

The Supreme Court of Ohio

THE STATE OF OHIO, ex rel.	:	
EDWARD SIEDLE	:	
	:	
Plaintiff,	:	Case No. 2021-0659
	:	
v.	:	Original Action in Mandamus
	:	
STATE TEACHERS RETIREMENT	:	
SYSTEM OF OHIO, <i>et al.</i> ,	:	
	:	
Defendants.	:	

RESPONDENTS' SUBMISSION OF EVIDENCE

Andrew M. Engel
Marc E. Dann
Advocate Attorneys LLP
1629 K St. NW, Suite 300
Washington, DC 20006
Attorney for Relator
Edward Siedle

Donald C. Brey (0021965)
Ryan Spitzer (0093515)
ISAAC WILES & BURKHOLDER LLC
Two Miranova Place, Suite 700
Columbus, OH 43215
614.340.7457 / Fax 614.362-9516
Counsel for Respondent
State Teachers Retirement System of Ohio

SUBMISSION OF EVIDENCE

The sole unresolved issue following the parties August 17, 2021, mediation is Relator’s request for attorneys’ fees. (See Relator’s October 25, 2021, Notice of Failure of Settlement). Respondents thus submit evidence as to the attorneys’ fee issue only.

Should Relator or this Court believe any issue other than Relator’s request for attorneys’ fees remain outstanding, Respondent reserves the right to supplement its evidentiary submissions accordingly. Pursuant to this Court’s February 23, 2022, Order, Respondents hereby file the following evidence:

LIST OF EVIDENCE:

EXHIBIT 1 – AFFIDAVIT OF JOY NELSONSTRS00001
Exhibit A – February 23, 2021, Public Records Request.....STRS00004
Exhibit B – February 19, 2021, Tracking Slip for Public Records Request.....STRS00008
Exhibit C – Email communications from J. Nelson to M. Dann.....STRS00009
Exhibit D – Email from J. Nelson to M. Reid.....STRS00033

EXHIBIT 2 – AFFIDAVIT OF STACEY WIDEMAN.....STRS00038
Exhibit A – Email communications from J. Spring to N. Treneff.....STRS00043
Exhibit B – May 4, 2020, email from S. Wideman to M. Reid.....STRS00179
Exhibit C – Email from J. Nelson to J. Spring.....STRS00316
Exhibit D – A copy of the June 7, 2021, Benchmark Financial Services
Report.....STRS00317
Exhibit E – A copy of STRS Ohio’s August 19, 2021, Response to the June 7, 2021,
Report.....STRS00422

**EXHIBIT 3 – JULY 1, 2021, FUNDFIRE ARTICLE TITLED “OHIO TEACHERS’
PENSION HAS ‘ABANDONED TRANSPARENCY,’ CRITICS SAY”**..... STRS00500

**EXHIBIT 4 – MARCH 6, 2022, CLEVELAND PLAIN DEALER NEWSPAPER
ARTICLE TITLED “RETIRED TEACHERS FIGHT TO GET
PENSION DOCUMENTS”**STRS00502

Respectfully submitted,

/s/ Donald C. Brey

Donald C. Brey (0021965)

Ryan Spitzer (0093515)

ISAAC WILES & BURKHOLDER, LLC

Two Miranova Place, Suite 700

Columbus, Ohio 43215

TEL: 614.221.2121

FAX: 614.365.9516

Email: dbrey@isaacwiles.com

rspitzer@isaacwiles.com

Counsel for Respondent

State Teachers Retirement System of Ohio

CERTIFICATE OF SERVICE

I hereby certify that a true and exact copy of the foregoing ***RESPONDENTS'***
SUBMISSION OF EVIDENCE was sent via electronic mail on March 15, 2022, upon the
following:

Andrew M. Engel

Marc E. Dann

Advocate Attorneys, LLP

1629 K St. NW, Suite 300

Washington, DC 20006

aengel@advocateattorneys.com

mdann@advocateattorneys.com

/s/ Donald C. Brey

Donald C. Brey (0021965)

The Supreme Court of Ohio

THE STATE OF OHIO, ex rel.	:	
EDWARD SIEDLE	:	
	:	
Plaintiff,	:	Case No. 2021-0659
	:	
v.	:	Original Action in Mandamus
	:	
STATE TEACHERS RETIREMENT	:	
SYSTEM OF OHIO, <i>et al.</i> ,	:	
	:	
Defendants.	:	

AFFIDAVIT OF JOY NELSON

1. I, Joy Nelson, being duly sworn and cautioned according to law, state as follows:
2. I am of sound mind, 18 years or older, competent to make this affidavit, and do so with personal knowledge of the facts stated herein.
3. I am the Records and Documentation Administration Manager for the State Teachers Retirement Systems of Ohio (“STRS Ohio”). I am a Certified Records Manager from the Institute of Certified Records Managers.
4. I have been employed with STRS Ohio as the Records and Documentation Administration Manager since my initial hire date of January 17, 2017.
5. As the Records and Documentation Administration Manager, my primary job duties include managing the records and information management program, maintaining a records retention schedule, collaborating with other business units, and tracking, logging, and responding to public records requests.
6. On February 23, 2021, I received a public records request initially addressed to William Neville from Attorney Mark Dann on behalf of Edward Siedle (the “public records

request”). *See* February 23, 2021, public records request attached hereto as Exhibit A and incorporated herein by reference.

7. The public records request was delivered by UPS. *See* February 19, 2021, tracking slip for public records request attached hereto as Exhibit B and incorporated herein by reference.

8. Within my regular business duties as the Records and Documentation Administration Manager, I responded to the public records request on February 25, 2021, and notified Attorney Dann that STRS Ohio would “respond in a reasonable period of time.” *See* Email communications from J. Nelson to M. Dann attached hereto as Exhibit C and incorporated herein by reference.

9. The public records request requested forty-five (45) different categories of documents, mostly pertaining to STRS Ohio’s selection of investment managers and investment funds. *See generally* Exhibit A.

10. Within my role as the Records and Documentation Administration Manager, and in consultation with STRS Ohio’s legal team, I sent approximately twenty-four (24) emails and a thumb drive, that contained a total of approximately eight hundred and twelve (812) documents believed by STRS Ohio to be responsive to the public records request.

11. Included in the public records request were the following requests below involving CEM Benchmarking (“CEM”) for the previous six years:

2. Please provide all reports and analysis produced by CEM Benchmarking related to STRS’s investment management fees, costs and expenses.
3. Please provide all reports and analysis produced by CEM Benchmarking related to alternative investments.

12. On March 25, 2021, I emailed Michael Reid, Vice President of CEM, and asked Mr. Reid if CEM believed there was a legal basis to redact portions of CEM’s final reports as

previously exerted with CEM's 2018 final report. *See* March 25, 2021, Email from J. Nelson to M. Reid attached hereto as Exhibit D and incorporated herein by reference.

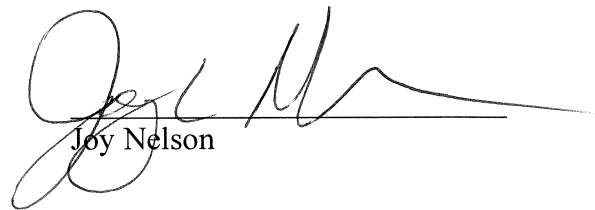
13. Shortly thereafter, Mr. Reid responded to my email and notified STRS Ohio that CEM would provide redacted final reports because the final reports contained information that constituted trade secrets.

14. On April 8, 2021, I emailed Attorney Dann documents responsive to the CEM portion of the public records request. *See* Exhibit C.

15. Generally, my emails responding to the public records request asked Attorney Dann for further clarification to assist in determining if any additional responsive documents existed. *See generally* Exhibit C.

16. Neither Attorney Dann nor Mr. Siedle provided additional clarity beyond the submission of their initial February 23, 2021, public records request, nor did either individual follow-up regarding the redacted CEM reports.

FURTHER AFFIANT SAYETH NAUGHT.



Joy Nelson

STATE OF OHIO }
 }
 } SS:
COUNTY OF FRANKLIN }

Sworn before me and subscribed in my presence by Joy Nelson, this 14th day of March, 2022.



Jennifer Ann Jones
Attorney at Law
Notary Public, State of Ohio
My Commission Has No Expiration
Section 147.03 R. C.


State of Ohio – Notary Public

Commission Expiration: N/A



216-452-1026
Direct Telephone

Marc E. Dann
MDann@DannLaw.com
Email

216-373-0536
Fax

Received by
STRS Ohio Executive Dept.

FEB 22 2021
23

February 19, 2020

William Neville
State Teacher Retirement System of Ohio
275 E. Broad St.
Columbus, OH 43215-3771

**RE: PUBLIC RECORDS REQUEST PURSUANT TO OHIO REVISED
CODE § 149.43, et seq. On Behalf of Edward Siedle**

Dear Mr. Neville:

Under the Ohio Open Records Law, Ohio Revised Code § 149.43, et seq. **On behalf of Edward Siedle we request an opportunity to inspect or obtain copies of public records as described below:**

Please provide the following documents and information in electronic format for the past 6 years:

Documents Regarding Investment Managers:

1. All contracts, including any private placement memoranda, offering documents and subscription agreements, between STRS and its investment managers.
2. All Requests for Proposal (“RFPs”) or other documents related to competitive bidding issued by STRS for hiring investment managers or investment funds.
3. All documents submitted to STRS in response to RFPs or other competitive bidding efforts by investment funds and investment fund managers.
4. Please provide all documents demonstrating that investment managers in the employ of STRS are GIPS compliant.
5. Please provide all valuations performed or submitted to STRS by any investment fund or investment fund manager.



6. Please provide copies of all independent third party valuations of hard-to-value assets in the possession of STRS.
7. Please provide copies of all evaluations of the value of assets provided by investment funds or investment fund managers engaged by STRS
8. Please provide all documents related to STRS investments in limited partnerships.
9. Please provide all documents related to STRS investments in Funds of Funds including but not limited to documents related to the underlying managers of each such fund.

Documents relating to Callan:

1. Please provide all contracts between the STRS and Callan Associates.
2. Please provide any documents relating to potential conflicts of interest at Callan.
3. Please provide any documents prepared or received as part of STRS's due diligence documents regarding litigation, regulatory or disciplinary matters involving Callan.
4. Please provide all documents related to compensation arrangements by Callan with the STRS investment managers.
5. Please provide documentation related to any review by the STRS Board of potential conflicts of interest at Callan.
6. Please provide any disclosure(s) providing the actual dollar amounts of compensation received by Callan from each of the STRS investment managers.
7. Please provide all asset allocation reports, investment manager recommendations, investment performance and other reports related to STRS produced by Callan.

Documents relating to ACA Compliance:

1. Please provide all Contracts between STRS and ACA Compliance.
2. Please provide any documents regarding potential conflicts of interest at ACA.
3. Please provide any due diligence documents regarding litigation, regulatory or disciplinary matters involving ACA.
4. Please provide any disclosure by ACA of compensation arrangements with STRS investment managers.



5. Please provide documents related to any review by the STRS Board conflicts of interest at ACA.
6. Please provide any disclosure providing the actual dollar amounts of compensation received by ACA from STRS investment managers.
7. Please provide all reports related to STRS GIPS compliance and investment performance produced by ACA.

Documents relating to Cliffwater

1. Please provide all contracts between STRS and Cliffwater.
2. Please provide any documents regarding potential conflicts of interest at Cliffwater.
3. Please provide any due diligence documents regarding litigation, regulatory or disciplinary matters involving Cliffwater.
4. Please provide any disclosure by Cliffwater of compensation arrangements with the fund's investment managers.
5. Please provide documents related to any review by the STRS Board of conflicts of interest at Cliffwater.
6. Please provide all asset allocation reports, investment manager recommendations, investment performance and other reports related to STRS produced by Cliffwater.
7. Please provide any disclosure requesting or providing the actual dollar amounts of compensation received by Cliffwater from the pension's investment managers.

Documents relating to CEM Benchmarking:

1. Please provide all contracts between STRS and CEM Benchmarking.
2. Please provide all reports and analysis produced by CEM Benchmarking related to STRS's investment management fees, costs and expenses.
3. Please provide all reports and analysis produced by CEM Benchmarking related to alternative investments.

Documents Relating to Auditors and Custodians:

1. Please provide all contracts between STRS and CliftonLarsonAllen.
2. Please provide all contracts between STRS and its custodian banks.
3. Please provide all documents relating to third party valuations of hard to value assets conducted by custodians contracted with STRS.



4. Please provide all documents related to investments not custodied at STRS's custodians and indicate where such assets are held.
5. Please provide all documents related to the efforts STRS custodians make to verify the existence of all STRS assets held everywhere.
6. Please provide documents related any STRS assets deemed "worthless" by any custodian.

Documents Relating to Board and Staff:

1. Please provide copies of the current fiduciary liability policies of the board and STRS.
2. Please provide documents related to any and all board seats that STRS holds on investment partnerships.
3. Please provide all documents related to travel expenses related to attendance by STRS staff at investment partnership meetings.
4. Please provide documents related to all expenses related to staff and board member travel to non-U.S. locations.
5. Please provide the minutes of any meetings of the board.
6. Please provide the STRS Investment Policy Statement.

If there are any fees for searching or copying these records, please inform me if the cost will exceed \$25.00. I would request that these records be copied and sent electronically to me or copied and allow me to pick them up from the STRS office.

If you expect a significant delay in responding to or in fulfilling this request, please contact me with information about when I might expect copies or the ability to inspect the requested records.

If you deny any or all of this request, please cite each specific exemption you feel justifies the refusal to release the information and notify me of the appeal procedures available to me under the law.

Thank you for considering our request.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Marc Dann', written over a horizontal line.

Marc Dann
DannLaw
mdann@dannlaw.com

Mailing Address
PO Box 6031040
Cleveland OH 44103

DannLaw.com
877-475-8100

Physical Address
2728 Euclid Ave Suite 300
Cleveland OH 44115

View/Print Label

EXHIBIT 1 - Exhibit B

1. **Ensure there are no other shipping or tracking labels attached to your package.** Select the Print button on the print dialogue box that appears. Note: If your browser does not support this function, select Print from the File menu to print the label.
2. **Fold the printed label at the solid line below.** Place the label in a UPS Shipping Pouch. If you do not have a pouch, affix the folded label using clear plastic shipping tape over the entire label.

3. GETTING YOUR SHIPMENT TO UPS

Customers with a scheduled Pickup

- o Your driver will pickup your shipment(s) as usual.

Customers without a scheduled Pickup

- o Schedule a Pickup on ups.com to have a UPS driver pickup all of your packages.
- o Take your package to any location of The UPS Store®, UPS Access Point(TM) location, UPS Drop Box, UPS Customer Center, Staples® or Authorized Shipping Outlet near you. To find the location nearest you, please visit the 'Locations' Quick link at ups.com.

UPS Access Point™
 CVS STORE # 4402
 1400 E 9TH ST
 CLEVELAND OH 44114-1727
 FOLD HERE

UPS Access Point™
 THE UPS STORE
 7 SAINT CLAIR AVE NE
 CLEVELAND OH 44114-1251

UPS Access Point™
 CVS STORE # 4803
 8000 EUCLID AVE
 CLEVELAND OH 44103-4229



<p>MARC DANN 216-393-0539 THE DANN LAW FIRM CO., LPA 2728 EUCLID AVENUE CLEVELAND OH 44115</p> <p>SHIP TO: WILLIAM NEVILLE ST TEACHER RETIREMENT SYSTEM OF OH 275 EAST BROAD STREET COLUMBUS OH 43215</p>	<p style="text-align: right;">1 LBS</p> <p style="text-align: right;">1 OF 1</p> <p style="text-align: center;">OH 432 9-50</p>  	<p style="text-align: center;">UPS 2ND DAY AIR A.M. 2A</p> <p>TRACKING #: 1Z 480 65E 19 9194 0184</p> 	<p style="text-align: center;"></p> <p>BILLING: P/P SIGNATURE REQUIRED</p> <p>Reference #: Siedle Edward-aw</p> <p style="font-size: small;">XOL 21.02.07 NV45-42.0A.01/2021*</p>
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EXHIBIT 1 - Exhibit C

From: Nelson, Joy
Sent: Thursday, February 25, 2021 11:22 AM
To: 'mdann@dannlaw.com' <mdann@dannlaw.com>
Subject: Public Records Request on behalf of Edward Siedle

Dear Marc Dann,

STRS Ohio is in receipt of the public records request on behalf of Edward Siedle received February 23, 2021. We will respond in a reasonable period of time.

Sincerely,

Joy L Nelson, CRM

Records and Documentation Administration Manager
State Teachers Retirement System of Ohio

From: Nelson, Joy <nelsonjl@strsoh.org>
Sent: Monday, March 15, 2021 2:08 PM
To: Marc Dann <mdann@dannlaw.com>
Subject: Public Records Request on behalf of Edward Siedle #1

Dear Mr. Dann,

STRS Ohio is responding to your public records request received February 23, 2021. The response will require multiple emails, over a period of time, due to volume. I will note when we send the final email. The two emails I am sending today contain records responsive to the following items for the past 6 years, as requested:

Documents Related to Board and Staff:

5. Please provide the minutes of any meetings of the board.
6. Please provide the STRS Investment Policy Statement.

We are still reviewing the remaining requests, and will follow up with additional records and/or clarifications regarding the records you seek.

Joy L Nelson, CRM

Records and Documentation Administration Manager
State Teachers Retirement System of Ohio

Items sent:

2015 01 Special Meeting Minutes. pdf	2015 02 Board Minutes.pdf
2015 03 Board Minutes.pdf	2015 03 Special Meeting Minutes.pdf
2015 04 Board Minutes.pdf	2015 05 Board Minutes.pdf
2015 06 Board Minutes.pdf	2015 08 Board Minutes.pdf
2015 09 Board Minutes.pdf	2015 10 Board Minutes.pdf
2015 11 Board Minutes.pdf	2015 12 Board Minutes.pdf

2016 01 Special Meeting Minutes. pdf
2016 03 Board Minutes.pdf
2016 04 Board Minutes.pdf
2016 06 Board Minutes.pdf
2016 09 Board Minutes.pdf
2016 11 Board Minutes.pdf
2016 09 HC Seminar – Special Meeting.pdf
2017 01 Special Meeting Minutes. pdf
2017 03 Board Minutes.pdf
2017 04 Board Minutes.pdf
2017 06 Board Minutes.pdf
2017 09 Board Minutes.pdf
2017 12 Board Minutes.pdf
2018 01 Special Meeting Minutes. pdf
2018 03 Board Minutes.pdf
2018 05 Board Minutes.pdf
2018 08 Board Minutes.pdf
2018 10 Board Minutes.pdf
2018 12 Board Minutes.pdf

2016 02 Board Minutes.pdf
2016 03 Special Meeting Minutes.pdf
2016 05 Board Minutes.pdf
2016 08 Board Minutes.pdf
2016 10 Board Minutes.pdf
2016 12 Board Minutes.pdf

2017 02 Board Minutes.pdf
2017 03 Special Meeting Minutes.pdf
2017 05 Board Minutes.pdf
2017 08 Board Minutes.pdf
2017 10 Board Minutes.pdf

2018 02 Board Minutes.pdf
2018 04 Board Minutes.pdf
2018 06 Board Minutes.pdf
2018 09 Board Minutes.pdf
2018 11 Special Meeting Minutes.pdf

From: Nelson, Joy <nelsonjl@strsoh.org>
Sent: Monday, March 15, 2021 2:10 PM
To: Marc Dann <mdann@dannlaw.com>
Subject: RE: Public Records Request on behalf of Edward Siedle #2

This is the second email for today.

Joy L Nelson, CRM

Records and Documentation Administration Manager
State Teachers Retirement System of Ohio

Items sent:

2019 02 Board Minutes.pdf
2019 03 Special Meeting Minutes.pdf
2019 05 Board Minutes.pdf
2019 08 Board Minutes.pdf
2019 10 Board Minutes.pdf
2020 02 Board Minutes.pdf
2020 05 Board Minutes.pdf
2020 06 Special Meeting Minutes.pdf
2020 09 Board Minutes.pdf
2020 11 Board Minutes.pdf
2015 03 Objectives and Policy Statement.pdf
2016 03 Objectives and Policy Statement.pdf
2017 05 Objectives and Policy Statement.pdf
2017 12 Objectives and Policy Statement.pdf

2019 03 Board Minutes.pdf
2019 04 Board Minutes.pdf
2019 06 Board Minutes.pdf
2019 09 Board Minutes.pdf
2019 12 Board Minutes.pdf
2020 03 Board Minutes.pdf
2020 06 Board Minutes.pdf
2020 08 Board Minutes.pdf
2020 10 Board Minutes.pdf
2020 12 Board Minutes.pdf

2018 12 Objectives and Policy Statement.pdf
2019 12 Objectives and Policy Statement.pdf

From: Nelson, Joy <nelsonjl@strsoh.org>
Sent: Tuesday, March 23, 2021 1:58 PM
To: Marc Dann <mdann@dannlaw.com>
Subject: Public Records Request on behalf of Edward Siedle #3

Dear Mr. Dann,

STRS Ohio is responding to your public records request received February 23, 2021. As noted in the initial two emails I sent last week, the response will require multiple emails, over a period of time, due to volume. I will note when we send the final email. The emails, approximately five, I am sending today contain records responsive to the following list for the past 6 years, as requested:

Documents Relating to Auditors and Custodians:

1. Please provide all contracts between STRS and CliftonLarsonAllen.
2. Please provide all contracts between STRS and its custodian banks.

Documents Relating to Board and Staff:

1. Please provide copies of the current fiduciary liability policies of the board and STRS.

Concerning item 2 above, pursuant to Ohio Revised Code 3307.12, the Treasurer of the State of Ohio is the custodian of funds for the system.

We are still reviewing the remaining requests, and will follow up with additional records and/or clarifications regarding the records you seek.

Sincerely,

Joy L Nelson, CRM

Records and Documentation Administration Manager
State Teachers Retirement System of Ohio

Items sent:

Extension Agreement 7-1-19 (AOS).pdf
Letter of Engagement 2015 Audit 5-8-15 (CLA).pdf
Letter of Engagement GASB 75 Audit FR2017 2-9-18 (CLA).pdf
Extension Agreement 7-1-15 (AOS).pdf

From: Nelson, Joy <nelsonjl@strsoh.org>
Sent: Tuesday, March 23, 2021 2:00 PM
To: Marc Dann <mdann@dannlaw.com>
Subject: RE: Public Records Request on behalf of Edward Siedle #4

[This is the second email for this portion of the request.](#)

STRS00011

Joy L Nelson, CRM

Records and Documentation Administration Manager
State Teachers Retirement System of Ohio

Items sent:

Letter of Engagement 2016 Audit 7-1-16 (CLA).pdf
Letter of Engagement 2017 Audit 7-1-17 (CLA).pdf

From: Nelson, Joy <nelsonjl@strsoh.org>
Sent: Tuesday, March 23, 2021 2:01 PM
To: Marc Dann <mdann@dannlaw.com>
Subject: RE: Public Records Request on behalf of Edward Siedle #5

[This is the third email for this portion of the request.](#)

Joy L Nelson, CRM

Records and Documentation Administration Manager
State Teachers Retirement System of Ohio

Item sent:

Letter of Engagement 2018 Audit 7-1-18 (CLA).pdf

From: Nelson, Joy <nelsonjl@strsoh.org>
Sent: Tuesday, March 23, 2021 2:02 PM
To: Marc Dann <mdann@dannlaw.com>
Subject: RE: Public Records Request on behalf of Edward Siedle #6

[This is the fourth email for this portion of the request.](#)

Joy L Nelson, CRM

Records and Documentation Administration Manager
State Teachers Retirement System of Ohio

Item sent:

Letter of Engagement 2019 Audit 7-1-19 (CLA).pdf

From: Nelson, Joy <nelsonjl@strsoh.org>
Sent: Tuesday, March 23, 2021 2:06 PM
To: Marc Dann <mdann@dannlaw.com>
Subject: RE: Public Records Request on behalf of Edward Siedle #7

[This is the fifth email for this portion of the request.](#)

Joy L Nelson, CRM

Records and Documentation Administration Manager
State Teachers Retirement System of Ohio

Items sent:

Letter of Engagement 2020 Audit 7-1-20 (CLA).pdf
7-Excess Fiduciary Liability-Hudson Ins-\$10MM xs \$10MM-Policy #SXS31210323.pdf
8-Labor Management Trust & Fiduciary-Chubb-\$10MM Primary-Policy #8225-8763.pdf
6-Excess Fiduciary Liability-ENDORSEMENT-RLI Ins-\$5MM xs \$20MM-Policy #EPG0028644.pdf
6-Excess Fiduciary Liability-RLI Ins-\$5MM xs \$20MM-Policy #EPG0028644.pdf

From: Nelson, Joy <nelsonjl@strsoh.org>
Sent: Thursday, March 25, 2021 2:40 PM
To: Marc Dann <mdann@dannlaw.com>
Subject: Public Records Request on behalf of Edward Siedle #8

Dear Marc Dann,

STRS Ohio is responding to your public records request received February 23, 2021. The response will require multiple emails, over a period of time, due to volume. I will note when we send the final email. The email I am sending today contains records responsive to items one and seven of the following list for the past 6 years, as requested:

Documents relating to ACA Compliance:

1. Please provide all contracts between the STRS and ACA Compliance.
2. Please provide any documents regarding potential conflicts of interest at ACA.
3. Please provide any due diligence documents regarding litigation, regulatory or disciplinary matters involving ACA.
4. Please provide any disclosure by ACA of compensation arrangements with STRS investment managers.
5. Please provide documents related to any review by the STRS Board conflicts of interest at ACA.
6. Please provide any disclosure providing the actual dollar amounts of compensation received by ACA from STRS investment managers.
7. Please provide all reports related to STRS GIPS compliance and investment performance produced by ACA.

Concerning items 2-7, I must note that much of your request fails to satisfy the requirement of public records law that you specifically and particularly identify the records that you are seeking. Under Ohio law, a requestor has the duty to "identify the records.....wanted with sufficient clarity." *State ex rel. Dillery v. Icsman (2001) 92 Ohio St.3d 312, 314.*

A public office is not required to conduct research or otherwise "seek out and retrieve those records which would contain the information of interest to the requester". *State ex rel. Fant v. Tober (8th Dist., April 28, 1993), No. 63737, 1993 Ohio App. LEXIS 2591 at *4; aff'd (1993), 68 Ohio St. 3d 117.* To the extent that you have requested records containing specific information, rather than identifying the

specific records you seek, your request is inappropriate under applicable legal standards. If there are specific records you would like to request, please identify those with sufficient clarity.

That said, in the interest of openness, this office has voluntarily made an effort to identify readily available public records that are responsive and have found no records we believe to be responsive to #2-6, and we are providing all 6 reports we believe to be responsive to Item #7. Again, to the extent there are additional records you seek, please identify those with sufficient clarity.

We are still reviewing the remaining requests, and will follow up with additional records and/or clarifications regarding the records you seek.

Sincerely,

Joy L Nelson, CRM

Records and Documentation Administration Manager
State Teachers Retirement System of Ohio

Items sent:

Service Agreement 1-8-15 (ACA Performance).pdf
ACA combined verification and examination report 6_30_15
ACA combined verification and examination report 6_30_16
ACA combined verification and examination report 6_30_17
ACA combined verification and examination report 6_30_18
ACA combined verification and examination report 6_30_19
ACA combined verification and examination report 6_30_20

From: Nelson, Joy <nelsonjl@strsoh.org>
Sent: Tuesday, March 30, 2021 9:18 AM
To: Marc Dann <mdann@dannlaw.com>
Subject: Public Records Request on behalf of Edward Siedle #9

Dear Mr. Dann,

STRS Ohio is responding to your public records request received February 23, 2021. The response will require multiple emails, over a period of time, due to volume. I will note when we send the final email. The emails I am sending today contains records responsive to following list for the past 6 years, as requested:

Documents relating to Callan:

1. Please provide all contracts between the STRS and Callan Associates.
2. Please provide any documents relating to potential conflicts of interest at Callan.
3. Please provide any documents prepared or received as part of STRS's due diligence documents regarding litigation, regulatory or disciplinary matters involving Callan.
4. Please provide all documents related to compensation arrangements by Callan with the STRS investment managers.

5. Please provide documentation related to any review by the STRS Board of potential conflicts of interest at Callan.
6. Please provide any disclosure(s) providing the actual dollar amounts of compensation received by Callan from each of the STRS investment managers.
7. Please provide all asset allocation reports, investment manager recommendations, investment performance and other reports related to STRS produced by Callan.

Documents Relating to Board and Staff:

2. Please provide documents related to any and all board seats that STRS holds on investment partnerships.
3. Please provide all documents related to travel expenses related to attendance by STRS staff at investment partnership meetings.
4. Please provide documents related to all expenses related to staff and board member travel to non-U.S. locations.

Concerning items 2-7 of the Documents relating to Callan and items 2-4 of the Documents Relating to Board and Staff, I must note that much of your request fails to satisfy the requirement of public records law that you specifically and particularly identify the records that you are seeking. Under Ohio law, a requestor has the duty to "identify the records.....wanted with sufficient clarity." *State ex rel. Dillery v. Icsman (2001) 92 Ohio St.3d 312, 314.*

A public office is not required to conduct research or otherwise "seek out and retrieve those records which would contain the information of interest to the requester". *State ex rel. Fant v. Tober (8th Dist., April 28, 1993), No. 63737, 1993 Ohio App. LEXIS 2591 at *4; aff'd (1993), 68 Ohio St. 3d 117.* To the extent that you have requested records containing specific information, rather than identifying the specific records you seek, your request is inappropriate under applicable legal standards. If there are specific records you would like to request, please identify those with sufficient clarity.

That said, in the interest of openness, this office has voluntarily made an effort to identify readily available public records that are responsive and we are providing all 24 reports we believe to be responsive to Item #7, and responsive in part to #2-6 of the section on Documents relating to Callan.

In response to item #2 of Documents relating to Board and Staff, STRS Ohio has 2 associates on the board of WHF STRS Ohio Senior Loan Fund LLC, which is jointly owned by WhiteHorse Finance, Inc. and State Teachers Retirement System of Ohio.

With regard to items #3 and 4 of documents relating to Board and Staff, STRS Ohio does not track travel expenses by location or meeting type. That said, in the interest of openness, this office is providing 12 reports containing all travel information for our Investments-Alternatives/Management staff, and International Investments staff. These reports include more information than requested, however, these groups of associates are those who would typically travel to partnership meetings or internationally.

Again, to the extent there are additional records you seek related to any of these items, please identify those records with sufficient clarity.

We are still reviewing the remaining requests, and will follow up with additional records and/or clarifications regarding the records you seek.

Joy L Nelson, CRM

Records and Documentation Administration Manager
State Teachers Retirement System of Ohio

Items sent:

Investment Advisor Agreement 7-1-15 (Callan).pdf
First Amendment to 07-2015 Investment Advisor Agreement 6-1-16 (Callan).pdf
Second Amendment to 07-2015 Investment Advisor Agreement 5-4-18 (Callan).pdf
Callan Dec 15 Report.pdf
Callan Dec 16 Report.pdf
Callan Dec 17 Report.pdf
Callan Dec 18 Report.pdf
Callan Dec 19 Report.pdf
Callan Dec 20 Report.pdf

From: Nelson, Joy <nelsonjl@strsoh.org>
Sent: Tuesday, March 30, 2021 9:23 AM
To: Marc Dann <mdann@dannlaw.com>
Subject: RE: Public Records Request on behalf of Edward Siedle #11

[This is the second email for this portion of the request.](#)

Joy L Nelson, CRM

Records and Documentation Administration Manager
State Teachers Retirement System of Ohio

Items sent:

Callan June 15 Report.pdf
Callan June 16 Report.pdf
Callan June 17 Report.pdf
Callan June 18 Report.pdf
Callan June 19 Report.pdf
Callan June 20 Report.pdf
Callan Mar 15 Report.pdf
Callan Mar 16 Report.pdf
Callan Mar 17 Report.pdf
Callan Mar 18 Report.pdf
Callan Mar 19 Report.pdf
Callan Mar 20 Report.pdf

From: Nelson, Joy <nelsonjl@strsoh.org>
Sent: Tuesday, March 30, 2021 9:24 AM
To: Marc Dann <mdann@dannlaw.com>
Subject: RE: Public Records Request on behalf of Edward Siedle #12

This is the third email for this portion of the request.

Joy L Nelson, CRM

Records and Documentation Administration Manager
State Teachers Retirement System of Ohio

Items sent:

Callan Sep 15 Report.pdf
Callan Sep 16 Report.pdf
Callan Sep 17 Report.pdf
Callan Sep 18 Report.pdf
Callan Sep 19 Report.pdf
Callan Sep 20 Report.pdf
Acct. 74001 Dept. 311 7-2015 thru 6-2016.pdf
Acct. 74001 Dept. 311 7-2016 thru 6-2017.pdf
Acct. 74001 Dept. 311 7-2017 thru 6-2018.pdf
Acct. 74001 Dept. 311 7-2018 thru 6-2019.pdf
Acct. 74001 Dept. 311 7-2019 thru 6-2020.pdf
Acct. 74001 Dept. 311 7-2020 thru 3-24-2021.pdf
Acct. 74001 Dept. 361 7-2015 thru 6-2016.pdf
Acct. 74001 Dept. 361 7-2016 thru 6-2017.pdf
Acct. 74001 Dept. 361 7-2017 thru 6-2018.pdf
Acct. 74001 Dept. 361 7-2018 thru 6-2019.pdf
Acct. 74001 Dept. 361 7-2019 thru 6-2020.pdf
Acct. 74001 Dept. 361 7-2020 thru 3-24-2021.pdf

From: Nelson, Joy <nelsonjl@strsoh.org>
Sent: Tuesday, March 30, 2021 9:28 AM
To: Marc Dann <mdann@dannlaw.com>
Subject: RE: Public Records Request on behalf of Edward Siedle #12

Dear Mr. Dann,

I just realized the emails went from #9 in the subject line to #11 and skipped #10. There is not a #10.

Joy L Nelson, CRM

Records and Documentation Administration Manager
State Teachers Retirement System of Ohio

From: Nelson, Joy <nelsonjl@strsoh.org>
Sent: Monday, April 5, 2021 9:34 AM
To: Marc Dann <mdann@dannlaw.com>
Subject: Public Records Request on behalf of Edward Siedle #13

Dear Mr. Dann,

STRS Ohio is responding to your public records request received February 23, 2021. The response will require multiple emails, over a period of time, due to volume. I will note when we send the final email. The email I am sending today contains records responsive to following list for the past 6 years, as requested:

Documents relating to Cliffwater:

1. Please provide all contracts between STRS and Cliffwater.
2. Please provide any documents regarding potential conflicts of interest at Cliffwater.
3. Please provide any due diligence documents regarding litigation, regulatory or disciplinary matters involving Cliffwater.
4. Please provide any disclosure by Cliffwater of compensation arrangements with the fund's investment managers.
5. Please provide documents related to any review by the STRS Board conflicts of interest at Cliffwater.
7. Please provide any disclosure requesting or providing the actual dollar amounts of compensation received by Cliffwater from the pension's investment managers.

Concerning items 2-5 and 7, I must note that much of your request fails to satisfy the requirement of public records law that you specifically and particularly identify the records that you are seeking. Under Ohio law, a requestor has the duty to "identify the records.....wanted with sufficient clarity." *State ex rel. Dillery v. Icsman (2001) 92 Ohio St.3d 312, 314.*

A public office is not required to conduct research or otherwise "seek out and retrieve those records which would contain the information of interest to the requester". *State ex rel. Fant v. Tober (8th Dist., April 28, 1993), No. 63737, 1993 Ohio App. LEXIS 2591 at *4; aff'd (1993), 68 Ohio St. 3d 117.* To the extent that you have requested records containing specific information, rather than identifying the specific records you seek, your request is inappropriate under applicable legal standards. If there are specific records you would like to request, please identify those with sufficient clarity.

That said, in the interest of openness, this office has voluntarily made an effort to identify readily available public records that are responsive and we are providing the report we believe to be responsive.

Again, to the extent there are additional records you seek related to any of these items, please identify those records with sufficient clarity.

We are still reviewing the remaining requests, and will follow up with additional records and/or clarifications regarding the records you seek.

Joy L Nelson, CRM

Records and Documentation Administration Manager
State Teachers Retirement System of Ohio

Items sent:

Investment Advisor Agreement 7-1-15 (Cliffwater) – Redacted.pdf
First Amendment to 07-2015 Investment Advisor Agreement 5-10-18 (Cliffwater).pdf
ADV Part 2A and 2B Cliffwater Brochure and Supplement 2020 03 27.pdf

From: Nelson, Joy <nelsonjl@strsoh.org>
Sent: Monday, April 5, 2021 9:43 AM
To: Marc Dann <mdann@dannlaw.com>
Subject: RE: Public Records Request on behalf of Edward Siedle #13

Dear Mr. Dann,

Concerning the redacted Investment Advisor Agreement from Cliffwater, they state the redacted portions are exempted from disclosure under R.C. 149.43(A)(1)(v) of the Public Records Act as “records the release of which is prohibited by state or federal law”, in particular, that they are trade secrets.

The compensation provisions of the Investment Advisor Agreement constitute a trade secret that contains proprietary commercial and financial information of Cliffwater. The compensation provisions are virtually unknown outside of the business or by employees and others involved in the business. Cliffwater takes extensive measures to maintain the confidentiality of the information in these compensation provisions and it would be virtually impossible for others to properly acquire or duplicate this information. In addition, Cliffwater’s competitors would obtain a significant advantage over Cliffwater if they had access to the information in the compensation provisions schedule as they could modify their own bids to defeat Cliffwater in the marketplace.

Sincerely,

Joy L Nelson, CRM

Records and Documentation Administration Manager
State Teachers Retirement System of Ohio

From: Nelson, Joy <nelsonjl@strsoh.org>
Sent: Thursday, April 8, 2021 2:54 PM
To: Marc Dann <mdann@dannlaw.com>
Subject: Public Records Request on behalf of Edward Siedle #14

Dear Mr. Dann,

STRS Ohio is responding to your public records request received February 23, 2021. The response will require multiple emails, over a period of time, due to volume. I will note when we send the final email. The three emails I am sending today contains records responsive to following list for the past 6 years, as requested:

Documents relating to CEM Benchmarking:

1. Please provide all contracts between STRS and CEM Benchmarking.

2. Please provide all reports and analysis produced by CEM Benchmarking related to STRS's investment management fees, costs and expenses.
3. Please provide all reports and analysis produced by CEM Benchmarking related to alternative investments.

Concerning the above items, I must note that much of your request is overly broad and fails to satisfy the requirement of public records law that you specifically and particularly identify the records that you are seeking. Under Ohio law, a requestor has the duty to "identify the records.....wanted with sufficient clarity." *State ex rel. Dillery v. Icsman (2001) 92 Ohio St.3d 312, 314.*

A public office is not required to conduct research or otherwise "seek out and retrieve those records which would contain the information of interest to the requester". *State ex rel. Fant v. Tober (8th Dist., April 28, 1993), No. 63737, 1993 Ohio App. LEXIS 2591 at *4; aff'd (1993), 68 Ohio St. 3d 117.* To the extent that you have requested records containing specific information, rather than identifying the specific records you seek, your request is inappropriate under applicable legal standards. If there are specific records you would like to request, please identify those with sufficient clarity.

That said, in the interest of openness, this office has voluntarily made an effort to identify readily available public records that are responsive to items two and three and we are providing the five reports we believe to be responsive.

Again, to the extent there are additional records you seek related to any of these items, please identify those records with sufficient clarity.

CEM Benchmarking's explanation of their redactions is

"The redactions have been made in line with the definition of "Trade secret" as defined in Ohio Code 1333.61 Uniform trade secrets act definitions as follows:

(D) "Trade secret" means information, including the whole or any portion or phase of any scientific or technical information, design, process, procedure, formula, pattern, compilation, program, device, method, technique, or improvement, or any business information or plans, financial information, or listing of names, addresses, or telephone numbers, that satisfies both of the following:

(1) It derives independent economic value, actual or potential, from not being generally known to, and not being readily ascertainable by proper means by, other persons who can obtain economic value from its disclosure or use.

(2) It is the subject of efforts that are reasonable under the circumstances to maintain its secrecy.

We have redacted our cost data as well as certain formulas and methods used in the preparation of the report. The information that has been redacted is not publicly available and is only provided to our paying clients. The redacted cost data has been provided to us by our clients and forms our proprietary cost database. This data and database is not available from other public sources and forms the basis for our analysis. It is key to our business model that the data not be publicly released. Note that I have not redacted return information since 1) much of this data could be gleaned from publicly available sources (CAFRs) and is not core to our product."

We are still reviewing the remaining requests, and will follow up with additional records and/or clarifications regarding the records you seek.

Sincerely,

Joy L Nelson, CRM

Records and Documentation Administration Manager
State Teachers Retirement System of Ohio

Items sent:

2015 CEM Final Report DB_Redacted.pdf
2018 CEM Final Report DB_Redacted.pdf
2019 CEM Final Report DB_Redacted.pdf

From: Nelson, Joy <nelsonjl@strsoh.org>
Sent: Thursday, April 8, 2021 2:56 PM
To: Marc Dann <mdann@dannlaw.com>
Subject: RE: Public Records Request on behalf of Edward Siedle #14

[This is the second email for this portion of the request.](#)

Joy L Nelson, CRM

Records and Documentation Administration Manager
State Teachers Retirement System of Ohio

Item sent:

2016 CEM Final Report DB_Redacted.pdf

From: Nelson, Joy <nelsonjl@strsoh.org>
Sent: Thursday, April 8, 2021 2:58 PM
To: Marc Dann <mdann@dannlaw.com>
Subject: RE: Public Records Request on behalf of Edward Siedle #14

[This is the third email for this portion of the request.](#)

Joy L Nelson, CRM

Records and Documentation Administration Manager
State Teachers Retirement System of Ohio

Item sent:

2017 CEM Final Report DB_Redacted.pdf

From: Nelson, Joy <nelsonjl@strsoh.org>
Sent: Thursday, April 15, 2021 7:25 AM
To: Marc Dann <mdann@dannlaw.com>
Subject: Public Records Request on behalf of Edward Siedle #15

Dear Mr. Dann,

STRS Ohio is responding to your public records request received February 23, 2021. The response will require multiple emails, over a period of time, due to volume. I will note when we send the final email. The email I am sending today is responsive to following list for the past 6 years, as requested:

Investment Managers:

1. All contracts, including any private placement memoranda, offering documents and subscription agreements, between STRS and its investment managers.
4. Please provide all documents demonstrating that investment managers in the employ of STRS are GIPS compliant.
5. Please provide all valuations performed or submitted to STRS by any investment fund or investment fund manager.
6. Please provide copies of all independent third party valuations of hard-to-value assets in the possession of STRS.
7. Please provide copies of all evaluations of the value of assets provided by investment funds or investment fund managers engaged by STRS
8. Please provide all documents related to STRS investments in limited partnerships.
9. Please provide all documents related to STRS investments in Funds of Funds including but not limited to documents related to the underlying managers of each such fund.

Documents Relating to Auditors and Custodians:

3. Please provide all documents relating to third party valuations of hard to value assets conducted by custodians contracted with STRS.
4. Please provide all documents related to investments not custodied at STRS's custodians and indicate where such assets are held.
5. Please provide all documents related to the efforts STRS custodians make to verify the existence of all STRS assets held everywhere.
6. Please provide documents related any STRS assets deemed "worthless" by any custodian.

Concerning the above items, I must note that much of your request is overly broad and fails to satisfy the requirement of public records law that you specifically and particularly identify the records that you are seeking. Under Ohio law, a requestor has the duty to "identify the records.....wanted with sufficient clarity." *State ex rel. Dillery v. Icsman (2001) 92 Ohio St.3d 312, 314.*

A public office is not required to conduct research or otherwise "seek out and retrieve those records which would contain the information of interest to the requester". *State ex rel. Fant v. Tober (8th Dist., April 28, 1993), No. 63737, 1993 Ohio App. LEXIS 2591 at *4; aff'd (1993), 68 Ohio St. 3d 117.* To the extent that you have requested records containing specific information, rather than identifying the specific records you seek, your request is inappropriate under applicable legal standards. If there are specific records you would like to request, please identify those with sufficient clarity.

For identifying records, the Public Records Act “does not contemplate that any individual has the right to a complete duplication of voluminous files kept by government agencies.” *State ex rel. Warren Newspapers, Inc. v. Hutson (1994)*, 70 Ohio St.3d 619, 624, 640 N.E.2d 174, citing *State ex rel. Zauderer v. Joseph (1989)*, 62 Ohio App.3d 752, 577 N.E.2d 444. Requests that “compel the records custodian to research voluminous files and identify a specific subset of records containing selected information, [e.g. request relating to all records of a subset] *** [t]he courts held that these types of requests were improper ***. It may seem counterintuitive to brand such requests as overbroad, vague, ambiguous, or unclear because the requests contain a great deal of specificity, but such labels may not be unwarranted when such requests are made without knowledge of whether such records exist or where to begin to look for them. *** Furthermore, although the phrase “related to” is commonly used in litigation discovery requests and understood by attorneys, the city employees who would have to search files might not understand the full breadth of the language.” *State ex rel. Essi v City of Lakewood, 2018-Ohio-5027*, 126 N.E.3d 254, ¶ 34.

That said, in the interest of openness, this office has voluntarily made an effort to identify readily available public records that are responsive to your request. Here is a link to the [2020 Comprehensive Annual Financial Report](#) to assist you in identifying the records you seek.

Again, to the extent there are additional records you seek related to any of these items, please identify those records with sufficient clarity.

We are still reviewing the remaining requests, and will follow up with additional records and/or clarifications regarding the records you seek.

Sincerely,

Joy L Nelson, CRM

Records and Documentation Administration Manager
State Teachers Retirement System of Ohio

From: Nelson, Joy <nelsonjl@strsoh.org>
Sent: Friday, April 30, 2021 11:09 AM
To: Marc Dann <mdann@dannlaw.com>
Subject: Public Records Request on behalf of Edward Siedle #16

Dear Mr. Dann,

STRS Ohio is responding to your public records request received February 23, 2021. The response will require multiple emails, over a period of time, due to volume. I will note when we send the final email. The email I am sending today contains records responsive to following list for the past 6 years, as requested:

Documents relating to Cliffwater:

6. Please provide all asset allocation reports, investment manager recommendations, investment performance and other reports related to STRS produced by Cliffwater.

I must note that much of your request fails to satisfy the requirement of public records law that you specifically and particularly identify the records that you are seeking. Under Ohio law, a requestor has the duty to “identify the records.....wanted with sufficient clarity.” *State ex rel. Dillery v. Icsman (2001) 92 Ohio St.3d 312, 314.*

A public office is not required to conduct research or otherwise “seek out and retrieve those records which would contain the information of interest to the requester”. *State ex rel. Fant v. Tober (8th Dist., April 28, 1993), No. 63737, 1993 Ohio App. LEXIS 2591 at *4; aff’d (1993), 68 Ohio St. 3d 117.* To the extent that you have requested records containing specific information, rather than identifying the specific records you seek, your request is inappropriate under applicable legal standards. If there are specific records you would like to request, please identify those with sufficient clarity.

That said, in the interest of openness, this office has voluntarily made an effort to identify readily available public records that are responsive and we are providing the 20 reports we believe to be responsive.

Again, to the extent there are additional records you seek related to any of these items, please identify those records with sufficient clarity.

We are still reviewing the remaining requests, and will follow up with additional records and/or clarifications regarding the records you seek.

Joy L Nelson, CRM

Records and Documentation Administration Manager
State Teachers Retirement System of Ohio

Items sent:

2019 06 Cliffwater Board Report.pdf
2020 06 Cliffwater Board Report.pdf
2015 06 Cliffwater Board Report.pdf
2016 06 Cliffwater Board Report.pdf
2017 06 Cliffwater Board Report.pdf
2018 06 Cliffwater Board Report.pdf
2019Inv03OvAltInvestments_SemiAnnualPeformance.pdf
2020 09 Cliffwater Board Report.pdf
201803InvCliffwaterAlternative.pdf
2017 09 Cliffwater Board Report.pdf
2018 09 Cliffwater Board Report.pdf
2019 09 Cliffwater Board Report.pdf
2015 11 Cliffwater Board Report.pdf
2016 03 Cliffwater_AltInvLiquid.pdf
2016 11 Cliffwater Board Report.pdf
2017 03 Cliffwater Board Report.pdf
201503Cliffwater.pdf
201603Inv_AltInv.pdf
201603Inv_Cliffwater.pdf
201703Inv_Cliffwater.pdf

From: Nelson, Joy <nelsonjl@strsoh.org>
Sent: Thursday, May 6, 2021 1:27 PM
To: Marc Dann <mdann@dannlaw.com>
Subject: Public Records request on behalf of Edward Siedle #17
Dear Mr. Dann,

STRS Ohio is responding to your public records request received February 23, 2021. The response will require multiple emails, over a period of time, due to volume. I will note when we send the final email. I am sending two emails containing one set of records relating to following requests; additional records are still being gathered. As requested, for the past six years:

Documents relating to Investment Managers:

2. All Requests for Proposals ("RFPs") or other documents related to competitive bidding issued by STRS for hiring investment managers or investment funds.
3. All documents submitted to STRS in response to RFPs or other competitive bidding efforts by investment funds and investment fund managers.

I must note that much of your request fails to satisfy the requirement of public records law that you specifically and particularly identify the records that you are seeking. Under Ohio law, a requestor has the duty to "identify the records.....wanted with sufficient clarity." *State ex rel. Dillery v. Icsman (2001) 92 Ohio St.3d 312, 314.*

A public office is not required to conduct research or otherwise "seek out and retrieve those records which would contain the information of interest to the requester". *State ex rel. Fant v. Tober (8th Dist., April 28, 1993), No. 63737, 1993 Ohio App. LEXIS 2591 at *4; aff'd (1993), 68 Ohio St. 3d 117.* To the extent that you have requested records containing specific information, rather than identifying the specific records you seek, your request is inappropriate under applicable legal standards. If there are specific records you would like to request, please identify those with sufficient clarity.

That said, in the interest of openness, this office has voluntarily made an effort to identify readily available public records that are responsive and we are providing the two Request for Proposals (RFP) and the five RFP Responses we believe to be responsive.

Three of the attached RFP responses contain redactions of information identified by the managers as exempt from disclosure as trade secret under Ohio law, with legal reasoning provided in the response document or via separate letter which is also attached.

Again, to the extent there are additional records you seek related to any of these items, please identify those records with sufficient clarity.

We are still reviewing the remaining requests, and will follow up with additional records and/or clarifications regarding the records you seek.

Sincerely,
Joy L Nelson, CRM
Records and Documentation Administration Manager
State Teachers Retirement System of Ohio

Items sent:

h-yield-rfp.pdf
Ohio STRS EMD RFP – Payden & Rygel.pdf
STRS Ohio – HYB – AMNA Final.pdf
STRS Ohio – MFS Emerging Markets Debt RFP = 12-05-2018_FINAL_Redacted.pdf
STRS Ohio_RFP – JPMAM High Yield Broad – 2018.12.07 – REDACTED Final.pdf
STRS Ohio FOIA Response Letter (68114228.1).docx
Em-mrkt-rfp.pdf

From: Nelson, Joy <nelsonjl@strsoh.org>
Sent: Thursday, May 6, 2021 1:32 PM
To: Marc Dann <mdann@dannlaw.com>
Subject: RE: Public Records request on behalf of Edward Siedle #18

[This is the second email for this portion of the request.](#)

Joy L Nelson, CRM

Records and Documentation Administration Manager
State Teachers Retirement System of Ohio

Item sent:

PGIM Fixed Income- OSTRS BMHY Proposal FINAL 12-07-18 – Redacted 4-2021.pdf

May 18, 2021

Marc Dann
Dann Law
P.O. Box 6031040
Cleveland OH 44103



**STATE TEACHERS
RETIREMENT SYSTEM
OF OHIO**

275 East Broad Street
Columbus, OH 43215-3771
614-227-4090
www.strsoh.org

Dear Mr. Dann,

STRS Ohio is responding to your public records request received February 23, 2021. The response will require multiple emails, over a period of time, due to volume. **We will be mailing a thumb drive of records relating to following requests due to the volume of records.** As requested, for the past six years:

Documents relating to Investment Managers:

2. All Requests for Proposals ("RFPs") or other documents related to competitive bidding issued by STRS for hiring investment managers or investment funds.

3. All documents submitted to STRS in response to RFPs or other competitive bidding efforts by investment funds and investment fund managers.

I must note that much of your request fails to satisfy the requirement of public records law that you specifically and particularly identify the records that you are seeking. Under Ohio law, a requestor has the duty to "identify the records.....wanted with sufficient clarity." *State ex rel. Dillery v. Icsman (2001) 92 Ohio St.3d 312, 314.*

A public office is not required to conduct research or otherwise "seek out and retrieve those records which would contain the information of interest to the requester". *State ex rel. Fant v. Tober (8th Dist., April 28, 1993), No. 63737, 1993 Ohio App. LEXIS 2591 at *4; aff'd (1993), 68 Ohio St. 3d 117.* To the extent that you have requested records containing specific information, rather than identifying the specific records you seek, your request is inappropriate under applicable legal standards. If there are specific records you would like to request, please identify those with sufficient clarity.

That said, in the interest of openness, this office has voluntarily made an effort to identify readily available public records that are responsive. On May 6, 2021 we sent two emails with records responsive. The thumb drive holds 1 Request for Proposals (RFP) and the 50 RFP Responses (and associated attachments) we also believe to be responsive.

The managers that redacted RFP responses containing information identified as exempt from disclosure have provided their legal reasoning in the response documents or via separate letters, all of which are included on the thumb drive. Below are explanations provided by some managers:

Acadian Asset Response:

Acadian Asset Management manages client portfolios using a systematic, quantitative investment process that is model based and highly technical and formulaic. The methods, techniques, and factors utilized have been developed and enhanced over the course of over 30 years at an expense to Acadian that could not be quantified. The specific details of how we create our investment models and the factors used within them, how we conduct investment research, how our investment process functions, and how we trade is highly proprietary and represent the firm's intellectual capital that we believe gives us a competitive advantage. We consider all of this information to be trade secrets and believe a public release of such information would cause irreparable harm to Acadian and our business. As such we believe that this information should be exempt from public records disclosure under Ohio Revised Code, Title 13 Commercial Transactions, Chapter 1333 Trade Practices, Section 1333.61 (D).

Section 1333.61 (D) defines a "Trade Secret" to mean information, including the whole or any portion or phase of any scientific or technical information, design, process, procedure, formula, pattern, compilation, program, device, method, technique, or improvement, or any business information or plans, financial information, or listing of names, addresses, or telephone numbers, that satisfies both of the following:

(1) It derives independent economic value, actual or potential, from not being generally known to, and not being readily ascertainable by proper means by, other persons who can obtain economic value from its disclosure or use.

(2) It is the subject of efforts that are reasonable under the circumstances to maintain its secrecy

We have identified four documents that we have provided to OHSTRS that we believe either fully or partially contain trade secrets that we wish to protect from public disclosure.

1. We request that the attached “Acadian Investment Process Updates 1995-2019 – DO NOT DISCLOSE - TRADE SECRETS” not be disclosed in its entirety contains trade secrets.
2. We request slides 16 and 17 of the attached “Acadian – State Teachers Retirement System of Ohio (ACW ex.US SC) call 2-4-21 REDACTED Slides 16 and 17” be redacted as they contain trade secrets.
3. “Response from Acadian Asset Management – STRS Ohio Small_Cap_RFP – REDACTED” has been edited to remove responses containing trade secrets.
4. “Acadian Response – Ohio STRS follow-up questions –REDACTED” has been edited to remove responses containing trade secrets.

American Century response:

For each, the applicable exemption is R.C. 149.43(A)(1)(v) which exempts the release of records prohibited by state or federal law. We believe such redacted responses are trade secrets under Ohio law as defined by R.C. 1333.61(D).

Castle Ark redactions:

Information redacted to comply with state or federal law. Personal information not subject to disclosure.

Dimensional response:

“On the 73rd page of the pdf of the response of Dimensional Fund Advisors (“Dimensional”) to the RFP, Dimensional redacted information related to its fee schedule for its services and contact information for certain of its clients. Dimensional believes this information is confidential and exempted from disclosure as Dimensional’s trade secrets under R.C. 149.43(A)(1)(v) of the Ohio Public Records Act and R.C. 1333.61(D) of the Ohio Uniform Trade Secrets Act.”

Highclere redactions:

Information redacted to comply with state or federal law. Personal information not subject to disclosure.

Neuberger Berman response:

Information redacted to comply with state or federal law. Personal information not subject to disclosure.

PIMCO response:

“The basis for these redactions is that PIMCO believes such information constitutes a “trade secret” as the term is defined in Section 1333.61(D) of the Ohio Revised Code and is exempt from disclosure pursuant to Ohio Revised Code Section 149.43(A)(1)(v).”

Seven Canyons response:

Information redacted to comply with state or federal law. Personal information not subject to disclosure.

Mr. Dann, again, to the extent there are additional records you seek related to any of these items, please identify those records with sufficient clarity.

We are still reviewing the remaining requests and will follow up with additional records and/or clarifications regarding the records you seek.

Sincerely,

Joy L Nelson, CRM

Records and Documentation Administration Manager
State Teachers Retirement System of Ohio

Enclosure

Item sent:

Thumb drive with 611 files

From: Nelson, Joy <nelsonjl@strsoh.org>
Sent: Friday, May 21, 2021 1:41 PM
To: Marc Dann <mdann@dannlaw.com>
Subject: Public Records request on behalf of Edward Siedle #20

Dear Mr. Dann,

STRS Ohio is responding to your public records request received February 23, 2021. The response will require multiple emails, over a period of time, due to volume. **This will be our final email responsive to your request.** Due to data size, the documents will come in two email. As requested, for the past six years:

Documents relating to Investment Managers:

2. All Requests for Proposals (“RFPs”) or other documents related to competitive bidding issued by STRS for hiring investment managers or investment funds.

3. All documents submitted to STRS in response to RFPs or other competitive bidding efforts by investment funds and investment fund managers.

I must note that much of your request fails to satisfy the requirement of public records law that you specifically and particularly identify the records that you are seeking. Under Ohio law, a requestor has the duty to “identify the records.....wanted with sufficient clarity.” *State ex rel. Dillery v. Icsman (2001) 92 Ohio St. 3d 312, 314.*

A public office is not required to conduct research or otherwise “seek out and retrieve those records which would contain the information of interest to the requester”. *State ex rel. Fant v. Tober (8th Dist., April 28, 1993), No. 63737, 1993 Ohio App. LEXIS 2591 at *4; aff’d (1993), 68 Ohio St. 3d 117.* To the extent that you have requested records containing specific information, rather than identifying the specific records you seek, your request is inappropriate under applicable legal standards. If there are specific records you would like to request, please identify those with sufficient clarity.

That said, in the interest of openness, this office has voluntarily made an effort to identify readily available public records that are responsive. On May 6, 2021 we sent two emails with records responsive. On May 18th, we mailed a thumb drive with records responsive. Today’s emails have 3 RFP responses (and associated attachments) we also believe to be response.

The managers that redacted RFP responses containing information identified as exempt from disclosure have provided their legal reasoning below and/or in the response documents:

Lazard

“LAM’s financial statements, fee information, and regulatory findings during examinations are all proprietary to our business and protected by trade secret as defined in R.C. 1333.61(D) under the Ohio Public Records Act.”

Wellington

“With respect to the documents you forwarded to Wellington for review on April 27, 2021, we are identifying one (1) document as not subject to disclosure under Ohio law. Please exclude the following document from disclosure:

Appendix 13 – 2019 WMC Statement of Financial Position

The document is not subject to disclosure pursuant to the Ohio Public Records Act (Ohio Revised Code Section 149.43) Section (A)(1)(v) as it is a “record the release of which is prohibited by state or federal law.” See *State ex rel. Besser v. Ohio State Univ.*, 89 Ohio St.3d 396 (2000).

The Ohio Uniform Trade Secrets Act defines Trade Secret as “ ... any business information or plans, financial information, or listing of names, addresses, or telephone numbers, that satisfies both of the following:

(1) It derives independent economic value, actual or potential, from not being generally known to, and not being readily ascertainable by proper means by, other persons who can obtain economic value from its disclosure or use.

(2) It is the subject of efforts that are reasonable under the circumstances to maintain its secrecy.

The “WMC Statement of Financial Position” reflects financial information of a private partnership that is not generally known or ascertainable and would provide competitive advantage if known to Wellington competitors. Wellington takes reasonable efforts to maintain the secrecy of this information, including without limitation, transmitting with password protection, as it did when it transmitted the document to STRS.”

Mr. Dann, again, to the extent there are additional records you seek related to any of these items, please identify those records with sufficient clarity.

Sincerely,

Joy L Nelson, CRM

Records and Documentation Administration Manager
State Teachers Retirement System of Ohio

Items sent:

State Teachers Retirement System of Ohio-FIAM SISC Plus 5 18 21.pdf

Redacted – Lazard Response – Ohio Teachers RS_International Small Cap RFP – 9 30 2020.pdf

Ohio STRS – Exhibits – 9.30-2020.zip

From: Nelson, Joy <nelsonjl@strsoh.org>

Sent: Friday, May 21, 2021 1:44 PM

To: Marc Dann <mdann@dannlaw.com>

Subject: RE: Public Records request on behalf of Edward Siedle #21

[This is the second email for this portion of the request.](#)

Joy L Nelson, CRM

Records and Documentation Administration Manager
State Teachers Retirement System of Ohio

Items sent:

Appendix 4 – Mission_Strategy_and_Culture.pdf

Appendix 5 – Policy and Procedures Regarding Allocation of Trades.pdf

Appendix 6 – Policy and Procedures on Side-by-Side Management of Client Accounts.pdf

Appendix 7 – Performance Data.xlsx

Appendix 8 – GIPS Compliant Presentation.pdf

Appendix 9 – GIPS Verification Letter.pdf

Appendix 10 – Sample Reporting Package.pdf

Appendix 11 – Code of Ethics Policy.pdf
Appendix 12 – Policy and Procedures on the Receipt and Use of Material – Non-Public Information.pdf
Appendix 13 – 2019 WMC Statement of Financial Position_PWP.pdf
Ohio STRS_ISC Follow-up Questions_Wellington.pdf
P&P Sample 2.2021.pdf
STRS_ISCRE_Cover Letter_Wellington Management.pdf
STRS_ISCRE_Wellington Management Response.pdf
Wellington – ISCRE Agenda – 2.3.21.pdf
Wellington Management_ISCRE presentation.pdf
2.3.21 Ohio STRS – ISCRE Finals.pdf
Appendix 1 – Monthly Returns.xlsx
Appendix 1 – Sample Investment Styles.pdf
Appendix 2 – GIPS-Compliant Presentation_ISCRE.pdf
Appendix 2 – Our Business and Practices (Form ADV Part 2A).pdf
Appendix 3 – Biographies ISCRE Team 2Q2020.pdf
Appendix 3 – Holdings_ISCRE.xlsx

From: Nelson, Joy <nelsonjl@strsoh.org>
Sent: Monday, May 24, 2021 7:53 AM
To: Marc Dann <mdann@dannlaw.com>
Subject: RE: Public Records request on behalf of Edward Siedle #21

Mr. Dann,

As a follow-up to the Fidelity document sent on Friday, they state “we would like to reference Ohio Code 149.43(A)(1)(v) as legal basis for the redaction”.

Thank you.

Joy L Nelson, CRM
Records and Documentation Administration Manager
State Teachers Retirement System of Ohio

EXHIBIT 1 - Exhibit D

Jaclyn D. Slusser

From: Michael Reid <michael@cembenchmarking.com>
Sent: Thursday, March 25, 2021 1:44 PM
To: Nelson, Joy
Cc: Lieser, Jeff; Wideman, Stacey
Subject: RE: STRS Ohio Public Records Request
Attachments: STRS Ohio CSA JYE 2020.doc

Follow Up Flag: Follow up
Due By: Thursday, April 8, 2021 8:00 AM
Flag Status: Flagged

Joy,

Thank you for your email. I will provide copies of the attached reports redacted in a consistent manner with the redacted 2018 report. I would plan on using the same rationale as before:

The redactions have been made in line with the definition of "Trade secret" as defined in Ohio Code 1333.61 Uniform trade secrets act definitions as follows:

(D) "Trade secret" means information, including the whole or any portion or phase of any scientific or technical information, design, process, procedure, formula, pattern, compilation, program, device, method, technique, or improvement, or any business information or plans, financial information, or listing of names, addresses, or telephone numbers, that satisfies both of the following:

(1) It derives independent economic value, actual or potential, from not being generally known to, and not being readily ascertainable by proper means by, other persons who can obtain economic value from its disclosure or use.

(2) It is the subject of efforts that are reasonable under the circumstances to maintain its secrecy.

We have redacted our cost data as well as certain formulas and methods used in the preparation of the report. The information that has been redacted is not publicly available and is only provided to our paying clients. The redacted cost data has been provided to us by our clients and forms our proprietary cost database. This data and database is not available from other public sources and forms the basis for our analysis. It is key to our business model that the data not be publicly released. Note that I have not redacted return information since 1) much of this data could be gleaned from publicly available sources (CAFRs) and is not core to our product.

Please confirm if the above rationale would continue to be sufficient.

I also note that, to the best of my knowledge, we do not have any formal contracts in place for the investment cost reports. We do however send a contract each year in respect of the pension administration benchmarking analysis (to Gary Russell's attention). I have attached a copy of the most recent one. I will leave it to you to decide if these need to be included in response to part 1 below. If so, I can provide you with similar documents for the past 6 years.

Regards,

Mike

Michael Reid | Vice President | CEM Benchmarking
372 Bay Street, Suite 1000 | Toronto | Ontario | M5H 2W9

From: Nelson, Joy <nelsonjl@strsoh.org>
Sent: March 25, 2021 1:10 PM
To: Michael Reid <michael@cembenchmarking.com>
Cc: Lieser, Jeff <LieserJ@strsoh.org>; Wideman, Stacey <widemans@strsoh.org>
Subject: STRS Ohio Public Records Request

Dear Mr. Reidl,

On February 23, 2021, STRS Ohio received a request under the Ohio Public Records Act (Ohio Revised Code Section 149.43) (excerpt follows) concerning records for the last 6 years:

- “1. Please provide all contracts between STRS and CEM Benchmarking.
2. Please provide all reports and analysis produced by CEM Benchmarking related to STRS's investment management fees, costs and expenses.
3. Please provide all reports and analysis produced by CEM Benchmarking related to alternative investments.”

STRS Ohio is providing notice of this request to CEM Benchmarking in consideration of the potentially confidential nature of certain aspects of our relationship. The attached documents appear responsive to the request. A redacted version of the 2018 CEM Final DB report was provided for a previous request and is included in the documents responsive, but is not attached.

If you believe these documents are not subject to disclosure under Ohio law, please advise and include the legal basis for any and all claimed exemption(s) or exception(s). Your response may be in the form of a redacted copy of the documents, with noted legal basis for redaction, or any other such form as you deem appropriate. If your response is challenged in court by the requester, STRS Ohio will call upon you to defend your position. Ohio law requires STRS Ohio to respond to a public records request within a reasonable period of time. We look forward to receiving your response on or before April 2, 2021.

If you have any questions, please feel free to contact me.

Sincerely,

Joy L Nelson, CRM
Records and Documentation Administration Manager
State Teachers Retirement System of Ohio
275 E Broad St
Columbus, OH 43215-3771
Phone: 614-227-2939

CONFIDENTIALITY NOTICE: STRS Ohio intends this e-mail message and any attachments to be used only by the person(s) or entity to which it is addressed. This message may contain confidential and/or legally privileged information. If the reader is not the intended recipient of this message or an employee or agent responsible for delivering the message to the intended recipient, you are hereby notified that you are prohibited from printing, copying, storing, disseminating or distributing this communication. If you received this communication in error, please delete it from your computer and notify the sender by reply e-mail.



Client Service Agreement

Pension Administration Benchmarking Service

July 1, 2020 to June 30, 2021

1. Scope of CEM's Services and Deliverables to State Teachers Retirement System of Ohio:

CEM will provide you with the following services:

- Issue a standard survey questionnaire to you.
- Assist you in understanding our data requirements.
- Review your data and discuss with you unusual or outlying data items.
- Prepare an electronic draft report, customised for your fund, with the results of the benchmarking.
- Update the data in the report as appropriate based on feedback from the draft report.
- Issue an electronic version and up to four hard copies of the final report.

In addition to the benchmarking report, you will be entitled to:

- One on-site meeting to present your benchmarking results to the Board or Management team.
- Receive CEM *Insights* research publications released during the client service agreement year.
- Send up to three attendees to CEM's annual Global Pension Administration Conference which will be held in Seattle, Washington, May 17th to May 20th, 2021.
- Have access for 12 months to CEM's online Peer Intelligence Network ("PIN"). The PIN network enables your staff to network with other administration experts around the world.

Please note that CEM does not advise on pension fund management. Decisions on actions arising from our analysis are yours alone.

2. Required from You

In order to produce a benchmarking report for you, we require information on your activities, costs, services and performance in a manner prescribed by CEM.

The delivery of your benchmarking report is dependent on the timely and effective delivery of information from you and your peers.

3. Fees

Our fee for the services outlined above is \$ 50,000. We will issue our invoice to you at the time that we send our draft benchmarking report in PDF format.

4. Exclusions from the fee:

- Your additional expenses in attending the world conference are not included in the fee. You are responsible for your own travel and accommodation arrangements and other ancillary expenses.
- You will receive an electronic copy of the benchmarking report and up to four hard copies. If you require additional hard copies we will charge an additional \$ 75 for each copy.
- If you require an additional benchmarking report with comparisons against a different peer group, such as an international peer group, there will be a charge of \$ 5,000 per report.
- Additional report customization will be provided based on the availability of production staff and priced at \$ 1,500 per day.

5. Timing

We ask that you complete the survey by October 15th 2020. This data should relate to your 2020 fiscal year.

We aim to provide your draft report in PDF format within 12 weeks of receiving complete data from you and your agreed peer group. In the event that one or more peers are late in providing their data, we will discuss with you whether to proceed immediately or to wait until we have data from all peers.

This agreement will continue for the duration of one full annual benchmarking cycle including the production of one benchmarking report, CEM *Insights* research publications and attendance at the 2021 world conference.

We will provide access to the PIN for a period of 12 months.

6. Intellectual Property

We retain the copyright and all intellectual property rights on all material provided to you.

7. Confidentiality

Your individual benchmarking results and report are proprietary and confidential and may not be disclosed to third parties without the express prior written consent of both CEM and State Teachers Retirement System of Ohio. Your data may be used in reports prepared for other CEM clients, as well as for custom analysis and research, provided that the data is used anonymously and is not linked to you in any way. Your plan's name may be disclosed in the reports prepared for other CEM clients on the pages that summarize the benchmarking universe or the peers used in the analysis. This disclosure will not be linked to your data or results.

8. Contact

Your key CEM contact will be:

Michael Reid, Vice President

Tel: +1 416-644-2516

Email: michael@cembenchmarking.com

Background information you may need:

CEM Benchmarking Inc.
372 Bay Street, Suite 1000
Toronto, Ontario, Canada
M5H 2W9

Phone: +1 (416) 369-0568

Fax: +1 (416) 369-0879

Website: www.cembenchmarking.com

Legal Status: Corporation

We appreciate the opportunity to be of service to you and look forward to working with you.

Yours sincerely



Michael Reid
Vice President

CEM Benchmarking Inc.

7. The Siedle Public Records Request requested forty-five (45) different categories of documents, mostly pertaining to STRS Ohio's investments, consultants, and service providers.

8. A member of my team, Joy Nelson, sent approximately twenty-four (24) emails and a thumb drive that contained a total of approximately eight hundred and twelve (812) documents believed by STRS Ohio to be responsive to the Siedle Public Records Request.

9. Included in the Siedle Public Records Request were the following requests regarding CEM Benchmarking ("CEM") for the previous six years:

2. Please provide all reports and analysis produced by CEM Benchmarking related to STRS's investment management fees, costs and expenses.

3. Please provide all reports and analysis produced by CEM Benchmarking related to alternative investments.

10. This was not the first time STRS Ohio has received a public records request for a CEM report.

11. On April 29, 2020, a public records request (the "2020 Public Records Request") was made to STRS Ohio for the "most recent full CEM investment report." *See* Email communications from J. Spring to N. Treneff attached hereto as Exhibit A and incorporated herein by reference.

12. On May 4, 2020, I emailed Michael Reid, Vice President of CEM, to inform him of the 2020 Public Records Request and asked Mr. Reid if CEM believed there was a legal basis not to disclose any portion of CEM's report requested in the 2020 Public Records Request. *See* Email communication from S. Wideman to M. Reid attached hereto as Exhibit B and incorporated herein by reference.

13. On May 6, 2020, Mr. Reid responded to my May 4, 2020, email, and asserted that some of the information contained in the CEM report was considered a trade secret, based, in part, on proprietary databases and cost formulas. *See* Exhibit B.

14. CEM provided STRS Ohio a redacted version of the report, and STRS Ohio provided the redacted version of the report to the requester of the 2020 Public Records Request. *See* Email communication from J. Nelson to J. Spring attached hereto as Exhibit C and incorporated herein by reference.

15. The requester of the 2020 Public Records Request did not challenge CEM's redactions or trade secrets assertion.

16. Similar to the 2020 Public Records Request, on March 25, 2021, Joy Nelson emailed Michael Reid to inform him of the Siedle Public Records Request and asked Mr. Reid if CEM believed there was a legal basis to again not disclose portions of CEM's reports.

17. Mr. Reid responded to Ms. Nelson's email shortly thereafter and notified STRS Ohio that CEM would provide redacted reports for responding to the Siedle Public Records Request because the reports contained information that constituted trade secrets.

18. On April 8, 2021, Ms. Nelson emailed Attorney Dann documents responsive to the CEM portion of the Siedle Public Records Request.

19. The documents provided to Attorney Dann on April 8, 2021, included five redacted CEM reports and the trade secret assertion provided by CEM for their redactions in the reports.

20. On May 24, 2021, STRS Ohio received notice that a lawsuit had been filed in the Ohio Supreme Court related to the CEM Reports provided in response to the Siedle Public Records Request.

21. STRS Ohio did not receive any clarifications or additional communications related to the CEM reports prior to May 24, 2021.

22. On June 7, 2021, Mr. Siedle released a report critical of STRS Ohio, including reference to the Siedle Public Records Request and identifying that a similar CEM report from a

South Carolina pension was available online. A copy of the June 7, 2021, report is attached hereto as Exhibit D and incorporated herein by reference.

23. The June 7, 2021, report indicated that South Carolina provided the entirety of the CEM report without redaction.

24. Prior to Mr. Siedle's report, STRS Ohio was not aware that unredacted versions of similar CEM reports publicly existed.

25. In response to my request for clarification, Mr. Reid relayed that South Carolina did not notify CEM that it would be posting the CEM report online or otherwise make it publicly available and that CEM was previously unaware of any public postings of its reports.

26. In light of the South Carolina disclosures, I spoke with Michael Reid of CEM in June 2021 and obtained his consent to provide all 5 unredacted reports to Mr. Dann at the mediation already scheduled for this case.

27. The parties engaged in their first mediation session on July 14, 2021, and at the onset, STRS Ohio agreed to provide the unredacted CEM reports to Attorney Dann.

28. The unredacted CEM reports were forwarded to Mr. Dann by counsel on July 14, 2021.

29. Mediation continued between the parties through August 17, 2021.


30. Specific to this case, all parties agreed at the August 17, 2021, mediation that the Siedle Public Records Request had been fulfilled, and the only remaining issue was Relator's request for attorneys' fees.

31. On August 19, 2021, STRS Ohio released a response to Benchmark Financial Services' June 7, 2021, report. A copy of STRS Ohio's August 19, 2021, response is attached hereto as Exhibit E and incorporated herein by reference.

32. It was reasonable for STRS Ohio to rely upon CEM's assertion that the redacted information was a trade secret as defined in the Ohio Revised Code and not subject to disclosure under R.C. 149.43(B).

33. It was reasonable for STRS Ohio to withhold the redacted portion of the CEM reports because it served the public policy underlying the public-records exemption for trade secrets information.

FURTHER AFFIANT SAYETH NAUGHT.



Stacey Wideman

STATE OF OHIO }
 }
COUNTY OF FRANKLIN } SS:

Sworn before me and subscribed in my presence by Stacey Wideman, this 15th day of March, 2022.



MARK D. MAXWELL, Attorney At Law
NOTARY PUBLIC STATE OF OHIO
My Commission has no expiration date
Section 147.03 R.C.



State of Ohio – Notary Public

Commission Expiration:

Jaclyn D. Slusser

From: Nelson, Joy <nelsonjl@strsoh.org>
Sent: Thursday, May 7, 2020 5:03 PM
To: JSpring@truenp.com
Cc: Treneff, Nick; Stein, Bob
Subject: RE: Full CEM report
Attachments: 2018 CEM Final Report DB_Redacted.pdf

Dear Mr. Spring,

Attached please find the records responsive to your request made to Nick Treneff on April 29, 2020. Please note that CEM has redacted certain information it deems to be trade secret under Ohio law.

Sincerely,

Joy L Nelson, CRM

Records and Documentation Administration Manager
State Teachers Retirement System of Ohio

From: Jonathan Spring <JSpring@truenp.com>
Sent: Wednesday, April 29, 2020 1:30 PM
To: Treneff, Nick <TreneffN@strsoh.org>
Subject: Full CEM report

Dear Nick,

Could you please email me the most recent full CEM investment report for STRS? Thank you very much,

Jonathan Spring

Investment
Cost Effectiveness Analysis
(for the 5-year period ending December 31, 2018)

STRS Ohio



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Prepared November 25, 2019. Although the information in this report has been based upon and obtained from sources we believe to be reliable, CEM Benchmarking Inc. ("CEM") does not guarantee its accuracy or completeness. The information contained herein is proprietary and confidential and may not be disclosed to third parties without the express written mutual consent of both CEM and STRS Ohio.

Key takeaways

Returns

- Your 5-year net total return of 6.25% was in the top quartile. This was above both the U.S. Public median of 5.42% and the peer median of 5.73%.
- Your 5-year policy return was 6.09%. This was above both the U.S. Public median of 5.30% and the peer median of 5.72%.

Value added

- Your 5-year net value added was 0.16%. This was above the U.S. Public median of 0.05% and above the peer median of 0.14%.

Cost

- Your investment cost of 40.1 bps was below your benchmark cost of 54.5 bps. This suggests that your fund was low cost compared to your peers.
- Your fund was low cost because you paid less than peers for similar services and you had a lower cost implementation style.

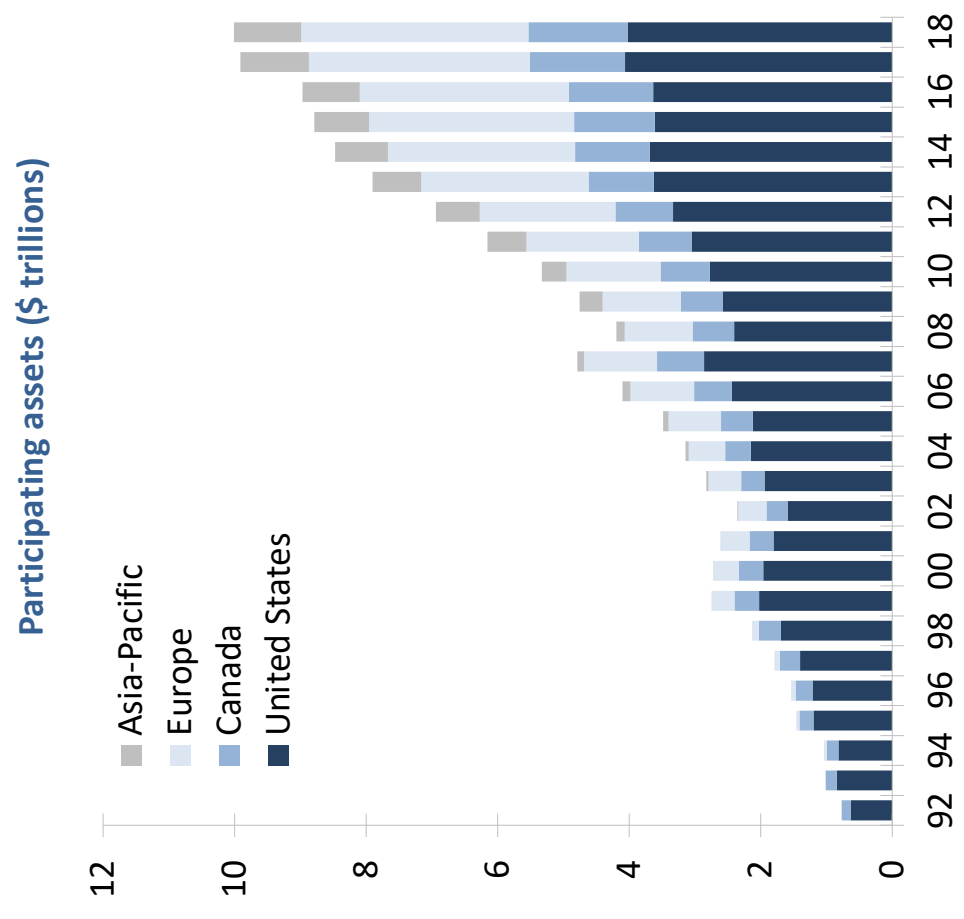
Risk

- Your asset risk of 11.8% was above the U.S. Public median of 10.4%.

This benchmarking report compares your cost and return performance to the 329 funds in CEM's extensive pension database.

- 166 U.S. pension funds participate. The median U.S. fund had assets of \$8.6 billion and the average U.S. fund had assets of \$24.2 billion. Total participating U.S. assets were \$4.0 trillion.
- 77 Canadian funds participate with assets totaling \$1.5 trillion.
- 77 European funds participate with aggregate assets of \$3.5 trillion. Included are funds from the Netherlands, Norway, Sweden, Finland, Ireland, Denmark and the U.K.
- 7 Asia-Pacific funds participate with aggregate assets of \$1.0 trillion. Included are funds from Australia, New Zealand, China and South Korea.
- 2 Gulf region funds participate.

The most meaningful comparisons for your returns and value added are to your custom peer group.



STRS00047

The most valuable comparisons for cost performance are to your custom peer group because size impacts costs.

Peer group for STRS Ohio

- 17 U.S. Public public sponsors from \$47 billion to \$228 billion
- Median size of \$83 billion versus your \$73 billion



To preserve client confidentiality, given potential access to documents as permitted by the Freedom of Information Act, we do not disclose your peers' names in this document.

What gets measured gets managed, so it is critical that you measure and compare the right things:

1. Returns

Why do total returns differ from other funds? What was the impact of your policy mix decisions versus implementation decisions?

2. Net value added

Are your implementation decisions adding value (i.e., mostly the effectiveness of active management, as well as the amount of active management versus passive management)?

3. Costs

Are your costs reasonable? Costs matter and can be managed.

4. Cost effectiveness

Net implementation value added versus excess cost. Does paying more get you more?

5. Risk

What is the risk of your policy mix?

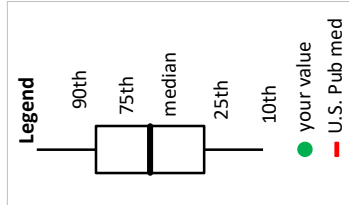
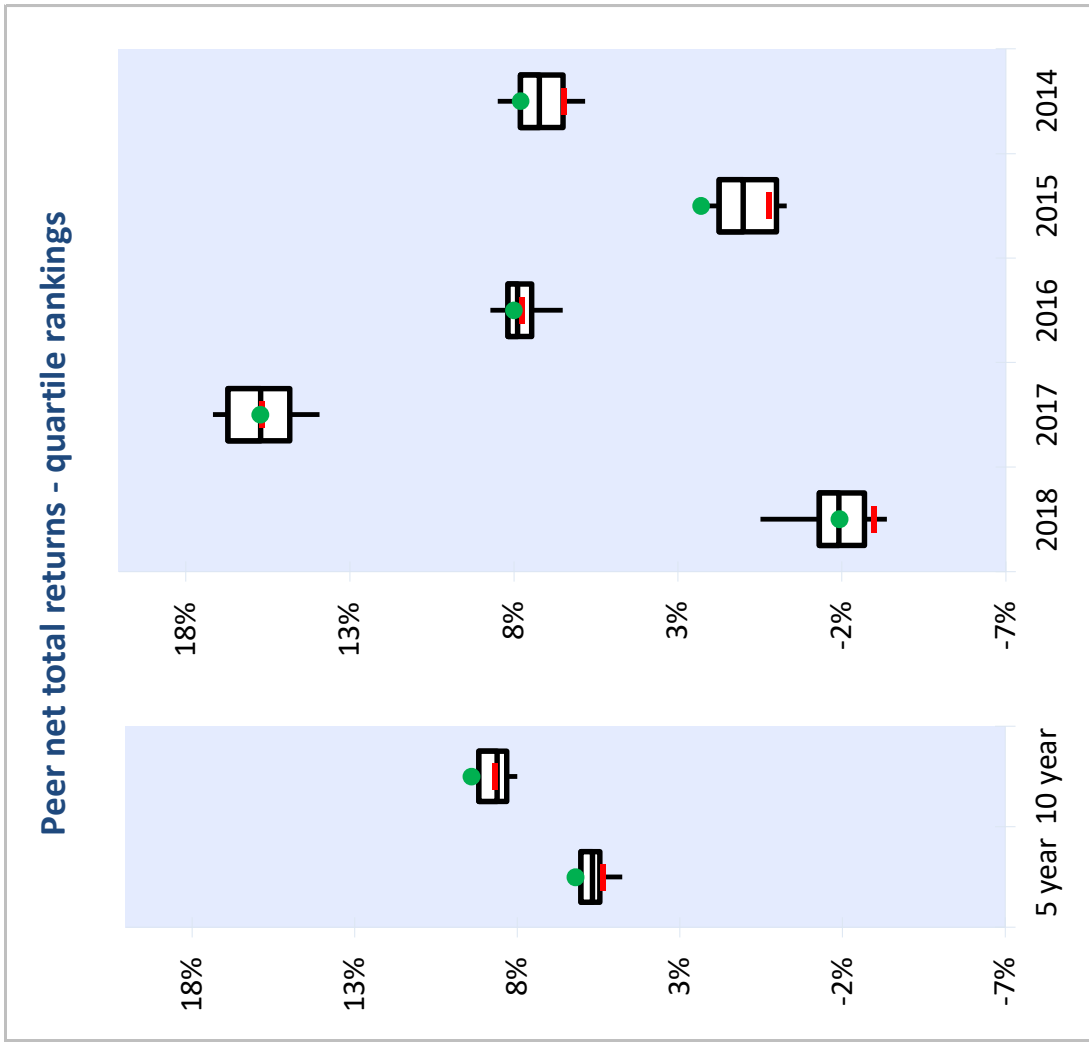
Your 5-year net total return of 6.25% was above the peer median of 5.73%.

Total returns, by themselves, provide little insight into the reasons behind relative performance. Therefore, we separate total return into its more meaningful components: policy return and value added.

Your 5-year	
Net total fund return	6.25%
- Policy return	6.09%
= Net value added	0.16%

This approach enables you to understand the contribution from both policy mix decisions (which tend to be the board's responsibility) and implementation decisions (which tend to be management's responsibility).

The median 5-year total return for the U.S. public universe was 5.4%.



Your 5-year policy return of 6.09% was above the peer median of 5.72%.

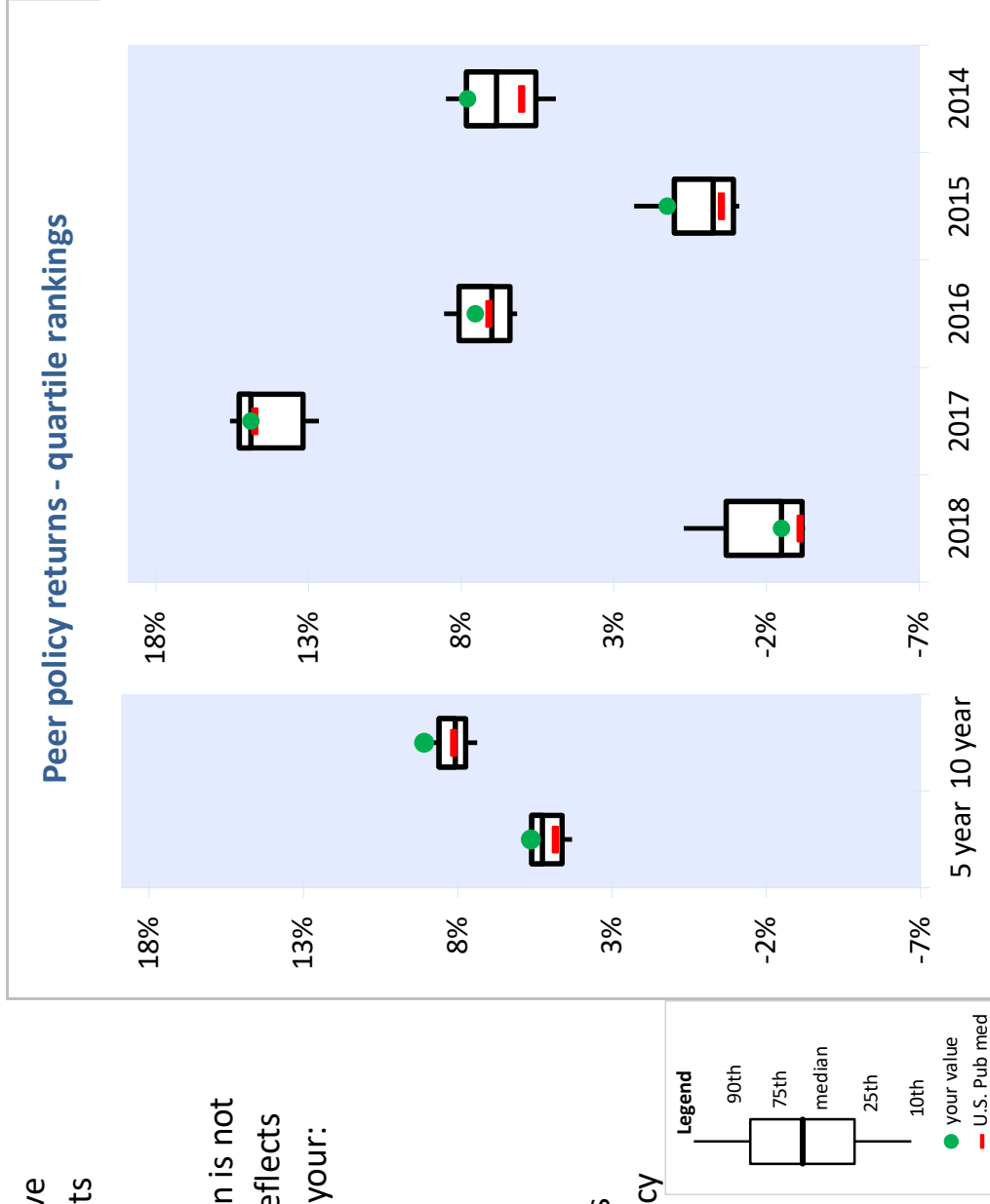
Your policy return is the return you could have earned passively by indexing your investments according to your policy mix.

Having a higher or lower relative policy return is not necessarily good or bad. Your policy return reflects your investment policy, which should reflect your:

- Long term capital market expectations
- Liabilities
- Appetite for risk

Each of these three factors is different across funds. Therefore, it is not surprising that policy returns often vary widely between funds.

The 5-year policy return of the U.S. public universe was 5.30%.



For peer comparison purposes, CEM uses a private equity benchmark that reflects lagged, investable public-market indices. If CEM used this same adjustment for your fund, your 5-year policy return would be 6.8%, 0.7% higher than your actual 5-year policy return of 6.1%.

Your 5-year policy return of 6.09% was above the peer median of 5.72% primarily because of:

- The positive impact of your higher weight in one of the better performing asset classes of the past 5 years: U.S. Stock.
- The positive impact of your lower weight in one of the weaker performing asset classes of the past 5 years: Fixed Income.

5-year average policy mix¹

	Your Fund	Peer Avg.	US pub Avg.
U.S. Stock	30%	17%	21%
Global Stock	0%	13%	10%
Non-US Stock	25%	16%	18%
Total Stock	56%	46%	49%
U.S. Bonds	19%	16%	16%
Cash	1%	0%	-1%
Other Fixed Income ²	0%	9%	12%
Total Fixed Income	20%	25%	27%
Risk Parity	0%	1%	1%
Real Estate incl. REITS	10%	11%	8%
Total Alternatives	14%	18%	17%
Total	100%	100%	100%

1. 5-year weights are based only on plans with 5 years of continuous data.

2. Other fixed income includes Inflation Indexed, High Yield, Emerging, Long and Global bonds.

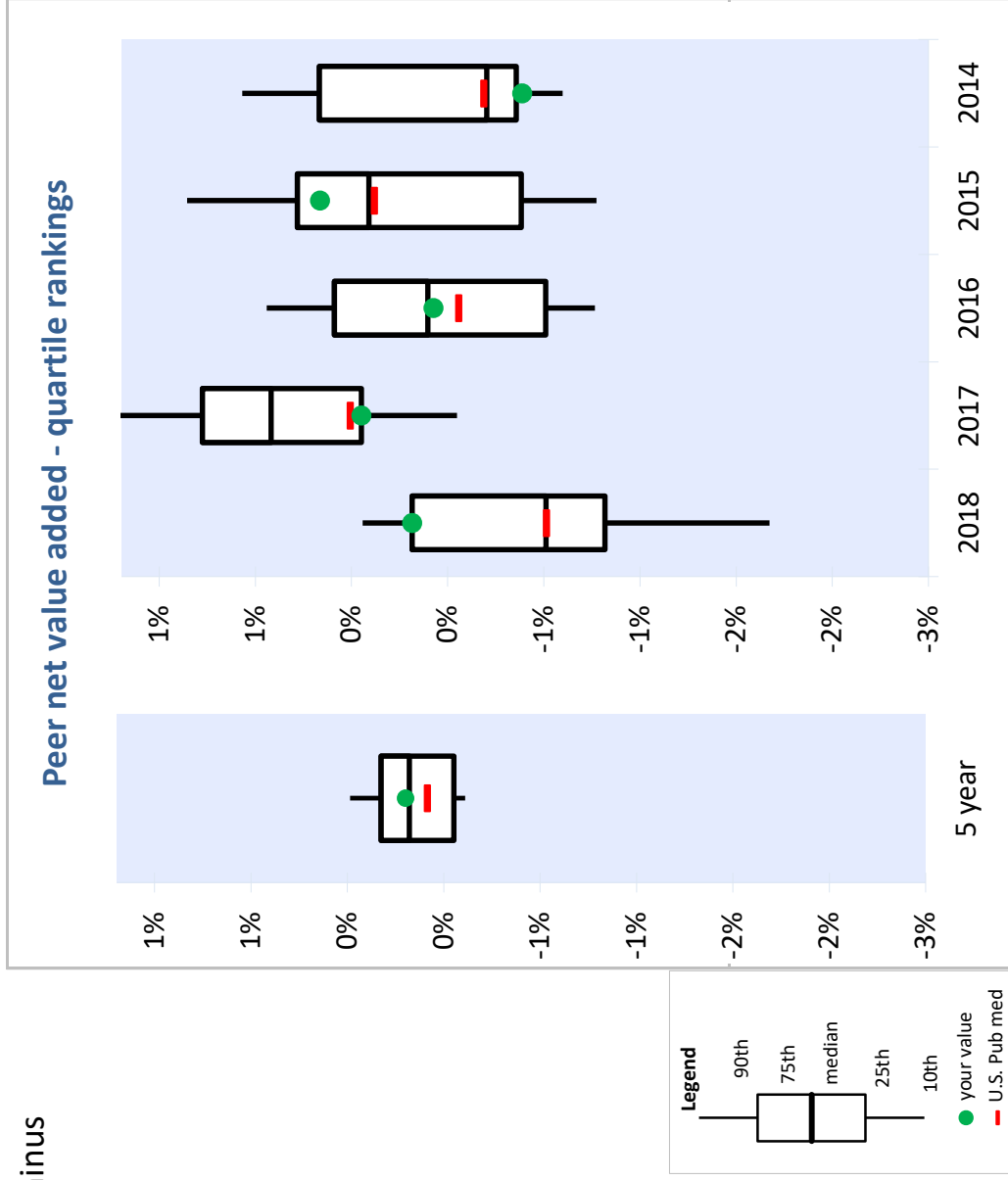
Net value added is the component of total return from active management. Your 5-year net value added was 0.16%.

Net value added equals total net return minus policy return.

Value added for STRS Ohio

Year	Net Return	Policy Return	Net value Added
2018	-1.89%	-2.04%	0.15%
2017	15.76%	15.35%	0.41%
2016	8.03%	8.00%	0.03%
2015	2.33%	1.71%	0.63%
2014	7.83%	8.26%	-0.43%
5-Year	6.25%	6.09%	0.16%

Your 5-year net value added of 0.16% compares to a median of 0.14% for your peers and 0.05% for the U.S. Public universe.



Your investment costs were \$279.1 million or 36.9 basis points in 2018.

Asset management costs by asset class and style (\$000s)	Internal Management*		External Active base fees	Total
	Passive	Active		
Stock - U.S. Large Cap	73	12,688	2,310	15,281
Stock - U.S. Small Cap		323	9,437	9,866
Stock - EAFE		2,968	19,126	22,300
Stock - Emerging		3,184	5,778	9,214
Stock - Global		488		488
Stock - ACWI x U.S.		468	5,474	5,962
Fixed Income - U.S.		3,466		3,466
Fixed Income - Emerging			3,476	3,619
Fixed Income - High Yield			3,161	3,305
Cash		299		299
REITs	106			106
Global TAA		1,667	2,306	4,069
Hedge Funds		17,796	26,479	26,734
Real Estate ex-REITs				17,796
Real Estate ex-REITs - LP			12,843	13,324
Infrastructure - FoFs		9	718	727
Natural Resources - LP		57	5,277	5,334
Natural Resources - Co-Invest.		24		24
Diversified Private Equity - LP		320	25,115	25,946
Diversified Private Equity - Co-Invest.		88		88
LBO - LP		1,068	50,838	51,906
LBO - FoFs		183	16,442	16,625
Venture Capital - LP		406	16,274	16,680
Venture Capital - FoFs		61	6,214	6,275
Private Credit - LP		74	10,946	11,210
Derivatives/Overlays	326			488
Total excluding private asset performance fees				271,132
				35.9bp
Oversight, custodial and other costs ¹				
Oversight & consulting				4,965
Trustee & custodial				2,293
Audit				168
Other				511
Total oversight, custodial & other costs				7,937
				1.0bp
Total investment costs (excl. transaction costs & private asset performance fees)**				279,069
				36.9bp

* Internal investment costs were 6.3 bps while external investment costs were 29.6 bps.

Of the total investment management costs of 36.9 bps, external manager fees for alternative and real estate investments were 23.1 bps; other investment costs for internal assets, external equity and external fixed income investments that were used to arrive at the net of fee Total Fund return were 13.8 bps."

Footnotes

1. Excludes non-investment costs, such as benefit insurance premiums and preparing cheques for retirees.

** Total cost excludes carry/performance fees for hedge funds, real estate, infrastructure, natural resources and private equity.

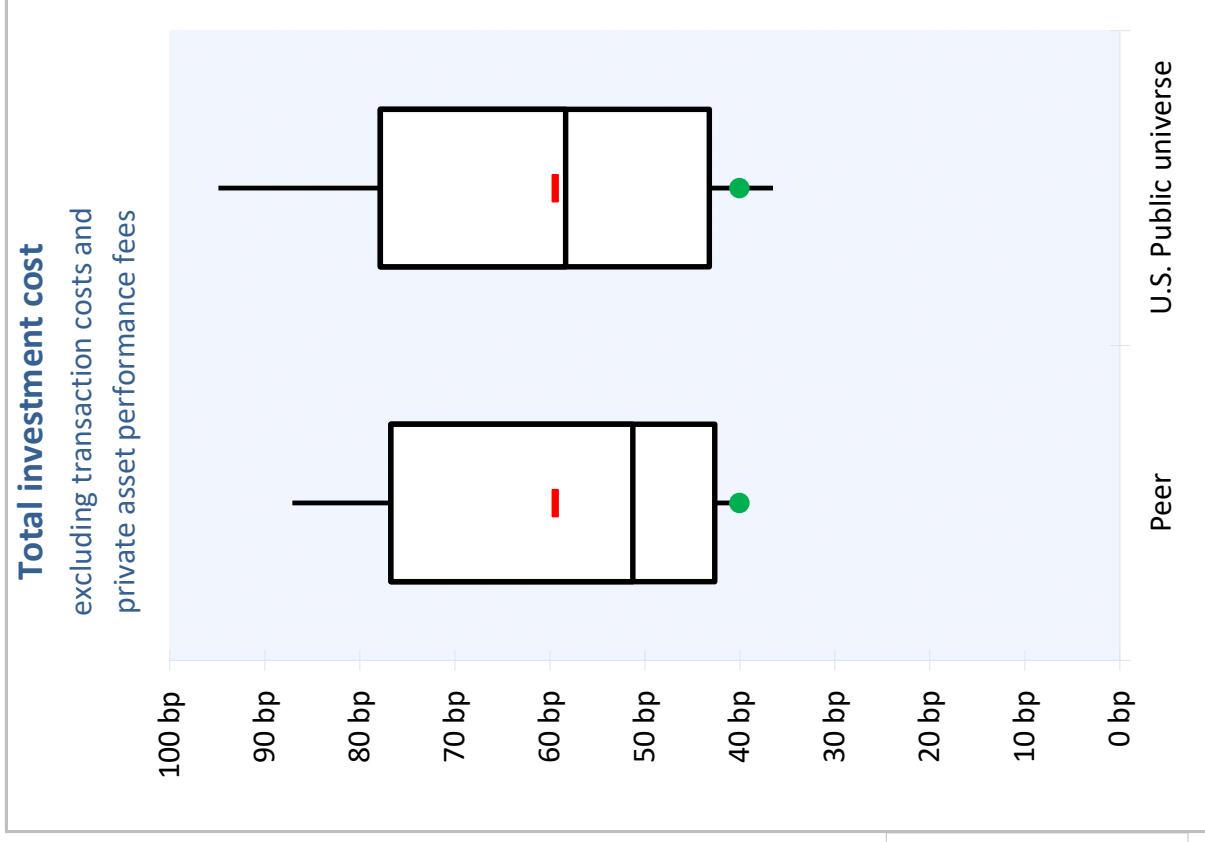
Your total investment cost of 40.1 bps was below the peer median of 51.3 bps.

For the comparison to the peer group, CEM has included your 36.9 bps in costs from page 9 and added hedge fund performance fees and private equity management fee offsets.

Differences in total investment cost are often caused by two factors that are often outside of management's control:

- Asset mix, particularly holdings of the highest cost asset classes: real estate (excl. REITs), infrastructure, hedge funds and private equity. These high cost assets equaled 24% of your funds assets at the end of 2018 versus a peer average of 28%.
- Fund size. Bigger funds have advantages of scale.

Therefore, to assess whether your costs are high or low given your unique asset mix and size, CEM calculates a benchmark cost for your fund. This analysis is shown on the following page.



STRS00055

Benchmark cost analysis suggests that, after adjusting for fund size and asset mix, your fund was low cost by 14.5 basis points in 2018.

Your benchmark cost is an estimate of what your cost would be given your actual asset mix and the median costs that your peers pay for similar services. It represents the cost your peers would incur if they had your actual asset mix.

Your total cost of 40.1 bp was below your benchmark cost of 54.5 bp. Thus, your cost savings were 14.5 bp.

Your cost versus benchmark

	\$000s	basis points
Your total investment cost	302,813	40.1 bp
Your benchmark cost	412,071	54.5 bp
Your excess cost	(109,258)	(14.5) bp

Your fund was low cost because you paid less than peers for similar services and you had a lower cost implementation style.

Reasons for your low cost status

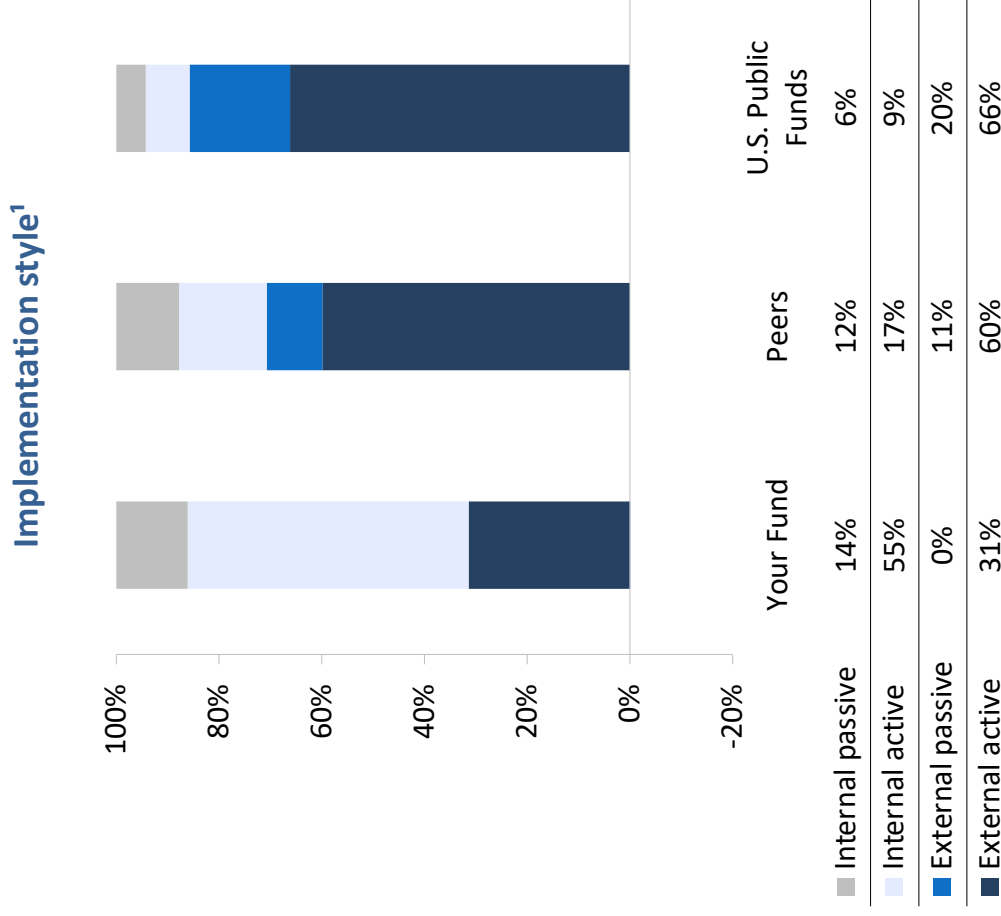
	Excess Cost/ (Savings) \$000s	bps
1. Lower cost implementation style		
• More active management, less lower cost passive	20,188	2.7
• Less external management, more lower cost internal	(74,593)	(9.9)
• More partnerships as a percentage of external	9,797	1.3
• Use of fund of funds	(1,396)	(0.2)
• Less co-investment as a percentage of LP/Co	3,433	0.5
• Less overlays	(1,601)	(0.2)
	<u>(44,173)</u>	<u>(5.8)</u>
2. Paying less than peers for similar services		
• External investment management costs	(66,820)	(8.8)
• Internal investment management costs	1,735	0.2
	(65,085)	(8.6)
Total savings	<u>(109,258)</u>	<u>(14.5)</u>

Differences in cost performance are often caused by differences in implementation style.

Implementation style is defined as the way in which your fund implements asset allocation. It includes internal, external, active, passive and fund of funds styles.

The greatest cost impact is usually caused by differences in the use of:

- External active management because it tends to be much more expensive than internal or passive management. You used less external active management than your peers (your 31% versus 60% for your peers).
- Within external active holdings, fund of funds usage because it is more expensive than direct fund investment. You had more in fund of funds. Your 8% of hedge funds, real estate and private equity in fund of funds compared to 3% for your peers.



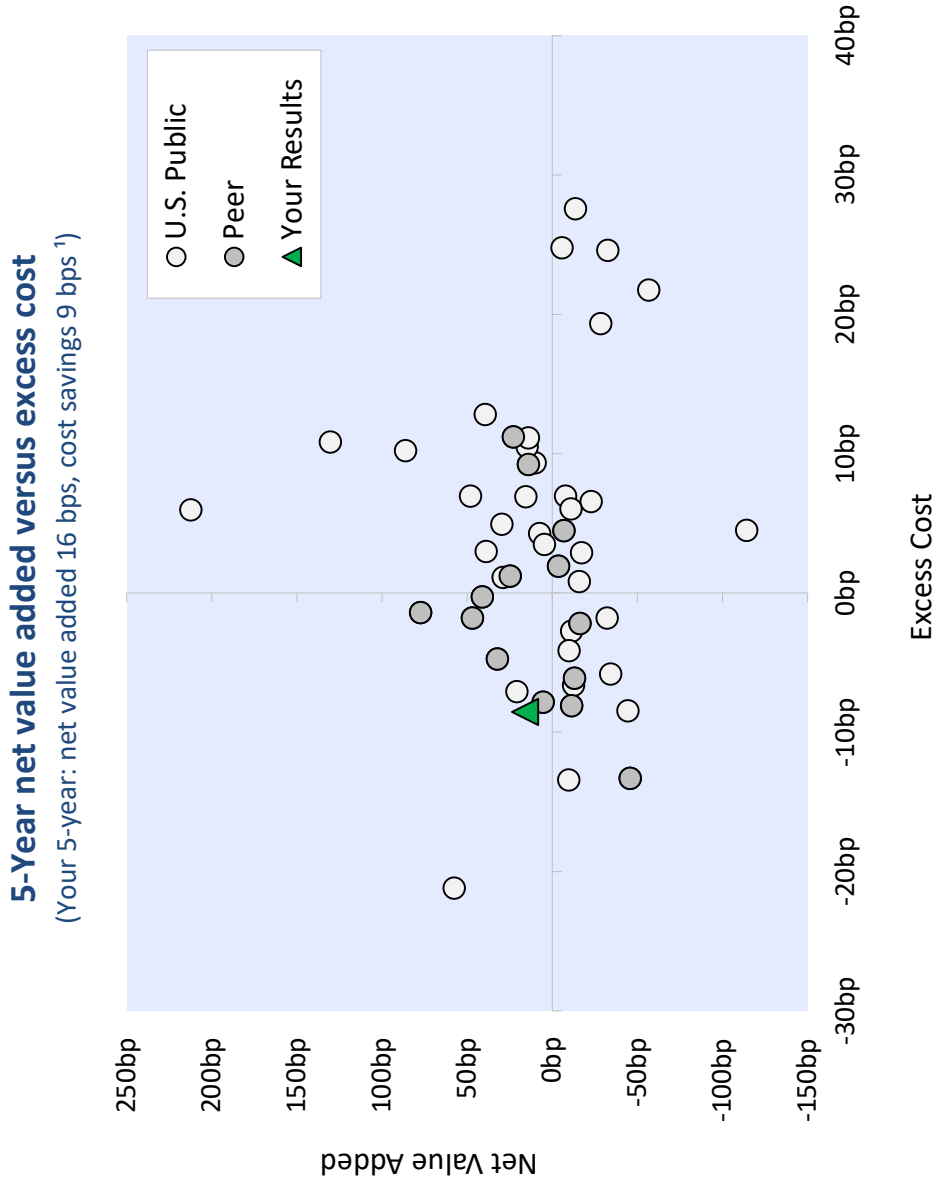
1. The graph above does not take into consideration the impact of derivatives. The values in the graph above are calculated using average holdings.

If your internally managed assets were managed externally and you paid the peer median costs, your costs would have been higher by approximately \$107 million.

Additional external investment management costs: assuming STRS Ohio no longer had internal holdings and paid peer median external costs

	STRS Ohio Avg holdings in \$mils	Internal cost	Peer median external cost	Difference in bps	savings \$000s
Stock - U.S. Large Cap	9,274	0.1	0.9	(0.8)	(762)
Stock - U.S. Large Cap	9,605	13.2	32.3	(19.1)	(18,340)
Stock - U.S. Small Cap	763	4.2	60.1	(55.9)	(4,265)
Stock - EAFE	5,290	5.6	35.3	(29.7)	(15,718)
Stock - Emerging	2,257	14.1	59.4	(45.3)	(10,214)
Stock - Global	591	8.3	43.9	(35.6)	(2,102)
Stock - ACWI x U.S.	2,958	1.6	39.9	(38.3)	(11,337)
Fixed Income - U.S.	12,627	2.7	17.0	(14.3)	(18,048)
Cash	1,351	2.2	n/a	--	--
REITs	1,137	0.9	6.3	(5.3)	(608)
Real Estate ex-REITs	5,540	32.1	58.4	(26.3)	(14,581)
Natural Resources	152	1.6	57.7	(56.1)	(853)
Global TAA	261	64.0	44.7	19.3	502
Diversified Private Equity	294	3.0	154.7	(151.7)	(4,457)
Diversified Private Equity	400	8.0	154.7	(146.7)	(5,864)
Private Credit	95	7.8	22.7	(15.0)	(142)
Total				(14.1)	(106,788)

Your 5-year performance placed in the positive value added, low cost quadrant of the cost effectiveness chart.



1. Your 5-year cost savings of 9 basis points is the average of your cost savings for the past 5 years.

Net value added
Excess Cost

Summary of key takeaways

Returns

- Your 5-year net total return of 6.25% was in the top quartile. This was above both the U.S. Public median of 5.42% and the peer median of 5.73%.
- Your 5-year policy return was 6.09%. This was above both the U.S. Public median of 5.30% and the peer median of 5.72%.

Value added

- Your 5-year net value added was 0.16%. This was above the U.S. Public median of 0.05% and above the peer median of 0.14%.

Cost and cost effectiveness

- Your investment cost of 40.1 bps was below your benchmark cost of 54.5 bps. This suggests that your fund was low cost compared to your peers.
- Your fund was low cost because you paid less than peers for similar services and you had a lower cost implementation style.

Risk

- Your asset risk of 11.8% was above the U.S. Public median of 10.4%.

2

Description of peer group and universe

Peer group	2
CEM global universe	3
Universe subsets	4
Implementation style, actual mix and policy mix:	
- by universe subset	5
- trends from 2014 to 2018	6
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Actual mix from 2014 to 2018	8
Policy mix from 2014 to 2018	9

Peer group

Your peer group is comprised of 17 U.S. Public funds, with assets ranging from \$47.4 billion to \$227.7 billion versus your \$72.9 billion. The median size is \$82.5 billion.

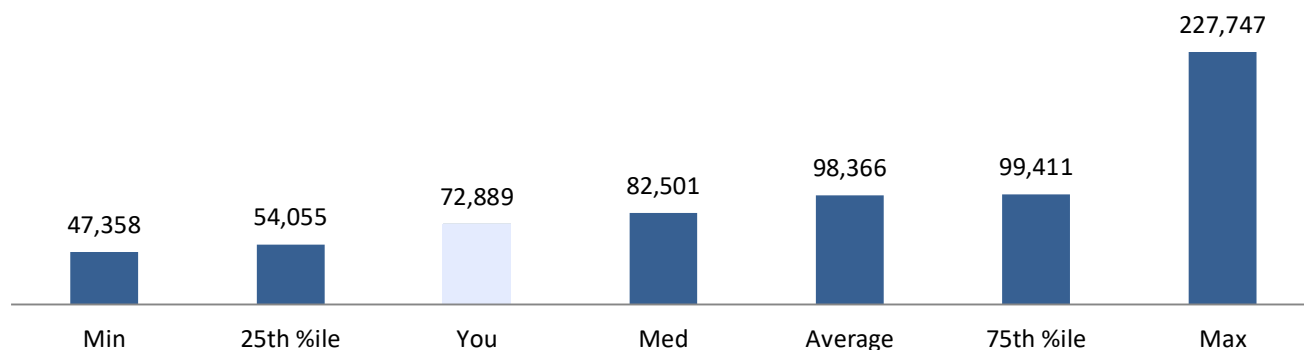
In order to preserve client confidentiality, we do not disclose your peers' names in this document due to the Freedom of Information Act. Your peer group consist of plans with the following characteristics:

Peer Group Characteristics - 2018

	Your Plan	Peers	U.S. Public
<u>Plan Assets (\$ billions)</u>			
Range	72.9	47.4 - 227.7	0.6 - 337.2
Median		82.5	22.5
<u># of Plans</u>			
Corporate		0	0
Public	1	17	56
Other		0	0
Total		17	56
<u>Implementation style</u>			
% External active	31.4	59.9	66.2
% External passive	0.0	10.8	19.5
% Internal active	54.7	17.1	8.6
% Internal passive	13.9	12.2	5.7
<u>Asset mix</u>			
% Stock	51.7	41.4	45.0
% Fixed Income	20.1	23.5	26.5
% Real Assets	11.5	13.1	10.8
% Private Equity	11.4	11.7	8.4
% Hedge Funds & Other	4.0	8.3	7.5

Your peer group is selected such that your fund size is usually close to the median of your peer group. Size is the primary criteria for choosing your peer group, because size greatly impacts how much you pay for services. Generally, the larger your fund, the smaller your unit operating costs (i.e., the economies of scale impact).

Total fund assets (\$ millions) - you versus peers

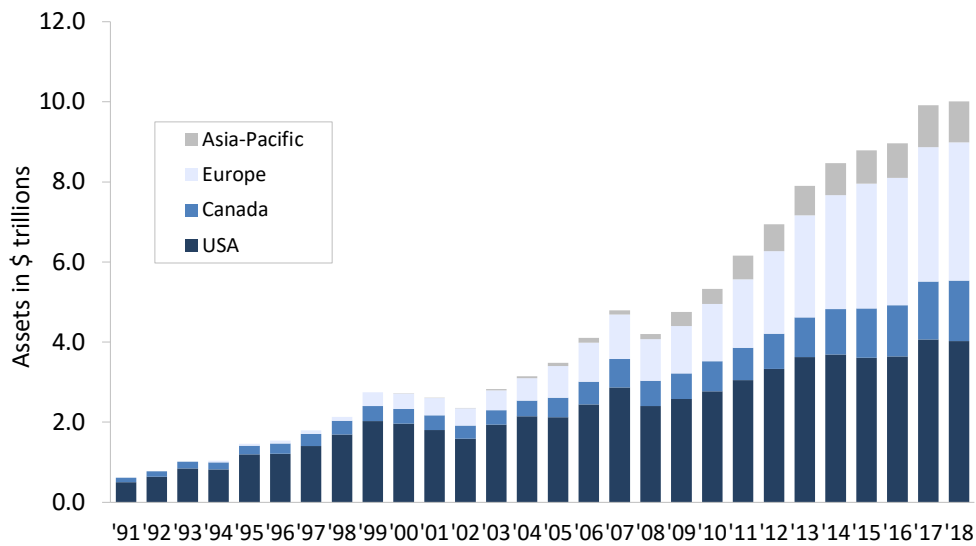


CEM global universe

CEM has been providing investment benchmarking solutions since 1991. The 2018 survey universe is comprised of 329 funds representing \$10.0 trillion in assets. The breakdown by region is as follows:

- 166 U.S. pension funds with aggregate assets of \$4.0 trillion.
- 77 Canadian pension funds with aggregate assets of \$1.5 trillion.
- 77 European pension funds with aggregate assets of \$3.5 trillion. Included are funds from the Netherlands, Norway, Sweden, Finland, Denmark, UK, and Ireland.
- 7 Asia-Pacific pension funds with aggregate assets of \$1.0 trillion.

CEM global universe



Universe subsets

CEM's global survey universe is comprised of 329 funds with total assets of \$10.0 trillion. Your fund's returns and costs are compared to the following two subsets of the global universe:

- Peers - Your peer group is comprised of 17 U.S. Public funds ranging in size from \$47.4 - \$227.7 billion. The peer median of \$82.5 billion compares to your \$72.9 billion.
- U.S. Public - The U.S. Public universe is comprised of 56 funds ranging in size from \$0.6 - \$337.2 billion. The median fund is \$22.5 billion.

Universe subsets by number of funds and assets

	Peer group ¹	Global by type				Global by Country				
		Corp.	Public	Other	Total	U.S.	Canada	Europe	Asia-Pacific	Total
# of funds										
2018	17	143	140	46	329	166	77	77	9	329
2017	17	151	151	48	350	168	79	90	13	350
2016	16	154	144	48	346	170	80	84	12	346
2015	15	161	148	55	364	176	80	95	13	364
2014	15	164	208	55	427	178	89	147	13	427
# of funds with uninterrupted data for:										
1 yr	17	143	140	46	329	166	77	77	9	329
2 yrs	17	131	131	40	302	152	68	74	8	302
3 yrs	16	119	124	38	281	141	63	70	7	281
4 yrs	15	108	117	35	260	132	54	67	7	260
5 yrs	15	100	117	34	251	128	52	64	7	251
Total assets (\$ billions)										
2018	1,672	1,496	6,659	1,881	10,036	4,023	1,509	3,456	1,048	10,036
2017	1,653	1,523	6,699	2,008	10,230	4,064	1,448	3,358	1,360	10,230
2016	1,429	1,473	5,864	1,886	9,223	3,637	1,284	3,177	1,125	9,223
2015	1,352	1,445	5,869	1,844	9,159	3,609	1,228	3,122	1,200	9,159
2014	1,351	1,495	5,643	1,656	8,794	3,689	1,132	2,850	1,123	8,794
2018 asset distribution (\$ billions)										
Avg	98.4	10.5	47.6	40.9	30.5	24.2	19.6	44.9	116.5	30.5
Max	227.7	68.9	1,206.8	588.6	1,206.8	337.2	314.6	1,206.8	569.5	1,206.8
75th %ile	99.4	13.5	38.6	36.0	22.2	24.4	10.5	31.8	95.8	22.2
Median	82.5	4.7	10.4	10.3	7.2	8.6	4.3	8.8	31.9	7.2
25th %ile	54.1	1.9	3.5	2.1	2.5	2.5	1.6	3.7	15.7	2.5
Min	47.4	0.2	0.2	0.0	0.0	0.2	0.0	0.6	3.1	0.0

1. Peer group statistics are for your 2018 peer group only as your peer group may have included different funds in prior years.

Implementation style, actual mix and policy mix by universe subset

Implementation style, actual mix and policy mix - 2018 (as a % of year-end assets)

	Your fund	Peer group	Global by type				Global by Country				
			Corp.	Public	Other	Total	U.S.	Canada	Europe	Asia-Pacific	Total
<u>Implementation style</u>											
External Active	29.5	59.0	69.8	57.3	63.4	63.6	69.9	65.1	50.7	45.2	63.6
Fund of funds	1.9	0.9	2.5	3.1	2.8	2.8	2.7	1.8	3.9	2.1	2.8
External passive	0.0	10.8	18.6	18.3	17.2	18.3	18.8	10.7	24.5	21.0	18.3
Internal Active	54.7	17.1	6.7	16.1	12.1	11.4	5.1	17.5	18.2	19.2	11.4
Internal Passive	<u>13.9</u>	<u>12.2</u>	<u>2.4</u>	<u>5.2</u>	<u>4.4</u>	<u>3.9</u>	<u>3.5</u>	<u>4.8</u>	<u>2.8</u>	<u>12.5</u>	<u>3.9</u>
Total	100	100	100	100	100	100	100	100	100	100	100
<u>Actual asset mix</u>											
Stock	51.7	41.4	31.6	46.8	43.0	39.6	37.1	40.4	43.5	46.6	39.6
Fixed Income	20.1	24.3	51.7	27.1	34.4	38.8	42.3	35.9	35.5	28.1	38.8
Global TAA	1.8	0.7	0.8	1.5	0.1	1.0	1.1	0.7	1.1	0.3	1.0
Real Assets	11.5	13.1	6.6	12.4	12.5	9.9	7.2	14.9	10.2	13.3	9.9
Hedge Funds	2.2	5.7	3.8	3.2	2.2	3.3	4.5	2.2	2.0	3.8	3.3
Balanced Funds	0.0	0.0	0.0	0.9	0.0	0.4	0.0	0.0	1.7	0.0	0.4
Risk Parity	0.0	1.1	0.4	0.5	0.6	0.5	0.7	0.2	0.1	0.9	0.5
Private Credit	1.3	1.9	1.4	1.6	3.4	1.8	1.2	2.2	2.5	1.3	1.8
Private Equity	<u>11.4</u>	<u>11.7</u>	<u>3.7</u>	<u>6.0</u>	<u>3.8</u>	<u>4.7</u>	<u>5.8</u>	<u>3.5</u>	<u>3.4</u>	<u>5.6</u>	<u>4.7</u>
Total	100	100	100	100	100	100	100	100	100	100	100
<u>Policy asset mix</u>											
Stock	52.0	42.0	32.2	47.6	43.6	40.3	38.4	40.4	43.1	51.6	40.3
Fixed Income	22.0	23.1	51.4	26.7	34.1	38.5	41.2	36.6	35.9	27.1	38.5
Global TAA	0.0	0.7	0.7	1.5	0.1	1.0	1.0	0.9	1.1	0.2	1.0
Real Assets	10.0	14.3	6.7	13.0	12.5	10.2	7.6	14.8	10.9	12.2	10.2
Hedge funds	0.0	5.3	3.5	2.8	2.4	3.1	4.2	1.9	1.8	2.7	3.1
Balanced Funds	0.0	0.0	0.0	0.5	0.0	0.2	0.0	0.0	0.9	0.0	0.2
Risk Parity	0.0	1.1	0.3	0.4	0.7	0.4	0.6	0.2	0.2	1.0	0.4
Private Credit	0.0	2.0	1.2	1.8	3.0	1.7	1.1	2.2	2.5	1.1	1.7
Private Equity	<u>16.0</u>	<u>11.6</u>	<u>4.0</u>	<u>5.8</u>	<u>3.6</u>	<u>4.7</u>	<u>6.0</u>	<u>3.1</u>	<u>3.6</u>	<u>4.1</u>	<u>4.7</u>
Total	100	100	100	100	100	100	100	100	100	100	100

Implementation style, actual mix and policy mix trends

Implementation style, actual mix and policy mix - 2014 to 2018 (as a % of year-end assets)

	Your fund					Peer average ¹					U.S. Public average ¹				
	2018	2017	2016	2015	2014	2018	2017	2016	2015	2014	2018	2017	2016	2015	2014
Implementation style															
External active	29.5	29.2	29.7	29.2	27.1	57.6	56.7	57.7	57.2	56.6	63.1	62.6	62.9	63.5	64.2
Fund of funds	1.9	1.5	1.5	1.4	1.0	1.0	1.2	1.2	1.1	1.0	2.9	2.9	2.9	2.9	2.6
External passive	0.0	-0.1	0.1	0.0	0.0	10.1	11.2	11.0	11.8	12.0	19.8	20.3	20.3	19.6	19.1
Internal active	54.7	55.8	54.6	55.6	58.5	18.5	19.2	19.0	19.4	19.9	8.1	8.4	8.3	8.3	8.0
Internal passive	<u>13.9</u>	<u>13.6</u>	<u>14.1</u>	<u>13.9</u>	<u>13.4</u>	<u>12.8</u>	<u>11.7</u>	<u>11.1</u>	<u>10.6</u>	<u>10.4</u>	<u>6.2</u>	<u>5.9</u>	<u>5.7</u>	<u>5.6</u>	<u>6.1</u>
Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Actual asset mix															
Stock	51.7	56.0	57.6	57.3	56.8	42.8	44.6	44.4	45.4	47.3	45.5	48.5	47.6	47.9	49.5
Fixed income	20.1	20.9	16.8	17.9	21.3	24.6	24.8	24.5	25.1	25.6	25.9	25.3	25.6	26.6	26.6
Global TAA	1.8	0.9	0.6	0.5	0.0	0.8	0.7	0.6	0.7	0.9	1.3	1.0	1.6	1.4	1.6
Real assets	11.5	10.5	12.9	12.4	10.5	12.8	12.2	13.0	12.1	11.0	10.9	10.3	10.6	9.8	9.0
Hedge funds	2.2	2.1	2.8	2.9	2.8	4.9	4.7	4.7	4.8	3.9	4.8	4.5	4.8	5.3	4.8
Balanced Funds	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Risk Parity	0.0	0.0	0.0	0.0	0.0	0.7	0.7	0.6	0.5	0.3	0.9	1.1	0.5	0.4	0.4
Private credit	1.3	0.5	0.0	0.0	0.0	1.8	1.6	1.4	1.0	0.8	2.0	1.6	1.5	1.2	1.1
Private equity	<u>11.4</u>	<u>9.1</u>	<u>9.3</u>	<u>9.0</u>	<u>8.6</u>	<u>11.7</u>	<u>10.7</u>	<u>10.8</u>	<u>10.4</u>	<u>10.2</u>	<u>8.8</u>	<u>7.7</u>	<u>7.8</u>	<u>7.5</u>	<u>7.0</u>
Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Policy asset mix															
Stock	52.0	55.0	57.0	57.0	57.0	44.0	45.2	45.9	46.4	46.3	46.6	47.8	47.9	48.6	48.5
Fixed income	22.0	21.0	19.0	19.0	19.0	23.1	23.4	24.5	24.5	25.2	24.3	25.0	25.3	25.5	26.1
Global TAA	0.0	0.0	0.0	0.0	0.0	0.8	0.7	0.8	0.9	0.9	1.0	0.9	1.5	1.3	1.4
Real assets	10.0	10.0	10.0	10.0	10.0	13.7	13.3	12.8	12.4	12.1	11.9	11.4	11.1	10.4	10.2
Hedge funds	0.0	0.0	0.0	0.0	0.0	4.3	3.7	3.3	3.5	3.1	4.4	4.0	4.2	4.5	4.4
Balanced Funds	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Risk Parity	0.0	0.0	0.0	0.0	0.0	0.7	0.7	0.7	0.7	0.6	0.8	0.9	0.6	0.6	0.5
Private credit	0.0	0.0	0.0	0.0	0.0	2.0	1.8	1.0	0.5	0.5	2.2	1.5	1.4	0.9	0.8
Private equity	<u>16.0</u>	<u>14.0</u>	<u>14.0</u>	<u>14.0</u>	<u>14.0</u>	<u>11.5</u>	<u>11.3</u>	<u>11.2</u>	<u>11.2</u>	<u>11.2</u>	<u>8.8</u>	<u>8.4</u>	<u>8.1</u>	<u>8.2</u>	<u>8.1</u>
Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

1. Trends are based on the 49 U.S. Public and 15 peer funds with 5 or more consecutive years of data ending 2018.

gement and fund-of-funds usage is more expensive than direct fund investment.

Implementation style by asset class - 2018
(as a % of year-end assets)

	Your fund %					Peer average %					U.S. Public average %				
	External			Internal		External			Internal		External			Internal	
	Active	FOFs	Index	Active	Index	Active	FOFs	Index	Active	Index	Active	FOFs	Index	Active	Index
U.S. Broad/All						21.2		34.5	4.7	39.5	24.8		58.8	1.8	
U.S. Large Cap	4.9		0.0	46.4	48.7	13.1		24.6	23.6	38.6	29.8		45.3	6.3	
U.S. Mid Cap						25.6		20.8	31.0	22.6	43.5		23.8	7.7	
U.S. Small Cap	60.9		0.0	39.1	0.0	68.2		5.5	18.1	8.1	81.9		8.3	6.7	
EAFE	51.0		0.0	49.0	0.0	57.1		20.8	11.4	10.6	59.3		31.5	4.7	
Global	0.0		0.0	100.0	0.0	79.0		0.0	18.8	2.1	55.7		17.9	15.0	
Emer Stock						0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Other						18.2		0.0	1.0	80.8	94.8		1.6	0.1	
Emerging	29.8		0.0	70.2	0.0	74.2		10.7	8.6	6.5	81.9		11.9	3.2	
ACWI x U.S.	29.0		0.0	71.0	0.0	67.3		15.0	7.2	10.6	66.8		30.2	1.2	
Aggregate	24.2		0.0	51.9	23.9	43.9		20.5	13.5	22.0	50.9		33.1	5.6	
Income - U.S.	0.0		0.0	100.0	0.0	32.3		9.8	53.9	4.1	57.0		18.8	22.8	
Income - U.S. Gov't						0.0		20.1	10.6	69.4	42.7		38.3	11.9	
Income - U.S. Credits						100.0		0.0	0.0	0.0	64.6		0.0	35.4	
Income - EAFE						0.0		0.0	0.0	0.0	100.0		0.0	0.0	
Income - Global						1.0		0.0	99.0	0.0	66.6		5.5	27.9	
Income - Other						100.0		0.0	0.0	0.0	96.9		0.0	3.1	
Income - Long Bonds						7.8		0.0	0.0	92.2	70.7		11.3	0.0	
Income - Emerging	100.0		0.0	0.0	0.0	100.0		0.0	0.0	0.0	99.1		0.9	0.0	
Income - Inflation Indexed						34.8		32.2	3.6	29.3	39.3		44.5	1.4	
Income - High Yield	100.0		0.0	0.0	0.0	97.5		0.0	0.7	1.8	92.8		1.0	5.7	
Income - Absolute Return Bond						0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Income - Bundled LDI						0.0		0.0	0.0	0.0	100.0		0.0	0.0	
Income - Convertibles						100.0		0.0	0.0	0.0	100.0		0.0	0.0	
Income - Aggregate	0.0			100.0		40.1			59.9		39.0			61.0	
Income - Aggregate	10.1		0.0	89.9	0.0	40.7		8.5	40.6	10.2	61.2		15.7	20.0	
Commodities						65.7		0.0	2.2	32.1	78.6		9.7	2.3	
Structure	0.0	100.0		0.0		75.0	5.2		15.3		84.8	9.5		3.9	
Resources	70.0	0.0		0.0		85.4	0.1		0.5		94.4	0.0		0.2	
	0.0		0.0	0.0	100.0	63.2		6.9	6.2	23.7	69.4		22.9	1.6	
State ex-REITs	13.3	0.0		86.7		86.8	0.6		8.4		94.2	0.4		3.8	
Real Assets						91.7			8.3		94.6			5.4	
Assets	14.8	0.7	0.0	68.8	13.8	84.7	0.6	0.4	7.7	2.3	91.3	0.7	2.1	3.3	
Funds	100.0	0.0				97.2	2.8				76.1	23.9			
TAA	27.6			72.4		62.9			37.1		92.6			7.4	
Equity						62.9			37.1		88.1			11.9	
Credit	89.8	0.0		10.2		96.9	0.0		2.1		99.0	0.0		0.7	
Reserves						61.1			38.9		22.1			77.9	
Unlevered Private Equity	71.1	0.0		14.2		88.8	5.1		0.4		74.1	22.6		0.1	
Real Capital	78.0	22.0		0.0		71.6	20.3		7.0		61.3	33.8		4.3	
	78.4	21.6		0.0		90.4	4.2		0.0		92.4	3.5		0.0	
Private Equity						98.7			0.1		98.4			0.7	
Equity	76.3	15.9		3.8		88.0	6.0		0.8		77.0	19.5		0.3	
Fund - Yr.-End Holdings	28.8	1.9	0.0	54.7	13.9	57.8	0.9	10.8	17.1	12.2	62.9	2.9	19.5	8.6	

Actual asset mix - 2014 to 2018
(as a % of total year-end assets)

	Your fund					Peer average %					U.S. Public average %				
	2018	2017	2016	2015	2014	2018	2017	2016	2015	2014	2018	2017	2016	2015	2014
Stock - U.S. Broad/All						8.0	6.7	6.9	7.2	7.5	6.5	7.1	6.9	6.7	6.6
Stock - U.S. Large Cap	25.4	27.3	28.3	28.2	28.7	9.8	11.5	11.7	12.5	13.0	11.1	12.2	13.6	14.5	15.3
Stock - U.S. Mid Cap						0.8	0.7	0.5	0.6	0.5	1.0	0.8	0.8	0.9	0.8
Stock - U.S. Small Cap	2.4	2.7	2.9	2.7	2.7	1.3	1.5	1.8	2.3	2.4	2.3	2.3	2.5	2.9	3.2
Stock - EAFE	13.8	14.7	15.4	15.8	15.3	10.1	11.0	10.1	10.8	11.1	7.5	7.0	6.5	6.8	7.3
Stock - Global	0.8	0.8	0.7	1.1	1.1	3.4	3.8	4.2	3.9	4.3	6.3	6.7	5.3	4.2	3.8
Employer Stock															
Stock - Other						0.1	0.2	0.3	0.3	0.4	0.9	1.0	1.0	1.2	1.2
Stock - Emerging	4.2	4.5	4.3	3.9	3.9	4.8	5.1	4.5	4.3	4.4	3.8	3.8	3.1	2.9	3.3
Stock - ACWI x U.S.	5.2	5.9	5.9	5.6	5.1	3.0	2.7	3.0	3.5	3.5	5.5	6.6	7.2	7.9	7.7
Stock - Aggregate	51.7	56.0	57.6	57.3	56.8	41.4	43.3	42.9	45.4	47.3	45.0	47.4	46.8	48.0	49.3
Fixed Income - U.S.	16.7	16.7	12.3	13.7	15.1	12.6	12.3	12.8	13.4	13.9	12.7	12.7	13.6	14.5	14.1
Fixed Income - U.S. Gov't						0.6	0.6	0.5	0.6	0.5	1.7	1.4	0.9	0.6	0.3
Fixed Income - U.S. Credits						0.1	0.0	0.0	0.1	0.3	0.3	0.2	0.2	0.3	0.1
Fixed Income - EAFE											0.0	0.1	0.1	0.1	0.1
Fixed Income - Global						1.5	1.5	1.8	2.1	2.3	1.7	1.4	1.7	1.7	1.9
Fixed Income - Other						0.8	0.9	1.5	1.5	1.4	0.7	0.7	0.9	0.9	1.0
Fixed Income - Long Bonds						0.9	0.8	0.8	0.8	0.9	1.5	1.3	0.9	1.0	1.0
Fixed Income - Emerging	1.0	1.0	1.0	1.0	1.2	1.3	1.4	1.3	1.2	1.1	1.3	1.3	1.1	0.9	0.9
Fixed Income - Inflation Indexed						2.0	2.2	2.1	2.2	2.1	1.9	1.9	1.8	1.9	1.8
Fixed Income - High Yield	1.0	1.1	1.1	1.3	1.7	1.7	1.7	1.7	1.5	1.4	2.1	1.7	1.6	1.5	1.6
Fixed Income - Absolute Return Bonds															
Fixed Income - Bundled LDI											0.2				
Fixed Income - Convertibles						0.2	0.2				0.1	0.1			
Cash	1.4	2.2	2.3	1.8	3.4	1.9	2.0	1.7	1.3	1.6	2.3	2.3	2.1	2.0	2.0
Fixed Income - Aggregate	20.1	21.0	16.7	17.9	21.3	23.5	23.7	24.2	24.7	25.4	26.5	25.1	24.8	25.3	24.8
Commodities						0.5	0.6	0.6	0.4	0.6	0.5	0.5	0.7	0.5	0.6
Infrastructure	0.1	0.1	0.2	0.1	0.1	0.4	0.3	0.3	0.2	0.1	0.4	0.6	0.4	0.3	0.3
Natural Resources	0.7	0.9	1.4	1.3	0.5	1.0	1.0	0.8	0.6	0.5	0.8	1.2	0.9	0.6	0.5
REITs	1.6	1.4	1.8	1.6	1.5	0.7	0.7	0.8	0.8	0.7	0.8	0.9	0.8	0.8	0.9
Real Estate ex-REITs	9.1	8.1	9.7	9.3	8.4	9.7	9.3	10.2	9.7	8.8	7.8	6.9	7.8	7.3	6.5
Other Real Assets						0.9	0.9	0.8	0.4	0.3	0.4	0.6	0.7	0.7	0.5
Real Assets	11.5	10.5	12.9	12.4	10.5	13.1	12.7	13.4	12.1	11.0	10.8	10.8	11.2	10.2	9.3
Hedge Funds	2.2	2.1	2.8	2.9	2.8	5.7	5.2	5.1	4.8	3.9	4.8	4.8	5.1	5.5	5.4
Global TAA	1.8	0.9	0.6	0.5		0.7	0.6	0.6	0.7	0.9	1.2	0.9	1.5	1.3	2.1
Risk Parity						1.1	1.1	1.1	0.5	0.3	1.0	1.0	0.7	0.3	0.3
Mortgages						0.2	0.1	0.1	0.2	0.2	0.2	0.1	0.1	0.2	0.2
Private Credit	1.3	0.5				1.8	1.6	1.3	0.8	0.6	1.7	1.4	1.2	1.0	0.7
Diversified Private Equity	3.1	0.1	0.1	0.1	4.7	7.6	6.9	7.4	7.1	7.3	6.3	5.6	6.1	5.5	5.5
Venture Capital	2.1	1.7	1.6	1.6	1.4	0.9	0.9	0.7	0.6	0.5	0.5	0.4	0.4	0.5	0.4
LBO	6.3	4.6	4.5	4.5		2.9	2.7	2.3	2.4	2.2	1.5	1.5	1.4	1.6	1.4
Other Private Equity		2.6	3.1	2.7	2.5	0.2	0.4	0.5	0.3	0.3	0.1	0.2	0.2	0.3	0.2
Private Equity	11.4	9.1	9.3	9.0	8.6	11.7	10.8	11.0	10.4	10.2	8.4	7.7	8.1	7.9	7.6
Derivatives/Overlays Mkt Value	0.0	-0.1	0.1			0.8	0.8	0.4	0.4	0.3	0.4	0.8	0.5	0.4	0.4
Total Fund	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Count	1	1	1	1	1	17	17	16	15	15	56	60	59	64	68
Median Assets (\$ billions)	72.9	78.3	71.7	70.8	73.5	82.5	79.2	78.4	79.7	78.4	22.5	19.9	17.1	16.6	16.4

Policy asset mix - 2014 to 2018
(as a % of total assets)

	Your fund %					Peer average %					U.S. Public average %				
	2018	2017	2016	2015	2014	2018	2017	2016	2015	2014	2018	2017	2016	2015	2014
Stock - U.S. Broad/All						11.0	11.0	12.4	13.2	10.4	9.5	9.8	9.9	10.2	9.5
Stock - U.S. Large Cap	28.0	30.0	31.0	31.0	31.0	3.8	4.1	5.2	4.9	7.2	7.8	8.5	9.7	9.9	11.1
Stock - U.S. Mid Cap						0.2				0.2	0.7	0.5	0.4	0.4	0.3
Stock - U.S. Small Cap						0.3	0.5	0.3	0.3	0.5	1.4	1.3	1.5	1.6	1.6
Stock - EAFE	19.2	20.0	20.8	20.8	20.8	6.6	6.8	7.3	7.2	7.4	5.9	4.7	5.1	5.1	5.9
Stock - Global						13.0	13.6	11.7	13.0	13.0	10.7	10.9	9.1	9.0	7.8
Employer Stock															
Stock - Other						0.1	0.1	0.3	0.5	0.5	0.8	0.9	0.8	0.9	0.7
Stock - Emerging	4.8	5.0	5.2	5.2	5.2	3.1	3.1	2.8	2.7	2.4	2.9	2.5	2.3	2.2	2.2
Stock - ACWI x U.S.						3.9	4.0	4.2	4.7	4.8	6.4	7.4	7.9	8.8	8.9
Stock - Aggregate	52.0	55.0	57.0	57.0	57.0	42.0	43.4	44.2	46.4	46.3	46.1	46.5	46.7	48.2	48.0
Fixed Income - U.S.	21.0	20.0	18.0	18.0	18.0	15.0	15.0	15.7	16.7	15.3	14.2	14.7	15.0	15.8	15.7
Fixed Income - U.S. Gov't						0.2	0.2	0.1	0.0		1.4	1.1	0.7	0.5	0.4
Fixed Income - U.S. Credits						0.0					0.4	0.3	0.3	0.2	
Fixed Income - EAFE											0.0	0.1	0.1	0.1	0.1
Fixed Income - Global						1.5	1.5	1.8	2.0	3.1	1.5	1.4	1.5	1.5	1.9
Fixed Income - Other						0.1	0.2	1.0	0.8	0.8	0.4	0.6	0.6	0.5	0.6
Fixed Income - Long Bonds						1.0	0.8	0.9	0.7	0.7	2.1	2.1	1.7	1.5	1.5
Fixed Income - Emerging						1.0	1.0	0.9	0.9	0.7	1.2	1.2	0.9	0.9	0.9
Fixed Income - Inflation Indexed						3.0	2.9	2.9	1.8	2.3	2.9	2.8	2.7	2.6	2.6
Fixed Income - High Yield						1.9	2.3	1.9	1.3	1.6	1.9	2.0	2.0	1.8	1.8
Fixed Income - Absolute Return Bonds															
Fixed Income - Bundled LDI											0.2				
Fixed Income - Convertibles											0.1	0.1			
Cash	1.0	1.0	1.0	1.0	1.0	-0.7	-0.9	-1.0	0.1	0.7	-1.2	-1.0	-1.0	-0.9	-0.7
Fixed Income - Aggregate	22.0	21.0	19.0	19.0	19.0	23.1	23.1	24.1	24.5	25.2	25.2	25.3	24.6	24.5	24.7
Commodities						0.8	0.8	1.1	0.7	0.7	1.0	0.9	1.2	1.0	1.1
Infrastructure						0.4	0.4	0.3	0.1	0.1	0.6	0.7	0.6	0.3	0.4
Natural Resources						1.0	1.1	0.7	0.6	0.6	0.7	1.1	1.0	0.7	0.5
REITs		1.5	1.5	1.5	1.5	0.6	0.6	0.5	0.6	1.0	0.7	0.8	0.6	0.6	0.6
Real Estate ex-REITs	10.0	8.5	8.5	8.5	8.5	10.4	10.2	10.0	9.8	9.3	8.1	7.7	7.6	7.4	7.5
Other Real Assets						1.2	1.0	1.0	0.6	0.4	0.7	0.6	1.0	0.8	0.7
Real Assets	10.0	10.0	10.0	10.0	10.0	14.3	14.1	13.6	12.4	12.1	11.8	11.9	12.0	10.9	10.8
Hedge Funds						5.3	4.6	3.7	3.5	3.1	4.5	4.5	4.6	4.9	5.1
Global TAA						0.7	0.6	0.7	0.9	0.9	1.2	1.0	1.5	1.4	1.7
Risk Parity						1.1	1.2	1.2	0.7	0.6	0.8	0.9	0.6	0.4	0.4
Mortgages						0.3	0.1	0.4	0.1	0.1	0.1	0.0	0.1	0.1	0.0
Private Credit						1.7	1.7	0.7	0.4	0.4	1.9	1.5	1.2	0.9	0.7
Diversified Private Equity					14.0	8.6	9.2	8.2	8.6	10.1	6.6	7.1	7.0	7.0	7.4
Venture Capital						0.6	0.4	0.5	0.3	0.3	0.3	0.3	0.3	0.2	0.3
LBO	16.0	14.0	14.0	14.0		2.2	1.6	2.2	2.4	0.8	1.3	0.9	1.2	1.5	0.9
Other Private Equity						0.1	0.1	0.4	0.0	0.0	0.1	0.1	0.2	0.1	0.1
Private Equity	16.0	14.0	14.0	14.0	14.0	11.6	11.3	11.3	11.2	11.2	8.4	8.5	8.7	8.8	8.7
Total Fund	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Count	1	1	1	1	1	17	17	16	15	15	56	60	59	64	68

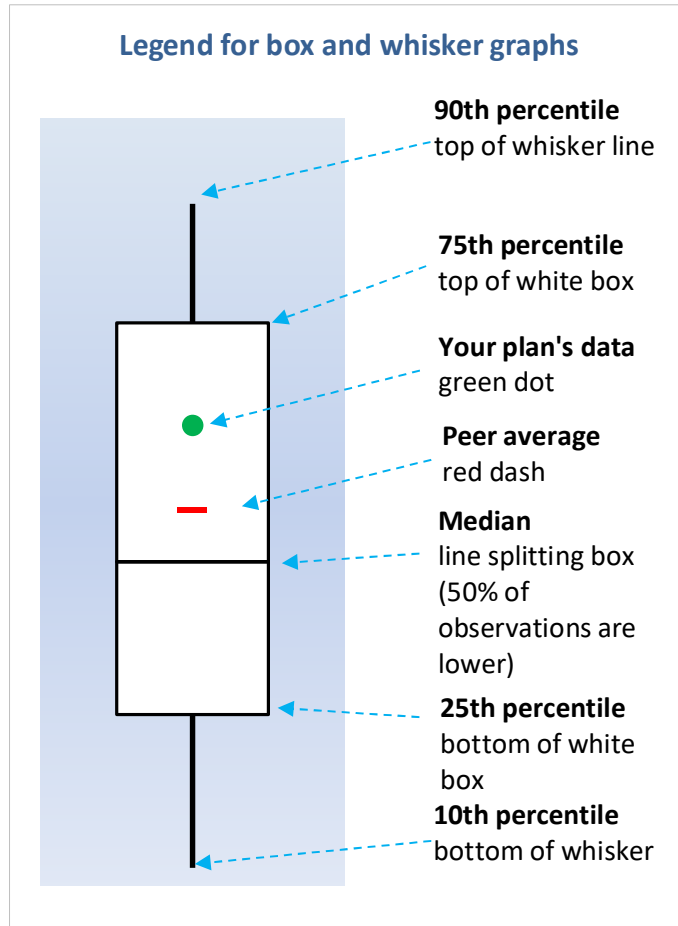
3

Returns, Benchmarks and Value Added

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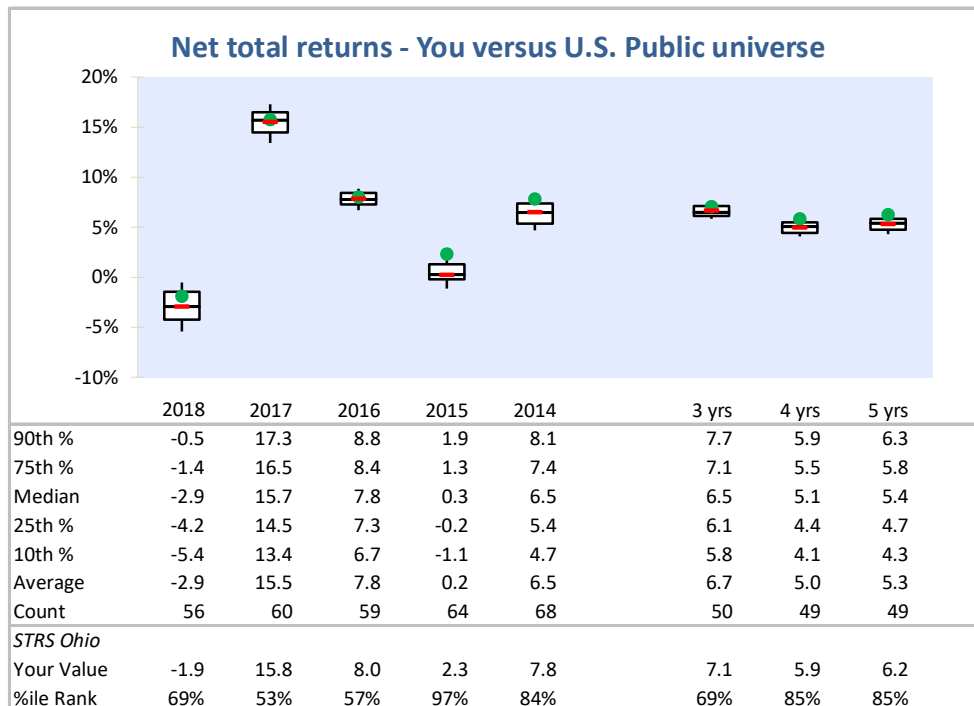
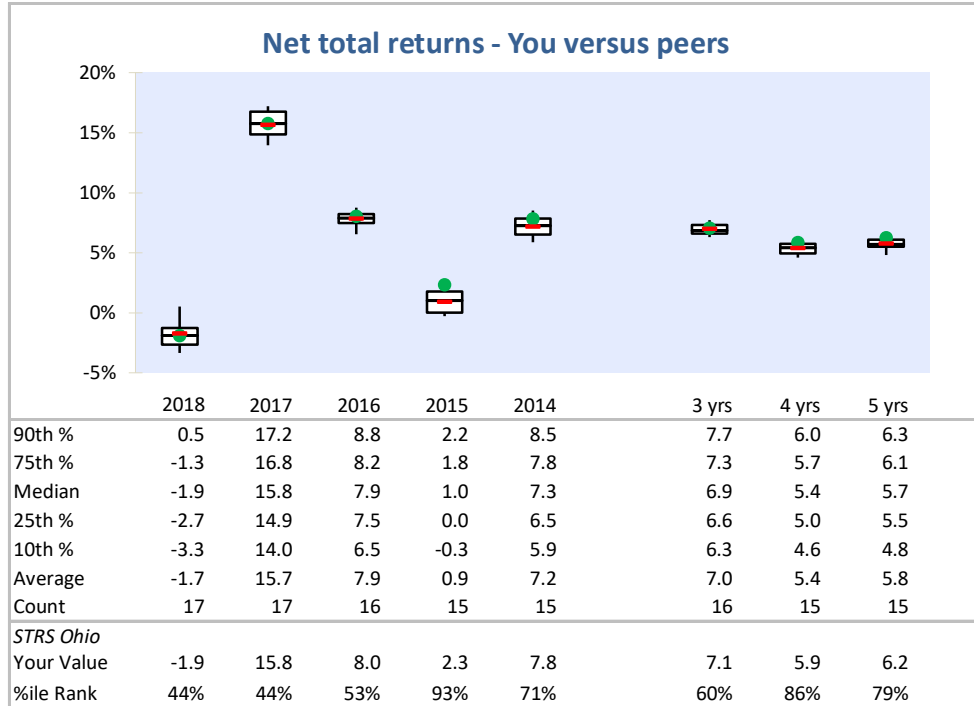
Interpreting box and whisker graphs

Box and whisker graphs are used extensively in this report because they show visually where you rank relative to all observations. At a glance you can see which quartile your data falls in.



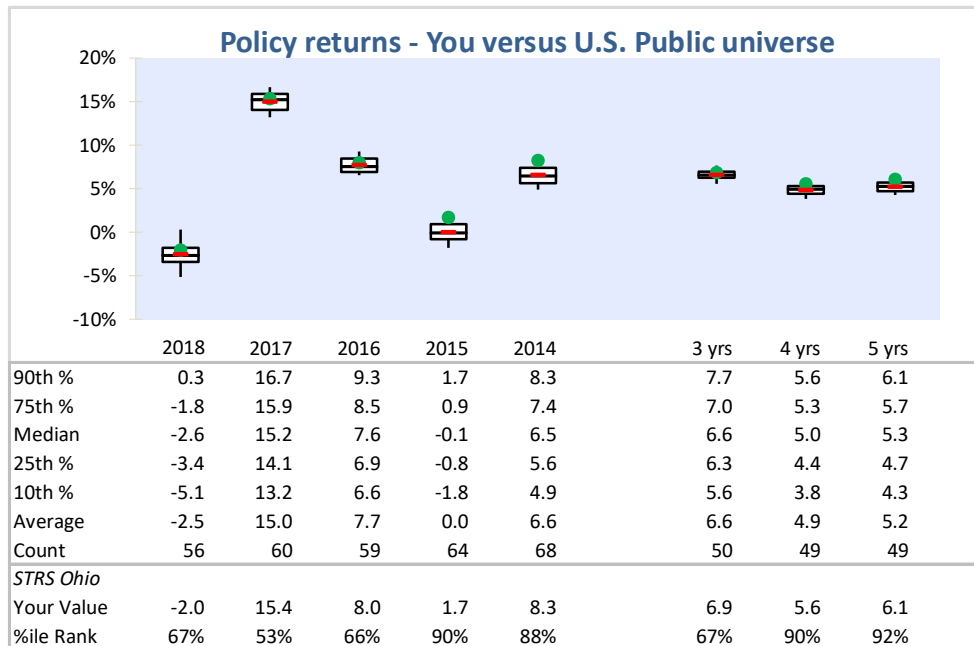
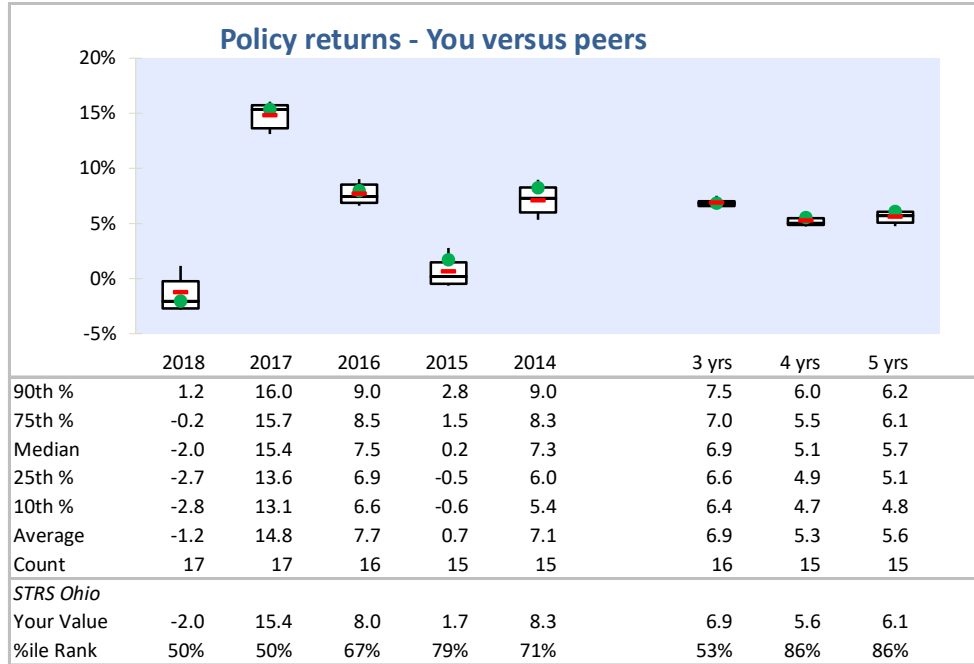
Net total returns

Your 5-year net total return of 6.2% was among the highest in your peer group and among the highest in the U.S. Public universe. Comparisons of total return do not help you understand the reasons behind relative performance. To understand the relative contributions from policy asset mix decisions and implementation decisions we separate total return into its more meaningful components - policy return and implementation value added.



Policy returns

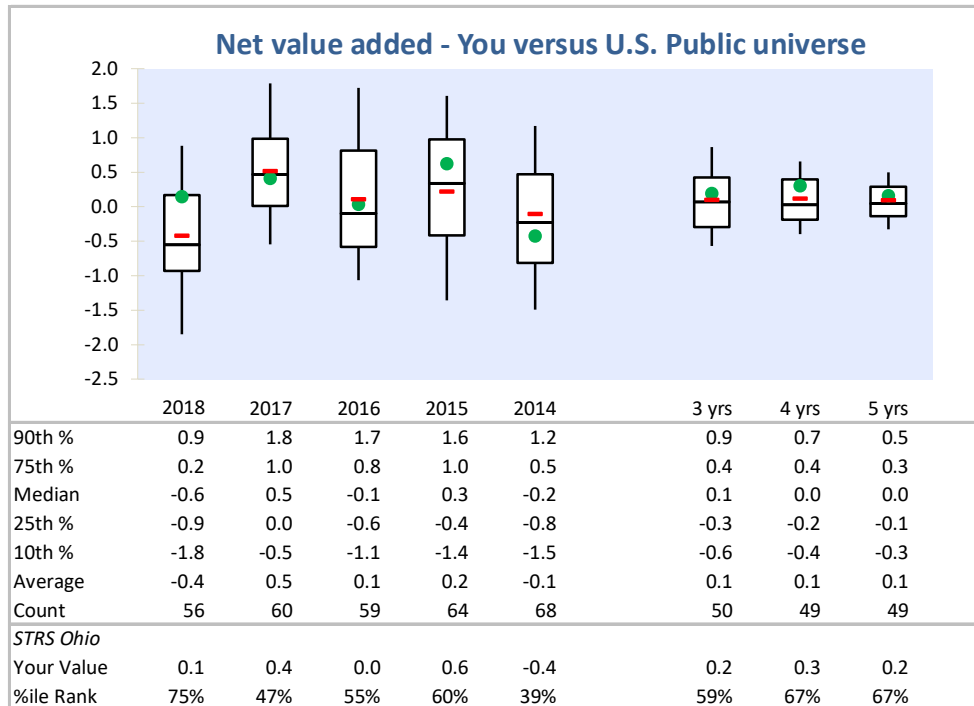
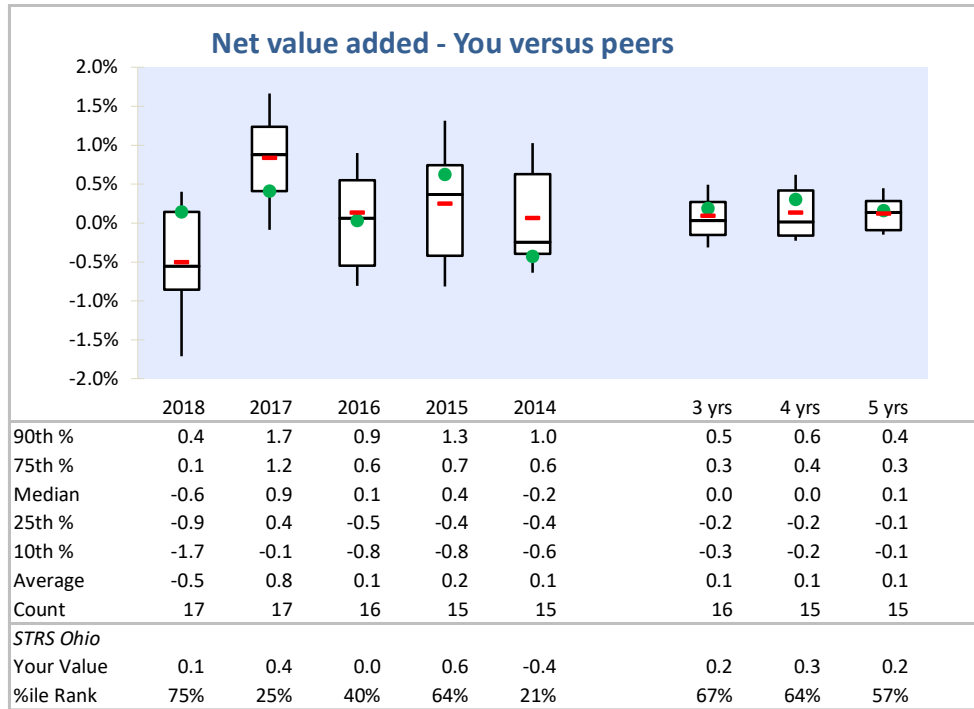
Your 5-year policy return of 6.1% was among the highest in your peer group and among the highest in the U.S. Public universe. Policy return is the return you would have earned had you passively implemented your policy asset mix decision through your benchmark portfolios.



To enable fairer comparisons, the policy returns of all participants except your fund were adjusted to reflect private equity benchmarks based on lagged, investable, public-market indices. If CEM used this same adjustment for your fund, your 5-year policy return would be 6.8%, 0.7% higher than your actual 5-year policy return of 6.1%. Mirroring this, your 5-year total fund net value added would be 0.7% lower. Refer to the appendix of this section for details.

Net value added

Your 5-year net value added of 0.2% was above the peer median and above the median of the U.S. Public universe. Net value added is the difference between your net total return and your policy return.



Net returns by asset class

Asset class	Your fund %						Peer average %						U.S. Public average %					
	2018	2017	2016	2015	2014	5-yr ¹	2018	2017	2016	2015	2014	5-yr ¹	2018	2017	2016	2015	2014	5-yr ¹
Stock - U.S. Broad/All							-4.9	21.9	11.1	-0.3	10.1	7.0	-5.3	20.2	11.1	-0.4	11.0	7.0
Stock - U.S. Large Cap	-4.8	22.1	10.6	1.0	12.4	7.8	-4.7	21.8	11.7	1.3	12.9	8.2	-4.7	22.2	11.2	0.9	12.7	8.0
Stock - U.S. Mid Cap							-9.8	17.7	12.6	-1.9	9.0	5.2	-9.0	19.0	13.0	-2.7	8.7	5.7
Stock - U.S. Small Cap	-9.8	19.6	17.2	-2.2	4.3	5.2	-10.8	15.3	18.7	-2.6	5.9	4.8	-10.8	15.6	18.4	-3.7	5.0	4.7
Stock - EAFE	-11.8	21.9	4.8	3.5	1.1	3.4	-13.9	26.6	3.1	-0.2	-2.2	1.8	-13.9	25.7	2.9	0.0	-3.5	1.6
Stock - Global	-9.7	24.0	8.8	-1.3	3.7	4.5	-8.6	37.0	7.5	-0.6	5.5	5.2	-9.0	29.5	7.3	-0.9	3.7	5.0
Employer Stock																		
Stock - Other							-8.2	14.2	12.7	-5.4	0.8	1.1	-12.6	14.8	10.3	-6.2	3.9	0.3
Stock - Emerging	-12.6	31.6	13.6	-12.0	-1.7	2.5	-15.1	36.5	10.5	-14.2	-1.1	1.8	-15.5	36.6	10.6	-13.6	-1.3	1.6
Stock - ACWI x U.S.	-12.0	23.8	7.5	-0.9	0.5	3.1	-13.3	28.5	4.3	-2.1	-2.7	2.0	-14.5	28.3	3.6	-2.7	-3.7	1.2
Stock - Aggregate	-8.4	22.9	9.2	0.4	6.9	5.7	-9.8	25.4	8.9	-1.5	5.0	5.0	-10.0	24.6	9.0	-1.7	5.2	4.9
Fixed Income - U.S.	0.2	3.4	2.7	1.0	5.5	2.6	-0.3	4.7	3.6	0.5	6.7	3.0	-0.1	4.3	3.8	0.2	5.8	2.7
Fixed Income - U.S. Gov't							-0.8	5.8	-0.3	0.7	1.0	0.5	-0.3	4.5	1.2	1.0	4.5	0.5
Fixed Income - U.S. Credits							1.5	5.1	6.0	-1.8	4.4	2.7	-0.1	4.5	4.4	-2.2	6.5	2.7
Fixed Income - EAFE													-0.4	9.6	3.8	-8.1	-1.3	0.0
Fixed Income - Global							-4.8	30.5	4.7	-0.9	3.9	5.3	-2.2	13.1	5.8	-2.0	3.7	3.8
Fixed Income - Other							1.1	5.4	6.5	-0.5	4.7	4.3	0.9	26.7	15.4	0.3	5.6	3.7
Fixed Income - Long Bonds							-2.9	8.3	0.7	-1.6	25.4	6.0	-3.6	9.8	3.4	-3.8	22.3	6.5
Fixed Income - Emerging	-4.5	10.4	15.4	0.6	1.5	4.4	-5.1	12.0	10.9	-3.5	-0.3	2.8	-5.9	12.3	10.7	-5.3	-0.8	2.2
Fixed Income - Inflation Indexed							-1.0	3.7	4.6	-1.9	4.2	1.7	-1.2	3.6	5.7	-1.7	4.6	2.2
Fixed Income - High Yield	-2.8	7.3	16.9	-4.5	2.1	3.5	-1.0	7.2	12.3	-2.5	4.4	4.1	-1.5	7.1	12.5	-3.2	3.3	3.5
Fixed Income - Absolute Return Bonds																		
Fixed Income - Bundled LDI																		
Fixed Income - Convertibles							-0.7	12.5					-0.7	10.9				
Cash	2.0	0.7	0.5	0.1	0.1	0.7	-4.7	0.1	2.9	-0.8	0.8	-2.4	-0.2	0.9	1.3	0.0	0.4	-0.2
Fixed Income - Aggregate	0.2	4.0	4.8	0.6	5.0	2.9	-1.0	5.3	4.7	-0.4	6.1	2.8	-0.7	5.0	4.7	-0.6	5.3	2.7
Commodities							-12.3	11.0	13.9	-31.7	-14.5	-9.7	-11.4	6.8	12.5	-26.5	-16.6	-9.3
Infrastructure	-3.2	1.9	3.6	3.2	15.8	4.1	7.5	13.0	8.8	5.7	22.2	11.5	7.6	12.2	9.0	4.3	15.8	9.9
Natural Resources	11.5	-34.5	-4.1	2.0	7.7	-5.1	5.1	2.4	3.9	-7.7	10.1	2.4	3.0	6.9	6.4	-5.4	11.7	4.5
REITs	-4.6	5.2	8.8	3.2	30.5	8.0	-4.5	9.2	5.2	3.1	19.4	6.4	-4.7	8.7	4.8	2.2	20.2	6.3
Real Estate ex-REITs	8.4	6.1	9.3	12.2	14.8	10.1	8.7	10.2	9.9	13.9	13.9	11.3	7.5	8.4	8.2	12.8	12.6	9.8
Other Real Assets							0.0	3.9	12.1	-8.6	2.5	0.8	-1.1	3.4	12.5	-12.3	3.9	-1.8
Real Assets	6.7	2.8	7.7	9.8	15.7	8.5	6.6	9.3	9.3	9.4	12.6	9.5	4.5	7.9	8.1	7.3	11.3	7.9
Hedge Funds	0.6	5.6	3.4	-0.6	3.3	2.4	-2.2	4.9	1.0	-0.7	3.3	1.3	-1.4	5.8	1.5	-0.5	4.2	1.7
Global TAA	-7.3	10.5	8.1	-2.6			-6.8	14.4	7.3	-2.3	6.1	3.6	-5.8	12.6	7.3	-3.5	5.3	3.0
Risk Parity							-7.8	15.5	13.4	-10.4	8.7	3.9	-7.5	13.7	12.2	-9.3	8.1	3.4
Mortgages							3.1	7.4	1.8	4.2	8.4	5.7	2.6	5.7	2.6	3.7	7.5	4.9
Private Credit	4.1	5.9					5.3	7.8	7.6	2.7	6.7	5.3	6.6	8.7	7.6	3.6	9.0	6.0
Diversified Private Equity	17.7	19.3	6.7	9.9	18.9	14.4	15.5	18.0	8.9	8.4	16.0	13.2	15.8	16.9	8.9	8.3	15.6	12.9
Venture Capital	18.4	13.2	3.1	11.8	17.9	12.7	20.2	10.9	5.1	12.5	23.5	13.6	19.8	11.4	4.4	14.3	18.7	13.1
LBO	19.8	19.3	6.7	9.9			15.0	18.7	9.3	6.6	14.7	12.7	16.7	19.8	14.2	10.2	14.7	13.3
Other Private Equity		7.3	4.2	5.0	13.5		22.2	10.2	8.7	9.2	11.5	15.0	24.8	8.8	9.1	8.3	16.4	15.7
Private Equity	19.0	14.7	5.3	8.7	17.2	12.9	16.8	18.0	9.1	8.7	16.7	13.6	16.8	17.3	9.2	9.2	15.7	13.4
Total Fund Return	-1.9	15.8	8.0	2.3	7.8	6.2	-1.7	15.7	7.9	0.9	7.2	5.8	-2.9	15.5	7.8	0.2	6.5	5.3

You were not able to provide full year returns for all of the components of returns of asset classes with values shown in italics. The composite calculation only uses those components with a full year return.

1. The 5-year return number only includes funds with continuous data over the last 5 years.

Benchmark returns by asset class

Asset class	Your fund %						Peer average %						U.S. Public average %					
	2018	2017	2016	2015	2014	5-yr ¹	2018	2017	2016	2015	2014	5-yr ¹	2018	2017	2016	2015	2014	5-yr ¹
Stock - U.S. Broad/All							-5.1	21.9	12.4	0.5	12.6	8.0	-5.2	21.8	12.4	0.7	12.7	8.0
Stock - U.S. Large Cap	-5.2	21.1	12.7	0.5	12.6	7.9	-4.7	21.4	12.2	1.0	13.2	8.2	-4.6	21.5	12.4	1.0	13.2	8.3
Stock - U.S. Mid Cap							-7.7	18.2	13.1	-2.4	12.1	6.5	-8.0	18.8	12.5	-2.0	10.8	6.0
Stock - U.S. Small Cap	-11.0	14.7	21.3	-4.4	4.9	4.4	-9.7	15.8	19.7	-3.9	5.6	4.8	-9.9	15.2	20.1	-3.4	6.0	5.0
Stock - EAFE	-11.5	20.1	5.0	0.4	0.8	2.5	-13.8	24.5	2.5	-1.2	-3.7	0.9	-13.8	25.0	2.3	-1.1	-4.2	0.8
Stock - Global	-9.4	24.6	7.9	-2.4	4.2	4.4	-9.6	23.9	7.9	-1.5	4.6	4.6	-9.8	24.2	7.9	-1.7	3.4	4.2
Employer Stock																		
Stock - Other							-9.7	19.1	13.1	-5.4	2.4	3.4	-10.5	16.3	8.6	-7.3	1.3	0.3
Stock - Emerging	-14.6	37.3	11.2	-14.9	-2.2	1.6	-14.8	37.1	11.1	-14.8	-2.0	1.6	-14.5	37.2	10.9	-14.5	-1.9	1.7
Stock - ACWI x U.S.	-12.1	23.4	6.4	-2.8	0.2	2.4	-14.0	26.8	5.2	-4.3	-3.2	1.2	-13.6	27.5	4.5	-4.8	-3.7	1.0
Stock - Aggregate	-8.4	22.2	9.8	-1.0	6.9	5.4	-9.4	24.0	9.2	-2.0	5.0	4.8	-9.3	23.8	9.4	-2.0	5.1	4.8
Fixed Income - U.S.	0.1	3.9	3.9	0.4	5.6	2.7	-0.2	4.4	2.7	0.4	6.4	2.7	-0.1	3.8	2.8	0.4	6.1	2.6
Fixed Income - U.S. Gov't							-0.8	6.1	-0.2	0.7	0.8	0.6	-0.4	4.3	0.8	0.8	4.5	0.6
Fixed Income - U.S. Credits							-0.5	3.7	3.7	0.2	5.8	2.5	-1.6	3.6	3.2	-0.7	6.3	2.5
Fixed Income - EAFE													-2.2	8.4	6.1	-6.0	-3.0	-0.1
Fixed Income - Global							-0.6	6.2	5.3	-0.7	3.2	2.3	-0.8	5.1	4.9	-0.9	3.7	2.3
Fixed Income - Other							0.3	4.3	6.8	0.0	5.9	3.6	0.3	4.5	7.2	0.4	5.8	3.0
Fixed Income - Long Bonds							-1.9	8.7	1.4	-1.2	25.1	5.9	-3.3	8.9	3.2	-1.9	20.1	5.6
Fixed Income - Emerging	-2.5	8.2	9.9	1.3	4.8	4.2	-4.4	11.3	9.6	-0.3	1.5	3.4	-5.0	11.4	9.8	-4.9	0.2	2.3
Fixed Income - Inflation Indexed							-0.7	3.1	4.9	-2.1	4.0	1.7	-1.4	3.2	5.6	-1.7	4.7	2.0
Fixed Income - High Yield	-2.1	7.5	17.1	-4.5	2.5	3.8	-1.5	6.9	15.0	-3.2	2.6	3.7	-1.7	6.9	15.4	-3.9	2.3	3.6
Fixed Income - Absolute Return Bonds																		
Fixed Income - Bundled LDI													-3.3					
Fixed Income - Convertibles							0.3	14.7					0.3	17.1				
Cash	1.9	0.9	0.3	0.1	0.0	0.6	1.8	1.0	0.3	0.1	0.0	0.6	1.6	1.0	0.4	0.1	0.2	0.7
Fixed Income - Aggregate	0.1	3.9	3.9	0.4	5.6	2.8	-0.8	5.2	4.9	-0.2	6.5	2.9	-1.3	5.2	4.9	-0.3	7.2	3.2
Commodities							-9.1	3.8	10.8	-22.8	-17.5	-8.1	-10.7	3.0	10.9	-22.8	-16.6	-9.0
Infrastructure	11.8	12.2	5.3	6.1	13.5	9.7	5.2	8.4	6.9	4.8	8.1	6.8	4.5	9.1	6.9	5.0	6.4	6.7
Natural Resources	11.8	12.2	5.3	6.1	13.5	9.7	4.0	8.2	5.2	-1.7	8.5	4.9	1.5	6.5	6.8	-0.5	7.0	4.1
REITs	-4.6	5.2	8.5	3.2	30.1	7.9	-4.6	8.7	6.1	3.1	21.4	6.1	-4.2	8.2	6.7	2.9	21.1	6.8
Real Estate ex-REITs	6.7	7.0	8.0	13.3	11.8	9.3	7.6	7.1	8.6	13.8	11.6	9.8	6.9	6.6	8.5	13.7	11.8	9.6
Other Real Assets							-0.2	3.5	10.2	4.6	6.3	5.3	-0.7	1.5	12.5	-8.7	4.7	1.7
Real Assets	6.7	6.7	8.1	11.8	14.6	9.5	5.4	7.3	8.7	9.6	10.3	8.4	3.9	6.2	8.8	7.5	9.1	7.2
Hedge Funds	11.8	12.2	5.3	6.1	13.5	9.7	1.1	5.9	2.9	0.7	4.2	2.8	0.0	6.7	3.1	1.3	4.0	2.7
Global TAA	11.8	12.2	5.3	6.1			-2.1	13.4	6.1	1.2	4.1	3.6	-3.9	12.6	5.9	1.3	5.0	3.7
Risk Parity							-8.2	13.7	10.5	-2.2	7.6	3.6	-5.8	14.4	9.8	-3.7	6.3	3.5
Mortgages							1.0	4.0	3.3	1.7	4.4	2.8	0.7	2.9	2.9	2.0	4.4	2.6
Private Credit	11.8	12.2					2.3	6.4	8.5	0.0	4.5	3.9	3.1	7.3	11.2	-0.6	4.3	4.2
Diversified Private Equity	11.8	12.2	5.3	6.1	13.5	9.7	20.7	17.6	8.6	4.4	15.7	13.0	20.5	18.9	8.5	3.9	16.3	13.2
Venture Capital	11.8	12.2	5.3	6.1	13.5	9.7	19.0	17.8	9.7	3.9	13.0	12.3	18.6	19.6	7.1	4.5	15.3	12.7
LBO	11.8	12.2	5.3	6.1			18.8	17.7	9.2	3.9	12.7	12.5	18.5	19.5	7.3	4.6	15.4	12.7
Other Private Equity		12.2	5.3	6.1	13.5		23.3	15.4	9.5	4.4	13.9	13.3	18.1	20.4	6.7	4.4	13.1	11.8
Private Equity	11.8	12.2	5.3	6.1	13.5	9.7	20.3	17.6	8.6	4.4	15.7	13.0	20.4	19.1	8.3	4.0	16.3	13.2
Total Policy Return	-2.0	15.4	8.0	1.7	8.3	6.1	-1.2	14.8	7.7	0.7	7.1	5.6	-2.5	15.0	7.7	0.0	6.6	5.2

1. The 5-year return number only includes funds with continuous data over the last 5 years.

2. To enable fairer comparisons, the policy returns of all participants except your fund were adjusted to reflect private equity benchmarks based on lagged, investable, public-market indices. If CEM used this same adjustment for your fund, your 5-year policy return would be 6.8%, 0.7% higher than your actual 5-year policy return of 6.1%. Mirroring this, your 5-year total fund net value added would be 0.7% lower. Refer to the appendix of this section for details.

Net value added by asset class

Asset class	Your fund %						Peer average %						U.S. Public average %					
	2018	2017	2016	2015	2014	5-yr ¹	2018	2017	2016	2015	2014	5-yr ¹	2018	2017	2016	2015	2014	5-yr ¹
Stock - U.S. Broad/All							0.3	-0.1	-1.1	-0.8	-2.5	-1.0	-0.2	-1.7	-1.2	-1.2	-1.7	-1.0
Stock - U.S. Large Cap	0.4	1.0	-2.1	0.5	-0.2	-0.1	0.0	0.4	-0.5	0.2	-0.3	0.0	-0.1	0.7	-1.2	-0.1	-0.5	-0.3
Stock - U.S. Mid Cap							-2.1	-0.6	-0.5	0.5	-3.1	-1.2	-1.0	0.2	0.5	-0.7	-2.2	-0.7
Stock - U.S. Small Cap	1.2	5.0	-4.1	2.2	-0.6	0.8	-1.1	-0.5	-1.0	1.2	0.3	0.0	-0.5	0.4	-1.6	-0.3	-1.0	-0.2
Stock - EAFE	-0.3	1.8	-0.2	3.2	0.3	0.9	-0.1	2.1	0.6	0.9	0.4	0.8	-0.1	0.6	0.5	1.3	0.3	0.7
Stock - Global	-0.3	-0.6	0.9	1.1	-0.5	0.1	1.0	13.0	-0.4	0.9	0.9	0.7	0.8	5.1	-0.4	0.6	0.5	0.8
Employer Stock																		
Stock - Other							1.5	-4.9	-0.5	0.0	-1.4	-1.0	-0.7	-1.5	1.2	1.1	2.8	1.0
Stock - Emerging	1.9	-5.7	2.4	3.0	0.5	0.8	-0.3	-0.7	-0.6	0.6	0.9	0.2	-1.0	-0.5	-0.6	0.8	0.6	-0.1
Stock - ACWI x U.S.	0.1	0.4	1.1	1.9	0.2	0.7	0.9	1.3	-0.8	2.6	0.3	0.8	-0.8	0.7	-0.9	2.2	0.0	0.2
Stock - Aggregate	0.1	0.6	-0.5	1.4	0.0	0.3	-0.4	1.4	-0.3	0.5	0.0	0.2	-0.6	0.8	-0.4	0.3	0.1	0.0
Fixed Income - U.S.	0.1	-0.4	-1.2	0.6	0.0	-0.2	-0.1	0.4	0.9	0.0	0.3	0.3	0.0	0.5	1.0	-0.2	-0.3	0.2
Fixed Income - U.S. Gov't							0.0	-0.3	-0.2	-0.1	0.2	-0.2	0.1	0.3	-0.1	0.2	0.0	-0.2
Fixed Income - U.S. Credits							1.9	1.4	2.3	-2.0	-1.4	0.2	1.5	0.9	1.3	-1.4	0.2	0.2
Fixed Income - EAFE													1.8	1.2	-2.3	-2.1	1.7	0.1
Fixed Income - Global							-4.3	24.3	-0.6	-0.2	0.7	3.1	-1.6	8.0	0.9	-1.2	-0.3	1.5
Fixed Income - Other							0.9	1.1	-0.3	-0.4	-1.2	1.0	0.7	22.2	8.8	-0.8	0.2	0.8
Fixed Income - Long Bonds							-1.0	-0.4	-0.6	-0.3	0.3	0.1	-0.3	0.9	-0.6	-1.8	3.3	0.9
Fixed Income - Emerging	-2.0	2.2	5.5	-0.6	-3.2	0.2	-0.7	0.7	1.3	-2.2	-1.8	-0.6	-1.1	0.9	0.9	-0.1	-1.0	0.0
Fixed Income - Inflation Indexed							-0.3	0.6	-0.3	0.4	-0.5	-0.1	0.1	0.4	0.1	0.0	-0.3	0.1
Fixed Income - High Yield	-0.7	-0.2	-0.3	0.0	-0.4	-0.3	0.5	0.3	-2.7	0.5	1.9	0.4	0.3	0.1	-3.1	0.9	0.7	-0.2
Fixed Income - Absolute Return Bonds																		
Fixed Income - Bundled LDI							-1.1	-2.2					-1.1	-6.1				
Fixed Income - Convertibles																		
Cash	0.1	-0.1	0.1	0.0	0.0	0.0	-6.5	-0.9	2.6	-0.9	0.8	-3.1	-1.9	-0.2	0.9	0.0	0.1	-0.9
Fixed Income - Aggregate	0.1	0.1	0.9	0.2	-0.5	0.1	-0.1	0.2	-0.1	-0.2	-0.4	0.0	0.6	-0.2	-0.2	-0.4	-1.9	-0.4
Commodities							-3.2	6.8	3.4	-9.3	3.9	-1.6	-0.9	3.5	1.2	-3.5	1.5	-0.1
Infrastructure	-15.0	-10.3	-1.7	-2.9	2.3	-5.7	2.3	4.6	1.9	0.9	14.1	4.7	2.3	3.1	2.1	-0.7	8.7	3.2
Natural Resources	-0.3	-46.7	-9.4	-4.1	-5.8	-14.8	1.2	-6.2	-1.3	-6.0	1.6	-2.5	1.6	0.5	-0.5	-4.5	4.7	0.5
REITs	0.0	0.0	0.3	0.0	0.3	0.1	0.1	0.5	-0.7	0.1	-2.0	0.2	-0.5	0.5	-1.8	-0.8	-1.0	-0.5
Real Estate ex-REITs	1.7	-0.9	1.3	-1.2	3.0	0.8	1.1	3.1	1.3	0.1	2.3	1.6	0.5	1.8	-0.3	-0.8	0.8	0.2
Other Real Assets							0.2	0.4	2.0	-13.2	-3.8	-4.5	-0.4	1.9	-0.4	-3.6	-0.3	-1.8
Real Assets	0.0	-3.9	-0.3	-2.0	1.1	-1.0	1.2	2.1	0.8	-0.5	2.3	1.2	0.6	1.7	-0.7	-0.2	2.3	0.8
Hedge Funds	-11.2	-6.7	-1.9	-6.7	-10.3	-7.3	-2.9	-1.0	-1.7	-1.4	-0.9	-1.2	-1.2	-0.8	-1.6	-1.8	0.0	-0.9
Global TAA	-19.1	-1.7	2.8	-8.7			-4.8	1.0	1.2	-3.6	2.0	0.0	-2.4	-0.3	1.4	-4.9	0.3	-0.7
Risk Parity							0.4	1.8	2.9	-13.7	1.1	0.3	-1.7	-0.6	2.8	-6.9	0.7	0.0
Mortgages							2.1	1.3	-1.5	2.6	4.1	2.2	2.0	1.5	-0.5	1.7	3.4	1.9
Private Credit	-7.7	-6.3					2.9	1.4	-1.3	3.9	2.2	2.1	3.4	1.2	-3.3	4.6	4.3	2.2
Diversified Private Equity	5.9	7.1	1.4	3.8	5.4	4.6	-5.2	0.7	0.2	4.0	0.2	0.2	-4.5	-2.0	0.7	4.1	-0.8	-0.3
Venture Capital	6.6	1.0	-2.2	5.7	4.4	3.0	1.2	-6.9	-4.5	8.6	10.5	1.3	1.6	-8.5	-2.4	9.0	4.1	0.7
LBO	8.0	7.1	1.4	3.8			-3.8	1.0	0.0	2.7	2.0	0.2	-1.4	0.1	7.9	5.0	-0.1	1.0
Other Private Equity		-4.9	-1.1	-1.1	0.0		-1.1	-5.2	-1.0	4.6	-2.4	1.7	6.7	-11.7	2.6	3.8	4.0	3.8
Private Equity	7.2	2.5	0.0	2.6	3.7	3.1	-3.5	0.4	0.5	4.3	0.9	0.6	-3.4	-1.9	1.0	5.0	-0.7	0.3
Total Fund Return	0.1	0.4	0.0	0.6	-0.4	0.2	-0.5	0.8	0.1	0.2	0.1	0.1	-0.4	0.5	0.1	0.2	-0.1	0.1

Total net value add is determined by both actual and policy allocation. It is the outcome of total net return (page 6) minus total benchmark return (page 7). Aggregate net returns are an asset weighted average of all categories that the fund has an actual allocation to. Aggregate benchmark returns are a policy weighted average and includes only those categories that are part of your policy fund's mix.

You were not able to provide full year returns for all of the components of returns of asset classes with values shown in italics. The composite calculation only uses those components with a full year return.

1. The 5-year return number only includes funds with continuous data over the last 5 years.

2. To enable fairer comparisons, the policy returns of all participants except your fund were adjusted to reflect private equity benchmarks based on lagged, investable, public-market indices. If CEM used this same adjustment for your fund, your 5-year policy return would be 6.8%, 0.7% higher than your actual 5-year policy return of 6.1%. Mirroring this, your 5-year total fund net value added would be 0.7% lower. Refer to the appendix of this section for details.

Your policy return and value added calculation - 2018

2018 Policy Return and Value Added

Asset class	Policy weight	Benchmark Description	Return	Net return	Value added
Stock - U.S. Large Cap	28.0%	Russell 1000 (Russell 3000 for total Dom Equity)	-5.2%	-4.8%	0.4%
Stock - U.S. Small Cap		Russell 2000	-11.0%	-9.8%	1.2%
Stock - EAFE	19.2%	MSCI World xUS 50% Hedged Net	-11.5%	-11.8%	-0.3%
Stock - Global		MSCI ACWI net	-9.4%	-9.7%	-0.3%
Stock - Emerging	4.8%	MSCI Emerging Market net	-14.6%	-12.6%	1.9%
Stock - ACWI x U.S.		International Blended Benchmark	-12.1%	-12.0%	0.1%
Fixed Income - U.S.	21.0%	Fixed Income Blended (Jul 1 2017)	0.1%	0.2%	0.1%
Fixed Income - Emerging		Barclays Emerging Market	-2.5%	-4.5%	-2.0%
Fixed Income - High Yield		Barclays US Corp High Yield	-2.1%	-2.8%	-0.7%
Cash	1.0%	US 90 day T bill	1.9%	2.0%	0.1%
Infrastructure		Custom (Alternative Investment Actual Return)	11.8%	-3.2%	-15.0%
Natural Resources		Custom (Alternative Investment Actual Return)	11.8%	11.5%	-0.3%
REITs		Your REIT benchmark	-4.6%	-4.6%	0.0%
Real Estate ex-REITs	10.0%	NCREIF NPI	6.7%	8.4%	1.7%
Hedge Funds		Custom (Alternative Investment Actual Return)	11.8%	0.6%	-11.2%
Global TAA		Custom (Alternative Investment Actual Return)	11.8%	-7.3%	-19.1%
Private Credit		Custom (Alternative Investment Actual Return)	11.8%	4.1%	-7.7%
Diversified Private Equity		Custom (Alternative Investment Actual Return)	11.8%	17.7%	5.9%
Venture Capital		Custom (Alternative Investment Actual Return)	11.8%	18.4%	6.6%
LBO	16.0%	Custom (Alternative Investment Actual Return)	11.8%	19.8%	8.0%
Total	100.0%				
Net Actual Return (reported by you)					-1.9%
Calculated Policy Return = sum of (policy weights X benchmark returns)				-1.8%	
Adjustment to reflect rebalancing and overlay impacts				<u>-0.3%</u>	
Policy Return (reported by you)					<u>-2.0%</u>
Net Value Added (Net Return - Policy Return)					0.1%

Your policy return and value added calculations - 2014 to 2017

2017 Policy Return and Value Added

Asset class	Policy weight	Benchmark Description	Benchmark Return	Net return	Value added
Stock - U.S. Large Cap	30.0%	Russell 1000 (Ru	21.1%	22.1%	1.0%
Stock - U.S. Small Cap		Russell 2000	14.7%	19.6%	5.0%
Stock - EAFE	20.0%	MSCI World xUS	20.1%	21.9%	1.8%
Stock - Global		MSCI ACWI net	24.6%	24.0%	-0.6%
Stock - Emerging	5.0%	MSCI Emerging I	37.3%	31.6%	-5.7%
Stock - ACWI x U.S.		International Bl	23.4%	23.8%	0.4%
Fixed Income - U.S.	20.0%	Fixed Income Bl	3.9%	3.4%	-0.4%
Fixed Income - Emerging		Barclays Emergi	8.2%	10.4%	2.2%
Fixed Income - High Yield		Barclays US Cor	7.5%	7.3%	-0.2%
Cash	1.0%	US 90 day T bill	0.9%	0.7%	-0.1%
Infrastructure		Custom (Alterna	12.2%	1.9%	-10.3%
Natural Resources		Custom (Alterna	12.2%	-34.5%	-46.7%
REITs	1.5%	Your REIT bench	5.2%	5.2%	0.0%
Real Estate ex-REITs	8.5%	NCREIF NPI	7.0%	6.1%	-0.9%
Hedge Funds		Custom (Alterna	12.2%	5.6%	-6.7%
Global TAA		Custom (Alterna	12.2%	10.5%	-1.7%
Private Credit		Custom (Alterna	12.2%	5.9%	-6.3%
Diversified Private Equity		Custom (Alterna	12.2%	19.3%	7.1%
Venture Capital		Custom (Alterna	12.2%	13.2%	1.0%
LBO	14.0%	Custom (Alterna	12.2%	19.3%	7.1%
Other Private Equity		Custom (Alterna	12.2%	7.3%	-4.9%
Total	100.0%				
Net Return (reported by you)					15.8%
Calculated policy return (sum: Policy weights x benchmarks)				15.4%	
Adjustment to reflect rebalancing and overlay impacts				0.0%	
Policy return (reported by you)					15.4%
Net Value Added (Net Return - Policy Return)					0.4%

2015 Policy Return and Value Added

Asset class	Policy weight	Benchmark Description	Benchmark Return	Net return	Value added
Stock - U.S. Large Cap	31.0%	Russell 1000 (Ru	0.5%	1.0%	0.5%
Stock - U.S. Small Cap		Russell 2000	-4.4%	-2.2%	2.2%
Stock - EAFE	20.8%	MSCI World xUS	0.4%	3.5%	3.2%
Stock - Global		MSCI ACWI net	-2.4%	-1.3%	1.1%
Stock - Emerging	5.2%	MSCI Emerging I	-14.9%	-12.0%	3.0%
Stock - ACWI x U.S.		International Bl	-2.8%	-0.9%	1.9%
Fixed Income - U.S.	18.0%	Barclays Univer	0.4%	1.0%	0.6%
Fixed Income - Emerging		Barclays Emergi	1.3%	0.6%	-0.6%
Fixed Income - High Yield		Barclays US Cor	-4.5%	-4.5%	0.0%
Cash	1.0%	US 90 day T bill	0.1%	0.1%	0.0%
Infrastructure		Custom (Alterna	6.1%	3.2%	-2.9%
Natural Resources		Custom (Alterna	6.1%	2.0%	-4.1%
REITs	1.5%	Your REIT bench	3.2%	3.2%	0.0%
Real Estate ex-REITs	8.5%	NCREIF NPI	13.3%	12.2%	-1.2%
Hedge Funds		Custom (Alterna	6.1%	-1.1%	-7.2%
Global TAA		Custom (Alterna	6.1%	-2.6%	-8.7%
Diversified Private Equity		Custom (Alterna	6.1%	9.9%	3.8%
Venture Capital		Custom (Alterna	6.1%	11.8%	5.7%
LBO	14.0%	Custom (Alterna	6.1%	9.9%	3.8%
Other Private Equity		Custom (Alterna	6.1%	5.0%	-1.1%
Total	100.0%				
Net Return (reported by you)					2.3%
Calculated policy return (sum: Policy weights x benchmarks)				1.6%	
Adjustment to reflect rebalancing and overlay impacts				0.1%	
Policy return (reported by you)					1.7%
Net Value Added (Net Return - Policy Return)					0.6%

2016 Policy Return and Value Added

Asset class	Policy weight	Benchmark Description	Benchmark Return	Net return	Value added
Stock - U.S. Large Cap	31.0%	Russell 1000 (Ru	12.7%	10.6%	-2.1%
Stock - U.S. Small Cap		Russell 2000	21.3%	17.2%	-4.1%
Stock - EAFE	20.8%	MSCI World xUS	5.0%	4.8%	-0.2%
Stock - Global		MSCI ACWI net	7.9%	8.8%	0.9%
Stock - Emerging	5.2%	MSCI Emerging I	11.2%	13.6%	2.4%
Stock - ACWI x U.S.		International Bl	6.4%	7.5%	1.1%
Fixed Income - U.S.	18.0%	Barclays Univer	3.9%	2.7%	-1.2%
Fixed Income - Emerging		Barclays Emergi	9.9%	15.4%	5.5%
Fixed Income - High Yield		Barclays US Cor	17.1%	16.9%	-0.3%
Cash	1.0%	US 90 day T bill	0.3%	0.5%	0.1%
Infrastructure		Custom (Alterna	5.3%	3.6%	-1.7%
Natural Resources		Custom (Alterna	5.3%	-4.1%	-9.4%
REITs	1.5%	Your REIT bench	8.5%	8.8%	0.3%
Real Estate ex-REITs	8.5%	NCREIF NPI	8.0%	9.3%	1.3%
Hedge Funds		Custom (Alterna	5.3%	2.3%	-3.0%
Global TAA		Custom (Alterna	5.3%	8.1%	2.8%
Private Credit					
Diversified Private Equity		Custom (Alterna	5.3%	6.7%	1.4%
Venture Capital		Custom (Alterna	5.3%	3.1%	-2.2%
LBO	14.0%	Custom (Alterna	5.3%	6.7%	1.4%
Other Private Equity		Custom (Alterna	5.3%	4.2%	-1.1%
Total	100.0%				
Net Return (reported by you)					8.0%
Calculated policy return (sum: Policy weights x benchmarks)				7.8%	
Adjustment to reflect rebalancing and overlay impacts				0.2%	
Policy return (reported by you)					8.0%
Net Value Added (Net Return - Policy Return)					0.0%

2014 Policy Return and Value Added

Asset class	Policy weight	Benchmark Description	Benchmark Return	Net return	Value added
Stock - U.S. Large Cap	31.0%	Russell 1000 (Ru	12.6%	12.4%	-0.2%
Stock - U.S. Small Cap		Russell 2000	4.9%	4.3%	-0.6%
Stock - EAFE	20.8%	MSCI World xUS	0.8%	1.1%	0.3%
Stock - Global		MSCI ACWI Net	4.2%	3.7%	-0.5%
Stock - Emerging	5.2%	MSCI Emerging I	-2.2%	-1.7%	0.5%
Stock - ACWI x U.S.		International Bl	0.2%	0.5%	0.2%
Fixed Income - U.S.	18.0%	Barclays Univer	5.6%	5.5%	0.0%
Fixed Income - Emerging		Barclays Emergi	4.8%	1.5%	-3.2%
Fixed Income - High Yield		Barclays US Cor	2.5%	2.1%	-0.4%
Cash	1.0%	US 90 day T bill	0.0%	0.1%	0.0%
Infrastructure		Custom (Alterna	13.5%	15.8%	2.3%
Natural Resources		Custom (Alterna	13.5%	7.7%	-5.8%
REITs	1.5%	Your REIT bench	30.1%	30.5%	0.3%
Real Estate ex-REITs	8.5%	NCREIF NPI	11.8%	14.8%	3.0%
Hedge Funds		Custom (Alterna	13.5%	2.0%	-11.5%
Global TAA					
Diversified Private Equity	14.0%	Custom (Alterna	13.5%	18.9%	5.4%
Venture Capital		Custom (Alterna	13.5%	17.9%	4.4%
LBO					
Other Private Equity		Custom (Alterna	13.5%	13.5%	0.0%
Total	100.0%				
Net Return (reported by you)					7.8%
Calculated policy return (sum: Policy weights x benchmarks)				8.3%	
Adjustment to reflect rebalancing and overlay impacts				0.0%	
Policy return (reported by you)					8.3%
Net Value Added (Net Return - Policy Return)					-0.4%

Profit/Loss on overlay programs

Overlay type	Your fund		Peer median				U.S. Public median			
	2018	2017	2018		2017		2018		2017	
	bps	bps	bps	#	bps	#	bps	#	bps	#
Int. Discretionary Currency			-3.4	1	-4.8	1	-3.4	1	-4.8	1
Ext. Discretionary Currency			-0.3	2	0.0	2	0.3	3	0.0	2
Internal Global TAA					0.0	1			0.0	1
External Global TAA										
Internal PolicyTilt TAA										
External PolicyTilt TAA										
Internal Commodities										
External Commodities							-1.9	1	0.1	1
Internal Long/Short										
External Long/Short										
Internal Other			0.0	1	0.0	1	0.0	1	0.0	1
External Other			-7.1	1	18.1	1	-7.1	3	20.3	4

Profit/loss in basis points was calculated using total fund average holdings. This was done to measure the impact of the program at the total fund level.

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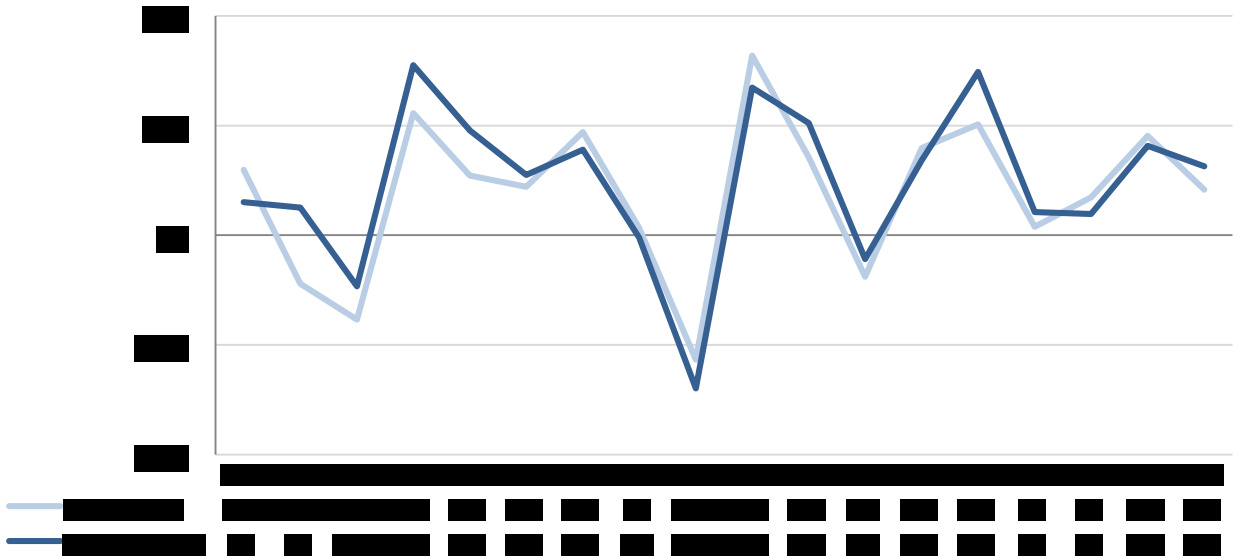
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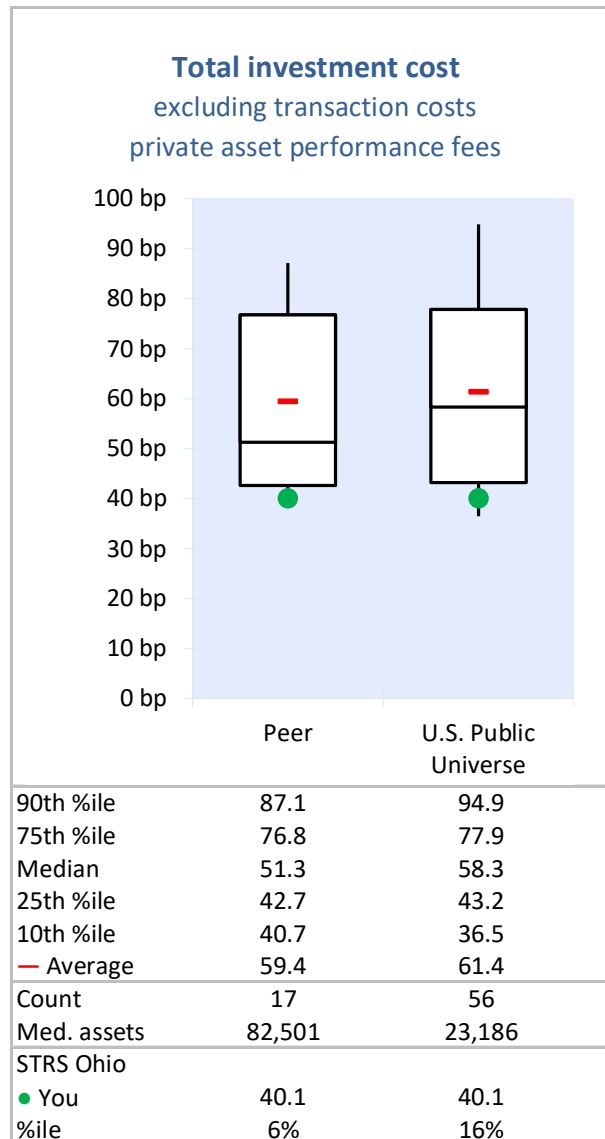
Total cost and benchmark cost

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Comparisons of total investment cost

Your total investment cost, excluding transaction costs and private asset performance fees, of 40.1 bps was below the peer median of 51.3 bps.

Differences in total investment cost are often caused by two factors that are usually outside of management's control: asset mix and fund size. Therefore, to assess whether your fund's total investment cost is high or low given your unique asset mix and size, CEM calculates a benchmark cost for your fund. Benchmark cost analysis begins on page 7 of this section.

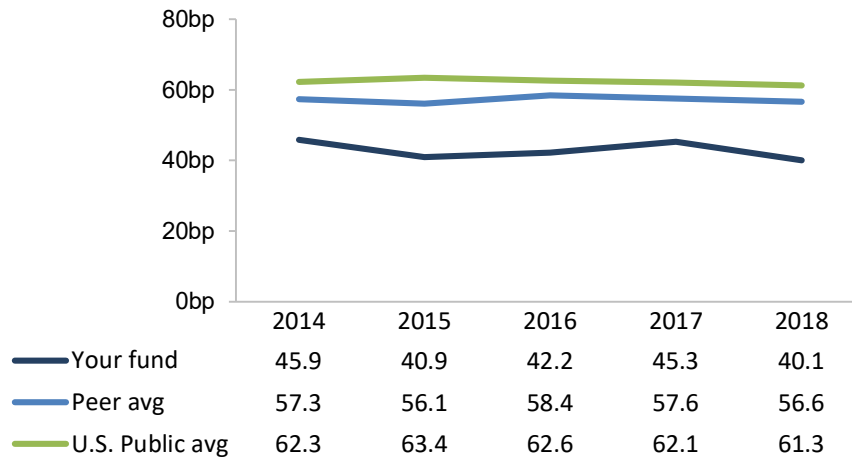


Trend in total investment cost

Your total investment cost, excluding transaction costs and private asset performance fees, decreased from 45.9 bps in 2014 to 40.1 bps in 2018.

Trend in total investment cost

(excluding transaction costs and private asset performance fees)



Trend analysis is based on 49 U.S. Public funds and 15 peer funds with 5 or more consecutive years of data.

Types of costs included in your total investment cost

The table below outlines the types of costs included in your total investment cost.

Asset class	Internal		External			
	In-house total cost	Transaction costs	Manager base fees	Monitoring & other costs	Perform. fees (active only)	Transaction costs
<u>Public</u> (Stock, Fixed income, commodities, REITs)	✓	✗	✓	✓	✓	✗
Derivatives/Overlays	✓	✗	✓	✓	✓	✗
<u>Hedge funds & Global TAA</u>						
Hedge Funds	n/a	n/a	✓	✓	✓	✗
Global TAA	✓	✗	✓	✓	✓	✗
<u>Private real assets</u> (Infrastructure, natural resources, real estate ex-REITs, other real assets)	✓	✗	✓	✓	✗	✗
<u>Private equity</u> (Diversified private equity, venture capital, LBO, other private equity)	✓	✗	✓*	✓	✗	✗

*External manager base fees represent gross contractual management fees.

- ✓ indicates cost is included.
- ✗ indicates cost is excluded.
- CEM currently excludes external private asset performance fees and all transaction costs from your total cost because only a limited number of participants are currently able to provide complete data.

Detailed breakdown of your total investment cost

Your 2018 total investment cost, excluding transaction costs and private asset performance fees, was 40.1 bp or \$302.8 million.

Your investment costs

	Internal		External Passive		External Active			Total ¹		
	Passive	Active	Fees	Monitoring & Other	Base Fees	Perform. Fees	Monitor. & Other	\$000s	bps	% of Total
Asset management										
Stock - U.S. Large Cap	73	12,688			2,310		211	15,281		5%
Stock - U.S. Small Cap		323			9,437		105	9,866		3%
Stock - EAFE		2,968			19,126		206	22,300		7%
Stock - Emerging		3,184			5,778		252	9,214		3%
Stock - Global		488						488		0%
Stock - ACWI x U.S.		468			5,474		20	5,962		2%
Fixed Income - U.S.		3,466						3,466		1%
Fixed Income - Emerging					3,476		143	3,619		1%
Fixed Income - High Yield					3,161		144	3,305		1%
Cash		299						299		0%
REITs	106							106		0%
Real Estate ex-REITs ¹²		17,796						17,796		6%
Real Estate ex-REITs - LP ¹²					14,030	5,526	481	14,511		5%
Infrastructure - FoFs ¹²					370	506	9	379		0%
Underlying FoF Fees ¹²					348	506		348		0%
Natural Resources ¹²										
Natural Resources - LP ¹²					5,691	2,090	57	5,748		2%
Natural Resources - Co-Invest. ¹					0		24	24		0%
Hedge Funds					26,479	12,406	255	39,140		13%
Global TAA		1,667			2,306		96	4,069		1%
Diversified Private Equity - LP ¹²		320			25,682	26,113	512	26,513		9%
Diversified Private Equity - Co-Invest. ¹					0		88	88		0%
LBO - LP ¹²					58,116	66,236	1,068	59,184		20%
LBO - FoFs ¹²					6,314	3,703	183	6,497		2%
Underlying FoF Fees ¹²					10,167	18,608		10,167		3%
Venture Capital - LP ¹²					16,328	15,264	406	16,734		6%
Venture Capital - FoFs ¹²					1,492	888	61	1,554		1%
Underlying FoF Fees ¹²					4,721	4,320		4,721		2%
Other Private Equity - LP ¹										
Other Private Equity - Co-Invest. ¹										
Private Credit ¹²		74						74		0%
Private Credit - LP ¹²					12,745	5,139	190	12,935		4%
Derivatives/Overlays	326			163				488		0%
Total asset management costs excluding private asset performance fees								294,877	39.0bp	97%
Oversight, custodial & other asset related costs										
Oversight of the Fund								4,965		2%
Trustee & Custodial								2,293		1%
Audit								168		0%
Other								511		0%
Total oversight, custodial & other costs								7,937	1.0bp	3%
Total investment costs excluding transaction costs and private asset performance fees								302,813	40.1bp	100%

1. Total cost excludes carry/performance fees for real estate, infrastructure, natural resources and private equity. Performance fees are included for the public market asset classes and hedge funds.

2. Default costs added. Refer to Appendix A.

Changes in your investment costs

The table below shows how your investment costs have changed from year to year by asset class.

Change in your investment costs (2018 - 2014)

	Investment costs (\$000s)					Change (\$000s)				Change (%)			
	2018	2017	2016	2015	2014	2018	2017	2016	2015	2018	2017	2016	2015
Asset management													
Stock - U.S. Large Cap	15,281	15,356	13,728	14,183	12,886	-75	1,628	-455	1,297	0%	12%	-3%	10%
Stock - U.S. Small Cap	9,866	10,064	9,173	9,392	9,742	-198	891	-219	-350	-2%	10%	-2%	-4%
Stock - EAFE	22,300	23,709	22,089	23,022	22,179	-1,409	1,620	-933	843	-6%	7%	-4%	4%
Stock - Emerging	9,214	9,362	8,662	8,177	8,780	-148	699	486	-604	-2%	8%	6%	-7%
Stock - Global	488	495	452	457	423	-7	43	-5	34	-1%	9%	-1%	8%
Stock - ACWI x U.S.	5,962	6,617	5,898	5,480	2,416	-655	719	418	3,064	-10%	12%	8%	127%
Fixed Income - U.S.	3,466	3,305	2,466	2,552	2,539	161	839	-86	13	5%	34%	-3%	1%
Fixed Income - Emerging	3,619	3,592	3,311	3,717	3,856	27	281	-406	-139	1%	8%	-11%	-4%
Fixed Income - High Yield	3,305	3,312	3,821	4,606	4,336	-7	-510	-785	270	0%	-13%	-17%	6%
Cash	299	286	266	269	266	13	20	-3	3	5%	7%	-1%	1%
REITs	106	94	89	226	16	12	5	-137	210	13%	6%	-61%	1273%
Real Estate ex-REITs ¹²	17,796	17,182	16,632	16,561	14,192	613	550	71	2,370	4%	3%	0%	17%
Real Estate ex-REITs - LP ¹²	14,511	18,114	17,879	18,382	25,031	-3,603	235	-502	-6,649	-20%	1%	-3%	-27%
Infrastructure - FoFs ¹²	379	473	508	514	518	-94	-36	-6	-3	-20%	-7%	-1%	-1%
Underlying FoF Fees ¹²	348	767	1,321	1,946	1,249	-419	-554	-625	697	-55%	-42%	-32%	56%
Natural Resources ¹²	0	0	298	169	0		-298	129	169		-100%	77%	
Natural Resources - LP ¹²	5,748	6,901	6,505	7,716	5,055	-1,153	396	-1,211	2,661	-17%	6%	-16%	53%
Natural Resources - Co-Invest. ¹	24	40				-15				-39%			
Hedge Funds	39,140	50,047	54,886	45,603	55,312	-10,907	-4,839	9,283	-9,709	-22%	-9%	20%	-18%
Global TAA	4,069	1,372	1,218	690		2,698	154	528		197%	13%	76%	
Diversified Private Equity - LP ¹²	26,513	3,943	2,743	1,442	95,549	22,570	1,200	1,301	-94,107	572%	44%	90%	-98%
Diversified Private Equity - Co-Invest. ¹	88												
LBO - LP ¹²	59,184	71,537	53,243	51,636		-12,353	18,294	1,607		-17%	34%	3%	
LBO - FoFs ¹²	6,497	7,500	7,355	6,569		-1,003	146	785		-13%	2%	12%	
Underlying FoF Fees ¹²	10,167	10,952	8,311	11,206		-785	2,641	-2,896		-7%	32%	-26%	
Venture Capital - LP ¹²	16,734	25,474	20,414	28,163	35,444	-8,740	5,060	-7,749	-7,281	-34%	25%	-28%	-21%
Venture Capital - FoFs ¹²	1,554	1,282	1,750	1,617	1,161	272	-468	133	456	21%	-27%	8%	39%
Underlying FoF Fees ¹²	4,721	4,794	4,392	3,665	2,824	-73	402	727	841	-2%	9%	20%	30%
Other Private Equity - LP ¹		24,065	25,635	19,766	10,947		-1,570	5,869	8,819		-6%	30%	81%
Other Private Equity - Co-Invest. ¹		193	34	9			160	25			473%	289%	
Private Credit ¹²	74												
Private Credit - LP ¹²	12,935	10,159				2,776				27%			
Derivatives/Overlays	488	495	452	457	367	-7	43	-5	90	-1%	9%	-1%	25%
Total excl. private asset perf. fees	294,877	331,483	293,532	288,193	328,574	-36,606	37,951	5,340	-40,381	-11%	13%	2%	-12%
Oversight, custodial & other asset related costs													
Oversight of the Fund	4,965	4,812	4,578	4,539	3,804	153	234	39	735	3%	5%	1%	19%
Trustee & Custodial	2,293	2,412	2,090	2,150	1,673	-119	322	-60	477	-5%	15%	-3%	29%
Audit	168	168	166	158	136	0	2	8	22	0%	1%	5%	16%
Other	511	477	418	375	339	33	59	43	36	7%	14%	12%	11%
Total oversight, custodial & other	7,937	7,870	7,252	7,222	5,952	67	618	30	1,270	1%	9%	0%	21%
Total investment costs¹	302,813	339,353	300,785	295,415	334,526	-36,540	38,569	5,370	-39,111	-11%	13%	2%	-12%
Total in basis points	40.1bp	45.3bp	42.2bp	40.9bp	45.9bp								

1. Total cost excludes carry/performance fees for real estate, infrastructure, natural resources and private equity. Performance fees are included for the public market asset classes and hedge funds.

2. Default costs added. Refer to Appendix A.

Total cost versus benchmark cost

Your fund's total investment cost, excluding transaction costs and private asset performance fees, was 14.5 bps below your benchmark cost of 54.5 bps. This implies that your fund was low cost by 14.5 bps compared to the peer median, after adjusting for your fund's asset mix.

Your cost versus benchmark

	\$000s	bps
Your fund's total investment costs excluding transaction costs and private asset performance fees	302,813	40.1 bp
- Your fund's benchmark	412,071	54.5 bp
= Your fund's cost savings	-109,258	-14.5 bp

Your benchmark cost is an estimate of your total costs assuming that you paid the peer median cost for each of your investment mandates and fund oversight. The calculation of your benchmark cost is shown on the following page.

The reasons why your fund's total cost was below your benchmark are summarized in the table below. Details of each of the impacts below are provided on pages 9 to 11.

Reasons why your fund was low cost

	Cost/-Savings impact	
	\$000s	bps
<u>Differences in implementation style:</u>		
Less passive	20,188	2.7 bp
More int. active % of total active	-74,593	-9.9 bp
Less evergreen % of external	9,797	1.3 bp
Mix of fund of funds	-1,396	-0.2 bp
Less co-investment	3,433	0.5 bp
Less overlays and unfunded strategies	-1,601	-0.2 bp
Total style impact	-44,173	-5.8 bp
<u>Paying more/-less for similar services:</u>		
External investment management	-66,820	-8.8 bp
Internal investment management	1,735	0.2 bp
Oversight, custodial and other	0	0.0 bp
Total impact of paying more /-less	-65,085	-8.6 bp
Total savings	-109,258	-14.5 bp

Benchmark cost calculation

Your 2018 benchmark cost was 54.5 basis points or 412.1 million. It equals your holdings for each asset class multiplied by the peer median cost for the asset class. The peer median cost is the style weighted average for all implementation styles (i.e., internal passive, internal active, external passive, external active).

Asset class	Your average assets (A)	Weighted peer median cost ¹ (B)	Benchmark \$000s (A X B)
Asset management costs			
Stock - U.S. Large Cap	19,942	6.1 bp	12,071
Stock - U.S. Small Cap	1,929	42.0 bp	8,109
Stock - EAFE	10,790	22.0 bp	23,720
Stock - Emerging	3,279	46.2 bp	15,134
Stock - Global	591	36.3 bp	2,145
Stock - ACWI x U.S.	4,220	28.7 bp	12,098
Fixed Income - U.S.	12,627	7.6 bp	9,591
Fixed Income - Emerging	782	35.5 bp	2,777
Fixed Income - High Yield	789	34.7 bp	2,740
Cash	1,351	2.2 bp	299
REITs	1,137	24.9 bp	2,834
Real Estate ex-REITs	6,967	82.8 bp	57,702
Infrastructure	55	105.9 bp	585
Natural Resources	674	94.0 bp	6,341
Hedge Funds	1,638	120.9 bp	19,796
Perf. fees (on NAV)	1,638	45.2 bp	7,396
Global TAA	1,033	85.1 bp	8,792
Diversified Private Equity	3,431	152.0 bp	52,152
Venture Capital	1,956	179.3 bp	35,081
LBO	6,888	160.7 bp	110,677
Private Credit	1,204	99.7 bp	12,005
Overlay Programs ²	75,596	0.3 bp	2,089
Benchmark for asset management	75,596	53.5 bp	404,134
Oversight, custody and other costs³			
Oversight	75,596	0.4 bp	
Trustee & Custodial	75,596	0.4 bp	
Consulting	75,596	0.0 bp	
Audit	75,596	0.0 bp	
Other	75,596	0.1 bp	
Benchmark for oversight, custody & other	75,596	1.0 bp	7,937
Total benchmark cost		54.5 bp	412,071

1. The weighted peer median cost for asset management is the style-weighted average of the peer median costs for all implementation styles (i.e., internal passive, internal active, external passive, external active, fund of fund). The style weights by asset class for your fund and the peers are shown on page 15 of this section.

2. Total fund average holdings is used as the base when calculating the relative cost impact of the overlay programs.

3. Benchmarks for oversight total and individual lines are based on peer medians. Sum of the lines may be different from the total.

Cost impact of overlays

As summarized on the previous page, the style impact of overlays saved you 0.2 bps. If you use more overlays than your peers, or more expensive types of overlays, then it increases your relative cost.

	Your average total holdings (mils)	Cost as % of total holdings		Cost/-Savings Impact (000s)
		You	Peer avg.	
	(A)	(B)	(C)	A X (B - C)
Internal Overlays				
[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
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[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
External Overlays				
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[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
Total impact in 000s				-1,601
Total impact in basis points				-0.2 bp

Summary of why you are high or low cost by asset class

The table below summarizes where you are high and low cost by asset class. It also quantifies how much is due to differences in implementation style (i.e., differences in the mix of external active, external passive, internal active, internal passive and fund of fund usage) and how much is due to paying more or less for similar services (i.e., same asset class and style).

	Your cost ¹	Benchmark = peer weighted median cost ¹	More/-less	Your average assets (or fee basis)	More/-less in \$000s		
					Total More/-less	Due to Impl. style	Due to paying more/less
	(A)	(B)	(C = A - B)	(D)	(C X D)		
Asset management costs							
Stock - U.S. Large Cap	7.7 bp	6.1 bp	1.6 bp	19,942	3,210	-2,671	5,881
Stock - U.S. Small Cap	51.1 bp	42.0 bp	9.1 bp	1,929	1,757	-668	2,425
Stock - EAFE	20.7 bp	22.0 bp	-1.3 bp	10,790	-1,420	244	-1,664
Stock - Emerging	28.1 bp	46.2 bp	-18.1 bp	3,279	-5,920	-5,887	-33
Stock - Global	8.3 bp	36.3 bp	-28.1 bp	591	-1,657	-1,657	0
Stock - ACWI x U.S.	14.1 bp	28.7 bp	-14.5 bp	4,220	-6,135	-4,101	-2,035
Fixed Income - U.S.	2.7 bp	7.6 bp	-4.9 bp	12,627	-6,125	-5,343	-782
Fixed Income - Emerging	46.3 bp	35.5 bp	10.8 bp	782	841	0	841
Fixed Income - High Yield	41.9 bp	34.7 bp	7.2 bp	789	565	60	505
Cash	2.2 bp	2.2 bp	0.0 bp	1,351	0	0	0
REITs	0.9 bp	24.9 bp	-24.0 bp	1,137	-2,728	-2,672	-56
Real Estate ex-REITs	46.4 bp	82.8 bp	-36.5 bp	6,967	-25,395	-22,019	-3,376
Infrastructure	131.6 bp	105.9 bp	25.7 bp	55	142	409	-267
Natural Resources	85.6 bp	94.0 bp	-8.4 bp	674	-569	688	-1,257
Hedge Funds	163.2 bp	120.9 bp	42.4 bp	1,638	6,938	-696	7,634
Perf. fees (on NAV)	75.8 bp	45.2 bp	30.6 bp	1,638	5,010	-574	5,584
Global TAA	39.4 bp	85.1 bp	-45.7 bp	1,033	-4,723	567	-5,290
Diversified Private Equity	77.5 bp	152.0 bp	-74.5 bp	3,431	-25,551	-8,004	-17,547
Venture Capital	117.6 bp	179.3 bp	-61.7 bp	1,956	-12,072	2,630	-14,702
LBO	110.1 bp	160.7 bp	-50.6 bp	6,888	-34,829	3,392	-38,221
Private Credit	108.0 bp	99.7 bp	8.3 bp	1,204	1,004	3,732	-2,728
Overlay Programs ²	0.1 bp	0.3 bp	-0.2 bp	75,596	-1,601	-1,601	0
Total asset management	39.0 bp	53.5 bp	-14.5 bp	75,596	-109,258	-44,173	-65,085
Oversight, custody and other costs³							
Oversight of the Fund	█	█	0.2 bp				
Trustee & Custodial	█	█	-0.1 bp				
Consulting	█	█	0.0 bp				
Audit	█	█	0.0 bp				
Other	█	█	0.0 bp				
Total oversight, custody & other	1.0 bp	1.0 bp	0.0 bp	75,596	0	n/a	0
Total	40.1 bp	54.5 bp	-14.5 bp	75,596	-109,258	-44,173	-65,085

1. The weighted peer median cost for asset management is the style-weighted average of the peer median costs for all implementation styles (i.e., internal passive, internal active, external passive, external active, fund of fund). It excludes performance fees on private assets. The style weights by asset class for your fund and the peers are shown on page 15 of this section.

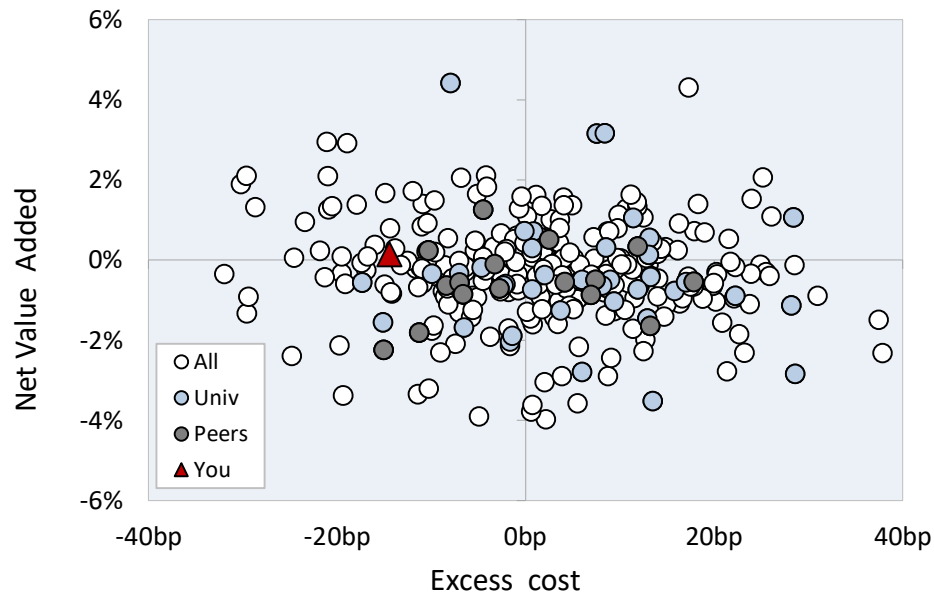
2. Total fund average holdings is used as the base when calculating the relative cost impact of the overlay programs.

3. Benchmarks for oversight total and individual lines are based on peer medians. Sum of the lines may be different from the total.

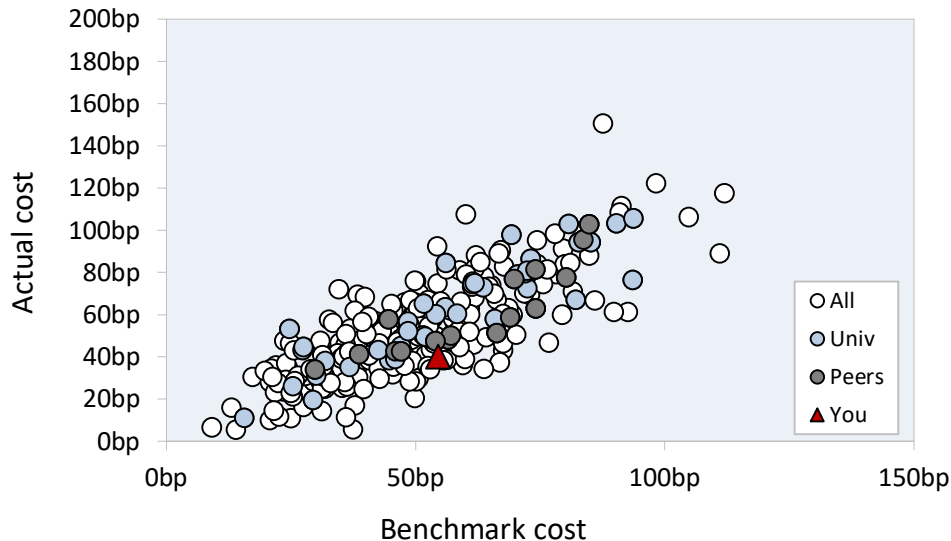
Your cost effectiveness ranking

Being high or low cost is neither good nor bad. More important is whether you are receiving sufficient value for your excess cost. At the total fund level, we provide insight into this question by combining your value added and excess cost to create a snapshot of your cost effectiveness performance relative to that of the global universe. In 2018, your fund ranked in the positive value added, low cost quadrant.

Your 2018 Net value added 0.1%, Excess cost -14 bps



Your 2018 Actual cost 40.1 bps, Benchmark cost 54.5 bps



For all funds except your fund, benchmark cost equals the sum of group median costs x fund's average holdings by asset class plus group median cost of derivatives/overlays plus group median cost of oversight/support. Group is peer if the fund is in the peer group, universe - if the fund is part of the universe, and global/database otherwise. Your fund's benchmark cost is calculated using peer-based methodology per page 7 of this section.

Appendix A: Benchmarking methodology formulas and data

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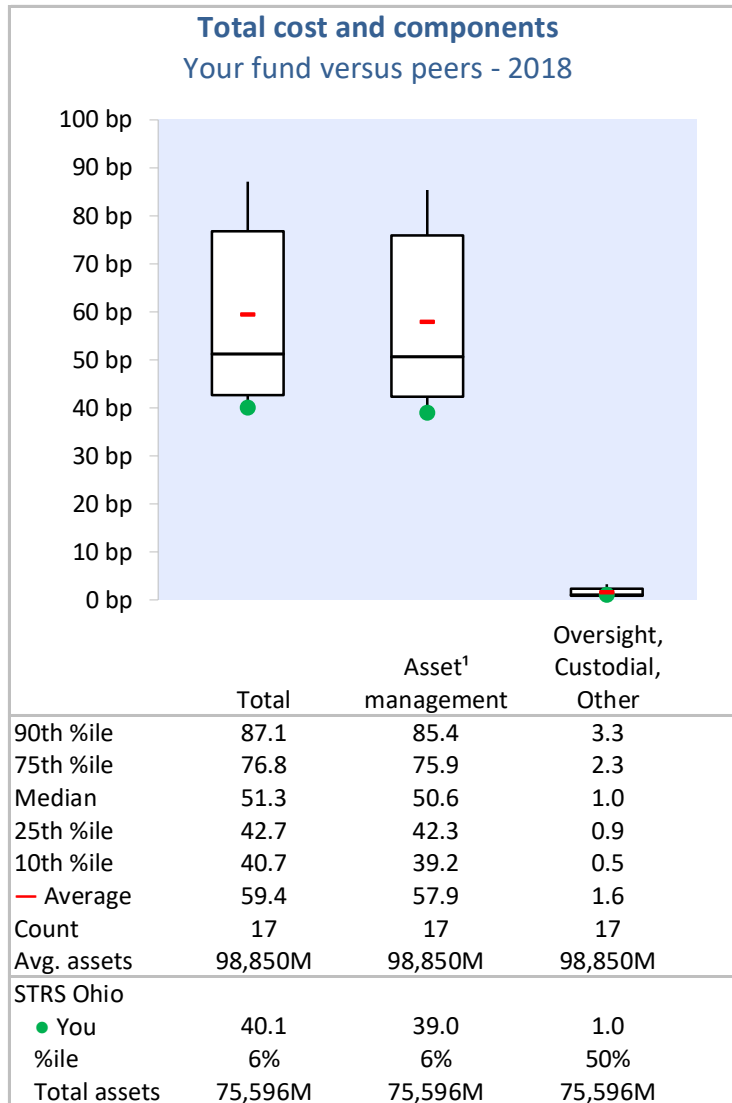
Cost comparisons

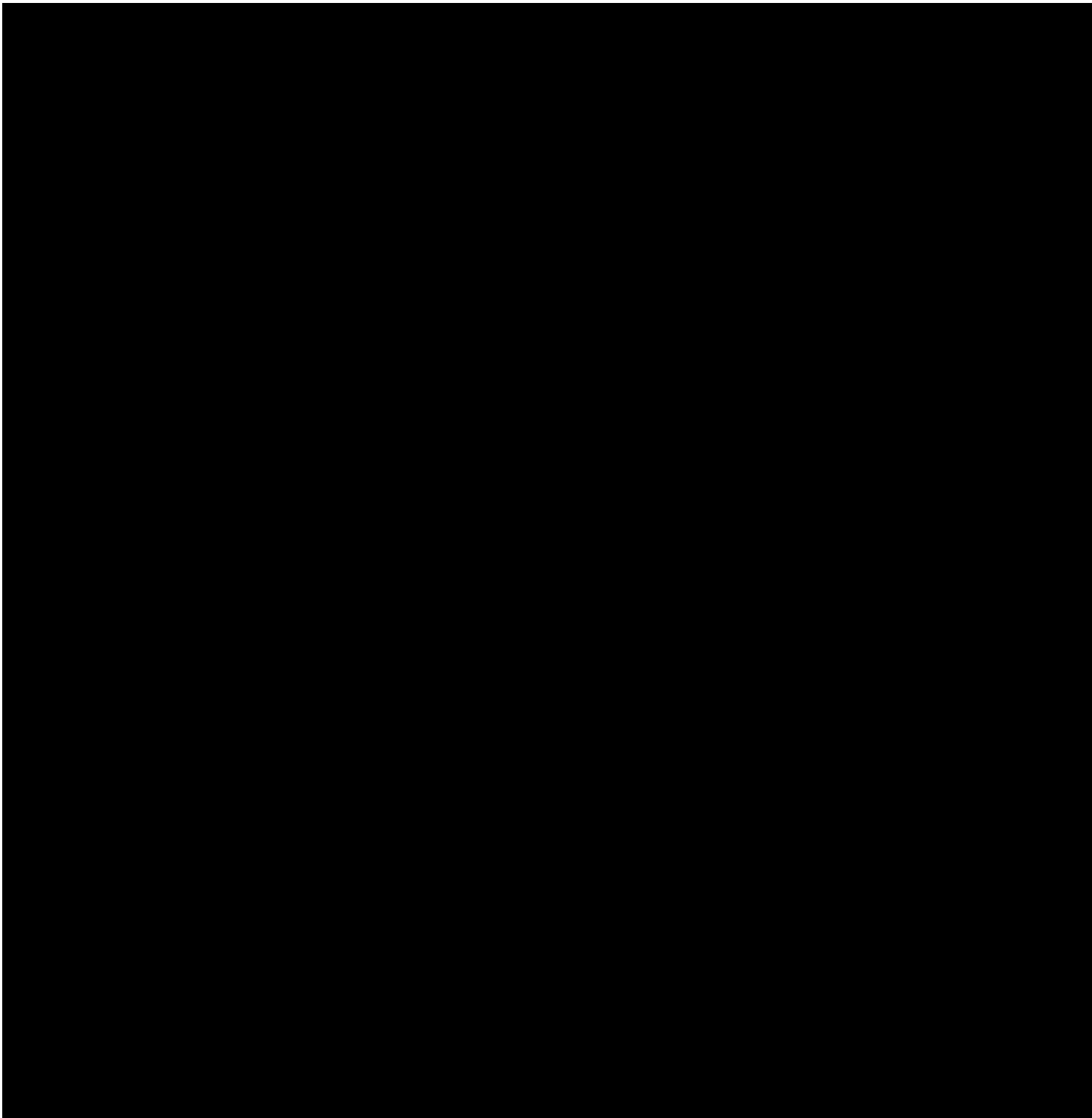
Total fund cost	2
Governance, operations & support	3
Public asset classes	
- Stock	4
- Fixed Income	14
- Commodities	28
- REITs	29
Real asset classes	
- Real estate ex-REITs	30
- Infrastructure	31
- Natural resources	32
- Other real assets	33
Private equity	
- Diversified private equity	34
- LBO	35
- Venture capital	36
- Private credit	37
- Other private equity	39
Global TAA	40
RiskParity	41
Hedge Funds	42
Overlays	43

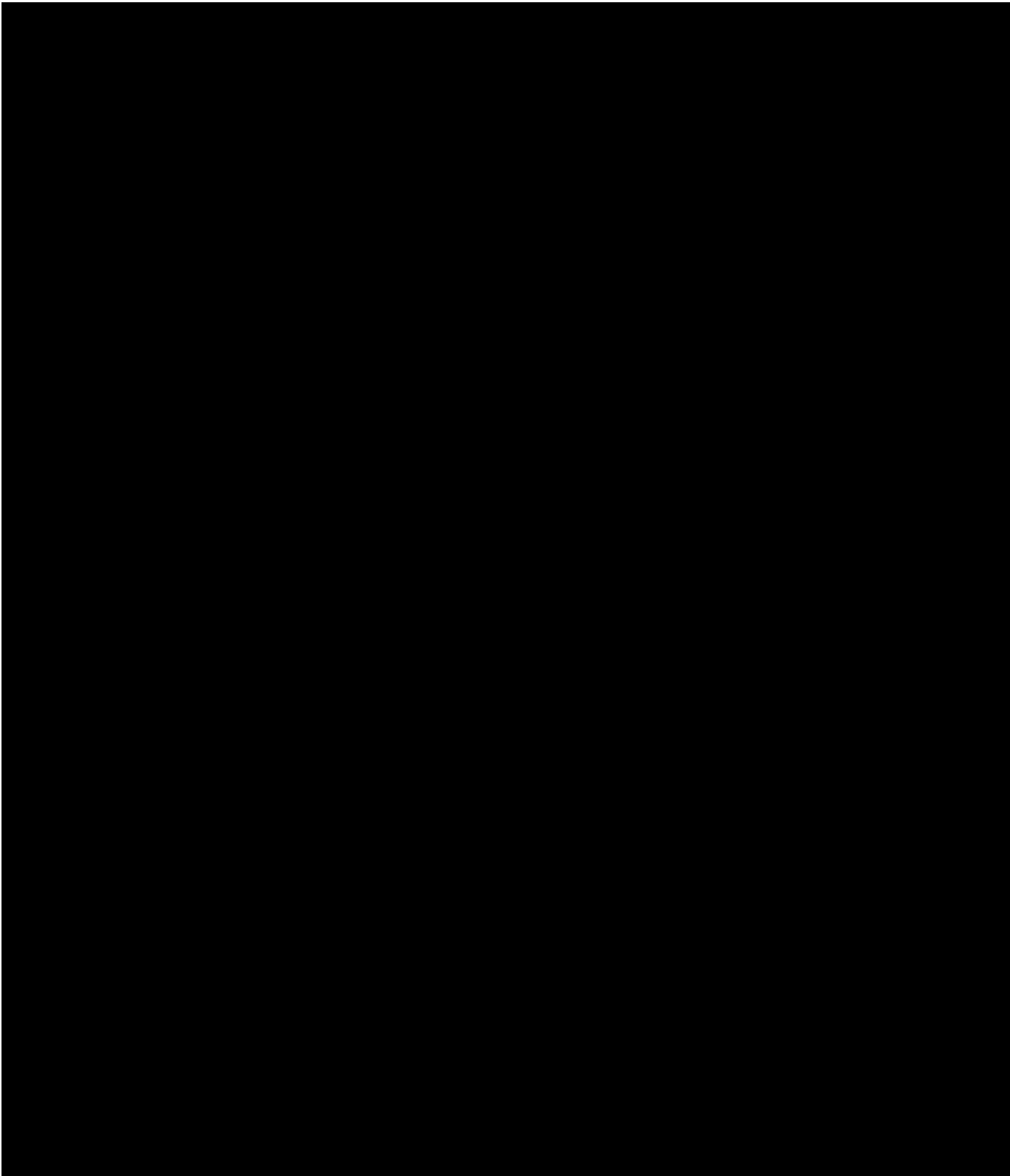
Total fund cost

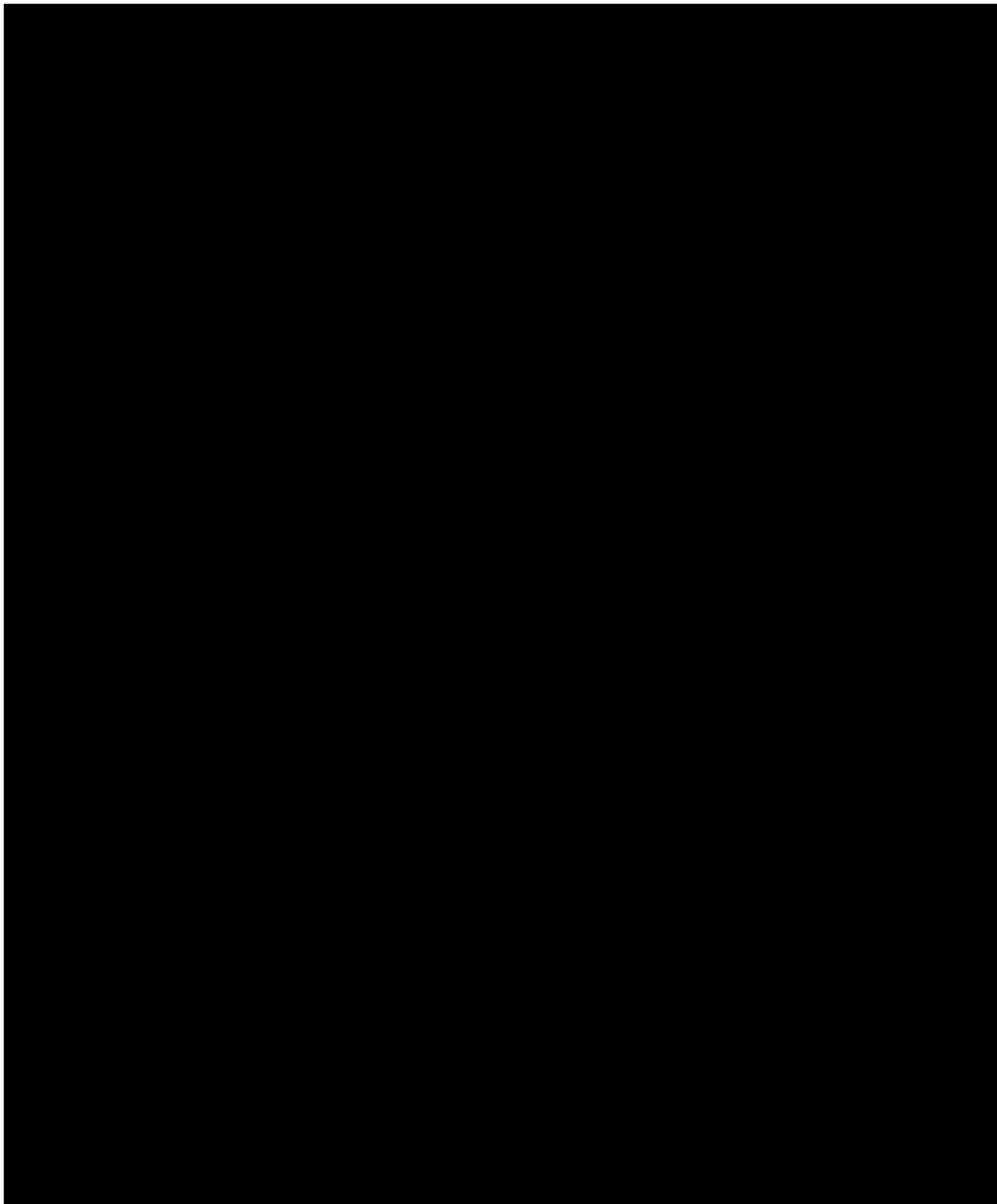
Total costs are benchmarked in the previous section. In this section, your fund's costs are compared on a line-item basis to your peers. This enables you to understand better why you may be a high or low cost fund and it also identifies and quantifies major cost differences that may warrant further investigation.

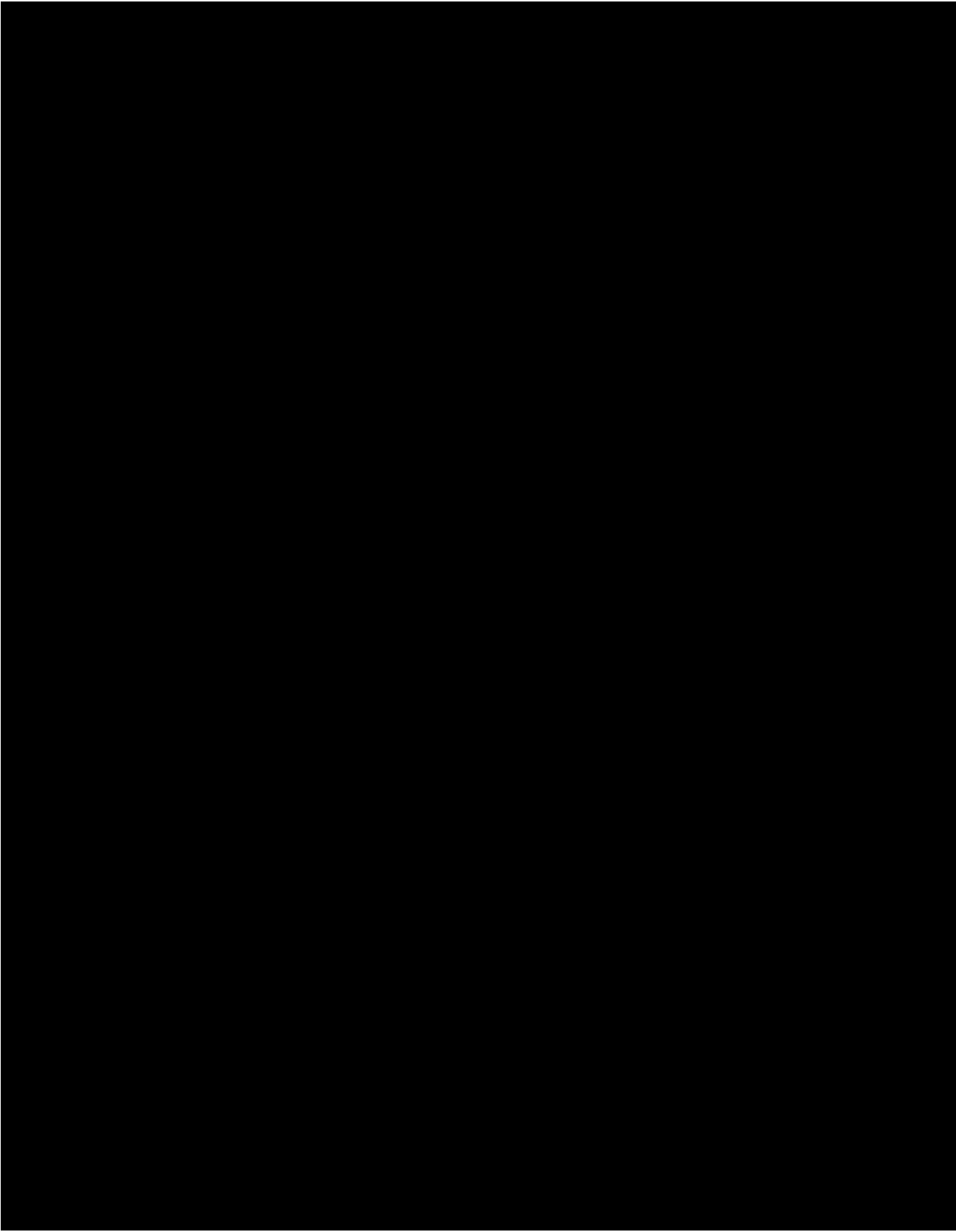
The 25th to 75th percentile range is the most relevant since higher and lower values may include outliers caused by unusual circumstances, such as performance-based fees. Count refers to the number of funds in your peer group that have costs in this category. It enables you to gauge the statistical significance.

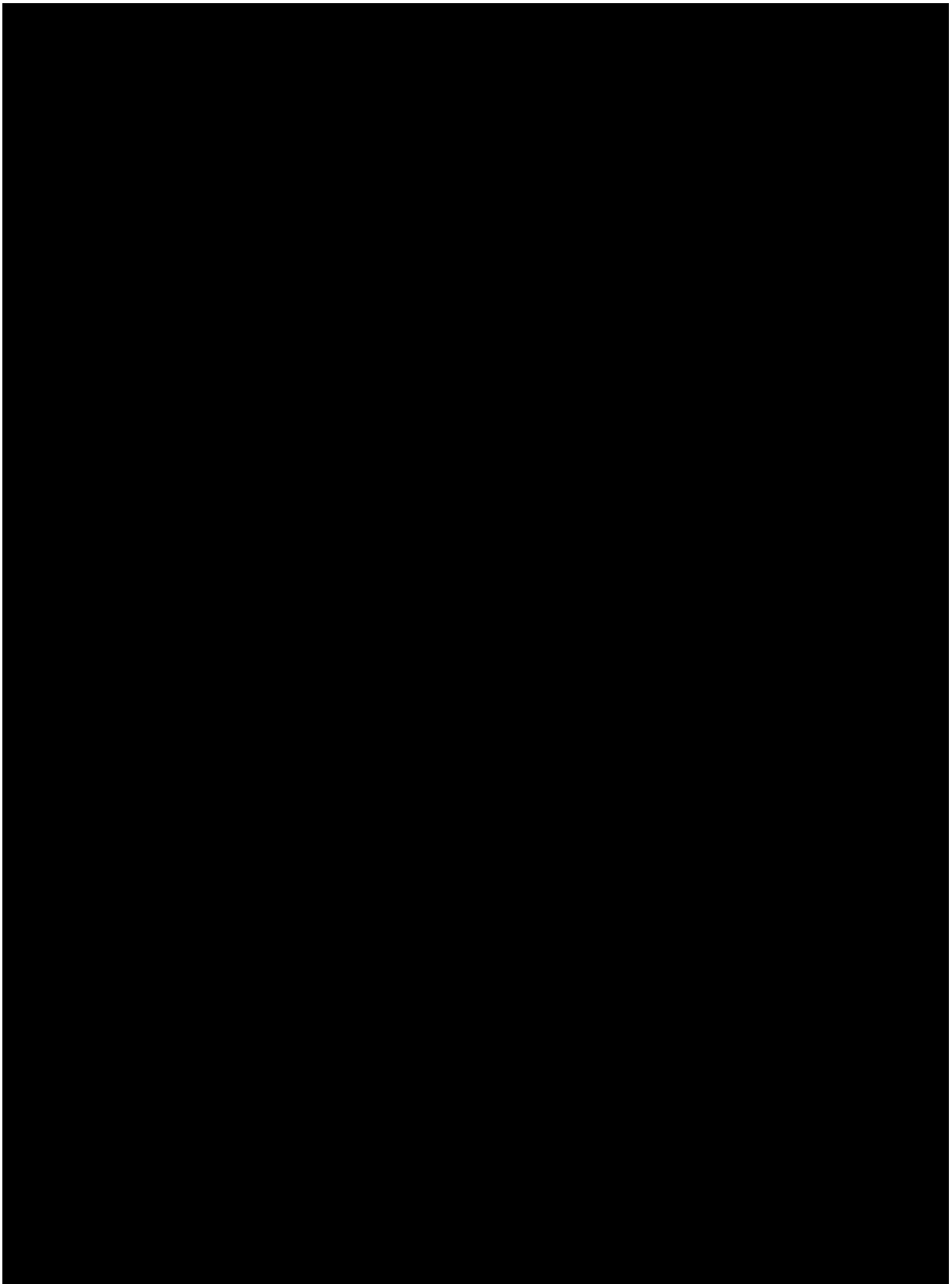


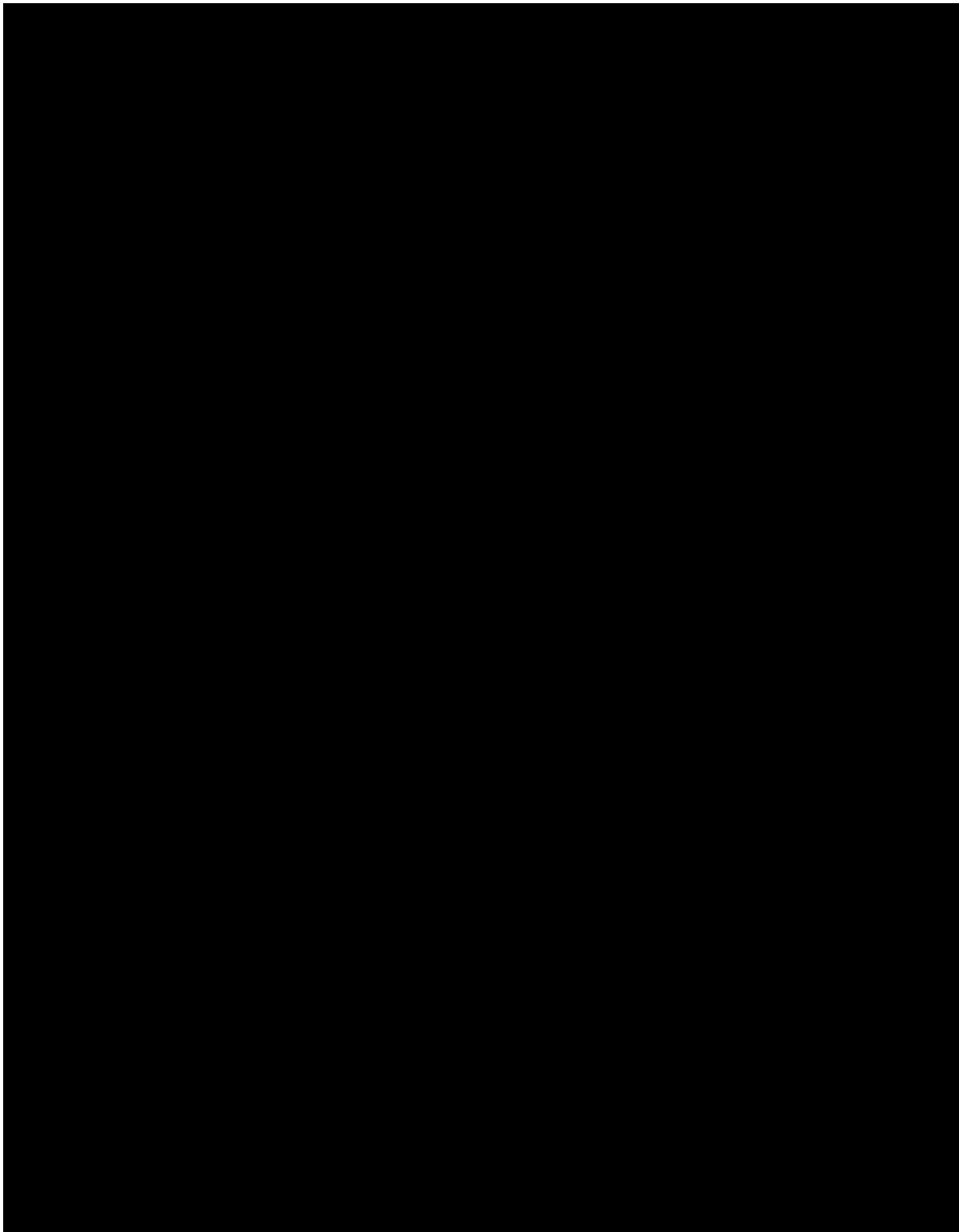


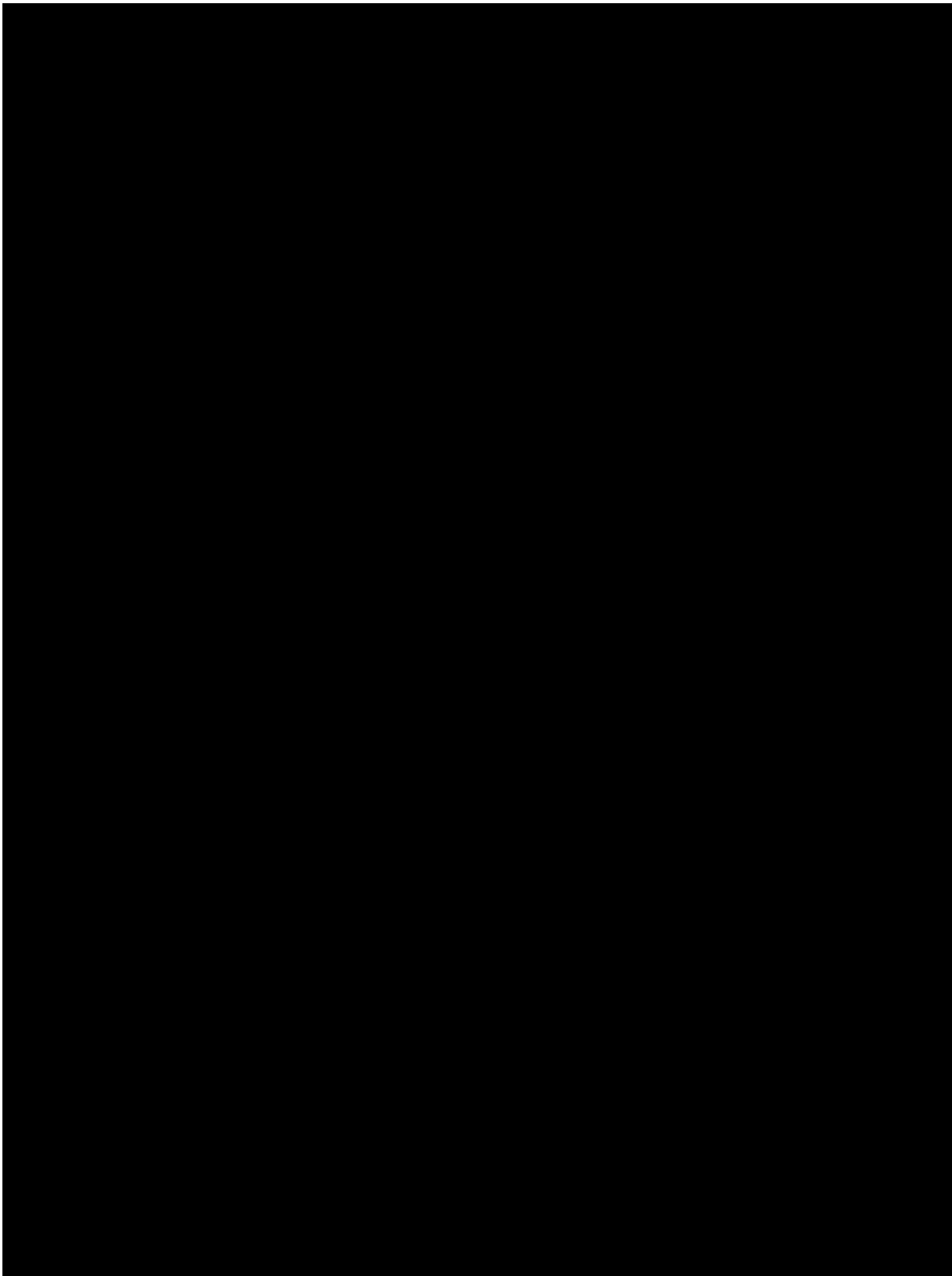


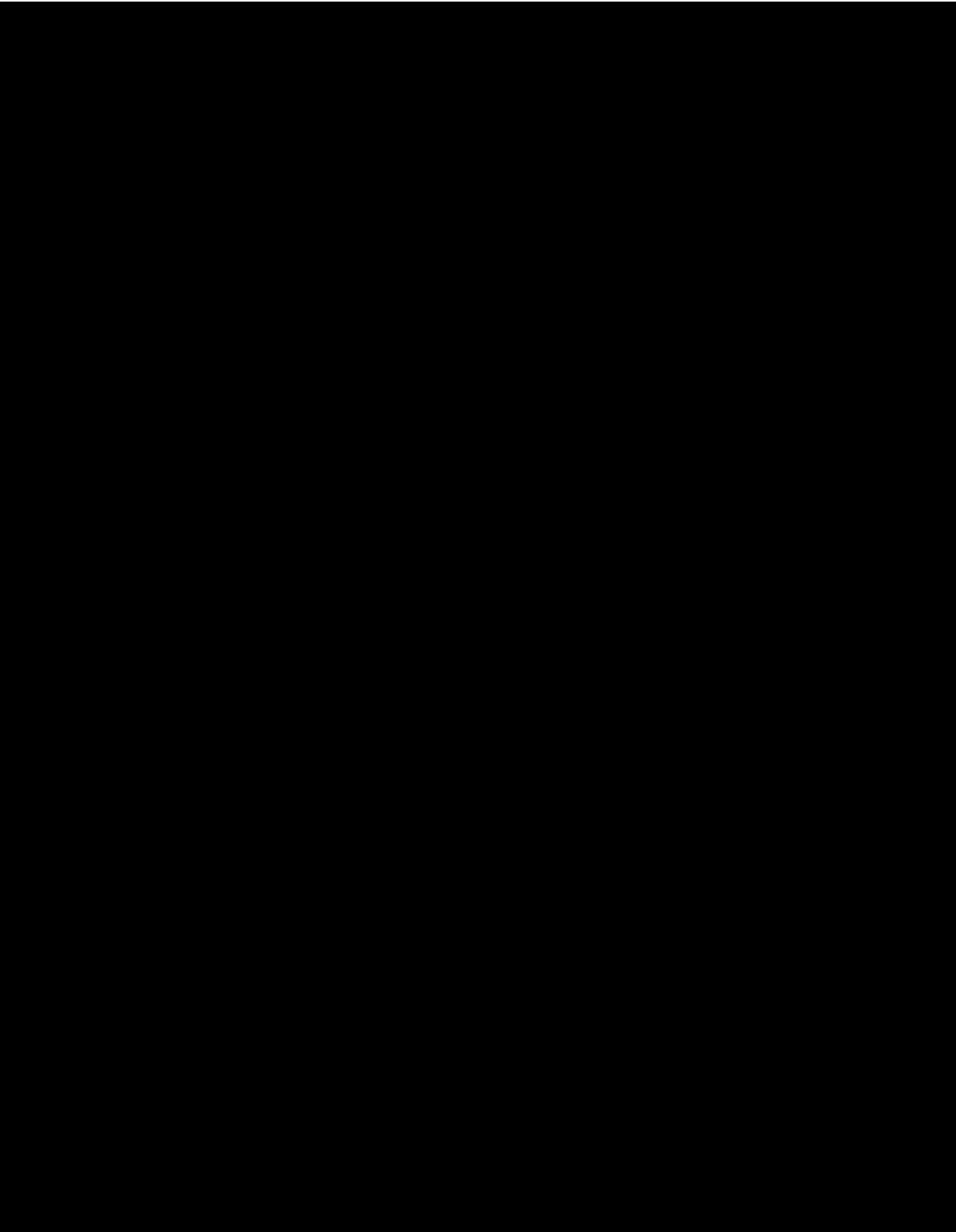


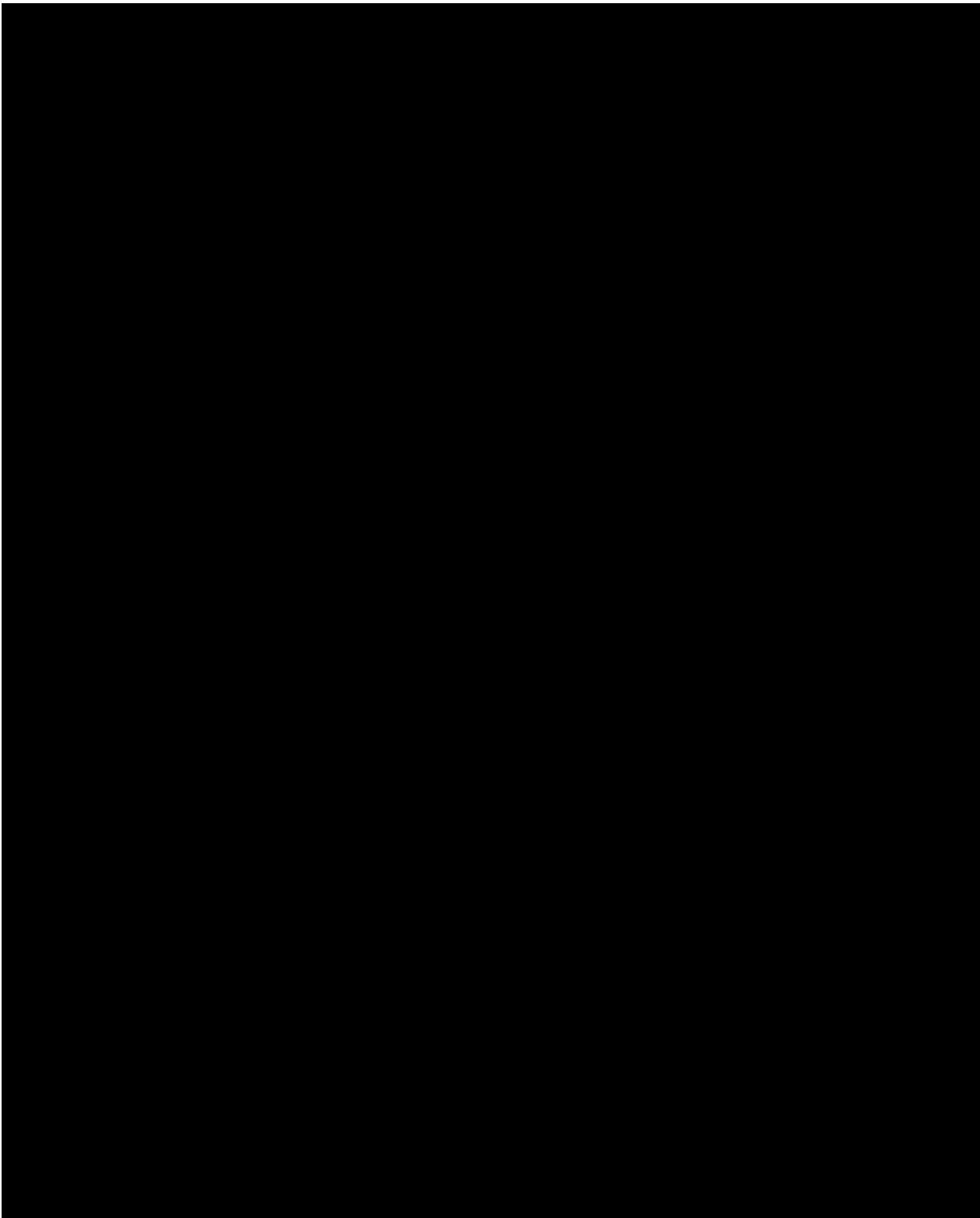


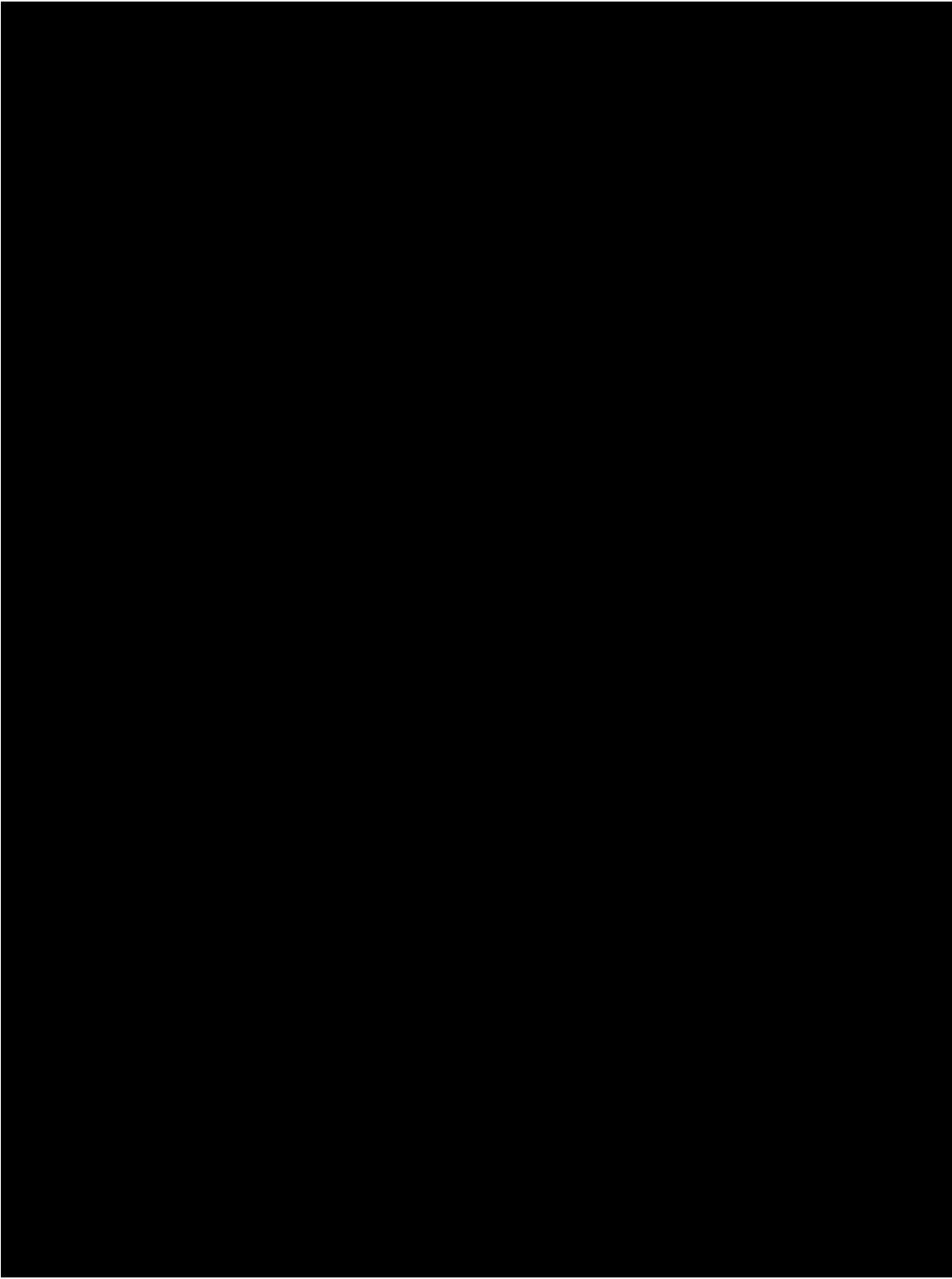


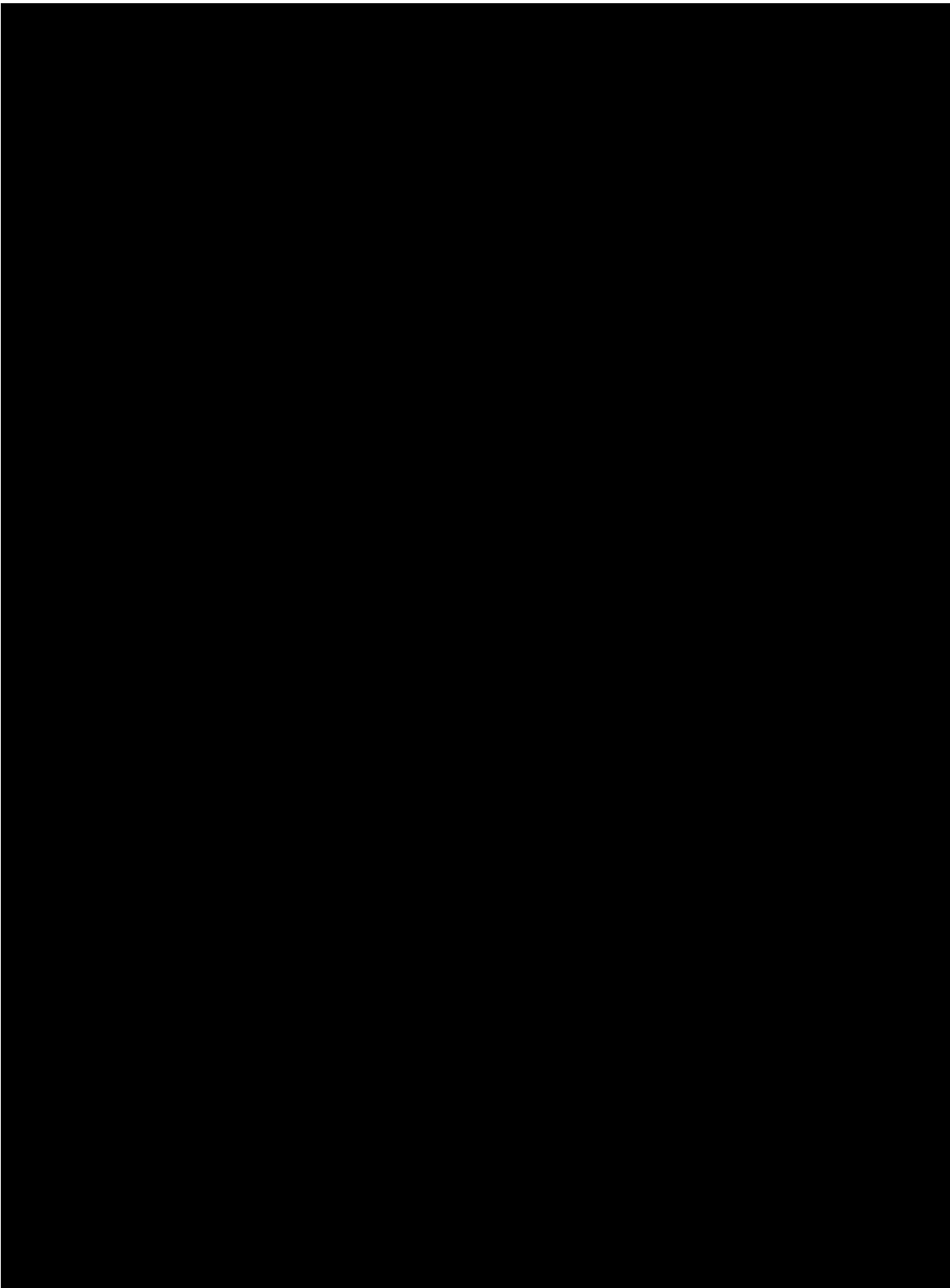


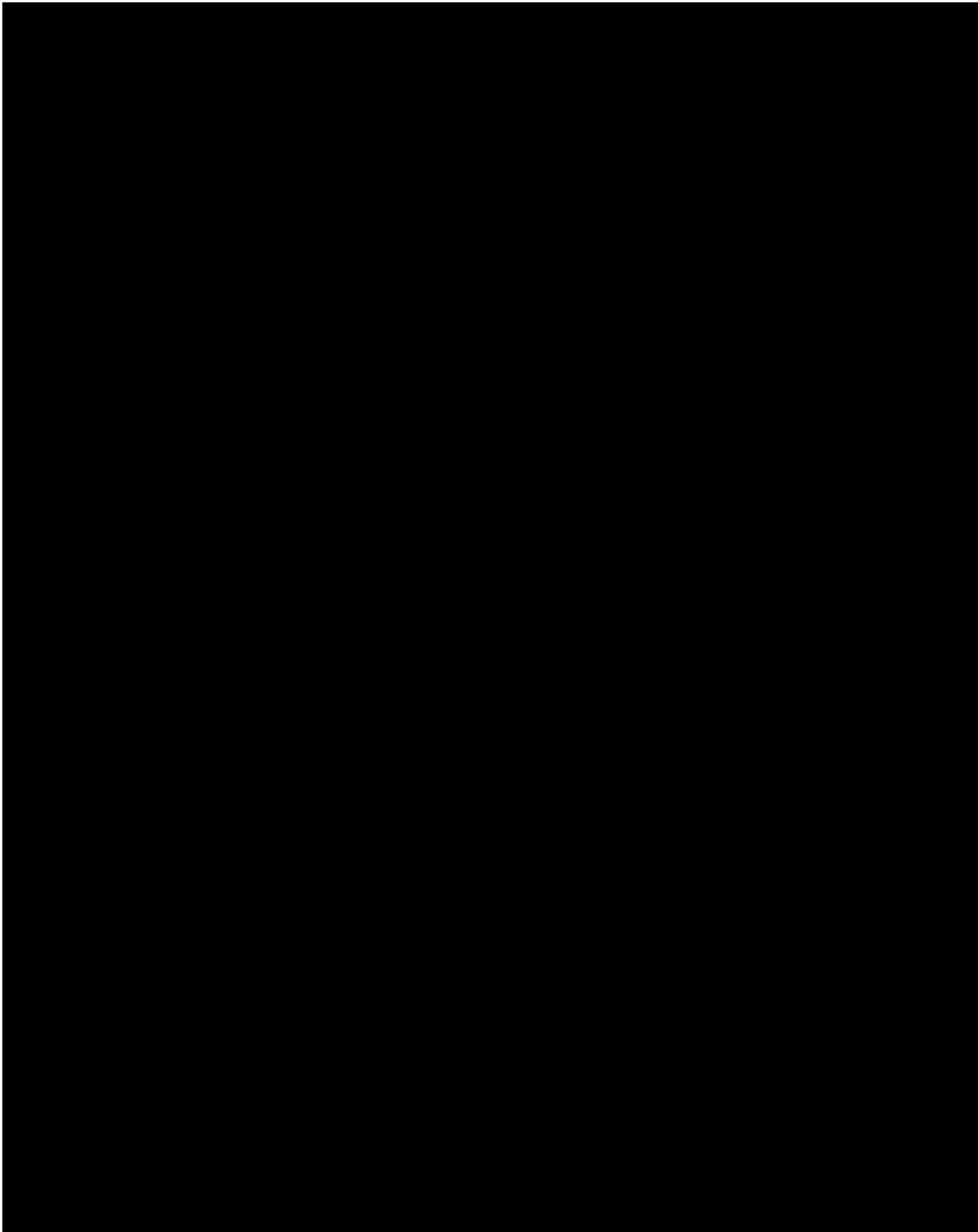


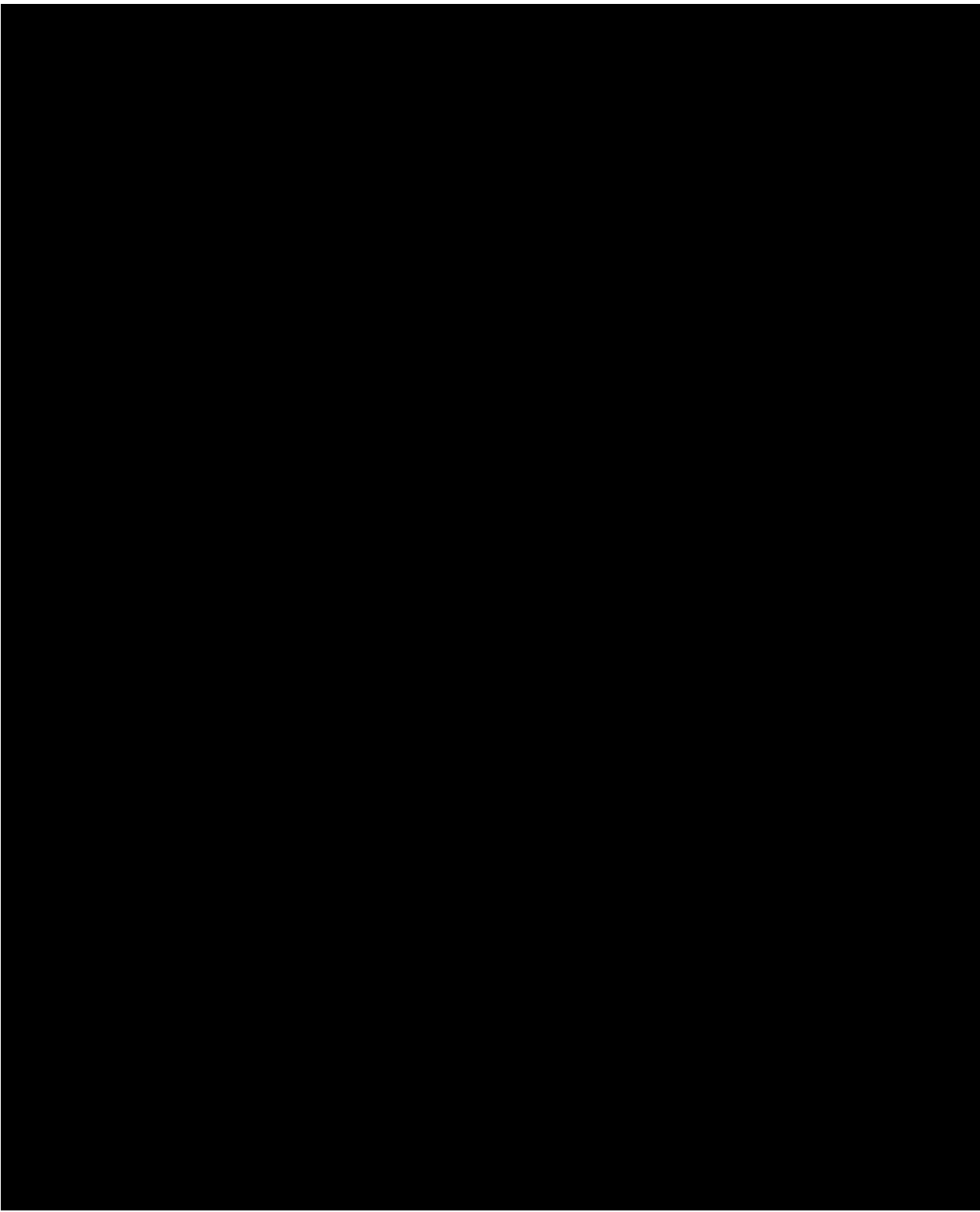


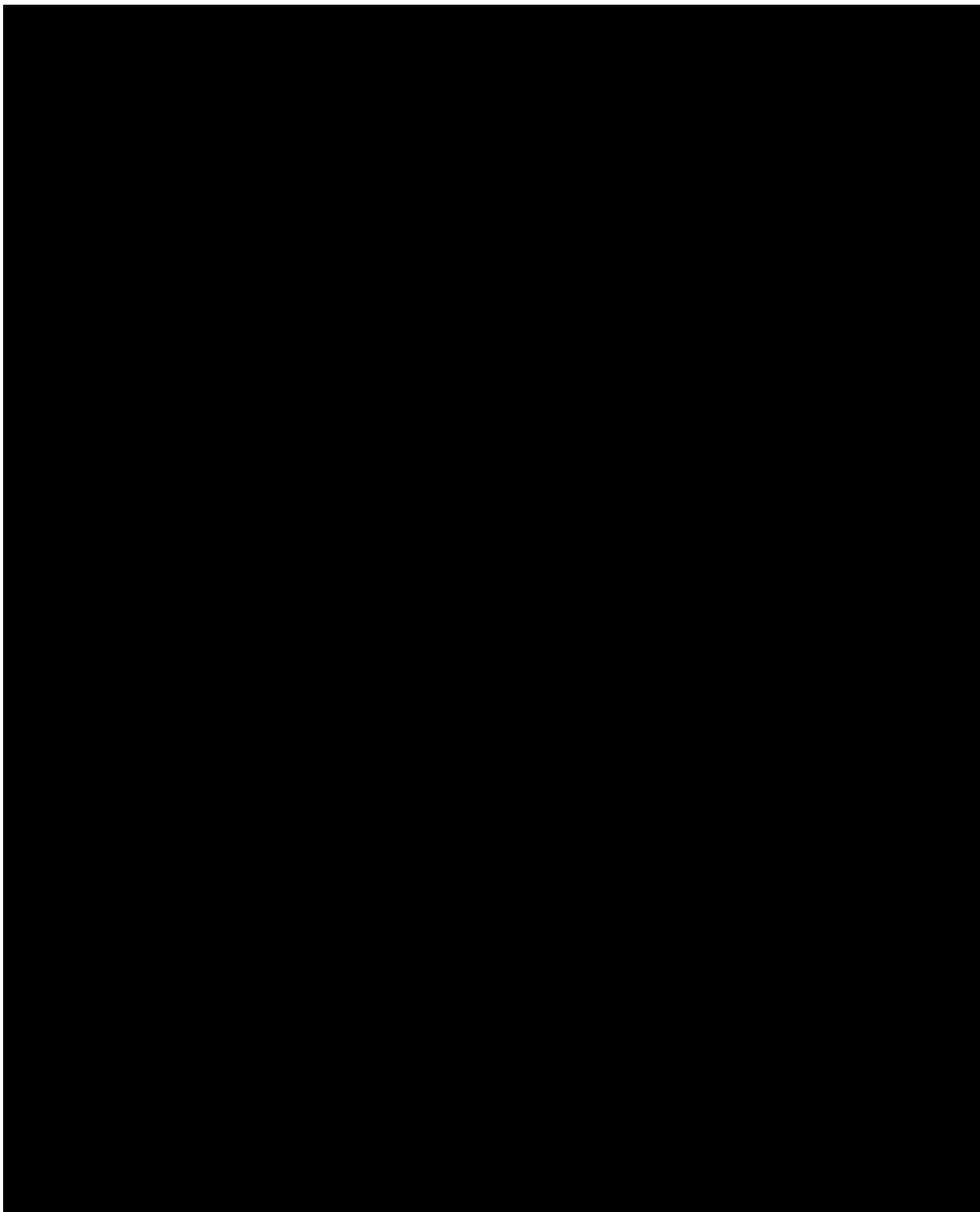


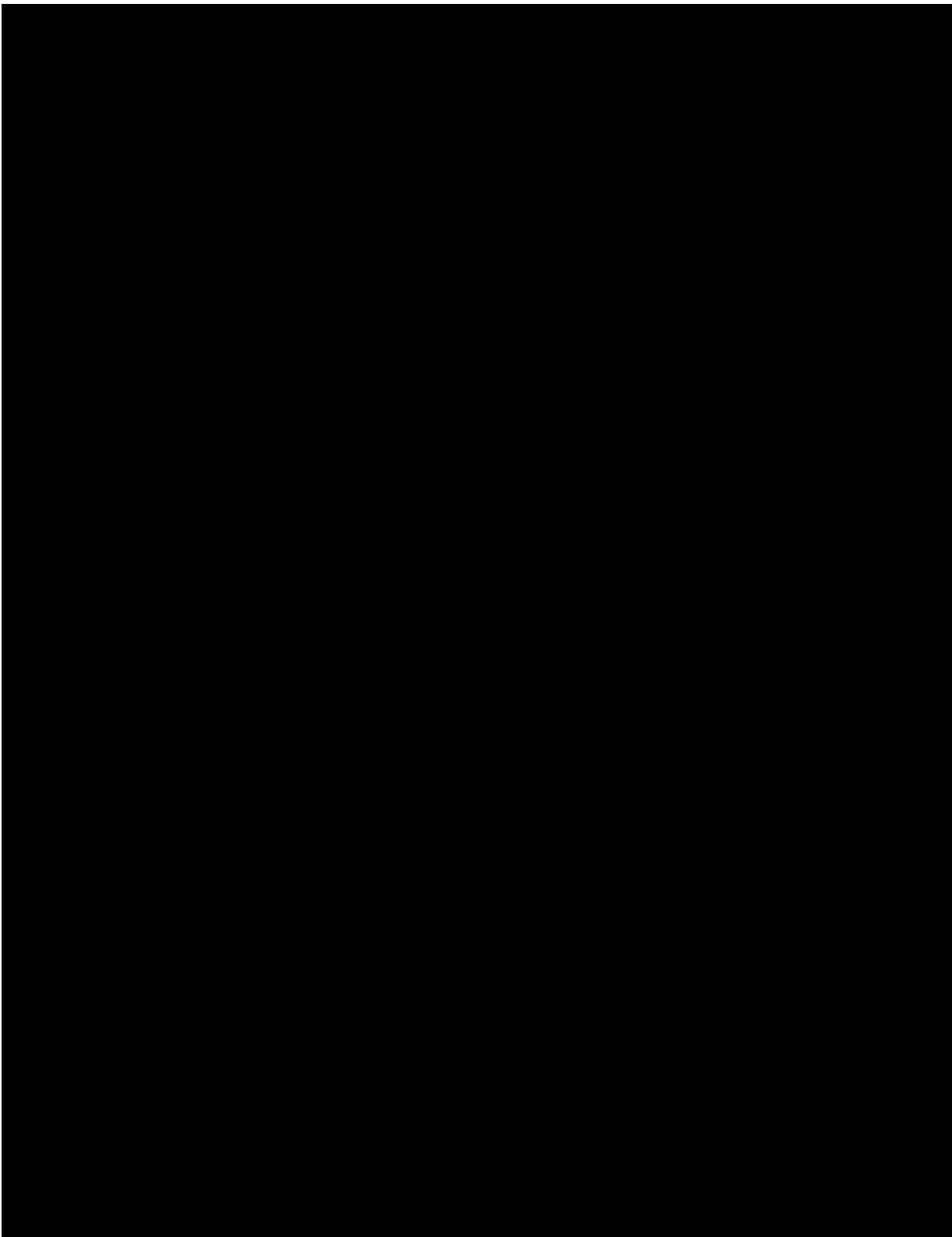


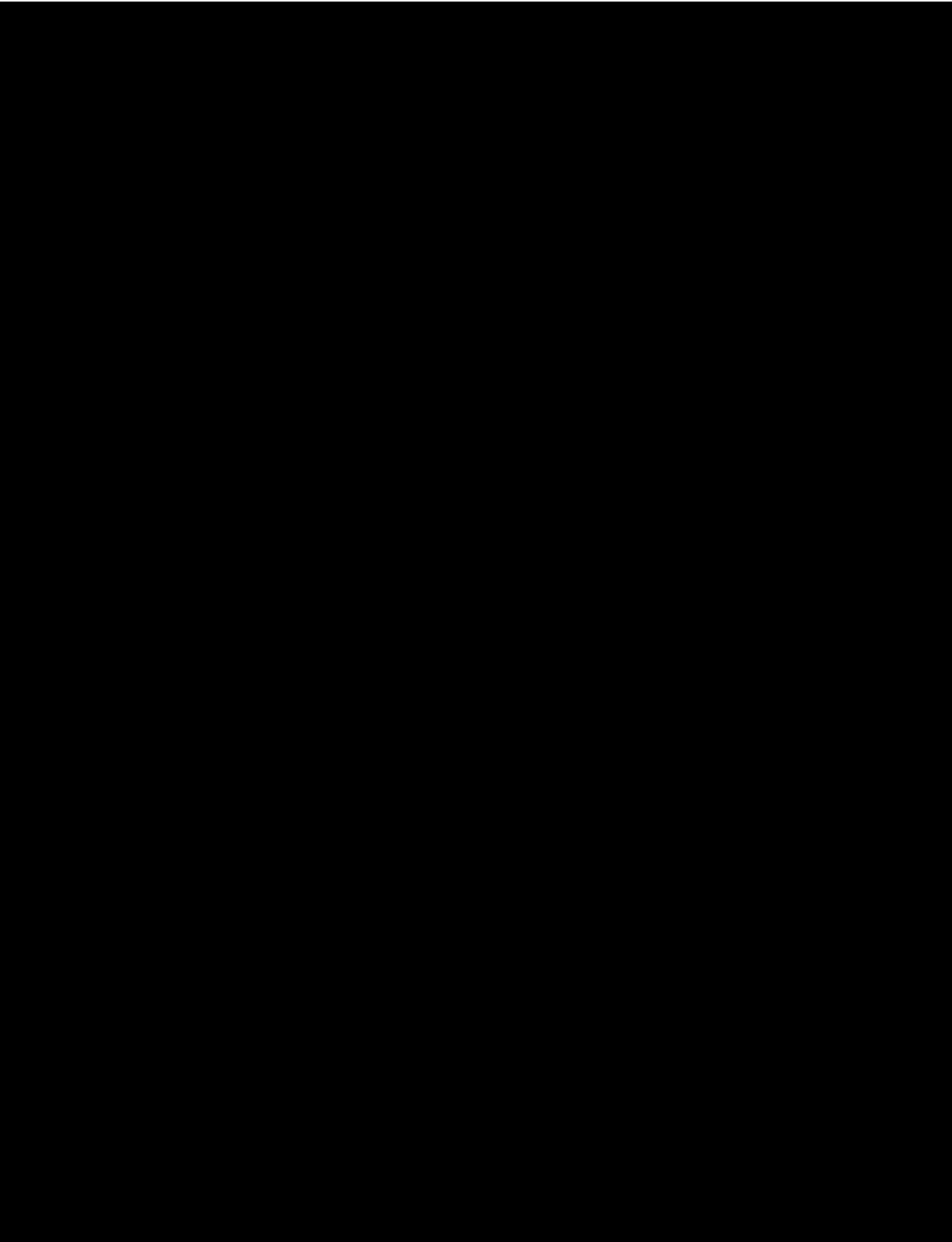


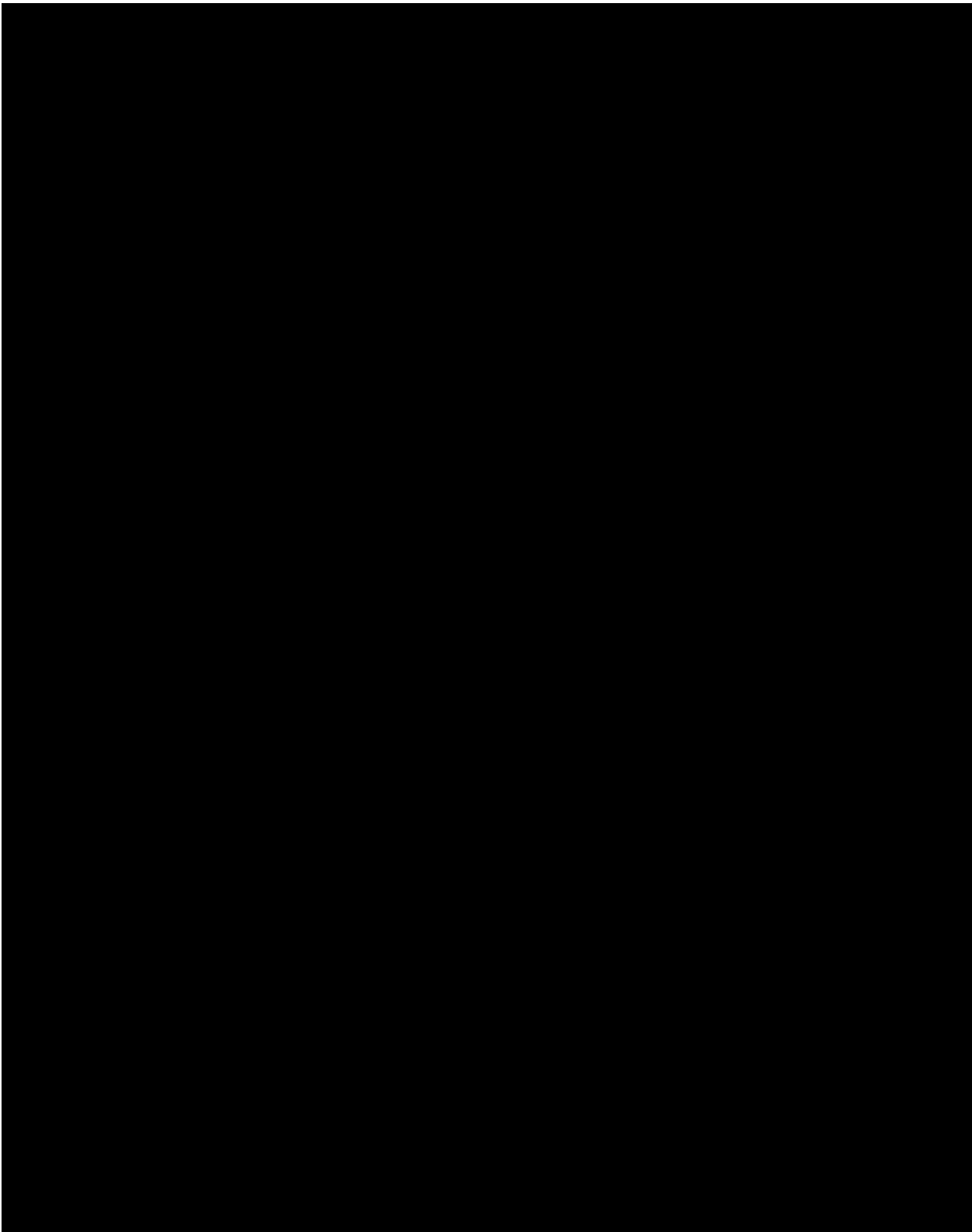


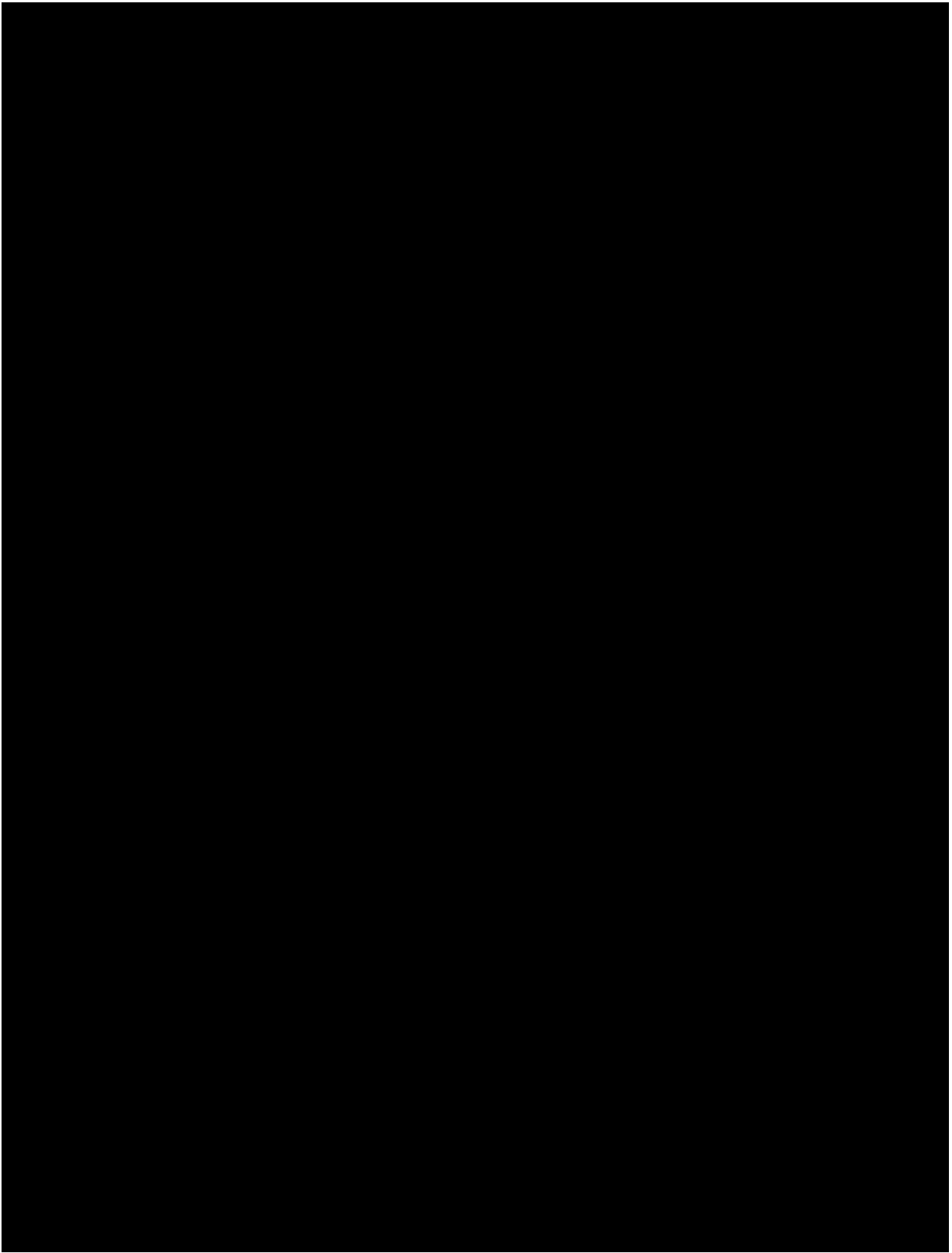


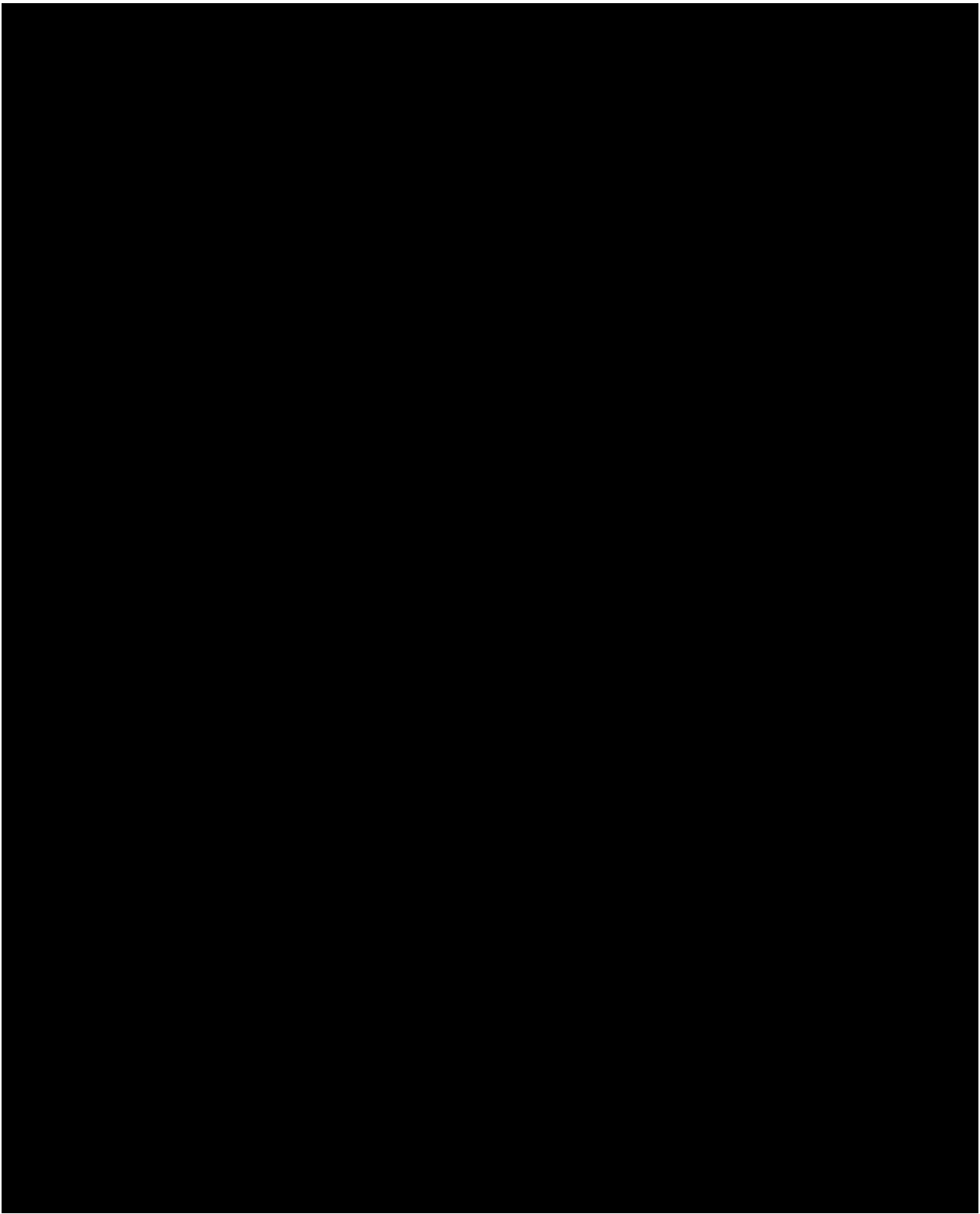


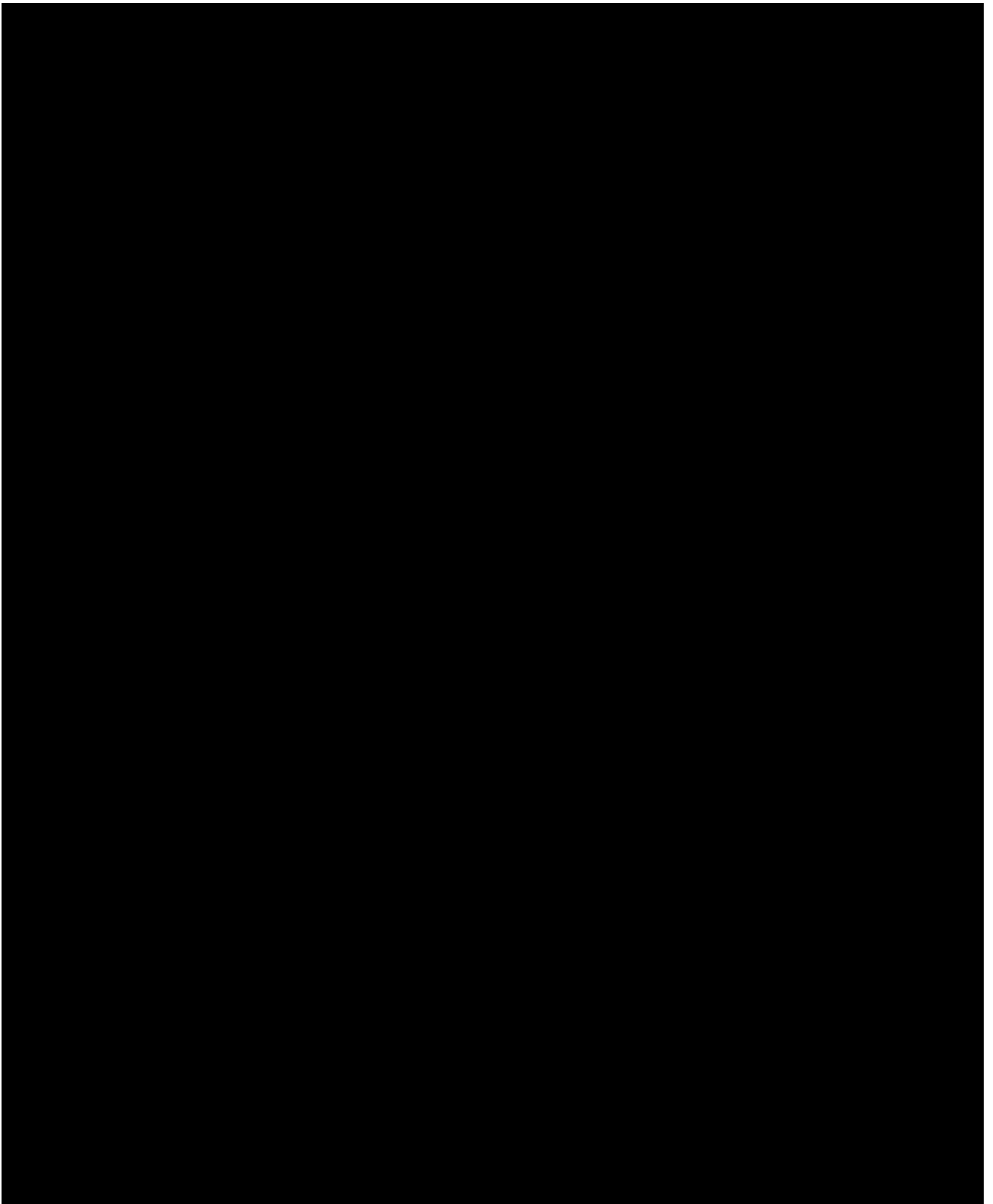


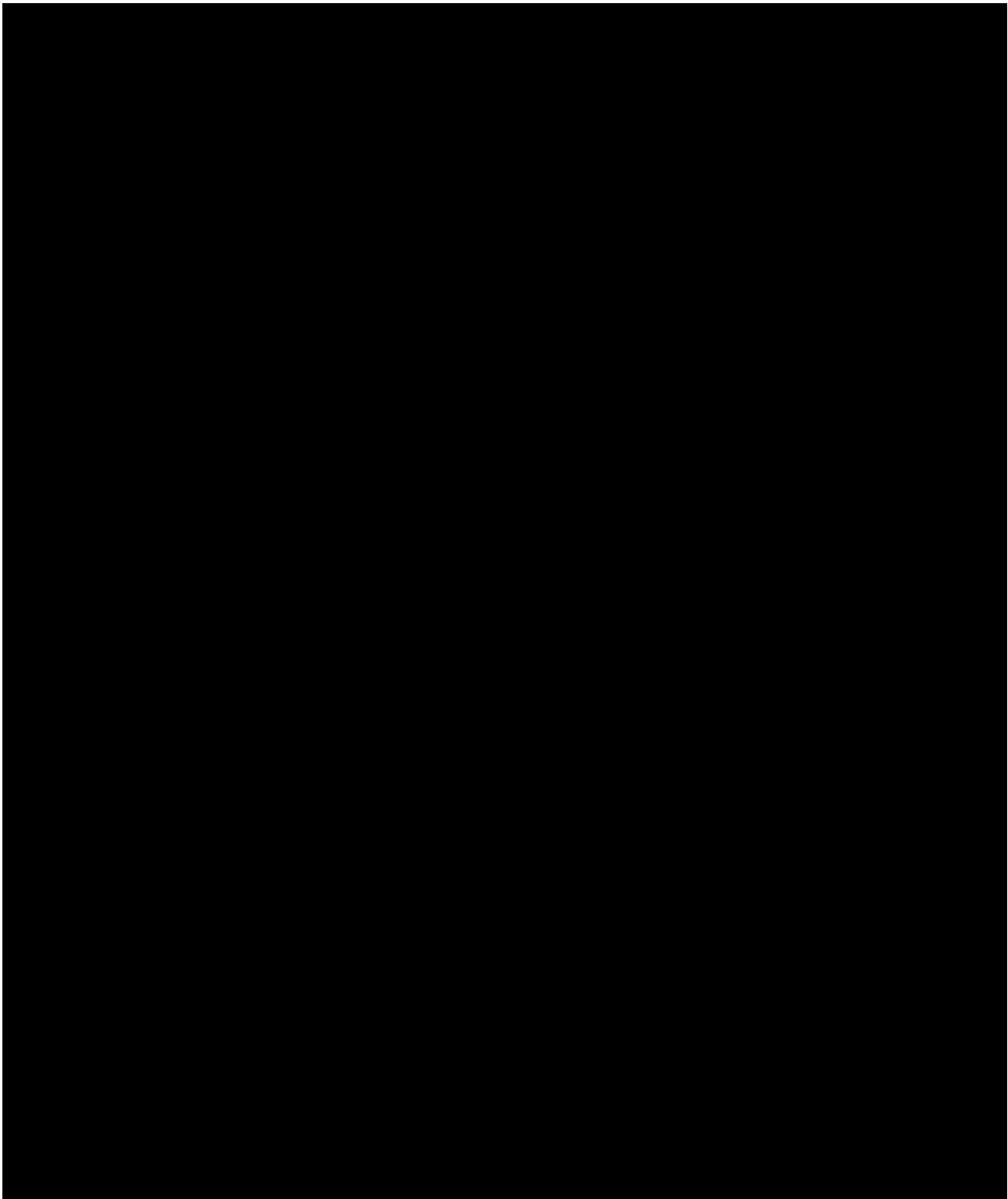


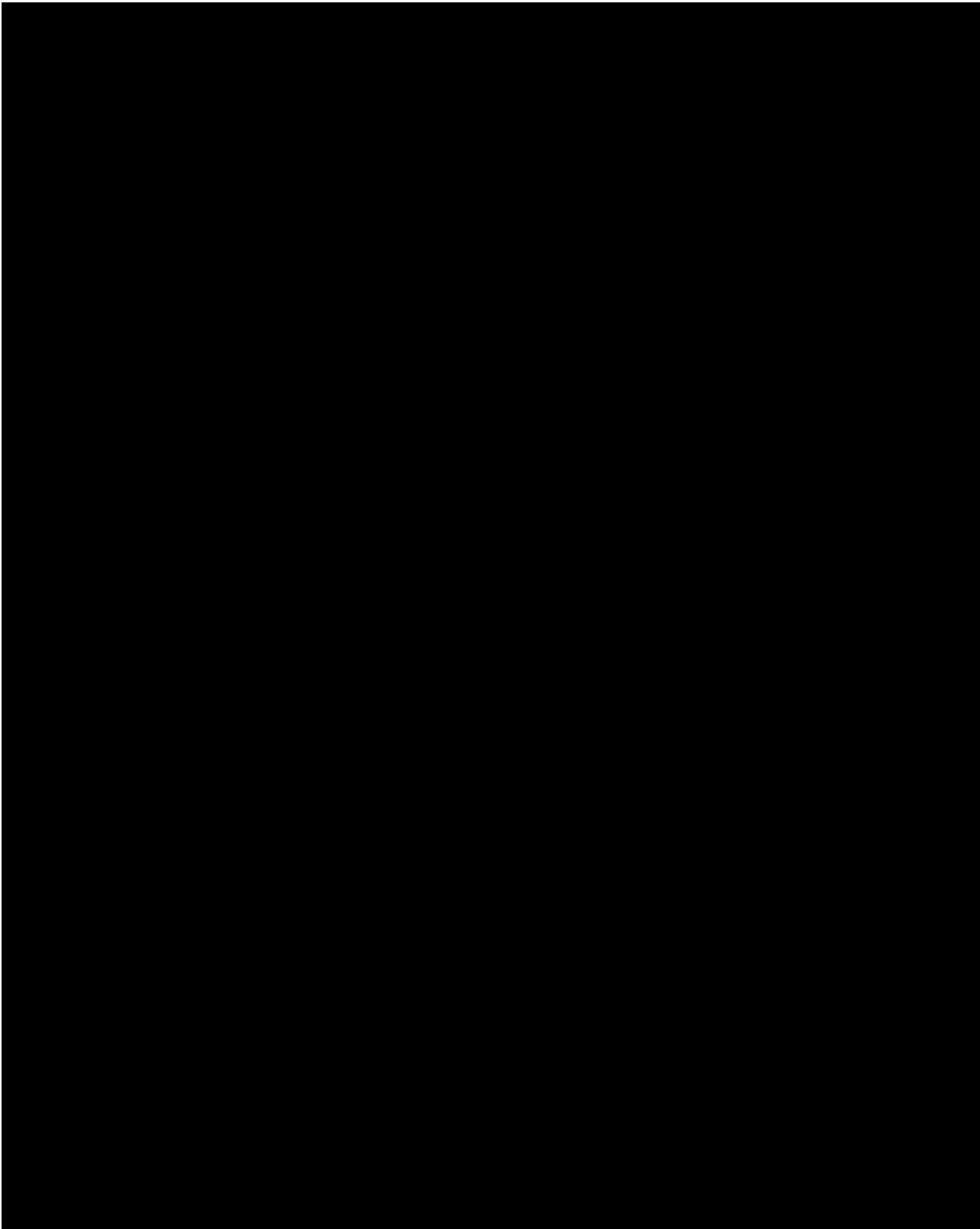


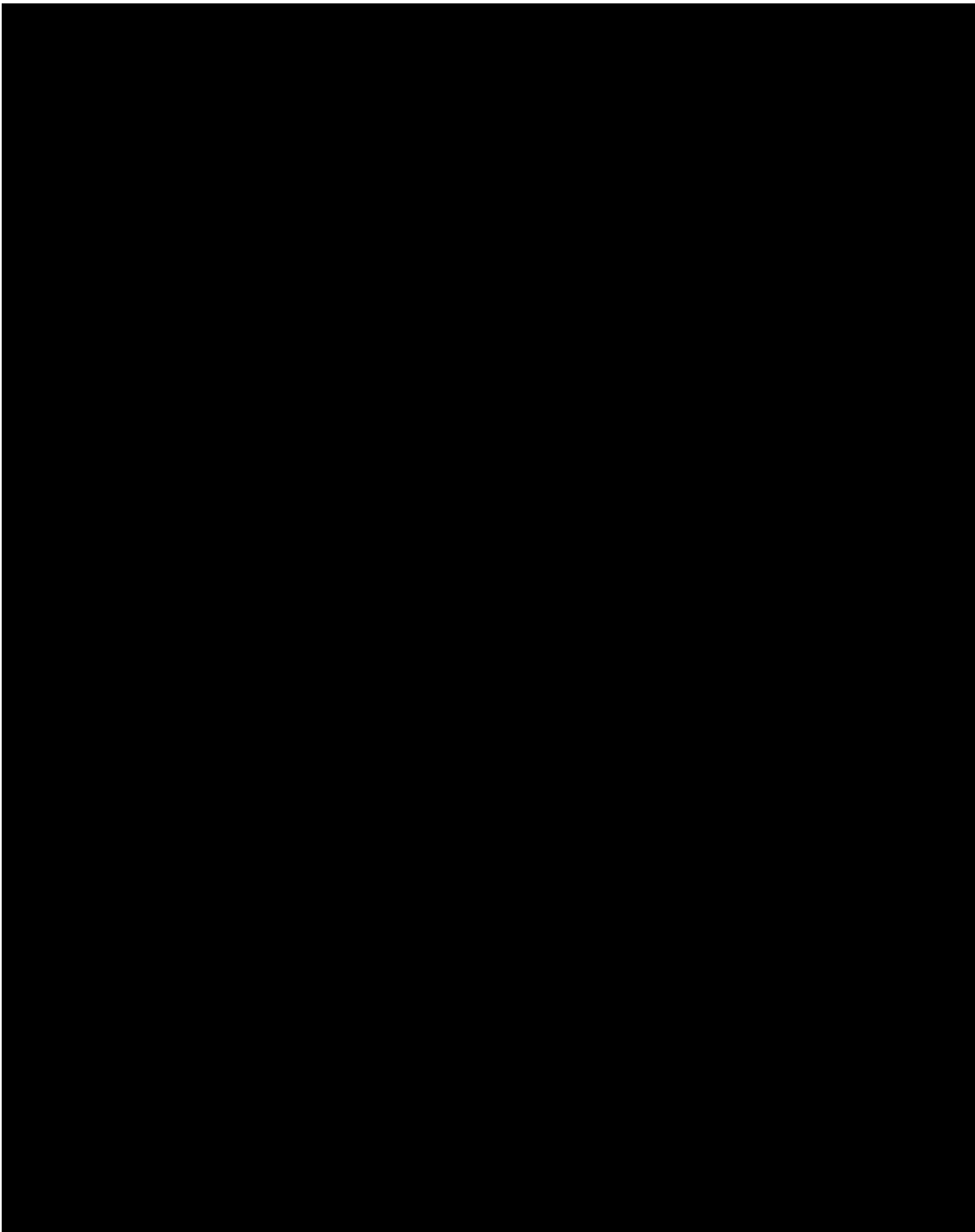




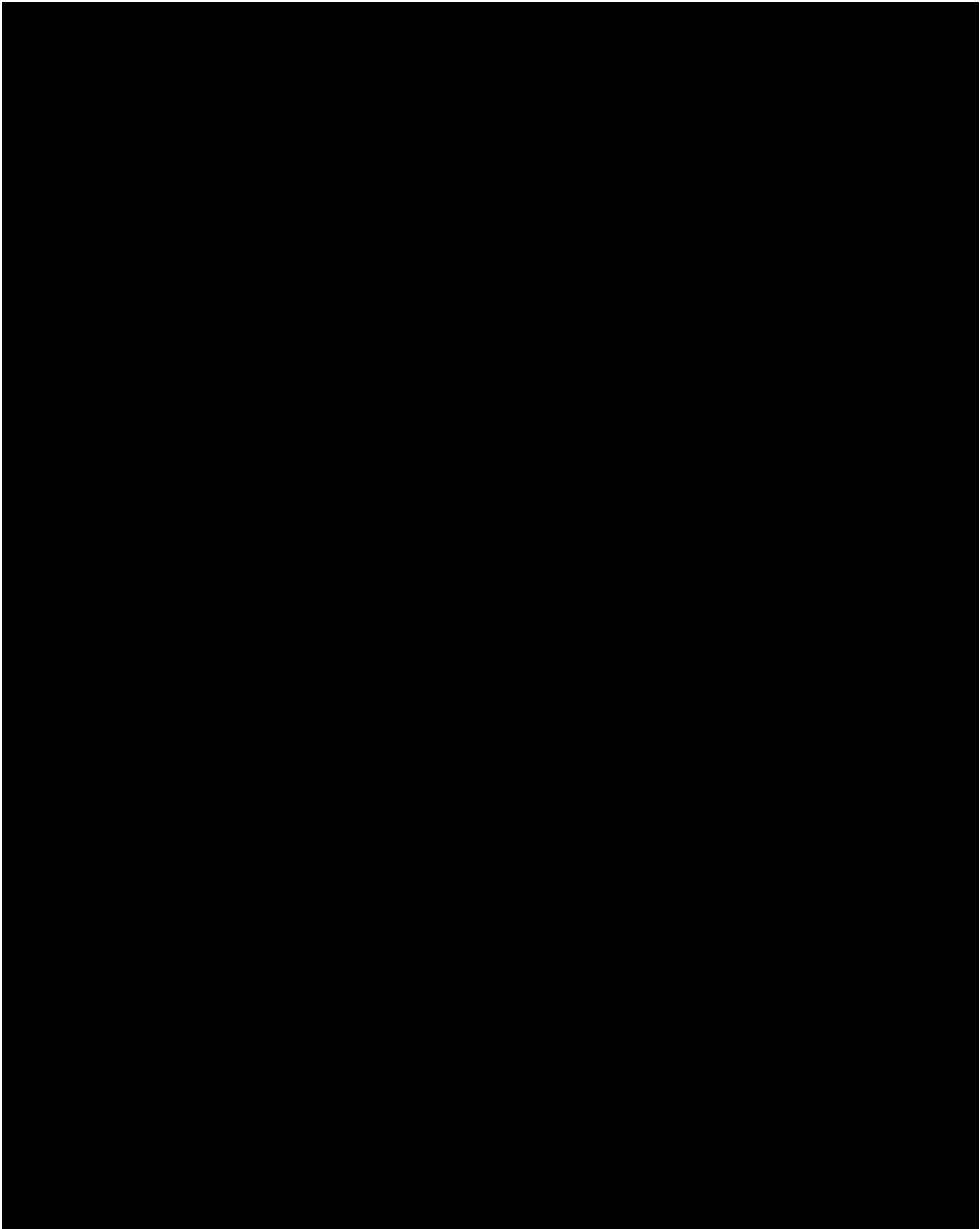


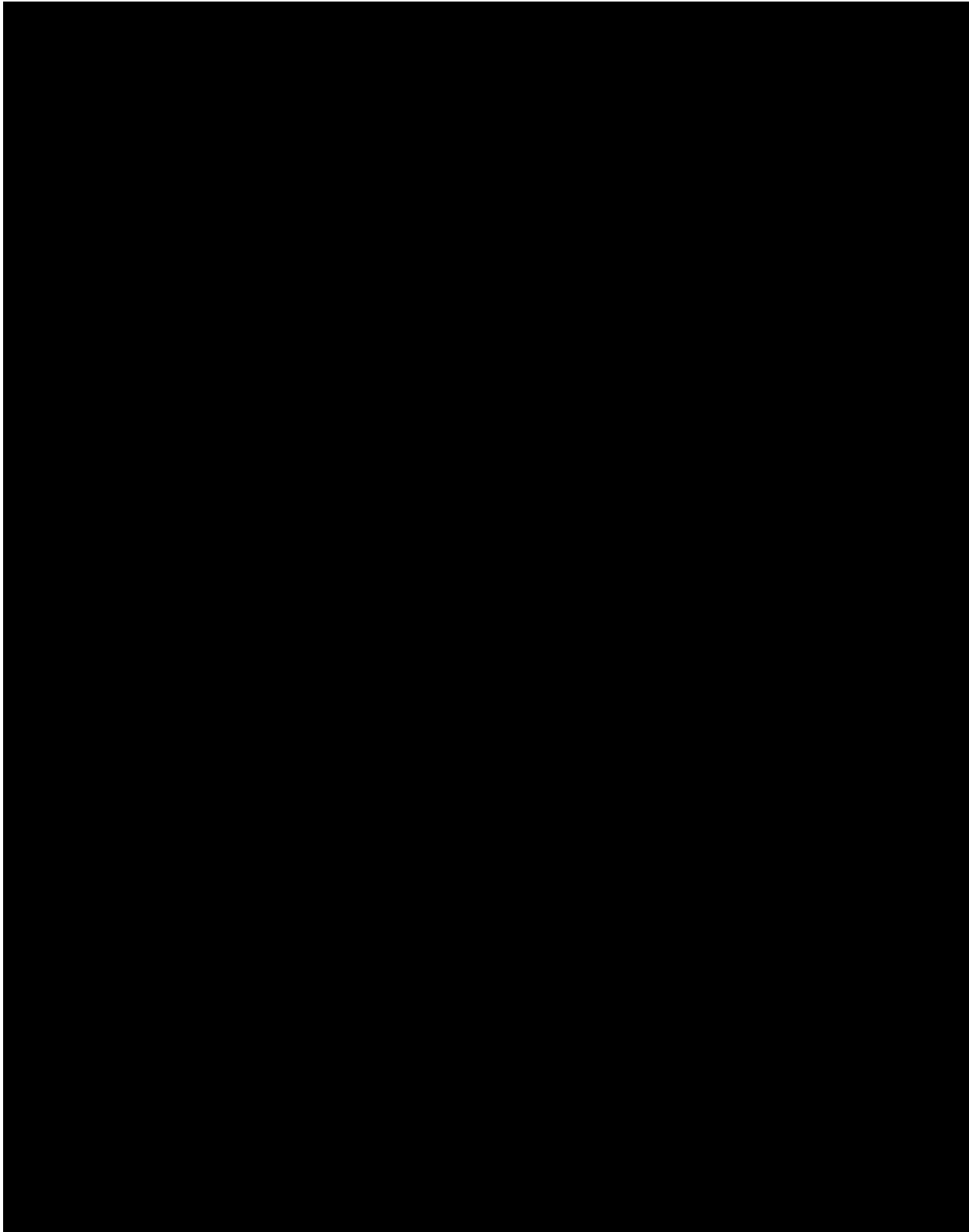


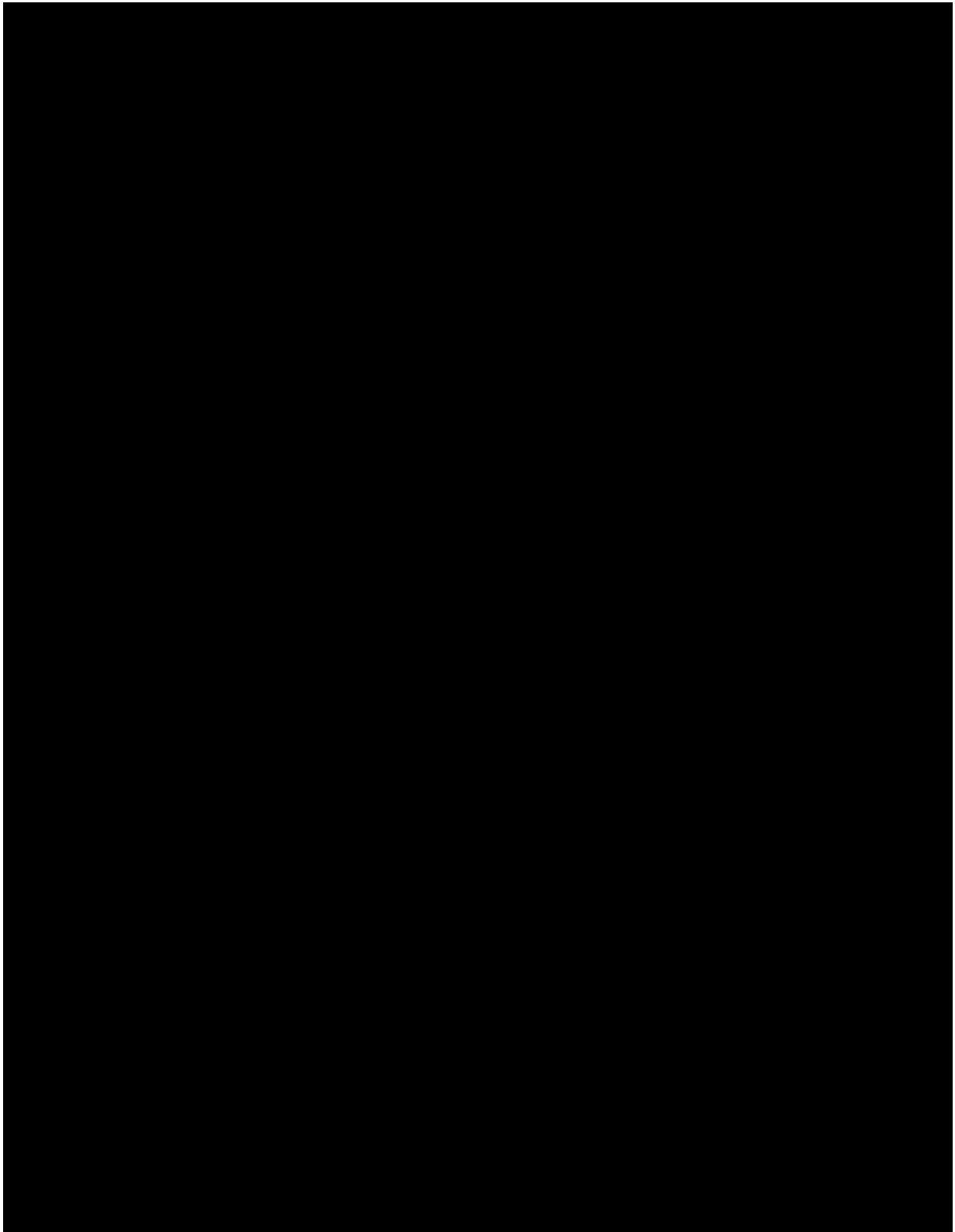


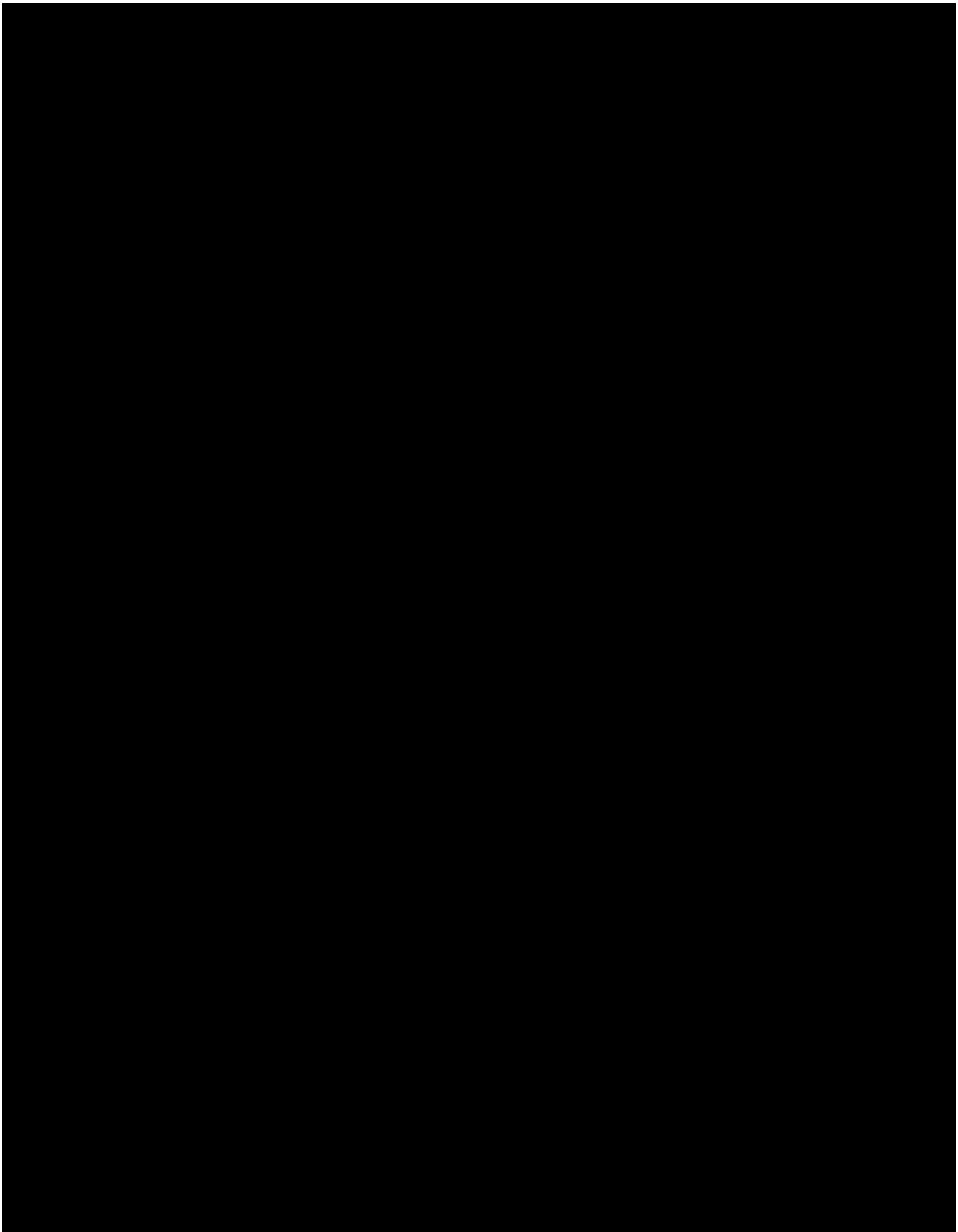


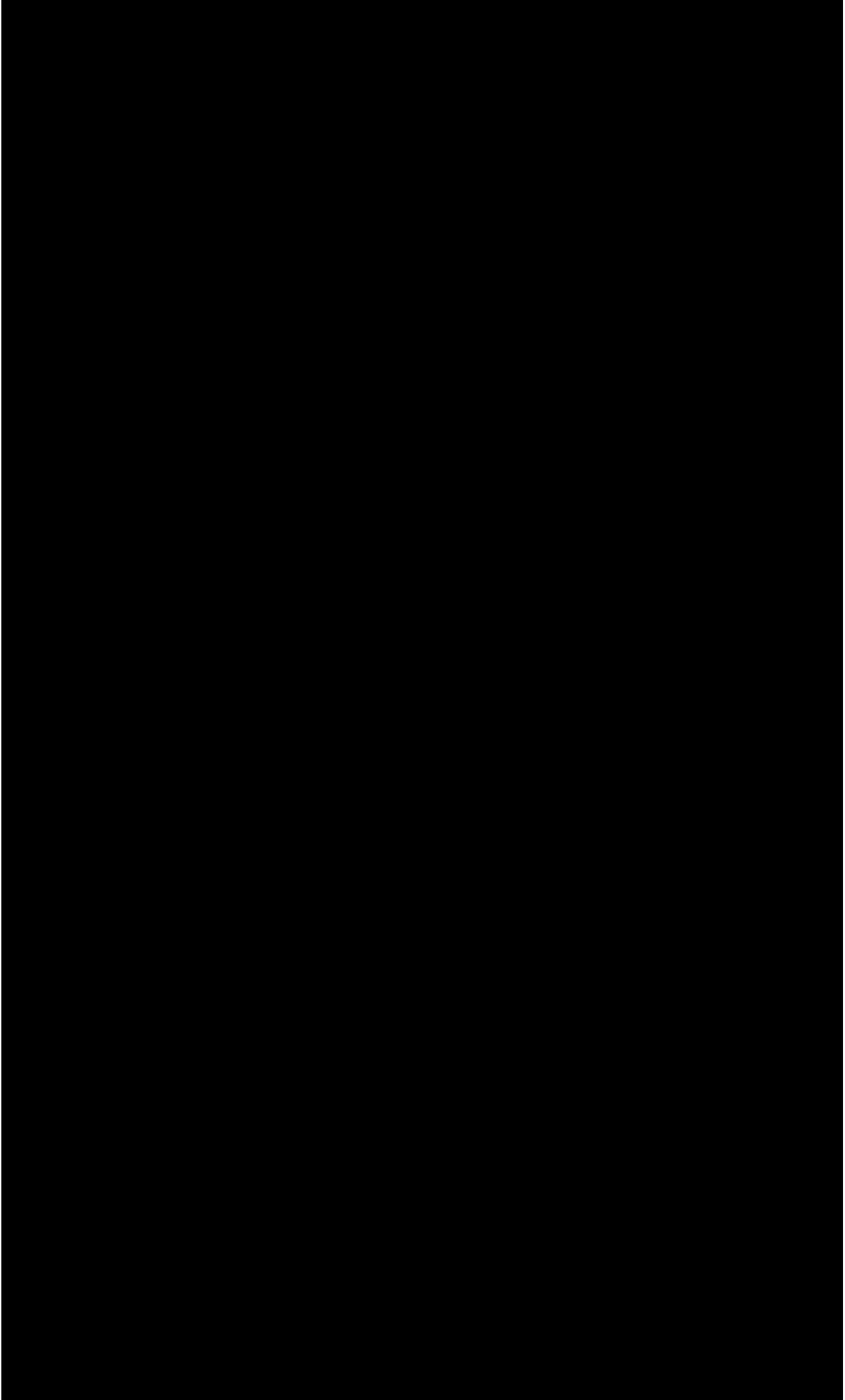
No funds reported a performance fee.

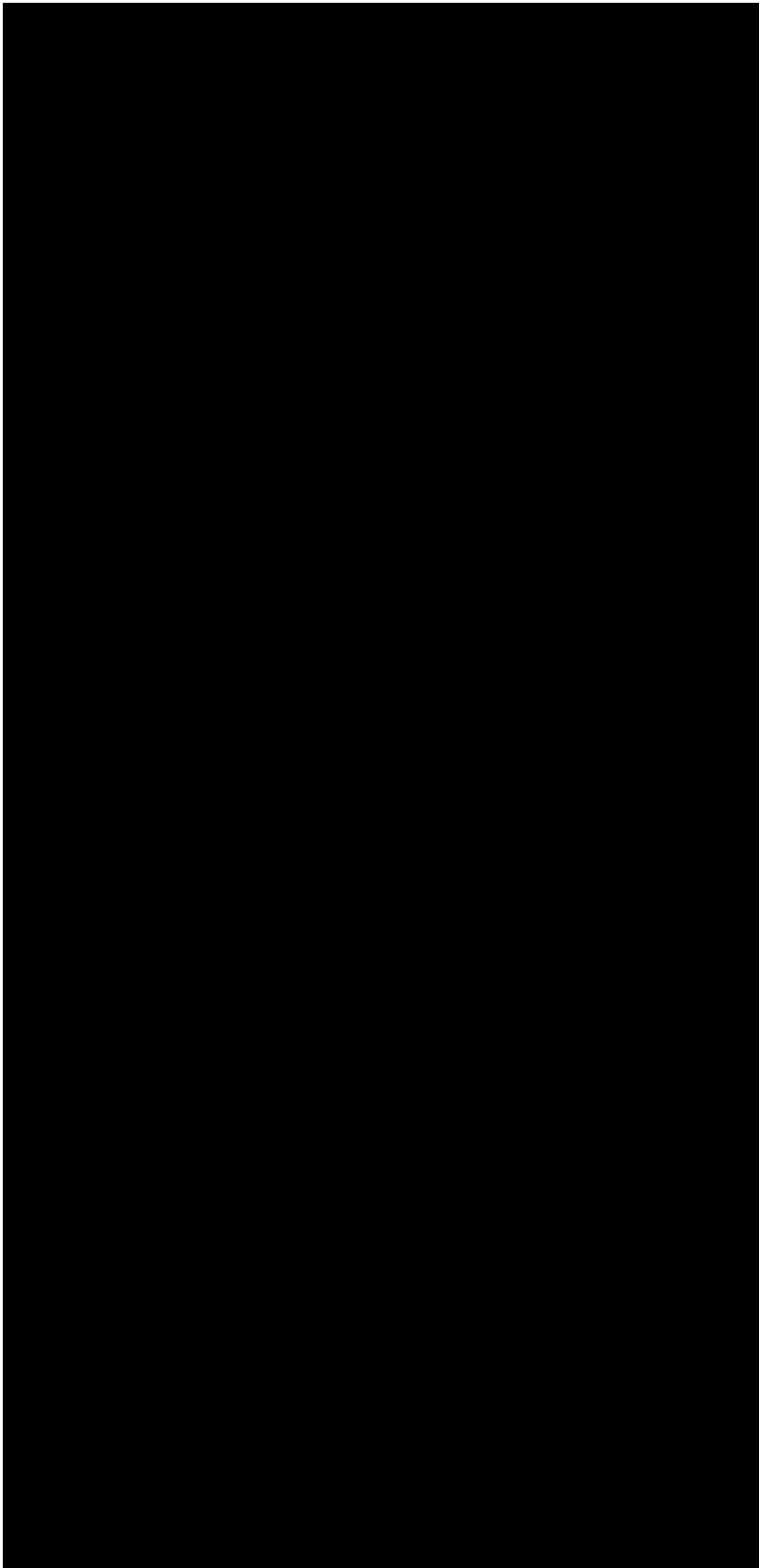


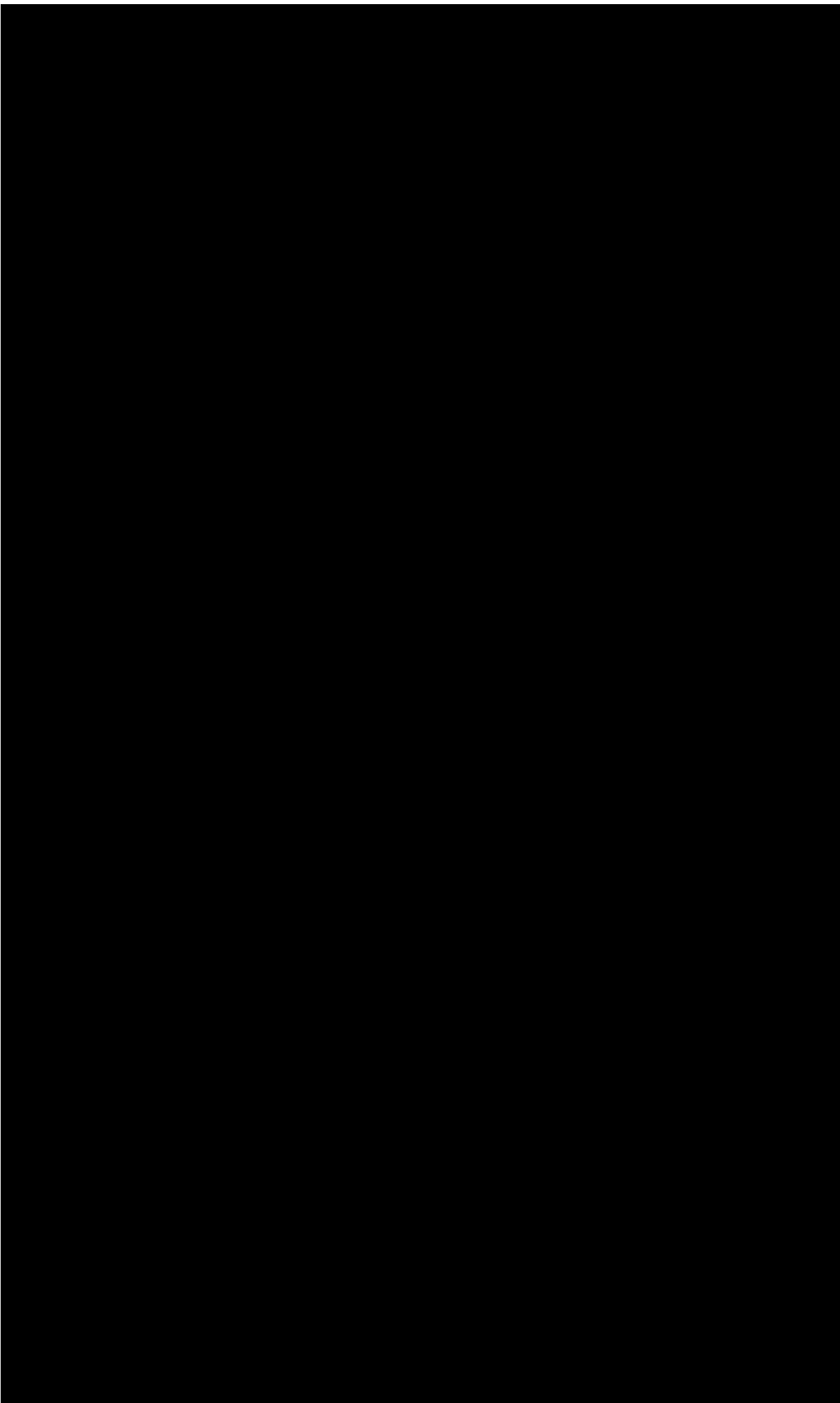


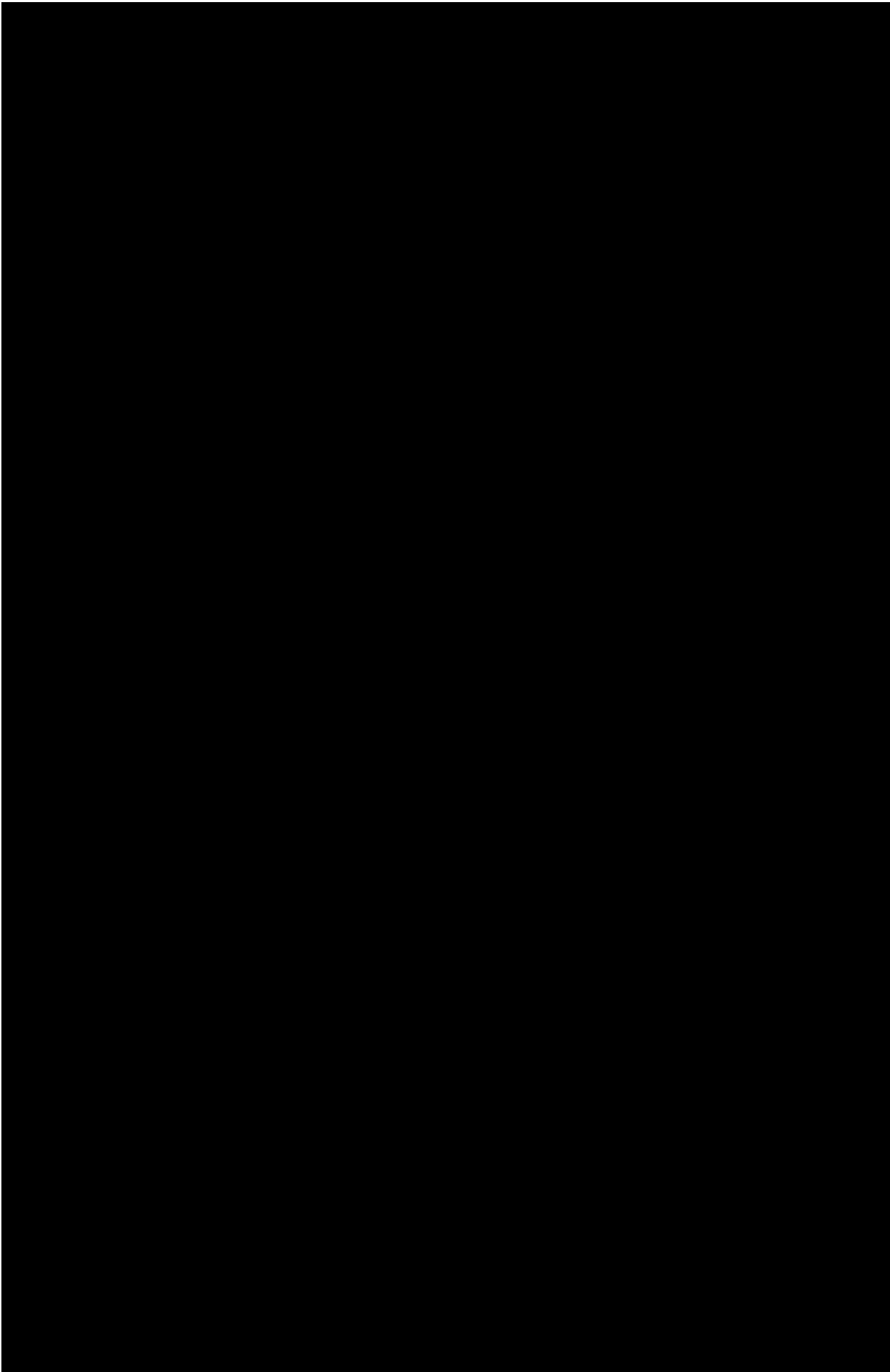


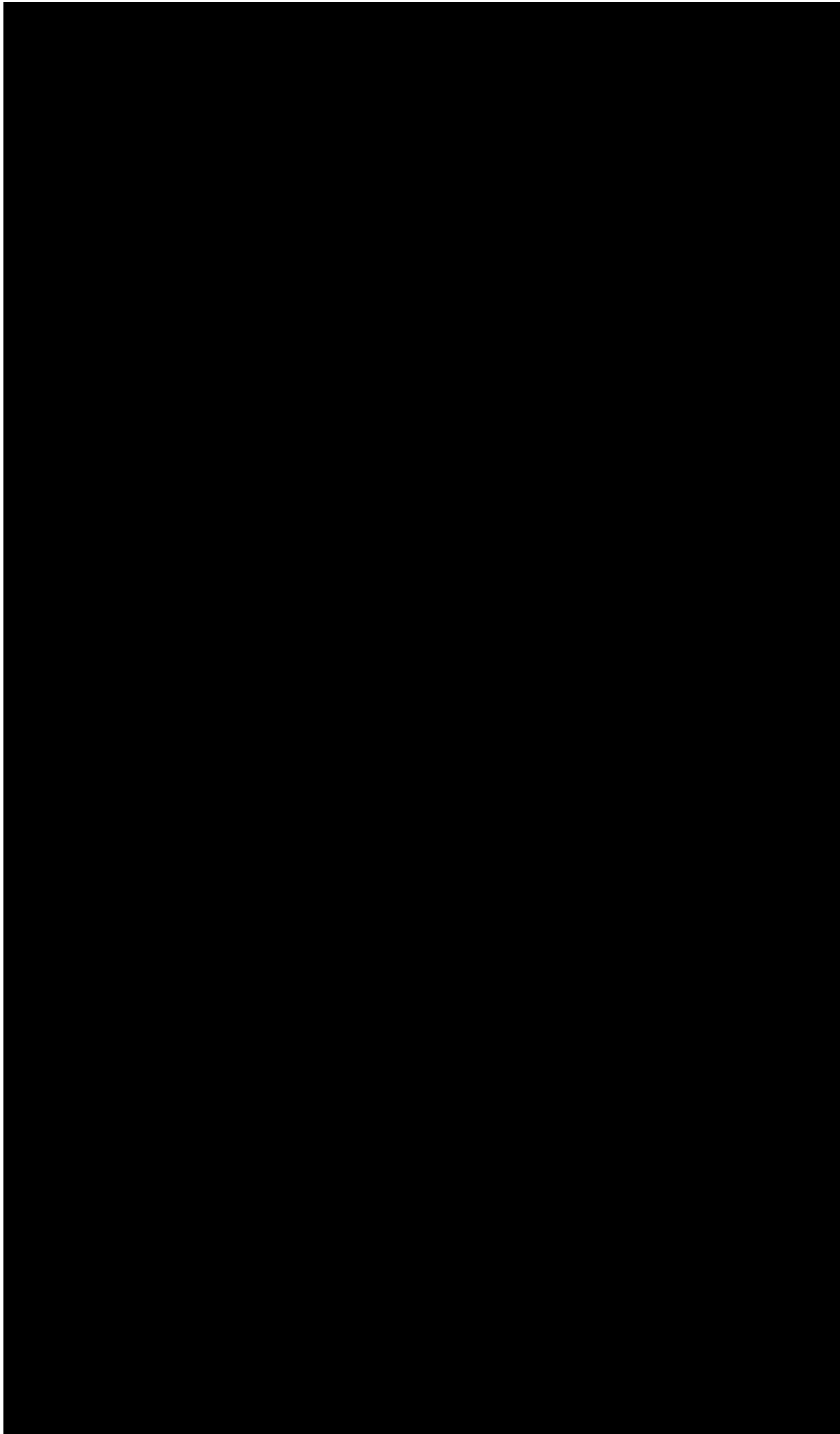


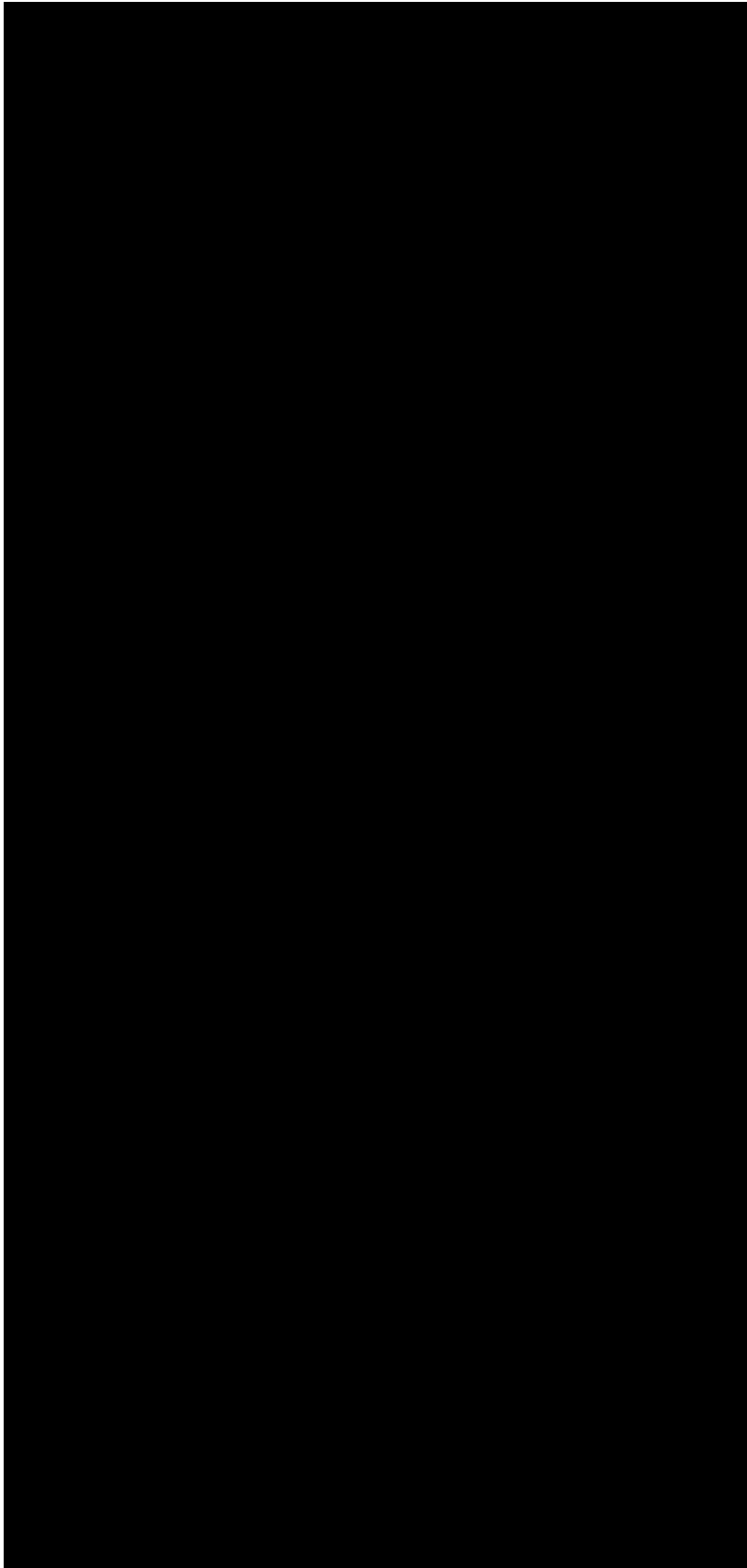


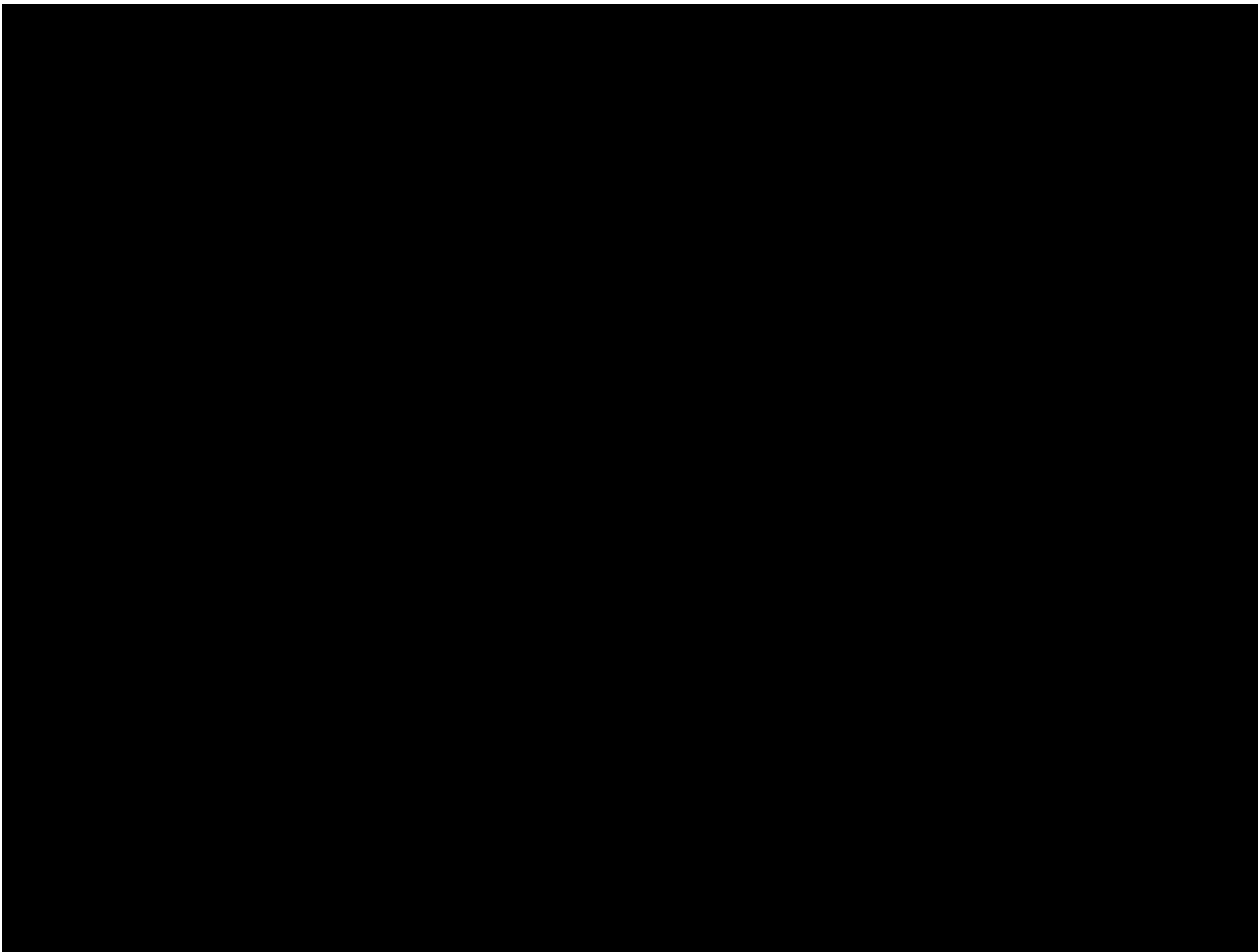


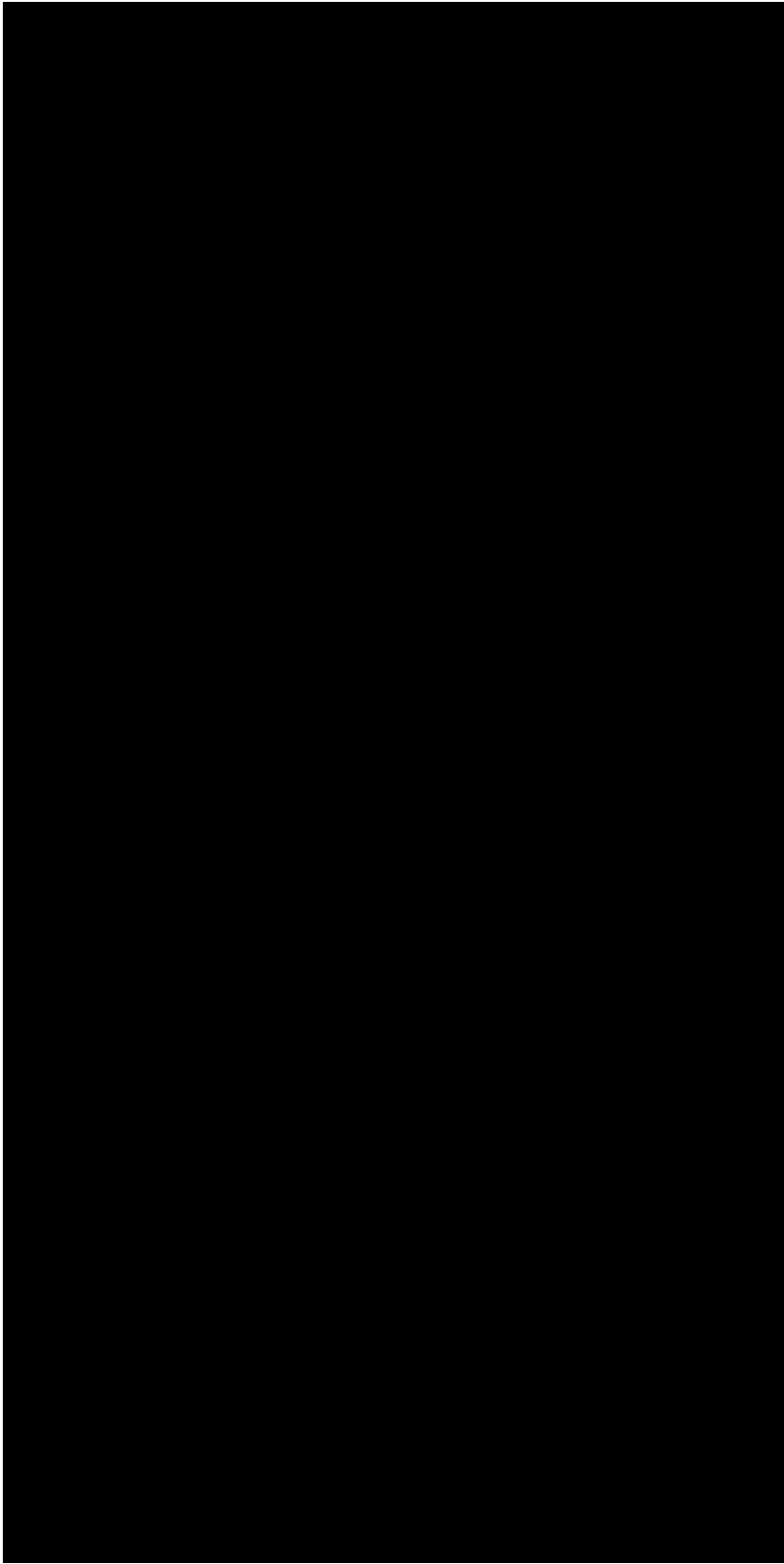


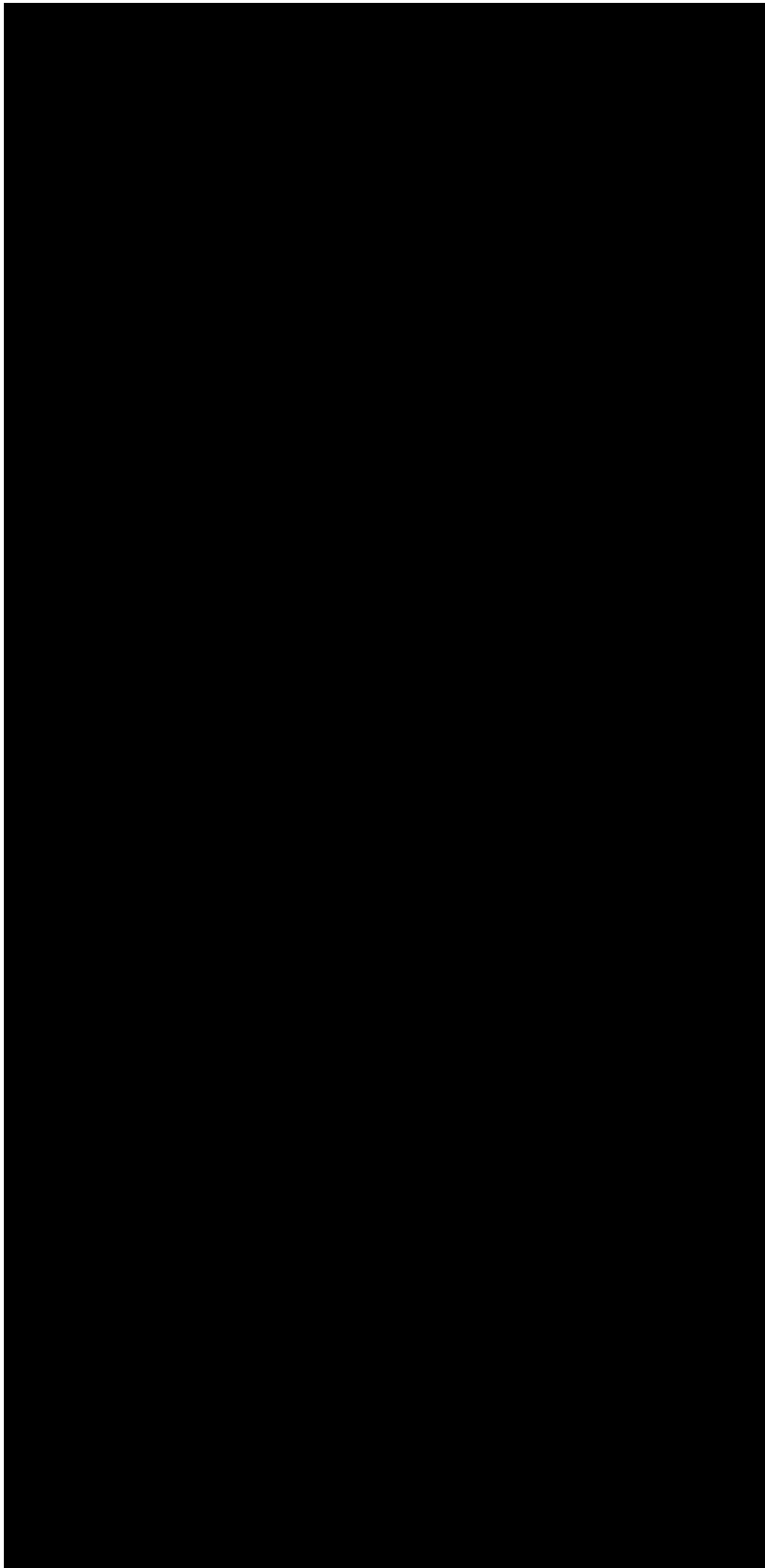


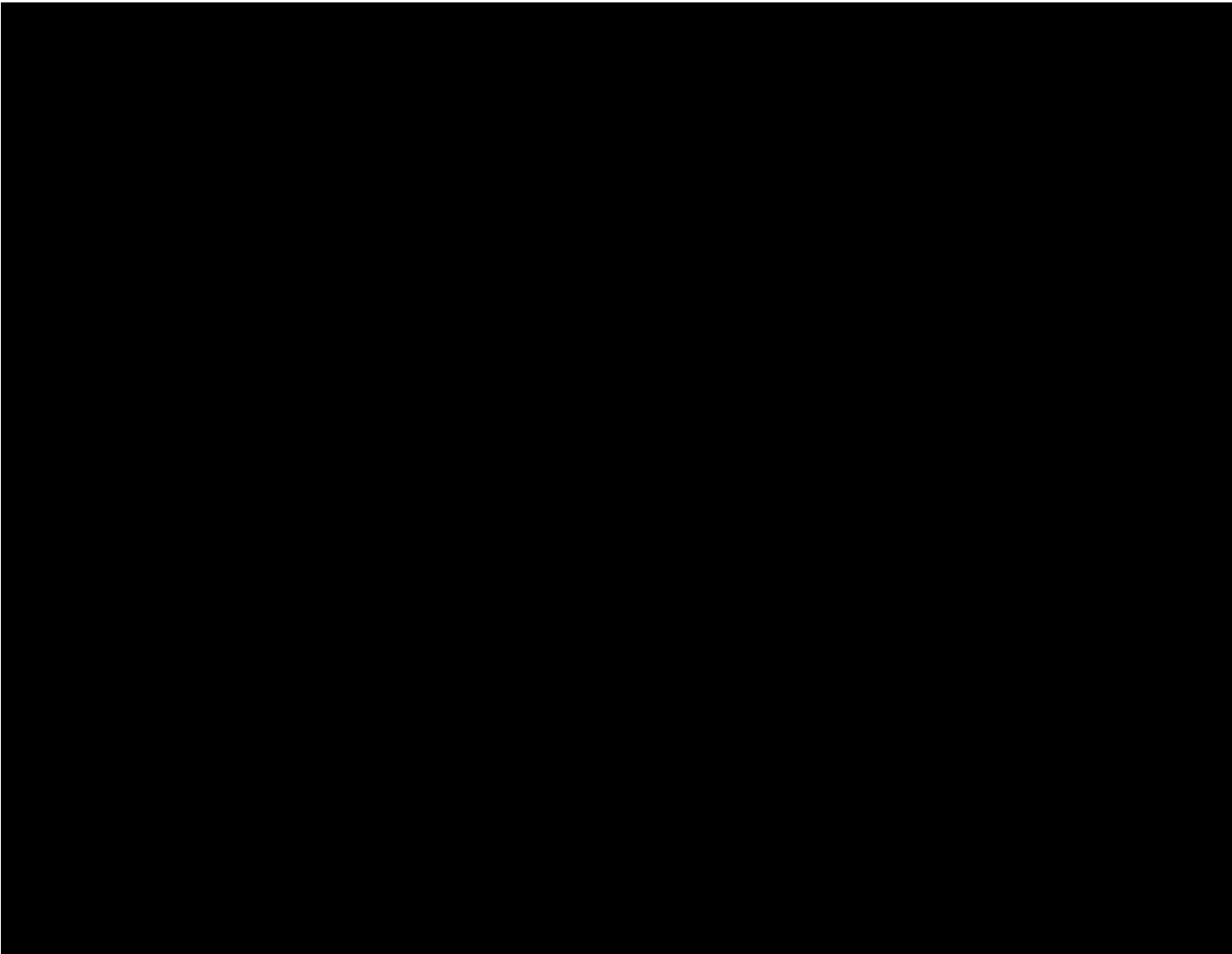


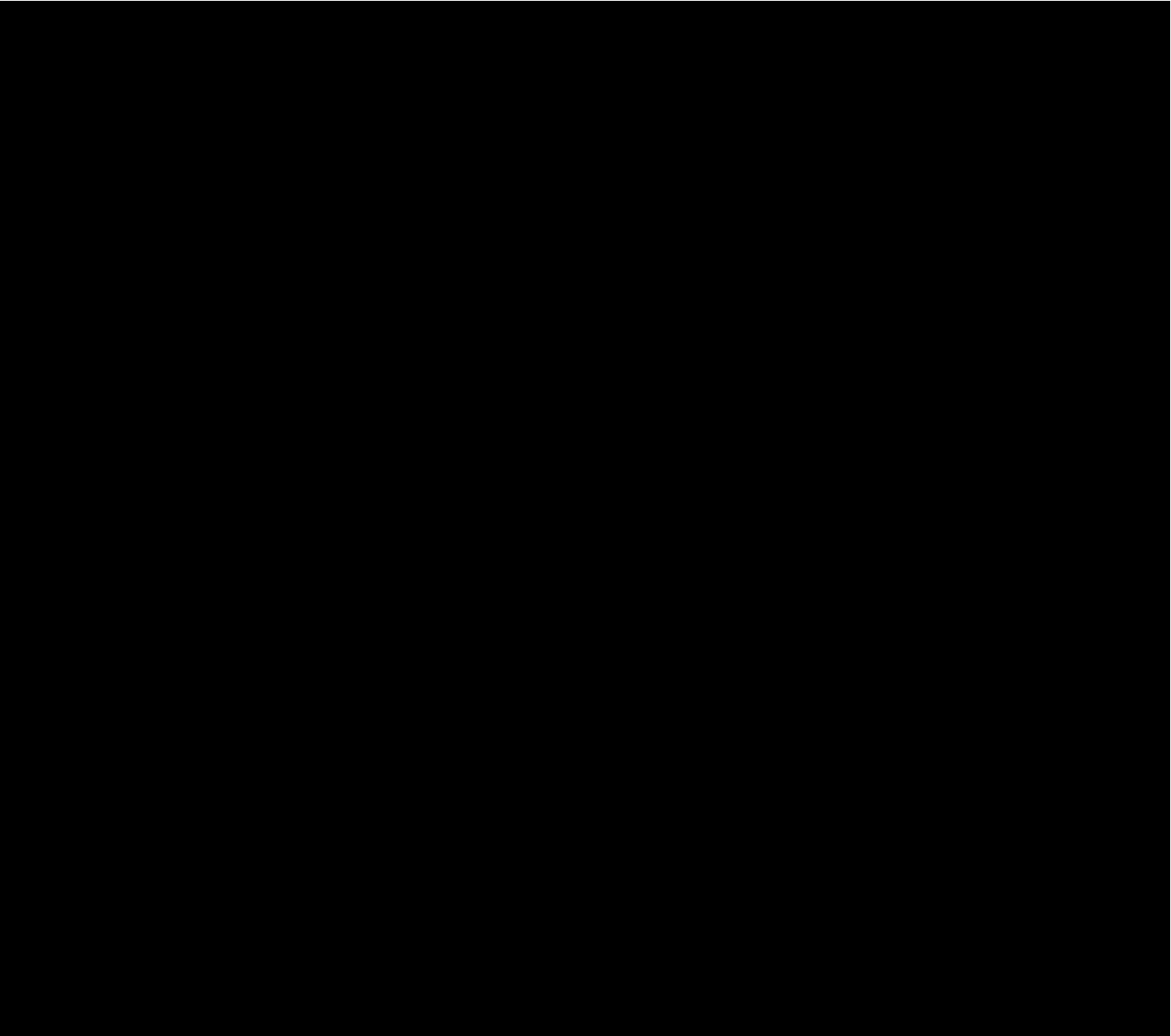


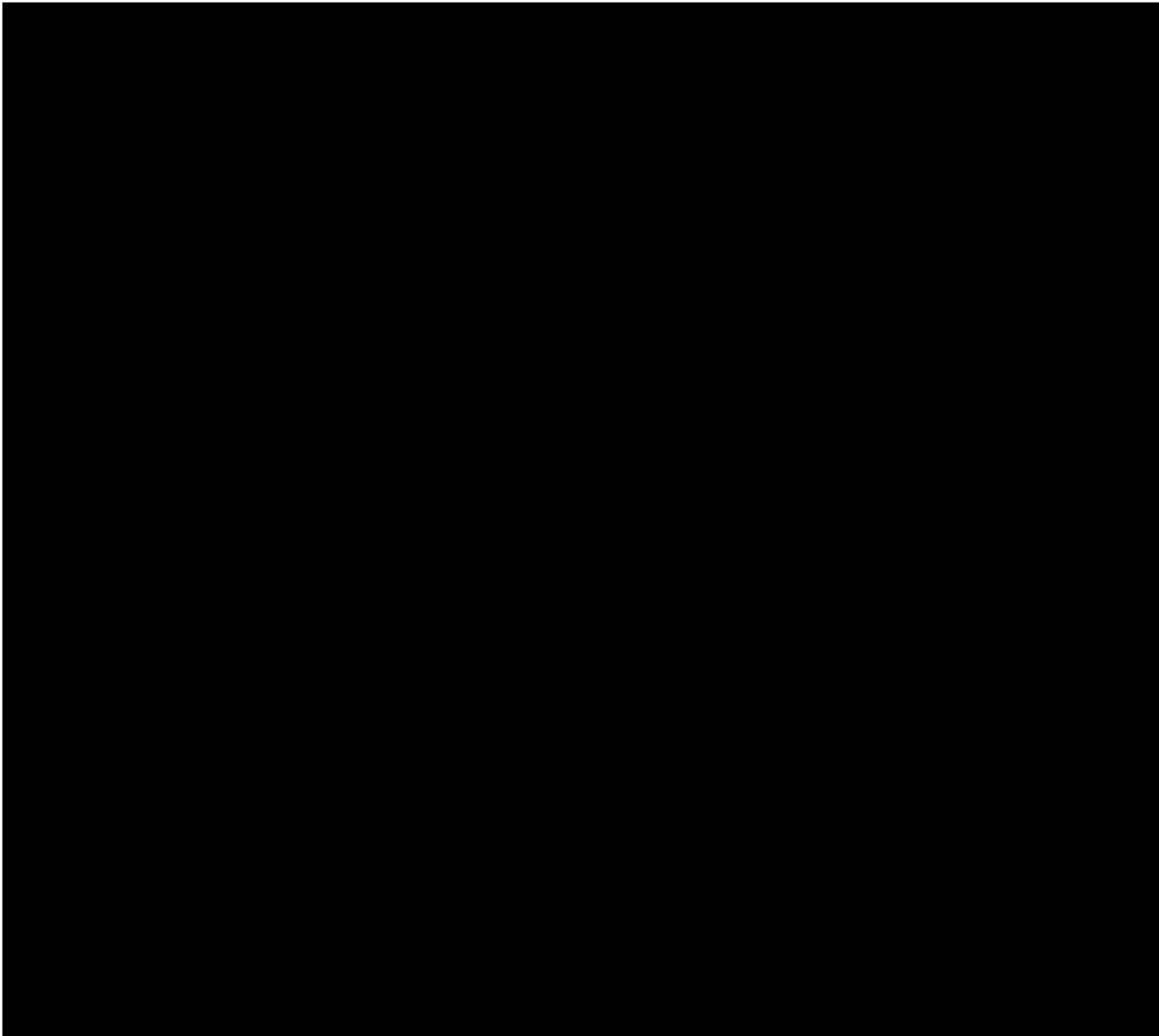


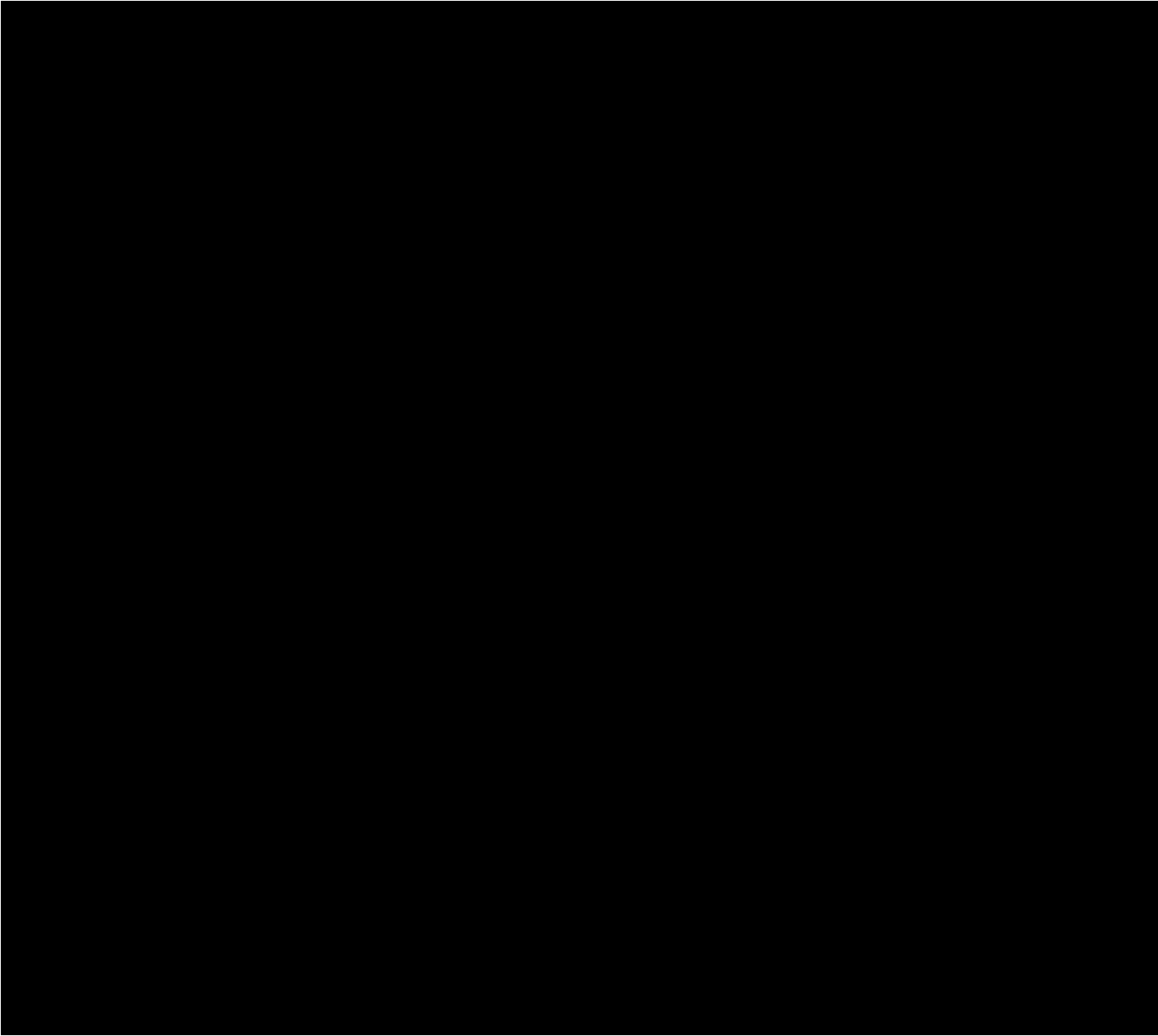










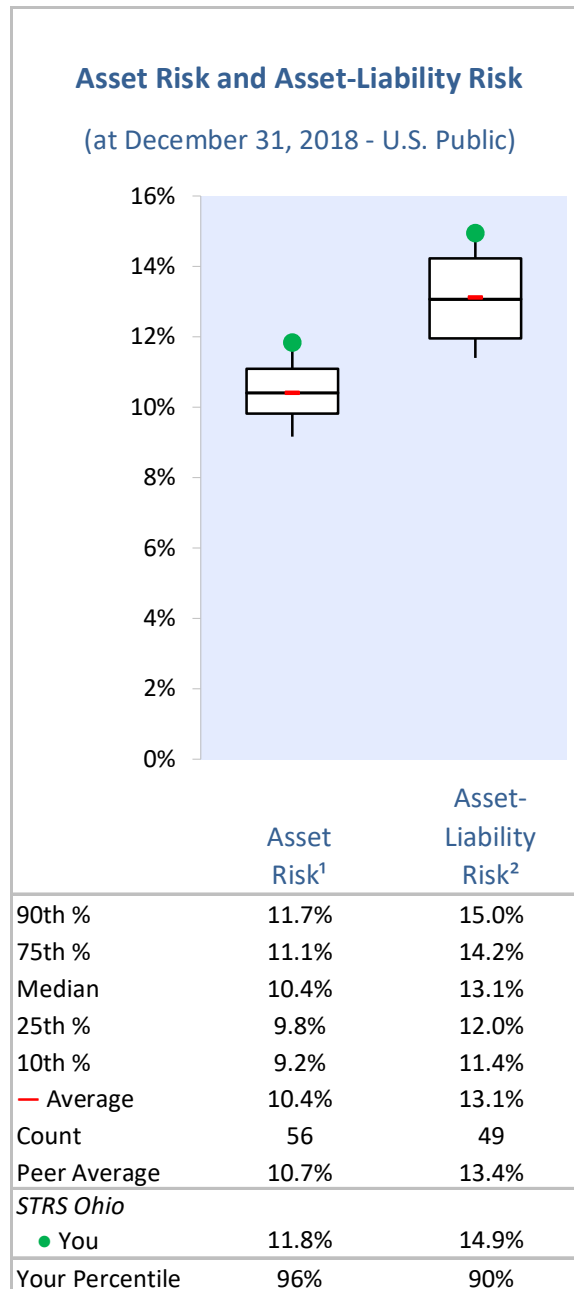


6

Risk

Comparison of your risk levels to the U.S. Public universe	2
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Comparison of your risk levels to the U.S. Public universe



1. Asset risk is the expected volatility of your policy return. It is based on the historical variance of, and covariance between, the asset classes in your asset mix policy. It is expressed as an annual standard deviation.

2. Asset-liability risk is the expected volatility of surplus returns. Surplus returns are the changes in a plan's marked-to-market funded status caused by market factors. Asset liability risk is a function of the volatility of policy returns (asset risk), the volatility of surplus returns (surplus risk) and the correlation between policy returns and surplus returns.

Calculation of asset risk

Before considering the benefit of diversification, the weighted average risk of the asset classes in your asset mix policy was 14.1%.

Calculation of your weighted asset class risk

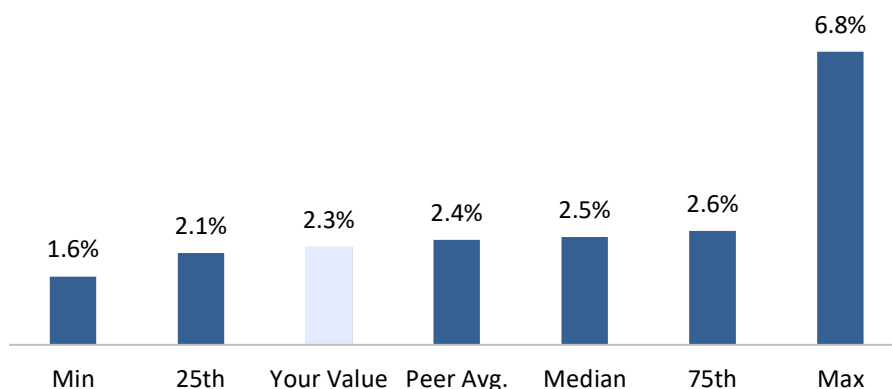
Asset Class	Policy weight (A)	Risk ¹ (B)	Weighted risk (A X B)
Stock: U.S. Large Cap	28.0%	14%	3.9%
Stock: EAFE	19.2%	17%	3.2%
Stock: Emerging	4.8%	22%	1.1%
Bonds: U.S.	21.0%	5%	1.1%
Bonds: Cash	1.0%	1%	0.0%
Real Estate ex-REITs	10.0%	9%	0.9%
LBO	16.0%	24%	3.8%
Weighted Total			14.1%

1. Risk is the standard deviation of returns for the asset class based on standard benchmarks used by CEM.

Reduction in asset risk due to diversification

Your asset risk is less than your weighted asset risk because of the benefit of diversification. Diversification reduces risk because when one asset class has a negative return, it might be offset by another asset class with a positive return. The lower the correlation between your policy asset classes, the greater the diversification benefit. The correlation between your policy asset classes is shown on page 15 of this section.

Diversification benefit: U.S. Public universe



The benefit of diversification equals weighted asset risk minus asset risk.

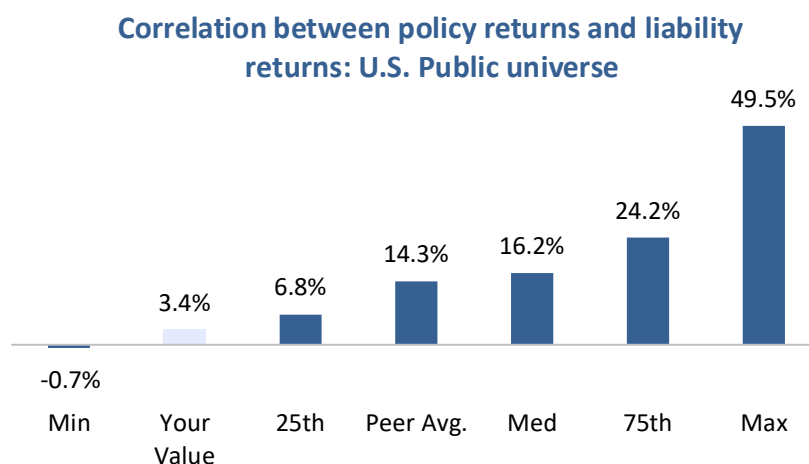
Components of asset risk

	You	Peer median*	Peer average	U.S. Public median*	U.S. Public average
Weighted asset risk	14.1%	13.1%	13.1%	12.8%	12.9%
Benefit of diversification	2.3%	2.6%	2.4%	2.5%	2.5%
Asset risk	11.8%	10.9%	10.7%	10.4%	10.4%

* Comparisons of components of asset risk should be interpreted with caution because it is not always possible to separate the diversification benefit from the weighted asset risk. For example, global stock as an asset class includes the diversification benefit of its geographic components within its asset risk.

Asset-liability risk

Your plan would not have any asset-liability risk if your assets perfectly matched your liabilities. If they matched, then the correlation between asset returns and liability returns would be 100%. If liabilities increased, assets would increase by a like amount (and vice versa). Thus higher correlation between your asset returns and liability returns reduces your asset-liability risk.



In addition to the correlation between asset returns and liability returns, asset-liability risk is also a function of the volatility of asset returns (asset risk) and the volatility of liability returns¹ (liability risk = $\sqrt{R_A^2 + R_L^2 - 2\rho_{AL}R_AR_L}$).

Components of asset-liability risk

	You	Peer median	Peer average	U.S. Public median	U.S. Public average
Asset risk (R_A)	11.8%	10.9%	10.7%	10.4%	10.4%
Liability risk (R_L)	9.5%	9.9%	9.7%	9.7%	9.6%
Correlation between policy returns and liability returns (ρ_{AL})	3.4%	9.8%	14.3%	16.2%	15.9%
Asset-liability risk	14.9%	13.6%	13.4%	13.1%	13.1%

1. Liability returns equal the changes in your marked-to-market liabilities caused by market factors. These are assumed to equal the return on your liability proxy portfolio (see next page).

Liability proxy portfolio

Your liability proxy portfolio is the portfolio of nominal and inflation-indexed bonds that best matches the sensitivity of your liabilities to changes in real and nominal interest rates.

Comparisons of liability proxy portfolio

	Your fund		Peer average		U.S. Public	
	Duration	% of Assets	Duration	% of Assets	Duration	% of Assets
Inflation Indexed Bonds	10.0	24%	11.6	46%	12.2	57%
Nominal Bonds	11.3	76%	13.3	54%	13.2	43%
Total		100%		100%		100%

Your liability proxy portfolio is a tool that:

- Helps you understand how the unsmoothed market value of your liabilities responds to changes in real and nominal interest rates.
- Helps you make better asset mix policy decisions by providing an understanding of which assets will decrease your asset-liability risk (i.e., assets that behave similarly to the neutral asset mix) and which assets will increase your risk.
- Helps you understand how your liabilities are different from your peers. Differences in liabilities mean that the same asset will have different risk / reward characteristics for different funds. For example, the risk of a nominal bond for a fund with 100% inflation sensitivity is much higher than it is for a fund with less than 100% inflation sensitivity.

Asset-liability risk could theoretically be eliminated if your actual asset mix matched the liability proxy portfolio. However, we recognize that this is neither an option nor a goal for most funds because:

- The supply of inflation-indexed assets is limited. These assets are required to match the obligations of pension liabilities.
- This low-risk strategy also has a lower expected return, implying either higher future funding costs or lower future benefits.

The methodology and formula used to determine your liability proxy portfolio are provided on pages 11-13 of this section.

Liability risk

Differences in liability risk are due to differences in inflation sensitivity and member demographics.

A plan's inflation sensitivity depends on:

a) The type of plan

Final and highest average plans have more inflation sensitivity than career average plans. Conversely, career average plans have more inflation sensitivity than flat benefit plans. Your plan type is final average.

Plan type	# of plans	% of Total
Flat Benefit	0	0%
Career Average	0	0%
Final/Highest/Best Avg	51	88%
Other	7	12%
Total	58	100%

b) Contractual inflation protection for retired members

Your retired members get 0% contractual inflation protection. Your retiree inflation protection is subject to a cap of 0%.

Retiree inflation protection	# of plans		
	Corporate	Public	Other
0%	0	27	0
>0% and <50%	0	0	0
50%	0	2	0
>50% and <100%	0	5	0
100%	0	20	0
Total	0	54	0

c) Member demographics

Member demographics impacts both inflation sensitivity and the duration of plan liabilities. The survey asks for your plan's percentage of liabilities that relate to retired members from your actuarial reports. If you did not provide this number, then it is estimated (see page 12 of this section). Your percentage of liabilities that relate to retired members was 72%.

	Your fund	Peer Average	U.S. Public Average
Active Members	55%	58%	55%
Retired Members	45%	42%	45%
Total	100%	100%	100%

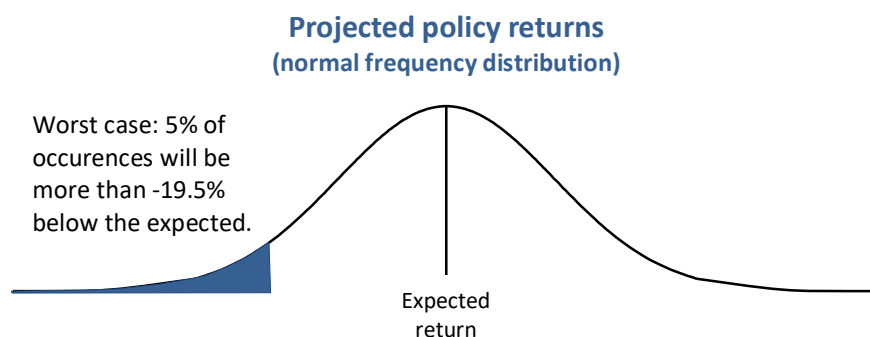
Projected worst case scenarios

We can convert your asset risk and asset-liability risk into worst case outcomes for policy returns and funded status if we make the following simplifying assumptions:

- a) Returns are normally distributed.
- b) Historic return volatility and correlations will continue in the future.
- c) No change in your policy asset mix or liabilities.

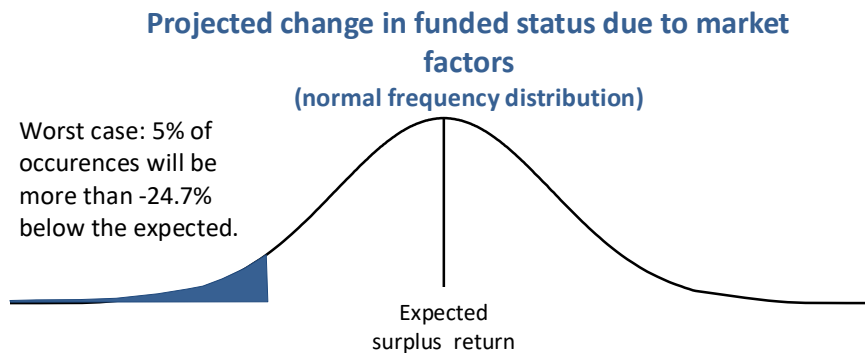
a) Worst case policy returns

Every year there is a 5% probability that your policy return will be worse than your expected policy return by more than -19.5% (-19.5% equals -1.65 X your asset risk of 11.8%). -19.5% is the starting point of worst case outcomes. They could be much worse.



b) Worst case impact on funded status

Every year, there is a 5% probability that changes in your mark-to-market funded status caused by market factors ("Surplus Returns") will be worse than expected by more than -24.7%. (-24.7% equals -1.65 X your asset-liability risk of 14.9%). -24.7% is the starting point of worst case outcomes. They could be much worse.



Historic worst case scenarios during the past 5 years

a) Historic worst case policy returns

During the past 5 years, your lowest policy return was -2.0% in 2018.

Historic policy returns - U.S. Public universe

	2018	2017	2016	2015	2014
90th %	0.3%	16.7%	9.3%	1.7%	8.3%
75th %	-1.8%	15.9%	8.5%	0.9%	7.4%
Median	-2.6%	15.2%	7.6%	-0.1%	6.5%
25th %	-3.4%	14.1%	6.9%	-0.8%	5.6%
10th %	-5.1%	13.2%	6.6%	-1.8%	4.9%
Average	-2.5%	15.0%	7.7%	0.0%	6.6%
Count	56	60	59	64	68
Peer Avg	-1.2%	14.8%	7.7%	0.7%	7.1%
Your Value	-2.0%	15.4%	8.0%	1.7%	8.3%

b) Historic worst case changes in funded status

During the past 5 years, your worst change in marked-to-market funded status caused by market factors ("Surplus Returns") was -6.1% in 2014.

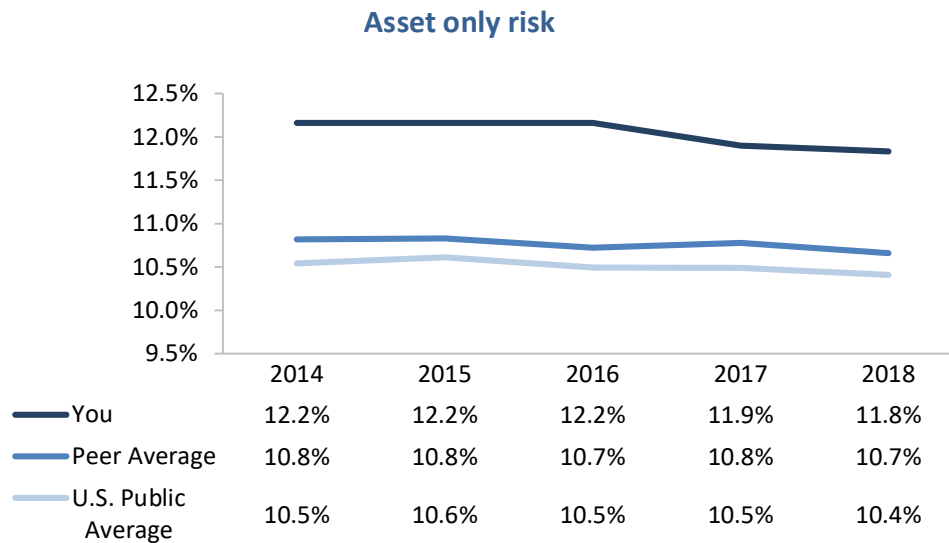
Historic changes in funded status caused by market factors - U.S. Public universe

	2018	2017	2016	2015	2014
90th %	2.9%	8.7%	4.9%	4.6%	-5.0%
75th %	0.9%	8.0%	4.4%	3.5%	-6.2%
Median	-0.2%	6.7%	2.8%	2.1%	-8.0%
25th %	-1.9%	5.1%	1.4%	0.8%	-9.8%
10th %	-3.5%	3.1%	0.1%	-0.5%	-11.3%
Average	-0.4%	6.4%	2.8%	2.1%	-8.1%
Count	50	54	55	59	63
Peer Avg	0.8%	6.2%	3.2%	2.6%	-7.3%
Your Value	-1.0%	6.7%	5.1%	1.8%	-6.1%

Risk Trends - 2014 to 2018

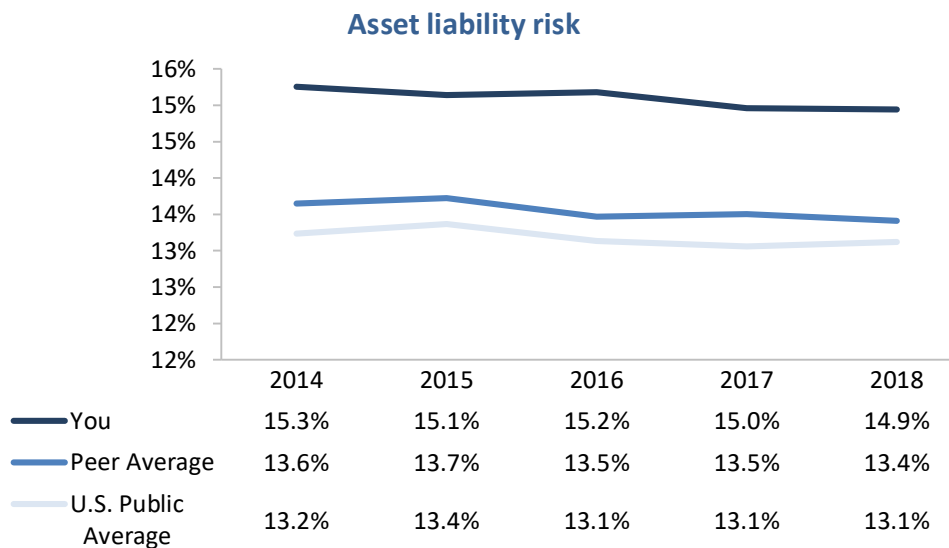
a) Asset risk trends

Asset risk will only change if policy asset mix changes. Between 2014 and 2018 the asset risk for your fund decreased from 12.2% to 11.8%.



b) Asset-liability risk trends

Asset-liability risk will change if policy asset mix changes, or if the nature of your liabilities changes. Between 2014 and 2018 the asset-liability risk for your fund decreased from 15.3% to 14.9%.



[Redacted]

[Redacted]

[Redacted]

[Redacted]

[Redacted] determine your liabilities' inflation sensitivity. The degree of total inflation sensitivity determines the proportion of inflation-indexed bonds versus nominal bonds that belong in your liability proxy portfolio.

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	Long Nominal Bonds		Inflation Indexed Bonds		CPI
[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
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Appendix B - Methodology used to calculate asset and asset-liability risk

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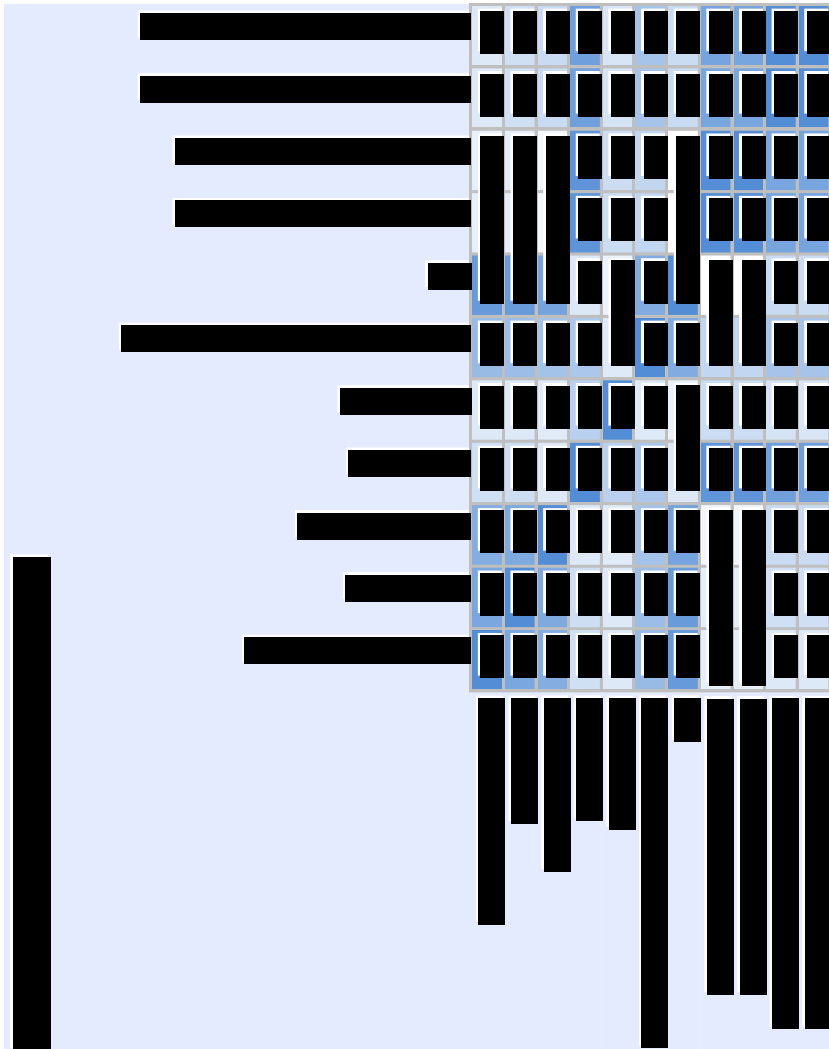
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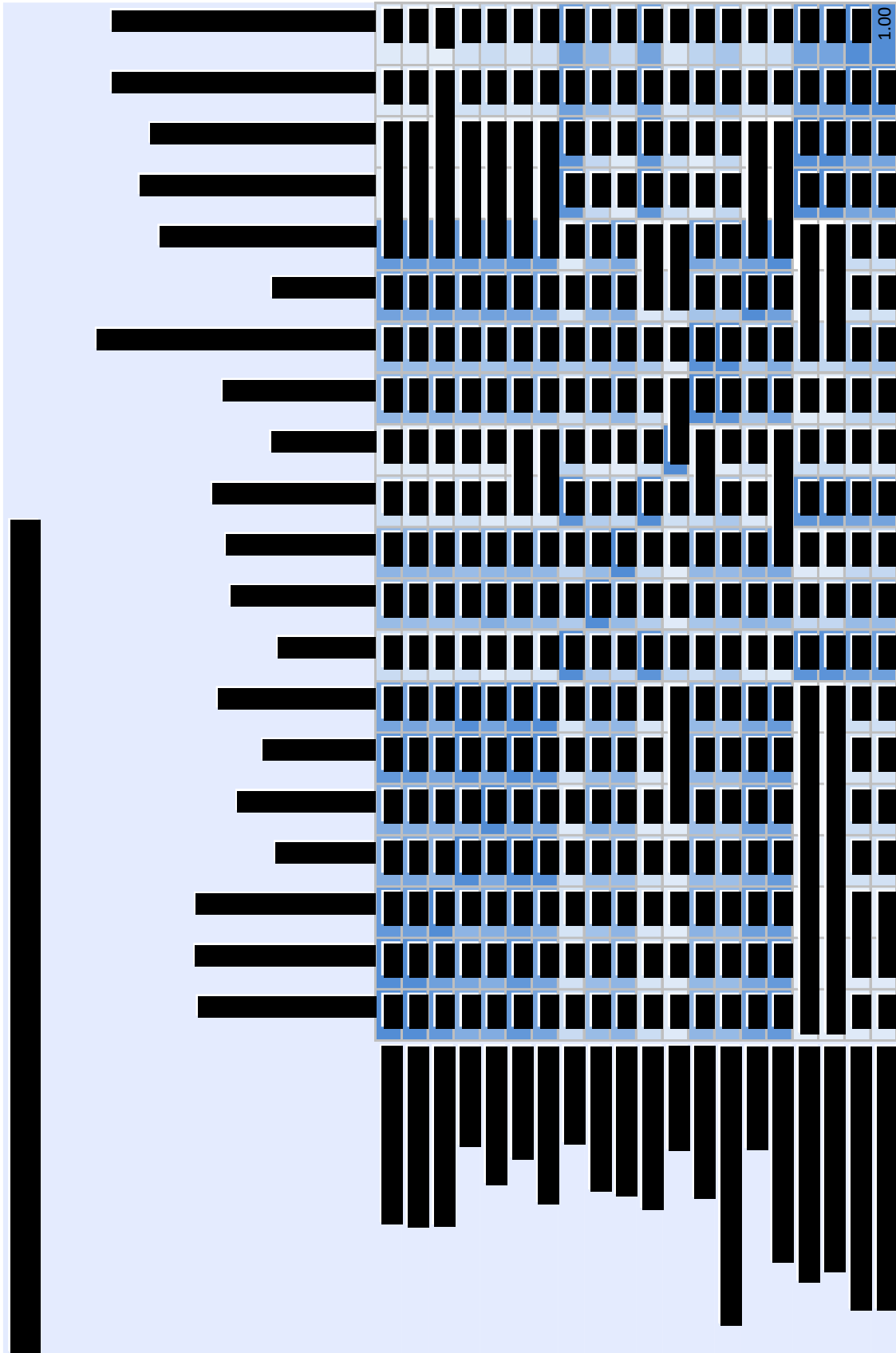
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[Redacted] the total weight divided proportionately between them.

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7

Appendices

Appendix A - Data Summary

Appendix A2 - Enhanced survey data & mapping to regular survey

Appendix B - Data quality

Appendix C - Glossary of terms

Appendix A - Data Summary

STRS Ohio

Plan Info	2018	2017	2016	2015	2014
Contact	Lynn Hoover	Lynn Hoover	Lynn Hoover	Lynn Hoover	Lynn Hoover
Type of fund (corporate, public, other)	Public	Public	Public	Public	Public
Total fund size (mils) as at December 31	72,888.7	78,304.0	71,661.0	70,756.0	73,655.0
Asset-class level holdings provided on survey are: year end or average?	Year End	Year End	Year End	Year End	Year End
Total return for year ended	-1.89%	15.76%	8.03%	2.33%	7.83%
Is the return net or gross?	Net of all investment costs	Net of all investment costs	Net of all investment costs	Net of all investment costs	Net of all investment costs
Total fund policy or benchmark return	-2.04%	15.35%	8.00%	1.71%	8.26%

Ancillary Data	2018	2017	2016	2015	2014
What is your hedging policy for: Foreign Holdings	50%	50%	50%	50%	50%
What were your actuarial fees in 000s?	219	513	266	247	244
How many plan members/beneficiaries do you have:					
Active?	192,365	193,141	195,440	189,731	194,451
Active (no-accrual)?	138,075	139,533	135,738	135,215	134,844
Retired?	157,422	158,039	157,938	158,116	152,208
Other?	18,416	18,403	17,627	17,453	17,036
What type of plan(s) do you have?	Final Average	Final Average	Final Average	Final Average	Final Average
To what extent are your retired members' benefits indexed to inflation?					
Contractual %	0%	0%	0%	0%	0%
If the indexation is subject to a cap, describe the cap	0%	0%	2% per year,	2% per year,	2% per year,
What % of the plan's liabilities pertain to retired members?	72%	73%	74%	75%	72%
Actuarial valuation assumptions for funding purposes:					
Liability discount rate	7.5%	7.5%	7.8%	7.8%	7.8%
Salary progression rate	3.0%	3.0%	3.5%	3.5%	3.5%
What was your actuarial assumption for expected rate of return?	7.5%	7.5%	7.8%	7.8%	7.8%

	2014	20.8	MSCI World xUS 50% Hedged Net	0.8
Stock - Emerging	2018	4.8	MSCI Emerging Market net	-14.6
	2017	5.0	MSCI Emerging Market Net	37.3
	2016	5.2	MSCI Emerging Market net	11.2
	2015	5.2	MSCI Emerging Market net	-14.9
	2014	5.2	MSCI Emerging Market Net	-2.2
Stock - ACWI x U.S.	2018		International Blended Benchmark	-12.1
	2017		International Blended Benchmark	23.4
	2016		International Blended Benchmark	6.4
	2015		International Blended Benchmark	-2.8
	2014		International Blended Benchmark	0.2
Stock - Global	2018		MSCI ACWI net	-9.4
	2017		MSCI ACWI net	24.6
	2016		MSCI ACWI net	7.9
	2015		MSCI ACWI net	-2.4
	2014		MSCI ACWI Net	4.2
Fixed Income - U.S.	2018	21.0	Fixed Income Blended (Jul 1 2017)	0.1
	2017	20.0	Fixed Income Blended (Jul 1 2017)	3.9
	2016	18.0	Barclays Universal for total FI (Barclays Aggregate Index not appropriate for US FI segment)	3.9
	2015	18.0	Barclays Universal for total FI (Barclays Aggregate Index not appropriate for US FI segment)	0.4
	2014	18.0	Barclays Universal for total FI (Barclays Aggregate Index not appropriate for US FI segment)	5.6
Fixed Income - Emerging	2018		Barclays Emerging Market	-2.5
	2017		Barclays Emerging Market	8.2
	2016		Barclays Emerging Market	9.9
	2015		Barclays Emerging Market	1.3
	2014		Barclays Emerging Market	4.8
Fixed Income - High Yield	2018		Barclays US Corp High Yield	-2.1
	2017		Barclays US Corp High Yield	7.5
	2016		Barclays US Corp High Yield	17.1
	2015		Barclays US Corp High Yield	-4.5
	2014		Barclays US Corp High Yield	2.5
Cash	2018	1.0	US 90 day T bill	1.9
	2017	1.0	US 90 day T bill	0.9
	2016	1.0	US 90 day T bill	0.3
	2015	1.0	US 90 day T bill	0.1
	2014	1.0	US 90 day T bill	0.0
Global TAA	2018		Custom (Alternative Investment Actual Return)	11.8
	2017		Custom (Alternative Investment Actual Return)	12.2
	2016		Custom (Alternative Investment Actual Return)	5.3
	2015		Custom (Alternative Investment Actual Return)	6.1
	2014		Custom (Alternative Investment Actual Return)	6.1
Hedge Funds	2018		Custom (Alternative Investment Actual Return)	11.8
	2017		Custom (Alternative Investment Actual Return)	12.2
	2016		Custom (Alternative Investment Actual Return)	5.3
	2015		Custom (Alternative Investment Actual Return)	6.1
	2014		Custom (Alternative Investment Actual Return)	13.5
REITs	2018		Your REIT benchmark	-4.6
	2017	1.5	Your REIT benchmark	5.2
	2016	1.5	Your REIT benchmark	8.5
	2015	1.5	Your REIT benchmark	3.2
	2014	1.5	Your REIT benchmark	30.1
Infrastructure	2018		Custom (Alternative Investment Actual Return)	11.8
	2017		Custom (Alternative Investment Actual Return)	12.2
	2016		Custom (Alternative Investment Actual Return)	5.3
	2015		Custom (Alternative Investment Actual Return)	6.1
	2014		Custom (Alternative Investment Actual Return)	13.5
Real Estate ex-REITs	2018	10.0	NCREIF NPI	6.7
	2017	8.5	NCREIF NPI	7.0
	2016	8.5	NCREIF NPI	8.0
	2015	8.5	NCREIF NPI	13.3
	2014	8.5	NCREIF NPI	11.8
Natural Resources	2018		Custom (Alternative Investment Actual Return)	11.8
	2017		Custom (Alternative Investment Actual Return)	12.2
	2016		Custom (Alternative Investment Actual Return)	5.3
	2015		Custom (Alternative Investment Actual Return)	6.1
	2014		Custom (Alternative Investment Actual Return)	13.5
Private Credit	2018		Custom (Alternative Investment Actual Return)	11.8
	2017		Custom (Alternative Investment Actual Return)	12.2
	2016			
	2015			
	2014			
Diversified Private	2018		Custom (Alternative Investment Actual Return)	11.8
	2017		Custom (Alternative Investment Actual Return)	12.2
	2016		Custom (Alternative Investment Actual Return)	5.3

Appendix A Data Summary - Assets, Returns and Costs: Public Market

STRS Ohio

(Default costs are highlighted with blue shading. See page 7 for more details)

Asset Class		Year	Asset (\$millions)	Return %	Cost (\$000)				
					Internal & Other	Base Fees	Perf Fees	Total	Bps
Stock - U.S. Large Cap									
Internal Active	2018	8,586.9	-6.09	12,687.9			12,687.9	13.2	
	2017	10,622.7	21.38	12,590.5			12,590.5	12.0	
	2016	10,342.4	10.22	11,243.9			11,243.9	10.9	
	2015	10,308.3	-0.14	11,794.0			11,794.0	10.9	
	2014	11,364.0	11.74	10,645.4			10,645.4	9.5	
Internal Passive	2018	9,004.0	-3.08	72.8			72.8	0.1	
	2017	9,544.3	22.97	72.1			72.1	0.1	
	2016	8,868.0	11.34	64.0			64.0	0.1	
	2015	8,672.3	2.36	40.6			40.6	0.0	
	2014	8,757.0	13.28	38.5			38.5	0.0	
External Active	2018	905.6	-7.20	210.7	2,309.6		2,520.3	23.7	
	2017	1,220.9	23.29	226.9	2,466.3		2,693.2	23.8	
	2016	1,046.3	9.78	186.0	2,233.7		2,419.7	23.6	
	2015	1,003.0	2.45	179.9	2,168.3		2,348.3	23.7	
	2014	981.0	13.11	147.0	2,055.0		2,202.0	23.8	
Stock - U.S. Small Cap									
Internal Active	2018	684.6	-10.05	323.5			323.5	4.2	
	2017	842.2	13.70	346.3			346.3	4.2	
	2016	824.9	22.03	257.6			257.6	3.2	
	2015	778.8	-2.44	293.3			293.3	3.6	
	2014	844.0	6.45	155.0			155.0	2.1	
External Active	2018	1,068.3	-8.82	104.9	9,437.5		9,542.4	81.9	
	2017	1,262.6	24.33	74.6	9,642.9		9,717.5	77.3	
	2016	1,252.0	14.77	54.0	8,861.7		8,915.7	75.8	
	2015	1,101.3	-1.24	203.3	8,895.4		9,098.7	81.2	
	2014	1,140.0	3.79	200.8	9,386.0		9,586.8	75.8	
Stock - EAFE									
Internal Active	2018	4,915.3	-11.91	2,968.2			2,968.2	5.6	
	2017	5,663.8	20.07	3,597.2			3,597.2	6.4	
	2016	5,589.9	4.49	3,292.2			3,292.2	5.9	
	2015	5,658.2	1.84	2,892.7			2,892.7	5.2	
	2014	5,523.7	1.01	2,429.2			2,429.2	4.3	
External Active	2018	5,120.4	-11.31	205.8	19,125.7		19,331.5	35.1	
	2017	5,881.0	24.11	241.7	19,869.7		20,111.5	35.5	
	2016	5,463.5	5.58	214.5	18,582.3		18,796.8	34.2	
	2015	5,529.7	5.63	194.7	19,934.8		20,129.5	35.7	
	2014	5,761.7	1.59	162.2	19,588.0		19,750.2	34.9	
Stock - Emerging									
Internal Active	2018	2,131.9	-11.13	3,183.9			3,183.9	14.1	
	2017	2,382.3	32.16	2,696.7			2,696.7	12.1	
	2016	2,061.8	14.55	2,571.8			2,571.8	13.1	
	2015	1,856.3	-10.54	2,578.4			2,578.4	14.1	
	2014	1,810.0	-2.42	2,261.3			2,261.3	12.9	
External Active	2018	903.8	-15.07	252.2	5,777.8		6,029.9	59.0	
	2017	1,139.1	31.36	263.3	6,401.6		6,664.9	61.4	
	2016	1,030.7	12.63	256.1	5,834.4		6,090.6	62.4	
	2015	920.4	-13.75	280.4	5,317.9		5,598.3	56.2	
	2014	1,073.0	0.39	274.1	6,245.0		6,519.1	61.2	
Stock - ACWI x U.S.									
Internal Active	2018	2,704.6	-10.91	468.3			468.3	1.6	
	2017	3,211.2	24.22	475.0			475.0	1.5	
	2016	2,988.9	9.11	433.9			433.9	1.5	
	2015	2,730.5	-1.78	439.9			439.9	1.6	
	2014	2,775.0	0.47	415.2			415.2	1.5	

Appendix A Data Summary - Assets, Returns and Costs: Public Market

STRS Ohio

(Default costs are highlighted with blue shading. See page 7 for more details)

Asset Class		Year	Asset (\$millions)	Return %	Cost (\$000)				
					Internal & Other	Base Fees	Perf Fees	Total	Bps
Stock - Global	External Active	2018	1,106.3	-14.01	20.0	5,474.0		5,494.0	43.5
		2017	1,418.8	23.41	20.4	6,121.7		6,142.1	46.1
		2016	1,243.3	4.09	18.6	5,445.3		5,463.8	44.6
		2015	1,206.1	1.97	17.5	5,022.1		5,039.7	45.9
		2014	990.0		7.7	1,993.0		2,000.7	38.5
Fixed Income - U.S.	Internal Active	2018	546.9	-9.63	488.3			488.3	8.3
		2017	634.2	24.07	495.3			495.3	8.5
		2016	536.0	8.83	452.5			452.5	6.9
		2015	778.8	-1.24	457.4			457.4	5.8
		2014	788.0	3.71	422.9			422.9	5.5
Fixed Income - Emerging	Internal Active	2018	12,171.5	0.27	3,465.9			3,465.9	2.7
		2017	13,081.7	3.46	3,304.9			3,304.9	3.0
		2016	8,787.2	2.71	2,465.8			2,465.8	2.7
		2015	9,726.0	1.01	2,552.2			2,552.2	2.5
		2014	11,082.0	5.55	2,538.8			2,538.8	2.2
Fixed Income - High Yield	External Active	2018	750.1	-4.04	143.1	3,475.7		3,618.7	46.3
		2017	813.7	10.82	156.3	3,435.7		3,592.0	46.3
		2016	737.3	15.81	130.4	3,180.6		3,311.0	45.1
		2015	731.4	1.11	130.5	3,586.6		3,717.1	46.6
		2014	864.0	2.01	113.8	3,742.0		3,855.8	48.7
Cash	External Active	2018	728.2	-2.33	144.3	3,160.8		3,305.1	41.9
		2017	849.1	7.74	165.3	3,146.4		3,311.7	40.4
		2016	792.0	17.30	155.0	3,666.2		3,821.3	43.8
		2015	953.9	-4.03	178.5	4,427.6		4,606.1	42.2
		2014	1,229.0	2.49	150.8	4,185.0		4,335.8	41.3
Global TAA	Internal Active	2018	1,002.8	1.98	299.0			299.0	2.2
		2017	1,699.9	0.77	285.8			285.8	1.7
		2016	1,679.5	0.48	266.0			266.0	1.8
		2015	1,274.8	0.08	268.6			268.6	1.4
		2014	2,480.0	0.09	265.9			265.9	0.9
REITs	Internal Passive	2018	958.1	-7.17	1,666.5			1,666.5	64.0
		2017	365.3	-7.17	96.2	2,306.4		2,402.6	31.1
		2016	741.8	10.52	36.8	1,334.7		1,371.5	23.8
		2015	412.0	8.44	26.5	1,191.4	-	1,217.9	30.6
		2014	383.8	-2.20	12.0	678.1	-	690.1	36.0
REITs	Internal Passive	2018	1,156.5	-4.60	106.4			106.4	0.9
		2017	1,117.2	5.21	94.3			94.3	0.8
		2016	1,262.4	8.78	89.1			89.1	0.7
		2015	1,166.2	3.21	226.4			226.4	2.0
		2014	1,098.0	30.47	16.5			16.5	0.3

Appendix A Data Summary - Assets, Returns and Costs: Private Market and Hedge Fund

STRS Ohio

(Default costs are highlighted with blue shading. See page 5 for more details)

Asset Class	Year	NAV (\$mils)	Fee Basis (\$mils)	Return	Cost (\$000)						
					Internal & Other	Base Fees	Perf. Fees	Underlying Base Fees	Underlying Perf Fees	Total	Total bps
Infrastructure											
Fund of Funds	2018	58.2	13.2	-3.1	8.6	370.4	506.2	347.6	506.2	726.7	131.6
	2017	68.4	97.2	1.9	12.9	459.7	351.7	766.8	1,626.6	1,239.5	137.8
	2016	107.5	82.7	5.3	12.5	495.9	426.0	1,320.8	1,267.2	1,829.2	220.1
	2015	105.5	83.6	5.6	12.9	501.4	637.0	1,945.9	821.9	2,460.3	268.0
	2014	100.0	100.0	17.7	11.7	506.0	252.0	1,249.0	414.0	1,766.7	176.7
Natural Resources											
Internal Active	2018										
	2017										
	2016	375.8	375.8	-3.4	298.4					298.4	7.2
	2015	455.9	455.9	3.0	169.0					169.0	3.8
Co-Investment	2018	154.8	154.8	11.5	24.3					24.3	1.6
	2017	149.4	149.4	-34.4	39.7					39.7	5.3
LP	2018	360.4	510.0	11.5	56.9	5,691.0	2,090.3			5,747.9	110.1
	2017	549.4	652.7	-34.4	69.4	6,832.0	2,885.0			6,901.4	111.1
	2016	604.6	589.4	-3.4	66.1	6,439.0	4,926.2			6,505.1	114.7
	2015	478.1	544.8	3.0	56.7	7,659.5	2,238.5			7,716.2	149.0
	2014	351.0	491.0	9.2	40.8	5,014.0	1,687.5			5,054.8	112.7
Real Estate ex-REITs											
Internal Active	2018	5,764.4	5,764.4	7.9	17,795.5					17,795.5	32.1
	2017	5,315.0	5,315.0	5.9	17,182.4					17,182.4	30.9
	2016	5,794.6	5,794.6	9.1	16,632.4					16,632.4	29.3
	2015	5,554.9	5,554.9	13.0	16,561.4					16,561.4	30.9
	2014	5,177.0	5,177.0	14.8	14,191.5					14,191.5	28.7
LP	2018	882.5	1,419.8	13.2	481.0	14,030.0	5,525.9			14,511.0	101.7
	2017	990.6	1,434.8	8.6	464.1	17,650.0	5,940.9			18,114.1	122.3
	2016	1,131.1	1,526.4	13.5	447.4	17,431.8	6,098.0			17,879.2	114.4
	2015	1,008.5	1,599.0	11.0	443.5	17,938.0	10,592.0			18,381.5	122.5
	2014	1,009.0	1,401.0	18.0	378.9	24,652.0	9,546.5			25,030.9	163.0
Diversified Private Equity											
Internal Active	2018	318.5	318.5	19.9	319.6					319.6	8.0
Co-Investment	2018	328.7	328.7	4.7	88.1					88.1	3.0
Fund of Funds	2018										
	2017										
	2016										
	2015										
	2014	527.0	1,123.0	18.9	155.0	5,367.0	3,718.5	7,965.0	6,633.0	13,487.0	124.2
LP	2018	1,591.4	3,653.5	19.9	511.7	25,682.0	26,112.8			26,193.7	95.7
	2017	100.6	240.3	19.3	39.7	3,903.4	1,807.9			3,943.1	158.6
	2016	97.0	257.0	6.8	27.7	2,715.0	1,258.3			2,742.7	165.1
	2015	60.3	75.3	9.9	11.8	1,429.9	892.7			1,441.6	191.5
	2014	2,893.0	6,288.0	18.9	783.7	94,765.2	38,002.8			95,548.9	158.3
Hedge Funds											
External Active	2018	1,636.3	1,636.3	0.6	255.1	26,478.9	12,406.2			39,140.1	239.0
	2017	1,638.9	1,638.9	5.6	290.8	26,980.9	22,775.2			50,046.9	274.8
	2016	2,003.9	2,003.9	5.0	336.8	32,054.3	22,495.0			54,886.1	271.5
	2015	2,039.1	2,039.1	1.2	319.6	35,310.0	9,973.0			45,602.6	223.0
	2014	2,050.0	2,050.0	5.1	234.7	32,279.0	22,798.0			55,311.7	305.9
Private Credit											
Internal Active	2018	94.8	94.8	-0.2	73.7					73.7	7.8
	LP	2018	837.3	1,286.2	4.7	190.2	12,745.0	5,138.6			12,935.2
	2017	417.3	791.1	6.0	113.7	10,045.7	4,712.1			10,159.4	128.4
LBO											
Fund of Funds	2018	991.2	1,015.8	19.9	183.0	6,314.4	3,703.1	10,166.8	18,608.2	16,664.2	141.8

Appendix A Data Summary - Assets, Returns and Costs: Private Market and Hedge Fund

STRS Ohio

(Default costs are highlighted with blue shading. See page 5 for more details)

Asset Class	Year	NAV (\$mils)	Fee		Cost (\$'000)								
			Basis (\$mils)	Return	Internal & Other	Base Fees	Perf. Fees	Underlying Base Fees	Underlying Perf Fees	Total	Total bps		
Venture Capital	LP	2017	860.4	1,334.1	19.3	793.8	6,706.6	3,151.1	10,951.9	16,464.3	18,452.4	148.5	
		2016	715.2	1,151.7	6.8	653.0	6,701.6	2,754.0	8,310.5	13,632.1	15,665.1	159.9	
		2015	661.8	808.1	9.9	603.7	5,965.6	2,377.6	11,206.1	10,520.9	17,775.4	184.1	
		2018	3,589.2	5,672.8	19.9	1,068.0	58,116.0	66,235.5			59,184.0	103.6	
		2017	2,778.2	5,382.0	19.3	791.4	70,745.7	55,268.1			71,537.1	158.8	
		2016	2,510.6	3,630.2	6.8	638.4	52,604.7	50,104.9			53,243.2	152.8	
		2015	2,550.5	3,337.4	9.9	573.9	51,062.2	47,243.1			51,636.1	154.7	
	Fund of Funds	LP	2018	329.8	341.4	18.5	61.3	1,492.4	887.6	4,721.3	4,319.6	6,275.0	191.4
			2017	262.0	314.2	13.3	75.3	1,206.9	739.8	4,794.2	2,934.7	6,076.4	206.3
			2016	231.3	275.0	3.1	72.6	1,677.4	655.2	4,391.9	2,686.3	6,141.9	225.4
			2015	205.5	270.0	11.9	55.0	1,562.2	506.3	3,664.6	3,611.6	5,281.8	240.1
		LP	2014	132.0	170.0	17.9	35.3	1,126.0	312.0	2,824.0	2,090.4	3,985.3	234.4
			2018	1,166.9	1,908.8	18.5	405.9	16,328.0	15,264.3			16,733.9	102.8
			2017	1,052.4	1,486.4	13.3	251.7	25,222.7	11,703.3			25,474.4	193.9
			2016	914.5	1,141.0	3.1	234.6	20,179.8	11,281.4			20,414.4	174.0
Other Private Equity	Internal Active	2015	919.9	1,205.5	11.9	278.2	27,885.1	19,258.5			28,163.3	189.9	
		2014	880.0	1,761.0	17.9	274.0	35,170.0	17,085.0			35,444.0	201.6	
		2018											
		2017	229.5	229.5	19.3	168.4					168.4	8.3	
		2016	178.3	178.3	6.8	25.9					25.9	1.4	
	Co-Investment	2015	192.4	192.4	9.9	50.0					50.0	0.7	
		2014	1,145.0	1,145.0	13.5	142.9					142.9	1.3	
		2018											
		2017	605.3	605.3	6.0	193.3					193.3	2.9	
		2016	705.2	705.2	4.0	33.7					33.7	0.5	
LP	2015	648.6	648.6	2.4	8.7					8.7	0.3		
	2018												
	2017	1,239.7	2,474.6	6.0	347.9	23,549.0	12,341.8			23,896.9	131.6		
	2016	1,323.7	1,948.1	4.0	344.1	25,265.0	11,853.2			25,609.1	148.8		
	2015	1,095.3	1,494.6	2.4	345.1	19,370.8	11,448.9			19,715.9	107.2		
2014	722.0	2,185.0	13.5	293.3	10,511.0	7,458.0			10,804.3	57.4			

Appendix A - Data Summary: Oversight, Custodial and Other Costs

STRS Ohio

Oversight, Custodial and Other Costs			
		000s	bps
Oversight of the fund assets ¹	2018	4,964.8	0.7bp
	2017	4,812.2	0.6bp
	2016	4,578.3	0.6bp
	2015	4,539.4	0.6bp
	2014	3,804.1	0.5bp
Custodial total	2018	2,292.9	0.3bp
	2017	2,412.3	0.3bp
	2016	2,090.0	0.3bp
	2015	2,149.9	0.3bp
	2014	1,673.0	0.2bp
Audit	2018	168.5	0.0bp
	2017	168.3	0.0bp
	2016	165.9	0.0bp
	2015	158.3	0.0bp
	2014	136.0	0.0bp
Other (legal etc)	2018	510.6	0.1bp
	2017	477.4	0.1bp
	2016	418.1	0.1bp
	2015	374.8	0.1bp
	2014	339.0	0.0bp
Total	2018	7,936.8	1.0bp
	2017	7,870.1	1.0bp
	2016	7,252.3	1.0bp
	2015	7,222.4	1.0bp
	2014	5,952.1	0.8bp

Summary of All Asset Management Costs			
		000s	bps
Investment Management Costs	2018	294,876.6	39.0bp
	2017	331,483.1	44.2bp
	2016	293,532.4	41.2bp
	2015	288,192.6	39.9bp
	2014	328,574.0	45.0bp
Oversight, Custodial & Other Costs	2018	7,936.8	1.0bp
	2017	7,870.1	1.0bp
	2016	7,252.3	1.0bp
	2015	7,222.4	1.0bp
	2014	5,952.1	0.8bp
Total	2018	302,813.4	40.1bp
	2017	339,353.2	45.3bp
	2016	300,784.7	42.2bp
	2015	295,415.0	40.9bp
	2014	334,526.2	45.9bp

1. Oversight includes the salaries and benefits of executives and their staff responsible for overseeing the entire fund or multiple asset classes and the fees / salaries of the board or investment committee. All costs associated with the above including fees / salaries, travel, director's insurance and attributed overhead should be included.

[REDACTED]

[REDACTED]

[REDACTED]

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[REDACTED] fee because you did not provide support for the unusually low cost of 99 bps (44.8 million).

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Data after the mapping process from enhanced survey to regular is shown below. The below data is used through the rest of this report.

Investment Costs by Asset Class and Style (\$000s)										
	Internal		External Passive		External Active			Total		
	Passive	Active	Fees	Monitoring & Other	Base Fees	Perform. Fees	Monitoring & Other	000s	% of Total	
Stock - U.S. Large Cap	73	12,688			2,310		211	15,281	5%	
Stock - U.S. Small Cap		323			9,437		105	9,866	3%	
Stock - EAFE		2,968			19,126		206	22,300	7%	
Stock - Emerging		3,184			5,778		252	9,214	3%	
Stock - ACWI x U.S.		468			5,474		20	5,962	2%	
Stock - Global		488						488	0%	
Fixed Income - U.S.		3,466						3,466	1%	
Fixed Income - Emerging					3,476		143	3,619	1%	
Fixed Income - High Yield					3,161		144	3,305	1%	
Cash		299						299	0%	
Infrastructure - FoFs					370	506	9	379	0%	
REITs	106							106	0%	
Real Estate ex-REITs		17,796						17,796	6%	
Real Estate ex-REITs - LP					14,030	5,526	481	14,511	5%	
Natural Resources - LP					5,691	2,090	57	5,748	2%	
Hedge Funds					26,479	12,406	255	26,734	9%	
Global TAA		1,667			2,306		96	4,069	1%	
Private Credit		74			12,745	5,139	190	13,009	4%	
Diversified Private Equity		320			25,682	26,113	512	26,513	9%	
LBO					58,116	66,236	1,068	59,184	20%	
LBO - FoFs					6,314	3,703	183	6,497	2%	
LBO - FoFs					10,167	18,608		10,167	3%	
Venture Capital					16,328	15,264	406	16,734	6%	
Venture Capital - FoFs					1,492	888	61	1,554	1%	
Venture Capital - FoFs					4,721	4,320		4,721	2%	
Overlay Programs	326			163				488	0%	
Total investment management costs - Internal & Monitoring								48,807	16%	
Total investment management fees (excluding performance in private assets)								233,204	77%	
Total investment management costs								39.0bp	294,877	97%

Oversight, Custodial & Other Asset Related Costs (\$000s)					
Oversight of the Fund			4,965	2%	
Trustee & Custodial			2,293	1%	
Audit			168	0%	
Other			511	0%	
Total oversight, custodial & other costs			1.0bp	7,937	3%

Total cost for STRS Ohio	40.1bp	302,813	100%
---------------------------------	--------	---------	------

* Default cost used. Refer to Appendix A.

Costs in blue come from the following page.

Costs in purple are from a two-step process shown over the next two pages.

Appendix A - Data Summary - Enhanced Survey Mapping to Regular Survey

Activity	Cost per Enhanced Survey	# of FTE	Step 1: Attribution of Oper. & Support	Cost with Attribution
Front Office				
Currency hedge (from internal developed)	349	1.0	139	488
external alternative investments	2,367	3.9	544	2,911
internal active large & mid cap	9,274	26.0	3,625	12,899
internal active small cap	150	2.0	279	428
internal alternative investments	111	2.3	321	432
internal developed	2,094	7.8	1,080	3,174
internal emerging	2,704	5.3	732	3,436
internal fixed income	2,777	7.0	976	3,753
internal Global ex US (ACWI ex US)	349	1.0	139	488
internal global quant	349	1.0	139	488
Internal liquidity reserves	160	1.0	139	299
internal passive domestic equity	45	0.2	28	73
internal real estate (directly held)	12,219	40.0	5,576	17,796
internal real estate indirect	342	1.0	139	481
internal reit	79	0.2	28	106
internal TAA	1,653	0.1	14	1,667
Total front office	35,020	99.7	13,899	48,919
Governance, Operations and Support				
Board, CEO & assistants re: investments (A)	1,051	2.0	279	1,329
CIO, Investment strategy, asset allocation (B)	2,659	7.0	976	3,635
Oversight of the fund per regular CEM survey (A + B)				4,965
Custodial fees	2,293		n/a	2,293
Internal audit	168	1.0	n/a	168
Legal services	511	2.0	n/a	511
Risk management	269	0.4	-269	0
Performance reporting and data management	2,495	3.0	-2,495	0
Investment operations, exc. private markets	615	4.0	-615	0
Investment operations, private markets	154	1.0	-154	0
Compliance	180	1.0	-180	0
Information technology	7,683	41.0	-7,683	0
Public relations & internal communication	275	2.0	-275	0
Finance, external reporting & tax	794	3.0	-794	0
Human resources	383	3.0	-383	0
Building, utilities & office services	2,248	16.0	-2,248	0
Other investment and support	59	8.0	-59	0
Total cost excluding external manager fees	56,856	194.1	0	56,856

How CEM mapped the above costs to the regular survey

CEM attributed both front office and back office costs to the CEM asset classes by style using the following methodology:

Step 1 - CEM attributed operations and support costs to front office & oversight pro rata based on FTE.

Step 2 - CEM attributes the fully loaded cost (shown in green) to all of the CEM asset classes that the team manages (see next page). The attribution preserves the relative cost ratios versus the CEM universe for each of the asset classes that the team manages.

Appendix A - Data Summary - Enhanced Survey Mapping of Internal Teams

Front Office	Cost with Attribution from Step 1	Responsibilities by CEM asset class	Step 2 Attribution to Asset Classes
Currency hedge (from internal develop	488	Passive Derivatives/Overlays - Currency	326
external alternative investments	2,911	Monitoring Passive Derivatives/Overlays - Currency	163
		Infrastructure	9
		Monitoring LP Natural Resources	57
		Monitoring Hedge Funds	255
		Monitoring Global TAA	96
		Monitoring LP Diversified Private Equity	512
		Venture Capital	61
		Monitoring LP Venture Capital	406
		LBO	183
		Monitoring LP LBO	1,068
		Private Credit	74
		Monitoring LP Private Credit	190
internal active large & mid cap	12,899	Stock - U.S. Large Cap	12,688
		Monitoring Stock - U.S. Large Cap	211
internal active small cap	428	Stock - U.S. Small Cap	323
		Monitoring Stock - U.S. Small Cap	105
internal alternative investments	432	Natural Resources	24
		Diversified Private Equity	88
		Diversified Private Equity	320
internal developed	3,174	Stock - EAFE	2,968
		Monitoring Stock - EAFE	206
internal emerging	3,436	Stock - Emerging	3,184
		Monitoring Stock - Emerging	252
internal fixed income	3,753	Fixed Income - U.S.	3,466
		Monitoring Fixed Income - Emerging	143
		Monitoring Fixed Income - High Yield	144
internal Global ex US (ACWI ex US)	488	Stock - ACWI x U.S.	468
		Monitoring Stock - ACWI x U.S.	20
internal global quant	488	Stock - Global	488
Internal liquidity reserves	299	Cash	299
internal passive domestic equity	73	Passive Stock - U.S. Large Cap	73
internal real estate (directly held)	17,796	Real Estate ex-REITs	17,796
internal real estate indirect	481	Monitoring LP Real Estate ex-REITs	481
internal reit	106	Passive REITs	106
internal TAA	1,667	Global TAA	1,667
Total Front Office	48,919		48,919

Front Office team costs, including allocated operations and support costs (see prior page), are attributed to the asset classes managed or overseen by the team. These attributions, shown in purple, are then inserted back into the regular survey.

Appendix A - Data Summary - Enhanced Survey Definitions

Costs - Attribute 100% of costs excluding manager fees and transaction costs including:

- (i) **Salaries and benefits** of FTE
- (ii) **General & administrative:** travel, supplies, staff education, publications and reference materials, etc.
- (iii) **Consulting** and other third party fees

FTE - Includes full time permanent salaried employees, include the FTE of long and short term contract individuals dedicated to your organization that are working onsite or working full-time for your fund on a project or in a role supervised by your staff. Do not include FTE at external consultants or service providers if they are not being supervised by your staff, even if they are dedicated to serving your organization.

Activity Definitions

1. **Front Office** consists of investment-decision making staff, including traders, analysts, portfolio managers and staff selecting and monitoring external managers, their immediate assistants and their management below the CIO level. Include third party fees for advice at the asset-class or security level such as manager search consultants, private equity consultants, and investment specific legal and due diligence fees that are not treated as transaction costs.

Does NOT include:

- (i) External manager fees. These are collected separately on the holdings tabs.
- (ii) Costs that relate to activities defined as Governance, Operations and Support in the table such as: board consultants, CIO, asset allocation and risk policy consultants, or other services (such as building, utilities and office services, information technology and human resources).

a. Board, CEO & assistants re: investments: Include only the proportion of the costs (fees paid to Board directors, travel, director insurance, CEO and CEO's direct assistants) equal to their proportion of time spent on investments and investment governance support. Exclude time spent on non-investment activities such as benefit administration, sales, marketing, new product development.

b. CIO, Investment strategy, asset allocation: Include 100% of CIO FTE and costs including his/her direct assistants, total fund asset allocation strategy, tactical deviations from the mix, economic political or other research, etc.

c. Risk management: Developing and implementing risk controls for operational and investment risk including surplus risk, factor exposures, credit, counterparty, etc. Excludes the cost of IT/IS risk systems. These belong in IT/IS.

d. Internal Audit: Independent review of business processes. Excludes external auditor fees. These belong in Finance, external reporting & tax.

e. Responsible investing, corporate governance: Policy setting and coordination across asset classes for sustainable, socially and/or environmentally responsible investing, and for corporate governance.

f. Client account management: Client service & reporting related to investing client assets, including client Board meetings, strategic client advice (ALM, risk, client portfolio construction).

g. Custodial fees: should be reported gross before any reductions relating to securities lending or other revenues credited against fees.

h. Data, valuation & performance analytics: Valuation and performance measurement of securities, funds, portfolios, risk, compliance, client reporting and other analysis and reporting. Include costs of data, dealing with data vendors and cleaning data.

Appendix A - Data Summary - Enhanced Survey Definitions (page 2)

i. Investment operations: Listed security operations including trade settlement, custodial bank monitoring and reconciliation, cash management and corporate actions, private asset class, derivatives and swap administration, COO. If the COO or CFO is responsible for multiple activities (i.e., Valuations and performance analytics, investment operation and finance) then split their FTE between the activities based on time spent.

j. Compliance: Monitoring, training on and dealing with regulatory infractions. Includes securities and pension regulation. Excludes compliance related to benefit administration.

k. IT/IS systems: IT management and strategy, architecture, data center, database and application management and maintenance, development, user services, network, telecommunications, etc. Also include the costs of purchasing and maintaining the following systems/software applications: portfolio management, risk management, trade processing/order execution management, compliance monitoring, performance analytics, fund accounting system. Exclude the pro rata portion that relates to non-investment activities such as benefit administration, sales, marketing, new product development.

l. Public relations and internal communication: External communication with entities such as regulators and media. Internal communication to staff. Excludes member and employer communication, marketing and sales.

m. Finance, external reporting & tax: Financial statements, external auditor fees, general accounting, budgeting, tax reporting, procurement and accounts payable. CFO. If the CFO or COO is responsible for multiple activities (i.e., finance and IT) then split their FTE between the activities based on time spent.

n. Legal services: General counsel, corporate secretary, legal counsel of any kind, even those specializing in real estate or private equity, paralegals, legal assistants and all FTE involved in legal analysis and advice. Investment related legal fees and costs, such as the legal fees to close private equity transactions, should be included under 'Front Office' if not treated as a transaction cost. Exclude amounts that pertain to non-investment activities such as benefit administration.

o. Human resources: Human resources staff and consulting, including recruitment, training, career development, induction, disciplinary action, developing HR policies and procedures, etc.
Exclude: Amounts that relate to non investment activities such as benefit administration and both severance and recruitment fees and activity specific training (these should be included in the Front Office Cost Centers table).

p. Building, utilities and office services: Building occupancy costs including rent, lease, amortization of leaseholds and depreciation of buildings, office services such as reception, mailroom, cleaning and maintenance, building insurance, utilities. Include satellite offices. Exclude the pro rata portion that relates to non-investment activities such as benefit administration, sales, marketing, new product development.

Appendix B - Data quality

The value of the information contained in these reports is only as good as the quality of the data received. CEM's procedures for checking and improving the data include the following.

Improved survey clarity

Twenty years of feedback from survey participants has led to improved definitions and survey clarity. In addition to immediate feedback from participants, CEM has hosted user workshops to solicit additional feedback and to resolve issues, such as trade-offs between more information and effort on the part of participants.

Computer and desktop verification

Survey responses are compared to norms for the survey universe and to each sponsor's prior year data when available. This typically results in questions generated by our online survey engine as well as additional follow-up to clarify responses or with additional questions.

In addition to these procedures, data quality continues to improve for the following reasons:

Learning curve

This is CEM's 28th year of gathering this data and experience is teaching the firm and the participants how to do a better job.

Growing universe

As our universe of respondents continues to increase in size, so does our confidence in the results as unbiased errors tend to average themselves out.

Any suggestions on how to further improve data quality are welcome.

Currency Conversions

For reports where either the peer group or report universe includes funds from multiple countries, we have converted the returns back to the base currency of the fund we prepared the report for. For example, for a Euro zone fund with peers from the U.S. we converted U.S. returns to Euro based on the currency return for the year using December 31 spot rates.

Appendix C - Glossary of terms

Average cost

- Calculated by dividing actual annual costs by the average of beginning and end-of-year holdings. If beginning-of-year holdings are not available, they are estimated using end-of-year holdings before the effect of this year's return on investment.

Benchmark return

- Rate of return on a portfolio of investable assets (such as the S&P500) designated as the benchmark portfolio against which the fund measures its own performance for that asset class.

F statistics

- Measure of the statistical significance of the regression coefficients taken as a group. Generally, regression equations with 5 coefficients and sample sizes greater than 20 are statistically significant if its F statistic is greater than 3.

Global TAA

- Fully funded segregated asset pool dedicated to active asset allocation.

Impact coefficient

- Estimate of the impact on the dependent variable in a regression of a change in the value of a given explanatory variable

Level of significance

- Degree to which sample data explains the universe from which they are extracted.

N-year peers

- Subset of peer group that have participated in our study for at least the consecutive n years.

Oversight of the fund

- Resources devoted to the oversight of the fund.

Overlay

- Derivative based program (unfunded other than margin requirements), designed to enhance total portfolio return (such as a tactical asset allocation program) or to achieve some specific mandate such as currency hedging.

Passive proportion

- Proportion of assets managed passively, i.e., indexed to broad capital market benchmarks or dedicated to replicate market benchmarks.

Policy mix

- Reflects long-term policy or target asset weights. Policy asset mix is often established by a fund's investment committee or board and is determined by such long term considerations as liability structure, risk tolerance and long term capital markets prospects.

Policy return

- The return you would have earned if you had passively implemented your policy mix decision through your benchmark portfolios. Your policy return equals the sum of your policy weights multiplied by your asset class benchmarks for each asset class.

R squared (coefficient of determination)

- The percentage of the differences in the dependent variable explained by the regression equation. For example, an R squared of 1 means 100% of the differences are explained and an R squared of 0 means that none of the differences are explained.

Value added

- the difference between your total actual return and your policy return. It is a measure of actual value produced over what could have been earned passively.

Jaclyn D. Slusser

From: Michael Reid <michael@cembenchmarking.com>
Sent: Wednesday, May 6, 2020 2:20 PM
To: Wideman, Stacey
Subject: RE: STRS Ohio-Public Records Request
Attachments: 2018 CEM Final Report DB_Redacted.pdf

Stacy,

Attached is a redacted version of the full CEM report for STRS Ohio. The redactions have been made in line with the definition of "Trade secret" as defined in Ohio Code 1333.61 Uniform trade secrets act definitions as follows:

(D) "Trade secret" means information, including the whole or any portion or phase of any scientific or technical information, design, process, procedure, formula, pattern, compilation, program, device, method, technique, or improvement, or any business information or plans, financial information, or listing of names, addresses, or telephone numbers, that satisfies both of the following:

(1) It derives independent economic value, actual or potential, from not being generally known to, and not being readily ascertainable by proper means by, other persons who can obtain economic value from its disclosure or use.

(2) It is the subject of efforts that are reasonable under the circumstances to maintain its secrecy.

We have redacted our cost data as well as certain formulas and methods used in the preparation of the report. The information that has been redacted is not publicly available and is only provided to our paying clients. The redacted cost data has been provided to us by our clients and forms our proprietary cost database. This data and database is not available from other public sources and forms the basis for our analysis. It is key to our business model that the data not be publicly released. Note that I have not redacted return information since 1) much of this data could be gleaned from publicly available sources (CAFRs) and is not core to our product.

Please let me know if what has been provided is sufficient.

Regards,

Mike
Michael Reid | Vice President | CEM Benchmarking
372 Bay Street, Suite 1000 | Toronto | Ontario | M5H 2W9
☎ office: +1-416-644-2516, ext. 245 cell: +1-647-210-5449
✉ michael@cembenchmarking.com 🌐 www.cembenchmarking.com

From: Wideman, Stacey <widemans@strsoh.org>
Sent: May 4, 2020 2:03 PM
To: Michael Reid <michael@cembenchmarking.com>
Subject: STRS Ohio-Public Records Request

Michael-

I received your name as the CEM contact from Jeff Lieser here at STRS Ohio. We received a public records request for our most recent full CEM Investment Report. We believe the attached report is responsive to this request. If CEM believes any portion of this report is not subject to disclosure under Ohio law, can you please let me know at your earliest opportunity?

Please let me know if you have any questions or would like to discuss in more detail.

Thanks,
Stacey



Stacey Wideman
Deputy General Counsel
State Teachers Retirement System of Ohio
275 East Broad Street
Columbus, OH 43215

Direct Dial 614|227|4076

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Investment
Cost Effectiveness Analysis
(for the 5-year period ending December 31, 2018)

STRS Ohio



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Prepared November 25, 2019. Although the information in this report has been based upon and obtained from sources we believe to be reliable, CEM Benchmarking Inc. ("CEM") does not guarantee its accuracy or completeness. The information contained herein is proprietary and confidential and may not be disclosed to third parties without the express written mutual consent of both CEM and STRS Ohio.

Key takeaways

Returns

- Your 5-year net total return of 6.25% was in the top quartile. This was above both the U.S. Public median of 5.42% and the peer median of 5.73%.
- Your 5-year policy return was 6.09%. This was above both the U.S. Public median of 5.30% and the peer median of 5.72%.

Value added

- Your 5-year net value added was 0.16%. This was above the U.S. Public median of 0.05% and above the peer median of 0.14%.

Cost

- Your investment cost of 40.1 bps was below your benchmark cost of 54.5 bps. This suggests that your fund was low cost compared to your peers.
- Your fund was low cost because you paid less than peers for similar services and you had a lower cost implementation style.

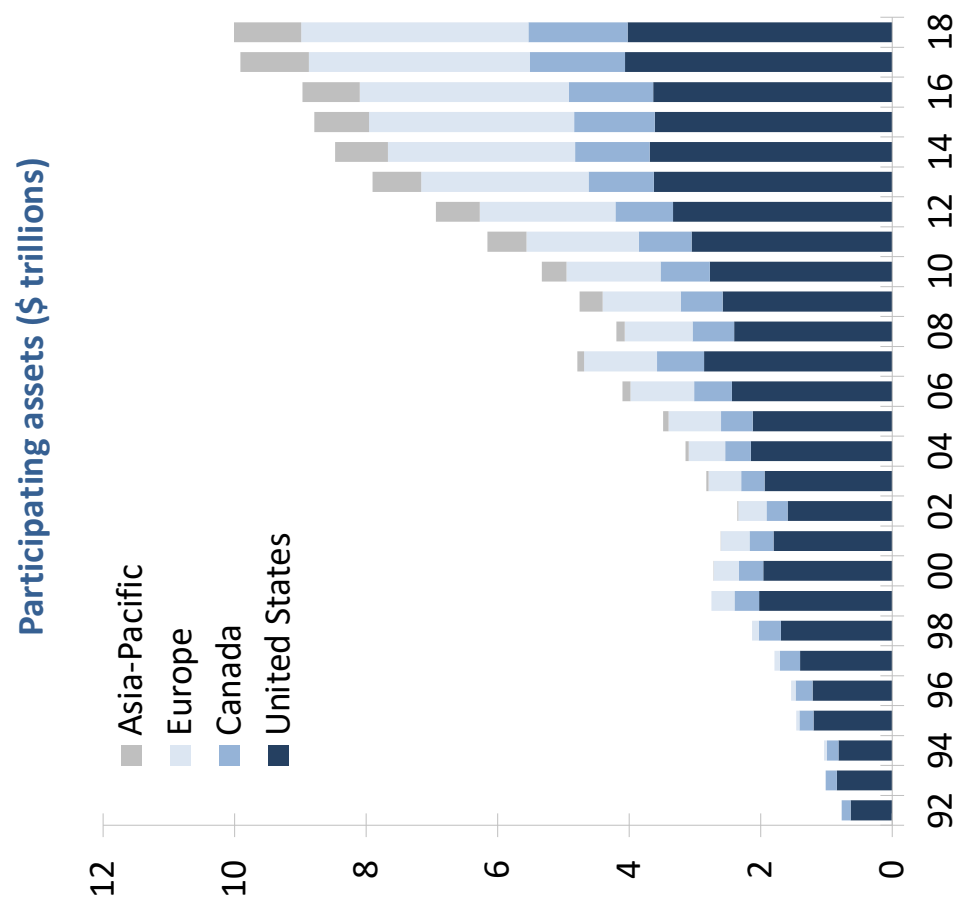
Risk

- Your asset risk of 11.8% was above the U.S. Public median of 10.4%.

This benchmarking report compares your cost and return performance to the 329 funds in CEM's extensive pension database.

- 166 U.S. pension funds participate. The median U.S. fund had assets of \$8.6 billion and the average U.S. fund had assets of \$24.2 billion. Total participating U.S. assets were \$4.0 trillion.
- 77 Canadian funds participate with assets totaling \$1.5 trillion.
- 77 European funds participate with aggregate assets of \$3.5 trillion. Included are funds from the Netherlands, Norway, Sweden, Finland, Ireland, Denmark and the U.K.
- 7 Asia-Pacific funds participate with aggregate assets of \$1.0 trillion. Included are funds from Australia, New Zealand, China and South Korea.
- 2 Gulf region funds participate.

The most meaningful comparisons for your returns and value added are to your custom peer group.



The most valuable comparisons for cost performance are to your custom peer group because size impacts costs.

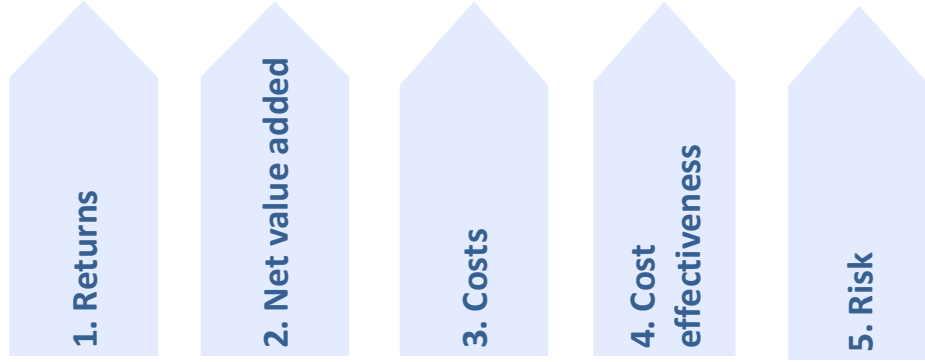
Peer group for STRS Ohio

- 17 U.S. Public public sponsors from \$47 billion to \$228 billion
- Median size of \$83 billion versus your \$73 billion



To preserve client confidentiality, given potential access to documents as permitted by the Freedom of Information Act, we do not disclose your peers' names in this document.

What gets measured gets managed, so it is critical that you measure and compare the right things:



Why do total returns differ from other funds? What was the impact of your policy mix decisions versus implementation decisions?

Are your implementation decisions adding value (i.e., mostly the effectiveness of active management, as well as the amount of active management versus passive management)?

Are your costs reasonable? Costs matter and can be managed.

Net implementation value added versus excess cost. Does paying more get you more?

What is the risk of your policy mix?

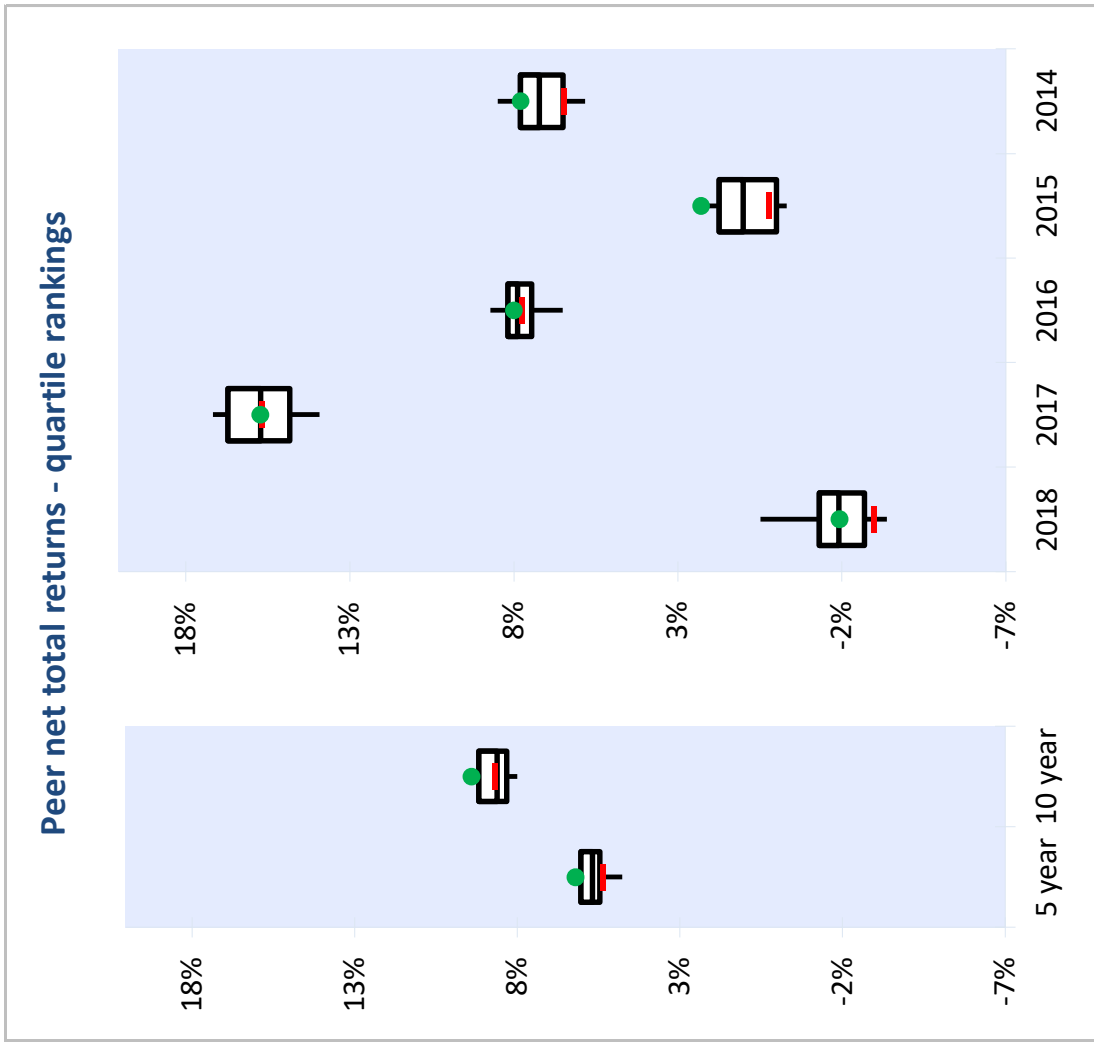
Your 5-year net total return of 6.25% was above the peer median of 5.73%.

Total returns, by themselves, provide little insight into the reasons behind relative performance. Therefore, we separate total return into its more meaningful components: policy return and value added.

Your 5-year	
Net total fund return	6.25%
- Policy return	6.09%
= Net value added	0.16%

This approach enables you to understand the contribution from both policy mix decisions (which tend to be the board's responsibility) and implementation decisions (which tend to be management's responsibility).

The median 5-year total return for the U.S. public universe was 5.4%.



Your 5-year policy return of 6.09% was above the peer median of 5.72%.

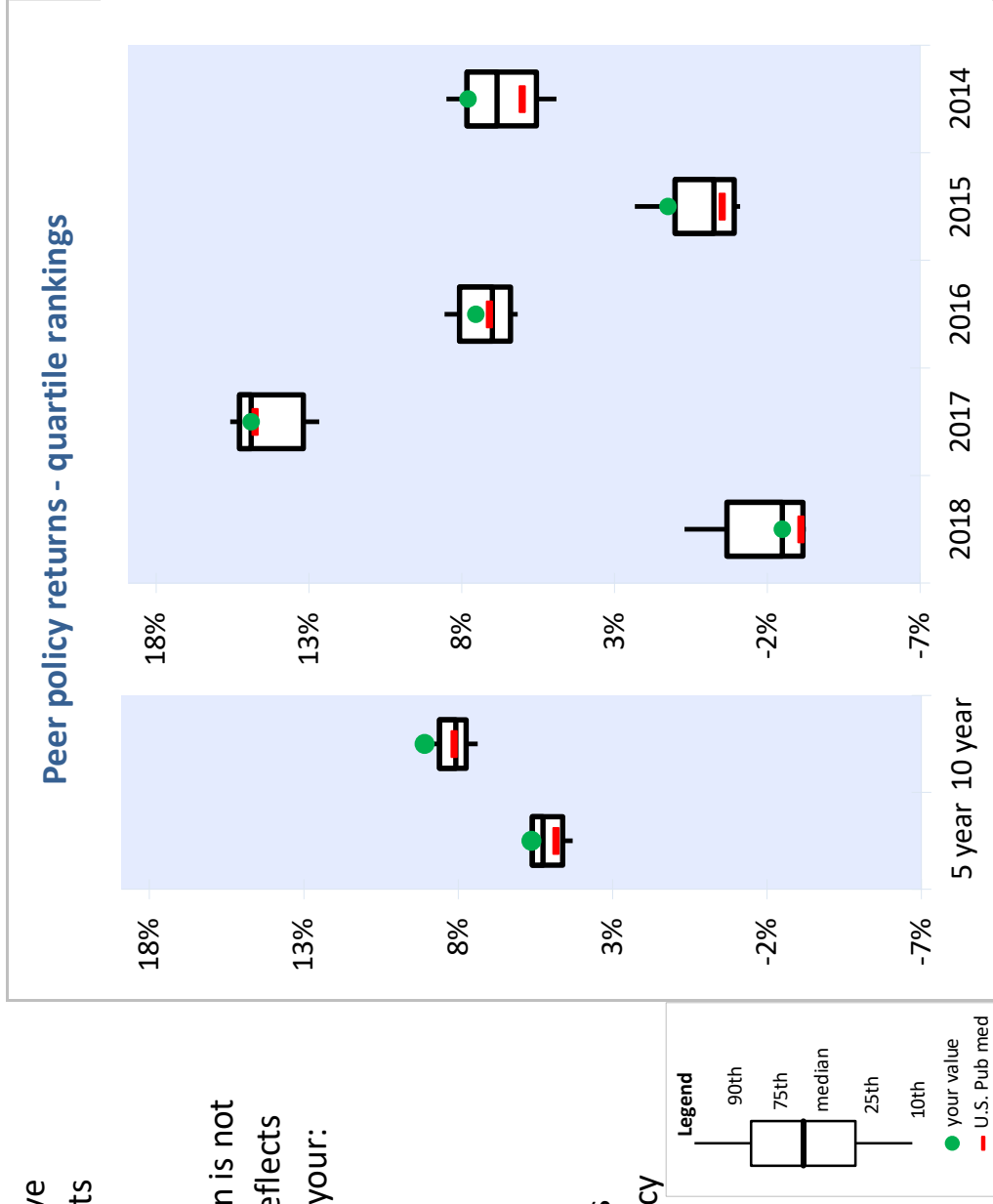
Your policy return is the return you could have earned passively by indexing your investments according to your policy mix.

Having a higher or lower relative policy return is not necessarily good or bad. Your policy return reflects your investment policy, which should reflect your:

- Long term capital market expectations
- Liabilities
- Appetite for risk

Each of these three factors is different across funds. Therefore, it is not surprising that policy returns often vary widely between funds.

The 5-year policy return of the U.S. public universe was 5.30%.



For peer comparison purposes, CEM uses a private equity benchmark that reflects lagged, investable public-market indices. If CEM used this same adjustment for your fund, your 5-year policy return would be 6.8%, 0.7% higher than your actual 5-year policy return of 6.1%.

Your 5-year policy return of 6.09% was above the peer median of 5.72% primarily because of:

- The positive impact of your higher weight in one of the better performing asset classes of the past 5 years: U.S. Stock.
- The positive impact of your lower weight in one of the weaker performing asset classes of the past 5 years: Fixed Income.

5-year average policy mix¹

	Your Fund	Peer Avg.	US pub Avg.
U.S. Stock	30%	17%	21%
Global Stock	0%	13%	10%
Non-US Stock	25%	16%	18%
Total Stock	56%	46%	49%
U.S. Bonds	19%	16%	16%
Cash	1%	0%	-1%
Other Fixed Income ²	0%	9%	12%
Total Fixed Income	20%	25%	27%
Risk Parity	0%	1%	1%
Real Estate incl. REITS	10%	11%	8%
Total Alternatives	14%	18%	17%
Total	100%	100%	100%

1. 5-year weights are based only on plans with 5 years of continuous data.

2. Other fixed income includes Inflation Indexed, High Yield, Emerging, Long and Global bonds.

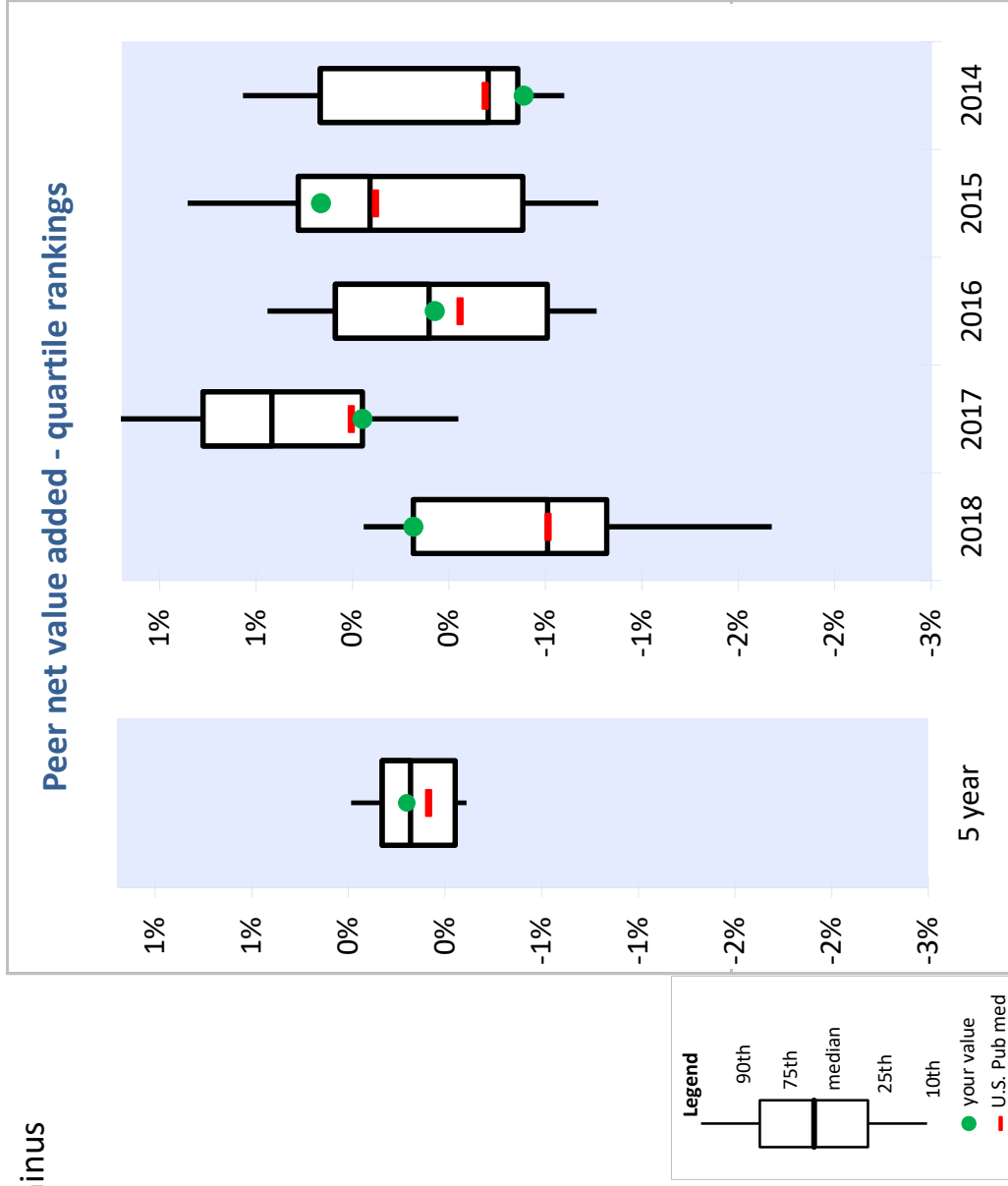
Net value added is the component of total return from active management. Your 5-year net value added was 0.16%.

Net value added equals total net return minus policy return.

Value added for STRS Ohio

Year	Net Return	Policy Return	Net value Added
2018	-1.89%	-2.04%	0.15%
2017	15.76%	15.35%	0.41%
2016	8.03%	8.00%	0.03%
2015	2.33%	1.71%	0.63%
2014	7.83%	8.26%	-0.43%
5-Year	6.25%	6.09%	0.16%

Your 5-year net value added of 0.16% compares to a median of 0.14% for your peers and 0.05% for the U.S. Public universe.



Your investment costs were \$279.1 million or 36.9 basis points in 2018.

Asset management costs by asset class and style (\$000s)	Internal Management*		External Active base fees	Total
	Passive	Active		
Stock - U.S. Large Cap	73	12,688	2,310	15,281
Stock - U.S. Small Cap		323	9,437	9,866
Stock - EAFE		2,968	19,126	22,300
Stock - Emerging		3,184	5,778	9,214
Stock - Global		488		488
Stock - ACWI x U.S.		468	5,474	5,962
Fixed Income - U.S.		3,466		3,466
Fixed Income - Emerging			3,476	3,619
Fixed Income - High Yield			3,161	3,305
Cash		299		299
REITs	106			106
Global TAA		1,667	2,306	4,069
Hedge Funds		17,796	26,479	26,734
Real Estate ex-REITs				17,796
Real Estate ex-REITs - LP			12,843	13,324
Infrastructure - FoFs		9	718	727
Natural Resources - LP		57	5,277	5,334
Natural Resources - Co-Invest.		24		24
Diversified Private Equity - LP		320	25,115	25,946
Diversified Private Equity - Co-Invest.		88		88
LBO - LP		1,068	50,838	51,906
LBO - FoFs		183	16,442	16,625
Venture Capital - LP		406	16,274	16,680
Venture Capital - FoFs		61	6,214	6,275
Private Credit - LP		74	10,946	11,210
Derivatives/Overlays	326			488
Total excluding private asset performance fees				271,132
				35.9bp
Oversight, custodial and other costs ¹				
Oversight & consulting				4,965
Trustee & custodial				2,293
Audit				168
Other				511
Total oversight, custodial & other costs				7,937
				1.0bp
Total investment costs (excl. transaction costs & private asset performance fees)**				279,069
				36.9bp

* Internal investment costs were 6.3 bps while external investment costs were 29.6 bps.

Of the total investment management costs of 36.9 bps, external manager fees for alternative and real estate investments were 23.1 bps; other investment costs for internal assets, external equity and external fixed income investments that were used to arrive at the net of fee Total Fund return were 13.8 bps."

Footnotes

1. Excludes non-investment costs, such as benefit insurance premiums and preparing cheques for retirees.

** Total cost excludes carry/performance fees for hedge funds, real estate, infrastructure, natural resources and private equity.

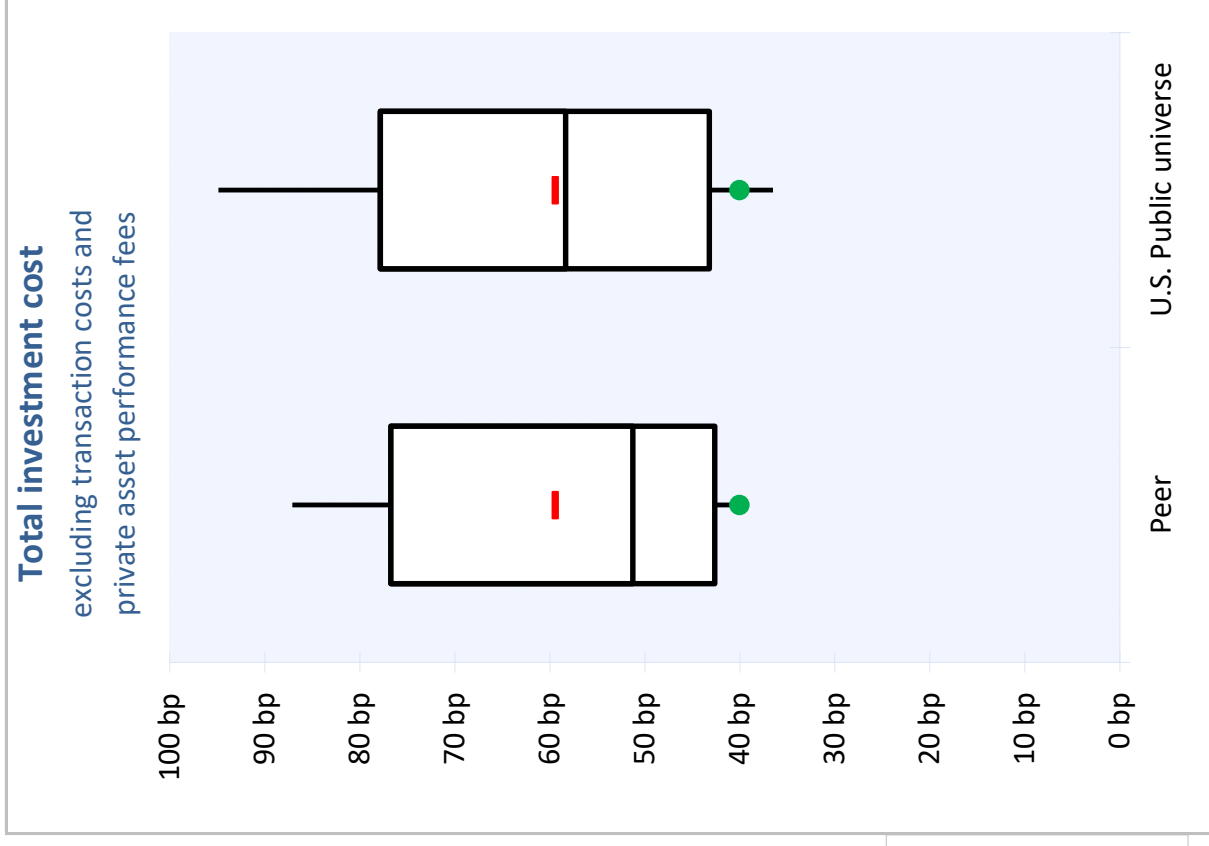
Your total investment cost of 40.1 bps was below the peer median of 51.3 bps.

For the comparison to the peer group, CEM has included your 36.9 bps in costs from page 9 and added hedge fund performance fees and private equity management fee offsets.

Differences in total investment cost are often caused by two factors that are often outside of management's control:

- Asset mix, particularly holdings of the highest cost asset classes: real estate (excl. REITs), infrastructure, hedge funds and private equity. These high cost assets equaled 24% of your funds assets at the end of 2018 versus a peer average of 28%.
- Fund size. Bigger funds have advantages of scale.

Therefore, to assess whether your costs are high or low given your unique asset mix and size, CEM calculates a benchmark cost for your fund. This analysis is shown on the following page.



Benchmark cost analysis suggests that, after adjusting for fund size and asset mix, your fund was low cost by 14.5 basis points in 2018.

Your benchmark cost is an estimate of what your cost would be given your actual asset mix and the median costs that your peers pay for similar services. It represents the cost your peers would incur if they had your actual asset mix.

Your total cost of 40.1 bp was below your benchmark cost of 54.5 bp. Thus, your cost savings were 14.5 bp.

Your cost versus benchmark

	\$000s	basis points
Your total investment cost	302,813	40.1 bp
Your benchmark cost	412,071	54.5 bp
Your excess cost	(109,258)	(14.5) bp

Your fund was low cost because you paid less than peers for similar services and you had a lower cost implementation style.

Reasons for your low cost status

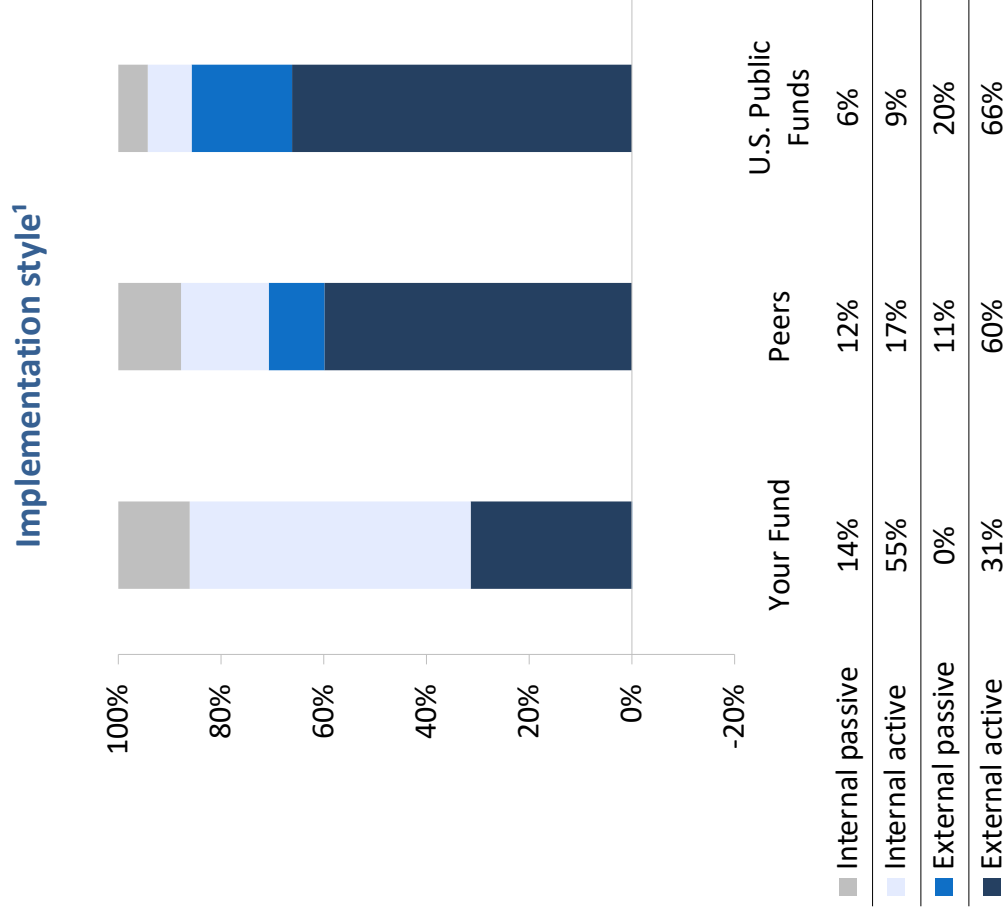
	Excess Cost/ (Savings) \$000s	bps
1. Lower cost implementation style		
• More active management, less lower cost passive	20,188	2.7
• Less external management, more lower cost internal	(74,593)	(9.9)
• More partnerships as a percentage of external	9,797	1.3
• Use of fund of funds	(1,396)	(0.2)
• Less co-investment as a percentage of LP/Co	3,433	0.5
• Less overlays	(1,601)	(0.2)
	(44,173)	(5.8)
2. Paying less than peers for similar services		
• External investment management costs	(66,820)	(8.8)
• Internal investment management costs	1,735	0.2
	(65,085)	(8.6)
Total savings	(109,258)	(14.5)

Differences in cost performance are often caused by differences in implementation style.

Implementation style is defined as the way in which your fund implements asset allocation. It includes internal, external, active, passive and fund of funds styles.

The greatest cost impact is usually caused by differences in the use of:

- External active management because it tends to be much more expensive than internal or passive management. You used less external active management than your peers (your 31% versus 60% for your peers).
- Within external active holdings, fund of funds usage because it is more expensive than direct fund investment. You had more in fund of funds. Your 8% of hedge funds, real estate and private equity in fund of funds compared to 3% for your peers.



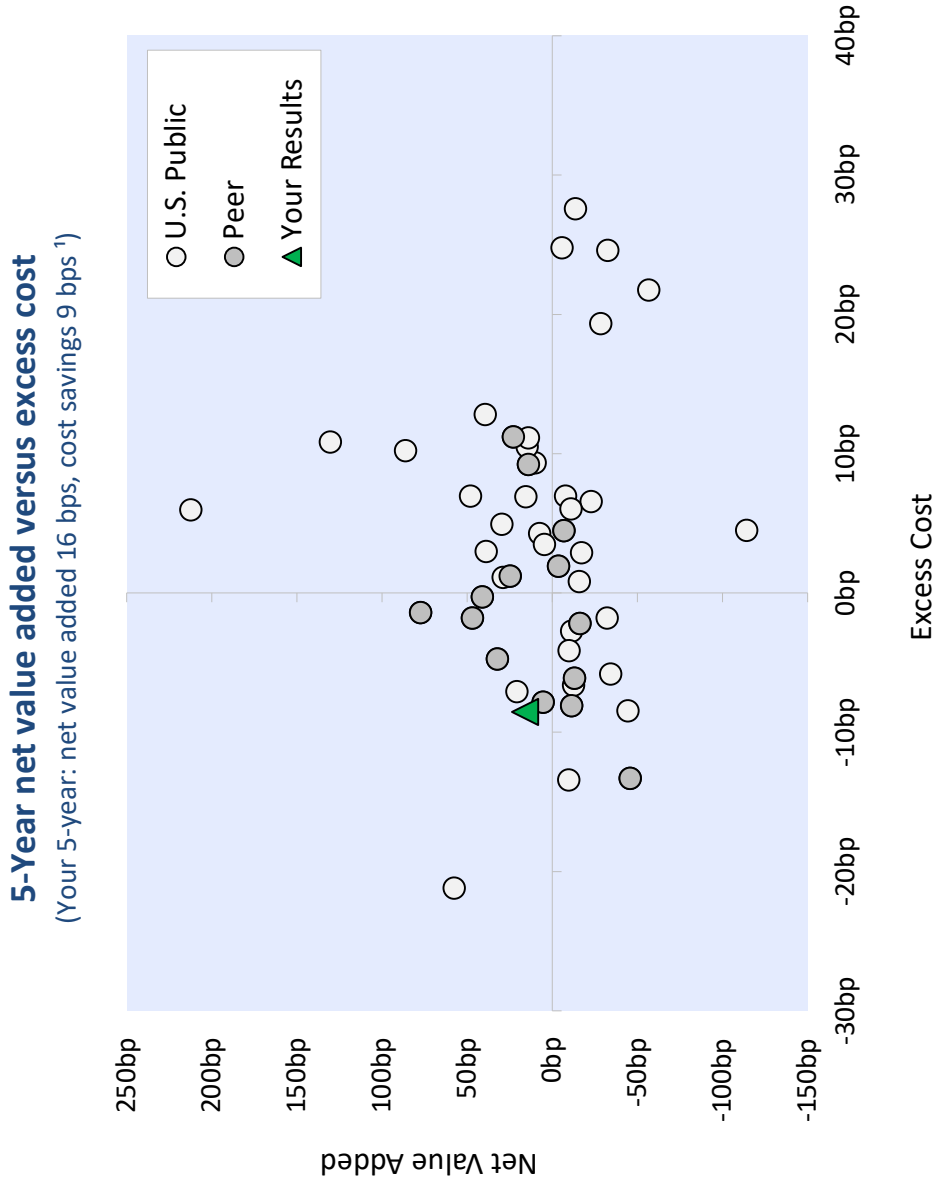
1. The graph above does not take into consideration the impact of derivatives. The values in the graph above are calculated using average holdings.

If your internally managed assets were managed externally and you paid the peer median costs, your costs would have been higher by approximately \$107 million.

Additional external investment management costs: assuming STRS Ohio no longer had internal holdings and paid peer median external costs

	STRS Ohio	Peer	Difference
	Avg holdings in \$mils	median external cost	
Style	Internal cost	in bps	savings \$000s
Stock - U.S. Large Cap	9,274	0.9	(0.8)
Stock - U.S. Large Cap	9,605	32.3	(19.1)
Stock - U.S. Small Cap	763	60.1	(55.9)
Stock - EAFE	5,290	35.3	(29.7)
Stock - Emerging	2,257	59.4	(45.3)
Stock - Global	591	43.9	(35.6)
Stock - ACWI x U.S.	2,958	39.9	(38.3)
Fixed Income - U.S.	12,627	17.0	(14.3)
Cash	1,351	n/a	--
REITs	1,137	6.3	(5.3)
Real Estate ex-REITs	5,540	58.4	(26.3)
Natural Resources	152	57.7	(56.1)
Global TAA	261	44.7	19.3
Diversified Private Equity	294	154.7	(151.7)
Diversified Private Equity	400	154.7	(146.7)
Private Credit	95	22.7	(15.0)
Total			(14.1)
			(106,788)

Your 5-year performance placed in the positive value added, low cost quadrant of the cost effectiveness chart.



1. Your 5-year cost savings of 9 basis points is the average of your cost savings for the past 5 years.

Net value added
 Excess Cost

Summary of key takeaways

Returns

- Your 5-year net total return of 6.25% was in the top quartile. This was above both the U.S. Public median of 5.42% and the peer median of 5.73%.
- Your 5-year policy return was 6.09%. This was above both the U.S. Public median of 5.30% and the peer median of 5.72%.

Value added

- Your 5-year net value added was 0.16%. This was above the U.S. Public median of 0.05% and above the peer median of 0.14%.

Cost and cost effectiveness

- Your investment cost of 40.1 bps was below your benchmark cost of 54.5 bps. This suggests that your fund was low cost compared to your peers.
- Your fund was low cost because you paid less than peers for similar services and you had a lower cost implementation style.

Risk

- Your asset risk of 11.8% was above the U.S. Public median of 10.4%.

2

Description of peer group and universe

Peer group	2
CEM global universe	3
Universe subsets	4
Implementation style, actual mix and policy mix:	
- by universe subset	5
- trends from 2014 to 2018	6
Implementation style by asset class	7
Actual mix from 2014 to 2018	8
Policy mix from 2014 to 2018	9

Peer group

Your peer group is comprised of 17 U.S. Public funds, with assets ranging from \$47.4 billion to \$227.7 billion versus your \$72.9 billion. The median size is \$82.5 billion.

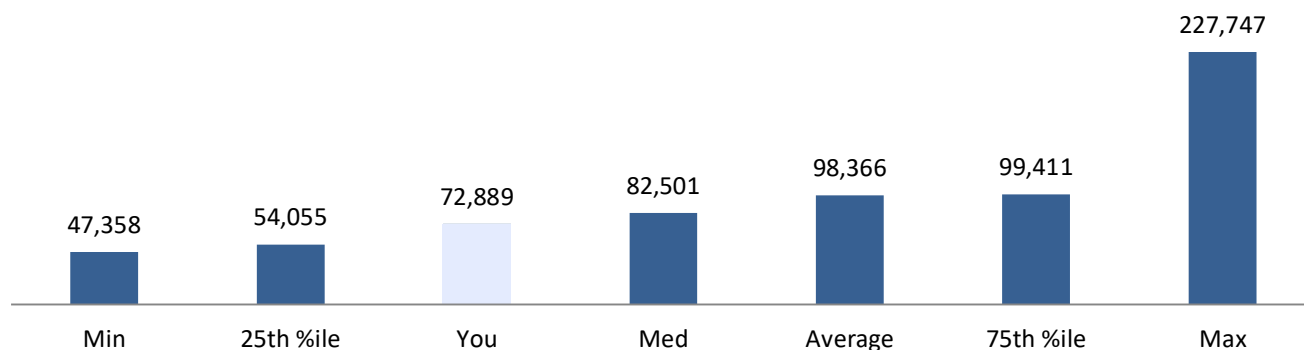
In order to preserve client confidentiality, we do not disclose your peers' names in this document due to the Freedom of Information Act. Your peer group consist of plans with the following characteristics:

Peer Group Characteristics - 2018

	Your Plan	Peers	U.S. Public
<u>Plan Assets (\$ billions)</u>			
Range	72.9	47.4 - 227.7	0.6 - 337.2
Median		82.5	22.5
<u># of Plans</u>			
Corporate		0	0
Public	1	17	56
Other		0	0
Total		17	56
<u>Implementation style</u>			
% External active	31.4	59.9	66.2
% External passive	0.0	10.8	19.5
% Internal active	54.7	17.1	8.6
% Internal passive	13.9	12.2	5.7
<u>Asset mix</u>			
% Stock	51.7	41.4	45.0
% Fixed Income	20.1	23.5	26.5
% Real Assets	11.5	13.1	10.8
% Private Equity	11.4	11.7	8.4
% Hedge Funds & Other	4.0	8.3	7.5

Your peer group is selected such that your fund size is usually close to the median of your peer group. Size is the primary criteria for choosing your peer group, because size greatly impacts how much you pay for services. Generally, the larger your fund, the smaller your unit operating costs (i.e., the economies of scale impact).

Total fund assets (\$ millions) - you versus peers

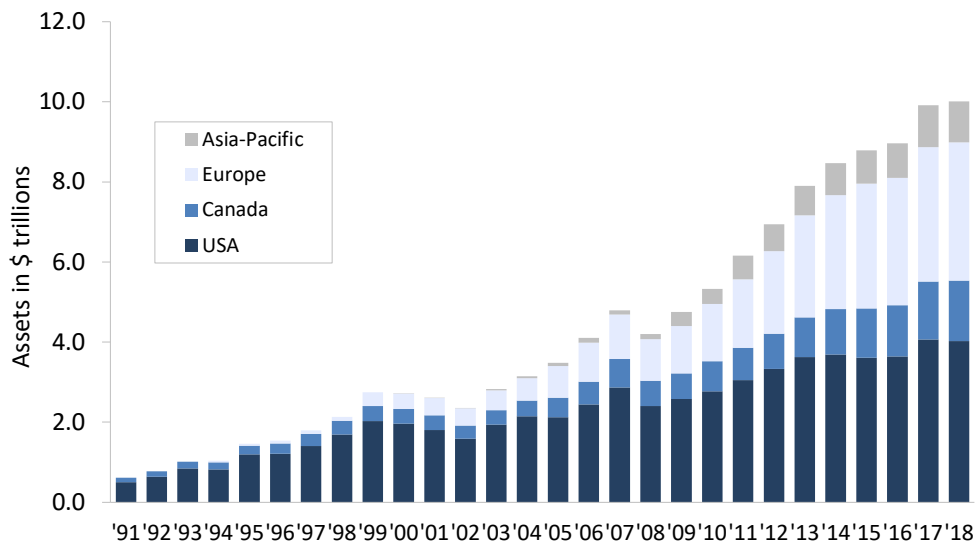


CEM global universe

CEM has been providing investment benchmarking solutions since 1991. The 2018 survey universe is comprised of 329 funds representing \$10.0 trillion in assets. The breakdown by region is as follows:

- 166 U.S. pension funds with aggregate assets of \$4.0 trillion.
- 77 Canadian pension funds with aggregate assets of \$1.5 trillion.
- 77 European pension funds with aggregate assets of \$3.5 trillion. Included are funds from the Netherlands, Norway, Sweden, Finland, Denmark, UK, and Ireland.
- 7 Asia-Pacific pension funds with aggregate assets of \$1.0 trillion.

CEM global universe



Universe subsets

CEM's global survey universe is comprised of 329 funds with total assets of \$10.0 trillion. Your fund's returns and costs are compared to the following two subsets of the global universe:

- Peers - Your peer group is comprised of 17 U.S. Public funds ranging in size from \$47.4 - \$227.7 billion. The peer median of \$82.5 billion compares to your \$72.9 billion.
- U.S. Public - The U.S. Public universe is comprised of 56 funds ranging in size from \$0.6 - \$337.2 billion. The median fund is \$22.5 billion.

Universe subsets by number of funds and assets

	Peer group ¹	Global by type				Global by Country				
		Corp.	Public	Other	Total	U.S.	Canada	Europe	Asia-Pacific	Total
<u># of funds</u>										
2018	17	143	140	46	329	166	77	77	9	329
2017	17	151	151	48	350	168	79	90	13	350
2016	16	154	144	48	346	170	80	84	12	346
2015	15	161	148	55	364	176	80	95	13	364
2014	15	164	208	55	427	178	89	147	13	427
<u># of funds with uninterrupted data for:</u>										
1 yr	17	143	140	46	329	166	77	77	9	329
2 yrs	17	131	131	40	302	152	68	74	8	302
3 yrs	16	119	124	38	281	141	63	70	7	281
4 yrs	15	108	117	35	260	132	54	67	7	260
5 yrs	15	100	117	34	251	128	52	64	7	251
<u>Total assets (\$ billions)</u>										
2018	1,672	1,496	6,659	1,881	10,036	4,023	1,509	3,456	1,048	10,036
2017	1,653	1,523	6,699	2,008	10,230	4,064	1,448	3,358	1,360	10,230
2016	1,429	1,473	5,864	1,886	9,223	3,637	1,284	3,177	1,125	9,223
2015	1,352	1,445	5,869	1,844	9,159	3,609	1,228	3,122	1,200	9,159
2014	1,351	1,495	5,643	1,656	8,794	3,689	1,132	2,850	1,123	8,794
<u>2018 asset distribution (\$ billions)</u>										
Avg	98.4	10.5	47.6	40.9	30.5	24.2	19.6	44.9	116.5	30.5
Max	227.7	68.9	1,206.8	588.6	1,206.8	337.2	314.6	1,206.8	569.5	1,206.8
75th %ile	99.4	13.5	38.6	36.0	22.2	24.4	10.5	31.8	95.8	22.2
Median	82.5	4.7	10.4	10.3	7.2	8.6	4.3	8.8	31.9	7.2
25th %ile	54.1	1.9	3.5	2.1	2.5	2.5	1.6	3.7	15.7	2.5
Min	47.4	0.2	0.2	0.0	0.0	0.2	0.0	0.6	3.1	0.0

1. Peer group statistics are for your 2018 peer group only as your peer group may have included different funds in prior years.

Implementation style, actual mix and policy mix by universe subset

Implementation style, actual mix and policy mix - 2018 (as a % of year-end assets)

	Your fund	Peer group	Global by type				Global by Country				
			Corp.	Public	Other	Total	U.S.	Canada	Europe	Asia-Pacific	Total
<u>Implementation style</u>											
External Active	29.5	59.0	69.8	57.3	63.4	63.6	69.9	65.1	50.7	45.2	63.6
Fund of funds	1.9	0.9	2.5	3.1	2.8	2.8	2.7	1.8	3.9	2.1	2.8
External passive	0.0	10.8	18.6	18.3	17.2	18.3	18.8	10.7	24.5	21.0	18.3
Internal Active	54.7	17.1	6.7	16.1	12.1	11.4	5.1	17.5	18.2	19.2	11.4
Internal Passive	<u>13.9</u>	<u>12.2</u>	<u>2.4</u>	<u>5.2</u>	<u>4.4</u>	<u>3.9</u>	<u>3.5</u>	<u>4.8</u>	<u>2.8</u>	<u>12.5</u>	<u>3.9</u>
Total	100	100	100	100	100	100	100	100	100	100	100
<u>Actual asset mix</u>											
Stock	51.7	41.4	31.6	46.8	43.0	39.6	37.1	40.4	43.5	46.6	39.6
Fixed Income	20.1	24.3	51.7	27.1	34.4	38.8	42.3	35.9	35.5	28.1	38.8
Global TAA	1.8	0.7	0.8	1.5	0.1	1.0	1.1	0.7	1.1	0.3	1.0
Real Assets	11.5	13.1	6.6	12.4	12.5	9.9	7.2	14.9	10.2	13.3	9.9
Hedge Funds	2.2	5.7	3.8	3.2	2.2	3.3	4.5	2.2	2.0	3.8	3.3
Balanced Funds	0.0	0.0	0.0	0.9	0.0	0.4	0.0	0.0	1.7	0.0	0.4
Risk Parity	0.0	1.1	0.4	0.5	0.6	0.5	0.7	0.2	0.1	0.9	0.5
Private Credit	1.3	1.9	1.4	1.6	3.4	1.8	1.2	2.2	2.5	1.3	1.8
Private Equity	<u>11.4</u>	<u>11.7</u>	<u>3.7</u>	<u>6.0</u>	<u>3.8</u>	<u>4.7</u>	<u>5.8</u>	<u>3.5</u>	<u>3.4</u>	<u>5.6</u>	<u>4.7</u>
Total	100	100	100	100	100	100	100	100	100	100	100
<u>Policy asset mix</u>											
Stock	52.0	42.0	32.2	47.6	43.6	40.3	38.4	40.4	43.1	51.6	40.3
Fixed Income	22.0	23.1	51.4	26.7	34.1	38.5	41.2	36.6	35.9	27.1	38.5
Global TAA	0.0	0.7	0.7	1.5	0.1	1.0	1.0	0.9	1.1	0.2	1.0
Real Assets	10.0	14.3	6.7	13.0	12.5	10.2	7.6	14.8	10.9	12.2	10.2
Hedge funds	0.0	5.3	3.5	2.8	2.4	3.1	4.2	1.9	1.8	2.7	3.1
Balanced Funds	0.0	0.0	0.0	0.5	0.0	0.2	0.0	0.0	0.9	0.0	0.2
Risk Parity	0.0	1.1	0.3	0.4	0.7	0.4	0.6	0.2	0.2	1.0	0.4
Private Credit	0.0	2.0	1.2	1.8	3.0	1.7	1.1	2.2	2.5	1.1	1.7
Private Equity	<u>16.0</u>	<u>11.6</u>	<u>4.0</u>	<u>5.8</u>	<u>3.6</u>	<u>4.7</u>	<u>6.0</u>	<u>3.1</u>	<u>3.6</u>	<u>4.1</u>	<u>4.7</u>
Total	100	100	100	100	100	100	100	100	100	100	100

Implementation style, actual mix and policy mix trends

Implementation style, actual mix and policy mix - 2014 to 2018 (as a % of year-end assets)

	Your fund					Peer average ¹					U.S. Public average ¹				
	2018	2017	2016	2015	2014	2018	2017	2016	2015	2014	2018	2017	2016	2015	2014
Implementation style															
External active	29.5	29.2	29.7	29.2	27.1	57.6	56.7	57.7	57.2	56.6	63.1	62.6	62.9	63.5	64.2
Fund of funds	1.9	1.5	1.5	1.4	1.0	1.0	1.2	1.2	1.1	1.0	2.9	2.9	2.9	2.9	2.6
External passive	0.0	-0.1	0.1	0.0	0.0	10.1	11.2	11.0	11.8	12.0	19.8	20.3	20.3	19.6	19.1
Internal active	54.7	55.8	54.6	55.6	58.5	18.5	19.2	19.0	19.4	19.9	8.1	8.4	8.3	8.3	8.0
Internal passive	<u>13.9</u>	<u>13.6</u>	<u>14.1</u>	<u>13.9</u>	<u>13.4</u>	<u>12.8</u>	<u>11.7</u>	<u>11.1</u>	<u>10.6</u>	<u>10.4</u>	<u>6.2</u>	<u>5.9</u>	<u>5.7</u>	<u>5.6</u>	<u>6.1</u>
Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Actual asset mix															
Stock	51.7	56.0	57.6	57.3	56.8	42.8	44.6	44.4	45.4	47.3	45.5	48.5	47.6	47.9	49.5
Fixed income	20.1	20.9	16.8	17.9	21.3	24.6	24.8	24.5	25.1	25.6	25.9	25.3	25.6	26.6	26.6
Global TAA	1.8	0.9	0.6	0.5	0.0	0.8	0.7	0.6	0.7	0.9	1.3	1.0	1.6	1.4	1.6
Real assets	11.5	10.5	12.9	12.4	10.5	12.8	12.2	13.0	12.1	11.0	10.9	10.3	10.6	9.8	9.0
Hedge funds	2.2	2.1	2.8	2.9	2.8	4.9	4.7	4.7	4.8	3.9	4.8	4.5	4.8	5.3	4.8
Balanced Funds	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Risk Parity	0.0	0.0	0.0	0.0	0.0	0.7	0.7	0.6	0.5	0.3	0.9	1.1	0.5	0.4	0.4
Private credit	1.3	0.5	0.0	0.0	0.0	1.8	1.6	1.4	1.0	0.8	2.0	1.6	1.5	1.2	1.1
Private equity	<u>11.4</u>	<u>9.1</u>	<u>9.3</u>	<u>9.0</u>	<u>8.6</u>	<u>11.7</u>	<u>10.7</u>	<u>10.8</u>	<u>10.4</u>	<u>10.2</u>	<u>8.8</u>	<u>7.7</u>	<u>7.8</u>	<u>7.5</u>	<u>7.0</u>
Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Policy asset mix															
Stock	52.0	55.0	57.0	57.0	57.0	44.0	45.2	45.9	46.4	46.3	46.6	47.8	47.9	48.6	48.5
Fixed income	22.0	21.0	19.0	19.0	19.0	23.1	23.4	24.5	24.5	25.2	24.3	25.0	25.3	25.5	26.1
Global TAA	0.0	0.0	0.0	0.0	0.0	0.8	0.7	0.8	0.9	0.9	1.0	0.9	1.5	1.3	1.4
Real assets	10.0	10.0	10.0	10.0	10.0	13.7	13.3	12.8	12.4	12.1	11.9	11.4	11.1	10.4	10.2
Hedge funds	0.0	0.0	0.0	0.0	0.0	4.3	3.7	3.3	3.5	3.1	4.4	4.0	4.2	4.5	4.4
Balanced Funds	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Risk Parity	0.0	0.0	0.0	0.0	0.0	0.7	0.7	0.7	0.7	0.6	0.8	0.9	0.6	0.6	0.5
Private credit	0.0	0.0	0.0	0.0	0.0	2.0	1.8	1.0	0.5	0.5	2.2	1.5	1.4	0.9	0.8
Private equity	<u>16.0</u>	<u>14.0</u>	<u>14.0</u>	<u>14.0</u>	<u>14.0</u>	<u>11.5</u>	<u>11.3</u>	<u>11.2</u>	<u>11.2</u>	<u>11.2</u>	<u>8.8</u>	<u>8.4</u>	<u>8.1</u>	<u>8.2</u>	<u>8.1</u>
Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

1. Trends are based on the 49 U.S. Public and 15 peer funds with 5 or more consecutive years of data ending 2018.

gement and fund-of-funds usage is more expensive than direct fund investment.

Implementation style by asset class - 2018
(as a % of year-end assets)

	Your fund %					Peer average %					U.S. Public average %				
	External			Internal		External			Internal		External			Internal	
	Active	FOFs	Index	Active	Index	Active	FOFs	Index	Active	Index	Active	FOFs	Index	Active	Index
U.S. Broad/All						21.2		34.5	4.7	39.5	24.8		58.8	1.8	
U.S. Large Cap	4.9		0.0	46.4	48.7	13.1		24.6	23.6	38.6	29.8		45.3	6.3	
U.S. Mid Cap						25.6		20.8	31.0	22.6	43.5		23.8	7.7	
U.S. Small Cap	60.9		0.0	39.1	0.0	68.2		5.5	18.1	8.1	81.9		8.3	6.7	
EAFE	51.0		0.0	49.0	0.0	57.1		20.8	11.4	10.6	59.3		31.5	4.7	
Global	0.0		0.0	100.0	0.0	79.0		0.0	18.8	2.1	55.7		17.9	15.0	
Emer Stock						0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Other						18.2		0.0	1.0	80.8	94.8		1.6	0.1	
Emerging	29.8		0.0	70.2	0.0	74.2		10.7	8.6	6.5	81.9		11.9	3.2	
ACWI x U.S.	29.0		0.0	71.0	0.0	67.3		15.0	7.2	10.6	66.8		30.2	1.2	
Aggregate	24.2		0.0	51.9	23.9	43.9		20.5	13.5	22.0	50.9		33.1	5.6	
Income - U.S.	0.0		0.0	100.0	0.0	32.3		9.8	53.9	4.1	57.0		18.8	22.8	
Income - U.S. Gov't						0.0		20.1	10.6	69.4	42.7		38.3	11.9	
Income - U.S. Credits						100.0		0.0	0.0	0.0	64.6		0.0	35.4	
Income - EAFE						0.0		0.0	0.0	0.0	100.0		0.0	0.0	
Income - Global						1.0		0.0	99.0	0.0	66.6		5.5	27.9	
Income - Other						100.0		0.0	0.0	0.0	96.9		0.0	3.1	
Income - Long Bonds						7.8		0.0	0.0	92.2	70.7		11.3	0.0	
Income - Emerging	100.0		0.0	0.0	0.0	100.0		0.0	0.0	0.0	99.1		0.9	0.0	
Income - Inflation Indexed						34.8		32.2	3.6	29.3	39.3		44.5	1.4	
Income - High Yield	100.0		0.0	0.0	0.0	97.5		0.0	0.7	1.8	92.8		1.0	5.7	
Income - Absolute Return Bond						0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Income - Bundled LDI						0.0		0.0	0.0	0.0	100.0		0.0	0.0	
Income - Convertibles						100.0		0.0	0.0	0.0	100.0		0.0	0.0	
Income - Aggregate	0.0			100.0		40.1			59.9		39.0			61.0	
Income - Aggregate	10.1		0.0	89.9	0.0	40.7		8.5	40.6	10.2	61.2		15.7	20.0	
Commodities						65.7		0.0	2.2	32.1	78.6		9.7	2.3	
Structure	0.0	100.0		0.0		75.0	5.2		15.3		84.8	9.5		3.9	
Resources	70.0	0.0		0.0		85.4	0.1		0.5		94.4	0.0		0.2	
	0.0		0.0	0.0	100.0	63.2		6.9	6.2	23.7	69.4		22.9	1.6	
State ex-REITs	13.3	0.0		86.7		86.8	0.6		8.4		94.2	0.4		3.8	
Real Assets						91.7			8.3		94.6			5.4	
Assets	14.8	0.7	0.0	68.8	13.8	84.7	0.6	0.4	7.7	2.3	91.3	0.7	2.1	3.3	
Funds	100.0	0.0				97.2	2.8				76.1	23.9			
TAA	27.6			72.4		62.9			37.1		92.6			7.4	
Equity						62.9			37.1		88.1			11.9	
Credit	89.8	0.0		10.2		96.9	0.0		2.1		99.0	0.0		0.7	
Reserves						61.1			38.9		22.1			77.9	
Unlevered Private Equity	71.1	0.0		14.2		88.8	5.1		0.4		74.1	22.6		0.1	
Real Capital	78.0	22.0		0.0		71.6	20.3		7.0		61.3	33.8		4.3	
	78.4	21.6		0.0		90.4	4.2		0.0		92.4	3.5		0.0	
Private Equity						98.7			0.1		98.4			0.7	
Equity	76.3	15.9		3.8		88.0	6.0		0.8		77.0	19.5		0.3	
Fund - Yr.-End Holdings	28.8	1.9	0.0	54.7	13.9	57.8	0.9	10.8	17.1	12.2	62.9	2.9	19.5	8.6	

Actual asset mix - 2014 to 2018
(as a % of total year-end assets)

	Your fund					Peer average %					U.S. Public average %				
	2018	2017	2016	2015	2014	2018	2017	2016	2015	2014	2018	2017	2016	2015	2014
Stock - U.S. Broad/All						8.0	6.7	6.9	7.2	7.5	6.5	7.1	6.9	6.7	6.6
Stock - U.S. Large Cap	25.4	27.3	28.3	28.2	28.7	9.8	11.5	11.7	12.5	13.0	11.1	12.2	13.6	14.5	15.3
Stock - U.S. Mid Cap						0.8	0.7	0.5	0.6	0.5	1.0	0.8	0.8	0.9	0.8
Stock - U.S. Small Cap	2.4	2.7	2.9	2.7	2.7	1.3	1.5	1.8	2.3	2.4	2.3	2.3	2.5	2.9	3.2
Stock - EAFE	13.8	14.7	15.4	15.8	15.3	10.1	11.0	10.1	10.8	11.1	7.5	7.0	6.5	6.8	7.3
Stock - Global	0.8	0.8	0.7	1.1	1.1	3.4	3.8	4.2	3.9	4.3	6.3	6.7	5.3	4.2	3.8
Employer Stock															
Stock - Other						0.1	0.2	0.3	0.3	0.4	0.9	1.0	1.0	1.2	1.2
Stock - Emerging	4.2	4.5	4.3	3.9	3.9	4.8	5.1	4.5	4.3	4.4	3.8	3.8	3.1	2.9	3.3
Stock - ACWI x U.S.	5.2	5.9	5.9	5.6	5.1	3.0	2.7	3.0	3.5	3.5	5.5	6.6	7.2	7.9	7.7
Stock - Aggregate	51.7	56.0	57.6	57.3	56.8	41.4	43.3	42.9	45.4	47.3	45.0	47.4	46.8	48.0	49.3
Fixed Income - U.S.	16.7	16.7	12.3	13.7	15.1	12.6	12.3	12.8	13.4	13.9	12.7	12.7	13.6	14.5	14.1
Fixed Income - U.S. Gov't						0.6	0.6	0.5	0.6	0.5	1.7	1.4	0.9	0.6	0.3
Fixed Income - U.S. Credits						0.1	0.0	0.0	0.1	0.3	0.3	0.2	0.2	0.3	0.1
Fixed Income - EAFE											0.0	0.1	0.1	0.1	0.1
Fixed Income - Global						1.5	1.5	1.8	2.1	2.3	1.7	1.4	1.7	1.7	1.9
Fixed Income - Other						0.8	0.9	1.5	1.5	1.4	0.7	0.7	0.9	0.9	1.0
Fixed Income - Long Bonds						0.9	0.8	0.8	0.8	0.9	1.5	1.3	0.9	1.0	1.0
Fixed Income - Emerging	1.0	1.0	1.0	1.0	1.2	1.3	1.4	1.3	1.2	1.1	1.3	1.3	1.1	0.9	0.9
Fixed Income - Inflation Indexed						2.0	2.2	2.1	2.2	2.1	1.9	1.9	1.8	1.9	1.8
Fixed Income - High Yield	1.0	1.1	1.1	1.3	1.7	1.7	1.7	1.7	1.5	1.4	2.1	1.7	1.6	1.5	1.6
Fixed Income - Absolute Return Bonds															
Fixed Income - Bundled LDI											0.2				
Fixed Income - Convertibles						0.2	0.2				0.1	0.1			
Cash	1.4	2.2	2.3	1.8	3.4	1.9	2.0	1.7	1.3	1.6	2.3	2.3	2.1	2.0	2.0
Fixed Income - Aggregate	20.1	21.0	16.7	17.9	21.3	23.5	23.7	24.2	24.7	25.4	26.5	25.1	24.8	25.3	24.8
Commodities						0.5	0.6	0.6	0.4	0.6	0.5	0.5	0.7	0.5	0.6
Infrastructure	0.1	0.1	0.2	0.1	0.1	0.4	0.3	0.3	0.2	0.1	0.4	0.6	0.4	0.3	0.3
Natural Resources	0.7	0.9	1.4	1.3	0.5	1.0	1.0	0.8	0.6	0.5	0.8	1.2	0.9	0.6	0.5
REITs	1.6	1.4	1.8	1.6	1.5	0.7	0.7	0.8	0.8	0.7	0.8	0.9	0.8	0.8	0.9
Real Estate ex-REITs	9.1	8.1	9.7	9.3	8.4	9.7	9.3	10.2	9.7	8.8	7.8	6.9	7.8	7.3	6.5
Other Real Assets						0.9	0.9	0.8	0.4	0.3	0.4	0.6	0.7	0.7	0.5
Real Assets	11.5	10.5	12.9	12.4	10.5	13.1	12.7	13.4	12.1	11.0	10.8	10.8	11.2	10.2	9.3
Hedge Funds	2.2	2.1	2.8	2.9	2.8	5.7	5.2	5.1	4.8	3.9	4.8	4.8	5.1	5.5	5.4
Global TAA	1.8	0.9	0.6	0.5		0.7	0.6	0.6	0.7	0.9	1.2	0.9	1.5	1.3	2.1
Risk Parity						1.1	1.1	1.1	0.5	0.3	1.0	1.0	0.7	0.3	0.3
Mortgages						0.2	0.1	0.1	0.2	0.2	0.2	0.1	0.1	0.2	0.2
Private Credit	1.3	0.5				1.8	1.6	1.3	0.8	0.6	1.7	1.4	1.2	1.0	0.7
Diversified Private Equity	3.1	0.1	0.1	0.1	4.7	7.6	6.9	7.4	7.1	7.3	6.3	5.6	6.1	5.5	5.5
Venture Capital	2.1	1.7	1.6	1.6	1.4	0.9	0.9	0.7	0.6	0.5	0.5	0.4	0.4	0.5	0.4
LBO	6.3	4.6	4.5	4.5		2.9	2.7	2.3	2.4	2.2	1.5	1.5	1.4	1.6	1.4
Other Private Equity		2.6	3.1	2.7	2.5	0.2	0.4	0.5	0.3	0.3	0.1	0.2	0.2	0.3	0.2
Private Equity	11.4	9.1	9.3	9.0	8.6	11.7	10.8	11.0	10.4	10.2	8.4	7.7	8.1	7.9	7.6
Derivatives/Overlays Mkt Value	0.0	-0.1	0.1			0.8	0.8	0.4	0.4	0.3	0.4	0.8	0.5	0.4	0.4
Total Fund	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Count	1	1	1	1	1	17	17	16	15	15	56	60	59	64	68
Median Assets (\$ billions)	72.9	78.3	71.7	70.8	73.5	82.5	79.2	78.4	79.7	78.4	22.5	19.9	17.1	16.6	16.4

Policy asset mix - 2014 to 2018
(as a % of total assets)

	Your fund %					Peer average %					U.S. Public average %				
	2018	2017	2016	2015	2014	2018	2017	2016	2015	2014	2018	2017	2016	2015	2014
Stock - U.S. Broad/All						11.0	11.0	12.4	13.2	10.4	9.5	9.8	9.9	10.2	9.5
Stock - U.S. Large Cap	28.0	30.0	31.0	31.0	31.0	3.8	4.1	5.2	4.9	7.2	7.8	8.5	9.7	9.9	11.1
Stock - U.S. Mid Cap						0.2				0.2	0.7	0.5	0.4	0.4	0.3
Stock - U.S. Small Cap						0.3	0.5	0.3	0.3	0.5	1.4	1.3	1.5	1.6	1.6
Stock - EAFE	19.2	20.0	20.8	20.8	20.8	6.6	6.8	7.3	7.2	7.4	5.9	4.7	5.1	5.1	5.9
Stock - Global						13.0	13.6	11.7	13.0	13.0	10.7	10.9	9.1	9.0	7.8
Employer Stock															
Stock - Other						0.1	0.1	0.3	0.5	0.5	0.8	0.9	0.8	0.9	0.7
Stock - Emerging	4.8	5.0	5.2	5.2	5.2	3.1	3.1	2.8	2.7	2.4	2.9	2.5	2.3	2.2	2.2
Stock - ACWI x U.S.						3.9	4.0	4.2	4.7	4.8	6.4	7.4	7.9	8.8	8.9
Stock - Aggregate	52.0	55.0	57.0	57.0	57.0	42.0	43.4	44.2	46.4	46.3	46.1	46.5	46.7	48.2	48.0
Fixed Income - U.S.	21.0	20.0	18.0	18.0	18.0	15.0	15.0	15.7	16.7	15.3	14.2	14.7	15.0	15.8	15.7
Fixed Income - U.S. Gov't						0.2	0.2	0.1	0.0		1.4	1.1	0.7	0.5	0.4
Fixed Income - U.S. Credits						0.0					0.4	0.3	0.3	0.2	
Fixed Income - EAFE											0.0	0.1	0.1	0.1	0.1
Fixed Income - Global						1.5	1.5	1.8	2.0	3.1	1.5	1.4	1.5	1.5	1.9
Fixed Income - Other						0.1	0.2	1.0	0.8	0.8	0.4	0.6	0.6	0.5	0.6
Fixed Income - Long Bonds						1.0	0.8	0.9	0.7	0.7	2.1	2.1	1.7	1.5	1.5
Fixed Income - Emerging						1.0	1.0	0.9	0.9	0.7	1.2	1.2	0.9	0.9	0.9
Fixed Income - Inflation Indexed						3.0	2.9	2.9	1.8	2.3	2.9	2.8	2.7	2.6	2.6
Fixed Income - High Yield						1.9	2.3	1.9	1.3	1.6	1.9	2.0	2.0	1.8	1.8
Fixed Income - Absolute Return Bonds															
Fixed Income - Bundled LDI											0.2				
Fixed Income - Convertibles											0.1	0.1			
Cash	1.0	1.0	1.0	1.0	1.0	-0.7	-0.9	-1.0	0.1	0.7	-1.2	-1.0	-1.0	-0.9	-0.7
Fixed Income - Aggregate	22.0	21.0	19.0	19.0	19.0	23.1	23.1	24.1	24.5	25.2	25.2	25.3	24.6	24.5	24.7
Commodities						0.8	0.8	1.1	0.7	0.7	1.0	0.9	1.2	1.0	1.1
Infrastructure						0.4	0.4	0.3	0.1	0.1	0.6	0.7	0.6	0.3	0.4
Natural Resources						1.0	1.1	0.7	0.6	0.6	0.7	1.1	1.0	0.7	0.5
REITs		1.5	1.5	1.5	1.5	0.6	0.6	0.5	0.6	1.0	0.7	0.8	0.6	0.6	0.6
Real Estate ex-REITs	10.0	8.5	8.5	8.5	8.5	10.4	10.2	10.0	9.8	9.3	8.1	7.7	7.6	7.4	7.5
Other Real Assets						1.2	1.0	1.0	0.6	0.4	0.7	0.6	1.0	0.8	0.7
Real Assets	10.0	10.0	10.0	10.0	10.0	14.3	14.1	13.6	12.4	12.1	11.8	11.9	12.0	10.9	10.8
Hedge Funds						5.3	4.6	3.7	3.5	3.1	4.5	4.5	4.6	4.9	5.1
Global TAA						0.7	0.6	0.7	0.9	0.9	1.2	1.0	1.5	1.4	1.7
Risk Parity						1.1	1.2	1.2	0.7	0.6	0.8	0.9	0.6	0.4	0.4
Mortgages						0.3	0.1	0.4	0.1	0.1	0.1	0.0	0.1	0.1	0.0
Private Credit						1.7	1.7	0.7	0.4	0.4	1.9	1.5	1.2	0.9	0.7
Diversified Private Equity					14.0	8.6	9.2	8.2	8.6	10.1	6.6	7.1	7.0	7.0	7.4
Venture Capital						0.6	0.4	0.5	0.3	0.3	0.3	0.3	0.3	0.2	0.3
LBO	16.0	14.0	14.0	14.0		2.2	1.6	2.2	2.4	0.8	1.3	0.9	1.2	1.5	0.9
Other Private Equity						0.1	0.1	0.4	0.0	0.0	0.1	0.1	0.2	0.1	0.1
Private Equity	16.0	14.0	14.0	14.0	14.0	11.6	11.3	11.3	11.2	11.2	8.4	8.5	8.7	8.8	8.7
Total Fund	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Count	1	1	1	1	1	17	17	16	15	15	56	60	59	64	68

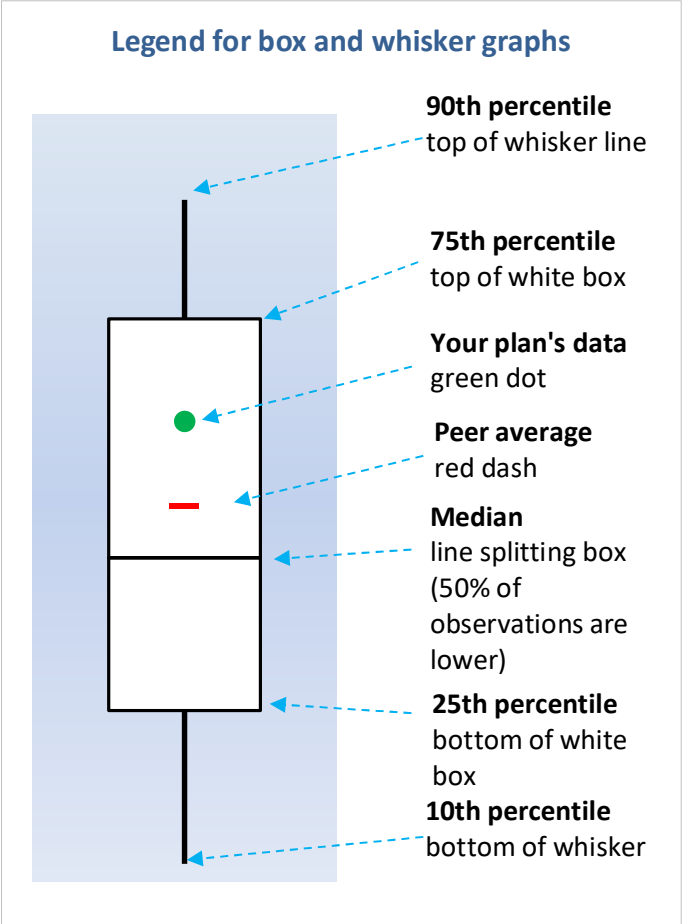
3

Returns, Benchmarks and Value Added

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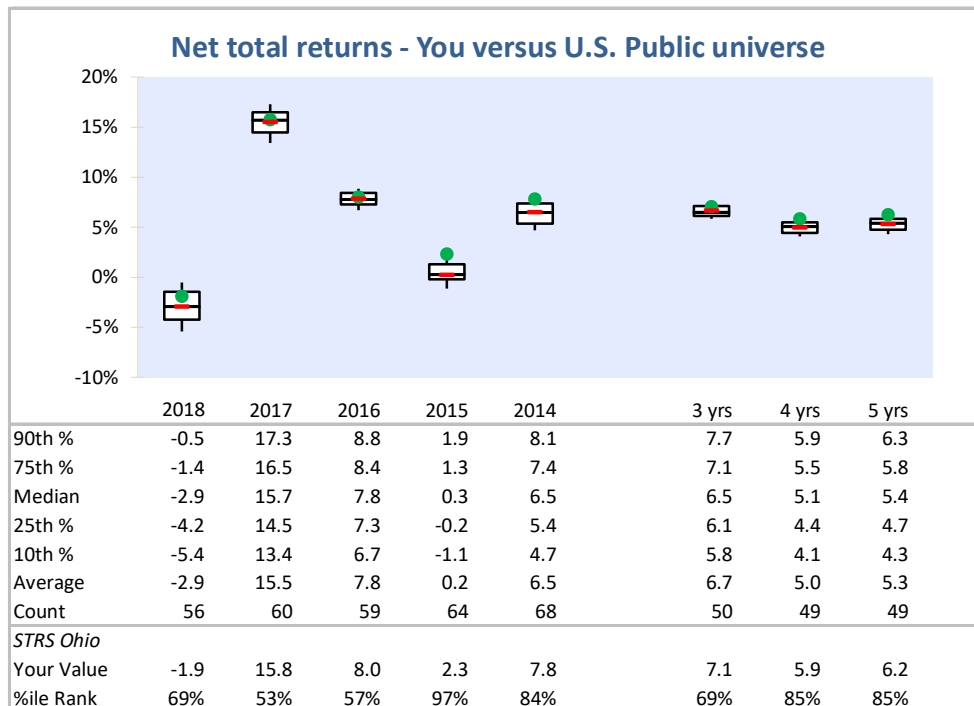
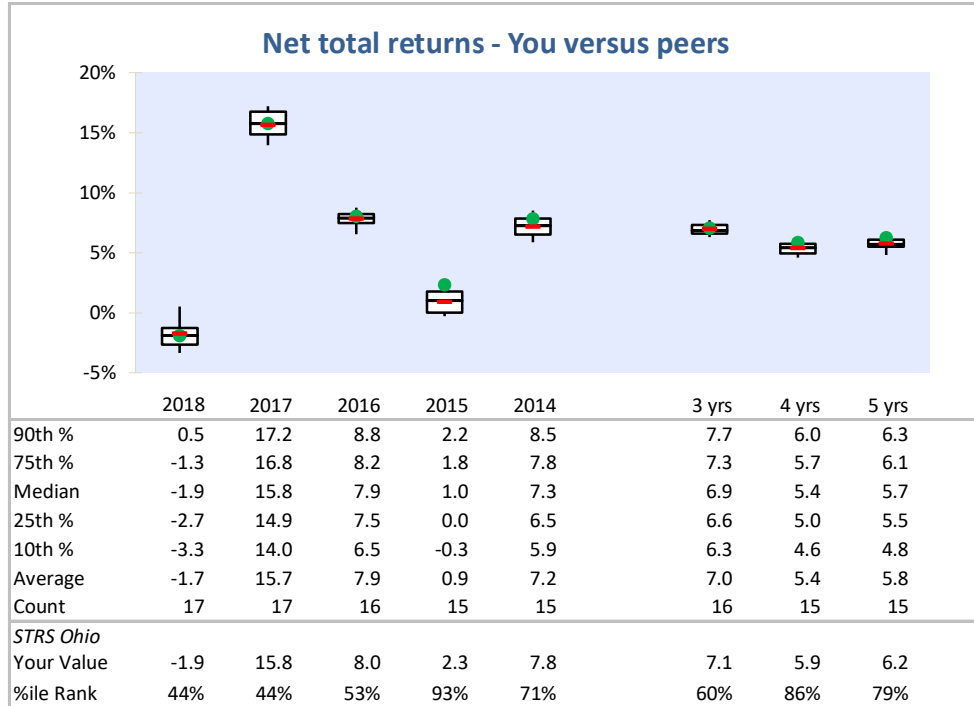
Interpreting box and whisker graphs

Box and whisker graphs are used extensively in this report because they show visually where you rank relative to all observations. At a glance you can see which quartile your data falls in.



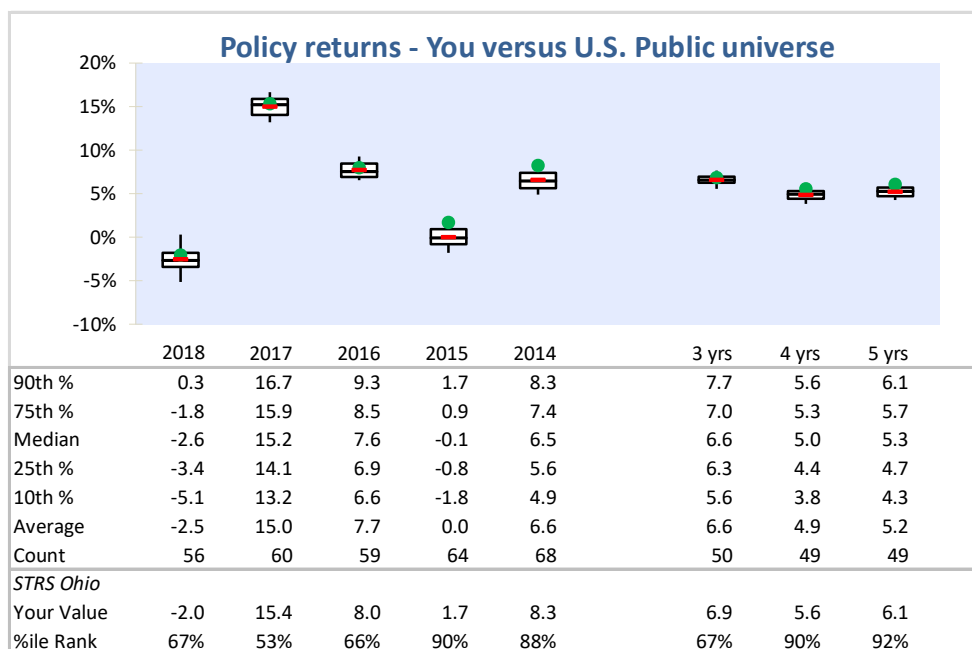
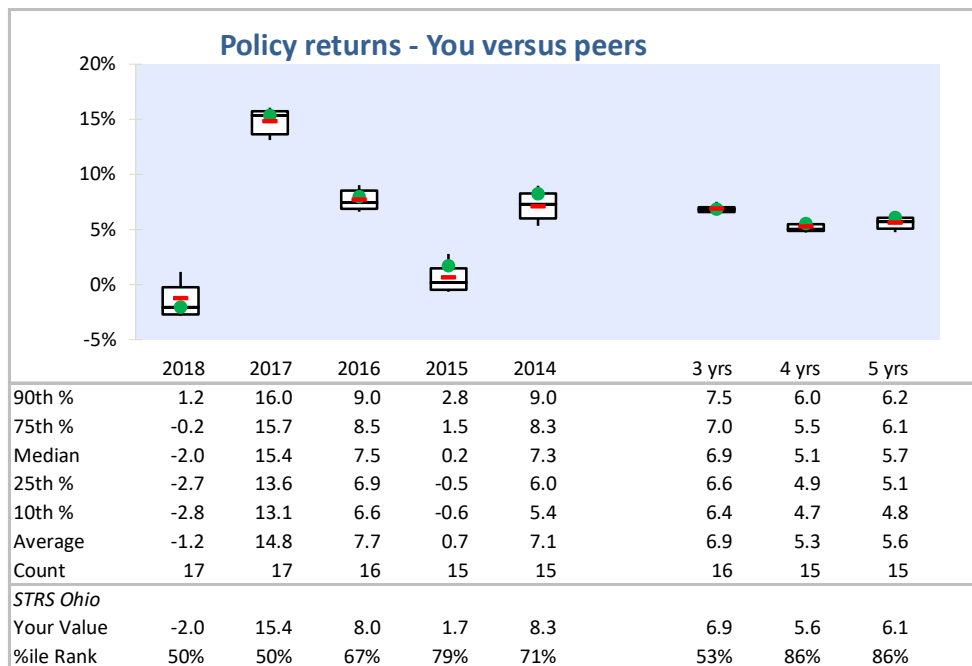
Net total returns

Your 5-year net total return of 6.2% was among the highest in your peer group and among the highest in the U.S. Public universe. Comparisons of total return do not help you understand the reasons behind relative performance. To understand the relative contributions from policy asset mix decisions and implementation decisions we separate total return into its more meaningful components - policy return and implementation value added.



Policy returns

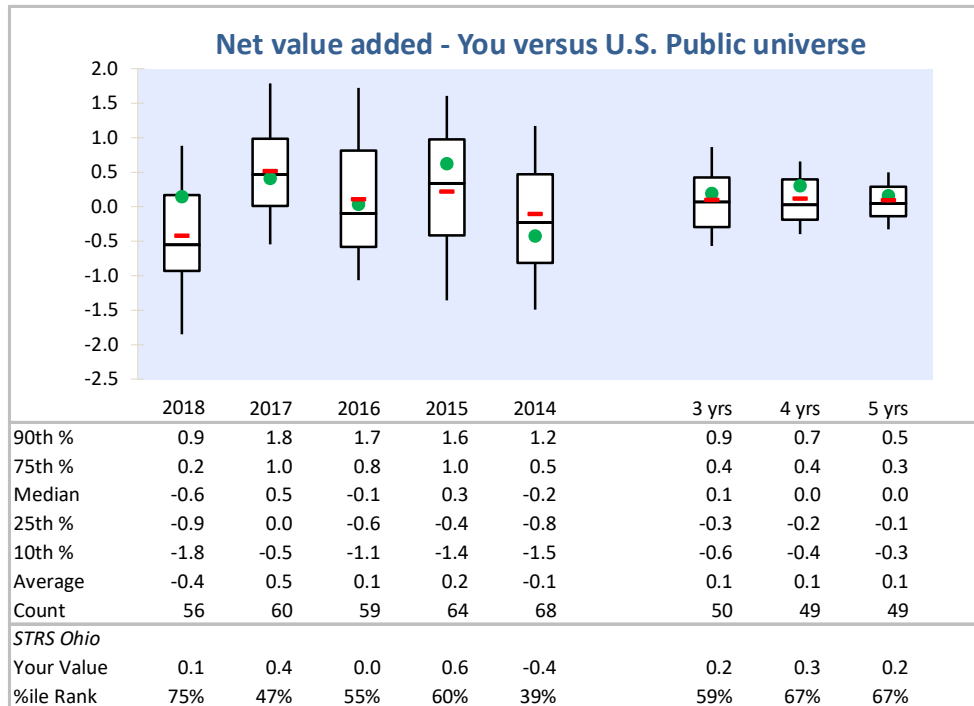
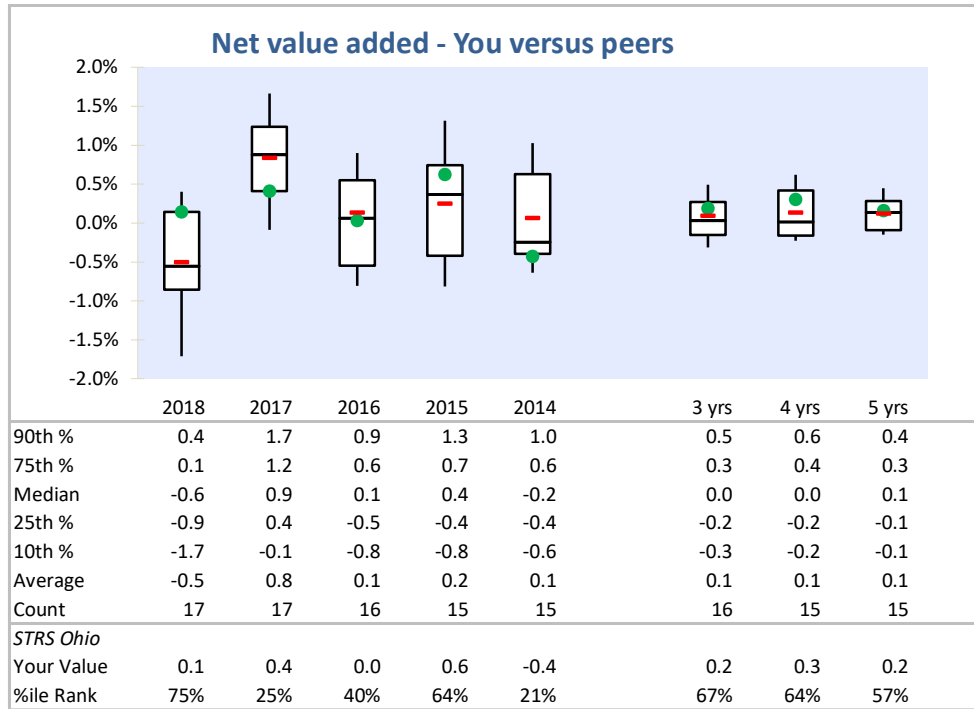
Your 5-year policy return of 6.1% was among the highest in your peer group and among the highest in the U.S. Public universe. Policy return is the return you would have earned had you passively implemented your policy asset mix decision through your benchmark portfolios.



To enable fairer comparisons, the policy returns of all participants except your fund were adjusted to reflect private equity benchmarks based on lagged, investable, public-market indices. If CEM used this same adjustment for your fund, your 5-year policy return would be 6.8%, 0.7% higher than your actual 5-year policy return of 6.1%. Mirroring this, your 5-year total fund net value added would be 0.7% lower. Refer to the appendix of this section for details.

Net value added

Your 5-year net value added of 0.2% was above the peer median and above the median of the U.S. Public universe. Net value added is the difference between your net total return and your policy return.



Net returns by asset class

Asset class	Your fund %						Peer average %						U.S. Public average %					
	2018	2017	2016	2015	2014	5-yr ¹	2018	2017	2016	2015	2014	5-yr ¹	2018	2017	2016	2015	2014	5-yr ¹
Stock - U.S. Broad/All							-4.9	21.9	11.1	-0.3	10.1	7.0	-5.3	20.2	11.1	-0.4	11.0	7.0
Stock - U.S. Large Cap	-4.8	22.1	10.6	1.0	12.4	7.8	-4.7	21.8	11.7	1.3	12.9	8.2	-4.7	22.2	11.2	0.9	12.7	8.0
Stock - U.S. Mid Cap							-9.8	17.7	12.6	-1.9	9.0	5.2	-9.0	19.0	13.0	-2.7	8.7	5.7
Stock - U.S. Small Cap	-9.8	19.6	17.2	-2.2	4.3	5.2	-10.8	15.3	18.7	-2.6	5.9	4.8	-10.8	15.6	18.4	-3.7	5.0	4.7
Stock - EAFE	-11.8	21.9	4.8	3.5	1.1	3.4	-13.9	26.6	3.1	-0.2	-2.2	1.8	-13.9	25.7	2.9	0.0	-3.5	1.6
Stock - Global	-9.7	24.0	8.8	-1.3	3.7	4.5	-8.6	37.0	7.5	-0.6	5.5	5.2	-9.0	29.5	7.3	-0.9	3.7	5.0
Employer Stock																		
Stock - Other							-8.2	14.2	12.7	-5.4	0.8	1.1	-12.6	14.8	10.3	-6.2	3.9	0.3
Stock - Emerging	-12.6	31.6	13.6	-12.0	-1.7	2.5	-15.1	36.5	10.5	-14.2	-1.1	1.8	-15.5	36.6	10.6	-13.6	-1.3	1.6
Stock - ACWI x U.S.	-12.0	23.8	7.5	-0.9	0.5	3.1	-13.3	28.5	4.3	-2.1	-2.7	2.0	-14.5	28.3	3.6	-2.7	-3.7	1.2
Stock - Aggregate	-8.4	22.9	9.2	0.4	6.9	5.7	-9.8	25.4	8.9	-1.5	5.0	5.0	-10.0	24.6	9.0	-1.7	5.2	4.9
Fixed Income - U.S.	0.2	3.4	2.7	1.0	5.5	2.6	-0.3	4.7	3.6	0.5	6.7	3.0	-0.1	4.3	3.8	0.2	5.8	2.7
Fixed Income - U.S. Gov't							-0.8	5.8	-0.3	0.7	1.0	0.5	-0.3	4.5	1.2	1.0	4.5	0.5
Fixed Income - U.S. Credits							1.5	5.1	6.0	-1.8	4.4	2.7	-0.1	4.5	4.4	-2.2	6.5	2.7
Fixed Income - EAFE													-0.4	9.6	3.8	-8.1	-1.3	0.0
Fixed Income - Global							-4.8	30.5	4.7	-0.9	3.9	5.3	-2.2	13.1	5.8	-2.0	3.7	3.8
Fixed Income - Other							1.1	5.4	6.5	-0.5	4.7	4.3	0.9	26.7	15.4	0.3	5.6	3.7
Fixed Income - Long Bonds							-2.9	8.3	0.7	-1.6	25.4	6.0	-3.6	9.8	3.4	-3.8	22.3	6.5
Fixed Income - Emerging	-4.5	10.4	15.4	0.6	1.5	4.4	-5.1	12.0	10.9	-3.5	-0.3	2.8	-5.9	12.3	10.7	-5.3	-0.8	2.2
Fixed Income - Inflation Indexed							-1.0	3.7	4.6	-1.9	4.2	1.7	-1.2	3.6	5.7	-1.7	4.6	2.2
Fixed Income - High Yield	-2.8	7.3	16.9	-4.5	2.1	3.5	-1.0	7.2	12.3	-2.5	4.4	4.1	-1.5	7.1	12.5	-3.2	3.3	3.5
Fixed Income - Absolute Return Bonds																		
Fixed Income - Bundled LDI																		
Fixed Income - Convertibles							-0.7	12.5					-0.7	10.9				
Cash	2.0	0.7	0.5	0.1	0.1	0.7	-4.7	0.1	2.9	-0.8	0.8	-2.4	-0.2	0.9	1.3	0.0	0.4	-0.2
Fixed Income - Aggregate	0.2	4.0	4.8	0.6	5.0	2.9	-1.0	5.3	4.7	-0.4	6.1	2.8	-0.7	5.0	4.7	-0.6	5.3	2.7
Commodities							-12.3	11.0	13.9	-31.7	-14.5	-9.7	-11.4	6.8	12.5	-26.5	-16.6	-9.3
Infrastructure	-3.2	1.9	3.6	3.2	15.8	4.1	7.5	13.0	8.8	5.7	22.2	11.5	7.6	12.2	9.0	4.3	15.8	9.9
Natural Resources	11.5	-34.5	-4.1	2.0	7.7	-5.1	5.1	2.4	3.9	-7.7	10.1	2.4	3.0	6.9	6.4	-5.4	11.7	4.5
REITs	-4.6	5.2	8.8	3.2	30.5	8.0	-4.5	9.2	5.2	3.1	19.4	6.4	-4.7	8.7	4.8	2.2	20.2	6.3
Real Estate ex-REITs	8.4	6.1	9.3	12.2	14.8	10.1	8.7	10.2	9.9	13.9	13.9	11.3	7.5	8.4	8.2	12.8	12.6	9.8
Other Real Assets							0.0	3.9	12.1	-8.6	2.5	0.8	-1.1	3.4	12.5	-12.3	3.9	-1.8
Real Assets	6.7	2.8	7.7	9.8	15.7	8.5	6.6	9.3	9.3	9.4	12.6	9.5	4.5	7.9	8.1	7.3	11.3	7.9
Hedge Funds	0.6	5.6	3.4	-0.6	3.3	2.4	-2.2	4.9	1.0	-0.7	3.3	1.3	-1.4	5.8	1.5	-0.5	4.2	1.7
Global TAA	-7.3	10.5	8.1	-2.6			-6.8	14.4	7.3	-2.3	6.1	3.6	-5.8	12.6	7.3	-3.5	5.3	3.0
Risk Parity							-7.8	15.5	13.4	-10.4	8.7	3.9	-7.5	13.7	12.2	-9.3	8.1	3.4
Mortgages							3.1	7.4	1.8	4.2	8.4	5.7	2.6	5.7	2.6	3.7	7.5	4.9
Private Credit	4.1	5.9					5.3	7.8	7.6	2.7	6.7	5.3	6.6	8.7	7.6	3.6	9.0	6.0
Diversified Private Equity	17.7	19.3	6.7	9.9	18.9	14.4	15.5	18.0	8.9	8.4	16.0	13.2	15.8	16.9	8.9	8.3	15.6	12.9
Venture Capital	18.4	13.2	3.1	11.8	17.9	12.7	20.2	10.9	5.1	12.5	23.5	13.6	19.8	11.4	4.4	14.3	18.7	13.1
LBO	19.8	19.3	6.7	9.9			15.0	18.7	9.3	6.6	14.7	12.7	16.7	19.8	14.2	10.2	14.7	13.3
Other Private Equity		7.3	4.2	5.0	13.5		22.2	10.2	8.7	9.2	11.5	15.0	24.8	8.8	9.1	8.3	16.4	15.7
Private Equity	19.0	14.7	5.3	8.7	17.2	12.9	16.8	18.0	9.1	8.7	16.7	13.6	16.8	17.3	9.2	9.2	15.7	13.4
Total Fund Return	-1.9	15.8	8.0	2.3	7.8	6.2	-1.7	15.7	7.9	0.9	7.2	5.8	-2.9	15.5	7.8	0.2	6.5	5.3

You were not able to provide full year returns for all of the components of returns of asset classes with values shown in italics. The composite calculation only uses those components with a full year return.

1. The 5-year return number only includes funds with continuous data over the last 5 years.

Benchmark returns by asset class

Asset class	Your fund %						Peer average %						U.S. Public average %					
	2018	2017	2016	2015	2014	5-yr ¹	2018	2017	2016	2015	2014	5-yr ¹	2018	2017	2016	2015	2014	5-yr ¹
Stock - U.S. Broad/All							-5.1	21.9	12.4	0.5	12.6	8.0	-5.2	21.8	12.4	0.7	12.7	8.0
Stock - U.S. Large Cap	-5.2	21.1	12.7	0.5	12.6	7.9	-4.7	21.4	12.2	1.0	13.2	8.2	-4.6	21.5	12.4	1.0	13.2	8.3
Stock - U.S. Mid Cap							-7.7	18.2	13.1	-2.4	12.1	6.5	-8.0	18.8	12.5	-2.0	10.8	6.0
Stock - U.S. Small Cap	-11.0	14.7	21.3	-4.4	4.9	4.4	-9.7	15.8	19.7	-3.9	5.6	4.8	-9.9	15.2	20.1	-3.4	6.0	5.0
Stock - EAFE	-11.5	20.1	5.0	0.4	0.8	2.5	-13.8	24.5	2.5	-1.2	-3.7	0.9	-13.8	25.0	2.3	-1.1	-4.2	0.8
Stock - Global	-9.4	24.6	7.9	-2.4	4.2	4.4	-9.6	23.9	7.9	-1.5	4.6	4.6	-9.8	24.2	7.9	-1.7	3.4	4.2
Employer Stock																		
Stock - Other							-9.7	19.1	13.1	-5.4	2.4	3.4	-10.5	16.3	8.6	-7.3	1.3	0.3
Stock - Emerging	-14.6	37.3	11.2	-14.9	-2.2	1.6	-14.8	37.1	11.1	-14.8	-2.0	1.6	-14.5	37.2	10.9	-14.5	-1.9	1.7
Stock - ACWI x U.S.	-12.1	23.4	6.4	-2.8	0.2	2.4	-14.0	26.8	5.2	-4.3	-3.2	1.2	-13.6	27.5	4.5	-4.8	-3.7	1.0
Stock - Aggregate	-8.4	22.2	9.8	-1.0	6.9	5.4	-9.4	24.0	9.2	-2.0	5.0	4.8	-9.3	23.8	9.4	-2.0	5.1	4.8
Fixed Income - U.S.	0.1	3.9	3.9	0.4	5.6	2.7	-0.2	4.4	2.7	0.4	6.4	2.7	-0.1	3.8	2.8	0.4	6.1	2.6
Fixed Income - U.S. Gov't							-0.8	6.1	-0.2	0.7	0.8	0.6	-0.4	4.3	0.8	0.8	4.5	0.6
Fixed Income - U.S. Credits							-0.5	3.7	3.7	0.2	5.8	2.5	-1.6	3.6	3.2	-0.7	6.3	2.5
Fixed Income - EAFE													-2.2	8.4	6.1	-6.0	-3.0	-0.1
Fixed Income - Global							-0.6	6.2	5.3	-0.7	3.2	2.3	-0.8	5.1	4.9	-0.9	3.7	2.3
Fixed Income - Other							0.3	4.3	6.8	0.0	5.9	3.6	0.3	4.5	7.2	0.4	5.8	3.0
Fixed Income - Long Bonds							-1.9	8.7	1.4	-1.2	25.1	5.9	-3.3	8.9	3.2	-1.9	20.1	5.6
Fixed Income - Emerging	-2.5	8.2	9.9	1.3	4.8	4.2	-4.4	11.3	9.6	-0.3	1.5	3.4	-5.0	11.4	9.8	-4.9	0.2	2.3
Fixed Income - Inflation Indexed							-0.7	3.1	4.9	-2.1	4.0	1.7	-1.4	3.2	5.6	-1.7	4.7	2.0
Fixed Income - High Yield	-2.1	7.5	17.1	-4.5	2.5	3.8	-1.5	6.9	15.0	-3.2	2.6	3.7	-1.7	6.9	15.4	-3.9	2.3	3.6
Fixed Income - Absolute Return Bonds																		
Fixed Income - Bundled LDI													-3.3					
Fixed Income - Convertibles							0.3	14.7					0.3	17.1				
Cash	1.9	0.9	0.3	0.1	0.0	0.6	1.8	1.0	0.3	0.1	0.0	0.6	1.6	1.0	0.4	0.1	0.2	0.7
Fixed Income - Aggregate	0.1	3.9	3.9	0.4	5.6	2.8	-0.8	5.2	4.9	-0.2	6.5	2.9	-1.3	5.2	4.9	-0.3	7.2	3.2
Commodities							-9.1	3.8	10.8	-22.8	-17.5	-8.1	-10.7	3.0	10.9	-22.8	-16.6	-9.0
Infrastructure	11.8	12.2	5.3	6.1	13.5	9.7	5.2	8.4	6.9	4.8	8.1	6.8	4.5	9.1	6.9	5.0	6.4	6.7
Natural Resources	11.8	12.2	5.3	6.1	13.5	9.7	4.0	8.2	5.2	-1.7	8.5	4.9	1.5	6.5	6.8	-0.5	7.0	4.1
REITs	-4.6	5.2	8.5	3.2	30.1	7.9	-4.6	8.7	6.1	3.1	21.4	6.1	-4.2	8.2	6.7	2.9	21.1	6.8
Real Estate ex-REITs	6.7	7.0	8.0	13.3	11.8	9.3	7.6	7.1	8.6	13.8	11.6	9.8	6.9	6.6	8.5	13.7	11.8	9.6
Other Real Assets							-0.2	3.5	10.2	4.6	6.3	5.3	-0.7	1.5	12.5	-8.7	4.7	1.7
Real Assets	6.7	6.7	8.1	11.8	14.6	9.5	5.4	7.3	8.7	9.6	10.3	8.4	3.9	6.2	8.8	7.5	9.1	7.2
Hedge Funds	11.8	12.2	5.3	6.1	13.5	9.7	1.1	5.9	2.9	0.7	4.2	2.8	0.0	6.7	3.1	1.3	4.0	2.7
Global TAA	11.8	12.2	5.3	6.1			-2.1	13.4	6.1	1.2	4.1	3.6	-3.9	12.6	5.9	1.3	5.0	3.7
Risk Parity							-8.2	13.7	10.5	-2.2	7.6	3.6	-5.8	14.4	9.8	-3.7	6.3	3.5
Mortgages							1.0	4.0	3.3	1.7	4.4	2.8	0.7	2.9	2.9	2.0	4.4	2.6
Private Credit	11.8	12.2					2.3	6.4	8.5	0.0	4.5	3.9	3.1	7.3	11.2	-0.6	4.3	4.2
Diversified Private Equity	11.8	12.2	5.3	6.1	13.5	9.7	20.7	17.6	8.6	4.4	15.7	13.0	20.5	18.9	8.5	3.9	16.3	13.2
Venture Capital	11.8	12.2	5.3	6.1	13.5	9.7	19.0	17.8	9.7	3.9	13.0	12.3	18.6	19.6	7.1	4.5	15.3	12.7
LBO	11.8	12.2	5.3	6.1			18.8	17.7	9.2	3.9	12.7	12.5	18.5	19.5	7.3	4.6	15.4	12.7
Other Private Equity		12.2	5.3	6.1	13.5		23.3	15.4	9.5	4.4	13.9	13.3	18.1	20.4	6.7	4.4	13.1	11.8
Private Equity	11.8	12.2	5.3	6.1	13.5	9.7	20.3	17.6	8.6	4.4	15.7	13.0	20.4	19.1	8.3	4.0	16.3	13.2
Total Policy Return	-2.0	15.4	8.0	1.7	8.3	6.1	-1.2	14.8	7.7	0.7	7.1	5.6	-2.5	15.0	7.7	0.0	6.6	5.2

1. The 5-year return number only includes funds with continuous data over the last 5 years.

2. To enable fairer comparisons, the policy returns of all participants except your fund were adjusted to reflect private equity benchmarks based on lagged, investable, public-market indices. If CEM used this same adjustment for your fund, your 5-year policy return would be 6.8%, 0.7% higher than your actual 5-year policy return of 6.1%. Mirroring this, your 5-year total fund net value added would be 0.7% lower. Refer to the appendix of this section for details.

Net value added by asset class

Asset class	Your fund %						Peer average %						U.S. Public average %					
	2018	2017	2016	2015	2014	5-yr ¹	2018	2017	2016	2015	2014	5-yr ¹	2018	2017	2016	2015	2014	5-yr ¹
Stock - U.S. Broad/All							0.3	-0.1	-1.1	-0.8	-2.5	-1.0	-0.2	-1.7	-1.2	-1.2	-1.7	-1.0
Stock - U.S. Large Cap	0.4	1.0	-2.1	0.5	-0.2	-0.1	0.0	0.4	-0.5	0.2	-0.3	0.0	-0.1	0.7	-1.2	-0.1	-0.5	-0.3
Stock - U.S. Mid Cap							-2.1	-0.6	-0.5	0.5	-3.1	-1.2	-1.0	0.2	0.5	-0.7	-2.2	-0.7
Stock - U.S. Small Cap	1.2	5.0	-4.1	2.2	-0.6	0.8	-1.1	-0.5	-1.0	1.2	0.3	0.0	-0.5	0.4	-1.6	-0.3	-1.0	-0.2
Stock - EAFE	-0.3	1.8	-0.2	3.2	0.3	0.9	-0.1	2.1	0.6	0.9	0.4	0.8	-0.1	0.6	0.5	1.3	0.3	0.7
Stock - Global	-0.3	-0.6	0.9	1.1	-0.5	0.1	1.0	13.0	-0.4	0.9	0.9	0.7	0.8	5.1	-0.4	0.6	0.5	0.8
Employer Stock																		
Stock - Other							1.5	-4.9	-0.5	0.0	-1.4	-1.0	-0.7	-1.5	1.2	1.1	2.8	1.0
Stock - Emerging	1.9	-5.7	2.4	3.0	0.5	0.8	-0.3	-0.7	-0.6	0.6	0.9	0.2	-1.0	-0.5	-0.6	0.8	0.6	-0.1
Stock - ACWI x U.S.	0.1	0.4	1.1	1.9	0.2	0.7	0.9	1.3	-0.8	2.6	0.3	0.8	-0.8	0.7	-0.9	2.2	0.0	0.2
Stock - Aggregate	0.1	0.6	-0.5	1.4	0.0	0.3	-0.4	1.4	-0.3	0.5	0.0	0.2	-0.6	0.8	-0.4	0.3	0.1	0.0
Fixed Income - U.S.	0.1	-0.4	-1.2	0.6	0.0	-0.2	-0.1	0.4	0.9	0.0	0.3	0.3	0.0	0.5	1.0	-0.2	-0.3	0.2
Fixed Income - U.S. Gov't							0.0	-0.3	-0.2	-0.1	0.2	-0.2	0.1	0.3	-0.1	0.2	0.0	-0.2
Fixed Income - U.S. Credits							1.9	1.4	2.3	-2.0	-1.4	0.2	1.5	0.9	1.3	-1.4	0.2	0.2
Fixed Income - EAFE													1.8	1.2	-2.3	-2.1	1.7	0.1
Fixed Income - Global							-4.3	24.3	-0.6	-0.2	0.7	3.1	-1.6	8.0	0.9	-1.2	-0.3	1.5
Fixed Income - Other							0.9	1.1	-0.3	-0.4	-1.2	1.0	0.7	22.2	8.8	-0.8	0.2	0.8
Fixed Income - Long Bonds							-1.0	-0.4	-0.6	-0.3	0.3	0.1	-0.3	0.9	-0.6	-1.8	3.3	0.9
Fixed Income - Emerging	-2.0	2.2	5.5	-0.6	-3.2	0.2	-0.7	0.7	1.3	-2.2	-1.8	-0.6	-1.1	0.9	0.9	-0.1	-1.0	0.0
Fixed Income - Inflation Indexed							-0.3	0.6	-0.3	0.4	-0.5	-0.1	0.1	0.4	0.1	0.0	-0.3	0.1
Fixed Income - High Yield	-0.7	-0.2	-0.3	0.0	-0.4	-0.3	0.5	0.3	-2.7	0.5	1.9	0.4	0.3	0.1	-3.1	0.9	0.7	-0.2
Fixed Income - Absolute Return Bonds																		
Fixed Income - Bundled LDI							-1.1	-2.2					-1.1	-6.1				
Fixed Income - Convertibles																		
Cash	0.1	-0.1	0.1	0.0	0.0	0.0	-6.5	-0.9	2.6	-0.9	0.8	-3.1	-1.9	-0.2	0.9	0.0	0.1	-0.9
Fixed Income - Aggregate	0.1	0.1	0.9	0.2	-0.5	0.1	-0.1	0.2	-0.1	-0.2	-0.4	0.0	0.6	-0.2	-0.2	-0.4	-1.9	-0.4
Commodities							-3.2	6.8	3.4	-9.3	3.9	-1.6	-0.9	3.5	1.2	-3.5	1.5	-0.1
Infrastructure	-15.0	-10.3	-1.7	-2.9	2.3	-5.7	2.3	4.6	1.9	0.9	14.1	4.7	2.3	3.1	2.1	-0.7	8.7	3.2
Natural Resources	-0.3	-46.7	-9.4	-4.1	-5.8	-14.8	1.2	-6.2	-1.3	-6.0	1.6	-2.5	1.6	0.5	-0.5	-4.5	4.7	0.5
REITs	0.0	0.0	0.3	0.0	0.3	0.1	0.1	0.5	-0.7	0.1	-2.0	0.2	-0.5	0.5	-1.8	-0.8	-1.0	-0.5
Real Estate ex-REITs	1.7	-0.9	1.3	-1.2	3.0	0.8	1.1	3.1	1.3	0.1	2.3	1.6	0.5	1.8	-0.3	-0.8	0.8	0.2
Other Real Assets							0.2	0.4	2.0	-13.2	-3.8	-4.5	-0.4	1.9	-0.4	-3.6	-0.3	-1.8
Real Assets	0.0	-3.9	-0.3	-2.0	1.1	-1.0	1.2	2.1	0.8	-0.5	2.3	1.2	0.6	1.7	-0.7	-0.2	2.3	0.8
Hedge Funds	-11.2	-6.7	-1.9	-6.7	-10.3	-7.3	-2.9	-1.0	-1.7	-1.4	-0.9	-1.2	-1.2	-0.8	-1.6	-1.8	0.0	-0.9
Global TAA	-19.1	-1.7	2.8	-8.7			-4.8	1.0	1.2	-3.6	2.0	0.0	-2.4	-0.3	1.4	-4.9	0.3	-0.7
Risk Parity							0.4	1.8	2.9	-13.7	1.1	0.3	-1.7	-0.6	2.8	-6.9	0.7	0.0
Mortgages							2.1	1.3	-1.5	2.6	4.1	2.2	2.0	1.5	-0.5	1.7	3.4	1.9
Private Credit	-7.7	-6.3					2.9	1.4	-1.3	3.9	2.2	2.1	3.4	1.2	-3.3	4.6	4.3	2.2
Diversified Private Equity	5.9	7.1	1.4	3.8	5.4	4.6	-5.2	0.7	0.2	4.0	0.2	0.2	-4.5	-2.0	0.7	4.1	-0.8	-0.3
Venture Capital	6.6	1.0	-2.2	5.7	4.4	3.0	1.2	-6.9	-4.5	8.6	10.5	1.3	1.6	-8.5	-2.4	9.0	4.1	0.7
LBO	8.0	7.1	1.4	3.8			-3.8	1.0	0.0	2.7	2.0	0.2	-1.4	0.1	7.9	5.0	-0.1	1.0
Other Private Equity		-4.9	-1.1	-1.1	0.0		-1.1	-5.2	-1.0	4.6	-2.4	1.7	6.7	-11.7	2.6	3.8	4.0	3.8
Private Equity	7.2	2.5	0.0	2.6	3.7	3.1	-3.5	0.4	0.5	4.3	0.9	0.6	-3.4	-1.9	1.0	5.0	-0.7	0.3
Total Fund Return	0.1	0.4	0.0	0.6	-0.4	0.2	-0.5	0.8	0.1	0.2	0.1	0.1	-0.4	0.5	0.1	0.2	-0.1	0.1

Total net value add is determined by both actual and policy allocation. It is the outcome of total net return (page 6) minus total benchmark return (page 7). Aggregate net returns are an asset weighted average of all categories that the fund has an actual allocation to. Aggregate benchmark returns are a policy weighted average and includes only those categories that are part of your policy fund's mix.

You were not able to provide full year returns for all of the components of returns of asset classes with values shown in italics. The composite calculation only uses those components with a full year return.

1. The 5-year return number only includes funds with continuous data over the last 5 years.

2. To enable fairer comparisons, the policy returns of all participants except your fund were adjusted to reflect private equity benchmarks based on lagged, investable, public-market indices. If CEM used this same adjustment for your fund, your 5-year policy return would be 6.8%, 0.7% higher than your actual 5-year policy return of 6.1%. Mirroring this, your 5-year total fund net value added would be 0.7% lower. Refer to the appendix of this section for details.

Your policy return and value added calculation - 2018

2018 Policy Return and Value Added

Asset class	Policy weight	Benchmark Description	Return	Net return	Value added
Stock - U.S. Large Cap	28.0%	Russell 1000 (Russell 3000 for total Dom Equity)	-5.2%	-4.8%	0.4%
Stock - U.S. Small Cap		Russell 2000	-11.0%	-9.8%	1.2%
Stock - EAFE	19.2%	MSCI World xUS 50% Hedged Net	-11.5%	-11.8%	-0.3%
Stock - Global		MSCI ACWI net	-9.4%	-9.7%	-0.3%
Stock - Emerging	4.8%	MSCI Emerging Market net	-14.6%	-12.6%	1.9%
Stock - ACWI x U.S.		International Blended Benchmark	-12.1%	-12.0%	0.1%
Fixed Income - U.S.	21.0%	Fixed Income Blended (Jul 1 2017)	0.1%	0.2%	0.1%
Fixed Income - Emerging		Barclays Emerging Market	-2.5%	-4.5%	-2.0%
Fixed Income - High Yield		Barclays US Corp High Yield	-2.1%	-2.8%	-0.7%
Cash	1.0%	US 90 day T bill	1.9%	2.0%	0.1%
Infrastructure		Custom (Alternative Investment Actual Return)	11.8%	-3.2%	-15.0%
Natural Resources		Custom (Alternative Investment Actual Return)	11.8%	11.5%	-0.3%
REITs		Your REIT benchmark	-4.6%	-4.6%	0.0%
Real Estate ex-REITs	10.0%	NCREIF NPI	6.7%	8.4%	1.7%
Hedge Funds		Custom (Alternative Investment Actual Return)	11.8%	0.6%	-11.2%
Global TAA		Custom (Alternative Investment Actual Return)	11.8%	-7.3%	-19.1%
Private Credit		Custom (Alternative Investment Actual Return)	11.8%	4.1%	-7.7%
Diversified Private Equity		Custom (Alternative Investment Actual Return)	11.8%	17.7%	5.9%
Venture Capital		Custom (Alternative Investment Actual Return)	11.8%	18.4%	6.6%
LBO	16.0%	Custom (Alternative Investment Actual Return)	11.8%	19.8%	8.0%
Total	100.0%				
Net Actual Return (reported by you)					-1.9%
Calculated Policy Return = sum of (policy weights X benchmark returns)				-1.8%	
Adjustment to reflect rebalancing and overlay impacts				<u>-0.3%</u>	
Policy Return (reported by you)					<u>-2.0%</u>
Net Value Added (Net Return - Policy Return)					0.1%

Your policy return and value added calculations - 2014 to 2017

2017 Policy Return and Value Added

Asset class	Policy weight	Benchmark Description	Benchmark Return	Net return	Value added
Stock - U.S. Large Cap	30.0%	Russell 1000 (Ru	21.1%	22.1%	1.0%
Stock - U.S. Small Cap		Russell 2000	14.7%	19.6%	5.0%
Stock - EAFE	20.0%	MSCI World xUS	20.1%	21.9%	1.8%
Stock - Global		MSCI ACWI net	24.6%	24.0%	-0.6%
Stock - Emerging	5.0%	MSCI Emerging I	37.3%	31.6%	-5.7%
Stock - ACWI x U.S.		International Bl	23.4%	23.8%	0.4%
Fixed Income - U.S.	20.0%	Fixed Income Bl	3.9%	3.4%	-0.4%
Fixed Income - Emerging		Barclays Emergi	8.2%	10.4%	2.2%
Fixed Income - High Yield		Barclays US Cor	7.5%	7.3%	-0.2%
Cash	1.0%	US 90 day T bill	0.9%	0.7%	-0.1%
Infrastructure		Custom (Alterna	12.2%	1.9%	-10.3%
Natural Resources		Custom (Alterna	12.2%	-34.5%	-46.7%
REITs	1.5%	Your REIT bench	5.2%	5.2%	0.0%
Real Estate ex-REITs	8.5%	NCREIF NPI	7.0%	6.1%	-0.9%
Hedge Funds		Custom (Alterna	12.2%	5.6%	-6.7%
Global TAA		Custom (Alterna	12.2%	10.5%	-1.7%
Private Credit		Custom (Alterna	12.2%	5.9%	-6.3%
Diversified Private Equity		Custom (Alterna	12.2%	19.3%	7.1%
Venture Capital		Custom (Alterna	12.2%	13.2%	1.0%
LBO	14.0%	Custom (Alterna	12.2%	19.3%	7.1%
Other Private Equity		Custom (Alterna	12.2%	7.3%	-4.9%
Total	100.0%				
Net Return (reported by you)					15.8%
Calculated policy return (sum: Policy weights x benchmarks)				15.4%	
Adjustment to reflect rebalancing and overlay impacts				0.0%	
Policy return (reported by you)					15.4%
Net Value Added (Net Return - Policy Return)					0.4%

2015 Policy Return and Value Added

Asset class	Policy weight	Benchmark Description	Benchmark Return	Net return	Value added
Stock - U.S. Large Cap	31.0%	Russell 1000 (Ru	0.5%	1.0%	0.5%
Stock - U.S. Small Cap		Russell 2000	-4.4%	-2.2%	2.2%
Stock - EAFE	20.8%	MSCI World xUS	0.4%	3.5%	3.2%
Stock - Global		MSCI ACWI net	-2.4%	-1.3%	1.1%
Stock - Emerging	5.2%	MSCI Emerging I	-14.9%	-12.0%	3.0%
Stock - ACWI x U.S.		International Bl	-2.8%	-0.9%	1.9%
Fixed Income - U.S.	18.0%	Barclays Univer	0.4%	1.0%	0.6%
Fixed Income - Emerging		Barclays Emergi	1.3%	0.6%	-0.6%
Fixed Income - High Yield		Barclays US Cor	-4.5%	-4.5%	0.0%
Cash	1.0%	US 90 day T bill	0.1%	0.1%	0.0%
Infrastructure		Custom (Alterna	6.1%	3.2%	-2.9%
Natural Resources		Custom (Alterna	6.1%	2.0%	-4.1%
REITs	1.5%	Your REIT bench	3.2%	3.2%	0.0%
Real Estate ex-REITs	8.5%	NCREIF NPI	13.3%	12.2%	-1.2%
Hedge Funds		Custom (Alterna	6.1%	-1.1%	-7.2%
Global TAA		Custom (Alterna	6.1%	-2.6%	-8.7%
Diversified Private Equity		Custom (Alterna	6.1%	9.9%	3.8%
Venture Capital		Custom (Alterna	6.1%	11.8%	5.7%
LBO	14.0%	Custom (Alterna	6.1%	9.9%	3.8%
Other Private Equity		Custom (Alterna	6.1%	5.0%	-1.1%
Total	100.0%				
Net Return (reported by you)					2.3%
Calculated policy return (sum: Policy weights x benchmarks)				1.6%	
Adjustment to reflect rebalancing and overlay impacts				0.1%	
Policy return (reported by you)					1.7%
Net Value Added (Net Return - Policy Return)					0.6%

2016 Policy Return and Value Added

Asset class	Policy weight	Benchmark Description	Benchmark Return	Net return	Value added
Stock - U.S. Large Cap	31.0%	Russell 1000 (Ru	12.7%	10.6%	-2.1%
Stock - U.S. Small Cap		Russell 2000	21.3%	17.2%	-4.1%
Stock - EAFE	20.8%	MSCI World xUS	5.0%	4.8%	-0.2%
Stock - Global		MSCI ACWI net	7.9%	8.8%	0.9%
Stock - Emerging	5.2%	MSCI Emerging I	11.2%	13.6%	2.4%
Stock - ACWI x U.S.		International Bl	6.4%	7.5%	1.1%
Fixed Income - U.S.	18.0%	Barclays Univer	3.9%	2.7%	-1.2%
Fixed Income - Emerging		Barclays Emergi	9.9%	15.4%	5.5%
Fixed Income - High Yield		Barclays US Cor	17.1%	16.9%	-0.3%
Cash	1.0%	US 90 day T bill	0.3%	0.5%	0.1%
Infrastructure		Custom (Alterna	5.3%	3.6%	-1.7%
Natural Resources		Custom (Alterna	5.3%	-4.1%	-9.4%
REITs	1.5%	Your REIT bench	8.5%	8.8%	0.3%
Real Estate ex-REITs	8.5%	NCREIF NPI	8.0%	9.3%	1.3%
Hedge Funds		Custom (Alterna	5.3%	2.3%	-3.0%
Global TAA		Custom (Alterna	5.3%	8.1%	2.8%
Private Credit					
Diversified Private Equity		Custom (Alterna	5.3%	6.7%	1.4%
Venture Capital		Custom (Alterna	5.3%	3.1%	-2.2%
LBO	14.0%	Custom (Alterna	5.3%	6.7%	1.4%
Other Private Equity		Custom (Alterna	5.3%	4.2%	-1.1%
Total	100.0%				
Net Return (reported by you)					8.0%
Calculated policy return (sum: Policy weights x benchmarks)				7.8%	
Adjustment to reflect rebalancing and overlay impacts				0.2%	
Policy return (reported by you)					8.0%
Net Value Added (Net Return - Policy Return)					0.0%

2014 Policy Return and Value Added

Asset class	Policy weight	Benchmark Description	Benchmark Return	Net return	Value added
Stock - U.S. Large Cap	31.0%	Russell 1000 (Ru	12.6%	12.4%	-0.2%
Stock - U.S. Small Cap		Russell 2000	4.9%	4.3%	-0.6%
Stock - EAFE	20.8%	MSCI World xUS	0.8%	1.1%	0.3%
Stock - Global		MSCI ACWI Net	4.2%	3.7%	-0.5%
Stock - Emerging	5.2%	MSCI Emerging I	-2.2%	-1.7%	0.5%
Stock - ACWI x U.S.		International Bl	0.2%	0.5%	0.2%
Fixed Income - U.S.	18.0%	Barclays Univer	5.6%	5.5%	0.0%
Fixed Income - Emerging		Barclays Emergi	4.8%	1.5%	-3.2%
Fixed Income - High Yield		Barclays US Cor	2.5%	2.1%	-0.4%
Cash	1.0%	US 90 day T bill	0.0%	0.1%	0.0%
Infrastructure		Custom (Alterna	13.5%	15.8%	2.3%
Natural Resources		Custom (Alterna	13.5%	7.7%	-5.8%
REITs	1.5%	Your REIT bench	30.1%	30.5%	0.3%
Real Estate ex-REITs	8.5%	NCREIF NPI	11.8%	14.8%	3.0%
Hedge Funds		Custom (Alterna	13.5%	2.0%	-11.5%
Global TAA					
Diversified Private Equity	14.0%	Custom (Alterna	13.5%	18.9%	5.4%
Venture Capital		Custom (Alterna	13.5%	17.9%	4.4%
LBO					
Other Private Equity		Custom (Alterna	13.5%	13.5%	0.0%
Total	100.0%				
Net Return (reported by you)					7.8%
Calculated policy return (sum: Policy weights x benchmarks)				8.3%	
Adjustment to reflect rebalancing and overlay impacts				0.0%	
Policy return (reported by you)					8.3%
Net Value Added (Net Return - Policy Return)					-0.4%

Profit/Loss on overlay programs

Overlay type	Your fund		Peer median				U.S. Public median			
	2018	2017	2018		2017		2018		2017	
	bps	bps	bps	#	bps	#	bps	#	bps	#
Int. Discretionary Currency			-3.4	1	-4.8	1	-3.4	1	-4.8	1
Ext. Discretionary Currency			-0.3	2	0.0	2	0.3	3	0.0	2
Internal Global TAA					0.0	1			0.0	1
External Global TAA										
Internal PolicyTilt TAA										
External PolicyTilt TAA										
Internal Commodities										
External Commodities							-1.9	1	0.1	1
Internal Long/Short										
External Long/Short										
Internal Other			0.0	1	0.0	1	0.0	1	0.0	1
External Other			-7.1	1	18.1	1	-7.1	3	20.3	4

Profit/loss in basis points was calculated using total fund average holdings. This was done to measure the impact of the program at the total fund level.

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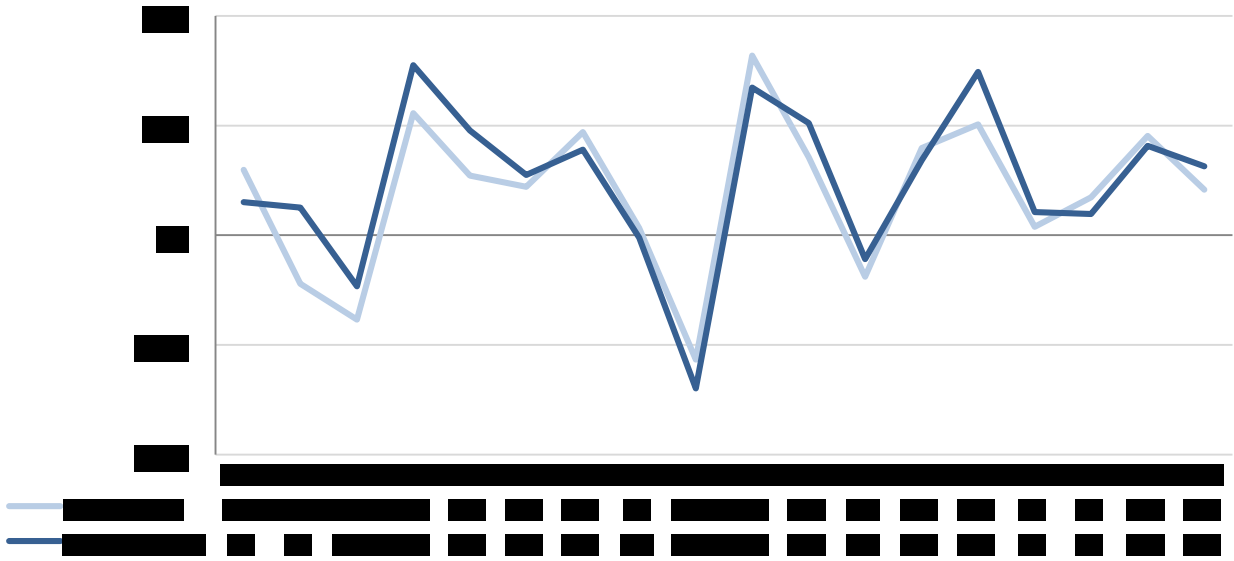
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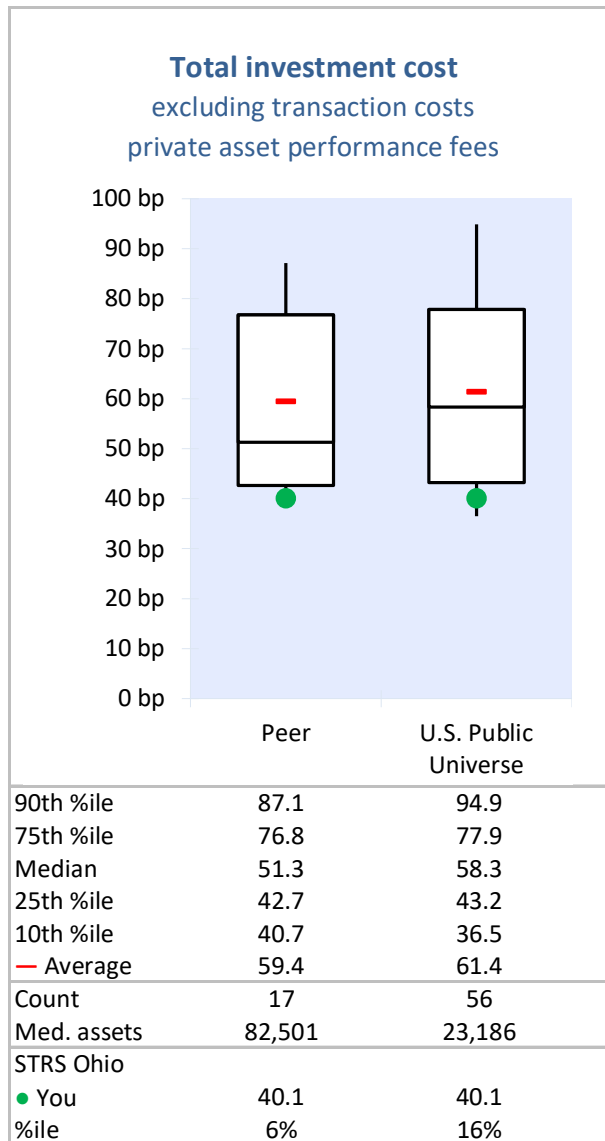
Total cost and benchmark cost

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Comparisons of total investment cost

Your total investment cost, excluding transaction costs and private asset performance fees, of 40.1 bps was below the peer median of 51.3 bps.

Differences in total investment cost are often caused by two factors that are usually outside of management's control: asset mix and fund size. Therefore, to assess whether your fund's total investment cost is high or low given your unique asset mix and size, CEM calculates a benchmark cost for your fund. Benchmark cost analysis begins on page 7 of this section.

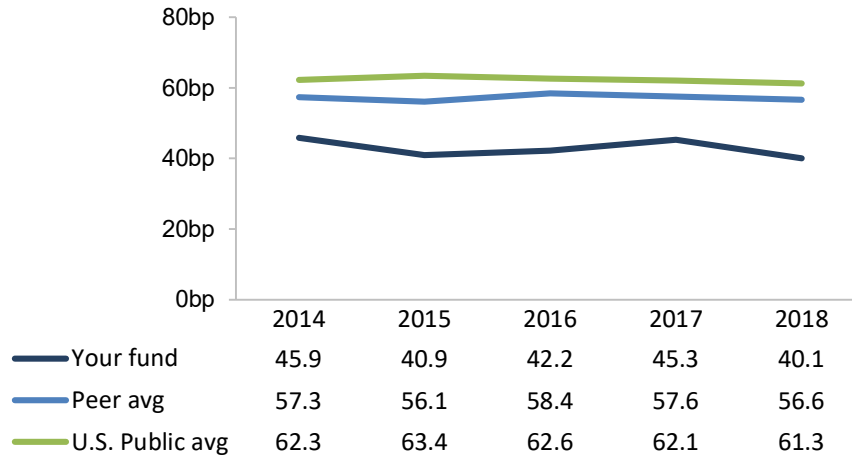


Trend in total investment cost

Your total investment cost, excluding transaction costs and private asset performance fees, decreased from 45.9 bps in 2014 to 40.1 bps in 2018.

Trend in total investment cost

(excluding transaction costs and private asset performance fees)



Trend analysis is based on 49 U.S. Public funds and 15 peer funds with 5 or more consecutive years of data.

Types of costs included in your total investment cost

The table below outlines the types of costs included in your total investment cost.

Asset class	Internal		External			
	In-house total cost	Transaction costs	Manager base fees	Monitoring & other costs	Perform. fees (active only)	Transaction costs
<u>Public</u> (Stock, Fixed income, commodities, REITs)	✓	✗	✓	✓	✓	✗
Derivatives/Overlays	✓	✗	✓	✓	✓	✗
<u>Hedge funds & Global TAA</u>						
Hedge Funds	n/a	n/a	✓	✓	✓	✗
Global TAA	✓	✗	✓	✓	✓	✗
<u>Private real assets</u> (Infrastructure, natural resources, real estate ex-REITs, other real assets)	✓	✗	✓	✓	✗	✗
<u>Private equity</u> (Diversified private equity, venture capital, LBO, other private equity)	✓	✗	✓*	✓	✗	✗

*External manager base fees represent gross contractual management fees.

- ✓ indicates cost is included.
- ✗ indicates cost is excluded.
- CEM currently excludes external private asset performance fees and all transaction costs from your total cost because only a limited number of participants are currently able to provide complete data.

Detailed breakdown of your total investment cost

Your 2018 total investment cost, excluding transaction costs and private asset performance fees, was 40.1 bp or \$302.8 million.

Your investment costs

	Internal		External Passive		External Active			Total ¹		
	Passive	Active	Fees	Monitoring & Other	Base Fees	Perform. Fees	Monitor. & Other	\$000s	bps	% of Total
Asset management										
Stock - U.S. Large Cap	73	12,688			2,310		211	15,281		5%
Stock - U.S. Small Cap		323			9,437		105	9,866		3%
Stock - EAFE		2,968			19,126		206	22,300		7%
Stock - Emerging		3,184			5,778		252	9,214		3%
Stock - Global		488						488		0%
Stock - ACWI x U.S.		468			5,474		20	5,962		2%
Fixed Income - U.S.		3,466						3,466		1%
Fixed Income - Emerging					3,476		143	3,619		1%
Fixed Income - High Yield					3,161		144	3,305		1%
Cash		299						299		0%
REITs	106							106		0%
Real Estate ex-REITs ¹²		17,796						17,796		6%
Real Estate ex-REITs - LP ¹²					14,030	5,526	481	14,511		5%
Infrastructure - FoFs ¹²					370	506	9	379		0%
Underlying FoF Fees ¹²					348	506		348		0%
Natural Resources ¹²										
Natural Resources - LP ¹²					5,691	2,090	57	5,748		2%
Natural Resources - Co-Invest. ¹					0		24	24		0%
Hedge Funds					26,479	12,406	255	39,140		13%
Global TAA		1,667			2,306		96	4,069		1%
Diversified Private Equity - LP ¹²		320			25,682	26,113	512	26,513		9%
Diversified Private Equity - Co-Invest. ¹					0		88	88		0%
LBO - LP ¹²					58,116	66,236	1,068	59,184		20%
LBO - FoFs ¹²					6,314	3,703	183	6,497		2%
Underlying FoF Fees ¹²					10,167	18,608		10,167		3%
Venture Capital - LP ¹²					16,328	15,264	406	16,734		6%
Venture Capital - FoFs ¹²					1,492	888	61	1,554		1%
Underlying FoF Fees ¹²					4,721	4,320		4,721		2%
Other Private Equity - LP ¹										
Other Private Equity - Co-Invest. ¹										
Private Credit ¹²		74						74		0%
Private Credit - LP ¹²					12,745	5,139	190	12,935		4%
Derivatives/Overlays	326			163				488		0%
Total asset management costs excluding private asset performance fees								294,877	39.0bp	97%
Oversight, custodial & other asset related costs										
Oversight of the Fund								4,965		2%
Trustee & Custodial								2,293		1%
Audit								168		0%
Other								511		0%
Total oversight, custodial & other costs								7,937	1.0bp	3%
Total investment costs excluding transaction costs and private asset performance fees								302,813	40.1bp	100%

1. Total cost excludes carry/performance fees for real estate, infrastructure, natural resources and private equity. Performance fees are included for the public market asset classes and hedge funds.

2. Default costs added. Refer to Appendix A.

Changes in your investment costs

The table below shows how your investment costs have changed from year to year by asset class.

Change in your investment costs (2018 - 2014)

	Investment costs (\$000s)					Change (\$000s)				Change (%)			
	2018	2017	2016	2015	2014	2018	2017	2016	2015	2018	2017	2016	2015
Asset management													
Stock - U.S. Large Cap	15,281	15,356	13,728	14,183	12,886	-75	1,628	-455	1,297	0%	12%	-3%	10%
Stock - U.S. Small Cap	9,866	10,064	9,173	9,392	9,742	-198	891	-219	-350	-2%	10%	-2%	-4%
Stock - EAFE	22,300	23,709	22,089	23,022	22,179	-1,409	1,620	-933	843	-6%	7%	-4%	4%
Stock - Emerging	9,214	9,362	8,662	8,177	8,780	-148	699	486	-604	-2%	8%	6%	-7%
Stock - Global	488	495	452	457	423	-7	43	-5	34	-1%	9%	-1%	8%
Stock - ACWI x U.S.	5,962	6,617	5,898	5,480	2,416	-655	719	418	3,064	-10%	12%	8%	127%
Fixed Income - U.S.	3,466	3,305	2,466	2,552	2,539	161	839	-86	13	5%	34%	-3%	1%
Fixed Income - Emerging	3,619	3,592	3,311	3,717	3,856	27	281	-406	-139	1%	8%	-11%	-4%
Fixed Income - High Yield	3,305	3,312	3,821	4,606	4,336	-7	-510	-785	270	0%	-13%	-17%	6%
Cash	299	286	266	269	266	13	20	-3	3	5%	7%	-1%	1%
REITs	106	94	89	226	16	12	5	-137	210	13%	6%	-61%	1273%
Real Estate ex-REITs ¹²	17,796	17,182	16,632	16,561	14,192	613	550	71	2,370	4%	3%	0%	17%
Real Estate ex-REITs - LP ¹²	14,511	18,114	17,879	18,382	25,031	-3,603	235	-502	-6,649	-20%	1%	-3%	-27%
Infrastructure - FoFs ¹²	379	473	508	514	518	-94	-36	-6	-3	-20%	-7%	-1%	-1%
Underlying FoF Fees ¹²	348	767	1,321	1,946	1,249	-419	-554	-625	697	-55%	-42%	-32%	56%
Natural Resources ¹²	0	0	298	169	0		-298	129	169		-100%	77%	
Natural Resources - LP ¹²	5,748	6,901	6,505	7,716	5,055	-1,153	396	-1,211	2,661	-17%	6%	-16%	53%
Natural Resources - Co-Invest. ¹	24	40				-15				-39%			
Hedge Funds	39,140	50,047	54,886	45,603	55,312	-10,907	-4,839	9,283	-9,709	-22%	-9%	20%	-18%
Global TAA	4,069	1,372	1,218	690		2,698	154	528		197%	13%	76%	
Diversified Private Equity - LP ¹²	26,513	3,943	2,743	1,442	95,549	22,570	1,200	1,301	-94,107	572%	44%	90%	-98%
Diversified Private Equity - Co-Invest. ¹	88												
LBO - LP ¹²	59,184	71,537	53,243	51,636		-12,353	18,294	1,607		-17%	34%	3%	
LBO - FoFs ¹²	6,497	7,500	7,355	6,569		-1,003	146	785		-13%	2%	12%	
Underlying FoF Fees ¹²	10,167	10,952	8,311	11,206		-785	2,641	-2,896		-7%	32%	-26%	
Venture Capital - LP ¹²	16,734	25,474	20,414	28,163	35,444	-8,740	5,060	-7,749	-7,281	-34%	25%	-28%	-21%
Venture Capital - FoFs ¹²	1,554	1,282	1,750	1,617	1,161	272	-468	133	456	21%	-27%	8%	39%
Underlying FoF Fees ¹²	4,721	4,794	4,392	3,665	2,824	-73	402	727	841	-2%	9%	20%	30%
Other Private Equity - LP ¹		24,065	25,635	19,766	10,947		-1,570	5,869	8,819		-6%	30%	81%
Other Private Equity - Co-Invest. ¹		193	34	9			160	25			473%	289%	
Private Credit ¹²	74												
Private Credit - LP ¹²	12,935	10,159				2,776				27%			
Derivatives/Overlays	488	495	452	457	367	-7	43	-5	90	-1%	9%	-1%	25%
Total excl. private asset perf. fees	294,877	331,483	293,532	288,193	328,574	-36,606	37,951	5,340	-40,381	-11%	13%	2%	-12%
Oversight, custodial & other asset related costs													
Oversight of the Fund	4,965	4,812	4,578	4,539	3,804	153	234	39	735	3%	5%	1%	19%
Trustee & Custodial	2,293	2,412	2,090	2,150	1,673	-119	322	-60	477	-5%	15%	-3%	29%
Audit	168	168	166	158	136	0	2	8	22	0%	1%	5%	16%
Other	511	477	418	375	339	33	59	43	36	7%	14%	12%	11%
Total oversight, custodial & other	7,937	7,870	7,252	7,222	5,952	67	618	30	1,270	1%	9%	0%	21%
Total investment costs ¹	302,813	339,353	300,785	295,415	334,526	-36,540	38,569	5,370	-39,111	-11%	13%	2%	-12%
Total in basis points	40.1bp	45.3bp	42.2bp	40.9bp	45.9bp								

1. Total cost excludes carry/performance fees for real estate, infrastructure, natural resources and private equity. Performance fees are included for the public market asset classes and hedge funds.

2. Default costs added. Refer to Appendix A.

Total cost versus benchmark cost

Your fund's total investment cost, excluding transaction costs and private asset performance fees, was 14.5 bps below your benchmark cost of 54.5 bps. This implies that your fund was low cost by 14.5 bps compared to the peer median, after adjusting for your fund's asset mix.

Your cost versus benchmark

	\$000s	bps
Your fund's total investment costs excluding transaction costs and private asset performance fees	302,813	40.1 bp
- Your fund's benchmark	412,071	54.5 bp
= Your fund's cost savings	-109,258	-14.5 bp

Your benchmark cost is an estimate of your total costs assuming that you paid the peer median cost for each of your investment mandates and fund oversight. The calculation of your benchmark cost is shown on the following page.

The reasons why your fund's total cost was below your benchmark are summarized in the table below. Details of each of the impacts below are provided on pages 9 to 11.

Reasons why your fund was low cost

	Cost/-Savings impact	
	\$000s	bps
<u>Differences in implementation style:</u>		
Less passive	20,188	2.7 bp
More int. active % of total active	-74,593	-9.9 bp
Less evergreen % of external	9,797	1.3 bp
Mix of fund of funds	-1,396	-0.2 bp
Less co-investment	3,433	0.5 bp
Less overlays and unfunded strategies	-1,601	-0.2 bp
Total style impact	-44,173	-5.8 bp
<u>Paying more/-less for similar services:</u>		
External investment management	-66,820	-8.8 bp
Internal investment management	1,735	0.2 bp
Oversight, custodial and other	0	0.0 bp
Total impact of paying more /-less	-65,085	-8.6 bp
Total savings	-109,258	-14.5 bp

Benchmark cost calculation

Your 2018 benchmark cost was 54.5 basis points or 412.1 million. It equals your holdings for each asset class multiplied by the peer median cost for the asset class. The peer median cost is the style weighted average for all implementation styles (i.e., internal passive, internal active, external passive, external active).

Asset class	Your average assets (A)	Weighted peer median cost ¹ (B)	Benchmark \$000s (A X B)
Asset management costs			
Stock - U.S. Large Cap	19,942	6.1 bp	12,071
Stock - U.S. Small Cap	1,929	42.0 bp	8,109
Stock - EAFE	10,790	22.0 bp	23,720
Stock - Emerging	3,279	46.2 bp	15,134
Stock - Global	591	36.3 bp	2,145
Stock - ACWI x U.S.	4,220	28.7 bp	12,098
Fixed Income - U.S.	12,627	7.6 bp	9,591
Fixed Income - Emerging	782	35.5 bp	2,777
Fixed Income - High Yield	789	34.7 bp	2,740
Cash	1,351	2.2 bp	299
REITs	1,137	24.9 bp	2,834
Real Estate ex-REITs	6,967	82.8 bp	57,702
Infrastructure	55	105.9 bp	585
Natural Resources	674	94.0 bp	6,341
Hedge Funds	1,638	120.9 bp	19,796
Perf. fees (on NAV)	1,638	45.2 bp	7,396
Global TAA	1,033	85.1 bp	8,792
Diversified Private Equity	3,431	152.0 bp	52,152
Venture Capital	1,956	179.3 bp	35,081
LBO	6,888	160.7 bp	110,677
Private Credit	1,204	99.7 bp	12,005
Overlay Programs ²	75,596	0.3 bp	2,089
Benchmark for asset management	75,596	53.5 bp	404,134
Oversight, custody and other costs³			
Oversight	75,596	0.4 bp	
Trustee & Custodial	75,596	0.4 bp	
Consulting	75,596	0.0 bp	
Audit	75,596	0.0 bp	
Other	75,596	0.1 bp	
Benchmark for oversight, custody & other	75,596	1.0 bp	7,937
Total benchmark cost		54.5 bp	412,071

1. The weighted peer median cost for asset management is the style-weighted average of the peer median costs for all implementation styles (i.e., internal passive, internal active, external passive, external active, fund of fund). The style weights by asset class for your fund and the peers are shown on page 15 of this section.

2. Total fund average holdings is used as the base when calculating the relative cost impact of the overlay programs.

3. Benchmarks for oversight total and individual lines are based on peer medians. Sum of the lines may be different from the total.

Cost impact of overlays

As summarized on the previous page, the style impact of overlays saved you 0.2 bps. If you use more overlays than your peers, or more expensive types of overlays, then it increases your relative cost.

	Your average total holdings (mils)	Cost as % of total holdings		Cost/-Savings Impact (000s)
		You	Peer avg.	
	(A)	(B)	(C)	A X (B - C)
Internal Overlays				
[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
External Overlays				
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[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]
Total impact in 000s				-1,601
Total impact in basis points				-0.2 bp

Summary of why you are high or low cost by asset class

The table below summarizes where you are high and low cost by asset class. It also quantifies how much is due to differences in implementation style (i.e., differences in the mix of external active, external passive, internal active, internal passive and fund of fund usage) and how much is due to paying more or less for similar services (i.e., same asset class and style).

	Your cost ¹	Benchmark = peer weighted median cost ¹	More/-less	Your average assets (or fee basis)	More/-less in \$000s		
					Total More/-less	Due to Impl. style	Due to paying more/less
	(A)	(B)	(C = A - B)	(D)	(C X D)		
Asset management costs							
Stock - U.S. Large Cap	7.7 bp	6.1 bp	1.6 bp	19,942	3,210	-2,671	5,881
Stock - U.S. Small Cap	51.1 bp	42.0 bp	9.1 bp	1,929	1,757	-668	2,425
Stock - EAFE	20.7 bp	22.0 bp	-1.3 bp	10,790	-1,420	244	-1,664
Stock - Emerging	28.1 bp	46.2 bp	-18.1 bp	3,279	-5,920	-5,887	-33
Stock - Global	8.3 bp	36.3 bp	-28.1 bp	591	-1,657	-1,657	0
Stock - ACWI x U.S.	14.1 bp	28.7 bp	-14.5 bp	4,220	-6,135	-4,101	-2,035
Fixed Income - U.S.	2.7 bp	7.6 bp	-4.9 bp	12,627	-6,125	-5,343	-782
Fixed Income - Emerging	46.3 bp	35.5 bp	10.8 bp	782	841	0	841
Fixed Income - High Yield	41.9 bp	34.7 bp	7.2 bp	789	565	60	505
Cash	2.2 bp	2.2 bp	0.0 bp	1,351	0	0	0
REITs	0.9 bp	24.9 bp	-24.0 bp	1,137	-2,728	-2,672	-56
Real Estate ex-REITs	46.4 bp	82.8 bp	-36.5 bp	6,967	-25,395	-22,019	-3,376
Infrastructure	131.6 bp	105.9 bp	25.7 bp	55	142	409	-267
Natural Resources	85.6 bp	94.0 bp	-8.4 bp	674	-569	688	-1,257
Hedge Funds	163.2 bp	120.9 bp	42.4 bp	1,638	6,938	-696	7,634
Perf. fees (on NAV)	75.8 bp	45.2 bp	30.6 bp	1,638	5,010	-574	5,584
Global TAA	39.4 bp	85.1 bp	-45.7 bp	1,033	-4,723	567	-5,290
Diversified Private Equity	77.5 bp	152.0 bp	-74.5 bp	3,431	-25,551	-8,004	-17,547
Venture Capital	117.6 bp	179.3 bp	-61.7 bp	1,956	-12,072	2,630	-14,702
LBO	110.1 bp	160.7 bp	-50.6 bp	6,888	-34,829	3,392	-38,221
Private Credit	108.0 bp	99.7 bp	8.3 bp	1,204	1,004	3,732	-2,728
Overlay Programs ²	0.1 bp	0.3 bp	-0.2 bp	75,596	-1,601	-1,601	0
Total asset management	39.0 bp	53.5 bp	-14.5 bp	75,596	-109,258	-44,173	-65,085
Oversight, custody and other costs³							
Oversight of the Fund			0.2 bp				
Trustee & Custodial			-0.1 bp				
Consulting			0.0 bp				
Audit			0.0 bp				
Other			0.0 bp				
Total oversight, custody & other	1.0 bp	1.0 bp	0.0 bp	75,596	0	n/a	0
Total	40.1 bp	54.5 bp	-14.5 bp	75,596	-109,258	-44,173	-65,085

1. The weighted peer median cost for asset management is the style-weighted average of the peer median costs for all implementation styles (i.e., internal passive, internal active, external passive, external active, fund of fund). It excludes performance fees on private assets. The style weights by asset class for your fund and the peers are shown on page 15 of this section.

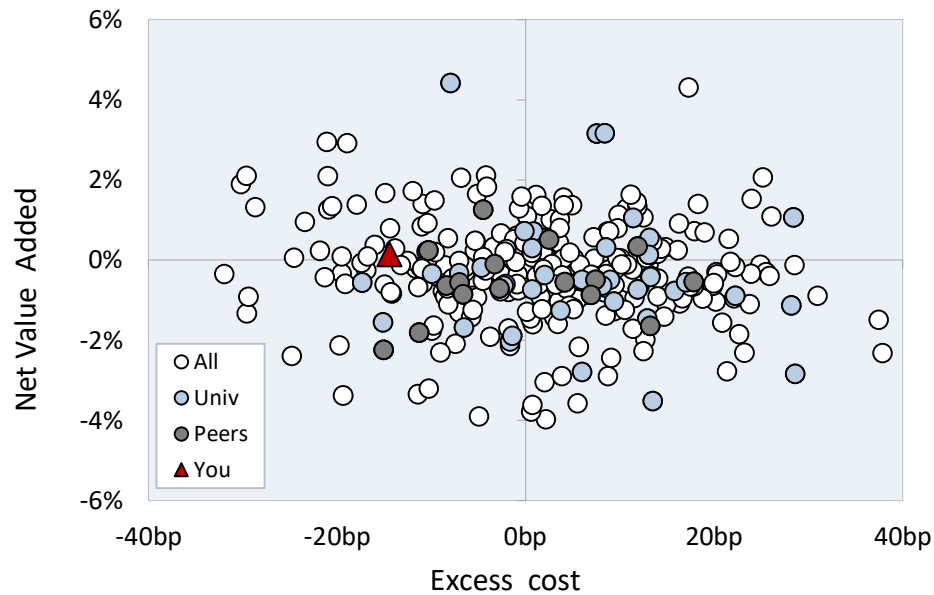
2. Total fund average holdings is used as the base when calculating the relative cost impact of the overlay programs.

3. Benchmarks for oversight total and individual lines are based on peer medians. Sum of the lines may be different from the total.

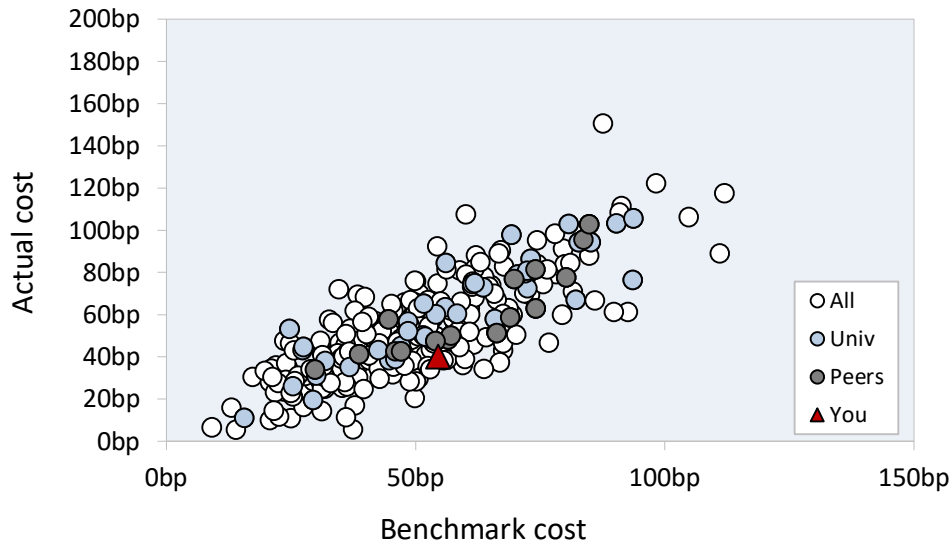
Your cost effectiveness ranking

Being high or low cost is neither good nor bad. More important is whether you are receiving sufficient value for your excess cost. At the total fund level, we provide insight into this question by combining your value added and excess cost to create a snapshot of your cost effectiveness performance relative to that of the global universe. In 2018, your fund ranked in the positive value added, low cost quadrant.

Your 2018 Net value added 0.1%, Excess cost -14 bps



Your 2018 Actual cost 40.1 bps, Benchmark cost 54.5 bps



For all funds except your fund, benchmark cost equals the sum of group median costs x fund's average holdings by asset class plus group median cost of derivatives/overlays plus group median cost of oversight/support. Group is peer if the fund is in the peer group, universe - if the fund is part of the universe, and global/database otherwise. Your fund's benchmark cost is calculated using peer-based methodology per page 7 of this section.

Appendix A: Benchmarking methodology formulas and data

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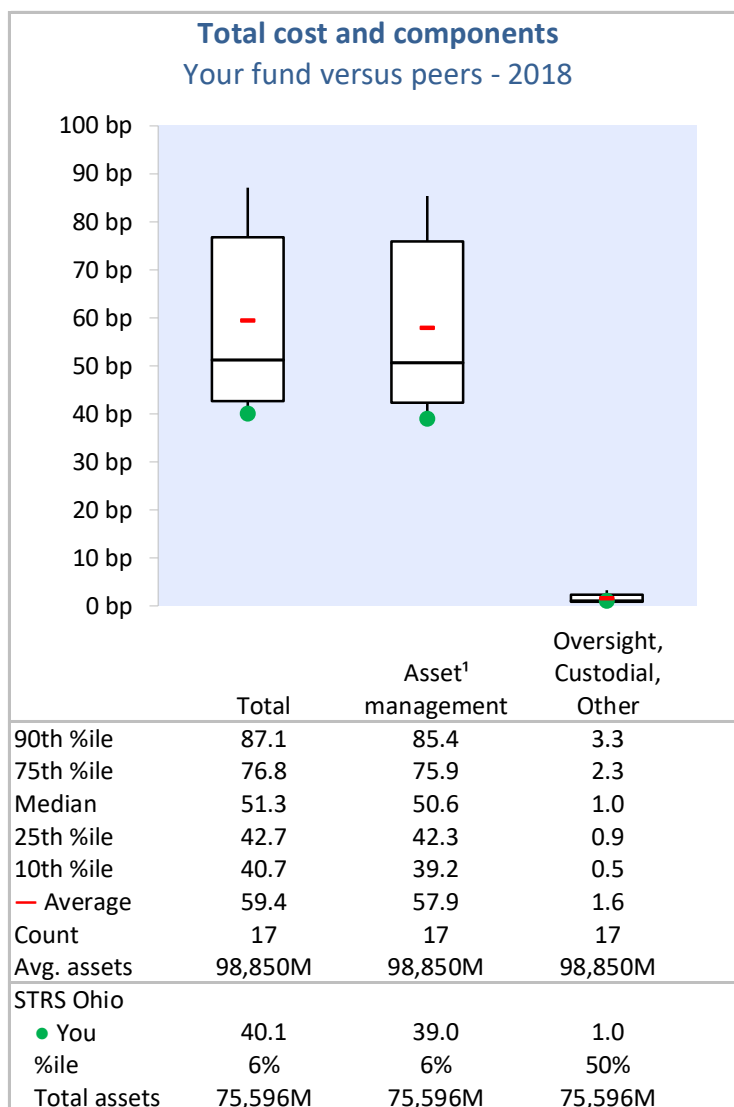
Cost comparisons

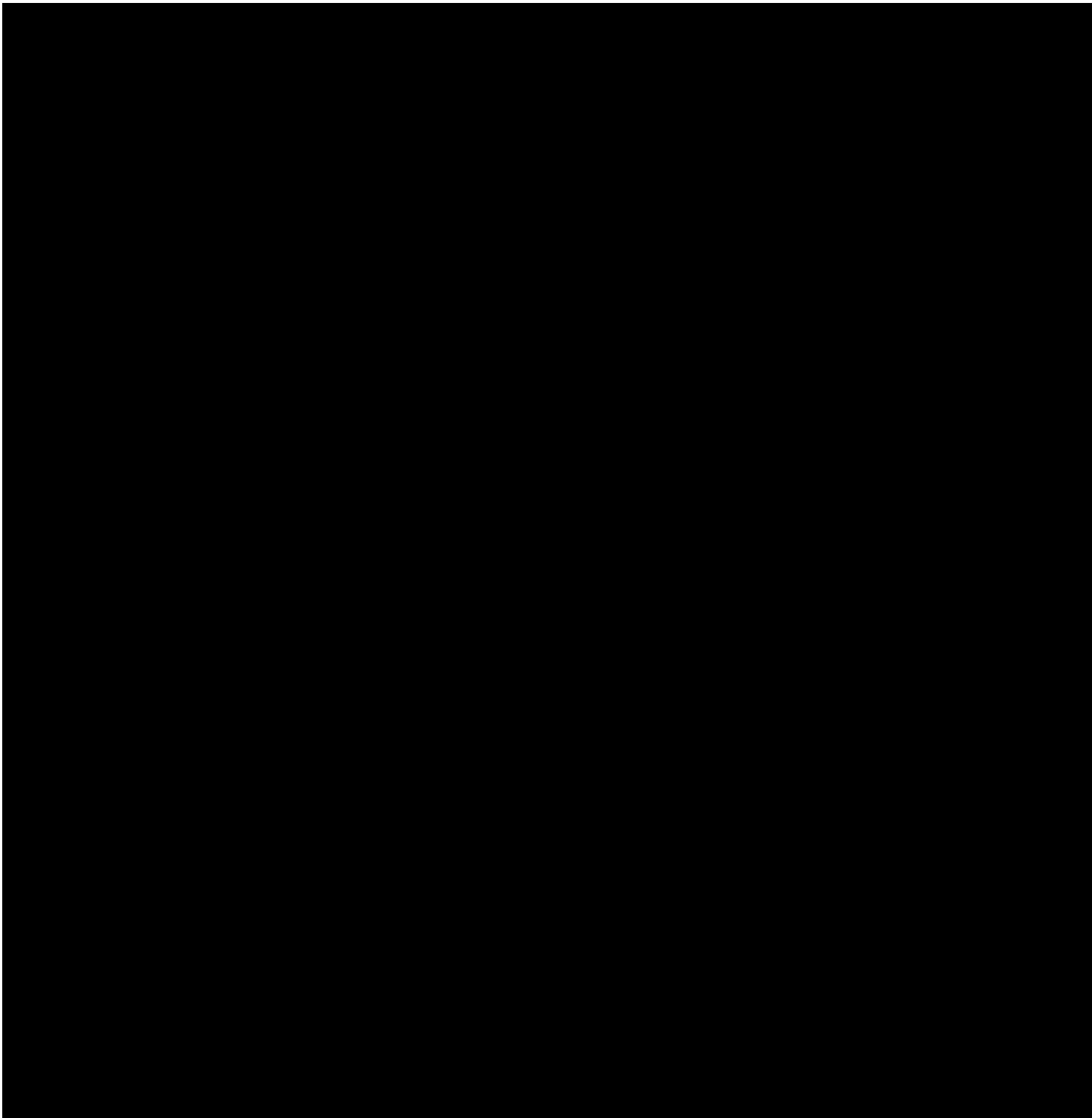
Total fund cost	2
Governance, operations & support	3
Public asset classes	
- Stock	4
- Fixed Income	14
- Commodities	28
- REITs	29
Real asset classes	
- Real estate ex-REITs	30
- Infrastructure	31
- Natural resources	32
- Other real assets	33
Private equity	
- Diversified private equity	34
- LBO	35
- Venture capital	36
- Private credit	37
- Other private equity	39
Global TAA	40
RiskParity	41
Hedge Funds	42
Overlays	43

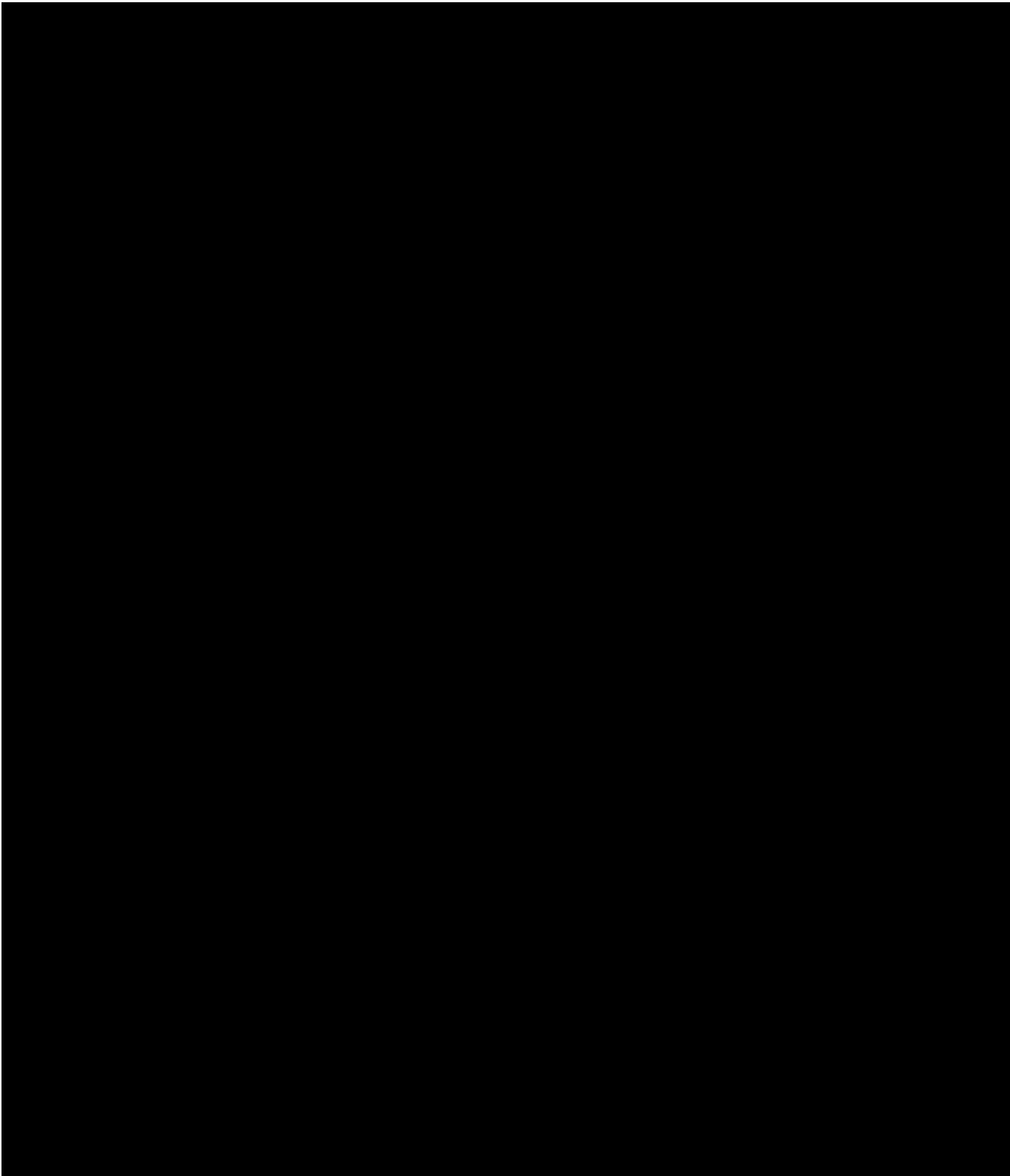
Total fund cost

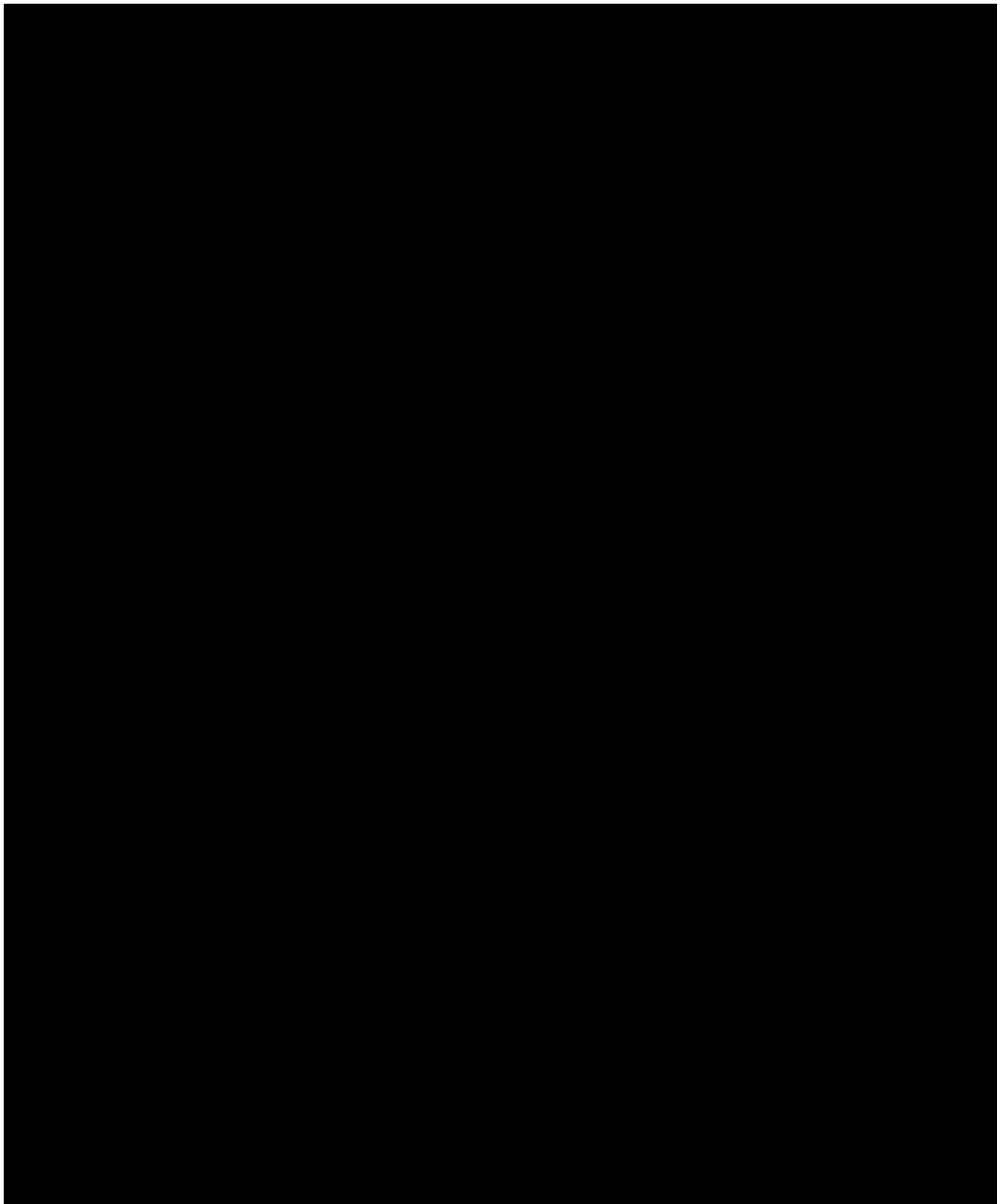
Total costs are benchmarked in the previous section. In this section, your fund's costs are compared on a line-item basis to your peers. This enables you to understand better why you may be a high or low cost fund and it also identifies and quantifies major cost differences that may warrant further investigation.

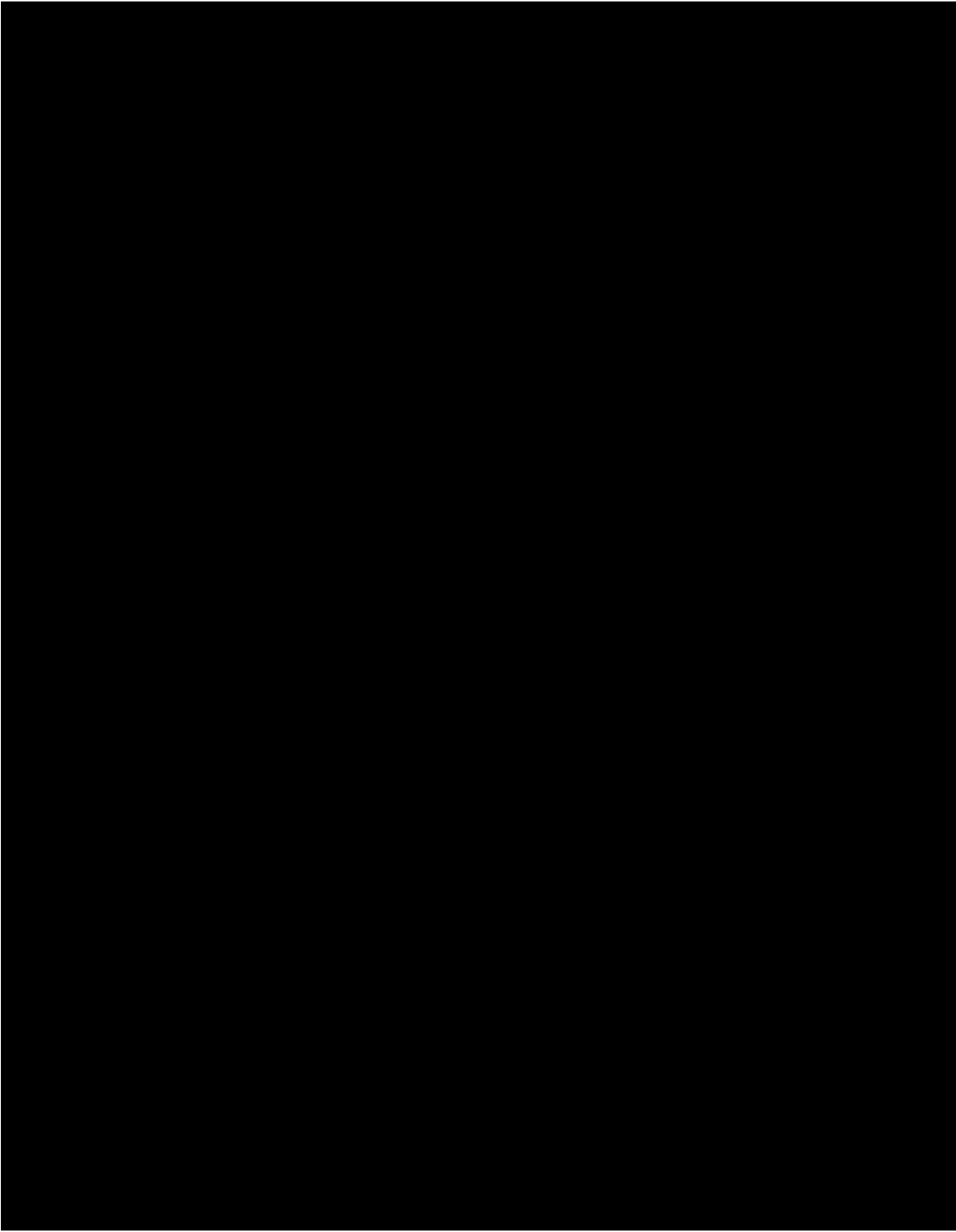
The 25th to 75th percentile range is the most relevant since higher and lower values may include outliers caused by unusual circumstances, such as performance-based fees. Count refers to the number of funds in your peer group that have costs in this category. It enables you to gauge the statistical significance.

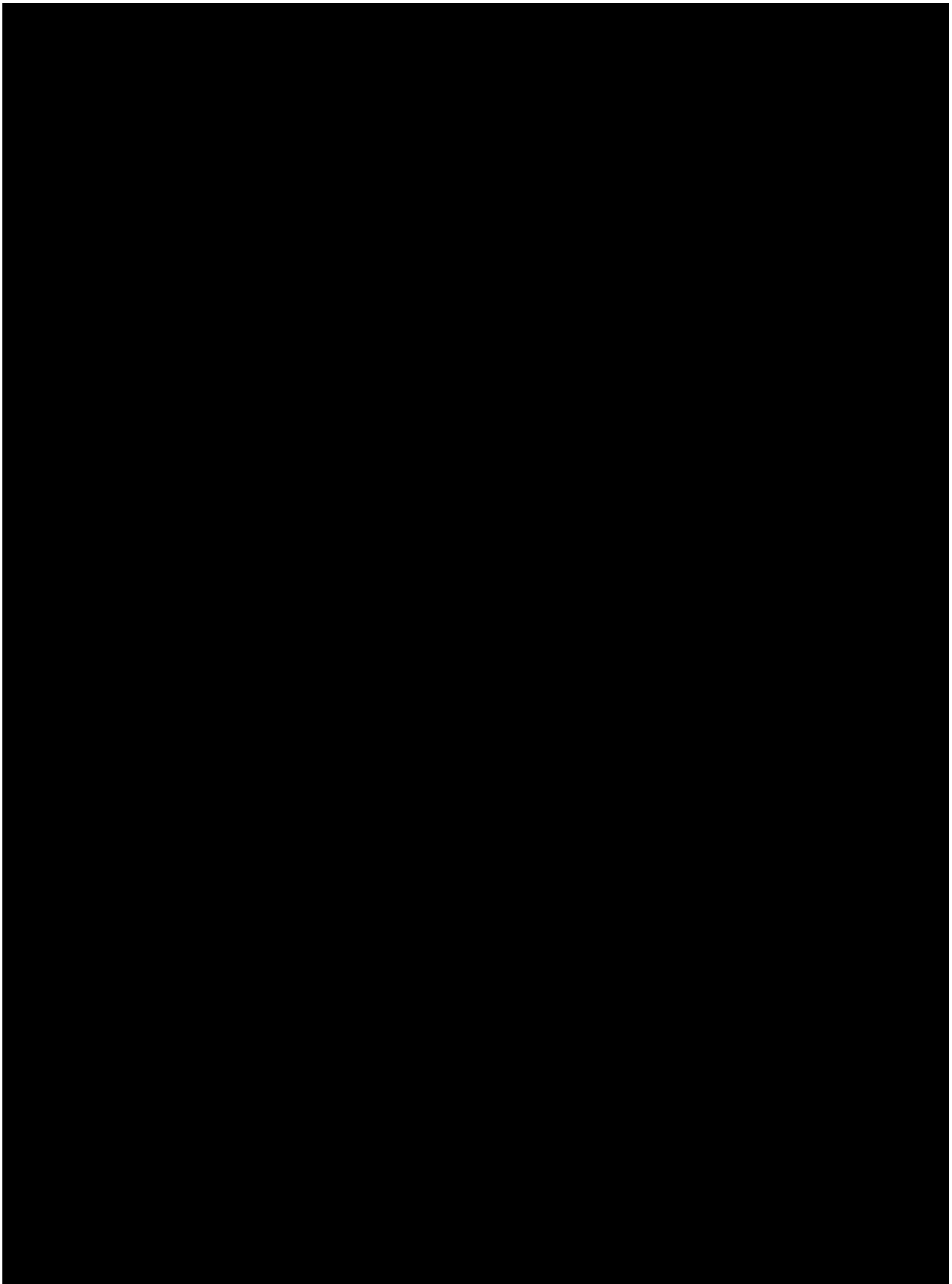


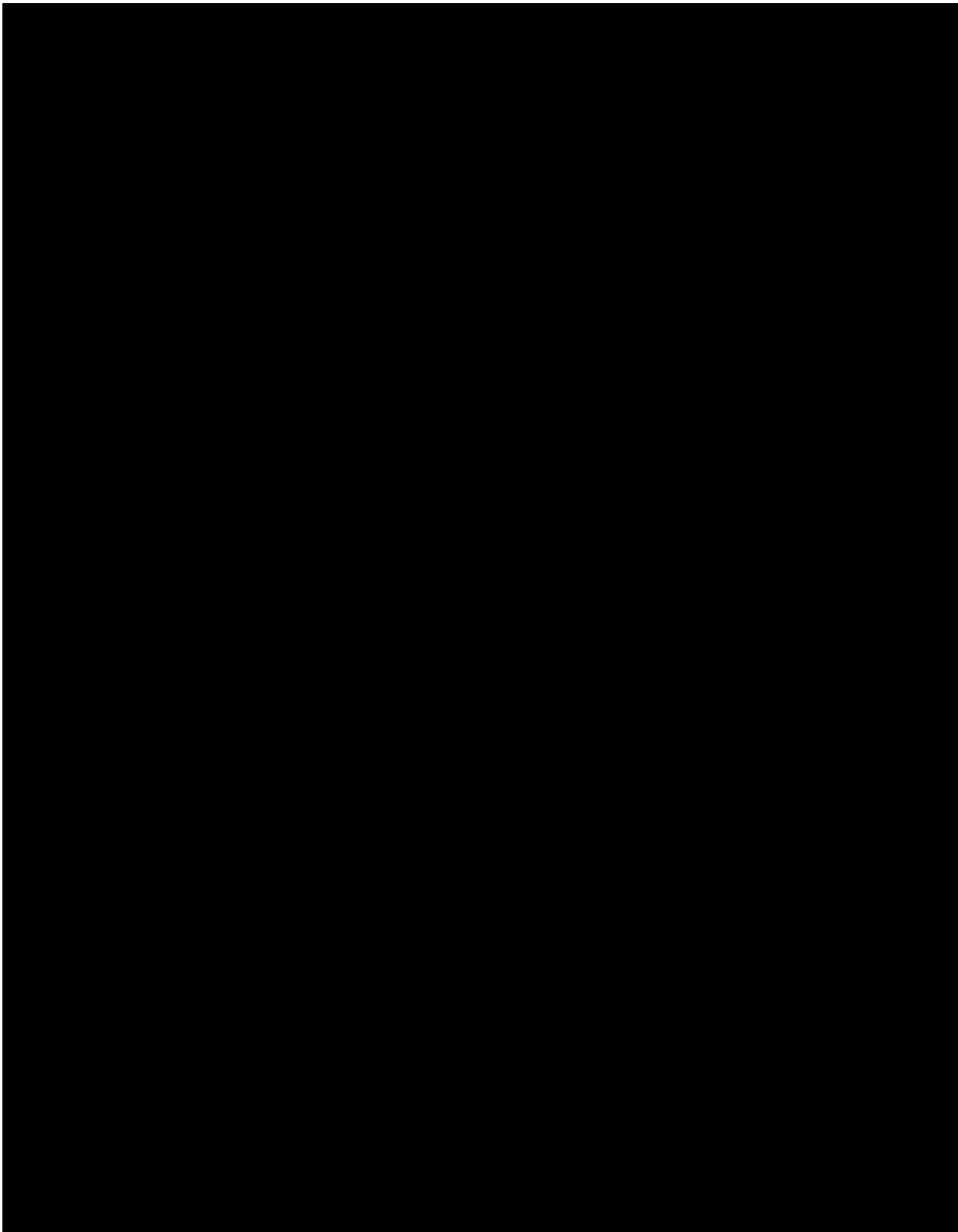


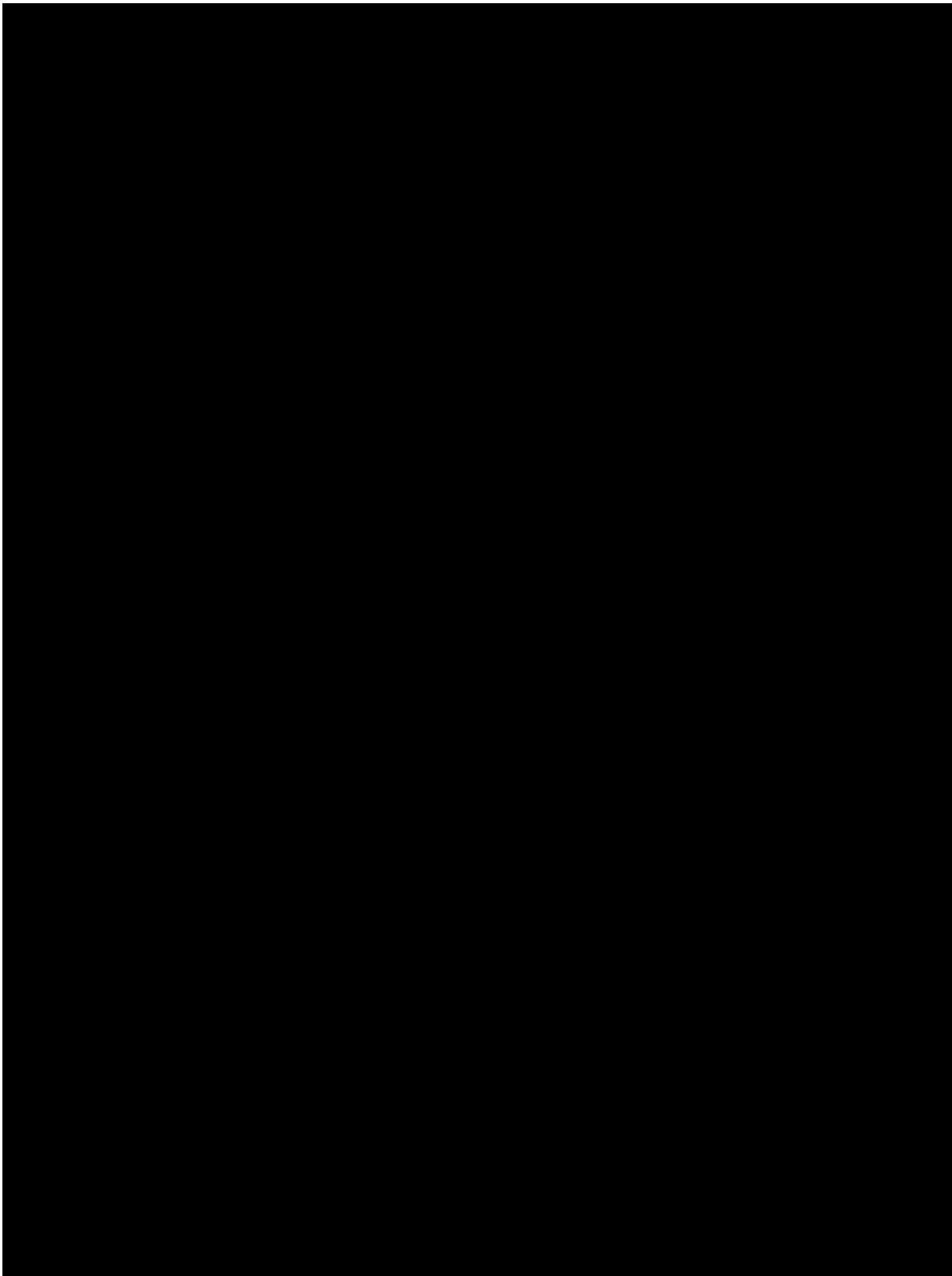


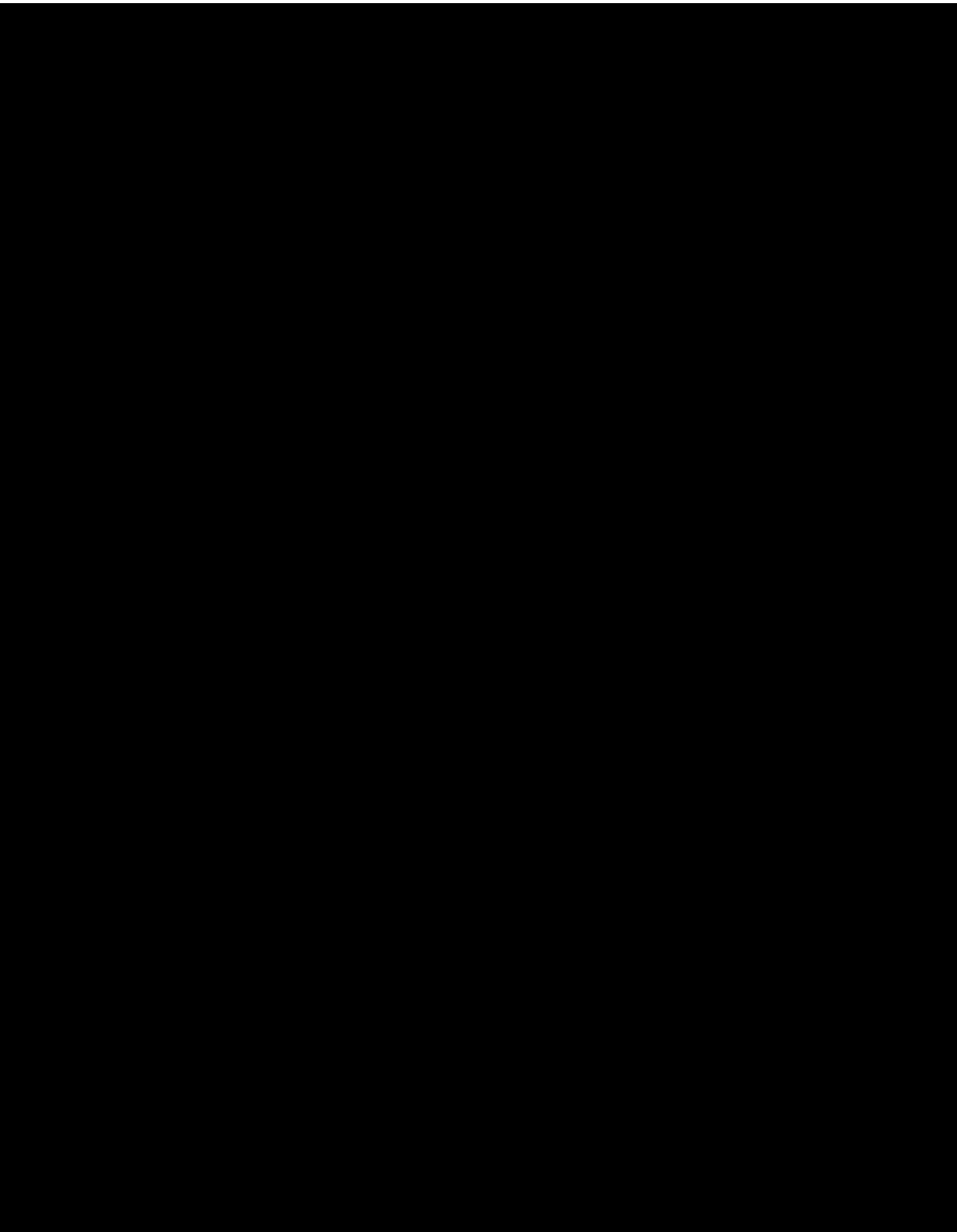


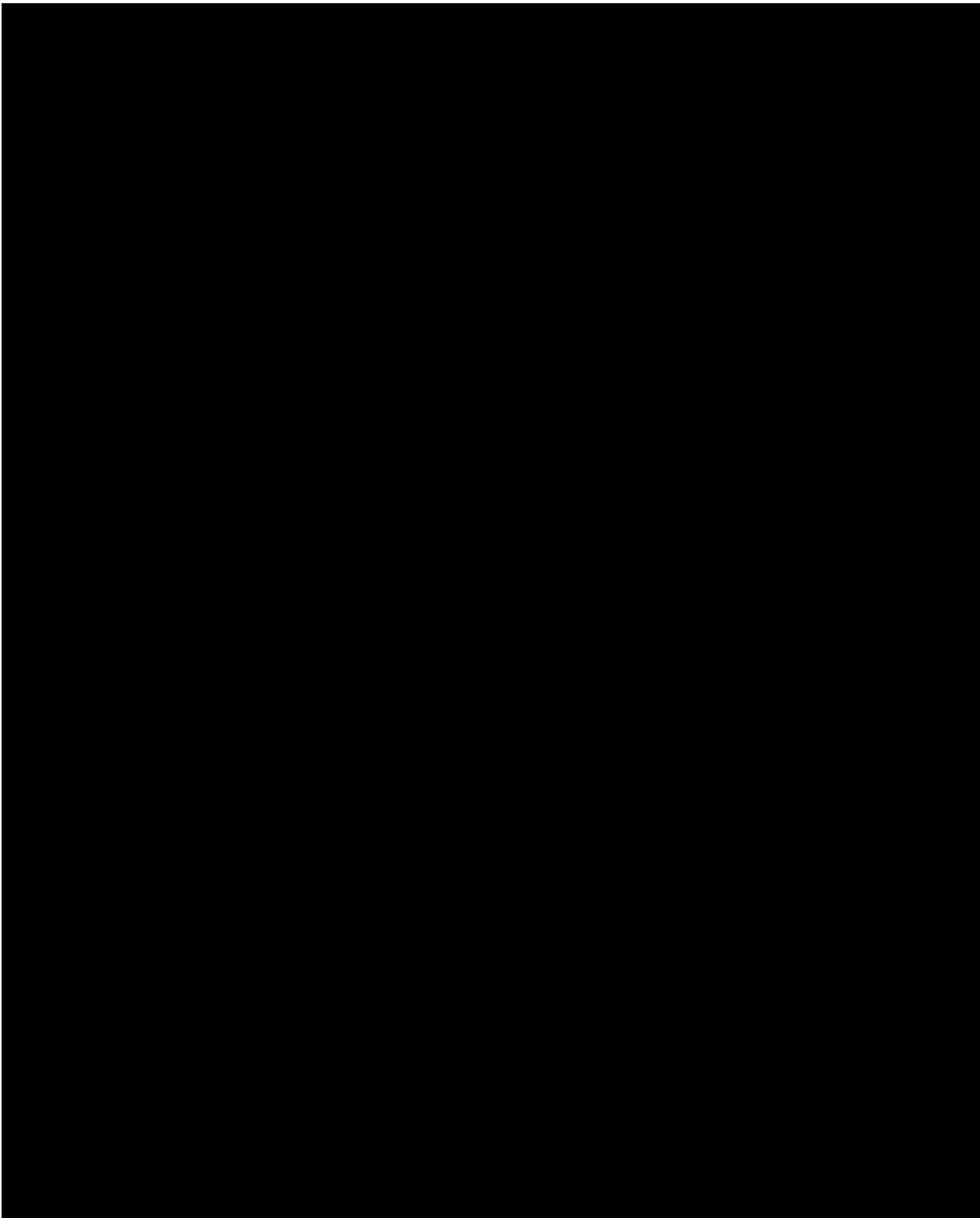


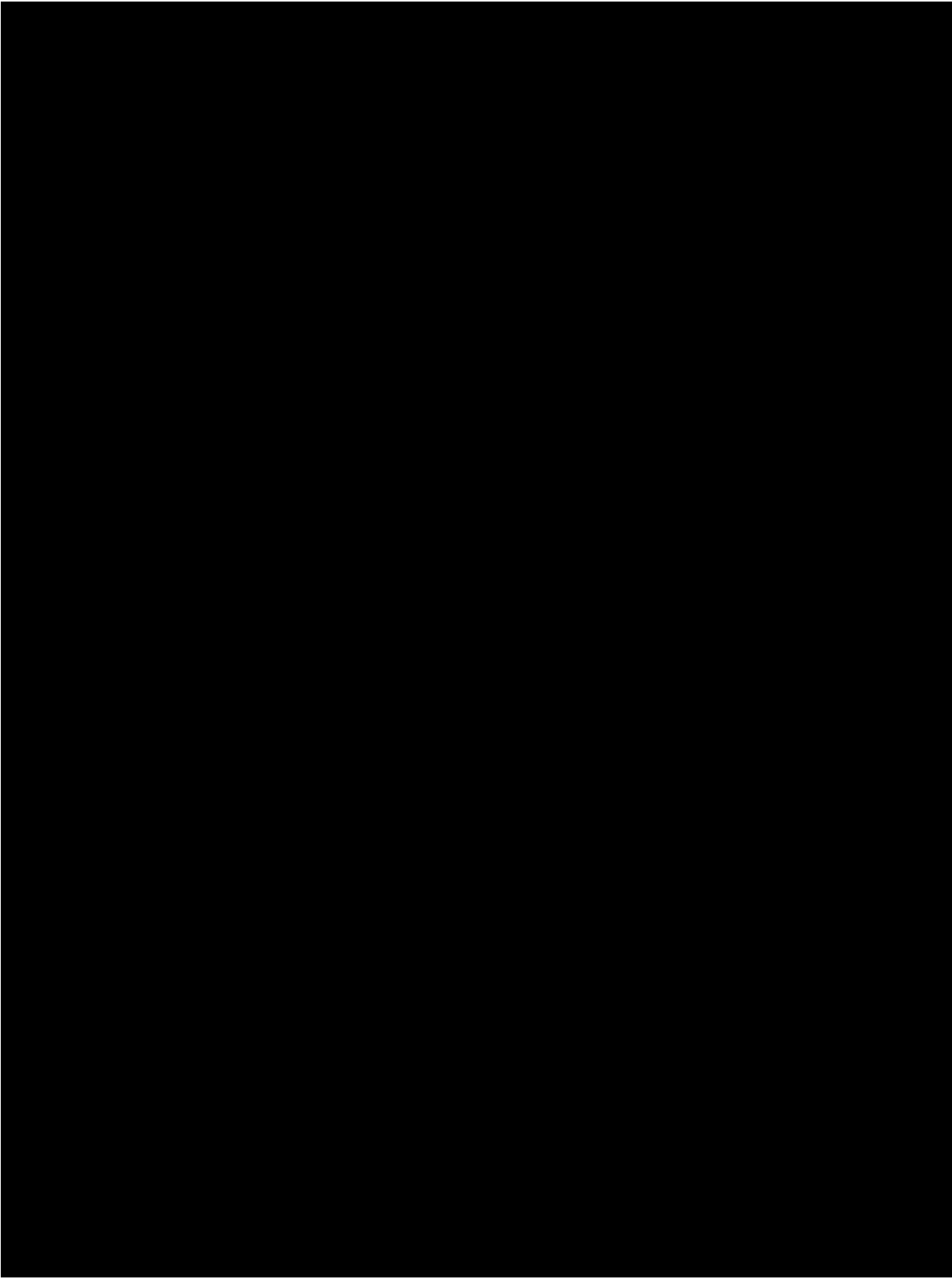


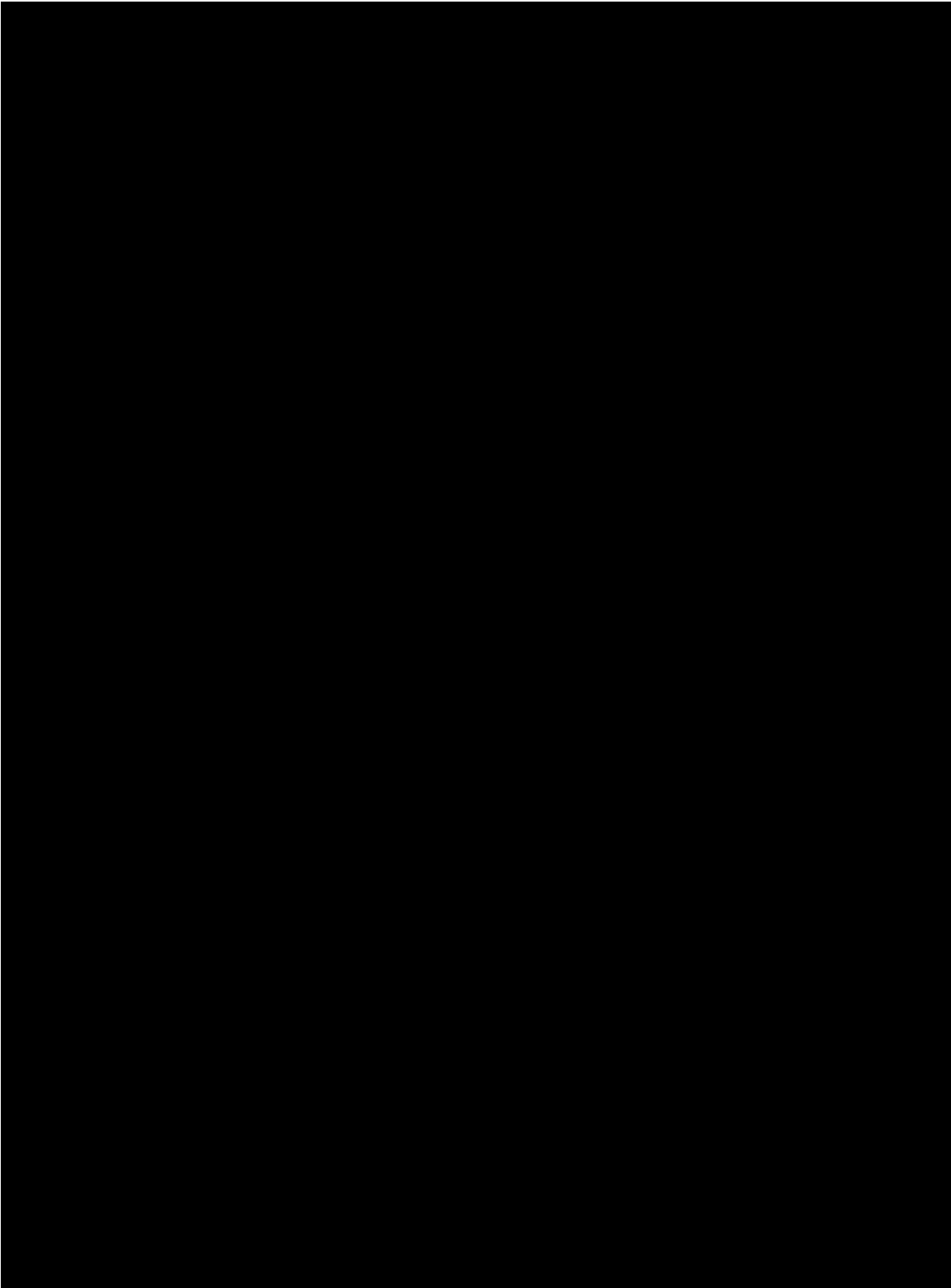


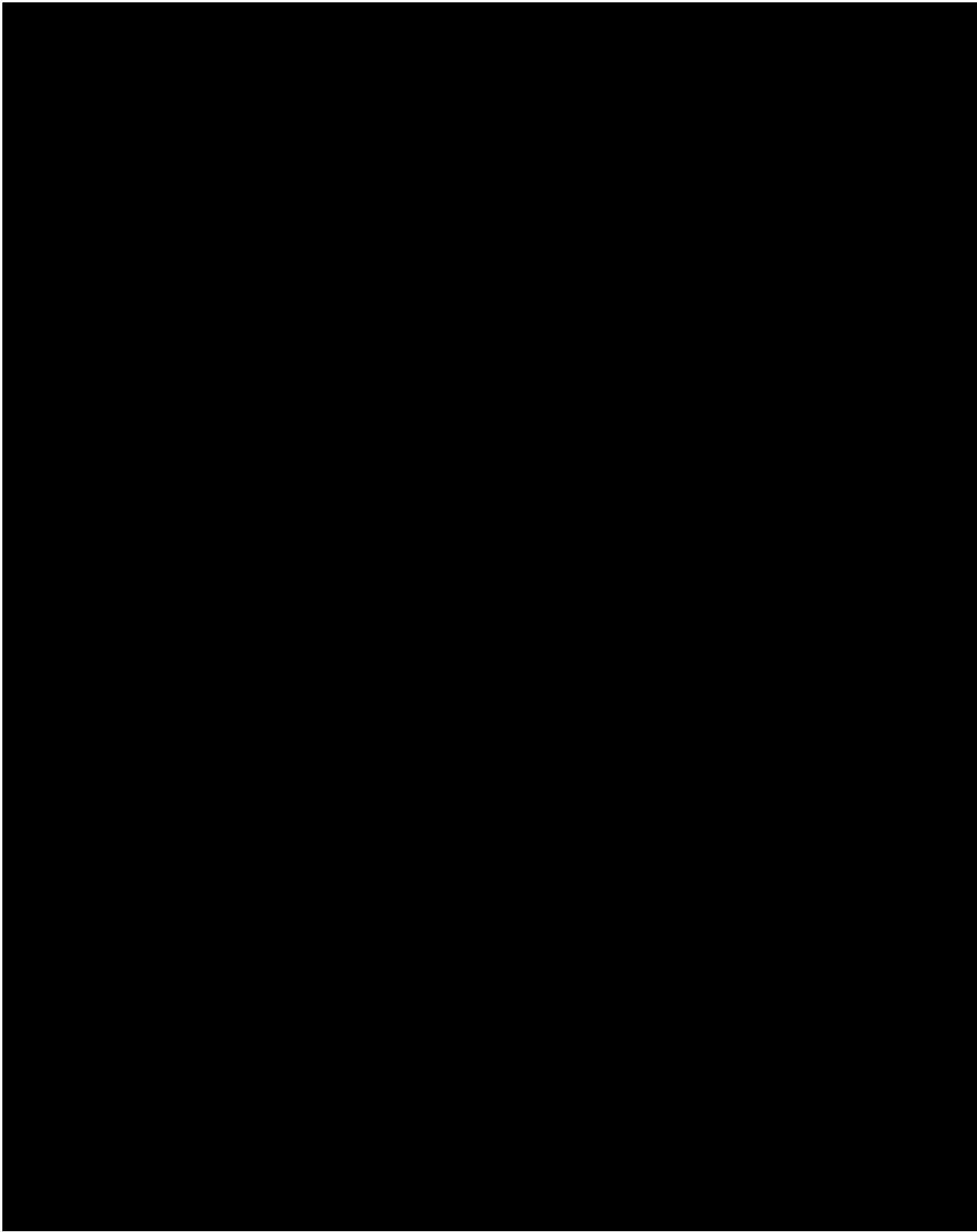


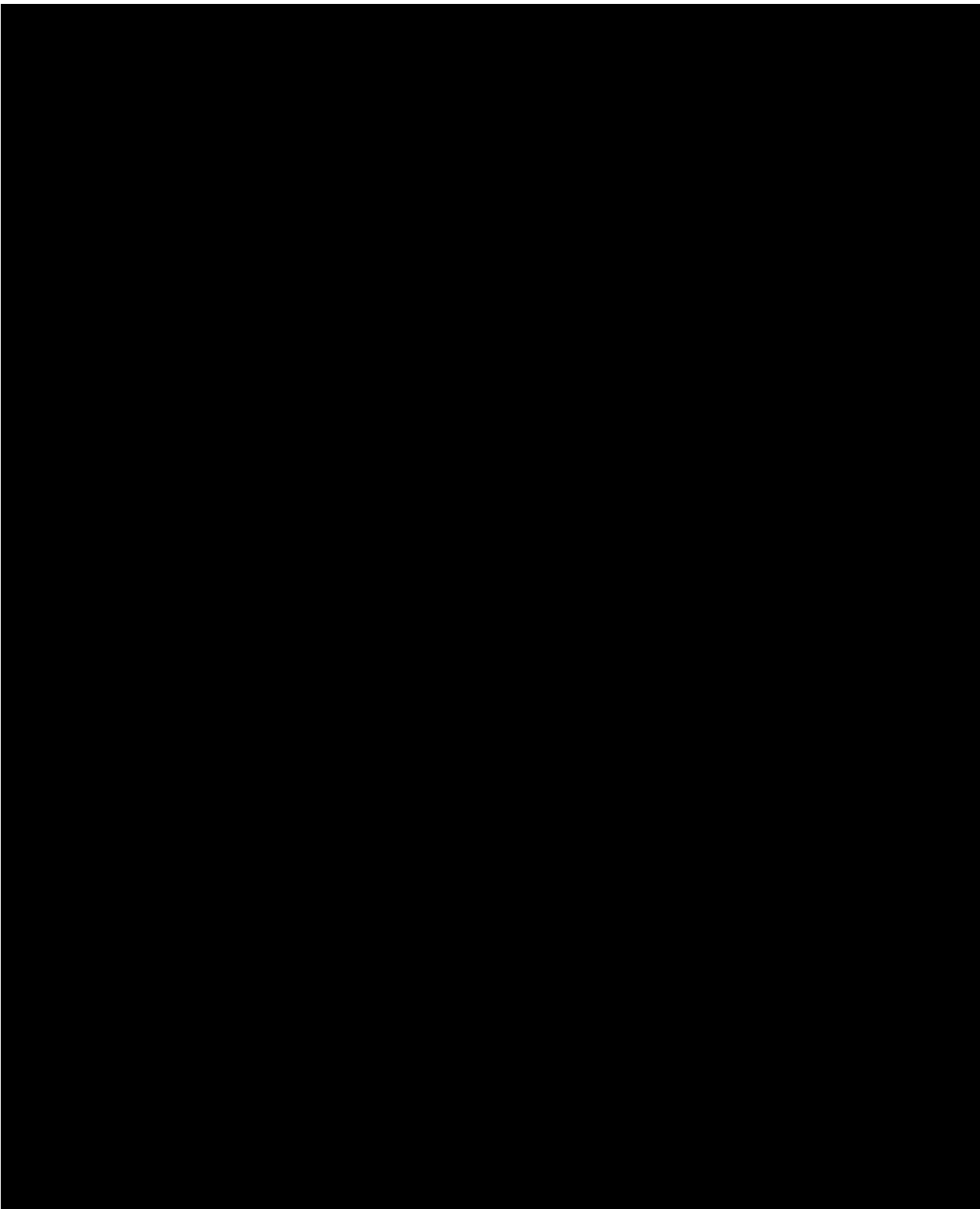


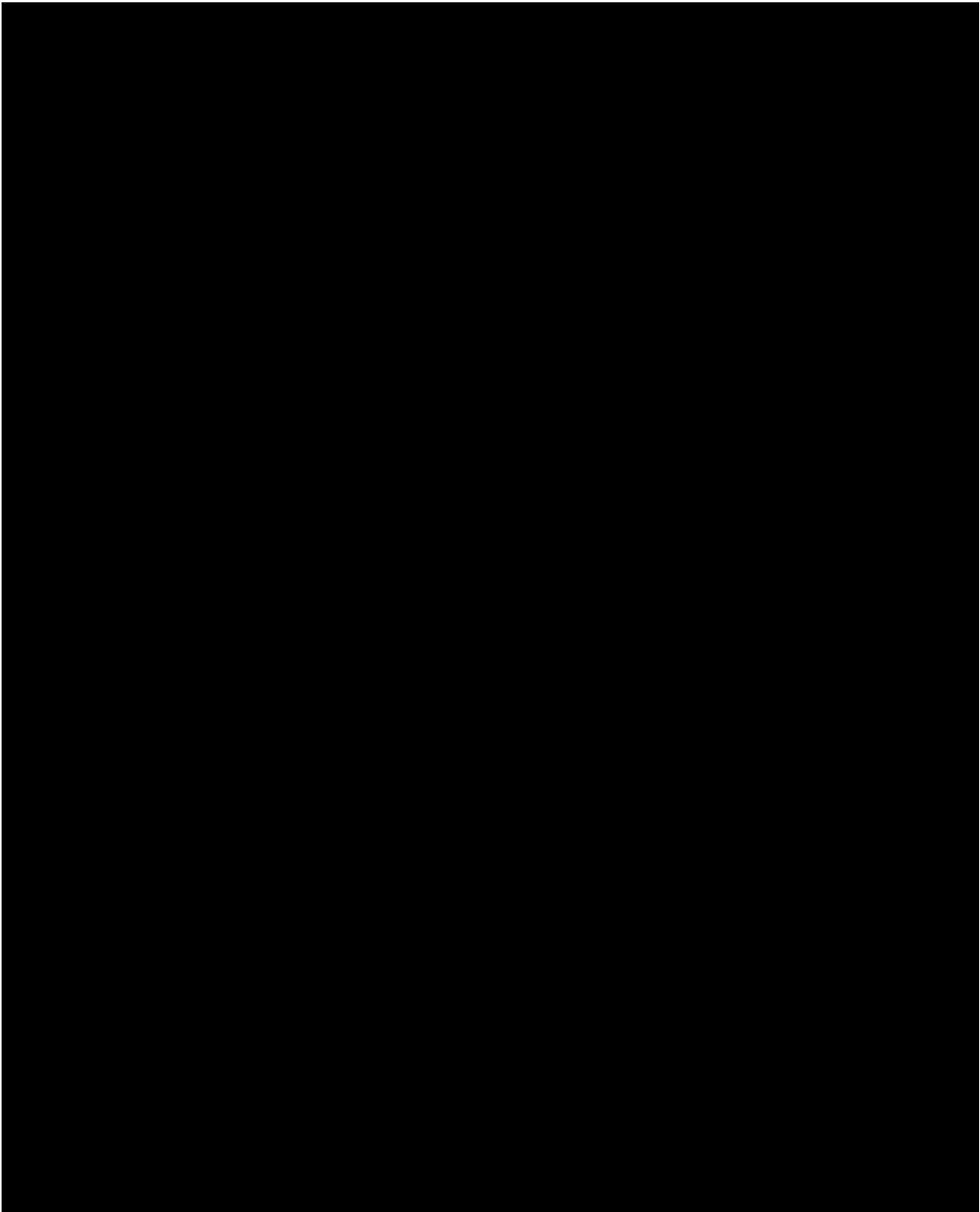


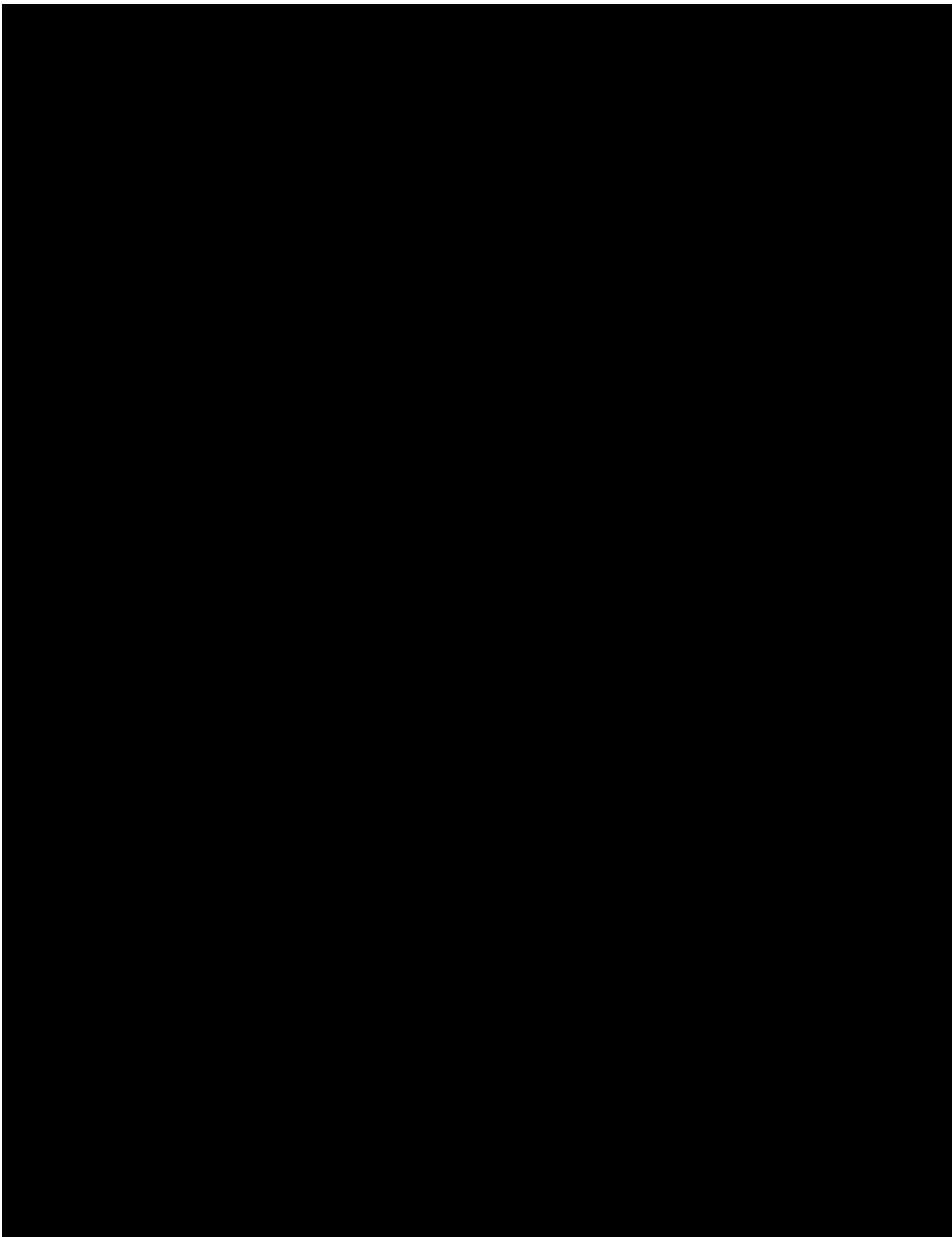


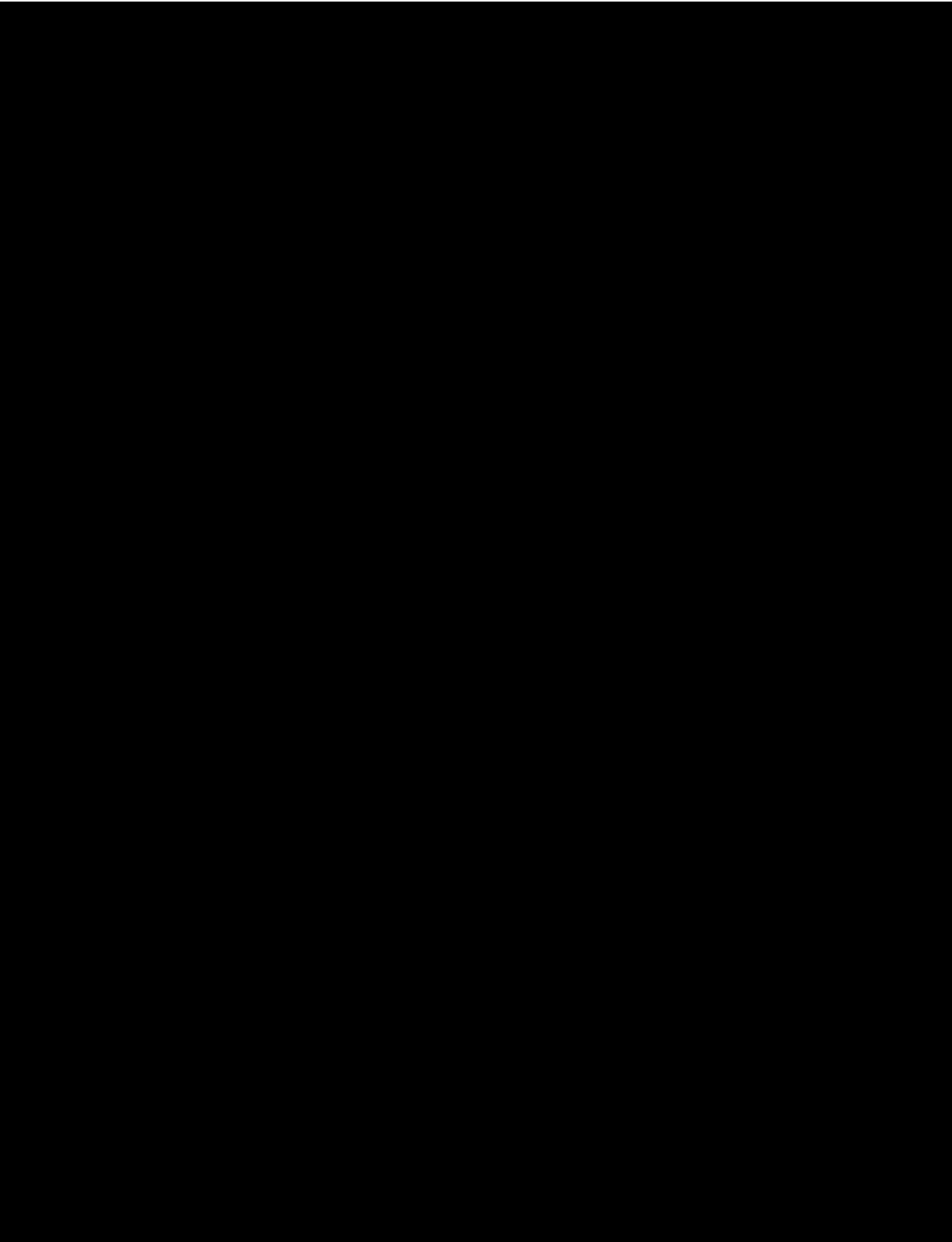


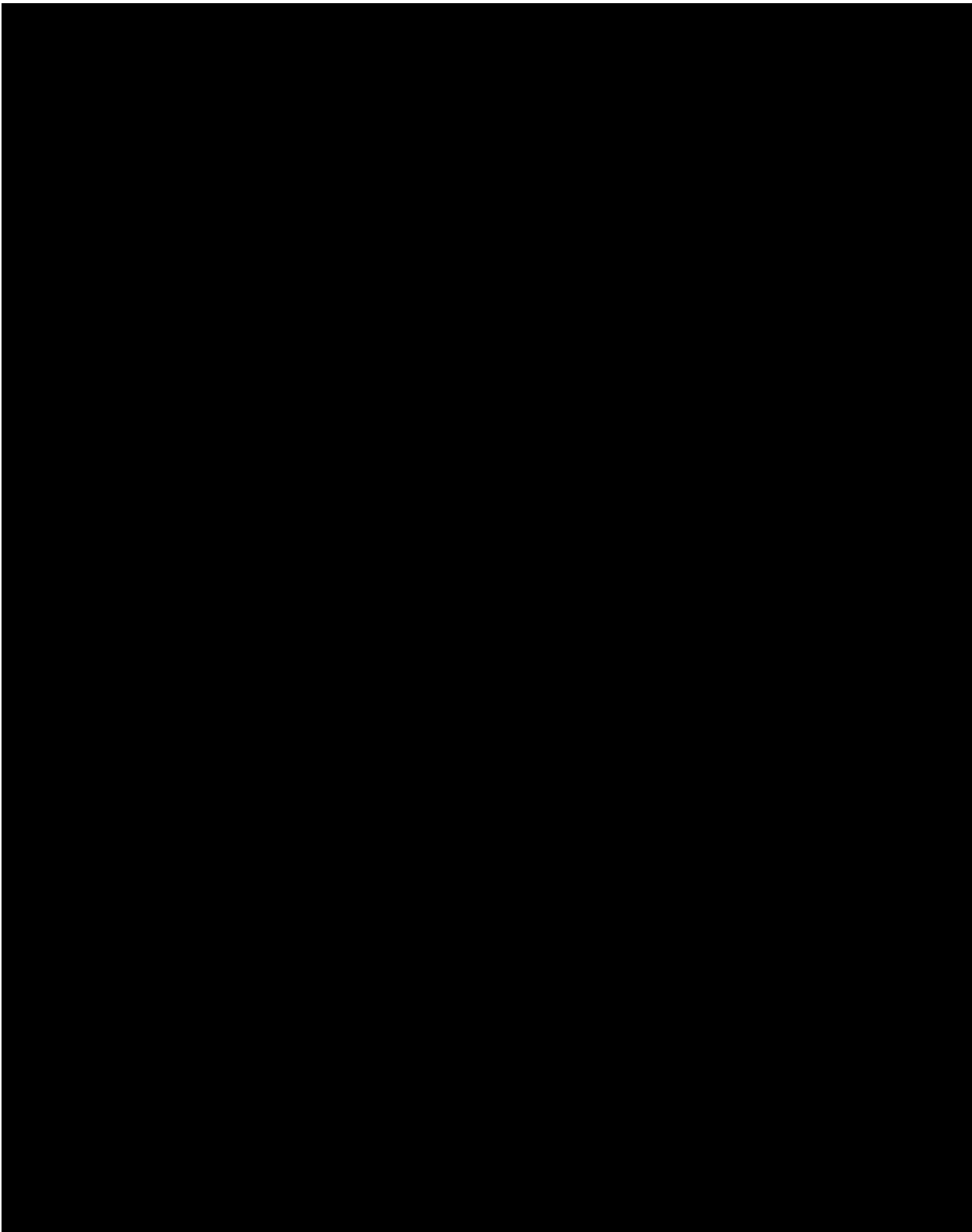


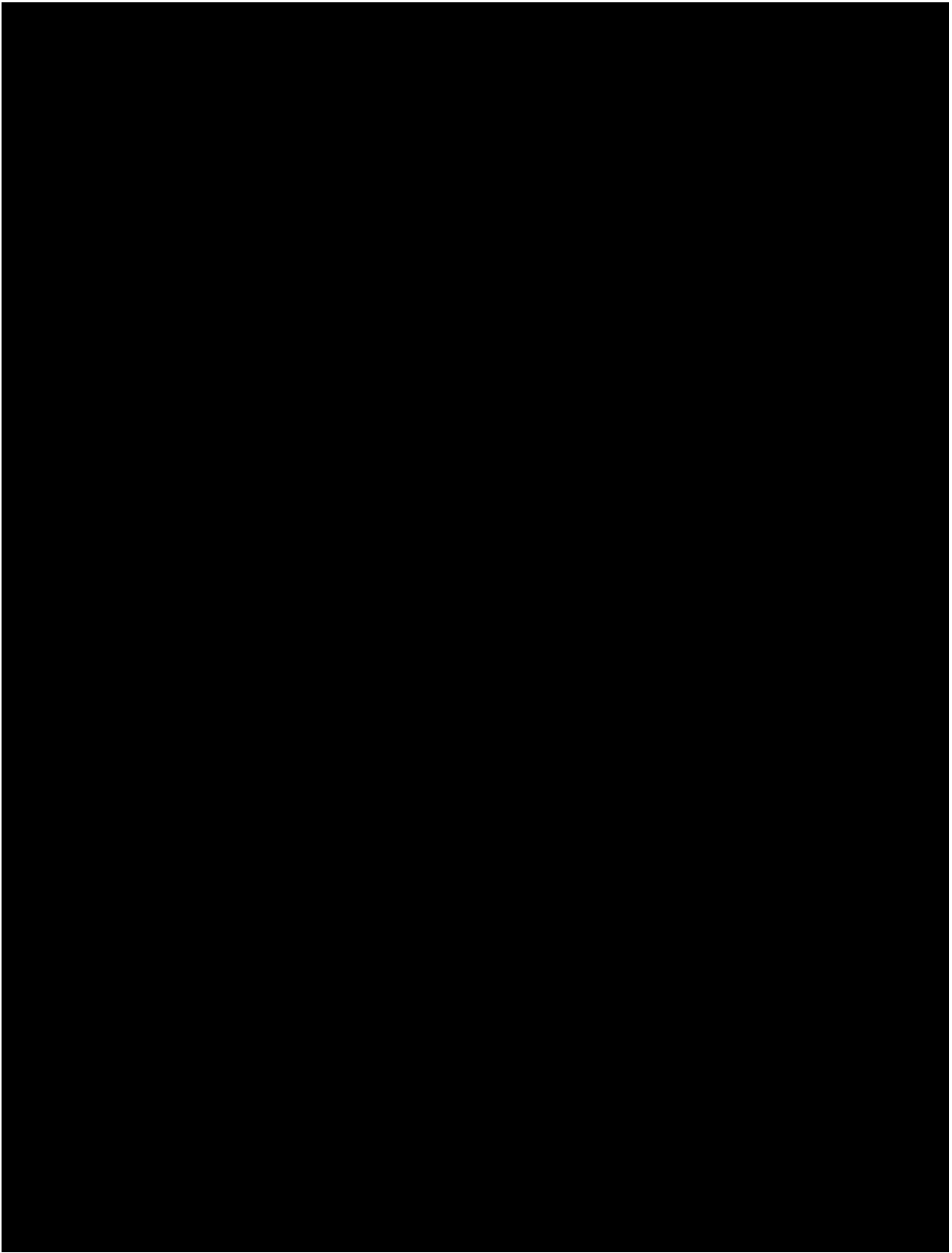


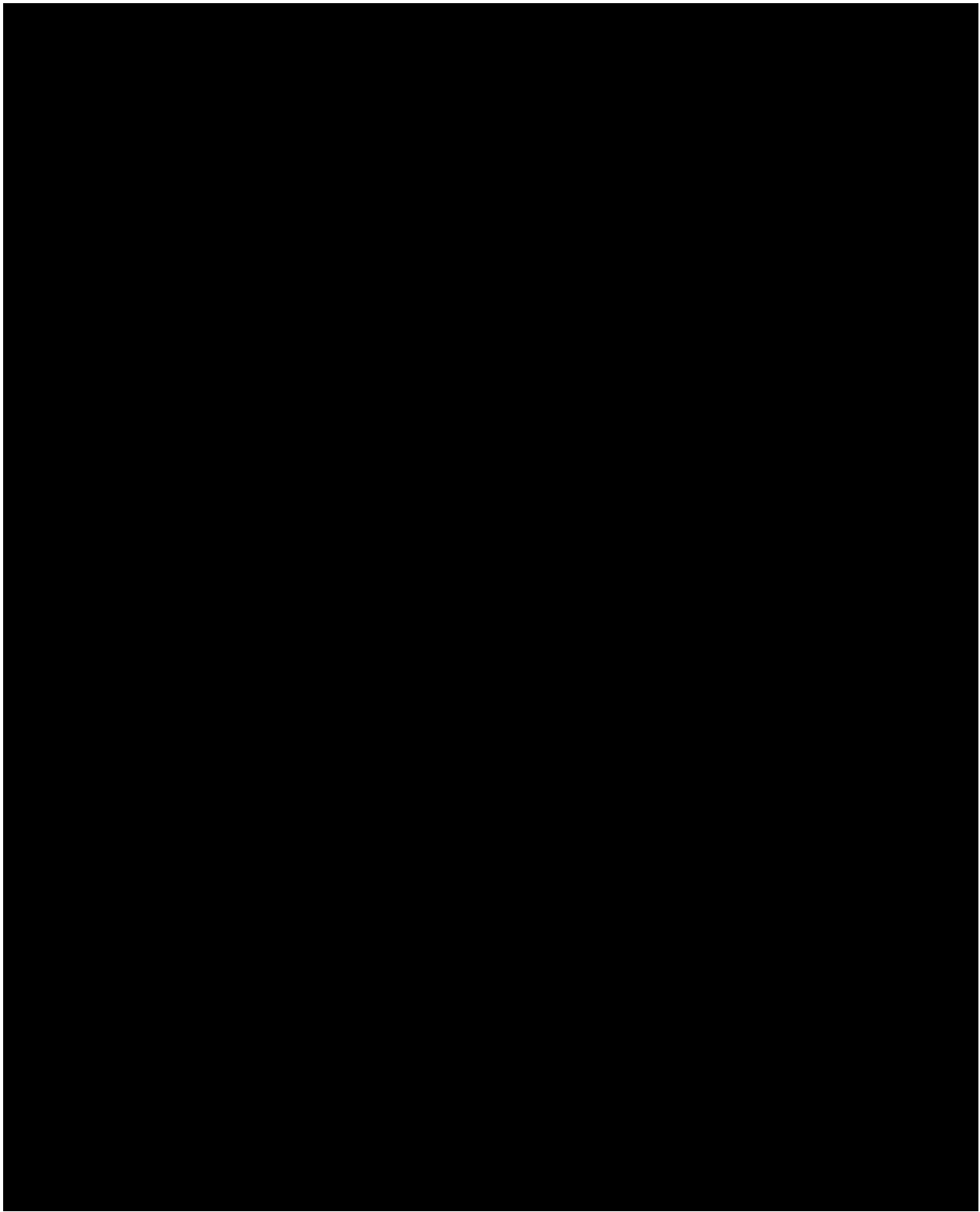


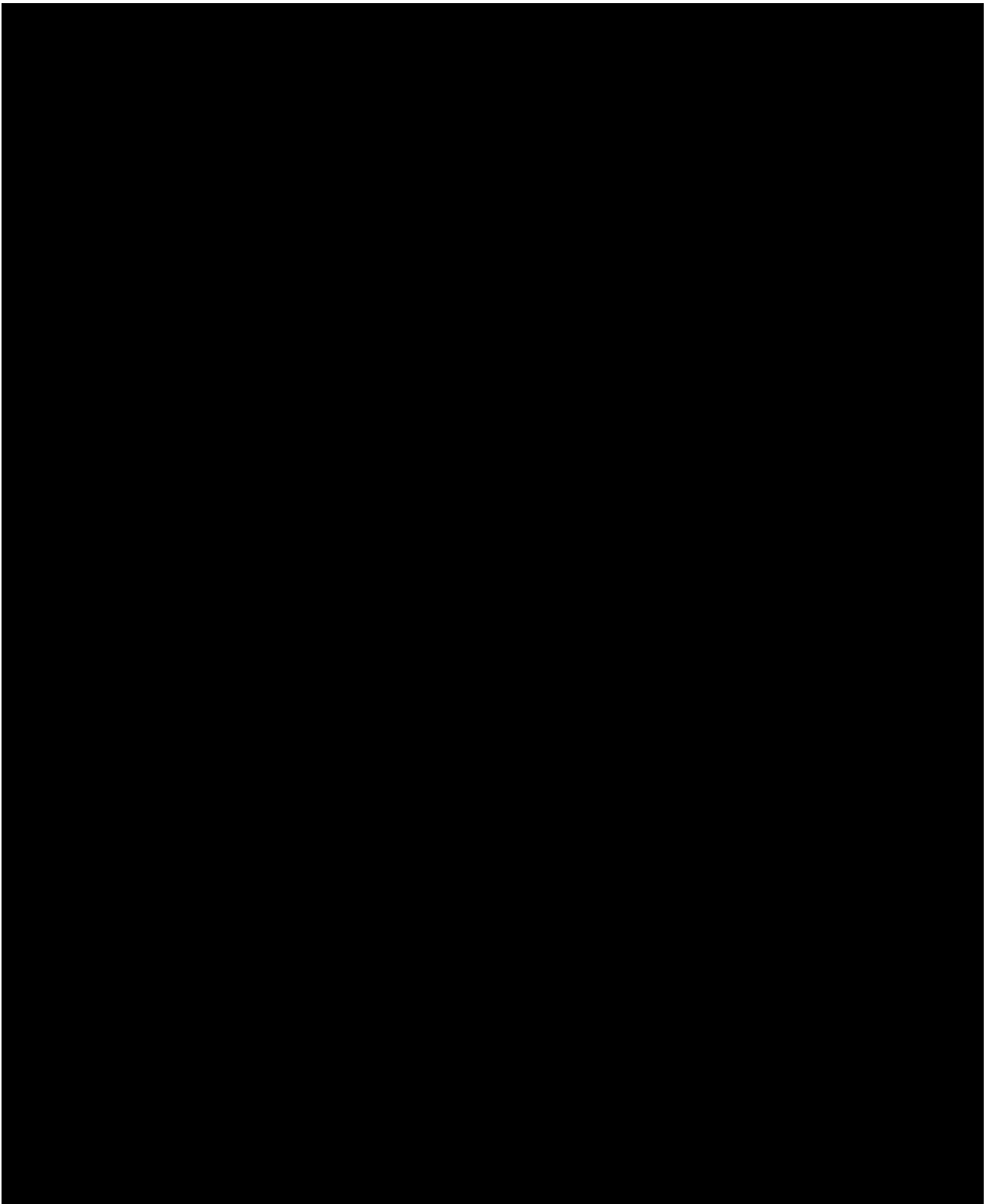


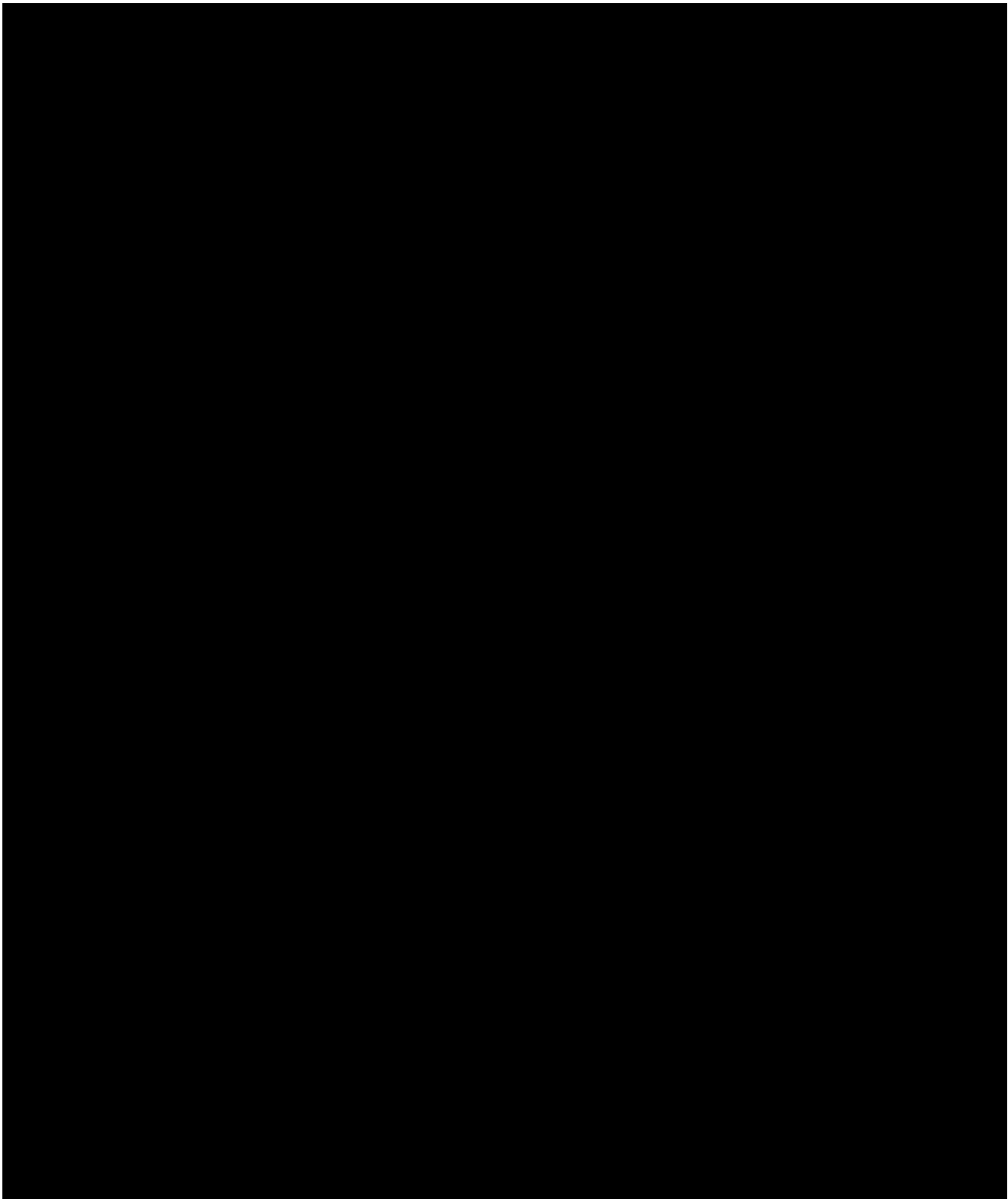


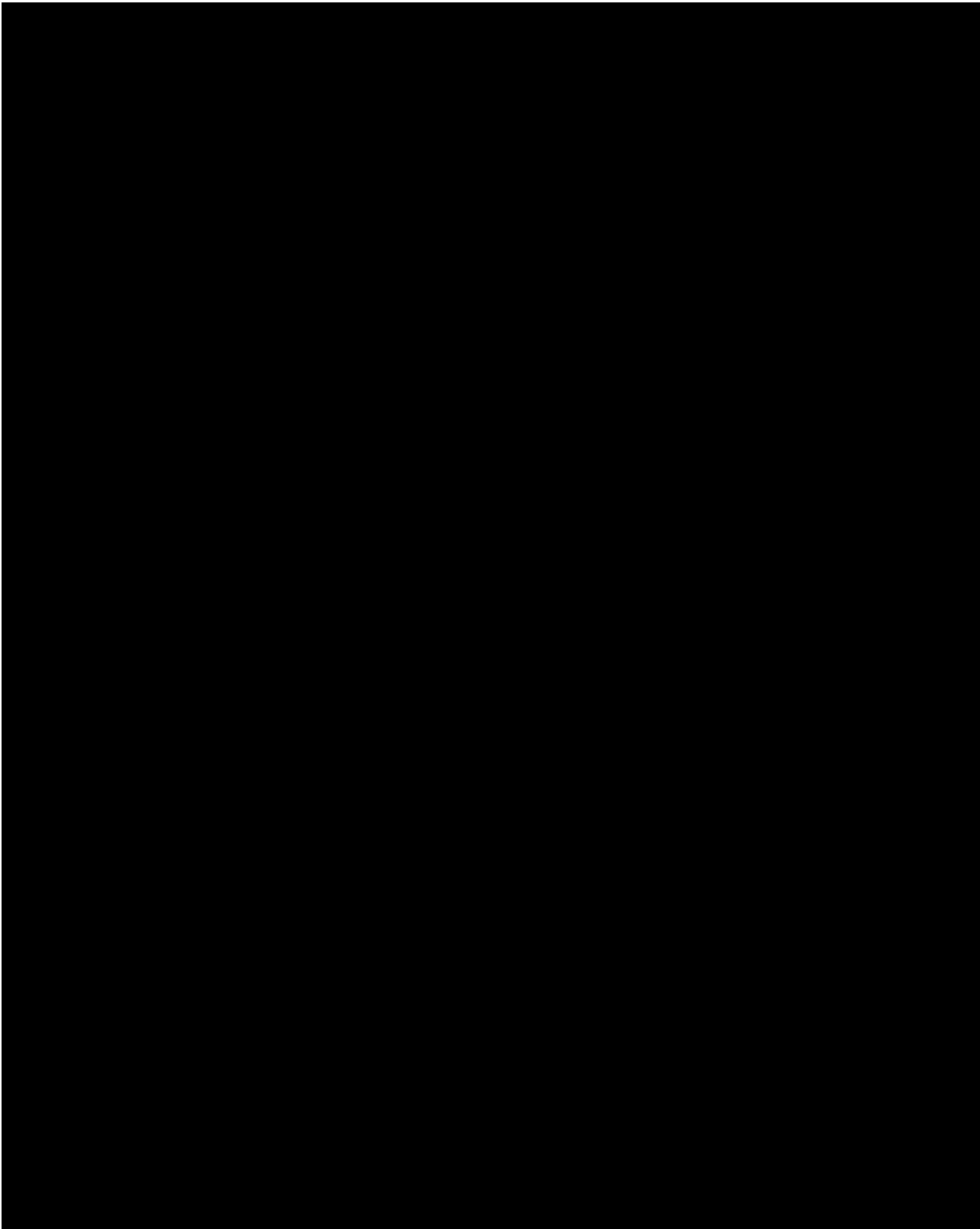


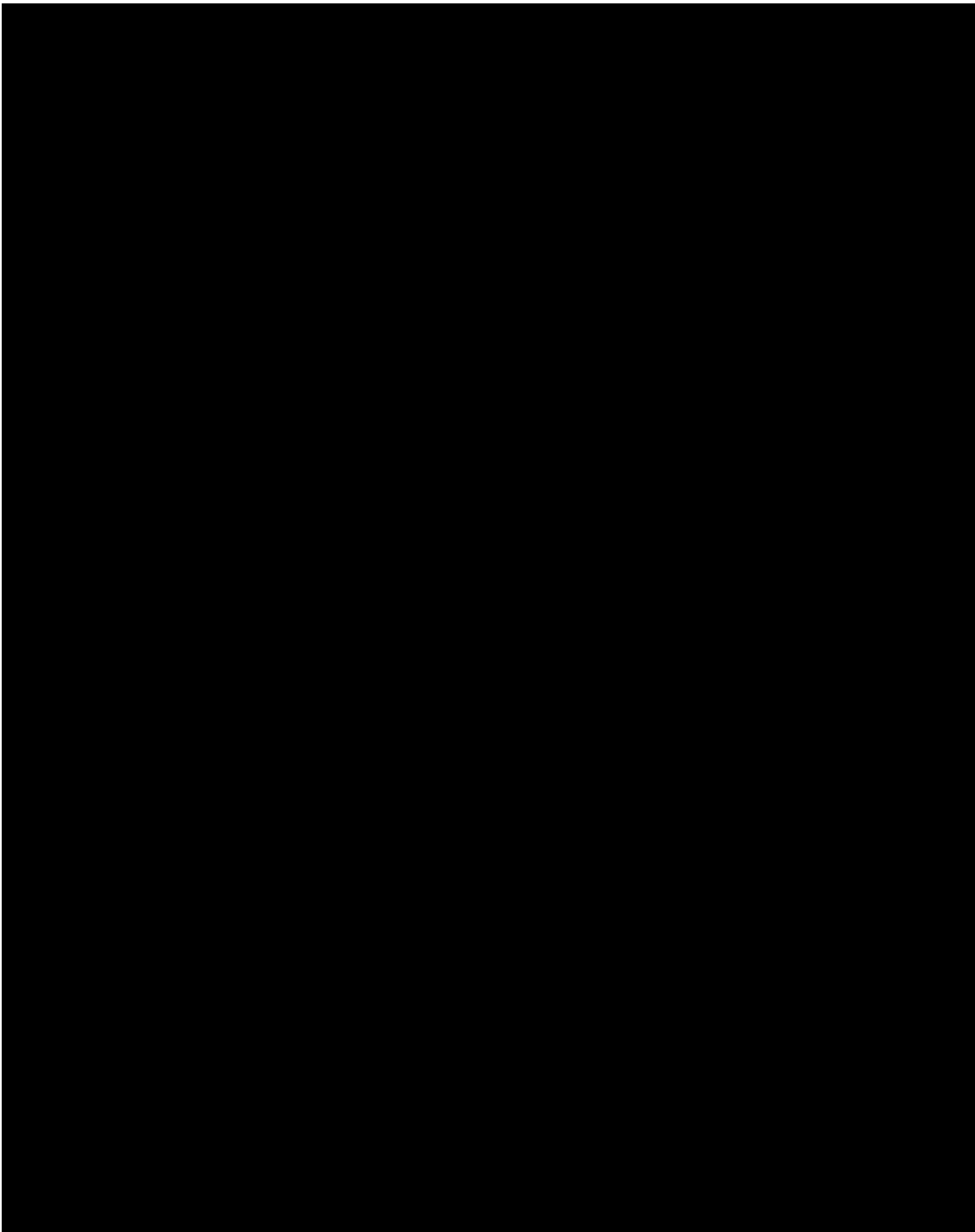




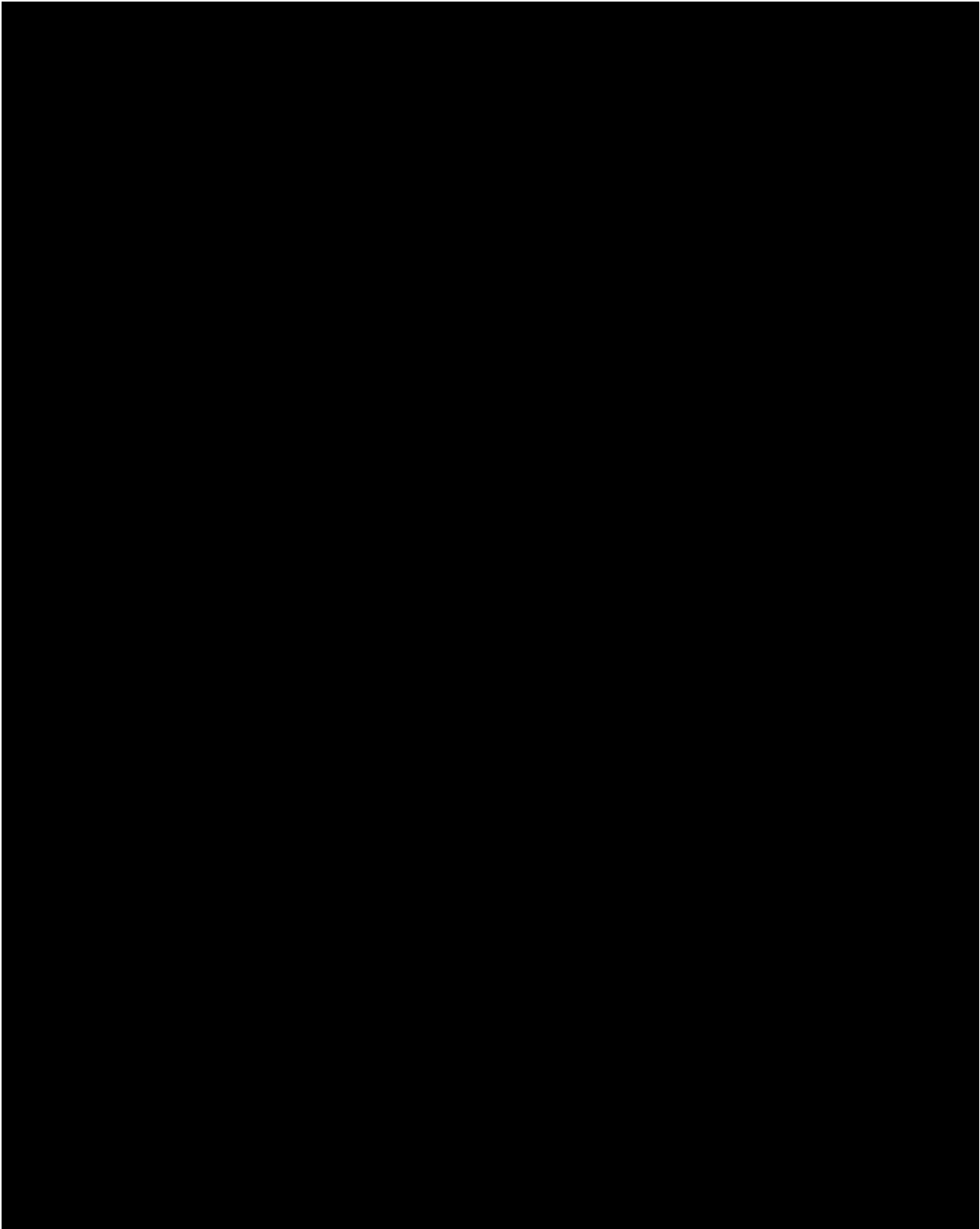


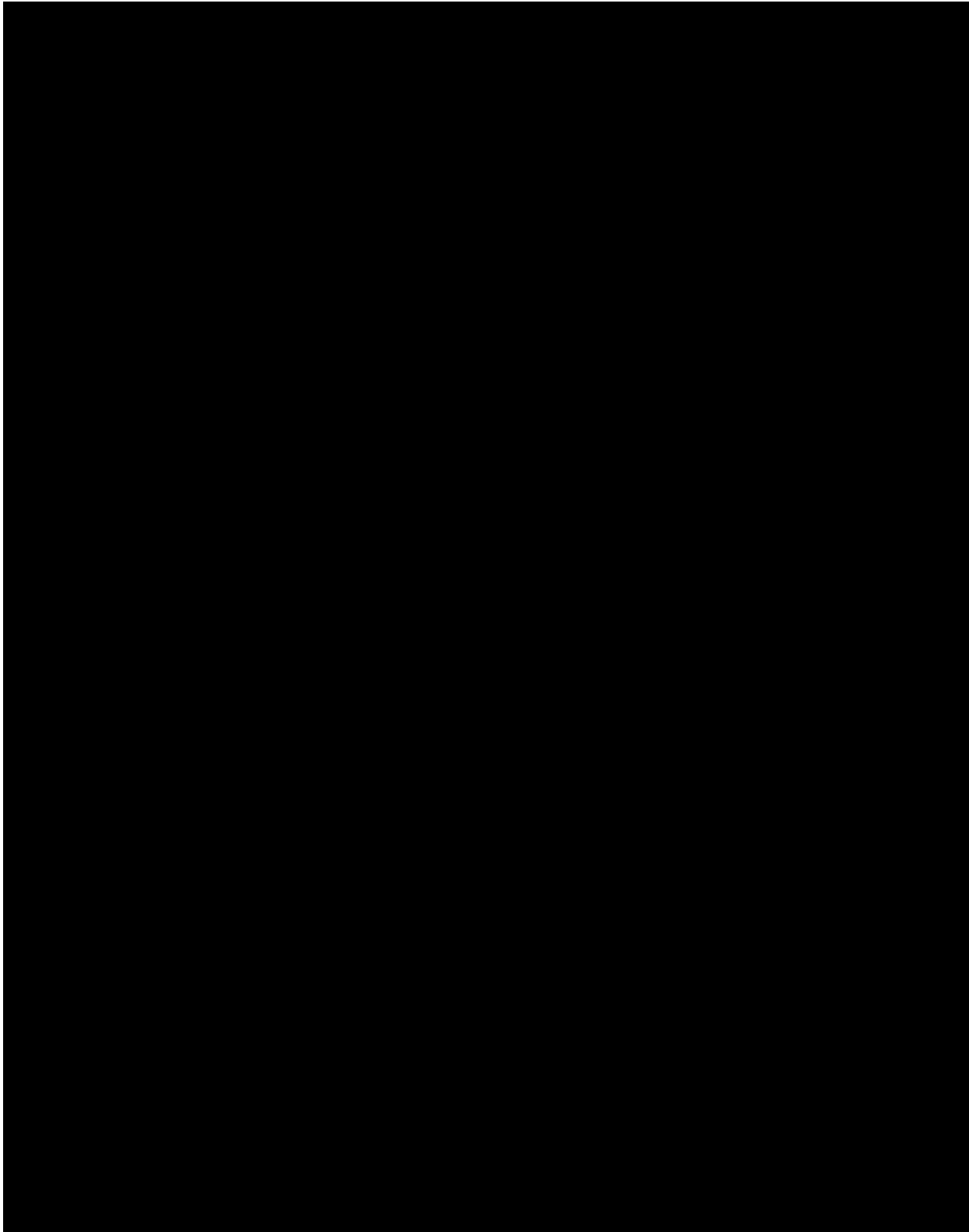


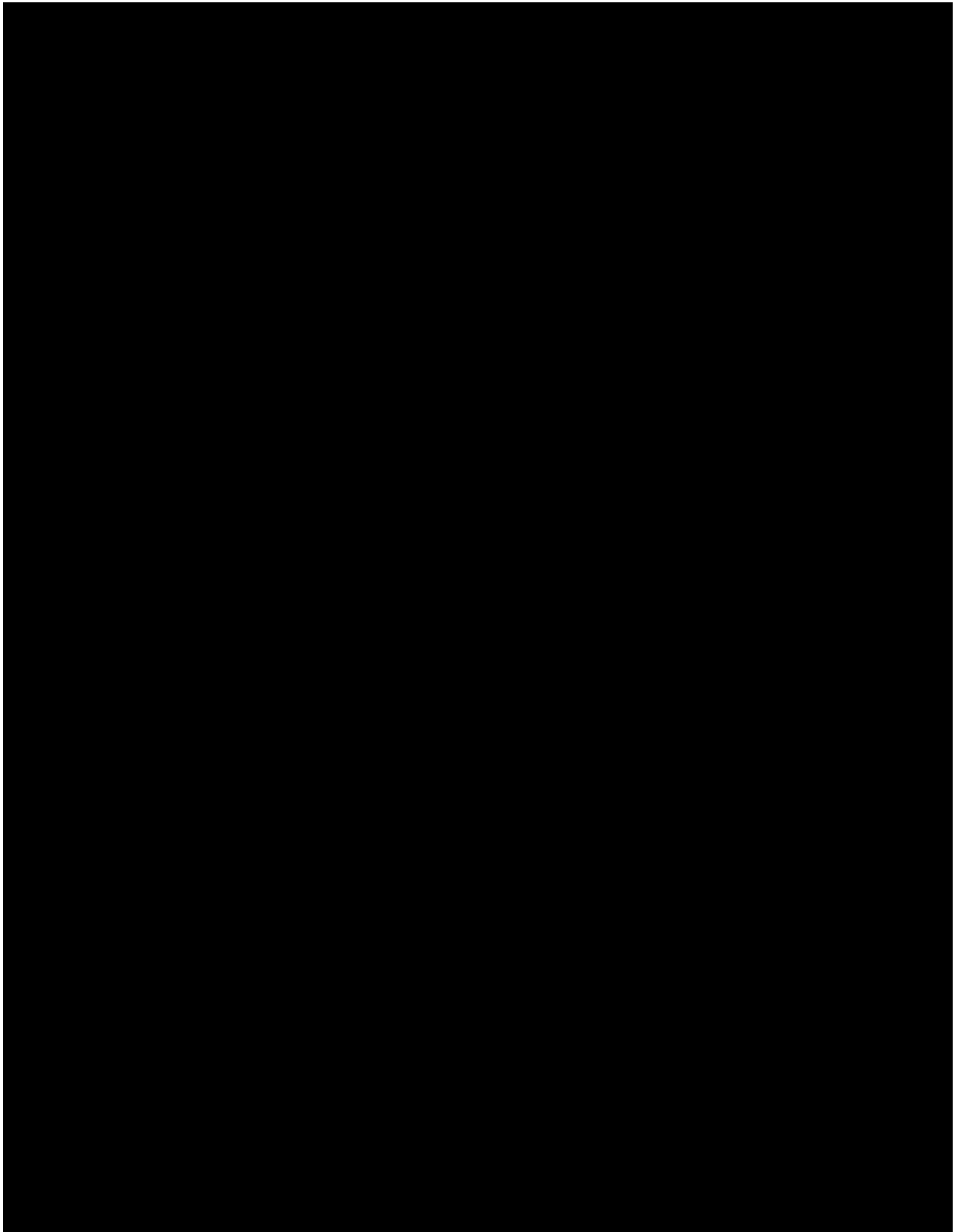


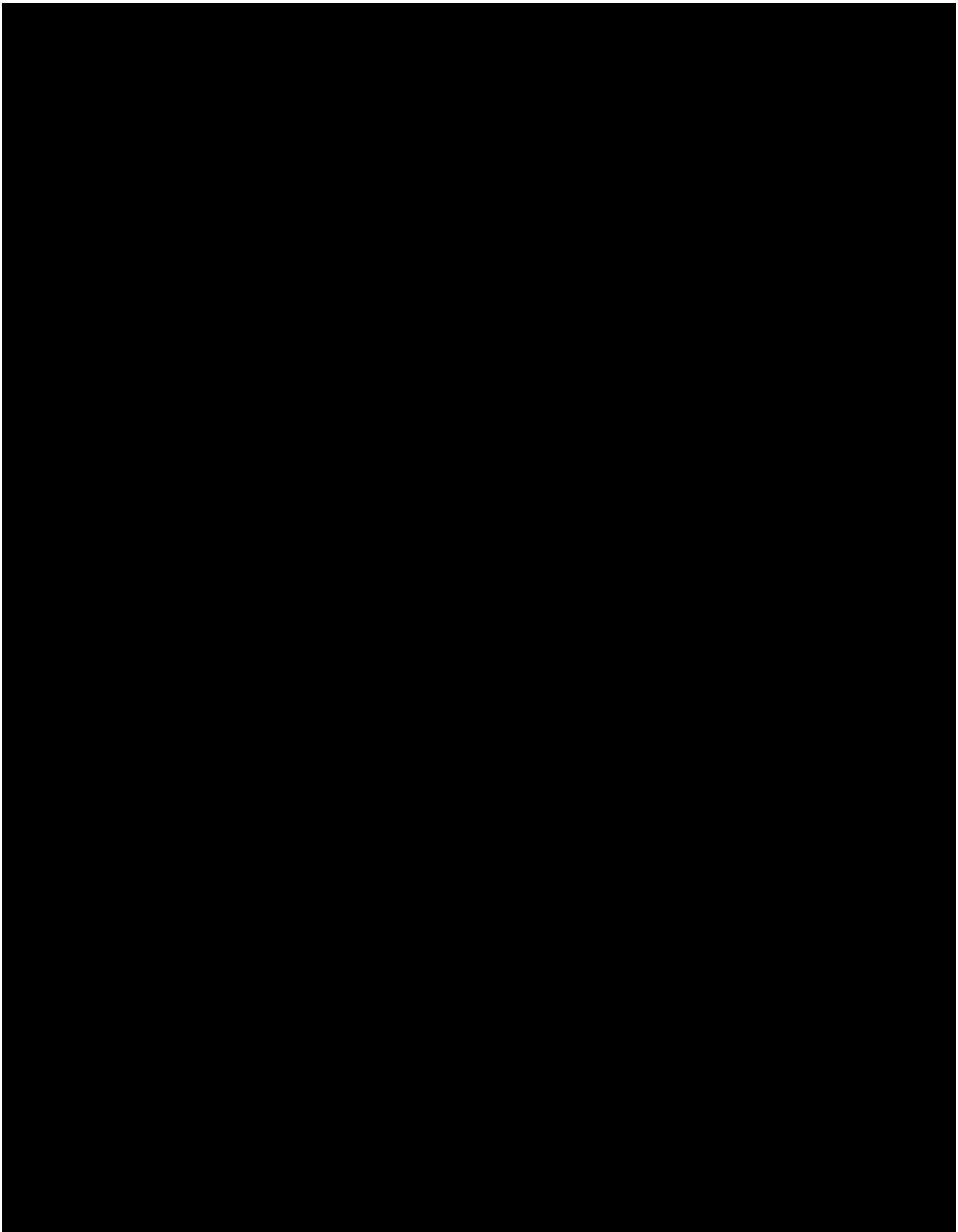


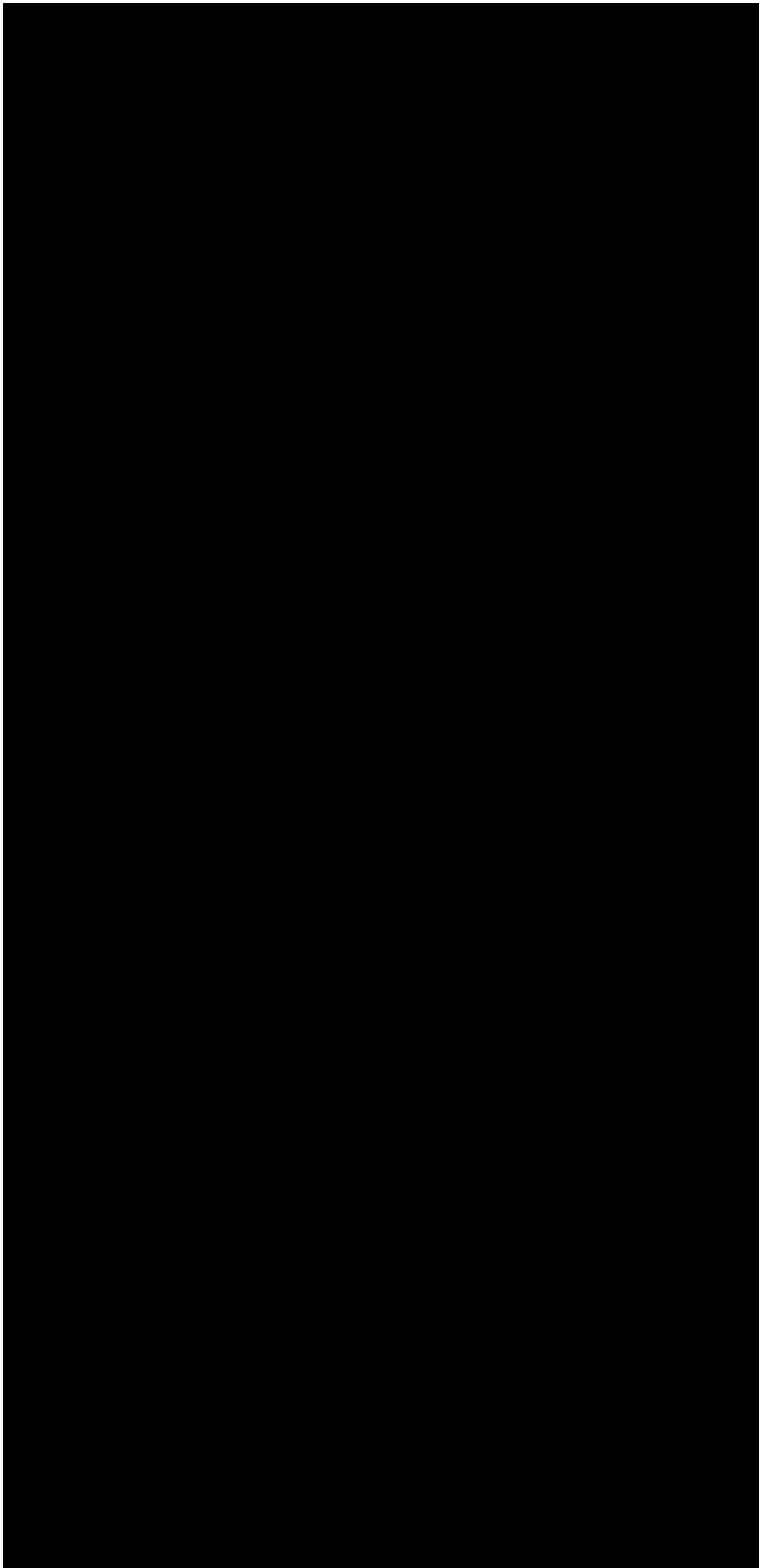
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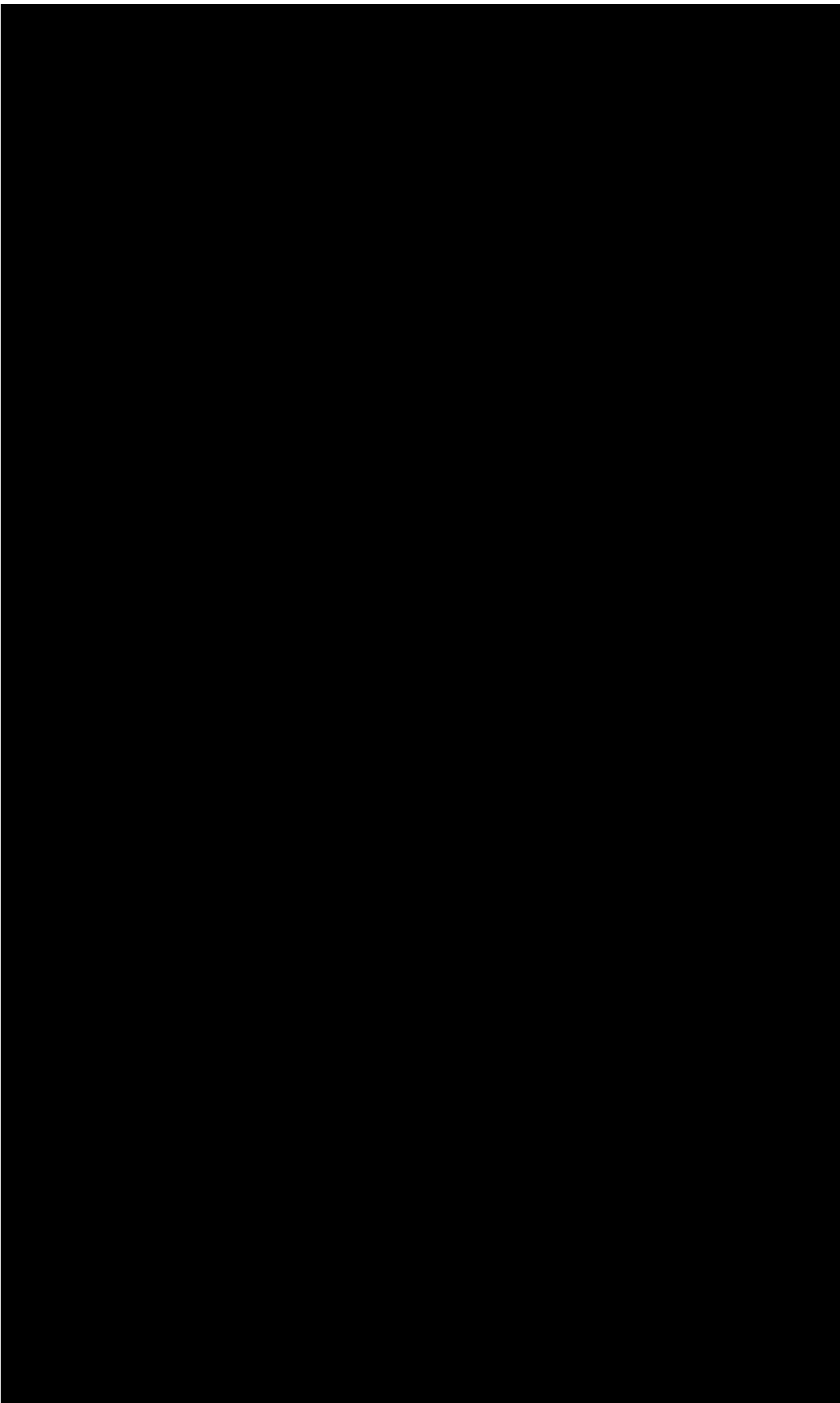


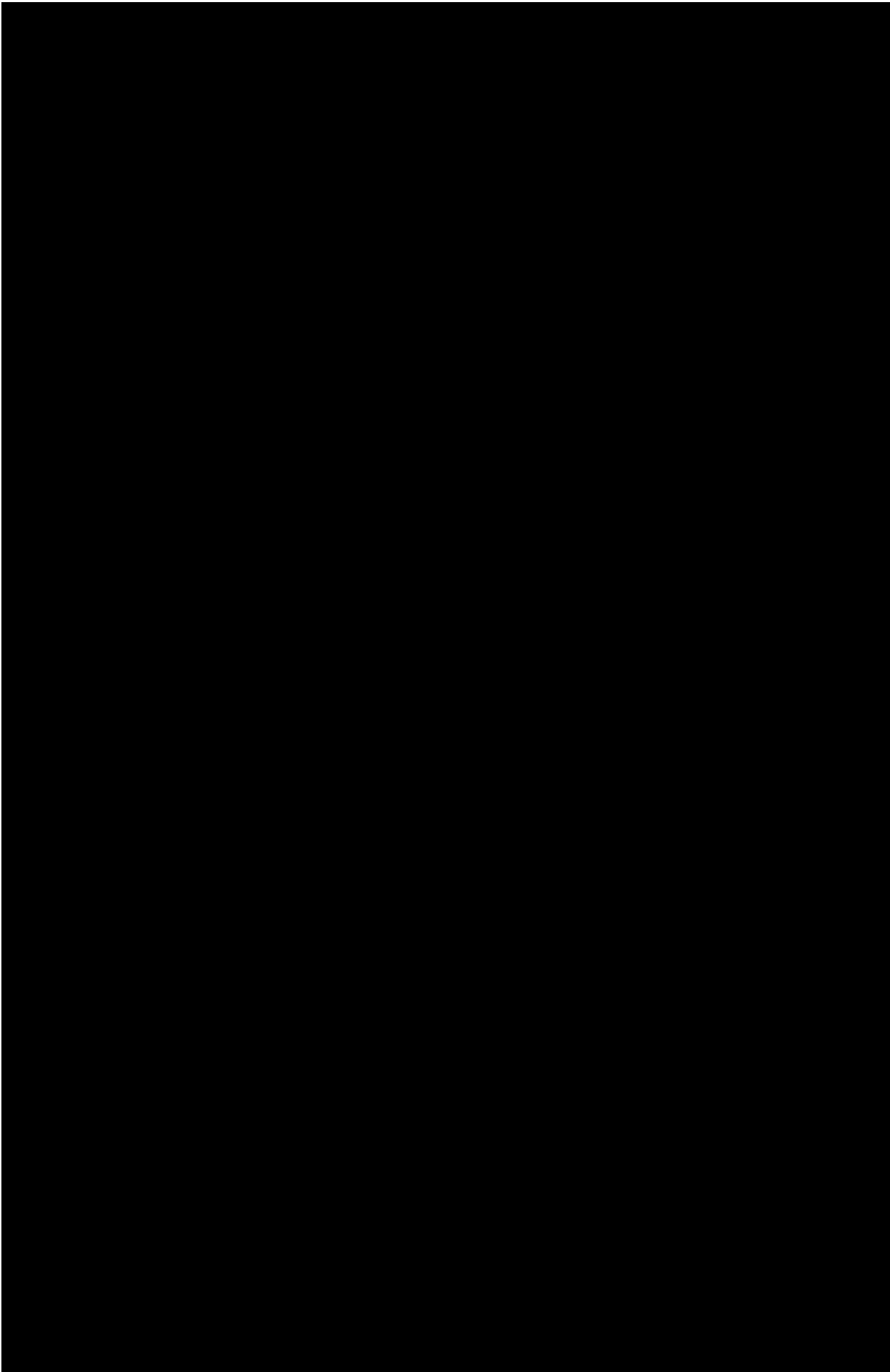


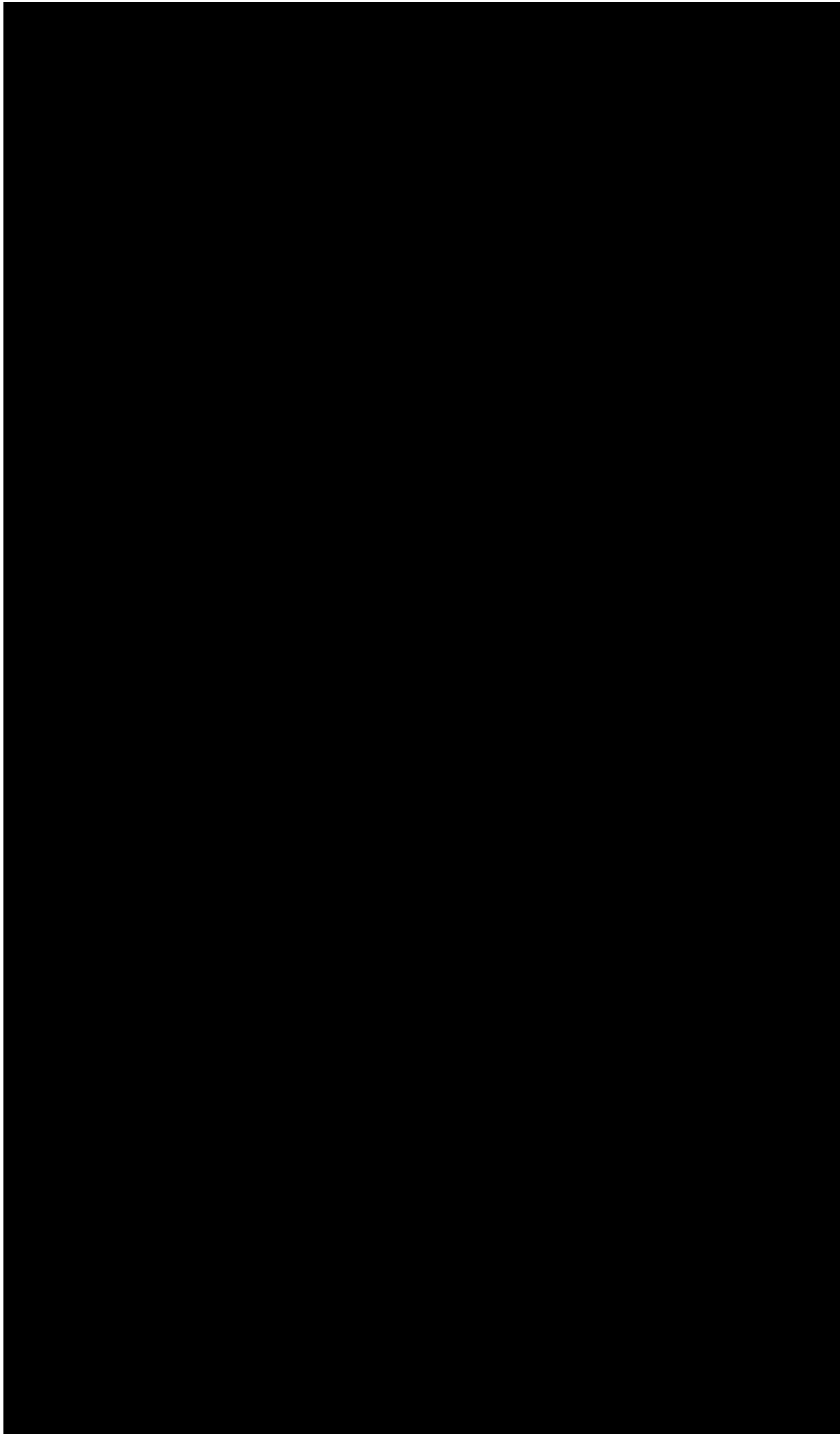


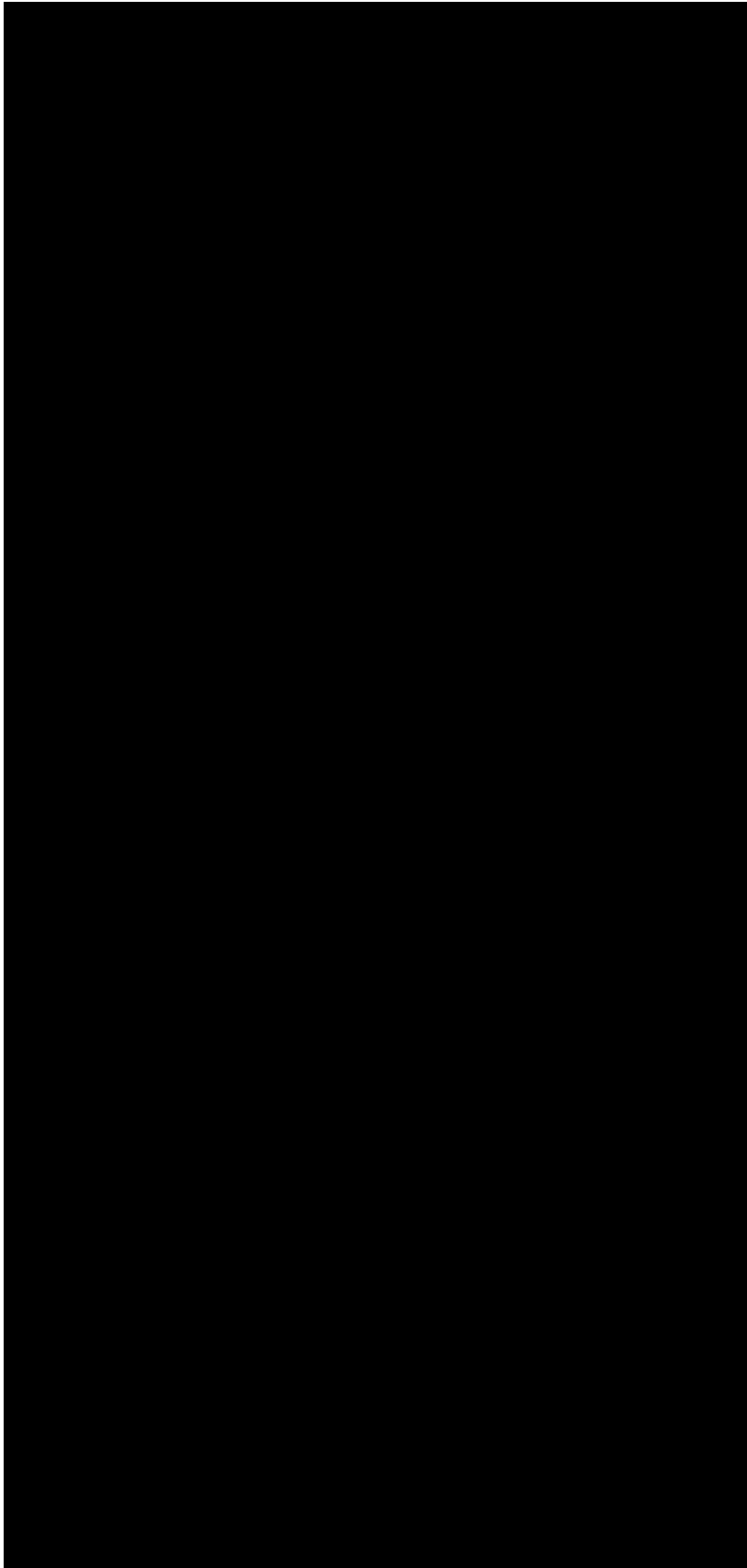


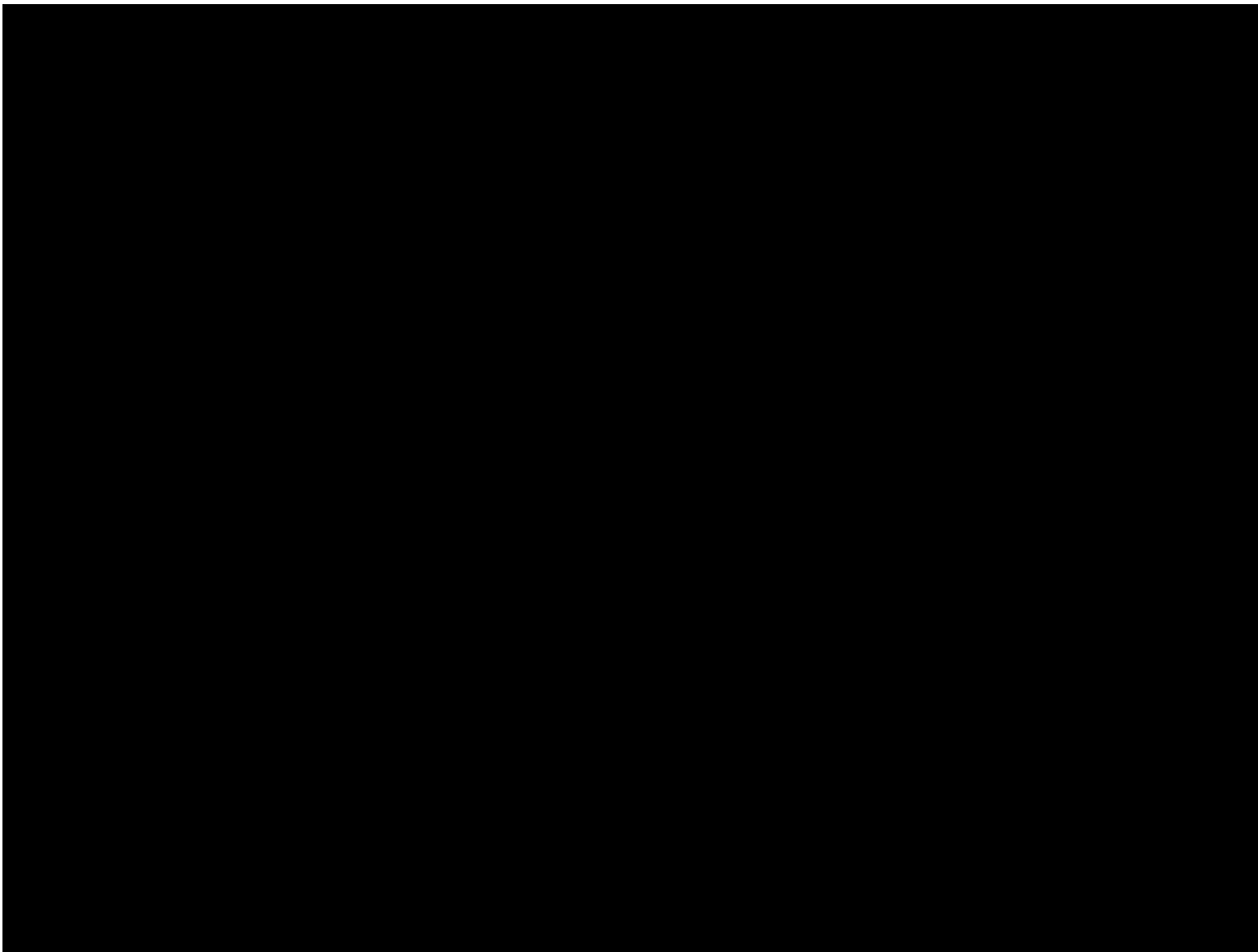


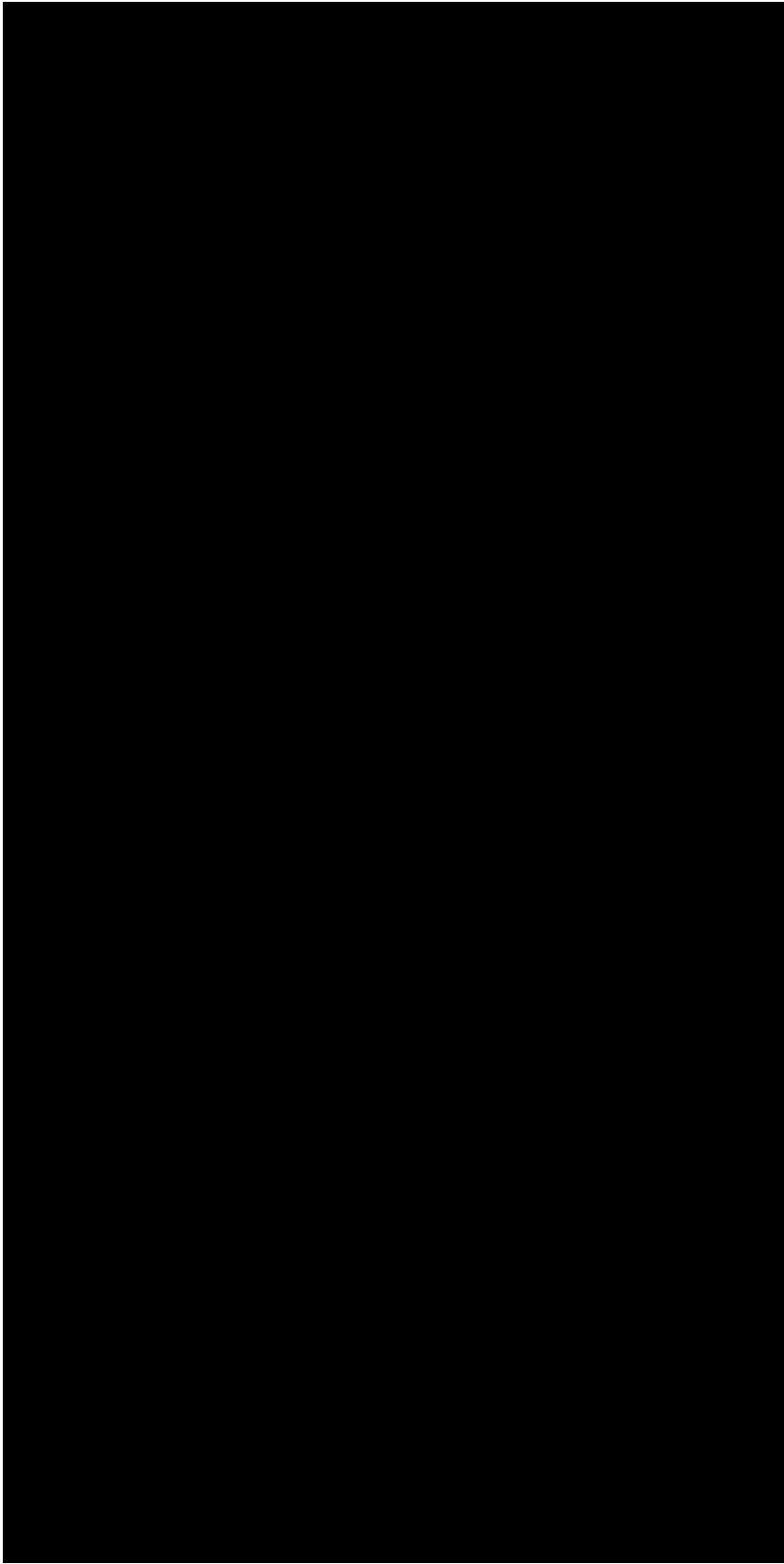


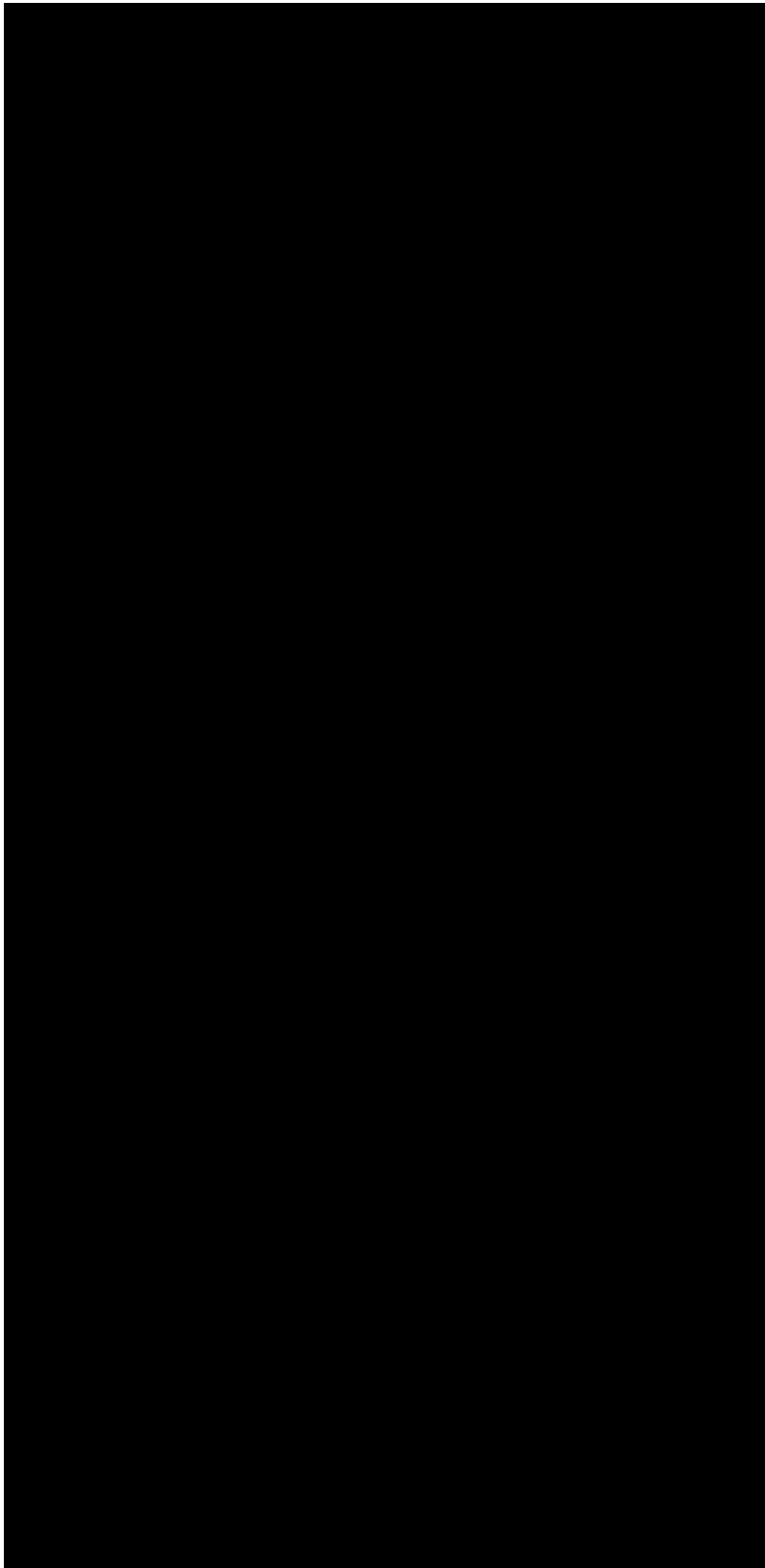


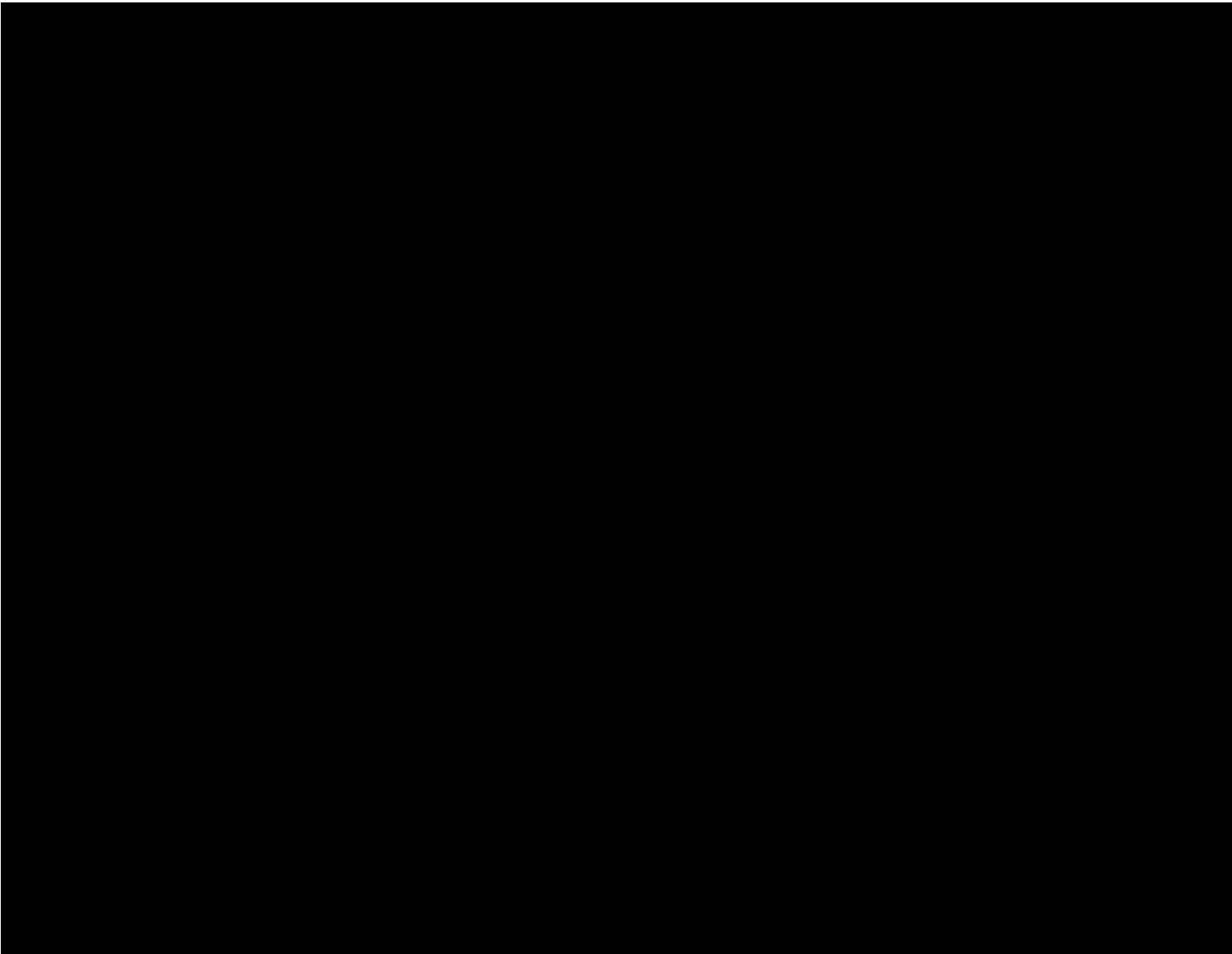


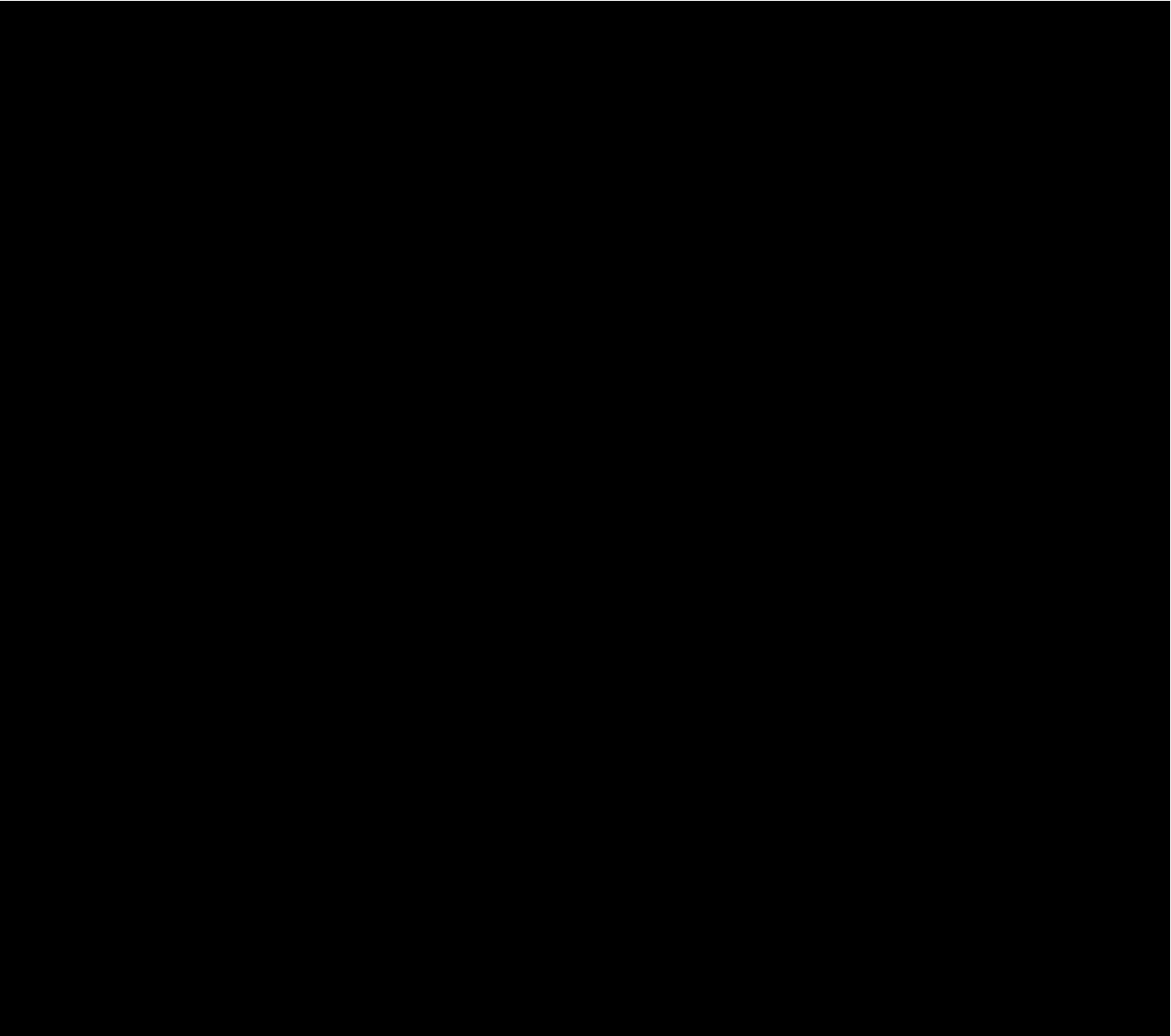


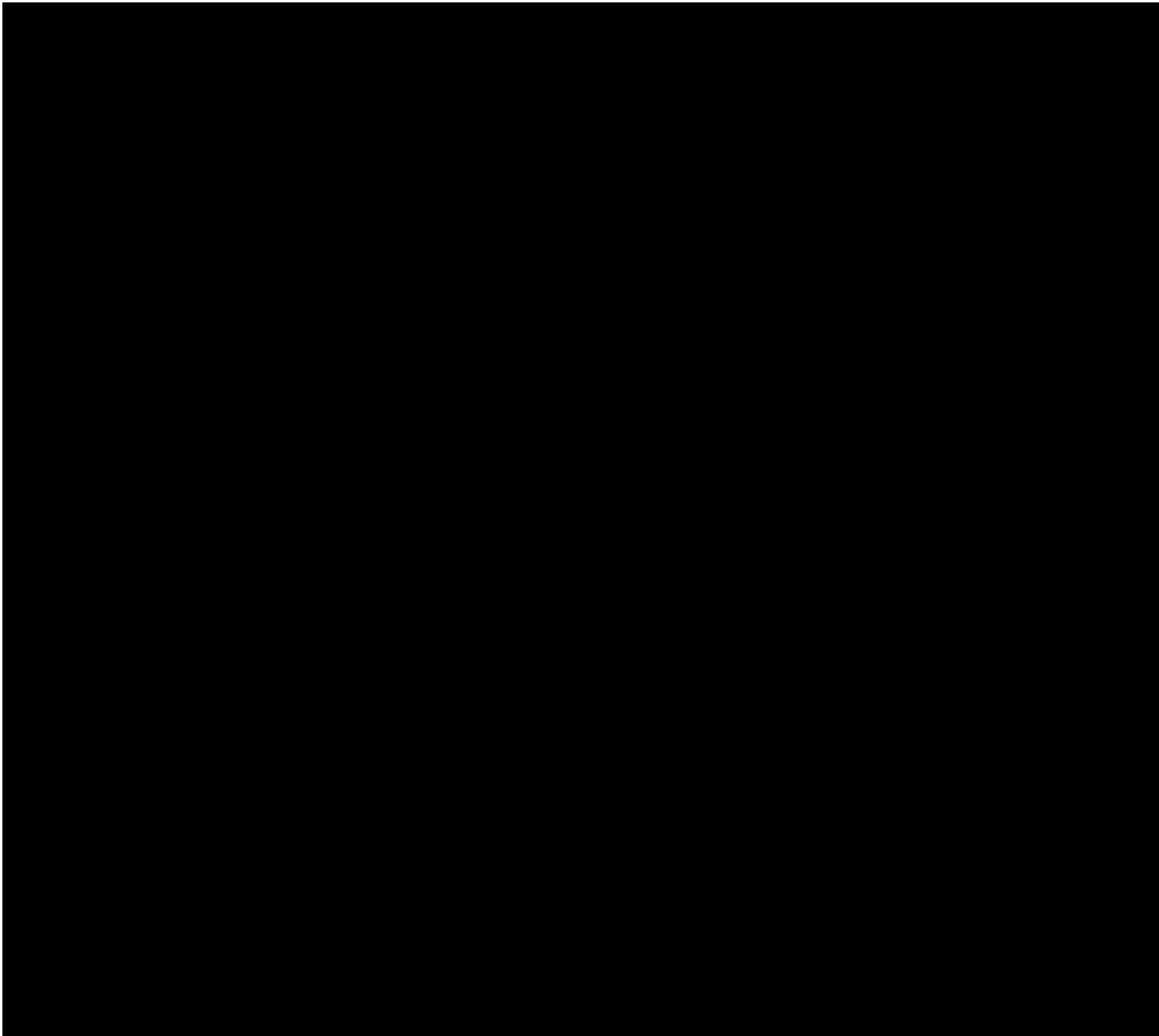


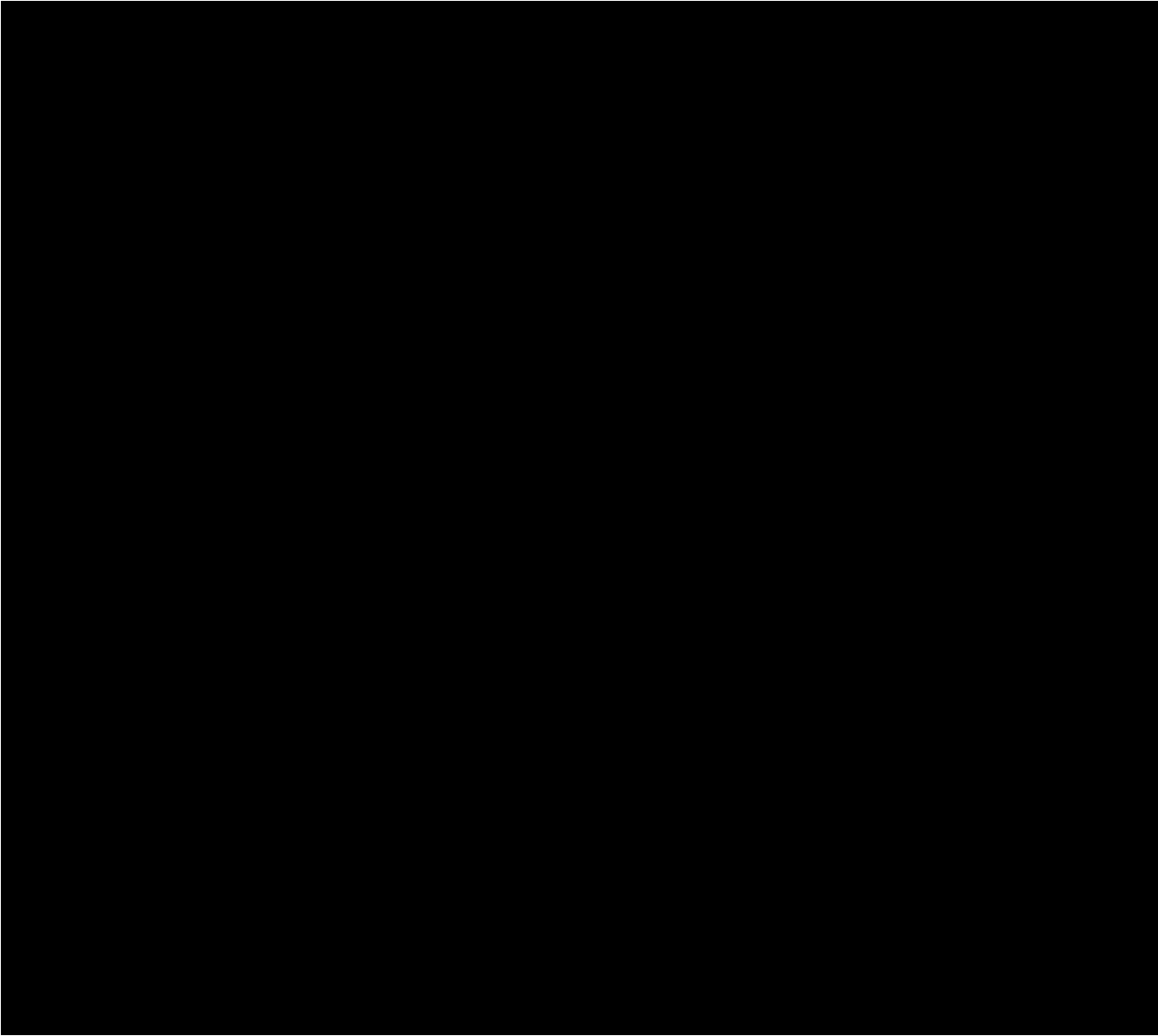










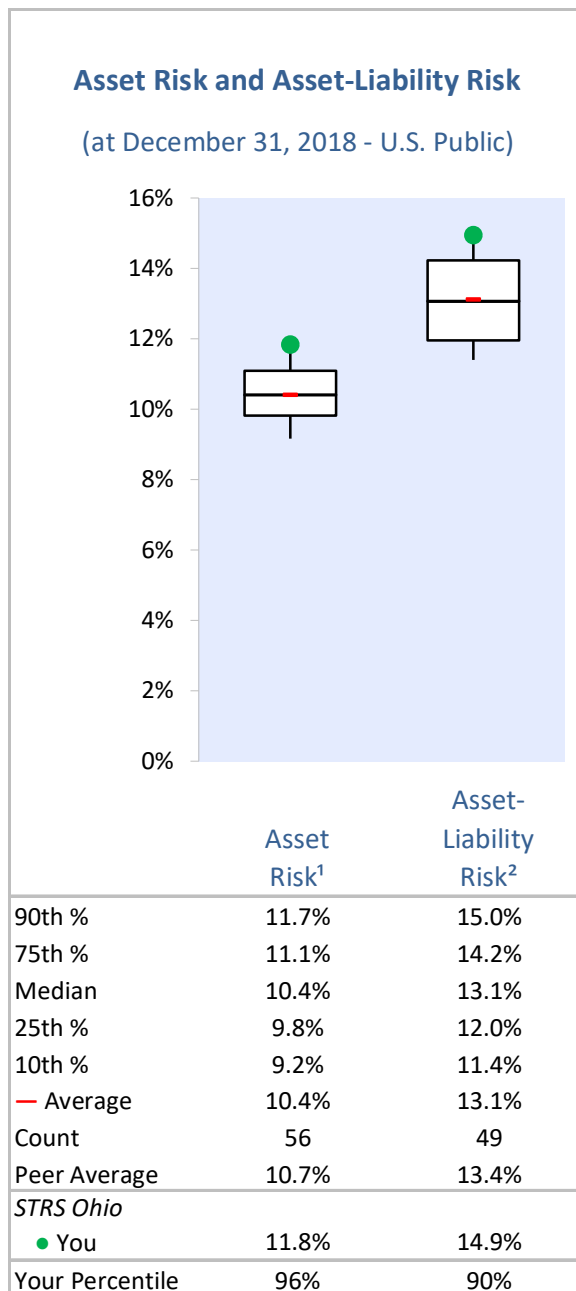


6

Risk

Comparison of your risk levels to the U.S. Public universe	2
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Comparison of your risk levels to the U.S. Public universe



1. Asset risk is the expected volatility of your policy return. It is based on the historical variance of, and covariance between, the asset classes in your asset mix policy. It is expressed as an annual standard deviation.

2. Asset-liability risk is the expected volatility of surplus returns. Surplus returns are the changes in a plan's marked-to-market funded status caused by market factors. Asset liability risk is a function of the volatility of policy returns (asset risk), the volatility of surplus returns (surplus risk) and the correlation between policy returns and surplus returns.

Calculation of asset risk

Before considering the benefit of diversification, the weighted average risk of the asset classes in your asset mix policy was 14.1%.

Calculation of your weighted asset class risk

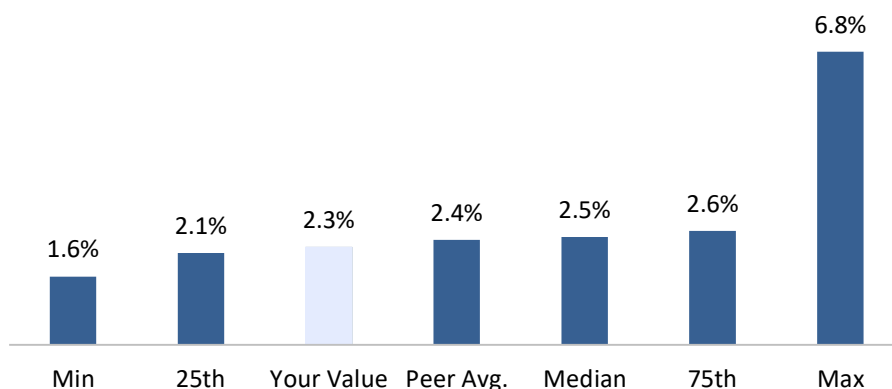
Asset Class	Policy weight (A)	Risk ¹ (B)	Weighted risk (A X B)
Stock: U.S. Large Cap	28.0%	14%	3.9%
Stock: EAFE	19.2%	17%	3.2%
Stock: Emerging	4.8%	22%	1.1%
Bonds: U.S.	21.0%	5%	1.1%
Bonds: Cash	1.0%	1%	0.0%
Real Estate ex-REITs	10.0%	9%	0.9%
LBO	16.0%	24%	3.8%
Weighted Total			14.1%

1. Risk is the standard deviation of returns for the asset class based on standard benchmarks used by CEM.

Reduction in asset risk due to diversification

Your asset risk is less than your weighted asset risk because of the benefit of diversification. Diversification reduces risk because when one asset class has a negative return, it might be offset by another asset class with a positive return. The lower the correlation between your policy asset classes, the greater the diversification benefit. The correlation between your policy asset classes is shown on page 15 of this section.

Diversification benefit: U.S. Public universe



The benefit of diversification equals weighted asset risk minus asset risk.

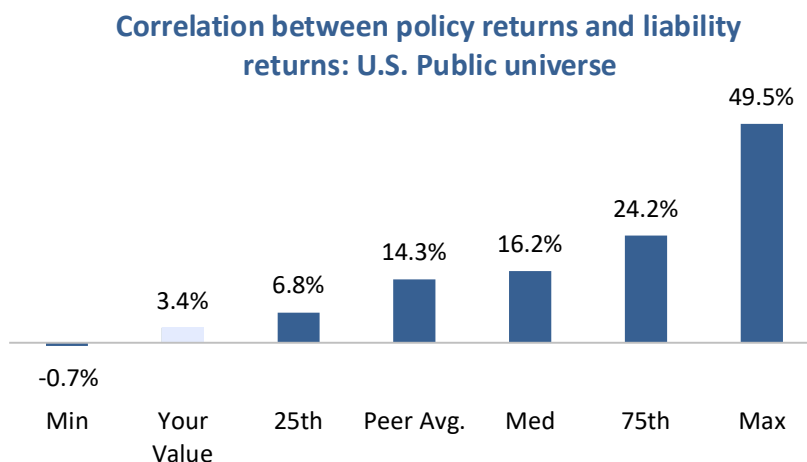
Components of asset risk

	You	Peer median*	Peer average	U.S. Public median*	U.S. Public average
Weighted asset risk	14.1%	13.1%	13.1%	12.8%	12.9%
Benefit of diversification	2.3%	2.6%	2.4%	2.5%	2.5%
Asset risk	11.8%	10.9%	10.7%	10.4%	10.4%

* Comparisons of components of asset risk should be interpreted with caution because it is not always possible to separate the diversification benefit from the weighted asset risk. For example, global stock as an asset class includes the diversification benefit of its geographic components within its asset risk.

Asset-liability risk

Your plan would not have any asset-liability risk if your assets perfectly matched your liabilities. If they matched, then the correlation between asset returns and liability returns would be 100%. If liabilities increased, assets would increase by a like amount (and vice versa). Thus higher correlation between your asset returns and liability returns reduces your asset-liability risk.



In addition to the correlation between asset returns and liability returns, asset-liability risk is also a function of the volatility of asset returns (asset risk) and the volatility of liability returns¹ (liability risk = $\sqrt{R_A^2 + R_L^2 - 2\rho_{AL}R_AR_L}$).

Components of asset-liability risk

	You	Peer median	Peer average	U.S. Public median	U.S. Public average
Asset risk (R_A)	11.8%	10.9%	10.7%	10.4%	10.4%
Liability risk (R_L)	9.5%	9.9%	9.7%	9.7%	9.6%
Correlation between policy returns and liability returns (ρ_{AL})	3.4%	9.8%	14.3%	16.2%	15.9%
Asset-liability risk	14.9%	13.6%	13.4%	13.1%	13.1%

1. Liability returns equal the changes in your marked-to-market liabilities caused by market factors. These are assumed to equal the return on your liability proxy portfolio (see next page).

Liability proxy portfolio

Your liability proxy portfolio is the portfolio of nominal and inflation-indexed bonds that best matches the sensitivity of your liabilities to changes in real and nominal interest rates.

Comparisons of liability proxy portfolio

	Your fund		Peer average		U.S. Public	
	Duration	% of Assets	Duration	% of Assets	Duration	% of Assets
Inflation Indexed Bonds	10.0	24%	11.6	46%	12.2	57%
Nominal Bonds	11.3	76%	13.3	54%	13.2	43%
Total		100%		100%		100%

Your liability proxy portfolio is a tool that:

- Helps you understand how the unsmoothed market value of your liabilities responds to changes in real and nominal interest rates.
- Helps you make better asset mix policy decisions by providing an understanding of which assets will decrease your asset-liability risk (i.e., assets that behave similarly to the neutral asset mix) and which assets will increase your risk.
- Helps you understand how your liabilities are different from your peers. Differences in liabilities mean that the same asset will have different risk / reward characteristics for different funds. For example, the risk of a nominal bond for a fund with 100% inflation sensitivity is much higher than it is for a fund with less than 100% inflation sensitivity.

Asset-liability risk could theoretically be eliminated if your actual asset mix matched the liability proxy portfolio. However, we recognize that this is neither an option nor a goal for most funds because:

- The supply of inflation-indexed assets is limited. These assets are required to match the obligations of pension liabilities.
- This low-risk strategy also has a lower expected return, implying either higher future funding costs or lower future benefits.

The methodology and formula used to determine your liability proxy portfolio are provided on pages 11-13 of this section.

Liability risk

Differences in liability risk are due to differences in inflation sensitivity and member demographics.

A plan's inflation sensitivity depends on:

a) The type of plan

Final and highest average plans have more inflation sensitivity than career average plans. Conversely, career average plans have more inflation sensitivity than flat benefit plans. Your plan type is final average.

Plan type	# of plans	% of Total
Flat Benefit	0	0%
Career Average	0	0%
Final/Highest/Best Avg	51	88%
Other	7	12%
Total	58	100%

b) Contractual inflation protection for retired members

Your retired members get 0% contractual inflation protection. Your retiree inflation protection is subject to a cap of 0%.

Retiree inflation protection	# of plans		
	Corporate	Public	Other
0%	0	27	0
>0% and <50%	0	0	0
50%	0	2	0
>50% and <100%	0	5	0
100%	0	20	0
Total	0	54	0

c) Member demographics

Member demographics impacts both inflation sensitivity and the duration of plan liabilities. The survey asks for your plan's percentage of liabilities that relate to retired members from your actuarial reports. If you did not provide this number, then it is estimated (see page 12 of this section). Your percentage of liabilities that relate to retired members was 72%.

	Your fund	Peer Average	U.S. Public Average
Active Members	55%	58%	55%
Retired Members	45%	42%	45%
Total	100%	100%	100%

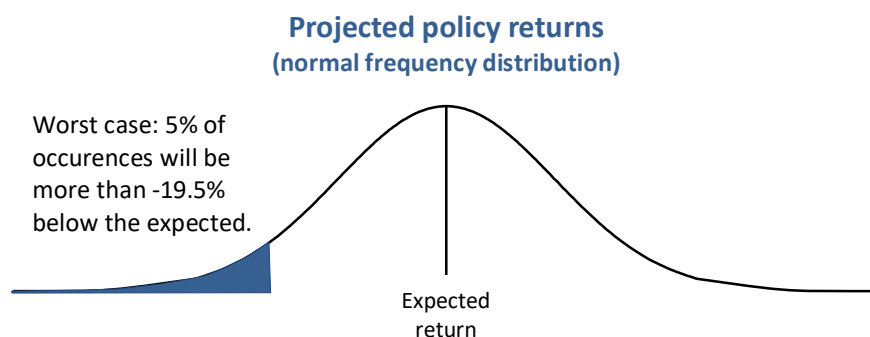
Projected worst case scenarios

We can convert your asset risk and asset-liability risk into worst case outcomes for policy returns and funded status if we make the following simplifying assumptions:

- a) Returns are normally distributed.
- b) Historic return volatility and correlations will continue in the future.
- c) No change in your policy asset mix or liabilities.

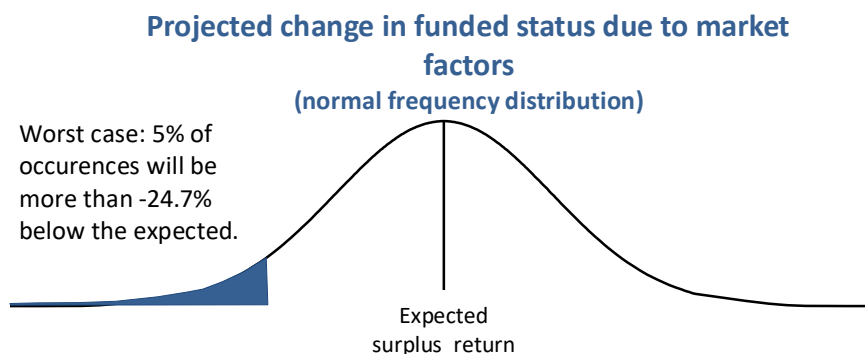
a) Worst case policy returns

Every year there is a 5% probability that your policy return will be worse than your expected policy return by more than -19.5% (-19.5% equals -1.65 X your asset risk of 11.8%). -19.5% is the starting point of worst case outcomes. They could be much worse.



b) Worst case impact on funded status

Every year, there is a 5% probability that changes in your mark-to-market funded status caused by market factors ("Surplus Returns") will be worse than expected by more than -24.7%. (-24.7% equals -1.65 X your asset-liability risk of 14.9%). -24.7% is the starting point of worst case outcomes. They could be much worse.



Historic worst case scenarios during the past 5 years

a) Historic worst case policy returns

During the past 5 years, your lowest policy return was -2.0% in 2018.

Historic policy returns - U.S. Public universe

	2018	2017	2016	2015	2014
90th %	0.3%	16.7%	9.3%	1.7%	8.3%
75th %	-1.8%	15.9%	8.5%	0.9%	7.4%
Median	-2.6%	15.2%	7.6%	-0.1%	6.5%
25th %	-3.4%	14.1%	6.9%	-0.8%	5.6%
10th %	-5.1%	13.2%	6.6%	-1.8%	4.9%
Average	-2.5%	15.0%	7.7%	0.0%	6.6%
Count	56	60	59	64	68
Peer Avg	-1.2%	14.8%	7.7%	0.7%	7.1%
Your Value	-2.0%	15.4%	8.0%	1.7%	8.3%

b) Historic worst case changes in funded status

During the past 5 years, your worst change in marked-to-market funded status caused by market factors ("Surplus Returns") was -6.1% in 2014.

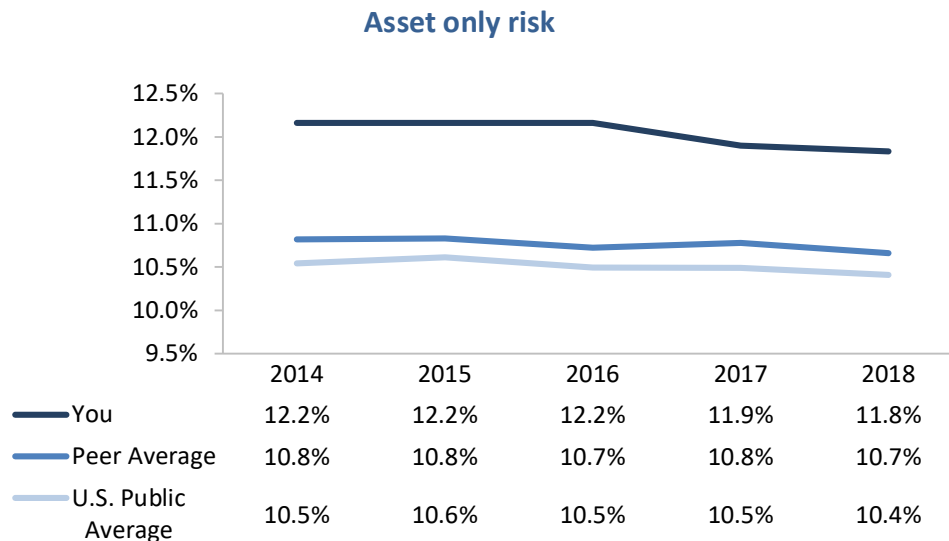
Historic changes in funded status caused by market factors - U.S. Public universe

	2018	2017	2016	2015	2014
90th %	2.9%	8.7%	4.9%	4.6%	-5.0%
75th %	0.9%	8.0%	4.4%	3.5%	-6.2%
Median	-0.2%	6.7%	2.8%	2.1%	-8.0%
25th %	-1.9%	5.1%	1.4%	0.8%	-9.8%
10th %	-3.5%	3.1%	0.1%	-0.5%	-11.3%
Average	-0.4%	6.4%	2.8%	2.1%	-8.1%
Count	50	54	55	59	63
Peer Avg	0.8%	6.2%	3.2%	2.6%	-7.3%
Your Value	-1.0%	6.7%	5.1%	1.8%	-6.1%

Risk Trends - 2014 to 2018

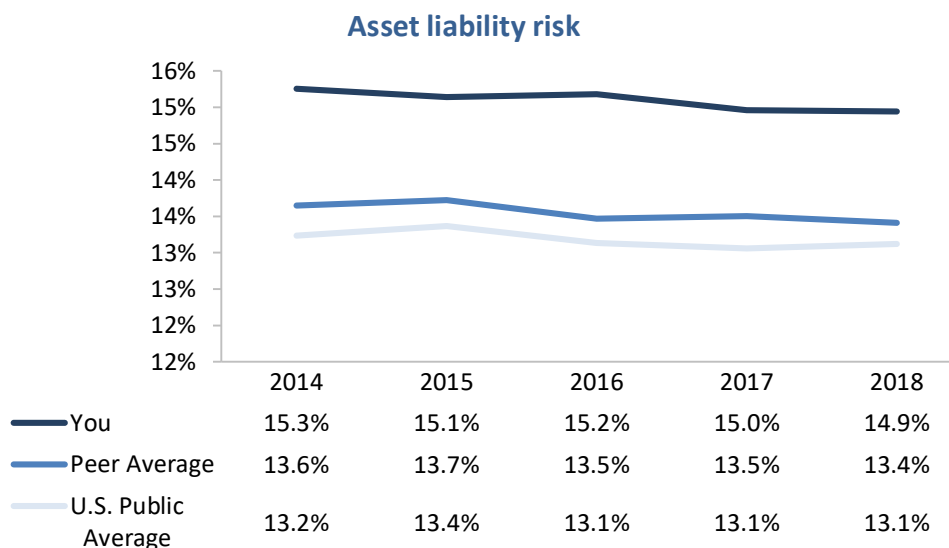
a) Asset risk trends

Asset risk will only change if policy asset mix changes. Between 2014 and 2018 the asset risk for your fund decreased from 12.2% to 11.8%.



b) Asset-liability risk trends

Asset-liability risk will change if policy asset mix changes, or if the nature of your liabilities changes. Between 2014 and 2018 the asset-liability risk for your fund decreased from 15.3% to 14.9%.



[Redacted]

[Redacted]

[Redacted]

[Redacted]

[Redacted] determine your liabilities' inflation sensitivity. The degree of total inflation sensitivity determines the proportion of inflation-indexed bonds versus nominal bonds that belong in your liability proxy portfolio.

[Redacted]

[Redacted]

[Redacted]

[Redacted]

[Redacted]

[Redacted]

[Redacted]

[Redacted]

[Redacted]

[Redacted]

[REDACTED]

[REDACTED]

[REDACTED]

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[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

	Long Nominal Bonds		Inflation Indexed Bonds		CPI
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]

Appendix B - Methodology used to calculate asset and asset-liability risk

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

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[REDACTED]

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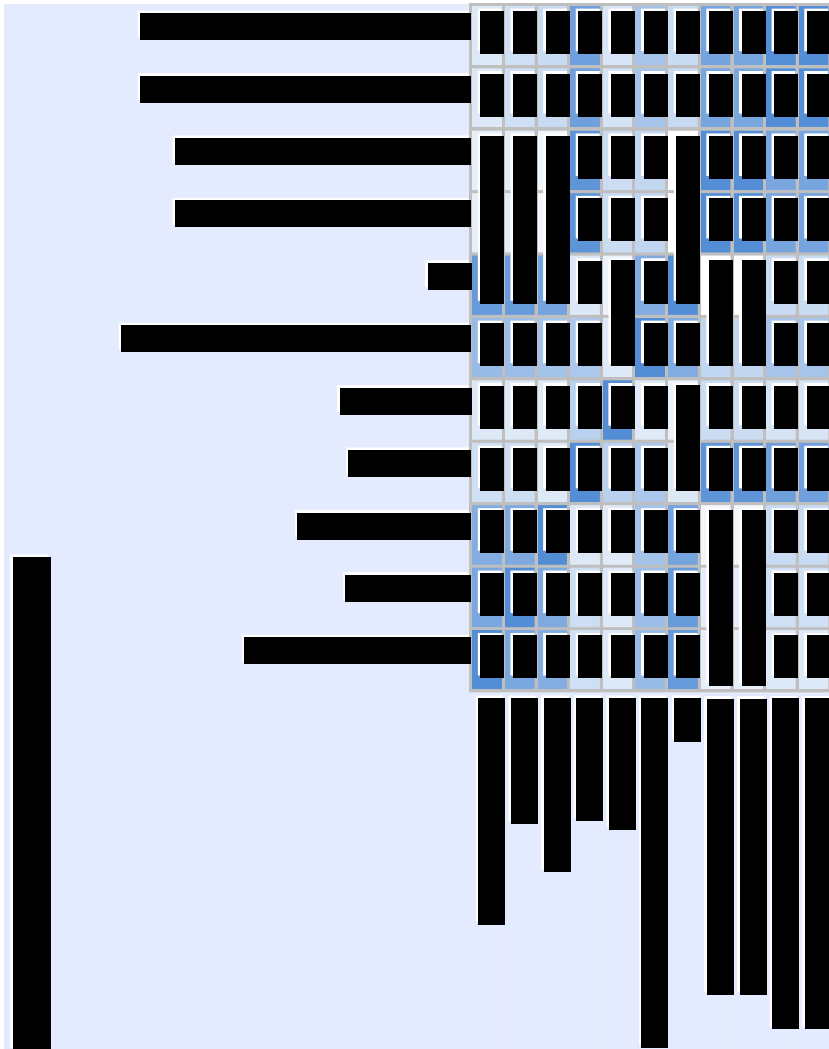
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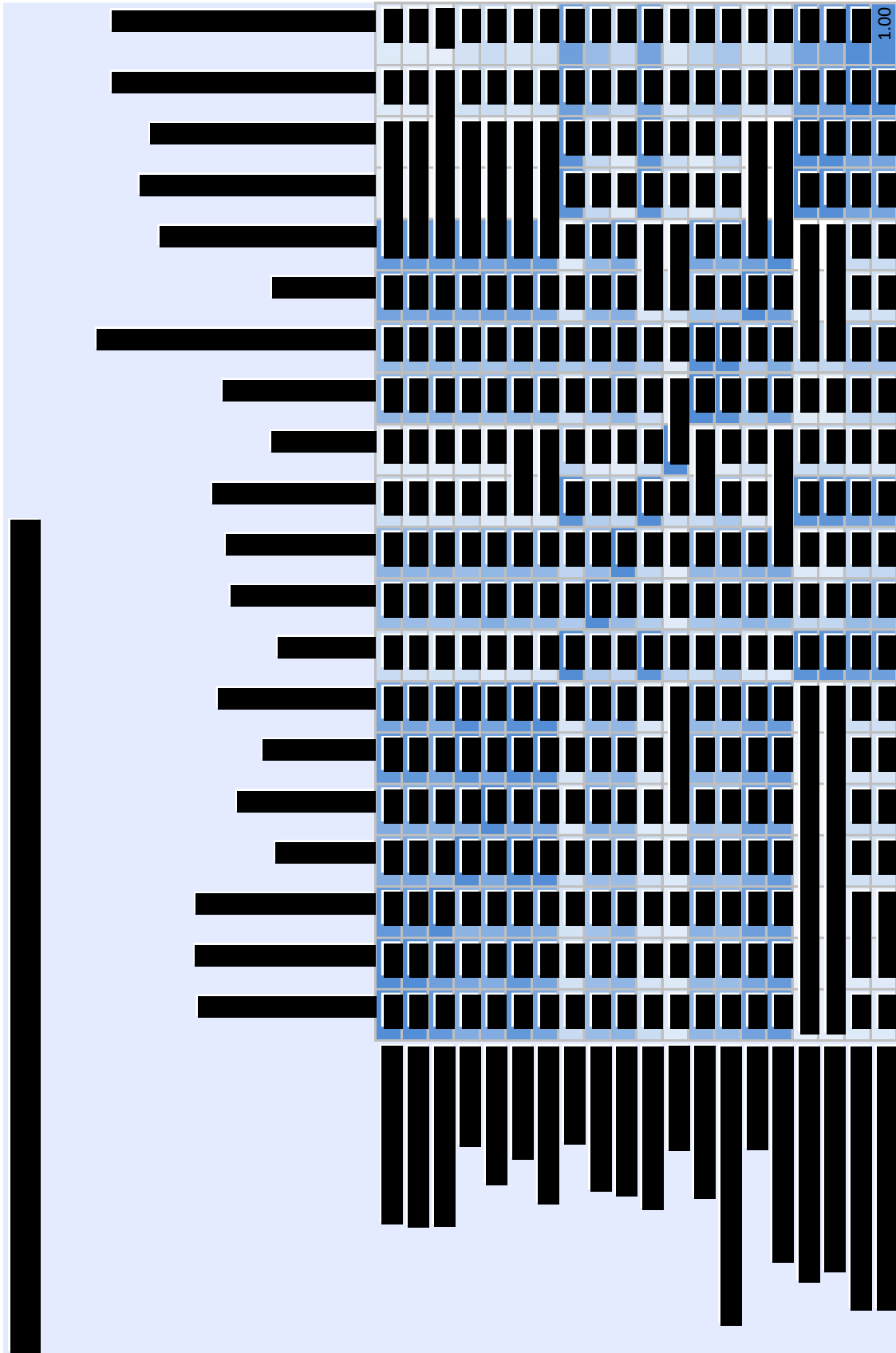
[REDACTED] the

total weight divided proportionately between them.

[REDACTED]

[REDACTED]





7

Appendices

Appendix A - Data Summary

Appendix A2 - Enhanced survey data & mapping to regular survey

Appendix B - Data quality

Appendix C - Glossary of terms

Appendix A - Data Summary

STRS Ohio

Plan Info	2018	2017	2016	2015	2014
Contact	Lynn Hoover	Lynn Hoover	Lynn Hoover	Lynn Hoover	Lynn Hoover
Type of fund (corporate, public, other)	Public	Public	Public	Public	Public
Total fund size (mils) as at December 31	72,888.7	78,304.0	71,661.0	70,756.0	73,655.0
Asset-class level holdings provided on survey are: year end or average?	Year End	Year End	Year End	Year End	Year End
Total return for year ended	-1.89%	15.76%	8.03%	2.33%	7.83%
Is the return net or gross?	Net of all investment costs	Net of all investment costs	Net of all investment costs	Net of all investment costs	Net of all investment costs
Total fund policy or benchmark return	-2.04%	15.35%	8.00%	1.71%	8.26%

Ancillary Data	2018	2017	2016	2015	2014
What is your hedging policy for: Foreign Holdings	50%	50%	50%	50%	50%
What were your actuarial fees in 000s?	219	513	266	247	244
How many plan members/beneficiaries do you have:					
Active?	192,365	193,141	195,440	189,731	194,451
Active (no-accrual)?	138,075	139,533	135,738	135,215	134,844
Retired?	157,422	158,039	157,938	158,116	152,208
Other?	18,416	18,403	17,627	17,453	17,036
What type of plan(s) do you have?	Final Average	Final Average	Final Average	Final Average	Final Average
To what extent are your retired members' benefits indexed to inflation?					
Contractual %	0%	0%	0%	0%	0%
If the indexation is subject to a cap, describe the cap	0%	0%	2% per year,	2% per year,	2% per year,
What % of the plan's liabilities pertain to retired members?	72%	73%	74%	75%	72%
Actuarial valuation assumptions for funding purposes:					
Liability discount rate	7.5%	7.5%	7.8%	7.8%	7.8%
Salary progression rate	3.0%	3.0%	3.5%	3.5%	3.5%
What was your actuarial assumption for expected rate of return?	7.5%	7.5%	7.8%	7.8%	7.8%

	2014	20.8	MSCI World xUS 50% Hedged Net	0.8
Stock - Emerging	2018	4.8	MSCI Emerging Market net	-14.6
	2017	5.0	MSCI Emerging Market Net	37.3
	2016	5.2	MSCI Emerging Market net	11.2
	2015	5.2	MSCI Emerging Market net	-14.9
	2014	5.2	MSCI Emerging Market Net	-2.2
Stock - ACWI x U.S.	2018		International Blended Benchmark	-12.1
	2017		International Blended Benchmark	23.4
	2016		International Blended Benchmark	6.4
	2015		International Blended Benchmark	-2.8
	2014		International Blended Benchmark	0.2
Stock - Global	2018		MSCI ACWI net	-9.4
	2017		MSCI ACWI net	24.6
	2016		MSCI ACWI net	7.9
	2015		MSCI ACWI net	-2.4
	2014		MSCI ACWI Net	4.2
Fixed Income - U.S.	2018	21.0	Fixed Income Blended (Jul 1 2017)	0.1
	2017	20.0	Fixed Income Blended (Jul 1 2017)	3.9
	2016	18.0	Barclays Universal for total FI (Barclays Aggregate Index not appropriate for US FI segment)	3.9
	2015	18.0	Barclays Universal for total FI (Barclays Aggregate Index not appropriate for US FI segment)	0.4
	2014	18.0	Barclays Universal for total FI (Barclays Aggregate Index not appropriate for US FI segment)	5.6
Fixed Income - Emerging	2018		Barclays Emerging Market	-2.5
	2017		Barclays Emerging Market	8.2
	2016		Barclays Emerging Market	9.9
	2015		Barclays Emerging Market	1.3
	2014		Barclays Emerging Market	4.8
Fixed Income - High Yield	2018		Barclays US Corp High Yield	-2.1
	2017		Barclays US Corp High Yield	7.5
	2016		Barclays US Corp High Yield	17.1
	2015		Barclays US Corp High Yield	-4.5
	2014		Barclays US Corp High Yield	2.5
Cash	2018	1.0	US 90 day T bill	1.9
	2017	1.0	US 90 day T bill	0.9
	2016	1.0	US 90 day T bill	0.3
	2015	1.0	US 90 day T bill	0.1
	2014	1.0	US 90 day T bill	0.0
Global TAA	2018		Custom (Alternative Investment Actual Return)	11.8
	2017		Custom (Alternative Investment Actual Return)	12.2
	2016		Custom (Alternative Investment Actual Return)	5.3
	2015		Custom (Alternative Investment Actual Return)	6.1
	2014		Custom (Alternative Investment Actual Return)	6.1
Hedge Funds	2018		Custom (Alternative Investment Actual Return)	11.8
	2017		Custom (Alternative Investment Actual Return)	12.2
	2016		Custom (Alternative Investment Actual Return)	5.3
	2015		Custom (Alternative Investment Actual Return)	6.1
	2014		Custom (Alternative Investment Actual Return)	13.5
REITs	2018		Your REIT benchmark	-4.6
	2017	1.5	Your REIT benchmark	5.2
	2016	1.5	Your REIT benchmark	8.5
	2015	1.5	Your REIT benchmark	3.2
	2014	1.5	Your REIT benchmark	30.1
Infrastructure	2018		Custom (Alternative Investment Actual Return)	11.8
	2017		Custom (Alternative Investment Actual Return)	12.2
	2016		Custom (Alternative Investment Actual Return)	5.3
	2015		Custom (Alternative Investment Actual Return)	6.1
	2014		Custom (Alternative Investment Actual Return)	13.5
Real Estate ex-REITs	2018	10.0	NCREIF NPI	6.7
	2017	8.5	NCREIF NPI	7.0
	2016	8.5	NCREIF NPI	8.0
	2015	8.5	NCREIF NPI	13.3
	2014	8.5	NCREIF NPI	11.8
Natural Resources	2018		Custom (Alternative Investment Actual Return)	11.8
	2017		Custom (Alternative Investment Actual Return)	12.2
	2016		Custom (Alternative Investment Actual Return)	5.3
	2015		Custom (Alternative Investment Actual Return)	6.1
	2014		Custom (Alternative Investment Actual Return)	13.5
Private Credit	2018		Custom (Alternative Investment Actual Return)	11.8
	2017		Custom (Alternative Investment Actual Return)	12.2
	2016			
	2015			
	2014			
Diversified Private	2018		Custom (Alternative Investment Actual Return)	11.8
	2017		Custom (Alternative Investment Actual Return)	12.2
	2016		Custom (Alternative Investment Actual Return)	5.3

Appendix A Data Summary - Assets, Returns and Costs: Public Market

STRS Ohio

(Default costs are highlighted with blue shading. See page 7 for more details)

Asset Class		Year	Asset (\$millions)	Return %	Cost (\$000)				
					Internal & Other	Base Fees	Perf Fees	Total	Bps
Stock - U.S. Large Cap									
Internal Active	2018	8,586.9	-6.09	12,687.9			12,687.9	13.2	
	2017	10,622.7	21.38	12,590.5			12,590.5	12.0	
	2016	10,342.4	10.22	11,243.9			11,243.9	10.9	
	2015	10,308.3	-0.14	11,794.0			11,794.0	10.9	
	2014	11,364.0	11.74	10,645.4			10,645.4	9.5	
Internal Passive	2018	9,004.0	-3.08	72.8			72.8	0.1	
	2017	9,544.3	22.97	72.1			72.1	0.1	
	2016	8,868.0	11.34	64.0			64.0	0.1	
	2015	8,672.3	2.36	40.6			40.6	0.0	
	2014	8,757.0	13.28	38.5			38.5	0.0	
External Active	2018	905.6	-7.20	210.7	2,309.6		2,520.3	23.7	
	2017	1,220.9	23.29	226.9	2,466.3		2,693.2	23.8	
	2016	1,046.3	9.78	186.0	2,233.7		2,419.7	23.6	
	2015	1,003.0	2.45	179.9	2,168.3		2,348.3	23.7	
	2014	981.0	13.11	147.0	2,055.0		2,202.0	23.8	
Stock - U.S. Small Cap									
Internal Active	2018	684.6	-10.05	323.5			323.5	4.2	
	2017	842.2	13.70	346.3			346.3	4.2	
	2016	824.9	22.03	257.6			257.6	3.2	
	2015	778.8	-2.44	293.3			293.3	3.6	
	2014	844.0	6.45	155.0			155.0	2.1	
External Active	2018	1,068.3	-8.82	104.9	9,437.5		9,542.4	81.9	
	2017	1,262.6	24.33	74.6	9,642.9		9,717.5	77.3	
	2016	1,252.0	14.77	54.0	8,861.7		8,915.7	75.8	
	2015	1,101.3	-1.24	203.3	8,895.4		9,098.7	81.2	
	2014	1,140.0	3.79	200.8	9,386.0		9,586.8	75.8	
Stock - EAFE									
Internal Active	2018	4,915.3	-11.91	2,968.2			2,968.2	5.6	
	2017	5,663.8	20.07	3,597.2			3,597.2	6.4	
	2016	5,589.9	4.49	3,292.2			3,292.2	5.9	
	2015	5,658.2	1.84	2,892.7			2,892.7	5.2	
	2014	5,523.7	1.01	2,429.2			2,429.2	4.3	
External Active	2018	5,120.4	-11.31	205.8	19,125.7		19,331.5	35.1	
	2017	5,881.0	24.11	241.7	19,869.7		20,111.5	35.5	
	2016	5,463.5	5.58	214.5	18,582.3		18,796.8	34.2	
	2015	5,529.7	5.63	194.7	19,934.8		20,129.5	35.7	
	2014	5,761.7	1.59	162.2	19,588.0		19,750.2	34.9	
Stock - Emerging									
Internal Active	2018	2,131.9	-11.13	3,183.9			3,183.9	14.1	
	2017	2,382.3	32.16	2,696.7			2,696.7	12.1	
	2016	2,061.8	14.55	2,571.8			2,571.8	13.1	
	2015	1,856.3	-10.54	2,578.4			2,578.4	14.1	
	2014	1,810.0	-2.42	2,261.3			2,261.3	12.9	
External Active	2018	903.8	-15.07	252.2	5,777.8		6,029.9	59.0	
	2017	1,139.1	31.36	263.3	6,401.6		6,664.9	61.4	
	2016	1,030.7	12.63	256.1	5,834.4		6,090.6	62.4	
	2015	920.4	-13.75	280.4	5,317.9		5,598.3	56.2	
	2014	1,073.0	0.39	274.1	6,245.0		6,519.1	61.2	
Stock - ACWI x U.S.									
Internal Active	2018	2,704.6	-10.91	468.3			468.3	1.6	
	2017	3,211.2	24.22	475.0			475.0	1.5	
	2016	2,988.9	9.11	433.9			433.9	1.5	
	2015	2,730.5	-1.78	439.9			439.9	1.6	
	2014	2,775.0	0.47	415.2			415.2	1.5	

Appendix A Data Summary - Assets, Returns and Costs: Public Market

STRS Ohio

(Default costs are highlighted with blue shading. See page 7 for more details)

Asset Class		Year	Asset (\$millions)	Return %	Cost (\$000)				
					Internal & Other	Base Fees	Perf Fees	Total	Bps
Stock - Global	External Active	2018	1,106.3	-14.01	20.0	5,474.0		5,494.0	43.5
		2017	1,418.8	23.41	20.4	6,121.7		6,142.1	46.1
		2016	1,243.3	4.09	18.6	5,445.3		5,463.8	44.6
		2015	1,206.1	1.97	17.5	5,022.1		5,039.7	45.9
		2014	990.0		7.7	1,993.0		2,000.7	38.5
Stock - Global	Internal Active	2018	546.9	-9.63	488.3			488.3	8.3
		2017	634.2	24.07	495.3			495.3	8.5
		2016	536.0	8.83	452.5			452.5	6.9
		2015	778.8	-1.24	457.4			457.4	5.8
		2014	788.0	3.71	422.9			422.9	5.5
Fixed Income - U.S.	Internal Active	2018	12,171.5	0.27	3,465.9			3,465.9	2.7
		2017	13,081.7	3.46	3,304.9			3,304.9	3.0
		2016	8,787.2	2.71	2,465.8			2,465.8	2.7
		2015	9,726.0	1.01	2,552.2			2,552.2	2.5
		2014	11,082.0	5.55	2,538.8			2,538.8	2.2
Fixed Income - Emerging	External Active	2018	750.1	-4.04	143.1	3,475.7		3,618.7	46.3
		2017	813.7	10.82	156.3	3,435.7		3,592.0	46.3
		2016	737.3	15.81	130.4	3,180.6		3,311.0	45.1
		2015	731.4	1.11	130.5	3,586.6		3,717.1	46.6
		2014	864.0	2.01	113.8	3,742.0		3,855.8	48.7
Fixed Income - High Yield	External Active	2018	728.2	-2.33	144.3	3,160.8		3,305.1	41.9
		2017	849.1	7.74	165.3	3,146.4		3,311.7	40.4
		2016	792.0	17.30	155.0	3,666.2		3,821.3	43.8
		2015	953.9	-4.03	178.5	4,427.6		4,606.1	42.2
		2014	1,229.0	2.49	150.8	4,185.0		4,335.8	41.3
Cash	Internal Active	2018	1,002.8	1.98	299.0			299.0	2.2
		2017	1,699.9	0.77	285.8			285.8	1.7
		2016	1,679.5	0.48	266.0			266.0	1.8
		2015	1,274.8	0.08	268.6			268.6	1.4
		2014	2,480.0	0.09	265.9			265.9	0.9
Global TAA	Internal Active	2018	958.1	-7.17	1,666.5			1,666.5	64.0
		2017	365.3	-7.17	96.2	2,306.4		2,402.6	31.1
	External Active	2017	741.8	10.52	36.8	1,334.7		1,371.5	23.8
		2016	412.0	8.44	26.5	1,191.4	-	1,217.9	30.6
		2015	383.8	-2.20	12.0	678.1	-	690.1	36.0
REITs	Internal Passive	2018	1,156.5	-4.60	106.4			106.4	0.9
		2017	1,117.2	5.21	94.3			94.3	0.8
		2016	1,262.4	8.78	89.1			89.1	0.7
		2015	1,166.2	3.21	226.4			226.4	2.0
		2014	1,098.0	30.47	16.5			16.5	0.3

Appendix A Data Summary - Assets, Returns and Costs: Private Market and Hedge Fund

STRS Ohio

(Default costs are highlighted with blue shading. See page 5 for more details)

Asset Class	Year	NAV (\$mils)	Fee Basis (\$mils)	Return	Cost (\$000)							
					Internal & Other	Base Fees	Perf. Fees	Underlying Base Fees	Underlying Perf Fees	Total	Total bps	
Infrastructure												
Fund of Funds	2018	58.2	13.2	-3.1	8.6	370.4	506.2	347.6	506.2	726.7	131.6	
	2017	68.4	97.2	1.9	12.9	459.7	351.7	766.8	1,626.6	1,239.5	137.8	
	2016	107.5	82.7	5.3	12.5	495.9	426.0	1,320.8	1,267.2	1,829.2	220.1	
	2015	105.5	83.6	5.6	12.9	501.4	637.0	1,945.9	821.9	2,460.3	268.0	
	2014	100.0	100.0	17.7	11.7	506.0	252.0	1,249.0	414.0	1,766.7	176.7	
Natural Resources												
Internal Active	2018											
	2017											
	2016	375.8	375.8	-3.4	298.4					298.4	7.2	
	2015	455.9	455.9	3.0	169.0					169.0	3.8	
Co-Investment	2018	154.8	154.8	11.5	24.3					24.3	1.6	
	2017	149.4	149.4	-34.4	39.7					39.7	5.3	
LP	2018	360.4	510.0	11.5	56.9	5,691.0	2,090.3			5,747.9	110.1	
	2017	549.4	652.7	-34.4	69.4	6,832.0	2,885.0			6,901.4	111.1	
	2016	604.6	589.4	-3.4	66.1	6,439.0	4,926.2			6,505.1	114.7	
	2015	478.1	544.8	3.0	56.7	7,659.5	2,238.5			7,716.2	149.0	
	2014	351.0	491.0	9.2	40.8	5,014.0	1,687.5			5,054.8	112.7	
Real Estate ex-REITs												
Internal Active	2018	5,764.4	5,764.4	7.9	17,795.5					17,795.5	32.1	
	2017	5,315.0	5,315.0	5.9	17,182.4					17,182.4	30.9	
	2016	5,794.6	5,794.6	9.1	16,632.4					16,632.4	29.3	
	2015	5,554.9	5,554.9	13.0	16,561.4					16,561.4	30.9	
	2014	5,177.0	5,177.0	14.8	14,191.5					14,191.5	28.7	
LP	2018	882.5	1,419.8	13.2	481.0	14,030.0	5,525.9			14,511.0	101.7	
	2017	990.6	1,434.8	8.6	464.1	17,650.0	5,940.9			18,114.1	122.3	
	2016	1,131.1	1,526.4	13.5	447.4	17,431.8	6,098.0			17,879.2	114.4	
	2015	1,008.5	1,599.0	11.0	443.5	17,938.0	10,592.0			18,381.5	122.5	
	2014	1,009.0	1,401.0	18.0	378.9	24,652.0	9,546.5			25,030.9	163.0	
Diversified Private Equity												
Internal Active	2018	318.5	318.5	19.9	319.6					319.6	8.0	
Co-Investment	2018	328.7	328.7	4.7	88.1					88.1	3.0	
Fund of Funds	2018											
	2017											
	2016											
	2015											
	2014	527.0	1,123.0	18.9	155.0	5,367.0	3,718.5	7,965.0	6,633.0	13,487.0	124.2	
	LP	2018	1,591.4	3,653.5	19.9	511.7	25,682.0	26,112.8			26,193.7	95.7
		2017	100.6	240.3	19.3	39.7	3,903.4	1,807.9			3,943.1	158.6
		2016	97.0	257.0	6.8	27.7	2,715.0	1,258.3			2,742.7	165.1
		2015	60.3	75.3	9.9	11.8	1,429.9	892.7			1,441.6	191.5
		2014	2,893.0	6,288.0	18.9	783.7	94,765.2	38,002.8			95,548.9	158.3
Hedge Funds												
External Active	2018	1,636.3	1,636.3	0.6	255.1	26,478.9	12,406.2			39,140.1	239.0	
	2017	1,638.9	1,638.9	5.6	290.8	26,980.9	22,775.2			50,046.9	274.8	
	2016	2,003.9	2,003.9	5.0	336.8	32,054.3	22,495.0			54,886.1	271.5	
	2015	2,039.1	2,039.1	1.2	319.6	35,310.0	9,973.0			45,602.6	223.0	
	2014	2,050.0	2,050.0	5.1	234.7	32,279.0	22,798.0			55,311.7	305.9	
Private Credit												
Internal Active	2018	94.8	94.8	-0.2	73.7					73.7	7.8	
	LP	2018	837.3	1,286.2	4.7	190.2	12,745.0	5,138.6			12,935.2	116.6
	2017	417.3	791.1	6.0	113.7	10,045.7	4,712.1			10,159.4	128.4	
LBO												
Fund of Funds	2018	991.2	1,015.8	19.9	183.0	6,314.4	3,703.1	10,166.8	18,608.2	16,664.2	141.8	

Appendix A Data Summary - Assets, Returns and Costs: Private Market and Hedge Fund

STRS Ohio

(Default costs are highlighted with blue shading. See page 5 for more details)

Asset Class	Year	NAV (\$mils)	Fee		Cost (\$'000)								
			Basis (\$mils)	Return	Internal & Other	Base Fees	Perf. Fees	Underlying Base Fees	Underlying Perf Fees	Total	Total bps		
Venture Capital	LP	2017	860.4	1,334.1	19.3	793.8	6,706.6	3,151.1	10,951.9	16,464.3	18,452.4	148.5	
		2016	715.2	1,151.7	6.8	653.0	6,701.6	2,754.0	8,310.5	13,632.1	15,665.1	159.9	
		2015	661.8	808.1	9.9	603.7	5,965.6	2,377.6	11,206.1	10,520.9	17,775.4	184.1	
		2018	3,589.2	5,672.8	19.9	1,068.0	58,116.0	66,235.5			59,184.0	103.6	
		2017	2,778.2	5,382.0	19.3	791.4	70,745.7	55,268.1			71,537.1	158.8	
		2016	2,510.6	3,630.2	6.8	638.4	52,604.7	50,104.9			53,243.2	152.8	
		2015	2,550.5	3,337.4	9.9	573.9	51,062.2	47,243.1			51,636.1	154.7	
	Fund of Funds	LP	2018	329.8	341.4	18.5	61.3	1,492.4	887.6	4,721.3	4,319.6	6,275.0	191.4
			2017	262.0	314.2	13.3	75.3	1,206.9	739.8	4,794.2	2,934.7	6,076.4	206.3
			2016	231.3	275.0	3.1	72.6	1,677.4	655.2	4,391.9	2,686.3	6,141.9	225.4
			2015	205.5	270.0	11.9	55.0	1,562.2	506.3	3,664.6	3,611.6	5,281.8	240.1
			2014	132.0	170.0	17.9	35.3	1,126.0	312.0	2,824.0	2,090.4	3,985.3	234.4
			2018	1,166.9	1,908.8	18.5	405.9	16,328.0	15,264.3			16,733.9	102.8
			2017	1,052.4	1,486.4	13.3	251.7	25,222.7	11,703.3			25,474.4	193.9
Other Private Equity	Internal Active	2016	178.3	178.3	6.8	25.9					25.9	1.4	
		2015	192.4	192.4	9.9	50.0					50.0	0.7	
		2014	1,145.0	1,145.0	13.5	142.9					142.9	1.3	
		2017	229.5	229.5	19.3	168.4					168.4	8.3	
		2018											
	Co-Investment	LP	2017	605.3	605.3	6.0	193.3					193.3	2.9
			2016	705.2	705.2	4.0	33.7					33.7	0.5
			2015	648.6	648.6	2.4	8.7					8.7	0.3
			2017	1,239.7	2,474.6	6.0	347.9	23,549.0	12,341.8			23,896.9	131.6
			2016	1,323.7	1,948.1	4.0	344.1	25,265.0	11,853.2			25,609.1	148.8
LP	2015	1,095.3	1,494.6	2.4	345.1	19,370.8	11,448.9			19,715.9	107.2		
	2014	722.0	2,185.0	13.5	293.3	10,511.0	7,458.0			10,804.3	57.4		

Appendix A - Data Summary: Oversight, Custodial and Other Costs

STRS Ohio

Oversight, Custodial and Other Costs			
		000s	bps
Oversight of the fund assets ¹	2018	4,964.8	0.7bp
	2017	4,812.2	0.6bp
	2016	4,578.3	0.6bp
	2015	4,539.4	0.6bp
	2014	3,804.1	0.5bp
Custodial total	2018	2,292.9	0.3bp
	2017	2,412.3	0.3bp
	2016	2,090.0	0.3bp
	2015	2,149.9	0.3bp
	2014	1,673.0	0.2bp
Audit	2018	168.5	0.0bp
	2017	168.3	0.0bp
	2016	165.9	0.0bp
	2015	158.3	0.0bp
	2014	136.0	0.0bp
Other (legal etc)	2018	510.6	0.1bp
	2017	477.4	0.1bp
	2016	418.1	0.1bp
	2015	374.8	0.1bp
	2014	339.0	0.0bp
Total	2018	7,936.8	1.0bp
	2017	7,870.1	1.0bp
	2016	7,252.3	1.0bp
	2015	7,222.4	1.0bp
	2014	5,952.1	0.8bp

Summary of All Asset Management Costs			
		000s	bps
Investment Management Costs	2018	294,876.6	39.0bp
	2017	331,483.1	44.2bp
	2016	293,532.4	41.2bp
	2015	288,192.6	39.9bp
	2014	328,574.0	45.0bp
Oversight, Custodial & Other Costs	2018	7,936.8	1.0bp
	2017	7,870.1	1.0bp
	2016	7,252.3	1.0bp
	2015	7,222.4	1.0bp
	2014	5,952.1	0.8bp
Total	2018	302,813.4	40.1bp
	2017	339,353.2	45.3bp
	2016	300,784.7	42.2bp
	2015	295,415.0	40.9bp
	2014	334,526.2	45.9bp

1. Oversight includes the salaries and benefits of executives and their staff responsible for overseeing the entire fund or multiple asset classes and the fees / salaries of the board or investment committee. All costs associated with the above including fees / salaries, travel, director's insurance and attributed overhead should be included.

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Data after the mapping process from enhanced survey to regular is shown below. The below data is used through the rest of this report.

Investment Costs by Asset Class and Style (\$000s)										
	Internal		External Passive		External Active			Total		
	Passive	Active	Fees	Monitoring & Other	Base Fees	Perform. Fees	Monitoring & Other	000s	% of Total	
Stock - U.S. Large Cap	73	12,688			2,310		211	15,281	5%	
Stock - U.S. Small Cap		323			9,437		105	9,866	3%	
Stock - EAFE		2,968			19,126		206	22,300	7%	
Stock - Emerging		3,184			5,778		252	9,214	3%	
Stock - ACWI x U.S.		468			5,474		20	5,962	2%	
Stock - Global		488						488	0%	
Fixed Income - U.S.		3,466						3,466	1%	
Fixed Income - Emerging					3,476		143	3,619	1%	
Fixed Income - High Yield					3,161		144	3,305	1%	
Cash		299						299	0%	
Infrastructure - FoFs					370	506	9	379	0%	
REITs	106							106	0%	
Real Estate ex-REITs		17,796						17,796	6%	
Real Estate ex-REITs - LP					14,030	5,526	481	14,511	5%	
Natural Resources - LP					5,691	2,090	57	5,748	2%	
Hedge Funds					26,479	12,406	255	26,734	9%	
Global TAA		1,667			2,306		96	4,069	1%	
Private Credit		74			12,745	5,139	190	13,009	4%	
Diversified Private Equity		320			25,682	26,113	512	26,513	9%	
LBO					58,116	66,236	1,068	59,184	20%	
LBO - FoFs					6,314	3,703	183	6,497	2%	
LBO - FoFs					10,167	18,608		10,167	3%	
Venture Capital					16,328	15,264	406	16,734	6%	
Venture Capital - FoFs					1,492	888	61	1,554	1%	
Venture Capital - FoFs					4,721	4,320		4,721	2%	
Overlay Programs	326			163				488	0%	
Total investment management costs - Internal & Monitoring								48,807	16%	
Total investment management fees (excluding performance in private assets)								233,204	77%	
Total investment management costs								39.0bp	294,877	97%
Oversight, Custodial & Other Asset Related Costs (\$000s)										
Oversight of the Fund								4,965	2%	
Trustee & Custodial								2,293	1%	
Audit								168	0%	
Other								511	0%	
Total oversight, custodial & other costs								1.0bp	7,937	3%
Total cost for STRS Ohio								40.1bp	302,813	100%

* Default cost used. Refer to Appendix A.

Costs in blue come from the following page.

Costs in purple are from a two-step process shown over the next two pages.

Appendix A - Data Summary - Enhanced Survey Mapping to Regular Survey

Activity	Cost per Enhanced Survey	# of FTE	Step 1: Attribution of Oper. & Support	Cost with Attribution
Front Office				
Currency hedge (from internal developed)	349	1.0	139	488
external alternative investments	2,367	3.9	544	2,911
internal active large & mid cap	9,274	26.0	3,625	12,899
internal active small cap	150	2.0	279	428
internal alternative investments	111	2.3	321	432
internal developed	2,094	7.8	1,080	3,174
internal emerging	2,704	5.3	732	3,436
internal fixed income	2,777	7.0	976	3,753
internal Global ex US (ACWI ex US)	349	1.0	139	488
internal global quant	349	1.0	139	488
Internal liquidity reserves	160	1.0	139	299
internal passive domestic equity	45	0.2	28	73
internal real estate (directly held)	12,219	40.0	5,576	17,796
internal real estate indirect	342	1.0	139	481
internal reit	79	0.2	28	106
internal TAA	1,653	0.1	14	1,667
Total front office	35,020	99.7	13,899	48,919
Governance, Operations and Support				
Board, CEO & assistants re: investments (A)	1,051	2.0	279	1,329
CIO, Investment strategy, asset allocation (B)	2,659	7.0	976	3,635
Oversight of the fund per regular CEM survey (A + B)				4,965
Custodial fees	2,293		n/a	2,293
Internal audit	168	1.0	n/a	168
Legal services	511	2.0	n/a	511
Risk management	269	0.4	-269	0
Performance reporting and data management	2,495	3.0	-2,495	0
Investment operations, exc. private markets	615	4.0	-615	0
Investment operations, private markets	154	1.0	-154	0
Compliance	180	1.0	-180	0
Information technology	7,683	41.0	-7,683	0
Public relations & internal communication	275	2.0	-275	0
Finance, external reporting & tax	794	3.0	-794	0
Human resources	383	3.0	-383	0
Building, utilities & office services	2,248	16.0	-2,248	0
Other investment and support	59	8.0	-59	0
Total cost excluding external manager fees	56,856	194.1	0	56,856

How CEM mapped the above costs to the regular survey

CEM attributed both front office and back office costs to the CEM asset classes by style using the following methodology:

Step 1 - CEM attributed operations and support costs to front office & oversight pro rata based on FTE.

Step 2 - CEM attributes the fully loaded cost (shown in green) to all of the CEM asset classes that the team manages (see next page). The attribution preserves the relative cost ratios versus the CEM universe for each of the asset classes that the team manages.

Appendix A - Data Summary - Enhanced Survey Mapping of Internal Teams

Front Office	Cost with Attribution from Step 1	Responsibilities by CEM asset class	Step 2 Attribution to Asset Classes
Currency hedge (from internal develop	488	Passive Derivatives/Overlays - Currency	326
external alternative investments	2,911	Monitoring Passive Derivatives/Overlays - Currency	163
		Infrastructure	9
		Monitoring LP Natural Resources	57
		Monitoring Hedge Funds	255
		Monitoring Global TAA	96
		Monitoring LP Diversified Private Equity	512
		Venture Capital	61
		Monitoring LP Venture Capital	406
		LBO	183
		Monitoring LP LBO	1,068
		Private Credit	74
		Monitoring LP Private Credit	190
internal active large & mid cap	12,899	Stock - U.S. Large Cap	12,688
		Monitoring Stock - U.S. Large Cap	211
internal active small cap	428	Stock - U.S. Small Cap	323
		Monitoring Stock - U.S. Small Cap	105
internal alternative investments	432	Natural Resources	24
		Diversified Private Equity	88
		Diversified Private Equity	320
internal developed	3,174	Stock - EAFE	2,968
		Monitoring Stock - EAFE	206
internal emerging	3,436	Stock - Emerging	3,184
		Monitoring Stock - Emerging	252
internal fixed income	3,753	Fixed Income - U.S.	3,466
		Monitoring Fixed Income - Emerging	143
		Monitoring Fixed Income - High Yield	144
internal Global ex US (ACWI ex US)	488	Stock - ACWI x U.S.	468
		Monitoring Stock - ACWI x U.S.	20
internal global quant	488	Stock - Global	488
Internal liquidity reserves	299	Cash	299
internal passive domestic equity	73	Passive Stock - U.S. Large Cap	73
internal real estate (directly held)	17,796	Real Estate ex-REITs	17,796
internal real estate indirect	481	Monitoring LP Real Estate ex-REITs	481
internal reit	106	Passive REITs	106
internal TAA	1,667	Global TAA	1,667
Total Front Office	48,919		48,919

Front Office team costs, including allocated operations and support costs (see prior page), are attributed to the asset classes managed or overseen by the team. These attributions, shown in purple, are then inserted back into the regular survey.

Appendix A - Data Summary - Enhanced Survey Definitions

Costs - Attribute 100% of costs excluding manager fees and transaction costs including:

- (i) **Salaries and benefits** of FTE
- (ii) **General & administrative:** travel, supplies, staff education, publications and reference materials, etc.
- (iii) **Consulting** and other third party fees

FTE - Includes full time permanent salaried employees, include the FTE of long and short term contract individuals dedicated to your organization that are working onsite or working full-time for your fund on a project or in a role supervised by your staff. Do not include FTE at external consultants or service providers if they are not being supervised by your staff, even if they are dedicated to serving your organization.

Activity Definitions

1. **Front Office** consists of investment-decision making staff, including traders, analysts, portfolio managers and staff selecting and monitoring external managers, their immediate assistants and their management below the CIO level. Include third party fees for advice at the asset-class or security level such as manager search consultants, private equity consultants, and investment specific legal and due diligence fees that are not treated as transaction costs.

Does NOT include:

- (i) External manager fees. These are collected separately on the holdings tabs.
- (ii) Costs that relate to activities defined as Governance, Operations and Support in the table such as: board consultants, CIO, asset allocation and risk policy consultants, or other services (such as building, utilities and office services, information technology and human resources).

a. Board, CEO & assistants re: investments: Include only the proportion of the costs (fees paid to Board directors, travel, director insurance, CEO and CEO's direct assistants) equal to their proportion of time spent on investments and investment governance support. Exclude time spent on non-investment activities such as benefit administration, sales, marketing, new product development.

b. CIO, Investment strategy, asset allocation: Include 100% of CIO FTE and costs including his/her direct assistants, total fund asset allocation strategy, tactical deviations from the mix, economic political or other research, etc.

c. Risk management: Developing and implementing risk controls for operational and investment risk including surplus risk, factor exposures, credit, counterparty, etc. Excludes the cost of IT/IS risk systems. These belong in IT/IS.

d. Internal Audit: Independent review of business processes. Excludes external auditor fees. These belong in Finance, external reporting & tax.

e. Responsible investing, corporate governance: Policy setting and coordination across asset classes for sustainable, socially and/or environmentally responsible investing, and for corporate governance.

f. Client account management: Client service & reporting related to investing client assets, including client Board meetings, strategic client advice (ALM, risk, client portfolio construction).

g. Custodial fees: should be reported gross before any reductions relating to securities lending or other revenues credited against fees.

h. Data, valuation & performance analytics: Valuation and performance measurement of securities, funds, portfolios, risk, compliance, client reporting and other analysis and reporting. Include costs of data, dealing with data vendors and cleaning data.

Appendix A - Data Summary - Enhanced Survey Definitions (page 2)

i. Investment operations: Listed security operations including trade settlement, custodial bank monitoring and reconciliation, cash management and corporate actions, private asset class, derivatives and swap administration, COO. If the COO or CFO is responsible for multiple activities (i.e., Valuations and performance analytics, investment operation and finance) then split their FTE between the activities based on time spent.

j. Compliance: Monitoring, training on and dealing with regulatory infractions. Includes securities and pension regulation. Excludes compliance related to benefit administration.

k. IT/IS systems: IT management and strategy, architecture, data center, database and application management and maintenance, development, user services, network, telecommunications, etc. Also include the costs of purchasing and maintaining the following systems/software applications: portfolio management, risk management, trade processing/order execution management, compliance monitoring, performance analytics, fund accounting system. Exclude the pro rata portion that relates to non-investment activities such as benefit administration, sales, marketing, new product development.

l. Public relations and internal communication: External communication with entities such as regulators and media. Internal communication to staff. Excludes member and employer communication, marketing and sales.

m. Finance, external reporting & tax: Financial statements, external auditor fees, general accounting, budgeting, tax reporting, procurement and accounts payable. CFO. If the CFO or COO is responsible for multiple activities (i.e., finance and IT) then split their FTE between the activities based on time spent.

n. Legal services: General counsel, corporate secretary, legal counsel of any kind, even those specializing in real estate or private equity, paralegals, legal assistants and all FTE involved in legal analysis and advice. Investment related legal fees and costs, such as the legal fees to close private equity transactions, should be included under 'Front Office' if not treated as a transaction cost. Exclude amounts that pertain to non-investment activities such as benefit administration.

o. Human resources: Human resources staff and consulting, including recruitment, training, career development, induction, disciplinary action, developing HR policies and procedures, etc.
Exclude: Amounts that relate to non investment activities such as benefit administration and both severance and recruitment fees and activity specific training (these should be included in the Front Office Cost Centers table).

p. Building, utilities and office services: Building occupancy costs including rent, lease, amortization of leaseholds and depreciation of buildings, office services such as reception, mailroom, cleaning and maintenance, building insurance, utilities. Include satellite offices. Exclude the pro rata portion that relates to non-investment activities such as benefit administration, sales, marketing, new product development.

Appendix B - Data quality

The value of the information contained in these reports is only as good as the quality of the data received. CEM's procedures for checking and improving the data include the following.

Improved survey clarity

Twenty years of feedback from survey participants has led to improved definitions and survey clarity. In addition to immediate feedback from participants, CEM has hosted user workshops to solicit additional feedback and to resolve issues, such as trade-offs between more information and effort on the part of participants.

Computer and desktop verification

Survey responses are compared to norms for the survey universe and to each sponsor's prior year data when available. This typically results in questions generated by our online survey engine as well as additional follow-up to clarify responses or with additional questions.

In addition to these procedures, data quality continues to improve for the following reasons:

Learning curve

This is CEM's 28th year of gathering this data and experience is teaching the firm and the participants how to do a better job.

Growing universe

As our universe of respondents continues to increase in size, so does our confidence in the results as unbiased errors tend to average themselves out.

Any suggestions on how to further improve data quality are welcome.

Currency Conversions

For reports where either the peer group or report universe includes funds from multiple countries, we have converted the returns back to the base currency of the fund we prepared the report for. For example, for a Euro zone fund with peers from the U.S. we converted U.S. returns to Euro based on the currency return for the year using December 31 spot rates.

Appendix C - Glossary of terms

Average cost

- Calculated by dividing actual annual costs by the average of beginning and end-of-year holdings. If beginning-of-year holdings are not available, they are estimated using end-of-year holdings before the effect of this year's return on investment.

Benchmark return

- Rate of return on a portfolio of investable assets (such as the S&P500) designated as the benchmark portfolio against which the fund measures its own performance for that asset class.

F statistics

- Measure of the statistical significance of the regression coefficients taken as a group. Generally, regression equations with 5 coefficients and sample sizes greater than 20 are statistically significant if its F statistic is greater than 3.

Global TAA

- Fully funded segregated asset pool dedicated to active asset allocation.

Impact coefficient

- Estimate of the impact on the dependent variable in a regression of a change in the value of a given explanatory variable

Level of significance

- Degree to which sample data explains the universe from which they are extracted.

N-year peers

- Subset of peer group that have participated in our study for at least the consecutive n years.

Oversight of the fund

- Resources devoted to the oversight of the fund.

Overlay

- Derivative based program (unfunded other than margin requirements), designed to enhance total portfolio return (such as a tactical asset allocation program) or to achieve some specific mandate such as currency hedging.

Passive proportion

- Proportion of assets managed passively, i.e., indexed to broad capital market benchmarks or dedicated to replicate market benchmarks.

Policy mix

- Reflects long-term policy or target asset weights. Policy asset mix is often established by a fund's investment committee or board and is determined by such long term considerations as liability structure, risk tolerance and long term capital markets prospects.

Policy return

- The return you would have earned if you had passively implemented your policy mix decision through your benchmark portfolios. Your policy return equals the sum of your policy weights multiplied by your asset class benchmarks for each asset class.

R squared (coefficient of determination)

- The percentage of the differences in the dependent variable explained by the regression equation. For example, an R squared of 1 means 100% of the differences are explained and an R squared of 0 means that none of the differences are explained.

Value added

- the difference between your total actual return and your policy return. It is a measure of actual value produced over what could have been earned passively.

From: Jonathan Spring <JSpring@truenp.com>
Sent: Wednesday, April 29, 2020 1:30 PM
To: Treneff, Nick <TreneffN@strsoh.org>
Subject: Full CEM report

Dear Nick,

Could you please email me the most recent full CEM investment report for STRS?

Thank you very much,

Jonathan Spring

From: Nelson, Joy <nelsonjl@strsoh.org>
Sent: Thursday, May 7, 2020 5:03 PM
To: JSpring@truenp.com
Cc: Treneff, Nick <TreneffN@strsoh.org>; Stein, Bob <steinr@strsoh.org>
Subject: RE: Full CEM report

Dear Mr. Spring,

Attached please find the records responsive to your request made to Nick Treneff on April 29, 2020. Please note that CEM has redacted certain information it deems to be trade secret under Ohio law.

Sincerely,

Joy L Nelson, CRM
Records and Documentation Administration Manager
State Teachers Retirement System of Ohio

Items sent:

2018 CEM Final Report DB_Redacted.pdf

The High Cost of Secrecy

Preliminary Findings of Forensic Investigation of State Teachers
Retirement System of Ohio, Commissioned by Ohio Retired
Teachers Association

Benchmark Financial Services, Inc., June 2021

The High Cost of Secrecy

Preliminary Findings of Forensic Investigation of
State Teachers Retirement System of Ohio,
Commissioned by Ohio Retired Teachers
Association

I. Executive Summary

• Lack of Transparency

Transparency in government has long been acknowledged in America as essential to a healthy democracy. On the federal level, the Freedom of Information Act opens up the workings of government to public scrutiny, giving citizens information they need to evaluate and criticize government decision-making.

All 50 states also have public records laws which allow members of the public to obtain documents and other public records from state and local government bodies. The Ohio Public Records Act is built on the United States' historical position that the records of government are "the people's records."

Key Findings:

STRS has long abandoned transparency; legislative oversight of the pension has utterly failed; Wall Street has been permitted to pocket lavish fees without scrutiny; investment costs and performance may have been misrepresented; and failure to monitor conflicts may have undermined the integrity of the investment process, as billions that could have been used to pay retirement benefits promised to teachers have been squandered.

Transparency is also critical to the prudent management of trillions of dollars invested in America's state and local government pensions. Indeed, the single most fundamental defining characteristic of our nation's public pensions is *transparency*. Of all pensions globally, our public pensions—securing the retirement security of nearly 15 million state and local government workers, funded by workers and taxpayers—are required under our public records laws to be the most transparent.

Public pensions primarily invest government workers' retirement savings in securities and funds which are regulated on the federal and state level. Our nation's securities laws require that securities issuers and fund advisers register with regulators, disclose financial and other significant information to *all* investors, including public pensions, as well as prohibit deceit, misrepresentations, and other fraud. The statutorily mandated disclosure information is commonly provided in the form of prospectuses, offering memoranda, annual reports, performance reviews and other documents.

Absent full disclosure by investment firms to pension boards and staffs, these individuals cannot fulfill their fiduciary duty to diligently safeguard pension assets. Full disclosure of investment information by the pension to the public is necessary for the stakeholders to understand the investment program, as well as evaluate whether pension fiduciaries are prudently performing their duties.

Thus, in public pension matters, we are concerned with two levels of transparency:

First, under state public records laws, all of the workings of the pension must be open to full public scrutiny, including, but not limited to, investments.

Second, under the securities laws, issuers and investment advisers must fully disclose material information to pensions, boards and staffs regarding pension investments.

Alarmingly, our investigation reveals that the State Teachers Retirement System of Ohio (STRS) has long abandoned transparency, choosing instead to collaborate with Wall Street firms to eviscerate Ohio public records laws and avoid accountability to stakeholders. Predictably, billions that could have been used to pay teachers' retirement benefits have been squandered over time as transparency has ceased to be a priority.

- **Litigation Regarding Denial of Public Records Request**

On February 19, 2021, we filed a request pursuant to Ohio Revised Code Section 149.49, et seq. for an opportunity to inspect or obtain copies of public records related to the pension's investment managers, investment consultants, performance compliance auditor, investment cost monitor, financial auditor, and custodians, as well as board and staff.

The *overwhelming majority* of the most critical disclosure information we requested was *summarily* denied. That is, STRS simply permitted the investment firms involved to unilaterally

determine whether the information we sought on behalf of stakeholders had to be disclosed under Ohio law. Not surprising, most firms granted the opportunity to oppose public scrutiny of their financial dealings with STRS, chose to do so.

Most disturbing, *not a single* prospectus or offering document required to be provided to *all investors* under our nation's securities laws was provided to us in response to our public records request.

As a result of the extensive denials of important public records requests, it is impossible for STRS stakeholders to evaluate the investment strategies, performance, fees, risks, and conflicts of interest related to the pension's investment portfolio. Accordingly, on May 21, 2021, we filed a complaint for writ mandamus with the Supreme Court of Ohio seeking certain STRS public records we have been denied.

The lack of cooperation by STRS is all-the-more surprising given that STRS is well-aware that this forensic review of the pension was commissioned, as well as paid for, by tens of thousands of participants, with the stated objective of improving management and oversight of the pension. Pension fiduciaries solely concerned with the best interests of participants and beneficiaries should welcome, not oppose, a free independent review by nationally recognized experts in pensions. Further, given the profound fiduciary breaches and disclosure concerns stakeholders (and even STRS's own commissioned experts) have long raised, it is clear STRS could

benefit from an independent review by experts—this time not of its own choosing.

Tellingly, in the pension's Mission & Vision statement; Current Strategic Goals; Overview of STRS and Its Impact on the State; Statement of Investment Objectives and Policy; and Statement of Fund Governance, the word “transparency” does not appear *even once*. There is not a single mention of any transparency requirements, no discussion the benefits of transparency and no commitment to it.

In our opinion, transparency, which would add not a single dollar of cost to the pension, would (through exposure) swiftly cure all that ails it—excessive fees, reckless risk-taking, unaddressed conflicts of interest, gross mismanagement and potential malfeasance.

- **Failure of Legislative Oversight**

While the Ohio Retirement Study Council (ORSC) was created by the Ohio Legislature to provide legislative oversight of Ohio's statewide public pension systems and is statutorily required to commission an independent fiduciary performance audit and actuarial audit at least every 10 years of each state pension, it has been approximately 15 years since the last such audits of STRS.

When statutorily mandated, critical audits designed to protect the integrity of a \$90 billion retirement plan are not commissioned, and delayed year-after-year, it is inexcusable. An investigation into the failure to audit by

ORSC—as well as STRS's failure to demand such audit results—is warranted, in our opinion.

Any mismanagement or malfeasance which could have been exposed years earlier through timely audits has been allowed to persist, potentially resulting in great risk and cost to the plan. Worse still, the last fiduciary performance audit of STRS revealed multiple serious deficiencies which have never been addressed over the past 15 years.

The ORSC failure to audit is especially troubling because it indicates a lack of diligent legislative oversight potentially impacting *all* \$203 billion in Ohio public pensions and over 2 million citizens. Further, the fiduciary audit for Ohio Public Employees Retirement System was not performed by an independent auditor (as required under applicable law) and was three years late; the Ohio Police & Fire Pension Fund is only now requesting proposals for the fiduciary audit due 2016; and the actuarial audit of the Ohio State Highway Patrol Retirement System is 21 years overdue.

Clearly, legislative oversight has been compromised *for decades*.

- **Failure to Address Serious Deficiencies Identified in Last Fiduciary Performance Audit**

Among the many concerns raised in the 2006 Fiduciary Performance Audit of the pension were: STRS staff was the underlying source of all performance data and benchmarks (i.e., returns were not calculated by an independent third

party); the Investment Policy Statement (IPS) did not include a plan in the event of active management underperformance; the IPS did not include a Total Fund Benchmark definition; the IPS did not include the source of performance data; whether, as represented to the auditor, the alternatives benchmark of “actual” performance was part of the staff incentive compensation program; the size of internal audit staff and absence of auditors; lack of input from other members of committee (non-Chair) in committee agendas; personal trading policy; and reporting and governance of external consultants and investment staff.

Two of the most serious deficiencies identified in the Fiduciary Performance Audit report and recommendations 15 years ago remain unaddressed to this day:

1. Use of actual performance for benchmarking alternative investments since 2002; and
2. Conflicts of interest involving external investment consultants.

With respect to STRS’s so-called alternative investment “benchmark,” it should be obvious that *actual* performance of an investment or strategy cannot be considered a benchmark since it does not provide a point of reference against which the investment or strategy can be compared. Actual performance does not clearly define expectations and success. *In our decades of professional experience, we have never seen actual performance proposed as a benchmark.*

Despite the recommendation in 2006 that the Russell 2000 or Russell 3000 plus 500 basis points would be an appropriate policy benchmark for the alternatives program, STRS has continued for the past 15 years to use the actual return of the pension's alternatives as the benchmark for the one-year period. As a result, it is impossible for the pension's alternatives to underperform on a one-year basis.

For the longer 5-year period, the alternative investments blended relative return objective is in two parts by policy: Russell 3000 Index plus 1 percent for Private Equity and Russell 3000 minus 1 percent for Opportunistic /Diversified.

In our opinion, this longer-term benchmark for alternatives is equally absurd. Not only is the Private Equity benchmark far too low given the greater risks related to private equity investing (Russell 3000 plus 1 percent, versus plus 5 percent as recommended by the Fiduciary Performance Audit), with respect to Opportunistic /Diversified we have never seen *underperforming* a readily achievable index rate of return (Russell 3000 *minus* 1 percent) proposed as an appropriate benchmark.

It is irrational, in our opinion, for a pension to set as a goal for its highly speculative alternative investments, such as hedge funds (or any other investments for that matter), to significantly *underperform* a public markets index, i.e., to *intentionally lose money*.

According to the Cliffwater report for June 30, 2019, STRS Ohio alternative returns "fall behind" Relative Return

Objectives across *all periods* “due to the very strong performance of public US stocks across all periods.” In our opinion, a more accurate assessment would be that the alternatives have **massively underperformed** the Relative Return objectives across all periods. For example, over the last 10 years alternatives returned 9.79 percent vs. 14 percent for the Relative Return Objective; for the last 5 years alternatives returned 6.66 percent versus 9.97 percent.

Use of the recommended Russell 3000 plus 500 basis points as the benchmark would reveal that since the 2006 fiduciary audit (not including the massive underperformance in the 5 years prior to the audit), the Alternatives have dramatically underperformed, 8.26 percent versus 11.91 percent.

The alternatives underperformance losses for the period amount to **\$8.6 billion or \$2.5 million per trading day for 14 years. Restoring the COLA benefit would cost less than \$1 million (\$890,000) per day.** For additional perspective, total active teacher contributions since the 2006 Fiduciary Audit amount to approximately \$18 billion. \$8.6 billion alternative investment underperformance equates to \$61,000 per retired teacher.

With respect to the pension’s then-external investment consultant, in 2006 it was recommended that due to conflicts of interest pervasive in the investment consulting industry and the potential for related harm, the consultant’s contract with STRS should be amended to require the firm to provide annual disclosure of its business relationships with all

investment managers or other providers of investment services. This contractually-required disclosure should include information on the specific amounts paid to the consultant by those investment managers employed by STRS and on the specific services provided to those managers. To date, it appears STRS has failed to receive the disclosure recommended in 2006 regarding external consultant compensation received from STRS investment managers.

- **Failure to Monitor and Fully Disclose Investment Fees and Expenses**

It is well established that sponsors of retirement plans have a fiduciary duty to ensure that the fees their plans pay money managers for investment advisory services are reasonable.

The shift by public pensions into more complex so-called “alternative” investment vehicles, such as hedge, private equity and venture funds, as well as fund of funds, has brought dramatically higher investment fees which are much more difficult for pensions to monitor.

Most disturbing, a recent internal review by the SEC found that more than half of about 400 private-equity firms it examined charged unjustified fees and expenses without notifying investors.

Thus, pensions which choose to gamble in asset classes—such as private equity funds, specifically cited by regulators for frequently charging bogus fees in violation of the federal securities laws—must establish *heightened safeguards* to ensure that all fees paid to, or collected by, such managers

are properly reviewed and determined to be legitimate, as well as fully disclosed to participants.

CEM Investment Benchmarking is a private Canadian company which STRS retains to annually analyze the pension's investment costs and performance. In our opinion, the summary disclosure provided by STRS regarding CEM's findings annually may, at a minimum, be so incomplete as to be misleading.

Disclosure of the full CEM report, not merely the Executive Summary or Key Takeaways section, is necessary for pension stakeholders to form a complete understanding of CEM's findings. We note that in Pennsylvania and South Carolina, unlike Ohio, there is recognition that the public deserves to see the entire CEM report, not just select passages.

It is our understanding (from interviews with CEM staff) that STRS staff provides the firm with *all* of the data regarding the pension's investment costs and performance, which CEM analyzes.

"The analysis is as accurate as possible based upon fees as reported to us by our clients (emphasis added)," says CEM.

However, CEM has advised us:

- Pensions *may not know* the costs of all their investments;
- Pensions may *decline* to provide CEM with *known* cost information which pensions are not "overly comfortable with;"

- CEM *does not independently collect* any cost information from investment managers which might verify or contradict the fees, as reported by pension clients; and
- Cost and performance *estimates* created by CEM have been utilized with respect to many STRS investments over the years.

The full findings in the CEM reports appear to conflict with the summary findings publicly stated by STRS and raise additional concerns in our opinion.

For example, the 2018 report we reviewed initially states in the Key Takeaways section of the Executive Summary that the pension's 5-year net total return of 6.25 percent was in the top quartile and above the fund's 6.09 percent 5-year policy return. The 5-year net value added was 0.16 percent.

However, CEM later in the report says that the pension *underperformed* its 5-year policy return, producing a *negative* value added. A negative net value added means that the pension did not benefit from active management, i.e., STRS would have earned **over \$400 million more annually, or over \$2 billion for the five-year period** by simply passively indexing its investments according to its policy mix.

Key Takeaways also states that the pension's investment cost of 40.1 basis points was below its benchmark cost of 54.5 basis points which suggests that the fund was low cost compared to its peers., i.e., was low cost because it paid less

than its peers for similar services and had a lower cost for implementing its style.

The report later states that the investment costs were \$279.1 million or 36.9 basis points and \$302.8 million or 40.1 basis points when hedge fund performance fees and private equity base management fee offsets were added. However, it is disclosed that transaction costs and private asset performance fees were not included in the latter total. Further in the report, performance fees of \$160.8 million are estimated by CEM in 2018.

We note with great emphasis that this performance fee figure is a mere *estimate* provided by CEM.

In our opinion, if, in connection with the analysis—during the data confirmation process—CEM and STRS discussed the disturbing fact that certain investment management costs were unknown to STRS, or, worse still, known but not provided for some reason, the sole acceptable, prudent course would have been to scrutinize any unknown costs more thoroughly and then demand disclosure of all costs, as opposed to continuing to invest billions in the highest-cost, highest-risk, most opaque assets blithely ignorant of (or concealing) the true costs—using problematic median default estimates as support for the strategy.

Again, pension fiduciaries have a legal duty to monitor all investment and other costs for reasonableness—not merely guess, or estimate, what those costs might be.

Use of median default estimates in managing an \$90 billion plan securing the retirement of hundreds of thousands of

state teachers fails to meet applicable fiduciary standards, in our opinion.

When performance fees of \$160.8 million are added in, the revised fee total rises from \$279.1 million, then \$302.8 million to **\$463.6 million or 61.3 basis points**, versus the 40.1 basis points noted in the Key Takeaways. This cost is significantly *greater* than the fund's benchmark cost of 54.5 basis points, suggesting that STRS was *high cost* compared to its peers, i.e., *paid more* than peers for similar services and had a *higher cost* for implementing its style. Again, these findings appear to be strikingly different from those publicly touted by STRS.

However, it appears that even the \$463.6 million estimated total cost is *incomplete*.

In 2020, CEM concluded that pensions are reporting, at best, only half of their investment management costs. In our opinion and based upon forensic investigations we have undertaken, there is ample reason to believe the total fees are nearly **double** what the pension is reporting, amounting to almost **\$1 billion** annually.

To put the hidden, unreported fees—alone—into context, they amount to \$2.75 million per school day, and **more than twice the \$210 million required to pay STRS COLAs annually.**

We note with great emphasis that since STRS external investment managers are permitted to withdraw their fees from pension accounts in the absence of any diligent

monitoring by STRS, *the risk of looting, i.e., illegitimate withdrawals, is dangerously high*, in our opinion.

In conclusion, there is no point in debating the true all-in investment costs since the pension has long-acknowledged to CEM it either does not know what its costs are, or knows but refuses to disclose, and CEM does not independently collect any cost information from STRS's investment managers. Absent an accounting and full transparency, pension stakeholders can never be certain of the true costs; with scrutiny, the true costs can be precisely determined and publicly disclosed, consistent with applicable fiduciary duties—restoring financial integrity to the pension.

An exhaustive investigation into all past payments to investment managers should be immediately undertaken, as well as recovery pursued with respect to any illegitimate payments, in our opinion. Finally, disclosure of historic costs should be adjusted to correct any past underreporting or errors.

- **\$143 Million In Fees Paid to Wall Street for Doing Nothing**

As of June 30, 2020, the pension had unfunded alternative investment capital commitments totaling \$7,152,101,083.

It is common practice for private equity and other alternative investment funds to seek to charge investment management fees on “committed capital.” In other words, after the investor makes a capital commitment to a fund, management fees are charged on the entire commitment

amount, regardless of whether the capital is actually drawn or invested. Paying fees on committed, uninvested capital results in exponentially greater fees on assets under management on a percentage basis.

Fees on committed, uninvested capital amount to paying managers for *doing nothing*—no service whatsoever is provided in exchange for the lavish fees. In our opinion, such fees add insult to injury since these types of investment funds already charge exponentially higher fees than traditional stock and bond managers.

Not surprising, a growing minority of savvy institutional investors, unlike STRS, resist paying fees to investment managers based upon their capital commitments.

Assuming STRS pays fees of 2 percent on total unfunded commitments, this amounts to an annual waste of approximately **\$143 million**—enough to restore the COLA benefit to **2 percent**.

- **Potentially Misleading GIPS Compliance Verification**

Since 2006, STRS has regularly announced in press releases and on its website that its “performance was verified by ACA Performance Services and was in compliance with the CFA Institute Global Investment Performance Standards (GIPS), widely considered to be the best standard for calculating and presenting investment performance.”

We note that STRS is one of only a handful of pensions to comply with GIPS standards. While GIPS compliance may present some perceived marketing advantage to a pension, such as STRS, under intense scrutiny, it is extremely rare (and problematic in our opinion) for asset owners to incorporate GIPS principles in their own performance reporting to oversight boards, governing bodies and plan beneficiaries.

Further, it is disputable whether GIPS standards are “best practice” or acceptable for retirement plan fiduciaries. That is, standards which the asset management industry is comfortable *voluntarily* adopting likely will fail to be rigorous enough to meet the heightened standards applicable to fiduciaries charged with safeguarding retirement plan assets.

GIPS compliance can be helpful to certain investment managers in their marketing. However, alternative investment managers are overwhelmingly *not* GIPS compliant. Thus, it is not at all clear that GIPS compliance verification for a pension, such as STRS, which invests at least 27 percent of its assets in approximately 170 alternative investments that are unlikely to be GIPS compliant provides any meaningful benefit to stakeholders. On the other hand, the risk that GIPS compliance representations may be mischaracterized by pensions, or misunderstood by stakeholders seems very real, in our opinion.

Finally, we note ACA is currently embroiled in a controversy regarding exaggerated investment returns at Pennsylvania’s \$64 billion public school employees pension

fund which is being investigated by the Federal Bureau of Investigation. In that matter, ACA is insisting that it was hired “only to spot-check the math.”

- **Failure to Monitor External Consultant Conflicts of Interest**

The 2006 Fiduciary Performance review recommended, given potential conflicts of interest pervasive in the investment consulting industry, that STRS’s contract with its then-investment consultant be amended to require the firm to provide annual disclosure of its business relationships with all investment managers, or other providers of investment services. This contractually-required disclosure should include information from the consultant on the specific amounts paid to the consultant by those investment managers employed by STRS and on the specific services provided to those managers.

STRS subsequently replaced its then-investment consultant and retained two new investment consultants. Both agreements with the new investment consultants require the full disclosure—as recommended 15 years ago—of all business relationships with investment managers and service providers, as well as specific amounts paid to the investment consultants by STRS investment managers. However, it appears full disclosure of conflicted payments has not been made to STRS.

If true, then both consultants may be in breach of their contracts with the fund. In our opinion, by failing to

adequately monitor conflicts of interests involving STRS investment consultants which could potentially undermine the integrity of the pension's investment decision-making process, the board may have breached its fiduciary duty to safeguard assets and exposed the fund to enormous risks. Further, the board may have permitted the investment consultants to enrich themselves by the amounts of such manager payments, at the expense of the pension.

Finally, the current agreements with external investment consultants provide that they will maintain professional liability insurance coverage in the amount of only \$5 million. In our opinion, this amount of insurance seems woefully inadequate to protect the \$90 billion public pension from potential investment consultant negligence or malfeasance, particularly given that the Government Accountability Office has estimated consultant conflicts can result in 1.3 percent lower returns.

If true, external investment consultant conflicts of interest may have cost STRS over **\$1 billion** annually or approximately **\$20 billion** over a ten-year period with compounding. Since the estimated cost of conflicts may nearly equal the unfunded liability of the pension, an investigation may reveal that "but for" the conflicts the pension could be nearly fully funded.

- **Need for Heightened ERISA Fiduciary Standards and Fiduciary Liability Insurance for Board**

The contracts involving the two investment consultants to the fund stipulate that in addition to the fiduciary obligations imposed by Ohio law, these firms agree to adhere to the standard of care imposed by Title 1 of the Employee Retirement Income Security Act of 1974 and any and all other applicable federal and state laws. ERISA's heightened fiduciary standards provide additional important protections to pensions generally lacking under state law. On the other hand, the STRS board is not similarly required to comply with ERISA fiduciary standards. In our opinion, there is no good reason why the investment consultants should be held to higher fiduciary standards than the board; further, board compliance with ERISA standards can only improve management of the pension.

Finally, in response to our request for information regarding any fiduciary liability insurance obtained by STRS, we were provided with documents indicating the fund had coverage in the amount of \$10 million with Hudson Insurance Company and \$10 million with Federal Insurance Company. In addition, the pension has an excess liability policy in the amount of \$5 million with RLI Insurance Company. In our opinion, this level of coverage is absurdly low and offers virtually no protection for a \$90 billion pension. Virtually any fiduciary breach may result in actual damages amounting to hundreds of millions of dollars.

For example, STRS recently disclosed it had lost more than half a billion dollars on a private equity investment in Panda Power Funds. From 2011 to 2013, State Teachers Retirement

System of Ohio invested \$525 million with Panda but the investment is now valued at zero.

In summary, our forensic investigation of STRS identified the following grave concerns:

- 1) STRS has long abandoned transparency, choosing instead to collaborate with Wall Street to eviscerate Ohio public records law;
- 2) Legislative oversight of the pension has utterly failed;
- 3) The pension has failed to address significant deficiencies identified in the last Fiduciary Performance audit—15 years ago;
- 4) Wall Street has been permitted to pocket lavish investment fees without scrutiny, including \$143 million in fees for doing nothing;
- 5) Disclosure of investment costs and performance may have been misrepresented;
- 6) Representations regarding GIPS Compliance Verification may have been misleading to the public;
- 7) Failure to monitor external consultant conflicts of interest may have undermined the integrity of the pension's investment decision-making process and resulted in significant losses;
- 8) Board compliance with heightened ERISA fiduciary standards is not required and fiduciary liability insurance coverage is woefully inadequate.

Billions that could have been used to pay retirement benefits promised to teachers have been squandered.

END EXECUTIVE SUMMARY

II. Preface

U. S. Supreme Court Justice Brandeis once famously said, “Sunshine is the best disinfectant.” In other words, transparency ensures that public officials act visibly and understandably, and report on their activities to the populace.

Transparency in government has long been acknowledged in America as essential to a healthy democracy. On the federal level, the Freedom of Information Act opens up the workings of government to public scrutiny, giving citizens information they need to evaluate and criticize government decision-making.

All 50 states also have public records laws which allow members of the public to obtain documents and other public records from state and local government bodies.¹ The Ohio Public Records Act is built on the United States’ historical position that the records of government are “the people’s records.”²

Likewise, transparency is critical to the prudent management of trillions of dollars invested in America’s state and local government pensions. Indeed, the single most fundamental defining characteristic of our nation’s public pensions is *transparency*. Of all pensions globally, our public

¹ <http://foiadvocates.com/records.html>

² Ohio Open Records Law, Ohio Revised Code § 149.43

pensions—securing the retirement security of nearly 15 million state and local government workers, funded by workers and taxpayers—are required under our public records laws to be the most transparent.

In the words of CEM Benchmarking, the firm STRS relies upon to evaluate its investment costs and performance:

“Far beyond the moral imperative that recognizes transparency “is the right thing to do” there is plenty of evidence that shows how greater transparency leads to better outcomes, including:

1. Improved decision making. Transparency and accountability go hand in hand.
2. Clarity of purpose that comes from simplifying and communicating complex issues.
3. Improved relationships with a broad spectrum of stakeholders including beneficiaries, plan sponsors, regulators, suppliers, and concerned citizens.
4. Improved stewardship. After all, management's duty is to do their best to the benefit of their stakeholders.³

- **State and Federal Securities Laws Also Demand Transparency**

Public pensions primarily invest government workers retirement savings in securities and funds which are regulated on the federal and state level. Our nation's securities laws require that securities issuers and fund advisers

³ <https://cembenchmarking.com/gptb.html>

register with regulators, disclose financial and other significant information to *all* investors, including public pensions, as well as prohibit deceit, misrepresentations, and other fraud. The statutorily mandated disclosure information is commonly provided to all investors in the form of prospectuses, offering memoranda, annual reports, performance reviews and other documents.

Absent full disclosure by investment firms *to pension boards and staffs*, these individuals cannot fulfill their fiduciary duty to diligently safeguard pension assets. Registration status, regulation, governance, investment strategies, performance, fees, risks, and conflicts of interest, cannot be monitored unless adequately disclosed to pension officials.

Full disclosure of investment information by the pension *to the public* is necessary for the stakeholders to understand the investment program, and, equally important, evaluate whether pension fiduciaries are prudently performing their duties.

Thus, in public pension matters, we are concerned with two levels of transparency:

First, under state public records laws, all of the workings of the pension must be open to full public scrutiny, including, but not limited to, investments.

Second, under the securities laws, issuers and investment advisers must fully disclose material information to pensions, boards and staffs.

It is axiomatic that, at a minimum, investment information which must be disclosed to *all investors*, including but not limited to public pensions, under the federal and state securities laws must be provided to stakeholders in public pensions subject to public records disclosure requirements. After all, pension stakeholders are the “investors” whose money is at risk.

To allow investment firms and public pension officials to use state public records laws to thwart securities disclosure requirements, concealing potential fraud and mismanagement from stakeholders, regulators and law enforcement, would make no sense. Indeed, public pension stakeholders should enjoy the *enhanced disclosure* and other benefits powerful, large institutional investor fiduciaries routinely negotiate—disclosure above and beyond that provided to ordinary retail investors.

Alarming, our investigation reveals that the State Teachers Retirement System of Ohio (STRS) has long abandoned transparency, choosing instead to collaborate with Wall Street firms to eviscerate Ohio public records laws and avoid accountability to stakeholders. Predictably, billions have been squandered as transparency has ceased to be a priority.

- **Denial of Public Records Requests**

On February 19, 2021, we filed a request pursuant to Ohio Revised Code Section 149.49, et seq. for an opportunity to inspect or obtain copies of public records related to the

pension's investment managers, investment consultants, performance compliance auditor, investment cost monitor, financial auditor, and custodians, as well as board and staff. As noted throughout this report, the *overwhelming majority* of the most critical disclosure information we requested was *summarily* denied. That is, STRS repeatedly simply permitted the investment firms involved to unilaterally determine whether the information we sought on behalf of stakeholders had to be disclosed under Ohio law. Not surprising, most firms granted the opportunity to oppose public scrutiny of their financial dealings with STRS, chose to do so.

More disturbing, included in key investment services contracts which were provided to us, we discovered identically-worded confidentiality provisions (apparently drafted by STRS) indicating that both parties agreed the services provided in connection with the contract were confidential; agreed to hold such confidential information in the strictest confidence; agreed to release it only to authorized parties on a need-to-know basis, or as required by law; provided, however, that each party gave the other prior timely notice of such disclosure to enable the other to challenge such disclosure.⁴

According to Section 3307.14 of the Ohio Revised Code, the Board and other fiduciaries of the pension must discharge

⁴ The STRS contracts provide that the party challenging disclosure bears the sole cost and expense.

their duties with respect to the funds *solely* in the interest of the participants and beneficiaries.

These contractual provisions drafted by STRS, which facilitate challenges to disclosure pursuant to state public records laws do not, in our opinion, in any way benefit the pension, its participants or beneficiaries.

If STRS, consistent with its fiduciary duties, was committed to transparency in compliance with applicable law, its contracts with investment vendors should include provisions which unequivocally state the precise opposite of what they say today, i.e., that the parties agree all information related to the contract is disclosable under applicable public records law. Further, any investment firm unwilling to operate in a fully transparent manner, consistent with applicable public records law, must be considered ineligible to manage public monies or otherwise contract with the pension.

Most disturbing, as discussed further below, *not a single* prospectus or offering document required to be provided to *all investors* under the nation's securities laws has been provided to us in response to our public records requests.

As a result of the extensive denials of our most important public records requests, it is impossible for STRS stakeholders to evaluate the investment strategies, performance, fees, risks, and conflicts of interest related to the pension's investment portfolio. Accordingly, as described more fully below, on May 21, 2021, a complaint for writ mandamus was filed in the Supreme Court of Ohio seeking certain STRS public records.

The above noted lack of cooperation by STRS is all the more surprising given that STRS is well-aware that this forensic review of the pension was commissioned, as well as paid for, by participants, with the stated objective of improving management and oversight of the pension. Pension fiduciaries legally solely concerned with the interests of participants and beneficiaries should welcome, not oppose, a free independent review by nationally recognized experts in pensions. Further, given the profound fiduciary breaches and disclosure concerns stakeholders (and even STRS's own commissioned experts) have long raised, it is clear STRS could benefit from an independent review by experts—this time not of its own choosing.

Tellingly, in the pension's Mission & Vision statement; Current Strategic Goals; Overview of STRS and Its Impact on the State; Statement of Investment Objectives and Policy; and Statement of Fund Governance, the word “transparency” does not appear *even once*. There is not a single mention of any transparency requirements, no discussion the benefits of transparency and no commitment to it.⁵

These key documents refer to such laudable goals as partnering with members to help build retirement security; strengthening relationships with members, employers and

⁵Suggested amendments to Board Policies dated December 19, 2019 by Board member Wade Steen recommended that the Purpose of the fund be supplemented to state, “Build an organizational culture that inspires a high level of professionalism and performance, *and trust through transparency* (emphasis added).” It is our understanding that Steen's proposed amendment may have been rejected because it suggested the pension was not already transparent.

other stakeholders; developing communication themes and channels to enhance STRS's reputation with key audiences; providing educational programs that partner with members on financial wellness and preparing for a secure retirement; and fostering and maintaining a culture of professionalism, service orientation and ethical business practices. Of course, absent transparency none of the aforementioned goals is achievable.

Furthermore, the stated goals of prudent and efficient management of assets, exceptional financial performance, mitigation of risk and cost effectiveness all necessitate full transparency, as detailed more fully throughout this report. Again, according to STRS's own expert, CEM Benchmarking, "greater transparency leads to better outcomes."

Conversely, our forensic investigations reveal that greater secrecy inevitably leads to fraud, mismanagement and waste.

In our opinion, transparency, which would add not a single dollar of additional cost to the pension would (through exposure) swiftly cure all that ails it—excessive fees, reckless risk-taking, unaddressed conflicts of interest, mismanagement and potential malfeasance.

III. Introduction

Founded in 1920, STRS is a statewide retirement system that provides pension, disability, survivor, and health care benefits to licensed teachers and other faculty members employed in the public schools of Ohio or any school, college,

university, institution, or other agency controlled, managed and supported, in whole or in part, by the state of Ohio or any political subdivision thereof. STRS serves more than 500,000 active, inactive and retired Ohio public educators. STRS had investment assets of \$91.7 billion (as of April 30, 2021), making it one of the largest public pension funds in the U.S. For the fiscal year ended June 30, 2020, the funded ratio of the pension—the value of assets compared to actuarial accrued liabilities—was 77.4 percent. The unfunded actuarial liability of the pension is \$22.3 billion.

Federal pension law (Pension Protection Act of 2006)⁶ designed to address alarming funding problems encountered by many multiemployer corporate pensions establishes three categories (or zones) of plans: (1) Green Zone for healthy; (2) Yellow Zone for endangered; and (3) Red Zone for critical. These categories are based upon the funding ratio of plan assets to plan liabilities. In general, Green Zone plans have a funding ratio greater than 80 percent, Yellow Zone plans have a funding ratio between 65 percent and 79 percent, and Red Zone plans are less than 65 percent funded. Each plan's actuary must certify the plan status every year and participants and employers must to be notified of the status of the plan. Each Yellow Zone plan must adopt a funding improvement plan designed to increase its funding percentage and Red Zone plans must adopt rehabilitation plans designed to allow the plans to emerge

⁶ <https://www.govinfo.gov/content/pkg/PLAW-109publ280/pdf/PLAW-109publ280.pdf>

from critical status within 10 years. *Under the federal scheme, at 77.4 percent funded, STRS is in the Yellow Zone for endangered.*

The investment return assumption used by STRS is 7.45 percent. The actuary for the plan has stated that this is a “relatively aggressive” rate.⁷

According to the National Association of State Retirement Administrators (NASRA), a public fund survey found that 96 percent of surveyed public pension plans have lowered investment rate of return assumptions since 2010, with reductions resulting in a decline in the average return assumption from 7.52 percent in fiscal year 2017 to 7.2 percent in fiscal year 2020.⁸ The Pew Charitable Trusts has estimated that the median 20-year investment return for a typical public pension portfolio will be far lower than these optimistic assumptions, at 6.4 percent.⁹ If the net pension liability were calculated using a discount rate which is one percentage point lower than the current assumption—at approximately the same rate estimated by Pew—the current underfunding would soar to \$34.45 billion.

⁷ https://www.strsoh.org/_pdfs/annual-reports/Actuarial_Valuation_2020.pdf

⁸ NASRA Issue Brief: Public Pension Plan Investment Return Assumptions Updated February 2020, available at <https://www.nasra.org/files/Issuepercent20Briefs/NASRAInvReturnAssumptBrief.pdf>

⁹ https://www.pewtrusts.org/-/media/assets/2018/09/statepublicpensionfundsinvestmentpracticesandperformance-2016dataupdate_chartbook.pdf

The Retirement Board which provides fiduciary oversight for the pension is composed of 11 members as follows: five elected contributing members; two elected retired members; an investment expert appointed by the governor; an investment expert appointed jointly by the speaker of the Ohio House of Representatives and the Ohio Senate president; an investment expert appointed by the treasurer of state; and the superintendent of public instruction or his designated investment expert. Board members serve without compensation and the fund's day-to-day operations are managed by an executive director, three deputy executive directors and seven senior officers. More than 100 associates actively manage system investments daily. STRS staff manages approximately 70 percent of the system's investments. The remaining 30 percent is invested by external money managers.

The Ohio Retirement Study Council (ORSC) was created by the Ohio Legislature to provide legislative oversight of Ohio's statewide public pension systems (Systems). As of January 1, 2019, the five state retirement systems had combined assets of approximately \$203 billion with approximately 675,000 active contributing members, 1,075,000 inactive members, and 475,000 beneficiaries and recipients. The ORSC is comprised of three senators, three representatives and three governor's appointees.

The ORSC is statutorily required to have conducted by an independent auditor at least once every ten years a fiduciary performance audit of each of the Systems and

actuarial audits of the Systems. The purpose of a fiduciary performance audit is to critically review and evaluate the organizational design, structure and practices of the Systems. An actuarial audit provides an independent review of the Systems' consulting actuary. The ORSC also reviews the annual operating budgets for each of the Systems. In addition, the ORSC hires its own independent investment consultant to perform the statutorily required semi-annual performance review of the policies, objectives and criteria of the Systems' investment programs.

- **Lack of Fiduciary and Actuarial Audits**

Despite the statutory requirement of an independent fiduciary performance audit and actuarial audit at least every 10 years mentioned above, it has been approximately 15 years since the last such audits of STRS commissioned by ORSC.

When statutorily mandated, critical audits designed to protect the integrity of a \$90 billion retirement plan are not commissioned, and delayed year-after-year, it is inexcusable. An investigation into the failures to audit—by ORSC, as well as STRS's failure to demand such audit results—is warranted, in our opinion.

Any mismanagement or malfeasance which could have been exposed years earlier through timely audits has been allowed to persist, potentially resulting in great risk and cost to the plan. Worse still, as discussed below, the last fiduciary

performance audit revealed multiple serious concerns which have never been addressed over the past 15 years.

The ORSC failure to audit is especially troubling because it indicates a lack of diligent legislative oversight potentially impacting *all* \$203 billion in Ohio public pensions and over 2 million citizens. Further, the fiduciary audit for Ohio Public Employees Retirement System was not performed by an independent auditor¹⁰ (as required under applicable law) and was three years late; the Ohio Police & Fire Pension Fund is only now requesting proposals for the fiduciary audit due 2016; and the actuarial audit of the Ohio State Highway Patrol Retirement System is 21 years overdue.¹¹

¹⁰ <https://www.thenews-messenger.com/story/news/2019/11/12/damschroder-aon-hewitt-audit-reveals-ohio-blew/2561261001/>

¹¹ The only 10-year actuarial review for STRS available on the ORSC website is dated Nov. 6, 2009. That review is limited to “the July 1, 2008 Actuarial Pension Valuation report for the State Teachers Retirement System of Ohio (STRS), and the January 1, 2009 Actuarial OPEB Valuation report for STRS.” It does not cover 10-years of valuation reports. In addition to the two valuation reports noted, the 2009 actuarial review report considered one 5-year experience review—a Powerpoint presentation prepared by Pricewaterhouse Coopers for the period 2003-2008. It also considered a 4-year experience review for the period 2003-2007 prepared by Buck Consulting. There should be included in this report another 5-year actuarial review for the period 1998-2002. An acknowledgement letter from STRS to the actuary dated October 30, 2009 states the next 5-year experience review was scheduled for 2013, but such a report is not on ORSC’s website.

Only one 5-year actuarial investigation report is available on the ORSC website. It is dated March 3, 2017 and covers the period July 1, 2011 through June 30, 2016. Assuming that this 5-year actuarial investigation is the first one conducted after the 2009 report mentioned above, STRS failed to conduct any 5-year actuarial investigation that includes the period July 1, 2008 to June 30, 2011. Of course, this period was in the middle of the Great Recession. The 2009 10-year report discussed above references a 5-year actuarial investigation that was concluded by Pricewaterhouse Coopers in 2008. However, based on the 2009 10-year report,

Clearly, legislative oversight has been compromised for decades.

- **Ohio Retired Teachers Association Commissioned Forensic Review**

Through a grassroots donation campaign that began on October 28, 2020, The Ohio Retired Teachers Association (ORTA) engaged Benchmark Financial Services, Inc. (“Benchmark”) to conduct an independent expert forensic review of STRS on behalf of participants. According to ORTA, the decision to engage in this project was driven by a lack of trust between retirees and those managing their pension system.

Most objectionable was the loss of a promised Cost of Living Adjustment (COLA) in 2013 with no resumption in sight.¹² In 2013, STRS did not pay the annual COLA; in 2014, 2015 and 2016 the COLA was reduced from the promised 3 percent to 2 percent. In 2017, the COLA benefits were reduced to zero supposedly “to preserve the fiscal integrity of the retirement system.” With approximately \$7 billion paid out in annual pension benefits, elimination of the 3 percent COLA saved the pension approximately \$210 million annually.

Pricewaterhouse Coopers did not issue a full written report. It merely created a Powerpoint presentation. It is not available on either ORSC’s website or STRS’s website.

¹² STRS retirees were promised an annual cost of living increase (COLA) at the time of their retirement. This promise was also codified in Ohio law (ORC 3307.67).

When pressed for answers by ORTA, STRS leadership has simply stated the pension will only consider providing any COLA after it has reached a funding level of 85 percent. The problem is, ORTA notes, in over 100 years of existence STRS has rarely been at funding level of 85 percent or above and has not been at such level in the past decade.

At the same time that retirees were experiencing a loss of promised benefits, active teachers saw an increase of 40 percent in their contributions to STRS. Active teachers also witnessed an increase in the number of years required to receive full retirement benefits. These changes resulted in many teachers paying more, working longer, and not receiving the level of benefits previously promised.

Finally, while benefits to retirees were slashed, active teachers required to pay more and receive less, the STRS board voted to increase salaries and pay nearly \$10 million in performance incentives for the STRS investment staff. The performance incentives have been paid annually, despite no clear benchmarks for earning these so-called “bonuses.”

Lack of transparency, as well as the benefit reductions described above has created a lack of trust between retirees and their pension system.

Benchmark has conducted a high-impact, limited preliminary forensic review of the pension. The purpose of a high-impact limited forensic review is to readily identify, at a reduced cost, deficiencies which, in our opinion, if

addressed, would significantly improve investment management and performance results.

As noted earlier, our requests for key documents from the pension were overwhelmingly rejected. As a participant-funded review, we had limited opportunity to communicate with or interview people directly associated with the board. We held a limited number of telephone interviews with various investment services providers. Nevertheless, we believe that our expert findings are credible and our recommendations, if followed, would result in significant improvements. In the likely event that STRS or its vendors disagree with our opinions, and are willing to fully disclose all the relevant documents, we welcome the opportunity to review the totality of the relevant information. We reserve the right to change our findings in the event that additional information should be forthcoming.

This report should be read and evaluated with several caveats in mind. First, many of the subjects addressed in this report are inherently judgmental and not susceptible to absolute or definitive conclusions. We assumed the information we were provided, whether by the service providers or STRS is accurate, and could be relied upon. We were not hired to detect or investigate fraud, concealment or misrepresentations and did not attempt to do so. We were not hired to, and did not attempt to conduct a formal or legal investigation or otherwise to use judicial processes or evidentiary safeguards in conducting our review. Our findings and conclusions are based upon our extensive

review of limited documents, the limited interviews we conducted with the board and others associated with STRS, independent analysis, and our experience and expertise. This Report does not and is not intended to provide legal advice. Although the report considers various legal matters, our analysis, findings and recommendations are not intended to provide legal interpretations, legal conclusions or legal advice. For that reason, action upon such matters should not be taken without obtaining legal advice addressing the appropriate statutory or regulatory interpretation and legal findings regarding such matters. Finally, our observations are necessarily based only on the information we considered as of and during the period we performed our review.

IV. Last Fiduciary Performance Audit

In 2004, Independent Fiduciary Services, Inc. (“IFS”) was directed by ORSC to conduct a Fiduciary Performance audit of STRS and in December 2006, the firm presented its Final Report.¹³

Among the concerns raised in the lengthy IFS report were: STRS staff was the underlying source of all performance data and benchmarks (i.e., returns were not calculated by an independent third party); the Investment Policy Statement (IPS) did not include a plan in the event of active management underperformance; the IPS did not include a Total Fund Benchmark definition; the IPS did not include the

¹³ The specific details, scope and depth of the review are defined by the July 21, 2004 Agreement, and the September 14, 2005 Amendment, between the ORSC and IFS. <http://www.orsc.org/Assets/Reports/19.pdf>

source of performance data; whether, as represented to IFS, the alternatives benchmark of “actual” performance was part of staff incentive compensation program; the size of internal audit staff and absence of auditors; lack of input from other members of committee (non-Chair) in committee agendas; personal trading policy; and reporting and governance of external consultants and investment staff.

Two serious deficiencies identified in the Fiduciary Performance Audit report and recommendations 15 years ago remain unaddressed to this day:

1. Use of actual performance for benchmarking alternative investments; and
2. Conflicts of interest involving external investment consultants.

- **Lack of Benchmark for Alternative Investments**

Pension fiduciaries have a legal duty to exercise care and skill in the management and investment of plan assets. Acting in the best interests of the plan and the plan participants, a pension fiduciary has the duty to protect and preserve trust assets and, generally, to make the assets productive. In making investment decisions and managing plan assets, the fiduciary must exercise reasonable care, skill and caution. The fiduciary should consider broad investment factors, such as: current economic conditions, effects of inflation or deflation, alternative investment opportunities, expected returns on income and capital, the need for liquidity versus preservation of capital, the production of

income, diversification of investments, and more. In sum, the trustee has a duty to continually observe and evaluate investments to ensure that they are consistent with the purpose of the plan, current economic conditions, and the needs of active and retired participants.

Pension fiduciaries establish investment “benchmarks” as standards against which the performance of investment managers or asset allocation decisions can be measured. Generally, broad market stock and bond indexes are used for this purpose. Absent a benchmark to measure an investment manager or asset allocation decision against, there is the danger that fiduciaries will be misled by absolute returns. Allocating pension assets without established benchmarks amounts to gross mismanagement because the fiduciaries have set no standards for evaluating the performance results.

Ohio Revised Code 3307.15 Investment and Fiduciary Duty of Board (B) states that “the board shall adopt in regular meeting, policies, objectives, or criteria for the operation of the investment program that include asset allocation targets and ranges, risk factors, asset class *benchmarks (emphasis added)*, time horizons, total return objectives, and performance evaluation guidelines.”

“Further, when reporting on the performance of investments, the board shall comply with the performance presentation standards established by the CFA Institute.”

CFA Institute Global Investment Performance Standards are ethical standards for calculating and presenting investment performance based on the principles of fair representation and full disclosure. According to CFA, one important element in the fair representation of investment performance is the choice of a benchmark. Several provisions of the GIPS standards focus on benchmarks. The GIPS standards require firms to select an appropriate total return benchmark for each composite and pooled fund, if an appropriate benchmark is available, and to present benchmark performance in GIPS Reports. The GIPS standards define a benchmark as a *point of reference* (emphasis added) against which the composite or pooled fund's returns or risks are compared. Properly used, a benchmark should be a focal point when evaluating a strategy. The thoughtful choice of a benchmark will enhance the performance evaluation of the investment strategy by clearly defining expectations and success, says CFA.

With respect to STRS's so-called alternative investment "benchmark," it should be obvious that *actual* performance of an investment or strategy cannot be considered a benchmark since it does not provide a point of reference against which the investment or strategy can be compared. Actual performance does not clearly define expectations and success. *In our decades of professional experience, we have never seen actual performance proposed as a benchmark.*

In 2006, IFS noted that the STRS Custom Benchmark for Alternatives was equal to the *actual* performance of the Alternatives program over time. Apparently STRS, said IFS, decided in 2002 to use the actual return of the Fund's Alternatives program on a quarterly basis until an appropriate and adequate benchmark for the Alternatives program was agreed upon and implemented. IFS recommended that the Russell 2000 plus 500 basis points, the Russell 3000 plus 500 basis points or the Wilshire 5000 plus 500 basis points, would be appropriate policy benchmarks for this program. The premium over the market index is designed to account for additional risks involved with private equity such as the high rates of failure of portfolio investments, illiquidity factors (concerning both the relevant investment vehicles in which the pension may invest as well as the actual underlying portfolio investments) and other issues, which add risks to investing in the private markets that are included within the pension's Alternatives program.

We agree with IFS's recommended benchmarks, as well as the rationale for demanding a 500-basis point "risk premium" above the index.

When compared against such benchmarks, long term performance of Alternatives "is not very impressive over the three and five-year periods and demonstrated that the current Alternatives program could likely be improved," observed IFS in 2006. In fact, STRS Alternatives underperformance against the Russell 2000 plus 500 basis

points was at that time **massive**—.5 percent versus 10.70 percent.

IFS observed that the IPS stated that the Alternatives program had an objective of earning at least 5 percent net of fees above domestic public equity markets over very long-time horizons and that the pension was not benchmarking its alternatives program as outlined in the IPS in its quarterly reports.

Despite the recommendation by IFS in 2006 that the Russell 2000 or Russell 3000 plus 500 basis points would be appropriate policy benchmark for the Alternatives Program, STRS has continued for the past 15 years to use the actual return of the pension's Alternatives program as the benchmark for the one-year period. As such, it is impossible for the pension to underperform on a one-year basis.

For the longer 5-year period, the alternative investments blended relative return objective is in two parts by policy: Russell 3000 Index plus 1 percent for Private Equity and Russell 3000 minus 1 percent for Opportunistic /Diversified.

In our opinion, this longer-term benchmark for alternatives is equally absurd. Not only is the Private Equity benchmark far too low given the greater risks related to private equity investing (Russell 3000 plus 1 percent, versus plus 5 percent as recommended by the Fiduciary Performance Audit), with respect to Opportunistic /Diversified we have never seen *underperforming* a readily achievable index rate of return

(Russell 3000 *minus* 1 percent) proposed as an appropriate benchmark.

It is irrational for a pension to set as a goal for its highly speculative alternative investments, such as hedge funds (or any other investments for that matter), to significantly *underperform* a public markets index, i.e., to *intentionally lose money*.

According to the Cliffwater report for June 30, 2019, STRS Ohio Alternative returns “fall behind” Relative Return Objectives across *all periods* “due to the very strong performance of public US stocks across all periods.” In our opinion, a more accurate assessment would be that the Alternatives have **massively underperformed** the Relative Return objectives across all periods. For example, over the last 10 years Alternatives returned 9.79 percent vs. 14 percent for the Relative Return Objective; for the last 5 years Alternatives returned 6.66 percent versus 9.97 percent.

Use of the IFS recommended Russell 3000 plus 500 basis points as the benchmark would reveal that since the 2006 fiduciary audit (not including the massive underperformance in the 5 years prior to the audit), the Alternatives have dramatically underperformed, 8.26 percent versus 11.91 percent.

The alternatives underperformance losses for the period amount to **\$8.6 billion or \$2.5 million per trading day for 14**

years.¹⁴ Restoring the COLA benefit would cost less than \$1 million (\$890,000) per day.

For additional perspective, total active teacher contributions since the 2006 Fiduciary Audit amount to approximately \$18 billion. \$8.6 billion alternative investment underperformance equates to \$61,000 per retired teacher.

- **External Investment Consultant Conflicts of Interest**

With respect to the pension's then-external investment consultant, Russell, IFS recommended that due to conflicts of interest pervasive in the investment consulting industry and the potential for related harm, "Russell's contract with STRS should be amended to require Russell to provide annual disclosure of its business relationships with all investment managers or other providers of investment services. This contractually-required disclosure should include information from Russell on the specific amounts paid to Russell by those investment managers employed by STRS and on the specific services provided to those managers."

While the pension, when it subsequently hired Callan and Cliffwater as its external investment consultants to replace Russell, included the above recommended disclosure obligations in its contracts with these firms, it appears that STRS has never received disclosure regarding the specific amounts paid to the two firms by those investment

¹⁴ Calculation input is 252 trading days per year.

managers employed by STRS, detailing the specific services provided to those managers.

V. Fiduciary Duty to Ensure Investment Fees and Expenses Are Reasonable

Unlike most other industries, the fees money managers charge institutional and retail investors for *comparable* investment services vary astronomically.

Passive, or index investment management services, can be purchased by institutional investors for 1 basis point (one one-hundredth of a percent) or even “for free.”¹⁵ Active managers, who attempt to beat the market by stock-picking, may charge pensions fees that are 100 times greater (1 percent). Alternative investment managers, including hedge, venture and private equity, may charge asset-based, performance and other fees amounting to approximately 8 percent-- 800 times greater fees than indexing.

Paying higher fees for active traditional or alternative asset management does not guarantee and, in fact, negatively correlates to superior investment performance. Indeed, the overwhelming majority of active managers fail to outperformance market indexes over time net of fees. The higher the fees, the greater the drag on investment returns.

¹⁵ Certain index managers will manage large accounts at no cost, in exchange for securities lending income related to the portfolio.

A 2013 report by the Maryland Public Policy Institute and the Maryland Tax Education Foundation which examined the investment fees and investment performance of state pension funds concluded:

“State pension funds, including Maryland, have succumbed for years to a popular Wall Street sales pitch: “active money management beats the market.” As a result, almost all state pension funds use outside managers to select, buy and sell investments for the pension funds for a fee. The actual result — a typical Wall Street manager underperforms relative to passive indexing — is costly to both taxpayers and public sector employees.

For example, **the top ten states — in terms of Wall Street fees — had a lower pension fund investment performance — over the last five fiscal years — than the bottom ten states** (emphasis added) ... State pension funds should consider indexing. Indexing fees cost a state pension fund about 3 basis points yearly on invested capital vs. 39 basis points for active management fees (or 92 percent less) ... By indexing most of their portfolios, we conclude the 46 state funds surveyed could save \$6 billion in fees annually, while obtaining similar (or better) returns to those of active managers.”¹⁶

It is well established that sponsors of public and private retirement plans have a fiduciary duty to ensure that the fees their plans pay money managers for investment advisory services are reasonable. Fees paid for such retirement plan investment services have always been an important consideration for ERISA retirement plan fiduciaries. Further, in recent years such fees have come under increased scrutiny because of class action litigation,

¹⁶ Wall Street Fees, Investment Returns, Maryland and 49 Other State Pension Funds by Jeff Hooke and John J. Walters, July 2, 2013.

Department of Labor regulations, and congressional hearings.

According to the Department of Labor:

“Plan fees and expenses are important considerations for all types of retirement plans. As a plan fiduciary, you have an obligation under ERISA to prudently select and monitor plan investments, investment options made available to the plan’s participants and beneficiaries, and the persons providing services to your plan. Understanding and evaluating plan fees and expenses associated with plan investments, investment options, and services are an important part of a fiduciary’s responsibility. This responsibility is ongoing. After careful evaluation during the initial selection, you will want to monitor plan fees and expenses to determine whether they continue to be reasonable in light of the services provided.”

State and local government pensions are exempt from ERISA and are governed by state law. However, because ERISA and state law protections both stem from common law fiduciary and trust principles, best practices for public pensions are frequently similar to those found in ERISA.

At the outset, sponsors of public, as well as private retirement plans must take steps to understand the sources, amounts, and nature of the fees paid by the plan, as well as the related services performed for such fees. After all, a plan sponsor cannot determine the reasonableness of fees paid without a comprehensive understanding of the plan’s services and fees.

Whether a plan’s fees are reasonable depends upon the facts and circumstances relevant to that plan. The plan

sponsor must obtain and consider the relevant information and then make a determination supported by that information.

The shift by public pensions into more complex so-called “alternative” investment vehicles, such as hedge, private equity and venture funds, as well as fund of funds, has brought dramatically higher investment fees which are more much more difficult for pensions to monitor. Disclosed fees, as a percentage of assets, have increased by about 30 percent over the past decade, as use of alternative assets has more than doubled since 2006.

In addition, public funds are paying more than \$4 billion annually in unreported fees associated with alternative investments, according to Pew Charitable Trusts. The hidden costs of private equity investments – which include carried interest, monitoring costs, and portfolio company fees – were not reported as investment expenses among most of the 73 large public funds Pew examined, according to a 2017 report from the non-profit group.¹⁷

According to Pew:

“Accounting and disclosure practices also vary widely among pension plans and have not kept pace with increasingly complex investments and fee structures, underscoring the need for additional public information on plan performance and attention to the effects of investment fees on plan health. Full and accurate reporting of asset

¹⁷ [https://www.institutionalinvestor.com/article/b1505qslc30c6x/the-bill-for-hidden-private-equity-fees-\\$4-billion](https://www.institutionalinvestor.com/article/b1505qslc30c6x/the-bill-for-hidden-private-equity-fees-$4-billion)

allocation, performance, and fee details is essential to determining public pension plans' ability to pay promised retirement benefits. With more than \$3.6 trillion in assets—and the retirement security of 19 million current and former state and local employees at stake—sound and transparent investment strategies are critical.”¹⁸

Finally, and most disturbing, a recent internal review by the United States Securities and Exchange Commission found that a majority of certain alternative investment managers, private-equity firms, inflate fees and expenses charged to companies in which they hold stakes, raising the prospect of a wave of sanctions against managers (including potentially some of the dozens of private equity managers STRS invests in), by the agency.

More than half of about 400 private-equity firms that SEC staff examined charged unjustified fees and expenses without notifying investors.

“The private-equity model lends itself to potential abuse because it’s so opaque, according to Daniel Greenwood, a law professor at Hofstra University in New York and author of a 2008 paper entitled “Looting: The Puzzle of Private Equity.” The attraction of the funds is that the managers have broad discretion, which also means that investors have a hard time knowing what the managers are doing, he said.”

¹⁸

https://www.pewtrusts.org/~media/assets/2017/04/psrs_state_public_pension_funds_increase_use_of_complex_investments.pdf

According to another expert cited in the article, “The industry is going to be forced into change because, frankly, when your big investors are *public plans and other money that’s run by fiduciaries* (emphasis added), you can’t afford as a business matter to be deemed to be engaging in fraud. Fraud doesn’t sell very well.”¹⁹

Accordingly, pensions, such as STRS which choose to gamble in asset classes, such as private equity funds, specifically cited by regulators for charging bogus fees in violation of the federal securities laws must establish *heightened safeguards* to ensure that all fees paid to such managers are properly reviewed and determined to be legitimate, as well as fully disclosed to participants.

- **CEM Benchmarking Analysis of Investment Costs and Performance**

CEM Investment Benchmarking is a private Canadian company which STRS retains to annually analyze the pension’s investment costs and performance. CEM is neither registered with the US Securities and Exchange Commission as an investment adviser nor as a broker-dealer.²⁰

According to the Summary of the Oversight of STRS Ohio:

CEM Investment Benchmarking annually presents a report to the board comparing STRS Ohio’s investment costs and performance to those of

¹⁹ Bogus Private-Equity Fees Said Found at 200 Firms by SEC, Bloomberg News, April 7, 2014.

²⁰ The firm’s website states, “Benchmarking pension and sovereign wealth funds is all we do. We do not manage assets.”

our peers. The report consistently shows STRS Ohio's performance ranks in the top 25 percent of our peer group and our investment costs are low compared to our peers.

In our opinion, the above summary disclosure by STRS regarding CEM findings may, at a minimum, be so incomplete as to be potentially misleading. Disclosure of the full 136-page CEM report, not merely the Executive Summary or Key Takeaways section, is necessary for pension stakeholders to form a complete understanding of CEM's findings.

The information CEM provides to pensions, their stakeholders and other investors globally relates to the investment performance and cost of \$15 trillion in participating assets. CEM acknowledges:

"We provide our clients with objective, actionable benchmarking insight into how to maximize value for money in investments and pension administration."

And:

"Our reports and insights provide actionable insights and are used strategically as well as to help meet fiduciary responsibilities."

In other words, both pensions and stakeholders rely upon CEM findings, as disclosed, in evaluating and executing investment strategies. The cost information the firm provides is intended to, and does, impact investment vehicle selection because costs are understood to materially impact performance.

For this reason, we believe it is appropriate for legislators, regulators, law enforcement and pension stakeholders to examine whether the investment cost and other information disclosed to pension stakeholders by the firm and its pension clients is accurate, as well as fully and fairly presented.

We requested the following information from STRS related to CEM:

1. Please provide all contracts between STRS and CEM Benchmarking.
2. Please provide all reports and analysis produced by CEM Benchmarking related to STRS's investment management fees, costs and expenses.
3. Please provide all reports and analysis produced by CEM Benchmarking related to alternative investments.

We received the following response from STRS:

Concerning the above items, I must note that much of your request is overly broad and fails to satisfy the requirement of public records law that you specifically and particularly identify the records that you are seeking. Under Ohio law, a requestor has the duty to "identify the records.....wanted with sufficient clarity." *State ex rel. Dillery v. Icsman (2001) 92 Ohio St.3d 312, 314.*

A public office is not required to conduct research or otherwise "seek out and retrieve those records which would contain the information of interest to the requester". *State ex rel. Fant v. Tober (8th Dist., April 28, 1993), No. 63737, 1993 Ohio App. LEXIS 2591 at *4; aff'd (1993), 68 Ohio St. 3d 117.* To the extent that you have requested records containing specific information, rather than identifying the specific records you seek, your request is inappropriate under applicable legal standards. If

there are specific records you would like to request, please identify those with sufficient clarity.

That said, in the interest of openness, this office has voluntarily made an effort to identify readily available public records that are responsive to items two and three and we are providing the five reports we believe to be responsive.

Again, to the extent there are additional records you seek related to any of these items, please identify those records with sufficient clarity.

CEM Benchmarking's explanation of their redactions is:

"The redactions have been made in line with the definition of "Trade secret" as defined in Ohio Code 1333.61 Uniform trade secrets act definitions as follows:

(D) "Trade secret" means information, including the whole or any portion or phase of any scientific or technical information, design, process, procedure, formula, pattern, compilation, program, device, method, technique, or improvement, or any business information or plans, financial information, or listing of names, addresses, or telephone numbers, that satisfies both of the following:

(1) It derives independent economic value, actual or potential, from not being generally known to, and not being readily ascertainable by proper means by, other persons who can obtain economic value from its disclosure or use.

(2) It is the subject of efforts that are reasonable under the circumstances to maintain its secrecy.

We have redacted our cost data as well as certain formulas and methods used in the preparation of the report. The information that has been redacted is not publicly available and is only provided to our paying clients. The redacted cost data has been provided to us by our clients and forms our proprietary cost database. This data and

database is not available from other public sources and forms the basis for our analysis. It is key to our business model that the data not be publicly released. Note that I have not redacted return information since 1) much of this data could be gleaned from publicly available sources (CAFRs) and is not core to our product."

We are still reviewing the remaining requests, and will follow up with additional records and/or clarifications regarding the records you seek.

Again, we do not believe it is appropriate for STRS to simply defer to investment service providers regarding whether information sought from the pension pursuant to Ohio public records laws should be provided to the public.

Apparently, all redactions were made or demanded by CEM and STRS neither confirms nor disputes CEM's rationale for its redactions. Conspicuously redacted from the reports were the identities of the public pension funds that CEM chose as STRS's peers for cost and performance comparison. CEM also redacted data about STRS's performance, including investment costs, external money manager fees, and performance information on STRS's investments. CEM offers no explanation as to how it can claim that STRS's own internal data can be CEM's trade secret.

In our opinion, STRS should be facilitating, not thwarting, transparency and compliance with Ohio public records laws. Accordingly, on May 21, 2021, we filed a complaint for writ mandamus with the Supreme Court of Ohio seeking the STRS public records related to CEM.

We have not been provided with a copy of the contract between STRS and CEM. However, the pension discloses that for the past five years it has paid the firm \$75,000 per year for its services.²¹ The contract which defines the obligations of the parties, the terms and scope of engagement should be made available in order to permit the public to scrutinize the methodology followed by the firm, as well as evaluate the firm's findings.

For example, it is our understanding (from interviews with CEM staff) that STRS staff provides the firm with *all* of the data regarding the pension's investment costs and performance, which CEM analyzes. Indeed, CEM acknowledges above that "the redacted cost data has been provided to us by our clients and forms our proprietary cost database."

"The analysis is as accurate as possible based upon fees as *reported to us by our clients* (emphasis added)," says CEM.

However, CEM has advised us:

- Pensions *may not know* the costs of all their investments;
- Pensions *may decline* to provide CEM with *known* cost information which pensions are not "overly comfortable with;"
- CEM does not *independently collect* any cost information from investment managers which might

²¹ <https://checkbook.ohio.gov/Pensions/STRS.aspx>

- verify or contradict the fees as reported by pension clients; and
- Cost and performance *estimates* created by CEM have been utilized with respect to many STRS investments.

In response to our public records request, we received from STRS an Investment Cost Effectiveness Analysis for the 5-year periods ending December 31, 2015, 2017, 2018 and 2019. The documents were *redacted* at the request of CEM as indicated earlier.

The CEM reports we were provided state that the information contained therein is proprietary and confidential and may not be disclosed to third parties without the express written mutual consent of both CEM and STRS. While the reports repeatedly state that the most meaningful comparisons for returns, value added and cost performance are to “your custom peer group,” it is noted: “To preserve client confidentiality, given potential access to documents as permitted by the Freedom of Information Act, we do not disclose your peers’ names in this document.” In other words, information which is critical for assessing the value of the peer group analysis has been intentionally withheld from the document to avoid potential disclosure of said information to the public under applicable state law.

In our opinion, there is no valid reason a single U.S. public pension, let alone a “custom peer group” of 17 such funds (with assets ranging from \$47.4 billion to \$227.7 billion) should

agree to provide in-depth, “sensitive”²² financial information related to perhaps \$1 trillion in public assets to a private investment services company—for purposes of analyses supposedly prepared for the benefit of, and certainly paid for by, the U.S. funds—and further agree to withhold the details of said analyses from pension stakeholders.²³ After all, the information provided to CEM relates to stakeholder money.

We note that at least one other state pension, South Carolina, has released its entire 136-page CEM analysis to the public.²⁴ Thus, it appears any supposed concerns regarding the proprietary and confidential nature of information contained in CEM analyses are not insurmountable.

We further note that the December 2018 Final Report and Recommendations of the Public Pension Management and Asset Investment Review Commission of the Commonwealth of Pennsylvania which was charged with comprehensively reviewing the investment operations of the Commonwealth’s two largest public retirement funds, with the goal of identifying efficiencies and best practices in

²² CEM’s website states that the information it collects from pensions is “sensitive.”

²³ CEM claims 166 U.S. pension funds participate in its database. The median U.S. fund had assets of \$8.6 billion and the average U.S. fund had assets of \$24.2 billion. Total participating U.S. assets were \$4.0 trillion.

²⁴ The South Carolina report released to the public includes much of the same information redacted from the STRS report.

<https://www.rsic.sc.gov/PDFs/2017.12.31percent20CEMpercent20REPORT.pdf>

pension fund management recommended that the two pensions collaborate on a detailed CEM administrative and investment cost benchmarking analysis, *and make the detailed report(s) available to the public (not only the Executive Summary).*²⁵

In Pennsylvania and South Carolina, unlike Ohio, there is recognition that the public deserves to see the entire CEM report, not select passages.

In our opinion, failure to disclose names of funds in the custom peer group renders the peer analysis unauditable. Indeed, stakeholders cannot even be certain that disclosure of the names in the custom peer group was made to, as well as understood and accepted by, the board consistent with the board's fiduciary duties.²⁶ To further complicate matters, CEM notes—without explanation—that the STRS peer group may change from year-to-year.

Paradoxically, according to CEM itself, *"in every other country in the world, pensions—such as Canada's largest pension, the \$221 billion Ontario Teachers' Pension Plan—willingly disclose their custom peer groups (emphasis added)."* Only American public pensions, subject to

²⁵

<https://www.psers.pa.gov/About/Investment/Documents/PPMAIRCpercent202018/2018-PPMAIRC-FINAL.pdf> Pg. 4.

²⁶ Board members we have interviewed indicate disclosure of peers' names in the custom peer group has not been made to the board. If true, the board cannot possibly evaluate whether the peer group analysis is appropriate, consistent with its fiduciary duties.

expansive state open records laws, demand secrecy, says CEM.

In summary, if favorable summaries of CEM analyses are to be happily announced to U.S. public pension stakeholders—for the American public to rely upon—then there should be no hesitancy in disclosing the underlying data and documents supporting those conclusions. Further, as discussed below, the full findings in the CEM report appear to conflict with the summary findings publicly stated by STRS and raise additional concerns in our opinion. At a minimum, public review of the *complete* CEM report is, in our opinion, critical to understanding the findings and assessing its credibility.

In support of our views regarding the importance of transparency, we note with great emphasis that CEM says the following in its report: “The value of the information contained in these reports is only as good as the quality of the data received.” If the public cannot see the underlying data, then it is impossible to assess its validity. However, we believe that the value of the CEM reports is also heavily dependent upon the quality of the analysis and extensive use of cost estimates supplied by CEM, not merely the quality of the data provided by pensions such as STRS.

CEM’s website unequivocally states that “Transparency Matters.”

Says CEM's Mike Heale: "Trust is a critically important success factor. Transparency builds trust. Transparency is the right thing to do and the smart thing to do."²⁷

Indeed, CEM offers a custom Transparency Benchmarking Service for funds which it claims "helps funds speed up the implementation of transparency best practices and builds a great foundation for transparency leadership in our industry."

On the other hand, the firm's website includes numerous assurances to clients regarding confidentiality.²⁸

Preaching transparency while promising confidentiality is problematic, in our opinion.

The unredacted 2018 report initially states in the Key Takeaways section of the Executive Summary that the pension's 5-year net total return of 6.25 percent was in the top quartile and above the fund's 6.09 percent 5-year policy return. The 5-year net value added was 0.16 percent. As noted by CEM, "Total returns, by themselves, provide little insight into the reasons behind relative performance.

²⁷ <https://cembenchmarking.com/gptb.html>

²⁸ "The information that CEM collects from clients is sensitive and we are very careful about how we handle it. Your data will be treated in the same confidential manner as data received from all other clients who participate in our surveys. Data collected from you may be used for benchmarking and research, but only in a manner that preserves confidentiality by combining your responses with many others. CEM may disclose your fund's inclusion by name in its client reports if your fund is part of the peer group used as the basis for the report. This disclosure will not be linked to your data or results. From time to time, CEM may provide access to the data on an unnamed basis, and under a strict confidentiality agreement, for academic research."

Therefore, we separate total return into its more meaningful components: policy return and value added.” Policy return is the return a pension would receive if it passively invested its assets i.e., bought appropriate index funds. Value added indicates the extra return provided by active management.

A footnote later in the report discloses that “to enable fairer comparisons, the policy returns for all participants except your fund were adjusted to reflect private equity benchmarks based on lagged, investable public-market indices.²⁹ If CEM used this same adjustment for your fund, your 5-year policy return would be 6.8 percent, 0.7 percent higher than the pension’s actual 5-year policy return of 6.1 percent. Mirroring this, the 5-year total fund net value added of 0.16 percent would be 0.7 percent lower” or, by our estimate, -0.54 percent.

In other words, a fairer comparison (says CEM)—not included in the Key Takeaways—reveals that the pension *underperformed* its 5-year policy return, producing a *negative* value added—the very two components of the pension’s total return which CEM claims are more meaningful. A negative net value added means that the pension did not benefit from active management, i.e., STRS would have earned **over \$400 million more annually, or over \$2 billion for the five-year period** by simply passively indexing

²⁹ As discussed elsewhere, the fund has continued to use its actual returns as its private equity benchmark for approximately 15 years—a “benchmark” it is impossible for the pension to underperform—despite the recommendation in a 2006 Fiduciary Performance Report to change to an appropriate benchmark.

its investments according to its policy mix. These findings are strikingly different from those announced by STRS, in our opinion.³⁰

Key Takeaways also states that the pension's investment cost of 40.1 basis points was below its benchmark cost of 54.5 basis points which suggests that the fund was low cost compared to its peers., i.e., was low cost because it paid less than its peers for similar services and had a lower cost for implementing its style.

The report later states that the investment costs were \$279.1 million or 36.9 basis points and \$302.8 million or 40.1 basis points when hedge fund performance fees and private equity base management fee offsets were added. However, it is disclosed that transaction costs and private asset performance fees were not included in the latter total.

The report indicates that CEM excluded external private asset performance fees and all transaction costs from the pension's total cost because "only a limited number of participants were able to provide complete data." In other words, either most of the 17 unnamed U.S. public pensions

³⁰ Similarly, the 2017 report states in the Key takeaways section that the pension's 5-year total return of 10.1 percent met the fund's 5-year policy return of 10.1 percent, and that the 5-year net value added was 0.0 percent. Later the report discloses, "to enable fairer comparisons, the policy returns for all participants except your fund were adjusted to reflect private equity benchmarks based on lagged, investable public-market indices. If CEM used this same adjustment for your fund, your 5-year policy return would be 10.7 percent, 0.6 percent higher than your actual 5-year policy return of 10.1 percent. Mirroring this, your 5-year total fund net value added would be 0.6 percent lower." That is, the fund underperformed its policy return and had a net value added of -.6 percent. Again, a negative net value added means that the pension did not benefit from active management.

included in the custom peer group failed to diligently monitor the complete fees paid related to these high-cost, high-risk opaque investments, i.e., did not know the complete costs, or the pensions were aware of the complete fees but refused to disclose them—either of which would serve to reduce each pension and the group's overall costs reported to CEM.

In Appendix A, performance fees of \$160.8 million are estimated by CEM in 2018. We note with great emphasis that this figure is a mere *estimate* provided by CEM, as an accommodation to its pension clients and without confirmation from the investment managers. In our opinion, the default fees (which are based upon pension reported medians) are likely underestimates.

Appendix A- Data Summary: Comments and defaults, is an extensive list of base and performance fee default cost estimates applied by CEM to 75 of the pension's investments over the period either because (according to CEM):

1. STRS did not provide cost information to CEM; or
2. STRS failed to provide support for the unusually low-cost information reported to CEM; or
3. To enable CEM comparisons of the total cost of different implementation styles.

These base and performance fee default costs are significant—some in excess of 2 percent.

Unlike the base fee estimates, the performance fee estimates “are not included in the pension's total fund cost

or in benchmark analysis," says CEM. It is unclear to us why the default costs are not included. Obviously, failure to include the significant performance fee default costs in the pension's total fund cost or in benchmark analysis—for whatever reason—serves to make the pension appear lower cost and more competitively managed.

In our opinion, if, during the data confirmation process CEM and STRS discussed the disturbing fact that certain investment management costs were unknown to STRS, or, worse still, known but not provided for some reason, the sole acceptable, prudent course would have been to scrutinize any unknown costs more thoroughly and demand full disclosure of all costs, as opposed to continuing to invest billions in the highest-cost, highest-risk, most opaque assets blithely ignorant of (or concealing) the true costs—using problematic median default estimates as support for the strategy.

Again, pension fiduciaries have a legal duty to monitor all investment and other costs for reasonableness—not merely guess, or estimate, what those costs might be.

Use of median default estimates in managing a \$90 billion plan securing the retirement of hundreds of thousands of state teachers fails to meet applicable fiduciary standards, in our opinion.

True costs are *always* ascertainable and should *always* be used in order to safeguard assets. Further, for STRS to represent to pension stakeholders that it is aware of and

diligently monitoring investment costs while secretly admitting to CEM it is failing to perform its oversight duties is unconscionable, in our opinion.

When performance fees of \$160.8 million are added in, the revised fee total rises from \$279.1 million, then \$302.8 million to **\$463.6 million or 61.3 basis points**, versus the 40.1 basis points noted in the Key Takeaways. This cost is significantly *greater* than the fund's benchmark cost of 54.5 basis points, suggesting that STRS was *high cost* compared to its peers, i.e., *paid more* than peers for similar services and had a *higher* cost for implementing its style. Again, these findings appear to be strikingly different from those announced by STRS.

However, it appears that even the \$463.6 million estimated total cost is *incomplete*.

In 2015, CEM concluded that the difference between what pensions reported as expenses and what they actually charged investors averaged at least two percentage points a year. And this estimate, CEM acknowledged, was probably low.³¹ CEM has stated private equity fund of funds costs average over 5 percent. Professor Ludovic Phalippou, at the Saïd School of Business at Oxford, found that the average private equity buyout fund charged more than 7 percent in fees each year.³²

³¹ https://www.cembenchmarking.com/Files/Documents/CEM_article_-_The_time_has_come_for_standardized_total_cost_disclosure_for_private_equity.pdf

³² https://papers.ssrn.com/sol3/papers.cfm?abstract_id=999910

More recently, in 2020, CEM concluded that pensions are reporting, at best, only half of their investment management costs.³³

“Our research indicates that, at best, only half of true total investment management costs are included in asset owner financial statements. Across the industry this means an enormous amount of costs actually incurred go unreported. Tens of billions of dollars are not reported by asset owners.”

“We believe our estimate that 49 per cent of costs go unreported in financial statements of annual reports is conservative and the extent of under-reporting is likely to be higher across the entire industry.”

Our forensic investigations routinely uncover fees related to alternative funds and fund of funds in the 7-10 percent range.³⁴ Our 2014 forensic investigation of the \$87 billion State Employees’ Retirement System of the State of North Carolina revealed that the pension paid undisclosed fees approximately \$500 million, in addition to the \$500 million in fees it disclosed.³⁵

³³ <https://www.top1000funds.com/2020/11/asset-owners-report-half-of-all-costs/>

³⁴ <https://www.forbes.com/sites/edwardsiedle/2012/06/26/jp-morgan-hedge-fund-of-funds-out-of-this-world-fees-and-egregious-conflicts/?sh=61def7b72e50>

³⁵ https://www.seanc.org/assets/SEANC_Pension_Investigation_Highlights_Recommendations.pdf

In our opinion, there is ample reason to believe the total fees are nearly **double** what the pension is reporting, amounting to almost **\$1 billion** annually.

To put the hidden, unreported fees into context, they amount to \$2.75 million per school day and **more than twice the \$210 million required to fund STRS COLAs annually.**

We note with great emphasis that since STRS investment managers may withdraw their fees from pension accounts in the absence of any diligent monitoring by STRS, *the risk of looting, i.e., illegitimate withdrawals, is dangerously high, in our opinion.*

In conclusion, there is no point in debating the true all-in investment costs. Absent an accounting and full transparency, pension stakeholders can never be certain of the true costs; with scrutiny, the true costs can be precisely determined and publicly disclosed, consistent with applicable fiduciary duties—restoring financial integrity to the pension.

As CEM notes in a private equity whitepaper, cost disclosure and transparency can lead to better decisions. Says CEM:

“Clearly there currently are challenges with collecting full private equity costs, but the exercise can yield benefits beyond improved disclosure and transparency. Understanding true costs can lead to lower costs through negotiation with managers. Additionally, understanding costs may lead to more efficient investment vehicle selection because high costs will materially impact private equity performance.”

In conclusion, there is never any justification for a pension to fail to demand full disclosure of fees from investment managers since failure to understand true costs may lead to less efficient investment vehicle selection and negatively impact performance.

An exhaustive investigation into all past payments to investment managers should be immediately undertaken, as well as recovery pursued with respect to any illegitimate payments, in our opinion. Finally, disclosure of historic costs should be adjusted to correct any past underreporting or errors.

VI. Fees On Committed, Uninvested Capital

According to the Quarterly Alternative Investment Report, as of June 30, 2020, the pension had unfunded alternative investment capital commitments in the following amounts:

Total Private Equity
\$4,308,715,233

Total Opportunistic/Diversified
\$2,843,385,850

Total Unfunded Commitments
\$7,152,101,083

It is common practice for private equity and other alternative investment funds to charge investment management fees on “committed capital.” In other words, after the investor makes a capital commitment to a fund, management fees are charged on the entire commitment

amount, regardless of whether the capital is actually drawn or invested. Paying fees on committed, uninvested capital results in exponentially greater fees on assets under management on a percentage basis.

For example, imagine STRS contractually agrees (commits) to invest \$100 million (capital) in a fund over the next ten years, but only actually deposits \$10 million into the fund early on. If the fee is 2 percent annually on committed capital (including the uninvested amount of \$90 million), STRS will be charged fees of 2 percent annually on \$100 million or \$2 million, not 2 percent of \$10 million or \$200,000—even though the manager is only actually handling (investing) \$10 million of the pension's assets initially. Note that in the example, 2 percent on “committed, uninvested capital” equates to an astronomical fee of 20 percent of the \$10 million actually invested initially.

In 2017, reportedly 91 percent of private equity managers demanded investors pay fees *today* on money investors had committed to invest over time, say, over the *next 10 years*.³⁶ Fees on committed, uninvested capital amount to paying managers for *doing nothing*—no service whatsoever is provided in exchange for the lavish fee. In our opinion, such fees add insult to injury since these types of investment funds

³⁶ <https://www.pionline.com/article/20170725/INTERACTIVE/170729897/fees-on-committed-capital-the-norm-in-private-equity-funds>

already charge exponentially higher fees than traditional stock and bond managers.³⁷

Not surprising, unlike STRS, a growing minority of savvy institutional investors resist paying fees to investment managers based upon their capital commitments.

According to CEM, fees on committed capital generally range from 1.56 percent to 2 percent. Assuming STRS pays fees of 2 percent on total unfunded commitments, this amounts to an annual waste of approximately **\$143 million**—enough to restore the COLA to 2 percent.

As discussed extensively earlier, it is unclear whether STRS monitors or knows the full fees—including fees on committed, uninvested capital—it pays investments managers and whether those fees are fully disclosed.

VII. ACA Compliance Group Independent Investment Performance Examination and Verification

Since 2006, STRS has regularly stated in press releases and on its website that its “performance was verified by ACA Performance Services and was in compliance with the CFA Institute Global Investment Performance Standards (GIPS), widely considered to be the best standard for calculating and presenting investment performance.”³⁸

³⁷ <https://www.forbes.com/sites/edwardsiedle/2019/05/01/when-money-managers-get-paid-handsomely-for-doing-nothing/?sh=759f1a085866>

³⁸ <https://www.strsoh.org/publications/newsletters/actives/finance.html>

According to a November 12, 2020 letter from Nick Treneff, STRS Communication Services Director, STRS was “one of the first asset owners to voluntarily adopt what is widely considered industry best practice for investment performance reporting and presentation — the Global Investment Performance Standards (GIPS), developed by the CFA Institute.”

“We are currently *one of only five* U.S. pension plans that comply with these standards and have done so each year since 2006 as verified by an independent third-party, ACA Compliance Group. ACA completed *rigorous testing and validation* of the STRS Ohio total fund performance calculation inputs, resulting return and reporting and shared that STRS Ohio complies with the *industry’s most stringent* reporting practices (emphasis added).”

Introduced in 1999, the GIPS standards are universal, voluntary standards based on the fundamental principles of full disclosure and fair representation of investment performance. The GIPS standards are administered globally by CFA Institute and have been adopted by 1,700+ firms in more than 47 markets around the world, including some or all of the assets of the 24 of the top 25 asset management firms.

STRS rightly states that it is one of only a handful of pensions to comply with GIPS standards. While many traditional investment managers secure GIPS compliance as a marketing tool, it is extremely rare (as well as problematic, in our opinion) for asset owners to incorporate GIPS principles in their own performance reporting to oversight boards,

governing bodies and plan beneficiaries. It has been noted that with increased public scrutiny of some asset owners, such public pensions, GIPS compliance verification may be reassuring to stakeholders that the asset owner is following universal standards and best practices related to performance calculation.³⁹ That is, GIPS compliance may present some perceived marketing advantage to a pension, such as STRS, under intense scrutiny.⁴⁰

To be clear, GIPS standards are *voluntary* asset management *industry* standards—standards which *the industry* agrees are “best practice” or acceptable. Whether GIPS standards are “best practice” or acceptable for retirement plan fiduciaries is an entirely different matter. That is, standards which the asset management industry is comfortable *voluntarily* adopting likely will fail to be rigorous enough to meet the heightened standards applicable to fiduciaries charged with safeguarding retirement plan assets.

We requested the following documents from STRS related to ACA Compliance:

1. Please provide all contracts between the STRS and ACA Compliance.
2. Please provide any documents regarding potential conflicts of interest at ACA.

³⁹ <https://www.diligend.com/manager-claim-of-gips-compliance-does-it-really-matter/>

⁴⁰ We note that GIPS Compliance began in 2006 when the pension emerged from its last Fiduciary Performance Review.

3. Please provide any due diligence documents regarding litigation, regulatory or disciplinary matters involving ACA.
4. Please provide any disclosure by ACA of compensation arrangements with STRS investment managers.
5. Please provide documents related to any review by the STRS Board conflicts of interest at ACA.
6. Please provide any disclosure providing the actual dollar amounts of compensation received by ACA from STRS investment managers.
7. Please provide all reports related to STRS GIPS compliance and investment performance produced by ACA.

STRS responded:

Concerning items 2-7, I must note that much of your request fails to satisfy the requirement of public records law that you specifically and particularly identify the records that you are seeking. Under Ohio law, a requestor has the duty to "identify the records.....wanted with sufficient clarity." *State ex rel. Dillery v. Icsman (2001) 92 Ohio St.3d 312, 314.*

A public office is not required to conduct research or otherwise "seek out and retrieve those records which would contain the information of interest to the requester". *State ex rel. Fant v. Tober (8th Dist., April 28, 1993), No. 63737, 1993 Ohio App. LEXIS 2591 at *4; aff'd (1993), 68 Ohio St. 3d 117.* To the extent that you have requested records containing specific information, rather than identifying the specific records you seek, your request is inappropriate under applicable legal standards. If there are specific records you would like to request, please identify those with sufficient clarity.

That said, in the interest of openness, this office has voluntarily made an effort to identify readily available public records that are responsive and have found no records we believe to be responsive to #2-6, and we are providing all 6 reports we believe to be responsive to Item

#7. Again, to the extent there are additional records you seek, please identify those with sufficient clarity.

The reports provided by STRS included a Service Agreement effective January 8, 2015 which provides the fee for the initial engagement was \$49,000. As to ACA's role, the Agreement warns:

Because ACA will not perform a detailed inspection of all of Client's books and records, communications, and transactions, there is a risk that material issues or deficiencies, fraudulent activity, misappropriation of assets, or violations of law, which may exist, will not be detected during the course of performing the Services. In addition, and due to the characteristics of fraud, a properly planned and performed verification or performance examination may not detect fraudulent activity, misappropriation of assets, or violations of law. ACA will promptly report to Client any fraudulent activity relating to Client that comes to ACA's attention during the course of performing the Services. Client acknowledges that it is ultimately responsible for the adequacy of its policies and procedures for complying with the GIPS standards as well as the calculation and presentation of any Asset Classes.

ACA does not offer legal or accounting services, nor does it provide substitute services for those provided by legal counsel or certified public accountants. If ACA provides forms or other documents to Client, the provision of such documents should not be deemed to constitute any form of legal advice. Although ACA's work may involve analysis of accounting and financial records, this engagement is not an audit of Client in accordance with generally accepted auditing standards, nor is it a review of the internal controls of Client in accordance with any authoritative accounting literature or other accounting standards.

The other reports we were provided include Verification and Performance Examination Reports for the periods from July 1, 2005 through June 30, 2015; for the periods from July 1, 2006 through June 30, 2016; for the periods from July 1, 2007 through June 30, 2017; for the periods from July 1, 2008 through June 30, 2018; for the period ended June 30, 2019; and for the period ended June 30, 2020.

The Verification and Performance Examination Report for the period ended June 30, 2020, states that the firm's management "is responsible for compliance with the GIPS standards and the design of its policies and procedures and for the Total Firm's compliant presentation." Also, it is stated "This report does not relate to or provide assurance on any composite compliant presentation of the Firm other than the Firm's Total Fund" and "The Total Fund Composite includes all individual portfolios that are combined into one aggregate portfolio for GIPS compliance purposes."

The Accompanying Notes to the ACA Report indicate that the actual asset allocation of the pension as of June 30, 2020 included Real Estate 9.7 percent and Alternative Investments 17.6 percent.

With respect to real estate, the ACA Report states "Due to the nature of real estate investments, all private real estate is valued using market-based inputs that are comparable but subjective in nature due to the lack of widely observable inputs." Also, "Internally managed direct real estate investments are valued by an external appraiser once every

three years and by an internal valuation quarterly. Valuations of externally managed commingled real estate funds are determined by the underlying investment manager quarterly, with supporting financial statements when available.”

With respect to alternative investments ACA states, “Due to the nature of alternative investments, substantially all investments in this asset class are valued using market-based inputs that are comparable but subjective in nature due to the lack of widely observable inputs.” Also, “Alternative investments are valued by the underlying investment manager with supporting financial statements generally on a quarterly basis.”

As the above statements regarding the pension’s real estate and alternative investments (comprising at least approximately 27 percent of the portfolio) indicate, there is *substantial uncertainty* regarding the value of these assets. While industry and GIPS standards may permit these managers to unilaterally, subjectively value such assets they manage, such valuations cannot be considered credible by asset owners. After all, the managers are subject to a profound conflict of interest in establishing portfolio values since they are compensated on the value of those assets through asset-based fees.

Thus, for the pension to proudly state, “ACA completed rigorous testing and validation of the STRS Ohio total fund performance calculation inputs, resulting return and

reporting and shared that STRS Ohio complies with the industry's most stringent reporting practices," is potentially misleading to stakeholders, in our opinion. At a minimum, it is inaccurate to state that there has been "rigorous testing and validation" of the real estate and alternative investment values. Whether STRS or the real estate and alternative managers comply with voluntary asset management industry reporting practices which may or may not be "most stringent" is irrelevant.

Further, we note that GIPS compliance is not the norm for alternative investment managers. As Justin Guthrie, Head of Performance Services at ACA Compliance Group was recently quoted saying:

When it comes to traditional fixed income and equity mandates, nearly 80 percent of firms are GIPS-compliant. But, in sharp contrast, that statistic for alternative asset managers is less than 5 percent. In an age where institutional investors demand increased transparency across asset classes, I believe private equity firms, hedge funds and the real estate investment industry will find themselves changing their tune around voluntary compliance ahead of the updated 2020 GIPS standards coming in effect. We've seen first-hand from our client base that institutional investors are demanding GIPS compliance as a part of the RFP and overall due diligence process from alternative managers, which is precisely why the GIPS executive committee has been working hard to reorient the standards to accommodate a wide array of asset classes.

The world of private equity would particularly benefit from the broad adoption of the GIPS standards, as the industry faces a lack of standardized methodologies and consistency for the presentation of IRR results. There has been much concern around lines of credit and

how private equity firms disclose performance results, including differences in the MOIC calculation as well as treatment of affiliated capital- the 2020 GIPS standards provide a framework for consistency, and prevent the comparison of apples to oranges when it comes to reporting results to investors.”⁴¹

Guthrie’s statements above suggest that ACA is largely in the business of providing GIPS compliance verification services to traditional asset managers. Few alternative asset managers (less than 5 percent, says Guthrie), and even fewer still pensions (only 5, says STRS), seek GIPS compliance services.

Based upon statements by ACA that less than 5 percent of alternatives managers are GIPS compliant, it seems likely that most of STRS’s approximately 170 alternative investment funds are *not* GIPS compliant.

With respect to Guthrie’s statement that “institutional investors are demanding GIPS compliance as a part of the RFP and overall due diligence process from alternative managers,” we asked the pension in a public records request for all RFPs related to asset management services (traditional, as well as alternative assets) to determine whether all managers were required to demonstrate GIPS compliance in connection with any due diligence undertaken by the pension. The RFPs we were provided in response to our public records request related to traditional active managers. It appears that alternatives managers are

⁴¹ <https://www.valuewalk.com/2019/01/gips-compliance-alt-asset-managers/>

hired without the issuance of an RFP. The RFPs we were provided included the following question:

Discuss whether the firm is GIPS® compliant. If so, state whether and for how long the firm has been verified, the name of your verifier, and provide a copy of your most recent verification letter. If not, state why.

In short, it appears that STRS does not require GIPS compliance of any of its asset managers—even those hired pursuant to an RFP.

We note that Ohio Revised Code 3309.15 governing the investment and fiduciary duties of the Board states:

If the board contracts with a person, including an agent or investment manager, for the management or investment of the funds, the board shall require the person to comply with the global investment performance standards established by the chartered financial analyst institute, or a successor organization, when reporting on the performance of investments.

It appears that compliance with the above statutory requirement may not be enforced.

Based upon this response and our experience, we have no reason to believe that pensions (which are increasingly relying upon alternative investments) are demanding, or the alternative investment managers are themselves voluntarily embracing GIPS compliance standards. While GIPS compliance may assist managers in their marketing, it is not at all clear that GIPS compliance verification for public pensions which invest heavily in alternatives investments (which are generally not GIPS compliant) provides any

meaningful benefit to stakeholders, in our opinion. On the other hand, the risk that STRS GIPS compliance representations may be mischaracterized by pensions, or misunderstood by stakeholders seems very real.

Finally, we note ACA is currently embroiled in a controversy regarding exaggerated investment returns at Pennsylvania's \$64 billion public school employees pension fund which is being investigated by the Federal Bureau of Investigation. According to an article in *The Inquirer*:

Another issue concerns an outside consultant, ACA Group of New York, which was hired to check the calculation and whether its review was deliberately handcuffed.

Before the board reversal, pension officials said repeatedly in official documents that ACA had verified the number. ACA then pushed back, insisting that it was hired only to spot-check the math.⁴²

VIII. External Investment Consultants

At this time, the Retirement Board retains two investment consulting firms. Callan is the full retainer consultant overseeing general investment matters, the liquid asset classes (equity and fixed income) and real estate. With respect to investment consulting services, Callan advises the Board on matters such as asset allocation, investment strategy, and investment performance benchmark selection for all asset classes; provides annual investment performance reviews (including real estate and alternative

⁴² <https://www.inquirer.com/business/psers-pension-fbi-pa-probe-subpoenas-20210516.html?outputType=amp>

investments), quarterly performance reports including direct cost estimates to arrive at a net active management return for each period, a review for the Board at least once every three years of the quality and capabilities of STRS's internal investment management organization, and annual investment and educational seminars for the Board.

Cliffwater LLC, is a full retainer non-discretionary⁴³ investment consultant specializing in alternative investments which provides review and comment on the alternative investment strategy; upon request, but in no event more than once during the initial three year contract term, conducts a review of STRS's alternatives investment operations; participates in STRS educational activities and seminars; upon request, assists STRS staff with the design and implementation of its hedge fund program, including recommending and monitoring hedge funds.

As discussed earlier, the 2006 Fiduciary Performance review recommended, given potential conflicts of interest pervasive in the investment consulting industry, that the then-consultant Russell's contract with STRS be amended to require Russell to provide annual disclosure of its business relationships with all investment managers or other providers of investment services. This contractually-required disclosure should include information from Russell on the specific amounts paid to Russell by those investment managers

⁴³ The Cliffwater Investment Advisor Agreement repeatedly specifically states that the firm is a non-discretionary adviser; for whatever reason, the Callan Agreement does not specify whether Callan is either a discretionary or non-discretionary adviser.

employed by STRS and on the specific services provided to those managers, said IFS.

As detailed below, our review indicates that STRS has replaced Russell and entered into investment advisory agreements with two new investment consultants. Both agreements with the new investment consultants require the full disclosure—as recommended 15 years ago—of all business relationships with investment managers and service providers, as well as specific amounts paid to the investment consultants by STRS investment managers. However, it appears STRS has not received full disclosure of conflicted payments.

If true, then both consultants may be in breach of their contracts with the fund. In our opinion, by failing to adequately monitor conflicts of interests involving STRS investment consultants which could potentially undermine the integrity of the pension's investment decision-making process, the board may have breached its fiduciary duty to safeguard assets and exposed the fund to enormous risks. Further, the board may have permitted the investment consultants to enrich themselves by the amounts of such manager payments, at the expense of the pension.

- **History of Regulatory Concerns Regarding Pension Investment Consultant Conflicts of Interest**

“Pension investment consultants” provide advice to pension plans and their trustees with respect to such matters as: (1) identifying investment objectives and restrictions; (2)

allocating plan assets to various objectives; (3) selecting money managers to invest plan assets in ways designed to achieve objectives; (4) negotiating investment advisory fees with managers; (5) monitoring performance of money managers and making recommendations for changes; and (6) selecting other service providers, such as custodians, administrators and broker-dealers.

Many pension plans rely heavily on the expertise and guidance of their pension consultants in helping them to manage pension plan assets. Public pensions, in particular, rely heavily on their pension consultants since these funds generally have lay boards that lack investment expertise.

In late 2003, the staff of the SEC following a recommendation for a high impact pension initiative requested from Benchmark announced an inquiry into conflicts of interest involving investment consultants to pensions, including allegations of “pay to play” practices.

“Pay to play” in the pension context refers to the common practice of investment consultants who are retained on a non-discretionary basis to provide independent objective advice regarding investment managers, requiring or encouraging managers to direct or pay trading commissions and/or other compensation to them in order to be recommended to pension clients.

When consultants recommend managers based upon their willingness to pay compensation to the consultant, as opposed to on the investment merits, they engage in self-

dealing and breach their fiduciary duty to place client interests ahead of their own. Substantial harm in the form of excessive risk and fees, as well as diminished investment returns has been found to result. The SEC staff examined the divergent sources of consultant compensation and the related conflicts; whether such amounts and conflicts were properly disclosed; and whether pensions were being harmed by such practices.

On May 16, 2005 the staff of the SEC's Office of Compliance Inspections and Examinations issued a report which, in part, concluded that conflicts of interest were pervasive and disclosure practices lacking in the investment consulting industry.⁴⁴

On June 1, 2005 the SEC and U.S. Department of Labor issued a publication entitled "Guidance Addressing Potential Conflicts of Interest Involving Pension Consultants." To encourage the disclosure and review of more and better information about potential conflicts of interest, the DOL and SEC took the unusual step of developing and issuing a set of questions to assist plan fiduciaries in evaluating the objectivity of the recommendations provided, or to be provided, by a pension consultant. That is, a form of questionnaire was provided for plan sponsors to use in their

⁴⁴ Staff Report Concerning Examinations Of Select Pension Consultants May 16, 2005, The Office of Compliance Inspections and Examinations, U.S. Securities and Exchange Commission.

dealings with their consultants and for consultants to voluntarily make available.⁴⁵

As the DOL noted at that time:

“Findings included in a report by the staff of the U.S. Securities and Exchange Commission released in May 2005 ..., raise serious questions concerning whether some pension consultants are fully disclosing potential conflicts of interest that may affect the objectivity of the advice they are providing to their pension plan clients... SEC staff examined the practices of advisers that provide pension consulting services to plan sponsors and trustees. These consulting services included assisting in determining the plan’s investment objectives and restrictions, allocating plan assets, selecting money managers, choosing mutual fund options, tracking investment performance, and selecting other service providers. Many of the consultants also offered, directly or through an affiliate or subsidiary, products and services to money managers. Additionally, many of the consultants also offered, directly or through an affiliate or subsidiary, brokerage and money management services, often marketed to plans as a package of “bundled” services. The SEC examination staff concluded in its report that the business alliances among pension consultants and money managers can give rise to serious potential conflicts of interest under the Advisers Act that need to be monitored and disclosed to plan fiduciaries.”

Most significantly, conflicts of interest at investment consulting firms were found to result in *substantial financial*

⁴⁵ Selecting and Monitoring Pension Consultants, Tips for Plan Fiduciaries, U.S. Department of Labor, May 2005.

harm to plans by the Government Accountability Office in a 2007 report.⁴⁶ Benchmark assisted GAO in its review.

In its report, the GAO took the extraordinary step of quantifying the harm a conflicted adviser to a plan can cause. "Defined Benefit plans using these 13 consultants (with undisclosed conflicts of interest) had annual returns generally 1.3 percent lower ... in 2006, these 13 consultants had over \$4.5 trillion in U.S. assets under advisement," the report stated.

As one observer noted, "That's a \$58.5 billion reduction in returns. And this was only a small sample of the pension-consulting universe."⁴⁷

If the GAO estimates are correct, investment consultant conflicts of interest could cost an \$90 billion pension, such as STRS, over \$1 billion annually or approximately **\$20 billion** over a ten-year period with compounding. As mentioned elsewhere, the unfunded actuarial liability of the pension is \$22.3 billion. *Thus, the estimated cost of conflicts nearly equals the unfunded liability, or, alternatively stated, "but for" the conflicts the pension would be nearly fully funded.*

Failure to disclose conflicted sources of compensation and the amounts of such compensation among these trusted advisers to sponsors of retirement plans, as well as the

⁴⁶ Defined Benefit Pensions: Conflicts of Interest Involving High Risk or Terminated Plans Pose Enforcement Challenges, GAO, June 28, 2007.

⁴⁷ Four-year SEC probe of pension consultants barely yields slap on wrist, Boston.com, October 2, 2007

potential economic harm to pensions resulting from such conflicted advice, has been well documented by the SEC, DOL and GAO. In summary, awareness of conflicts of interest involving pension consultants has grown and for well over a decade plan sponsors, unlike STRS, have acknowledged a duty to investigate such conflicts.

Ironically, while disclosure of conflicts of interest in the pension consulting industry has improved over the past 15 years, the conflicts have grown to be more significant than ever. Today, many consultants derive far greater revenue from conflicted revenue streams than from providing objective advice on a non-discretionary basis.

As mentioned earlier, the SEC staff in 2005 found that many investment consultants offer, directly or through an affiliate or subsidiary, products and services to money managers that can give rise to serious potential conflicts of interest under the Advisers Act that, at a minimum, need to be monitored and disclosed to plan fiduciaries.⁴⁸

The three most common and controversial investment consultant conflict scenarios relate to:

1. Consultants with securities brokerage affiliations;
2. Educational and/or consulting services sold to investment managers; and

⁴⁸ Staff Report Concerning Examinations Of Select Pension Consultants May 16, 2005, The Office of Compliance Inspections and Examinations, U.S. Securities and Exchange Commission.

3. Marketing of discretionary asset management services by consultants retained on a non-discretionary basis.

- **Pension Consultants with Affiliated Brokerages**

Pension consultant gatekeepers may offer either directly or through their subsidiaries and affiliates securities trading and other services to the very money managers they recommend to pension clients. The securities commissions consultants with affiliated brokerages earn from managers may be significantly greater than the compensation received for providing pensions with supposedly objective advice regarding these managers.

There is a risk that these payments from managers to consultants may not only undermine the integrity of the advice consultants provide to pensions but also result in underperformance if assets are allocated to investment managers based upon willingness to pay, as opposed to investment merit. Further, commission payments from money managers to investment consultants can result in excessive consulting, brokerage and investment management fees.

For example, in March 31, 2000, a KPMG Performance and Operational Review of the Metropolitan Government of Nashville and Davidson County's pension investments determined that the PaineWebber investment consulting contracted fee was excessive. The fee the \$1.3 billion pension was contractually obligated to pay for consulting services was \$788,747, as opposed to an average fee for similar public funds which ranged from \$92,000 to \$163,000.

However, PaineWebber actually earned a total of \$1,408,773 in commissions for the year. Similarly, investment manager fees were higher than fees paid by other similar public funds.

Benchmark's subsequent investigation of the PaineWebber compensation scheme on behalf of the Nashville pension revealed significant additional fiduciary breaches, compensation and excessive fees.

We subsequently investigated this same investment consultant after he left PaineWebber and joined Morgan Stanley on behalf of the City of Chattanooga pension fund.

In June 2005 the Atlanta District Office of the SEC concluded an examination of the Nashville Branch Office of Morgan Stanley. The SEC review of the pension consulting arrangement between Morgan Stanley and the City of Chattanooga public pension fund revealed that Morgan Stanley failed to fully and fairly disclose all material facts concerning its conflicts of interest, including its compensation agreements in violation of Section 206 of the Investment Advisers Act of 1940.

The SEC concluded that the disclosures made by Morgan Stanley were not sufficiently detailed in order to allow its client to evaluate investment manager recommendations and to give its informed consent to Morgan Stanley's conflicts of interest. Further, SEC determined that Morgan Stanley had failed to disclose to the pension the conflicts of interest related to the firm's financial adviser (broker) compensation program, including indirect "perks."

On July 20, 2009, the SEC instituted public administrative and cease-and-desist proceedings against the pension consultant, who, according to the SEC, was a member of Morgan Stanley's Chairman's Club, comprised of the firm's top 175 financial advisers, and ranked among the firm's top 25 financial advisers in revenue.⁴⁹

PaineWebber and Morgan Stanley both entered into settlements with the public pension funds of the cities of Nashville (\$10 million) and Chattanooga (\$6 million) in matters involving pension consultant conflicts of interest and pay-to-play.⁵⁰

In 2009, following meetings with Benchmark, the SEC entered a cease and desist order against Merrill Lynch regarding the investment consulting services the firm provided to over 100 public pension clients in Florida. According to SEC:

From at least 2002 through 2005, Merrill Lynch, through its pension consulting services advisory program, breached its fiduciary duty to certain of the firm's pension fund clients and prospective clients by misrepresenting and omitting to disclose material information. Merrill Lynch's pension fund clients came to it seeking advice in developing appropriate investment strategies and in selecting money managers to manage the assets entrusted to their care. In providing such advice, Merrill Lynch failed to disclose the facts creating the material conflict of interest in recommending clients use directed brokerage to pay hard dollar fees, and in recommending the use of Merrill Lynch's transition

⁴⁹ <https://www.sec.gov/litigation/admin/2010/34-61278.pdf>

⁵⁰ Morgan Stanley Settles Chattanooga Suit, fundfire.com, March 24, 2006.

management desk. In addition, Merrill Lynch made misleading statements.... regarding its manager identification process.⁵¹

Following the SEC action, approximately 70 Florida public pensions settled a class action lawsuit against the firm for \$8.5 million in 2012.⁵²

- **Callan**

We have reviewed the Investment Advisor Agreement between STRS and Callan effective July 1, 2015, as well as the June 1, 2016 first amendment related to an asset liability study and the May 2018 amendment renewing the Agreement for an additional three-year term, for full retainer investment consulting services to report directly to the Board for general investment matters, the liquid asset classes (equity and fixed income) and the real estate asset class.

The annual fee stated in the Agreement is \$431,756, multiplied by the change in the CPI-U as of June 2015, however, in no event will the annual fee ever be less than the amount payable for fiscal year 2016. (Ironically, while the pension has eliminated cost of living adjustments to participants, at least this vendor has not been impacted.)

The Agreement indicates that Callan agrees to adhere to the standard of care and conduct required of a fiduciary under Chapter 3307 of the Ohio Revised Code, Title 1 of the

⁵¹ <https://www.sec.gov/litigation/admin/2009/ia-2834.pdf>

⁵² <https://www.law360.com/articles/333752/merrill-lynch-pays-8-5m-to-settle-pension-plan-action>

Employee Retirement Income Security Act of 1974 and any and all other applicable federal and state laws. We note that, ERISA, the comprehensive federal law that sets minimum standards to protect pension participants, generally does not cover plans established or maintained by government entities; however, many public pensions have adopted ERISA's heightened fiduciary requirements.

Under ERISA, fiduciaries are required to discharge their duties solely in the interest of plan participants and beneficiaries and for the exclusive purpose of providing benefits and defraying reasonable expenses of administering the plan. Fiduciaries are generally prohibited from profiting from plan transactions and investigations to ensure compliance with such legal prohibitions are required of plans. Thus, under ERISA, at a minimum Callan is required to disclose, and the board is required to investigate, any conflicted compensation arrangements.

With respect to confidentiality, the Agreement states that both parties acknowledge that confidential material and information may come into the possession or knowledge of each party in connection with the agreement and if disclosure of such information may be required by law, each party will nevertheless give timely notice of such disclosure to enable the other party to challenge such disclosure.

In our opinion, as a public pension, STRS contracts should not include contractual provisions which attempt to thwart public disclosure under applicable law. To the best of our

knowledge, there is no benefit to the pension or its stakeholders from enabling any party to challenge public disclosure required by law. On the other hand, as mentioned earlier (according to STRS expert CEM Benchmarking), transparency and public accountability lead to better outcomes. In our opinion, this provision is yet another example of STRS abandoning its transparency obligations in apparent pursuit of alternate goals.

The Agreement provides that Callan will maintain professional liability insurance coverage in the amount of only \$5 million. In our opinion, this amount of insurance seems woefully inadequate to protect the \$90 billion public pension from potential investment consultant negligence or malfeasance, particularly given that GAO estimates consultant conflicts can result in billions of losses over time.

We note that in recent years large, deep-pocketed consultants have abandoned public defined benefit plans, as the legal risks of advising severely underfunded pensions mount. For example, in 2010, investment consultant Mercer departed from providing services to public pensions after paying \$500 million to settle a lawsuit brought by the Alaska Retirement Management Board. A year earlier, the firm had agreed to pay Milwaukee County \$45 million to settle a negligence lawsuit filed by Milwaukee's pension board. Mercer's decision affected \$240 billion in public assets under advisement.

Mercer's loss reportedly was Callan's gain. Callan's President Greg Allen noted at the time that, "from the standpoint of a plaintiff's lawyer, interest in litigation is driven partly by the size of the potential settlement and, therefore, the bigger the insurance policy, or the deeper the pockets of the parent company, the larger the potential settlement. Small firms with small policies are relatively unattractive targets, Allen said."⁵³ In other words, Callan's small insurance policy and lack of other financial resources is a strategic advantage in dealing with problematic public pensions.

As mentioned below, in 2006, Callan agreed to pay the city of San Diego \$4.5 million to settle a lawsuit that claimed Callan was negligent in advising the \$4.6 billion San Diego City Employees' Retirement System. While City Attorney Michael Aguirre had been seeking more than \$50 million in damages in the suit, the case was settled for the amount of the remaining insurance. Had the STRS Board conducted an adequate due diligence review of Callan, both the limited insurance policy and the San Diego settlement should have emerged as concerns.

With respect to conflicts of interest, the Agreement states that Callan shall not receive any remuneration in connection with transactions involving the fund unless disclosed in writing in advance; Callan has disclosed in writing those actual and potential conflicts of interest that could be reasonably expected to affect the objectivity of the firm or its

⁵³ <https://www.ai-cio.com/news/mercer-abandons-public-pension-plans/>

employees in fulfilling their duties to STRS and will update STRS promptly in the event of any additional, actual or potential conflicts of interest. Also, Callan will provide annual disclosure of its business relationships with all investment managers or other providers of investment services employed by STRS Ohio. This disclosure will include information on the specific services provided and the specific amounts paid to Callan.

We note with particular emphasis, the contract prohibits Callan receiving any remuneration in connection with transactions unless disclosed in advance both as to specific services and specific amounts. Callan is compelled to disclose—regardless of whether the pension asks or not.

In light of the 2006 Fiduciary Performance recommendations regarding conflicts of interest involving STRS investment consultants and the above conflicts of interest prohibitions and disclosure obligations in the Agreement between the fund and Callan, we requested from the pension the following information:

1. Please provide all contracts between the STRS and Callan Associates.
2. Please provide any documents relating to potential conflicts of interest at Callan.
3. Please provide any documents prepared or received as part of STRS's due diligence documents regarding litigation, regulatory or disciplinary matters involving Callan.
4. Please provide all documents related to compensation arrangements by Callan with the STRS investment managers.

5. Please provide documentation related to any review by the STRS Board of potential conflicts of interest at Callan.
6. Please provide any disclosure(s) providing the actual dollar amounts of compensation received by Callan from each of the STRS investment managers.
7. Please provide all asset allocation reports, investment manager recommendations, investment performance and other reports related to STRS produced by Callan.

In response, we received the Investment Advisor Agreements and Amendments previously discussed, as well as 24 Investment Measurement Service Quarterly Reviews from 2015 through 2020.⁵⁴

STRS responded:

Concerning items 2-7 of the Documents relating to Callan... I must note that much of your request fails to satisfy the requirement of public records law that you specifically and particularly identify the records that you are seeking. Under Ohio law, a requestor has the duty to “identify the records.....wanted with sufficient clarity.” *State ex rel. Dillery v. Icsman (2001) 92 Ohio St.3d 312, 314.*

A public office is not required to conduct research or otherwise “seek out and retrieve those records which would contain the information of interest to the requester”. *State ex rel. Fant v. Tober (8th Dist., April 28, 1993), No. 63737, 1993 Ohio App. LEXIS 2591 at *4; aff'd (1993), 68 Ohio St. 3d 117.* To the extent that you have requested records containing specific information, rather

⁵⁴ Note: The Callan Reviews beginning around 2018 state: “Information contained herein includes confidential, trade secret and proprietary information. Neither this Report nor any specific information contained herein is to be used other than by the intended recipient for its intended purpose or disseminated to any other person without Callan’s permission.” In our opinion, there are no trade secrets or proprietary information in these reports—other than possibly the investment management firms which make conflicted payments to Callan. Despite this footnote disclosure, neither Callan nor STRS withheld these documents from us.

than identifying the specific records you seek, your request is inappropriate under applicable legal standards. If there are specific records you would like to request, please identify those with sufficient clarity.

That said, in the interest of openness, this office has voluntarily made an effort to identify readily available public records that are responsive and we are providing all 24 reports we believe to be responsive to Item #7, and responsive in part to #2-6 of the section on Documents relating to Callan.

We note that each of the 24 Quarterly Reviews the pension provided to us include in their final pages a list of approximately 200 investment managers that pay Callan fees for “educational, consulting, software, database or reporting products and services.” As mentioned earlier, the SEC has long been concerned that payments from investment managers may undermine the objectivity of investment consultant recommendations which, according to GAO, may adversely impact pension performance.

Notably, neither the Callan Quarterly Reviews nor any other document provided by STRS in response to our request for information disclose the *specific services* provided and the *specific amounts* of compensation received by Callan from each of STRS investment managers—disclosure which the 2006 Fiduciary Performance review recommended and which the contract between Callan and STRS requires in advance. Absent disclosure of actual dollar amounts and services provided, fiduciaries to a pension cannot effectively evaluate the potential harm to the fund, as

well as benefit to the consultant, related to the conflict.

We note that in the past Callan routinely provided *greater disclosure* regarding the types of services different asset managers purchased from the firm. A List of Managers We Do Business With 9/30/06 includes approximately 220 investment managers and separates those managers who purchase educational services from those who purchase consulting services. Approximately half of the managers listed purchase both services. The document also discloses that BNY is the exclusive broker in those instances where a manager chooses to pay Callan's fees through brokerage commissions.

The 2015 Callan Reviews include a List of Managers That Do Business With Callan that also listed approximately 200 investment managers and separates those managers who purchase educational services from those who purchase consulting services. Approximately half of the managers listed purchase both services. It is also noted that "Clients should also be aware that Callan maintains an asset management division, the Trust Advisory Group (TAG). TAG specializes in the design, implementation and on-going management of multi-manager portfolios for institutional investors. Please refer to Callan's ADV Part 2A for a complete listing of TAG's portfolios. We are happy to provide clients with more specific information regarding TAG, including detail on the portfolios it oversees."

Beginning in 2016, the List of Callan Investment Manager Clients no longer indicates the type of services managers purchase from Callan.

The Callan Reviews also indicate, “Fund sponsor clients may request a copy of the most currently available list at any time. Fund sponsor clients may also request specific information regarding the fees paid to Callan by particular fund manager clients.” Again, the contract between STRS and Callan requires Callan to disclose compensation—regardless of whether the client asks—and prohibits any undisclosed compensation.

- **SEC Cease and Desist Regarding Callan Brokerage Affiliate**

In 1998, Callan sold Alpha Management Inc. (“Alpha”), its affiliated broker-dealer, to BNY ESI & Co., Inc., a subsidiary of the Bank of New York. As a part of that transaction, Callan and BNY entered into a Services Agreement wherein BNY agreed to pay Callan a specified amount per year for eight years, 1998 through 2006. A portion of the annual payment was contingent on BNY’s generating gross brokerage commissions above a certain minimum threshold from Callan clients. The minimum threshold was based on Alpha’s brokerage commissions earned in 1998.

Pursuant to the provisions of the Services Agreement, Callan was required to inform its retirement plan clients that BNY was its preferred broker should the clients elect to pay for Callan’s services through directed brokerage. Callan sent

annual letters to its retirement plan clients informing them of this option. Similarly, Callan agreed to inform its investment manager clients that BNY was its exclusive broker should the clients elect to pay for Callan's services with brokerage commissions. Callan sent annual letters to its investment manager clients informing them of this option. While the annual letters to the retirement plan and investment manager clients referenced the fact that Callan had sold Alpha to BNY, the letters failed to disclose that Callan was receiving compensation from BNY that depended on a certain level of commissions being generated by Callan clients.

As a registered investment adviser, Callan was required to file amendments to SEC registration statements known as Form ADV Part II at least annually. Between 1999 and 2005, Callan's Form ADV Part II stated that Callan was obligated by the terms of the Services Agreement to inform its plan sponsor clients that BNY was its preferred broker and investment manager clients that BNY was its exclusive broker if the client chose to pay Callan's fees through soft-dollar or directed brokerage arrangements. Callan further reported that, "[a]ccording to the terms of the transaction, BNY ESI makes periodic fixed payments to Callan each year." The SEC concluded that the characterization of BNY's payments to Callan as "fixed" was misleading in that a material portion of each annual payment was contingent upon BNY's receipt of a minimum threshold of Callan client brokerage business.

The SEC found Callan willfully violated Section 207 of the Advisers Act and ordered Callan to cease and desist from committing or causing any violations and any future violations of Section 207 of the Advisers Act.⁵⁵

According to its current Form ADV filed with SEC, “Callan has no soft-dollar arrangements with any broker and only accepts checks from brokers as payment for its hard-dollar client fees.”

- **Callan Educational and Consulting Services Sold to Investment Managers**

According to its current Form ADV filed with SEC:

Callan provides research and educational services to investment managers and receives compensation from them for those services. Some of those investment managers are evaluated or recommended by Callan to its other clients. Callan recognizes there is a potential conflict between Callan's interest in receiving compensation from investment managers and Callan's obligation to provide objective advice to our advisory clients who work with those managers. Callan has adopted certain policies and practices designed to prevent such conflicts, including the policies set forth in its Code of Ethical Responsibility, disclosure policies, roles of its oversight committees, and separation of the areas of business, including separate personnel, revenue streams, and compensation arrangements. Among other policies, Callan is committed to ensure it does not consider an investment manager's business relationship with Callan, or lack thereof, in performing evaluations for or making suggestions or recommendations to its other non-discretionary or discretionary advisory clients. Callan informs its investment manager clients of this

⁵⁵ <https://www.sec.gov/litigation/admin/2007/ia-2650.pdf>

policy at the start of a contractual relationship. Callan also routinely informs all clients of our manager client relationships, including disclosing the existence of its business relationships with investment managers on request. Callan also discloses these manager relationships in annual mailings, as part of each applicable manager search, and in the quarterly performance evaluation reports provided to fund sponsor clients. Fund sponsor clients can also request specific information regarding the fees, if any, paid to Callan by the managers employed by their fund. Per Callan policy, information requests regarding fees are handled by Callan's Compliance Department.

We note that while the above disclosure clearly states Fund sponsor clients can request specific information regarding the fees, if any, paid to Callan by the managers employed by their fund, we were provided by no documents in response to our request for information related to compensation arrangements between Callan and fund managers. Thus, we conclude that STRS has never requested information regarding such potentially conflicted payments and Callan has never provided such information to STRS, as required by the contract between Callan and STRS.

According to its current Form ADV filed with SEC, Callan's "Institutional Consulting Group (ICG) provides investment manager clients with research, education, performance measurement, and database and analytical tools that help them better serve the needs of institutional investors." Institutional managers pay Callan up to approximately \$135,000 annually, with a median payment of \$60,000.

According to its current Form ADV filed with SEC:

Callan's educational services are available to our clients, including asset owners, investment managers, and financial intermediaries through the Callan Institute and the Center for Investment Training ("Callan College"). The Callan Institute functions as an education institution servicing clients and our employees by independently analyzing trends in the industry via research communications and conference programs. The "Callan College," featuring sessions offered over several days throughout the year and on a customized basis, provides investment fiduciaries and their advisers with basic- to intermediate-level of classroom-style instruction on prudent investment practices. Each line of business, coupled with our client education services, contributes to the overall strength and stability of the organization, and fits well within our mission of helping institutional investors achieve their investment objectives. The firm maintains policies to ensure each division is compliant with our business, governance, ethics, and oversight practices.

The Form ADV further states "While the suite of services for each business line is individually priced, there is one set of services that spans all client types—our educational services. Fees for these services are up to \$3,500 per person, per session for "Callan College" and up to \$60,000 per organization per year for the Callan Institute." According to the firm's website, there are 3,129 attendees to Callan events.⁵⁶

As mentioned earlier, recent Callan STRS Quarter Reviews indicate approximately 200 managers that pay Callan for educational, consulting, software, database or reporting products and services. Assuming an average payment of

⁵⁶ <https://www.callan.com/callan-institute/>

\$60,000, the firm earned approximately \$12 million annually from managers for such services. Assuming, as in years past, half of all managers purchased both research and educational services, the firm may have earned \$18 million from managers. These are estimates; only Callan knows the actual amounts it earns from the investment managers it recommends.

STRS investment managers who, according to Callan, pay compensation to Callan at 6/30/2020 include the following 23 firms:

1. Stone Harbor LP
2. Wellington
3. Fidelity
4. Fortress
5. Genesis Asset Managers
6. GCM Grosvenor
7. Intech Investment Management
8. Invesco
9. JP Morgan
10. Lazard Asset Management
11. MFS Investment Management
12. Neuberger Berman
13. PIMCO
14. Goldman Sachs
15. Alliance Bernstein
16. AQR Capital
17. Ares Management
18. Blackrock
19. Chartwell Investment Partners
20. Wells Fargo
21. PGIM

- 22. TCW Group
- 23. BNY Mellon

In our opinion, clearly the annual payments Callan receives from asset managers are an important source of revenue.

- **Hawaii State Auditor Investigation**

According to The New York Times:

A 2002 audit of Hawaii's pension fund found that its consultant, Callan Associates, had recommended 16 money managers over time -- and 14 of them were paying Callan for marketing advice and other services. "The consultant's objectivity could be suspect," said the state auditor, Marion M. Higa, calling for further scrutiny. She noted that the Hawaii fund's overall five-year investment performance "ranks in the bottom 5 to 15 percent nationwide."

A Callan spokeswoman said that Hawaii's trustees stood by Callan after the audit, issuing a statement calling it "a highly regarded investment advisory firm with an unblemished reputation for integrity." In a statement, Callan said that it kept its various business lines separate and that it told all money managers that they would not win preferential treatment from Callan's pension consultants by buying other Callan services.⁵⁷

- **San Diego City Employees Retirement System Settlement**

In 2006, Callan agreed to pay the city of San Diego \$4.5 million to settle a 2005 lawsuit that claimed Callan was negligent in advising the \$4.6 billion San Diego City Employees' Retirement System. City Attorney Michael Aguirre

⁵⁷ Concerns Raised Over Consultants to Pension Funds, The New York Times, March 21, 2004

had been seeking more than \$50 million in damages in the suit, filed in California Superior Court in August 2005. The complaint stated Callan engaged in professional negligence and included allegations that the consulting firm recommended its clients hire money managers that attended Callan's educational forums.⁵⁸

- **Teachers' Retirement System of the State of Illinois**

This case brought on behalf of participants and beneficiaries alleged that between 2002 and 2006 Callan was a party to a contract with the Teachers' Retirement System of the State of Illinois under which Callan was to provide investment advice and consulting services to the TRS Board of Trustees. The contract covering these services explicitly acknowledged Callan's role as a fiduciary. Callan's responsibilities included evaluating and recommending investment policies; assisting in the development of policies, procedures, and guidelines for the investment program; making recommendations for asset allocation; maintaining a database of investment managers; evaluating the work of investment managers; and recommending the hiring, firing and retention of each investment manager. Despite Callan's role as a "gatekeeper" and its obligations as a fiduciary to TRS, Callan was paid consulting fees, membership dues and tuition payments from investment managers for Callan services. Callan simultaneously carried out its contractual duties in seeking, evaluating and recommending potential

⁵⁸ <https://www.pionline.com/article/20061211/PRINT/612110708/callan-san-diego-reach-4-5-million-settlement>

investment managers for TRS some of whom were Callan's clients. This acceptance of funds from investment managers who hoped to obtain or retain a contract with TRS was a conflict of interest in violation of Callan's obligations as a fiduciary to TRS under the Illinois Pension Code, according to the complaint.

As noted in the complaint, "According to Callan's responses to a Department of Labor and United States Securities and Exchange Commission questionnaire, fees collected from investment managers through offerings such as the Callan Investments Institute and Callan College account for a significant percentage of Callan's annual revenue. In 2005, Callan noted that it derived 30 percent of its revenue from investment manager consulting services."

- **Cliffwater**

We have reviewed a redacted investment advisory agreement between STRS and Cliffwater LLC effective July 1, 2015, as well as the May 10, 2018 first amendment renewing the agreement for an additional three-year term, for full retainer non-discretionary investment consulting services to report directly to the Board for alternative investments. Concerning the redacted Investment Advisor Agreement from Cliffwater, the firm states:

"the redacted portions are exempted from disclosure under R.C. 149.43(A)(1)(v) of the Public Records Act as "records the release of which is prohibited by state or federal law," in particular, that they are trade secrets.

The compensation provisions of the Investment Advisor Agreement constitute a trade secret that contains proprietary commercial and financial information of Cliffwater. The compensation provisions are **virtually unknown** outside of the business or by employees and others involved in the business. Cliffwater takes extensive measures to maintain the confidentiality of the information in these compensation provisions and it would be *virtually impossible* for others to properly acquire or duplicate this information. In addition, Cliffwater's competitors would obtain a significant advantage over Cliffwater if they had access to the information in the compensation provisions schedule as they could modify their own bids to defeat Cliffwater in the marketplace." (emphasis added)

In our experience, the compensation provisions of Cliffwater's contracts are hardly "virtually unknown," or "virtually impossible for others to properly acquire." To the contrary, investment consulting contracts in the public pension context, including Cliffwater's, are routinely disclosed in full in response to public records requests.⁵⁹

⁵⁹ See discussion in IFS 2006 STRS Fiduciary Performance Audit regarding investment consultant fees, pgs. 138-140. For example: "Several points of reference allow us to compare consultant fees. First, a nationally recognized survey of 37 state public employee pension funds that voluntarily pooled their cost data, showed that consultant fees averaged \$559,000 per year, with a median fee of \$320,000. Funds that relied primarily on internal asset management tended to pay dramatically lower consulting fees. The average internally managed fund paid an average of \$177,000, with the median fund paying \$169,000." And: "Separately, according to the 2005 Greenwich Associates survey of pension plan sponsors, the mean investment consulting fee for public funds with over \$5 billion is \$379,000." Finally: "With respect to private equity specialty consultants, the peer group paid from \$750,000 to \$2,248,000, with an average fee of \$1,196,000." Clearly, in 2006 STRS's retained expert did not consider investment consultant fees "trade secrets" exempt from disclosure and public review.

As noted in our forensic investigation of the Employee Retirement System of Rhode Island, the pension's contract with Cliffwater was disclosed in full to the public:

Pursuant to an agreement dated April 4, 2011, Cliffwater LLC serves as the non-discretionary alternative asset class investment consultant to the Fund. The contract between the Fund and Cliffwater states that the total annual compensation to Cliffwater of \$450,000 shall be paid in "hard dollars," i.e., an annual cash fee. Further, the consultant is precluded from accepting any fees, commissions, or other forms of compensation from any other party or source, whether direct or indirect, in connection with or relating to its services under the contract.⁶⁰

Further we note, the compensation provisions of Callan's contract with STRS were fully disclosed to us—despite any supposed "significant advantage" over Callan such disclosure might provide to Cliffwater.

Cliffwater provides extensive information in its SEC Form ADV Part II filings with the SEC—as required under the federal securities laws—of its different compensation arrangements. The firm warns potential clients:

"Since Cliffwater provides its services for clients with different fee structures, Cliffwater may have an incentive to favor client accounts for which it receives a fee based on assets under advisement or management, as applicable."

In short, according to Cliffwater, clients should be aware of how the firm is paid and any potential related dangers related to the compensation arrangement. If Cliffwater

⁶⁰ <https://www.providencejournal.com/article/20131017/NEWS/310179861>

compensation is a “trade secret” under public record laws, then full disclosure to public pension stakeholders under the federal securities laws has been thwarted. In our opinion, there is no justification for providing *less disclosure* to participants in public pensions that are Cliffwater clients than ordinary retail investors would receive.

We also note, CEM Benchmarking (STRS’s consultant for investment cost and performance measurement) has advised us that, included in its Global Transparency Benchmark process which measures whether pensions are disclosing what they do and how they generate value for stakeholders clearly, completely and concisely, is the following question: Is the amount spent on external consultants disclosed?

Apparently, CEM also believes that transparency requires disclosure of fees paid to consultants, such as Cliffwater.⁶¹

Finally, we note that while STRS deferred to Cliffwater in denying our public record request for contractual compensation information, STRS *already discloses* to the public that Cliffwater has been paid consulting fees of \$250,000 annually each of the past five years.⁶² In summary, Cliffwater’s representations that the compensation provisions in its contracts are “virtually unknown” and “virtually impossible” to properly acquire are preposterous.

⁶¹ <https://www.top1000funds.com/global-pension-transparency-benchmark-methodology/>

⁶² <https://checkbook.ohio.gov/Pensions/STRS.aspx>

The contract indicates that Cliffwater agrees to adhere to the standard of care and conduct required of a fiduciary under Chapter 3307 of the Ohio Revised Code, Title 1 of the Employee Retirement Income Security Act of 1974 and any and all other applicable federal and state laws. Under ERSIA, fiduciaries are generally prohibited from profiting from plan transactions and investigations to ensure compliance with such legal prohibitions are required of plans. Thus, at a minimum Cliffwater is required to disclose, and the board is required to investigate, any such compensation arrangements.

The Cliffwater contract includes the very same confidentiality provision included in the Callan contract, which leads us to believe the provision was not only agreed to by STRS but drafted by the plan. In our opinion, this provision is yet another example of STRS abandoning transparency for alternate purposes.

The contract provides that Cliffwater will maintain professional liability insurance coverage in the amount of only \$5 million. Again, in our opinion, this amount of insurance seems woefully inadequate to protect the \$90 billion public pension from potential investment consultant negligence or malfeasance, particularly given that GAO estimates consultant conflicts can result in billions of losses over time and, as mentioned earlier, the city of San Diego pension settled its \$50 million claim against Callan for a mere \$4.5 million due to limited insurance coverage.

Due diligence of Cliffwater by the STRS Board should have revealed the limited insurance policy.

With respect to conflicts of interest, the contract states that Cliffwater shall not receive any remuneration in connection with transactions involving the fund unless disclosed in writing in advance; Cliffwater has disclosed in writing those actual and potential conflicts of interest that could be reasonably expected to affect the objectivity of the firm or its employees in fulfilling their duties to STRS and will update STRS promptly in the event of any additional, actual or potential conflicts of interest. Also, Cliffwater will provide annual disclosure of its business relationships with all investment managers or other providers of investment services employed by STRS Ohio. This disclosure will include information on the specific services provided and the specific amounts paid to Cliffwater.

In light of the 2006 Fiduciary Performance recommendations regarding conflicts of interest involving STRS investment consultants and the above conflicts of interest prohibitions and disclosure obligations in the contract between the fund and Cliffwater, we requested from the pension the following information:

1. Please provide all contracts between STRS and Cliffwater.
2. Please provide any documents regarding potential conflicts of interest at Cliffwater.

3. Please provide any due diligence documents regarding litigation, regulatory or disciplinary matters involving Cliffwater.
4. Please provide any disclosure by Cliffwater of compensation arrangements with the fund's investment managers.
5. Please provide documents related to any review by the STRS Board conflicts of interest at Cliffwater.
6. Please provide all asset allocation reports, investment manager recommendations, investment performance and other reports related to STRS produced by Cliffwater.
7. Please provide any disclosure requesting or providing the actual dollar amounts of compensation received by Cliffwater from the pension's investment managers.

STRS responded:

Concerning items 2-5 and 7, I must note that much of your request fails to satisfy the requirement of public records law that you specifically and particularly identify the records that you are seeking. Under Ohio law, a requestor has the duty to "identify the records.....wanted with sufficient clarity." *State ex rel. Dillery v. Icsman (2001) 92 Ohio St.3d 312, 314.*

A public office is not required to conduct research or otherwise "seek out and retrieve those records which would contain the information of interest to the requester". *State ex rel. Fant v. Tober (8th Dist., April 28, 1993), No. 63737, 1993 Ohio App. LEXIS 2591 at *4; aff'd (1993), 68 Ohio St. 3d 117.* To the extent that you have requested records containing specific information, rather than identifying the specific records you seek, your request is inappropriate under applicable legal standards. If there are specific records you would like to request, please identify those with sufficient clarity.

That said, in the interest of openness, this office has voluntarily made an effort to identify readily available public records that are responsive and we are providing the report we believe to be responsive.

Again, to the extent there are additional records you seek related to any of these items, please identify those records with sufficient clarity.

We are still reviewing the remaining requests, and will follow up with additional records and/or clarifications regarding the records you seek.

Since we received no documents from STRS specifically related to questions 2-5 and 7, we must assume for purposes of this report, they simply do not exist. With respect to item 6, STRS later responded:

I must note that much of your request fails to satisfy the requirement of public records law that you specifically and particularly identify the records that you are seeking. Under Ohio law, a requestor has the duty to "identify the records.....wanted with sufficient clarity." *State ex rel. Dillery v. Icsman (2001) 92 Ohio St.3d 312, 314.*

A public office is not required to conduct research or otherwise "seek out and retrieve those records which would contain the information of interest to the requester". *State ex rel. Fant v. Tober (8th Dist., April 28, 1993), No. 63737, 1993 Ohio App. LEXIS 2591 at *4; aff'd (1993), 68 Ohio St. 3d 117.* To the extent that you have requested records containing specific information, rather than identifying the specific records you seek, your request is inappropriate under applicable legal standards. If there are specific records you would like to request, please identify those with sufficient clarity.

That said, in the interest of openness, this office has voluntarily made an effort to identify readily available public records that are responsive and we are providing the 20 reports we believe to be responsive.

Again, to the extent there are additional records you seek related to any of these items, please identify those records with sufficient clarity.

We are still reviewing the remaining requests, and will follow up with additional records and/or clarifications regarding the records you seek.

None of the 20 Cliffwater reports provided include any disclosure whatsoever regarding conflicts of interest at Cliffwater, or compensation paid by money managers to Cliffwater.

- **Cliffwater Origins**

According to published reports, Stephen L. Nesbitt, the founder of Cliffwater, resigned from Wilshire Associates February, 2004, "after declining a reduction in responsibilities."⁶³

At this time, the nation was reeling from revelations of multiple scandals involving the mutual fund industry. Money Magazine stated that it had "learned that one of the world's leading investment firms -- Wilshire Associates of Santa Monica -- was engaged for years in massive rapid-fire trading of mutual funds that raises disturbing questions about ethics and conflicts of interest."⁶⁴

In addition to Wilshire's fast-trading scheme, which the SEC was looking into, a second area of investigation targeting several major investment consulting firms, including Wilshire, emerged at this time.

The variety of questionable payments from investment managers to consulting firms that were in a position to

⁶³ Nesbit Leaves Wilshire Associates, HedgeWorld.com, February 11, 2004.

⁶⁴ The Great Fund Ripoff, Money Magazine, September 22, 2003.

recommend them to their big institutional clients was described as "pay-to-play" arrangements. Wilshire was one of at least seven pension consulting firms that received a letter from the Securities and Exchange Commission in 2004 as part of an examination of pension consultant practices, compensation and disclosure.

According to Pensions & Investments:

"Mr. Nesbitt quit after he lost the consulting post in a reorganization in which Julia Bonafede was named senior managing director of consulting. Mr. Nesbitt was offered the funds management position but resigned instead, and Michael J. Napoli Jr. was named managing director of that division. Funds management handles manager-of-managers outsourcing; private equity, including venture capital and leveraged buyouts; and hedge fund selection."

The restructuring was done by Chief Executive Officer Dennis Tito and the board of directors.

"In light of the SEC's recent focus on consulting firms, the Wilshire board determined that in order to strengthen the ethical walls and eliminate the possible appearance of conflicts of interest, it was necessary to separate the funds management and consulting divisions and have them headed by different executives," Mr. Tito said in an e-mail response to questions from Pensions & Investments.

The firm also has been swept up in the mutual fund market-timing scandal, with the SEC reportedly reviewing Wilshire's trading practices. The firm has said it has not violated any laws. "Wilshire was contacted by the SEC as a part of its investigation of the mutual fund industry and cooperated fully," Mr. Tito said."⁶⁵

⁶⁵ Nesbitt Walks When Wilshire Takes Away Consulting Role: SEC probe spurs firm to separate consulting and asset management sides, Pensions & Investments, February 9, 2004.

While Nesbitt represented in a September 25, 2003 letter to David Russ, Treasurer of the University of California that Wilshire used a double “Chinese Wall” to separate the firm’s proprietary mutual fund trading from the selection of money managers it recommended to pensions, according to a highly critical study authored by Charles Schwartz, Professor Emeritus, University of California, Berkeley, Nesbitt himself was in charge of the two divisions at Wilshire that the Chinese Wall he referred to was supposed to separate.

- **Cliffwater Consulting Services Sold to Investment Managers**

Cliffwater’s Form ADV disclosures regarding compensation received from investment advisers has changed over time but has always been confusing, in our opinion.

Prior to May 10, 2013, Cliffwater’s Form ADV stated, “Other than for services provided to clients which are investment advisers, Cliffwater does not receive fees or any other compensation from investment managers or other service providers it recommends or selects for its clients.” This disclosure language seemingly indicated that the firm received compensation from investment managers or other service providers it recommended or selected for its clients.

Cliffwater’s Form ADV was amended May 10, 2013 (at a time we were asking questions in connection with a review of the Employee Retirement System of Rhode Island) to state:

“Cliffwater does not receive fees or any other compensation from investment managers or other service providers for fund selections and

recommendations made to its clients. Separately, Cliffwater receives fees for its standard advisory services provided to a small number of clients who are investment managers that offer products and services to their investors. Cliffwater will advise a client in the limited instances where an affiliation exists between a fund selected or recommended for the client's portfolio and one of Cliffwater's investment manager clients."

This new disclosure language appeared to indicate that while Cliffwater received compensation from money managers and may have recommended or selected investment managers who paid the firm compensation, any such fees or compensation received by Cliffwater from managers *was not for fund recommendation or selection*.

Cliffwater's Form ADV disclosure regarding receipt of manager compensation has continued to evolve and currently states:

Cliffwater does not receive fees or any other compensation from investment advisers or other service providers for fund selections and recommendations made to its clients.

Cliffwater has a small number of clients who are investment advisers or who are affiliated with investment advisers. Cliffwater provides advisory services to these clients similar to the advisory services it provides to its other clients and, accordingly, receives standard advisory fees from these investment adviser or investment adviser-affiliated clients. Some of these clients or their affiliates offer products and services to their own clients or to investors in funds that they manage. In the limited circumstances in which an affiliation exists between a fund selected or recommended for a client's portfolio and one of Cliffwater's investment adviser or investment adviser-affiliated clients, Cliffwater will advise the client of the affiliation and will endeavor to ensure that any such recommendation or selection is made in the best interests of the client. In addition, Cliffwater may have a commercial relationship with an investment manager who advises on a fund selected or recommended for a client's portfolio. For example, Cliffwater has

engaged, and may engage in the future, such a manager to advise or sub-advise on one or more pooled investment vehicles that Cliffwater may sponsor and/or advise. In these limited circumstances, Cliffwater will endeavor to ensure that any such recommendation or selection is made in the best interests of the client. For the avoidance of doubt, as stated above, Cliffwater does not receive fees or any other compensation from investment advisers or other service providers for fund selections and recommendations made to its clients.

In our opinion, where Cliffwater above states, in a conflict situation, it “will endeavor to ensure that any such recommendation or selection is in the best interests of the client” is highly problematic. As a fiduciary to the pension, Cliffwater has a duty to ensure, *beyond merely endeavoring to ensure*, the conflicted recommendation or selection is in the best interest of the client. For example, if Cliffwater has a commercial relationship with an investment manager that advises an investment vehicle Cliffwater sponsors that is more favorable than the relationship STRS has with said manager, then, in our opinion, Cliffwater would have a fiduciary obligation to, at a minimum, advise STRS of the terms of the more favorable relationship.

Since Cliffwater’s current Form ADV disclosure indicates the firm will advise a client where an affiliation exists between a fund selected or recommended for the client’s portfolio and one of Cliffwater’s investment manager clients, we requested from STRS any documents related to any such disclosure by Cliffwater. As noted earlier, none of the Cliffwater documents provided by STRS in response to our public records request include any information regarding compensation paid by money managers to Cliffwater.

In conclusion, Cliffwater's disclosed receipt of compensation from money managers it recommends or selects (regardless of whether any such compensation is, in Cliffwater's opinion, in exchange for any recommendations or selections), requires that a pension fiduciary relying upon the firm for independent advice regarding investment managers review any such compensation arrangements and evaluate any potential danger to the pension. Regardless of whether STRS asks for such information, the contract between Cliffwater and the pension requires full disclosure.

However, none of the 20 Cliffwater reports provided provide any disclosure whatsoever regarding conflicts of interest at Cliffwater or compensation paid by money managers to Cliffwater.

- **Cliffwater Litigation**

According to published reports, Blueprint Capital Advisors is suing current and past members of the New Jersey Division of Investment (DOI), BlackRock Alternative Advisors, and Cliffwater. The suit filed in federal court alleges racial discrimination, theft of intellectual property and trade secrets, retaliation, and unlawful interference with Blueprint's business with the state of New Jersey by BlackRock Alternative Advisors, a unit of the world's largest asset manager, BlackRock Inc.

Under the guise of performing "due diligence" into Blueprint, the DOI, and its consultant Cliffwater, demanded that Blueprint open its books and share hundreds of pages of

research, financial models, vendor lists, and investment strategies that comprised the FAIR program, the suit states.

The lawsuit alleges that the DOI and Cliffwater then sent confidential and proprietary information about Blueprint's FAIR program to BlackRock, mentioning that firm has an overwhelmingly White executive management and workforce.⁶⁶

- **Cliffwater Discretionary Asset Management Services**

Cliffwater serves as an investment consultant to STRS, on a non-discretionary basis, reviewing and recommending investment advisors to manage, on a discretionary basis, the pension's assets. A conflict of interest may arise where a non-discretionary investment consultant also manages assets on a discretionary basis. For example, the consultant may recommend itself to actually manage client assets or may advantage discretionary clients at the expense of nondiscretionary since the cost of discretionary services is generally higher. While Cliffwater's Form ADV indicates the firm does manage significant assets on a discretionary basis, it does not appear that the firm manages any STRS assets on a discretionary basis. Whether Cliffwater's discretionary asset management services may potentially disadvantage STRS would require additional research.

⁶⁶ <https://www.nj.com/news/2020/06/black-owned-firm-sues-after-nj-official-allegedly-says-state-is-not-a-fan-of-investing-with-minority-owned-companies.html>

IX. Fiduciary Status of Board Members and Fiduciary Liability Insurance

According to Section 3307.14 of the Ohio Revised Code, the members of the state teachers retirement board shall be the trustees of the funds. The board shall have full power to invest the funds. The board and other fiduciaries shall discharge their duties with respect to the funds solely in the interest of the participants and beneficiaries; for the exclusive purpose of providing benefits to participants and their beneficiaries and defraying reasonable expenses of administering the system; with care, skill, prudence, and diligence under the circumstances then prevailing that a prudent person acting in a like capacity and familiar with these matters would use in the conduct of an enterprise of a like character and with like aims; and by diversifying the investments of the system so as to minimize the risk of large losses, unless under the circumstances it is clearly prudent not to do so.

As noted elsewhere, the contracts involving the two investment consultants to the fund, Callan and Cliffwater, provide that in addition to the fiduciary obligations imposed by Ohio law, these two firms agree to adhere to the standard of care imposed by Title 1 of the Employee Retirement Income Security Act of 1974 and any and all other applicable federal and state laws. On the other hand, the STRS board is not required to comply with ERISA fiduciary standards.

ERISA's heightened fiduciary standards provide additional important protections to pensions generally lacking under state law. In our opinion, there is no good reason why the investment consultants should be held to higher fiduciary standards than the board; further, board adherence to ERISA standards can only improve management of the pension.

Section 3307.10 (B) of the Ohio Revised Code provides the Board may secure insurance coverage designed to indemnify board members and employees for their actions or conduct in the performance of official duties, and may pay required premiums for such coverage from the expense fund.

In response to our request for information regarding any fiduciary liability insurance obtained by STRS, we were provided with documents indicating the fund had coverage in the amount of \$10 million with Hudson Insurance Company and \$10 million with Federal Insurance Company. In addition, the pension has an excess liability policy in the amount of \$5 million with RLI Insurance Company. In our opinion, this level of coverage is absurdly low and offers virtually no protection for a \$90 billion pension. Virtually any fiduciary breach may result in actual damages amounting to tens or hundreds of millions of dollars.

For example, STRS recently disclosed it had lost more than half a billion dollars on a private equity investment in Panda Power Funds. From 2011 to 2013, State Teachers Retirement

System of Ohio invested \$525 million with Panda but the investment is now valued at zero.⁶⁷

In conclusion, our forensic investigation of STRS identified the following grave concerns:

- 1) STRS has long abandoned transparency, choosing instead to collaborate with Wall Street to eviscerate Ohio public records law;
- 2) Legislative oversight of the pension has utterly failed;
- 3) The pension has failed to address significant deficiencies identified in the last Fiduciary Performance audit—15 years ago;
- 4) Wall Street has been permitted to pocket lavish investment fees without scrutiny, including \$143 million in fees for doing nothing;
- 5) Disclosure of investment costs and performance may have been misrepresented;
- 6) Representations regarding GIPS Compliance Verification may have been misleading to the public;
- 7) Failure to monitor external consultant conflicts of interest may have undermined the integrity of the pension's investment decision-making process and resulted in significant losses;
- 8) Board compliance with heightened ERISA fiduciary standards is not required and fiduciary liability insurance coverage is woefully inadequate.

⁶⁷ <https://www.thenews-messenger.com/story/news/2021/04/14/damschroder-stand-your-ground-move-pension-policy/7187844002/>

Billions that could have been used to pay retirement benefits promised to teachers have been squandered.

END REPORT

About Benchmark Financial Services, Inc.

Benchmark Financial Services, Inc., uses cutting-edge financial forensics, coupled with whistleblower insights, to investigate abuses in the money management industry. The firm has pioneered forensic investigations of asset management and has investigated in excess of \$1 trillion globally.

Benchmark was founded in 1999 by Edward "Ted" Siedle. Ted is an American attorney, investment banking and securities industry professional, and longtime Forbes writer. The media has referred to him as "the Sam Spade of Money Management," "the Financial Watchdog," "the Pension Detective" and "the Equalizer."

Ted is the nation's leading expert in forensic investigations of money managers and pensions, focusing upon excessive and hidden investment fees and risks, conflicts of interest and wrongdoing. Prior investigations include the state of Rhode Island, state of North Carolina, the Alabama State Employees' Pension, Wal-Mart, Cities of Nashville, Chattanooga and Jacksonville, Towns of Jupiter and Longboat Key, Caterpillar, Boeing, Northrup Grumman, John Deere, Bechtel, ABB, Edison, Shelby County, Tennessee, Fidelity Investments, JP Morgan, Sanford Bernstein, Banco Santander, US Airways Pilots Pension and New York State Teamsters Pension.

Ted was named as one of the 40 most influential people in the U.S. pension debate by Institutional Investor Magazine for 2014 and 2015.

In 2018, Ted secured the largest CFTC whistleblower award in history-- \$30 million and in 2017, he secured the largest SEC whistleblower award-- \$48 million—both related to a \$367 million JP Morgan Chase settlement that charged the bank with failing to disclose certain conflicts of interest to some of its wealth management clients. In 2016, he obtained the first whistleblower award from the State of Indiana on behalf of a client.

Ted is the co-author of *Who Stole My Pension?* along with Robert Kiyosaki, author of the international bestseller, *Rich Dad, Poor Dad*, and the author of *How to Steal A Lot of Money—Legally*.