Arlie G. Sterling, Marsoft, Inc., ¶¶ 14, 26, 50, 55, and 67.

[208] Rosen Report, Schedule 4.

thereafter.[209] However, Mr. Rosen's cost assumptions raise many reliability concerns because they lack support, are inconsistent with the EIS, assume unreasonable productivity levels, and fail to incorporate some costs.

a. Mr. Rosen's Assumed Costs Are Unsupported and Inconsistent with the EIS

149. The exhibits on which Mr. Rosen relies for operating cost assumptions appear to have been prepared specifically for this dispute by Mr. Buxton and Mr. Wall, and not in the normal course of BNS' business.[210] The witness statements that attach these projections do not describe the derivation of the operating costs relied upon by Mr. Rosen for categories other than labor, nor do they present any information or analysis to demonstrate that the cost assumptions are reasonable. However, as discussed in Section V.E.1, the operating costs assumed by Mr. Rosen do not reflect the Whites Point operating plans described by BNS in the EIS, as evidenced by the labor cost calculation in Exhibit C-1010.

b. Mr. Rosen's Assumed Costs Fail to Accurately Reflect the Quarry's Total Production

150. The SCMA Report explains that the amount of saleable product from Whites Point is a function of the total amount of rock quarried, and the yield of saleable product after applying the crushing and screening process to achieve the desired product mix.[211] SCMA analyzed the Whites Point design in conjunction with the manufacturers' specifications for key equipment in the design to conclude that [redacted] The SCMA Report presents the operating cost requirements necessary to achieve [redacted] which are higher than those assumed by Mr. Rosen.[214]

---

209 Rosen Report, ¶ 5.31.

210 **C-1342**, Letter from Gregory Nash to Tribunal, p. 9.

211 **RE-8**, Expert Report of SC Market Analytics, ¶ 91 and Table 3.

212 **RE-8**, Expert Report of SC Market Analytics, ¶ 94.

213 **RE-8**, Expert Report of SC Market Analytics, ¶ 94.

214 **RE-8**, Expert Report of SC Market Analytics, ¶¶ 95-96.

In particular, the Claimants have overstated their productivity levels, and have understated the number of production hours required to meet their sales target.[215] Accounting for an increased number of production hours also increases the maintenance costs due to increasing quarrying operations.[216] Had Mr. Rosen's analysis reflected SCMA's higher operating and maintenance costs, the resulting damages would have been lower.

c. Mr. Rosen's Assumed Costs Are Incomplete

151. Mr. Rosen's DCF analysis also appears to be missing some costs. For example, it does not appear that the operating costs adopted by Mr. Rosen include the environmental monitoring costs necessary for Whites Point to comply with its permit requirements. The Claimants retained Mr. Peter Oram of GHD Limited to provide an independent expert opinion regarding the EA Approval and Industrial Approval ("IA") of the Project. Mr. Oram stated that the EA and IA would have required the Claimants to engage in environmental monitoring activities over the life of the quarry.[217] The monitoring activities would have been required to begin prior to construction, with the most intensive costs upfront.[218] Thereafter, Mr. Oram opined that annual monitoring costs would amount to approximately C$180,000.[219]

152. I see no evidence that Mr. Rosen's analysis includes these monitoring costs. The exhibits from which Mr. Rosen adopts his operating cost assumptions do include a line item entitled "Environmental." If this cost is intended to reflect monitoring costs, it is insufficient. For example, in 2012, Mr. Rosen includes environmental costs of [redacted].[220] Given Mr. Rosen's assumed [redacted],[221] the total environmental costs would have amounted to only [redacted].[222] This amount is far less than the C$180,000 in

---

215 **RE-8**, Expert Report of SC Market Analytics, ¶¶ 95-96.

216 **RE-8**, Expert Report of SC Market Analytics, Appendix IV, Section 3, ¶ 4.

217 First Expert Report of GHD (Peter Oram), 6 December 2016, pp. 3 and 7-8.

218 First Expert Report of GHD (Peter Oram), p. 8.

219 First Expert Report of GHD (Peter Oram), p. 8. Per footnote 4 of the Oram Report, these are in Canadian dollars. The 2004 Business Plan prepared by the Claimants estimated that environmental controls and tests would cost [redacted] **R-717**, Business Plan for Whites Point Quarry, Prepared by Clayton Concrete, April 2004, p. 7.

220 Rosen Report, Schedule 4.

221 Rosen Report, Schedule 2.

222 This is calculated as [redacted]

annual monitoring costs that Mr. Oram opines would have been required for the EA and IA monitoring. The same would be true of every year.

153. Other costs appear to be missing from Mr. Rosen's analysis as well:

a. Mr. Rosen's analysis does not appear to include the costs of any managerial time during the construction period.

b. Mr. Rosen does not account for any property taxes prior to 2011, [redacted].[223]

c. Mr. Rosen assumes that [redacted]

d. Mr. Rosen uses [redacted] for which BNS would have been required to [redacted].[225] The freight rate deducted by Mr. Rosen does not include [redacted], which Dr. Sterling estimates would cost up to [redacted]

154. The fact that Mr. Rosen's analysis is missing costs raises additional concerns about the reliability of his analysis. Had Mr. Rosen accounted for these and any other potentially missing costs, the resulting profitability of Whites Point would have been lower.

2. Mr. Rosen's Assumed Capital Costs Are Understated

155. The amount of stone required to be processed to yield the assumed [redacted]

---

223 Rosen Report, Schedule 4.

224 Rosen Report, ¶ 5.27 and Schedule 1.

225 Rosen Report, Schedule 3.

226 **C-1108,** Morrison Calculation of Shipping Rates; **RE-7**, Expert Report of Arlie G. Sterling, Marsoft, Inc., ¶ 37.

227 Mr. Rosen does deduct a cost related to [redacted] but this [redacted] appears to be related to the [redacted], as reflected in the 2004 Business Plan. **R-717**, Business Plan for Whites Point Quarry, Prepared by Clayton Concrete, April 2004, p. 5.

[redacted].[228]

156. In addition, Mr. Rosen's analysis has not allowed for a contingency in the budgeted capital cost of the processing plant. The SCMA Report states that when developing a budget for construction costs, it is customary to add 10% for contingencies for onshore facilities because the components are not based on firm quotes.[229] The need for a contingency was recognized by the Claimants themselves in estimating the capital cost of the processing plant in 2004[230] and estimating the cost for the marine terminal.[231] Because the capital cost assumed by Mr. Rosen does not reflect the 10% contingency to account for the uncertainty in the ultimate cost, it is likely to be understated.

VI. The Value of Potential Profits from Whites Point But-For the Breach

157. I have been instructed to determine the present value of the future profits of Whites Point as of the 22 October 2007 breach date excluding the effect of the breach using a DCF analysis. It is important to note that this assessment does not represent my view about the Claimants' loss as of the breach date. Setting damages equal to the present value of all profits that would be generated by the Project assumes a loss equivalent to that of an expropriation of the project, which I understand has not been found. In particular, I understand that the Claimants had the opportunity to mitigate losses resulting from the breach through a judicial review, which is not reflected in this assessment. However, understanding the value of the potential profits from the Project but-for the breach is a necessary ingredient for assessing the Claimants' loss after accounting for mitigation, which I discuss in Section VII.

---

228 **RE-8**, Expert Report of SC Market Analytics, ¶¶ 97-98.

229 **RE-8**, Expert Report of SC Market Analytics, ¶ 97.

230 **C-1344**, Costings dated 18 October 2004, p. 3.

231 Witness Statement of William Richard Clayton, 15 December 2016, ¶ 25.

A. THE POTENTIAL PROFITS FROM WHITES POINT WERE SUBJECT TO SIGNIFICANT UNCERTAINTY IMMEDIATELY PRIOR TO THE BREACH

158. Whites Point was facing important risks as of October 2007. These risks made the profits that might have been generated from the Project but for the breach uncertain. Because of this uncertainty, I refer to the profits estimated here as "potential" profits.

159. An important risk faced by the Project was permitting risk. I have been instructed that: (1) even absent the breach, the Project still faced the risk of a negative JRP recommendation;[232] and (2) the Nova Scotia and Federal governments were not bound by the recommendation of the JRP.[233] Therefore, even if the JRP reached a favorable conclusion, either the provincial or federal government could have refused to grant the necessary permits for a variety of reasons. Moreover, in the event that permits were granted, the Project faced risk regarding the time and cost of complying with any requirements imposed by those approvals. [redacted]

160. The outlook for the construction of a new aggregates quarry was also risky as of October 2007. Around the lead-up to the global financial crisis, there was uncertainty about future US construction spending, which would directly affect demand for aggregates.[234] Shipments of aggregate had dropped approximately 17 percent from the first half of 2006 to the first half of 2007 and there was concern about continued declines moving forward.[235] In fact, the last quarter of 2007 reflected the seventh sequential downturn in aggregates demand.[236] Stock prices for the two largest publicly traded aggregates suppliers, which are sensitive to construction spending, experienced a significant drop in the months leading up

---

232 **RE-1**, Expert Report of Lesley Griffiths, 9 June 2017, ¶¶ 12, 62 (e), pp. 44-45 (Conclusion Text), 63 (Conclusion Text), ¶ 154; **RE-2**, Expert Report of Tony Blouin, 9 June, 2017, ¶¶ 12, 120.

233 **RE-3**, Expert Report of Robert G. Connelly, ¶ 74; **RE-4**, Report of Peter Geddes, ¶¶ 17.

234 McGraw-Hill's 2008 Construction Outlook forecasted a drop in overall US construction spending to $614 billion, or 2 a percent reduction. See **R-725**, Darren Constantino, "State of the Industry," Pit & Quarry, December 2007, p. 38.

235 **R-725**, Darren Constantino, "State of the Industry," Pit & Quarry, December 2007, p. 26.

236 **R-726**, Martin Marietta Quarter 4 2007 Earnings Call Transcript, 5 February 2008, p. 9.

to the breach date, despite the fact that the market overall was largely unchanged.[237] These trends indicate the market's expectation of a negative outlook for aggregates.

161. It was also the case that there was uncertainty relating to the potential output and costs of the facility. The potential output of Whites Point is a function of the size of the basalt deposit. Mr. Cullen estimated the size of the mineral resource at Whites Point based on testing and analysis done in 2016. However, Mr. Cullen notes that prior to his 2016 analysis, there were no studies evaluating whether the basalt deposit had reasonable prospects for economic extraction to quantify the Whites Point mineral resources.[238] Also, as discussed in Section V.B, there was no operating history and were no realistic, contemporaneous projections of construction and operating costs for the Project.[239]

B. METHODOLOGY FOR VALUING THE POTENTIAL PROFITS FROM A FULLY PERMITTED WHITES POINT PROJECT AS OF 22 OCTOBER 2007

162. I estimate the value of the potential profits of a fully permitted Whites Point using a DCF approach that is, at a high level, similar to the analysis prepared by Mr. Rosen. However, there are important differences. First, unlike Mr. Rosen's analysis, my analysis is based on expectations as of the 22 October 2007 JRP Report date but ignores any adverse effects of the breach. This means that all potential cash flows are discounted to the breach date and that I use financial assumptions (*e.g.*, the discount rate, exchange rate, and inflation rate) that reflect expectations as of that date. Second, I model the operations of Whites Point consistent with the details of the Project as it was understood on the breach date and reflected in the EIS rather than on the alternative assumptions that the Claimants have hypothesized during this arbitration. Finally, I adopt certain adjustments to other assumptions used by Mr. Rosen. I discuss each of these differences below.

---

[237] The S&P 500 stock index rose from 1,482.37 on 30 April 2007 to 1,506.33 on 22 October 2007. The stock price of Martin Marietta dropped from 145.82 on 30 April 2007 to 126.66 on 22 October 2007 (**R-727**, Martin Marietta, Historic Stock Lookup, 30 April 2007, accessed 15 May 2017; **R-728**, Martin Marietta, Historic Stock Lookup, 22 October 2007, accessed 15 May 2017). The stock price of Vulcan Materials dropped from 123.67 on 30 April 2007 to 85.59 on 22 October 2007. **R-729**, Bloomberg, Vulcan Materials Historic Closing Prices 2007, accessed 22 February 2017.

[238] First Expert Report of Mercator Geological Services (Michael Cullen), §§ 14.9 and 14.16.

[239] The only profitability analysis provided by Claimants was the 2004 Business Plan. This plan was prepared years before Claimants prepared the design relied upon in the EIS, and key aspects of the plan were unreliable, as evidenced by the fact that Mr. Washer and Mr. Rosen rely on entirely different estimates of capital costs for the facility.

163. To implement my analysis, I begin with Mr. Rosen's model[240] and make the appropriate adjustments. For certain assumptions adopted by Mr. Rosen from other experts that are outside of my expertise, I use the same assumption unless otherwise noted, although this should not be interpreted as an opinion about their reasonableness.

1. Project Life

164. BNS described Whites Point as having a 50-year life in the EIS, with the first 1.5 years of life devoted to construction.[241] The remaining 48.5 years would be devoted to production operations followed by decommissioning. My DCF analysis adopts the 50-year project life as described in the EIS. Like Mr. Rosen, I assume that production would begin at the start of 2011. I then assume production would continue until 2059, a period of 48.5 years. In this final year, I assume that activities would include both production and decommissioning.[242]

2. Production and Sales Volumes

165. Although there was uncertainty about the volume of aggregates that could be economically extracted from the Project because no pre-feasibility or feasibility study had been conducted, I assume that Whites Point would produce 2.0 million tons of aggregates for sale per year, as stated in the EIS.[243] Mr. Rosen assumes that [redacted].[244] I adopt this [redacted] which appears to be consistent with the EIS statement that the shift from construction to production activities is gradual.[245] Mr. Rosen also assumes that [redacted][246] I adopt this same assumption, as [redacted]

---

240 **C-1095**, FTI Native DCF Model.

241 See Section II.C and **R-581**, Revised Project Description, pp. 52, 147.

242 See Section II.C and **R-581**, Revised Project Description, p. 55.

243 See Section V.B and **R-581**, Revised Project Description, pp. 6, 24.

244 Rosen Report, ¶ 5.13.

245 **R-581**, Revised Project Description, p. 52.

246 Rosen Report, ¶¶ 5.12-5.14.

[redacted]. I assume the same product mix proportions that Mr. Rosen adopted from Mr. Dooley.[247]

3. Prices

166. Aggregates prices are a key factor affecting the potential profits for Whites Point. The prices at which Whites Point stone might be sold were subject to significant uncertainty as of October 2007. Beyond the concern about demand for aggregates, there was significant uncertainty about the price that Whites Point would have received from selling its aggregates.

167. The introduction of new supplies from Whites Point and other sources would be expected to have a material downward effect on prices, as discussed in Section V.E.3. Section V.E.3.a noted that Mr. Rosen's analysis failed to consider the effects of competition from new sources of Canadian aggregates on his "but-for" prices. The impact of competition from new sources of Canadian aggregates would also have impacted expected prices as of the breach date. Figure 12 shows the actual supplies of aggregates shipped from Eastern Canada to the East and Gulf Coasts of the U.S. as of October 2007, and the potential impact of new volumes from Whites Point and Belleoram on those shipments. In each year, the two new quarries would have increased supply capacity to the Atlantic coast by about 140% to 190%, with a potentially significant impact on the resulting prices.

[247] Rosen Report, ¶ 5.15.

Figure 12: Impact of Whites Point and Belleoram Entry on Import Volumes

Source: Appendix F, Table F.1. Percentages report the production volume with the addition of Whites Point and Belleoram, as a percentage of actual imports.

168. While the Claimants' experts and fact witnesses ignore this supply shock, SCMA does not. SCMA prepared a forecast of the prices that Whites Point would have expected to receive on its sales of aggregates accounting for the competitive effect of these new supplies. I adopt SCMA's price forecast in my assessment of the potential profits for Whites Point.[248]

169. I note that these prices continue to assume that Whites Point would make sales into the New York City market rather than to New Jersey, as BNS stated clearly in its EIS. SCMA explained that prices in the BNS' intended market of New Jersey were typically lower than those in New York City.[249] As noted above, [redacted]. This suggests that [redacted] If so, any residual aggregates would have had to find alternative, less profitable

[248] **RE-8**, Expert Report of SC Market Analytics, Appendix III.

[249] **RE-8**, Expert Report of SC Market Analytics, ¶ 2 and Appendix III.

markets, such as BNS' intended market of southern New Jersey.[250] However, to be conservative, I do not include this in my analysis.

4. Freight Costs

170. The cost of freight has a large impact on the value of Whites Point. A valuation of Whites Point on the breach date requires an understanding of what expected freight rates would have been at the time. As discussed in Section V.E.4, the freight rates relied upon by Mr. Rosen's report contains many errors or unreasonable assumptions. Dr. Sterling's expert report has prepared a forecast of freight rates over the life of the Project based on expectations that existed at the breach date.[251] This calculation uses [redacted] and corrects the errors contained in the freight rate calculation relied upon by Mr. Rosen. Dr. Sterling's forecast of freight rates is significantly higher than those assumed by Mr. Rosen.

5. Other Operating Costs

171. I rely on the forecast of operating costs provided in the SCMA Report which accounts for the [redacted].[252] The SCMA Report corrects the Claimants' failure to base its costs on the quarry's total production, but does not incorporate other costs that were missing from the operating costs assumed by Mr. Rosen. I therefore add to the SCMA costs: (1) the ongoing environmental monitoring costs from the report of the Claimants' expert, Mr. Oram, but which were excluded from Mr. Rosen's analysis;[253] and (2) Mr. Rosen's missing cost for [redacted].[254] While Mr. Rosen's analysis neglected to account for property taxes and material time during the

---

250 **C-445**, Bilcon's Response to Undertaking #12; **RE-8**, Expert Report of SC Market Analytics, ¶87 and Appendix III; SCMA notes that prices in New Jersey were approximately 13% below the prevailing prices in New York State in 2007.

251 **RE-7**, Expert Report of Arlie G. Sterling, Marsoft, Inc., Figure 17.

252 **RE-8**, Expert Report of SC Market Analytics, ¶¶ 94-96.

253 See Section V.F.1.c

254 **C-1108,** Morrison Calculation of Shipping Rates; **RE-7**, Expert Report of Arlie G. Sterling, Marsoft, Inc., ¶ 37; Dr. Sterling notes that the cost for insurance of the aggregates in transit would not exceed 0.25%. I adopt the mid-point of this range in my model.

construction period,[255] I do not have a reliable estimate of these costs, so I have not included them in my analysis.

6. Project Capital Expenditures and Maintenance Costs

172. I adopt the capital expenditure and maintenance cost assumptions used by Mr. Rosen with two adjustments. The first adjustment corrects errors in Mr. Washer's analysis discovered since completing his report, as described by counsel for the Claimants.[256] The second adjustment accounts for the total production problem identified in the SCMA report—I include the additional capex to accommodate the full production volumes, as well as adjust for the increased maintenance costs due to greater usage of the equipment for the higher number of production hours.[257]

173. The SCMA Report described that it is typical practice to include a contingency of 10% to budgeted costs for onshore facilities.[258] To be conservative, I have not included any contingency adjustment to the assumed capital costs.

7. Reclamation and Decommissioning Costs

174. Mr. Rosen adopted assumptions about reclamation and decommissioning costs from Mr. Buxton.[259] Mr. Buxton's estimate of reclamation costs is consistent with the C$7,000-per-acre cost described in the EIS.[260] The EIS did not quantify expected decommissioning costs. As such, I use the same assumptions as Mr. Rosen for these costs.

8. Foreign Exchange Rate

175. Many of the Whites Point costs are quoted in Canadian dollars. Mr. Rosen converts these values into U.S. dollars at the actual exchange rates from 2011 to 2016, and then adopts a 2016 forecast for all future amounts. The forecasted exchange rates that I adopt are based

---

255 See Section V.F.1.c

256 **C-1342**, Letter from Gregory Nash re: Procedural Order No. 22.

257 See Section V.F.2

258 **RE-8**, Expert Report of SC Market Analytics, ¶ 97.

259 Rosen Report, ¶ 5.35.

260 **R-581**, Revised Project Description, p.72.

on U.S. dollar to Canadian dollar forward contract prices reported by Bloomberg for 22 October 2007.[261]

9. Discount Rate

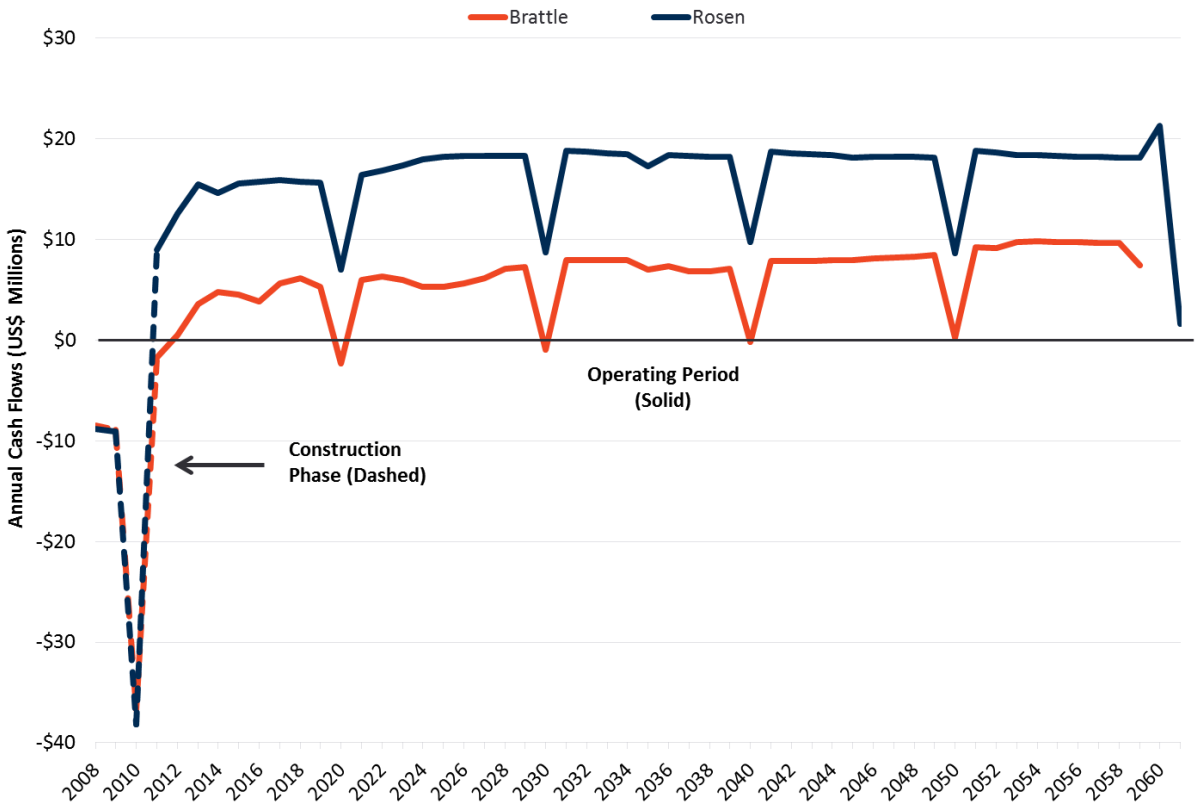
176. I agree with Mr. Rosen that the appropriate discount rate to use to determine the present value of future potential profits would be the weighted average cost of capital ("WACC") for the Project. I estimate the WACC using a similar methodology to Mr. Rosen, but as of the 22 October 2007 breach date. I arrive at a nominal discount rate of 9.22% and a real discount rate of 6.75%. The higher discount rate used in my analysis reflects a number of differences, but is affected significantly by the fact that interest rates were higher in 2007 than in 2016. A more detailed discussion of my discount rate calculation is contained in Appendix G.

C. DCF Valuation of Potential Cash Flows from Whites Point as of the Breach Date

177. Figure 13 shows my forecast of potential cash flows for Whites Point as of the October 2007 breach date. This forecast reflects the assumption that the Project would be fully permitted with certainty. As shown in the figure below, my forecast of potential cash flows is materially lower than that of Mr. Rosen. The difference arises because expectations were less favorable as of the breach date, and because I have corrected the errors and omissions in Mr. Rosen's analysis that were described in Section V.

[261] **R-730**, Bloomberg USD/CAD forwards, accessed 15 May 2017.

Figure 13: Undiscounted Annual Cash Flows – Brattle vs. Rosen



Sources: Appendix D, Table D.1 and Rosen Report Schedule 1.

178. The net present value of these cash flows using the discount rate of 6.75% is US$8.7 million as of the breach date.[262] This amount reflects an adjusted valuation of the potential profits from a fully permitted Whites Point project as of the breach date. However, these cash flows are uncertain because of the lack of operating history and pre-feasibility studies for the Project, as discussed earlier, as well as permitting risk.

179. More importantly, as I discuss in Section VII, the potential for mitigation would cause the losses to be far less than the full value of potential profits from Whites Point absent the breach.

D. COMPARISON TO MARKET-BASED EVIDENCE

180. When assessing the potential value of an asset that was never constructed or operated, as well as subject to permitting uncertainty, it can be helpful to turn to market evidence for insights into a reasonable range of valuation. I have therefore sought to test the

[262] See Appendix D, Table D.1.

reasonableness of my valuation of potential profits from Whites Point as of the breach date based on the limited market evidence that is available.[263]

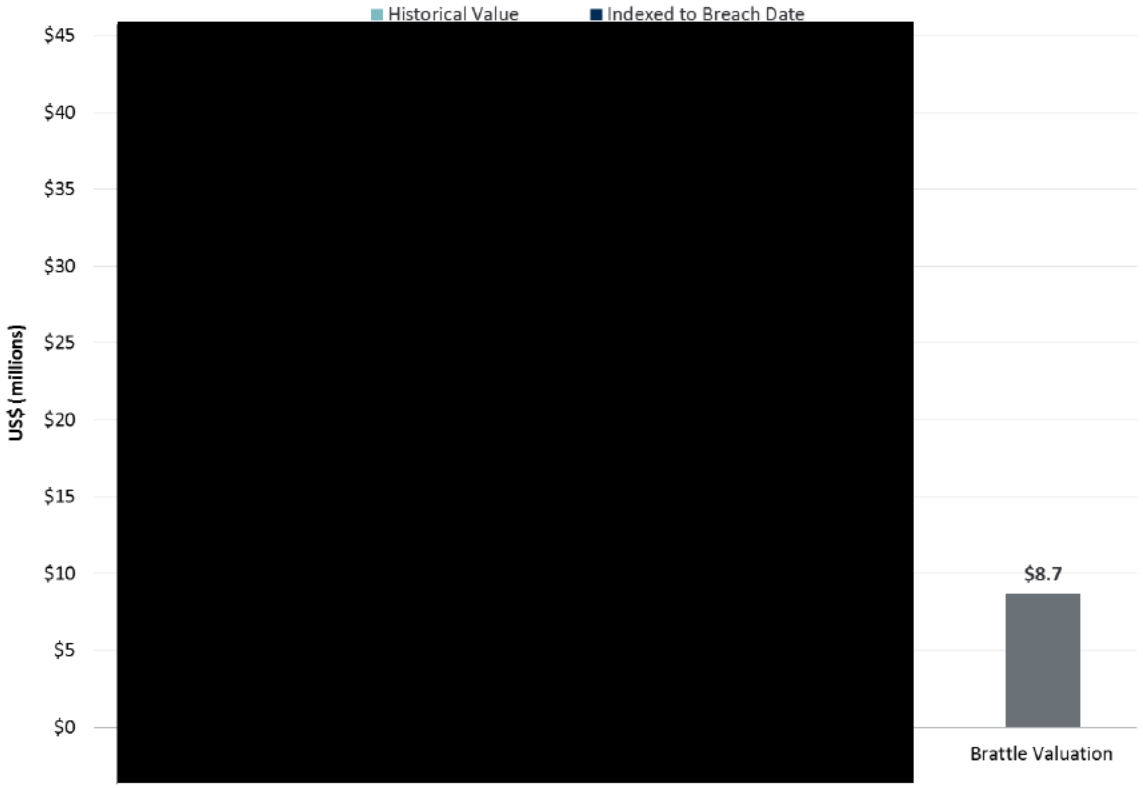
181. As discussed above in Section IV, there are three indications of Whites Point's value from the formation of GQP in April 2002 implying a value of [redacted],[264] the implied valuation of [redacted] based on BNS' purchase of Nova Stone's stake in GQP in 2004, and an offer from [redacted] to purchase Whites Point [redacted].

182. In Figure 14, I adjust each of these values to 22 October 2007, in order to reflect changes in the observed market value of aggregates producers. The indexation results in a 22 October 2007 market-adjusted value of [redacted] for the 2004 GQP buyout, [redacted] for the 2002 GQP formation, and [redacted] for the [redacted] offer. In the case of the [redacted] offer, the adjustment is downward because valuations of aggregates producers declined between May and October 2007. My valuation of potential profits from Whites Point as of the breach date is within the range of these market indicators.

[263] It is often useful to evaluate market evidence for insights into the valuation, such as comparable transactions or comparable firms. Identifying comparables can be a challenge due to differences in quarry location, rock type, stage of development, and other site-specific factors. I reviewed transaction data available through S&P Capital IQ and Bloomberg and have been unable to identify any reasonable comparables aside from these market indicators for Whites Point itself.

[264] See Section IV.B. Because the February 2002 offer from NSE was followed up with an actual transaction on different terms in April 2002, I disregard the February 2002 offer.

Figure 14: Valuations of Whites Point in October 2007



Sources: Appendix F, Table F.3.

183. My estimate of the present value of potential profits contingent on permitting as of the breach date is below the [redacted] offer value [redacted]. The reason that [redacted] offer is higher than my valuation is uncertain, but potential explanations include:

- The offer was [redacted]
- [redacted]

[265] **R-590**, Letter from [redacted]. to William Clayton, [redacted]

- [redacted]

184. My estimate of the present value of potential profits contingent on permitting as of the breach date also is below the indexed value of [redacted] implied by the 2002 formation of GQP. This transaction was conducted at a very early stage in the development of the Project, and reflects the value of Whites Point with some construction costs already funded.[266] Therefore, all else equal, one would expect the value implied by the 2002 formation of GQP to exceed the result from my analysis, which reflects the value before any construction costs have been funded.

185. Two years later, when BNS bought NSE's stake in Whites Point, the indexed value implied by this transaction was [redacted]. As I noted in section IV.C, by 2004, both NSE and BNS had two years of experience with Whites Point and would likely have had a better understanding of the Project's potential value at that time than when GQP was formed. The fact that the 2004 valuation is significantly lower than what BNS originally agreed to pay for its [redacted] stake in 2002 suggests that the quarry had a low value if permitted and/or that the permitting risk was perceived to be high. Unless the perceived permitting risk as of 2004 was extremely high, this outcome is relatively consistent with the present value of potential profits from my analysis.

E. ACCOUNTING FOR THE RISK OF PERMITTING

186. The Rosen Report values Whites Point under the assumption that permitting is certain, and the valuations of potential profits presented above have done the same. However, I have been instructed that Whites Point would have faced permitting risk even absent the breach identified by the Tribunal. The presence of any permitting risk would reduce the loss incurred.

187. In simple terms, one can think of permitting risk like the risk of a coin flip. Imagine that someone successfully calling a coin flip would receive a $1 payment, but that a missed call results in no payment. The value of the right to call the coin flip is not $1. It is less than $1 because of the potential for an adverse outcome. For a fair coin flip, the probability of

[266] See Section IV.B.

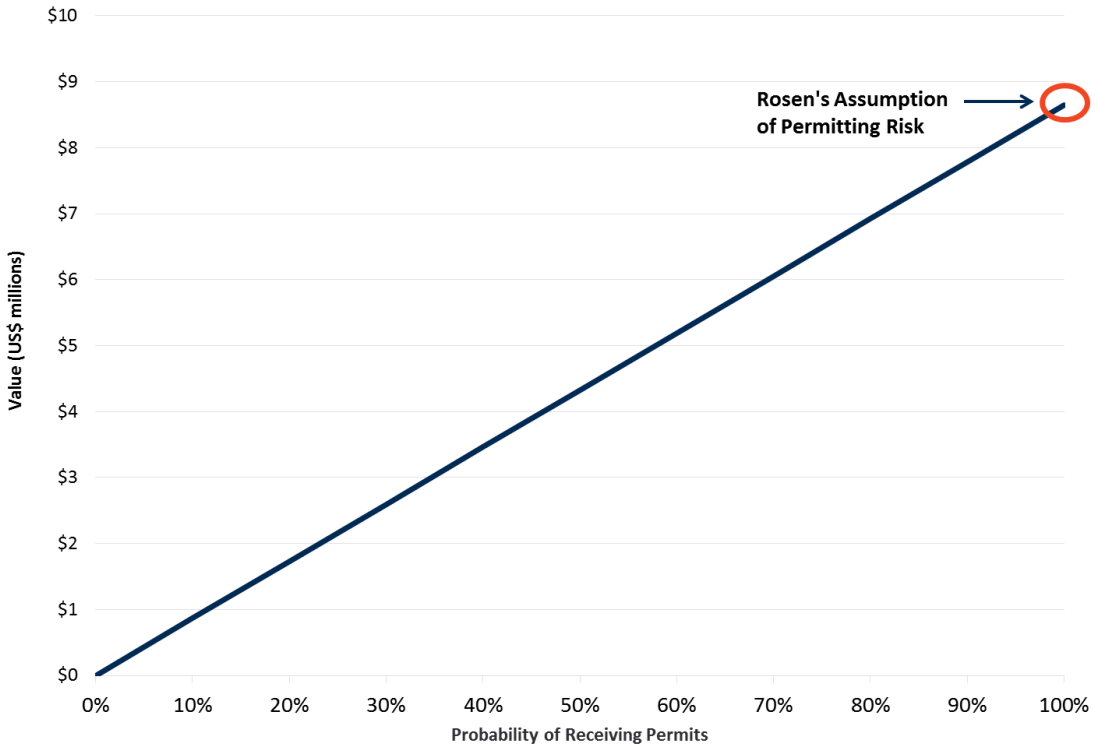
successfully calling the flip is 50%. Therefore, the value of the right to the coin flip is $0.50 ($1 payout in the event of a correct call x 50% probability of successfully calling the flip).

188. Mr. Rosen has valued Whites Point assuming a 100% probability that the quarry will be permitted. This approach is like valuing the right to bet on the coin flip at $1 because it overstates the value in the presence of permitting risk. Like the coin flip, the probability of permitting can be used to adjust the value of Whites Point profits assuming permits. If the quarry was worth $100 with permits, and there was a 30% probability that permits would be received, the value before permitting would be $30.

189. The probability that Whites Point would receive the necessary permits to operate but for the breach is beyond my expertise. There is, however, evidence to suggest that Whites Point did face permitting risk. [redacted] If the risk of permitting for Whites Point were very low, this contingency would have been less important.

190. Should the Tribunal wish to value the potential profits from Whites Point immediately prior to the breach, a better approach would be to assess the probability of permitting and multiply that by the value of a permitted quarry as of the breach date. Figure 15 illustrates how this approach would modify the valuation resulting from my DCF analysis. I understand that regulatory experts for the Government of Canada have opined that Whites Point would not necessarily have received operating permits even with a favorable JRP report. If Whites Point did not receive operating permits, the Project would have no value.

Figure 15: Impact of Permitting Risk on the Value of Potential Profits from Whites Point



Source: Appendix D, Table D.16.

191. This approach is a simplification. Unlike the coin flip, the permitting process does not have an entirely binary outcome. Permits may be issued with conditions such that even if a permit were issued for Whites Point, conditions placed on the construction or operations could potentially result in a reduction in value relative to figures presented above.[267] However, if the probability of receiving permitting can be determined reliably, this approach would be a reasonable approximation as an estimate for the value of Whites Point immediately prior to the breach.

---

[267] **R-1**, Canadian Environmental Assessment Act, S.C. 1992, c. 37, ss. 37(1), 37(2) ("…a responsible authority … shall…in the exercise of its powers or the performance of its duties or functions under that other Actor any regulation made thereunder or in any other manner that the responsible authority considers necessary, ensure that any mitigation measures … in respect of the project are implemented"), 38(1) (…a responsible authority … shall, in accordance with any regulations made for that purpose, design any follow-up program that it considers appropriate for the project and arrange for the implementation of that program."); **RE-3**, Expert Report of Robert G. Connelly, 9 June 2017, ¶ 27.

192. That said, as I discuss below, the valuation of potential profits from Whites Point immediately prior to the breach does not measure the loss from the breach because it ignores any potential mitigation.

VII. The Loss Based on My Alternative DCF Analysis Given Mitigation Opportunities

193. The impact of the breach on the loss depends on the ability to mitigate the effects of the breach. I have been asked to evaluate the effect on the value of Whites Point assuming that the Claimants had the right to appeal the breach through a judicial review. For purposes of this analysis, I have been instructed to assume that:

    a. The breach could have been remedied through a judicial review;

    b. With a favorable decision on judicial review, the Project would undergo a second JRP process that would result in a non-breaching report;

    c. A second, non-breaching JRP process would not have guaranteed a favorable JRP recommendation and receipt of permits; and

    d. The Claimants did not pursue this avenue of judicial review.

194. As an economic matter, the damages should be equal to the economic loss after accounting for possible mitigation. Mr. Rosen's damages estimate reflects the full value of the Project. He is therefore implicitly assuming that the loss could not have been mitigated in any way. If judicial review offered the Claimants an opportunity to mitigate the effects of the breach, the breach did not deprive BNS of the ability to continue developing the Project; it merely delayed it. The economic loss was therefore not the entire value of the Project—rather it was the diminution in the value of the project, if any, resulting from the need to pursue judicial review to obtain a non-breaching JRP report.

195. The diminution in value of the Project resulting from the judicial review would have been comprised of two parts. The first component is the added procedural costs to undergo the judicial review and potentially the costs of a second JRP process. I have been instructed to

assume that the judicial review through the appellate courts would have cost no more than US$103,780 dollars.[268]

196. If the Project had been required to undergo a second JRP, I have been instructed that many of the materials prepared for the first JRP process would have made a second JRP process more cost effective. Specifically, I have been instructed that the cost of a second JRP process can be approximated by the sum of BNS' invoices from CEAA for Joint Review Panel and the JRP-related Consulting, Office, and Operations expenses incurred from 1 May 2007 through 22 October 2007.[269] The cost of a second JRP would therefore equal approximately [redacted]

197. In total, these added procedural costs would have been no more than [redacted]

198. The second source of damages arising from the need to pursue judicial review is the loss in value, if any, arising from delay. Assuming that the Project had received approval to move forward after pursuing judicial review, it would have been delayed. I have been instructed to assume that the judicial review would have concluded by December 2010.[271] I have been further instructed that a second JRP, if required, would have been expected to take one year, which again assumes a faster JRP as prior work could be re-purposed for the

---

[268] I have been instructed that the judicial review through the appellate courts would have cost the Claimants between C$105,000 and C$130,000 in 2017 dollars based on the judicial review cost estimates in the Expert Report of the Honourable Justice John Evans: **RE-6**, Expert Report of the Honourable John M. Evans, ¶ 87. I set out my conversion of the top range of this estimate to 2007 U.S. dollars in Appendix E, Table E.16.

[269] It is my understanding from counsel and the Expert Report of the Honourable Justice John M. Evans, ¶¶ 79-80 that the bulk of the JRP-related work performed prior to May 2007, the time at which the JRP announced BNS was ready to proceed with the JRP hearing, would be re-usable for a second JRP. However, the efforts in preparation for the hearing from May to October 2007, including the testimony of those heard at the first hearing, would need to be replicated in a second JRP. I have therefore been instructed that the cost of a second JRP may be approximated by BNS's expenditures on the first JRP over the time period from May, when the JRP panel announced it was ready to proceed to a hearing (see R-258), through October 2007, when the first JRP issued its report.

[270] **R-731**, Joint Review Panel of the Whites Point Quarry and Marine Terminal Project - Invoice #01-07/08, 13 July 2007; **R-732,** Joint Review Panel of the Whites Point Quarry and Marine Terminal Project - Invoice #02-07/08, 27 November 2007; **R-733**, Joint Review Panel of the Whites Point Quarry and Marine Terminal Project - Invoice #03-07/08, 27 March 2008. CEAA Panel cost invoices [redacted]. The cost of Consulting Experts and Office & Operations total [redacted] See Appendix C, Table C.3.

[271] **RE-6**, Expert Report of the Honourable John M. Evans, ¶ 83.

proceeding. In total, this suggests that quarry operations would have been delayed by approximately 4.2 years, with construction starting in 2012 rather than 2008.[272]

199. I estimate the impact of delay using my valuation of the Project discussed in Section VI. My analysis uses the same underlying assumptions about future construction spending, prices, costs, and operations, but assumes they will occur about 4.2 years later.[273] All dollar figures are adjusted to reflect amounts as of later dates, including expected changes in market conditions. I find that the need for a delay in startup would not have caused BNS to incur lost profits. [redacted] Therefore, the damages to the Claimants from the breach were limited to the added procedural costs for the judicial review and the new JRP panel, which amount to [redacted].[276]

200. An economically rational party with a high-value project, as the Claimants argue is the case for Whites Point, would have pursued reasonable options in an attempt to mitigate their loss such as judicial review. The Claimants' decision not to pursue judicial review may be a sign that: (1) there was a material risk that, even with a favorable JRP report, the Project would not have received permits; (2) the value of the Project as of the breach date was much lower than that implied by Mr. Rosen's calculation, as my analysis found; or (3) the Claimants may have expected to recover their losses through arbitration without accounting for mitigation. These and other potential reasons are not mutually exclusive.

---

272 At the instruction of Counsel, I assume the Judicial Review would conclude on 31 December 2010 and the second JRP process would conclude on 31 December 2011.

273 See Appendix E, Table E.1.

274 **RE-7**, Expert Report of Arlie G. Sterling, Marsoft, Inc., ¶¶ 56, 67, and 101.

275 **RE-7**, Expert Report of Arlie G. Sterling, Marsoft, Inc., ¶¶ 101, 103, and 106- 107.

276 Claimants' loss as of the breach date should be the present value of the judicial review and the new review panel. These costs would not be discounted at the risky rate used for the Project's operating cash flows, but at a rate that reflects the lower-risk nature of these figures. To be conservative, I have not discounted these added procedural costs to the breach date.

VIII. Pre-Award Interest and Tax Gross-Up

201. Mr. Rosen adjusts his estimate of lost profits to include pre-award interest and a gross-up for taxes.

A. PRE-AWARD INTEREST

202. Mr. Rosen adds pre-award interest to losses incurred in the past. I have been instructed that the Government of Canada disputes whether pre-award interest is legally justified in this matter. However, below I discuss the economically appropriate calculation of pre-award interest in the event that the Tribunal concludes that pre-award interest is appropriate.

203. Mr. Rosen states in his report that "[p]re-award interest compensates the Investors for the passing of time between the date of the lost cash flows and the date of the award…"[277] Mr. Rosen notes that two principal considerations in calculating pre-award interest are whether the interest is calculated on a compound or simple basis and the rate of interest to be applied.[278] I agree.

204. Compound interest assumes that interest in any period will accrue both on the liability outstanding itself (*e.g.*, the award here) as well as on the interest already accrued. Mr. Rosen calculates pre-award interest using a compound interest rate.[279] I cannot provide an opinion on the appropriate legal standard, but as an economic matter it is my opinion that Mr. Rosen's decision to use compounding is economically reasonable.

205. Mr. Rosen states that there are a variety of interest rates that might be used to calculate pre-award interest, including: the Claimants' Weighted Average Cost of Capital ("WACC"), the Claimants' cost of equity, the Claimants' borrowing cost, and the risk-free rate.[280] The pre-award interest rate selected by Mr. Rosen is a risk-free rate based on the yield on one-year U.S. Treasury securities.[281]

---

277 Rosen Report, ¶ 7.2.

278 Rosen Report, ¶ 7.3.

279 Rosen Report, ¶ 7.5.

280 Rosen Report, ¶ 7.4.

281 Rosen Report, ¶ 7.4.

206. Pre-award interest at the Claimants' WACC, cost of equity, or cost of debt is not economically justifiable. Each of these alternatives proposed by Mr. Rosen, but not used, would provide the Claimants compensation for risks that they did not bear, as discussed in further detail in Appendix H. Mr. Rosen's ultimate application of a pre-award interest rate based on U.S. Treasury yields avoids this pitfall, and is therefore economically reasonable.

1. Mr. Rosen's Pre-Award Interest Calculation Is Methodologically Flawed

207. The Past Lost Profits that Mr. Rosen uses in his calculation of pre-award interest are presented in Figure 16. The lost profits in the early years part of this period are negative (*i.e.*, the Claimants avoided having to make cash outlays) because of large upfront capital expenditures required to construct the project. BNS benefitted from avoiding these cash outlays. Once the project is complete, Mr. Rosen estimated lost profits as positive. BNS was harmed from not receiving these cash flows.

Figure 16: Mr. Rosen's Annual Net Cash Flows During the Past Lost Profits Period

Source: Appendix F, Table F.5.

208. Mr. Rosen starts to calculate pre-award interest only when his cumulative cash flows during the Past Lost Profits period became positive in [redacted]. The use of this *cumulative* approach is economically flawed. The fundamental economic principle behind pre-award

interest is that a dollar paid or received at different points in time has a different value from a dollar today. Mr. Rosen's cumulative approach disregards this simple economic principle because it offsets any past cash outflows against past cash inflows, regardless of when those cash inflows or outflows occurred. This approach ignores completely the timing of those cash flows—simply offsetting a dollar of cash outflows against a dollar of cash inflows, even if those flows had occurred at different times. Mr. Rosen's cumulative approach therefore contradicts the very economic principle underlying pre-award interest.

209. Mr. Rosen recognizes that pre-award interest can compensate for "…not having access to the funds as at the date of the lost cash flows."[282] Figure 16 above presents Mr. Rosen's view that, but for the breach, the Claimants would have had access to more cash [redacted] Where legally appropriate, pre-award interest would compensate BNS for being unable to access that cash. However, the figure also shows that, but for the breach, BNS would have had less cash [redacted] because they would have to pay construction costs in those years. As an economic matter, a pre-award interest calculation also should account for the benefit BNS would have received by avoiding the need to pay the construction costs in those years. Mr. Rosen's method, which only starts to calculate pre-award interest when *cumulative* Past Lost Profits are positive, fails to provide this symmetric treatment. As a result, his pre-award interest methodology provides compensation beyond what is necessary.

210. Table 5 shows a corrected calculation of pre-award interest for Mr. Rosen's Past Lost Profits. For all the cash flows reflected in Mr. Rosen's Past Lost Profits, I apply the cumulative interest that would have been earned from the year of that cash flow through Mr. Rosen's award date. These interest factors reflect Mr. Rosen's selected interest rate and, like Mr. Rosen's calculation, assume that each year's cash flows are received in the middle of the year.

[282] Rosen Report, ¶ 7.2.

Table 5: Corrected Pre-Award Interest Calculation

Year	Rosen Cash Flow for Year	Rosen Interest Rate	Interest Factor from Start of Year	Interest Factor from Mid-Year	Pre-Award Interest
[redacted]					
			Total Pre-Award Interest		($358,972)

Sources & Notes: Appendix F, Table F.6.
[2]: Cash flows as stated in Rosen Report, Schedule 13, C-1095.
[3]: Average 1-Year U.S. Treasury Rate, C-1095.
[4]: 100% plus the sum of [3] in all years after and including [1].
[5]: 100% plus the sum of [3] in all years after [1], multiplied by (1 plus [3] / 2).
[6]: [2] x ([5] – 1).

211. Mr. Rosen calculated pre-award interest of US$129,696.[283] The corrected calculation shows that, under Mr. Rosen's assumed Past Lost Profits, there would have had a pre-award interest benefit of US$358,972 rather than a cost of US$129,696 (i.e., the corrected pre-award interest adjustment is negative US$358,972). While this outcome may sound strange, it is logical, given the circumstances here. The Claimants avoided large project-related cash outflows from [redacted], which would have allowed them to invest those funds when the interest rates were high, [redacted] The cash flows that BNS did not receive from [redacted] would have earned far less interest because interest rates had fallen significantly. Thus, if Mr. Rosen had correctly calculated pre-award interest for his Past Lost Profits period, the result would have been negative.

B. GROSS-UP FOR TAXES

212. Mr. Rosen assumed that the operating quarry would have been taxed at a rate of [redacted] given that the Claimants would get a foreign tax credit in the U.S. for taxes paid by BNS in

[283] Rosen Report, ¶ 7.6.

Canada.[284] In the case of an award, Mr. Rosen states that the award would be taxed in both Canada and the U.S., but that the Claimants would not be able to benefit from U.S. foreign tax credits. Therefore, he assumed based on the testimony of Mr. Forestieri that the award would be taxed at a higher rate of [redacted].[285] To account for his assumed higher tax rate on the award, Mr. Rosen grosses up the award by 48.65% to account for this difference.[286] The gross-up adds US$145.1 million to Mr. Rosen's damages estimate.

213. I have been instructed that the application of a gross-up in this case is not appropriate and hence have not included it in my analysis.

IX. Conclusions

214. I estimate that BNS' total historical investment costs since its formation were [redacted] of which [redacted] were substantiated with invoices. Only a portion of these total costs were related to the JRP process. I estimate that BNS' JRP-related costs were [redacted] of which [redacted] were substantiated with invoices. The Claimants have presented their own estimate of historical investment costs, but this analysis appears to be overstated and raises concerns about reliability that cannot be assessed based on the limited information provided in the Claimants' filings.

215. Mr. Rosen's DCF valuation of lost profits is based on economically unreasonable assumptions and a flawed approach that result in a significant overstatement of the Claimants' loss as of the breach date. While my alternative DCF valuation of the potential profits from Whites Point will have significant uncertainty given the Project's circumstances as of the breach date, using more reasonable assumptions would result in a significantly lower valuation of the Project's potential profits. However, neither of these DCF analyses reflects the loss from the breach because they do not account for mitigation options. Accounting for potential mitigation, I estimate the loss to be [redacted]

---

[284] Rosen Report, ¶ 6.3, relying on Witness Statement of Joe Forestieri, ¶ 29(c).

[285] Rosen Report, ¶ 6.5. The [redacted] rate was taken from Witness Statement of Joe Forestieri, ¶ 29(d).

[286] Rosen Report, ¶ 6.8.

X. Declaration

216. I understand that my duty in giving evidence in this arbitration is to assist the Arbitral Tribunal in deciding the issues in respect of which expert evidence is adduced. I have complied with, and will continue to comply with, that duty.

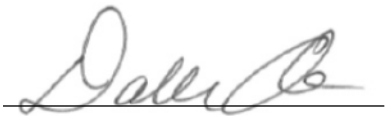
217. I confirm that this is my own, impartial, objective, unbiased opinion which has not been influenced by the pressures of the dispute resolution process or by any party to the arbitration.

218. I confirm that all matters upon which I have expressed an opinion are within my area of expertise.

219. I confirm that I have referred to all matters which I regard as relevant to the opinions I have expressed and have drawn to the attention of the Arbitral Tribunal all matters, of which I am aware, which might adversely affect my opinion.

220. I confirm that, at the time of providing this written opinion, I consider it to be complete and accurate and that it constitutes my true, professional opinion.

221. I confirm that if, subsequently, I consider this opinion to require any correction, modification or qualification I will notify the parties to this arbitration and the Arbitral Tribunal forthwith.



Darrell Chodorow
Washington, DC
9 June 2017

Appendix A: Resume

DARRELL B. CHODOROW
Principal

Washington, DC +1.202.955.5050 Darrell.Chodorow@brattle.com

Mr. Darrell Chodorow is a principal in the Washington, DC office of The Brattle Group. He has more than twenty years of consulting experience in commercial damages, valuation, and tax matters with The Brattle Group. His work has covered a broad array of industries including oil, natural gas, and electricity; biotechnology, pharmaceuticals, and chemicals; commodities and financial services; gaming; consumer products; high technology and media; and transportation.

His expertise includes developing practical insights from detailed analyses of complex business and financial contracts in the context of damages quantification, asset valuation, and the evaluation of economic substance underlying transactions. Mr. Chodorow was identified as a leading expert in quantum of damages in the Who's Who Legal Consulting Experts guide.

Commercial Damages: Mr. Chodorow provides testimonial and non-testimonial consulting on damages in breach of contract, intellectual property, antitrust, and other matters. He has worked on cases before U.S. state and federal courts, the U.S. Court of Claims, and the Federal Court of Australia, as well as arbitration tribunals including the AAA, ICSID, ICC, SCC, LCIA, and the Permanent Court of Arbitration in The Hague.

Business and Asset Valuation: Mr. Chodorow has valued businesses, financial assets, and business assets in litigation and non-litigation matters. He has conducted valuations in a variety of industries including agricultural products, cement, chemicals, financial products, gaming, petroleum, and electricity.

Tax Disputes: Mr. Chodorow has advised the Internal Revenue Service, the U.S. Department of Justice, and taxpayers on matters related to economic substance, research tax credits, transfer pricing, and asset valuation. Cases related to economic substance include BLIPS, Son of Boss, CARDS, DAD, STARS, short-sale, and leasing transactions.

In addition to authoring expert reports and testifying, Mr. Chodorow has worked closely with a number of leading economic and finance academics. They include University of California at Berkeley Professor Daniel McFadden, winner of the 2000 Nobel Prize in Economic Sciences; Massachusetts Institute of Technology Professor Stewart Myers, author of the world's leading corporate finance textbook; and Ohio State University Professor René Stulz, a recent president of the American Finance Association.

Prior to joining Brattle, Mr. Chodorow was an associate in the Energy, Chemicals and Pharmaceuticals group of Booz Allen & Hamilton and at Global Petroleum clearing trades in the futures trading room. He received a B.A. in economics from Brandeis University and an M.B.A. from the Yale School of Management, where he was invited to be a teaching assistant for courses in financial accounting, decision making, and economics.

REPRESENTATIVE EXPERIENCE

Commercial Damages – U.S. Federal and State Courts

- Mr. Chodorow provided expert testimony assessing the damages analysis underlying the request for a $50 million bond in a Lanham Act matter.
- In a lawsuit alleging predatory conduct by a market research provider, Mr. Chodorow submitted an expert report in federal court estimating damages to the plaintiff.
- Mr. Chodorow submitted an expert report on damages in a case involving alleged patent infringement in the biotechnology industry.
- In a matter alleging collusion among financial products providers, Mr. Chodorow evaluated the excess profits earned as a result of the alleged collusion.
- On behalf of a pest control company, he submitted an expert report estimating damages arising from the alleged breach of a distribution agreement and patent infringement.
- For an industrial products company, Mr. Chodorow submitted an expert report on damages in a dispute over a distribution agreement and the accompanying option to purchase the supplier.
- In a lawsuit over an exclusive pharmaceutical distribution agreement for the Former Soviet Union, Mr. Chodorow testified on the reliability of a damages claim in excess of $300 million arising from the supplier's alleged breach of contract.

Commercial Damages – Arbitration Proceedings

- *Permanent Court of Arbitration in The Hague:* On behalf of a minority shareholder in a major financial institution, Mr. Chodorow worked with Professor Stewart Myers to critique the valuation methodologies used to determine the price applied in a mandatory share repurchase.
- *International Centre for the Settlement of Investment Disputes:* Mr. Chodorow estimated damages to foreign investors relating to alleged violations of Chapter 11 of NAFTA by the United Mexican States through the imposition of a tax on high-fructose corn syrup.
- *Arbitration Institute of the Stockholm Chamber of Commerce:* He estimated damages arising from an alleged violation of a license agreement granted to a Chinese chemical manufacturer.

- *London Court of International Arbitration:* Mr. Chodorow evaluated the economic factors surrounding the alleged breach of a crude oil supply agreement between a large buyer and a state-owned oil company.
- *ICC International Court of Arbitration:* He conducted an assessment of the implementation of a valuation clause in a cross-border joint venture agreement involving the beverage industry.
- *American Arbitration Association*: Mr. Chodorow provided expert testimony on issues relating to market timing, directed brokerage, and damages in the mutual fund industry.

Valuation Matters

- Mr. Chodorow advised a client on the valuation of a refinery expansion project being proposed to its board of directors.
- In a dispute over a gaming license in an Asian market, he valued the gaming business resulting from a multi-billion dollar investment program relying on the license.
- Mr. Chodorow advised on the fair market value of the assets during negotiations over the sale of a controlling stake in a large cement, aggregates, and ready-mix concrete business.
- In a dispute over the value of a multi-billion dollar petroleum refining and marketing business, Mr. Chodorow advised on the reliability of the methodology and conclusions of an appraisal.
- For an entrepreneur considering the purchase of hydroelectric generating assets, Mr. Chodorow estimated the fair market value of the target assets.
- Mr. Chodorow advised a client on the valuation of online gaming assets that generated net gaming revenues of nearly $1 billion per year.
- On behalf of a potential acquirer, he assisted in the valuation of transmission assets being offered for sale by a vertically-integrated electric utility.
- Mr. Chodorow has valued a wide variety of financial instruments.

Tax Matters

- In *Roy E. Hahn and Linda G. Montgomery v. Commissioner of Internal Revenue*, Mr. Chodorow testified on the potential for economic profit and non-tax business purpose of the CARDS transaction.

- For both the U.S. Government and taxpayers, Mr. Chodorow has evaluated issues related to economic substance and business purpose for transactions including: BLIPS (*Klamath Strategic Investment Fund LLC v. U.S.*); "Son of Boss" (United States v. Woods); CARDS (*Country Pine Finance, LLC v. Commissioner of Internal Revenue);* Distressed Asset/Debt (*Southgate Master Fund LLC. W. United States*); STARS (Salem Financial Inc. v. United States); and sale-leaseback transactions.
- In a variety of matters, Mr. Chodorow advised clients on transfer pricing issues both for advance pricing agreements and in the course of litigation. Industries analyzed include liquefied natural gas, mining, commodities trading, insurance, and pharmaceuticals.
- In multiple cases, Mr. Chodorow assessed the reasonableness of claimed valuations of performing and non-performing debt instruments.
- Mr. Chodorow submitted an expert report valuing crude oil reserves worth nearly $1 billion in a tax basis dispute and presented before an IRS Appeals panel.
- On behalf of a taxpayer, Mr. Chodorow evaluated whether a company bore the economic benefits and burdens of research costs for which it claimed research tax credits.
- In multiple cases, Mr. Chodorow has evaluated the economic reasonableness of a taxpayers' claimed tax treatment of hedging transactions conducted using exotic derivatives.
- Mr. Chodorow advised a promoter of alleged abusive tax shelters on potential damages in a class action lawsuit by its customers.

PUBLICATIONS AND PRESENTATIONS

"An Economic Evaluation of 'Funding' for Research Tax Credits", (with S. Ledgerwood). *Tax Notes,* Volume 144, Number 13 (September 29, 2014): 1593.

Credit, Where Credit is Due: An Economic Approach to Evaluating the Issue of "Funding" in Research Tax Credit Claims, (with S. Ledgerwood), February 2014.

"The BP Royalty Trust: Warning of Impending Price Declines or a Failing Economic Indicator," Notes at the Margin, (with P. Verleger), September 2012.

"The Economic Implications of the Texas Waiver on Petroleum Markets and the Broader Economy," (with P. Verleger), June 2008.

University of Virginia School of Law, Guest Lecturer in Regulation and Deregulation of U.S. Industries, February 2008.

"Standards for Consulting Firms Working with Academic Experts," presented at Law Seminars International's Expert Testimony in Litigation Conference, Reston, VA, December 2004.

"The FERC, Stranded Cost Recovery, and Municipalization," *Energy Law Journal,* Vol. 19 (2), pp. 351-386. (with others).

"Stages of Power Plant Development – A Survey," (with F. Graves), presented at *"Boom-Bust" in the Electric Power Industry*, Cambridge, MA, August 2000.

"What's in the Cards for Distribution Companies," (with P. Hanser and J. Pfeifenberger), presented at *The Electricity Distribution Conference*, Denver, CO, April 1998.

"Distributed Generation: Threats and Opportunities," (with P. Hanser and J. Pfeifenberger), presented at *The Electricity Distribution Conference*, Denver, CO, April 1998.

TESTIMONY AND EXPERT REPORTS

Agrizap, Inc. v. Woodstream Corp., et al., U.S. District Court, Eastern District of Pennsylvania. Civil Action No. 04-3925. Expert Report.

City of Ontario v. City of Los Angeles, Los Angeles World Airport, and Los Angeles Board of Airport Commissioners, Superior Court of California. Case No. RIC 1306498. Expert Report and Deposition Testimony.

Confidential AAA arbitration involving the mutual fund industry (New York). Expert Report, Deposition Testimony, and Testimony.

Confidential ICC arbitration of alleged misrepresentations in a cosmetics industry acquisition (Singapore). Expert Report and Testimony.

Confidential ICC arbitration relating to the construction contract for a hydroelectric dam in Central America (New York). Expert Report and Rebuttal Report.

Confidential LCIA arbitration regarding the delivery of allegedly defective solar modules (Singapore). Expert Report.

Confidential tax mediation over the value of crude oil reserves. Expert Report and Presentation to IRS Appeals Panel.

Coverings Space NJ, Inc. v. Adele, et al., Superior Court of New Jersey. Civil Action HUD-L-3730-06. Expert Report and Deposition Testimony.

Embrex, Inc. v. Avitech, L.L.C. U.S. District Court, Middle District of North Carolina. Civil Action No. 1:04CV00693. Expert Report.

Enel Green Power S.p.A. v. Republic of El Salvador, International Centre for Settlement of Investment Disputes, Case No. ARB/13/18. Expert Report.

ErinMedia, LLC v. Nielsen Media Research, Inc., U.S. District Court, Middle District of Florida. Civil Action No. 8:05-CV-1123-T24-EAJ. Expert Report and Deposition Testimony.

Hydro-Fraser Inc., Société d'energie Columbus Inc., Ayers Ltée v. Hydro Québec, ad hoc arbitration. Expert Report, Rebuttal Report, and Hearing Testimony.

Kayat Trading Ltd. v. Genzyme Corporation, Cyprus District Court, Nicosia District. Expert Report and Testimony.

Laboratorios Haymann S.A. v. Ivax Pharmaceuticals, Inc. and Teva Pharmaceuticals USA, Inc., International Chamber of Commerce International Court of Arbitration, Case No. ICC 18589/CA. Expert Report, Deposition Testimony, and Arbitration Testimony.

Norfolk Southern Railway Company v. Drummond Coal Sales, Inc., U.S. District Court, Western District of Virginia. Civil Action No. 7:08CV00340. Expert Report.

Perfetti Van Melle USA and Perfetti Van Melle Benelux v. Cadbury Adams USA LLC, U.S. District Court for the Eastern District of Kentucky, Civil Action No. 2:10-CV-35-DLB. Expert Declaration and Testimony.

Petroplast Petrofisa Plasticos S.A. and Petrofisa Do Brazil, Ltda v. Ameron International Corp., Delaware Court of Chancery, Civil Action No. 4304-VCP. Expert Report, Deposition Testimony, and Testimony.

Robert Rockwood and Roxanna Marchosky v. SKF USA, Inc. U.S. District Court for the District of New Hampshire, Civil Action No. 1:08-CV-00168. Expert Report.

Roy E. Hahn and Linda G. Montgomery v. Commissioner of Internal Revenue, U.S. Tax Court, Docket No. 1910-14. Expert Report and Testimony.

SCS Interactive, Inc. and Whitewater West Industries Ltd v. Vortex Aquatic Structures International Inc., U.S. District Court of Colorado, Civil Action No. 09-cv-01732-REB-KLM. Expert Report.

SoBe Entertainment International, LLC v. Paul Wight a/k/a "The Big Show," Bess Wight f/k/a Bess Katramados, and World Wrestling Entertainment, Inc., Circuit Court for Miami-Data County, Case No. 09-45461 CA 09. Expert Declaration.

The Northern Cheyenne Tribe v. Gale A Norton, Secretary of the Interior and Fidelity Exploration and Production Company, U.S. District Court, District of Montana, Billings, Civil Action No. CV-03-00078-RWA. Expert Declaration.

Appendix B: Materials Considered

Documents Considered

1. Documents from Arbitration

Amended Statement of Claim, *William Ralph Clayton, William Richard Clayton, Douglas Clayton, Daniel Clayton and Bilcon of Delaware, Inc. v. Government of Canada* , 3 December 2009.

Award on Jurisdiction and Liability, *William Ralph Clayton, William Richard Clayton, Douglas Clayton, Daniel Clayton and Bilcon of Delaware, Inc. v. Government of Canada* , 17 March 2015.

Notice of Arbitration under the Arbitration Rules of the United Nations Commission on International Trade Law and the North American Free Trade Agreement, *William Ralph Clayton, William Richard Clayton, Douglas Clayton, Daniel Clayton and Bilcon of Delaware, Inc. v. Government of Canada,* 26 May 2008.

Statement of Claim, *William Ralph Clayton, William Richard Clayton, Douglas Clayton, Daniel Clayton and Bilcon of Delaware, Inc. v. Government of Canada* , 30 January 2009.

Memorial of the Investors, *William Ralph Clayton, William Richard Clayton, Douglas Clayton, Daniel Clayton and Bilcon of Delaware, Inc. v. Government of Canada* , 25 July 2011.

2. Documents Produced by Claimants

First Expert Report of GHD (Peter Oram). 6 December 2016.

First Expert Report of Howard Rosen. 15 December 2016.

First Expert Report of John T. Boyd Company (Michael F. Wick). 5 December 2016.

First Expert Report of Mercator Geological Services (Michael Cullen). 17 November 2016.

Affidavit of Bob Petrie. 1 December 2011.

Witness Statement of Joe Forestieri. 13 December 2016.

Witness Statement of John Wall. 8 December 2016.

Witness Statement of Michael G. Washer. 8 December 2016.

Witness Statement of Paul Buxton. 15 December 2016.

Witness Statement of Tom Dooley. 9 December 2016.

Witness Statement of William Richard Clayton. 15 December 2016.

Witness Statement of Dan Fougere. 12 December 2016.

C-5. Letter of Intent from Bilcon to Nova Stone Exporters Inc.

C-16. Director's Register. 24 April 2002.

C-19. Aggregate Lease Agreement. 3 April 2002.

C-22. Partnership Agreement between Nova Stone Exporters Inc. and Bilcon of Nova Scotia. April 2002.

C-23. Agreement between Bilcon of Nova Scotia Corporation and Nova Stone Exporters, Inc.

C-445. Bilcon's Response to Undertaking #12. 22 June 2007.

C-637. Bilcon's Responses to Comments on the EIS – Vol. III—Comments on the EIS-Whites Point Quarry and Marine Terminal Project, Environmental Impact Statement.

Documents Considered

C-640. Whites Point Quarry & Marine Terminal, Revised Project Description. November 2006.

C-1002. Revenue Matrix Summary. 2011-2015. 9 December 2016.

C-1005. Bilcon of Nova Scotia/Seabulk Systems Inc.. White's Point Quarry Ship Loading Facility Construction Cost Estimate. March 2006.

C-1010. Whites Point Operating Costs. 2011-2015.

C-1025. Supply Agreement Between NYSS and Martin Marietta Materials. 24 May 2010.

C-1026. NYSS Confidential Information Memorandum. January 2014.

C-1030. Whites Point Quarry and Marine Terminal Project Expenses. 13 December 2016.

C-1046. Whites Point Quarry Pro Forma Statement of Operations. 7 December 2016.

C-1092. Vulcan Materials Company. Black Point Quarry Project Environmental Impact Statement. February 2015.

C-1095. FTI Native DCF Model. 15 December 2016.

C-1108. Morrison Calculation of Shipping Rates. 9 December 2016.

C-1342. Letter from Gregory Nash re: Procedural Order No. 22. 10 March 2017.

C-1343. Letter from Nash Johnston re: Procedural Order No. 23. 5 May 2017.

C-1344. Costings dated 18 October 2004.

C-1361. Amboy Aggregates – Highlighted Spreadsheet of Grits Purchased by Amboy Aggregates Between 2001-2014. 2016.

3. Documents Produced by Respondent

R-1. Canadian Environmental Assessment Act. S.C. 1992.

R-27. *Agreement Concerning the Establishment of a Joint Review Panel for the Whites Point Quarry and Marine Terminal Project between the Minister of the Environment. Canada and the Minister of the Environment and Labour, Nova Scotia* . Terms of Reference for the Joint Review Panel. 3 November 2004.

R-73. Letter from Minister of Fisheries and Oceans Robert G. Thibault to Minister of Environment David Anderson. 26 June 2003.

R-87. Nova Stone Approval to Construct and Operate a Quarry at or Near Little River, Digby County. 30 April 2002.

R-212. Environmental Assessment of the Whites Point Quarry and Marine Terminal Project. Joint Review Panel Report. October 2007.

R-258. News Release: Whites Point Quarry and Marine Terminal Joint Review Panel Announces Public Hearings. 1 May 2007.

R-331. Letter from Nova Scotia Department of Environment and Labour Office of the Minister to Paul G. Buxton. Re: Whites Point Quarry and Marine Terminal. 20 November 2007.

Documents Considered

R-383. The Government of Canada's Response to the Environmental Assessment Report of the Joint Review Panel on the Whites Point Quarry and Marine Terminal Project. 17 December 2007.

R-575. Whites Point Quarry & Marine Terminal. Environmental Impact Statement, Volume I – Plain Language Summary. 31 March 2006.

R-579. Whites Point Quarry & Marine Terminal. Environmental Impact Statement, Volume VI. 31 March 2006.

R-581. Whites Point Quarry & Marine Terminal. Revised Project Description. November 2006.

R-590. Letter from [redacted], Inc. to William Clayton. [redacted]

R-687. "10-Year Breakeven Inflation Rate, Percent, Daily, Not Seasonally Adjusted." Federal Reserve Bank of St. Louis, 22 October 2007. Accessed 12 April 2017. https://fred.stlouisfed.org/series/T10YIE.

R-717. Business Plan for Whites Point Quarry. Clayton Concrete. April 2004.

R-718. Letter from Nova Stone Exporters Inc. to Bill Clayton. 4 February 2002.

R-719. Financial Statements of Global Quarry Products. 1 April 2004.

R-720. Document Production Requests of the Government of Canada. 10 February 2016.

R-721. CIM Definition Standards – For Mineral Resources and Mineral Reserves. CIM Standing Committee on Reserve Definitions. 27 November 2010.

R-722. Brealey, Richard A., Myers, Seth C., and Franklin Allen. *Principles of Corporate Finance.* 10th ed. New York, NY: McGraw-Hill/Irwin, 2010.

R-723. Clayton Hunt. "Company Still Interested in Belleoram Rock Quarry." *The Gander Beacon.* 20 October 2014. Accessed 2 November 2016.

R-724. Continental Stone Limited. "Environmental Assessment Registration Document." Newfoundland and Labrador Department of the Environment and Conservation. October 2014. Accessed 1 November 2016. http://www.env.gov.nl.ca/env/env_assessment/projects/Y2014/1767/1767_reg_document.pdf.

R-725. Darren Constantino. "State of the Industry." Pit & Quarry. December 2007.

R-726. Martin Marietta Quarter 4 2007 Earnings Call Transcript. 5 February 2008.

R-727. Martin Marietta, Historic Stock Lookup. 30 April 2007. Accessed 15 May 2017. Bloomberg LP.

R-728. Martin Marietta, Historic Stock Lookup. 22 October 2007. Accessed 15 May 2017. Bloomberg LP.

R-729. Daily PX_LAST of MLM US Equity, VMC US Equity, and SPX Index. 3 January 2000 - 21 February 2017. Accessed 12 May 2017. Bloomberg LP.

R-730. Bloomberg USD/CAD forwards. Accessed 15 May 2017. Bloomberg LP.

R-731. Joint Review Panel of the Whites Point Quarry and Marine Terminal Project - Invoice #01-07/08. 13 July 2007.

R-732. Joint Review Panel of the Whites Point Quarry and Marine Terminal Project - Invoice #02-07/08. 27 November 2007.

R-733. Joint Review Panel of the Whites Point Quarry and Marine Terminal Project - Invoice #03-07/08. 27 March 2008.

Documents Considered

R-734. Aswath Damodaran. ERP Estimates By Month (2008-2017). Accessed 5 May 2017. http://www.stern.nyu.edu/~adamodar/pc/implprem/ERPbymonth.xls.

R-735. The Most Important Number in Finance: The Quest for the Market Risk Premium. JP Morgan. May 2008.

R-736. Moody's Long Term Ratings of Martin Marietta and Vulcan Materials. Accessed 25 April 2017. Bloomberg LP.

R-737. "Moody's Seasoned Baa Corporate Bond Yield, Percent, Monthly, Not Seasonally Adjusted." Federal Reserve Bank of St. Louis. September 2007. Accessed 12 April 2017. https://fred.stlouisfed.org/series/BAA.

R-738. Fisher, Franklin M., and R. Craig Romaine. "Janis Joplin's yearbook and the theory of damages." *Journal of Accounting, Auditing & Finance* 5.1 (1990).

R-739. "Harmonized Tariff Schedule of the United States (2017)." Section V: Mineral Products. Chapter 25. Accessed 6 June 2017. https://hts.usitc.gov/current.

R-740. Daily PX_LAST of CAD BGN Currency. 3 January 2000 – 23 February 2017. Accessed 23 February 2017. Bloomberg LP.

R-741. Domestic Exports of 251710 Pebbles, gravel, broken/crushed stone, used for concrete aggregates w/n heat-treat from Canada. 2003 - 2015. Canadian International Merchandise Trade Database. Accessed 13 December 2016.

R-742. 20-Year Treasury Constant Maturity Rate (GS20) on 22 October 2007. Federal Reserve Economic Data. Accessed 20 May 2017.

R-743. Five-year monthly levered betas of September 2007 (IQ_CUSTOM_BETA). Capital IQ. Accessed 22 May 2017.

R-744. Effective tax rate from October 2002 - September 2007 (IQ_EFFECT_TAX_RATE). Capital IQ. Accessed 22 May 2017.

R-745. Book value of total debt in USD millions (IQ_TOTAL_DEBT). Capital IQ. Accessed 22 May 2017.

R-746. Market cap in USD millions (IQ_MARKETCAP). Capital IQ. Accessed 22 May 2017.

R-747. Monthly HISTORICAL_MARKET_CAP, Monthly RT116, and Daily PX_LAST of MLM US Equity and VMC US Equity. 3 January 2000 - 21 February 2017. Accessed 12 May 2017. Bloomberg LP.

R-748. Frequently Asked Questions: How Do I Convert Between Short Tons and Metric Tons, U.S. Energy Information Adminstration. Accessed 31 January 2017.

RE-1. Expert Report of Lesley Griffiths. 9 June 2017.

RE-2. Expert Report of Tony Blouin. 9 June 2017.

RE-3. Expert Report of Robert G. Connelly. 9 June 2017.

RE-4. Report of Peter Geddes. 9 June 2017.

RE-6. Expert Report of the Honourable John M. Evans. 9 June 2017.

RE-7. Expert Report of Dr. Arlie G. Sterling, Marsoft, Inc. 9 June 2017.

RE-8. Expert Report of SC Market Analytics. 9 June 2017.

Appendix C: Historical Costs

Table C.1: Total Historical Costs in Canadian Dollars (Apr. 2002 - Oct. 2007)

		Total Costs	BNS Total Costs	Substantiated Costs
[1]	Consulting Experts	[redacted]	[redacted]	[redacted]
[2]	Panel Costs	[redacted]	[redacted]	[redacted]
[3]	Office & Operations	[redacted]	[redacted]	[redacted]
[4]	2004 GQP Purchase	[redacted]	[redacted]	[redacted]
[5]	Total Investment Costs	[redacted]	[redacted]	[redacted]

Sources: Table C.5. [12], [14], [7], and Table C.6.

Notes: Total BNS Costs exclude cases where [redacted]
Substantiated Costs exclude costs that were not supported with an invoice or receipt or cases where evidence of [redacted]
Amounts listed in C-1172, a duplicative file, are also excluded. Figures reported in US$ are converted to C$ using the month-end exchange rate for each invoice.

[1]: Costs associated with consulting experts for the environmental assessment.

[2]: Costs associated with the JRP Panel. This includes all payments to the Canadian Environmental Assessment Agency and the Nova Scotia Department of the Environment and Labour.

[3]: Costs associated with the development of the quarry and business, excluding foreign withholding taxes.

[4]: Claimants' payments to buy NSE's stake in GQP, converted to Canadian dollars.

[5]: [1] + [2] + [3] + [4].

Table C.2: JRP-Related EA Costs in Canadian Dollars (Nov. 2004 - Oct. 2007)

		Total Costs	BNS Total Costs	Substantiated Costs
[1]	Consulting Experts	[redacted]	[redacted]	[redacted]
[2]	Panel Costs	[redacted]	[redacted]	[redacted]
[3]	Office & Operations	[redacted]	[redacted]	[redacted]
[4]	Total Investment Cost	[redacted]	[redacted]	[redacted]

Sources: Table C.5 [12], [14], [7], and Table C.6.

Notes: Total BNS Costs exclude cases where evidence of [redacted]
Substantiated Costs exclude costs that were not supported with an invoice or receipt or cases where evidence of [redacted]
Amounts listed in C-1172, a duplicative file, are excluded. Figures reported in US$ are converted to C$ using the month-end exchange rate for each invoice.

[1]: Costs associated with consulting experts for the environmental assessment.

[2]: Costs associated with the JRP Panel. This includes all payments to the Canadian Environmental Assessment Agency and the Nova Scotia Department of the Environment and Labour.

[3]: Costs associated with the operation of the office during the JRP process, such as salaries, office supplies, and courier servicers. Non-essential costs, such as foreign withholding taxes, hats and mugs, are excluded from the JRP period tabulation.

[4]: [1] + [2] + [3].

Table C.3: Second JRP Cost Estimation in 2007 US Dollars (May 2007 - Oct. 2007)

		Costs in Canadian Dollars	Cost in US Dollars
[1]	Consulting Experts	[redacted]	[redacted]
[2]	Panel Costs	[redacted]	[redacted]
[3]	Office & Operations	[redacted]	[redacted]
[4]	Total	[redacted]	[redacted]

Sources: Table C.4, C.5 [12], [13] and Table C.6.

Notes: Amounts listed in C-1172, a duplicative file, are excluded.

[1]: Costs associated with consulting experts for the environmental assessment.

[2]: Table C.4.

[3]: Costs associated with the operation of the office during the JRP process, such as salaries, office supplies, and courier servicers. Non-essential costs, such as foreign withholding taxes, hats and mugs, are excluded from the JRP period tabulation.

[4]: [1] + [2] + [3].

Table C.4: Second JRP Panel Cost Estimation

Invoice Date	Cost in Nominal C$	Exchange Rate	Cost in 2007 US$
[1]	[2]	[3]	[4]
16-Sep-07	[redacted]	[redacted]	[redacted]
27-Nov-07			
27-Mar-08			
Total	[redacted]		[redacted]

Source: CEAA Invoices.

Notes:

[1]: The date of the CEAA invoice.

[2]: The amount due to the CEAA, listed in Canadian dollars.

[3]: Table C.7.

[4]: [2] / [3].

Table C.5: Historical Costs

[redacted]

Table C.5: Historical Costs

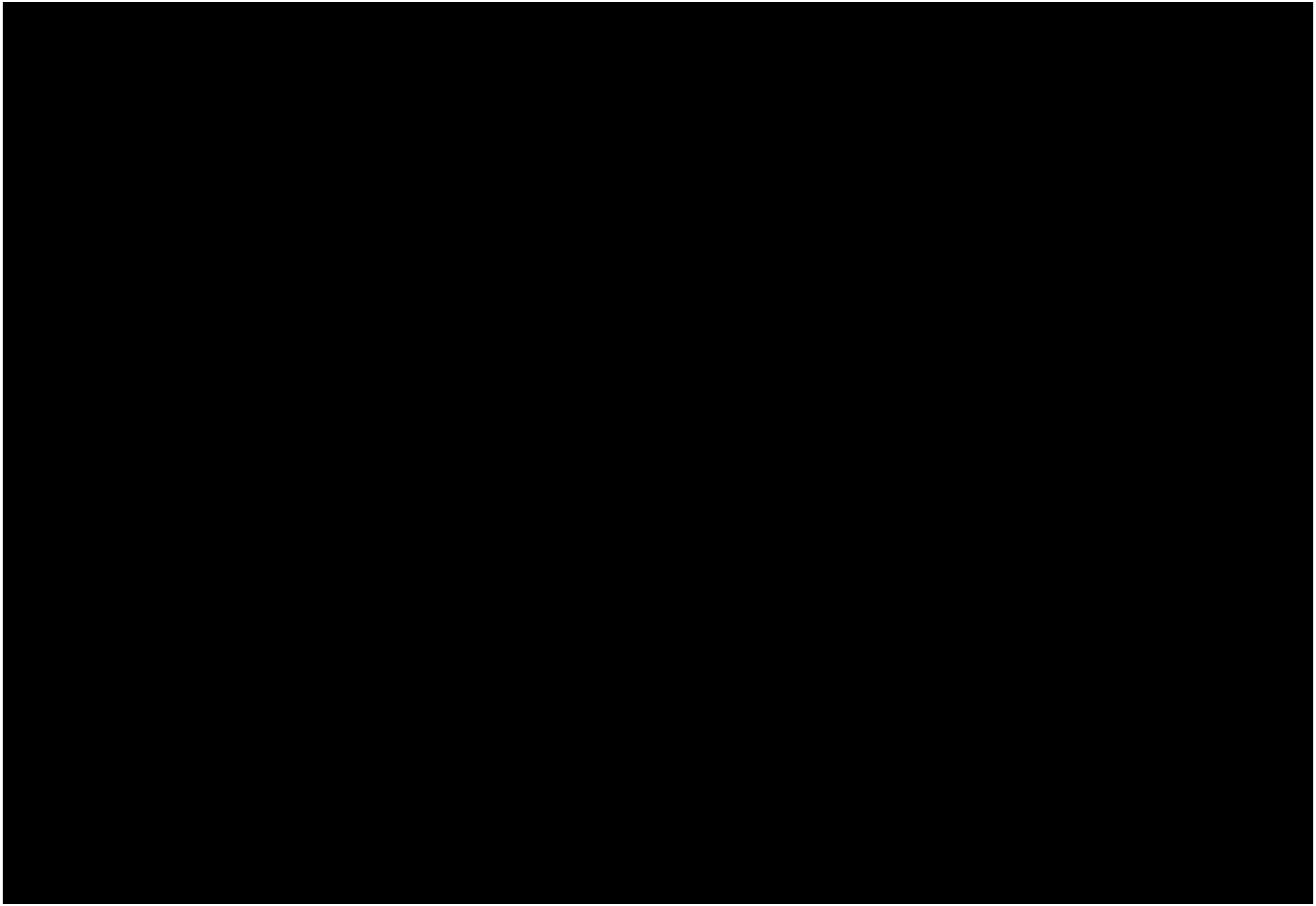


Table C.5: Historical Costs

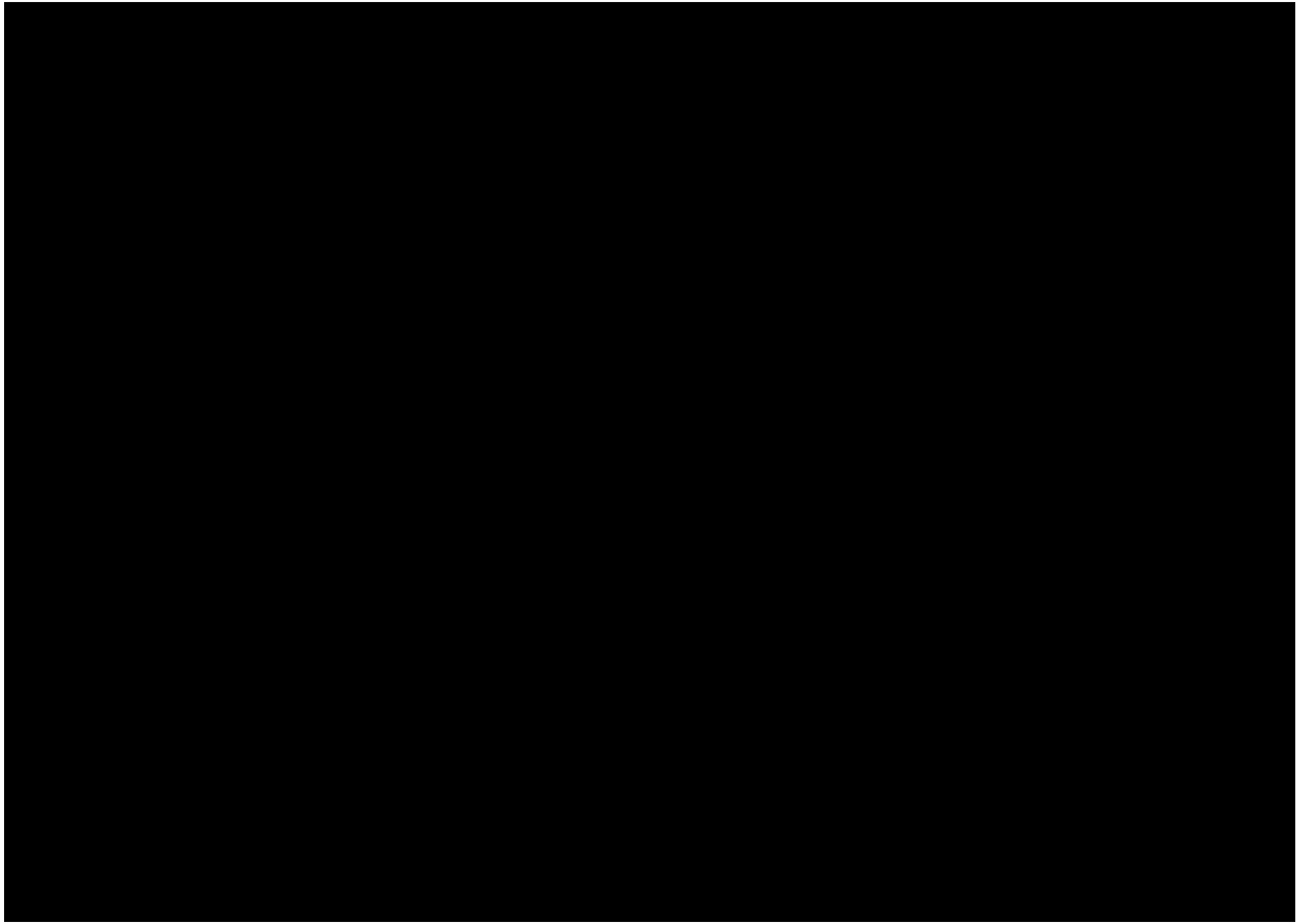


Table C.5: Historical Costs

Table C.5: Historical Costs

Table C.5: Historical Costs

Table C.5: Historical Costs

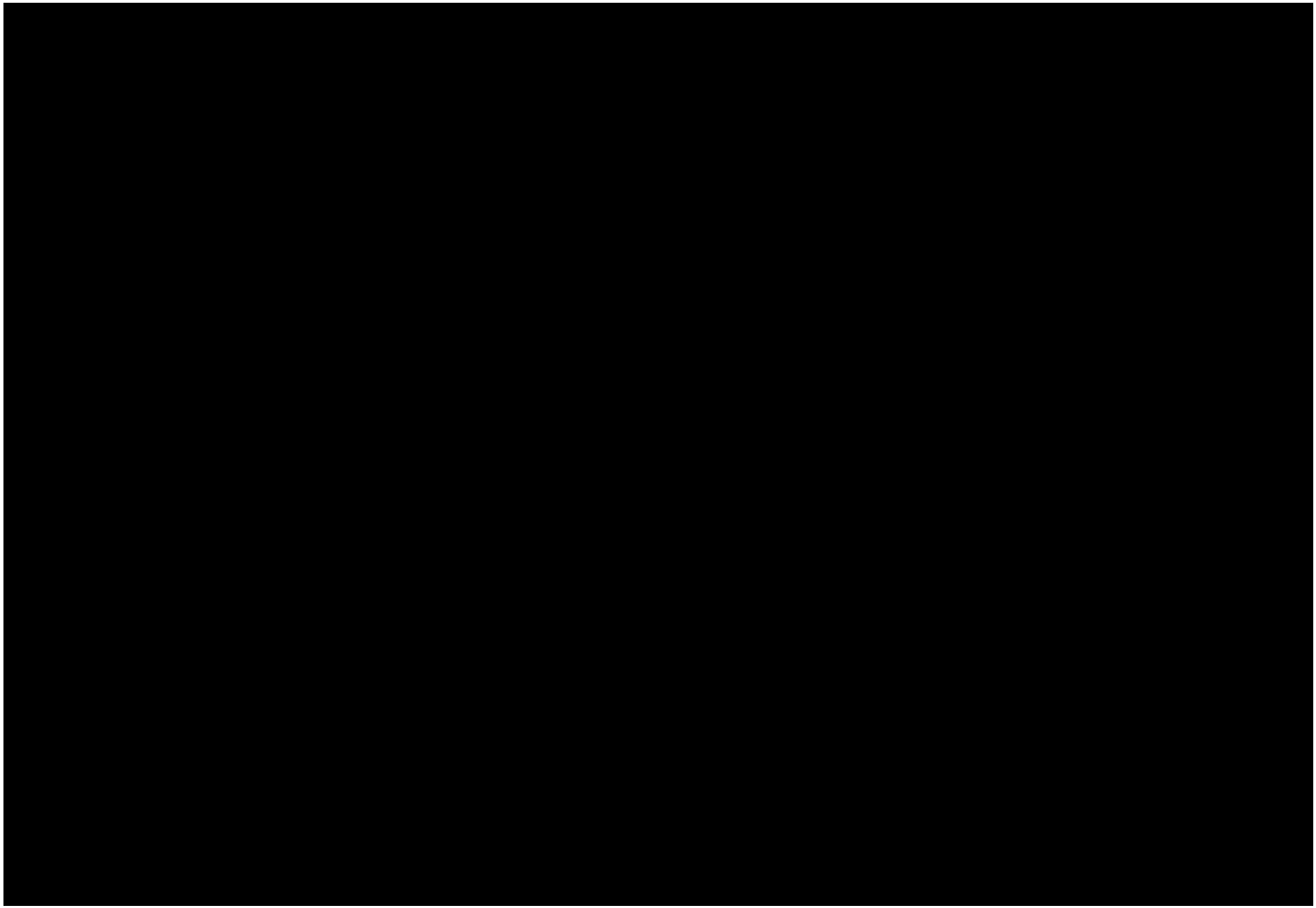


Table C.5: Historical Costs

Table C.5: Historical Costs

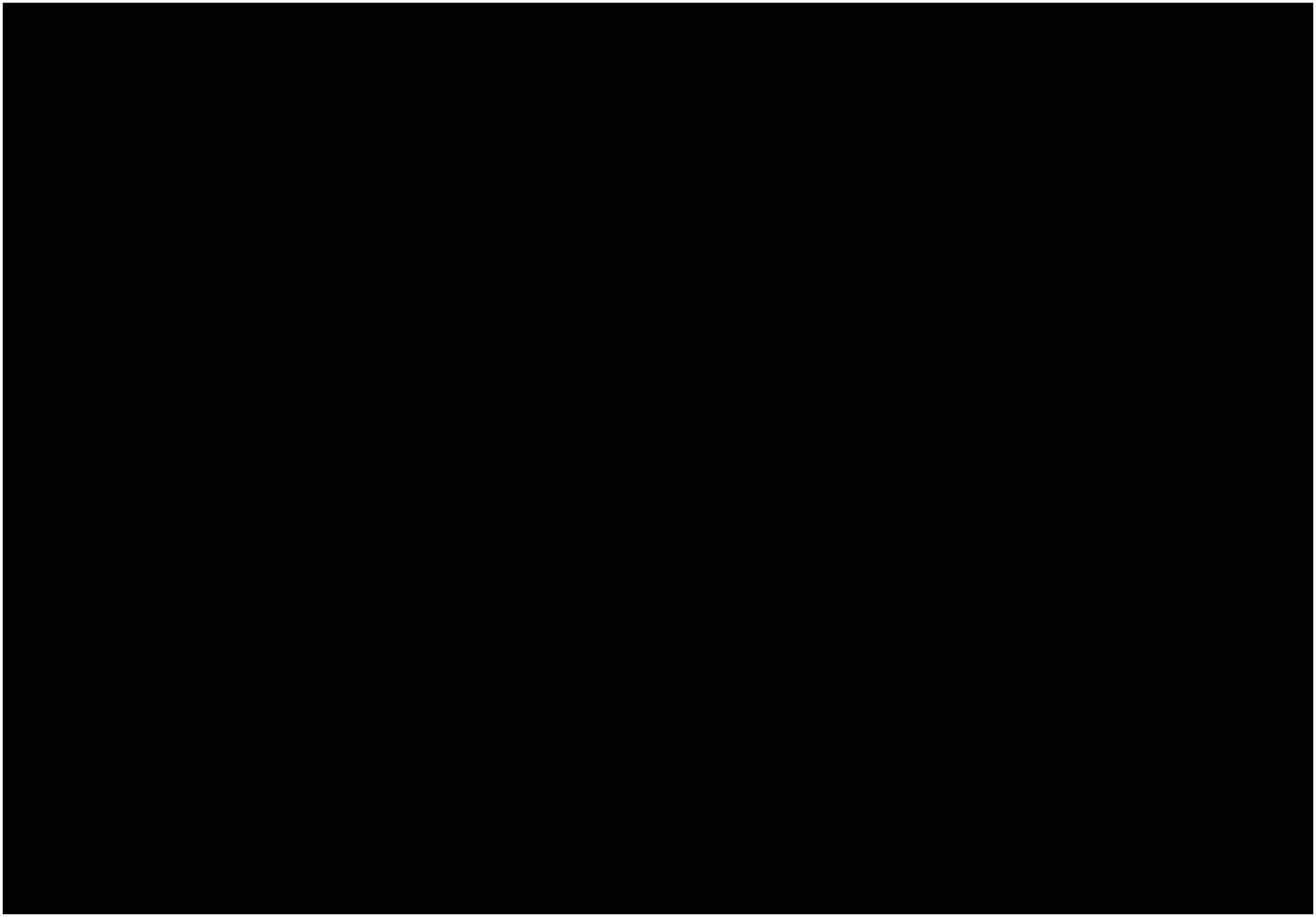


Table C.5: Historical Costs

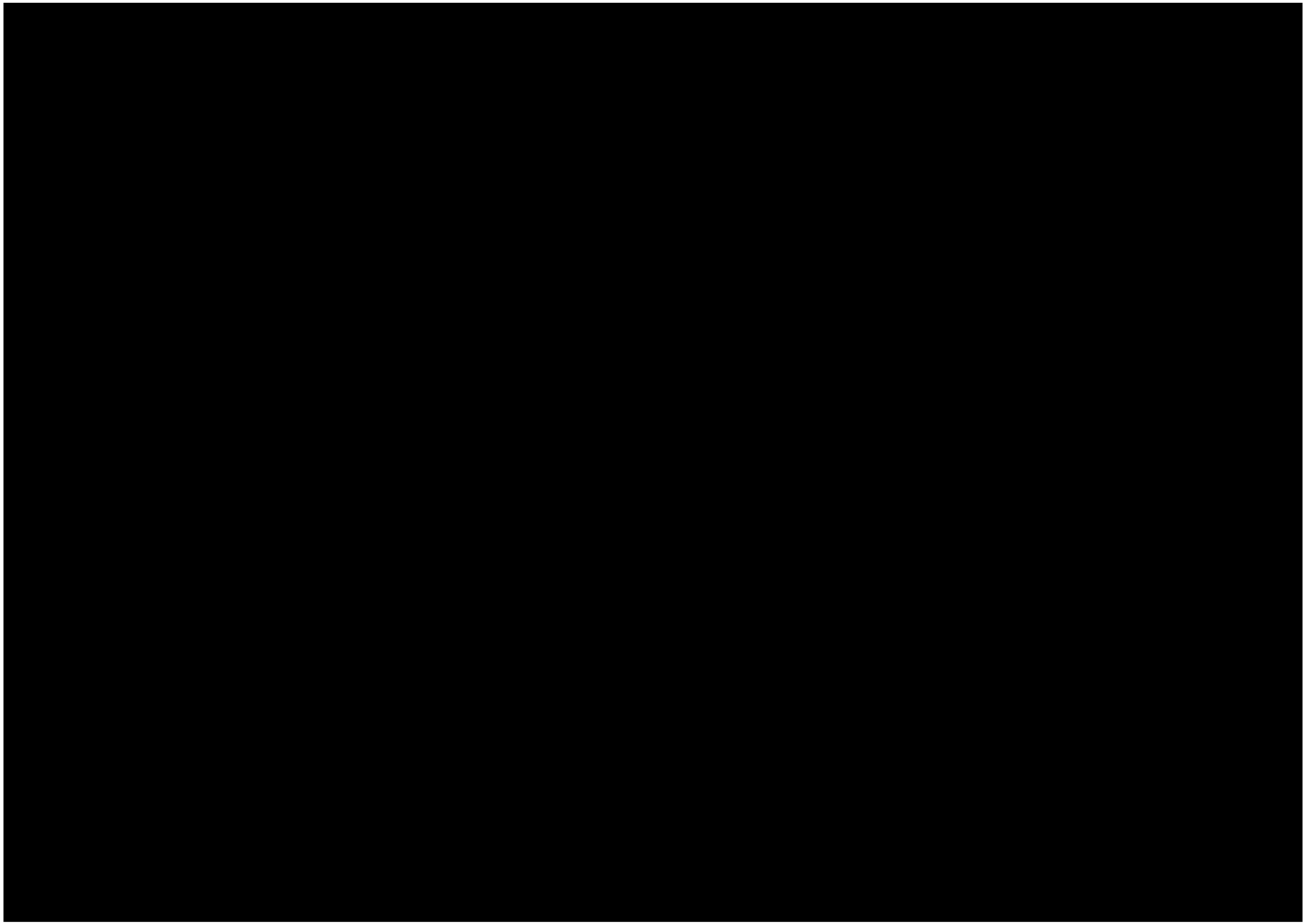


Table C.5: Historical Costs

[redacted]

Table C.5: Historical Costs

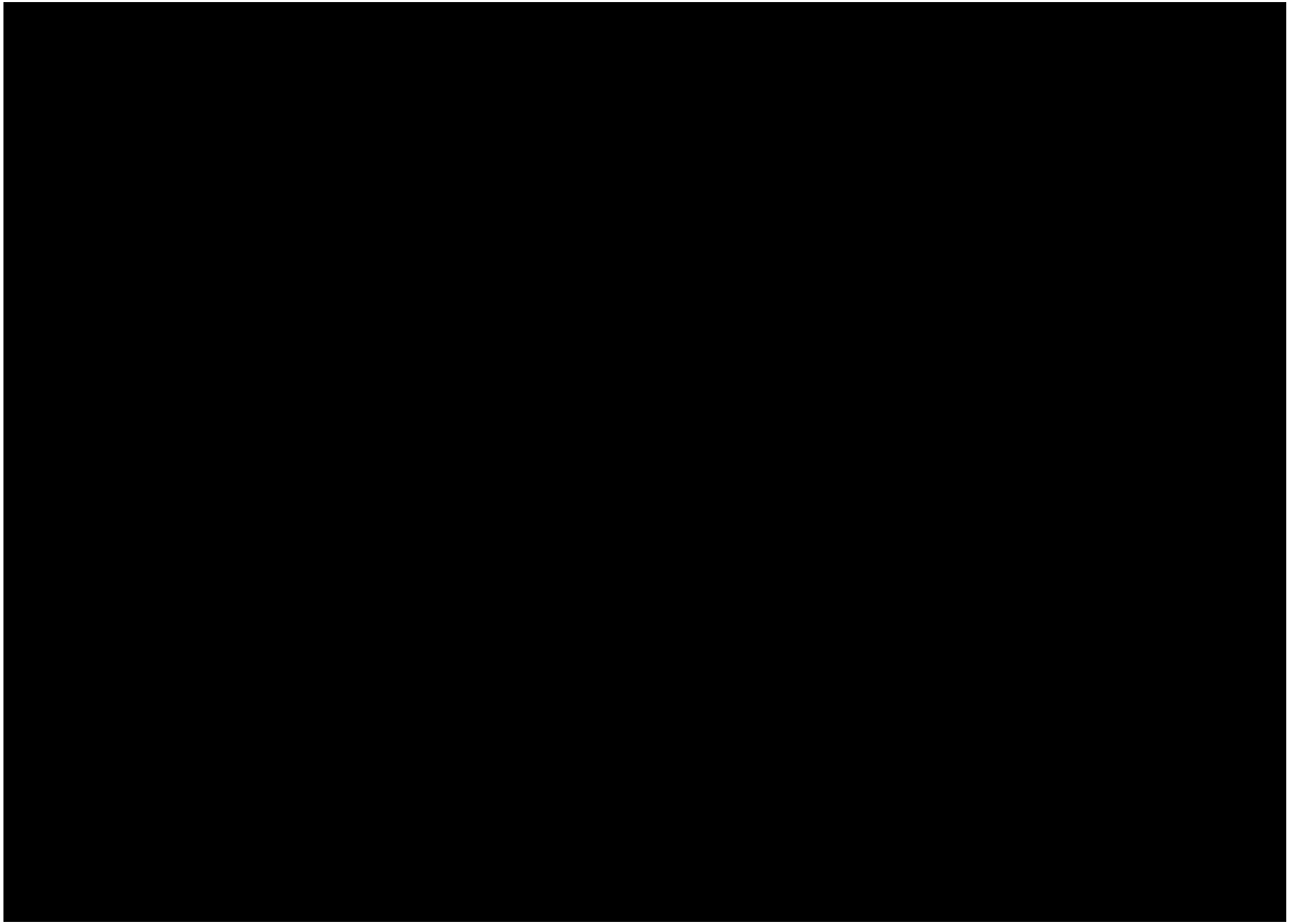


Table C.5: Historical Costs

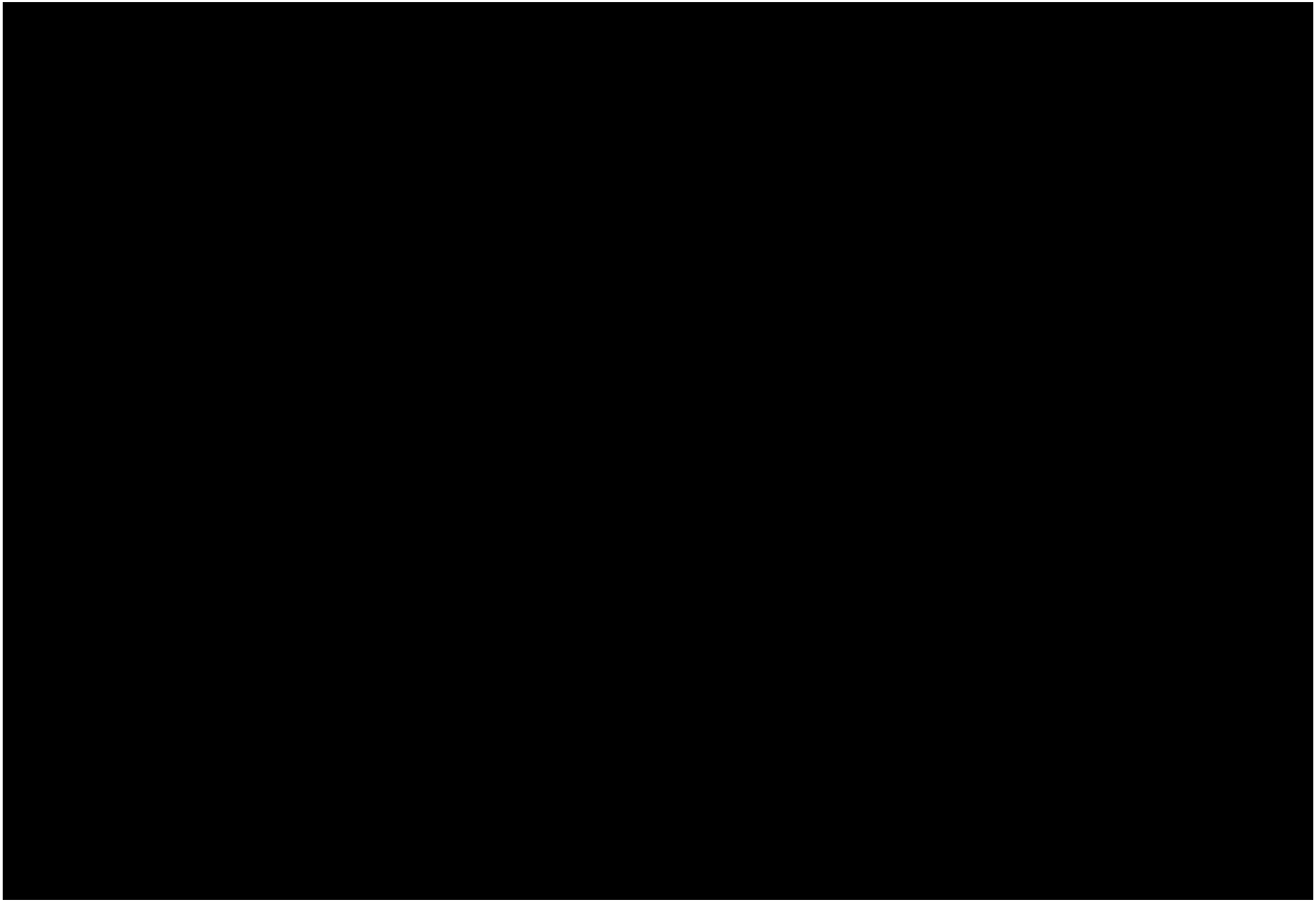
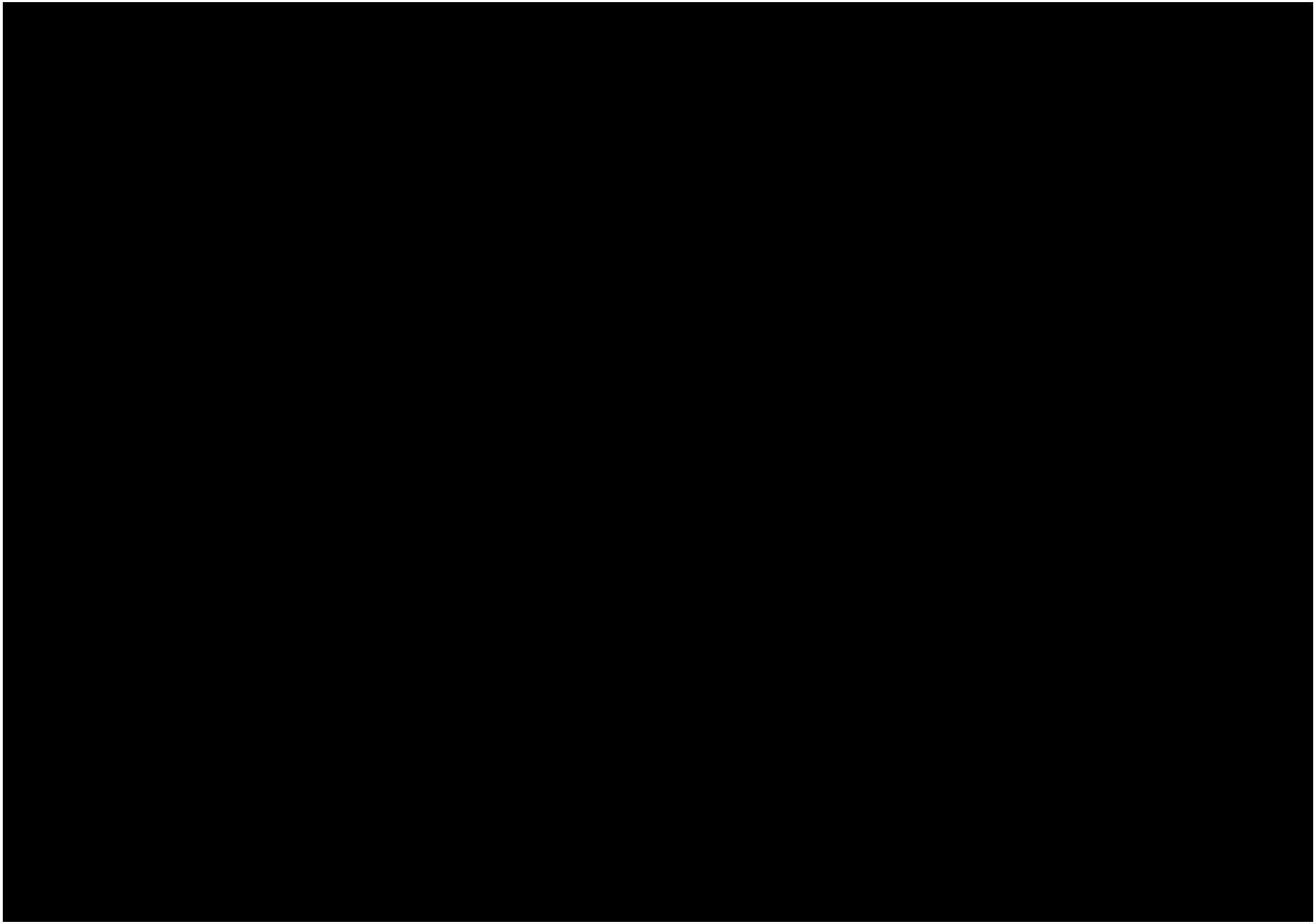


Table C.5: Historical Costs



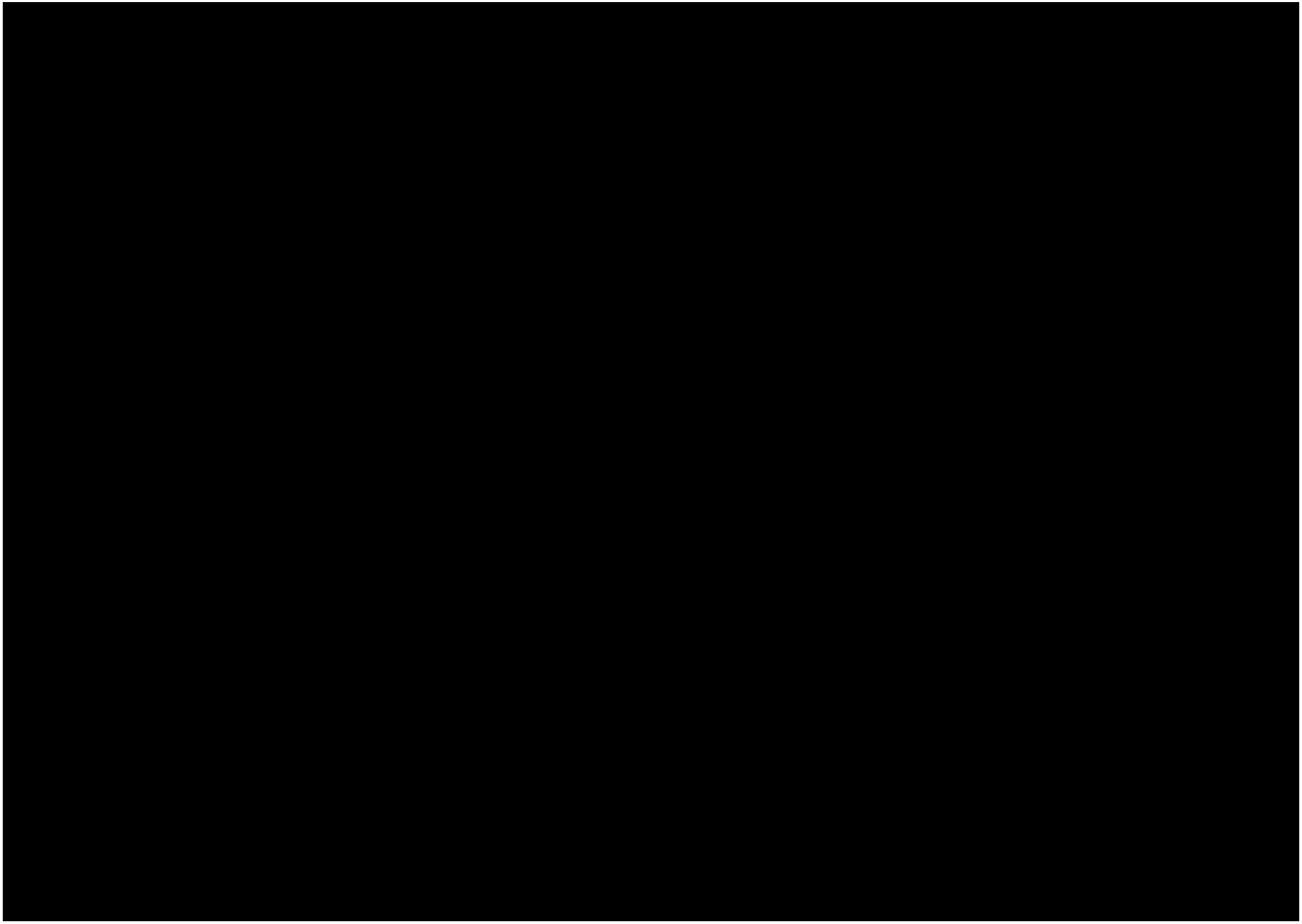


Table C.5: Historical Costs

Table C.5: Historical Costs

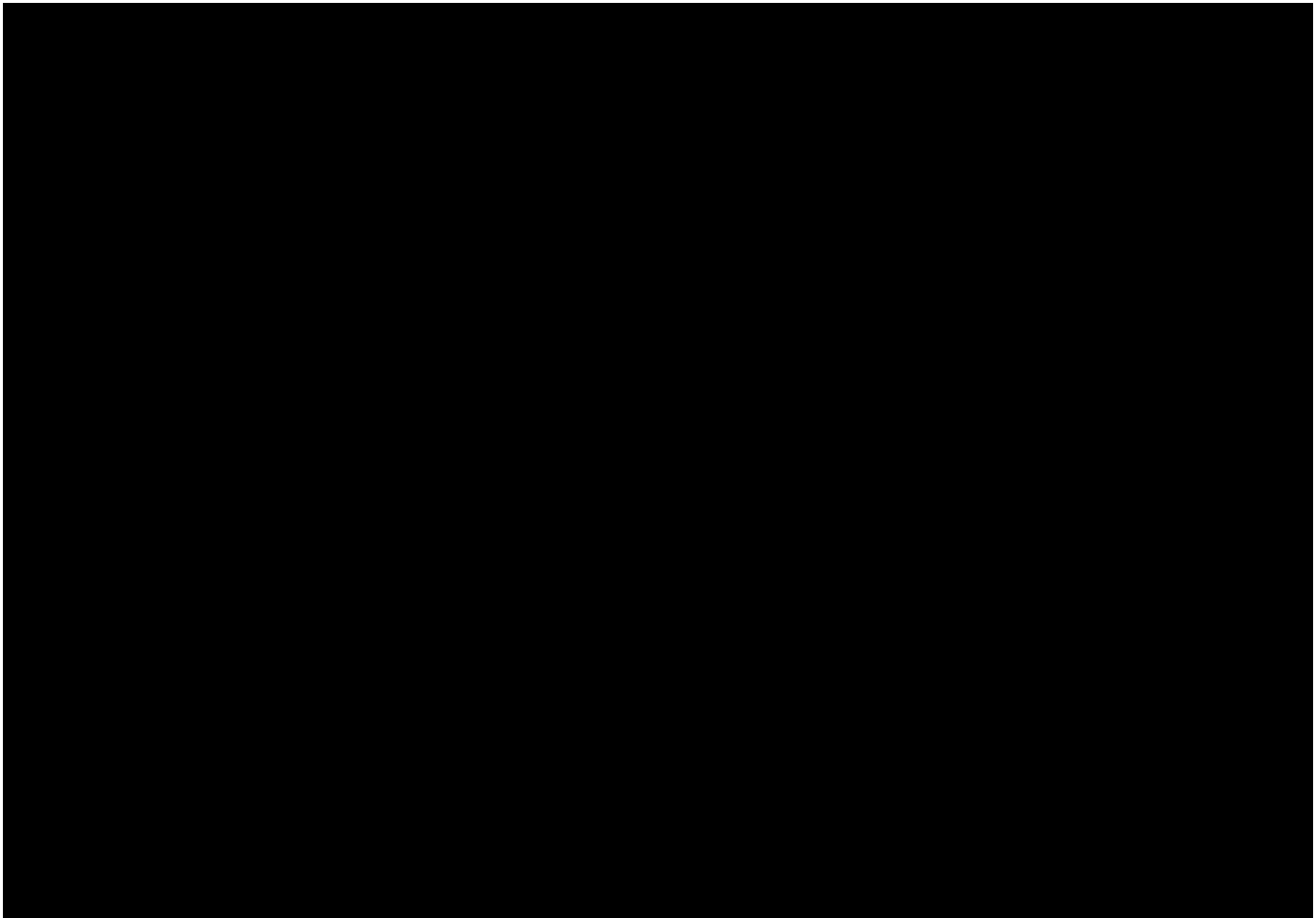


Table C.5: Historical Costs

Table C.5: Historical Costs

Table C.5: Historical Costs

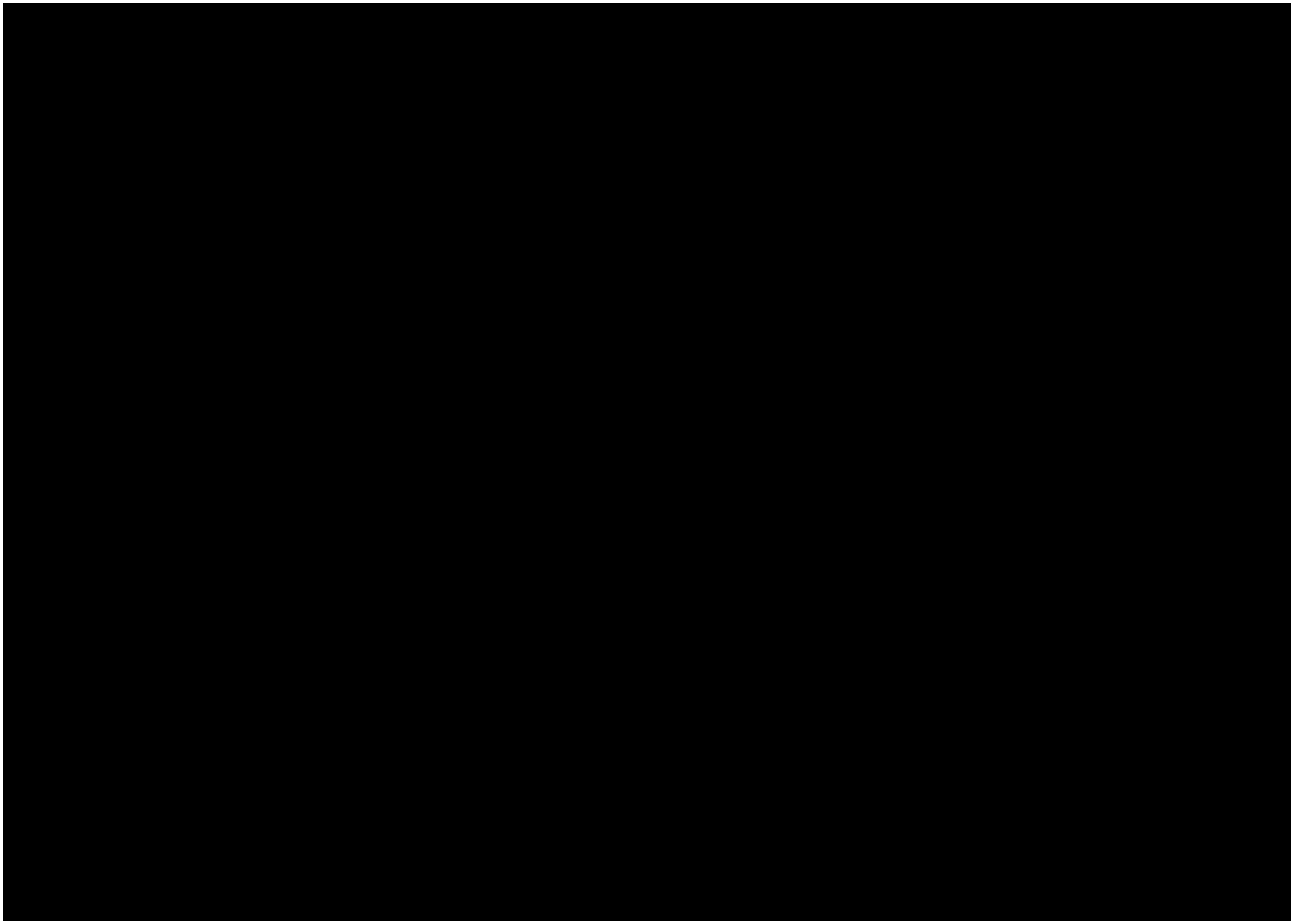


Table C.5: Historical Costs

[redacted]

Table C.5: Historical Costs

Table C.5: Historical Costs

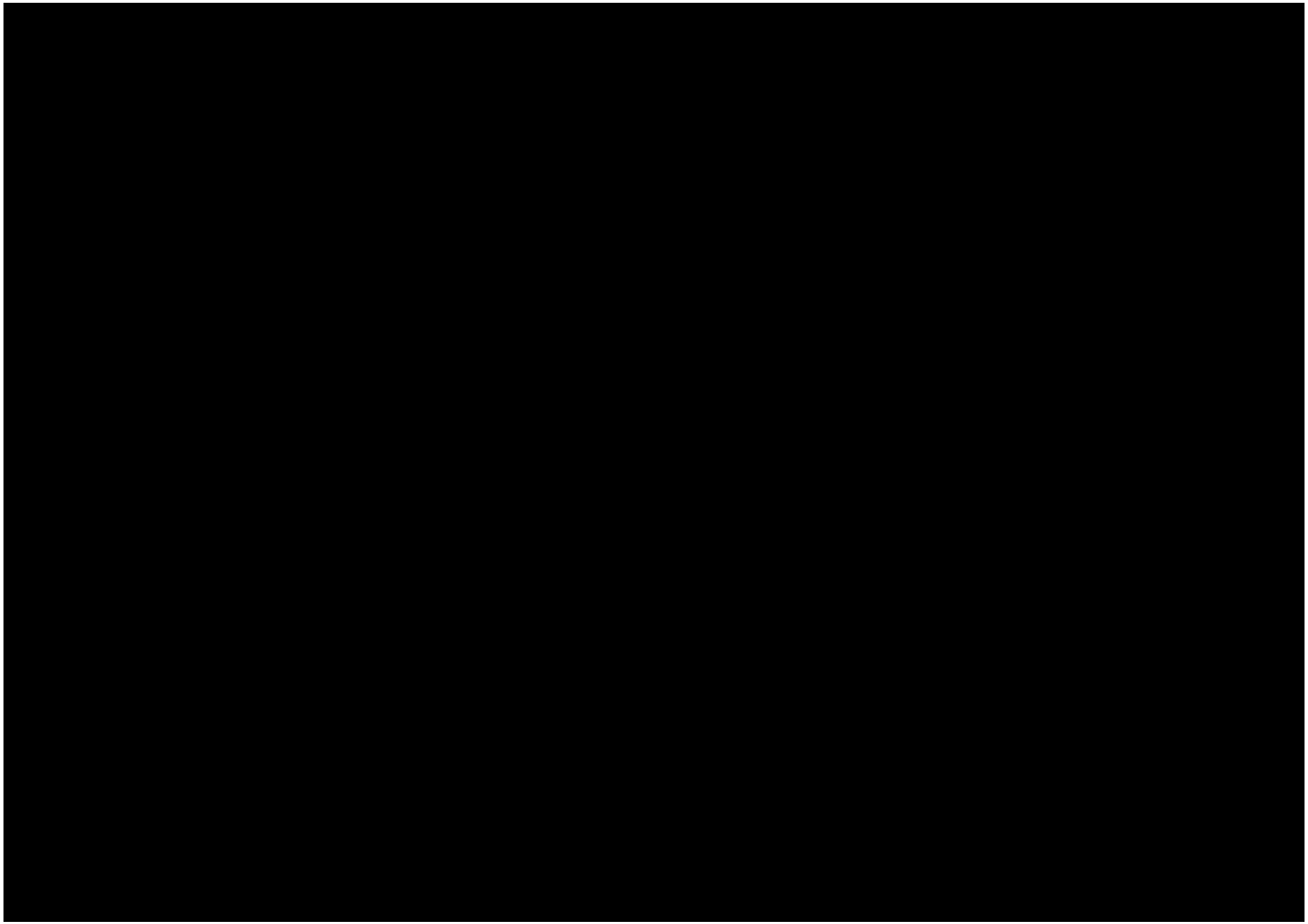


Table C.5: Historical Costs

Table C.5: Historical Costs

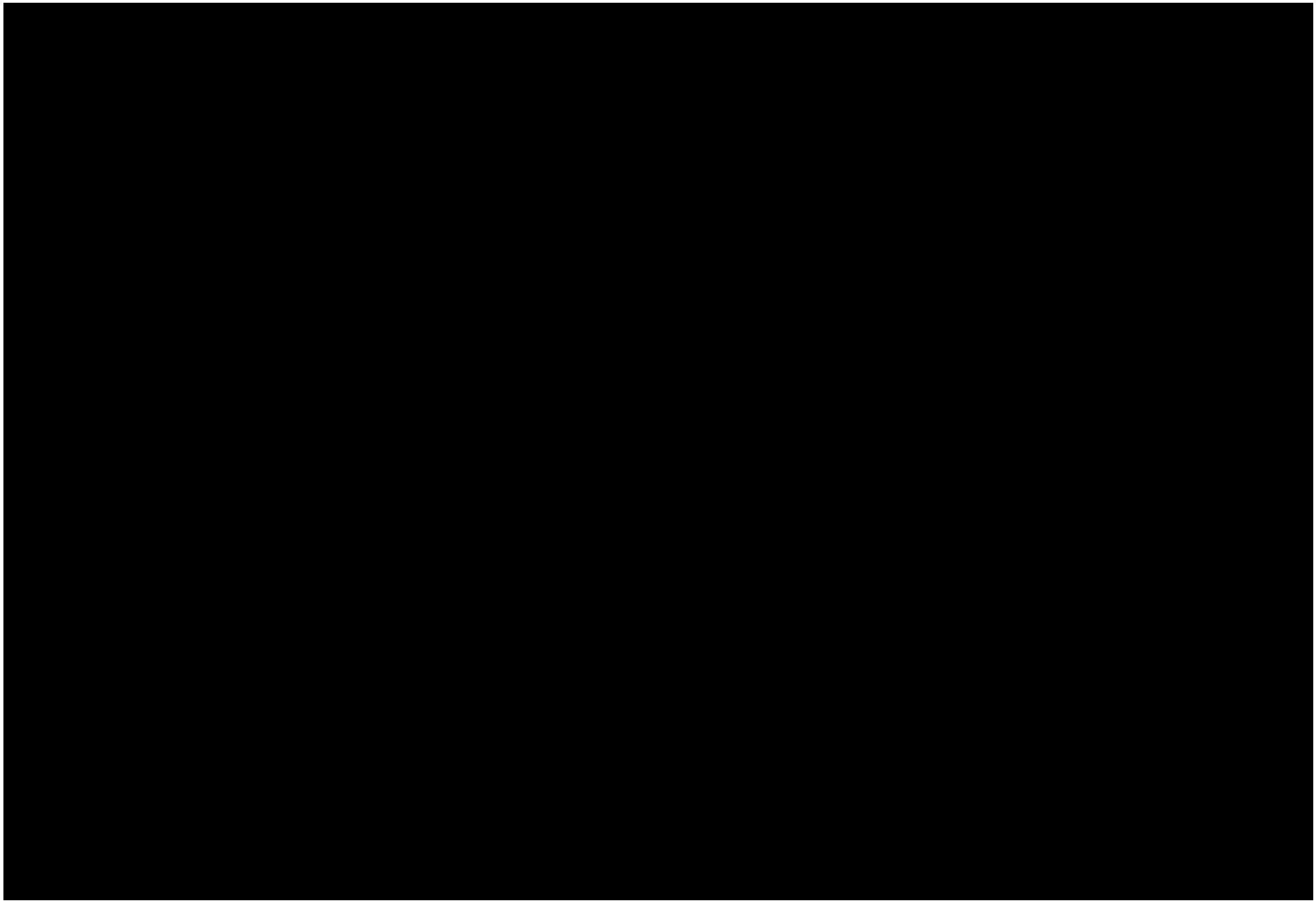


Table C.5: Historical Costs

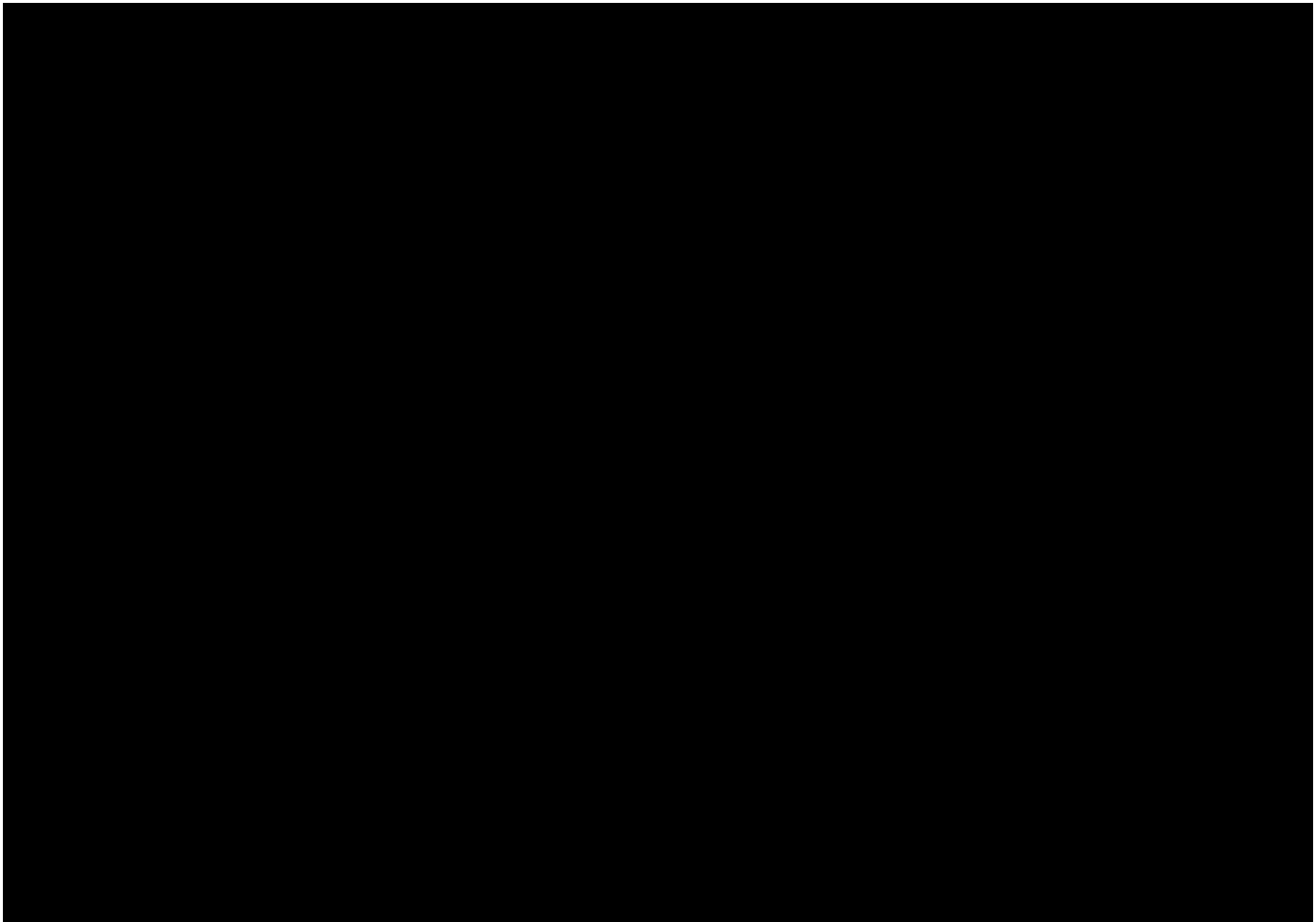


Table C.5: Historical Costs

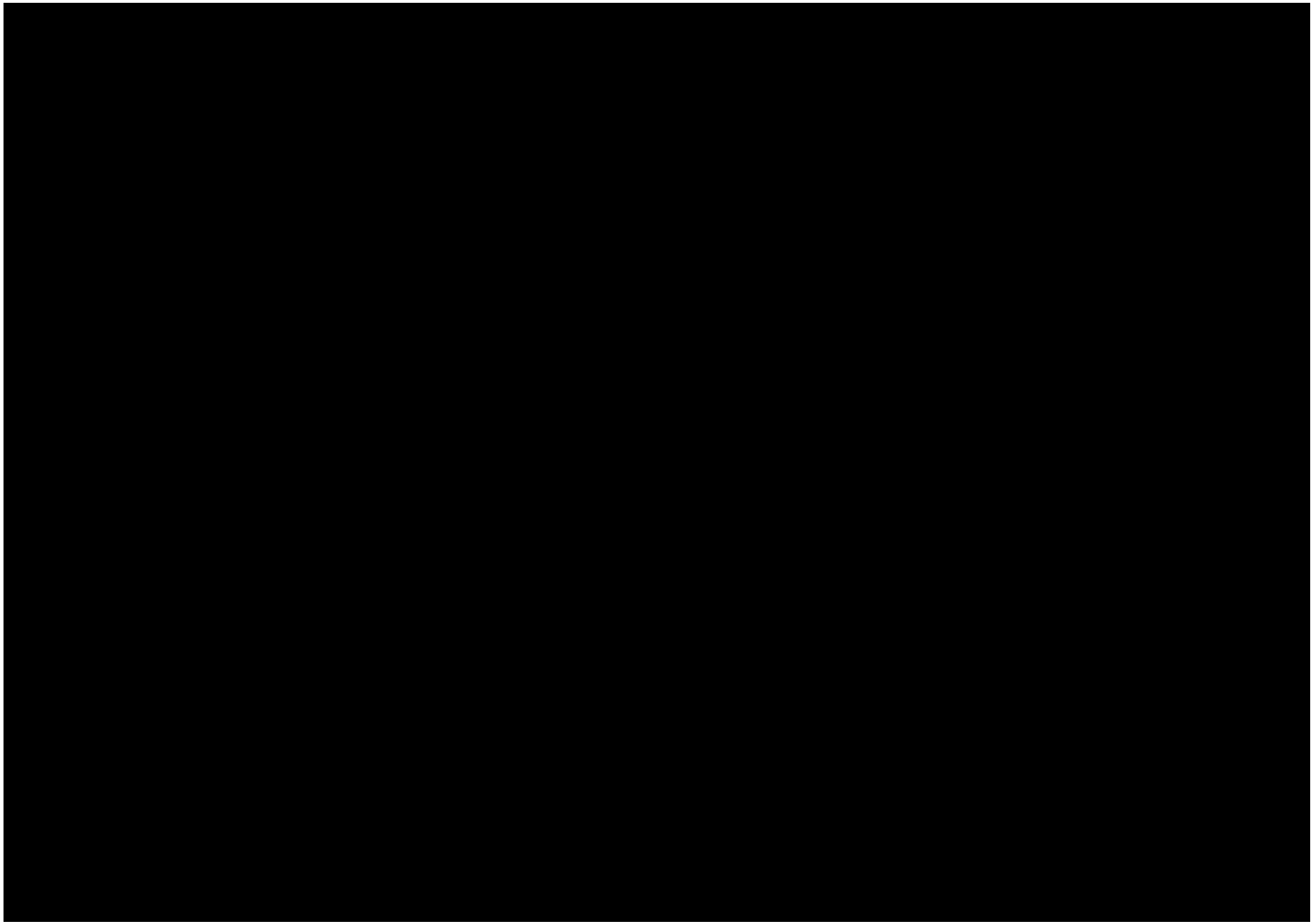


Table C.5: Historical Costs

Table C.5: Historical Costs

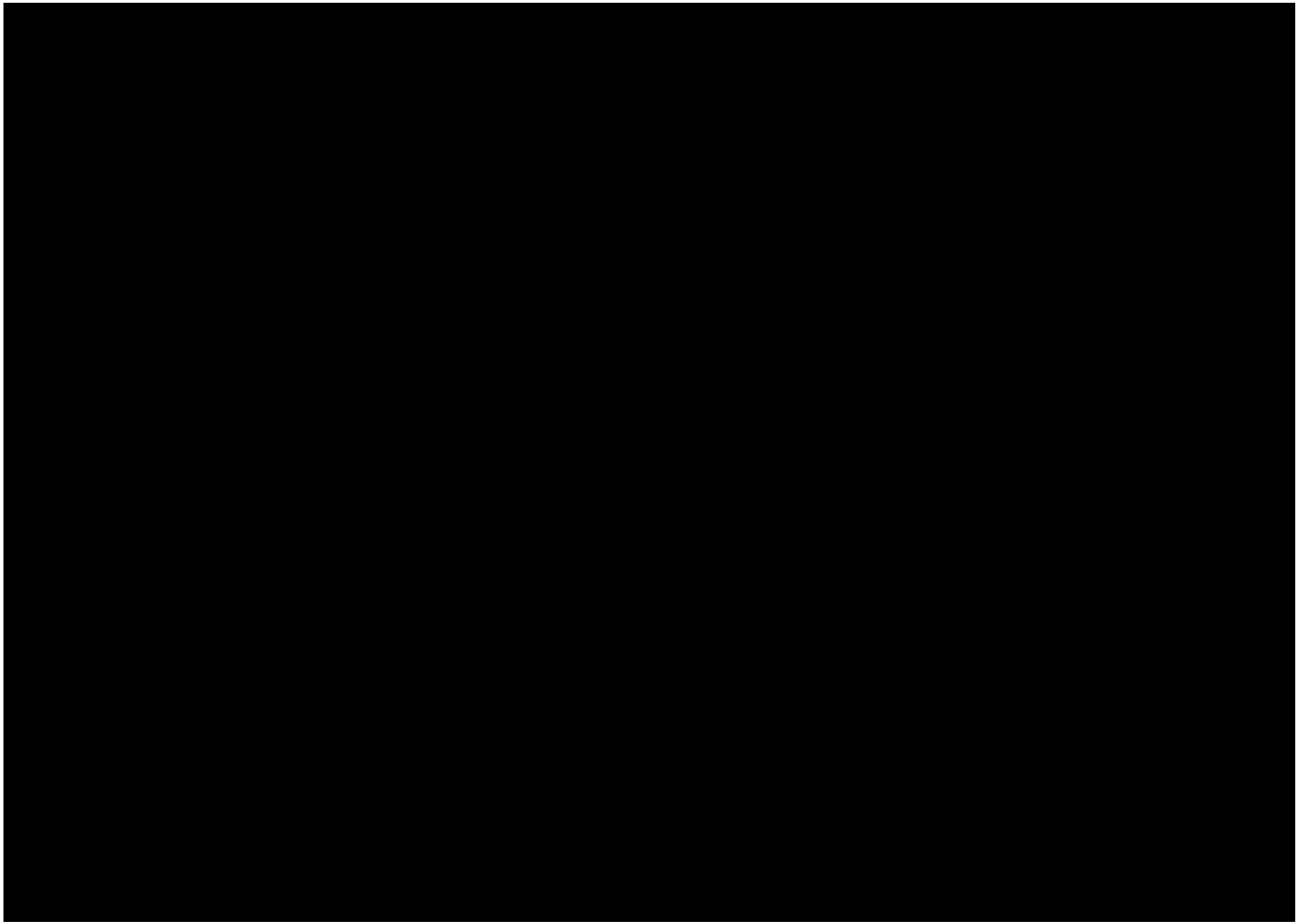


Table C.5: Historical Costs

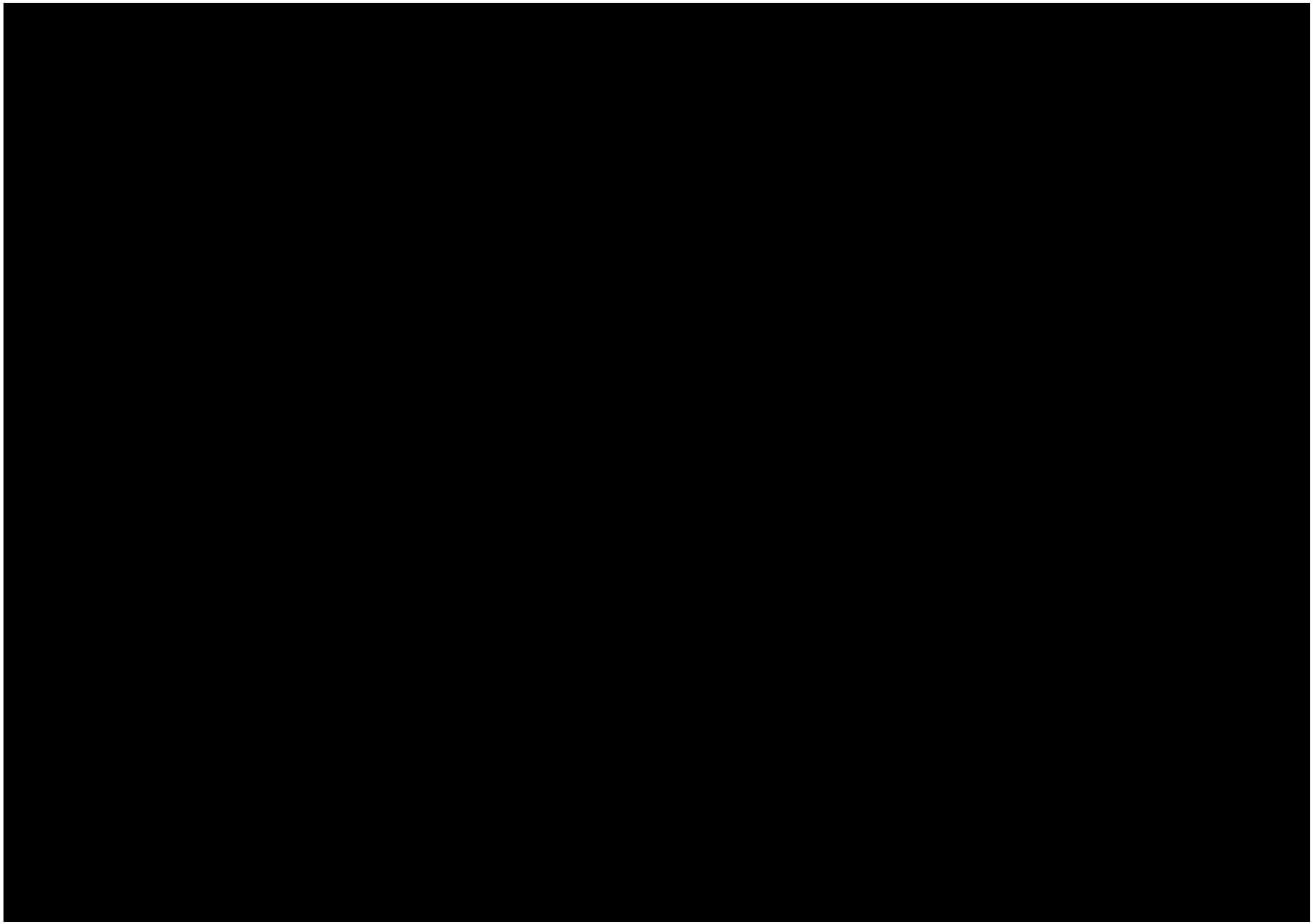
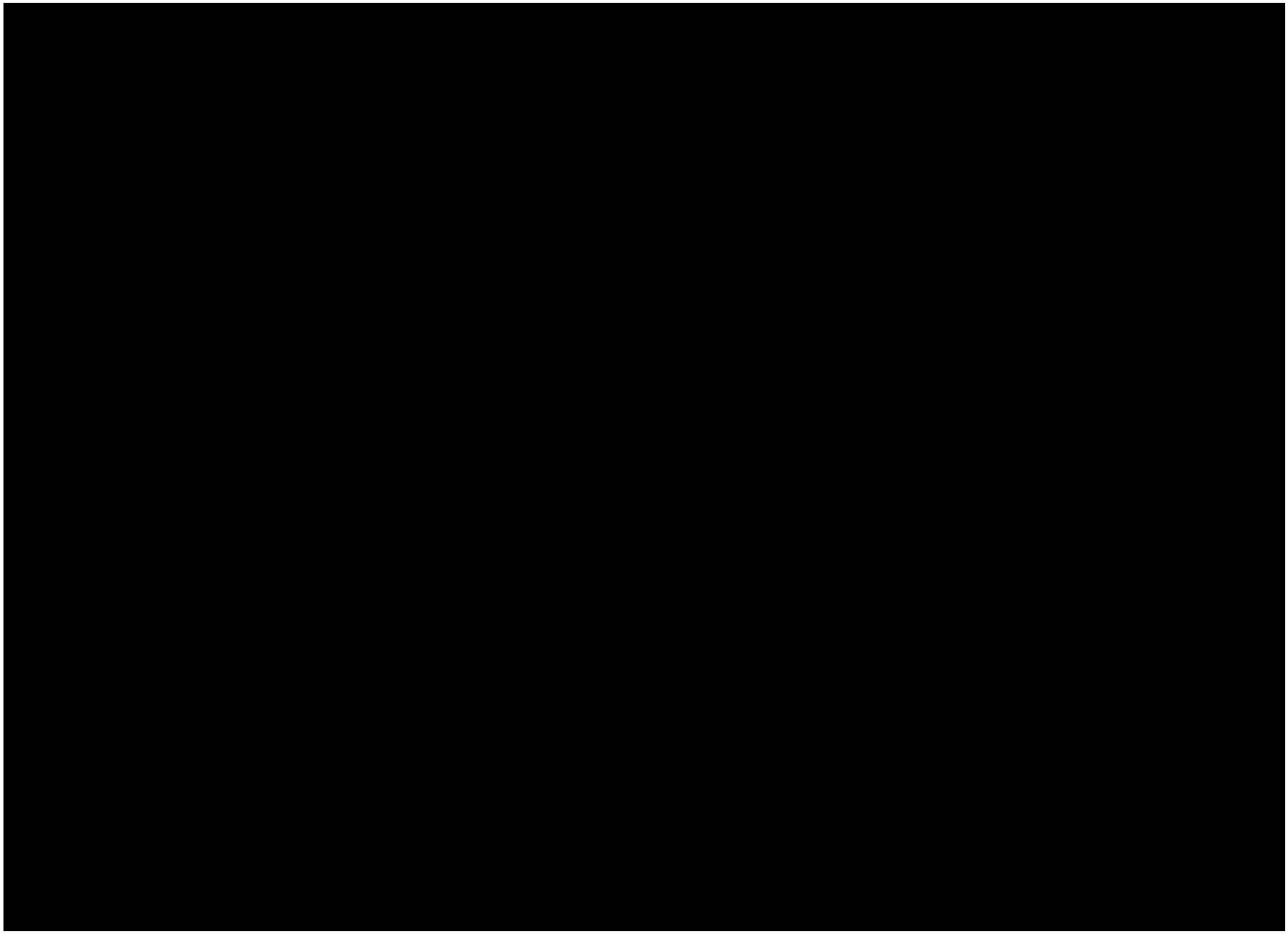


Table C.5: Historical Costs



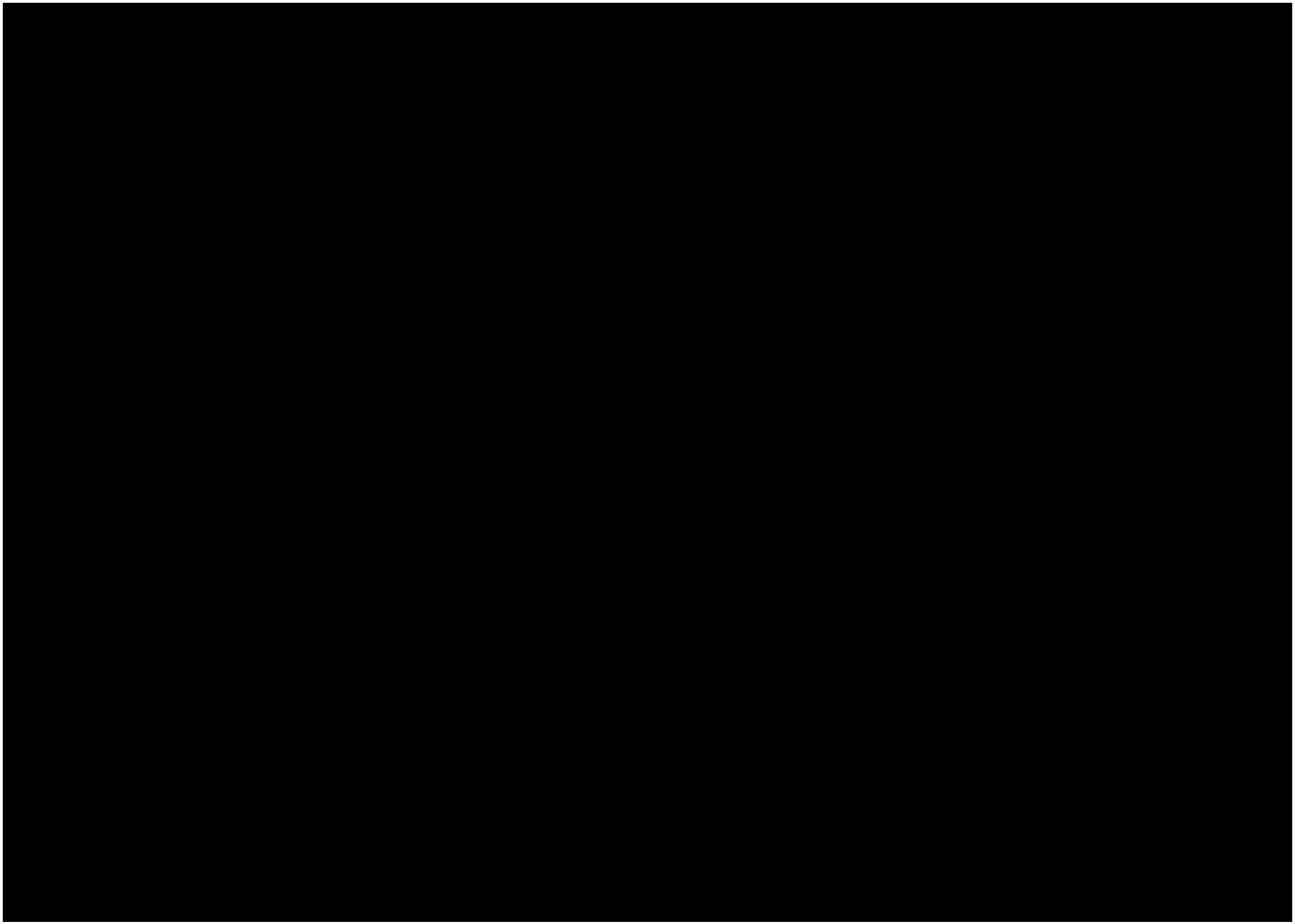


Table C.5: Historical Costs

Table C.5: Historical Costs

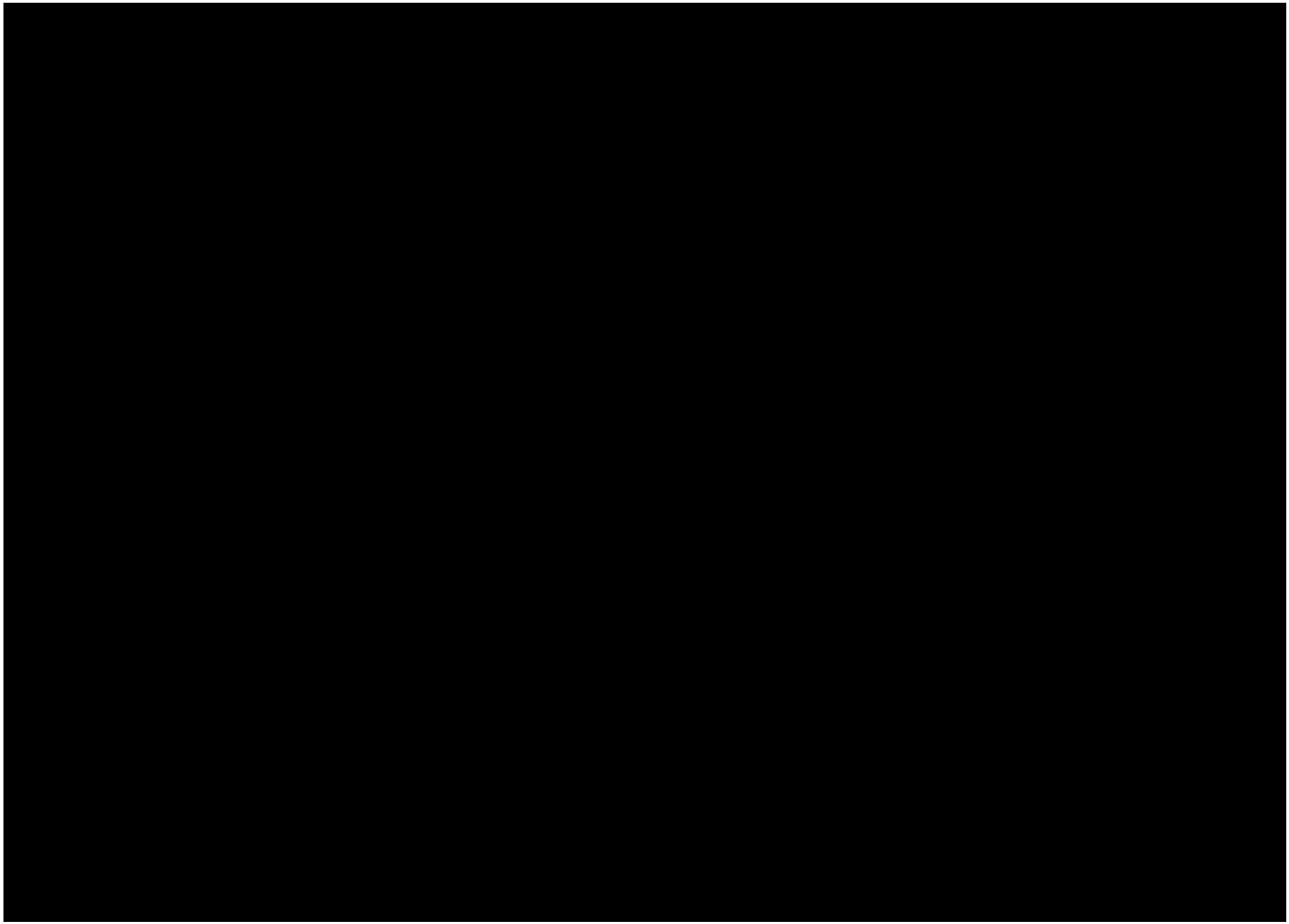


Table C.5: Historical Costs

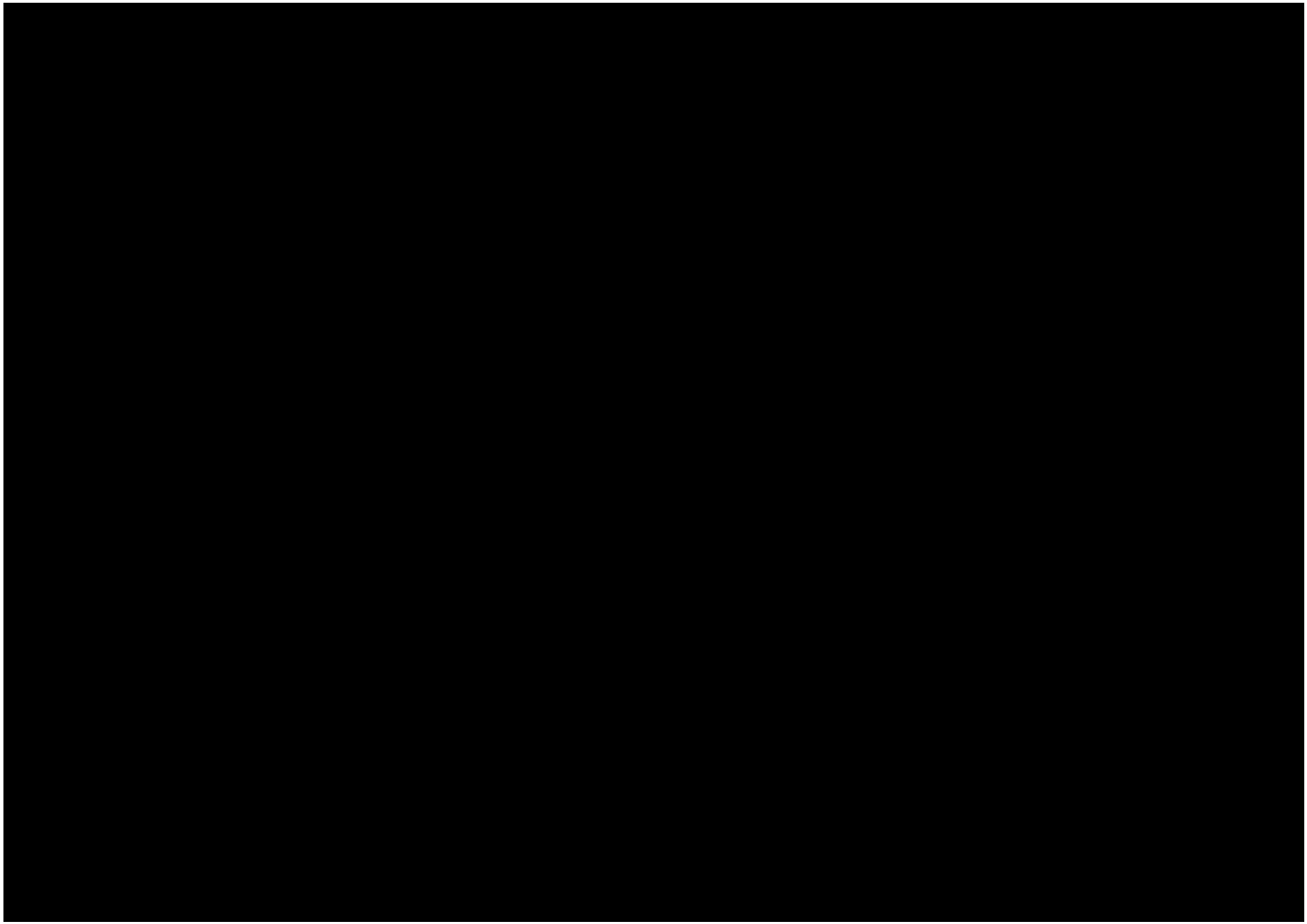


Table C.5: Historical Costs

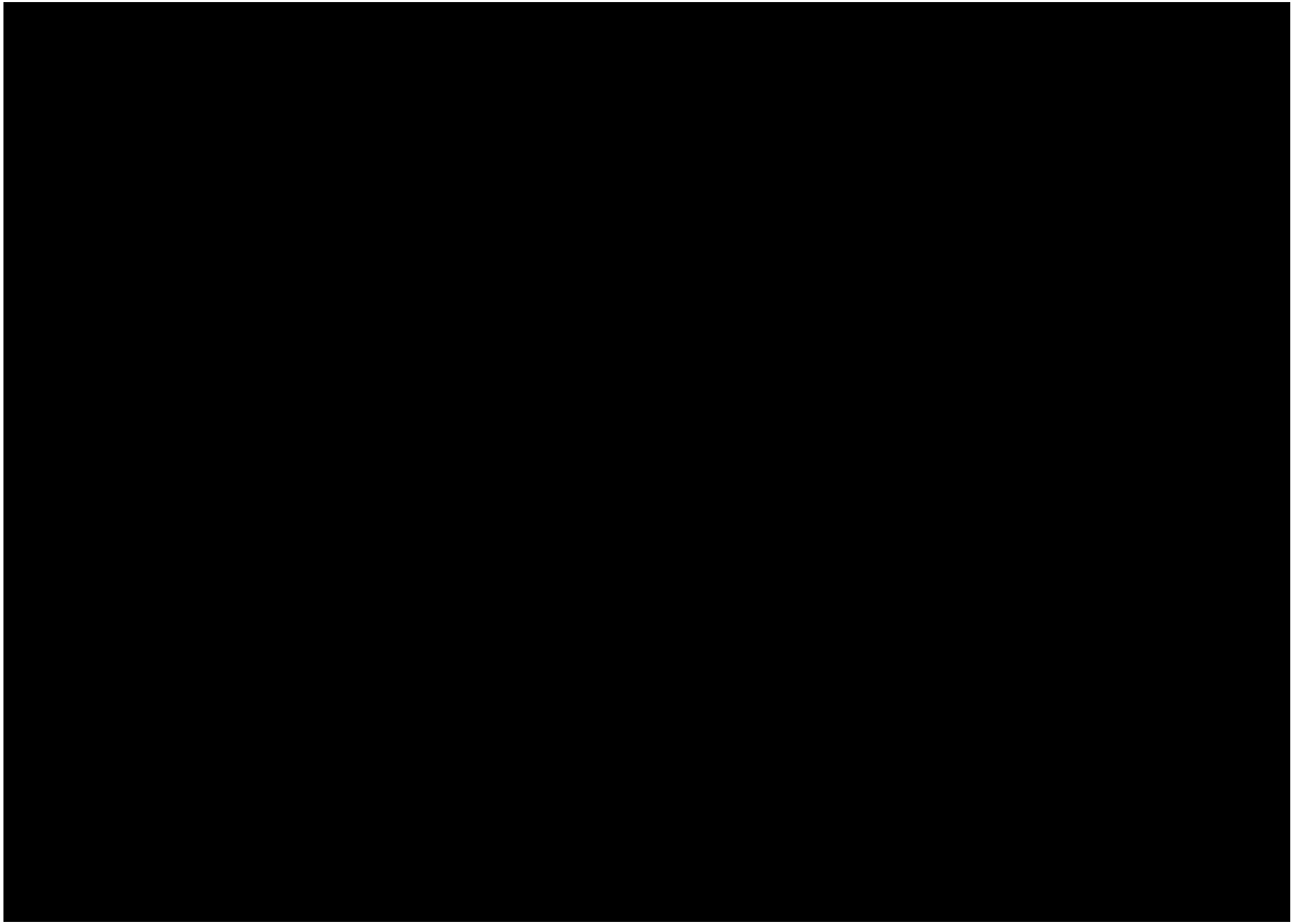


Table C.5: Historical Costs

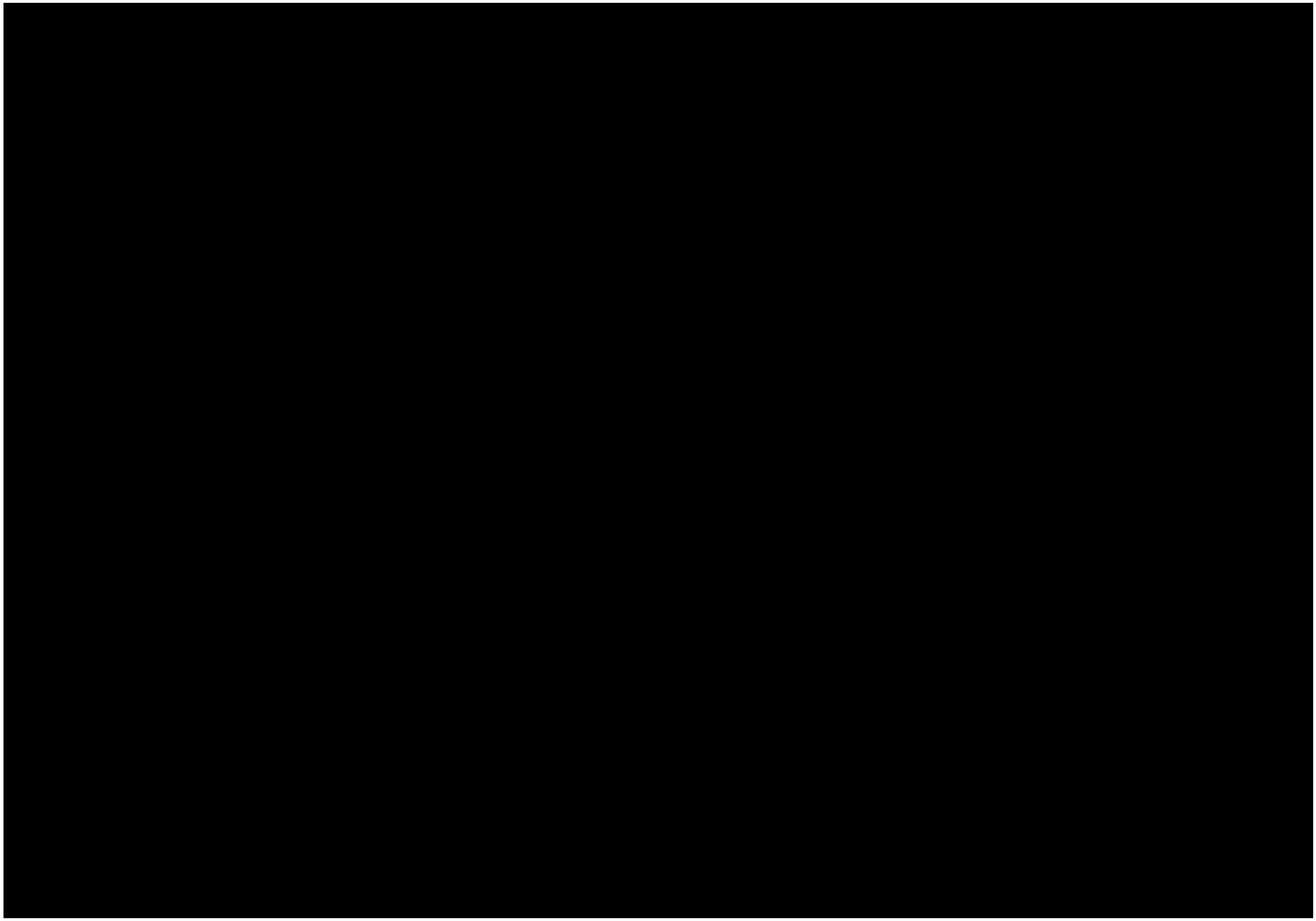


Table C.5: Historical Costs

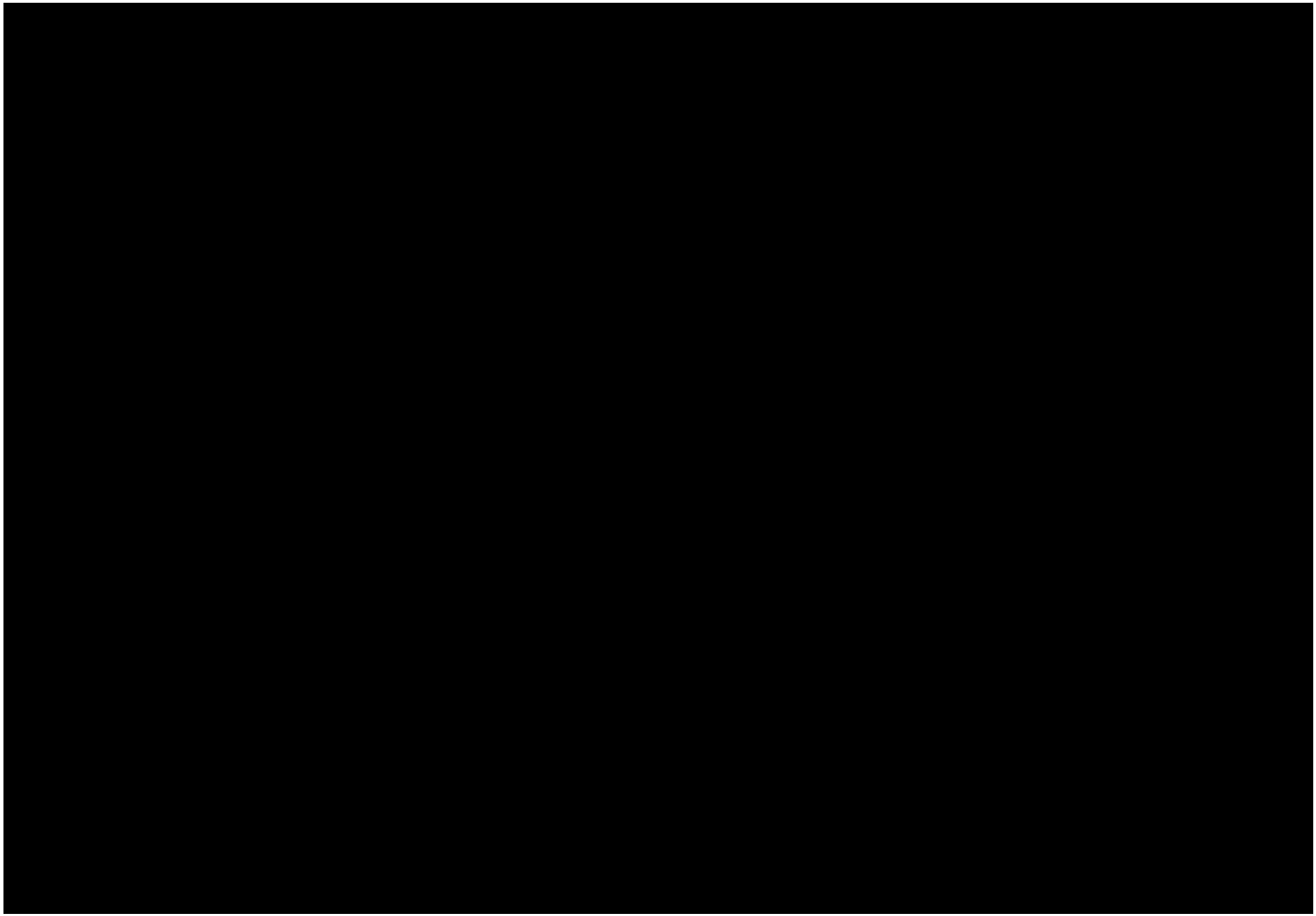


Table C.5: Historical Costs

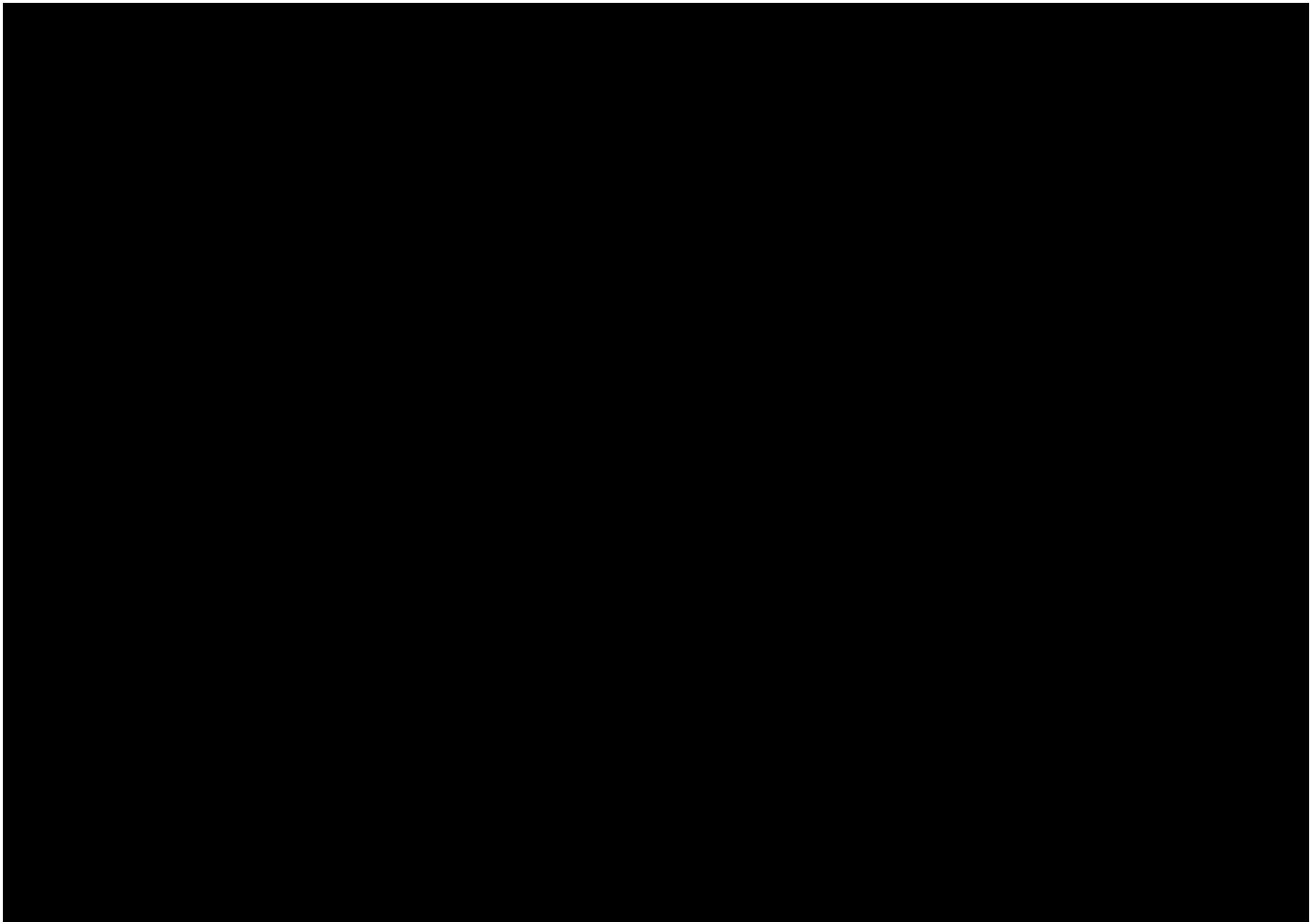


Table C.5: Historical Costs

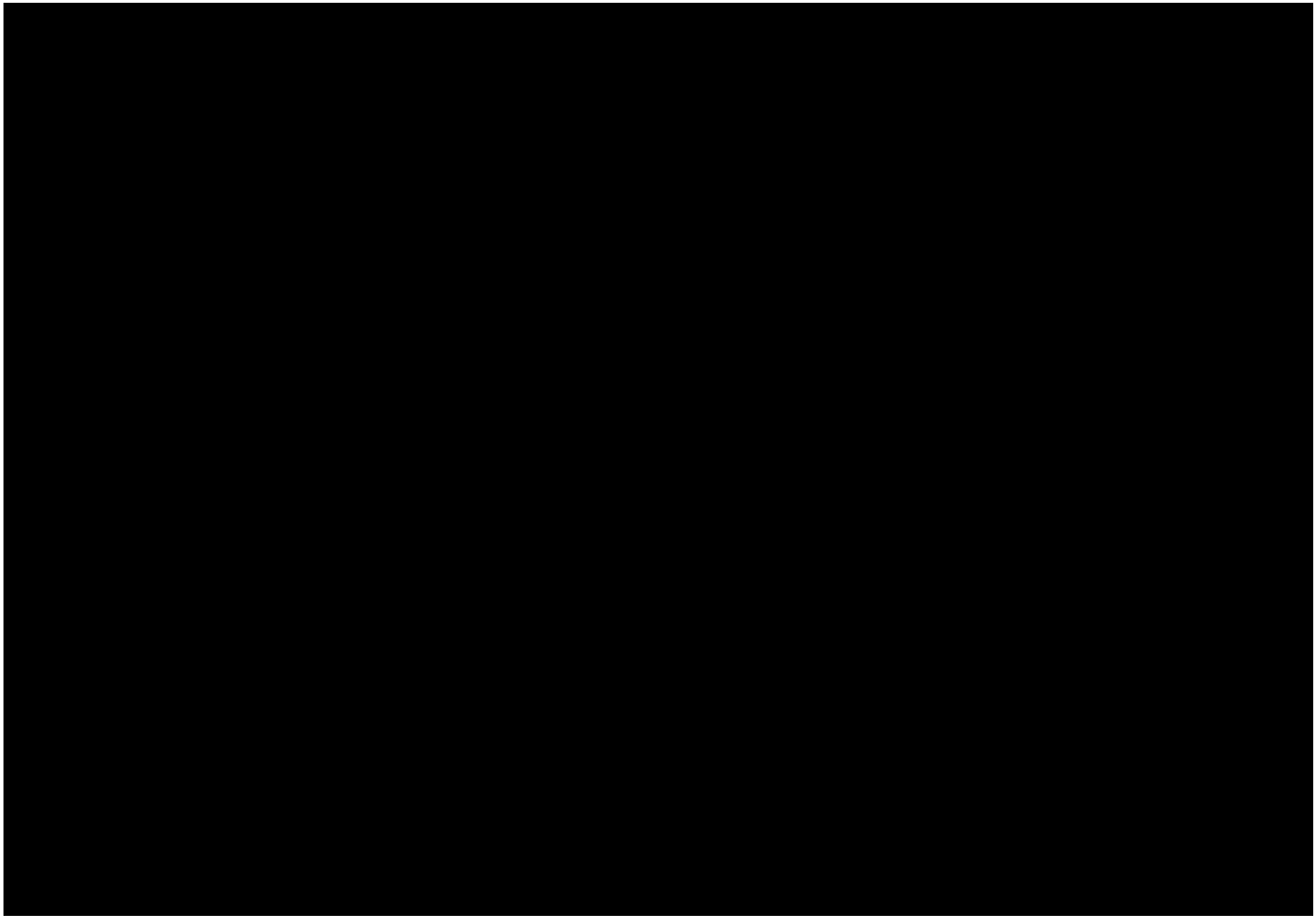


Table C.5: Historical Costs

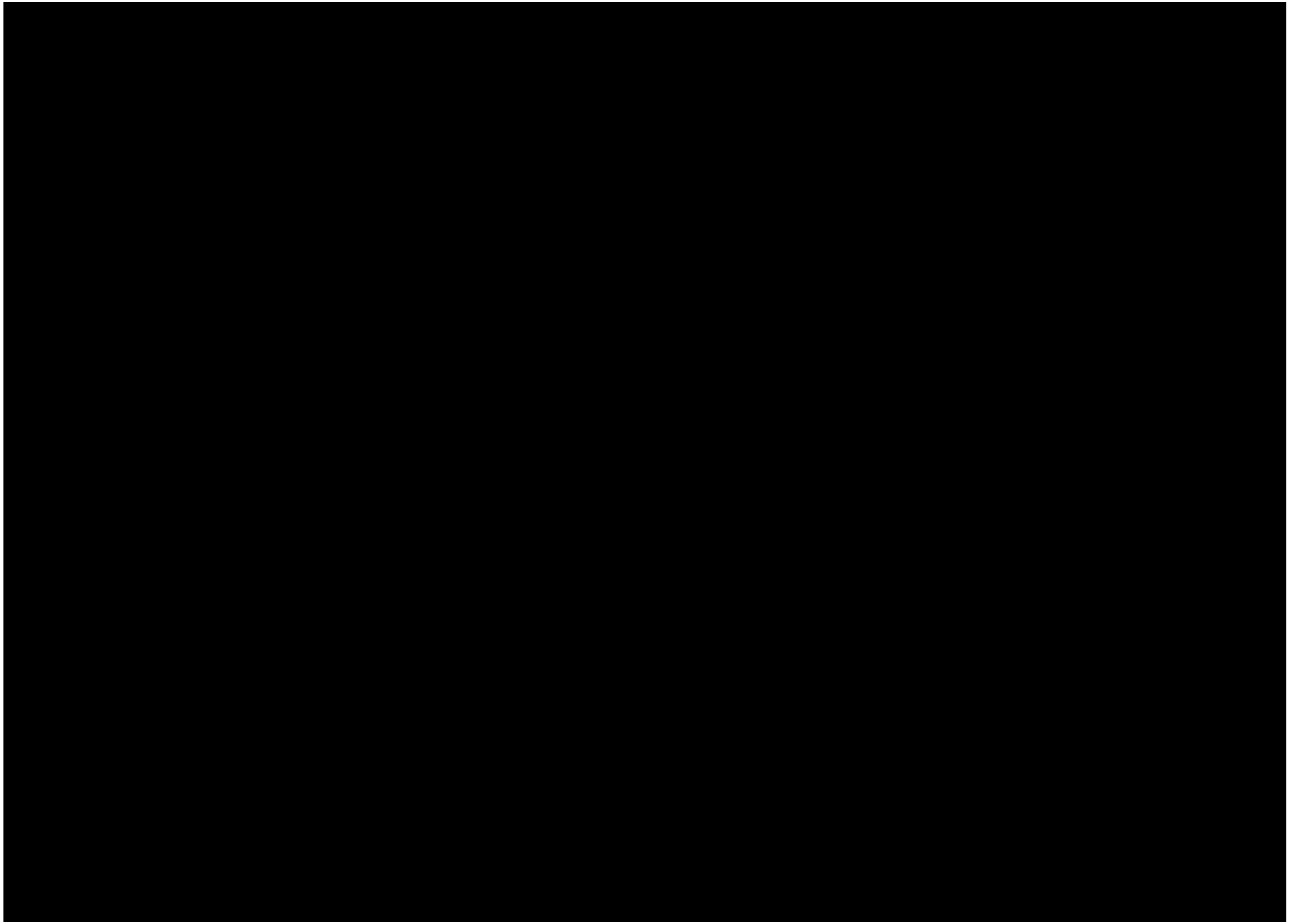


Table C.5: Historical Costs

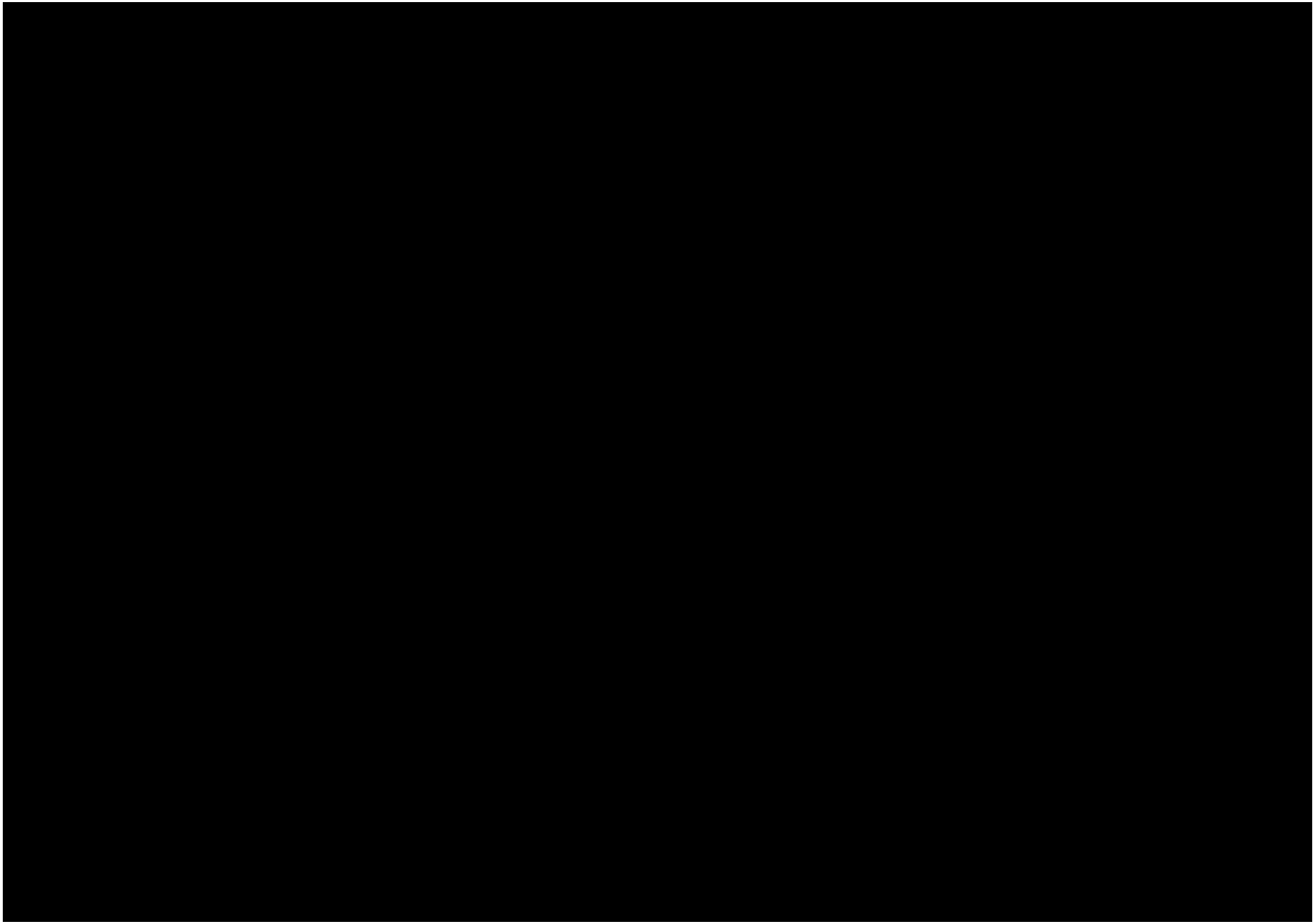


Table C.5: Historical Costs

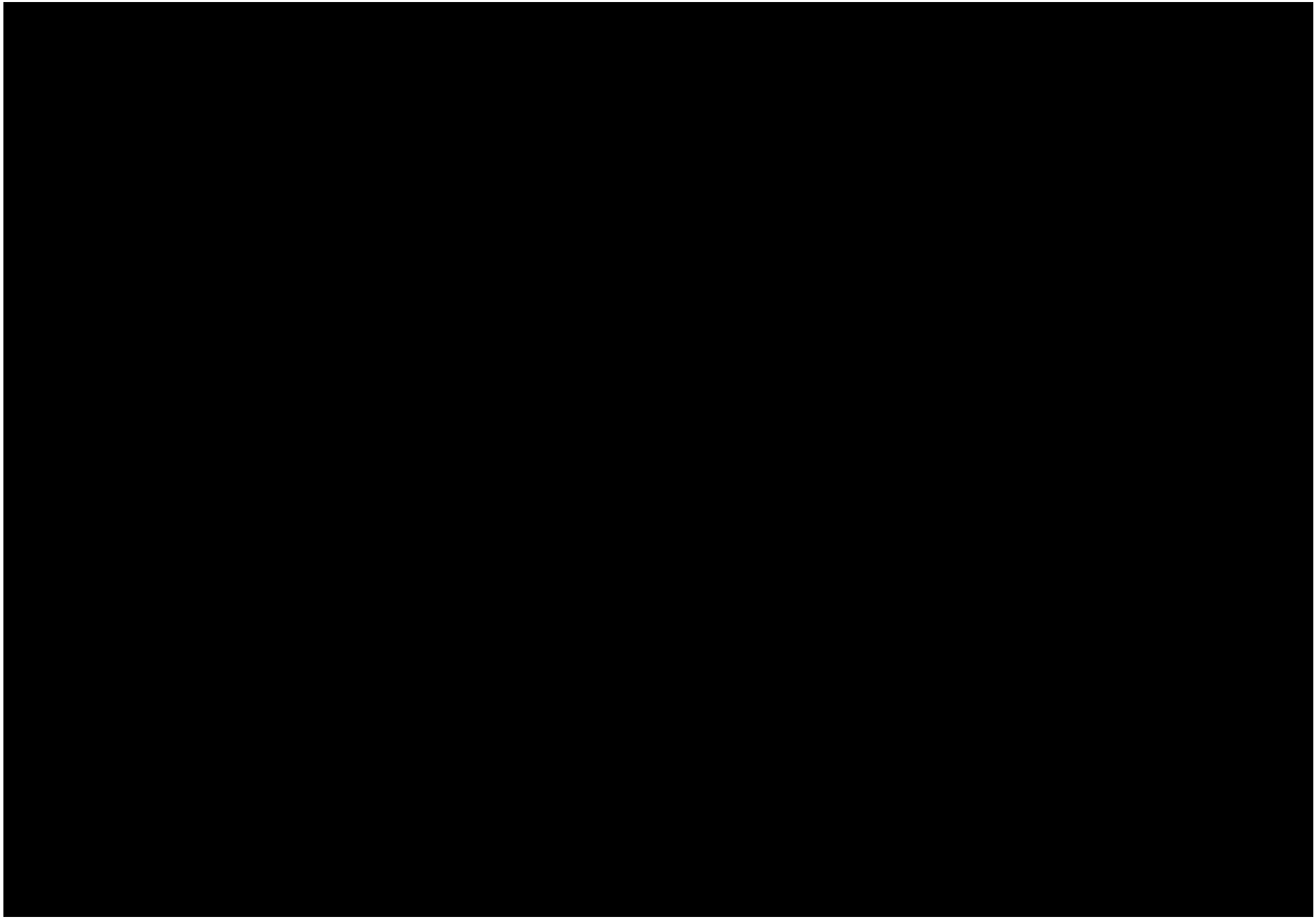


Table C.5: Historical Costs

[redacted]

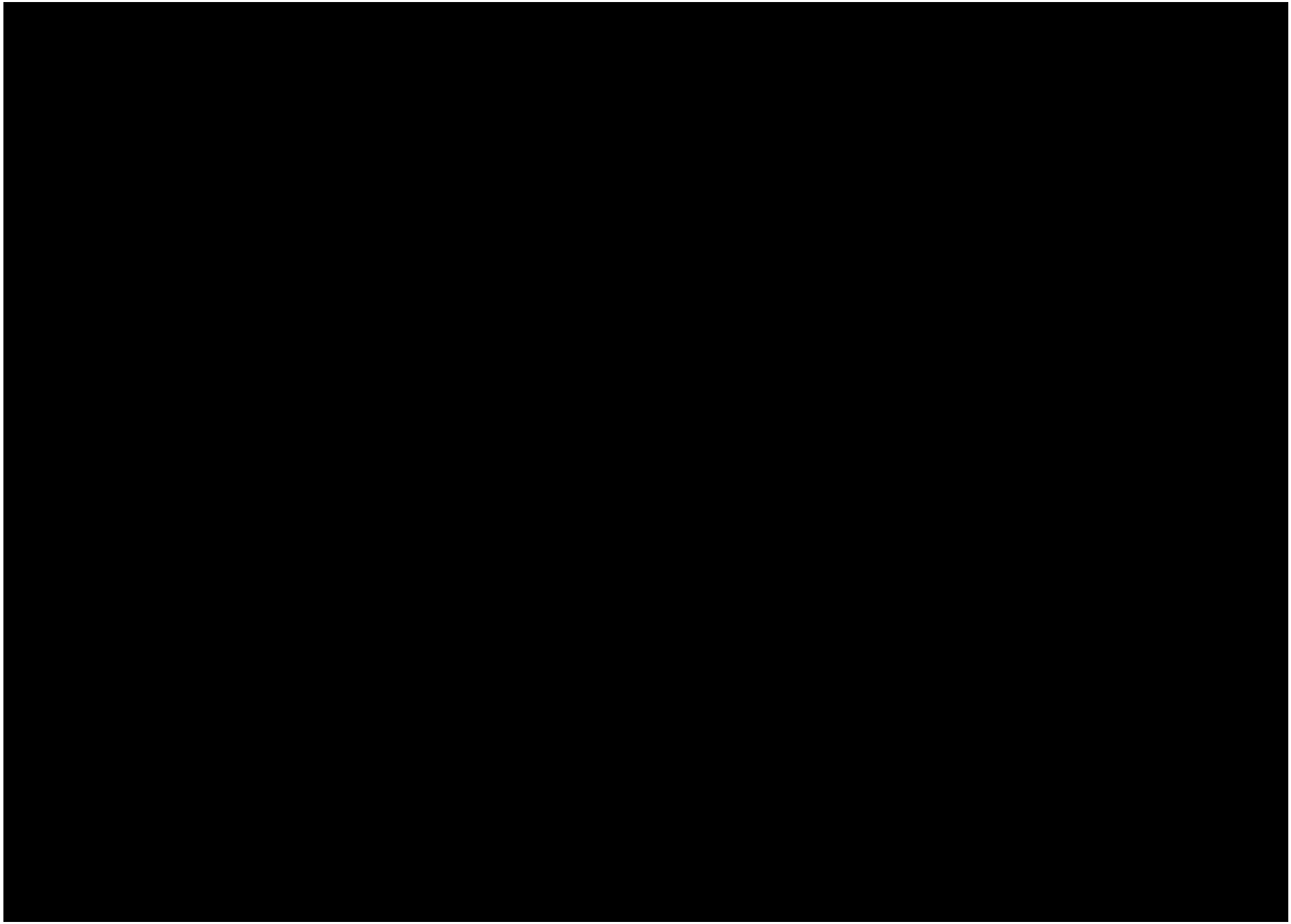


Table C.5: Historical Costs

[redacted]

Table C.5: Historical Costs

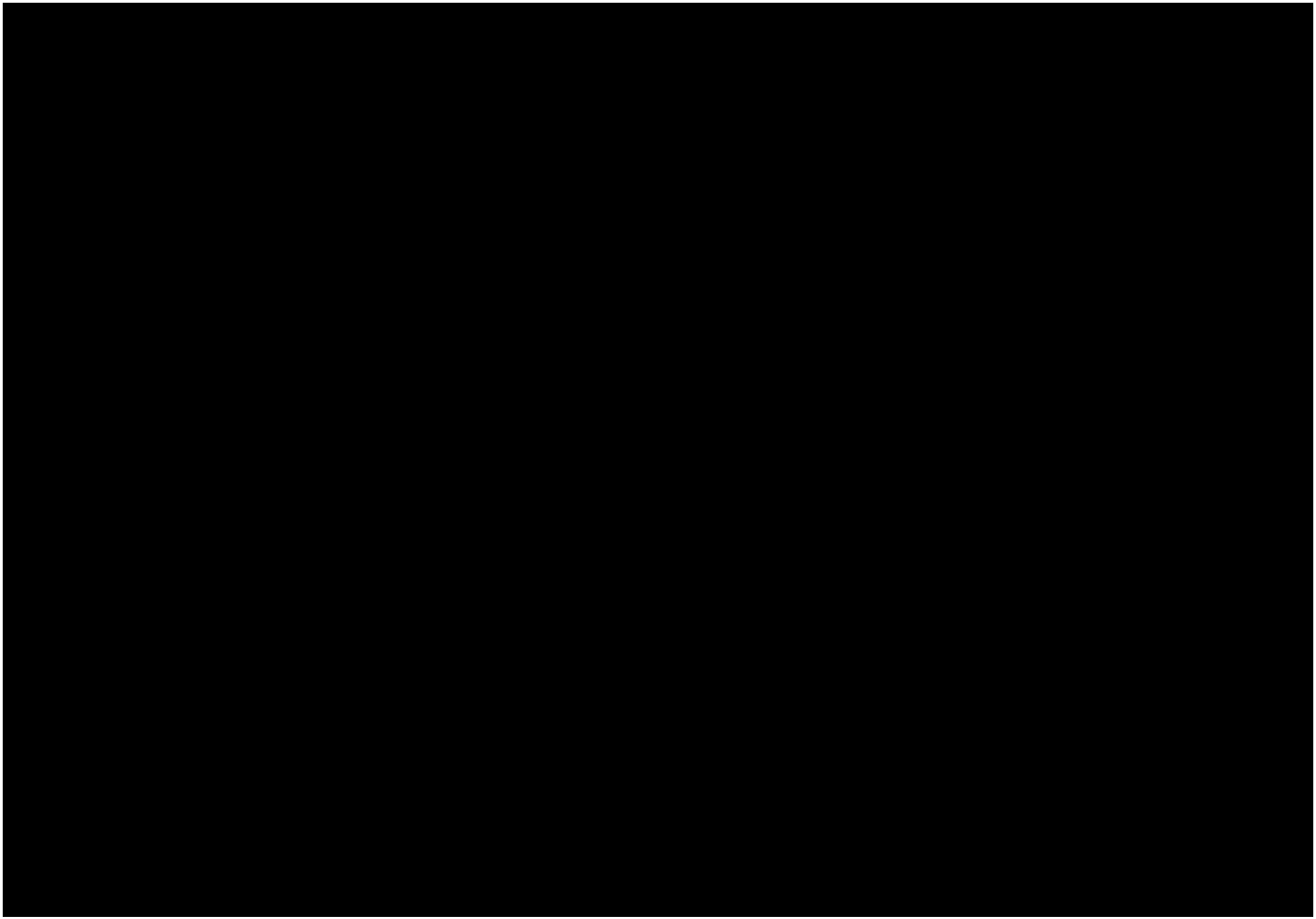


Table C.5: Historical Costs

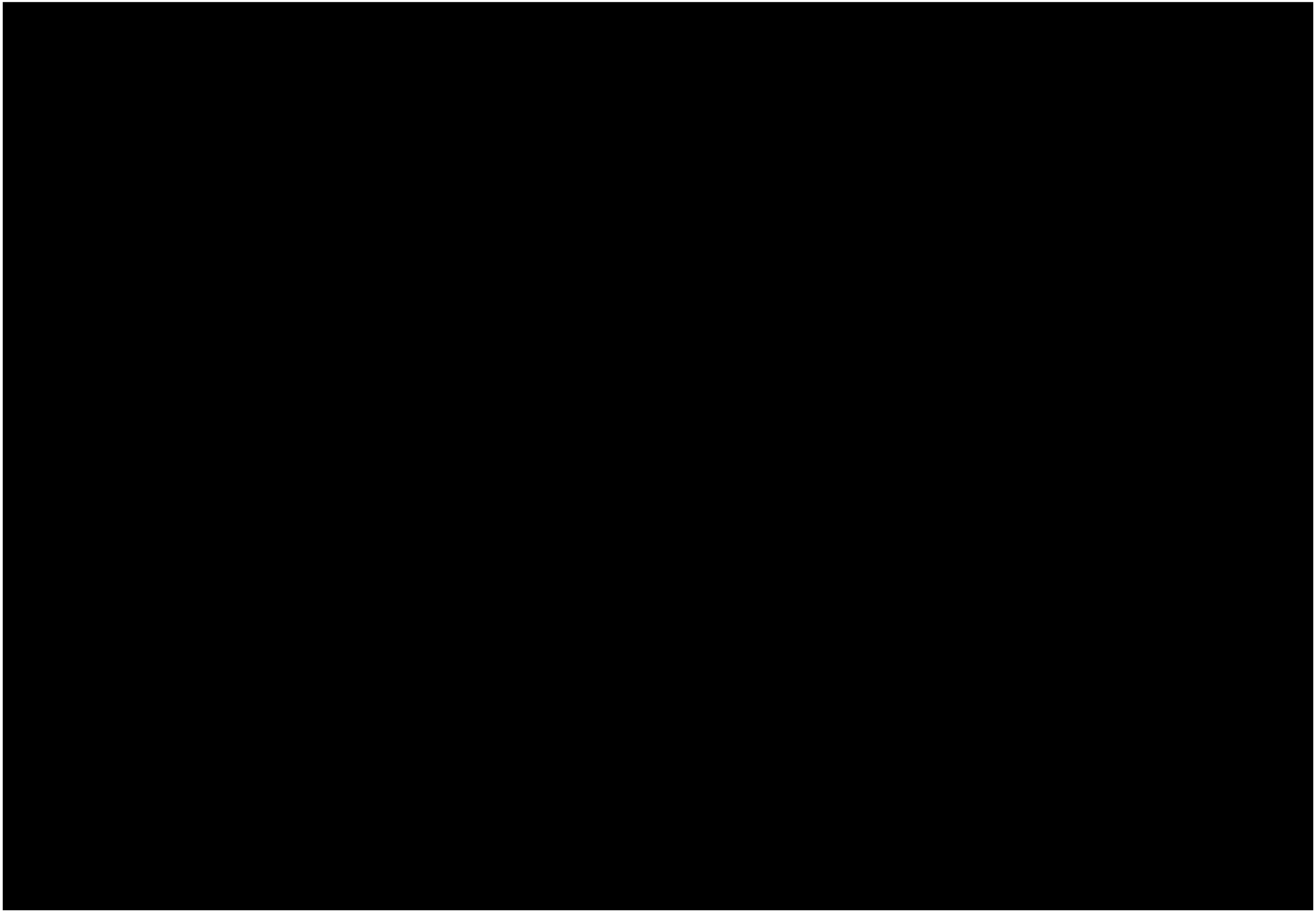


Table C.5: Historical Costs

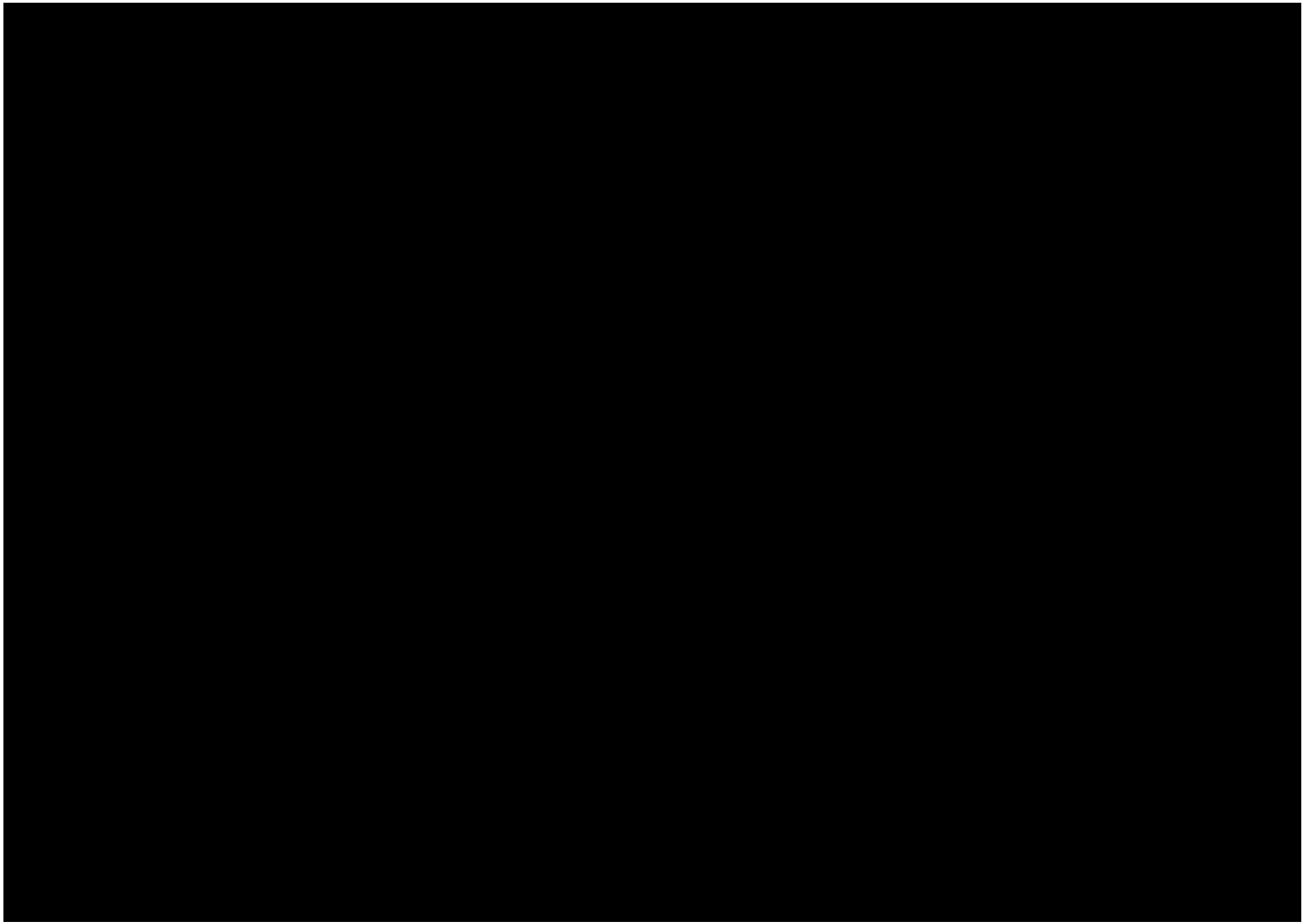


Table C.5: Historical Costs

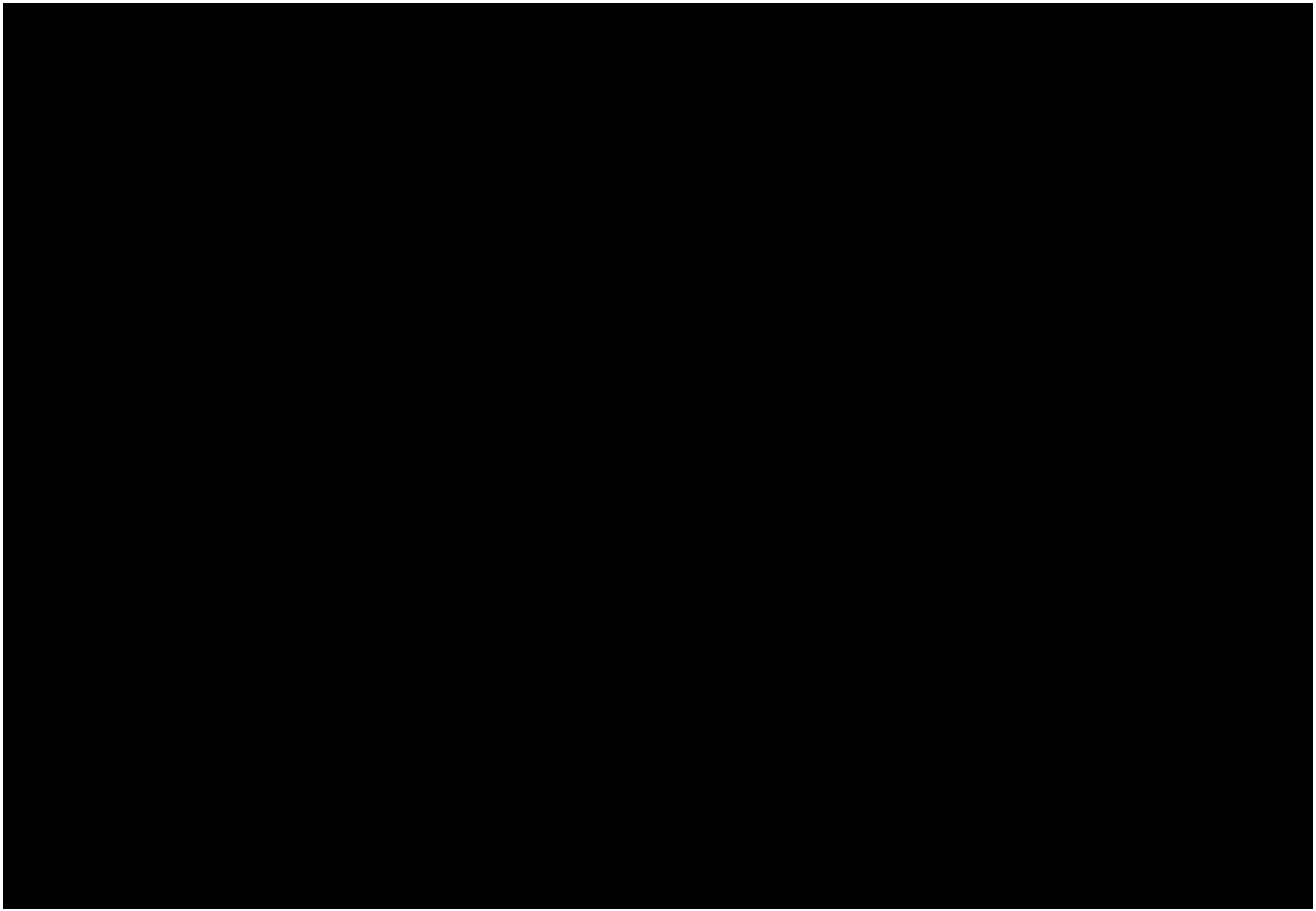


Table C.5: Historical Costs

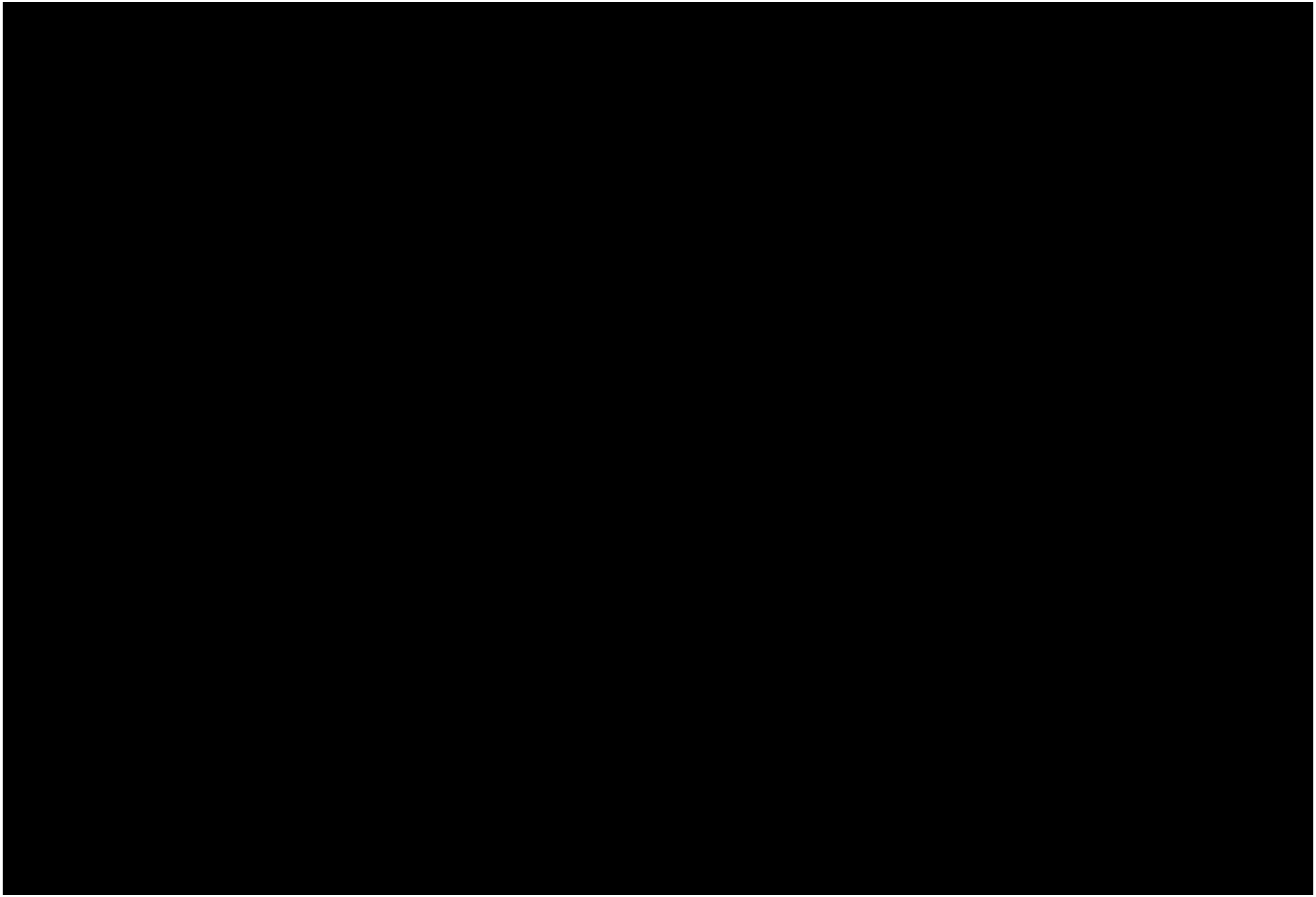


Table C.5: Historical Costs

[redacted]

Table C.5: Historical Costs

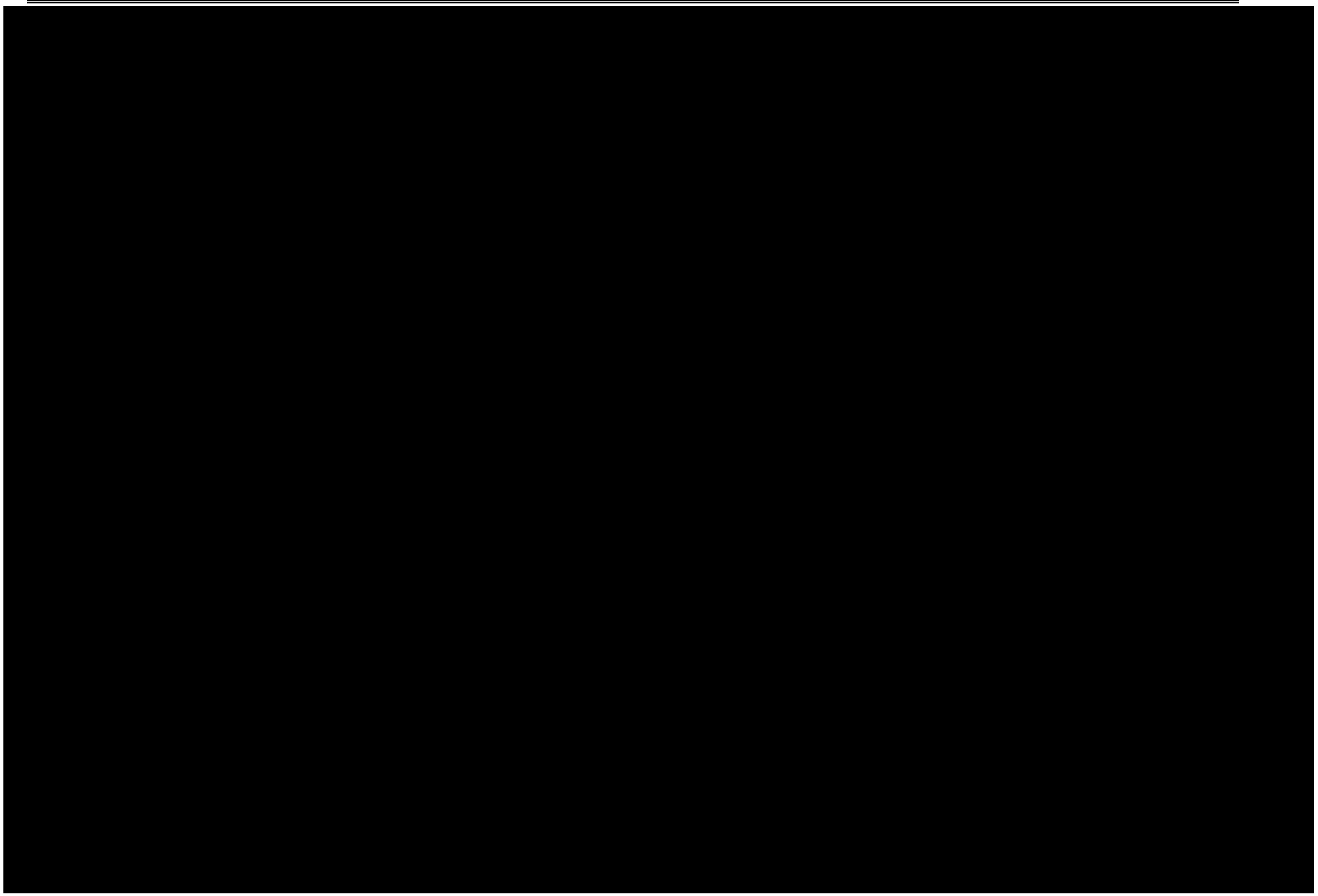


Table C.5: Historical Costs

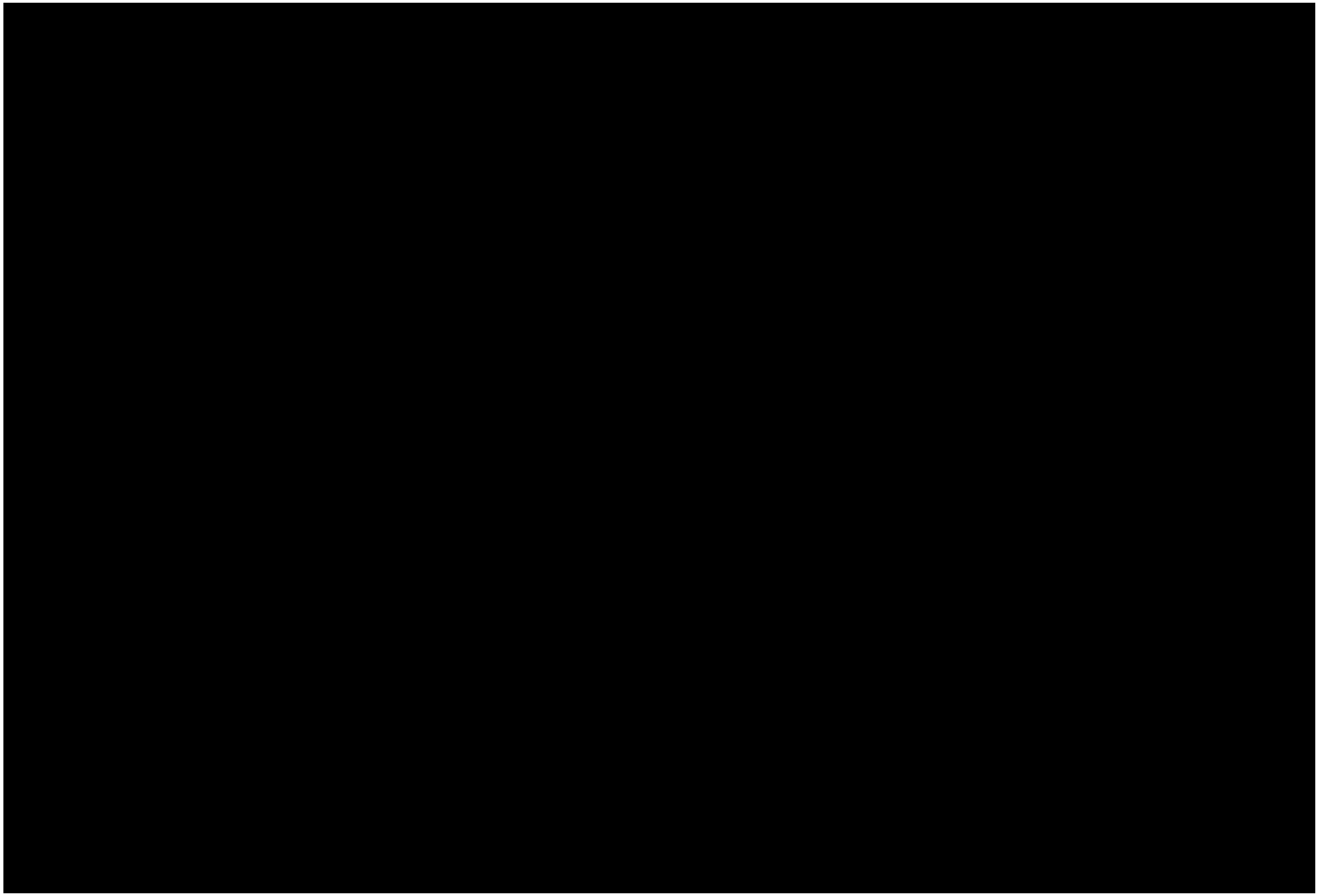


Table C.5: Historical Costs

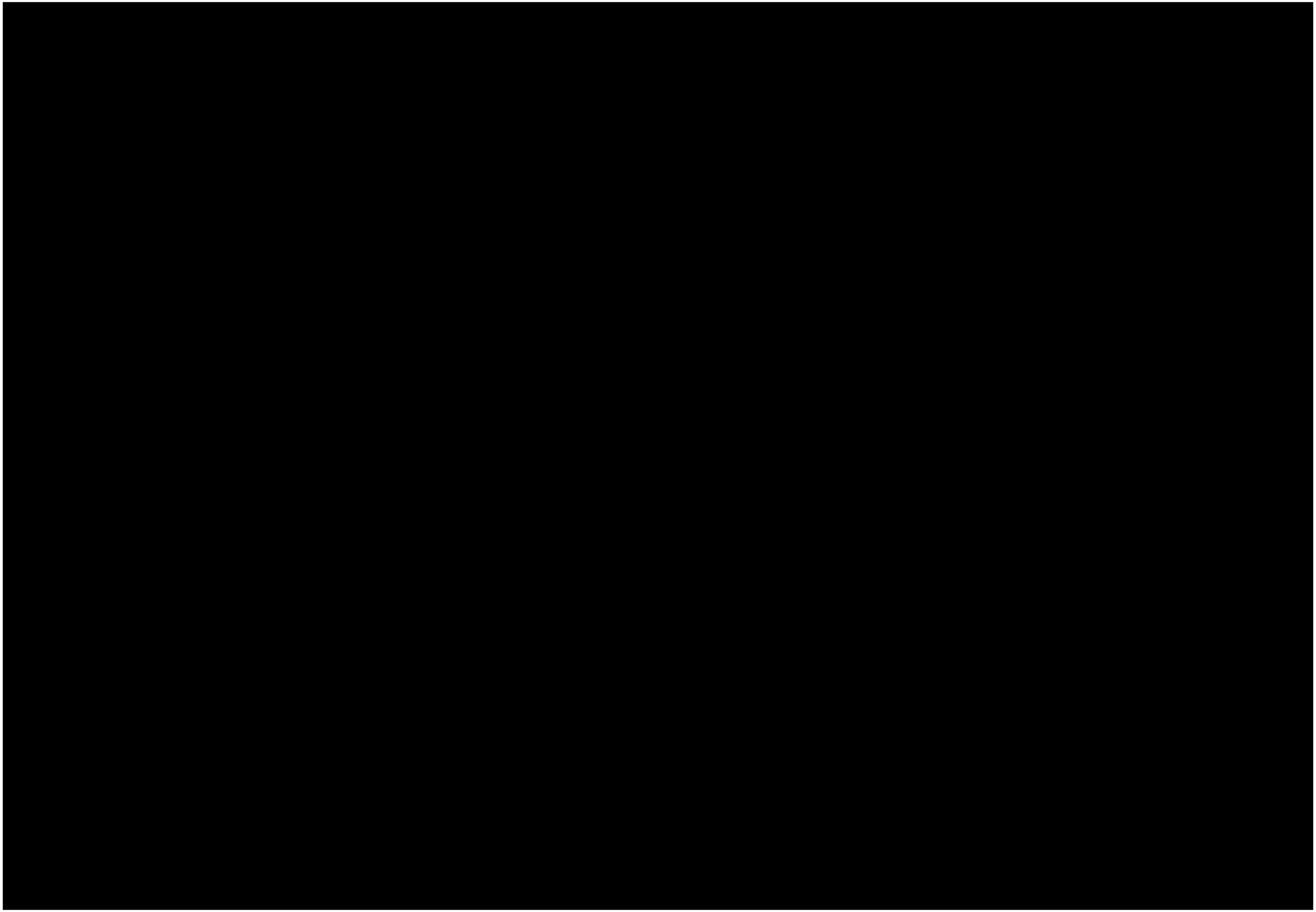


Table C.5: Historical Costs

[redacted]

Table C.5: Historical Costs

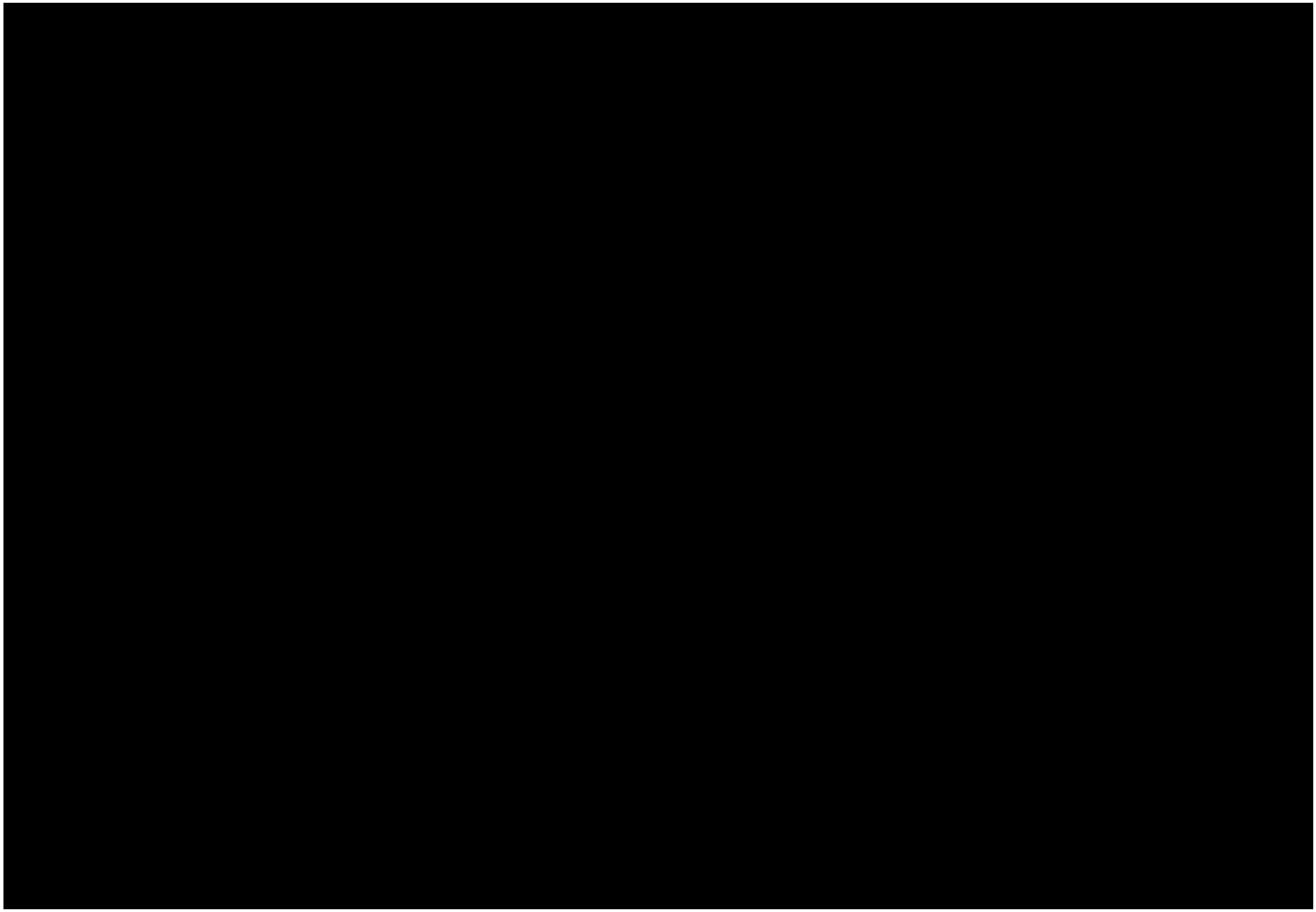


Table C.5: Historical Costs

Table C.5: Historical Costs

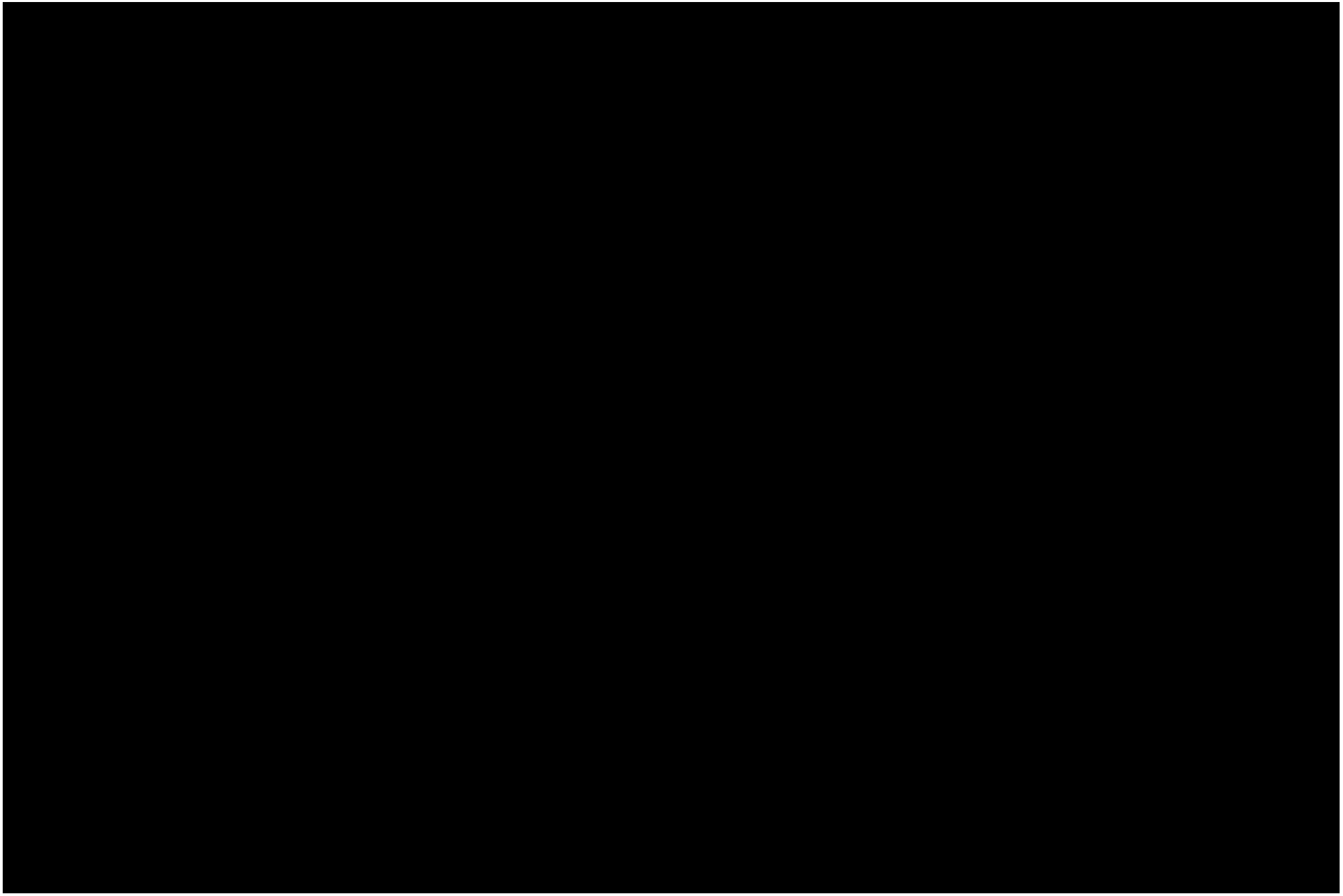


Table C.5: Historical Costs

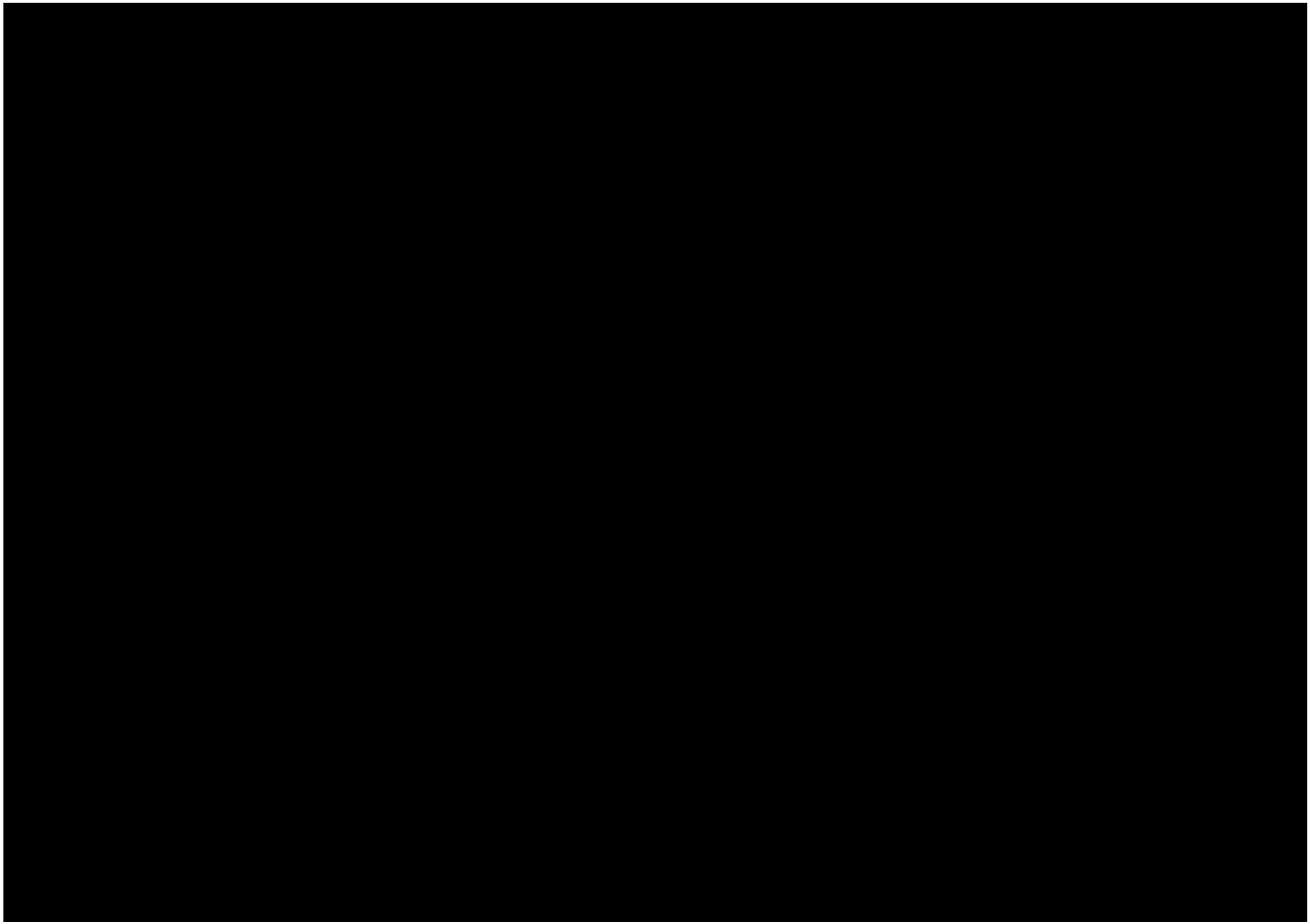


Table C.5: Historical Costs

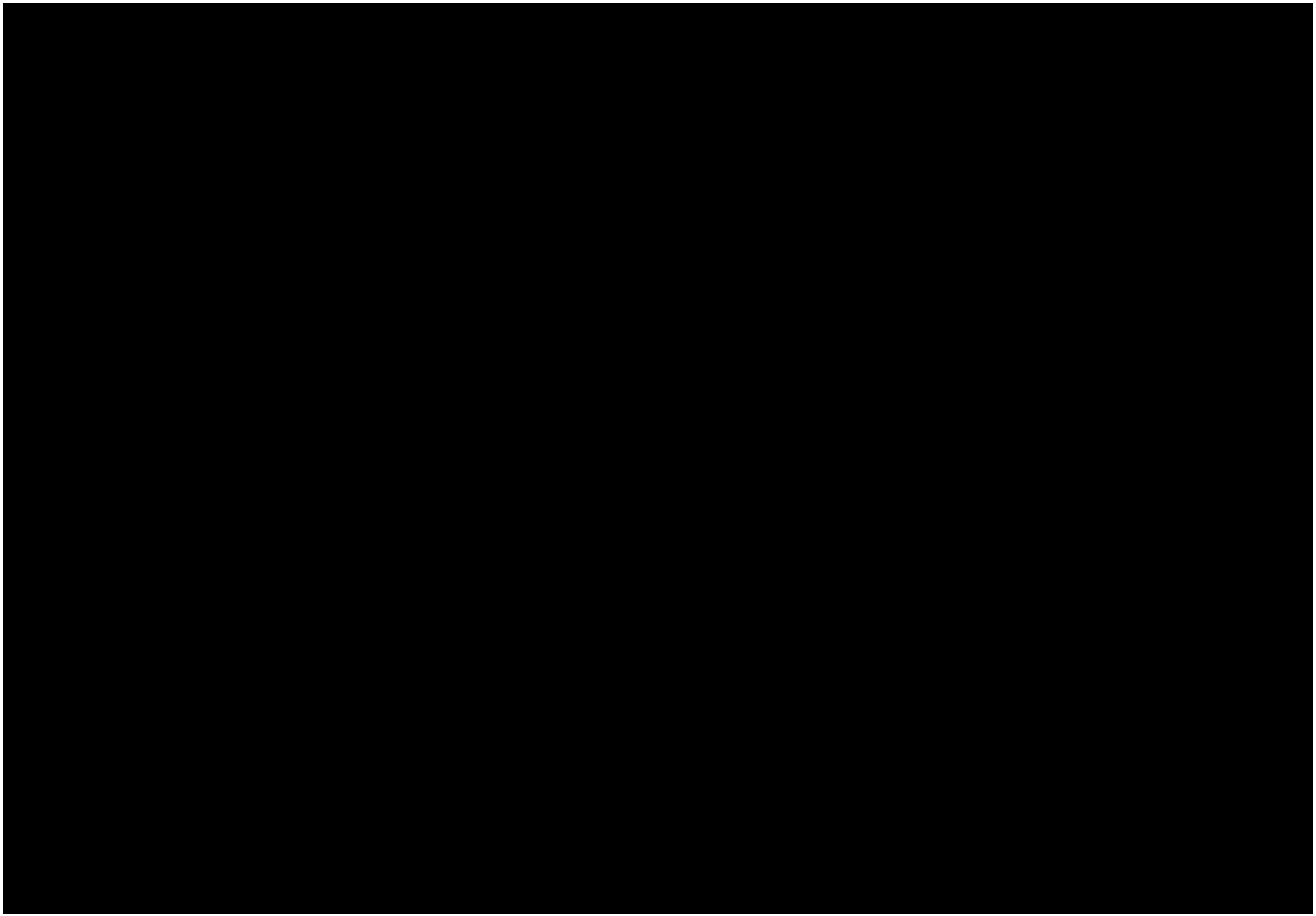


Table C.5: Historical Costs

Table C.5: Historical Costs

[redacted]

Table C.5: Historical Costs

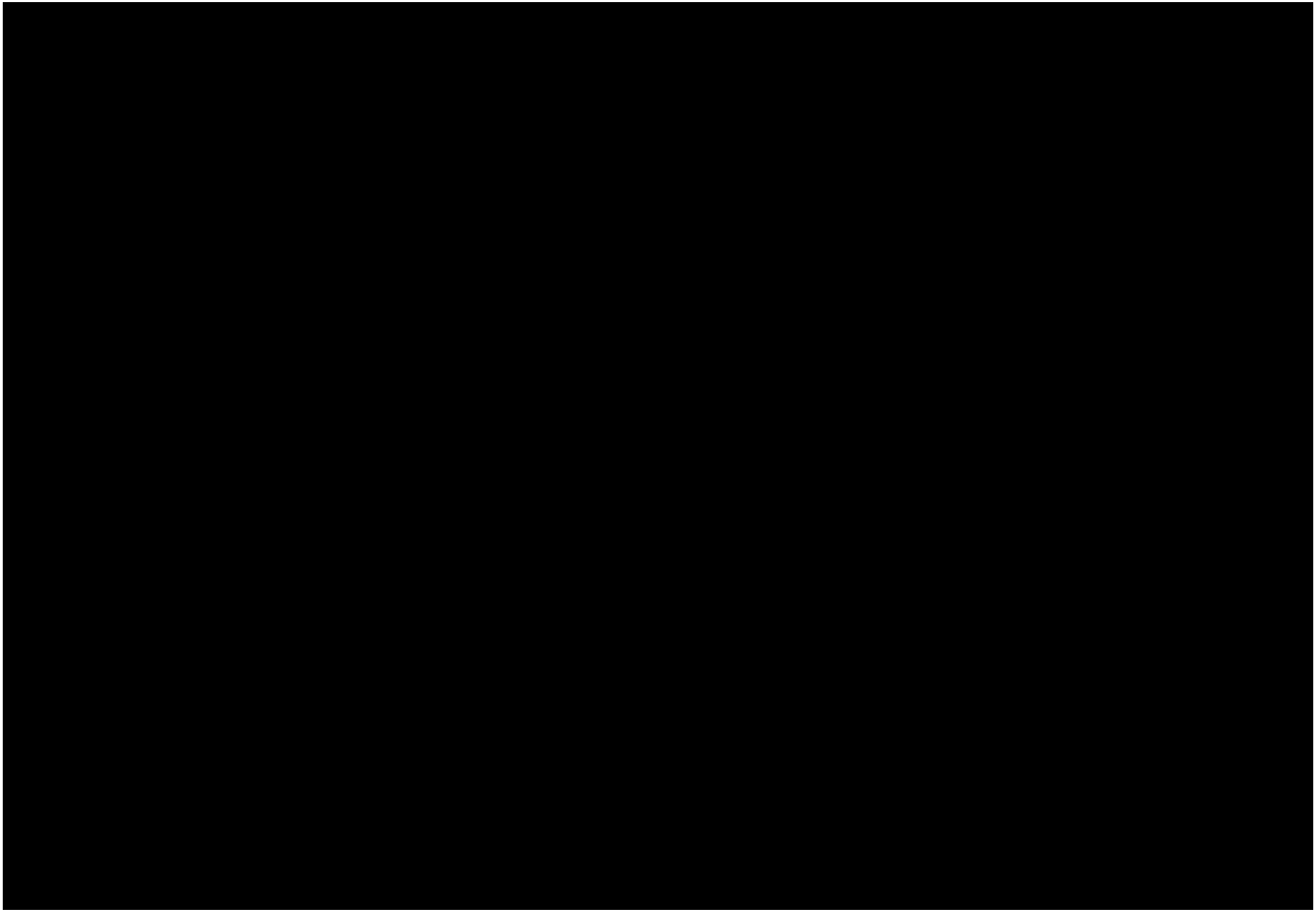


Table C.5: Historical Costs

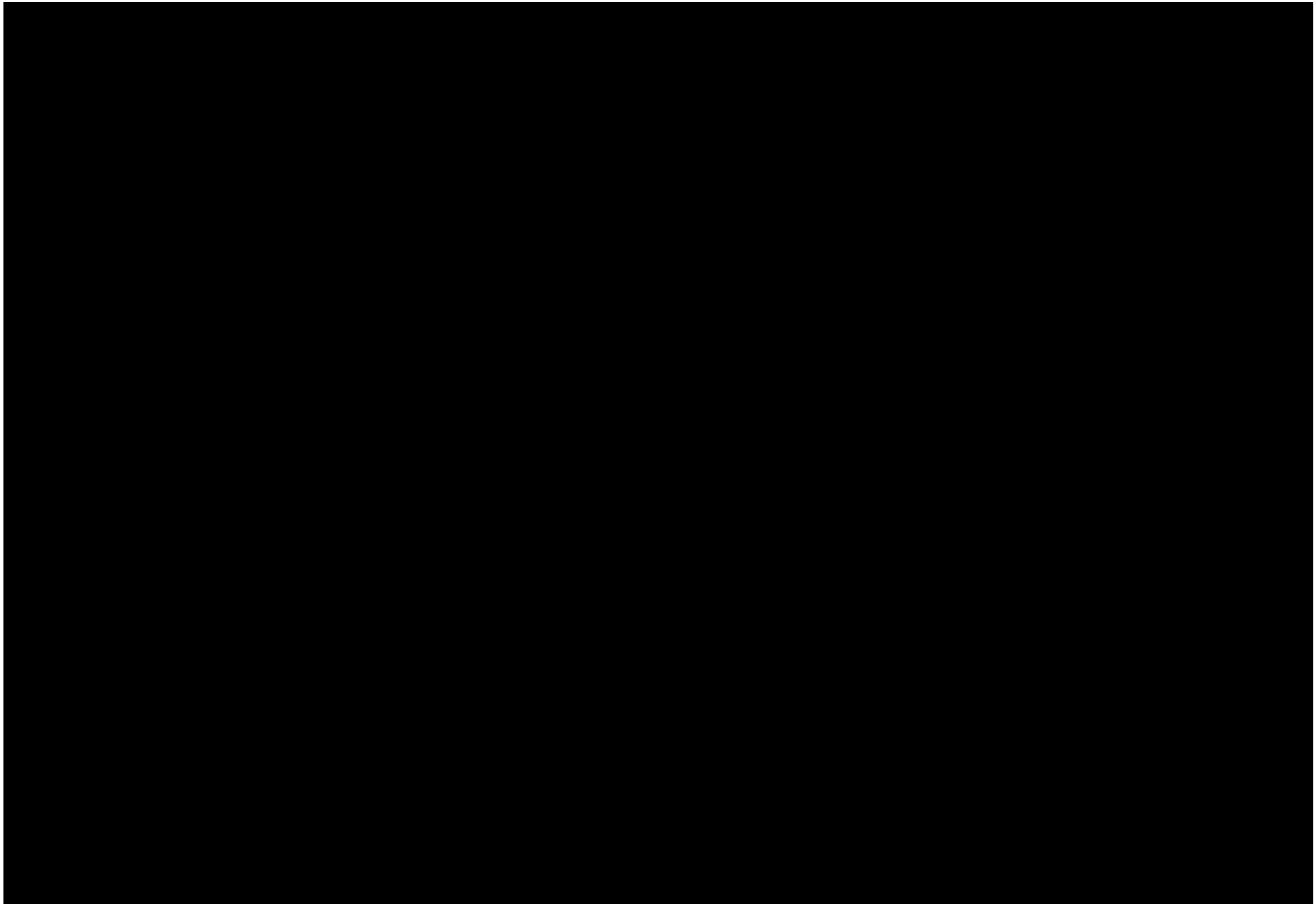


Table C.5: Historical Costs

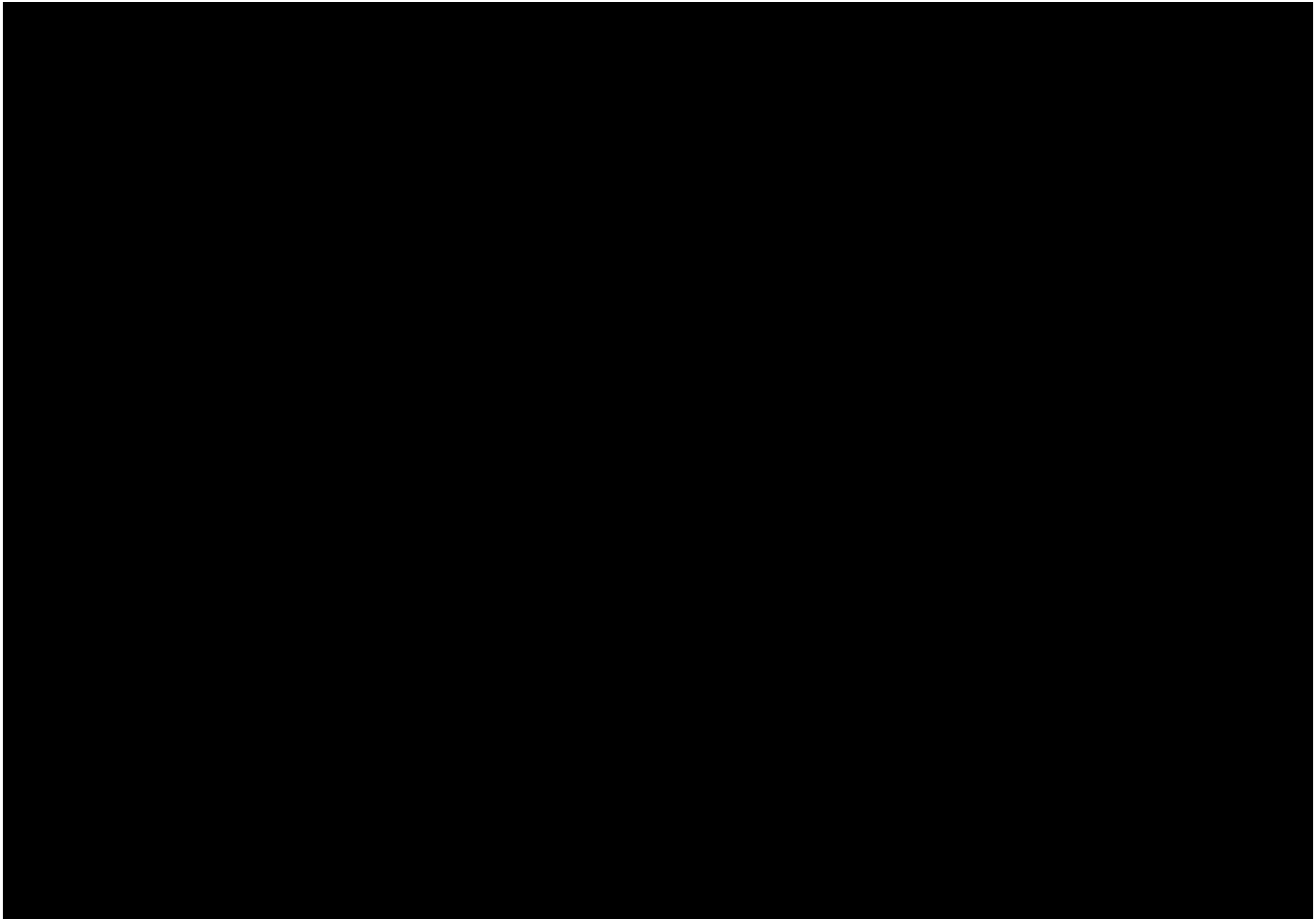


Table C.5: Historical Costs

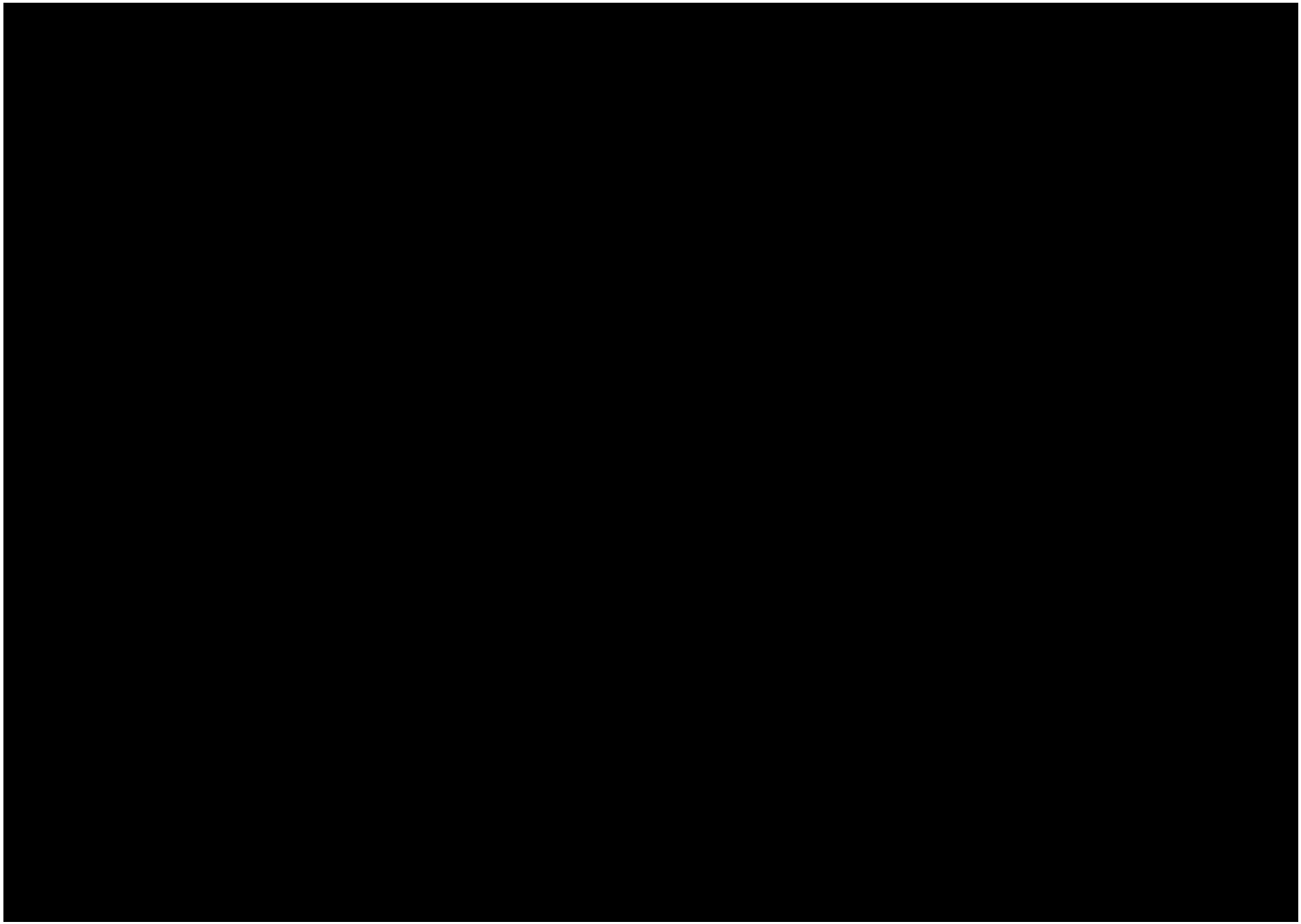


Table C.5: Historical Costs

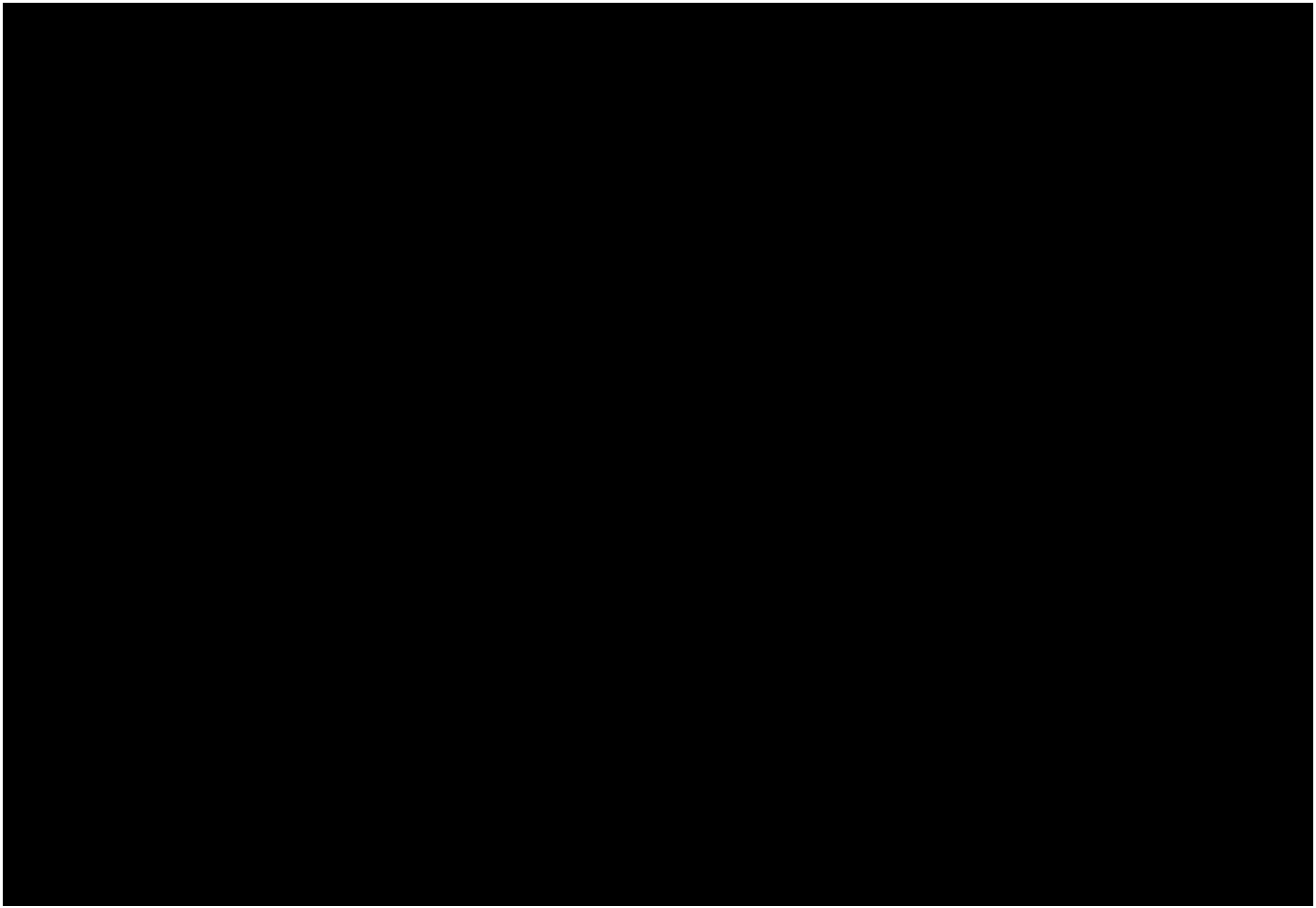


Table C.5: Historical Costs

[redacted]

Sources: C-1169 to C-1318, Table C.6, Table C.7
Amounts listed in C-1172, a duplicative file, are excluded.
Notes:
[5]: Indicates Bilcon's share of payments, if provided.
[6]: If the document contains support for the line item costs in the form of receipts or correspondence, 'Yes' is reported, otherwise 'No'.
[7]: If the document contains evidence of [redacted] 'Yes' is reported, otherwise 'No'.
[8]: If the document reports monetary amounts in U.S. dollars, 'Yes' is reported, otherwise 'No'.
[9]: The month-end exchange rate of C$ per US$, as reported by Bloomberg, using the date reported in [3]. See Table C.7.
[10]: If [4] is reported in C$, as indicated in [8], then [4] is reported. Otherwise, [4] x [9].
[11]: If [4] is reported in US$, as indicated in [8], then [4] is reported. Otherwise, [4] / [9].
[12]: [10] x [5].
[13]: [11] x [5].
[14]: If support for the line item is present, as indicated in [6], and the check is not written by Ralph Clayton & Sons, as indicated in [7], then [12], otherwise, 0.

Table C.6: Index Between Historical Cost Line Items and Cost Categories

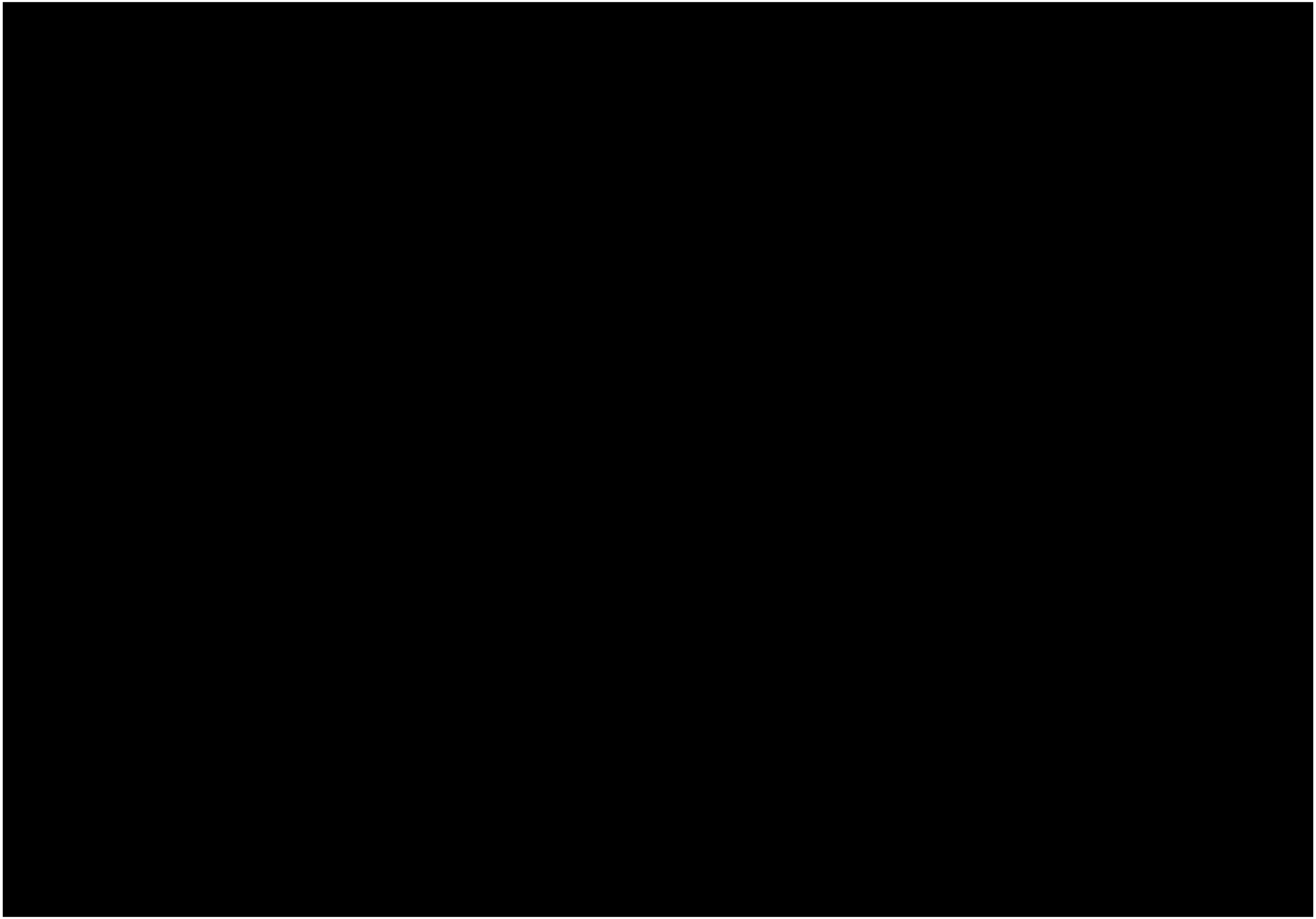


Table C.6: Index Between Historical Cost Line Items and Cost Categories

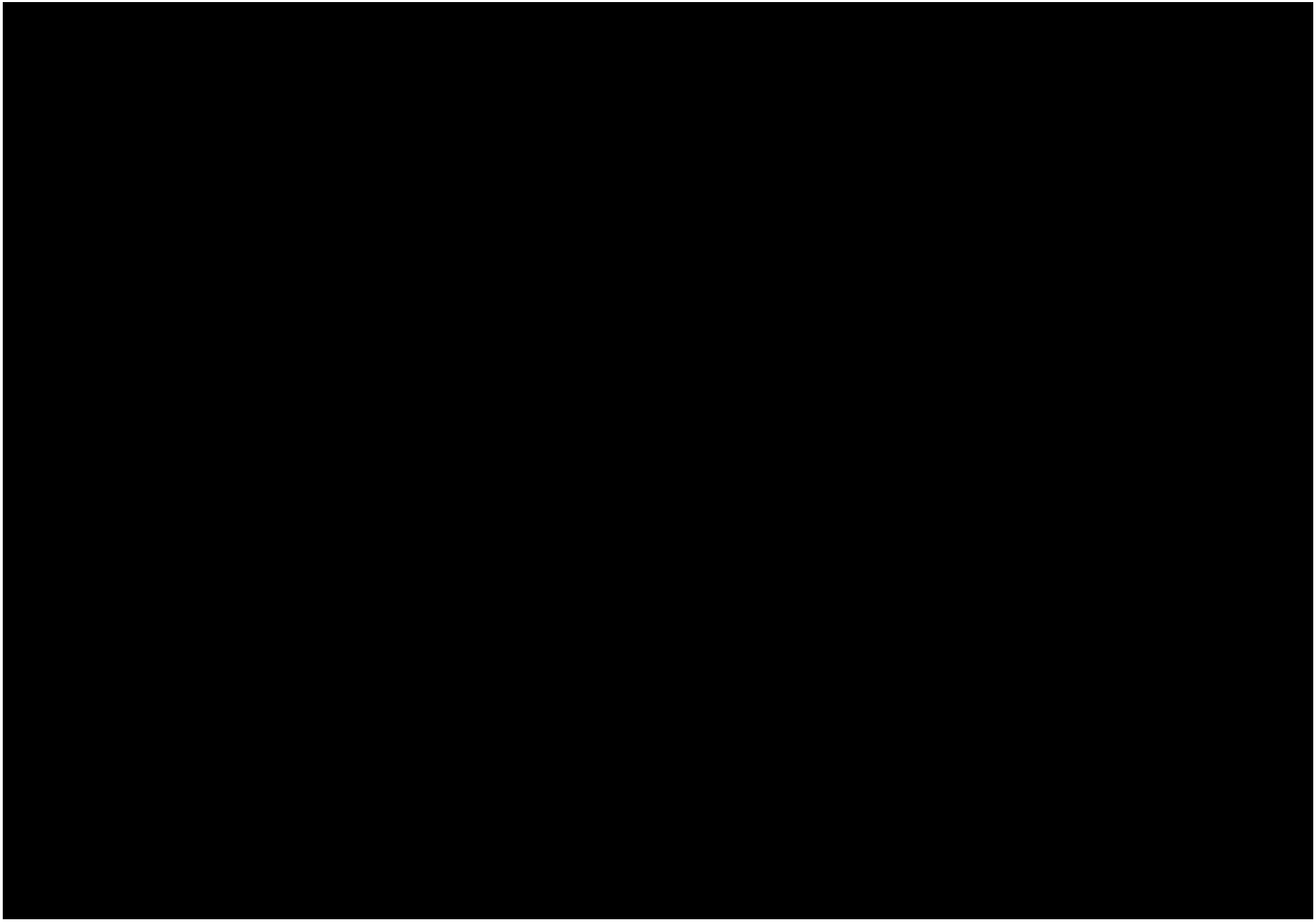


Table C.6: Index Between Historical Cost Line Items and Cost Categories

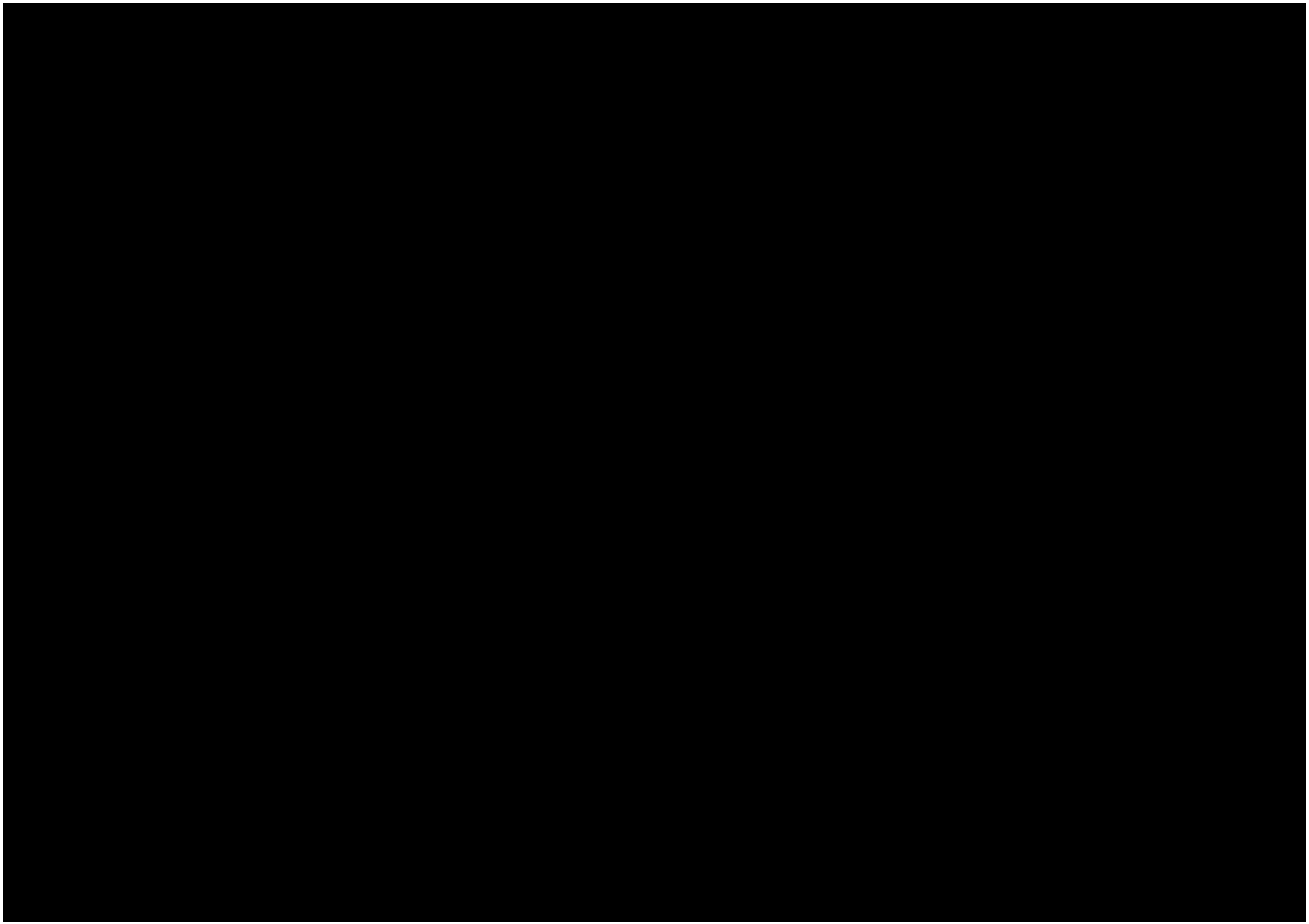


Table C.6: Index Between Historical Cost Line Items and Cost Categories

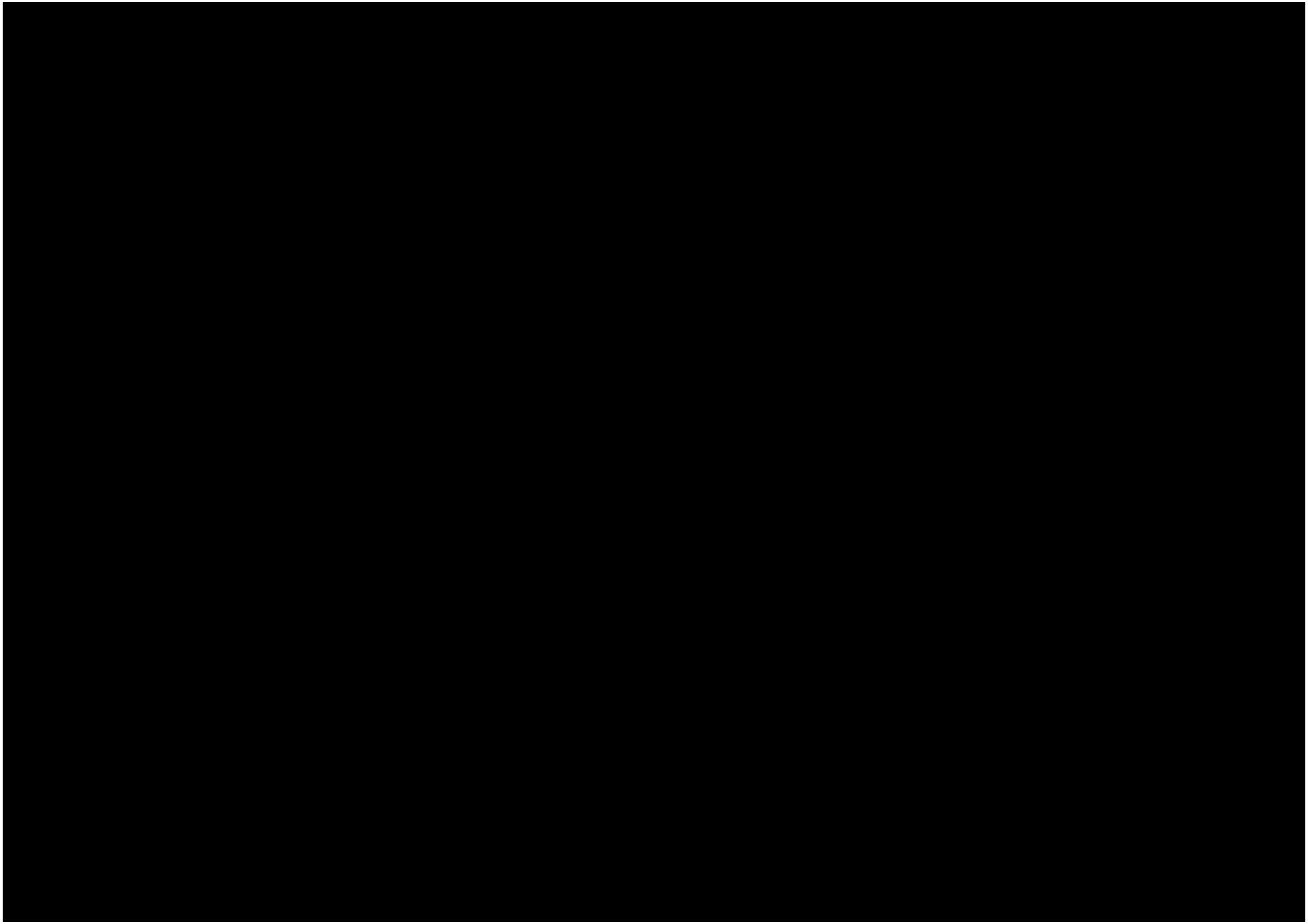


Table C.6: Index Between Historical Cost Line Items and Cost Categories

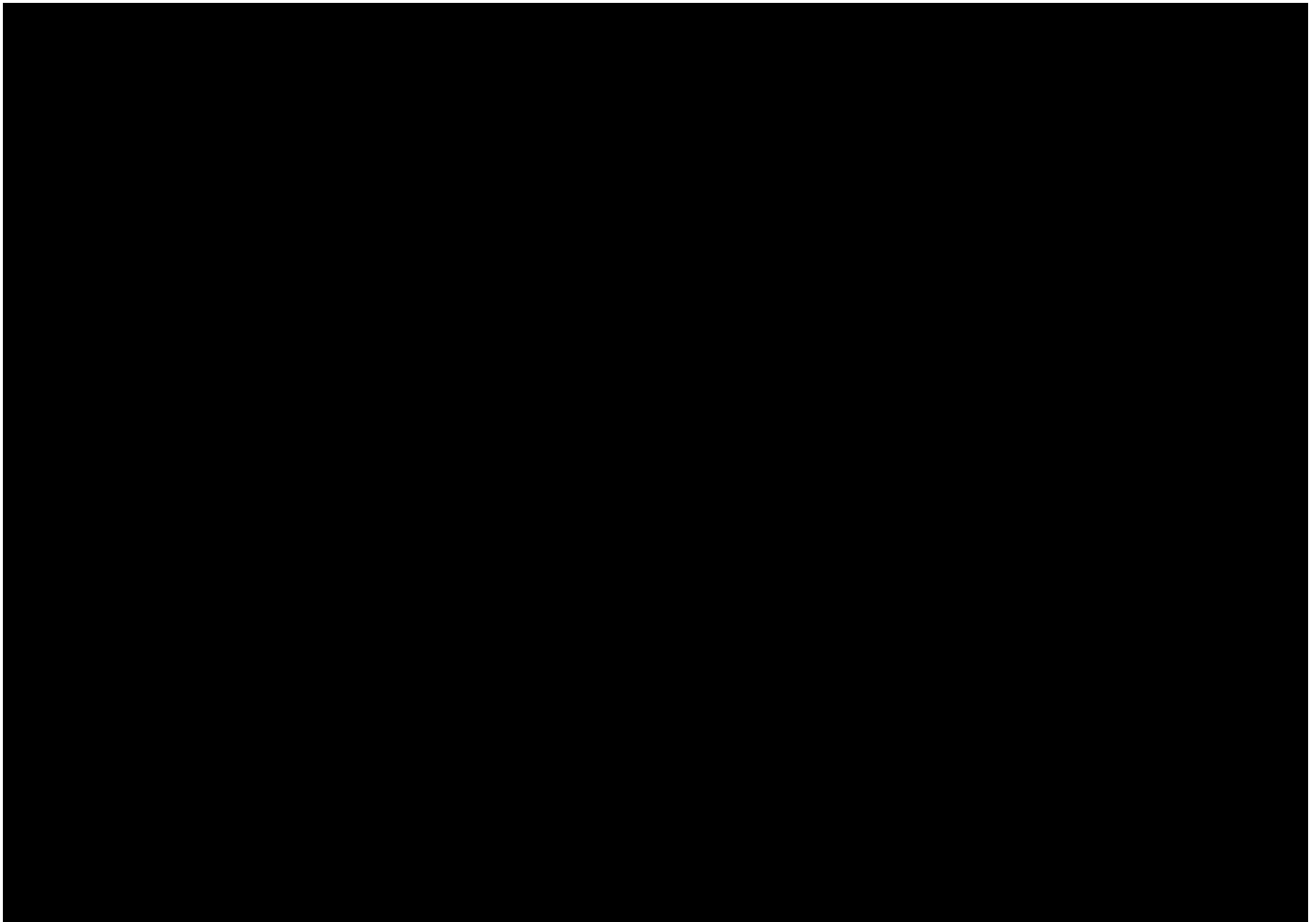


Table C.6: Index Between Historical Cost Line Items and Cost Categories

[redacted]

Table C.6: Index Between Historical Cost Line Items and Cost Categories

Table C.6: Index Between Historical Cost Line Items and Cost Categories

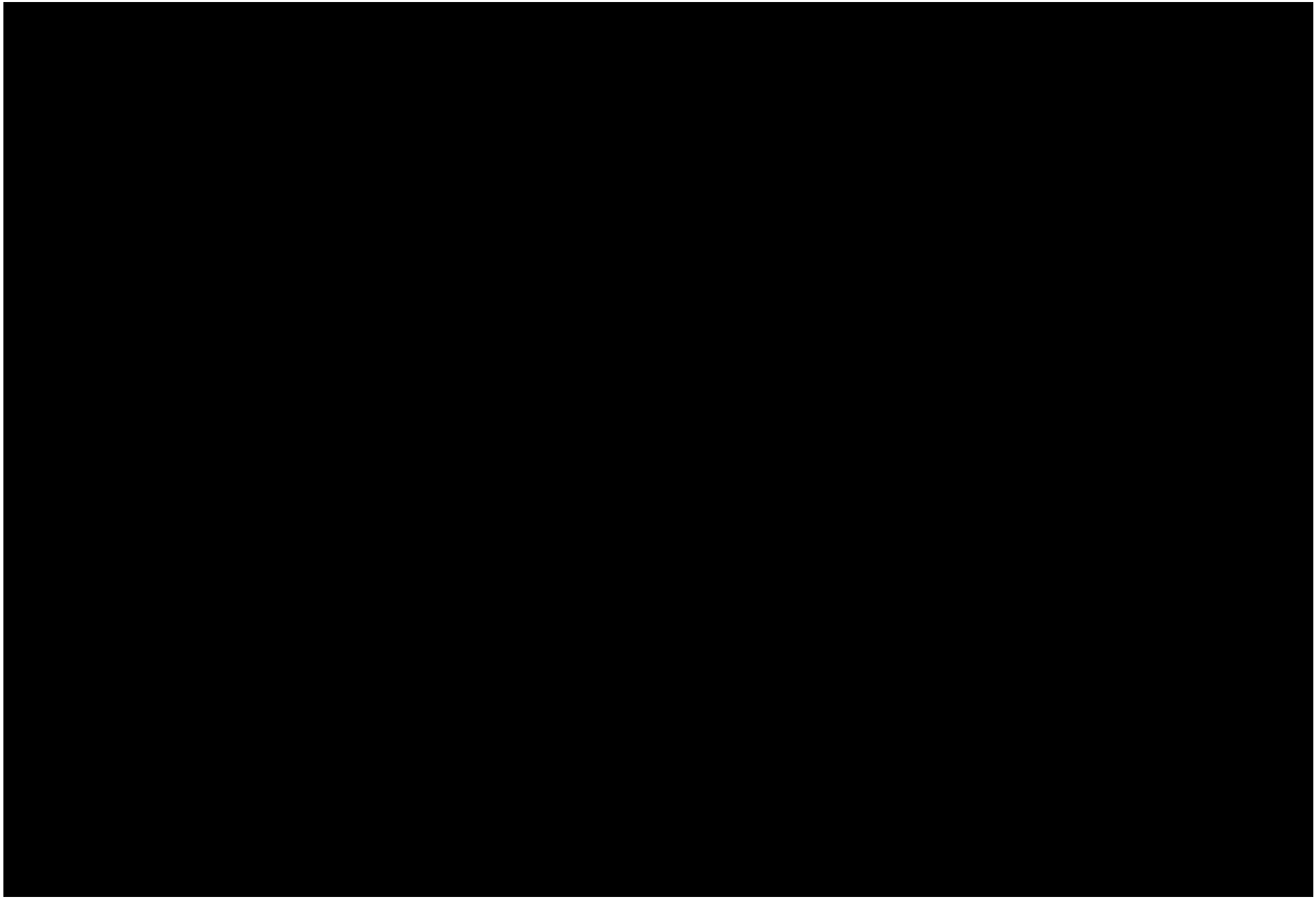


Table C.6: Index Between Historical Cost Line Items and Cost Categories

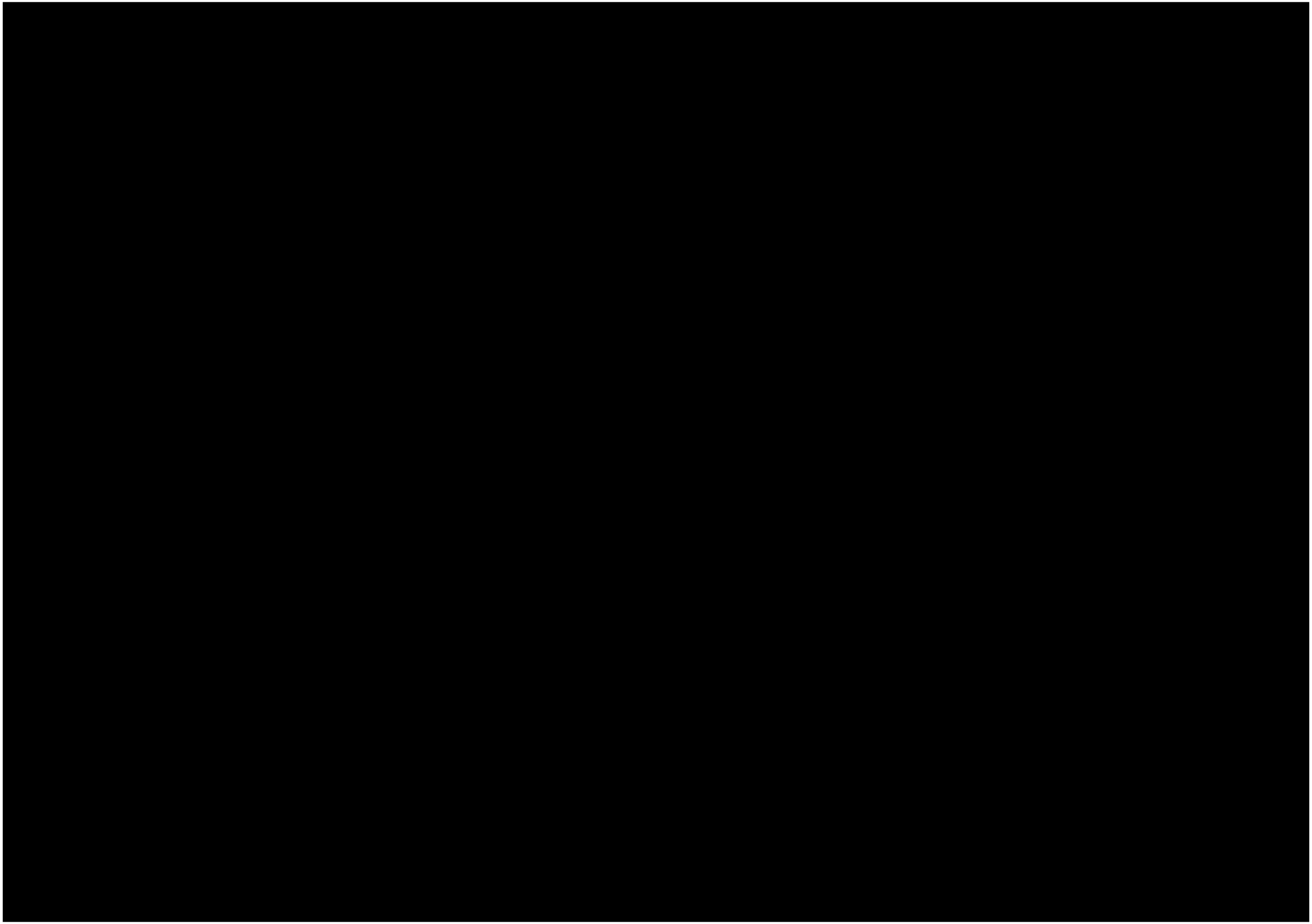


Table C.6: Index Between Historical Cost Line Items and Cost Categories

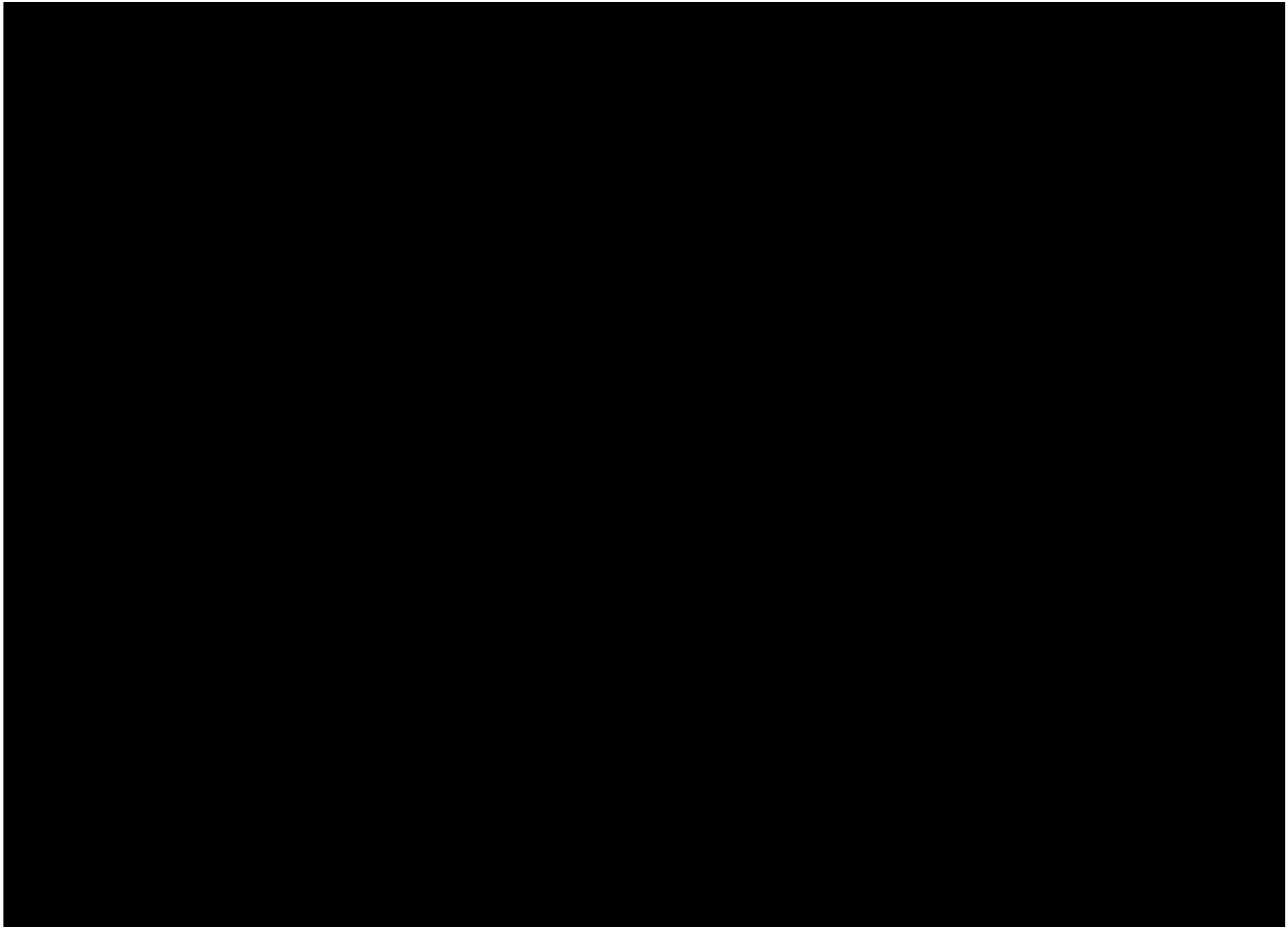


Table C.6: Index Between Historical Cost Line Items and Cost Categories

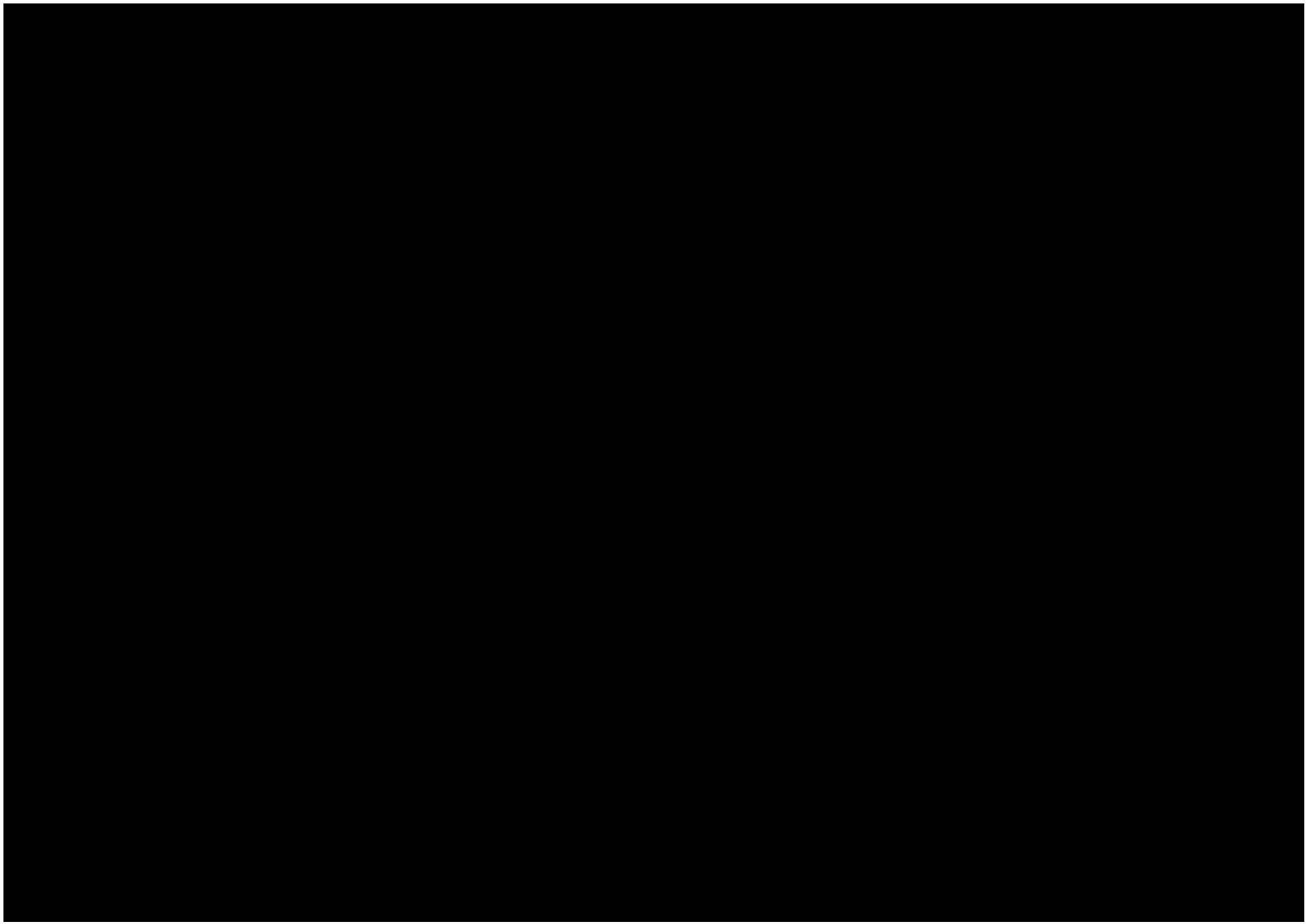


Table C.6: Index Between Historical Cost Line Items and Cost Categories

[redacted]

Source: C-1169 to C-1318.
Notes:
Counsel has instructed on the categorization of invoices into Consulting Experts, Panel Costs, Office & Operations, Non-EA Related Quarry Costs, and Witholding Tax (CCRA)
[1]: Entity paid by Bilcon, as listed in the source document
[2]: Entity paid by Bilcon, with generalized name.
[3]: Description of [1], taken from the Claimants' Memorial, of the document provided
[4]: Cost category.

Table C.7:
Exchange Rates
(Canadian Dollars to U.S. Dollars)

Month	Exchange Rate
May-02	1.5279
Jun-02	1.5174
Jul-02	1.5842
Aug-02	1.5585
Sep-02	1.5868
Oct-02	1.5584
Nov-02	1.5653
Dec-02	1.5718
Jan-03	1.5195
Feb-03	1.4846
Mar-03	1.4673
Apr-03	1.4301
May-03	1.3666
Jun-03	1.3467
Jul-03	1.4043
Aug-03	1.3865
Sep-03	1.3521
Oct-03	1.3198
Nov-03	1.3008
Dec-03	1.2970
Jan-04	1.3252
Feb-04	1.3343
Mar-04	1.3093
Apr-04	1.3722
May-04	1.3624
Jun-04	1.3328
Jul-04	1.3314
Aug-04	1.3127
Sep-04	1.2613
Oct-04	1.2177
Nov-04	1.1874
Dec-04	1.2019
Jan-05	1.2398
Feb-05	1.2339
Mar-05	1.2104
Apr-05	1.2583
May-05	1.2549
Jun-05	1.2251
Jul-05	1.2233
Aug-05	1.1878
Sep-05	1.1630

Table C.7:
Exchange Rates
(Canadian Dollars to U.S. Dollars)

Month	Exchange Rate
Oct-05	1.1822
Nov-05	1.1657
Dec-05	1.1620
Jan-06	1.1390
Feb-06	1.1369
Mar-06	1.1686
Apr-06	1.1170
May-06	1.1016
Jun-06	1.1170
Jul-06	1.1313
Aug-06	1.1037
Sep-06	1.1180
Oct-06	1.1222
Nov-06	1.1403
Dec-06	1.1657
Jan-07	1.1769
Feb-07	1.1699
Mar-07	1.1540
Apr-07	1.1097
May-07	1.0689
Jun-07	1.0653
Jul-07	1.0665
Aug-07	1.0556
Sep-07	0.9923
Oct-07	0.9431
Nov-07	0.9987
Dec-07	0.9984
Jan-08	1.0028
Feb-08	0.9878
Mar-08	1.0253
Apr-08	1.0079
May-08	0.9934
Jun-08	1.0215
Jul-08	1.0246
Aug-08	1.0637
Sep-08	1.0644
Oct-08	1.2125
Nov-08	1.2398
Dec-08	1.2188

Source: R-740, CAD BGN Currency, Bloomberg.

Appendix D: Discounted Cash Flow Analysis of Potential Profits

Table D.1: Brattle Schedule 1
Discretionary Cash Flow (2007 US$)

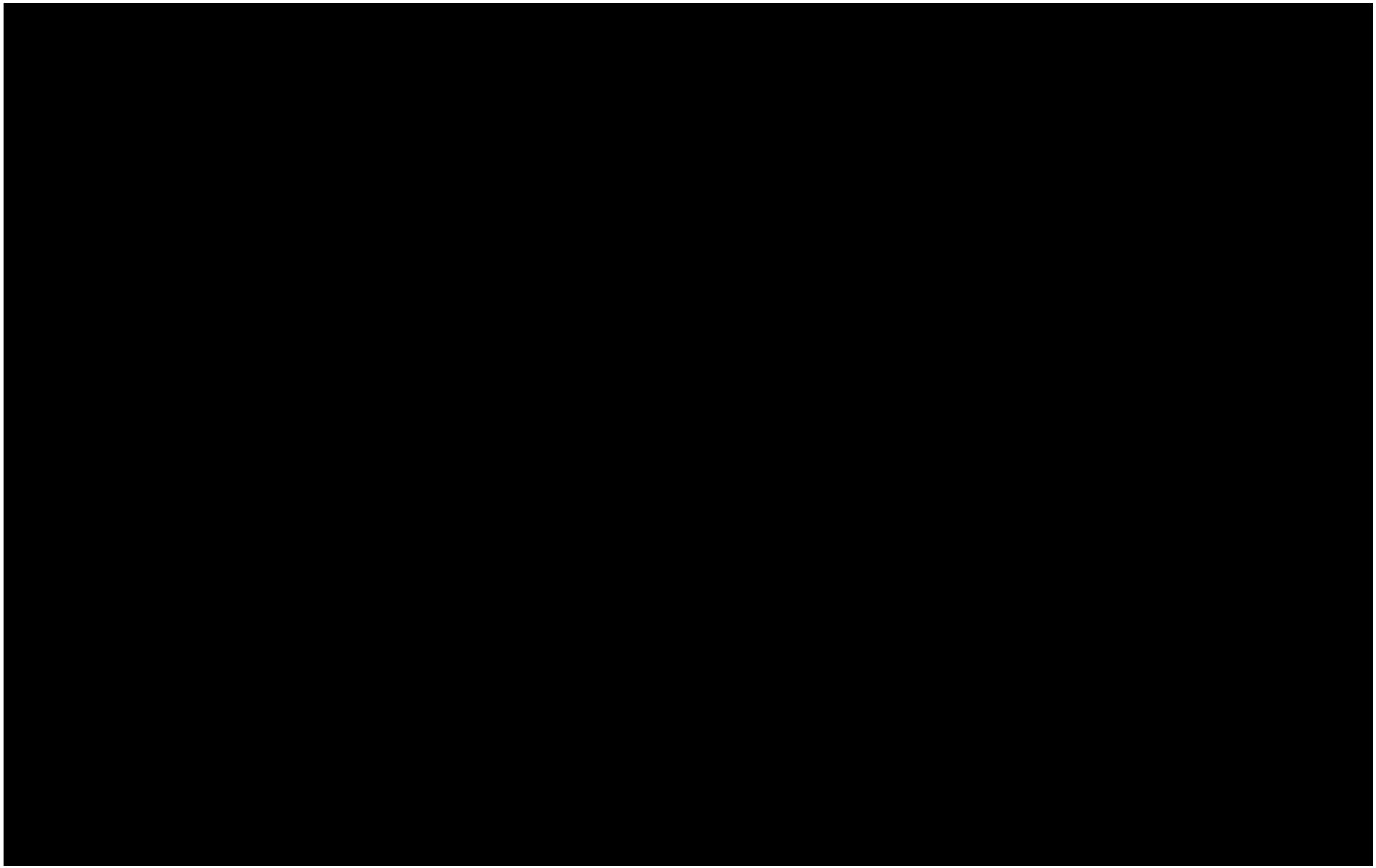


Table D.1: Brattle Schedule 1
Discretionary Cash Flow (2007 US$)

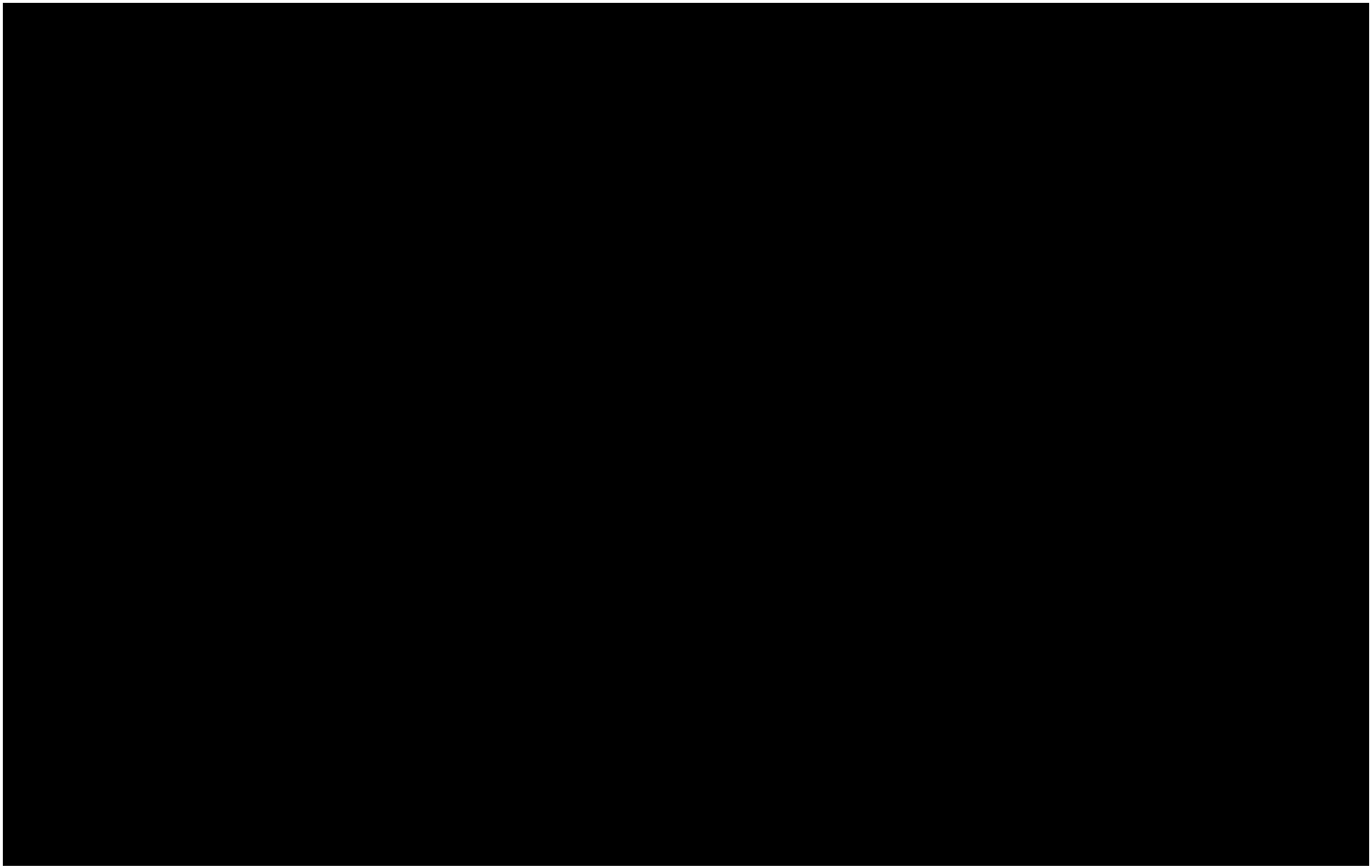


Table D.1: Brattle Schedule 1
Discretionary Cash Flow (2007 US$)

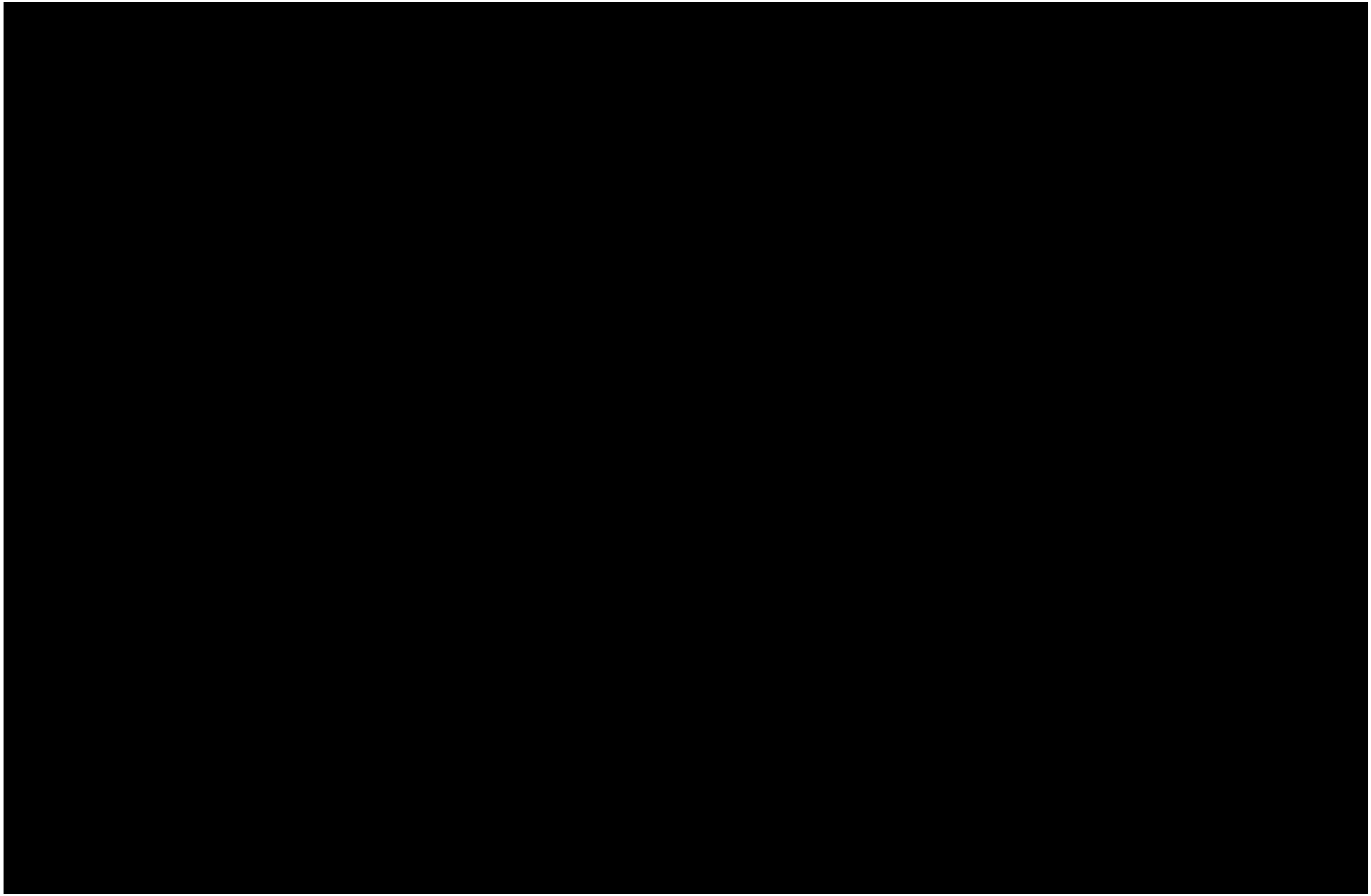


Table D.1: Brattle Schedule 1
Discretionary Cash Flow (2007 US$)

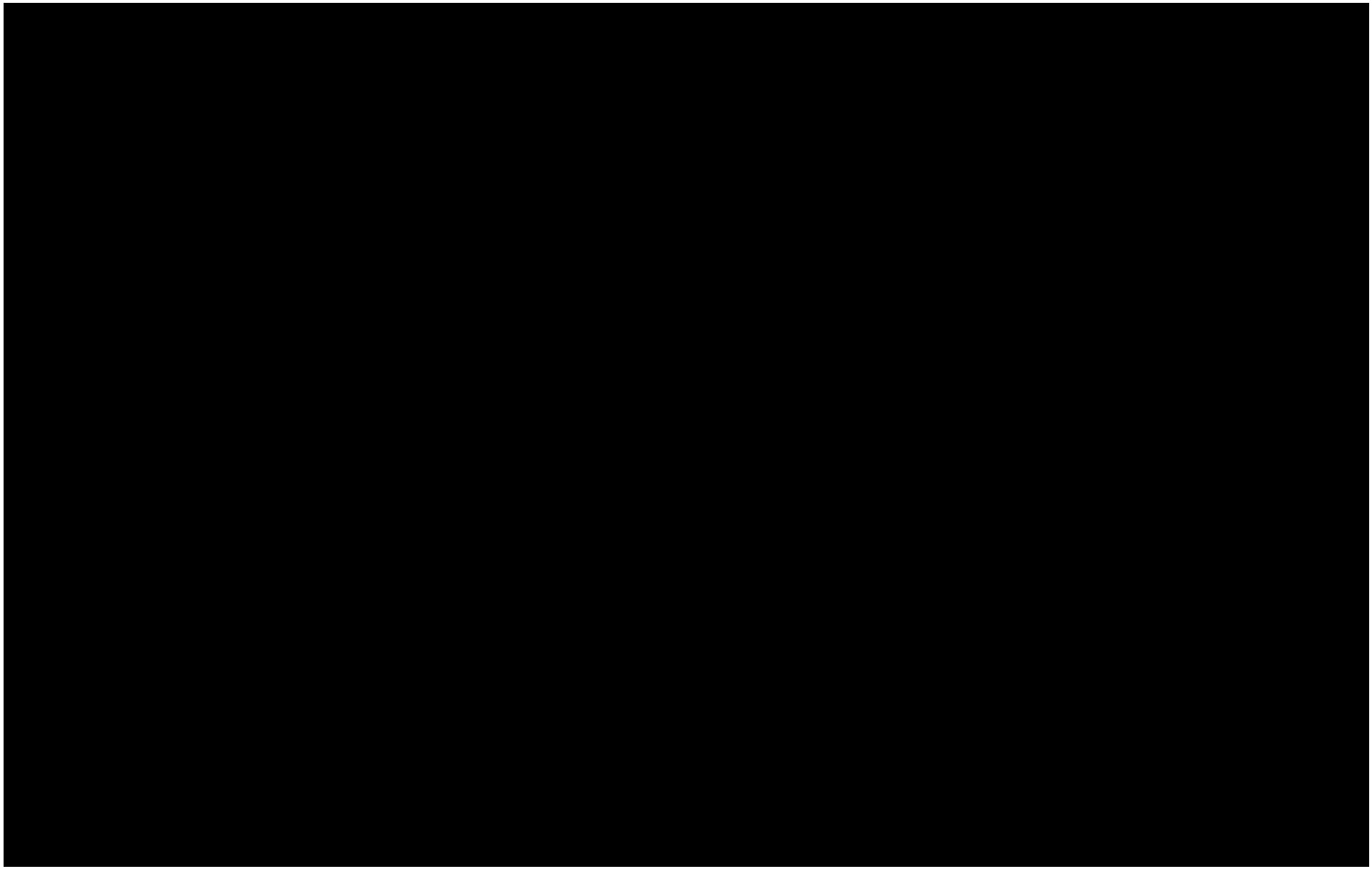


Table D.1: Brattle Schedule 1
Discretionary Cash Flow (2007 US$)

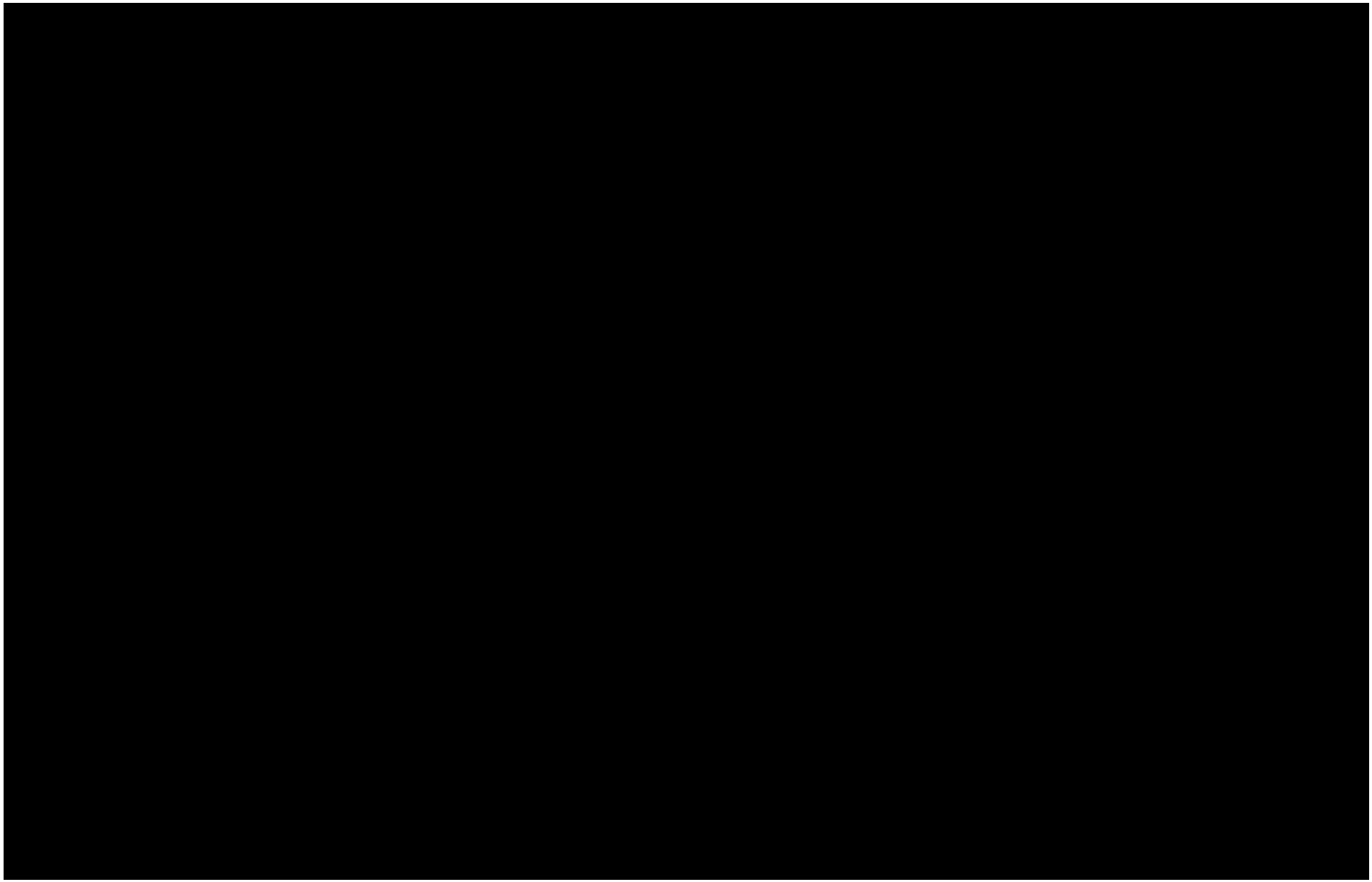


Table D.1: Brattle Schedule 1
Discretionary Cash Flow (2007 US$)

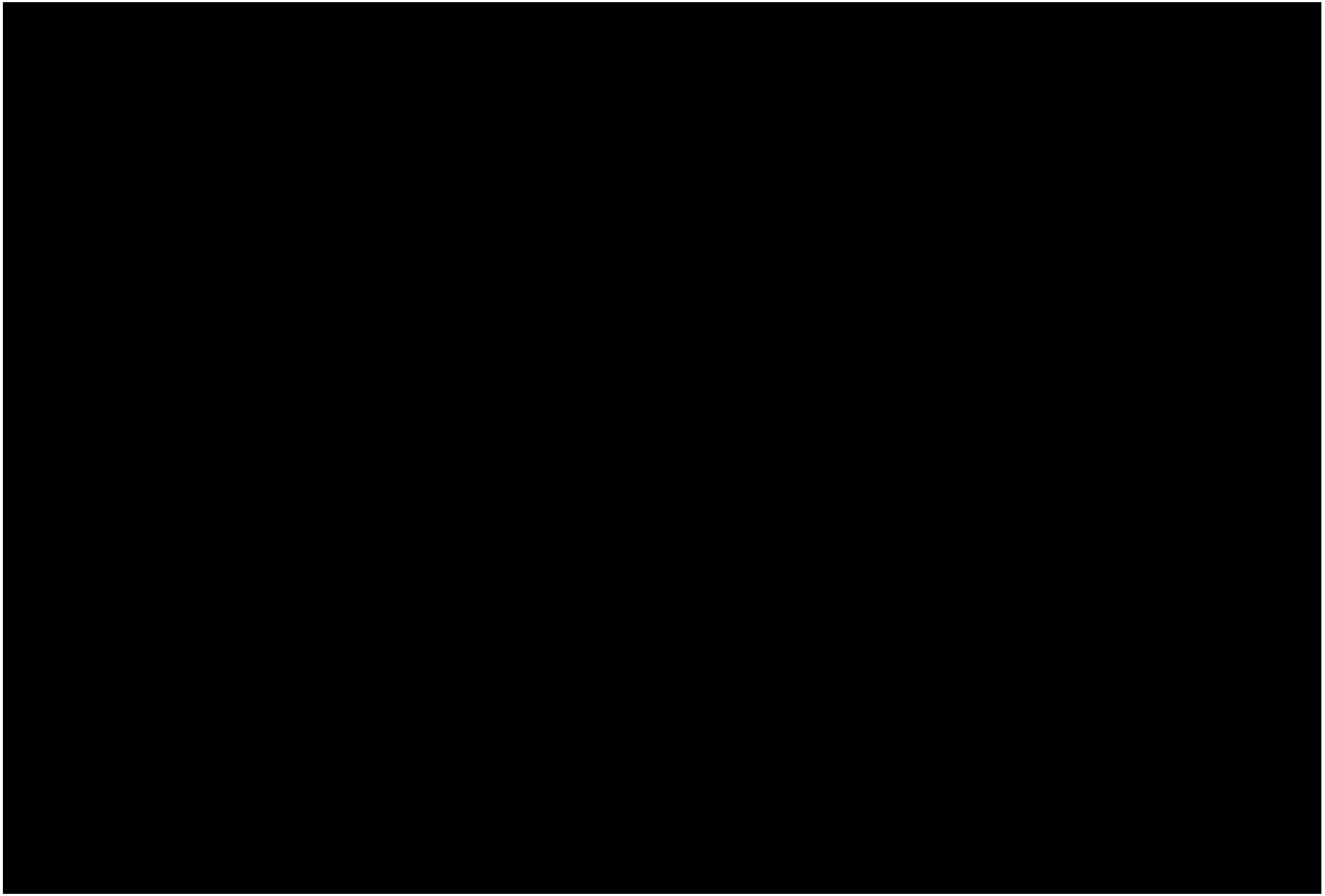


Table D.1: Brattle Schedule 1
Discretionary Cash Flow (2007 US$)

Sources & Notes:

[1]: Report Section V.D.
[2]: See Appendix G.
[3]: D.2.
[4]: D.2.
[5]: D.3.
[6]: [4] x [5].
[7]: (-1) x [3] x Table D.4 [3] x Table D.4 [6] .
[8]: Chodorow Report, Section V.F.2.
[9]: The sum of Table D.6 [9], Table D.7 [8], and Table D.8 [4].
[10]: The sum of [6] through [9].
[11]: 5% of [6]. See Rosen Report, Schedule 1.
[12]: D.9.
[13]: D.10.
[14]: The sum of [10] through [13].
[15]: D.11.
[16]: D.5.
[17]: D.12.
[18]: The sum of [14] through [17].
[19]: Assumed mid-year cashflows. See Rosen Report, Schedule 1.
[20]: 1 / (1 + [2]) ^ (([19] - [1]) / 365).
[21]: [18] x [20].
[22]: The sum of [21].

Table D.2: Brattle Schedule 2
Production, Sales, and Change in Inventory
(tons)

[redacted]

Sources & Notes:
[1]: Report Section VI.B.
[2]: Report Section VI.B.
[3]: [1] - Sum of [2].
[4]: [6] from the previous year.
[5]: [3].
[6]: [4] + [5].

Table D.2: Brattle Schedule 2
Production, Sales, and Change in Inventory
(tons)

Sources & Notes:
[1]: Report Section VI.B.
[2]: Report Section VI.B.
[3]: [1] - Sum of [2].
[4]: [6] from the previous year.
[5]: [3].
[6]: [4] + [5].

Table D.2: Brattle Schedule 2
Production, Sales, and Change in Inventory
(tons)

[redacted]

Sources & Notes:
[1]: Report Section VI.B.
[2]: Report Section VI.B.
[3]: [1] - Sum of [2].
[4]: [6] from the previous year.
[5]: [3].
[6]: [4] + [5].

Table D.2: Brattle Schedule 2
Production, Sales, and Change in Inventory
(tons)

[redacted]

Sources & Notes:
[1]: Report Section VI.B.
[2]: Report Section VI.B.
[3]: [1] - Sum of [2].
[4]: [6] from the previous year.
[5]: [3].
[6]: [4] + [5].

Table D.2: Brattle Schedule 2
Production, Sales, and Change in Inventory
(tons)

Sources & Notes:
[1]: Report Section VI.B.
[2]: Report Section VI.B.
[3]: [1] - Sum of [2].
[4]: [6] from the previous year.
[5]: [3].
[6]: [4] + [5].

Table D.2: Brattle Schedule 2
Production, Sales, and Change in Inventory
(tons)

[1]: Report Section VI.B.
[2]: Report Section VI.B.
[3]: [1] - Sum of [2].
[4]: [6] from the previous year.
[5]: [3].
[6]: [4] + [5].

Table D.2: Brattle Schedule 2
Production, Sales, and Change in Inventory
(tons)

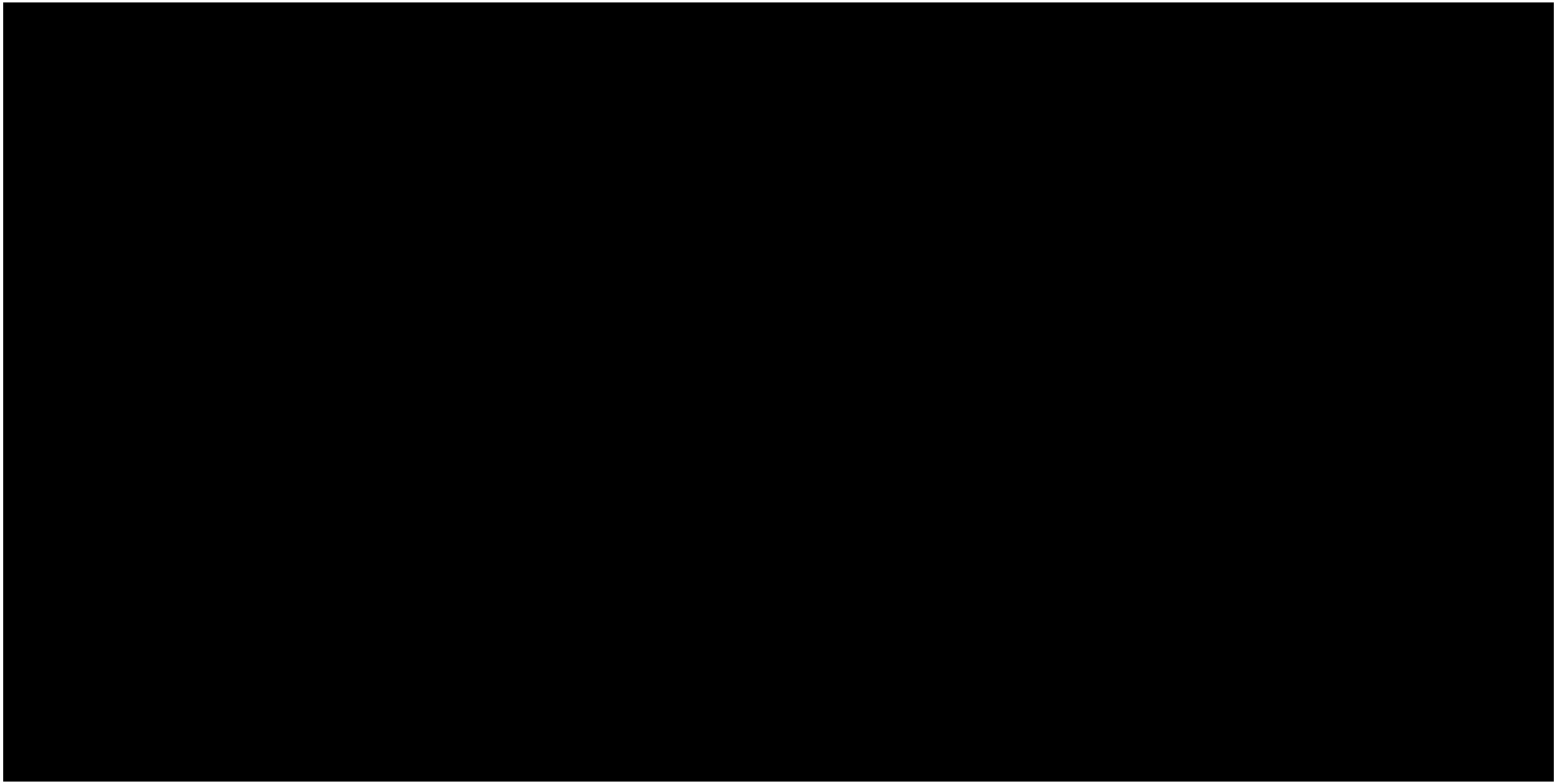
[redacted]

Sources & Notes:
[1]: Report Section VI.B.
[2]: Report Section VI.B.
[3]: [1] - Sum of [2].
[4]: [6] from the previous year.
[5]: [3].
[6]: [4] + [5].

Table D.3: Brattle Schedule 3
Price and Freight (2007 US$ per ton)

Sources & Notes:
[1]: Table D.13.
[2]: Table D.14.
[3]: 0.125% x ([1] - [2]).
[4]: [1] - [2] - [3].

Table D.3: Brattle Schedule 3
Price and Freight (2007 US$ per ton)



Sources & Notes:
[1]: Table D.13.
[2]: Table D.14.
[3]: 0.125% x ([1] - [2]).
[4]: [1] - [2] - [3].

Table D.3: Brattle Schedule 3
Price and Freight (2007 US$ per ton)

Sources & Notes:
[1]: Table D.13.
[2]: Table D.14.
[3]: 0.125% x ([1] - [2]).
[4]: [1] - [2] - [3].

Table D.3: Brattle Schedule 3
Price and Freight (2007 US$ per ton)

Sources & Notes:
[1]: Table D.13.
[2]: Table D.14.
[3]: 0.125% x ([1] - [2]).
[4]: [1] - [2] - [3].

Table D.4: Brattle Schedule 4
Operating Costs
(Converted to 2007 $US per ton)

Sources & Notes:

[1]: Canadian CPI, Bloomberg.

[2]: Nominal year in which values were reported in the Rosen Report and SCMA Report.

[3]: 1 over the product of (1 + [1]) ^ n using [1] from each year from 2007 through [2], where n is 0.19 for 2007, 0.5 for [2], and 1 for all years in-between.

[4]: Table D.15.

[5]: SCMA Report.

[6]: [5] x [3] / [4].

Table D.4: Brattle Schedule 4
Operating Costs
(Converted to 2007 $US per ton)

[redacted]

Sources & Notes:

[1]: Canadian CPI, Bloomberg.

[2]: Nominal year in which values were reported in the Rosen Report and SCMA Report.

[3]: 1 over the product of (1 + [1]) ^ n using [1] from each year from 2007 through [2], where n is 0.19 for 2007, 0.5 for [2], and 1 for all years in-between.

[4]: Table D.15.

[5]: SCMA Report.

[6]: [5] x [3] / [4].

Table D.4: Brattle Schedule 4
Operating Costs
(Converted to 2007 $US per ton)

Sources & Notes:

[1]: Canadian CPI, Bloomberg.

[2]: Nominal year in which values were reported in the Rosen Report and SCMA Report.

[3]: 1 over the product of (1 + [1]) ^ n using [1] from each year from 2007 through [2], where n is 0.19 for 2007, 0.5 for [2], and 1 for all years in-between.

[4]: Table D.15.

[5]: SCMA Report.

[6]: [5] x [3] / [4].

Table D.4: Brattle Schedule 4
Operating Costs
(Converted to 2007 $US per ton)

Sources & Notes:

[1]: Canadian CPI, Bloomberg.

[2]: Nominal year in which values were reported in the Rosen Report and SCMA Report.

[3]: 1 over the product of (1 + [1]) ^ n using [1] from each year from 2007 through [2], where n is 0.19 for 2007, 0.5 for [2], and 1 for all years in-between.

[4]: Table D.15.

[5]: SCMA Report.

[6]: [5] x [3] / [4].

Table D.4: Brattle Schedule 4
Operating Costs
(Converted to 2007 $US per ton)

[redacted]

Sources & Notes:

[1]: Canadian CPI, Bloomberg.

[2]: Nominal year in which values were reported in the Rosen Report and SCMA Report.

[3]: 1 over the product of (1 + [1]) ^ n using [1] from each year from 2007 through [2], where n is 0.19 for 2007, 0.5 for [2], and 1 for all years in-between.

[4]: Table D.15.

[5]: SCMA Report.

[6]: [5] x [3] / [4].

Table D.5: Brattle Schedule 5
Capital Expenditures
(Converted to 2007 $US)

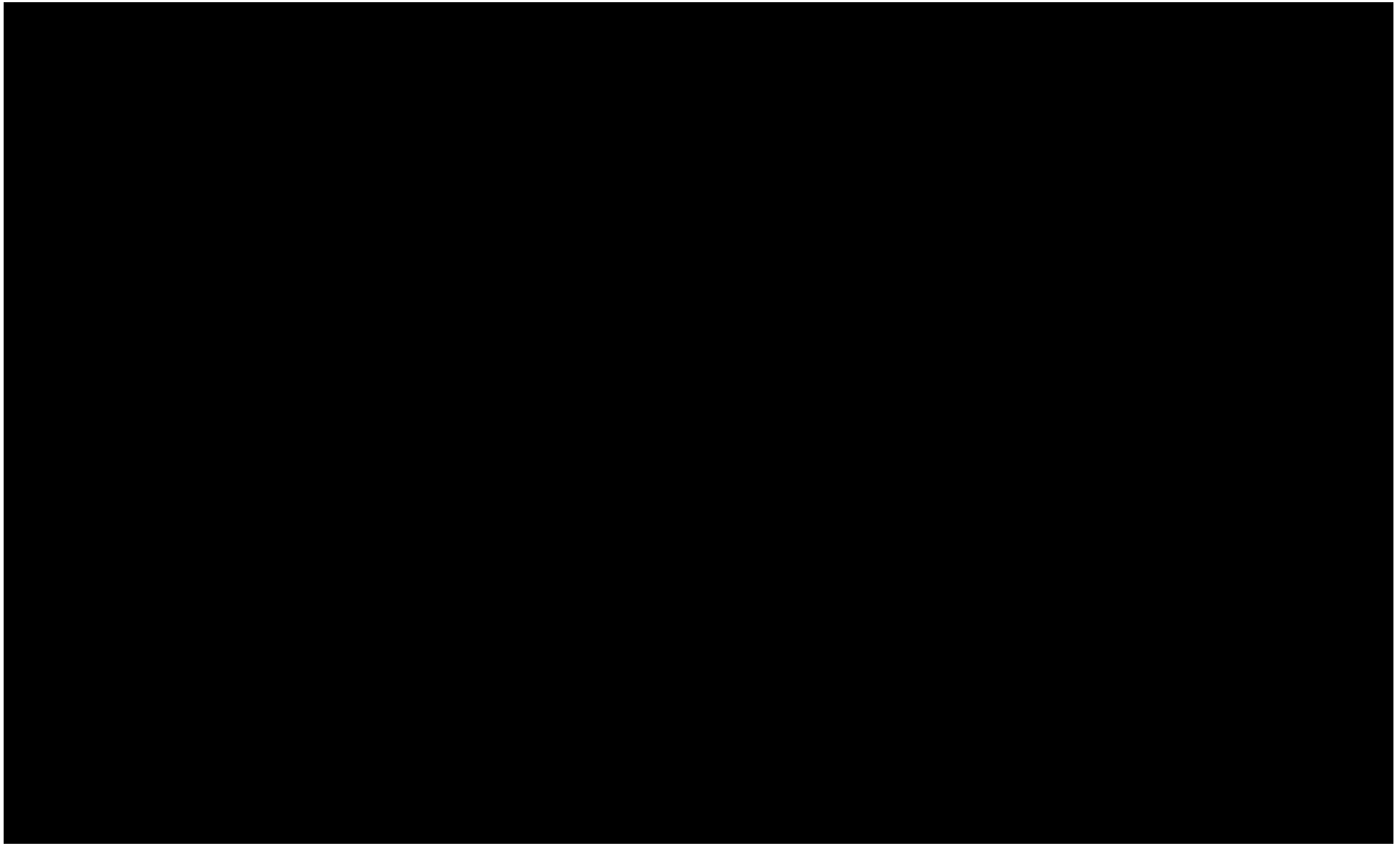


Table D.5: Brattle Schedule 5
Capital Expenditures
(Converted to 2007 $US)

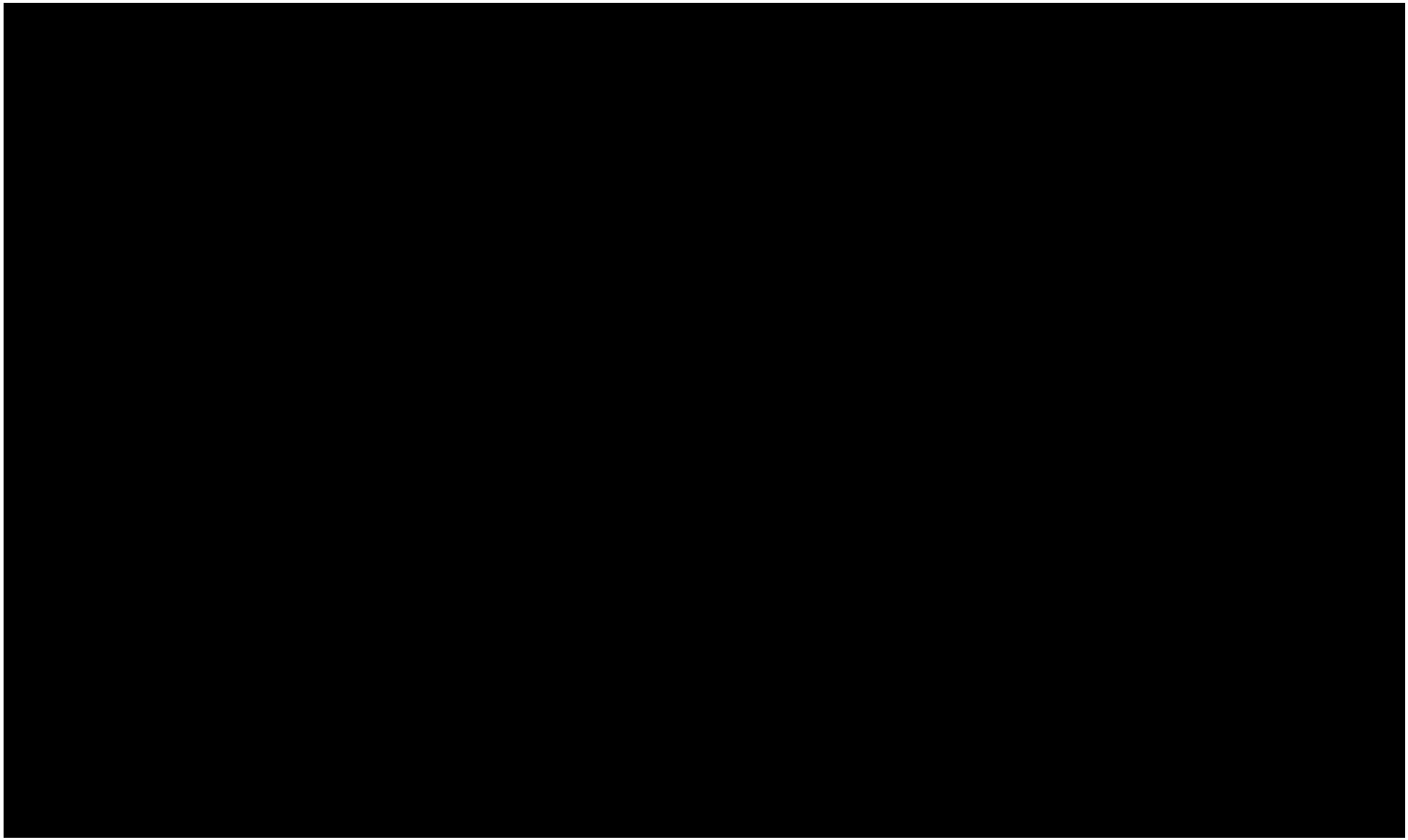


Table D.5: Brattle Schedule 5
Capital Expenditures
(Converted to 2007 $US)

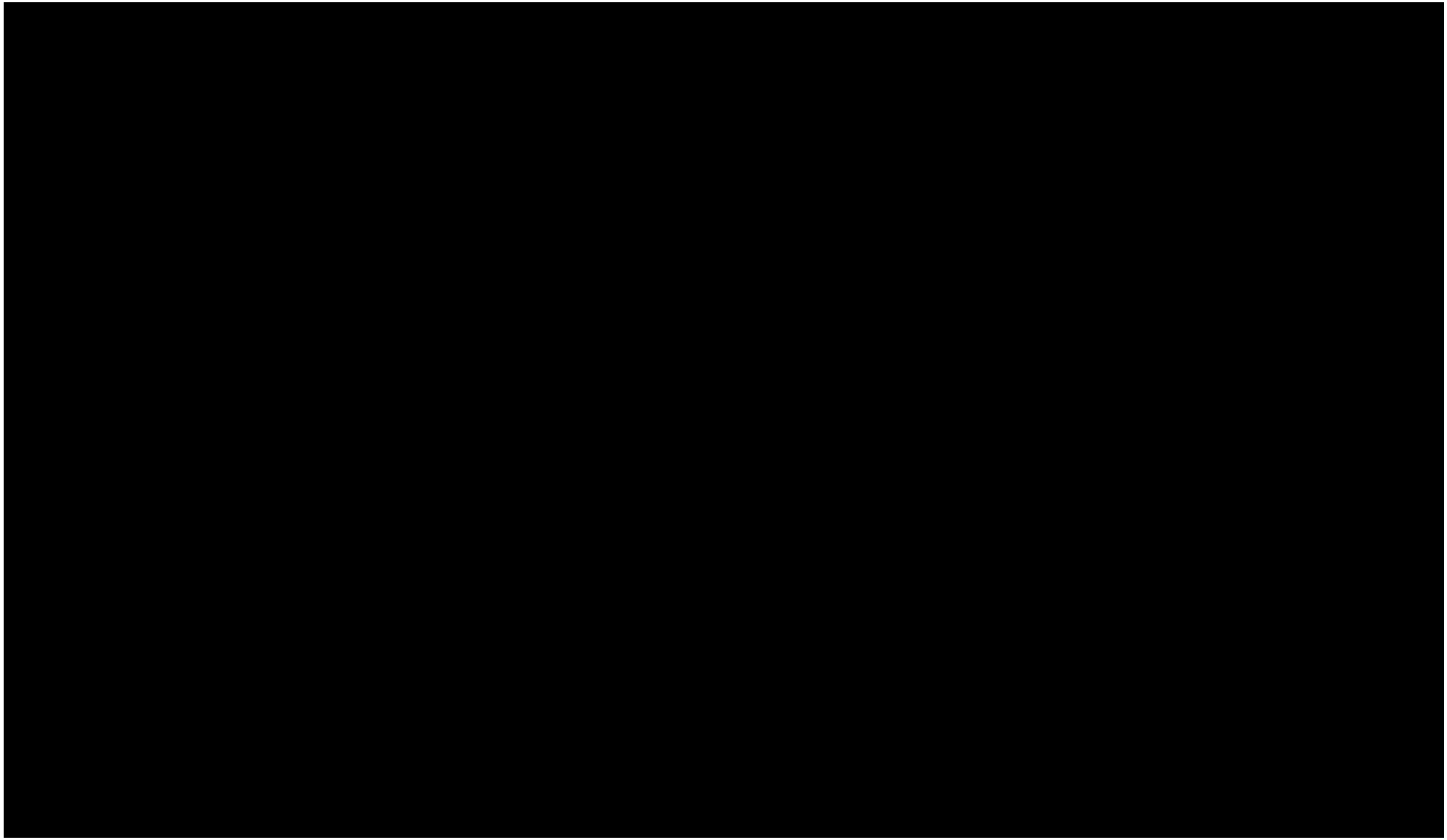


Table D.5: Brattle Schedule 5
Capital Expenditures
(Converted to 2007 $US)

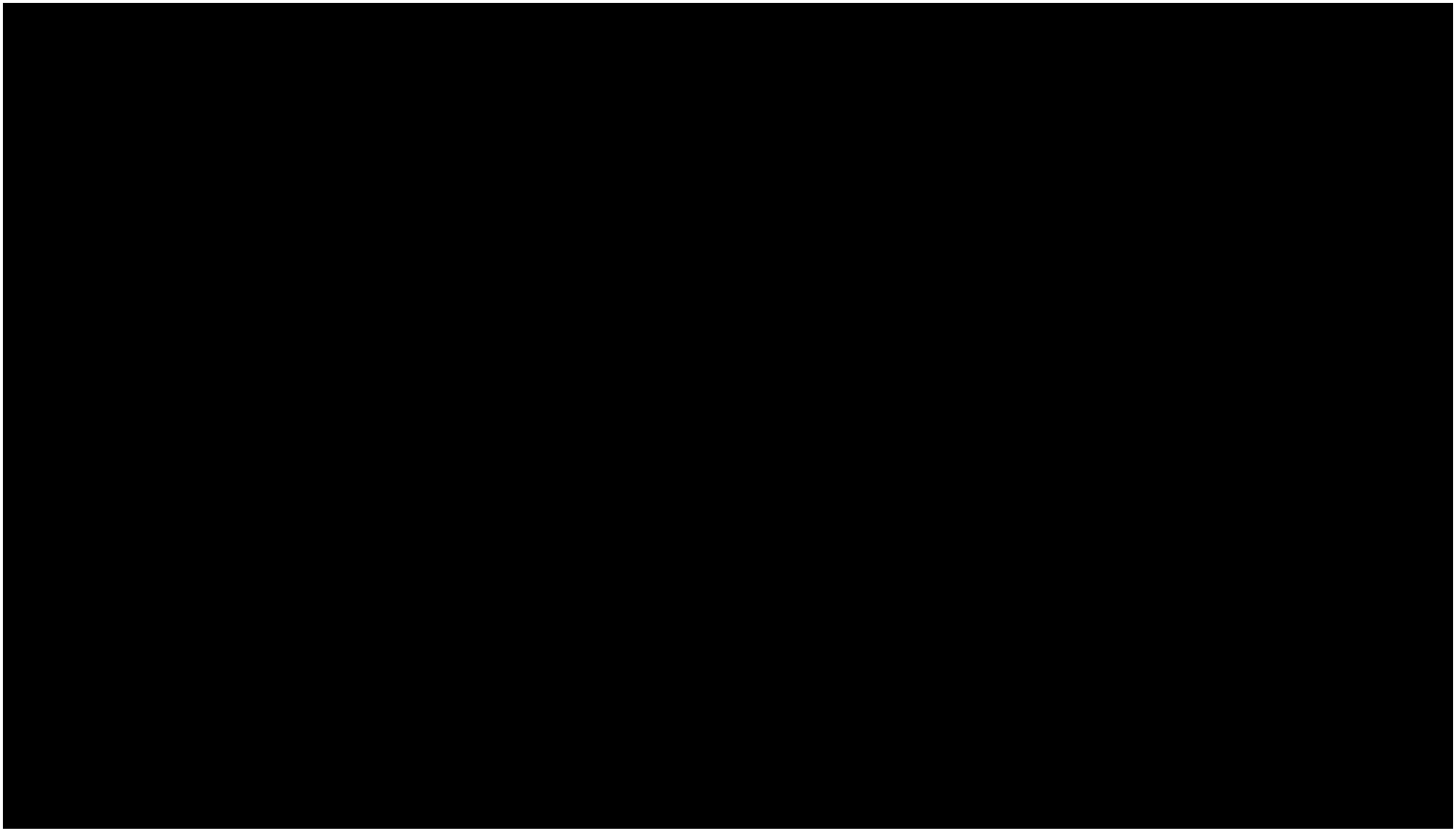


Table D.5: Brattle Schedule 5
Capital Expenditures
(Converted to 2007 $US)

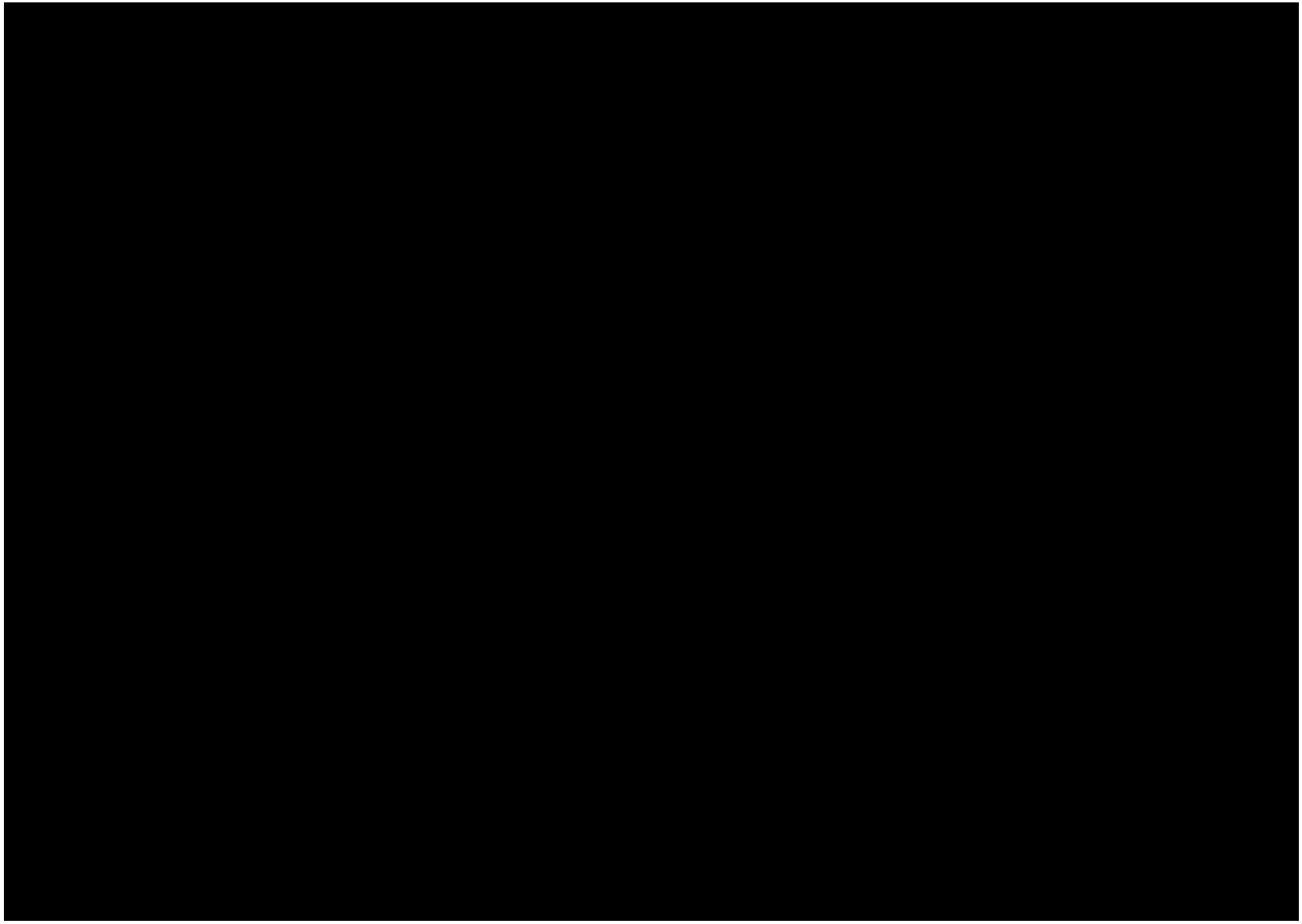


Table D.5: Brattle Schedule 5
Capital Expenditures (Converted to 2007 $US)

Sources & Notes:
[1]: C/US$ foreign exchanges rates, Bloomberg.
[2]: Table D.15.
[3]: U.S. CPI, Bloomberg.
[4]: Canadian CPI, Bloomberg.
[5],[9],[12],[15],[19],[23]: Rosen Schedule 5. Initial outlays are corrected for the price of [redacted], per C-1342, p.17.
[redacted]
[6]: The sum of [5].
[7]: 1 / (1 + [3]) ^ (0.19)) using [3] from 2007 x 1 / (1 + [3]) ^ (0.5)) using [3] from 2008.
[8]: [6] x [7].
[10]: 1 / (1 + [3])^ (0.19)) using [3] from 2007 x 1 / (1 + [3])^ (0.5)) using [3] from 2008.
[11]: [9] x [10].
[12]: Rosen's calculated [redacted]
[13]: 1 / (1 + [3]) ^ (0.19)) using [3] from 2007, multiplied by 1 / (1 + [3]) ^ (1)) using [3] from years between 2007 and the current year, multiplied by 1 / (1 + [3]) ^ (0.5)) using [3] from the current year
[14]: [12] x [13].
[16]: 1 / (1 + [4]) ^ (0.19)) using [4] from 2007, multiplied by 1 / (1 + [4]) ^ (1)) using [4] from years between 2007 and the current year,
[17]: [15] x [16].
[18]: [17] / [2].
[20]: 1 / (1 + [4]) ^ (0.19)) using [4] from 2007, multiplied by 1 / (1 + [4]) ^ (1)) using [4] from years between 2007 and the current year, multiplied by 1 / (1 + [4]) ^ (0.5)) using [4]
[21]: [19] x [20].
[22]: [21] / [2].
[24]: 1 / (1 + [3]) ^ (0.19)) using [3] from 2007, multiplied by 1 / (1 + [3]) ^ (1)) using [3] from years between 2007 and the current year, multiplied by 1 / (1 + [3]) ^ (0.5)) using [3] from the current year
[25]: [23] x [24].
[26]: [8] + [11] + [14] + [18] + [22] + [25]. Rosen excludes [redacted], which are included here.

Table D.6: Brattle Schedule 6
Maintenance Costs - Mobile Equipment
(Converted to 2007 US$)

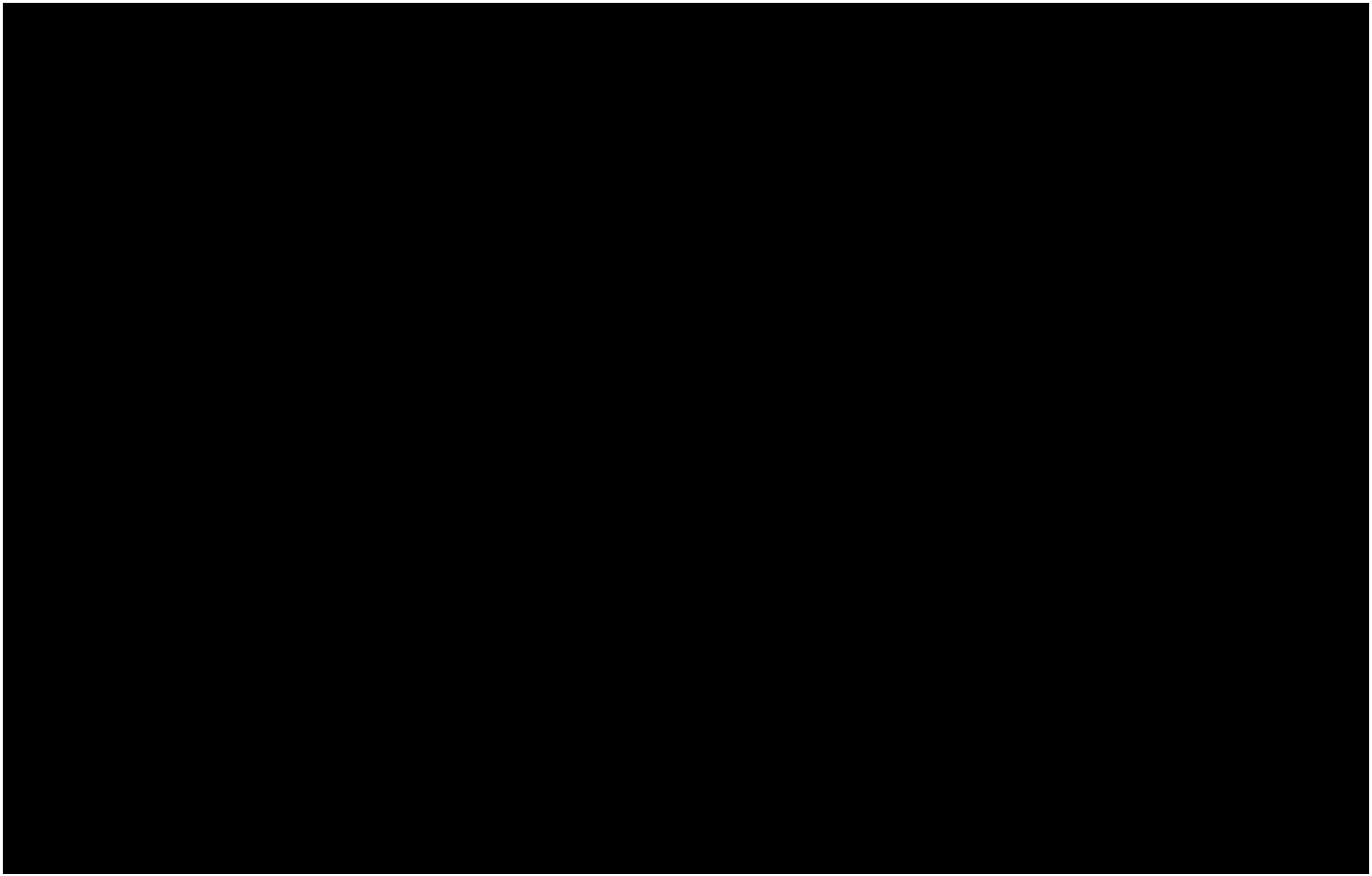


Table D.6: Brattle Schedule 6
Maintenance Costs - Mobile Equipment
(Converted to 2007 US$)

[redacted]

Table D.6: Brattle Schedule 6
Maintenance Costs - Mobile Equipment
(Converted to 2007 US$)

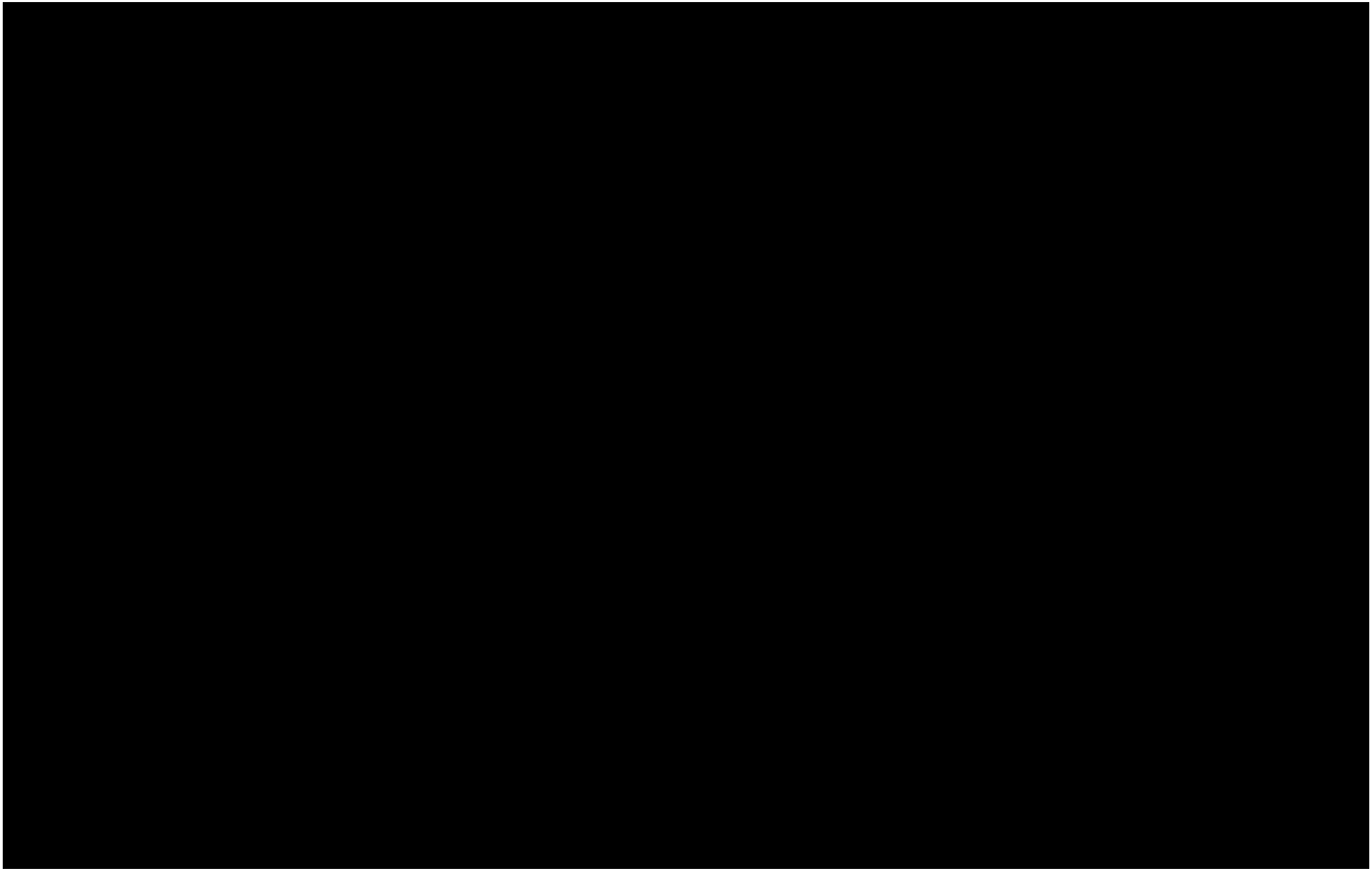


Table D.6: Brattle Schedule 6
Maintenance Costs - Mobile Equipment
(Converted to 2007 US$)

[redacted]

Table D.6: Brattle Schedule 6
Maintenance Costs - Mobile Equipment (Converted to 2007 US$)

Sources & Notes:
[1]: Rosen Schedule 6. The cost of [redacted]. See SCMA Report.
[2]: U.S. CPI, Bloomberg.
[3]: Nominal year in which values were reported in Rosen Report.
[4]: 1/ ((1 + [2]) ^ 0.19) using [2] from 2007, multiplied by 1 / ((1 + [2]) ^ 0.5) using [2] from 2008.
[5]: Production Factor. See SCMA Report.
[6]: [1] x [4].
[7]: 1% of [6] in Year 1 and Year 2, 2% in Year 3 onward.
[8]: [5] x 1% of [6] in Year 1 and Year 2, [5] x 2% of [6] in Year 3 onward.
[9]: The sum of [7] through [8].

Table D.7: Brattle Schedule 7
Maintenance Costs - Plant Equipment (Converted to 2007 US$)

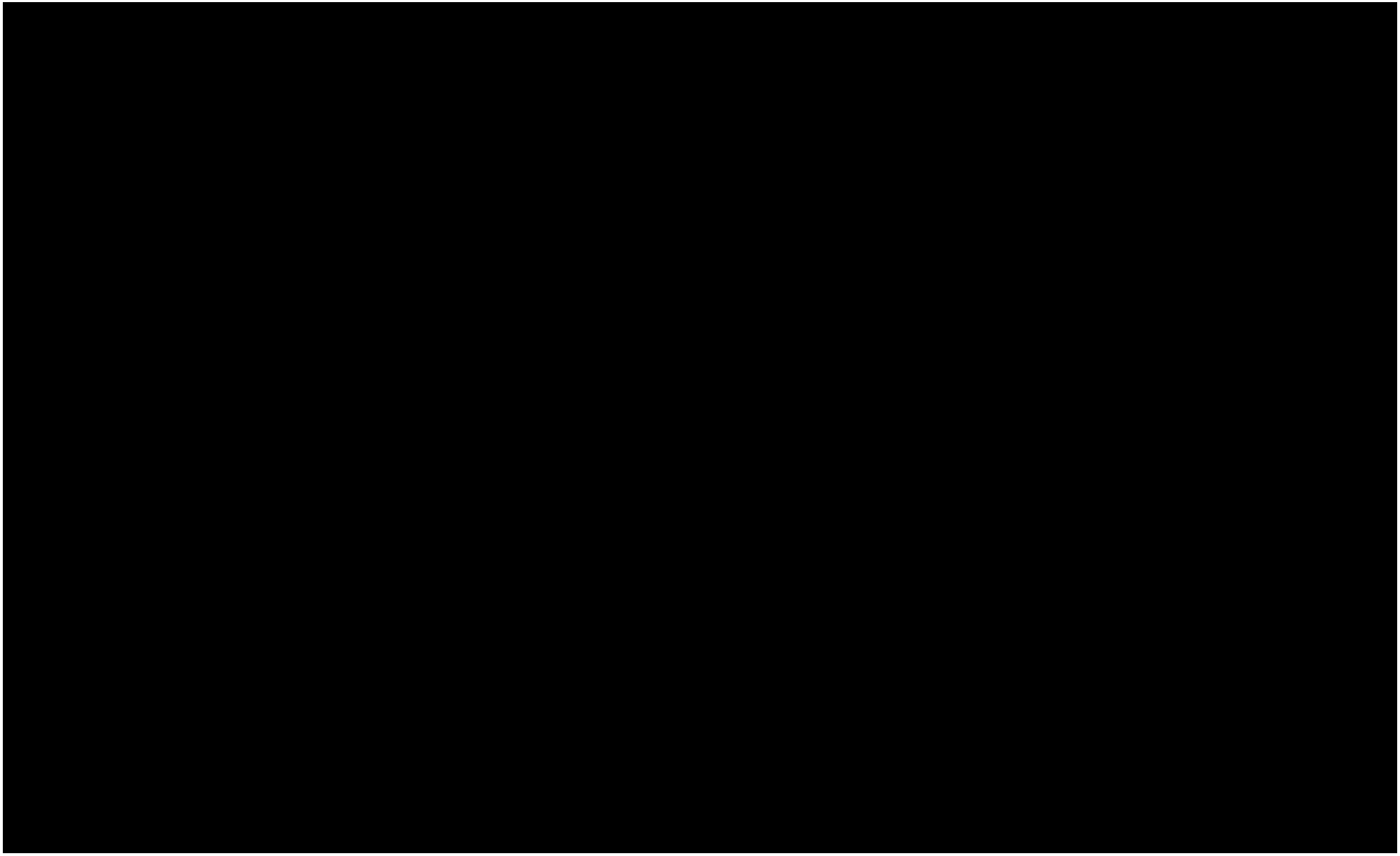


Table D.7: Brattle Schedule 7
Maintenance Costs - Plant Equipment (Converted to 2007 US$)

Table D.7: Brattle Schedule 7
Maintenance Costs - Plant Equipment (Converted to 2007 US$)

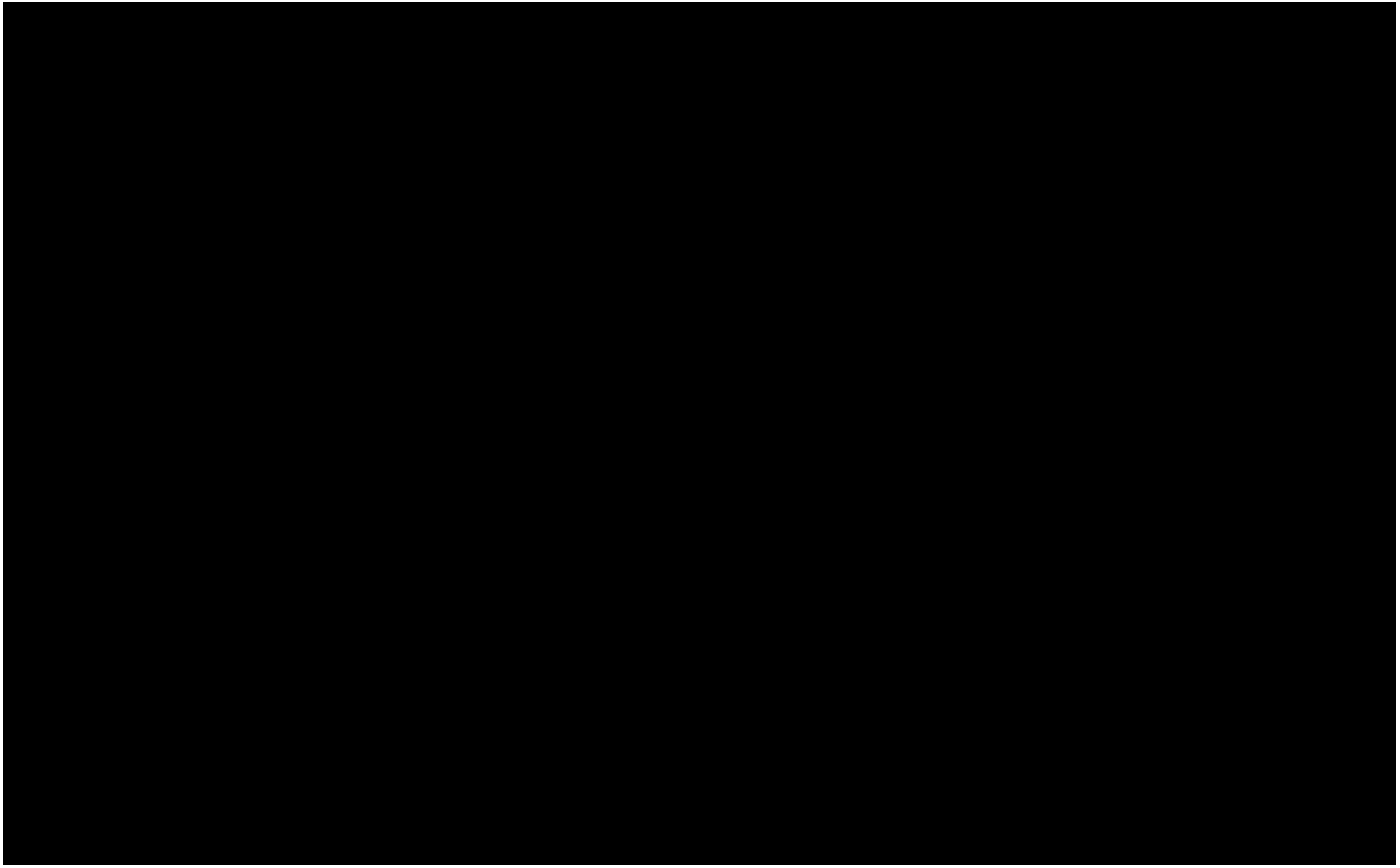


Table D.7: Brattle Schedule 7
Maintenance Costs - Plant Equipment (Converted to 2007 US$)

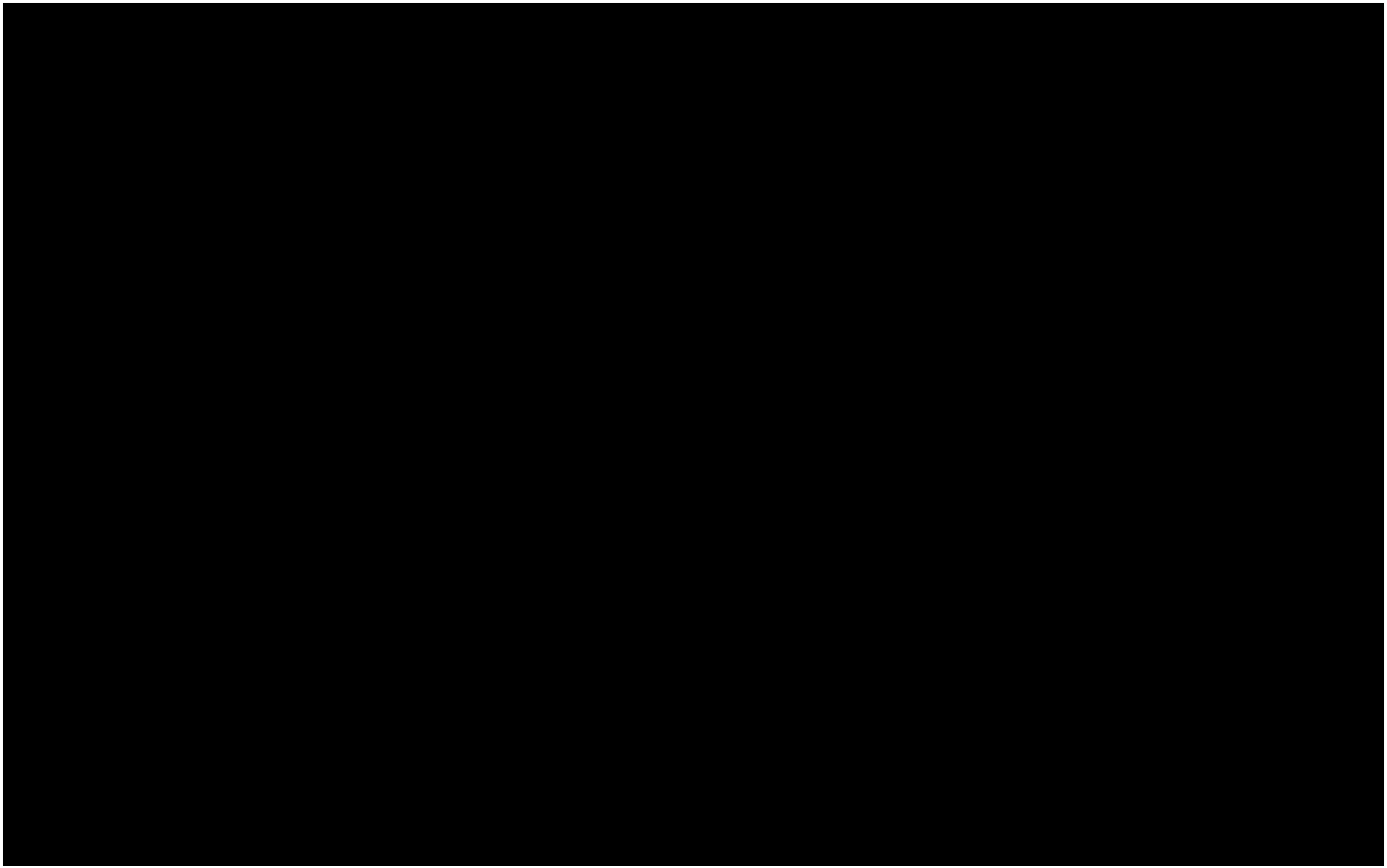


Table D.7: Brattle Schedule 7
Maintenance Costs - Plant Equipment (Converted to 2007 US$)

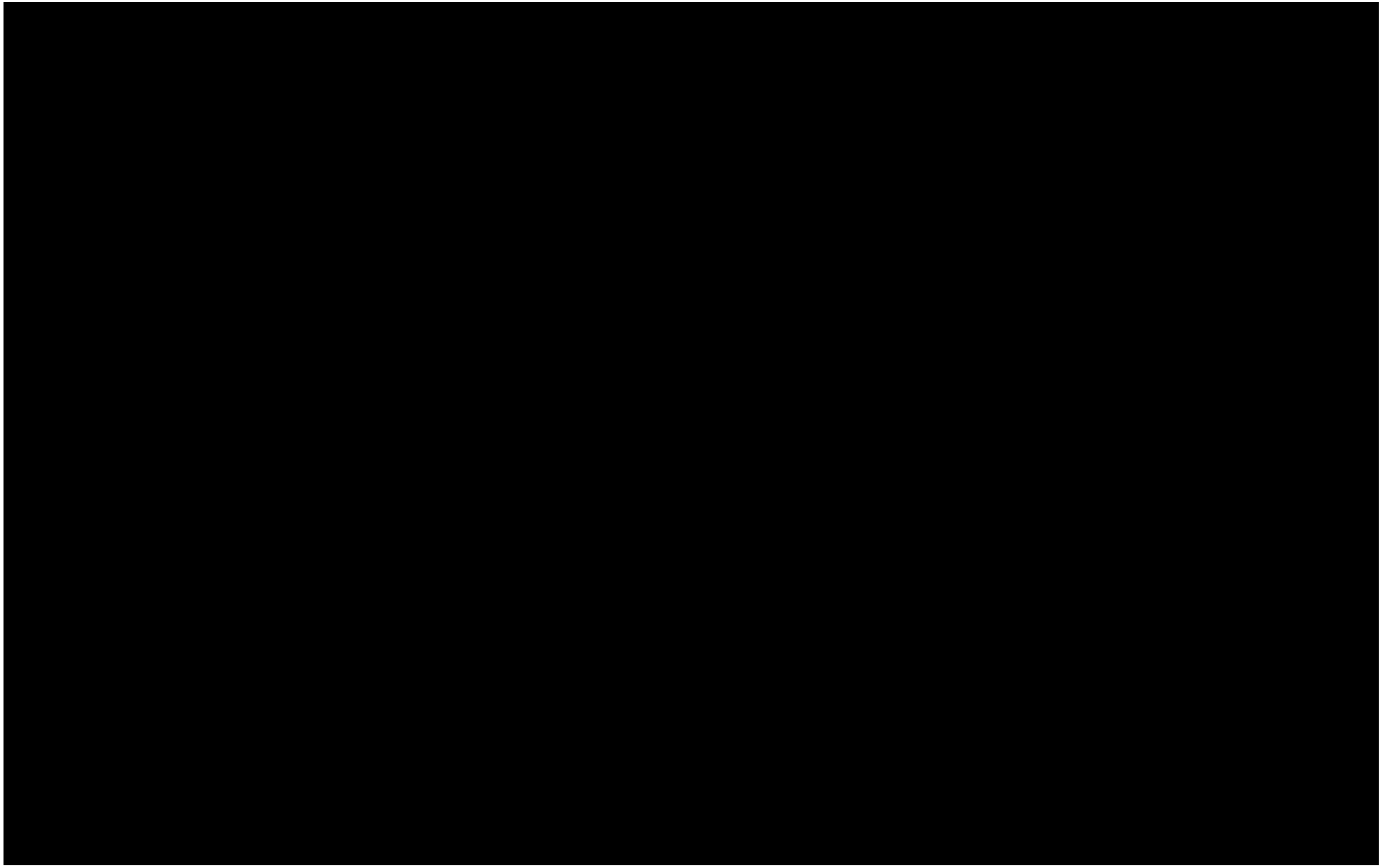


Table D.7: Brattle Schedule 7
Maintenance Costs - Plant Equipment (Converted to 2007 US$)

Sources & Notes:

[1]: Rosen Schedule 7, with [redacted] corrected per Exhibit C-1342, p.17. [redacted] See SCMA Report.

[2]: U.S. CPI, Bloomberg.

[3]: Nominal year in which values were reported in Rosen Report.

[4]: 1/ (1 + [2]) ^ 0.19) using [2] from 2007, multiplied by 1/ (1 + [2]) ^ 0.5) using [2] from 2008.

[5]: Production Factor. See SCMA Report.

[6]: [1] x [4].

[7]: [5] x 2% of [6] in Years 1 to 2; [5] x 3% of [6] in Years 3 to 6, and [5] x 4% of [6] in Year 7 onward.

[8]: The sum of [7].

Table D.8: Brattle Schedule 8
Maintenance Costs - Marine Terminal
(Converted to 2007 US$)

[redacted]

Sources & Notes:
[1]: Table D.5.
[2]: See Rosen Report Schedule 8 [redacted]
[3]: See SCMA Report.
[4]: [2] x [3].

Table D.8: Brattle Schedule 8
Maintenance Costs - Marine Terminal
(Converted to 2007 US$)

[redacted]

[1]: Table D.5.
[2]: See Rosen Report Schedule 8: [redacted]
[3]: See SCMA Report.
[4]: [2] x [3].

Table D.8: Brattle Schedule 8
Maintenance Costs - Marine Terminal
(Converted to 2007 US$)

[redacted]

[1]: Table D.5.
[2]: See Rosen Report Schedule 8: [redacted]
[3]: See SCMA Report.
[4]: [2] x [3].

Table D.8: Brattle Schedule 8
Maintenance Costs - Marine Terminal
(Converted to 2007 US$)

[redacted]

Sources & Notes:
[1]: Table D.5.
[2]: See Rosen Report Schedule 8 [redacted]
[3]: See SCMA Report.
[4]: [2] x [3].

Table D.8: Brattle Schedule 8
Maintenance Costs - Marine Terminal
(Converted to 2007 US$)

[redacted]

Sources & Notes:
[1]: Table D.5.
[2]: See Rosen Report Schedule 8: [redacted]
[3]: See SCMA Report.
[4]: [2] x [3].

Table D.9: Brattle Schedule 9
Reclamation and Decommissioning Costs
(Converted to 2007 US$)

Sources & Notes:

[1]: Rosen Schedule 9. Adjusted for end of project life.

[2]: Canadian CPI, Bloomberg.

[3]: Nominal year in which values were reported in Rosen. Report. There is no basis for Mr. Rosen's assumption.

[4]: 1/ (1 + [2]) ^ 0.19) using [2] from 2007, multiplied by 1/ (1 + [2]) ^ 1) using [2]from 2008, multiplied by 1/ (1 + [2]) ^ 0.5) using [2] from 2009.

[5]: Table D.15.

[6]: [1] / [5] x [4].

Table D.9: Brattle Schedule 9
Reclamation and Decommissioning Costs
(Converted to 2007 US$)

Sources & Notes:

[1]: Rosen Schedule 9. Adjusted for end of project life.

[2]: Canadian CPI, Bloomberg.

[3]: Nominal year in which values were reported in Rosen. Report. There is no basis for Mr. Rosen's assumption.

[4]: 1/ (1 + [2]) ^ 0.19) using [2] from 2007, multiplied by
1/ (1 + [2]) ^ 1) using [2]from 2008, multiplied by
1/ (1 + [2]) ^ 0.5) using [2] from 2009.

[5]: Table D.15.

[6]: [1] / [5] x [4].

Table D.9: Brattle Schedule 9
Reclamation and Decommissioning Costs
(Converted to 2007 US$)

[redacted]

[1]: Rosen Schedule 9. Adjusted for end of project life.
[2]: Canadian CPI, Bloomberg.
[3]: Nominal year in which values were reported in Rosen. Report. There is no basis for Mr. Rosen's assumption.
[4]: 1/ (1 + [2]) ^ 0.19) using [2] from 2007, multiplied by 1/ (1 + [2]) ^ 1) using [2]from 2008, multiplied by 1/ (1 + [2]) ^ 0.5) using [2] from 2009.
[5]: Table D.15.
[6]: [1] / [5] x [4].

Table D.9: Brattle Schedule 9
Reclamation and Decommissioning Costs
(Converted to 2007 US$)

Sources & Notes:

[1]: Rosen Schedule 9. Adjusted for end of project life.

[2]: Canadian CPI, Bloomberg.

[3]: Nominal year in which values were reported in Rosen. Report. There is no basis for Mr. Rosen's assumption.

[4]: 1/ (1 + [2]) ^ 0.19) using [2] from 2007, multiplied by 1/ (1 + [2]) ^ 1) using [2]from 2008, multiplied by 1/ (1 + [2]) ^ 0.5) using [2] from 2009.

[5]: Table D.15.

[6]: [1] / [5] x [4].

Table D.9: Brattle Schedule 9
Reclamation and Decommissioning Costs
(Converted to 2007 US$)

Sources & Notes:

[1]: Rosen Schedule 9. Adjusted for end of project life.

[2]: Canadian CPI, Bloomberg.

[3]: Nominal year in which values were reported in Rosen. Report. There is no basis for Mr. Rosen's assumption.

[4]: 1/ (1 + [2]) ^ 0.19) using [2] from 2007, multiplied by 1/ (1 + [2]) ^ 1) using [2]from 2008, multiplied by 1/ (1 + [2]) ^ 0.5) using [2] from 2009.

[5]: Table D.15.

[6]: [1] / [5] x [4].

Table D.9: Brattle Schedule 9
Reclamation and Decommissioning Costs
(Converted to 2007 US$)

Sources & Notes:

[1]: Rosen Schedule 9. Adjusted for end of project life.

[2]: Canadian CPI, Bloomberg.

[3]: Nominal year in which values were reported in Rosen. Report. There is no basis for Mr. Rosen's assumption.

[4]: 1/ (1 + [2]) ^ 0.19) using [2] from 2007, multiplied by 1/ (1 + [2]) ^ 1) using [2]from 2008, multiplied by 1/ (1 + [2]) ^ 0.5) using [2] from 2009.

[5]: Table D.15.

[6]: [1] / [5] x [4].

Table D.9: Brattle Schedule 9
Reclamation and Decommissioning Costs
(Converted to 2007 US$)

Sources & Notes:

[1]: Rosen Schedule 9. Adjusted for end of project life.

[2]: Canadian CPI, Bloomberg.

[3]: Nominal year in which values were reported in Rosen. Report. There is no basis for Mr. Rosen's assumption.

[4]: 1/ (1 + [2]) ^ 0.19) using [2] from 2007, multiplied by 1/ (1 + [2]) ^ 1) using [2]from 2008, multiplied by 1/ (1 + [2]) ^ 0.5) using [2] from 2009.

[5]: Table D.15.

[6]: [1] / [5] x [4].

Table D.10: Brattle Schedule 10
Interest Expense

	2008	2009	2010	2011	2012	2013	2014	2015	2016
Interest expense									
Existing debt	-	-	-	-	-	-	-	-	-
New debt	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-

Sources & Notes:

Interest expense is set to zero.

Table D.11: Brattle Schedule 11
Income Taxes
(US$ 2007)

[redacted]

Table D.11: Brattle Schedule 11
Income Taxes
(US$ 2007)

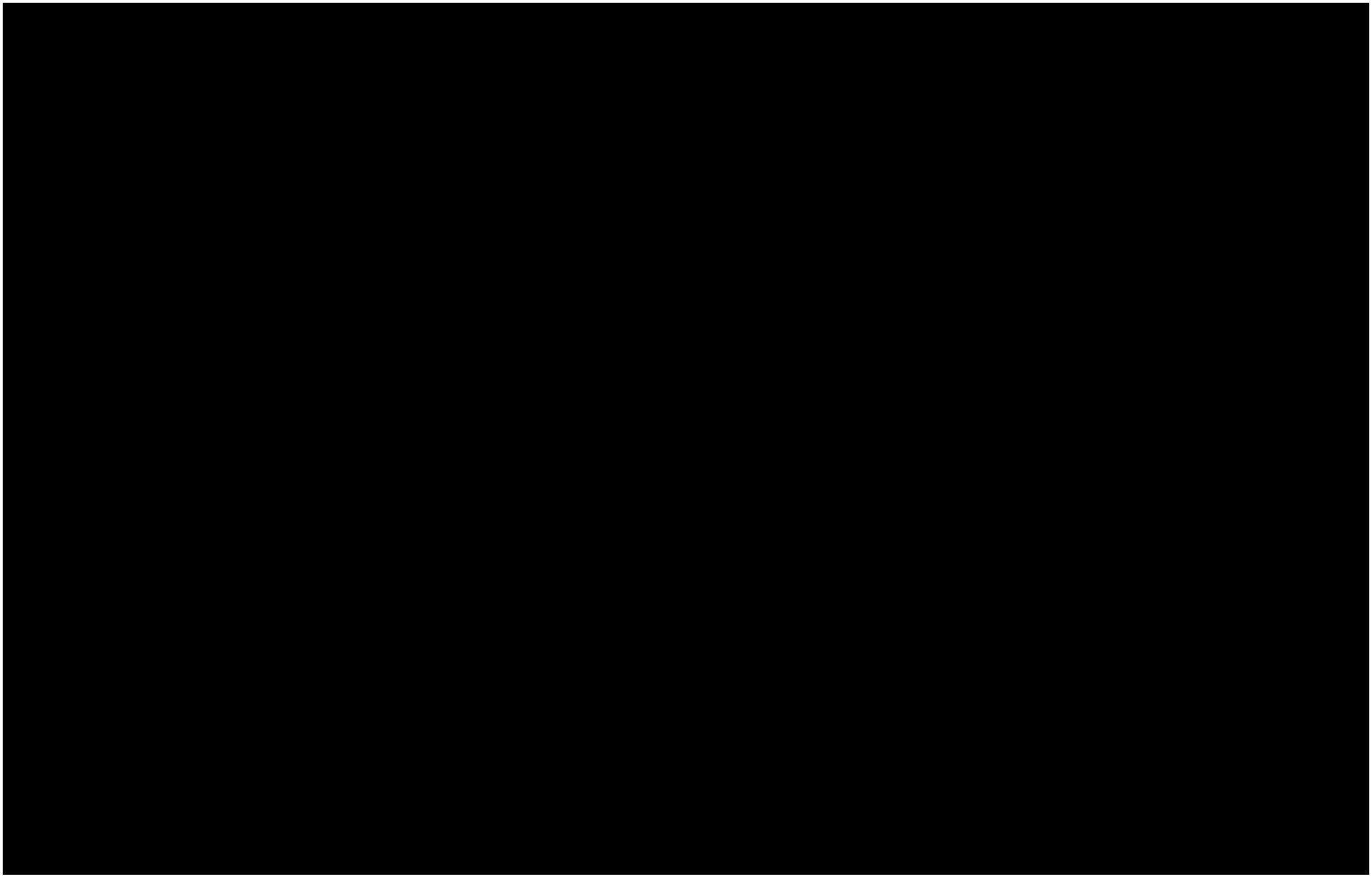


Table D.11: Brattle Schedule 11
Income Taxes
(US$ 2007)

Table D.11: Brattle Schedule 11
Income Taxes
(US$ 2007)

[redacted]

Table D.11: Brattle Schedule 11
Income Taxes
(US$ 2007)

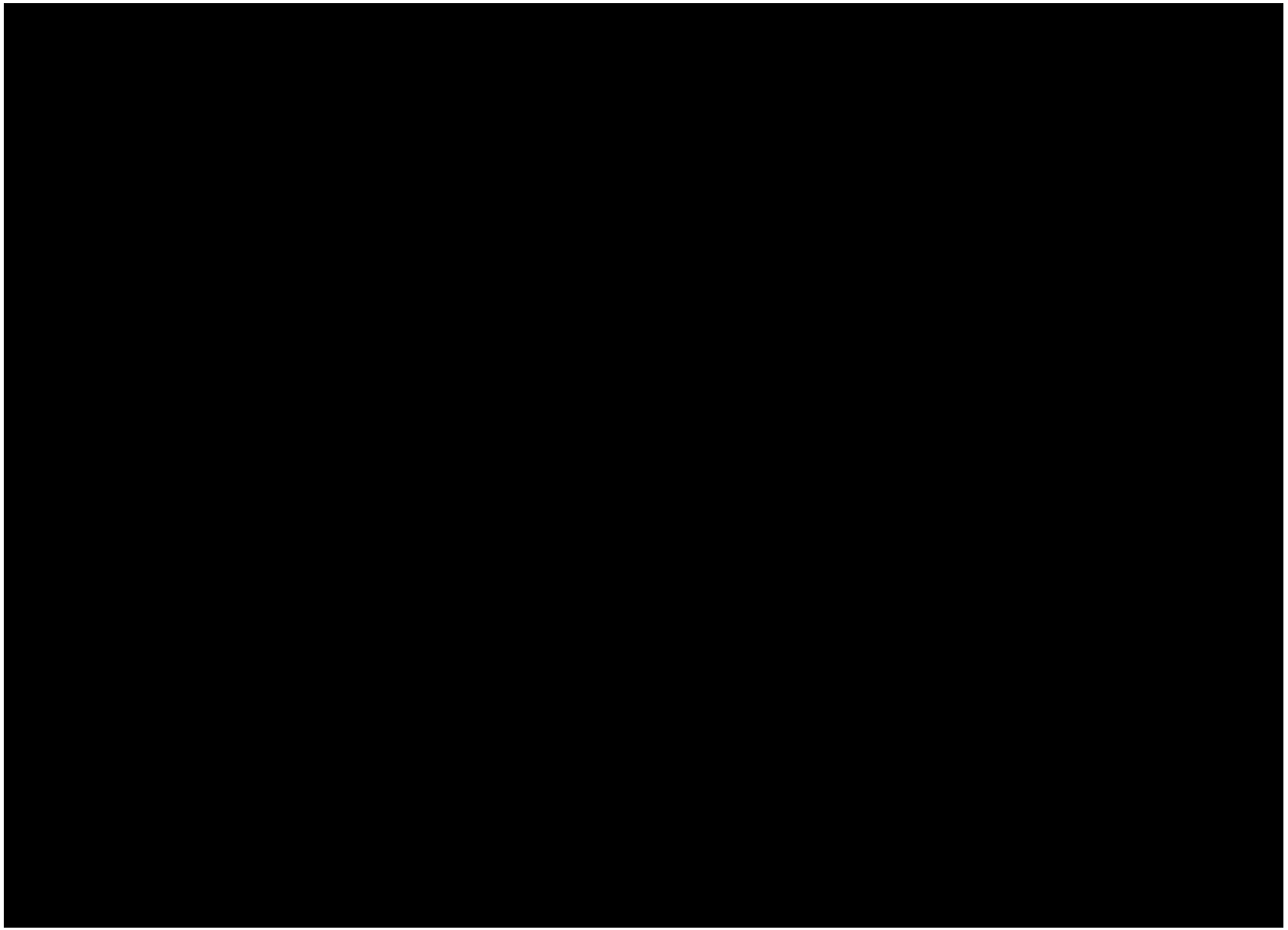


Table E.11: Delayed Brattle Schedule 11
Income Taxes
(US$ 2007)

Sources & Notes:
Tax calculations are adopted from Rosen's Schedule 11.
Captial tax is converted to US$ using Table E.15.
[1]: Table E.1.
[2]: Table E.1.
[3]: [1] + [2].
[4]: Cumulative of [3].
[5]: 31% in 2012-2016. Deloitte. Corporate Income Tax Rates (2012-2016).
[6]: Negative [11].
[7]: Rosen Report, Schedule 11.
[8]: The sum of [5] through [7].
[9]: Taken from Table E.5.
[10]: Reclassified as CCA Class 14.1 beginning January 1, 2017.
Subject to CCA rate of 7% for the first 10 years and 5% thereafter. Source: Grant Thornton. New Rules for eligible property.

Table D.12: Brattle Schedule 12
Changes in Working Capital
(US$ 2007)

Sources & Notes:
[1]: Table D.1.
[2]: Table D.1.
[3]: The sum of [2].
[4]: Days in each year. See Rosen Schedule 12.
[5]: [1] / [4] x 30.
[6]: [3] / [4] x 30.
[7]: The sum of [5] and [6].
[8]: [7] from the current year, less [7] from the previous year.

Table D.12: Brattle Schedule 12
Changes in Working Capital
(US$ 2007)

Sources & Notes:
[1]: Table D.1.
[2]: Table D.1.
[3]: The sum of [2].
[4]: Days in each year. See Rosen Schedule 12.
[5]: [1] / [4] x 30.
[6]: [3] / [4] x 30.
[7]: The sum of [5] and [6].
[8]: [7] from the current year, less [7] from the previous year.

Table D.12: Brattle Schedule 12
Changes in Working Capital
(US$ 2007)

[redacted]

[1]: Table D.1.
[2]: Table D.1.
[3]: The sum of [2].
[4]: Days in each year. See Rosen Schedule 12.
[5]: [1] / [4] x 30.
[6]: [3] / [4] x 30.
[7]: The sum of [5] and [6].
[8]: [7] from the current year, less [7] from the previous year.

Table D.12: Brattle Schedule 12
Changes in Working Capital
(US$ 2007)

Sources & Notes:

[1]: Table D.1.
[2]: Table D.1.
[3]: The sum of [2].
[4]: Days in each year. See Rosen Schedule 12.
[5]: [1] / [4] x 30.
[6]: [3] / [4] x 30.
[7]: The sum of [5] and [6].
[8]: [7] from the current year, less [7] from the previous year.

Table D.12: Brattle Schedule 12
Changes in Working Capital
(US$ 2007)

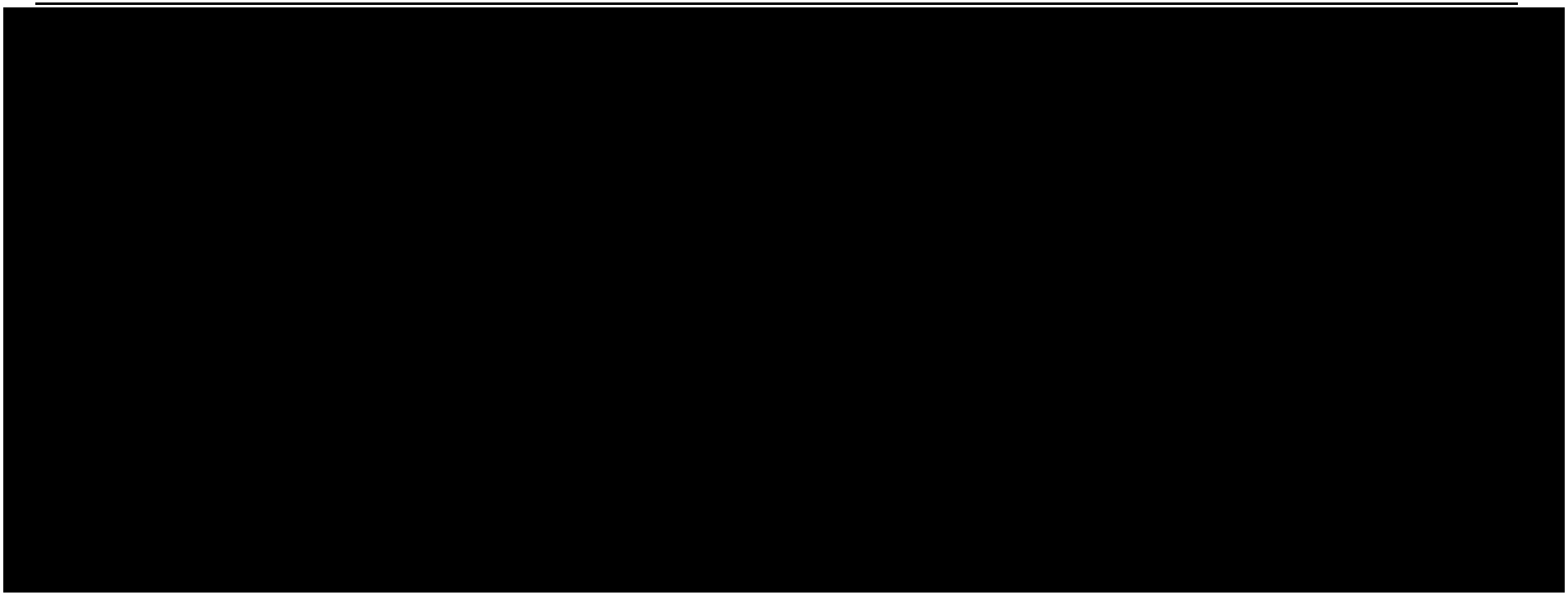
Sources & Notes:
[1]: Table D.1.
[2]: Table D.1.
[3]: The sum of [2].
[4]: Days in each year. See Rosen Schedule 12.
[5]: [1] / [4] x 30.
[6]: [3] / [4] x 30.
[7]: The sum of [5] and [6].
[8]: [7] from the current year, less [7] from the previous year.

Table D.12: Brattle Schedule 12
Changes in Working Capital
(US$ 2007)

[redacted]

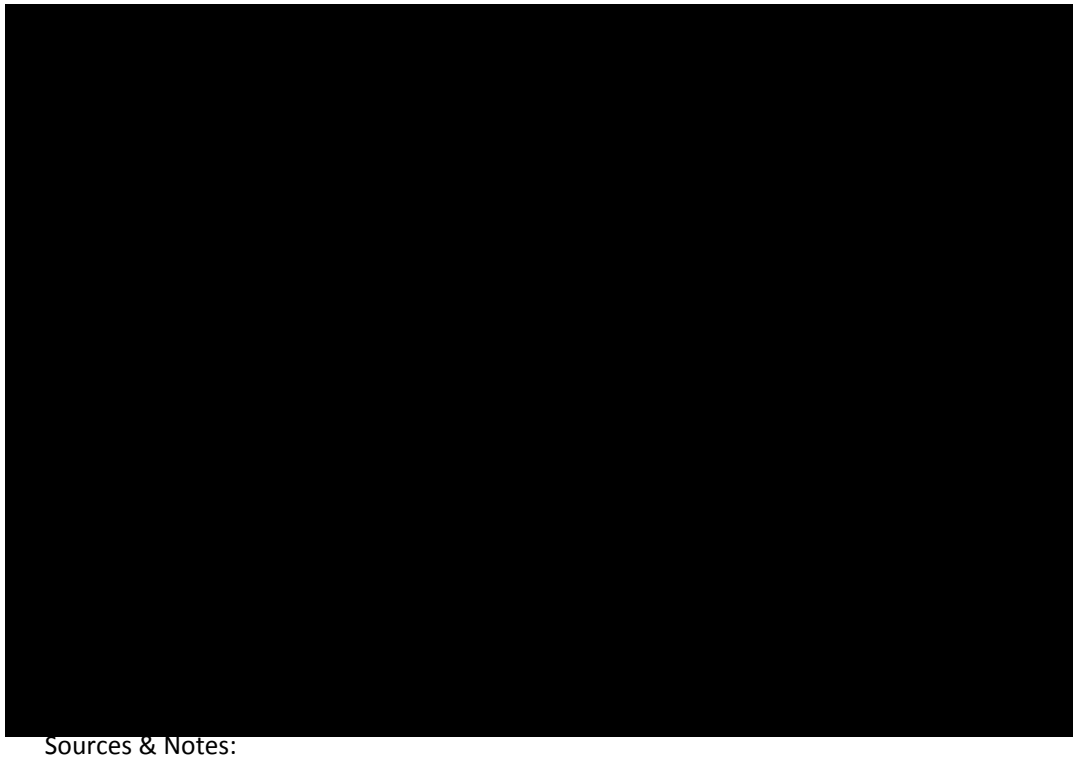
[1]: Table D.1.
[2]: Table D.1.
[3]: The sum of [2].
[4]: Days in each year. See Rosen Schedule 12.
[5]: [1] / [4] x 30.
[6]: [3] / [4] x 30.
[7]: The sum of [5] and [6].
[8]: [7] from the current year, less [7] from the previous year.

Table D.12: Brattle Schedule 12
Changes in Working Capital
(US$ 2007)



Sources & Notes:
[1]: Table D.1.
[2]: Table D.1.
[3]: The sum of [2].
[4]: Days in each year. See Rosen Schedule 12.
[5]: [1] / [4] x 30.
[6]: [3] / [4] x 30.
[7]: The sum of [5] and [6].
[8]: [7] from the current year, less [7] from the previous year.

Table D.12: Brattle Schedule 12
Changes in Working Capital
(US$ 2007)



Sources & Notes:

[1]: Table D.1.
[2]: Table D.1.
[3]: The sum of [2].
[4]: Days in each year. See Rosen Schedule 12.
[5]: [1] / [4] x 30.
[6]: [3] / [4] x 30.
[7]: The sum of [5] and [6].
[8]: [7] from the current year, less [7] from the previous year.

Table D.13: SCMA CIF Prices (2007 US$)

[3]: SCMA Report.
[4]: [2] x [3] for each specified location.

Table D.14: Freight Costs
2007 (USD/Tonne)

[redacted]

Source: Marsoft.
Note: Figures are deflated to 2007 values using Marsoft's inflation rate of 2.3%.

Table D.14: Freight Costs
2007 (USD/Tonne)

[redacted]

Source: Marsoft.
Note: Figures are deflated to 2007 values using Marsoft's inflation rate of 2.3%.

Table D.14: Freight Costs
2007 (USD/Tonne)

[redacted]

Source: Marsoft.
Note: Figures are deflated to 2007 values using Marsoft's inflation rate of 2.3%.

Table D.14: Freight Costs
2007 (USD/Tonne)

Source: Marsoft.
Note: Figures are deflated to 2007 values using Marsoft's inflation rate of 2.3%.

Table D.15: Forward FX Rates (October 2007)

		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Foreign Exchange Rate (US$ to C$)	[1]	1.0265	1.0237	1.0234	1.0279	1.0305	1.0346	1.0388	1.0440	1.0492	1.0545	1.0578	1.0611	1.0643	1.0676	1.0708
Years from 2007	[2]	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Forward Year	[3]	1Y	2Y	3Y	4Y	5Y	6Y	7Y	8Y	9Y	10Y	-	-	-	-	15Y

Sources & Notes:

[1]: R-730, Bloomberg FX forward rates. FX rates in years without forward rates are interpolated.

[2]: [Year] - 2007.

[3]: Years beyond 2037 are assigned the 30Y forward rate.

Table D.15: Forward FX Rates (October 2007)

		2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Foreign Exchange Rate (US$ to C$)	[1]	1.0739	1.0771	1.0802	1.0833	1.0864	1.0936	1.1009	1.1081	1.1153	1.1225	1.1284	1.1343	1.1402	1.1462	1.1521
Years from 2007	[2]	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Forward Year	[3]	-	-	-	-	20Y	-	-	-	-	25Y	-	-	-	-	30Y

Sources & Notes:

[1]: R-730, Bloomberg FX forward rates. FX rates in years without forward rates are interpolated.

[2]: [Year] - 2007.

[3]: Years beyond 2037 are assigned the 30Y forward rate.

Table D.15: Forward FX Rates (October 2007)

		2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051
Foreign Exchange Rate (US$ to C$)	[1]	1.1521	1.1521	1.1521	1.1521	1.1521	1.1521	1.1521	1.1521	1.1521	1.1521	1.1521	1.1521	1.1521	1.1521
Years from 2007	[2]	31	32	33	34	35	36	37	38	39	40	41	42	43	44
Forward Year	[3]	30Y	30Y	30Y	30Y	30Y	30Y	30Y	30Y	30Y	30Y	30Y	30Y	30Y	30Y

Sources & Notes:

[1]: R-730, Bloomberg FX forward rates. FX rates in years without forward rates are interpolated.

[2]: [Year] - 2007.

[3]: Years beyond 2037 are assigned the 30Y forward rate.

Table D.15: Forward FX Rates (October 2007)

		2052	2053	2054	2055	2056	2057	2058	2059
Foreign Exchange Rate (US$ to C$)	[1]	1.1521	1.1521	1.1521	1.1521	1.1521	1.1521	1.1521	1.1521
Years from 2007	[2]	45	46	47	48	49	50	51	52
Forward Year	[3]	30Y	30Y	30Y	30Y	30Y	30Y	30Y	30Y

Sources & Notes:
[1]: R-730, Bloomberg FX forward rates. FX rates in years without forward rates are interpolated.
[2]: [Year] - 2007.
[3]: Years beyond 2037 are assigned the 30Y forward rate.

Table D.16: The Impact of Permitting Risk on the Value of Whites Point

Value with Full Permits ($US Millions)	$8,650,945										
Probability of Receiving Permits	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Value ($US Millions)	$0	$865,094	$1,730,189	$2,595,283	$3,460,378	$4,325,472	$5,190,567	$6,055,661	$6,920,756	$7,785,850	$8,650,945

Source: Table D.1.

Appendix E: Discounted Cash Flow Analysis—Project Delay

Table E.1: Delayed Brattle Schedule 1
Discretionary Cash Flow (2007 US$)

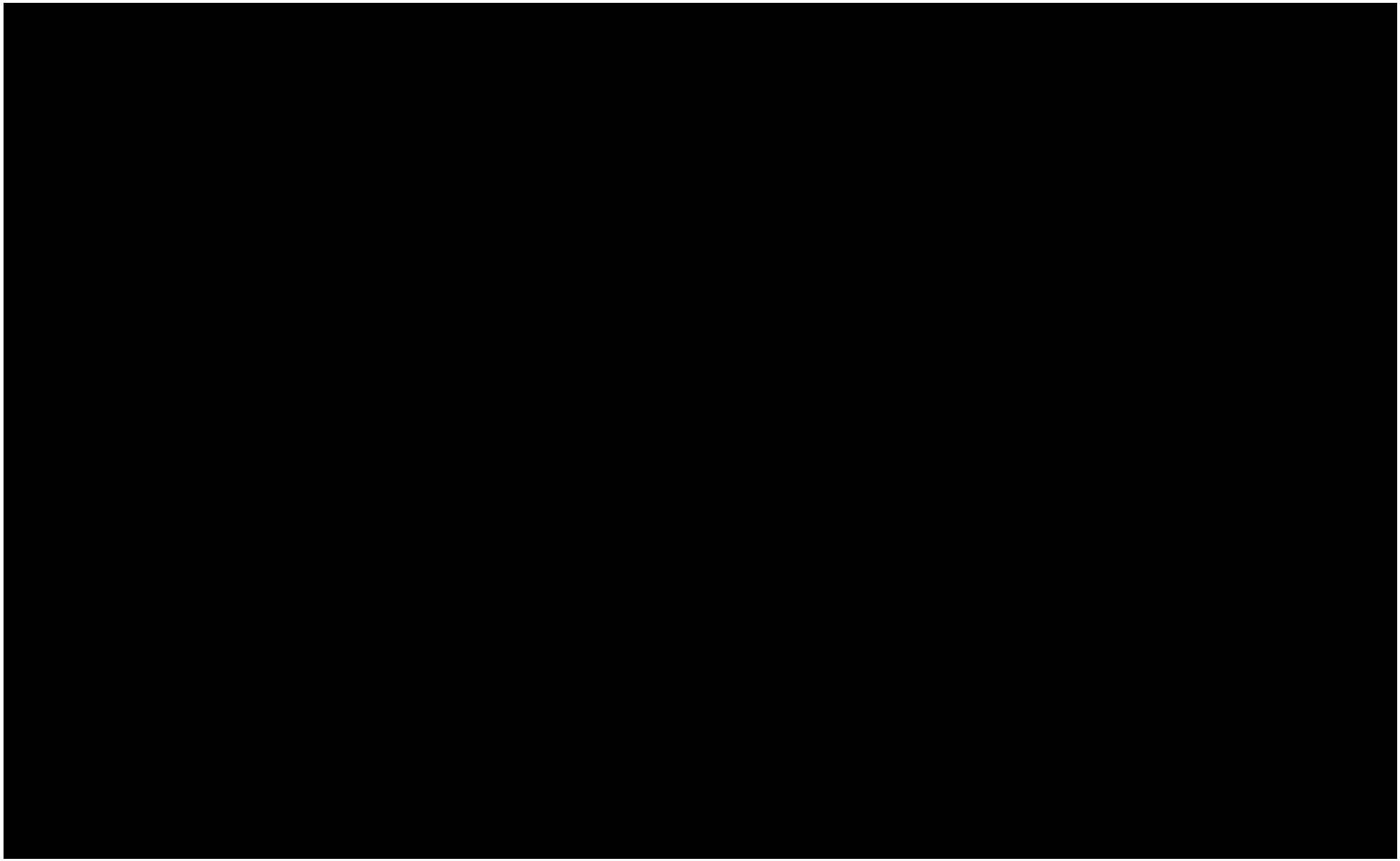


Table E.1: Delayed Brattle Schedule 1
Discretionary Cash Flow (2007 US$)

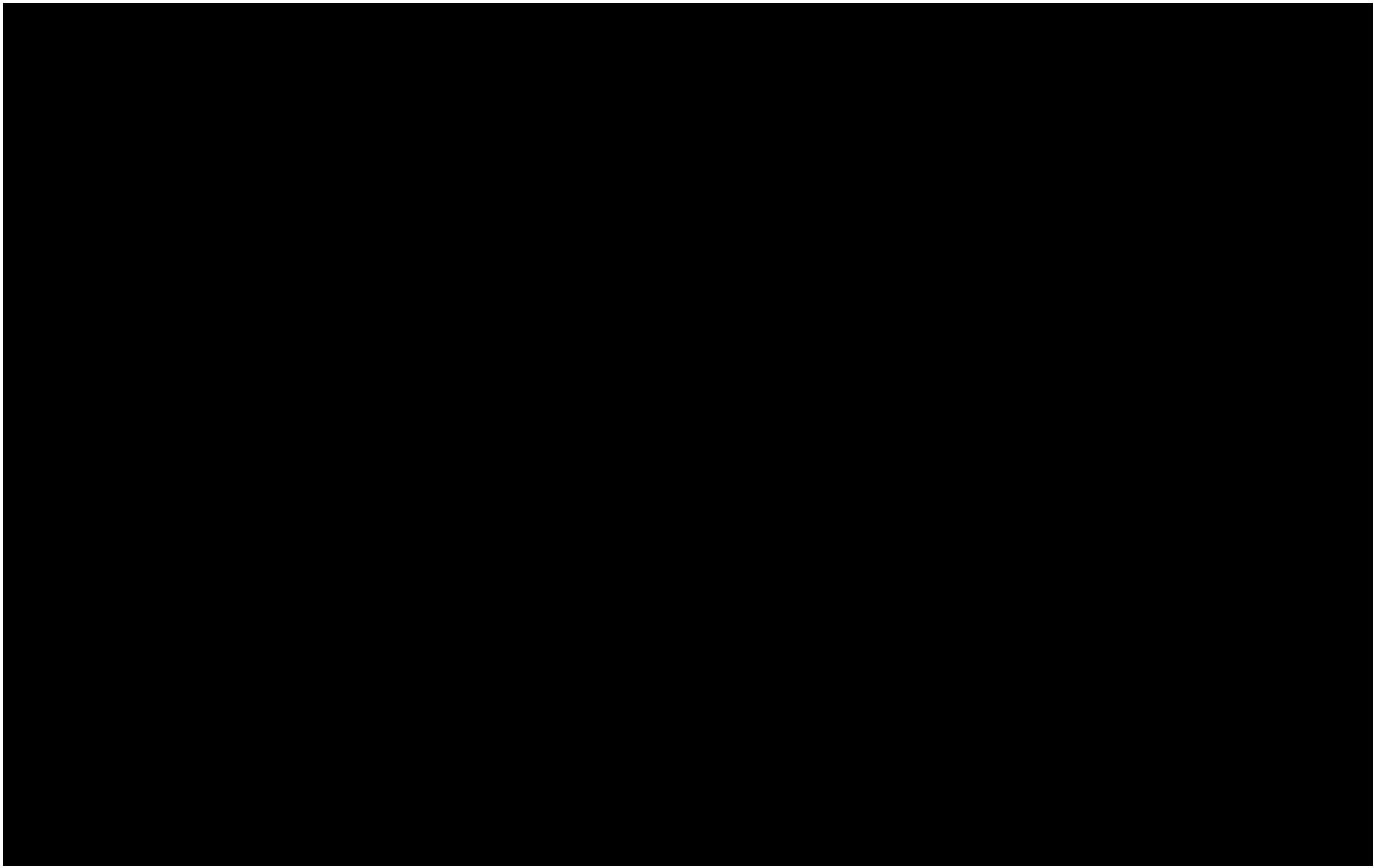


Table E.1: Delayed Brattle Schedule 1
Discretionary Cash Flow (2007 US$)

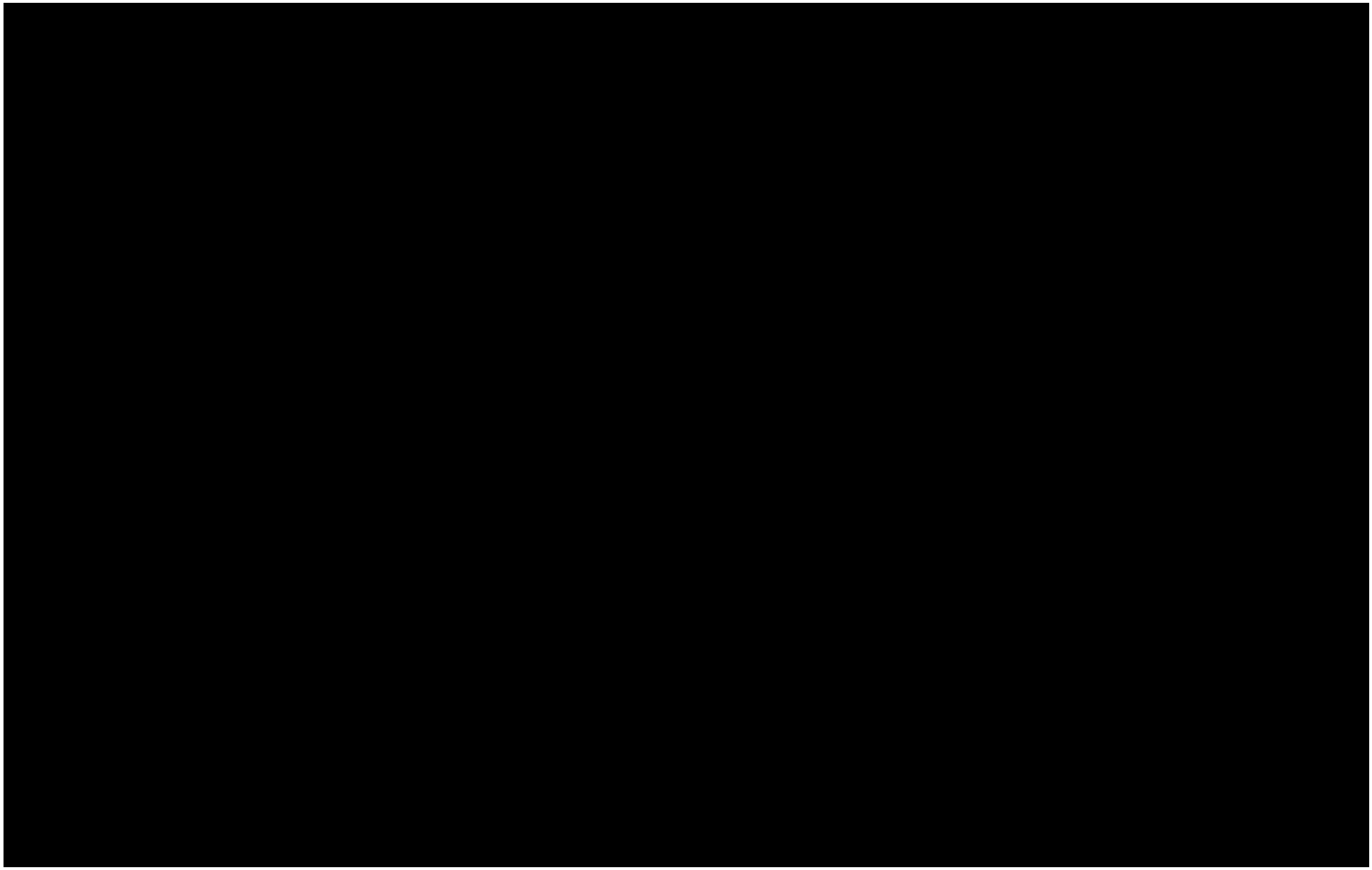


Table E.1: Delayed Brattle Schedule 1
Discretionary Cash Flow (2007 US$)

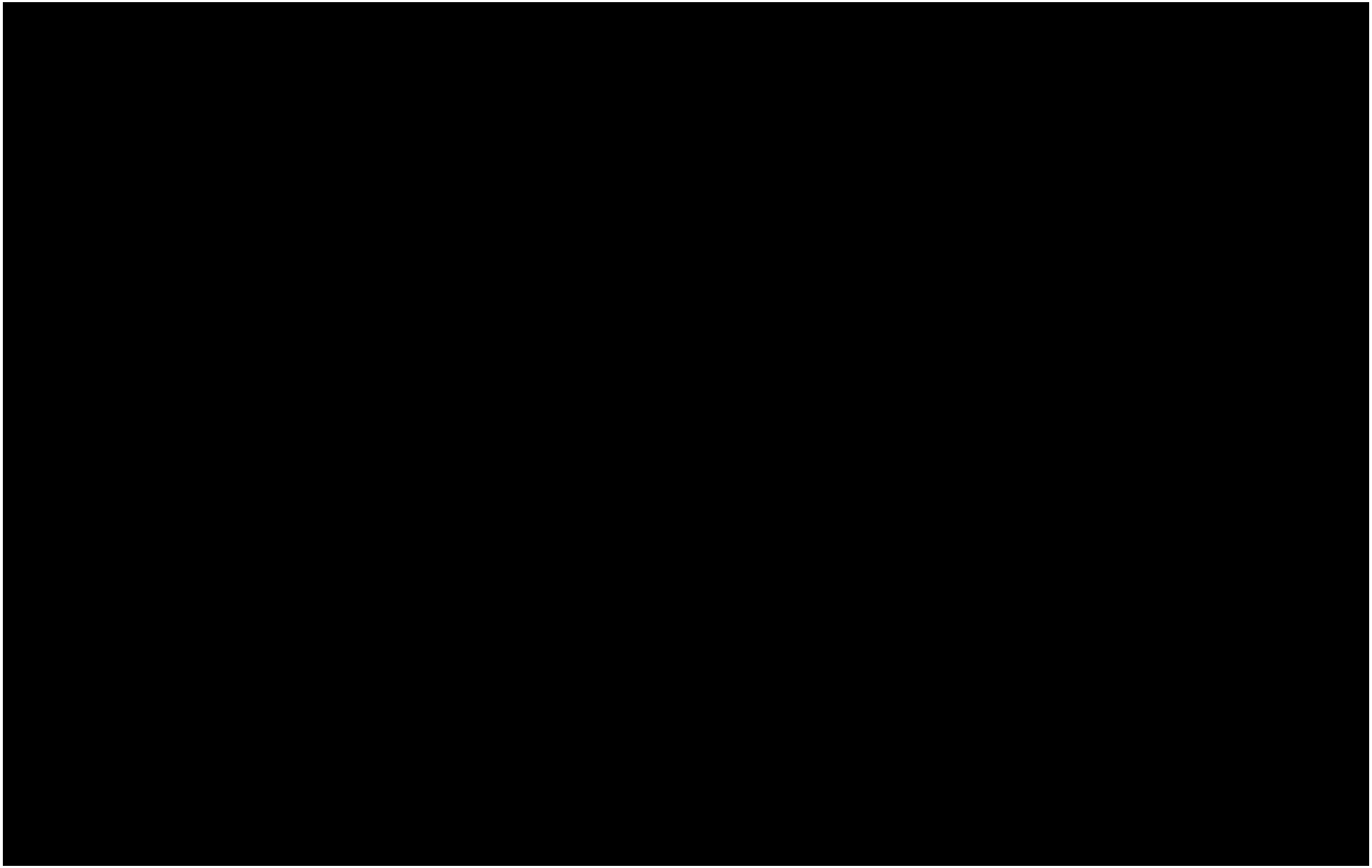


Table E.1: Delayed Brattle Schedule 1
Discretionary Cash Flow (2007 US$)

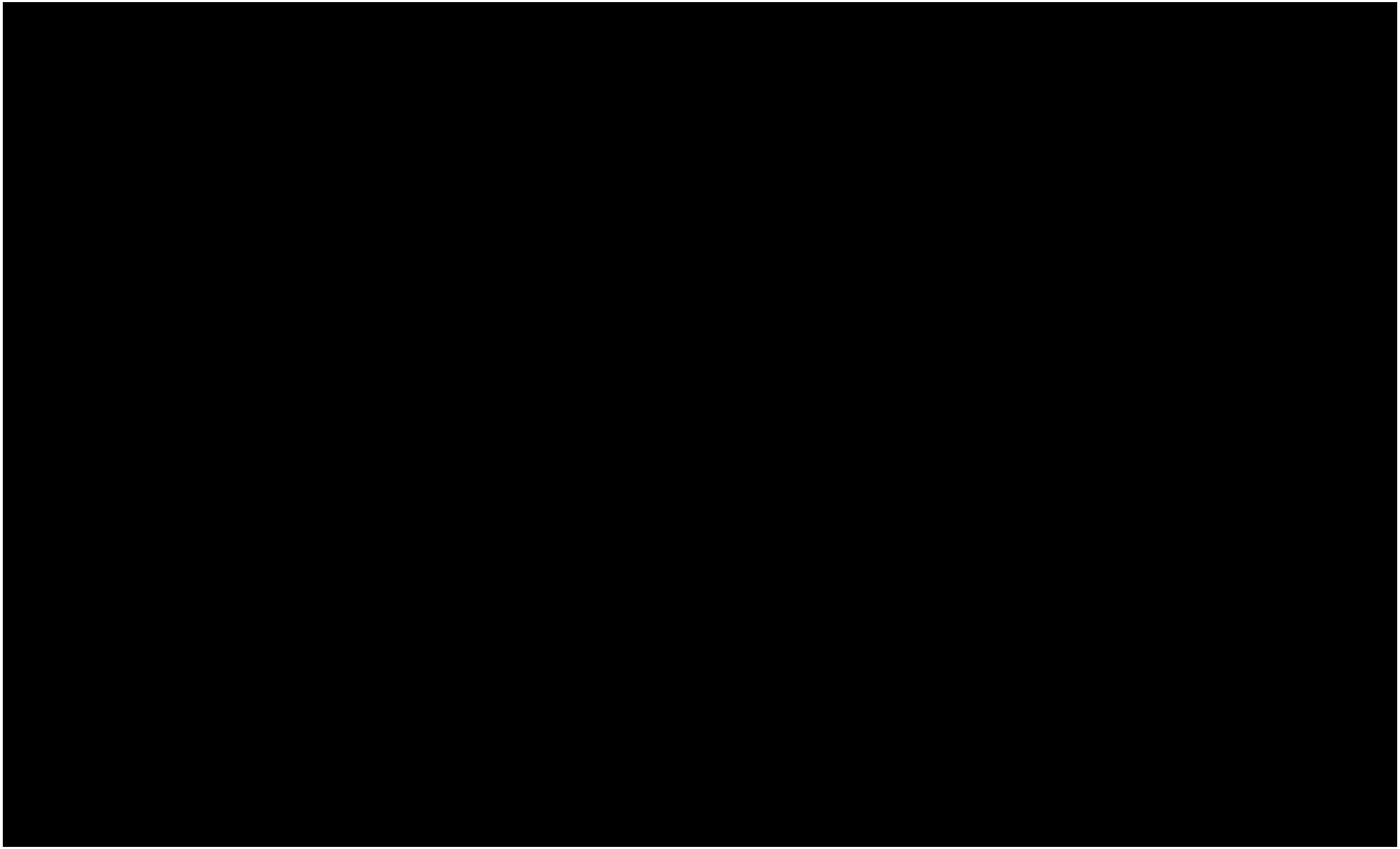


Table E.1: Delayed Brattle Schedule 1
Discretionary Cash Flow (2007 US$)

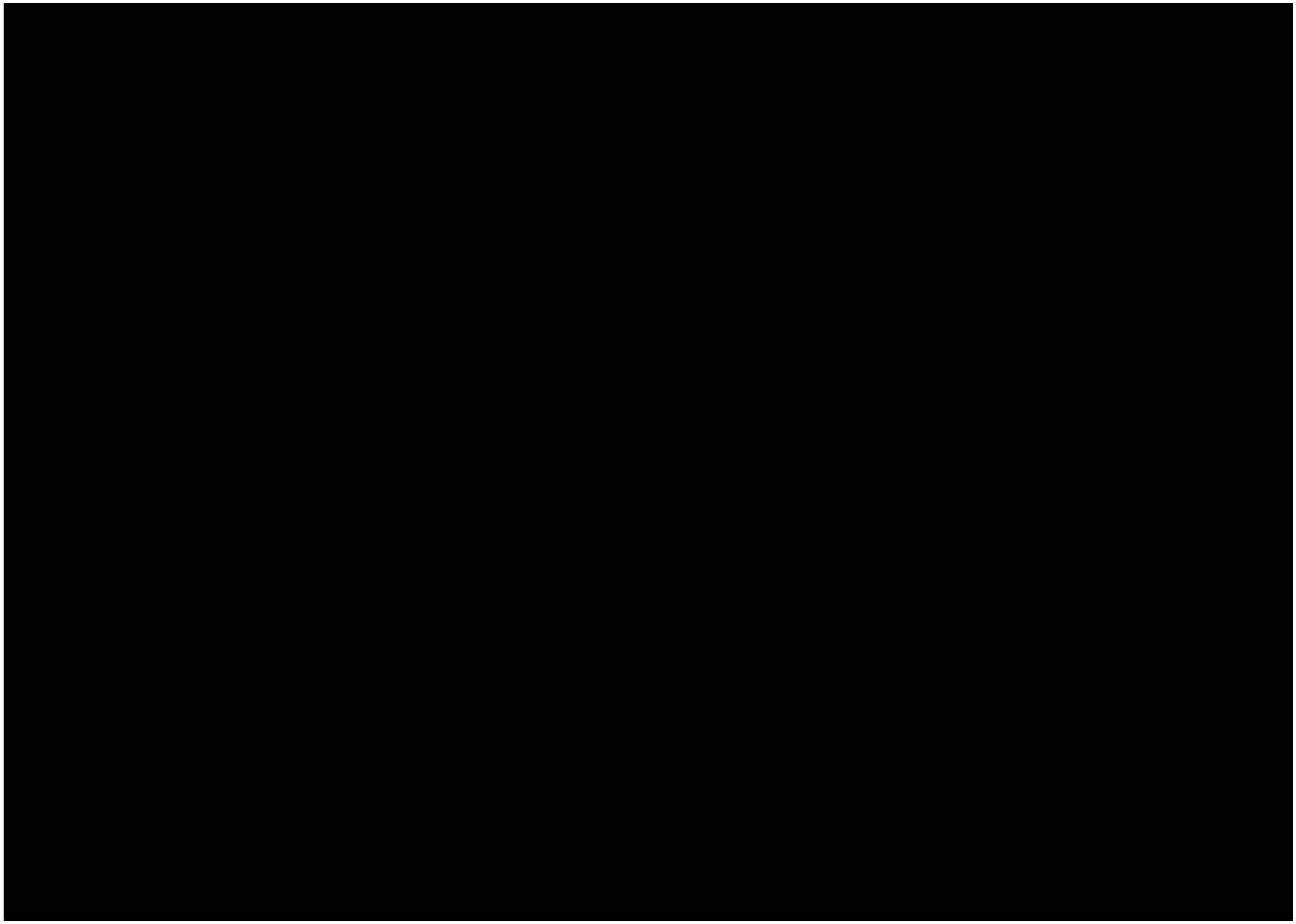


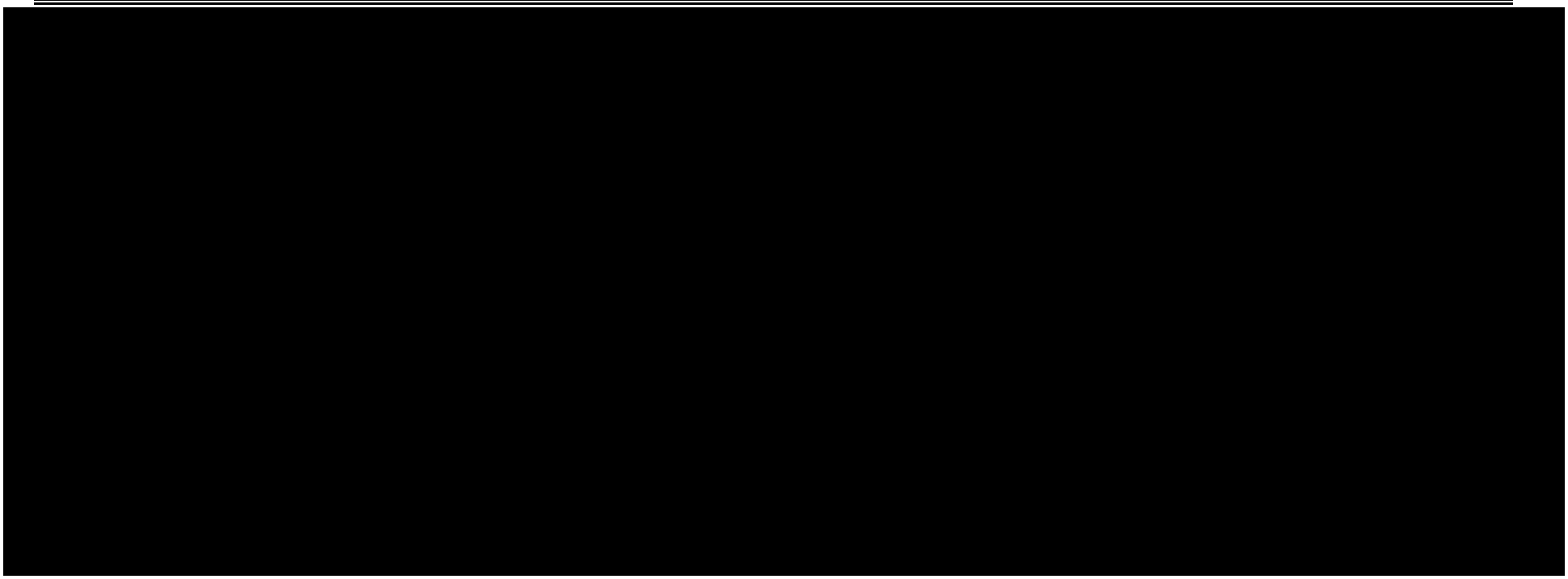
Table E.1: Delayed Brattle Schedule 1
Discretionary Cash Flow (2007 US$)

Sources & Notes:

The project is delayed 4.19 years.

[1]: Report Section VI.
[2]: See Appendix G.
[3]: E.2.
[4]: E.2.
[5]: E.3.
[6]: [4] x [5].
[7]: (-1) x [3] of Table E.4 x [6] of Table E.4.
[8]: Report Section V.F.2.
[9]: The sum of [9] of E.6, [8] of Table E.7, and [4] of Table E.8.
[10]: The sum of [6] through [9].
[11]: 5% of [6]. See Rosen Report, Schedule 1.
[12]: E.9.
[13]: E.10.
[14]: The sum of [10] through [13].
[15]: E.11.
[16]: E.5.
[17]: E.12.
[18]: The sum of [14] through [17].
[19]: Assumed mid-year cashflows. See Rosen Report, Schedule 1.
[20]: 1 / (1 + [2]) ^ (([19] - [1]) / 365).
[21]: [18] x [20].
[22]: The sum of [21].

Table E.2: Delayed Brattle Schedule 2
Production, Sales, and Change in Inventory
(tons)



Sources & Notes:
[1]: Report Section VI. B.
[2]: Report Section VI. B.
[3]: [1] - Sum of [2].
[4]: [6] from the previous year.
[5]: [3].
[6]: [4] + [5].

Table E.2: Delayed Brattle Schedule 2
Production, Sales, and Change in Inventory
(tons)

[1]: Report Section VI. B.
[2]: Report Section VI. B.
[3]: [1] - Sum of [2].
[4]: [6] from the previous year.
[5]: [3].
[6]: [4] + [5].

Table E.2: Delayed Brattle Schedule 2
Production, Sales, and Change in Inventory
(tons)

[1]: Report Section VI. B.
[2]: Report Section VI. B.
[3]: [1] - Sum of [2].
[4]: [6] from the previous year.
[5]: [3].
[6]: [4] + [5].

Table E.2: Delayed Brattle Schedule 2
Production, Sales, and Change in Inventory
(tons)

[1]: Report Section VI. B.
[2]: Report Section VI. B.
[3]: [1] - Sum of [2].
[4]: [6] from the previous year.
[5]: [3].
[6]: [4] + [5].

Table E.2: Delayed Brattle Schedule 2
Production, Sales, and Change in Inventory
(tons)

[1]: Report Section VI. B.
[2]: Report Section VI. B.
[3]: [1] - Sum of [2].
[4]: [6] from the previous year.
[5]: [3].
[6]: [4] + [5].

Table E.2: Delayed Brattle Schedule 2 Production, Sales, and Change in Inventory (tons)

Sources & Notes:
[1]: Report Section VI. B.
[2]: Report Section VI. B.
[3]: [1] - Sum of [2].
[4]: [6] from the previous year.
[5]: [3].
[6]: [4] + [5].

Table E.2: Delayed Brattle Schedule 2 Production, Sales, and Change in Inventory (tons)

Sources & Notes:
[1]: Report Section VI. B.
[2]: Report Section VI. B.
[3]: [1] - Sum of [2].
[4]: [6] from the previous year.
[5]: [3].
[6]: [4] + [5].

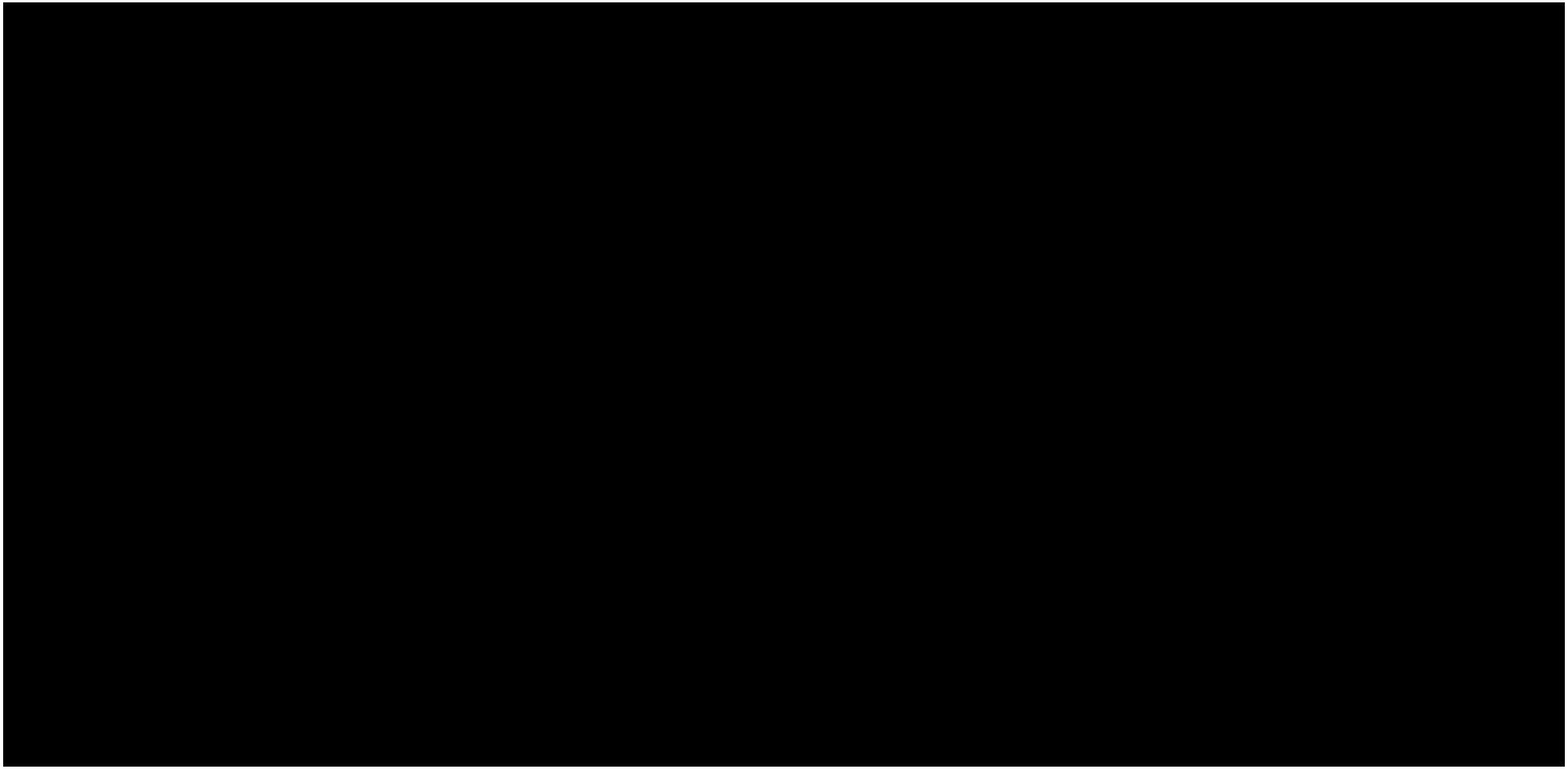
Table E.3: Delayed Brattle Schedule 3
Price and Freight (per ton & in 2007 US$)

Sources & Notes:
[1]: Table E.13.
[2]: Table E.14.
[3]: 0.125% x ([1] - [2]).
[4]: [1] - [2] - [3].

Table E.3: Delayed Brattle Schedule 3
Price and Freight (per ton & in 2007 US$)

Sources & Notes:
[1]: Table E.13.
[2]: Table E.14.
[3]: 0.125% x ([1] - [2]).
[4]: [1] - [2] - [3].

Table E.3: Delayed Brattle Schedule 3
Price and Freight (per ton & in 2007 US$)



Sources & Notes:
[1]: Table E.13.
[2]: Table E.14.
[3]: 0.125% x ([1] - [2]).
[4]: [1] - [2] - [3].

Table E.3: Delayed Brattle Schedule 3
Price and Freight (per ton & in 2007 US$)

Sources & Notes:
[1]: Table E.13.
[2]: Table E.14.
[3]: 0.125% x ([1] - [2]).
[4]: [1] - [2] - [3].

Table E.4: Delayed Brattle Schedule 4
Operating Costs
(Converted to 2007 US$)

Sources & Notes:

[1]: Canadian CPI, Bloomberg.
Inflation figures are from four years previous to each labeled year.

[2]: Nominal year in which values were reported in Rosen and SCMA Report.

[3]: 1 over the product of (1 + [1]) ^ n using [1] from each year from 2007 through [2], where n is 0.19 for 2007, 0.5 for [2], and 1 for all years in-between.

[4]: Table E.15.

[5]: SCMA Report.

[6]: [5] x [3] / [4].

Table E.4: Delayed Brattle Schedule 4
Operating Costs
(Converted to 2007 US$)

Sources & Notes:

[1]: Canadian CPI, Bloomberg.
Inflation figures are from four years previous to eac labeled year.

[2]: Nominal year in which values were reported in Rosen and SCMA Report.

[3]: 1 over the product of (1 + [1]) ^ n using [1] from each year from 2007 through [2], where n is 0 for 2007, 0.5 for [2], and 1 for all years in-between.

[4]: Table E.15.

[5]: SCMA Report.

[6]: [5] x [3] / [4].

Table E.4: Delayed Brattle Schedule 4
Operating Costs
(Converted to 2007 US$)

[redacted]

Sources & Notes:

[1]: Canadian CPI, Bloomberg.
Inflation figures are from four years previous to eac labeled year.

[2]: Nominal year in which values were reported in Rosen and SCMA Report.

[3]: 1 over the product of (1 + [1]) ^ n using [1] from each year from 2007 through [2], where n is 0 for 2007, 0.5 for [2], and 1 for all years in-between.

[4]: Table E.15.

[5]: SCMA Report.

[6]: [5] x [3] / [4].

Table E.4: Delayed Brattle Schedule 4
Operating Costs
(Converted to 2007 US$)

Sources & Notes:

[1]: Canadian CPI, Bloomberg.
Inflation figures are from four years previous to eac labeled year.

[2]: Nominal year in which values were reported in Rosen and SCMA Report.

[3]: 1 over the product of (1 + [1]) ^ n using [1] from each year from 2007 through [2], where n is 0 for 2007, 0.5 for [2], and 1 for all years in-between.

[4]: Table E.15.

[5]: SCMA Report.

[6]: [5] x [3] / [4].

Table E.4: Delayed Brattle Schedule 4
Operating Costs
(Converted to 2007 US$)

Sources & Notes:

[1]: Canadian CPI, Bloomberg.
Inflation figures are from four years previous to eac labeled year.

[2]: Nominal year in which values were reported in Rosen and SCMA Report.

[3]: 1 over the product of (1 + [1]) ^ n using [1] from each year from 2007 through [2], where n is 0 for 2007, 0.5 for [2], and 1 for all years in-between.

[4]: Table E.15.

[5]: SCMA Report.

[6]: [5] x [3] / [4].

Table E.5: Delayed Brattle Schedule 5
Capital Expenditures (Converted to 2007 US$)

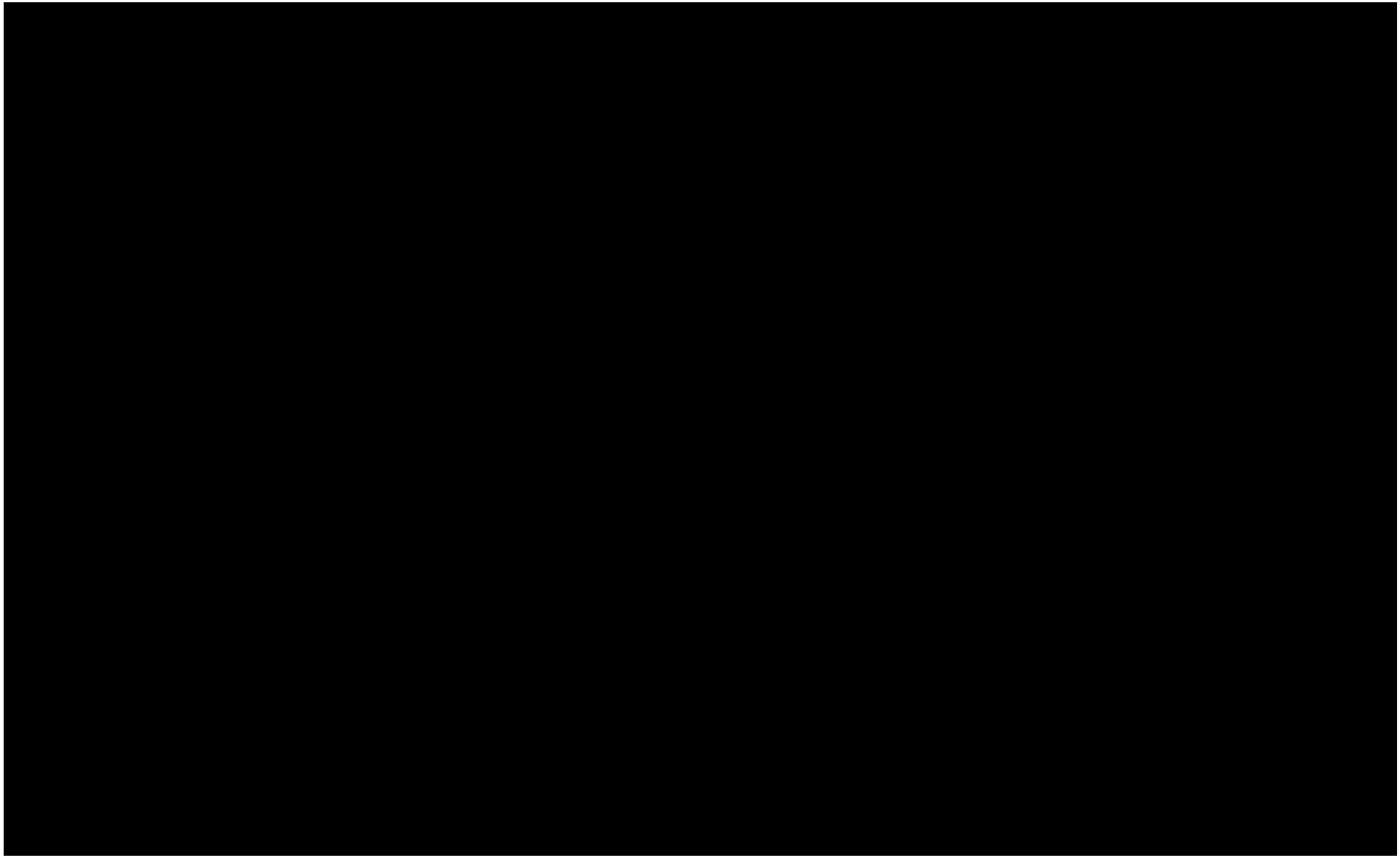


Table E.5: Delayed Brattle Schedule 5
Capital Expenditures (Converted to 2007 US$)

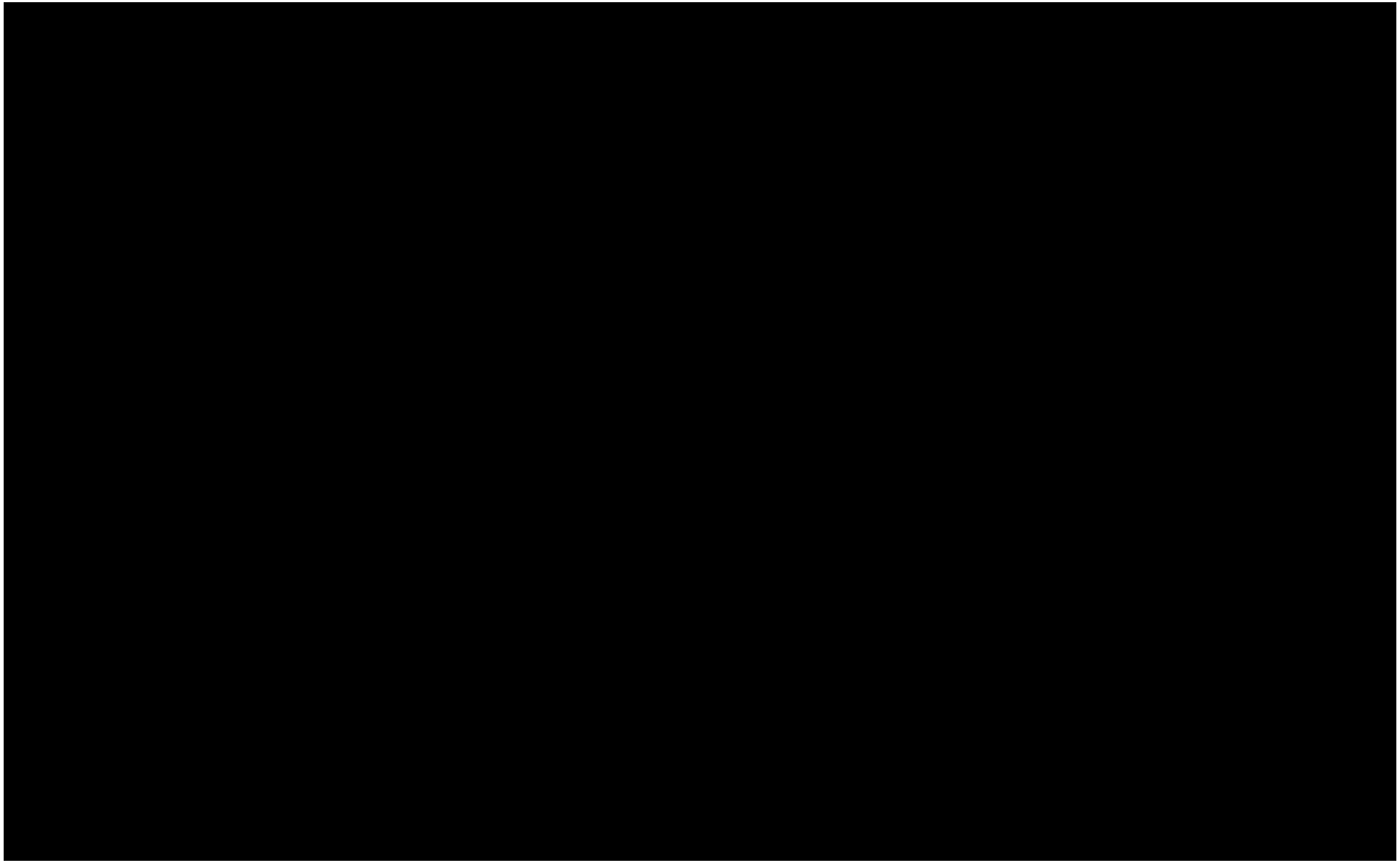


Table E.5: Delayed Brattle Schedule 5
Capital Expenditures (Converted to 2007 US$)

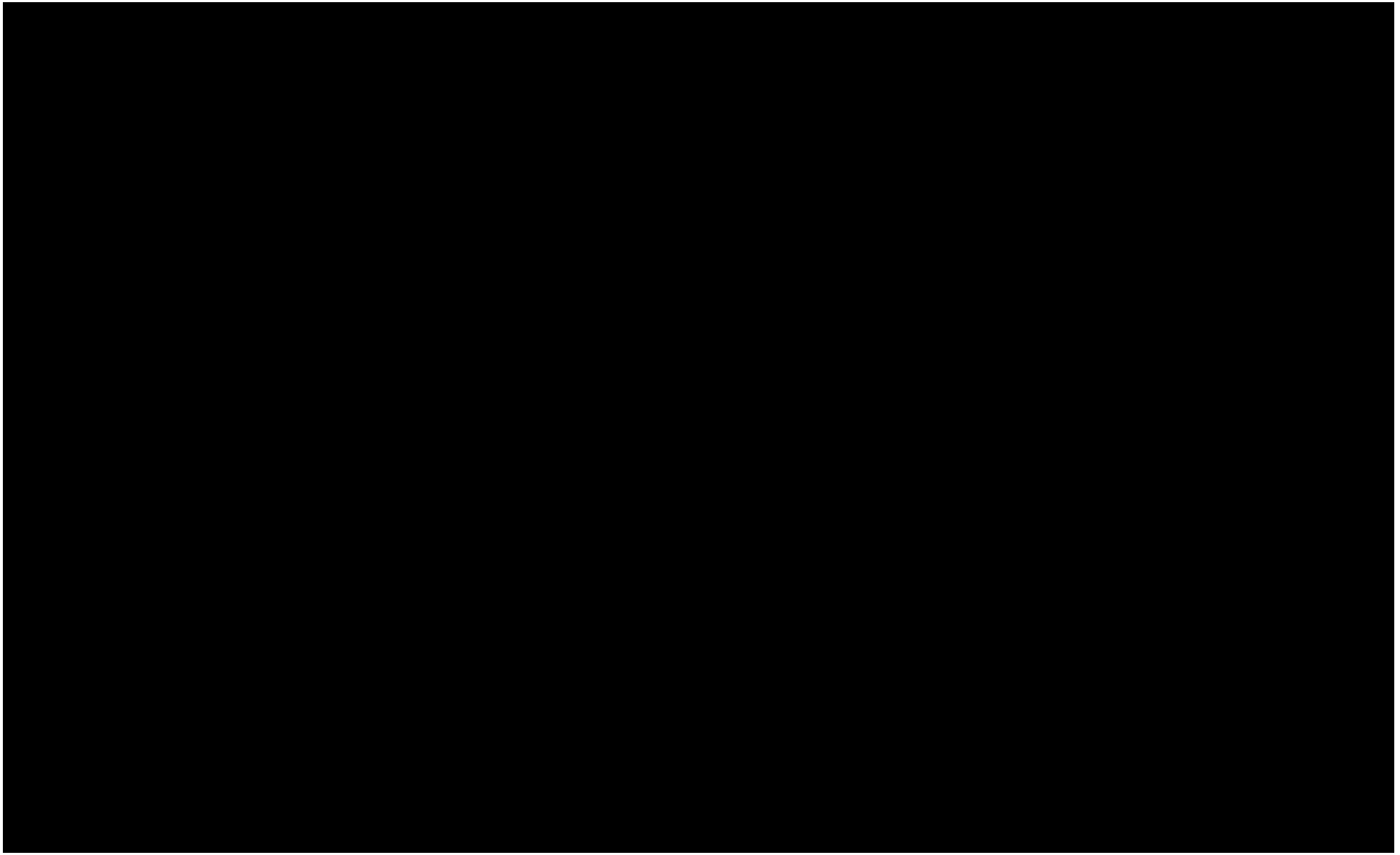


Table E.5: Delayed Brattle Schedule 5
Capital Expenditures (Converted to 2007 US$)

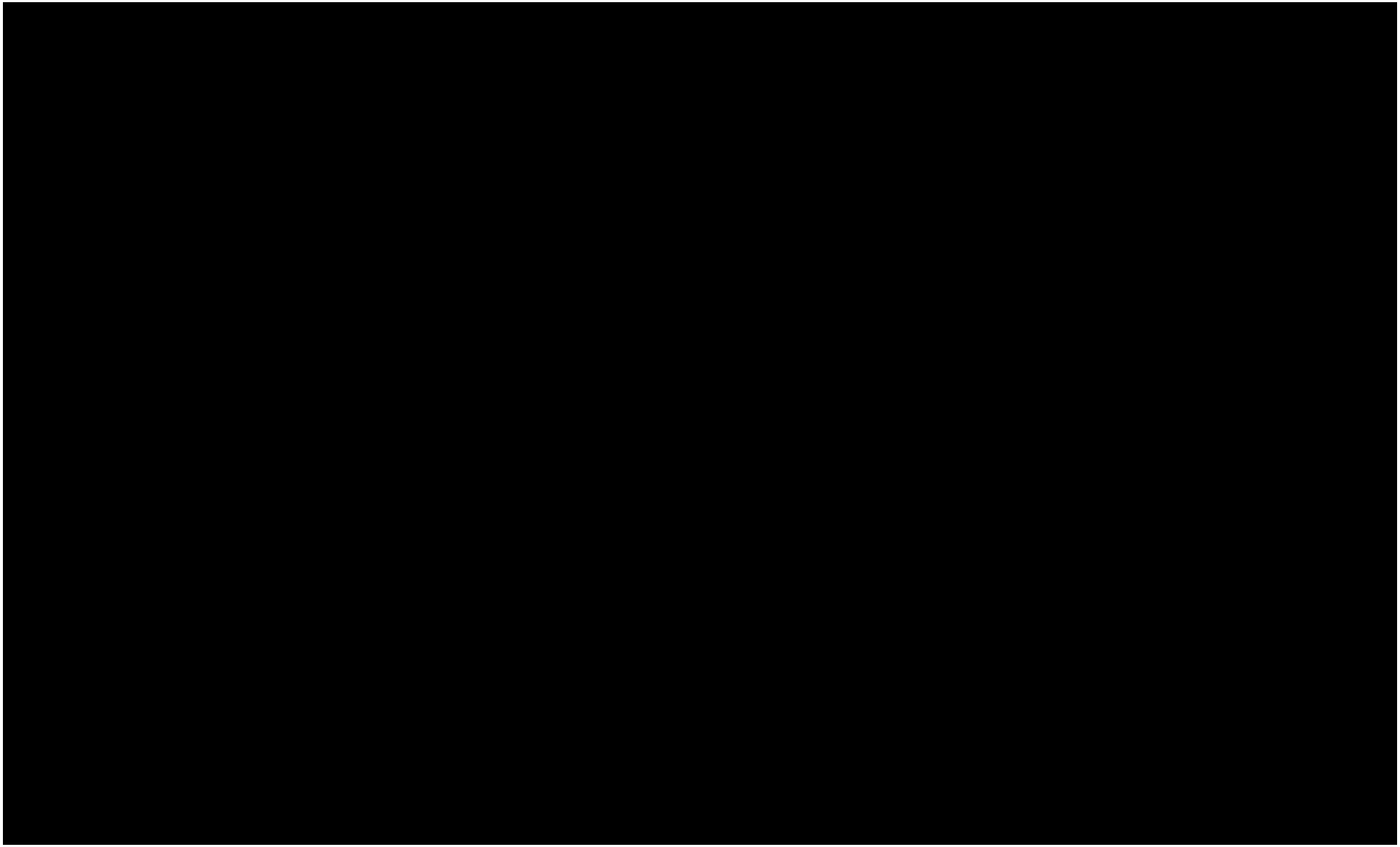


Table E.5: Delayed Brattle Schedule 5
Capital Expenditures (Converted to 2007 US$)

Table E.5: Delayed Brattle Schedule 5
Capital Expenditures (Converted to 2007 US$)

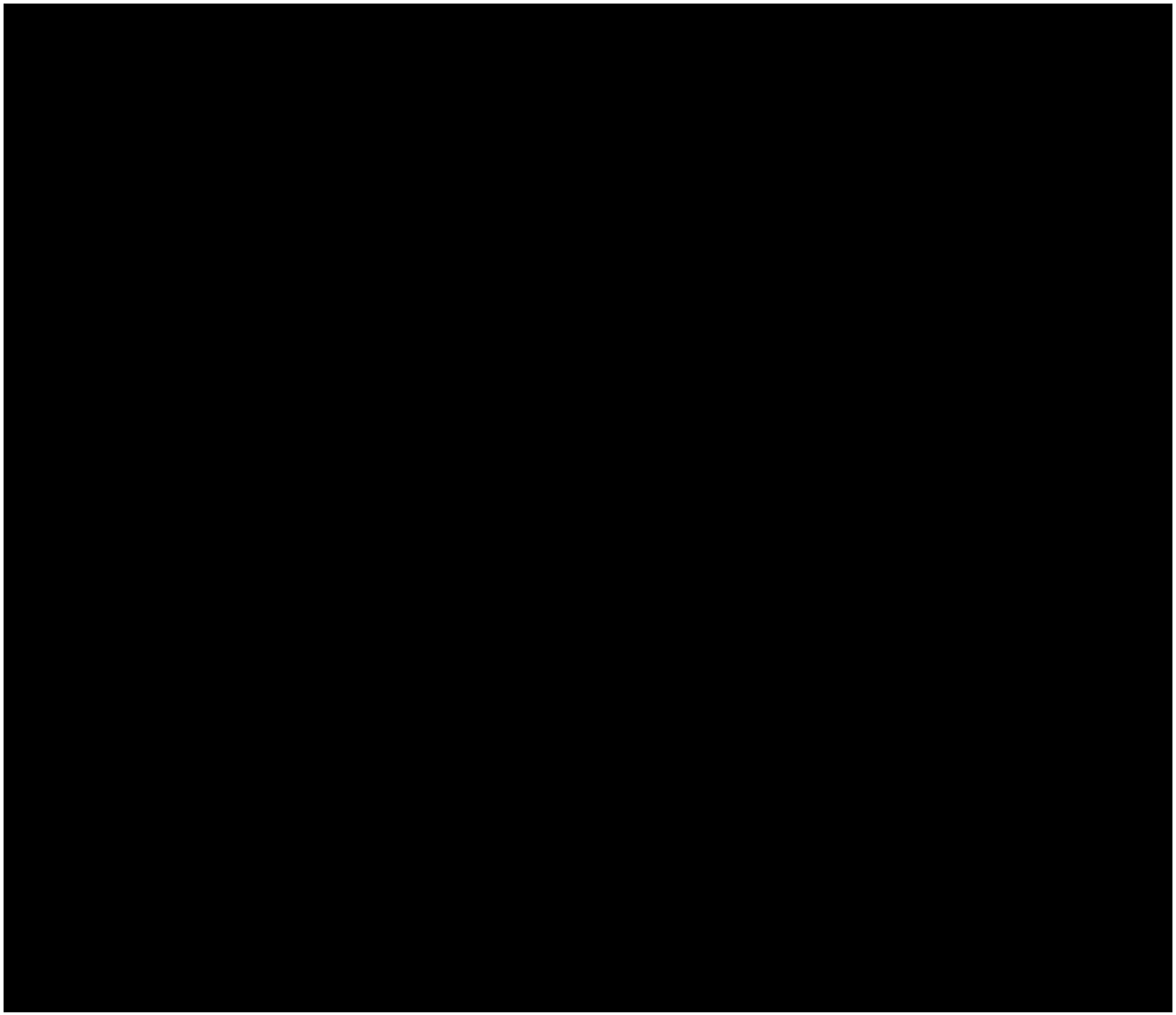


Table E.5: Delayed Brattle Schedule 5
Capital Expenditures (Converted to 2007 US$)

Sources & Notes:
[1]: C/US$ foreign exchanges rates, Bloomberg.
[2]: Table E.15.
[3]: Nominal year in which values were reported in Rosen.
[4]: U.S. CPI, Bloomberg. Inflation is taken from four years previous to each labeled year, due to the delay.
[5]: Canadian CPI, Bloomberg. Inflation is taken from four years previous to each labeled year, due to the delay.
[6],[10],[13],[16],[20],[24]: Rosen Schedule 5. Initial outlays are corrected for the price of Crusher 1 in 2012, per Rexhibit C-1342, p.17. Initial outlays are corrected by SCMA in 2013 and 2014.
[7]: The sum of [6].
[8]: 1 / (1 + [4]) ^ (0.19)) using [4] from when [3] is 2007, multiplied by 1 / (1 + [4]) ^ (0.5)) using [4] from when [3] is 2008.
[9]: [7] x [8].
[11]: 1 / (1 + [4]) ^ (0.19)) using [4] from when [3] is 2007, multiplied by 1 / (1 + [4]) ^ (0.5)) using [4] from when [3] is 2008.
[12]: [10] x [11].
[13]: [redacted]
[14]: (1 + [5]) ^ 0.5) using [5] from when [3] is 2006, multiplied by (1 + [5]) ^ 0.81) using [5] from when [3] is 2007 .
[15]: [13] x [14].
[17]: 1 / (1 + [5])^ (0.19)) using [5] from when [3] is 2007, multiplied by 1 / (1 + [5]) ^ (1)) using [5] from years when [3]
[18]: [16] x [17].
[19]: [18] / [2].
[21]: 1 / (1 + [5]) ^ (0.19)) using [5] from when [3] is 2007, multiplied by 1 / (1 + [5]) ^ (1)) using [5] from years when [3]
[22]: [20] x [21].
[23]: [22] / [2].
[25]: 1 / (1 + [4]) ^ (0.19)) using [4] from when [3] is 2007, multiplied by 1 / (1 + [4]) ^ (1)) using [4] from years when [3]
[26]: [24] x [25].
[27]: [9] + [12] + [15] + [19] + [23] + [26]. [redacted]

Table E.6: Delayed Brattle Schedule 6
Maintenance Costs - Mobile Equipment (Converted to 2007 US$)

[redacted]

Table E.6: Delayed Brattle Schedule 6
Maintenance Costs - Mobile Equipment (Converted to 2007 US$)

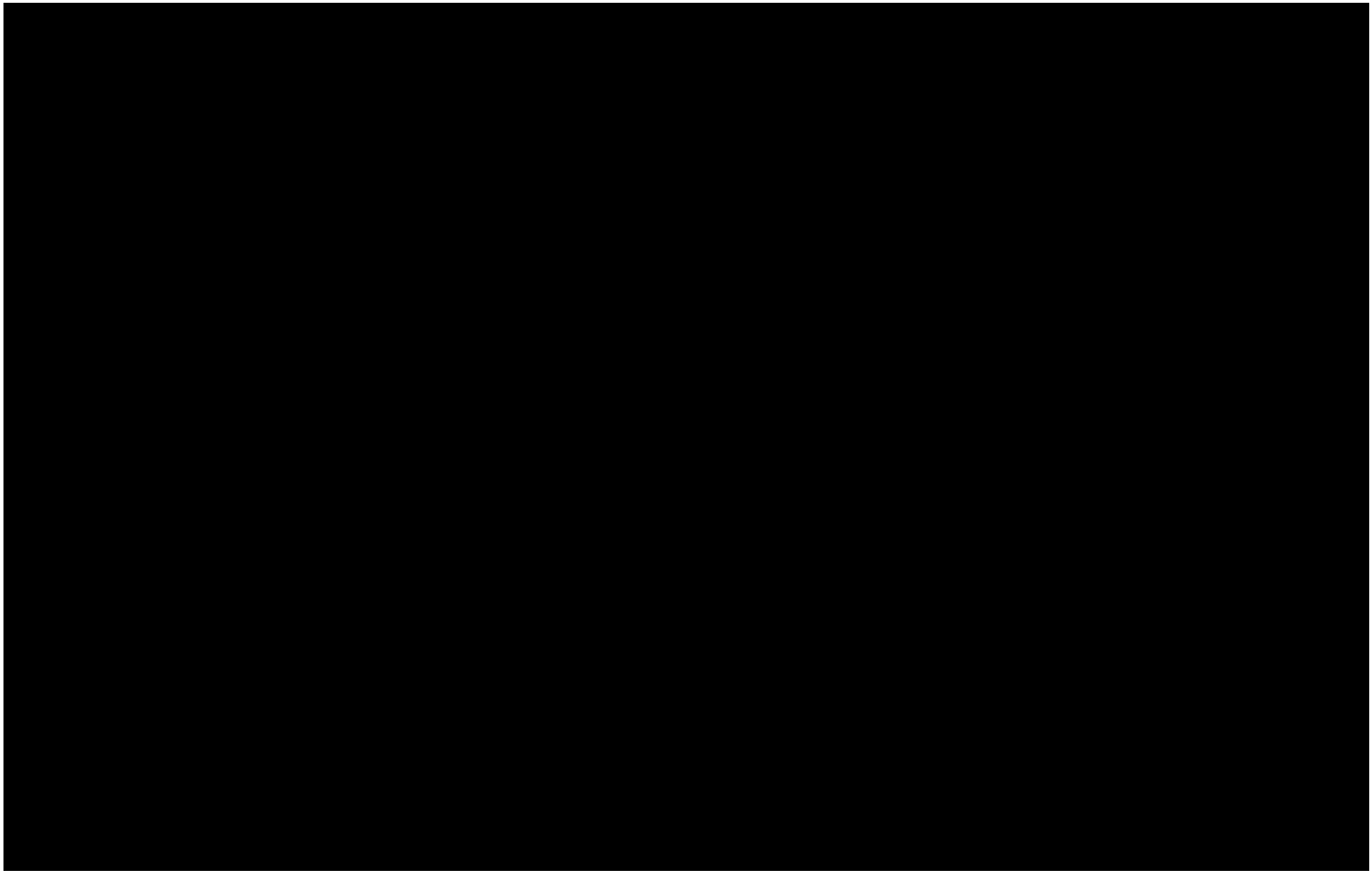


Table E.6: Delayed Brattle Schedule 6
Maintenance Costs - Mobile Equipment (Converted to 2007 US$)

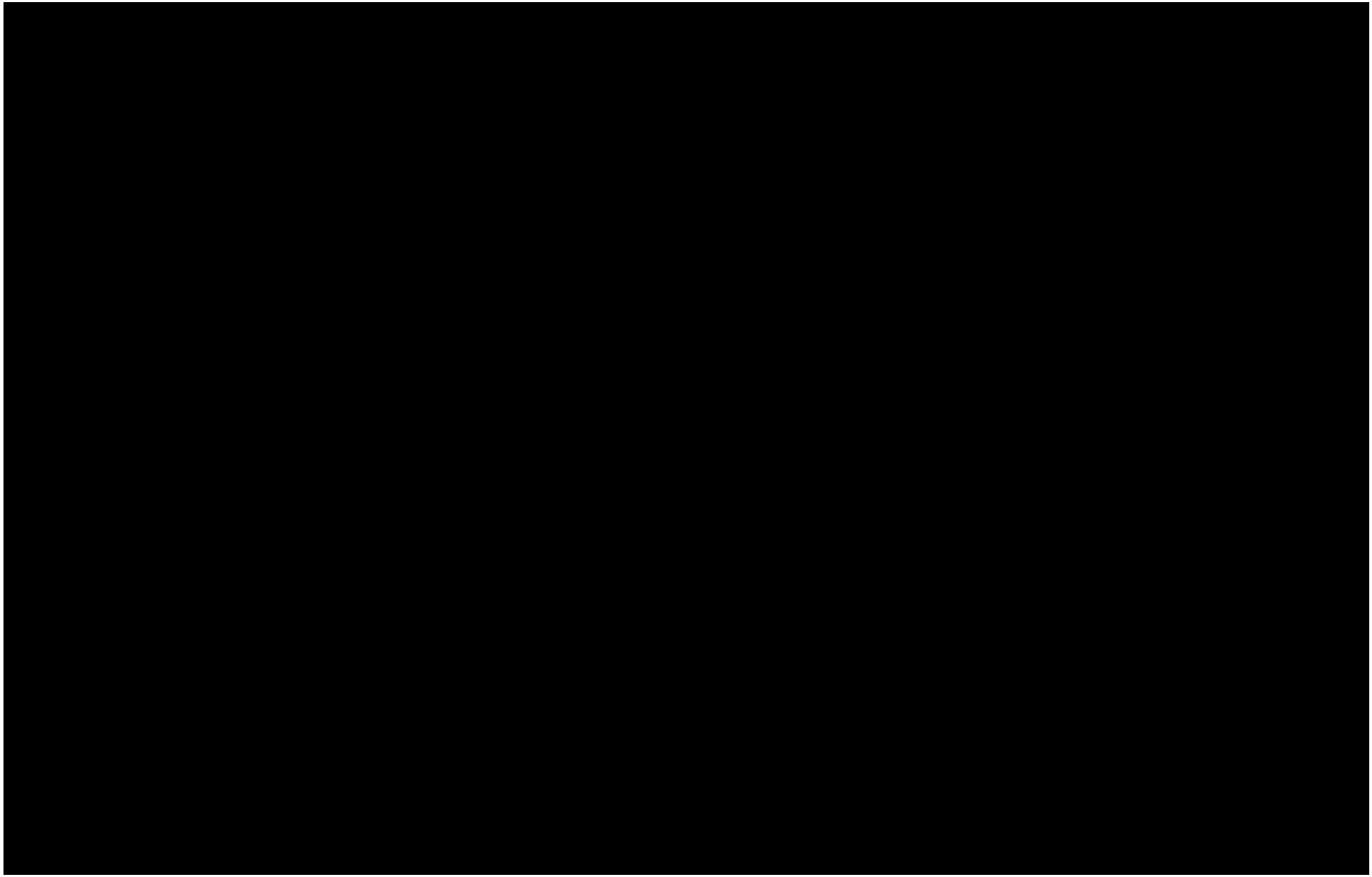


Table E.6: Delayed Brattle Schedule 6
Maintenance Costs - Mobile Equipment (Converted to 2007 US$)

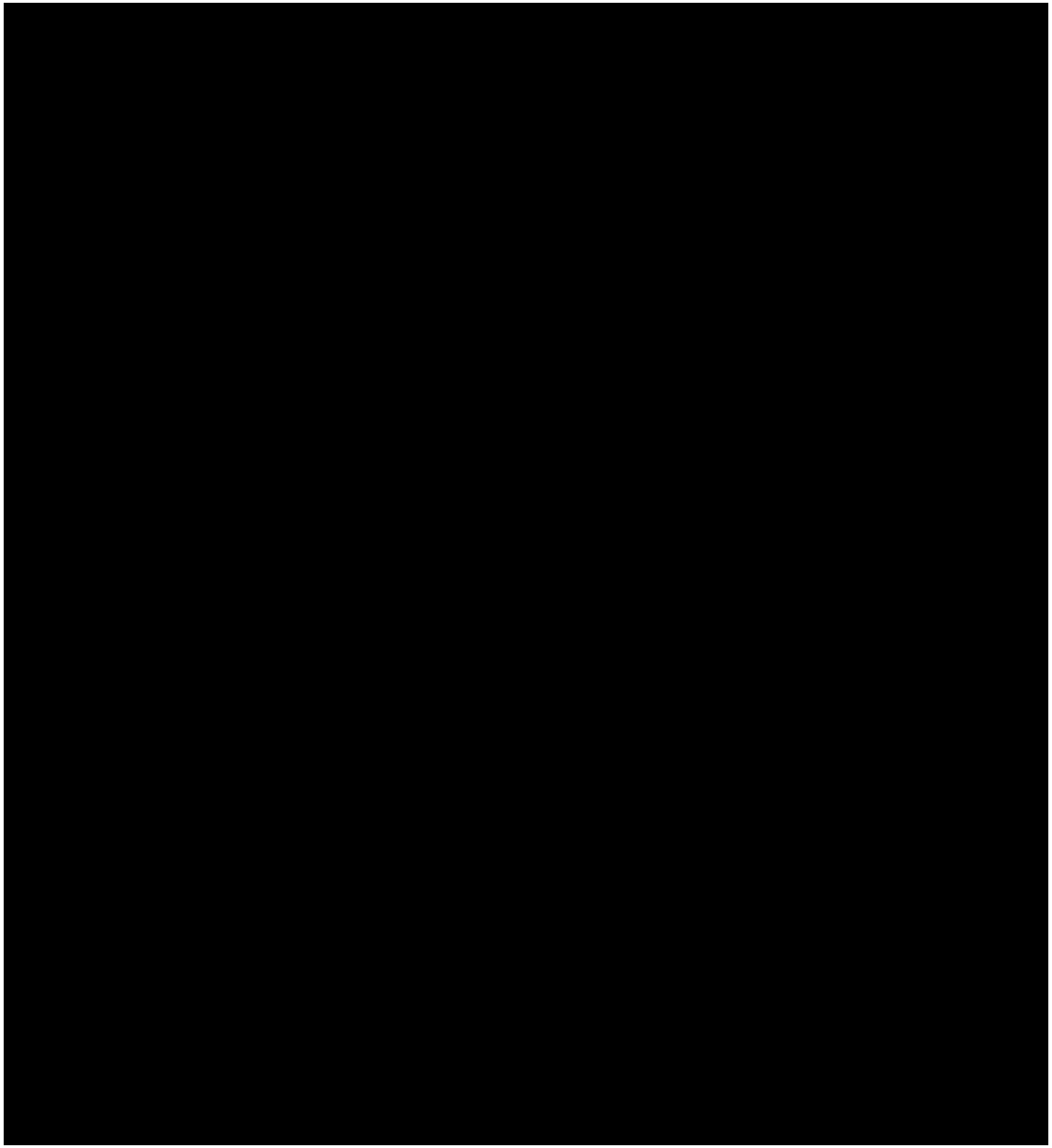


Table E.6: Delayed Brattle Schedule 6
Maintenance Costs - Mobile Equipment (Converted to 2007 US$)

Sources & Notes:

[1]: Rosen Schedule 6.
The cost of [redacted] is added here. See SCMA Report.

[2]: U.S. CPI, Bloomberg.

[3]: Nominal Year in which values were reported in Rosen Report.

[4]: 1/ (1 + [2]) ^ 0.19) using [2] from when [3] is 2007, multiplied by 1/ (1 + [2]) ^ 0.5) using [2] from when [3] is 2008.

[5]: Production Factor. See SCMA Report.

[6]: [1] x [4].

[7]: 1% of [6] in Year 1 and Year 2, 2% in Year 3 onward.

[8]: [5] x 1% of [6] in Year 1 and Year 2, [5] x 2% of [6] in Year 3 onward.

[9]: The sum of [7] through [8].

Table E.7: Delayed Brattle Schedule 7
Maintenance Costs - Plant Equipment (Converted to 2007 US$)

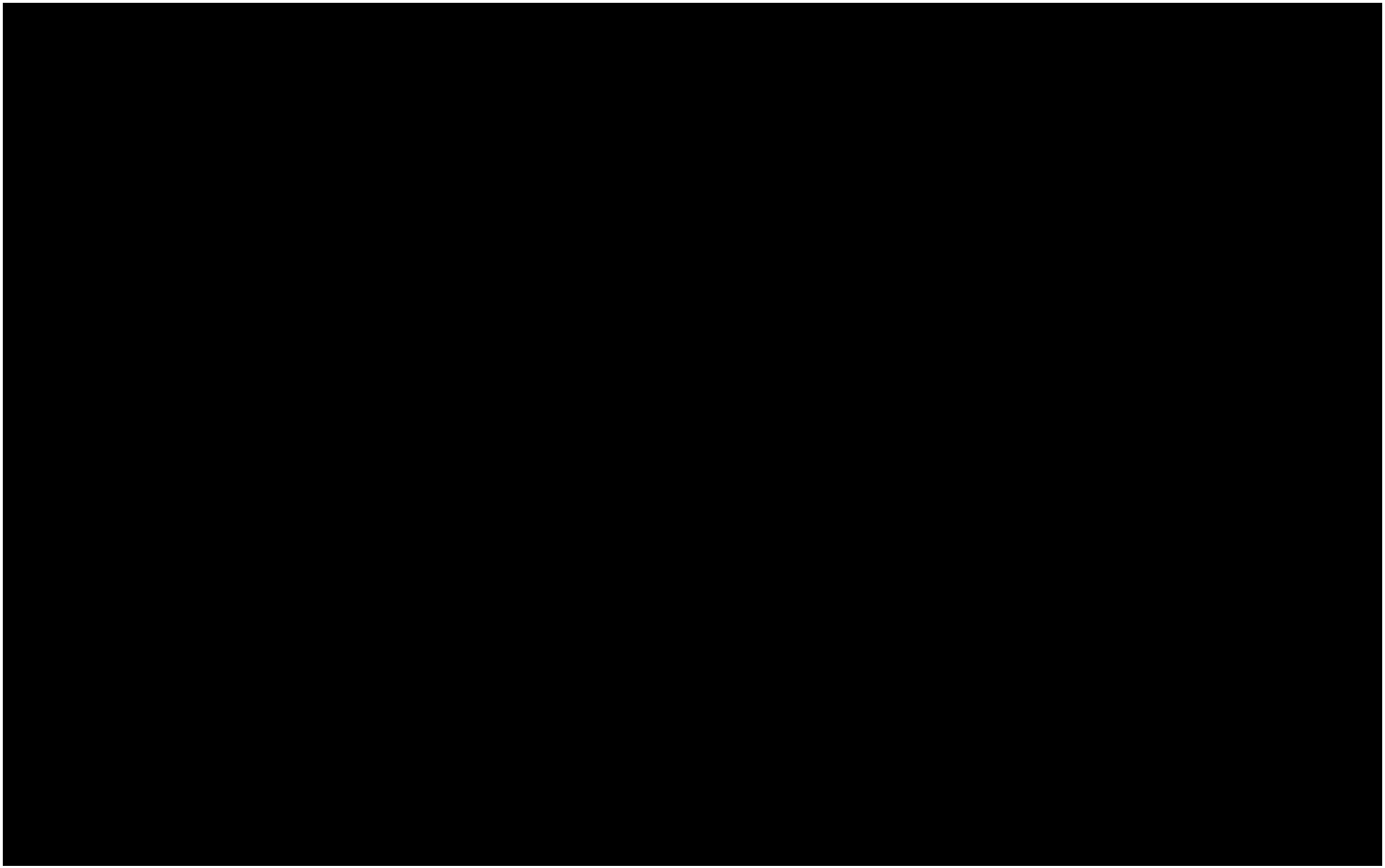


Table E.7: Delayed Brattle Schedule 7
Maintenance Costs - Plant Equipment (Converted to 2007 US$)

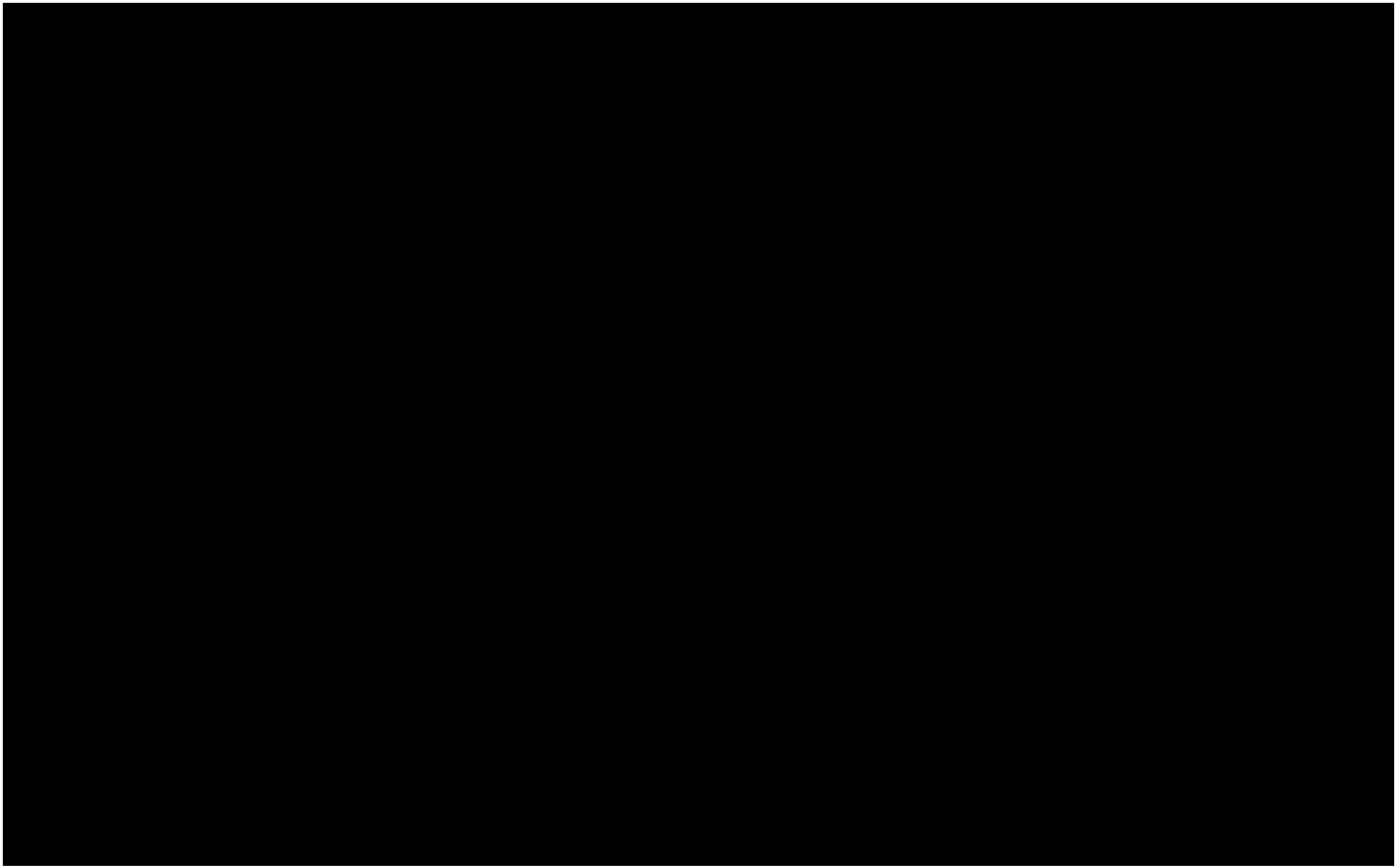


Table E.7: Delayed Brattle Schedule 7
Maintenance Costs - Plant Equipment (Converted to 2007 US$)

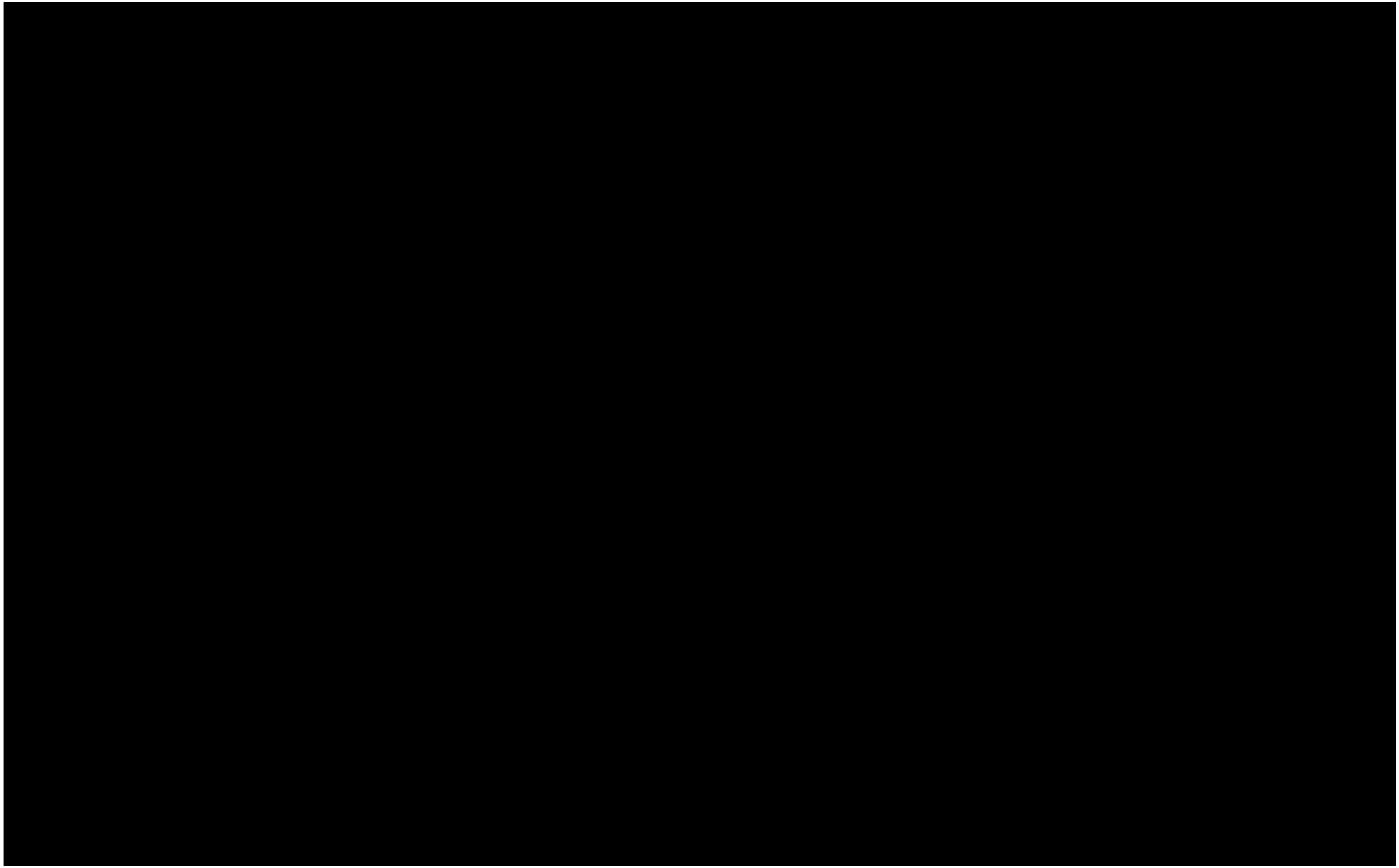


Table E.7: Delayed Brattle Schedule 7
Maintenance Costs - Plant Equipment (Converted to 2007 US$)

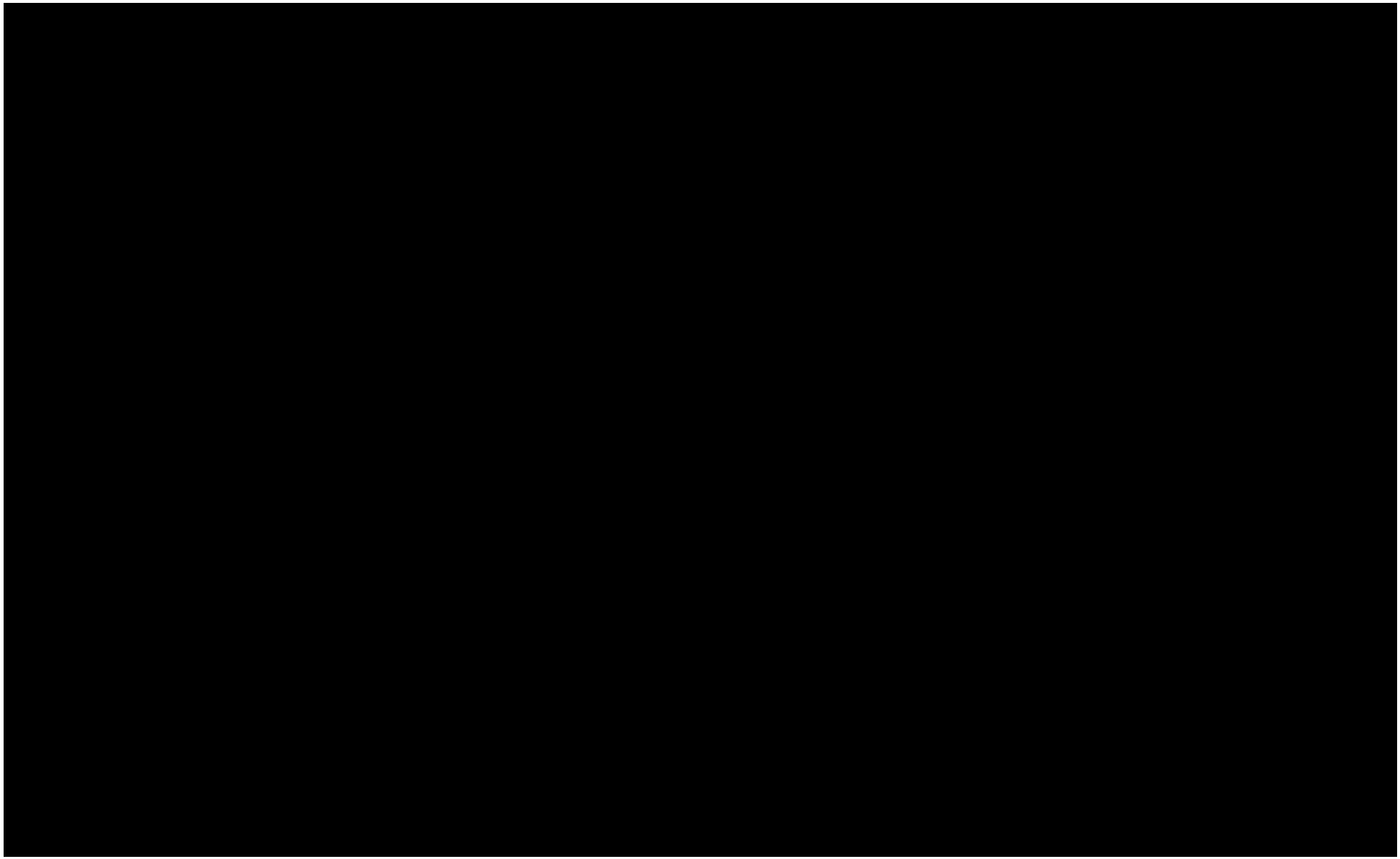


Table E.7: Delayed Brattle Schedule 7
Maintenance Costs - Plant Equipment (Converted to 2007 US$)

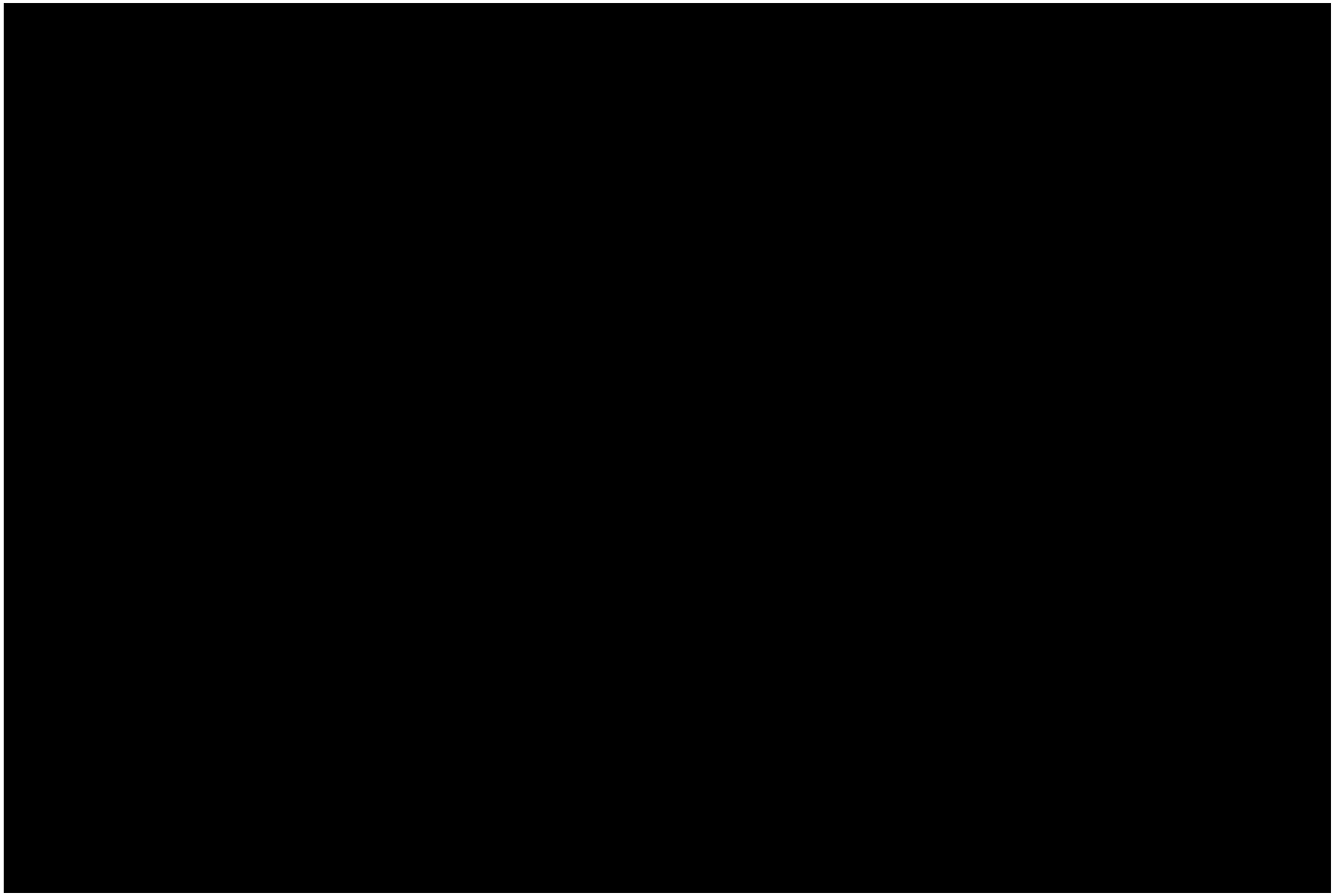


Table E.7: Delayed Brattle Schedule 7
Maintenance Costs - Plant Equipment (Converted to 2007 US$)

Sources & Notes:

[1]: Rosen Schedule 7, with [redacted] specified by SCMA and the price of [redacted] corrected per Exhibit C-1342, p.17.

[2]: Rosen CPI (Bloomberg).

[3]: Nominal Year in which values were reported in Rosen Report.

[4]: 1/ (1 + [2]) ^ 0.19) using [2] from when 3 is 2007, multiplied by 1/ (1 + [2]) ^ 0.5) using [2] from when 3 is 2008.

[5]: Production Factor. See SCMA Report.

[6]: [1] x [4].

[7]: [5] x 2% of [6] in Years 1 to 2; [5] x 3% of [6] in Years 3 to 6, and [5] x 4% of [6] in Year 7 onward.

[8]: The sum of [7].

Table E.8: Delayed Brattle Schedule 8 Maintenance Costs - Marine Terminal (Converted to 2007 US$)

[redacted]

Sources & Notes:

[1]: Table E.5.

[2]: See Rosen Report Schedule 8: [redacted]

[3]: See SCMA Report.

[4]: [2] x [3].

Table E.8: Delayed Brattle Schedule 8 Maintenance Costs - Marine Terminal (Converted to 2007 US$)

[redacted]

Sources & Notes:

[1]: Table E.5.

[2]: See Rosen Report Schedule 8: [redacted]

[3]: See SCMA Report.

[4]: [2] x [3].

Table E.8: Delayed Brattle Schedule 8 Maintenance Costs - Marine Terminal (Converted to 2007 US$)

[redacted]

[1]: Table E.5.
[2]: See Rosen Report Schedule 8: [redacted]
[3]: See SCMA Report.
[4]: [2] x [3].

Table E.8: Delayed Brattle Schedule 8 Maintenance Costs - Marine Terminal (Converted to 2007 US$)

[redacted]

Sources & Notes:

[1]: Table E.5.

[2]: See Rosen Report Schedule 8[redacted]

[3]: See SCMA Report.

[4]: [2] x [3].

Table E.8: Delayed Brattle Schedule 8 Maintenance Costs - Marine Terminal (Converted to 2007 US$)

[redacted]

Sources & Notes:

[1]: Table E.5.

[2]: See Rosen Report Schedule 8: [redacted]

[3]: See SCMA Report.

[4]: [2] x [3].

Table E.8: Delayed Brattle Schedule 8 Maintenance Costs - Marine Terminal (Converted to 2007 US$)

[redacted]

Sources & Notes:

[1]: Table E.5.

[2]: See Rosen Report Schedule 8: [redacted]

[3]: See SCMA Report.

[4]: [2] x [3].

Table E.9: Delayed Brattle Schedule 9 Reclamation and Decommissioning Costs (Converted to 2007 US$)

[redacted]

Sources & Notes:

[1]: Rosen Schedule 9, adjusted for the change in project life.

[2]: Rosen CPI (Bloomberg), Canadian CPI.

[3]: Nominal year in which values were reported in Rosen Report.
There is no basis for Mr. Rosen's assumption.

[4]: 1/ (1 + [2]) ^ 0.19) using [2] from when [3] is 2007, multiplied by
1/ (1 + [2]) ^ 1) using [2] from when [3] is 2008, multiplied by
1/ (1 + [2]) ^ 0.5) using [2] from when [3] is 2009.

[5]: Table E.15.

[6]: [1] / [5] x [4].

Table E.9: Delayed Brattle Schedule 9 Reclamation and Decommissioning Costs (Converted to 2007 US$)

Sources & Notes:

[1]: Rosen Schedule 9, adjusted for the change in project life.

[2]: Rosen CPI (Bloomberg), Canadian CPI.

[3]: Nominal year in which values were reported in Rosen Report.
There is no basis for Mr. Rosen's assumption.

[4]: 1/ (1 + [2]) ^ 0.19) using [2] from when [3] is 2007, multiplied by
1/ (1 + [2]) ^ 1) using [2] from when [3] is 2008, multiplied by
1/ (1 + [2]) ^ 0.5) using [2] from when [3] is 2009.

[5]: Table E.15.

[6]: [1] / [5] x [4].

Table E.9: Delayed Brattle Schedule 9 Reclamation and Decommissioning Costs (Converted to 2007 US$)

[redacted]

Sources & Notes:

[1]: Rosen Schedule 9, adjusted for the change in project life.

[2]: Rosen CPI (Bloomberg), Canadian CPI.

[3]: Nominal year in which values were reported in Rosen Report.
There is no basis for Mr. Rosen's assumption.

[4]: 1/ (1 + [2]) ^ 0.19) using [2] from when [3] is 2007, multiplied by
1/ (1 + [2]) ^ 1) using [2] from when [3] is 2008, multiplied by
1/ (1 + [2]) ^ 0.5) using [2] from when [3] is 2009.

[5]: Table E.15.

[6]: [1] / [5] x [4].

Table E.9: Delayed Brattle Schedule 9 Reclamation and Decommissioning Costs (Converted to 2007 US$)

[redacted]

Sources & Notes:

[1]: Rosen Schedule 9, adjusted for the change in project life.

[2]: Rosen CPI (Bloomberg), Canadian CPI.

[3]: Nominal year in which values were reported in Rosen Report.
There is no basis for Mr. Rosen's assumption.

[4]: 1/ (1 + [2]) ^ 0.19) using [2] from when [3] is 2007, multiplied by
1/ (1 + [2]) ^ 1) using [2] from when [3] is 2008, multiplied by
1/ (1 + [2]) ^ 0.5) using [2] from when [3] is 2009.

[5]: Table E.15.

[6]: [1] / [5] x [4].

Table E.9: Delayed Brattle Schedule 9 Reclamation and Decommissioning Costs (Converted to 2007 US$)

[redacted]

Sources & Notes:

[1]: Rosen Schedule 9, adjusted for the change in project life.
[2]: Rosen CPI (Bloomberg), Canadian CPI.
[3]: Nominal year in which values were reported in Rosen Report.
There is no basis for Mr. Rosen's assumption.
[4]: 1/ (1 + [2]) ^ 0.19) using [2] from when [3] is 2007, multiplied by
1/ (1 + [2]) ^ 1) using [2] from when [3] is 2008, multiplied by
1/ (1 + [2]) ^ 0.5) using [2] from when [3] is 2009.
[5]: Table E.15.
[6]: [1] / [5] x [4].

Table E.9: Delayed Brattle Schedule 9 Reclamation and Decommissioning Costs (Converted to 2007 US$)

Sources & Notes:

[1]: Rosen Schedule 9, adjusted for the change in project life.

[2]: Rosen CPI (Bloomberg), Canadian CPI.

[3]: Nominal year in which values were reported in Rosen Report.
There is no basis for Mr. Rosen's assumption.

[4]: 1/ (1 + [2]) ^ 0.19) using [2] from when [3] is 2007, multiplied by
1/ (1 + [2]) ^ 1) using [2] from when [3] is 2008, multiplied by
1/ (1 + [2]) ^ 0.5) using [2] from when [3] is 2009.

[5]: Table E.15.

[6]: [1] / [5] x [4].

Table E.9: Delayed Brattle Schedule 9 Reclamation and Decommissioning Costs (Converted to 2007 US$)

[redacted]

Sources & Notes:

[1]: Rosen Schedule 9, adjusted for the change in project life.
[2]: Rosen CPI (Bloomberg), Canadian CPI.
[3]: Nominal year in which values were reported in Rosen Report.
There is no basis for Mr. Rosen's assumption.
[4]: 1/ (1 + [2]) ^ 0.19) using [2] from when [3] is 2007, multiplied by
1/ (1 + [2]) ^ 1) using [2] from when [3] is 2008, multiplied by
1/ (1 + [2]) ^ 0.5) using [2] from when [3] is 2009.
[5]: Table E.15.
[6]: [1] / [5] x [4].

Table E.9: Delayed Brattle Schedule 9 Reclamation and Decommissioning Costs (Converted to 2007 US$)

[redacted]

Sources & Notes:

[1]: Rosen Schedule 9, adjusted for the change in project life.

[2]: Rosen CPI (Bloomberg), Canadian CPI.

[3]: Nominal year in which values were reported in Rosen Report.
There is no basis for Mr. Rosen's assumption.

[4]: 1/ (1 + [2]) ^ 0.19) using [2] from when [3] is 2007, multiplied by
1/ (1 + [2]) ^ 1) using [2] from when [3] is 2008, multiplied by
1/ (1 + [2]) ^ 0.5) using [2] from when [3] is 2009.

[5]: Table E.15.

[6]: [1] / [5] x [4].

Table E.10: Delayed Brattle Schedule 10
Interest Expense

[redacted]

Sources & Notes:

[redacted].

Table E.11: Delayed Brattle Schedule 11
Income Taxes
(US$ 2007)

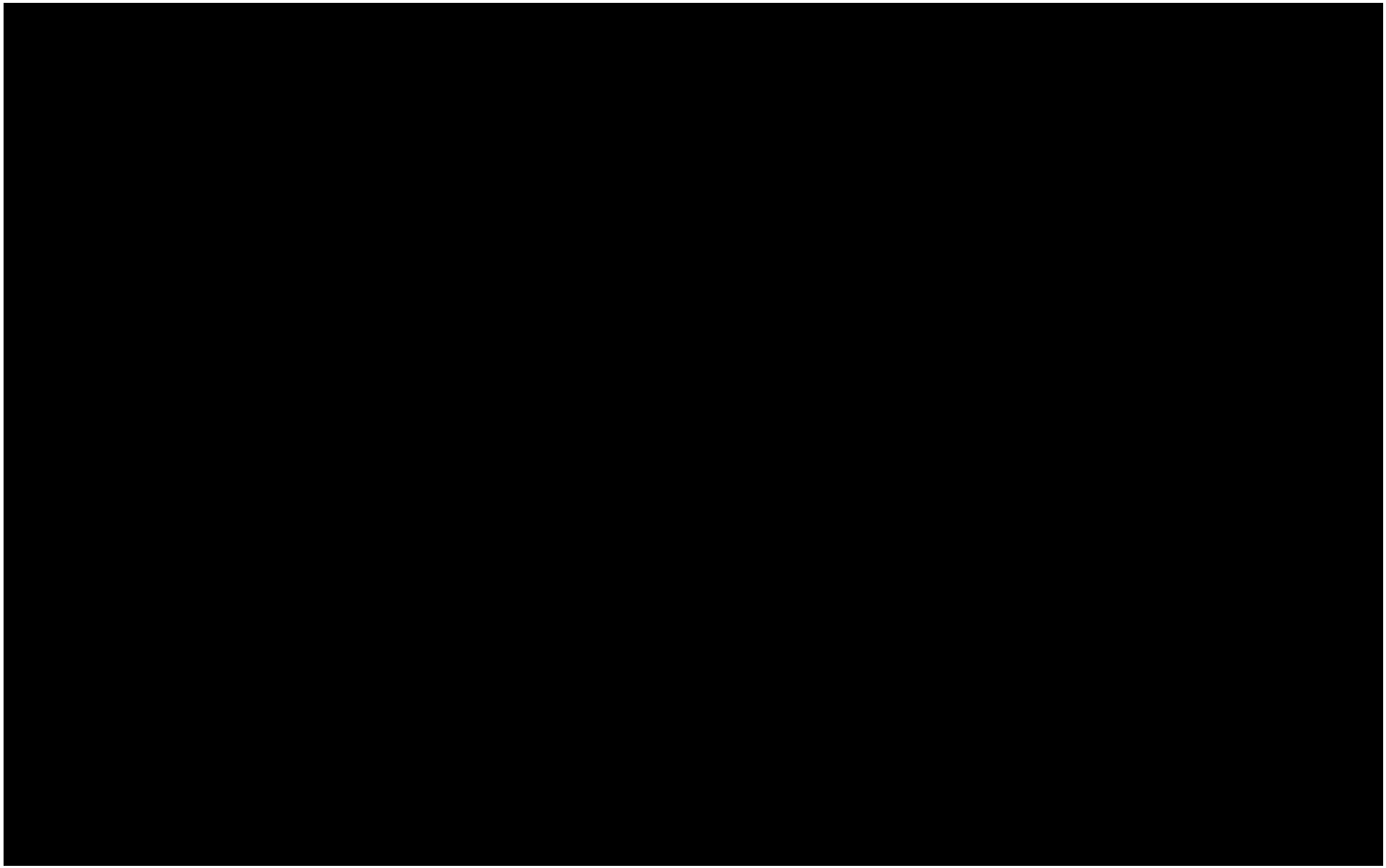


Table E.11: Delayed Brattle Schedule 11
Income Taxes
(US$ 2007)

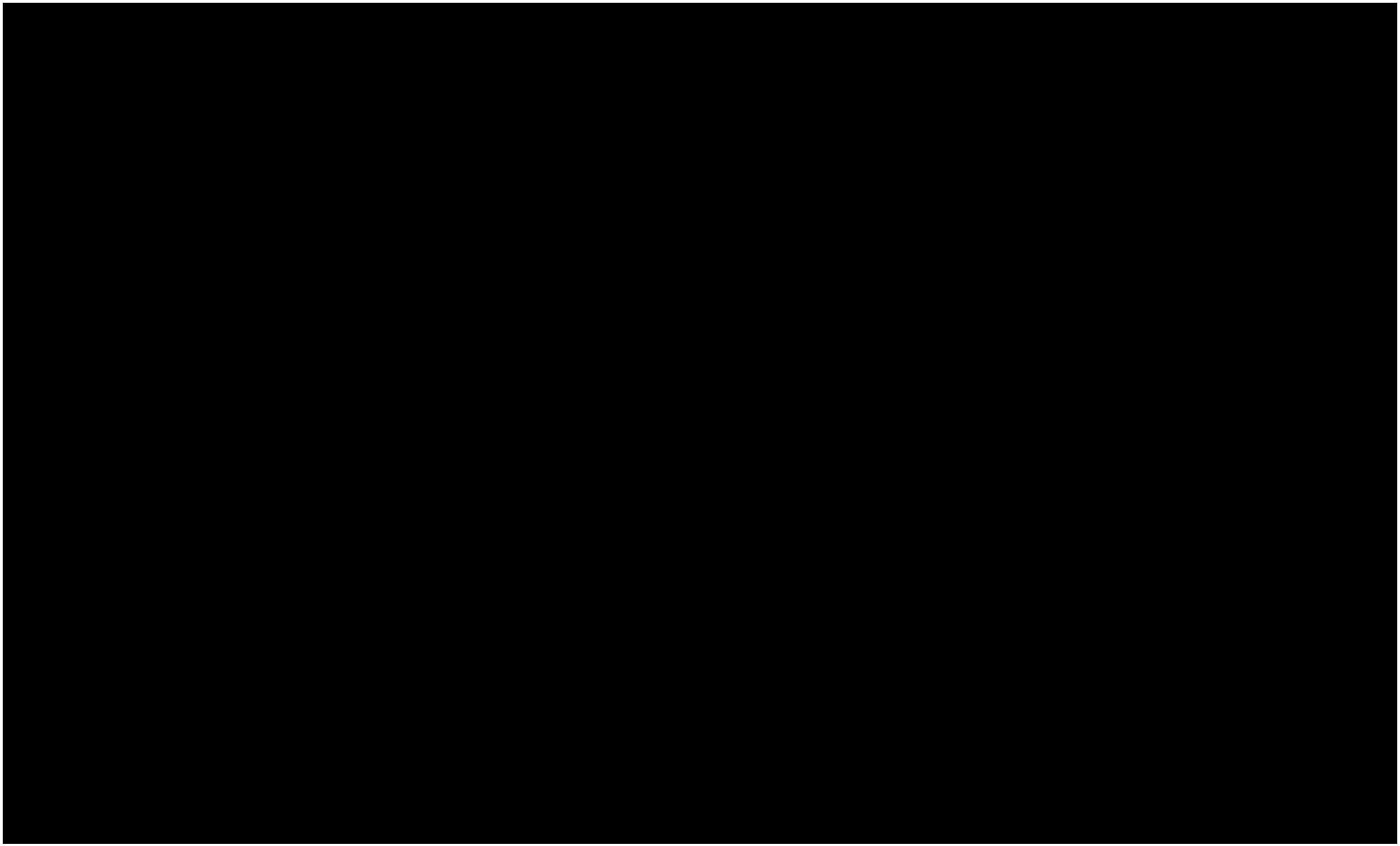


Table E.11: Delayed Brattle Schedule 11
Income Taxes
(US$ 2007)

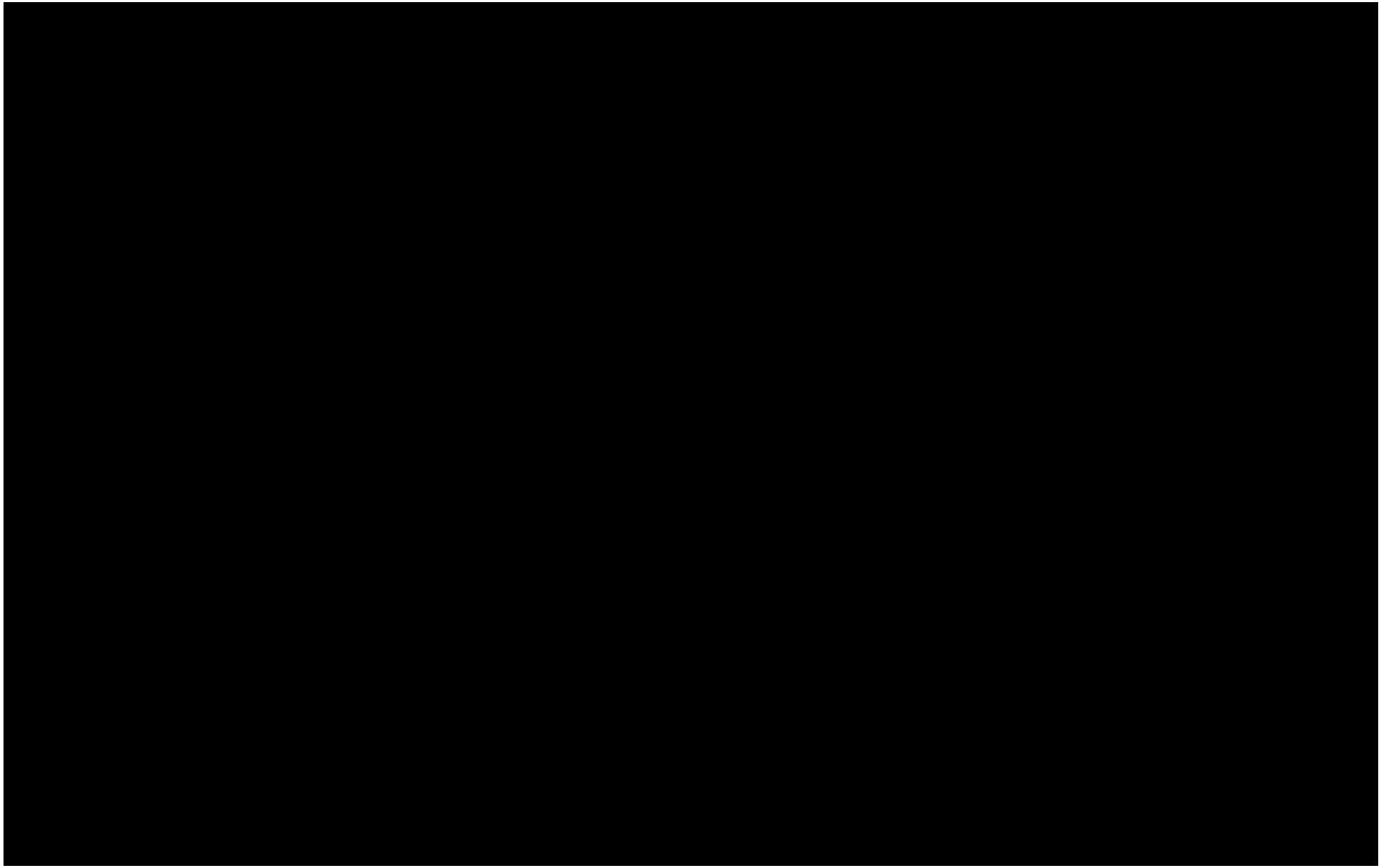


Table E.11: Delayed Brattle Schedule 11
Income Taxes
(US$ 2007)

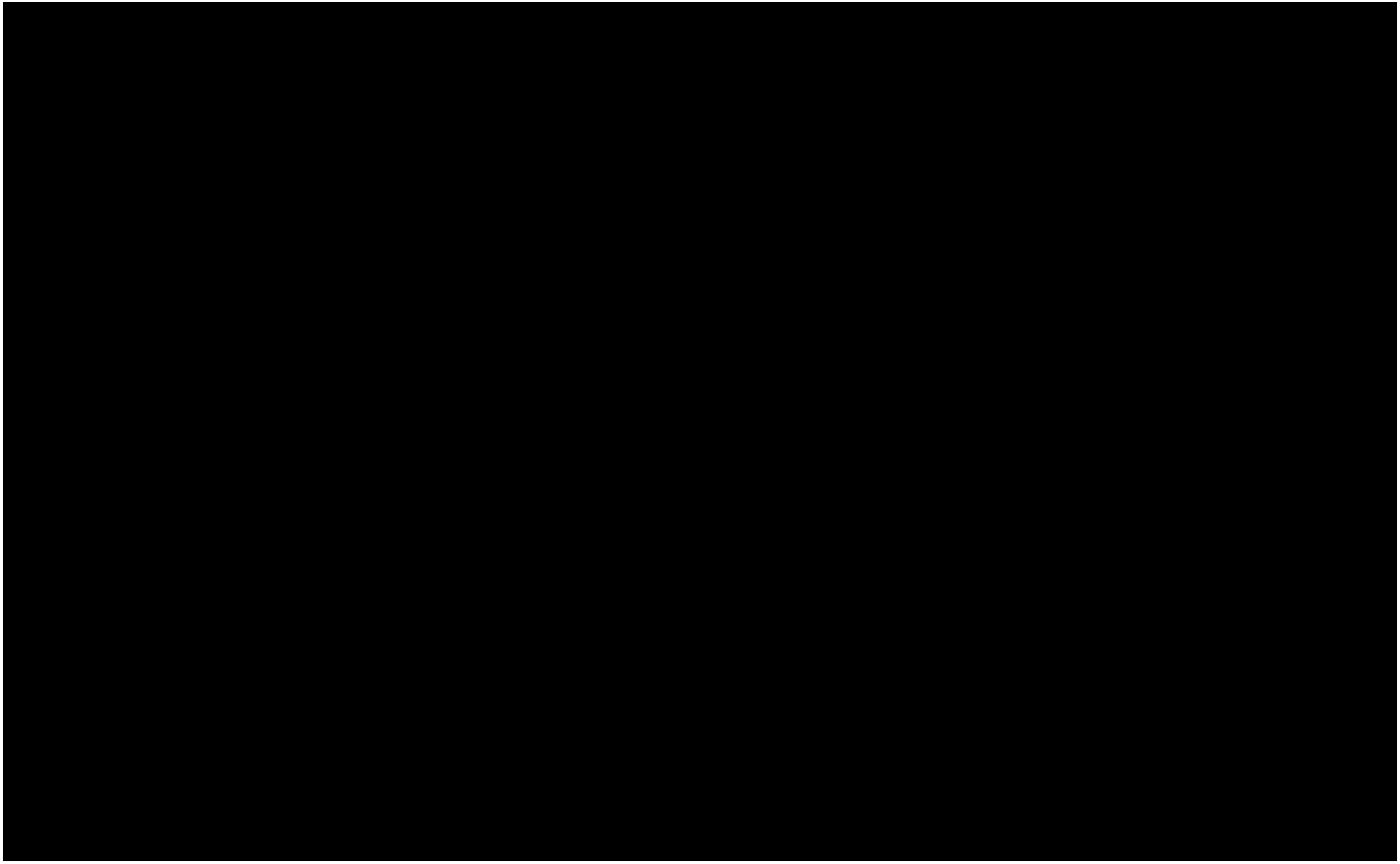


Table E.11: Delayed Brattle Schedule 11
Income Taxes
(US$ 2007)

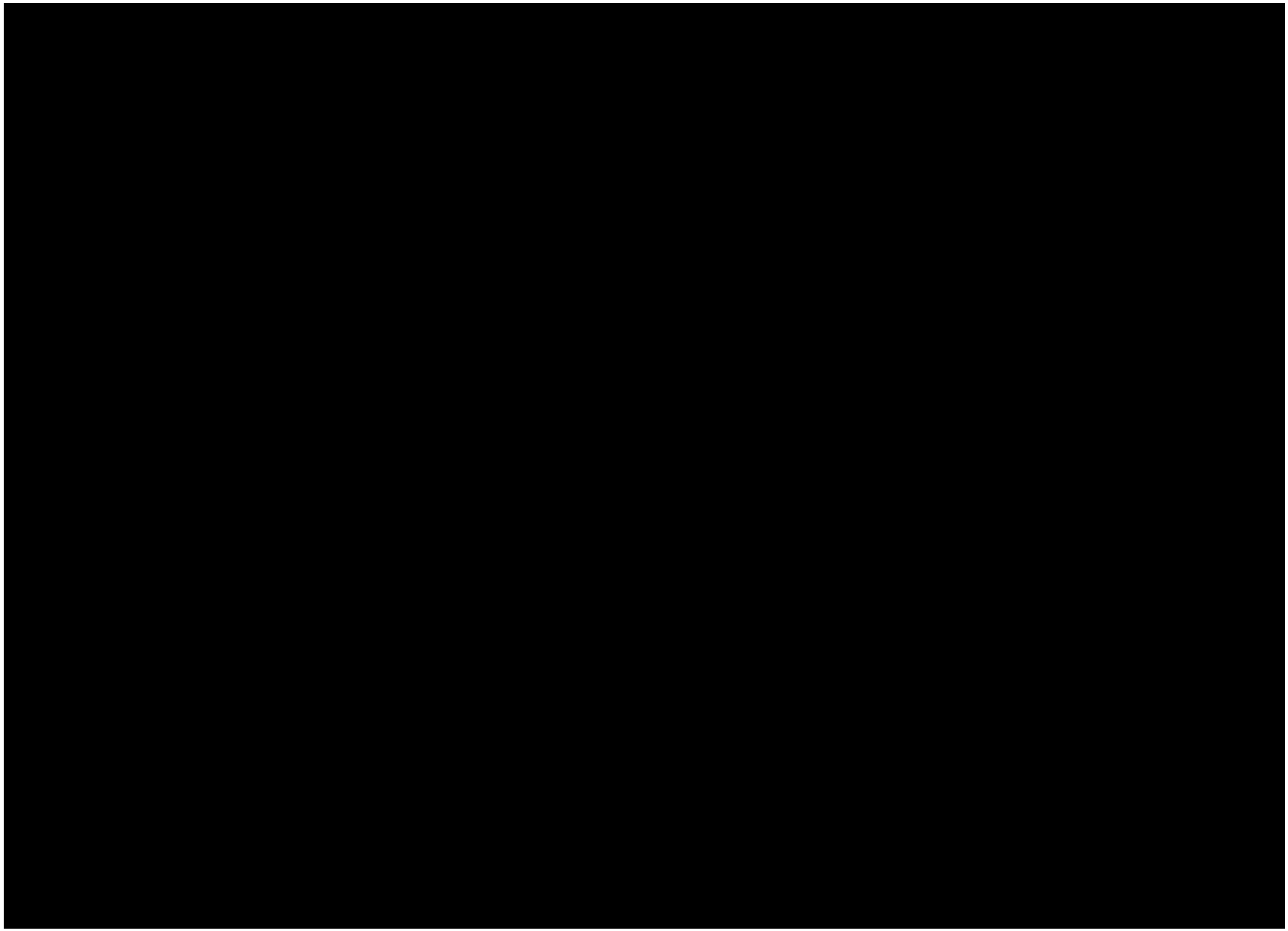


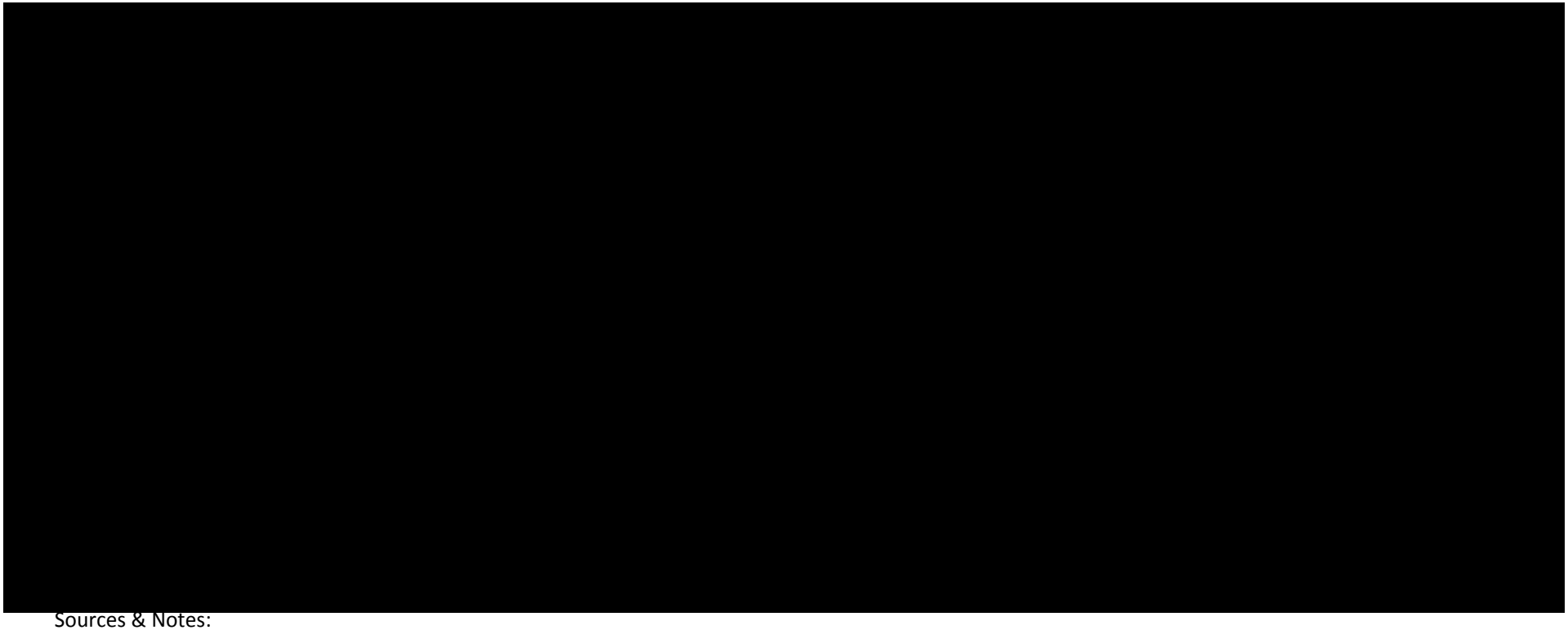
Table E.11: Delayed Brattle Schedule 11
Income Taxes
(US$ 2007)

Sources & Notes:
Tax calculations are adopted from Rosen's Schedule 11.
Captial tax is converted to US$ using Table E.15.
[1]: Table E.1.
[2]: Table E.1.
[3]: [1] + [2].
[4]: Cumulative of [3].
[5]: 31% in 2012-2016. Deloitte. Corporate Income Tax Rates (2012-2016).
[6]: Negative [11].
[7]: Rosen Report, Schedule 11.
[8]: The sum of [5] through [7].
[9]: Taken from Table E.5.
[10]: Reclassified as CCA Class 14.1 beginning January 1, 2017.
Subject to CCA rate of 7% for the first 10 years and 5% thereafter. Source: Grant Thornton. New Rules for eligible property.

Table E.12: Delayed Brattle Schedule 12
Changes in Working Capital
($US 2007)

Sources & Notes:
[1]: Table E.1.
[2]: Table E.1.
[3]: The sum of [2].
[4]: Days in each year. See Rosen Schedule 12.
[5]: [1] / [4] x 30.
[6]: [3] / [4] x 30.
[7]: The sum of [5] and [6].
[8]: [7] from the current year, less [7] from the previous year.

Table E.12: Delayed Brattle Schedule 12
Changes in Working Capital
($US 2007)



Sources & Notes:
[1]: Table E.1.
[2]: Table E.1.
[3]: The sum of [2].
[4]: Days in each year. See Rosen Schedule 12.
[5]: [1] / [4] x 30.
[6]: [3] / [4] x 30.
[7]: The sum of [5] and [6].
[8]: [7] from the current year, less [7] from the previous year.

Table E.12: Delayed Brattle Schedule 12
Changes in Working Capital
($US 2007)

Sources & Notes:
[1]: Table E.1.
[2]: Table E.1.
[3]: The sum of [2].
[4]: Days in each year. See Rosen Schedule 12.
[5]: [1] / [4] x 30.
[6]: [3] / [4] x 30.
[7]: The sum of [5] and [6].
[8]: [7] from the current year, less [7] from the previous year.

Table E.12: Delayed Brattle Schedule 12
Changes in Working Capital
($US 2007)

Sources & Notes:
[1]: Table E.1.
[2]: Table E.1.
[3]: The sum of [2].
[4]: Days in each year. See Rosen Schedule 12.
[5]: [1] / [4] x 30.
[6]: [3] / [4] x 30.
[7]: The sum of [5] and [6].
[8]: [7] from the current year, less [7] from the previous year.

Table E.12: Delayed Brattle Schedule 12
Changes in Working Capital
($US 2007)

[1]: Table E.1.
[2]: Table E.1.
[3]: The sum of [2].
[4]: Days in each year. See Rosen Schedule 12.
[5]: [1] / [4] x 30.
[6]: [3] / [4] x 30.
[7]: The sum of [5] and [6].
[8]: [7] from the current year, less [7] from the previous year.

Table E.12: Delayed Brattle Schedule 12
Changes in Working Capital
($US 2007)

Sources & Notes:

[1]: Table E.1.
[2]: Table E.1.
[3]: The sum of [2].
[4]: Days in each year. See Rosen Schedule 12.
[5]: [1] / [4] x 30.
[6]: [3] / [4] x 30.
[7]: The sum of [5] and [6].
[8]: [7] from the current year, less [7] from the previous year.

Table E.12: Delayed Brattle Schedule 12
Changes in Working Capital
($US 2007)

Sources & Notes:
[1]: Table E.1.
[2]: Table E.1.
[3]: The sum of [2].
[4]: Days in each year. See Rosen Schedule 12.
[5]: [1] / [4] x 30.
[6]: [3] / [4] x 30.
[7]: The sum of [5] and [6].
[8]: [7] from the current year, less [7] from the previous year.

Table E.12: Delayed Brattle Schedule 12
Changes in Working Capital
($US 2007)

Sources & Notes:

[1]: Table E.1.
[2]: Table E.1.
[3]: The sum of [2].
[4]: Days in each year. See Rosen Schedule 12.
[5]: [1] / [4] x 30.
[6]: [3] / [4] x 30.
[7]: The sum of [5] and [6].
[8]: [7] from the current year, less [7] from the previous year.

Table E.13: SCMA CIF Prices (2007 US$)

Table E.14: Freight Costs
2007 (USD/Tonne)

Source: Marsoft.
Note: Figures are deflated to 2007 values using Marsoft's inflation rate of 2.3%.

Table E.14: Freight Costs
2007 (USD/Tonne)

Source: Marsoft.
Note: Figures are deflated to 2007 values using Marsoft's inflation rate of 2.3%.

Table E.14: Freight Costs
2007 (USD/Tonne)

Source: Marsoft.
Note: Figures are deflated to 2007 values using Marsoft's inflation rate of 2.3%.

Table E.14: Freight Costs
2007 (USD/Tonne)

Source: Marsoft.
Note: Figures are deflated to 2007 values using Marsoft's inflation rate of 2.3%.

Table E.14: Freight Costs
2007 (USD/Tonne)

Source: Marsoft.
Note: Figures are deflated to 2007 values using Marsoft's inflation rate of 2.3%.

Table E.15: Forward FX Rates (October 2007)

		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Foreign Exchange Rate (US$ to C$)	[1]	1.0265	1.0237	1.0234	1.0279	1.0305	1.0346	1.0388	1.0440	1.0492	1.0545	1.0578	1.0611
Years from 2007	[2]	1	2	3	4	5	6	7	8	9	10	11	12
Forward Year	[3]	1Y	2Y	3Y	4Y	5Y	6Y	7Y	8Y	9Y	10Y	-	-

Sources & Notes:

[1]: R-730, Bloomberg FX forward rates. FX rates in years without forward rates are interpolated.

[2]: [Year] - 2007.

[3]: Years beyond 2037 are assigned the 30Y exchange rate.

Table E.15: Forward FX Rates (October 2007)

		2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Foreign Exchange Rate (US$ to C$)	[1]	1.0643	1.0676	1.0708	1.0739	1.0771	1.0802	1.0833	1.0864	1.0936	1.1009	1.1081	1.1153
Years from 2007	[2]	13	14	15	16	17	18	19	20	21	22	23	24
Forward Year	[3]	-	-	15Y	-	-	-	-	20Y	-	-	-	-

Sources & Notes:

[1]: R-730, Bloomberg FX forward rates. FX rates in years without forward rates are interpolated.

[2]: [Year] - 2007.

[3]: Years beyond 2037 are assigned the 30Y exchange rate.

Table E.15: Forward FX Rates (October 2007)

		2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042
Foreign Exchange Rate (US$ to C$)	[1]	1.1225	1.1284	1.1343	1.1402	1.1462	1.1521	1.1521	1.1521	1.1521	1.1521	1.1521
Years from 2007	[2]	25	26	27	28	29	30	31	32	33	34	35
Forward Year	[3]	25Y	-	-	-	-	30Y	30Y	30Y	30Y	30Y	30Y

Sources & Notes:

[1]: R-730, Bloomberg FX forward rates. FX rates in years without forward rates are interpolated.

[2]: [Year] - 2007.

[3]: Years beyond 2037 are assigned the 30Y exchange rate.

Table E.15: Forward FX Rates (October 2007)

		2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053
Foreign Exchange Rate (US$ to C$)	[1]	1.1521	1.1521	1.1521	1.1521	1.1521	1.1521	1.1521	1.1521	1.1521	1.1521	1.1521
Years from 2007	[2]	36	37	38	39	40	41	42	43	44	45	46
Forward Year	[3]	30Y	30Y	30Y	30Y	30Y	30Y	30Y	30Y	30Y	30Y	30Y

Sources & Notes:

[1]: R-730, Bloomberg FX forward rates. FX rates in years without forward rates are interpolated.

[2]: [Year] - 2007.

[3]: Years beyond 2037 are assigned the 30Y exchange rate.

Table E.15: Forward FX Rates (October 2007)

		2054	2055	2056	2057	2058	2059	2060	2061	2062	2063
Foreign Exchange Rate (US$ to C$)	[1]	1.1521	1.1521	1.1521	1.1521	1.1521	1.1521	1.1521	1.1521	1.1521	1.1521
Years from 2007	[2]	47	48	49	50	51	52	53	54	55	56
Forward Year	[3]	30Y	30Y	30Y	30Y	30Y	30Y	30Y	30Y	30Y	30Y

Sources & Notes:

[1]: R-730, Bloomberg FX forward rates. FX rates in years without forward rates are interpolated.

[2]: [Year] - 2007.

[3]: Years beyond 2037 are assigned the 30Y exchange rate.

Table E.16: Cost of Judicial Review

Calculation Step		Value
Judicial Review Costs (2017 C$)	[1]	$130,000
Inflation Adjustment Factor	[2]	0.8569
Judicial Review Costs (2007 C$)	[3]	$111,403
Exchange Rate (2007)	[4]	1.0734
Judicial Review Costs (2007 US$)	[5]	$103,780

Sources & Notes:

[1]: I am instructed that the judicial review would cost between C$105,000 and C$130,000.

[2]: 1 over the product of (1 + Canadian Inflation) ^ n, using Canadian CPI (Bloomberg) from each year from 2007 through 2017, where n is 0.19 for 2007, 0.41 for 2017, and 1 for all years in-between.

[3]: [1] x [2].

[4]: C/US$ foreign exchanges rates, Bloomberg.

[5]: [3] / [4].

Appendix F: Market Data and Comparisons

Table F.1: Historical Aggregate Volumes vs. Whites Point and Belleoram
Short Tons (millions)

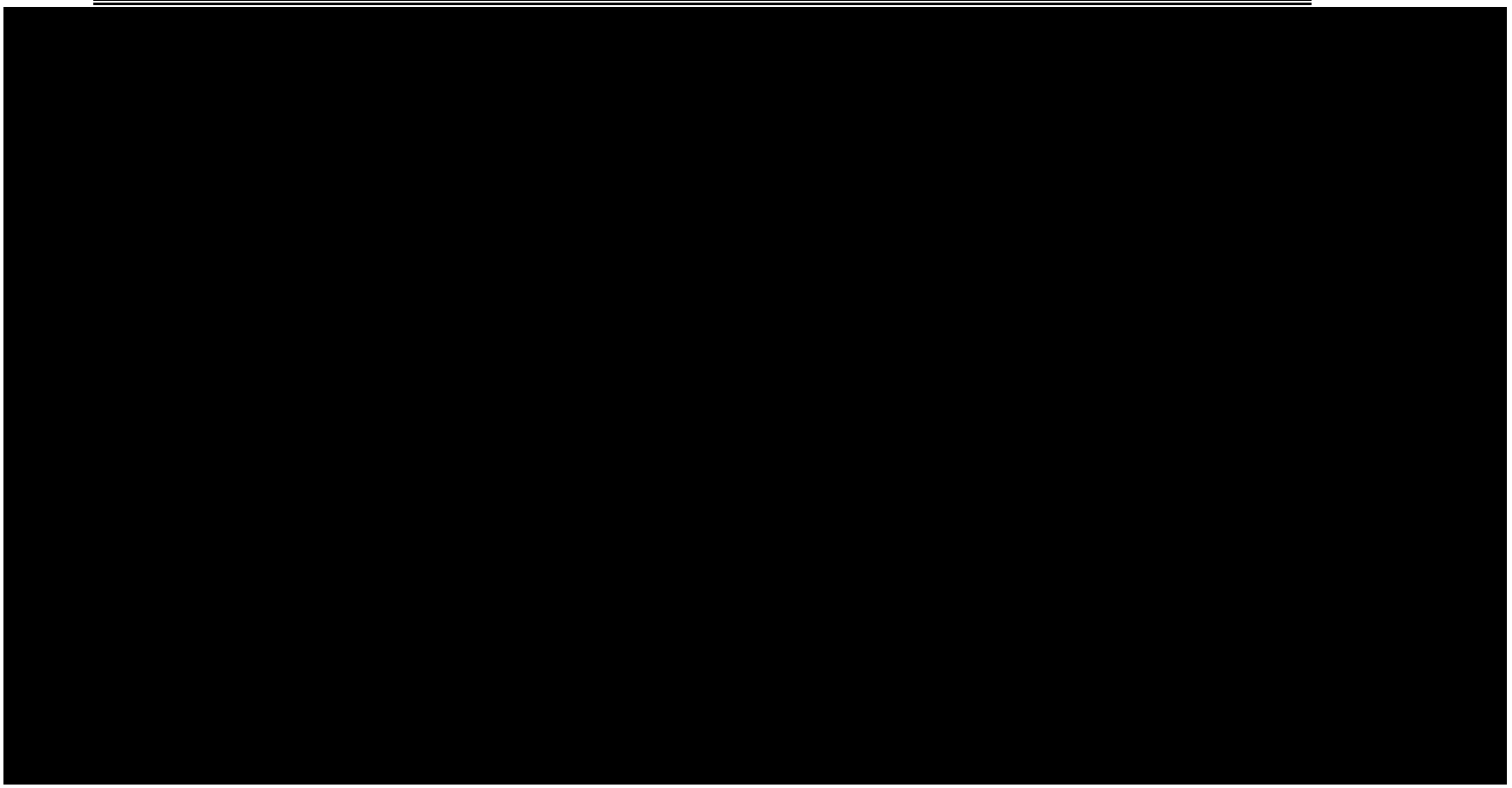


Table F.2: Quantities of HTS Code 25.17.10 Materials Exported from Canada to U.S.

[redacted]

Table F.3: Indexed Values for Whites Point
(Month-End Values)

Table F.4: Vulcan and Martin Marietta Historical Returns

	Vulcan			Martin Marietta				
Month	Stock Price	Quarterly Market Capitalization	Total Return Index	Stock Price	Quarterly Market Capitalization	Total Return Index	Weighted Average Total Return Index	Change in Total Return
[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
Dec-01	$47.94	$4,857.28	47.94	$46.60	$2,262.38	46.60	47.51	-
Jan-02	$46.40	$4,857.28	46.40	$40.77	$2,262.38	40.77	44.61	-6.11%
Feb-02	$48.33	$4,857.28	48.57	$41.75	$2,262.38	41.89	46.44	4.11%
Mar-02	$47.54	$4,821.55	47.77	$42.22	$2,051.01	42.36	46.16	-0.62%
Apr-02	$46.02	$4,821.55	46.24	$38.96	$2,051.01	39.09	44.11	-4.44%
May-02	$47.83	$4,821.55	48.30	$40.00	$2,051.01	40.28	45.90	4.07%
Jun-02	$43.80	$4,445.39	44.23	$39.00	$1,903.94	39.27	42.74	-6.89%
Jul-02	$40.44	$4,445.39	40.84	$38.33	$1,903.94	38.59	40.16	-6.03%
Aug-02	$39.02	$4,445.39	39.64	$36.64	$1,903.94	37.04	38.86	-3.24%
Sep-02	$36.16	$3,670.96	36.73	$32.57	$1,590.10	32.93	35.58	-8.43%
Oct-02	$33.56	$3,670.96	34.09	$27.84	$1,590.10	28.15	32.30	-9.24%
Nov-02	$37.74	$3,670.96	38.58	$31.52	$1,590.10	32.02	36.60	13.31%
Dec-02	$37.50	$3,808.39	38.33	$30.66	$1,497.50	31.14	36.30	-0.80%
Jan-03	$34.05	$3,808.39	34.81	$29.20	$1,497.50	29.66	33.35	-8.13%
Feb-03	$31.70	$3,808.39	32.65	$27.58	$1,497.50	28.17	31.39	-5.89%
Mar-03	$30.23	$3,069.68	31.14	$27.61	$1,350.16	28.20	30.24	-3.65%
Apr-03	$34.97	$3,069.68	36.02	$29.57	$1,350.16	30.20	34.24	13.24%
May-03	$36.64	$3,069.68	38.00	$34.21	$1,350.16	35.12	37.12	8.39%
Jun-03	$37.07	$3,766.61	38.44	$33.61	$1,644.20	34.51	37.25	0.34%
Jul-03	$40.22	$3,766.61	41.71	$38.30	$1,644.20	39.32	40.98	10.03%
Aug-03	$41.41	$3,766.61	43.20	$38.23	$1,644.20	39.44	42.05	2.61%
Sep-03	$39.91	$4,058.81	41.63	$36.45	$1,783.50	37.60	40.40	-3.93%
Oct-03	$44.31	$4,058.81	46.22	$40.97	$1,783.50	42.26	45.01	11.42%
Nov-03	$44.47	$4,058.81	46.64	$42.57	$1,783.50	44.10	45.87	1.90%
Dec-03	$47.57	$4,843.15	49.90	$46.97	$2,286.03	48.66	49.50	7.92%
Jan-04	$47.70	$4,843.15	50.03	$46.00	$2,286.03	47.65	49.27	-0.46%
Feb-04	$47.30	$4,843.15	49.89	$49.09	$2,286.03	51.04	50.25	2.00%

Table F.4: Vulcan and Martin Marietta Historical Returns

	Vulcan			Martin Marietta				
Month	Stock Price	Quarterly Market Capitalization	Total Return Index	Stock Price	Quarterly Market Capitalization	Total Return Index	Weighted Average Total Return Index	Change in Total Return
[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
Mar-04	$47.44	$4,843.81	50.03	$46.16	$2,225.34	47.99	49.39	-1.72%
Apr-04	$46.24	$4,843.81	48.77	$43.25	$2,225.34	44.97	47.57	-3.68%
May-04	$44.76	$4,843.81	47.48	$42.83	$2,225.34	44.72	46.61	-2.02%
Jun-04	$47.55	$4,861.80	50.44	$44.33	$2,137.80	46.28	49.17	5.49%
Jul-04	$47.62	$4,861.80	50.51	$43.75	$2,137.80	45.68	49.04	-0.27%
Aug-04	$47.67	$4,861.80	50.84	$44.99	$2,137.80	47.18	49.72	1.40%
Sep-04	$50.95	$5,217.69	54.34	$45.27	$2,174.04	47.48	52.32	5.22%
Oct-04	$49.78	$5,217.69	53.09	$45.53	$2,174.04	47.75	51.52	-1.53%
Nov-04	$51.85	$5,217.69	55.58	$50.25	$2,174.04	52.91	54.79	6.35%
Dec-04	$54.61	$5,606.21	58.54	$53.66	$2,538.44	56.50	57.90	5.67%
Jan-05	$56.48	$5,606.21	60.54	$54.02	$2,538.44	56.88	59.40	2.59%
Feb-05	$57.86	$5,606.21	62.33	$57.68	$2,538.44	60.94	61.90	4.21%
Mar-05	$56.83	$5,803.40	61.22	$55.92	$2,606.44	59.08	60.56	-2.16%
Apr-05	$53.04	$5,803.40	57.14	$54.99	$2,606.44	58.10	57.44	-5.16%
May-05	$59.93	$5,803.40	64.87	$61.05	$2,606.44	64.71	64.82	12.86%
Jun-05	$64.99	$6,647.78	70.35	$69.12	$3,200.46	73.27	71.30	9.99%
Jul-05	$70.24	$6,647.78	76.03	$72.69	$3,200.46	77.05	76.36	7.11%
Aug-05	$71.85	$6,647.78	78.09	$72.32	$3,200.46	76.90	77.70	1.76%
Sep-05	$74.21	$7,557.12	80.66	$78.46	$3,637.68	83.43	81.56	4.96%
Oct-05	$65.00	$7,557.12	70.65	$78.91	$3,637.68	83.91	74.96	-8.09%
Nov-05	$66.70	$7,557.12	72.81	$75.11	$3,637.68	80.11	75.18	0.30%
Dec-05	$67.75	$6,797.09	73.96	$76.72	$3,508.18	81.83	76.64	1.93%
Jan-06	$71.88	$6,797.09	78.46	$84.78	$3,508.18	90.43	82.54	7.70%
Feb-06	$79.00	$6,797.09	86.64	$97.50	$3,508.18	104.24	92.63	12.23%
Mar-06	$86.65	$8,717.70	95.03	$107.03	$4,893.52	114.43	102.00	10.12%
Apr-06	$84.96	$8,717.70	93.18	$106.16	$4,893.52	113.50	100.48	-1.49%
May-06	$78.05	$8,717.70	86.00	$91.51	$4,893.52	98.08	90.35	-10.09%

Table F.4: Vulcan and Martin Marietta Historical Returns

	Vulcan			Martin Marietta				
Month	Stock Price	Quarterly Market Capitalization	Total Return Index	Stock Price	Quarterly Market Capitalization	Total Return Index	Weighted Average Total Return Index	Change in Total Return
[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
Jun-06	$78.00	$7,526.69	85.95	$91.15	$4,132.10	97.70	90.11	-0.26%
Jul-06	$66.97	$7,526.69	73.79	$80.52	$4,132.10	86.30	78.23	-13.19%
Aug-06	$78.61	$7,526.69	87.03	$82.36	$4,132.10	88.57	87.57	11.95%
Sep-06	$78.25	$7,388.65	86.63	$84.62	$3,817.29	91.00	88.12	0.62%
Oct-06	$81.48	$7,388.65	90.21	$88.00	$3,817.29	94.64	91.71	4.08%
Nov-06	$88.72	$7,388.65	98.63	$99.31	$3,817.29	107.09	101.51	10.68%
Dec-06	$89.87	$8,502.24	99.91	$103.91	$4,660.47	112.05	104.21	2.66%
Jan-07	$101.84	$8,502.24	113.22	$115.42	$4,660.47	124.47	117.20	12.47%
Feb-07	$116.65	$8,502.24	130.19	$125.32	$4,660.47	135.44	132.05	12.67%
Mar-07	$116.48	$11,099.46	130.00	$135.20	$5,799.94	146.12	135.53	2.64%
Apr-07	$123.67	$11,099.46	138.03	$145.82	$5,799.94	157.59	144.74	6.80%
May-07	$119.69	$11,099.46	134.10	$155.44	$5,799.94	168.29	145.83	0.75%
Jun-07	$114.54	$10,944.34	128.33	$162.02	$6,771.14	175.41	146.32	0.34%
Jul-07	$95.72	$10,944.34	107.24	$137.00	$6,771.14	148.32	122.94	-15.98%
Aug-07	$90.01	$10,944.34	101.36	$135.00	$6,771.14	146.53	118.63	-3.51%
Sep-07	$89.15	$8,521.90	100.39	$133.55	$5,590.14	144.96	118.05	-0.49%
Oct-07	$85.51	$8,521.90	96.29	$129.35	$5,590.14	140.40	113.76	-3.63%
Nov-07	$88.80	$8,521.90	100.52	$134.55	$5,590.14	146.42	118.70	4.34%
Dec-07	$79.09	$8,560.23	89.52	$132.60	$5,478.77	144.30	110.90	-6.57%
Jan-08	$78.25	$8,560.23	88.57	$123.28	$5,478.77	134.15	106.36	-4.09%
Feb-08	$70.10	$8,560.23	79.90	$107.60	$5,478.77	117.47	94.56	-11.09%
Mar-08	$66.40	$7,266.89	75.69	$106.17	$4,387.58	115.91	90.83	-3.95%
Apr-08	$68.82	$7,266.89	78.44	$109.38	$4,387.58	119.41	93.87	3.35%
May-08	$76.93	$7,266.89	88.25	$116.69	$4,387.58	127.77	103.12	9.86%
Jun-08	$59.78	$6,565.89	68.57	$103.59	$4,282.83	113.42	86.28	-16.33%
Jul-08	$64.19	$6,565.89	73.63	$104.97	$4,282.83	114.93	89.94	4.24%
Aug-08	$74.84	$6,565.89	86.41	$112.90	$4,282.83	124.05	101.27	12.60%

Table F.4: Vulcan and Martin Marietta Historical Returns

	Vulcan			Martin Marietta				
Month	Stock Price	Quarterly Market Capitalization	Total Return Index	Stock Price	Quarterly Market Capitalization	Total Return Index	Weighted Average Total Return Index	Change in Total Return
[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
Sep-08	$74.50	$8,205.86	86.02	$111.98	$4,638.77	123.04	99.39	-1.86%
Oct-08	$54.28	$8,205.86	62.67	$78.38	$4,638.77	86.12	71.14	-28.42%
Nov-08	$59.98	$8,205.86	69.82	$87.64	$4,638.77	96.74	79.54	11.81%
Dec-08	$69.58	$7,672.59	80.99	$97.08	$4,025.13	107.16	90.00	13.15%
Jan-09	$49.46	$7,672.59	57.57	$80.52	$4,025.13	88.88	68.35	-24.06%
Feb-09	$41.41	$7,672.59	48.77	$76.56	$4,025.13	84.95	61.22	-10.42%
Mar-09	$44.29	$4,896.56	52.17	$79.30	$3,530.28	87.99	67.17	9.72%
Apr-09	$47.55	$4,896.56	56.01	$84.03	$3,530.28	93.24	71.60	6.59%
May-09	$44.29	$4,896.56	52.74	$81.47	$3,530.28	90.40	68.52	-4.31%
Jun-09	$43.10	$5,387.04	51.33	$78.88	$3,519.07	87.97	65.80	-3.96%
Jul-09	$47.48	$5,387.04	56.54	$86.07	$3,519.07	95.99	72.13	9.61%
Aug-09	$50.04	$5,387.04	59.89	$87.58	$3,519.07	98.12	74.99	3.97%
Sep-09	$54.07	$6,780.42	64.71	$92.07	$4,109.64	103.15	79.22	5.63%
Oct-09	$46.03	$6,780.42	55.09	$83.32	$4,109.64	93.34	69.53	-12.23%
Nov-09	$48.48	$6,780.42	58.32	$85.29	$4,109.64	96.00	72.54	4.34%
Dec-09	$52.67	$6,631.79	63.36	$89.41	$4,059.12	100.64	77.51	6.86%
Jan-10	$44.19	$6,631.79	53.16	$79.18	$4,059.12	89.12	66.81	-13.80%
Feb-10	$43.41	$6,631.79	52.52	$79.22	$4,059.12	89.62	66.61	-0.31%
Mar-10	$47.24	$6,032.22	57.16	$83.55	$3,793.42	94.52	71.58	7.47%
Apr-10	$57.28	$6,032.22	69.30	$95.88	$3,793.42	108.46	84.42	17.94%
May-10	$50.48	$6,032.22	61.38	$93.23	$3,793.42	105.47	78.40	-7.13%
Jun-10	$43.83	$5,622.05	53.29	$84.81	$3,860.55	96.39	70.84	-9.64%
Jul-10	$45.24	$5,622.05	55.01	$85.40	$3,860.55	97.06	72.13	1.82%
Aug-10	$36.76	$5,622.05	45.00	$73.20	$3,860.55	83.65	60.74	-15.80%
Sep-10	$36.92	$4,740.20	45.20	$76.97	$3,504.37	87.96	63.37	4.34%
Oct-10	$36.51	$4,740.20	44.69	$80.48	$3,504.37	91.97	64.79	2.23%
Nov-10	$40.12	$4,740.20	49.42	$84.54	$3,504.37	97.07	69.67	7.54%

Table F.4: Vulcan and Martin Marietta Historical Returns

	Vulcan			Martin Marietta				
Month	Stock Price	Quarterly Market Capitalization	Total Return Index	Stock Price	Quarterly Market Capitalization	Total Return Index	Weighted Average Total Return Index	Change in Total Return
[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
Dec-10	$44.36	$5,703.37	54.64	$92.24	$4,204.21	105.91	76.40	9.65%
Jan-11	$42.56	$5,703.37	52.43	$83.50	$4,204.21	95.87	70.86	-7.24%
Feb-11	$45.85	$5,703.37	56.79	$88.86	$4,204.21	102.49	76.18	7.50%
Mar-11	$45.60	$5,887.28	56.48	$89.67	$4,087.97	103.42	75.71	-0.61%
Apr-11	$45.20	$5,887.28	55.98	$91.19	$4,087.97	105.18	76.14	0.56%
May-11	$40.49	$5,887.28	50.46	$85.66	$4,087.97	99.26	70.46	-7.47%
Jun-11	$38.53	$4,979.00	48.01	$79.97	$3,653.11	92.67	66.91	-5.03%
Jul-11	$34.29	$4,979.00	42.73	$75.62	$3,653.11	87.62	61.73	-7.74%
Aug-11	$35.03	$4,979.00	43.96	$70.83	$3,653.11	82.54	60.29	-2.34%
Sep-11	$27.56	$3,561.66	34.59	$63.22	$2,888.96	73.67	52.09	-13.60%
Oct-11	$31.29	$3,561.66	39.27	$72.17	$2,888.96	84.10	59.35	13.93%
Nov-11	$32.44	$3,561.66	40.73	$78.26	$2,888.96	91.66	63.54	7.06%
Dec-11	$39.35	$5,085.79	49.40	$75.41	$3,448.20	88.32	65.13	2.50%
Jan-12	$43.86	$5,085.79	55.06	$82.51	$3,448.20	96.64	71.86	10.34%
Feb-12	$44.56	$5,085.79	55.96	$85.87	$3,448.20	101.04	74.17	3.22%
Mar-12	$42.73	$5,528.80	53.66	$85.63	$3,916.89	100.76	73.19	-1.33%
Apr-12	$42.81	$5,528.80	53.76	$82.88	$3,916.89	97.53	71.91	-1.75%
May-12	$34.65	$5,528.80	43.51	$67.47	$3,916.89	79.86	58.58	-18.53%
Jun-12	$39.71	$5,138.19	49.88	$78.82	$3,612.95	93.30	67.80	15.74%
Jul-12	$38.74	$5,138.19	48.66	$75.14	$3,612.95	88.94	65.29	-3.71%
Aug-12	$38.92	$5,138.19	48.90	$76.38	$3,612.95	90.88	66.23	1.44%
Sep-12	$47.30	$6,129.91	59.43	$82.87	$3,804.40	98.61	74.43	12.38%
Oct-12	$45.97	$6,129.91	57.76	$82.31	$3,804.40	97.94	73.14	-1.73%
Nov-12	$52.84	$6,129.91	66.40	$90.00	$3,804.40	107.57	82.16	12.33%
Dec-12	$52.05	$6,751.98	65.41	$94.28	$4,337.07	112.68	83.90	2.11%
Jan-13	$56.56	$6,751.98	71.07	$98.73	$4,337.07	118.00	89.43	6.59%
Feb-13	$50.93	$6,751.98	64.01	$97.13	$4,337.07	116.56	84.57	-5.44%

Table F.4: Vulcan and Martin Marietta Historical Returns

	Vulcan			Martin Marietta				
Month	Stock Price	Quarterly Market Capitalization	Total Return Index	Stock Price	Quarterly Market Capitalization	Total Return Index	Weighted Average Total Return Index	Change in Total Return
[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
Mar-13	$51.70	$6,718.52	64.98	$102.02	$4,699.18	122.43	88.62	4.80%
Apr-13	$49.88	$6,718.52	62.69	$100.99	$4,699.18	121.20	86.77	-2.09%
May-13	$53.58	$6,718.52	67.35	$109.03	$4,699.18	131.33	93.68	7.97%
Jun-13	$48.41	$6,291.51	60.86	$98.42	$4,550.15	118.55	85.07	-9.20%
Jul-13	$47.18	$6,291.51	59.31	$99.60	$4,550.15	119.97	84.77	-0.35%
Aug-13	$47.80	$6,291.51	60.10	$96.05	$4,550.15	116.17	83.63	-1.34%
Sep-13	$51.81	$6,734.73	65.14	$98.17	$4,540.17	118.74	86.72	3.69%
Oct-13	$53.55	$6,734.73	67.33	$98.09	$4,540.17	118.64	87.99	1.46%
Nov-13	$56.37	$6,734.73	70.89	$96.56	$4,540.17	117.27	89.57	1.79%
Dec-13	$59.42	$7,736.48	74.72	$99.94	$4,623.32	121.38	92.18	2.91%
Jan-14	$61.73	$7,736.48	77.63	$109.01	$4,623.32	132.39	98.11	6.44%
Feb-14	$67.93	$7,736.48	85.49	$121.98	$4,623.32	148.63	109.11	11.21%
Mar-14	$66.45	$8,691.79	83.63	$128.35	$5,949.41	156.39	113.20	3.75%
Apr-14	$64.53	$8,691.79	81.21	$124.33	$5,949.41	151.50	109.77	-3.03%
May-14	$60.97	$8,691.79	76.79	$122.80	$5,949.41	150.12	106.59	-2.90%
Jun-14	$63.75	$8,345.51	80.29	$132.05	$6,126.46	161.43	114.64	7.55%
Jul-14	$63.13	$8,345.51	79.51	$124.23	$6,126.46	151.87	110.14	-3.92%
Aug-14	$63.38	$8,345.51	79.90	$130.96	$6,126.46	160.58	114.06	3.55%
Sep-14	$60.23	$7,932.47	75.93	$128.94	$8,672.25	158.11	118.85	4.20%
Oct-14	$61.71	$7,932.47	77.80	$116.92	$8,672.25	143.37	112.04	-5.73%
Nov-14	$66.10	$7,932.47	83.41	$120.04	$8,672.25	147.68	116.98	4.40%
Dec-14	$65.73	$8,670.25	82.94	$110.32	$7,423.76	135.73	107.29	-8.28%
Jan-15	$70.51	$8,670.25	88.97	$107.74	$7,423.76	132.55	109.07	1.66%
Feb-15	$83.00	$8,670.25	104.86	$142.33	$7,423.76	175.60	137.49	26.05%
Mar-15	$84.30	$11,183.24	106.50	$139.80	$9,433.01	172.48	136.69	-0.58%
Apr-15	$85.52	$11,183.24	108.04	$142.65	$9,433.01	175.99	139.13	1.79%
May-15	$89.93	$11,183.24	113.74	$149.01	$9,433.01	184.33	146.04	4.96%

Table F.4: Vulcan and Martin Marietta Historical Returns

	Vulcan			Martin Marietta				
Month	Stock Price	Quarterly Market Capitalization	Total Return Index	Stock Price	Quarterly Market Capitalization	Total Return Index	Weighted Average Total Return Index	Change in Total Return
[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
Jun-15	$83.93	$11,161.35	106.15	$141.51	$8,986.59	175.06	136.89	-6.27%
Jul-15	$91.02	$11,161.35	115.12	$156.82	$8,986.59	194.00	150.30	9.80%
Aug-15	$93.62	$11,161.35	118.54	$167.80	$8,986.59	208.07	158.47	5.44%
Sep-15	$89.20	$11,891.70	112.94	$151.95	$10,049.97	188.42	147.51	-6.92%
Oct-15	$96.58	$11,891.70	122.28	$155.15	$10,049.97	192.39	154.39	4.67%
Nov-15	$102.67	$11,891.70	130.12	$157.40	$10,049.97	195.67	160.15	3.73%
Dec-15	$94.97	$12,647.34	120.36	$136.58	$8,806.54	169.79	140.65	-12.17%
Jan-16	$88.20	$12,647.34	111.78	$125.58	$8,806.54	156.12	129.98	-7.59%
Feb-16	$98.53	$12,647.34	125.13	$142.62	$8,806.54	177.80	146.75	12.90%
Mar-16	$105.57	$14,077.55	134.07	$159.51	$10,129.68	198.85	161.18	9.83%
Apr-16	$107.63	$14,077.55	136.68	$169.23	$10,129.68	210.97	167.77	4.09%
May-16	$116.75	$14,077.55	148.52	$189.04	$10,129.68	236.16	185.19	10.39%
Jun-16	$120.36	$16,011.13	153.11	$192.00	$12,178.94	239.86	190.59	2.91%
Jul-16	$123.98	$16,011.13	157.72	$202.65	$12,178.94	253.17	198.95	4.39%
Aug-16	$113.87	$16,011.13	145.11	$183.03	$12,178.94	229.18	181.43	-8.81%
Sep-16	$113.73	$15,047.50	144.93	$179.11	$11,367.40	224.27	179.07	-1.30%
Oct-16	$113.20	$15,047.50	144.26	$185.38	$11,367.40	232.12	182.07	1.67%
Nov-16	$125.65	$15,047.50	160.38	$219.45	$11,367.40	275.31	209.84	15.25%
Dec-16	$125.15	$16,562.23	159.74	$221.53	$13,995.38	277.92	213.86	1.92%

Source: R-747, Bloomberg, accessed 12 May 2017.

[1]: The month for which all other figures are reported.

[2] & [5]: The closing price at the end of [1].

[3] & [6]: Market capitalization at quarter end.

[4] & [7]: Bloomberg Total Return Index (Gross Dividends) for each company.

[8]: Total return index of Martin Marietta and Vulcan, weighted by market capitalization. [3] / ([3] + [6]) * [4] plus [6] / ([3] + [6]) * [7].

[9]: The month over month change in [8].

Table F.5: Mr. Rosen's Annual Net Cash Flows in U.S. Dollars During the Past Lost Profits Period (millions)

Source: Table F.6.

Table F.6: Corrected Pre-Award Interest Calculation

Total Pre-Award Interest	($358,972)

Sources & Notes:

[2]: Cash flows as stated in Rosen Report, Schedule 13, C-1095.

[3]: Average 1-Year U.S. Constant Maturity Treasury Rate, as stated in Rosen Report, Schedule 13, C-1095.

[4]: 100% plus the sum of [3] in all years after and including [1].

[5]: 100% plus the sum of [3] in all years after [1], multiplied by (1 plus [3] / 2).

[6]: [2] x ([5] - 1).

Table F.7: Discounting of Rosen Lost Profits to Breach Date

Rosen WACC: 5.78% [1]

	Cash Flow	Discount Factor	Discounted Cash Flow
[redacted]			

Source: Rosen Schedule 1, Exhibit C-1095.
Notes:
[4]: [2] x [3].

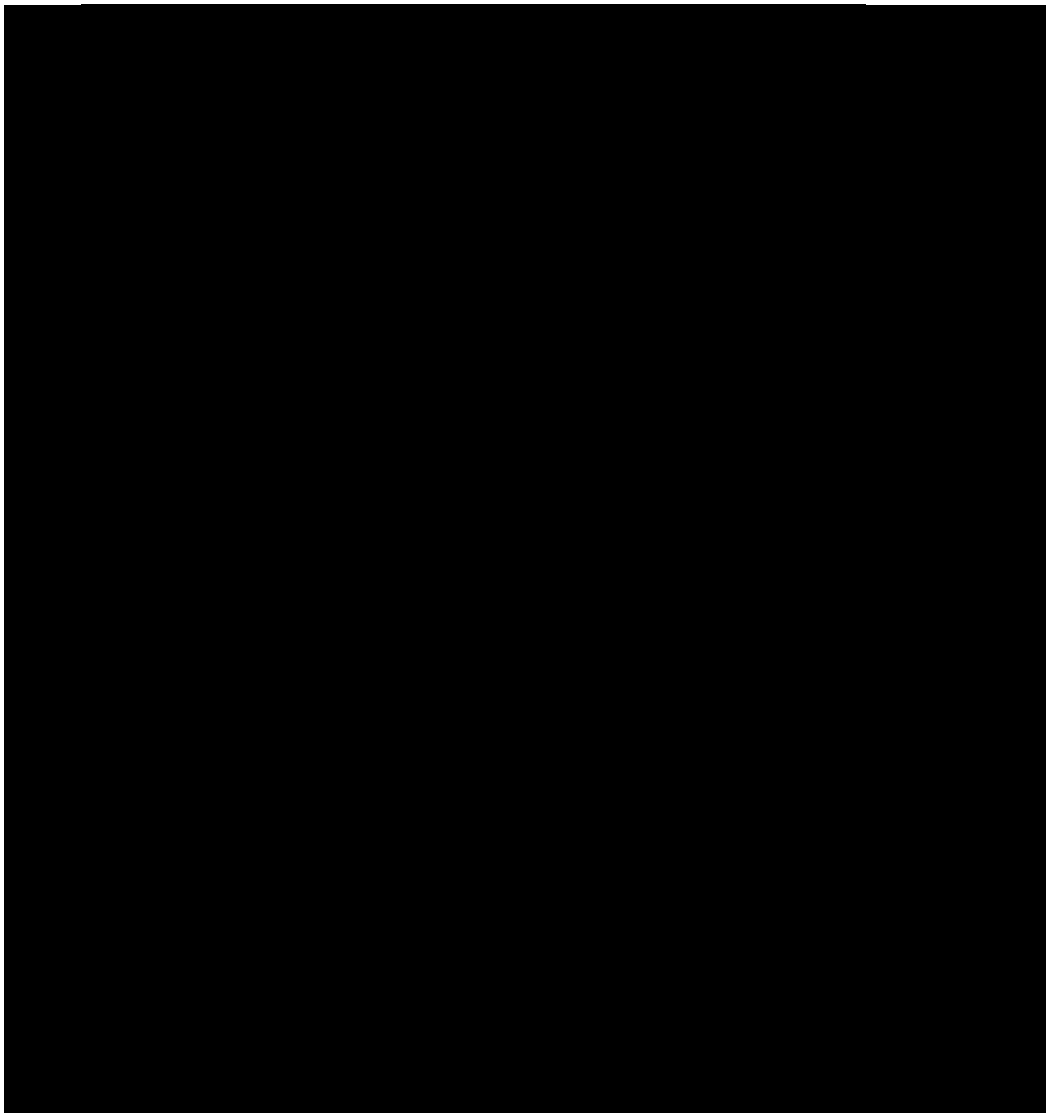
Table F.8: Annual Production Over Quarry Life
EIS vs. Rosen Report (short tons)

Sources: First Expert Report of Howard Rosen, Schedule 2, Exhibit C-1095;
17 November 2006 Revised EIS Project Description, p. 96, Exhibit C-147.

Notes:

[3]

Table F.9: Comparison of Fougere's Labor Costs to Contemporaneous Planning Documents



Source: Fougere Exhibit 12 and Expert Report of Darrell Chodorow.
[1], [2], [4]: Fougere, Exhibit 12.
[3]: Chodorow Report, Section V. E.
[5]: [3] x 6 x 8.
[6]: [4] x 6 x 8.
[7]: Chodorow Report, Section V.E.
[8]: [1] x [5].
[9]: [2] x [6].
[10]: [1] x [7].
[11]: The sum of [8] through [10].
[12]: Fougere Exhibit 11, p.4.
[13]: [12] / [11].
[14], [15]: Fougere, Exhibit 11, p. 4 and Table D.2.
[16]: [8] x [14] + [9] x [15].
[17]: [10] x [14] x 1 5.
[18]: [16] + [17].
[19]: Fougere, Exhibit 12.
[20]: [18] x [19].
[21]: Chodorow Report, Section V.E.
[22]: [18] + [20] + [21].
[23]: [22] / [12].

Appendix G: Discount Rate as of 22 October 2007

1. The appropriate discount rate to use in valuing Whites Point is the project's cost of capital. The cost of capital that I use is the weighted-average cost of capital ("WACC"). The WACC is the combination of a project's cost of debt capital and cost of equity capital, weighted by the proportion of each component in the capital structure. This is the same general approach used by Mr. Rosen to derive the discount rate used in his report.[1] However, as I discuss below, I make some corrections to his implementation and also estimate the discount rate for October 2007 rather than November 2015. The resulting real discount rate is 6.75%.

A. The Cost of Equity

2. The cost of equity is commonly estimated using the Capital Asset Pricing Model ("CAPM"), which draws on the risk profile of comparable companies. This approach estimates the cost of equity for an asset based on the expected return that investors require for investing in other assets of similar risk. The CAPM calculates the cost of equity capital as the expected return on risk-free assets plus a premium, measuring the systematic risk of a security relative to that of the overall stock market. The CAPM can be expressed by the following formula:

$$\text{Cost of Equity} = \text{Risk Free Rate} + \text{Beta} \times \text{Equity Risk Premium}.$$

3. The first component of cost of equity is the Risk Free Rate. In practice, the risk-free rate is estimated based on U.S. Treasury securities. It is fairly typical for practitioners to use a risk-free rate based on the market yield of Treasury Bonds with 10 to 20-year horizons. Mr. Rosen elects to use a 30-year Treasury Bond,[2] but so long as the equity risk premium, which I will discuss below, is calculated consistent with the Treasury Bond selected, different terms can be reasonable. Here I use the yield from a 20-year Treasury Bond.

---

1 **C-1095**, FTI Native DCF Model, Schedule 14.

2 **C-1095**, FTI Native DCF Model, Schedule 14.

4. The second component is the "beta," which measures the systematic risk of a security relative to risk of the market portfolio as a whole.[3] Beta is estimated using statistical analysis to understand the relationship between the returns of an asset and those of the overall market. The beta represents a relative measure of risk. For example, the risk premium for an asset with a beta of 0.5 is half as large as the risk premium for the overall market, while the risk premium for an asset with a beta of 2.0 is twice that of the market as a whole.

5. The assets used to measure beta here are publicly traded companies with businesses that are similar to Whites Point. Mr. Rosen's sample includes companies with a focus on the broader construction materials business.[4] All else equal, it is preferable to use companies that have greater comparability, but given that there are only two companies that are primarily aggregates focused, it is not unreasonable to use the broader group identified by Mr. Rosen. The typical practice for estimating the returns on the market as a whole is to use a broad-based equity index, such as the S&P 500 stock index, to reflect the market. That is what I do here.

6. Like Mr. Rosen, I use betas based on five years of historical return data for the comparable companies and S&P 500 index from Capital IQ.[5] The beta is typically estimated as of the valuation date. This is a place where my analysis diverges from that of Mr. Rosen. Mr. Rosen estimated beta as of November 2016, but I estimate beta as of the date of the breach.[6]

7. The risk of an equity stake in a business is a function of the risk of the assets held by the business, but also how those assets are financed. Companies that have a greater proportion of debt financing in their capital structure will have greater risk and therefore have a higher beta, all else equal. Therefore, one must adjust for differences in leverage. I have applied a similar approach to account for leverage as does Mr. Rosen with the exception

---

[3] The "market portfolio" consists of a representative pool of risky assets in the economy, each weighted in proportion to its outstanding market value. A beta of one indicates that the asset closely follows the market's ups and downs over a long period of time, such that if the market went up by one percent, the asset would be expected to go up by one percent, and vice versa. A beta greater than one means that the asset is riskier than the market, so that if the market went up by one percent, the asset would be expected to move up by more than one percent, and vice versa.

[4] **C-1095**, FTI Native DCF Model, Schedule 15.

[5] See Appendix G and **C-1095**, FTI Native DCF Model, Schedules 14 and 15.

[6] **C-1095**, FTI Native DCF Model, Schedule 15; Appendix G, Table G.1.

that I have corrected Mr. Rosen's failure to use 5-year average debt-to-equity ratios in his calculation of unlevered 5-year betas.[7] Adjusting for leverage I use the median beta among the sample of comparable companies. After re-levering the median beta, I arrive at its value of 1.08.[8] This outcome is somewhat lower than Mr. Rosen's beta of 1.29, therefore requiring a lower cost of equity, all else equal.[9]

8. The third key component of the CAPM is the Equity Risk Premium ("ERP"), sometimes referred to as the Market Risk Premium ("MRP"). The ERP represents the additional return an investor expects to receive over and above the risk-free rate to compensate for the additional risks associated with investing the market as a whole, which is represented by an equity index like the S&P 500. The ERP premium cannot be directly observed and has been an area of significant debate in the area of corporate finance for decades. Numerous papers have been written on the topic, but there is yet to be a consensus.

9. Mr. Rosen cites to a measure of the ERP from Professor Aswath Damodaran of New York University.[10] He cites a single specific number, but even Professor Damodaran recognizes that there are multiple approaches that could be used.[11] The variety of different ways to estimate the ERP is reflected in the many different options which once can choose in the spreadsheet from Professor Damodaran that Mr. Rosen has elected to use.

10. The ERP typically used around the time was between about 5% and 7%.[12] I use an ERP of 5.0%. A higher ERP would reduce the present value of the Project's potential profits, making this the most conservative point in the range.

11. Like Mr. Rosen, I do not apply any country risk premium or size premium in my analysis.

12. The resulting cost of equity used in my analysis is 10.1%.

---

7 **C-1095,** FTI Native DCF Model, Schedules 14 and 15; Appendix G, Table G.2.

8 See Appendix G, Table G.1 [3].

9 **C-1095**, FTI Native DCF Model, Schedule 14.

10 **C-1095**, FTI Native DCF Model, Schedule 14.

11 For example, Professor Damodaran reports four different ERP estimates for November 2016 (ERP Trailing Twelve Months, ERP Smoothed, ERP Normalized, and ERP Net Cash Yield), and these figures range from 4.6% to 6.4%. See **R-734**, Aswath Damodaran, ERP Estimates By Month (2008-2017), accessed 5 May 2017, http://www.stern.nyu.edu/~adamodar/pc/implprem/ERPbymonth.xls.

12 **R-735**, The Most Important Number in Finance: The Quest for the Market Risk Premium, JP Morgan, May 2008, p. 2. It is generally recognized that the ERP can vary somewhat over time.

B. The Cost of Debt

13. The next ingredient for the calculation of the WACC is the cost of debt. Mr. Rosen uses an embedded cost of debt which is an incorrect measure of borrowing costs for reasons discussed in Section V.E.2. I use a borrowing cost based on the yields of bonds with an investment grade rating of Baa, which is roughly consistent with the debt ratings of the rated comparable companies.[13] As of 22 October 2007, this cost was approximately 6.6%.[14] I use the same tax rate of 31% as Mr. Rosen, which results in an after-tax cost of debt of 4.55%.[15]

14. Based on the set of comparable companies, I arrive at median debt to capital structure of 16.3%. The value is similar to that of Mr. Rosen.

C. Converting from a Nominal to Real Discount Rate

15. The resulting nominal discount rate from my calculation is 9.2%.

16. Mr. Rosen uses a short-term inflation projection to convert his nominal discount rate into real terms.[16] As discussed in Section V.E.2, the U.S. Federal Reserve publishes an expected longer-term inflation rate implied by the yields on U.S. Treasury Bonds. As of 22 October 2007, the expected inflation rate implied by the yields on U.S. Treasury Securities was 2.31%.[17]

17. I convert this nominal discount rate into a real discount rate using the Fisher equation. The resulting real discount rate is 6.75%.

---

[13] See Appendix G, Table G.1 [8] and **R-736**, Moody's Long Term Ratings of Martin Marietta and Vulcan Materials, Bloomberg, accessed 25 April 2017.

[14] **R-737**, "Moody's Seasoned Baa Corporate Bond Yield, Percent, Monthly, Not Seasonally Adjusted," Federal Reserve Bank of St. Louis, September 2007, accessed 12 April 2017, https://fred.stlouisfed.org/series/BAA.

[15] See Rosen Report, Note [5] of Schedule 11.

[16] **C-1095**, FTI Native DCF Model, Schedule 14.

[17] **R-687**, "10-Year Breakeven Inflation Rate, Percent, Daily, Not Seasonally Adjusted", Federal Reserve Bank of St. Louis, 22 October 2007, accessed 12 April 2017, https://fred.stlouisfed.org/series/T10YIE.

Table G.1:
Cost of Capital - 22 October 2007

Risk-Free Rate (%)	[1]	4.73
Median 5-Year Beta (Unlevered)	[2]	0.95
Median 5-Year Monthly Beta (Re-levered)	[3]	1.08
Equity Risk Premium (%)	[4]	5.00
Effective Tax Rate (%)	[5]	31.00
Median Debt to Capital (%)	[6]	16.29
Cost of Equity (%)	[7]	10.13
Cost of Debt (%)		
Average Cost of Debt of Comparable Companies	[8]	6.59
After-Tax Average Cost of Debt of Comparables	[9]	4.55
Cost of Capital (Nominal) (%)	[10]	9.22
Forecasted Inflation Rate (%)	[11]	2.31
Cost of Capital (Real) (%)	[12]	6.75

Sources and Notes:

[1]: R-742, 20-Year Treasury Constant Maturity Rate (GS20) on 22 October 2007. Federal Reserve Economic Data. Accessed 20 May 2017.

[2]: September 2007 median five-year monthly unlevered beta of Martin Marietta, United States Lime and Minerals, Eagle Materials, and Vulcan Materials. Table G.2.

[3]: [2] x (1 + (1 - [5] / 100) x (([6] / 100) / (1 - [6] / 100))).

[4]: Considered equity risk premium.

[5]: Expected tax rate for 2012-2016. Rosen Report, Schedule 11, C-1095.

[6]: Median September 2007 debt to capital ratio of Martin Marietta, Vulcan, United States Lime & Minerals, and Eagle Materials. Table G.3 through G.4. Capital IQ. Accessed 22 May 2017. Table G.3.

[7]: [1] + [3] x [4].

[8]: R-737, September 2007 Moody's seasoned BAA yield on seasoned corporate bonds, all industries, (BBA). Federal Reserve Economic Data. Accessed 12 April 2017.

[9]: [8] x (1 - [5] / 100).

[10]: (1 - [6] / 100) x [7] + [6] / 100 x [9].

[11]: R-687, 10-Year breakeven inflation rate on 22 October 2007 (T10YIE). Federal Reserve Bank of St. Louis. Accessed 20 May 2017.

[12]: ((1 + [10] / 100) / (1 + [11] / 100) - 1) x 100.

Table G.2:
Unlevering of Five-Year Monthly Betas - 22 October 2007

		Vulcan Materials Company	Martin Marietta Materials, Inc.	Eagle Materials, Inc.	United States Lime & Minerals, Inc.
Levered Beta	[1]	1.13	1.05	1.45	0.33
Debt to Equity Ratio	[2]	0.13	0.29	0.08	0.83
Effective Tax Rate (%)	[3]	29.59	28.83	33.42	19.12
Unlevered Beta	[4]	1.03	0.87	1.38	0.20

Sources and Notes: Capital IQ.

Complete data for Summit Materials and U.S. Concrete were unavailable.

[1]: R-743, Five-year monthly levered betas of September 2007 (IQ_CUSTOM_BETA). Capital IQ. Accessed 22 May 2017.

[2]: Average debt to equity ratio from October 2002 - September 2007. Tables G.3 through G.9.

[3]: R-744, Average monthly effective tax rate (%) from October 2002 - September 2007 (IQ_EFFECT_TAX_RATE). Capital IQ. Accessed 22 May 2017.

[4]: [1] / (1 + (1 - [3] / 100) x [2]).

Table G.3:
Debt to Capital - 22 October 2007

		Vulcan Materials Company	Martin Marietta Materials, Inc.	Eagle Materials, Inc.	United States Lime & Minerals, Inc.
Book Value of Total Debt	[1]	469.56	1,128.89	320.00	62.52
Market Value of Equity	[2]	8,518.28	5,581.86	1,710.22	221.87
Debt to Capital (%)	[3]	5.22	16.82	15.76	21.98

Sources and Notes:

Complete data for Summit Materials and U.S. Concrete were unavailable.

[1]: R-745, Book value of total debt in USD millions (IQ_TOTAL_DEBT). Capital IQ. Accessed 22 May 2017.

[2]: R-746, Market cap in USD millions (IQ_MARKETCAP). Capital IQ. Accessed 22 May 2017.

[3]: [1] / ([2] + [1]) x 100.

Table G.4:
Vulcan Materials Debt to Equity

Month	Book Value of Debt (USD millions)	Market Cap (USD millions)	Debt to Equity (%)
[1]	[2]	[3]	[4]
10/31/2002	936.40	3406.11	27.49%
11/30/2002	936.40	3831.36	24.44%
12/31/2002	936.70	3807.00	24.60%
1/31/2003	936.70	3456.76	27.10%
2/28/2003	936.70	3218.18	29.11%
3/31/2003	933.77	3068.95	30.43%
4/30/2003	933.77	3551.83	26.29%
5/31/2003	933.77	3720.57	25.10%
6/30/2003	931.21	3764.24	24.74%
7/31/2003	931.21	4084.10	22.80%
8/31/2003	931.21	4207.63	22.13%
9/30/2003	923.47	4055.22	22.77%
10/31/2003	923.47	4502.29	20.51%
11/30/2003	923.47	4522.55	20.42%
12/31/2003	886.38	4837.82	18.32%
1/31/2004	886.38	4851.04	18.27%
2/29/2004	886.38	4810.36	18.43%
3/31/2004	880.77	4840.59	18.20%
4/30/2004	880.77	4719.44	18.66%
5/31/2004	880.77	4570.18	19.27%
6/30/2004	634.84	4855.05	13.08%
7/31/2004	634.84	4868.95	13.04%
8/31/2004	634.84	4874.07	13.02%
9/30/2004	656.46	5209.43	12.60%
10/31/2004	656.46	5097.87	12.88%
11/30/2004	656.46	5309.85	12.36%
12/31/2004	607.75	5592.50	10.87%
1/31/2005	607.75	5784.00	10.51%
2/28/2005	607.75	5925.33	10.26%
3/31/2005	606.71	5848.94	10.37%
4/30/2005	606.71	5416.39	11.20%
5/31/2005	606.71	6119.99	9.91%
6/30/2005	597.77	6636.71	9.01%
7/31/2005	597.77	7184.78	8.32%
8/31/2005	597.77	7349.46	8.13%
9/30/2005	597.43	7590.87	7.87%
10/31/2005	597.43	6619.21	9.03%
11/30/2005	597.43	6792.33	8.80%
12/31/2005	595.46	6899.25	8.63%

Table G.4:
Vulcan Materials Debt to Equity

Month	Book Value of Debt (USD millions)	Market Cap (USD millions)	Debt to Equity (%)
[1]	[2]	[3]	[4]
1/31/2006	595.46	7319.83	8.13%
2/28/2006	595.46	7930.97	7.51%
3/31/2006	355.41	8698.97	4.09%
4/30/2006	355.41	8545.11	4.16%
5/31/2006	355.41	7852.45	4.53%
6/30/2006	572.19	7847.42	7.29%
7/31/2006	572.19	6737.72	8.49%
8/31/2006	572.19	7585.55	7.54%
9/30/2006	591.56	7550.81	7.83%
10/31/2006	591.56	7693.67	7.69%
11/30/2006	591.56	8377.30	7.06%
12/31/2006	521.59	8485.88	6.15%
1/31/2007	521.59	9616.14	5.42%
2/28/2007	521.59	11083.03	4.71%
3/31/2007	562.63	11066.88	5.08%
4/30/2007	562.63	11738.88	4.79%
5/31/2007	562.63	11405.38	4.93%
6/30/2007	546.09	10914.63	5.00%
7/31/2007	546.09	9146.05	5.97%
8/31/2007	546.09	8600.46	6.35%
9/30/2007	469.56	8518.28	5.51%

Source: Capital IQ. Accessed 22 May 2017.

Notes:

[1]: End of month.

[2]: R-745, Monthly book value of debt (IQ_TOTAL_DEBT). Capital IQ. Accessed 22 May 2017.

[3]: R-746, Monthly market cap (IQ_MARKETCAP). Capital IQ. Accessed 22 May 2017.

[4]: [2] / [3].

Table G.5:
Martin Marietta Materials Debt to Equity

Month	Book Value of Debt (USD millions)	Market Cap (USD millions)	Debt to Equity (%)
[1]	[2]	[3]	[4]
10/31/2002	783.18	1359.12	57.62%
11/30/2002	783.18	1538.84	50.89%
12/31/2002	759.66	1496.85	50.75%
1/31/2003	759.66	1425.57	53.29%
2/28/2003	759.66	1346.48	56.42%
3/31/2003	767.90	1348.69	56.94%
4/30/2003	767.90	1444.44	53.16%
5/31/2003	767.90	1672.90	45.90%
6/30/2003	756.14	1643.56	46.01%
7/31/2003	756.14	1872.91	40.37%
8/31/2003	756.14	1870.21	40.43%
9/30/2003	721.01	1783.13	40.43%
10/31/2003	721.01	2004.25	35.97%
11/30/2003	721.01	2082.95	34.61%
12/31/2003	729.41	2298.24	31.74%
1/31/2004	729.41	2250.78	32.41%
2/29/2004	729.41	2401.97	30.37%
3/31/2004	731.61	2221.63	32.93%
4/30/2004	731.61	2081.67	35.15%
5/31/2004	731.61	2064.79	35.43%
6/30/2004	725.21	2137.10	33.93%
7/31/2004	725.21	2109.14	34.38%
8/31/2004	725.21	2169.64	33.43%
9/30/2004	721.67	2183.15	33.06%
10/31/2004	721.67	2195.68	32.87%
11/30/2004	721.67	2413.21	29.90%
12/31/2004	724.16	2576.97	28.10%
1/31/2005	724.16	2594.26	27.91%
2/28/2005	724.16	2720.53	26.62%
3/31/2005	719.07	2637.52	27.26%
4/30/2005	719.07	2580.68	27.86%
5/31/2005	719.07	2845.54	25.27%
6/30/2005	717.61	3221.68	22.27%
7/31/2005	717.61	3388.08	21.18%
8/31/2005	717.61	3348.63	21.43%
9/30/2005	724.38	3632.93	19.94%
10/31/2005	724.38	3653.77	19.83%
11/30/2005	724.38	3482.32	20.80%
12/31/2005	717.31	3556.97	20.17%

Table G.5:
Martin Marietta Materials Debt to Equity

Month	Book Value of Debt (USD millions)	Market Cap (USD millions)	Debt to Equity (%)
[1]	[2]	[3]	[4]
1/31/2006	717.31	3930.66	18.25%
2/28/2006	717.31	4462.77	16.07%
3/31/2006	717.79	4898.98	14.65%
4/30/2006	717.79	4870.94	14.74%
5/31/2006	717.79	4184.57	17.15%
6/30/2006	734.67	4168.11	17.63%
7/31/2006	734.67	3682.02	19.95%
8/31/2006	734.67	3733.71	19.68%
9/30/2006	727.15	3836.16	18.96%
10/31/2006	727.15	3972.76	18.30%
11/30/2006	727.15	4483.35	16.22%
12/31/2006	713.65	4691.02	15.21%
1/31/2007	713.65	5210.64	13.70%
2/28/2007	713.65	5646.17	12.64%
3/31/2007	966.64	6091.30	15.87%
4/30/2007	966.64	6385.46	15.14%
5/31/2007	966.64	6625.16	14.59%
6/30/2007	1182.67	6905.62	17.13%
7/31/2007	1182.67	5839.21	20.25%
8/31/2007	1182.67	5642.46	20.96%
9/30/2007	1128.89	5581.86	20.22%

Source: Capital IQ. Accessed 22 May 2017.

Notes:

[1]: End of month.

[2]: R-745, Monthly book value of debt (IQ_TOTAL_DEBT). Capital IQ. Accessed 22 May 2017.

[3]: R-746, Monthly market cap (IQ_MARKETCAP). Capital IQ. Accessed 22 May 2017.

[4]: [2] / [3].

Table G.6:
Eagle Materials Debt to Equity

Month	Book Value of Debt (USD millions)	Market Cap (USD millions)	Debt to Equity (%)
[1]	[2]	[3]	[4]
10/31/2002	131.73	630.49	20.89%
11/30/2002	131.73	663.19	19.86%
12/31/2002	100.21	645.92	15.51%
1/31/2003	100.21	622.95	16.09%
2/28/2003	100.21	608.25	16.47%
3/31/2003	80.93	661.54	12.23%
4/30/2003	80.93	710.37	11.39%
5/31/2003	80.93	717.72	11.28%
6/30/2003	62.17	738.44	8.42%
7/31/2003	62.17	828.88	7.50%
8/31/2003	62.17	827.61	7.51%
9/30/2003	31.16	824.29	3.78%
10/31/2003	31.16	994.61	3.13%
11/30/2003	31.16	1094.23	2.85%
12/31/2003	0.16	1125.41	0.01%
1/31/2004	0.16	1035.79	0.02%
2/29/2004	0.16	1078.90	0.01%
3/31/2004	82.88	1103.52	7.51%
4/30/2004	82.88	1216.60	6.81%
5/31/2004	82.88	1245.45	6.65%
6/30/2004	74.48	1300.48	5.73%
7/31/2004	74.48	1214.61	6.13%
8/31/2004	74.48	1184.70	6.29%
9/30/2004	49.88	1301.48	3.83%
10/31/2004	49.88	1247.20	4.00%
11/30/2004	49.88	1412.05	3.53%
12/31/2004	30.18	1564.51	1.93%
1/31/2005	30.18	1444.21	2.09%
2/28/2005	30.18	1508.53	2.00%
3/31/2005	84.80	1466.13	5.78%
4/30/2005	84.80	1362.89	6.22%
5/31/2005	84.80	1575.54	5.38%
6/30/2005	94.40	1661.48	5.68%
7/31/2005	94.40	1836.90	5.14%
8/31/2005	94.40	1962.49	4.81%
9/30/2005	93.20	2110.29	4.42%
10/31/2005	93.20	1834.85	5.08%
11/30/2005	93.20	1996.54	4.67%
12/31/2005	200.00	2133.53	9.37%

Table G.6:
Eagle Materials Debt to Equity

Month	Book Value of Debt (USD millions)	Market Cap (USD millions)	Debt to Equity (%)
[1]	[2]	[3]	[4]
1/31/2006	200.00	2727.49	7.33%
2/28/2006	200.00	2709.73	7.38%
3/31/2006	200.00	3205.14	6.24%
4/30/2006	200.00	1718.61	11.64%
5/31/2006	200.00	2452.03	8.16%
6/30/2006	200.00	2394.30	8.35%
7/31/2006	200.00	1812.61	11.03%
8/31/2006	200.00	1792.45	11.16%
9/30/2006	200.00	1683.95	11.88%
10/31/2006	200.00	1800.44	11.11%
11/30/2006	200.00	2077.39	9.63%
12/31/2006	200.00	2088.50	9.58%
1/31/2007	200.00	2386.33	8.38%
2/28/2007	200.00	2238.57	8.93%
3/31/2007	200.00	2156.89	9.27%
4/30/2007	200.00	2155.93	9.28%
5/31/2007	200.00	2407.16	8.31%
6/30/2007	200.00	2353.42	8.50%
7/31/2007	200.00	2100.31	9.52%
8/31/2007	200.00	1816.45	11.01%
9/30/2007	320.00	1710.22	18.71%

Source: Capital IQ. Accessed 22 May 2017.

Notes:

[1]: End of month.

[2]: R-745, Monthly book value of debt (IQ_TOTAL_DEBT). Capital IQ. Accessed 22 May 2017.

[3]: R-746, Monthly market cap (IQ_MARKETCAP). Capital IQ. Accessed 22 May 2017.

[4]: [2] / [3].

Table G.7:
United States Lime & Minerals Debt to Equity

Month	Book Value of Debt (USD millions)	Market Cap (USD millions)	Debt to Equity (%)
[1]	[2]	[3]	[4]
10/31/2002	43.89	22.33	196.56%
11/30/2002	43.89	22.62	194.04%
12/31/2002	42.03	21.46	195.87%
1/31/2003	42.03	22.33	188.24%
2/28/2003	42.03	21.40	196.40%
3/31/2003	43.40	22.91	189.45%
4/30/2003	43.40	19.43	223.38%
5/31/2003	43.40	20.01	216.90%
6/30/2003	42.57	19.72	215.86%
7/31/2003	42.57	24.65	172.69%
8/31/2003	42.57	25.17	169.11%
9/30/2003	52.33	27.96	187.20%
10/31/2003	52.33	27.26	191.98%
11/30/2003	52.33	46.91	111.55%
12/31/2003	51.22	39.15	130.83%
1/31/2004	51.22	49.65	103.17%
2/29/2004	51.22	48.49	105.64%
3/31/2004	50.40	47.34	106.47%
4/30/2004	50.40	48.91	103.05%
5/31/2004	50.40	52.44	96.11%
6/30/2004	46.64	67.00	69.60%
7/31/2004	46.64	58.33	79.96%
8/31/2004	46.64	52.65	88.58%
9/30/2004	43.18	55.81	77.38%
10/31/2004	43.18	52.59	82.10%
11/30/2004	43.18	64.57	66.87%
12/31/2004	43.89	66.32	66.18%
1/31/2005	43.89	73.04	60.09%
2/28/2005	43.89	90.57	48.46%
3/31/2005	43.26	92.55	46.75%
4/30/2005	43.26	74.34	58.20%
5/31/2005	43.26	89.50	48.34%
6/30/2005	39.71	98.73	40.22%
7/31/2005	39.71	108.78	36.51%
8/31/2005	39.71	167.01	23.78%
9/30/2005	39.58	203.12	19.48%
10/31/2005	39.58	143.76	27.53%
11/30/2005	39.58	175.23	22.59%
12/31/2005	55.00	158.91	34.61%

Table G.7:
United States Lime & Minerals Debt to Equity

Month	Book Value of Debt (USD millions)	Market Cap (USD millions)	Debt to Equity (%)
[1]	[2]	[3]	[4]
1/31/2006	55.00	164.85	33.36%
2/28/2006	55.00	155.11	35.46%
3/31/2006	55.93	169.24	33.05%
4/30/2006	55.93	190.44	29.37%
5/31/2006	55.93	203.72	27.45%
6/30/2006	59.97	202.25	29.65%
7/31/2006	59.97	210.49	28.49%
8/31/2006	59.97	218.37	27.46%
9/30/2006	62.93	190.13	33.10%
10/31/2006	62.93	193.54	32.51%
11/30/2006	62.93	215.98	29.13%
12/31/2006	64.64	187.24	34.52%
1/31/2007	64.64	204.31	31.64%
2/28/2007	64.64	190.22	33.98%
3/31/2007	71.12	190.74	37.29%
4/30/2007	71.12	225.47	31.54%
5/31/2007	71.12	215.17	33.05%
6/30/2007	68.01	229.50	29.63%
7/31/2007	68.01	227.02	29.96%
8/31/2007	68.01	216.29	31.44%
9/30/2007	62.52	221.87	28.18%

Source: Capital IQ. Accessed 22 May 2017.

Notes:

[1]: End of month.

[2]: R-745, Monthly book value of debt (IQ_TOTAL_DEBT). Capital IQ. Accessed 22 May 2017.

[3]: R-746, Monthly market cap (IQ_MARKETCAP). Capital IQ. Accessed 22 May 2017.

[4]: [2] / [3].

Appendix H: The Pre-Award Interest Rate

1. The basic concept of interest is to compensate lenders for providing funding. The interest rate on a loan must reflect the time value of money and risk. The time value of money arises from the basic principle that a dollar today is worth more than a dollar tomorrow. A dollar today is worth more because: (1) inflation will generally erode the value of that dollar over time; and (2) that dollar could be invested in a deposit account with a bank and earn interest so that it is worth more than a dollar tomorrow. The need to reflect risk arises from the principle that a safe dollar is worth more than a risky dollar. A lender facing risk that its borrower will not repay the amounts due on a loan requires compensation for bearing this risk.

2. There are two prevailing theories regarding pre-award interest.[1] The first is the so-called "forced lender" theory, in which a claimant party was effectively made a lender to the respondent at the time of the breach. Under this theory, a claimant bears the risk associated with lending to the respondent from the breach date to the award date (and continuing on until payment). An appropriate interest rate here would reflect both the time value of money and risk of the respondent.

3. The second is the "risk-free" theory, which reflects the view that no liability arises until the time of the award. Here, a claimant is not a creditor until the award date, and thus there is no lending risk prior to the award. An appropriate interest rate under this theory would only compensate a claimant for the time value of money, which is reflected in the risk-free rate on securities like U.S. Treasury bills.

4. Which theory should govern is a question of law on which I do not opine. However, in this case, the difference is immaterial. As of the breach date (and up to the present), Canada held the highest credit rating awarded by Moody's Investor Services. This is the same credit rating held by the U.S., which is deemed to be a risk-free borrower. Therefore, a risk-free rate is an appropriate pre-award interest rate for an award. For an award denominated in U.S. dollars, the appropriate risk-free rate is the U.S. risk-free rate.

[1] In cases where there is a pre-award interest rate set forth as a matter of law or set for in an agreement by the parties, these theories are not relevant.

5. Mr. Rosen does not explain the economic logic to support a pre-award interest rate at the Claimants' WACC, cost of equity, or cost of debt. These rates bear no relation to the risks that the Claimants faced with respect to the award. A pre-award interest rate based on the Claimants' WACC or cost of equity would provide the Claimants with a return that includes a risk premium as if the award had been invested in risky assets. The cost of debt also reflects the risk of the company's assets and capital structure decisions. There is no economic justification for pre-award interest including the risk premiums inherent in the Claimants' WACC, cost of equity, or debt. The Claimants did not bear these risks on the award, and therefore should not be compensated as if they had. Doing so would place the Claimants in a better position than they would have been had there been in an instantaneous award to cure the harm at the moment of breach.

6. The irrelevance of the Claimants' WACC, cost of equity, or cost of debt to the pre-award interest rate is also highlighted by the fact that the alternative measures mentioned by Mr. Rosen would result in a different award amount for a different Claimant. A seminal article co-authored by Professor Franklin Fisher of the Massachusetts Institute of Technology and Craig Romaine describes the problem with pre-award interest based on these measures:

> One can see the problem with awarding interest at the plaintiff's opportunity cost of capital by considering the following example. The same defendant destroys two identical assets belonging to two different plaintiffs, Hetty and Ravenal. Hetty is extremely risk averse and only invests in government bonds. Ravenal, on the other hand, invests in high-risk ventures. On average, Hetty earns a low rate of return, while Ravenal earns a high one. Naturally, those returns have different distributions: Hetty always earns the same rate on every investment, while Ravenal earns a very high rate on a few investments and loses money on most others.
>
> In this situation, it cannot be right to award Ravenal a higher amount than Hetty just because of the passage of time and their different investment strategies. Had the award been made at time 0, they would each have been awarded the same amount. To give Ravenal more than Hetty at time t is to forget that his higher average rate of return compensates him for the risk associated with his investments. It is made up of even higher returns on successful ventures and negative returns on unsuccessful ones. The asset destroyed might perfectly well have been employed in an unsuccessful venture; that risk has not been borne.
>
> To vary the example, suppose that Hetty is a prudent investor, while Ravenal is a (very rich) compulsive gambler who always loses and would, by time t, have frittered away the asset. It cannot be right to award Hetty positive interest and award Ravenal nothing at all. In this case, Ravenal's negative returns are the

> price he pays for indulging his tastes for hopeless risk. He was surely not able to indulge those tastes with the asset in question; hence, he should not have to pay the price. The same general principle applies to less extreme examples with positive returns: The plaintiff should not be compensated (positively or negatively) for risks he or she did not bear. [2]

7. Thus, the use of interest rates from U.S. Treasuries is the appropriate measure of pre-award interest here. The alternative measures that Mr. Rosen suggests would not be appropriate; the Claimants' WACC, cost of equity, or cost of debt, lack a reasonable economic justification.

[2] **R-738** Franklin M. Fisher, and R. Craig Romaine. "Janis Joplin's Yearbook and the Theory of Damages", *Journal of Accounting, Auditing & Finance* 5.1 (1990): 146-147.