



Technical Memorandum

To:	Ground-Level Monitoring Committee
From:	Watermaster Engineer – Wildermuth Environmental Inc. (WEI)
Date:	April 9, 2019
Subject:	Recommended Scope and Budget of the Ground-Level Monitoring Committee for FY 2019/20 (FINAL)

Background and Purpose

Pursuant to the Optimum Basin Management Program (OBMP) Implementation Plan and the Peace Agreement, the Chino Basin Watermaster (Watermaster) implements a Subsidence Management Plan (SMP) for the Chino Basin to minimize or abate the occurrence of land subsidence and ground fissuring. The SMP outlines a program of monitoring, data analysis, and annual reporting. A key element of the SMP is its adaptive nature—Watermaster can adjust the SMP as warranted by the data.¹

The Watermaster Engineer, with the guidance of the Ground-Level Monitoring Committee (GLMC), prepares the annual reports which include the results of the monitoring program, interpretations of the data, recommendations for the Ground-Level Monitoring Program (GLMP) for the following fiscal year, and recommendations for adjustments to the SMP, if any.

This memorandum describes the Watermaster Engineer’s recommended activities for the GLMP for FY 2019/20 in the form of a proposed scope-of-work and budget.

Members of the GLMC are asked to:

1. Review this memorandum prior to February 28, 2019.
2. Attend a meeting of the GLMC at 9am on February 28, 2019 at Watermaster to discuss the proposed scope-of-work and budget for FY 2019/20.
3. Submit comments and suggested revisions on the proposed scope-of-work and budget for FY 2019/20 to the Watermaster by March 15, 2019.
4. Attend a meeting of the GLMC at 9am on March 28, 2019 at Watermaster to discuss comments and revisions to the proposed scope-of-work and budget for FY 2019/20 (if needed).

¹ The Court approved the SMP and ordered its implementation in November 2007. The SMP was updated in 2015, and can be downloaded or viewed at this [link](#).

The final scope-of-work and budget that is recommended by the GLMC will be included in the Watermaster's FY 2019/20 budget. The final scope-of-work, budget, and schedule for FY 2019/20 will be included in Section 4 of the *2018/19 Annual Report of the Ground-Level Monitoring Committee*.

Recommended Scope of Work and Budget – FY 2019/20

A proposed scope-of-work for the GLMP for FY 2019/20 is shown in Table 1 as a line-item cost estimate. The proposed scope-of-work is summarized below:

Task 1—Setup and Maintenance of the Monitoring Network

The extensometers are the key monitoring facilities for the GLMP. They require regular and as-needed maintenance and calibration to remain in good working order and to ensure the recording of accurate measurements.

Task 1.1—Maintain Extensometer Facilities. This subtask includes performing monthly visits to the Ayala Park, Chino Creek, and Pomona Extensometer facilities to ensure functionality and calibration of the monitoring equipment and data loggers.

Task 1.2—Annual Lease Fees for CCX Extensometer Site.

Task 2—Aquifer-System Monitoring and Testing

This task involves the collection and compilation of hydraulic head and aquifer-system deformation data from the Ayala Park, Chino Creek, and Pomona Extensometer facilities.

Task 2.1—Conduct Quarterly Data Collection from Extensometers; Data Checking and Management. This subtask involves the routine quarterly collection and checking of data from the extensometer facilities. Quarterly data collection is necessary to ensure that the monitoring equipment is in good working order and to minimize the risk of losing data because of equipment malfunction. For FY 2019/20, this task includes collection and checking of data from the newly-installed Pomona Extensometer facility.

Task 2.2—Conduct Long-Term Pumping Test in the Managed Area. This sub-task involves the work to implement the Long-Term Pumping Test in the Managed Area to test the appropriateness of the current Guidance Level. The work includes: (i) coordination with the City of Chino Hills on the start and duration of the pumping test; (ii) downloading and checking data from the Ayala Park Extensometer and uploading the data to the database; (iii) preparing stress-strain diagrams of the PA-7 piezometer and deep extensometer data and distributing the diagrams to the GLMC; and (iv) terminating the test once the stress-strain diagrams indicate the first occurrence of permanent compaction. The results of the test will be documented in a subsequent Annual Report of the GLMC.

This sub-task will not be implemented in FY 2019/20 due to water quality issues reported by the City of Chino Hills at well CH-17 (M. Wiley, personal communication, January 20, 2019).

Task 2.3—Conduct Pilot Injection Test in the Managed Area. This sub-task involves the work to implement a Pilot Injection Test in the Managed Area at City of Chino Hills well CH-16 to test the effectiveness of injection as a tool to manage hydraulic head and land subsidence in the Managed Area. The work involved in this task includes coordinating the injection test with the City of Chino Hills and collecting and compiling the injection/production data at CH-16 (e.g. timing of injection, injection rates, water levels at CH-16, etc.). The results of the test will be documented in a subsequent Annual Report of the GLMC.

This sub-task will be implemented only if the City of Chino Hills indicates that it wants to proceed with the test in FY 2019/20.

Task 3—Basin-Wide Ground-Level Monitoring Program (InSAR)

This task involves the annual collection and analysis of Synthetic Aperture Radar (SAR) scenes to estimate the vertical ground motion that occurred across the western portion of Chino Basin from March 2019 to March 2020.

Task 3.1—Acquire SAR Data from German Aerospace Center and Prepare Interferograms for 2019/20. In this sub-task, six SAR scenes that will be acquired by the TerraSAR-X satellite from March 2019 to March 2020 are purchased from the German Aerospace Center. Neva Ridge Technologies of Boulder, CO uses the SAR scenes to prepare 12 interferograms that describe the incremental and cumulative vertical ground motion that occurred from March 2019 to March 2020 and since 2011.

Task 3.2—Convert Interferograms to GIS Rasters and Check Results. In this sub-task, the Watermaster Engineer converts the interferograms into GIS rasters of vertical ground motion across western Chino Basin and performs checks for reasonableness and accuracy.

Task 4—Perform Ground-Level Surveys

This task involves conducting elevation surveys at benchmark monuments across defined areas of western Chino Basin to estimate the vertical ground motion that occurred since the prior survey. Electronic distance measurements (EDM surveys) are performed between benchmark monuments to estimate horizontal ground motion in areas where ground fissuring due to differential land subsidence is a concern. The surveys for consideration in FY 2019/20 include:

Task 4.1—Conduct Spring-2020 Elevation and EDM surveys in the Northwest MZ-1 Area. In this subtask, the surveyor conducts elevation and EDM surveys at the established benchmarks in Northwest MZ-1 in early 2020. The elevation survey begins at the new Pomona Extensometer Facility and includes benchmarks across Northwest MZ-1 shown on Figure 1. The elevation survey will be referenced to a newly-established elevation datum at the Pomona Extensometer. The EDM survey is performed across the San Jose Array of benchmark monuments shown on Figure 1.

These surveys are recommended in FY 2019/20 because of the ongoing subsidence that is occurring in Northwest MZ-1 and will support the development of a subsidence management plan in Northwest MZ-1.

Task 4.2—Conduct Spring-2020 Elevation Survey in the Northeast Area. In this subtask, the surveyor conducts an elevation survey at the established benchmarks in the Northeast Area in early 2020. The elevation survey will begin at the new Pomona Extensometer Facility and includes benchmarks across the Northeast Area shown on Figure 1.

This survey is recommended in FY 2019/20 budget because InSAR indicates ongoing subsidence is occurring in the Northeast Area; Spring-2018 was the initial elevation survey of newly-installed benchmarks in this area; and InSAR is largely incoherent south of the Ontario Airport.

Task 4.3—Conduct Spring-2020 Elevation in the Southeast Area. In this subtask, the surveyor conducts an elevation survey at the established benchmarks in the Southeast Area in early 2019. The elevation survey begins at the Ayala Park Extensometer and includes benchmarks across the Southeast Area shown on Figure 1. The elevation survey data is referenced to the Ayala Park elevation datum.

This survey is not recommended for FY 2019/20 because over the past several years hydraulic heads have been relatively stable in this area; recent ground motion as measured by InSAR, ground-level surveys, and the Chino Creek Extensometer has been minor in this area; hydraulic heads are not projected to significantly decline in this area over the next year.

Task 4.4—Install Closely-Spaced Benchmarks along Edison and Eucalyptus (for Long-Term Pumping Test). In this sub-task, closely-spaced benchmarks are installed by the surveyor across the historic fissure zone in the Managed Area along Edison and Eucalyptus Avenues to facilitate future the EDM surveys. This task was a recommendation in the 2016 Annual Report of the GLMC, if the Long-Term Pumping Test is conducted to test the Guidance Level.

This task is not recommended in FY 2019/20 unless the Long-Term Pumping Test is planned for execution in the near future.

Task 4.5—Conduct Spring-2020 Elevation and EDM Surveys in the Managed Area. In this sub-task, the surveyor conducts elevation and EDM surveys at the established benchmarks in the Managed Area and Fissure Zone Area in early 2020. The elevation survey begins at the Ayala Park Extensometer and includes benchmarks across the Managed Area shown on Figure 1. The elevation survey is referenced to the Ayala Park elevation datum. The EDM surveys are performed between closely-spaced benchmarks located across the historic fissure zone along Chino, Schaefer, Edison, and Eucalyptus Avenues.

This survey is not recommended for FY 2019/20 because over the past several years hydraulic heads have been relatively stable in this area; recent ground motion as measured by InSAR, ground-level surveys, and the Ayala Park Extensometer has been minor in this area.

Task 4.6—Establish the Pomona Extensometer Datum. The Pomona Extensometer is expected to be completed and operational by the end of FY 2018/19. In this subtask, the surveyor will install a new benchmark monument at the Pomona Extensometer in Summer-2019 (after the Pomona Extensometer is operational) and establish an initial elevation for the monument that is tied to the Ayala Park elevation datum. This task is necessary so that future elevation surveys that start at the Pomona Extensometer are consistent with elevation surveys that begin at the Ayala Park Extensometer.

Task 4.7—Replace Destroyed Benchmarks (if needed). In this sub-task, the surveyor replaces benchmark monuments that have been destroyed since the last survey, if any.

Task 4.8—Process, Check, and Update Database. In this sub-task, the Watermaster Engineer receives and catalogs the survey results provided by the surveyor, prepares the data for display as a GIS layer, and performs checks against InSAR and extensometer data for reasonableness and accuracy.

Task 4.9—New Surveyor Support. Guida Surveying, Inc. is replacing the long-time surveyor for the GLMP (Jim Elliott of WSP USA) in Spring-2019. In this sub-task, Jim Elliott is retained through FY 2019/20 to continue to assist Guida Surveying with locating all the existing benchmarks and ensuring the surveying methods, protocols for data processing, and the data deliverables are consistent with previous ground-level surveys.

Task 5—Data Analysis and Reporting

Task 5.1—Prepare Draft 2018/19 Annual Report of the Ground-Level Monitoring Committee. Prepare the text, tables, and figures for a draft *2018/19 Annual Report of the GLMC* and submit the report to the GLMC by September 20, 2019 for review and comment.

Task 5.2—Prepare Final 2018/19 Annual Report of the Ground-Level Monitoring Committee. Update the text, tables, and figures based on the comments received from the GLMC and prepare a final *2018/19 Annual Report of the GLMC* by October 31, 2019. Responses to comments will be included as an appendix to the final report. The report will be included in the agenda packet for the November 2019 Watermaster meetings for approval.

Task 5.3—Compile and Analyze Data from the 2019/20 Ground-Level Monitoring Program. In this task, monitoring data generated from the GLMP during 2019/20 is checked, mapped, charted, and analyzed as the first step in the preparation of the subsequent annual report. Some of the maps, charts, and tables are shared with the

GLMC at its meetings in early 2020 during the development of a recommended scope and budget for FY 2020/21.

Task 6—Develop a Subsidence-Management Plan for the Northwest MZ-1 Area

The development of the subsidence management plan for the Northwest MZ-1 Area is a multi-year effort. The conceptual framework for this effort is described in the *Work Plan to Develop a Subsidence-Management Plan for the Northwest MZ-1 Area*.² Several tasks outlined in the Work Plan are recommended for implementation in FY 2019/20:

Task 6.1—Conduct One-Year of Passive Monitoring and Prepare Recommendations for Controlled Aquifer-System Stress Test(s). The monitoring of water levels and production at wells in Northwest MZ-1 will continue through various techniques, including: (i) SCADA-based monitoring by Monte Vista Water District; (ii) monitoring of water levels via sonar³; (iii) monitoring of water levels via pressure transducers; and (iv) manual measurements of water levels. It is anticipated that the Pomona Extensometer will be collecting water-level and aquifer-system-deformation data by the end of FY 2018/19. This subtask includes one-year of passive monitoring of water levels from existing wells in Northwest MZ-1 and water-level and aquifer-system-deformation data from the Pomona Extensometer Facility. Analysis of these data will improve the understanding of the hydrogeology in Northwest MZ-1 and provide the basis for designing controlled aquifer-system stress tests in FY 2020/21, if deemed necessary by the GLMC.

Task 7—Meetings and Administration

Task 7.1—Prepare for and Conduct Four Meetings of the Ground-Level Monitoring Committee. This sub-task includes preparing for and conducting four meetings of the GLMC:

- July 25, 2019 – Implementation of the GLMP for FY 2019/20.
- September 26, 2019 – Review the draft *2018/19 Annual Report of the Ground-Level Monitoring Committee*.
- February 28, 2020 – Review the draft recommended scope and budget for FY 2020/21.
- March 28, 2020 – Review the final recommended scope and budget for FY 2020/21 (if needed).

Task 7.2—Prepare for and Conduct One As-Requested Ad-Hoc Meeting. This sub-task includes preparing for and conducting one ad-hoc meeting of the GLMC, as requested by the GLMC or Watermaster staff.

² http://www.cbwm.org/docs/engdocs/Land%20Subsidence/20150724%20-%20Chino%20Basin%20Subsidence%20Management%20Plan%202015/FINAL_CBSMP_Appendix_B.pdf

³ The use of sonar technology to measure piezometric levels in wells is currently being used in Monte Vista Water District wells 28 and 31.

Task 7.3—Perform Monthly Project Management. This sub-task includes monthly project administration and management, including staffing, financial and schedule reporting to Watermaster and sub-contractor coordination.

Task 7.4—Prepare a Recommended Scope and Budget for the GLMC for FY 2020/21. This sub-task includes preparing a draft and final recommended scope and budget for FY 2020/21 for the GLMC to support the Watermaster’s budgeting process.

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Table 1. Work Breakdown Structure and Cost Estimates – Ground-Level Monitoring Program: FY 2019/20

Figure 1. Ground-Level Monitoring Program – Fiscal Year 2019/20

Table 1
Work Breakdown Structure and Cost Estimates
Ground-Level Monitoring Program: FY 2019/20

Task Description	Labor		Other Direct Costs								Totals					
	Person Days	Total	Travel	New Equip.	Equip. Rental	Outside Pro	Lab	Repro	Misc.	Total	Totals by Task	Recommended Budget FY 2019/20	Approved Budget FY 2018/19	Net Change FY 2018/19 to 2019/20	Potential Carry-Over FY 2019/20	Budget with Carry-Over FY 2019/20
											a	b	a - b	c	a - c	
Task 1 -- Setup and Maintenance of the Monitoring Network		\$28,320								\$8,537	\$36,857	\$36,857	\$35,353	\$1,504	\$0	\$36,857
1.1 Maintain Extensometer Facilities																
Routine maintenance of Ayala Park, Chino Creek, and Pomona extensometer facilities	16	\$22,272	\$1,139	\$250	\$152					\$1,541	\$23,813	\$23,813	\$22,661	\$1,152	\$0	\$23,813
Replacement/repair of equipment at extensometer facilities	4	\$6,048	\$362	\$3,000	\$38	\$2,000				\$5,400	\$11,448	\$11,448	\$11,096	\$352	\$0	\$11,448
1.2 Annual Lease Fees for CCX Extensometer Site	0	\$0							\$1,596	\$1,596	\$1,596	\$1,596	\$1,596	\$0	\$0	\$1,596
Task 2 -- MZ-1: Aquifer-System Monitoring and Testing		\$31,696								\$2,990	\$34,686	\$34,686	\$33,150	\$1,536	\$0	\$34,686
2.1 Conduct Quarterly Data Collection from Extensometers; Data Checking and Management																
Download data from the Ayala Park Extensometer facility	2	\$2,544	\$275		\$76					\$351	\$2,895	\$2,895	\$2,783	\$112	\$0	\$2,895
Download data from the Chino Creek Extensometer facility	2	\$2,544	\$42		\$76					\$118	\$2,662	\$2,662	\$2,550	\$112	\$0	\$2,662
Download data from Pomona Extensometer facility	4	\$5,088	\$269		\$76					\$345	\$5,433	\$5,433	\$5,209	\$224	\$0	\$5,433
Process, check, and upload data to database	11	\$15,712								\$0	\$15,712	\$15,712	\$14,944	\$768	\$0	\$15,712
2.2 Conduct Long-Term Pumping Test in the Managed Area																
Coordinate testing with pumps	0	\$0								\$0	\$0	\$0	\$0	\$0	\$0	\$0
Equip CH-15B and CH-17 with high-frequency water-level monitoring devices	0	\$0	\$0	\$0	\$0					\$0	\$0	\$0	\$0	\$0	\$0	\$0
Collect data; process, check, and upload to database	0	\$0								\$0	\$0	\$0	\$0	\$0	\$0	\$0
Prepare, analyze, and distribute stress-strain diagrams to GLMC; terminate test	0	\$0								\$0	\$0	\$0	\$0	\$0	\$0	\$0
Adjust extensometer hardware, as necessary	0	\$0	\$0							\$0	\$0	\$0	\$0	\$0	\$0	\$0
2.3 Conduct Pilot Injection Test in the Managed Area																
Coordinate testing with pumps	1	\$1,512								\$0	\$1,512	\$1,512	\$1,424	\$88	\$0	\$1,512
Equip CH-15B and CH-17 with high-frequency water-level monitoring devices	3	\$4,296	\$138	\$2,000	\$38					\$2,176	\$6,472	\$6,472	\$6,240	\$232	\$0	\$6,472
Task 3 -- Basin Wide Ground-Level Monitoring Program (InSAR)		\$5,362								\$85,000	\$90,362	\$90,362	\$90,064	\$298	\$0	\$90,362
3.1 Acquire SAR Data from German Aerospace Center and Prepare Interferograms for 2019/20	1	\$1,752				\$85,000				\$85,000	\$86,752	\$86,752	\$86,632	\$120	\$0	\$86,752
3.2 Convert Interferograms to GIS Raster Surfaces and Check Results	2.5	\$3,610								\$0	\$3,610	\$3,610	\$3,432	\$178	\$0	\$3,610
Task 4 -- Perform Ground-Level Surveys		\$7,828								\$209,030	\$216,858	\$124,878	\$84,046	\$40,832	\$0	\$124,878
4.1 Conduct Spring-2020 Elevation and EDM surveys in the Northwest MZ-1 Area	0.5	\$876				\$28,600				\$28,600	\$29,476	\$29,476	\$23,816	\$5,660	\$0	\$29,476
4.2 Conduct Spring-2020 Elevation Survey in the Northeast Area	0.5	\$876				\$37,180				\$37,180	\$38,056	\$38,056	\$33,316	\$4,740	\$0	\$38,056
4.3 Conduct Spring-2020 Elevation Survey in the Southeast Area	0	\$0				\$37,180				\$0	\$37,180	\$0	\$0	\$0	\$0	\$0
4.4 Install Closely-Spaced Benchmarks along Edison and Eucalyptus (for Long-Term Pumping Test)	0	\$0				\$12,300				\$12,300	\$12,300	\$0	\$0	\$0	\$0	\$0
4.5 Conduct Spring 2020-Elevation and EDM Surveys in the Managed Area/Fissure Zone Area	0	\$0				\$42,500				\$42,500	\$42,500	\$0	\$0	\$0	\$0	\$0
4.6 Conduct Summer-2019 Survey to Establish PX Datum and Connect to Existing Survey Network	0	\$0				\$31,570				\$31,570	\$31,570	\$31,570	\$0	\$31,570	\$0	\$31,570
4.7 Replace Destroyed Benchmarks (if needed)	0	\$0				\$9,700				\$9,700	\$9,700	\$9,700	\$6,000	\$3,700	\$0	\$9,700
4.8 Process, Check, and Update Database	4.25	\$6,076								\$0	\$6,076	\$6,076	\$5,768	\$308	\$0	\$6,076
4.9 New Surveyor Support	0	\$0				\$10,000				\$10,000	\$10,000	\$10,000	\$15,146	-\$5,146	\$0	\$10,000
Task 5 -- Data Analysis and Reporting		\$63,842								\$0	\$63,842	\$63,842	\$70,476	-\$6,634	\$0	\$63,842
5.1 Prepare Draft 2018/19 Annual Report of the Ground-Level Monitoring Committee	23	\$35,312								\$0	\$35,312	\$35,312	\$33,384	\$1,928	\$0	\$35,312
5.2 Prepare Final 2018/19 Annual Report of the Ground-Level Monitoring Committee	5.5	\$8,584								\$0	\$8,584	\$8,584	\$8,148	\$436	\$0	\$8,584
5.3 Compile and Analyze Data from the 2019/20 Ground-Level Monitoring Program																
Production/recharge/piezometric/extensometer	4	\$5,568								\$0	\$5,568	\$5,568	\$15,280	-\$9,712	\$0	\$5,568
Ground-level survey and Northwest MZ-1 Area EDM data	4	\$5,948								\$0	\$5,948	\$5,948	\$5,648	\$300	\$0	\$5,948
InSAR data	4	\$5,568								\$0	\$5,568	\$5,568	\$5,280	\$288	\$0	\$5,568
Tectonic data	0.25	\$318								\$0	\$318	\$318	\$304	\$14	\$0	\$318
Recycled water reuse data	2	\$2,544								\$0	\$2,544	\$2,544	\$2,432	\$112	\$0	\$2,544
Task 6 -- Develop a Subsidence-Management Plan for the Northwest MZ-1 Area		\$0								\$7,500	\$7,500	\$7,500	\$36,406	-\$28,906	\$0	\$7,500
6.1 Conduct One-Year Passive Monitoring and Prepare Recommendations for Controlled Pumping Test(s)	0	\$0	\$0		\$0	\$7,500				\$7,500	\$7,500	\$7,500	\$35,220	-\$27,720	\$0	\$7,500
6.2 Install the Pomona Extensometer Facility	0	\$0	\$0			\$0				\$0	\$0	\$0	\$0	\$0	\$0	\$0
6.3 Install and Test Monitoring Equipment at the Pomona Extensometer	0	\$0	\$0	\$0		\$0				\$0	\$0	\$0	\$820	-\$820	\$0	\$0
6.4 Prepare Completion Report for the Pomona Extensometer Facility	0	\$0								\$0	\$0	\$0	\$366	-\$366	\$0	\$0
Task 7 -- Meetings and Administration		\$46,776								\$418	\$47,194	\$47,194	\$44,434	\$2,760	\$0	\$47,194
7.1 Prepare for and Conduct Four Meetings of the Ground-Level Monitoring Committee	12	\$22,144	\$334							\$334	\$22,478	\$22,478	\$21,198	\$1,280	\$0	\$22,478
7.2 Prepare for and Conduct One As-Requested Ad-Hoc Meeting	3	\$5,536	\$84							\$84	\$5,620	\$5,620	\$5,300	\$320	\$0	\$5,620
7.3 Perform Monthly Project Management	7.5	\$13,560								\$0	\$13,560	\$13,560	\$12,720	\$840	\$0	\$13,560
7.4 Prepare a Recommended Scope and Budget for the GLMC for FY 2020/21	3	\$5,536								\$0	\$5,536	\$5,536	\$5,216	\$320	\$0	\$5,536
Totals											\$405,318	\$393,928	\$11,390	\$0	\$405,318	

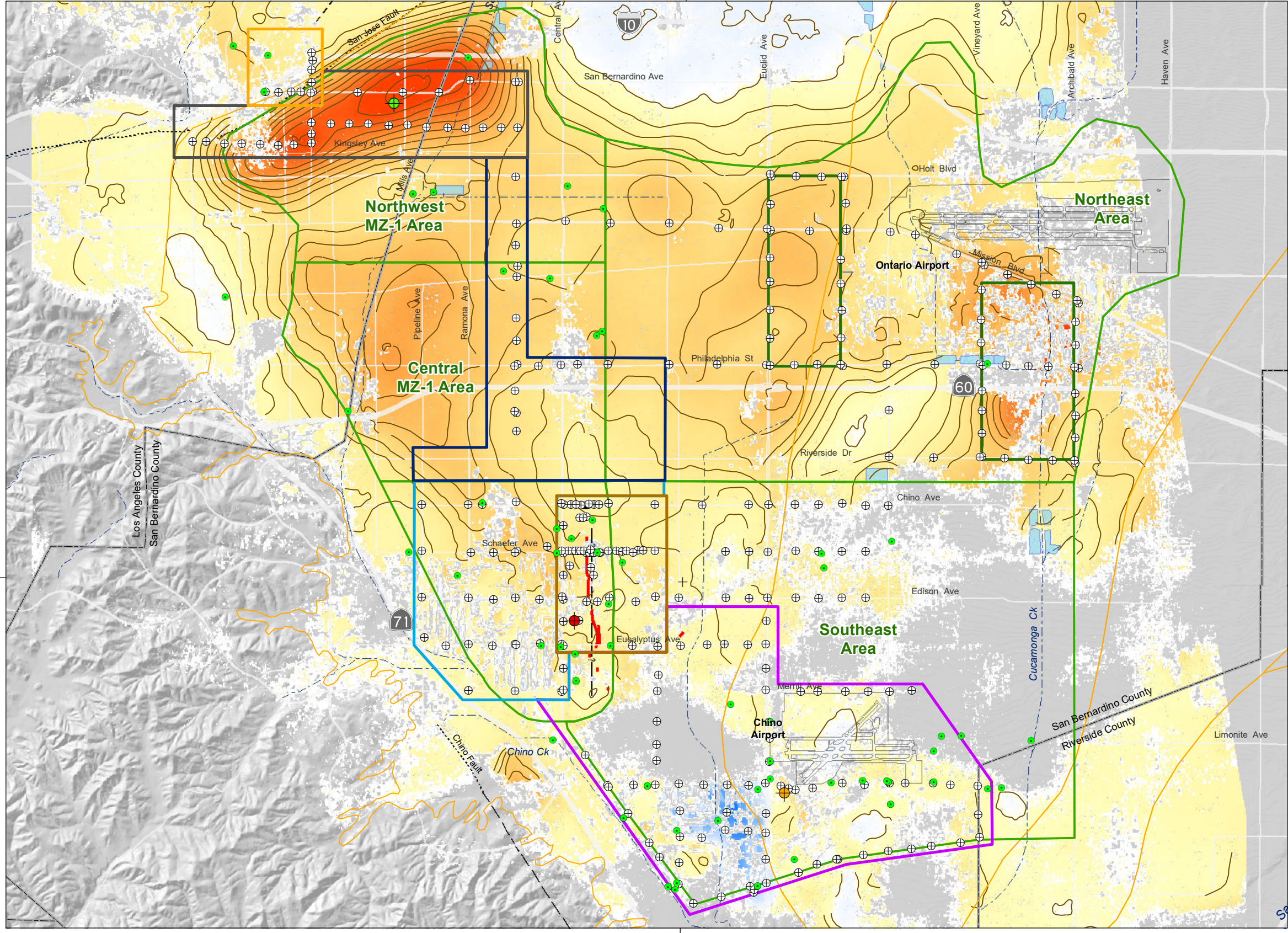


117°40'0"W

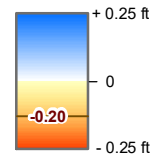
117°40'0"W

34°0'0"N

34°0'0"N



Relative Change in Land Surface Altitude
as Measured by InSAR
March 2011 to March 2018



⊖ InSAR absent or incoherent

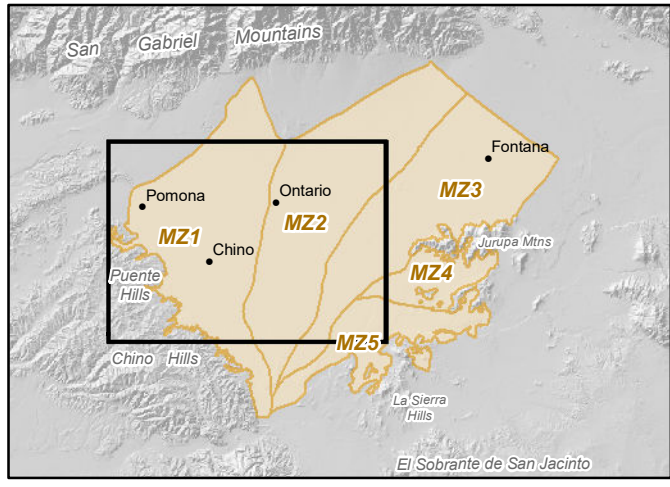
Groundwater-Level and
Aquifer-System Deformation Monitoring

- Ayala Park Extensometer
- Chino Creek Extensometer
- Pomona Facility Extensometer
- Well Equipped with Transducer (2017/18)

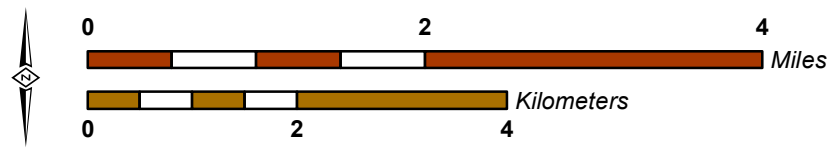
Ground-Level Survey Areas

- ⊕ Ground-Level Survey Benchmark
- ▭ Northeast Area
- ▭ Managed Area
- ▭ Fissure Zone
- ▭ Southeast
- ▭ Central
- ▭ Northwest MZ-1
- ▭ San Jose Fault Zone

- ▭ Areas of Subsidence Concern
- ▭ Flood Control and Conservation Basins
- ▭ Ground Fissures
- ▭ Approximate Location of the Riley Barrier
- ▭ Fault - Solid where accurately located. Dashed where approximately located or inferred; dotted where concealed.



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Ground-Level Monitoring Committee
Ground-Level Monitoring Program

Ground-Level Monitoring Program
Fiscal Year 2019/20

Figure 1