

Docket	A.17-07-010
Exhibit Number	ORA- _____
Commissioner	Martha Guzman Aceves
Administrative Law Judge	Gerald F. Kelly
ORA Witness	Zaved Sarkar



**OFFICE OF RATEPAYER ADVOCATES
CALIFORNIA PUBLIC UTILITIES COMMISSION**

Report on Plant – General Office

**Golden State Water Company
Test Year 2019 General Rate Case
A.17-07-010**

**San Francisco, California
February 16, 2018**

Memorandum

This Report on Plant – General Office is prepared by Zaved Sarkar under the general supervision of Richard Smith, Program Manager of the *Office of Ratepayer Advocates (ORA) - Water Branch*. Shanna Foley serves as ORA legal counsel, and Pat Ma as project coordinator.

Report on Plant - General Office

Table of Contents

Chapter 1. Executive Summary	1
A. Introduction.....	1
B. Summary of Recommendations	1
Chapter 2. General Office IT Investment	2
A. Introduction.....	2
B. Summary of Recommendations.....	2
C. Discussion.....	3
1. Additional Disk Storage.....	3
2. Personal Computers & Peripherals	5
3. Storage Area Network - Replace NetApp.....	9
4. WAN Optimization - Replace Riverbed Steelheads.....	11
5. Firewalls - Replace SCADA Firewalls	13
6. Computrace Software.....	14
D. Conclusion	15
Statement of Qualifications – Zaved Sarkar	16
Appendix 1-1: ORA Estimate for GO Capital Budget	
Appendix 2-1: ORA Calculations for Projected Storage Area Network Growth	

Chapter 1. Executive Summary

A. Introduction

This report presents the Office of Ratepayer Advocates' (ORA) recommended adjustments to Golden State Water Company's (GSWC) General Office (GO) capital budget request in its general rate case (GRC) Application 17-07-010.

B. Summary of Recommendations

The California Public Utilities Commission ("Commission" or CPUC) should reduce GSWC's GO capital budget request by \$2,212,200 for six Information Technology (IT) projects in GSWC's GO Corporate Support cost center, for reasons presented in Chapter 2 of this report.

The table below presents GSWC's and ORA's GO capital budget estimates. Appendix 1-1 provides project details corresponding to ORA's budget estimates.

Table 1-1: GO Capital Budget

Description	2017	2018	2019	2020	TOTAL
GSWC	\$ 6,979,260	\$ 5,552,717	\$ 6,145,000	\$ 3,156,800	\$ 21,833,777
Corporate Support	\$ 1,864,782	\$ 2,320,620	\$ 5,774,500	\$ 2,778,100	\$ 12,738,002
Centralized Oper. Support (COPS)	\$ 4,487,878	\$ 2,519,597	\$ 370,500	\$ 378,700	\$ 7,756,675
Utility Support Services (USS)	\$ 626,600	\$ 712,500	\$ -	\$ -	\$ 1,339,100
ORA	\$ 6,979,260	\$ 5,435,717	\$ 4,132,500	\$ 3,074,100	\$ 19,621,577
Corporate Support	\$ 1,864,782	\$ 2,203,620	\$ 3,762,000	\$ 2,695,400	\$ 10,525,802
Centralized Oper. Support (COPS)	\$ 4,487,878	\$ 2,519,597	\$ 370,500	\$ 378,700	\$ 7,756,675
Utility Support Services (USS)	\$ 626,600	\$ 712,500	\$ -	\$ -	\$ 1,339,100
GSWC > ORA	\$ -	\$ 117,000	\$ 2,012,500	\$ 82,700	\$ 2,212,200
Corporate Support	\$ -	\$ 117,000	\$ 2,012,500	\$ 82,700	\$ 2,212,200
Centralized Oper. Support (COPS)	\$ -	\$ -	\$ -	\$ -	\$ -
Utility Support Services (USS)	\$ -	\$ -	\$ -	\$ -	\$ -
ORA as % of GSWC	100%	98%	67%	97%	90%
Corporate Support	100%	95%	65%	97%	83%
Centralized Oper. Support (COPS)	100%	100%	100%	100%	100%
Utility Support Services (USS)	100%	100%	0%	0%	100%

[END OF CHAPTER]

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27

Chapter 2. General Office IT Investment

A. Introduction

This chapter presents ORA’s analysis and recommendation on GSWC’s proposed General Office Information Technology (GO IT) projects in its GRC A.17-07-010 presented in GSWC Prepared Testimony of Randell Miller, totaling \$10,536,000 over three years (2018-2020).¹

B. Summary of Recommendations

The Commission should:

- (1) Adopt a budget of \$82,700 for the Additional Disk Storage project in 2018 because GSWC’s estimate provides 25% more storage capacity than GSWC states it needs. ORA’s recommended budget is more than sufficient to satisfy GSWC’s data storage needs in 2018.
- (2) Adopt a budget of \$971,486 over three years (2018-2020) to upgrade personal computers and peripherals (for 220 device replacements per year). GSWC’s estimate is overstated and is based on questionable data.
- (3) Adopt a budget of \$2,100,000 for the Storage Area Network project for 2019 because GSWC does not adequately justify its request.
- (4) Adopt a budget of \$888,900 to replace WAN Optimization hardware in 2020. The Commission should deny GSWC’s request for \$888,900 to replace WAN Optimization hardware in 2019 because the hardware will continue to be supported until end of 2020.
- (5) Adopt a project budget of \$72,600 for GSWC for only 16 of the requested 18 SCADA firewalls in 2020 because it is not cost efficient to purchase two extra new units to serve as back-ups.
- (6) Adopt a budget of \$31,600 for 2018 for 300 Computrace software licenses because GSWC’s request to renew 450 licenses in 2018 is overstated and is based on questionable data.

GSWC’s IT investment should reflect demonstrated needs and costs should be adequately justified. The following table summarizes ORA’s adjustments to specific GO IT projects.

¹ GSWC Prepared Testimony of Randell Miller, page 2.

1

Table 2-1: ORA's Adjustments to Specific GO IT Projects²

IT Project	Year	GSWC	ORA	GSWC > ORA	ORA as % of GSWC
Additional Disk Storage	2018	\$110,200	\$82,700	\$27,500	75%
	2019	\$0	\$0	\$0	0%
	2020	\$0	\$0	\$0	0%
Subtotal		\$110,200	\$82,700	\$27,500	75%
Personal Computers and Peripherals	2018	\$397,400	\$323,800	\$73,600	81%
	2019	\$397,400	\$323,800	\$73,600	81%
	2020	\$397,400	\$323,800	\$73,600	81%
Subtotal		\$1,192,200	\$971,400	\$220,800	81%
Storage Area Network – Replace NetApp	2018	\$0	\$0	\$0	0%
	2019	\$3,150,000	\$2,100,000	\$1,050,000	67%
	2020	\$0	\$0	\$0	0%
Subtotal		\$3,150,000	\$2,100,000	\$1,050,000	67%
WAN Optimization – Replace Riverbed Steelheads	2018	\$0	\$0	\$0	0%
	2019	\$888,900	\$0	\$888,900	0%
	2020	\$888,900	\$888,900	\$0	100%
Subtotal		\$1,777,800	\$888,900	\$888,900	100%
Firewalls – Replace SCADA Firewalls	2018	\$0	\$0	\$0	0%
	2019	\$0	\$0	\$0	0%
	2020	\$81,700	\$72,600	\$9,100	89%
Subtotal		\$81,700	\$72,600	\$9,100	89%
Computrace Software	2018	\$47,500	\$31,600	\$15,900	67%
	2019	\$0	\$0	\$0	0%
	2020	\$0	\$0	\$0	0%
Subtotal		\$47,500	\$31,600	\$15,900	67%
TOTAL		\$6,359,400	\$4,147,200	\$2,212,200	65%

2

3 C. Discussion

4 1. Additional Disk Storage

5 The Commission should adopt a budget of \$82,700 for the Additional Disk Storage project in
6 2018 because GSWC's estimate provides 25% more storage capacity than GSWC states it needs.
7 ORA's recommended budget is more than sufficient to satisfy GSWC's data storage needs in
8 2018.

² The table is not a comprehensive list of IT projects requests; it only shows items for which ORA recommends adjustments.

1 a. GSWC's request

2 GSWC requests \$110,200 in 2018 to add disk capacity to meet its IT data storage needs. To
3 support its request for additional storage capacity, GSWC provides a price quotation from one
4 vendor – Insight Integrated Systems – and a description of the hardware GSWC plans to
5 acquire.³ To justify the request, GSWC states:

6 As with most organization we continue to see a significant increase in data storage
7 requirements. This is driven in part by the mandated document retention requirements
8 which include retention periods for up to the lifetime of the corporation for items such
9 as water quality testing and treatment records. We also have retention period of up to
10 50 years for records concerning plant construction, drilling, engineering as well as
11 several other data records.⁴

12 GSWC also describes the need to migrate from magnetic tape to hard disk media.⁵ In response
13 to ORA's request for the status of migrating from magnetic disks to hard disk media, GSWC
14 states: "It is a very slow and tedious process but we were able to covert 64 magnetic tapes, which
15 equated to 8.97 TB [terabytes] of disk space."^{6 7} GSWC also states that 340 Linear Tape-Open
16 Generation 4 (LTO4) tapes remain to be migrated.⁸ GSWC did not identify how many magnetic
17 tapes it plans to convert in 2018-2020, stating only that it does not have the space to
18 accommodate additional tape conversion at the moment.⁹

19 b. ORA's analysis and recommendation

20 To support its request, GSWC states: "Between January 2014 and November 2017 our disk
21 storage growth increased to an average of 73,703 Gigabytes (GB) per year."¹⁰ GSWC also states

³ GSWC Workpapers: General Office Volume 2 of 2, Corporate Support tab, sheets 115-116.

⁴ GSWC Prepared Testimony of Randell Miller, page 2, lines 16-21.

⁵ GSWC Prepared Testimony of Randell Miller, page 2, lines 23.

⁶ GSWC Response to ORA Data Request ZS1-001, #1.c.i.

⁷ One terabyte (TB) = 1000 gigabytes (GB).

⁸ GSWC Response to ORA Data Request ZS1-001, #1.c.ii.

⁹ GSWC Response to ORA Data Request ZS1-001, #1.c.iii.

¹⁰ GSWC Response to ORA Data Request ZS1-001, #1.a.

1 that GSWC's current total usable disk capacity is 515,202 GB, with a total of 483,680 GB total
2 disk used as of the end of November 2017.¹¹

3 GSWC requests \$110,200 for 57,600 GB of additional storage capacity. Based on the above
4 information, ORA calculates the need of storage capacity for 2018 to be 42,181 GB as shown in
5 the table below.

6 **Table 2-2: ORA's calculations - Storage capacity needs for 2018**

Units in Gigabytes (GB)	[a]	[b]	[c] = b - a	[d]	[e] = d - c
Total Usable Disk Capacity	515,202				
Total Disk Used		483,680			
Available Disk as of Nov 2017			31,522		
Average Growth Per Year				73703	
Storage Capacity Needs					42,181

7
8 To support the Additional Disk Space project cost estimates, GSWC provides a price quote for
9 two units of disk shelf hardware (DS2246-28.8TB-QS-R6¹²), which provides a total of 57,600
10 GB.¹³ This is 25% more storage capacity than GSWC estimates it needs. To meet the 42,181
11 GB storage capacity need, ORA has determined that two smaller units of disk shelf hardware
12 (DS2246-21.6TB-QS-R6) with a total capacity of 43,200 GB will more than meet GSWC's need
13 for 42,181 GB of storage capacity in 2018.¹⁴ Therefore, the Commission should adopt a budget
14 of \$82,700 for the Additional Disk Storage project in 2018.

15 **2. Personal Computers & Peripherals**

16 The Commission should adopt a budget of \$971,486 over three years (2018-2020) to upgrade
17 personal computers and peripherals because GSWC's estimate overstates the number of devices
18 requiring upgrading.

¹¹ GSWC Response to ORA Data Request ZS1-001, #3.a and #3.b.

¹² Disk shelf hardware "DSK SHLF,24x1.2TB,10k,6G,QS" as quoted in GSWC Workpapers: General Office Volume 2 of 2, Corporate Support tab, sheet 115.

¹³ $(24(\text{slots}) \times 1.2 \text{ TB}) \text{ per unit} \times 2 \text{ units} = 57.6 \text{ TB} = 57,600 \text{ GB}$.

¹⁴ Technical Specifications for "DSK SHLF,24x0.9TB,10k,6G,QS" (<https://www.netapp.com/us/products/storage-systems/disk-shelves-and-storage-media/index.aspx>, accessed on December 14, 2017).

1 a. GSWC’s request

2 GSWC requests \$1,192,200 over three years (2018-2020) to upgrade personal computers and
3 peripherals. To support its request, GSWC states: “The IT department is budgeting for all
4 standard computers and peripherals for the company. This is done on a four-year refresh
5 schedule.”¹⁵

6 GSWC cites a price quotation from one vendor – PCM – as the source of the amount requested.
7 The quote provided shows an annual cost of \$397,400 for 2018-2020.¹⁶ GSWC further states:
8 “The current count of computers (desktop and laptop) in use for the company is 1,080 based on
9 SCCM [System Center Configuration Manager] report. SCCM is a Microsoft software tool that
10 scans our network to identify active computer systems.”¹⁷

11 b. ORA’s analysis and recommendation

12 ORA requested the SCCM report(s) showing 1,080 devices cited by GSWC in support of its
13 request and the latest available SCCM report(s) (November 2017) showing the devices in use, in
14 user-to-device report format.¹⁸ ORA also requested, and GSWC provided, an employee-specific
15 list with employee name, category (field or professional) position and home business unit, and
16 the assigned device type and count (“Employee-Specific list”).¹⁹

17 GSWC could not provide the SCCM report(s) supporting its cited 1,080 active devices and
18 instead provided the following general explanation: “Some of the types of systems that may not
19 show on SCCM reports are computers used with SCADA [supervisory control and data
20 acquisition], loaner equipment, systems configured for training classes and other systems that
21 simply are off-line at the time of the reporting.”²⁰ Instead of providing the SCCM report to
22 support the 1,080 count, GSWC provided two lists dated January 2017 – one for GSWC and one

¹⁵ GSWC Prepared Testimony of Randell Miller, page 7, lines 20-21.

¹⁶ GSWC Workpapers: General Office Volume 2 of 2, Corporate Support tab, sheets 39-41.

¹⁷ GSWC Prepared Testimony of Randell Miller, page 7, lines 24-26.

¹⁸ ORA Data Request ZS1-002, #1.a.i and #1.a.ii.

¹⁹ GSWC Response to ORA Data Request ZS1-002, Spreadsheet “ZS-002 Q1.b (GO IT PC) Attachment 1.”

²⁰ ORA Data Request ZS1-002, #1.a.i.

1 for Bear Valley Electric Service (BVES) – showing the number of desktops and laptops assigned
2 to employees in GSWC and BVES, respectively (“January 2017 GSWC list” and “January 2017
3 BVES list”).²¹ GSWC also provided a similar list that combined GSWC and BVES for
4 November 2017 as requested by ORA (“November 2017 list”).²²

5 There are several discrepancies and duplicate records in the four lists provided by GSWC. For
6 example:

- 7 (1) The Employee-Specific list shows a particular employee having one desktop while the
8 November 2017 list shows the same employee having two laptops and one desktop (with
9 a different serial number than that shown on the Employee-Specific list).²³
- 10 (2) The November 2017 list has duplicate records for the same employee.²⁴
- 11 (3) The Employee-Specific list shows an employee with one device only (desktop), but the
12 November 2017 list shows the same employee with three different devices (three
13 desktops).²⁵

14 These types of discrepancies occur throughout the lists, making them unreliable and insufficient
15 evidence to support GSWC’s request.

16 ORA evaluated additional documents provided by GSWC as part of the Minimum Data
17 Requirements.²⁶ GSWC’s spreadsheet “Min Data Req – ALL” shows the “Last Authorized”

²¹ GSWC Response to ORA Data Request ZS1-002, Attachment ZS1-002 Q.1a GSW computers 010417.xls and ZS1-002 Q.1a BVES Computers 010417.xls.

²² GSWC Response to ORA Data Request ZS1-002, Attachment ZS1-002 Q.1a Active computers GSWC_BVES Nov 2017.xls.

²³ GSWC Response to ORA Data Request ZS1-002, Attachment ZS1-002 Q.1a Active computers GSWC_BVES Nov 2017.xls, rows 142, 171 and 173.

²⁴ GSWC Response to ORA Data Request ZS1-002, Attachment ZS1-002 Q.1a Active computers GSWC_BVES Nov 2017.xls, rows 938 and 968.

²⁵ GSWC Response to ORA Data Request ZS1-002, Attachment ZS1-002 Q.1a Active computers GSWC_BVES Nov 2017.xls, rows 284, 292 and 293.

²⁶ GSWC Response to Minimum Data Requirement: Spreadsheet Min Data Req – ALL, tab Basic Information.

1 employee counts for GO and operating districts totaling to 560.²⁷ The recorded number for
2 2014-2016 was approximately 500.²⁸

3 ORA also evaluated documents provided by GSWC as part of GSWC's response to ORA's
4 Supplemental Data Request (SDR).²⁹ GSWC's list in the "2016 pc" file is in a similar format as
5 the Employee-Specific lists. This list shows "563" as the total number of employees,³⁰ and
6 "607" as the total number of active devices (desktops, laptops and tablets).³¹ The devices-to-
7 employee ratio for 2016 then is only approximately 1.08:1.

8 In sum, GSWC could not provide documentation to support the estimate of 1,080 devices, which
9 serves as the basis of its budget request for 270 replacements per year at an annual cost of
10 \$397,400. The January 2017 lists ("January 2017 GSWC list" and "January 2017 BVES list")
11 show a total of 900 devices, and the November 2017 list shows a total of 983 devices. However,
12 the discrepancies and duplicate records described above call into question the validity of the total
13 device counts from the January 2017 and November 2017 lists. These device counts (1,080, 900,
14 and 983) if true would produce a devices-to-employee ratio much higher than 1.08:1 from 2016
15 (based on data from GSWC's SDR response).

16 GSWC also provides a copy of an agreement for the Microsoft Enterprise licenses (for operating
17 system and office suites upgrades). The agreement identifies 882 licenses for "OfficeProPlus"
18 for 42 months.³² The accompanying Product Notes, Note 1 states that the prices are per
19 desktop/device,³³ meaning GSWC has 882 devices that need software licenses. This further
20 shows that GSWC's device count of 1,080 is overstated.

²⁷ GSWC Response to Minimum Data Requirement: Spreadsheet Min Data Req – ALL, tab Basic Information, cells I22 and I25, for 2016.

²⁸ GSWC Response to Minimum Data Requirement: Spreadsheet Min Data Req – ALL, tab Basic Information, cells F22, F25, G22, G25, H22 and H25.

²⁹ GSWC Response to ORA's Supplement Data Request #48, 2016 pc.pdf.

³⁰ GSWC Response to ORA's Supplement Data Request #48, 2016 pc.pdf, page 14, Employee Type column.

³¹ GSWC Response to ORA's Supplement Data Request #48, 2016 pc.pdf, page 14, Computer Type column.

³² GSWC Workpapers: General Office Volume 2 of 2, Corporate Support tab, sheet 8.

³³ GSWC Workpapers: General Office Volume 2 of 2, Corporate Support tab, sheet 15.

1 Because GSWC cannot provide the SCCM lists to support its claim of 1,080 devices, and
2 because of discrepancies and inconsistencies between the other lists that GSWC provided, ORA
3 developed its own estimate based on the total devices identified in the last GRC, which was 852.
4 ORA recommends using 880 devices as the basis for estimating the cost to upgrade personal
5 computers and peripherals over the next three years (2018-2020) because it is consistent with the
6 data related to the Microsoft licenses discussed above, and allows for some growth in employee
7 head counts since the last GRC. Under the four-year replacement schedule, 220 devices will
8 need to be replaced each year.³⁴ Therefore, the Commission should adopt a budget of \$323,800
9 per year, for a total of \$971,400 over the next three years (2018-2020).

10 **3. Storage Area Network - Replace NetApp**

11 The Commission should adopt a budget of \$2,100,000 for 2019 to replace its Storage Area
12 Network solution because GSWC does not adequately justify its request.

13 **a. GSWC's request**

14 GSWC requests \$3,150,000 for 2019 to replace its Storage Area Network solution. In support of
15 its request to replace the Storage Area Network, GSWC states:

16 NetApp has announced the end of support for our data storage devices as January 21
17 and March 30 of 2020. As with most information technology vendors, NetApp will
18 stop support for our device models 3250, 3220, and 2240s, approximately five years
19 after announcing end of availability/sale. Our models went into production in March
20 of 2014. All of our water customer, financial, and employee data is housed within
21 these data storage devices, which span both our primary and disaster recovery
22 datacenters. So it is vital that we replace it prior to January 21, 2020.³⁵

23 Further, GSWC states: "Since the NetApp SAN is a shared storage resource across multiple
24 applications, database, etc., its failure could be catastrophic to the entire company and our ability
25 to serve our customers."³⁶

³⁴ According to GSWC Workpapers: General Office Volume 2 of 2, Corporate Support tab, sheets 39-41, cost per computer is approximately $\$305,005.30 \div 270 = \$1,129.65$. Applying that price per computer for 220 units = $220 \times \$1,129.65 = \$248,522.84$.

³⁵ GSWC Prepared Testimony of Randell Miller, page 44, lines 17-24.

³⁶ GSWC Prepared Testimony of Randell Miller, page 47, lines 1-3.

1 b. ORA’s analysis and recommendation

2 GSWC describes its NetApp storage solution being similar to servers, which are comprised of
3 software, controllers, and various types of hardware (shelves, disk drives, etc.) and also
4 susceptible to failures due to aging electronics.³⁷ GSWC states: “This system is the most critical
5 component of our entire infrastructure as it houses the company’s data.”³⁸

6 In response to ORA’s inquiry, GSWC reports that its total useable disk capacity is 515,202 GB
7 as of November 2017.³⁹ GSWC also states that as of end of November 2017 its total disk
8 capacity used is 483,680 GB.⁴⁰

9 GSWC provides price quotations from one vendor – Red8 – as the source of the actual hardware
10 it plans to purchase for this project.⁴¹ As mentioned earlier, GSWC wants to replace data storage
11 devices for both its primary and disaster recovery datacenters by January 2020. The quotations
12 provided are based on replacement estimates for both primary and disaster recovery datacenters.

13 ORA calculates the disk shelf hardware as per the quotations provided. GSWC requests 1,180.8
14 TB and 561.6 TB for its datacenters.⁴² The total of 1,742.4 TB is more than triple the storage
15 capacity that GSWC currently has in place. GSWC cites the migration projects such as GIS

³⁷ GSWC Prepared Testimony of Randell Miller, page 46, lines 15-17.

³⁸ GSWC Response to ORA Data Request ZS1-001, #3.a.

³⁹ GSWC Response to ORA Data Request ZS1-001, #3.b.

⁴⁰ GSWC Response to ORA Data Request ZS1-001, #3.a and #3.b.

⁴¹ GSWC Workpapers General Office Volume 2 of 2, Corporate Support tab, sheets 84-92.

⁴² Disk shelf hardware 2 units of “DSK SHLF,4x400GB,20x1.8TB,Mixed,OP,-C” and 3 units of DSK SHLF,4x400GB,20x6TB,Mixed,OP,-C as quoted in GSWC Workpapers: General Office Volume 2 of 2, Corporate Support tab, sheet 84 equals to 440 TB.

Disk shelf hardware 1 unit of “DSK SHLF,4x400GB,20x6TB,Mixed,1P,SK” as quoted in GSWC Workpapers: General Office Volume 2 of 2, Corporate Support tab, sheet 86 equals to 121.6 TB.

Disk shelf hardware 12 units of “DSK SHLF,4x400GB,20x1.8TB,Mixed,OP,-C” and 5 units of DSK SHLF,4x400GB,20x6TB,Mixed,OP,-C as quoted in GSWC Workpapers: General Office Volume 2 of 2, Corporate Support tab, sheet 89 equals to 1,059.2 TB.

Disk shelf hardware 1 unit of “DSK SHLF,4x400GB,20x6TB,Mixed,1P,SK” as quoted in GSWC Workpapers: General Office Volume 2 of 2, Corporate Support tab, sheet 91 equals to 121.6 TB.

Primary datacenters = 1,059.2TB + 121.6TB = 1,180.8 TB (1 TB = 1,000 GB).

Disaster recovery datacenters = 440TB + 121.6TB = 561.6 TB (1 TB = 1,000 GB).

1 Implementation and Migration to Microsoft Exchange as big drivers for additional storage
2 capacity needs.⁴³ GSWC also cites the Customer Care & Billing, Financial Systems, End-users
3 support storage and litigation holds as drivers for additional storage capacity needs.⁴⁴ However,
4 GSWC provides no verifiable data or quantitative analysis to accompany these claimed needs.
5 ORA recommends reducing GSWC’s request of \$3,150,000 for 2019 by one-third, to
6 \$2,100,000. This budget adjustment takes into account the existing disk storage capacity and
7 estimated need, as detailed in Appendix 2-1 of this report.

8 **4. WAN Optimization - Replace Riverbed Steelheads**

9 The Commission should adopt a budget of \$888,900 to replace WAN Optimization hardware in
10 2020. The Commission should deny GSWC’s request for \$888,900 to replace WAN
11 Optimization hardware in 2019 because the hardware will continue to be supported until end of
12 2020.

13 **a. GSWC’s request**

14 GSWC requests \$1,777,800 over two years (\$888,900/year for 2019-2020) for the WAN
15 Optimization project.⁴⁵ GSWC requests to replace its WAN Optimization hardware “due to the
16 product being End-of-Life and no longer being supported by the vendor.”⁴⁶ It states that the
17 hardware to be replaced went into production in approximately March 2014.⁴⁷ In justifying its
18 request, GSWC states: “By replacing our Riverbed WAN Optimization, we will continue
19 accelerating applications and communications across the network by compressing, de-
20 duplicating and utilizing other acceleration algorithms provided by the solution.”⁴⁸

⁴³ GSWC Response to ORA Data Request ZS1-001, #1.a.1.

⁴⁴ GSWC Response to ORA Data Request ZS1-001, #1.a.2, #1.a.3, #1.a.4 and #1.a.5.

⁴⁵ GSWC Prepared Testimony of Randell Miller, page 47, line 5 and page 62, line 16.

⁴⁶ GSWC Response to ORA Data Request ZS1-001, #4.a.

⁴⁷ GSWC Prepared Testimony of Randell Miller, page 47, line 12.

⁴⁸ GSWC Prepared Testimony of Randell Miller, page 49, lines 5-8.

1 b. ORA’s analysis and recommendation

2 In response to ORA’s request for data reflecting the performance increase resulting from
3 replacing the WAN Optimization hardware, GSWC did not specify any direct performance
4 increase but instead stated: “In general, most new versions of hardware are more efficient and
5 higher performing which will be helpful.”⁴⁹

6 ORA also requested data showing GSWC’s current applications and communications across the
7 network. In response, GSWC provided graphical representations that show network traffic
8 percentages for various applications. The information GSWC provided is insufficient for ORA
9 to verify the actual performance of the current solution in production or the expected increase in
10 performance to be projected with the replacement solution. GSWC has the burden of
11 demonstrating the reasonableness of its requests. GSWC has not adequately supported or
12 justified this request.

13 GSWC provides price quotations from Riverbed Technology Inc.⁵⁰ and the actual hardware it
14 plans to purchase. GSWC did not provide any data showing the existing number of hardware
15 units in its current system or any justification to support the quantity identified in Riverbed’s
16 quotations. Hence, GSWC cannot verify the actual need to replace the hardware and cannot
17 quantify the benefits of replacing the hardware, if any.

18 GSWC’s primary justification is that the current WAN Optimization hardware is at “End-of-
19 Life” and not supported by the vendor.⁵¹ Riverbed Technology Inc.’s Hardware and Software
20 End-of-Life Products documentation states that it supports the hardware/software maintenance
21 for the models in use at GSWC’s WAN Optimization through the end of 2020 (August 28, 2020
22 and December 31, 2020).⁵²

23 It is unreasonable to expect these products to stop functioning because they are not reaching their
24 End of Support dates until the end of 2020. GSWC’s request amounts to an attempt to
25 prematurely replace this hardware. Therefore, ORA recommends that the date of End of Support

⁴⁹ GSWC Response to ORA Data Request ZS1-001, #4.b.

⁵⁰ GSWC Workpapers General Office Volume 2 of 2, Corporate Support tab, sheets 93-97.

⁵¹ GSWC Response to ORA Data Request ZS1-001, #4.

⁵² GSWC Prepared Testimony of Randell Miller, pages 47-48.

1 (December 2020) be used to determine the first budget year for this project (i.e., 2020 instead of
2 2019). Therefore, the Commission should approve a project budget of \$888,900 for year 2020,
3 and none for 2019.

4 **5. Firewalls - Replace SCADA Firewalls**

5 The Commission should approve a project budget of \$72,600 for GSWC for only 16 of the
6 requested 18 SCADA firewalls because it is not cost efficient to purchase two extra new units to
7 serve as back-ups.

8 **a. GSWC's request**

9 GSWC requests \$81,700 in 2020 to replace SCADA firewalls.⁵³ In support of its request to
10 replace 18 firewalls hardware, GSWC states:

11 Our network firewalls were put into production 2013 through 2015 and will have
12 reached past the five-year life cycle of network equipment. Considering they are
13 security appliance, it is vital that they do not go beyond the recommended lifecycle as
14 we risk not receiving the adequate support from our vendor. This support includes
15 security enhancements, bug fixes, and, more importantly, fixes to the security
16 features. We will be past or around the fifth year in 2020 for these network
17 firewalls.⁵⁴

18 GSWC also cites industry experts' opinions on the industry standard lifespan of network
19 equipment.⁵⁵

20 **b. ORA's analysis and recommendation**

21 SCADA firewalls are needed to protect against the threat of a cyber-security breach. ORA
22 requested GSWC to provide data justifying the need for 18 firewalls to be replaced in year 2020.

23 In response to ORA's inquiry, GSWC states:

24 We are requesting 18 to replace the existing 16 plus one to remain as hot swappable
25 in case of failure. This will allow us to provide access to the SCADA system as soon
26 as possible. And one firewall for testing configuration changes before we deploy to
27 production.

⁵³ GSWC Prepared Testimony of Randell Miller, page 66.

⁵⁴ GSWC Prepared Testimony of Randell Miller, page 66, lines 11-17.

⁵⁵ GSWC Prepared Testimony of Randell Miller, page 66, lines 20-25 and page 67, lines 1-9.

1 We are requesting to replace the firewalls based on the recommended five-year life
2 cycle of network equipment as stated in the testimony. We want to ensure that we
3 receive security enhancements, bug fixes, etc. This request is not due to any
4 performance enhancements.⁵⁶

5 Purchasing two extra new units to serve as back-ups is not cost efficient because it is reasonable
6 to expect the existing hardware to remain usable as back-ups. GSWC can reserve the units in the
7 best operating condition from the current pool of 16 firewalls and use them as backup units.
8 Additionally, GSWC can use one of the SCADA firewalls in the current pool of existing
9 hardware in production to test its changes to firewall configuration before deploying to
10 production. Therefore, the Commission should approve a budget of \$72,600 for GSWC for only
11 16 of the requested 18 SCADA firewalls in 2020 because it is not cost efficient to purchase two
12 extra new units to serve as back-ups.⁵⁷

13 **6. Computrace Software**

14 The Commission should approve a budget of \$31,600 for 300 three-year software licenses
15 because GSWC's estimate is overstated and is based on questionable data.

16 **a. GSWC's request**

17 GSWC requests \$47,500 for 2018 to repurchase (renew) 450 three-year Computrace software
18 licenses. In support of its request, GSWC states:

19 There is a security risk when using laptops in a corporate environment. They can be
20 lost or stolen and the data stored in them becomes vulnerable to theft. To mitigate this
21 risk, IT has implemented Computrace Software on all company laptops. Computrace
22 allows IT to remotely wipe all data off a laptop hard drive in the event of loss or
23 theft.⁵⁸

24 GSWC provides a price quotation from one vendor – PCM – for the requested 450 three-year
25 licenses.⁵⁹

⁵⁶ GSWC Response to ORA Data Request ZS1-001, #5.b.

⁵⁷ GSWC requests \$62,676 for 18 Firewalls before sales tax and overhead.

Per item costs $\$2,931 + \$551 = \$3,482$ for hardware. Cost for 16 hardware $16 \times \$3,482 = \$55,712$.

Cost including contingencies, overhead and sales tax = \$72,600.

⁵⁸ GSWC Prepared Testimony of Randell Miller, page 7, lines 11-15.

⁵⁹ GSWC Workpapers General Office Volume 2 of 2, Corporate Support tab, sheet 38.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19

Statement of Qualifications – Zaved Sarkar

Q1. Please state your name, business address, and position with the California Public Utilities Commission (“Commission”).

A1. My name is Zaved Sarkar and my business address is 505 Van Ness Avenue, San Francisco, California 94102. I am a Utilities Engineer in the Water Branch of the Office of Ratepayer Advocates.

Q2. Please summarize your education background and professional experience.

A2. I received my Bachelors of Science and Masters of Science in Electrical and Electronic Engineering from American International University - Bangladesh (AIUB) and California State University Sacramento (CSUS) respectively. I have passed the Fundamentals of Engineering exam (E.I.T.) in 2010.

I joined the Office of Ratepayer Advocates - Water Branch as a Utilities Engineer in October 2017. My previous professional positions include Test Software Engineer at Eyefinity Inc. and Software Quality Assurance Analyst at California ISO.

Q3. What is your responsibility in this proceeding, GSWC GRC A.17-07-010?

A3. I am responsible for ORA Report on Plant – General Office.

Q4. Does this conclude your prepared direct testimony?

A4. Yes, it does.

[END OF SOQ]

Appendix 1-1: ORA Estimate for GO Capital Budget (Page 1 of 8 - Summary)

GENERAL OFFICE CAPITAL BUDGETS 2017 - 2020

	2017	2018	2019	2020	Total 2018 - 2020
Corporate Support					
Information Technology	\$ 537,300	\$ 1,562,200	\$ 3,601,300	\$ 2,447,800	\$ 7,611,300
GO Facility	\$ 175,300	\$ 410,600	\$ 160,700	\$ 247,600	\$ 818,900
Tax	\$ 94,700	\$ -	\$ -	\$ -	\$ -
Accounting & Finance	\$ 227,300	\$ -	\$ -	\$ -	\$ -
Centralized Operations Support (COPS)					
Asset Management (30W)	\$ -	\$ 6,600	\$ 6,800	\$ 6,900	\$ 20,300
Capital Program Management (31W, 32W, 38W)	\$ 10,000	\$ 184,400	\$ 97,000	\$ 109,900	\$ 391,300
Customer Service Center	\$ 8,500	\$ 68,300	\$ 7,700	\$ 51,600	\$ 127,600
Regulatory Affairs	\$ 88,400	\$ 609,100	\$ -	\$ -	\$ 609,100
Engineering Design Center (24W)	\$ 374,000	\$ 94,100	\$ 75,500	\$ 23,000	\$ 192,600
Environmental Compliance Department	\$ -	\$ 123,100	\$ 122,900	\$ 125,200	\$ 371,200
New Business Department (34W)	\$ -	\$ 1,300	\$ 1,400	\$ 1,400	\$ 4,100
Engineering Planning Department (21W)	\$ 2,570,700	\$ 5,100	\$ 5,200	\$ 5,300	\$ 15,600
Planning & Analysis Department (37W)	\$ 2,800	\$ 4,600	\$ 4,700	\$ 4,800	\$ 14,100
Water Quality Department (72W)	\$ -	\$ 5,100	\$ 48,500	\$ 5,300	\$ 58,900
Water Resources Department (22W)		\$ 7,600	\$ 800	\$ 45,300	\$ 53,700
Utility Support Services (USS)					
Information Technology Department		\$ 712,500	\$ -	\$ -	\$ 712,500
Tax	\$ 364,000	\$ -	\$ -	\$ -	\$ -
Accounting Plant	\$ 25,300				
Corporate Support	\$ 1,034,600	\$ 1,972,800	\$ 3,762,000	\$ 2,695,400	\$ 8,430,200
Centralized Operations Support (COPS)	\$ 3,054,400	\$ 1,109,300	\$ 370,500	\$ 378,700	\$ 1,858,500
Utility Support Services (USS)	\$ 389,300	\$ 712,500	\$ -	\$ -	\$ 712,500
Total General Office	\$ 4,478,300	\$ 3,794,600	\$ 4,132,500	\$ 3,074,100	\$ 11,001,200

Appendix 1-1: ORA Estimate for GO Capital Budget (Page 2 of 8 - Corporate

GENERAL OFFICE - CORPORATE SUPPORT

	Quotes Unloaded			Sales Tax			1.9% 2018
	2018	2019	2020	9% 2018	9% 2019	9% 2020	
Information Technology							
Microsoft Enterprise License Installment Payment/Renewal & True-Up	\$ 407,823	\$ 440,458	\$ 440,458				\$ 487,500
Computrace Software	\$ 26,475						\$ 31,600
Personal Computers and Peripherals	\$ 248,523	\$ 248,523	\$ 248,523	\$ 22,367	\$ 22,367	\$ 22,367	\$ 323,800
AntiVirus Software	\$ 31,123						\$ 37,200
Upgrade Sharepoint	\$ 146,910						\$ 175,600
PowerPlan and Provision Module Upgrade	\$ 40,000						\$ 47,800
Intrusion Prevention System - Replace HP Tippingpoint	\$ 288,524	\$ 288,524		\$ 25,967	\$ 25,967	\$ -	\$ 376,000
Datacenter(s) Hardware Refresh		\$ 201,415	\$ 201,415	\$ -	\$ 18,127	\$ 18,127	\$ -
ArcTools - Data Archive & Purge Software		\$ 10,500		\$ -	\$ -	\$ -	\$ -
Storage Area Network - Replace NetApp		\$ 1,611,625			\$ 145,046	\$ -	\$ -
WAN Optimization - Replace Riverbed Steelheads		\$ -	\$ 682,168	\$ -	\$ -	\$ 61,395	\$ -
Microsoft Exchange 2013 Upgrade			\$ 82,000	\$ -	\$ -	\$ -	\$ -
Firewalls - Replace SCADA Firewalls			\$ 55,712	\$ -	\$ -	\$ 5,014	\$ -
WLAN - Replace Bluesocket			\$ 211,503	\$ -	\$ -	\$ 19,035	\$ -
Additional Disk Space	\$ 63,453			\$ 5,711	\$ -	\$ -	\$ 82,700
GO Facility							
Water Source Heat Pump Units	\$ 101,741	\$ 77,298		\$ 9,157	\$ 6,957	\$ -	\$ 135,100
Smartboards for GO Conference Rooms - 3	\$ 30,885			\$ 2,780	\$ -	\$ -	\$ 41,000
Cooling Tower Parts	\$ 29,500			\$ 2,655	\$ -	\$ -	\$ 39,200
Relocate Data Center Electrical	\$ 80,000			\$ 7,200	\$ -	\$ -	\$ 106,200
General Facility Repairs	\$ 22,138	\$ 22,138	\$ 22,138	\$ 1,992	\$ 1,992	\$ 1,992	\$ 29,400
Linoleum Flooring in GO Kitchen		\$ 19,315		\$ -	\$ 1,738.35	\$ -	\$ -
Data Center Floor System Repairs			\$ 101,300	\$ -	\$ -	\$ 9,117	\$ -
Replace UPS Batteries			\$ 26,244	\$ -	\$ -	\$ 2,362	\$ -
Emergency Generator Temporary Connection	\$ 45,000			\$ 4,050	\$ -	\$ -	\$ 59,700
GO Parking Lot Lighting			\$ 29,875	\$ -	\$ -	\$ 2,688.75	\$ -
Total Information Technology	\$ 1,252,800	\$ 2,801,000	\$ 1,921,800	\$ 54,000	\$ 211,500	\$ 125,900	\$ 1,562,200
Total GO Facility	\$ 309,300	\$ 118,800	\$ 179,600	\$ 27,800	\$ 10,700	\$ 16,200	\$ 410,600
Total Corporate Support	\$ 1,562,100	\$ 2,919,800	\$ 2,101,400	\$ 81,800	\$ 222,200	\$ 142,100	\$ 1,972,800
			\$ 6,583,300			\$ 446,100	

Appendix 1-1: ORA Estimate for GO Capital Budget (Page 3 of 8 - Centralized Op

GENERAL OFFICE - CENTRALIZED OPERATIONS SUPPORT

	Quotes Unloaded			Sales Tax			
	2018	2019	2020	9% 2018	9% 2019	9% 2020	
Asset Management (30W)							
Misc. Office Furniture & Equipment (30W)	\$ 5,000	\$ 5,000	\$ 5,000	\$ 450	\$ 450	\$ 450	\$
Capital Program Management (31W, 32W, 38W)							
Trimble GPS (31W)	\$ 28,990			\$ 2,609	\$ -	\$ -	\$
Misc. Office Furniture & Equipment (31W)	\$ 2,500	\$ 2,500	\$ 2,500	\$ 225	\$ 225	\$ 225	\$
Replace Foothill District Inspector Vehicle #1283 (31W)			\$ 29,900	\$ -	\$ -	\$ -	\$
Replace Mtn Desert District Inspector Vehicle #503469 (31W)		\$ 30,200		\$ -	\$ -	\$ -	\$
Replace Orange Co. District Inspector Vehicle #69167 (31W)		\$ 30,200		\$ -	\$ -	\$ -	\$
Misc. Office Furniture & Equipment (32W)	\$ 7,530	\$ 7,530	\$ 7,530	\$ 678	\$ 678	\$ 678	\$
Replace CPM Manager Vehicle #2169 (32W)	\$ 35,800			\$ -	\$ -	\$ -	\$
Replace District Inspector Vehicle #68163 (32W)	\$ 30,200			\$ -	\$ -	\$ -	\$
Misc. Office Furniture & Equipment (38W)	\$ 6,180	\$ 6,180	\$ 6,180	\$ 556	\$ 556	\$ 556	\$
Replace CPM Director Vehicle #500031 (38W)			\$ 35,800	\$ -	\$ -	\$ -	\$
Replace CPM Manager & Engineer Workstations (38W)	\$ 3,261		\$ 3,261	\$ 293	\$ -	\$ 293	\$
Click Share Video Screen Sharing System - Northern District Conf Rm (38W)	\$ 2,200			\$ 198	\$ -	\$ -	\$
Replace Foothill District Inspector Vehicle #500625 (31W)	\$ 30,200			\$ -	\$ -	\$ -	\$
Customer Service Center							
UPS Power Modules (2)	\$ 3,272	\$ 3,272	\$ 3,272	\$ 294	\$ 294	\$ 294	\$
Agent Avaya Telephones (20)	\$ 8,739			\$ 787	\$ -	\$ -	\$
Agent POTS Line for Disaster Recovery (20)	\$ 640			\$ 58	\$ -	\$ -	\$
Agent Wireless Headsets (10)	\$ 2,438	\$ 2,438	\$ 2,438	\$ 219	\$ 219	\$ 219	\$
Workstation Cubicle Panels	\$ 36,426			\$ 3,278	\$ -	\$ -	\$
Voicemail Servers for Telephone System at Disaster Recovery Site			\$ 31,689	\$ -	\$ -	\$ 2,852	\$
Regulatory Affairs							
RO Model - Phase 2	\$ 500,000			\$ -	\$ -	\$ -	\$
Engineering Design Center (24W)							
Replace CAD Workstation Computers for Technicians (6)	\$ 26,136			\$ 2,352	\$ -	\$ -	\$
Replace CAD Laptop & Docking Station for Engineers (12)	\$ 22,788			\$ 2,051	\$ -	\$ -	\$
Trimble R-2 GPS Receiver (24W)	\$ 11,995	\$ 11,995		\$ 1,080	\$ 1,080	\$ -	\$
AutoCAD Civil 3D Software (3)	\$ 9,930	\$ 9,930	\$ 9,930	\$ 894	\$ 894	\$ 894	\$
Replace Oce Scanner/Plotter		\$ 7,595		\$ -	\$ 684	\$ -	\$
Replace Oce TC 4 Desktop		\$ 1,141		\$ -	\$ 103	\$ -	\$
Replace Printers/Plotters (3)		\$ 25,185		\$ -	\$ 2,267	\$ -	\$
Replace Guest Chairs (18)			\$ 6,768	\$ -	\$ -	\$ 609	\$

Appendix 1-1: ORA Estimate for GO Capital Budget (Page 5 of 8 - Utility Support Services)

GENERAL OFFICE - UTILITY SUPPORT SERVICES

Overhead
13.85%

	Quotes Unloaded			Loaded	
	2018	2019	2020	2018	2019
Information Technology Department PowerPlan Upgrade	\$ 596,000			\$ 712,500	\$
Total Information Technology Department	\$ 596,000	\$ -	\$ -	\$ 712,500	\$
Total Utility Support Service:	\$ 596,000	\$ -	\$ -	\$ 712,500	\$
			\$ 596,000		

Appendix 1-1: ORA Estimate for GO Capital Budget (Page 6 of 8 - 2017 Cap

GENERAL OFFICE CAPITAL BUDGETS 2017

Adopted OH	Adopted Contingency
20.29%	5%

GO SEGMENT	DEPARTMENT	DESCRIPTION	BUDGET	DECISION
Corporate Support	GO Facility	Replacement of 3 WSHP HVAC Units	\$ 97,600	\$ 97,600
Corporate Support	GO Facility	Carpeting , Painting	\$ 69,300	\$ 69,300
Corporate Support	Information Technology	Microsoft Enterprise License Installment Payment & True-Up	\$ 511,700	\$ 511,700
Corporate Support	Tax	Tax Provision	\$ 90,215	
Corporate Support	Accounting & Finance	Lease Accounting Module	\$ 216,517	
Utility Support	Accounting - Plant	Revise Set up of PowerPlan	\$ 24,057	
Centralized Operations	Capital Program Management	321709-01 Blankets: CPM 32W (Office Furniture and Equip.)	\$ 3,300	\$ 3,300
Centralized Operations	Capital Program Management	Blankets: CPM 31W (Office Furniture and Equip.)	\$ 3,300	\$ 3,300
Centralized Operations	Capital Program Management	CPM 38W: Replace 6 Office Chairs & Equipment	\$ 900	\$ 900
Centralized Operations	Capital Program Management	Blankets (Office Furniture and Equipment, etc.)	\$ 2,000	\$ 2,000
Centralized Operations	Customer Service Center	Agent Wireless Headsets	\$ 3,400	\$ 3,400
Centralized Operations	Customer Service Center	2 -UPS Replacement Power Modules - APC in computer room	\$ 4,700	\$ 4,700
Centralized Operations	Engineering Design	Replace 17 Office Chairs & Equipment	\$ 2,300	\$ 2,300
Centralized Operations	Engineering Design	11 x 17 Color Copier/Scanner	\$ 13,000	\$ 13,000
Centralized Operations	Engineering Design	AMI	\$ 340,894	
Centralized Operations	Planning	Replace Computer Workstation (CAD/GIS w/ extra memory)	\$ 4,300	\$ 4,300
Centralized Operations	Planning	Blankets (Office Furniture and Equipment, etc.)	\$ 2,100	\$ 2,100
Centralized Operations	Planning	GIS Project	\$ 2,441,900	\$ 2,441,900
Centralized Operations	Planning & Analysis	Blankets: PA 37W (Office Furniture and Equip.)	\$ 2,700	\$ 2,700
Centralized Operations	Regulatory Affairs	RO Model - Phase 1	\$ 84,201	
Utility Support	Tax	Tax WorkFlow management	\$ 46,000	\$ 46,000
Utility Support	Tax	PowerPlan Updgrade - PowerTax	\$ 36,086	
Utility Support	Tax	Property Tax	\$ 54,129	
Utility Support	Tax	Tax Repairs	\$ 18,043	
Utility Support	Tax	CR Module	\$ 192,459	
Total Corporate Support			\$ 985,332	\$ 678,600
Total Centralized Operations Support (COPS)			\$ 2,908,995	\$ 2,483,900
Total Utility Support Services (USS)			\$ 370,775	\$ 46,000
TOTAL GENERAL OFFICE CAPITAL BUDGET			\$ 4,265,102	\$ 3,208,500

Appendix 1-1: ORA Estimate for GO Capital Budget (Page 7 of 8 - CWIP)

GENERAL OFFICE - CONSTRUCTION WORK IN PROGRESS (CWIP)

department	work order number	wo_description	funding project	CWIP	Fun in 2
Senior Executive	4300048	Denise's Office Furniture	431609-99	\$ 2,223	\$
Accting and Finance-Accts Payable	6600042	Troy Micr M605tn Printer for AP	661609-99	\$ 3,256	\$
CIS Application Support	8700066	Personal Computers & Peripherals	871709-01	\$ 24,604	\$
Application System Support	8900088	Data Base Upgrade	891709-99		\$
Application System Support	8900087	Transform AP Enhancements	891509-02	\$ 5,472	\$
Application System Support	8900084	JD Edwards Upgrade	891609-01	\$ (684)	\$
GO Facility	7900072	Visitor Parking Lot Improvements	791509-08		\$
GO Facility	7900068, 7900073	Replacement of 3 WSHP HVAC Units	791609-02		\$
GO Facility	7900069, 7900070, 7900074	Carpeting , Painting	791609-03		\$
Cust Ops Support-Inf Svcs Ntwrk Svc	8600087	Data Center Hardware Refresh	861809-02	\$ 32,780	
Cust Ops Support-Inf Svcs Ntwrk Svc	8600086	Cybersecurity and Network Infrastr	861609-99	\$ 119,459	\$
Cust Ops Support-Inf Svcs Ntwrk Svc	8600080	Additional Disk Space	861709-01	\$ 41,098	\$
Corporate Support Total				\$ 228,208	\$
Engineering Planning	2100071	GIS Project	211509-08	\$ 657,631	\$
Engineering Planning		GIS Project	211609-04		\$
Engineering Planning	2100074	Purchase Furn & Equip - Planning	211709-03	\$ 2,347	\$
Engineering Planning	2100075	Replace Workstation Comp CivilEng	211609-01	\$ 10,511	\$
Engineering Design	2400060	Office Furniture and Equipment	241509-05	\$ 6,510	\$
Engineering Design	2400061	Layout Tables	241509-04	\$ 5,627	\$
Asset Management	3010068	SCADA Master Plan	301655-98	\$ 37,395	\$
Capital Program Management - III	3111014	Office Furniture and Equipment	311509-02		\$
Capital Program Management - III	3111012	Tools and Safety Equip	311511-01		\$
Capital Program Management - III	3111013	AicView License, Chairs and Equipment	311609-01		\$
Capital Program Management - III	3200055	Replace Manager Vehicle 2145	321610-01		\$
Capital Program Management - II		Purchasing inspector vehicles	321610-99		\$
Capital Program Management - II	3200056	ArcView License, Chars and Equipmen	321609-01		\$
Capital Program Management - II		Trimble GPS SD	321611-01		\$

Appendix 1-1: ORA Estimate for GO Capital Budget (Page 8 of 8 - CV

Capital Program Management - II		Trimble GPS Unit for SW CPM	321511-01	\$	110	\$
Capital Program Management - III	3800007	Office Furniture	381609-03	\$	18,846	\$
Capital Program Management - III	3800008	New Manager vehicle	381610-99	\$	35,141	\$
Capital Program Management - III	3800009	Trimble GPS Unit and Software	381509-04			\$
Capital Program Management - III	3800010	Trimble GPS	381609-02			\$
Environmental Matters	7100055	Safety training videos	711709-02	\$	3,130	\$
Environmental Matters	7100058	Ergonomic Equipment	711709-01	\$	13,079	\$
Customer Service Support Exec.	9000066	Anaheim Office Carpeting & Paint Pr	901509-99	\$	141,389	\$
Customer Service Support Exec.	9000063	Upgrades Anaheim Facility	901409-99	\$	374,023	\$
Centralized Operation Support Total					\$ 1,305,739	\$
CIS Application	8800003	CC&B Upgrade Project Manager Phasel	881509-01	\$	19,318	
CIS Application	8800002	CC&B Upgrade Testing Lead Phase I	881509-01	\$	2,510	
CIS Application	8800004	Project Labor	881509-01	\$	26,868	
CIS Application	8800005	Oracle Blackbelt Services	881509-01	\$	11,254	
CIS Application	8800007	Contingency on the CC&B 2.4 Upgrade	881509-01	\$	7,261	
CIS Application	8800006	Software	881509-01	\$	589	
		Overhead		\$	(17,673)	
Tax		Tax WorkFlow management	6816		0	\$
Uiltiy Support Services Total					\$ 50,127	\$

Appendix 2-1: ORA Calculations for Projected Storage Area Network Growth (

In Gigabytes (GB)	Total Disk Used	Total Usable Disk Capacity	Average Disk Utilization / Year	Available Disk Space
Ending Jan 2011	22,960	Not provided	Not provided	Not provided
Ending Dec 2013	188,867 ¹	370,893	55,300	182,026 ²
Ending Nov 2017	483,680 ³	515,202	73,703	31,522 ⁴
ORA Projections:				
Ending Dec 2018	Not known	557,383 ⁵	73,703	Not known
Ending Dec 2020	Not known	757,383 ⁶	100,000 ⁷	Not known

¹ Total disk used end of November 2017 = 22,960 + 55,300 × 3 = 188,860 GB.

² Available disk space = 370,893 - 188,867 = 182,026 GB.

³ Total disk used end of December 2017 = 188,867 + 73,703 × 4 = 483,679 GB.

⁴ Available disk space = 515,202 - 483,680 = 31,522 GB.

⁵ Total usable disk capacity end of 2018 = 515,202 + 42,181 = 557,383 GB.

⁶ Total usable disk capacity end of 2020 = 557,383 + 100,000 × 2 = 757,383 GB.

⁷ ORA's projected assumption of average disk utilization per year (2019-2020) = 100,000 GB.