



PLEASE SILENCE ALL ELECTRONIC COMMUNICATION DEVICES. THANK YOU.

NOTICE OF POSSIBLE QUORUM OF THE CITY OF BUCKEYE PLANNING AND ZONING COMMISSION OR OTHER COUNCIL APPOINTED BOARD: PLEASE NOTE THAT THERE MAY BE A QUORUM PRESENT BUT THERE WILL BE NO VOTING TAKING PLACE BY THE CITY PLANNING AND ZONING COMMISSION OR OTHER COUNCIL APPOINTED BOARD AT THIS MEETING.

**CITY OF BUCKEYE
PLANNING AND ZONING COMMISSION
JANUARY 11, 2022
AGENDA**

**City Council Chambers
530 E. Monroe Ave.
Buckeye, AZ 85326
**Live stream available via YouTube
6:00 PM**

Accessibility for all persons with disabilities will be provided upon request. Please telephone your accommodation request (623) 349-6911, 72 hours in advance if you need a sign language interpreter or alternate materials for a visual or hearing impairment.

Voting Members will either attend in person or by telephone conference call or video presentation. Items listed may be considered in any order

IMPORTANT INFORMATION REGARDING PUBLIC PARTICIPATION:

This meeting will be open to the public. Adherence to COVID-19 safety measures are recommended. If you would like to make a public comment, either in person or remotely, please review the information on the City's website and complete and submit the comment form found here: <https://www.buckeyeaz.gov/government/city-clerk/meeting-agendas-minutes/meetings-agendas-minutes>

At Large	District 1	District 2	District 3	District 4	District 5	District 6
Ted Burton	Alan Ladd	Preston Hundley	Deanna Kupcik <i>Vice Chair</i>	Anthony DiMascio	Ed Sumner	Charles Trullinger <i>Chairperson</i>
Charles Hester <i>(Alternate)</i>	Rebecca Puppe <i>(Alternate)</i>	Jennie Ragsdale <i>(Alternate)</i>	Darwin Meighen <i>(Alternate)</i>	Douglas McDonald <i>(Alternate)</i>	Larry Draves <i>(Alternate)</i>	Nick Hudec <i>(Alternate)</i>
<i>Council Liaison:</i> Craig Heustis						

1. CALL TO ORDER/PLEDGE OF ALLEGIANCE/ROLL CALL

2. ELECTION OF OFFICERS

Planning and Zoning Commission nomination and appointment of Chairperson.

Planning and Zoning Commission nomination and appointment of Vice Chairperson.

3. MINUTES

3.A [Approval of minutes from the November 23, 2021 Planning and Zoning Commission regular](#)

meeting.

Staff Liaison: Keri Hernandez, Management Assistant, khernandez@buckeyeaz.gov (623)349-6211

4. REGULAR AGENDA

- 4.A** Recommendation to approve with conditions a Preliminary Plat for a 270 single-family residential subdivision with 19% of the property planned for open space in addition to a 5.78-acre active recreation area.

Staff Liaison: Andrea Marquez, Planner II, amarquez@buckeyeaz.gov (623) 349-6220

- 4.B** Motion to recommend approval by City Council of an amendment to the Code of Buckeye, Chapter 15 Building Regulations, Section 15-2-10 Fire Code, adopting local amendments to the 2018 International Fire Code.

Staff Liaison: Jake Rhoades, Fire Chief, jrhoades@buckeyeaz.gov, (623) 349-6700

5. COMMENTS FROM THE PUBLIC

Any members of the audience may comment on non-agenda items. However, State Open Meeting Law does not permit the Commission to discuss items not specifically on the agenda. The Commission may direct inquiries to City staff.

Action Required: None

6. DEPUTY DIRECTOR OF PLANNING REPORT AND SUMMARY OF CURRENT EVENTS

7. PLANNING AND ZONING COMMISSION SUMMARY OF CURRENT EVENTS

Any regular or alternate Commissioner or Council Liaison may present a brief summary on current events

Action Required: None; there will be no discussion, deliberation, proposals, or legal action.

8. ADJOURNMENT

CITY OF BUCKEYE
Regular Planning & Zoning Commission
PLANNING ACTION REPORT

MEETING DATE: 01/11/22	AGENDA ITEM: 3.A. Approval of minutes.
DATE PREPARED: 01/08/22	DISTRICT NO.:
STAFF LIAISON: Keri Hernandez, Management Assistant, khernandez@buckeyeaz.gov (623)349-6211	
DEPARTMENT: Development Services	AGENDA ITEM TYPE: Minutes

ACTION/MOTION: (This language identifies the formal motion to be made by the Voting Members)
Approval of minutes from the November 23, 2021 Planning and Zoning Commission regular meeting.

SUMMARY

Items related to a project or facility location must include an attached vicinity map for Council Review.

ATTACHMENTS:

[11.23.2021.PZC.MinutesDRAFT.pdf](#)



CITY OF BUCKEYE
PLANNING AND ZONING COMMISSION
REGULAR MEETING MINUTES
NOVEMBER 23, 2021

City of Buckeye

530 East Monroe Avenue

Buckeye, AZ 85326

****Audio recording of this meeting, is available on YouTube**

1. CALL TO ORDER/PLEDGE OF ALLEGIANCE/ROLL CALL

Chairperson Trullinger called the meeting to order at 6:00 p.m.

Members present: Commissioner Ted Burton, Commissioner Alan Ladd via MS Teams, Commissioner Preston Hundley via MS Teams joined at 6:08 p.m., Vice Chairperson Deanna Kupcik, Commissioner Ed Sumner, Chairperson Charles Trullinger, Alternate Charles Hester, Alternate Rebecca Puppe via MS Teams, Alternate Jennie Ragsdale, Alternate Darwin Meighan, Alternate Douglas McDonald seated for District 4, Alternate Draves, Alternate Nick Hudec.

Members absent: Commissioner Anthony DiMascio

Staff present: Deputy Director of Planning Adam Copeland, Senior Planner Randy Proch, Management Assistant Keri Hernandez, Council Liaison Craig Heustis.

Staff online: City Attorney Shiela Schmidt, City Traffic Engineer John Willett, Fire Marshall Nate Ryan

2. MINUTES

2A. APPROVAL OF MINUTES FROM THE NOVEMBER 9, 2021 PLANNING AND ZONING COMMISSION WORKSHOP.

A motion was made by Vice Chairperson Kupcik and seconded by Commissioner Burton to approve minutes as presented. Approval 7-0. Motion carried.

2B. APPROVAL OF MINUTES FROM THE NOVEMBER 9, 2021 PLANNING AND ZONING COMMISSION REGULAR MEETING.

Vice Chairperson Kupcik requested correction to the signature block.

A motion was made by Chairperson Trullinger and seconded by Alternate McDonald to approve minutes with correction. Approval 7-0. Motion carried.

3. CANCELLATION OF THE DECEMBER 28, 2021 PLANNING AND ZONING COMMISSION REGULAR MEETING.

A motion was made by Chairperson Trullinger and seconded by Commissioner Burton to cancel the December 28, 2021 regular Planning and Zoning Commission meeting. Approval 7-0. Motion carried.

4. REGULAR AGENDA

4A. BUNGALOWS ON YUMA AND APACHE – PAD OVERLAY (PLZZ-21-00023)

Randy Proch, AICP, Senior Planner, presented and was available to answer questions from the Commission.

Applicant Kyle Barichello indicated that all conditions have been agreed upon.

Commissioner Burton asked, that with the large number of bungalows, if there would be adequate parking. Mr. Proch indicated that a traffic impact analysis is currently under review, but there have been additional parking spaces added to the development plan and exceeds the parking standards.

Vice Chairperson Kupcik asked if these units will be leased or owner occupied. Mr. Proch indicated that the proposed project consists of leased units.

Commissioner Sumner asked if there would be management onsite. Mr. Barichello indicated that a property management company will be located centrally during business hours, and security will be available and monitored 24/7 in this gated community.

Alternate Hester spoke of his concern with foot traffic surrounding the development.

Alternate Draves asked about street improvements to 247th Avenue.

City Traffic Engineer John Willett indicated that the 247th east half-street improvements are currently under review with a separate project.

Council Liaison Heustis asked if this project is consistent with what other communities are allowing at this time. Mr. Proch informed the Commission that this developer has exceeded guidelines, regulations and standards with this project. Mr. Heustis questioned the estimated rental cost of the proposed units. Mr. Barichello informed the Commission that the leasing rates are typical to the current economy and region.

Chairperson Trullinger requested clarification on the assigned parking. Mr. Proch informed the Commission that the internal parking would be managed by the private owner of the entire community. A Public Hearing opened at 6:33 p.m.

With there being no comments from the public, the Public Hearing closed at 6:33 p.m.

A motion was made by Vice Chairperson Kupcik and seconded by Alternate McDonald to recommend approval to City Council as presented. Approval 7-0. Motion carried.

5. COMMENTS FROM THE PUBLIC

Council Liaison Heustis informed the Commission of the downtown events occurring in the upcoming weekend, and thanked Chairperson Trullinger for his service on the Planning and Zoning Commission Board.

6. DEPUTY DIRECTOR OF PLANNING REPORT AND SUMMARY OF CURRENT EVENTS

Adam Copeland updated Commission on plans and topics for workshops in the 2022 New Year. Mr. Copeland congratulated Planner II, Robert Busick on obtaining his AICP Certification.

7. PLANNING AND ZONING COMMISSION SUMMARY OF CURRENT EVENTS

Commissioner Burton requested to have city logo shirts provided for the members of the Commission. Chairperson Trullinger announced his resignation from the Planning and Zoning Commission at the end of 2021.

8. ADJOURNMENT

A motion was made by Chairperson Trullinger and seconded by Commissioner Sumner to adjourn at 6:43 p.m. Motion carried.

Charles Trullinger, Chairperson

ATTEST:

Keri Hernandez, Management Assistant

I hereby certify that the foregoing is a true and correct copy of the Planning and Zoning Commission Regular Meeting held on the 23rd day of November 2021. I further certify that a quorum was present.

Keri Hernandez, Management Assistant

CITY OF BUCKEYE
Regular Planning & Zoning Commission
PLANNING ACTION REPORT

MEETING DATE: 01/11/22	AGENDA ITEM: 4.A. PLZS-21-00130 Montana Vista Preliminary Plat
DATE PREPARED: 01/08/22	DISTRICT NO.: 1
STAFF LIAISON: Andrea Marquez, Planner II, amarquez@buckeyeaz.gov (623) 349-6220	
DEPARTMENT: Development Services	AGENDA ITEM TYPE: Public Meeting / Non Consent - New Business

ACTION/MOTION: (This language identifies the formal motion to be made by the Voting Members) Recommendation to approve with conditions a Preliminary Plat for a 270 single-family residential subdivision with 19% of the property planned for open space in addition to a 5.78-acre active recreation area.

RELEVANT GOALS:

GOAL 3: A Well-Planned Urban Community

ADDITIONAL RELEVANT GOALS:

GOAL 4: Adequate, Well-Maintained and Well-Planned Public Infrastructure

SUMMARY

BUDGETED:

No

Items related to a project or facility location must include an attached vicinity map for Council Review.

ATTACHMENTS:

[Montana Vista Vicinity Map.pdf](#)

[PLZS-21-00130 Montana Vista Preliminary Plat PZ Staff Report 1.11.2022.pdf](#)

[4R PLZS-21-00130 MONTANA VISTA PRELIMINARY PLAT - Project Narrative.pdf](#)

[4R PLZS-21-00130 MONTANA VISTA PRELIMINARY PLAT - Preliminary Plat.pdf](#)

[3R PLZS-21-00130 MONTANA VISTA PRELIMINARY PLAT - Landscape Plans.pdf](#)

[4R PLZS-21-00130 MONTANA VISTA PRELIMINARY PLAT - Preliminary Drainage Report.pdf](#)

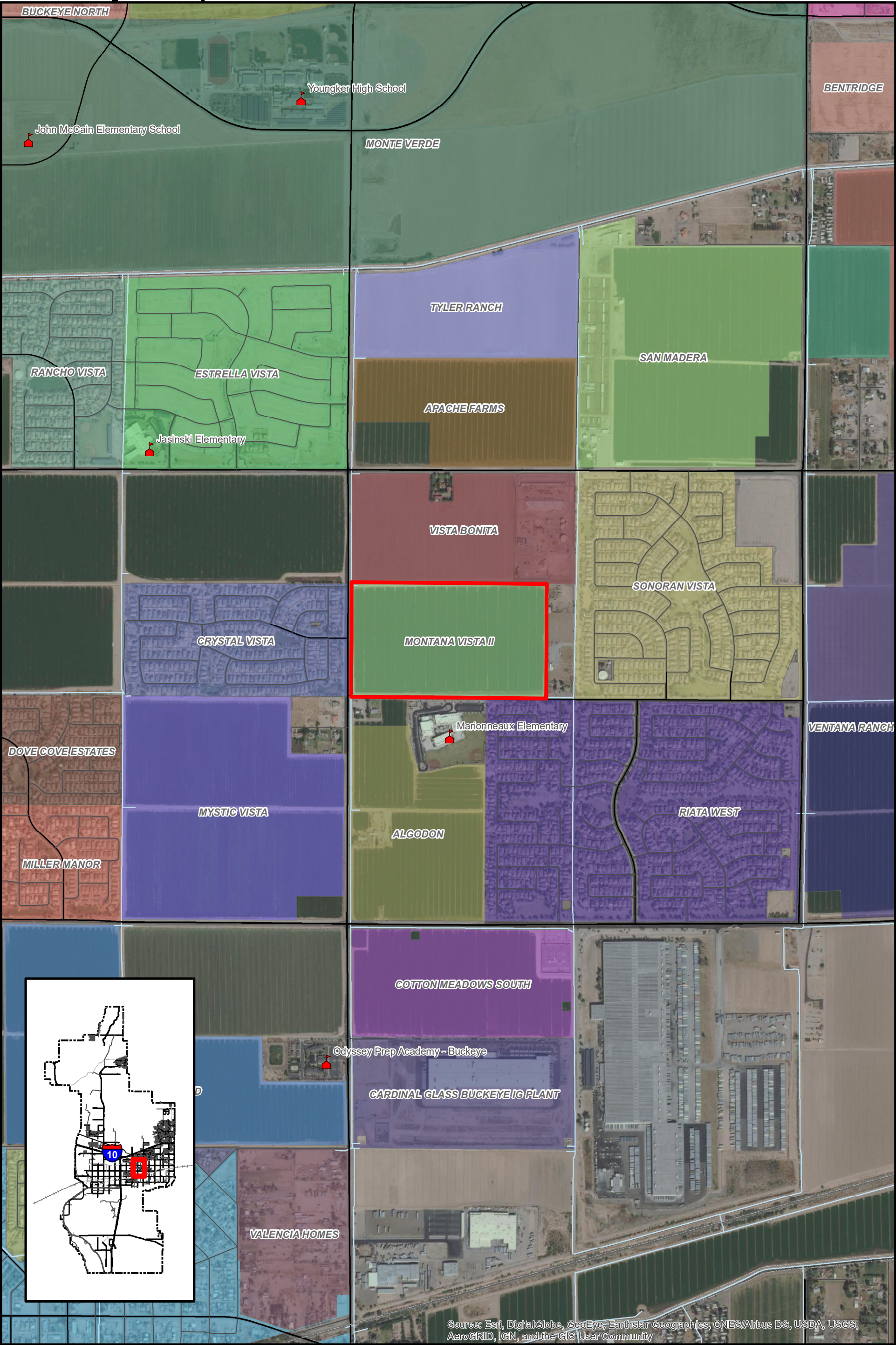
[4R PLZS-21-00130 MONTANA VISTA PRELIMINARY PLAT - Preliminary Grading &](#)

[Drainage.pdf](#)

[4R PLZS-21-00130 MONTANA VISTA PRELIMINARY PLAT - Preliminary Sewer Report.pdf](#)

[4R PLZS-21-00130 MONTANA VISTA PRELIMINARY PLAT - Preliminary Water Report.pdf](#)

Vicinity Map



CASE NUMBER: PLZS-21-00130
TITLE: Montana Vista
MEETING DATE: January 11, 2022

Applicant: Natalie Maikoski, EPS Group, Inc.
James Alexander, Beazer Homes

Owner: MV Holding Company

Request: Preliminary plat for a 270 single-family residential subdivision with 19% of the property planned for open space in addition to a 5.78-acre active recreation area.

District 1

Location: NEC Apache & Roeser Road

Site size: Approximately 71 acres

Density: 3.80 du/ac

Public input: None Known

Recommendation: Approve with conditions

PROJECT DESCRIPTION

1. The request is for a preliminary plat for the Montana Vista Subdivision. The subject property measures 71.32 acres, proposing 270 single-family residential lots, with a density of 3.80 dwelling unit per acre. Approximately 19% open space will be provided including 5.78 acres of active recreation area, which includes multi-use paths, DG trails, and seating nodes throughout the development including a community park. Generally located approximately ½ mile south of the southeast corner of Broadway and Apache Roads.
2. The property is bordered by the Crystal Vista subdivision to the west, active agricultural lands to the north, and active agricultural lands including rural residential property to the east and to the south including the Marionneaux Elementary School.

AREA CONTEXT

3. **Table 1: Existing Land Use, General Plan Designation, and Zoning District**

	LAND USE	GENERAL PLAN	ZONING
Subject Property	Undeveloped Agricultural	Neighborhood	Planned Residential (PR)
North	Undeveloped Agricultural	Neighborhood	PR (Planned Residential)
South	Residential, Elementary School, and Undeveloped Agricultural	Neighborhood	PR (Planned Residential)
East	Residential	Neighborhood	Maricopa County R-43
West	Developed Crystal Vista Residential Subdivision	Neighborhood	PR (Planned Residential)

PUBLIC PARTICIPATION SUMMARY:

4. Public notification for preliminary plats requires an initial application notice to property owners within 300 feet of the subject property prior to being heard by the Planning and Zoning Commission.

5. **Table 2: Public Notice**

Notification Element	Date
Published in Buckeye Valley News	N/A
Site Posted	N/A
Mailing to Property Owners w/in 300'	Affidavit of Notice dated 12/13/2021

BACKGROUND:

6. 05/02/2002 - Annexation; Ordinance 11-02
7. 04/16/2002 - Rezoned from RR to PR; Ordinance 12-02
8. 06/06/2006 - FP05-09 Montana Vista Final Plat tabled

ANALYSIS:

Land Use Allocations

9. The preliminary plat contains 270 detached single-family lots with a project density of 3.8 du/ac which is in conformance with the Neighborhood Land Use in the General Plan.
10. The Planned Residential (PR) district is a vested obsolete zoning district. PR allows lot coverage, width, and development standards to be determined by an approved plat.
11. The Montana Vista property is within the Watson Road CFD, which vests the originally approved lot count and provided open space.
12. Two (2) lot sizes are proposed. The 48-feet wide lots will be at least 5,520 square feet in area and 58-feet wide product will be at least 6,960 square feet in area. See Lot Setbacks for development standard details.

See Development Table Next Page

Lot Setbacks

Development Standards	
Standard	PR
Minimum Lot Area	5,400 SF
Minimum Width	48'
Minimum Front Setback	To Garage: 20' To Livable Area/Front Porch/Non-Garage Area – 10'
Minimum Side Setback*	5' / 8' (13' total)
Minimum Rear Setback**	20'
Maximum Building Height	30'
Maximum Lot Coverage	50%
Minimum Open Space	15%
*Corner lots shall have a minimum 10-foot landscape setback on the street sides.	
**The roof or lattice structure may overhang up two (2) feet into the aforementioned rear yard setback and side yard setbacks.	

Schools

- The applicant has been coordinating with Buckeye Union High School District and Buckeye Elementary School District. At final plat, the school district will be asked to provide the City a statement of whether or not there are adequate facilities for the anticipated student load generated by the development.

Circulation

- Access to the site will be provided by Apache Road to the west and Roeser Road to the south. Half street improvements will be required.
- Roeser Road alignment is located half way between Southern Ave and Broadway Road and is to be improved as a collector roadway from Apache along the frontage of this property for approximately 2,318 feet.
- A local road connection at 241st Drive is planned to the north. The subdivision bordering at the north is currently also in the planning stages of a residential subdivision known as Vista Bonita.

Open Space / Trails

17. A minimum of 25% open space is required of this project. However, because this project is identified within the Watson Road CFD, the lot counts are vested and therefore a minimum of 19% open space will be provided. The project proposes a centralized 5.78 acre park and is in conformance with the Buckeye Parks and Recreation Master Plan. Proposed amenities in the conceptual landscape plan include playground with shade sails, corn-hole courts, turf area, ramadas, a 10' multi-use path along Apache Road, and a stabilized decomposed granite trail along West Mobile Lane with seating nodes. All amenities to be shaded and trails lighted.
18. View walls are strategically located to allow visibility along the open space landscaped corridors with multi-use trails as well as the open tracts with trails that run along the eastern side of the development providing access to the future elementary school, parks, and other amenities.

Site Design Details and Theming

19. Site perimeter walls will be architecturally enhanced and have a consistent design and color theme between solid walls, view fences, and partial view walls.

Infrastructure

20. Water and sewer are provided by the City of Buckeye and will be constructed by the developer as per the terms of the master reports, the latest City of Buckeye design standards, and conditions.

Emergency Access

21. The project will utilize existing and planned local streets to provide adequate emergency access. The Fire Department will continue to work with the applicant to ensure that emergency access requirements are provided throughout the phases of construction.
22. The following City of Buckeye departments have reviewed and have found no outstanding issues with the application:
 - Engineering
 - Fire
 - Public Works
 - Community Services
 - Police

- Water Resources
- Development Services

RECOMMENDATION:

23. Staff recommends the Planning and Zoning Commission take the following motion to **approve with conditions a - aaa** of case PLZS-21-00130 for the following reasons:

- Conformance with General Plan
 - Conformance with Development Code
 - No outstanding issues for reviewing departments
- a. Development of the property shall be in general conformance with the preliminary plat entitled “Preliminary Plat for Montana Vista Buckeye, Arizona” consisting of seven (7) pages, dated 11/15/2021 and stamped received 12/14/2021 except as modified by the following conditions.
 - b. Development of the site shall be in general conformance with the Landscape Plan entitled “Montana Vista Buckeye, Arizona Preliminary Landscape Design Package”, consisting of five (5) pages, dated 11/15/21 and stamped received 11/16/2021, except as modified by the following conditions.
 - c. Prior to final plat approval, the Property Owner/Developer shall provide a letter from the appropriate school district(s) that certifies the developer and the school district(s) have entered into an agreement to provide, or help to provide, adequate school facilities within the school district’s attendance area in a timely manner.
 - d. The preliminary plat does not depict any phasing. Phasing of final construction plans and plats will be allowed without the need to amend and reapprove the preliminary plat as long as the following criteria are met:
 1. A minimum of two (2) points of access are provided to any phase. The points of access shall meet the requirements of the fire department.
 2. Waterlines are looped with a minimum of two (2) connections to any phase.
 3. Temporary upstream and downstream drainage provisions are provided for any phase to the satisfaction of the City Engineer.
 4. Each phase includes a reasonable amount of open space and amenities as determined and approved by the Planning Division.
 - e. Preliminary plat approval is valid for a period of two (2) years. For a preliminary plat that identifies phases, the preliminary plat shall remain valid for a period not to exceed two (2) years from the date of recording of any final plat that conforms to the approved preliminary plat. The Development Services Director or Designee may grant a one-time

extension of 12 months if, in the opinion of the Director, satisfactory progress has been made towards completion of the final plat or for the next phase of subdivision development. Additional extensions may be approved through the discretion of the Planning and Zoning Commission.

- f. The property owners and their successors waive any and all claims for diminution in value of the property with regard to any action taken by the City of Buckeye as result of this approval.
- g. At final landscaping plan review, the applicant shall provide elevation details showing typical benches, trashcans, ramadas, lighted trails, and other site amenities. The elevations shall include materials and colors and will be in substantial design conformance with the proposed theme walls of the community.
- h. This subdivision is subject to a Parkway Maintenance Improvement District (MID) and is in accordance with City of Buckeye Ordinance 42-06. The MID shall be established prior to the recordation of the first final plat, as determined in the MID guidelines, and submitted with the first final plat or before.
- i. This subdivision is subject to a Street Light Improvement District (SLID) in accordance with City of Buckeye Ordinance 43-05. The SLID shall be established prior to the recordation of the first final plat as determined by the SLID guidelines and submitted with the first final plat or before.
- j. All landscaped areas within the public rights of way, whether to be maintained by the City of Buckeye or if delegated to the adjacent property owner, homeowners' association or other property maintenance association, shall be designed and sealed by a landscape architect licensed by the Arizona Board of Technical Registration. (The above described MID requirement ensures protection of the city in case maintenance of the ROW landscaping is not maintained or is abandoned by the responsible owner.) The City Public Works Department shall review all irrigation plans for material selection only; therefore, the landscape architect shall coordinate with the Public Works Department early in the design to ensure the most efficient means of landscape irrigation that will reduce both long term maintenance costs and keep watering to the absolute minimum required for healthy growth of landscaping along the roadways of the City of Buckeye.
- k. Artificial or synthetic turf shall be allowed on all surfaces where turf can be used. No individual or association may impose private covenants, conditions, restrictions, deed clauses or other agreements between parties which prevent individuals from utilizing artificial or synthetic turf as an alternative to any landscaping where turf can be used. The quality of the artificial or synthetic turf may be subject to the requirements of individuals or associations.

- I. No new natural turf shall be installed in a public right-of-way or median. Areas with up to 10,000 square feet of turf within a public right-of-way at gateways, entrances to major communities, or special landscaping designs approved by the city's development services department are exempt from the restrictions of this stipulation.
- m. Shrubbery in the right of way shall not obstruct any regulatory signage or sight distance triangles as defined in the Engineering Development Standards; therefore, shall be trimmed to less than 2'-0".
- n. Landscaping within the public-right-of-way will require:
 1. All landscaped areas, except those intentionally maintained with native plants, shall include an automatic irrigation system.
 2. All native plant landscaping plans shall include an establishment maintenance plan that ensures long term growth of all plantings.
 3. Establishment maintenance plan shall be sealed by a registered Landscape Architect.
 4. Water-efficient systems (e.g., drip, mini-spray, bubbler-type, or similar drip systems) shall be used whenever feasible. Low-flow sprinkler heads with matched precipitation rates shall be used when spray or rotor-type heads are specified for watering shrubs and ground cover areas.
 5. Multi-program weather sensing controllers with separated valves and circuits shall be used when the project contains more than one type of landscape treatment (e.g., lawn, ground cover, shrubs, tree areas), or a variety of solar aspects.
 6. Soil moisture-sensing devices and rain sensors shall be used on all projects within public rights of way and in landscape tracts. The use of satellite based controllers is encouraged.
 7. Root barriers shall be designed and incorporated for all trees that are in the public right of way to ensure vertical root growth and avoid adjacent curb, sidewalk or pavement upheaval due to tree roots.
 8. Linear Root barriers shall be used along public improvements that are only on one side of a tree.
 9. Surround Root barriers shall be used when a tree is within the sidewalk or within a median.
 10. Tree canopies extending into the right of way shall be trimmed to the following minimum standards: 18'-0" over any public roadway, 7'-0" over any public sidewalk.

11. All trash shall be collected through a City of Buckeye licensed trash hauler, including construction debris. Trash enclosures shall be in accordance with City of Buckeye standards.
- o. Prohibited Trees: The following trees are prohibited from any landscaping plans in accordance with Chapter 9 of City Code (Section 9-10):
- Male Mulberry Tree (*Morus Alba*).
 - Olive Tree (*Olea Europea*).
 - Additionally, North Indian Rosewood Trees (*Dalbergia Sissoo*) shall not be planted within the rights of way (and are suggested not be planted within the property) due to their destructive and invasive root structure
- p. Storm Drainage: The City of Buckeye is permitted as a Phase 2 MS4 and is now subject to more stringent standards for stormwater discharge. All stormwater plans must now meet the requirements of the City of Buckeye's MS4 permit as issued by ADEQ (Permit Number AZG2016-002).
- q. The Buckeye Fire Chief and City Engineer shall determine the number, location, and types of all fire hydrants.
- r. Prior to delivery of any combustible materials to the site, the fire protection system shall be completely operational, with proper fire flow, and in accordance with the plans approved by the Buckeye Fire Chief and City Engineer.
- s. All buildings shall be equipped with a fire protection system as required by City of Buckeye Ordinance 20-13.
- t. Where two fire apparatus access roads are required, they shall be placed a distance apart equal to not less than one half of the length of the maximum overall diagonal dimension of the lot or area to be served, measured in a straight line between accesses.
- u. All streets must conform to the Maricopa County/Phoenix street name and hundred block grid system.
- v. Residential developments where the number of dwelling units exceeds 10 shall be provided with two separate and approved fire apparatus access roads.
- w. Developer to deed restrict Tract 17 so that at such time the City of Buckeye decides to develop the well site, the HOA will dedicate a 150' x 150' lot, at no cost to the City of Buckeye, around the well for this purpose. The 150'x150' lot would need to be located to cover the existing well and utilize the existing 20' easement.
- x. Both streets that intersect Apache Road & Roeser Road will be a minimum of a Residential Entrance Street per the City of Buckeye's Engineering Design Standard Detail 63190.
- y. Phasing of public infrastructure shall be subject to a phasing plan as approved by the Development Services Director and City Engineer.

- z. Prior to final plat recordation, final landscaping and irrigation plans, including all lighting improvements, shall be reviewed and approved by the City of Buckeye.
- aa. The Property Owner/Developer shall provide for channelization of off-site storm water that will be intercepted by this project in accordance with a Final Drainage Report as approved by the City Engineer, which shall be submitted along with the first submittal of the improvements plans. In the case where work related to interception of off-site storm water is required on adjacent parcels of land not controlled by the Property Owner/Developer, the Property Owner/Developer shall first obtain a drainage easement from the adjacent parcel owners. When required, said easement shall include an acknowledgment by the adjacent parcel owner(s) that historic drainage discharge points may be altered. Said drainage easements shall be executed and submitted to the City prior to approval of the Grading Plans and shall be recorded prior to approval of the final plat for this project.
- bb. Montana Vista's developer is responsible for a temporary drainage channel along the south boundary of the Vista Bonita and City Water Campus parcels to the Sonoran Vista channel at the mid-section line if Montana Vista develops prior to the Vista Bonita parcel.
- cc. Prior to final plat approval, the Property Owner/Developer shall obtain approval from the applicable utility interests for easement location and width as required for utility purposes.
- dd. At the time of improvement plan submittal, the Property Owner/Developer shall provide a comprehensive Drainage Master Plan, which addresses all on-site and off-site drainage requirements and issues. The Drainage Master Plan shall also identify the method by which existing 100-year floodplains will be mitigated.
- ee. The Buckeye Fire Chief and City Engineer shall determine the number, location, and types of all fire hydrants.
- ff. Prior to delivery of any combustible materials to the site, the fire protection system shall be completely operational, with proper fire flow, and in accordance with the plans approved by the Buckeye Fire Chief and City Engineer.
- gg. The Applicant will submit an electronic CAD and GIS file with full construction documents of the development to the City Engineer, Public Works Department, and GIS Administrator upon final plat approval in order to maintain current street records and assist in emergency dispatch and response.
- hh. All streets (local, collector, and arterial), sidewalks, parks, and other common areas, as determined by the City Engineer, shall be sufficiently illuminated to ensure the safety and security of persons and property. The City Engineer shall approve all lighting improvements.

- ii. All street names shall be subject to final approval by the City of Buckeye and shall conform to the City of Phoenix grid alignment.
- jj. Pavement sections for all streets shall be determined in accordance with a City Engineer-approved geotechnical analysis, but shall not be less than the City's minimum requirements.
- kk. Prior to the issuance of a Building Permit, the Property Owner/Developer shall pay a pro rata share, based on acreage, of the cost of up to nine (9) future traffic signals to be installed within this section of land. The sectional contribution is to be based on the following allocation of costs: (i) 25 percent share of four (4) possible signals at arterial street intersections; (ii) 50 percent share of four (4) possible signals at half-mile collector street intersections or project entries; and (iii) 100 percent share of one (1) possible signal internal to this project. The cost shall be based on an anticipated signal cost as determined by the City Engineer.
- ll. Street signs and sign posts shall be placed at all street intersections, with stop signs where applicable, by the Property Owner/Developer and shall be in place when street paving is completed. Specification for design, construction, location, and installation shall be in accordance with city roadway standards and shall be approved by the City Engineer.
- mm. The paved portion of all cul-de-sacs shall have a minimum radius of 43 feet.
- nn. Any traffic signals that are required due to traffic generated by this project shall be installed by the Property Owner/Developer when warranted.
- oo. All irrigation ditches to remain on-site shall be installed underground. Irrigation pipe crossings of the streets shall be constructed to the city's standards.
- pp. All existing irrigation facilities located on the site shall be abandoned, relocated off the property, or installed underground. Any district-owned facilities to be located within the right-of-way shall be located near the rear of the right-of-way and the right-of-way shall be extended at least five (5) feet. Any additional right-of-way for district-owned facilities (not to exceed five feet) can be deducted from the depth of the perimeter landscape tracts.
- qq. At the time of Improvement Plan submittal, the Property Owner/Developer shall submit for review and approval a Sewer Master Plan which provides sizing calculations for all on-site and off-site sewers.
- rr. Prior to final plat approval, an effluent irrigation pipe (Purple Pipe) system shall be designed by the Property Owner/Developer and approved by the City Engineer in order to service all association maintained landscaping. At such time as an effluent delivery system is designed and developed by the City, the Property Owner/Developer is required

to install and bring the development's system into full operation by connecting into the city's system.

- ss. The Property Owner/Developer is responsible for providing, at their sole cost and expense, all public infrastructure necessary to serve the project including, without limitation, water and wastewater service in accordance with Ordinance No. 86-06. This includes water supply, infrastructure, and capacity for the production, treatment, and delivery of water to the project and the collection, treatment, and disposal, including recharge and/or reuse, of wastewater generated at the project. Notwithstanding any authority of the City to create a special district for purposes of funding infrastructure in the City, to meet its obligations under this Stipulation and under Ordinance No. 86-06, the Property Owner/Developer may participate jointly with other property owners/developers in the provision of the necessary regional public infrastructure to serve the subject property and, in such event, shall pay its pro-rata share of the costs of providing such infrastructure and shall provide documentation satisfactory to the City of such participation and payment of its pro rata share.
- tt. Prior to final plat/site plan approval, the Property Owner/Developer shall submit to the City for review and approval Water and Wastewater Master Plans. In order to provide for water production and treatment, the Property Owner/Developer may be required to provide additional sites for production wells and water production site on the Final plat/site plan or at off-site locations.
- uu. The Property Owner/Developer is responsible for providing water at the project for construction purposes including obtaining the necessary water rights for the water supply to be used for construction purposes.
- vv. If the property is location with the City's water service area, to the extent allowed by law, all Type-I Non-irrigation and Irrigation Grandfathered Rights associated with the property shall be properly extinguished and the resulting extinguishment credits conveyed to the City of Buckeye or pledged to the City of Buckeye account at the Arizona Department of Water Resources prior to the issuance of any building permits.
- ww. If the property is located within the City's water service area, the Property Owner/Developer shall allocate any surface water rights to the City prior to the issuance of any building permits.
- xx. If the Development is within the City of Buckeye's Water Service Area, the Property Owner/Developer shall notify the City's Water Resources Department of the location of any registered and unregistered wells on the property and the Property Owner/Developer and the City's Water Resources Department shall meet and confer to determine if the wells are beneficial or whether they shall be abandoned. Wells shall be abandoned by

the Property Owner/Developer if the City's Water Resources Department determines that they present a health and safety hazard or are contributing to groundwater contamination and are not able to be rehabilitated, modified, or re-drilled to prevent the health and safety hazard or groundwater contamination.

- yy. Abandonment of wells shall be performed pursuant to and in compliance with State law and shall be completed prior to the issuance of any building permits.
- zz. In the event the City has been designated by the Arizona Department of Water Resources (ADWR) as having an assured water supply, the Property Owner/Developer has, prior to final plat approval and if requested by the City, reduced the volume of its analysis of assured water supply for the subdivision to allow the City to include the relinquished water supply in the City's designation in order that the City may provide water service to the subdivision; provided, however, the Property Owner/Developer may relinquish a portion(s) of its analysis for assured water supply in connection with water service by the City to a Phase or Phases of development of the subdivision if ADWR approves such partial relinquishment and reduction in the analysis volume without negatively impacting the priority of the remaining reserved groundwater under the Property Owner/Developer's analysis of assured water supply. The Property Owner/Developer acknowledges that the City is preparing to submit to ADWR its application for designation as an assured water provider and the Property Owner/Developer agrees to cooperate with and support the City's efforts in processing its designation application. The Property Owner/Developer further agrees that it shall submit to ADWR its request to reduce its analysis, by the volume required to meet the demand of the development included in the designation, as applicable and as requested by the City, upon (1) ADWR's administrative determination that the City's designation application is complete; and (2) written notice from ADWR to the City that ADWR is prepared to issue its order designating the City as an assured water provider upon submission of any applicable requests to reduce analyses of assured water supply as evidence of physical availability (the foregoing requirements collectively referred to as "Analysis Reduction Requirements"). If prior to the date on which ADWR issues its order designating the City as an assured water provider, the law or ADWR policy and procedure change that affect the above Analysis Reduction Requirements for the Property Owner/Developer, the Property Owner/Developer specifically acknowledges and agrees that the City shall have the right to require the Property Owner/Developer's compliance with the new law or ADWR policy or procedure and the Property Owner/Developer agrees that it shall perform its obligations in such regard at its sole cost and expense.

aaa. Prior to final plat approval, the Development Services Director shall require the Property Owner/Developer to produce a Certificate of Assured Water Supply issued by the Arizona Department of Water Resources (ADWR), covering all lots and parcels created, defined, or depicted on said plat. The certificate must be consistent with all Arizona Department of Water Resources ADWR rules and regulations. In the event the City has been designated an assured water provided prior to Final Plat approval, and the ADWR has not yet issued a Certificate or Certificates of Assured Water Supply for the subdivision, a Certificate or Certificates of Assured Water Supply will not be required by the City. The City may instead require as a condition to Final Plat approval that the Property Owner/Developer provide the City with other evidence demonstrating that there is sufficient volume and quality of water necessary to serve the demands at the subdivision such as a physical availability determination issued by the ADWR along with supporting documentation or that the Property Owner/Developer provide the City with a copy of an analysis of assured water supply, with supporting documentation, issued by the ADWR for the subdivision.

Attachments

- Vicinity Map (Aerial Photo)
- Narrative
- Preliminary Plat
- Conceptual Landscape Plan
- Preliminary Drainage Report
- Preliminary Sewer Report
- Preliminary Water Report
- Preliminary Grading & Drainage Plan

Prepared By:
Andrea Marquez, Planner II

Reviewed By:
Adam Copeland, Deputy Director of Planning

Case No.: PLZS-21-00130

PLZS-21-00130

Project Narrative Montaña Vista

*Located:
NEC of Apache Road and Roeser Road*

**4TH REVIEW
RECEIVED
Dec 14 21
CITY OF BUCKEYE
PLANNING & ZONING
DM**

October 15, 2021



Property Owner:
MV Holding Company
1017 W Happy Valley Rd
Phoenix, AZ 85085
Tel: 602-708-8550
Contact: Lenn Pritchard

Developer:
Beazer Homes
1130 N Alma School Rd, #110
Mesa, AZ 85201
Tel: 480-232-5747
Contact: James Alexander

Engineer & Planning Consultant:
EPS Group, Inc.
1130 N Alma School Rd, #120
Mesa, AZ 85201
Tel: 480-503-2250
Contact: Dan Auxier & Josh Hannon

Introduction

EPS Group, Inc., on behalf of Beazer Homes, submits this request for review and approval of the Preliminary Plat for a proposed single family residential community on ± 71.32 -gross acres, located at the northeast corner of Apache Road and Roeser Road in Buckeye, AZ. The subject site, zoned Planned Residential (PR), is identified as Maricopa County Assessor Parcel Numbers (APNs) 504-41-006P; -006Q; -721; and -722.

Description of Request

Beazer Homes is seeking Preliminary Plat approval in order to develop a 270-lot single-family residential subdivision with a gross density of 3.80 dwelling units per acre. The proposed subdivision will have a mix of lot sizes, including 48' x 115' and 58' x 120'.

Current Use and Planned Changes

The site is currently undeveloped, agricultural land. As stated above, Beazer Homes is seeking to develop a residential subdivision with a 65' arterial half-street, 40' half-street collector street and 50' internal local public streets, including curb, gutter, and sidewalk.

Relationship to Surrounding Properties

This development is zoned Planned Residential (PR) and is located within the 'Neighborhoods' land use designation of the City of Buckeye General Plan. This site is compatible with surrounding uses, which include single family residences, a school, and undeveloped land.

Surrounding Existing Use and Zoning Designations		
	Existing Use	Existing Zoning
North	Undeveloped, Villa Capri Mobile Home Park	PR
East	Maricopa County Large-Lot Residential / Sonoran Vista Subdivision	RU-43 (MC) / PR
South	Riata West & Cotton Meadows Subdivision / Buckeye Elementary School	PR
West	Crystal Vista Subdivision	PR

Accessibility & Circulation

The proposed community is three (3) miles east of the Phoenix Bypass Route 85 and I-10 Freeway interchange and 2.5-miles from the I-10 and Watson Road intersection, which provides the future residents with multiply, quick accessways to the greater Phoenix Metro area. The site intends to have standard 50' rights-of-way throughout the site and all primary project access roads shall be public roadways. Full half-street improvements will be constructed for Apache Road and Roeser Road on the south and west side of the community.

Design & Landscaping

The landscape and open space theme designed for the community includes street trees and streetscape design to promote strong community identity. The landscape and open space network have been designed to provide both visual and actual connection to bring the neighborhood residents together and focus amenity activity on open space and amenities. Landscape within the common open has been designed to provide connectivity to open space amenities through the site. Onsite retention areas will be

landscaped to provide areas for active and passive recreation. All passive and active open space areas for the community are located within close proximity to all lots.

Parks, Open Space & Trails

Montaña Vista will feature a total of 13.62-acres of open space, which is 19% of the total project acreage (gross) and included 5.78-acres of active recreation area. The proposed single-family subdivision will not have any detrimental impact on surrounding local parks. The new community will feature a central amenity, pocket parks and open space throughout the development, which provide opportunities and places for residents of all ages and abilities to gather, socialize, and explore. A comprehensive park, amenity, open space, and connectivity system has been designed for the residential community. The main amenity will feature unique recreational amenities such as ramadas, cornhole courts, and a playground with shade sails and turf.

Utilities & Services

Montaña Vista shall be serviced by the following utility companies and community services:

Utilities & Services	
Service	Provider
Water	City of Buckeye
Sewer	City of Buckeye
Refuse	City of Buckeye
Fire	City of Buckeye
Police / Security	City of Buckeye
Electric	APS
Gas	Southwest Gas
Telephone	Century Link / Cox Communication
Cable TV	Century Link / Cox Communication
School District	Buckeye Union High School District Buckeye Elementary District

Impact on Local Schools & Parks

The proposed single-family subdivision will not have any detrimental impact on surrounding schools. An Agreement of Understanding between The Buckeye Union High School District and site owners is currently being reviewed and approved by Dr. Drew Davis, the Assistant Superintendent of Operations and Innovations.

Development Standards

The Montaña Vista subdivision shall be developed in conformance with the development standards as shown in the table below:

Development Standards	
Standard	PR
Minimum Lot Area	5,400 SF
Minimum Width	48'
Minimum Front Setback	To Garage: 20' To Livable Area/Front Porch/Non-Garage Area – 10'
Minimum Side Setback*	5' / 8' (13' total)
Minimum Rear Setback**	20'
Maximum Building Height	30'
Maximum Lot Coverage	50%
Minimum Open Space	15%
*Corner lots shall have a minimum 10-foot landscape setback on the street sides.	
**The roof or lattice structure may overhang up two (2) feet into the aforementioned rear yard setback and side yard setbacks.	

Conclusion

The development team thanks you for your time and requests your favorable consideration of the submitted documents.

PARCEL NO. 1 :
THE SOUTHERLY 1345.00 FEET OF THE NORTHWEST QUARTER OF SECTION 28, TOWNSHIP 1 NORTH, RANGE 3 WEST OF THE GILA AND SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA; EXCEPT THE EAST HALF OF THE EAST HALF OF THE EAST HALF OF THE NORTHWEST QUARTER OF SAID SECTION 28; AND EXCEPT THE SOUTH HALF OF THE SOUTHWEST QUARTER OF THE NORTHWEST QUARTER OF SAID SECTION 28.
EXCEPT THAT PORTION OF THE NORTHWEST QUARTER OF SECTION 28, TOWNSHIP 1 NORTH, RANGE 3 WEST OF THE GILA AND SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA, MORE SPECIFICALLY DESCRIBED AS THE FOLLOWING PARCEL:
COMMENCING AT THE WEST QUARTER CORNER OF SAID SECTION 28, SAID POINT ALSO BEING THE CENTERLINE INTERSECTION OF APACHE ROAD AND ROESER ROADS;
THENCE SOUTH 89 DEGREES 50 MINUTES 48 SECONDS EAST, ALONG THE MID-SECTION LINE, A DISTANCE OF 2,317.54 FEET;
THENCE NORTH 00 DEGREES 12 MINUTES 11 SECONDS WEST, A DISTANCE OF 748.24 FEET TO THE TRUE POINT OF BEGINNING;
THENCE SOUTH 55 DEGREES 10 MINUTES 37 SECONDS WEST, A DISTANCE OF 138.22 FEET, TO THE BEGINNING OF A NON-TANGENT CURVE CONCAVE SOUTHWESTERLY, WITH A RADIUS OF 50 FEET AND A RADIAL BEARING OF NORTH 55 DEGREES 10 MINUTES 37 SECONDS EAST;
THENCE 1/4 MILE NORTHEAST ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 36 DEGREES 51 MINUTES 04 SECONDS, WITH A CURVE LENGTH OF ABOUT 32.16 FEET;
THENCE NORTH 18 DEGREES 19 MINUTES 33 SECONDS EAST, A DISTANCE OF 113.44 FEET;
THENCE NORTH 89 DEGREES 41 MINUTES 38 SECONDS EAST, A DISTANCE OF 102.95 FEET;
THENCE SOUTH 00 DEGREES 12 MINUTES 11 SECONDS EAST, A DISTANCE OF 49.22 FEET TO THE POINT OF BEGINNING.

PARCEL NO. 3:
THE SOUTH HALF OF THE SOUTH HALF OF THE SOUTHWEST QUARTER OF THE NORTHWEST QUARTER
OF SECTION 28, TOWNSHIP 1 NORTH, RANGE 3 WEST OF THE GILA AND SALT RIVER BASE AND
MERIDIAN, MARICOPA COUNTY, ARIZONA.

Typical Lot Setbacks

48'x115'

Typical Lot Setbacks

58'x120'

MIN. LOT AREA:	5,400 SF
MIN. LOT WIDTH:	48'
MIN. FRONT SETBACK:	20' (TO GARAGE) 10' (LIVABLE / FRONT PORCH / NON-GARAGE AREA
MIN. SIDE SETBACK*:	5' / 8' (13' TOTAL)
MIN. REAR SETBACK**:	20'
MAX. BUILDING HEIGHT:	30'
MAX. LOT COVERAGE:	50%

Plan view of a proposed L/S Tract. The diagram shows a curved boundary with a 25.0' R/W and a 10.0' MIN. distance. A 25.0' R/W is also shown at the bottom left. The tract is bounded by a 5.0' S/W on the left and a 5.0' S/W on the right. The tract is divided into sections with dimensions: 8.0' B.S.L., 20.0' B.S.L., 20.0' B.S.L., 10.0' B.S.L., 8.0' P.U.E., and 5.0' S/W. A V.N.A.E. (Vertical Not A Part) is indicated. The tract is labeled 'L/S Tract'.

Plan view of the bridge deck showing dimensions and offsets. The deck is 25.0' wide on each side of the centerline (C/L). The total width is 50.0'. The deck is divided into sections: 4.0' L/S (Left Side), 5.0' S/W (Shoulder Width), 16.0' B/C (Base Course), and 16.0' B/C (Base Course). The total width of the base course is 32.0'. The deck is 8.0' wide on each side of the base course. The total width of the deck is 50.0'. The deck is 8.0' wide on each side of the base course. The total width of the deck is 50.0'.

Plan view of proposed bridge deck showing dimensions and existing conditions. The diagram includes the following labels and dimensions:

- EXISTING 33.0' R/W** (Right of Way) on the left side.
- EXISTING 40.0' R/W** (Right of Way) on the right side, with a note **PER DOC. 16-0072115, MCR**.
- PROPOSED 20.0' R/W** (Right of Way) on the right side.
- 8.0' P.U.E.** (Public Utility Easement) on the far right.
- EX. +/- 15.0' PAVEMENT** (Existing Pavement) on the left side.
- 42.0' B/C** (Bridge Clear) in the center.
- 0.58'** (Offset) between the existing pavement and the bridge structure.
- 10.0' L/S** (Left Side) and **6.0' S/W** (Shoulder Width) on the right side of the bridge.
- 2.0'** (Offset) between the proposed right of way and the public utility easement.

BEING A PORTION OF THE NORTHWEST QUARTER OF SECTION 28, TOWNSHIP 1 NORTH,
RANGE 3 WEST, GILA AND SALT RIVER BASE AND MERIDIAN, CITY OF BUCKEYE,
MARICOPA COUNTY, ARIZONA

☐ Approved
☒ Approved with Comments
☐ Approved with Signatures
☐ Review & Resubmit
 Date: 1/16/2023
 Reviewed By: JACA
 Final Approval subject to site inspection

APN: 504-41-723
CITY OF BUCKEYE
ZONING: PR

N.T.S.

W. BROADWAY RD

W. SOUTHERN AVE

N. APACHE ROAD

N. WATSON RD

SUBJECT SITE

OWNER	<u>CIVIL ENGINEER & PLANNER:</u>
MV HOLDING COMPANY	EPS GROUP, INC.
1017 W HAPPY VALEY ROAD,	1130 N. ALMA SCHOOL ROAD, SUITE 120
PHOENIX, AZ 85085	MESA, ARIZONA 85201
TEL: (602) 708-8550	TEL: (480)-503-2250
CONTACT: LENN PRITCHARD	CONTACT: JOSH HANNON
lennp82601@gmail.com	josh.hannon@epsgruoinc.com

PROJECT DATA

GENERAL PLAN:	NEIGHBORHOOD
EXISTING ZONING:	PLANNED RESIDENTIAL (PR)

LOT SIZE:	
48' x 115'	176 (65%)
58' x 120'	94 (35%)
TOTAL	270 (100%)

OPEN SPACE:
ACTIVE RECREATION AREA:

OPEN SPACE: 13.62 ACRES (19.1% OF GROSS)
ACTIVE RECREATION AREA: 5.78 ACRES (8.1% OF GROSS)

SOUTH LINE OF THE NORTHWEST QUARTER SECTION 28, TOWNSHIP 1 NORTH, RANGE 3 WEST, GILA & SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA.
(SOUTH 89° 51'27" EAST)

NGS DESIGNATION 46G1. A STAINLESS STEEL ROD UNDER ALUMINUM CAP LID,
LOCATED 258' WEST OF
THE CENTERLINE OF ROOKS ROAD, 30' SOUTH OF
THE CENTERLINE OF BASELINE ROAD, 100' NORTH OF
THE CENTERLINE OF RAILROAD TRACKS
ELEVATION = 892.40' (NAV 88' DATUM)

WATER	CITY OF BUCKEYE
SEWER	CITY OF BUCKEYE
GAS	SOUTHWEST GAS
ELECTRIC	ARIZONA PUBLIC SERVICE (APS)
TELEPHONE	CENTURYLINK / COX
CABLE TV	CENTURYLINK / COX
FIRE	CITY OF BUCKEYE
POLICE	CITY OF BUCKEYE
SCHOOL DISTRICT	BUCKEYE UNION HIGH SCHOOL BUCKEYE ELEMENTARY SCHOOL

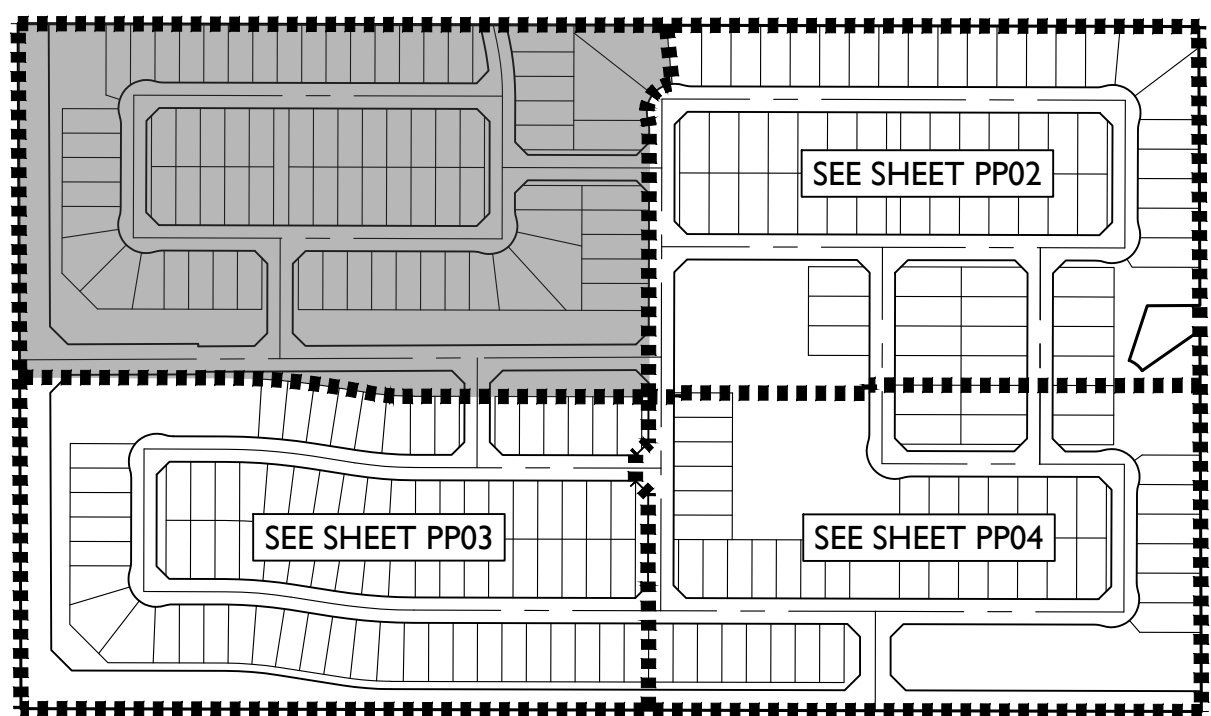
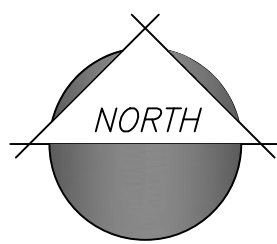
- PROPERTY CORNER
- ⊙ FIRE HYDRANT (FH)
- MANHOLE
- ◌ EASEMENT
- EMST RIGHT-OF-WAY
- R/W PRIVATE STREET TRACT
- P/S PUBLIC UTILITY EASEMENT
- PUE SIGHT VISIBILITY TRIANGLE
- SVT VEHICULAR NON-ACCESS EASEMENT
- VNAE

- ===== PROPERTY BOUNDARY
- STREET CENTERLINE
- STREET RIGHT-OF-WAY
- PUE
- LOT LINE
- SEWER LINE
- WATER LINE
- 1' VEHICULAR NON-ACCESS EASEMENT

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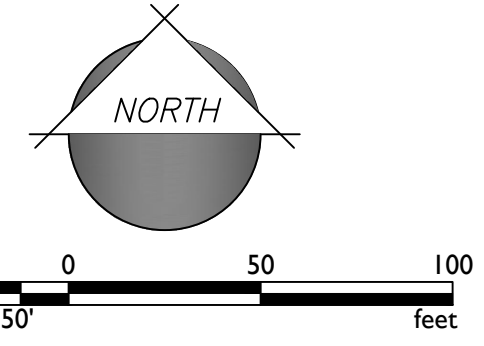
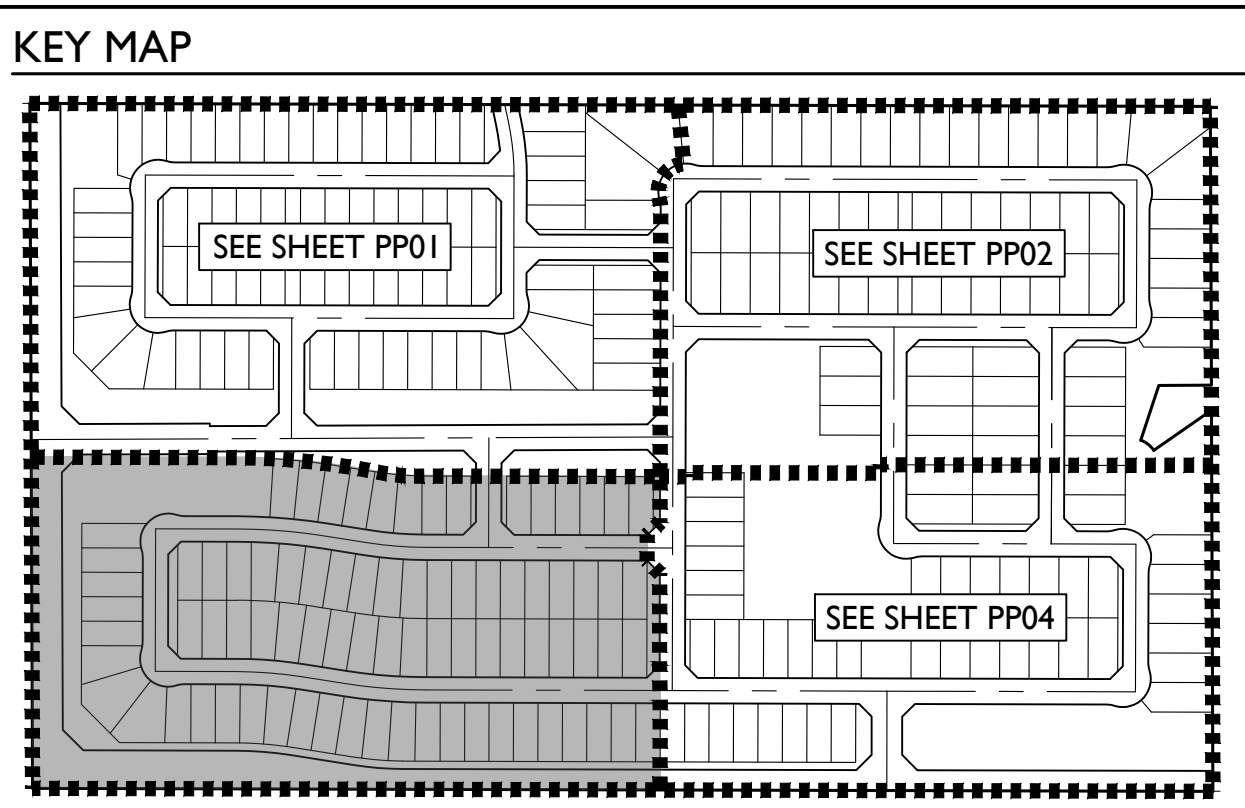
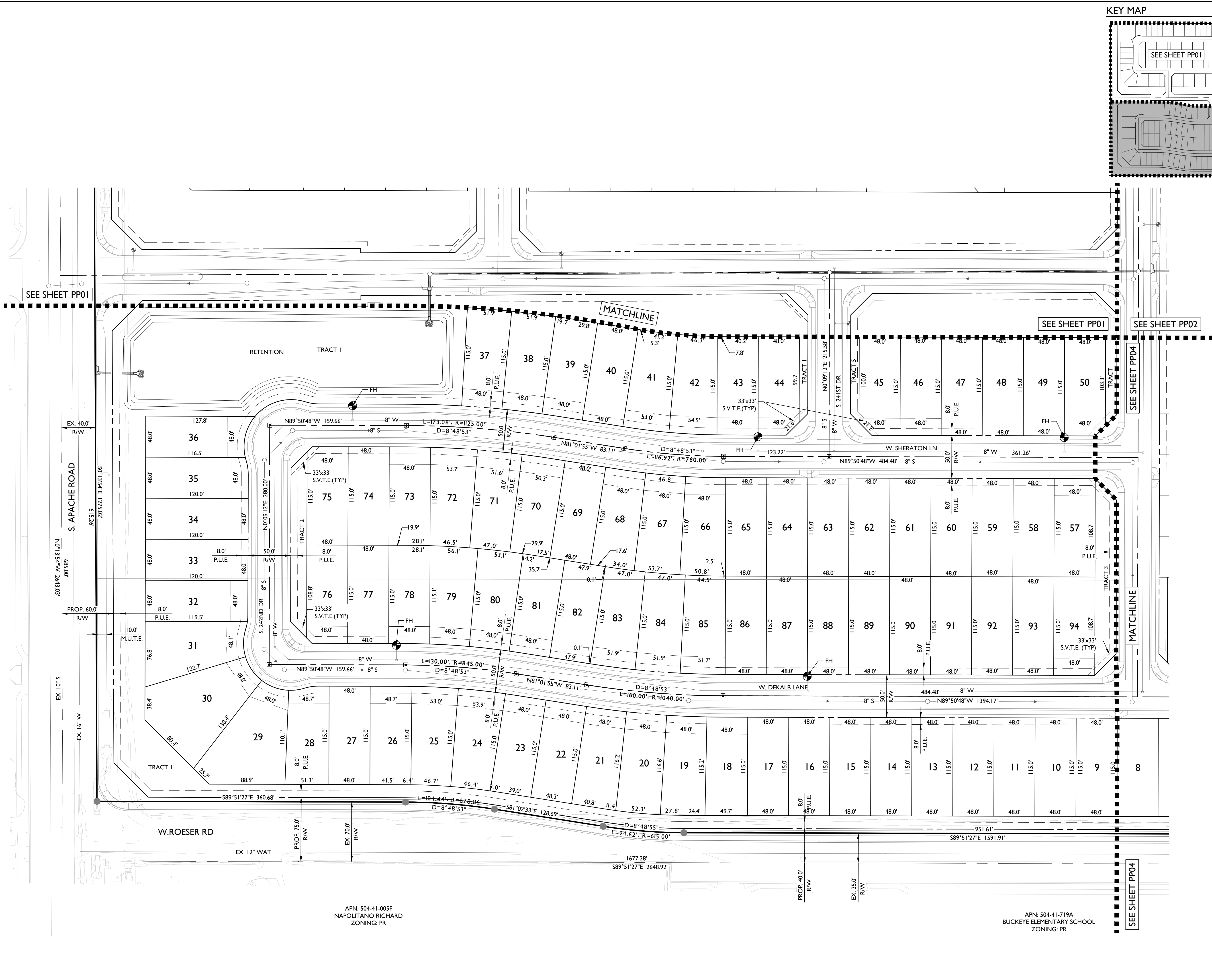
CS01	COVER SHEET
PP01	PRELIMINARY PLAT
PP02	PRELIMINARY PLAT
PP03	PRELIMINARY PLAT
PP04	PRELIMINARY PLAT
PP05	DATE TABLES
PP06	FIRE HYDRANT EXHIBIT

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20-1512 - Montaña Vista

Dec 13, 2021 4:06pm \\Eps-m16-fs01\shared\Projects\2020\20-1512\Planning\Drawings\Preliminary Plat\20-1512 - PP03.dwg ngriffin



APN: 504-41-005F
NAPOLITANO RICHARD
ZONING: PR

APN: 504-41-719A
BUCKEYE ELEMENTARY SCHOOL
ZONING: PR

1130 N. Alma School Road, Suite 120
Mesa, AZ 85201
T: 480.503.2350 | F: 480.503.2358
www.epsgroupinc.com

Project:
Montaña Vista
Buckeye, Arizona

PRELIMINARY PLAT

Revisions:
JULY 8, 2021 - 1ST PRELIMINARY PLAT SUB.
OCTOBER 6, 2021 - 2ND PRELIMINARY PLAT SUB.
NOVEMBER 15, 2021 - 3RD PRELIMINARY PLAT SUB.

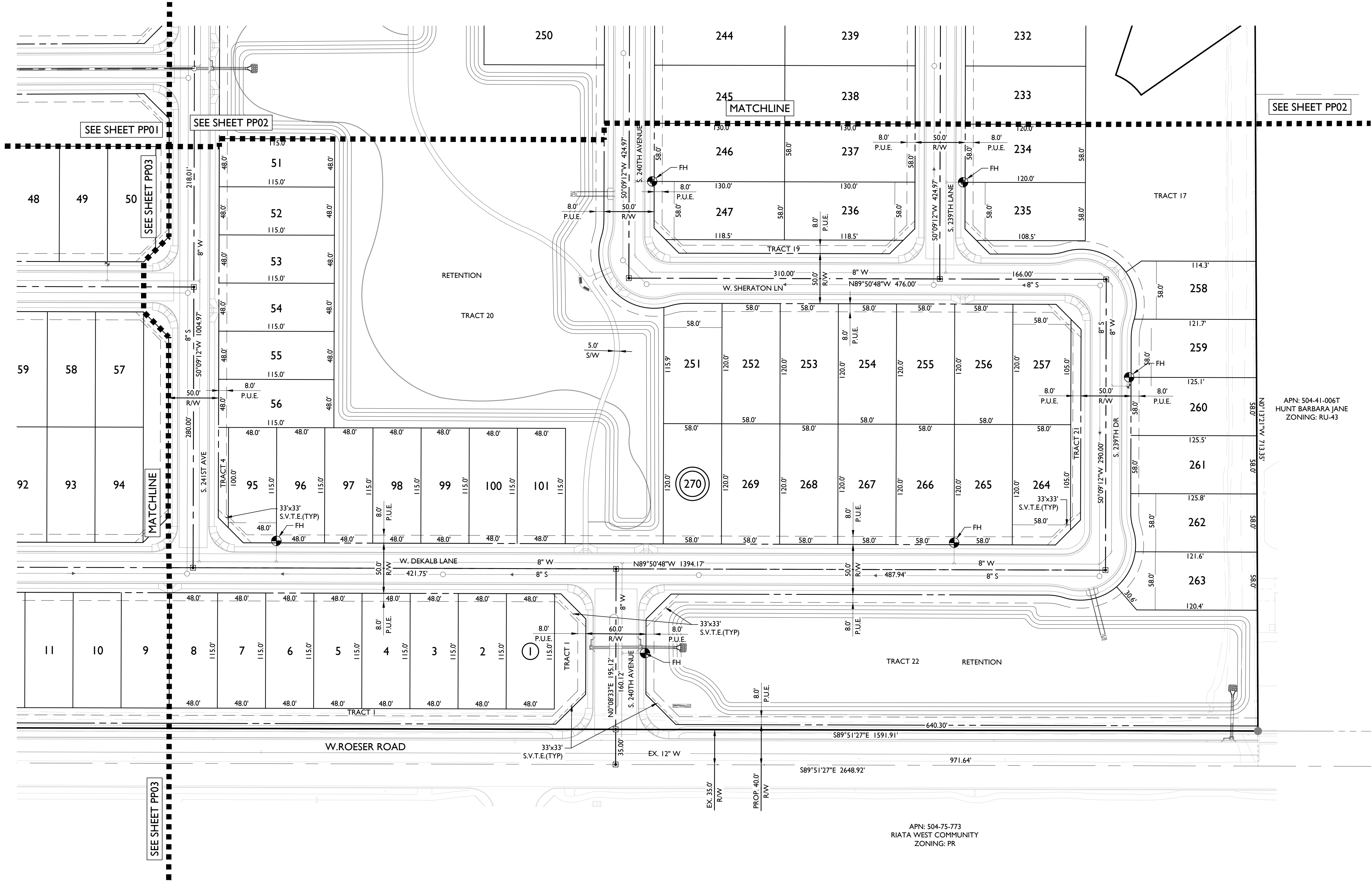
Designer: JH
Drawn by: JAJ

Job No.
20-1512
PP03

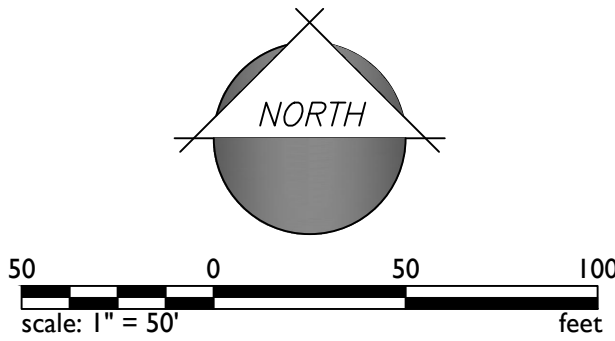
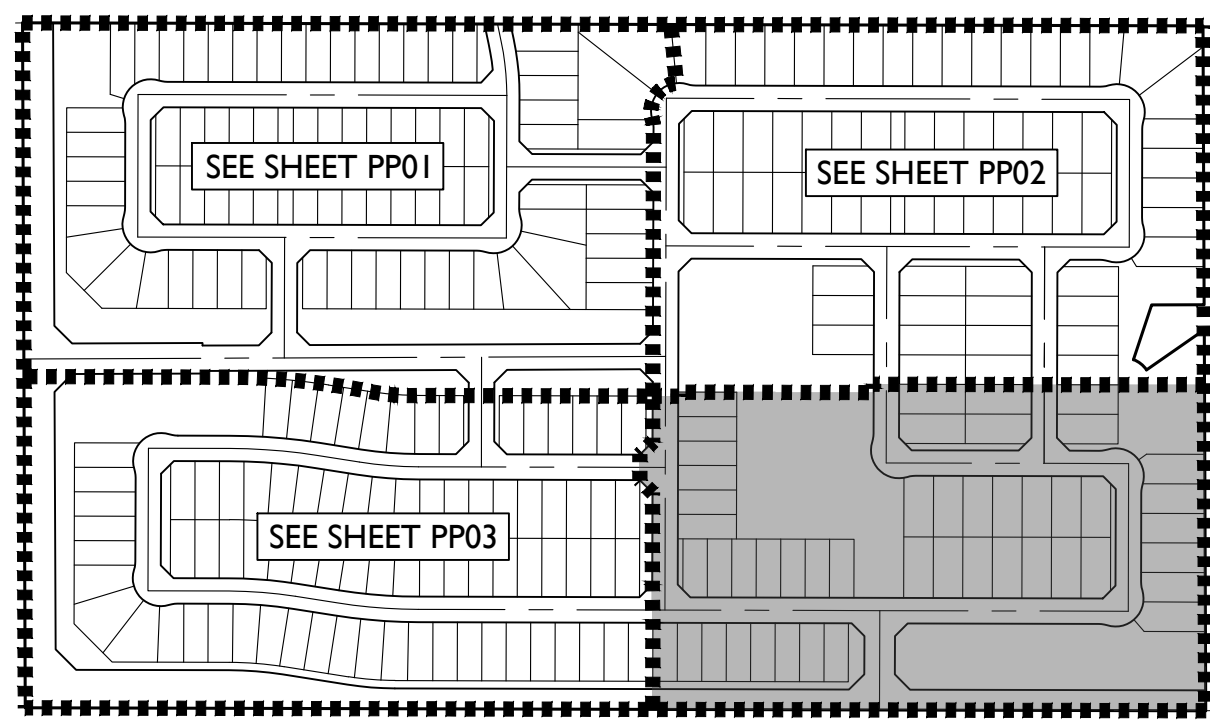
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of 7

20-1512 - Montaña Vista

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KEY MAP



1130 N. Alma School Road, Suite120
Mesa, AZ 85201
T:480.503.2350 | F:480.503.2358
www.epsgroupinc.com

Project:
Montaña Vista
Buckeye, Arizona

PRELIMINARY PLAT

Revisions:
JULY 8, 2021 - 1ST PRELIMINARY PLAT SUB.
OCTOBER 6, 2021 - 2ND PRELIMINARY PLAT SUB.
NOVEMBER 15, 2021 - 3RD PRELIMINARY PLAT SUB.

Call at least two full working days before you begin excavation.
Seal No. 1-190-010000-010000-010000
in Maricopa County (002263-1100)

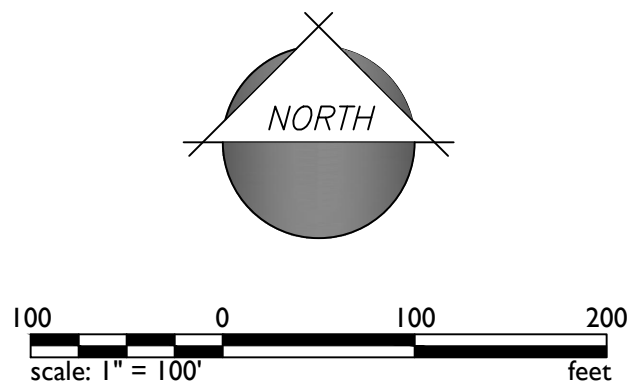
Designer: JH
Drawn by: JAJ

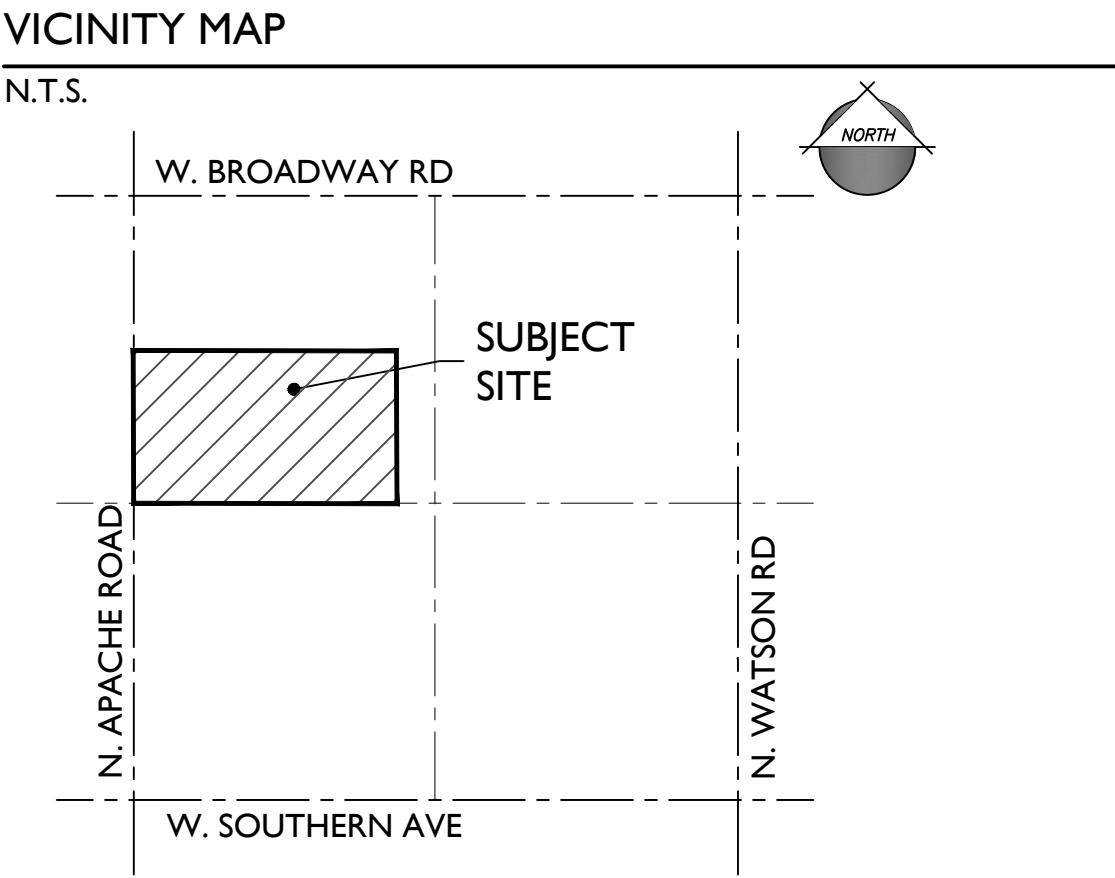
Job No.
20-1512
PP04

Sheet No.
5
of **7**

TRACT USE TABLE			
TRACT	USE	AREA (SF)	AREA (AC)
1	LANDSCAPE / OPEN SPACE / RETENTION	113186	2.598
2	LANDSCAPE / OPEN SPACE	3727	0.086
3	LANDSCAPE / OPEN SPACE	5109	0.117
4	LANDSCAPE / OPEN SPACE	950	0.022
5	LANDSCAPE / OPEN SPACE	17728	0.407
6	LANDSCAPE / OPEN SPACE	48709	1.118
7	LANDSCAPE / OPEN SPACE	61382	1.409
8	LANDSCAPE / OPEN SPACE	1900	0.044
9	LANDSCAPE / OPEN SPACE	6900	0.158
10	LANDSCAPE / OPEN SPACE	1900	0.044
11	LANDSCAPE / OPEN SPACE	2604	0.060
12	LANDSCAPE / OPEN SPACE	2233	0.051
13	LANDSCAPE / OPEN SPACE	2233	0.051
14	LANDSCAPE / OPEN SPACE	2000	0.046
15	LANDSCAPE / OPEN SPACE	6621	0.152
16	LANDSCAPE / OPEN SPACE	2021	0.046
17	LANDSCAPE / OPEN SPACE / ACCESS EASEMENT	54133	1.243
18	LANDSCAPE / OPEN SPACE	3014	0.069
19	LANDSCAPE / OPEN SPACE	3014	0.069
20	LANDSCAPE / OPEN SPACE / RETENTION / AMENITY	175187	4.022
21	LANDSCAPE / OPEN SPACE	2000	0.046
22	LANDSCAPE / OPEN SPACE / RETENTION	76628	1.759
TOTAL TRACT AREA		593179	13.617

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Montaña Vista

Buckeye, Arizona

SUBMITTED: September 30, 2021
RESUBMITTED: October 6, 2021
RESUBMITTED: November 15, 2021



PLZS-21-00130

3RD REVIEW
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CITY OF BUCKEYE
PLANNING & ZONING
DM

Preliminary Landscape Design Package

DEVELOPER:
BEAZER HOMES
1130 N. Alma School Road, Suite 110
TEL: (480) 232-5747
CONTACT: James Alexander
James.Alexander@beazer.com

LANDSCAPE ARCHITECT:
EPS GROUP, INC.
1130 N. Alma School Rd., Suite 120
Mesa, AZ 85201
TEL: (480) 503-2250
CONTACT: Aliza Sabin, RLA, LEED AP
aliza.sabin@epsgroupinc.com

PLANNER:
EPS GROUP, INC.
1130 N. Alma School Rd., Suite 120
Mesa, AZ 85201
TEL: (480) 503-2250
CONTACT: Josh Hannon
josh.hannon@epsgroupinc.com

CIVIL ENGINEER:
EPS GROUP, INC.
1130 N. Alma School Rd., Suite 120
Mesa, AZ 85201
TEL: (480) 503-2250
CONTACT: Dan Auxier, PE
dan.auxier@epsgroupinc.com





KEYNOTES

- 1

ENTRY MONUMENT
- 2

20' x 20' RAMADA
- 3

(2) CORNHOLE COURTS
- 4

CONCRETE SIDEWALK
- 5

TURF

6

SHADE SAIL

7

PLAYGROUND STRUCTURE w/ SWINGSET

8

10' MULTI-USE PATH ALONG APACHE ROAD

9

5' STABILIZED DG TRAIL

10

SEATING NODE

PLANT LEGEND

SYMBOL	SCIENTIFIC NAME	COMMON NAME	SIZE
TREES			
	Acacia aneura	Mulga	24" Box
	Chitalpa tashkentensis 'Pink Dawn'	Chitalpa	24" Box
	Parkinsonia x 'Desert Museum'	Desert Museum Palo Verde	24" Box
	Pistacia X 'Red Push'	Red Push Pistacia	24" Box
	Prosopis hybrid 'Phoenix'	Thornless Mesquite	24" Box
	Quercus virginiana	Live Oak	24" Box
	Ulmus parvifolia	Chinese Evergreen Elm	24" Box

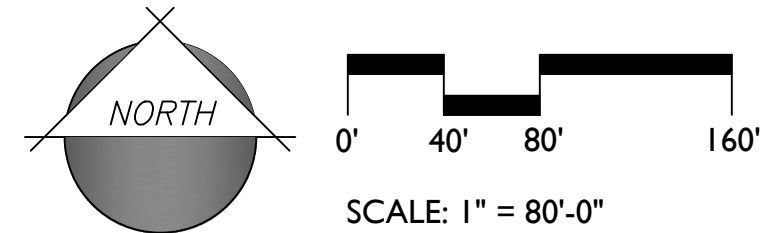
SHRUBS/ACCENTS		COMMON NAME	SIZE
	Aloe hybrid 'Blue Elf'	Blue Elf Aloe	5 Gal
	Agave americana	Century Plant	5 Gal
	Calliandra californica	Baja Fairy Duster	5 Gal
	Dasylirion wheeleri	Desert Spoon	5 Gal
	Encelia farinosa	Brittlebush	5 Gal
	Eremophila glabra ssp. Carnosa 'Winter Blaze'	'Winter Blaze' Emu Bush	5 Gal
	Eremophila maculata 'Valentine'	'Valentine' Emu Bush	5 Gal
	Eremophila hygrophana 'Blue Bells'	Blue Bells	5 Gal
	Gossypium harknessii	San Marcos Hibiscus	5 Gal
	Hesperaloe funifera	Giant Hesperaloe	1 Gal
	Hesperaloe parviflora 'Brakelights'	Brakelights Red Yucca	1 Gal
	Justicia californica	Chuparosa	1 Gal
	Lantana x 'Dallas Red'	Dallas Red Lantana	5 Gal
	Leucophyllum langmaniae 'Rio Bravo'	Rio Bravo Sage	5 Gal
	Leucophyllum candidum 'Thunder Cloud'	Thunder Cloud Sage	5 Gal
	Muhlenbergia capillaris 'Regal Mist'	'Regal Mist' Muhly	5 Gal
	Muhlenbergia lindheimeri 'Autumn Glow'	'Autumn Glow' Muhly	5 Gal
	Muhlenbergia rigens	Deer Grass	5 Gal
	Ruellia brittoniana	Purple Ruellia	5 Gal
	Ruellia peninsularis	Desert Ruellia	5 Gal
	Salvia greggii	Autumn sage	5 Gal
	Simmondsia chinensis	Jojoba	5 Gal
	Simmondsia chinensis 'Vista'	Compact Jojoba	5 Gal
	Tecoma x 'Sunrise'	Sunrise Esperanza	5 Gal

GROUNDCOVERS		COMMON NAME	SIZE
	Acacia redolens Desert Carpet	Prostrate Acacia	1 Gal
	Dalea capitata 'Sierra Gold'	Sierra Gold Dalea	1 Gal
	Dalea greggii	Trailing Indigo Bush	1 Gal
	Lantana montevidensis	Trailing Purple Lantana	1 Gal
	Lantana x 'New Gold'	New Gold Lantana	1 Gal
	Rosmarinus officianlis 'Huntington Carpet'	Trailing Rosemary	1 Gal

TURF & INERT MATERIALS		
	Hybrid Bermuda Sod	Midiron Bermuda Sod
	'Santa Fe Brown' Decomposed Granite Or Equal	3/4" Screened 2" Depth, Min.

NOTE: MINIMUM PLANT SPECIFICATIONS INCLUDING LANDSCAPE MIXTURE, MATERIAL LIST AND TREE BOX SIZES BUT NOT LIMITED TO, ARE OUTLINED IN THE BUCKEYE, ARIZONA DEVELOPMENT CODE

1 ILLUSTRATIVE LANDSCAPE PLAN
SCALE: 1"=80'



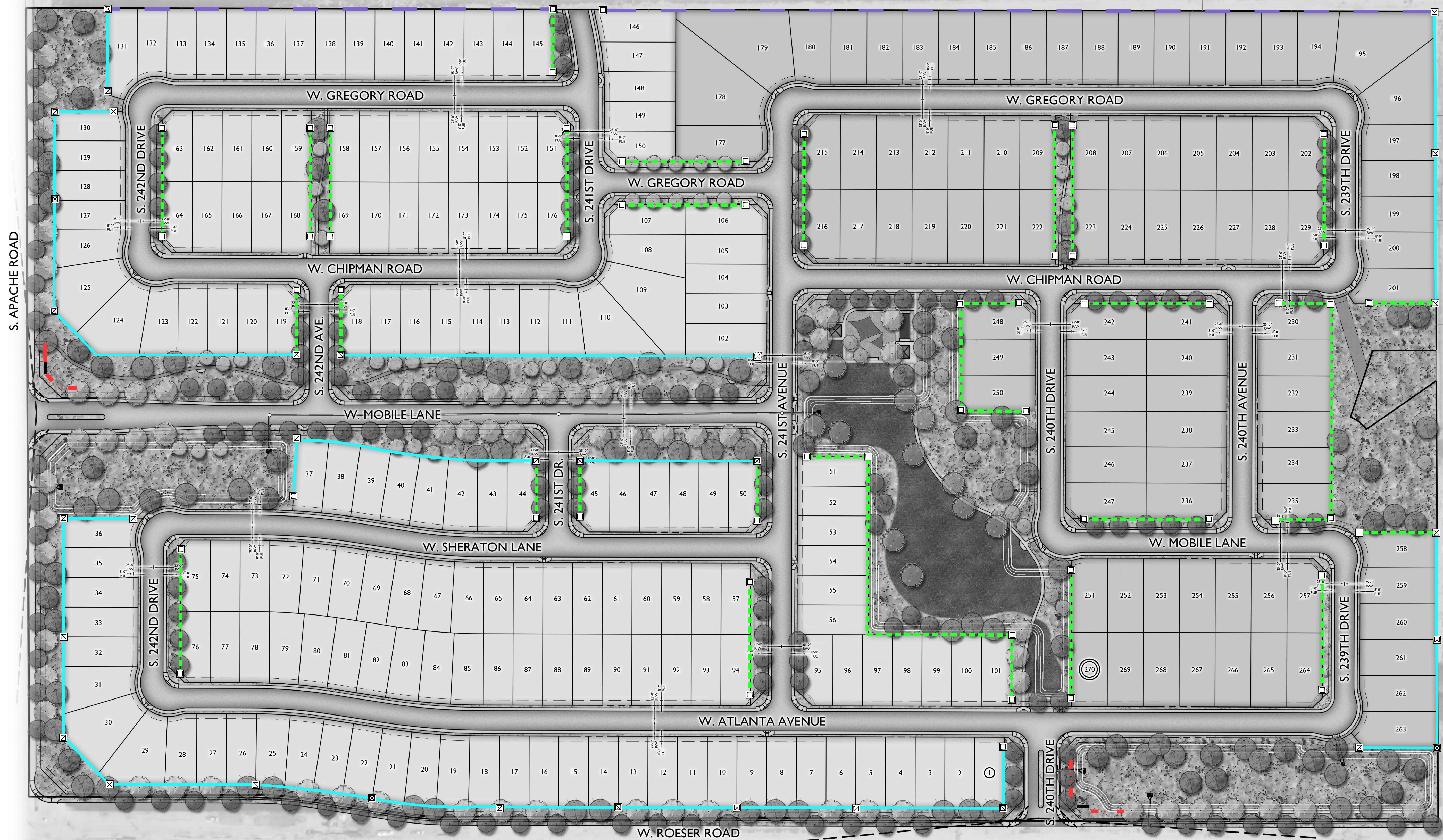
PROJECT DATA

APN:	504-41-006P, 504-41-722 504-41-006Q, 504-41-721	LOT SIZE:	48' x 115' 176 (65%) 58' x 120' 94 (35%)
GENERAL PLAN:	NEIGHBORHOOD PLANNED RESIDENTIAL (PR)	TOTAL	270
EXISTING ZONING:		GROSS DENSITY:	3.80 DU/AC
GROSS AREA:	71.32 AC.	NET DENSITY:	4.15 DU/AC
NET AREA:	66.98 AC.	OPEN SPACE:	13.62 AC (19.1% OF GROSS)
		ACTIVE RECREATION AREA:	5.78 ACRES (8.1% OF GROSS)

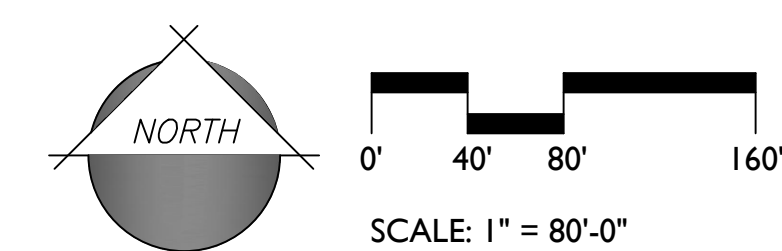


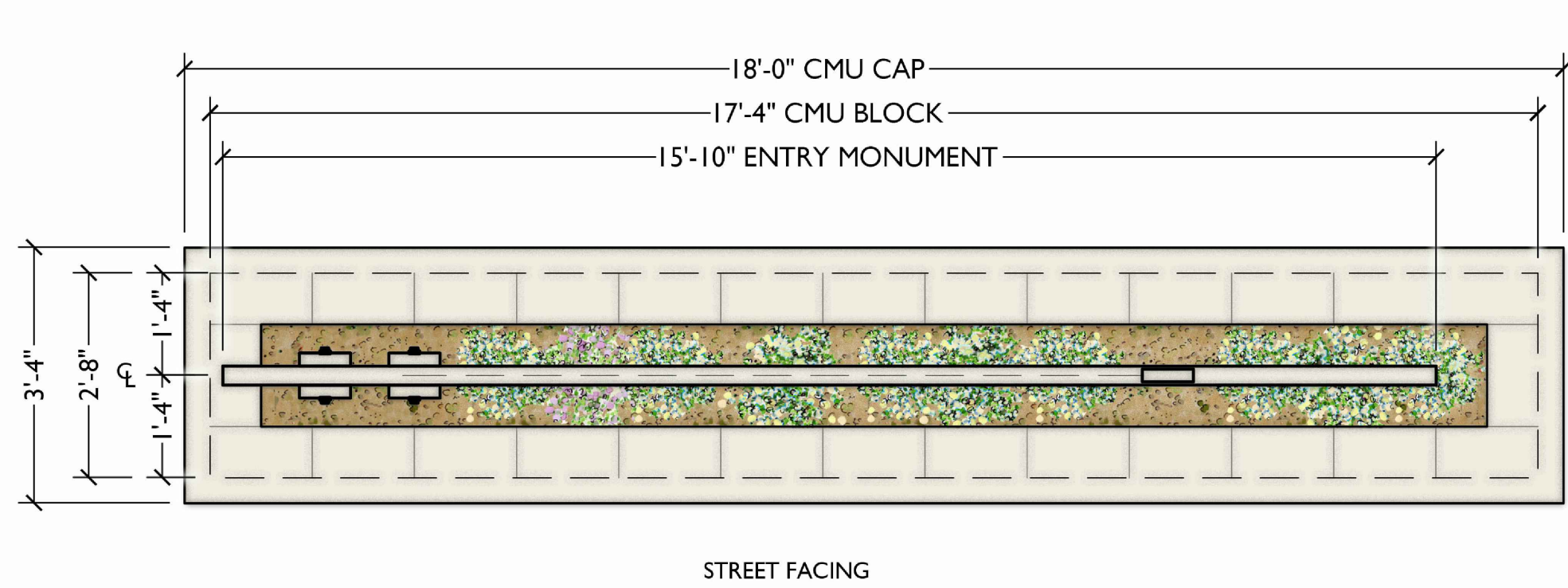
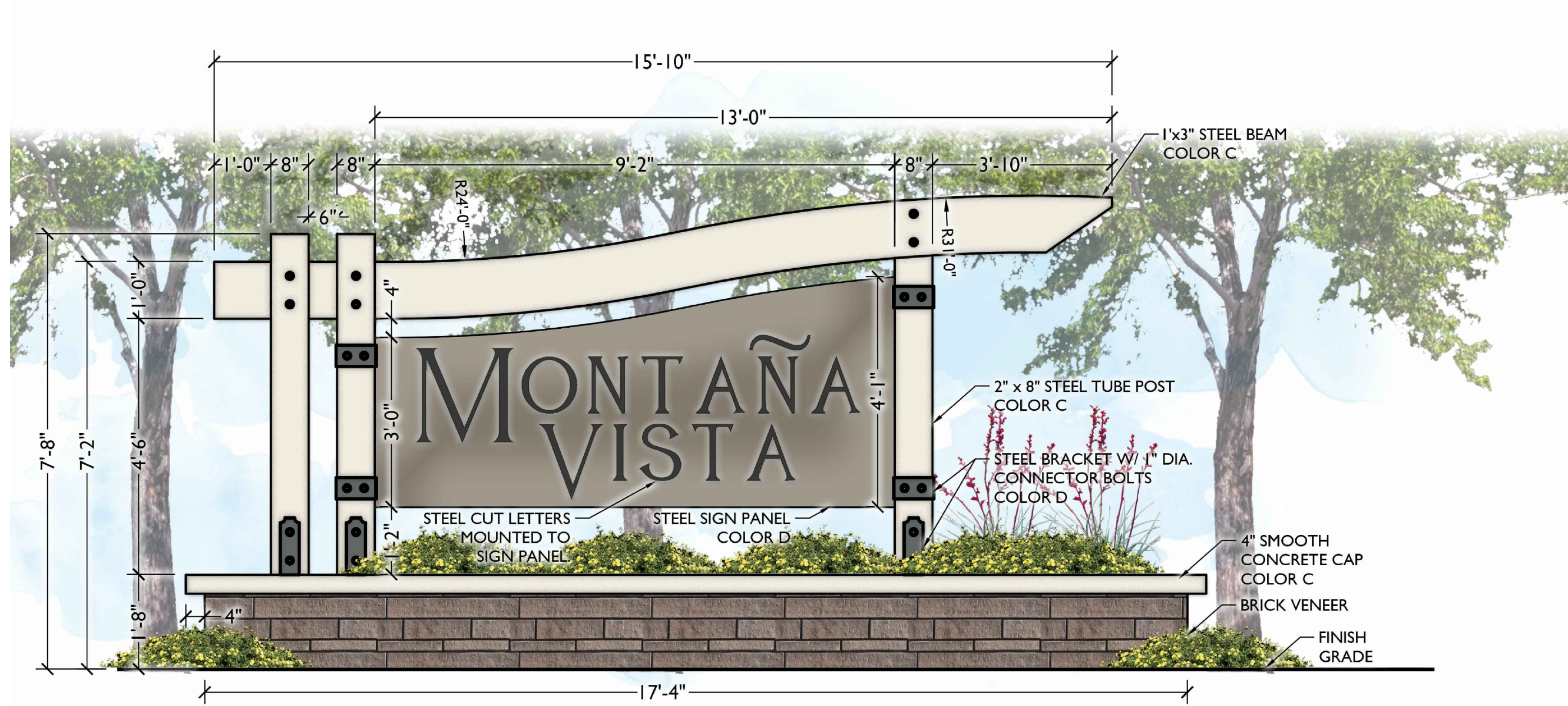
WALLS LEGEND

SYMBOL	ITEM
	DECORATIVE COLUMN 'TYPE A'
	DECORATIVE COLUMN 'TYPE B'
	PRIMARY THEME WALL
	SECONDARY THEME WALL
	RAIL FENCE
	BUILDER WALL



I CONCEPTUAL WALL MASTER PLAN
SCALE: 1"=80'





ELEVATION

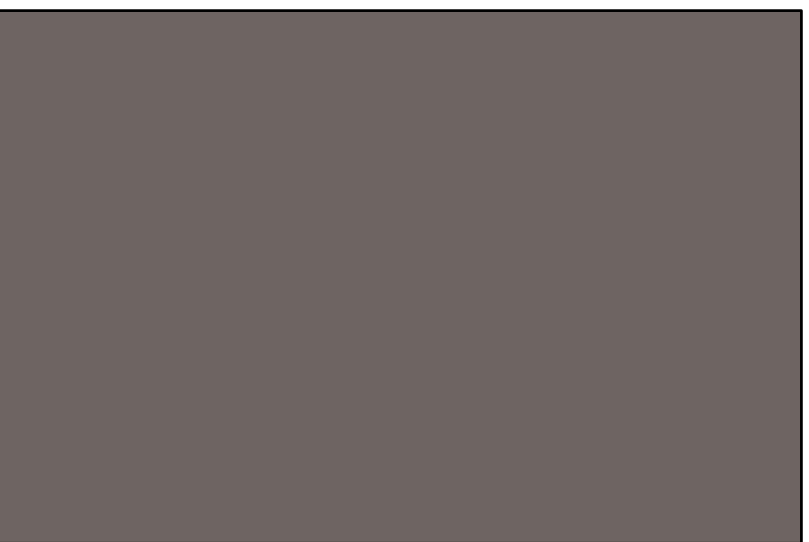
PLAN VIEW

1 PRIMARY ENTRY MONUMENT

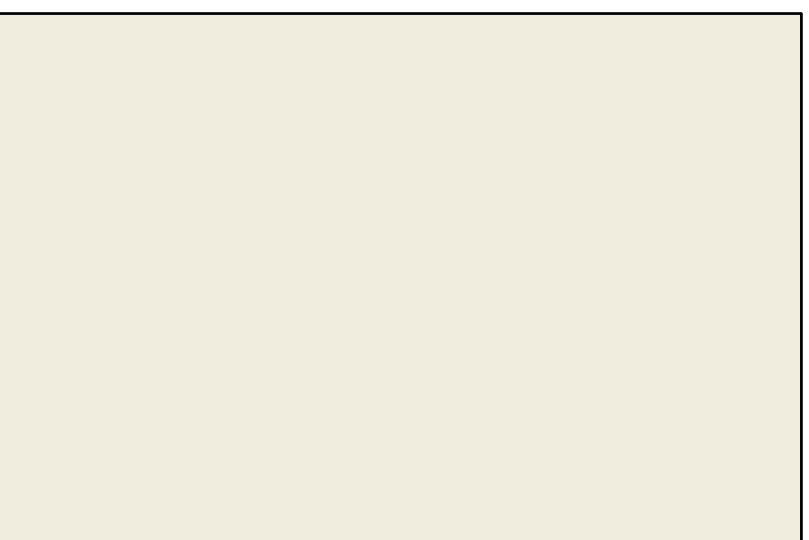
SCALE: 1/2" = 1'-0"



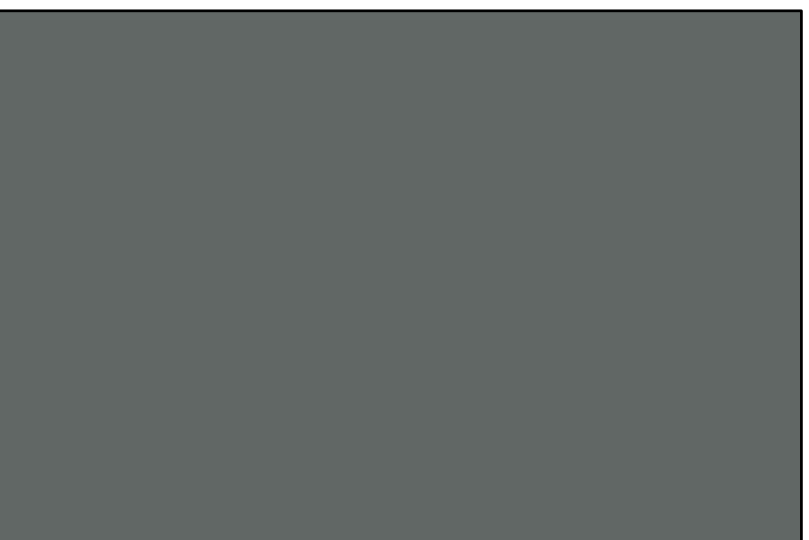
COLOR A - PRIMARY CMU
SW7642 - Pavestone



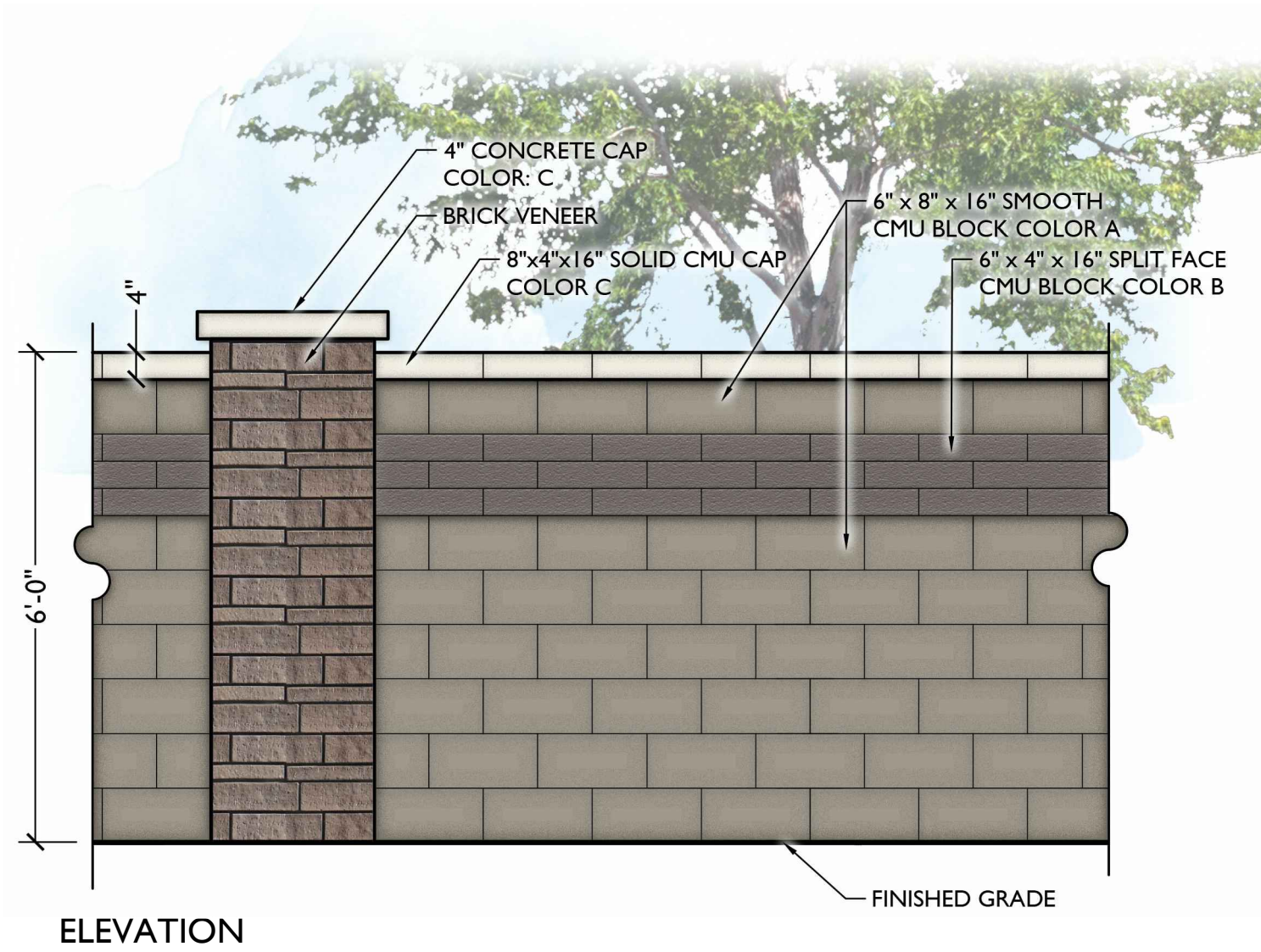
COLOR B - ACCENT CMU
SW6005 - Folkstone



COLOR C - WHITE
SW7551 - Greek Villa



COLOR D - STEEL
SW2848 - Roycroft Pewter

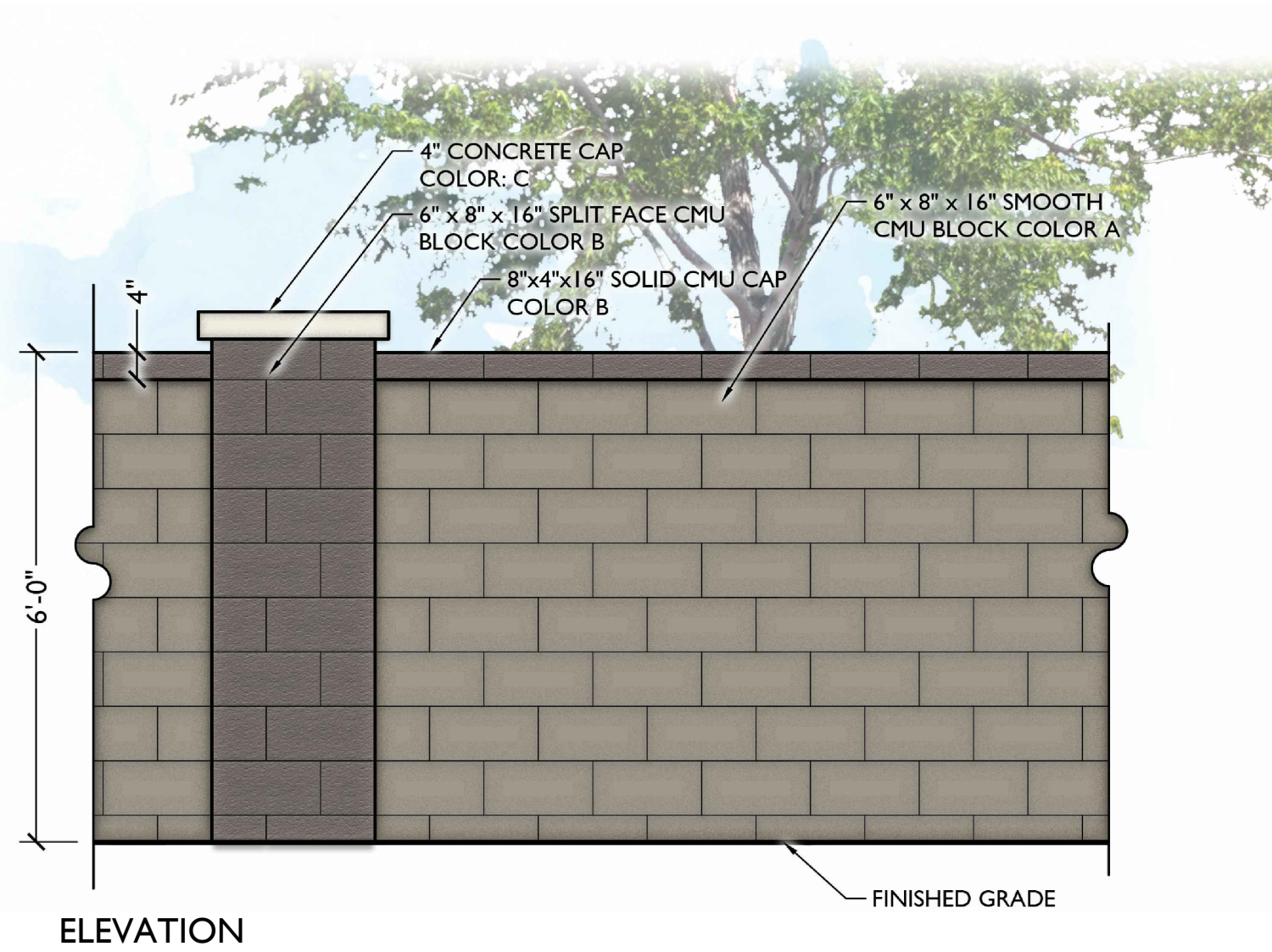


ELEVATION

FINISHED GRADE

2 PRIMARY THEME WALL & COLUMN

SCALE: 1/2" = 1'-0"

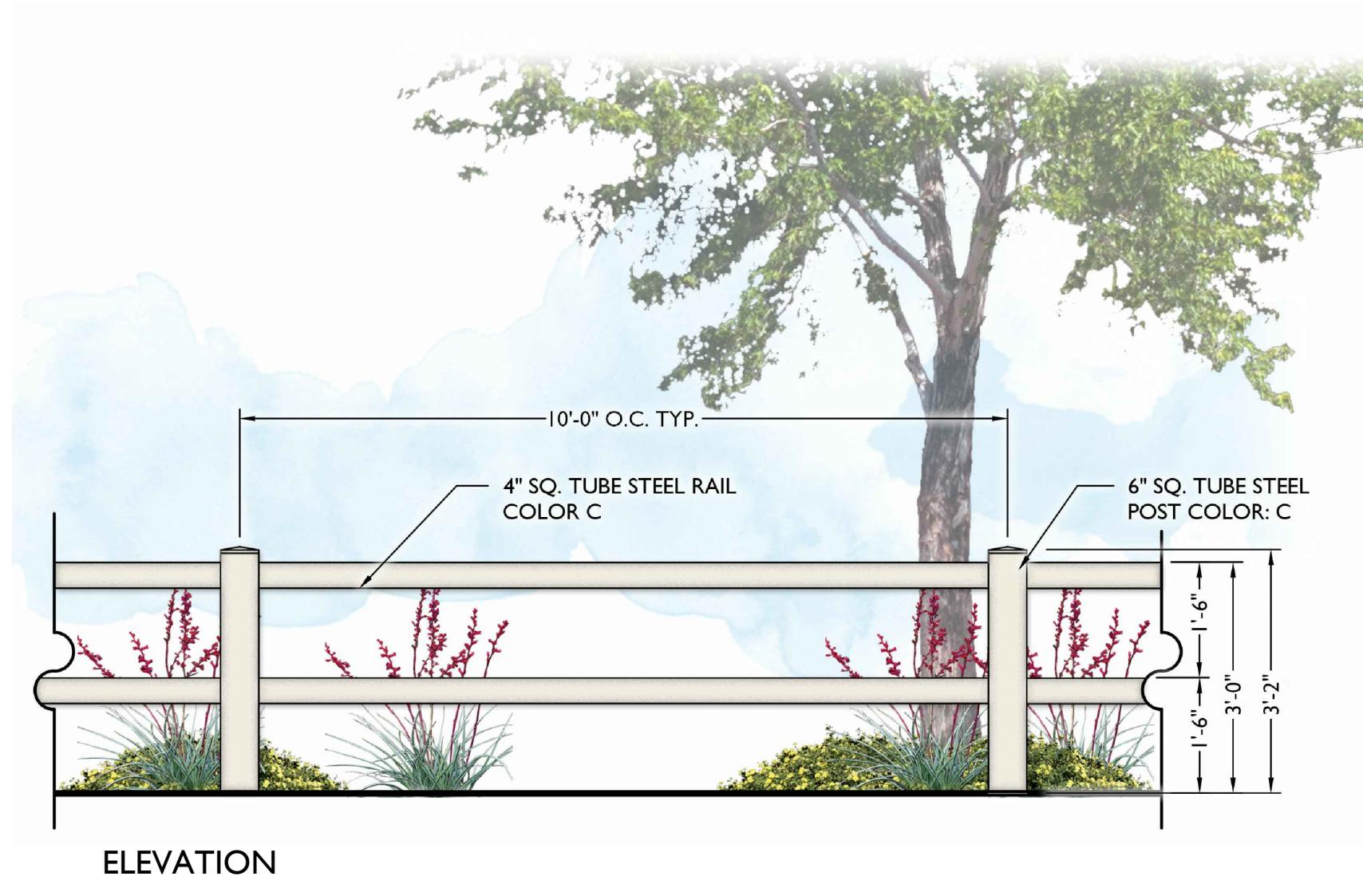


ELEVATION

FINISHED GRADE

3 SECONDARY THEME WALL & COLUMN

SCALE: 1/2" = 1'-0"



ELEVATION

4 RAIL FENCE

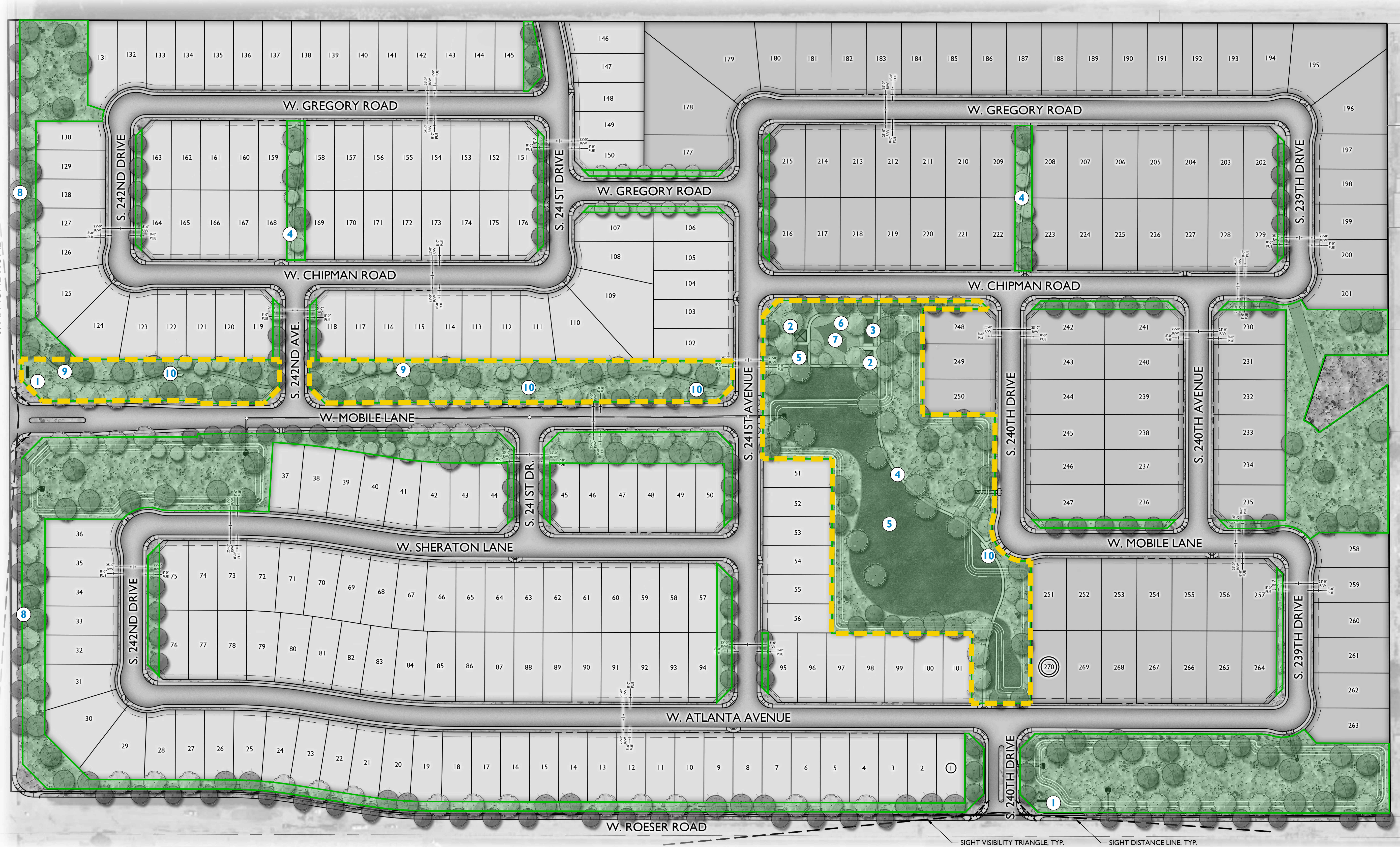
SCALE: 1/2" = 1'-0"



BRICK VENEER
Prairie Stone Color: Mocha Granite
by Coronado Stone

①	ENTRY MONUMENT	⑥	SHADE SAIL
②	20' x 20' RAMADA	⑦	PLAYGROUND STRUCTURE w/ SWINGSSET
③	(2) CORNHOLE COURTS	⑧	10' MULTI-USE PATH ALONG APACHE ROAD
④	CONCRETE SIDEWALK	⑨	5' STABILIZED DG TRAIL
⑤	TURF	⑩	SEATING NODE

ACTIVE RECREATION AREA:
5.78 ACRES (8.1% of GROSS)



APN:	504-41-006P, 504-41-722 504-41-006Q, 504-41-721	LOT SIZE: 48' x 115' 58' x 120'	176 (65%) <u>94 (35%)</u>
GENERAL PLAN:	NEIGHBORHOOD	TOTAL	270
EXISTING ZONING:	PLANNED RESIDENTIAL (PR)	GROSS DENSITY:	3.80 DU/AC
GROSS AREA:	71.32 AC.	NET DENSITY:	4.15 DU/AC
NET AREA:	66.98 AC.	OPEN SPACE:	13.62 AC (19.1% OF GROSS)
		ACTIVE RECREATION AREA:	5.78 ACRES (8.6% OF GROSS)

PLZS-21-00130

**4TH REVIEW
RECEIVED
Dec 14 21
CITY OF BUCKEYE
PLANNING & ZONING
DM**



Preliminary Drainage Report

For

Montana Vista

Prepared By:
EPS Group, inc.

1130 N. Alma School Rd, Suite 120
Mesa, Az 85201

Contact: Mike LoTempio
Phone: 480.503.2250

Email: Mike.LoTempio@epsgroupinc.com

Prepared For:
Beazer Homes

1130 N Alma School Rd, #110
Mesa, Az 85201

Contact: James Alexander
Phone: 480-232-5747

Email : james.alexander@beazer.com



Expires: 12/31/21

Project No. 20-1512

Date: December, 2021

1130 N. Alma School Road
Suite 120
Mesa, AZ 85201
480.503.2250

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Appendix B: Drainage Calculations

Appendix C: NOAA Atlas 14

Appendix D: Excerpts From: Offsite Drainage Report for Montana Vista / Sonoran Vista

Appendix E: Agreement for Cooperation (with Vista Bonita)

1.0 Introduction

1.1 Project Description

Montana Vista (the Project) is a proposed 71.32-acre, 278 lot sub-division located in Buckeye, Arizona.

The project is located at the NEC of Roeser Rd and Apache Rd in the City of Buckeye. The project is bounded by undeveloped, planned residential land to the north, west, and south. Single family residential (zoned RU-43) lots border the development to the east. The project is further located within a portion of the Northwest quarter of Section 28, Township 1 North, Range 3 West, of the Gila and Salt River Meridian Maricopa County, Assessor Parcel Numbers (APN) 504-41-006P, 504-41-006Q, 504-41-721, and 504-41-722. See Appendix A, for Vicinity Map.

1.2 National Flood Insurance Program

This site is located within FEMA Flood Zone Shaded X as shown on FEMA Flood Insurance Rate Map number 04013C2115L dated October 16, 2013. See Figure 2: FIRM Map, Appendix A. Flood Zone Shaded X is defined as:

Areas of the 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

2.0 Existing Site Condition and Offsite Drainage

The current existing site condition is agricultural land. The existing site has a general slope which falls from the northwest to the southeast. Half street flows from Roeser Road and Apache Road will be captured by catch basins along the projects frontage and collected into an onsite basin at the southeast corner.

Offsite flows from the north have been studied in detail in the “Offsite Drainage Report for Montana Vista / Sonoran Vista” dated June 7, 2004 as prepared by RBF Consulting. Portions of the study are included in the appendix for reference. The RBF report concludes that there will be flow over the RID main canal near a point about 0.3 miles east of Apache Road. The report concludes that it is possible that all of this flow could go south and intercept the Sonoran Vista channel along the westerly side the of Sonoran Vista subdivision. The RBF report recommends that the design of Montana Vista include a raised road (along the northerly side) raised lots or a channel. They suggest utilizing some combination of these elements with the capacity to convey approximately 400 cfs along the northern line of Montana

Vista. Flows from the north would then be collected by the existing drainage swale located along the south boundary of the adjacent Jackie A. Meck Water Campus which in-turn discharges to the Sonoran Vista channel.

There is an existing Agreement for Cooperation recorded between the Montana Vista property and the property to the north, Vista Bonita that would allow the recommended combination of improvements to be installed north of the Montana Vista property line. This agreement and a depiction of the proposed improvements is included in the appendix for reference.

The projects current zoning is PR, planned residential. The proposed density is 3.86 DU/AC. There are existing utilities that surround the site that were installed during the construction of adjacent developments.

3.0 Onsite Hydrology

The drainage plan of this project is to allow all onsite storm water to drain into the roadways and be conveyed to low points where runoff will be conveyed into surface retention basin by catch basins and storm drain pipes.

The site slopes from the northwest to the southeast. Basin RB1 will retain a small area adjacent to it, and will overtop any necessary runoff to Basin RB2. Basin RB2 retains a majority of the flows within the northeast portion of the site and collects overflow from RB1. Basin RB3 collects all the onsite southeast flows and is located at the southeast corner of the site which is the lowest area of Montana Vista. This basin also retains runoff volume from Roeser Road and Apache Road. Equalizer pipes will be used between basins that require the capture of overtop flows, and these pipes will be designed at minimum 15 inches in diameter per City of Buckeye Standards.

Storm drain features will be designed to capture and convey the onsite runoff and half street runoff of all abutting streets for the 100-year, 2- hour storm event. Onsite retention basins will drain any storm event up to and including the 100 year 2-hour storm within 36 hours. Drywells will be used to facilitate percolation of the runoff for any basins deeper than 1 foot in ponding depth. Drywells will be installed according to Arizona Department of Environmental Quality (ADEQ) guidelines of installation and will be designed and maintained in accordance with Maricopa County's Drywell Policy.

All retention basins were designed with a maximum of 4:1 side slopes and ponding depths not to exceed 3 feet with 1 foot of freeboard to the low gutter elevation, making a total depth not to exceed 4 feet.

The site will be designed so that runoff generated by storm events greater than the 100-year, 2-hour storm event will not adversely affect existing or proposed building

finished floors. The 10-year storm flows will be contained between the roadway curbs, and the maximum depth of flow in residential streets is 8 inches during the 100-year peak.

Drainage from the project will be routed to onsite retention basins via overland flow, catch basins and storm drain. See Appendix A, Figure 3 for a Drainage Exhibit.

4.0 Methodology and Criteria

The following subsections give a brief outline of the design methodology and criteria that will be utilized for the final drainage design of the site as outlined in the City of Buckeye and FCDMC Drainage Design Manuals.

4.1 Rational Method

The Rational Method will be used to calculate peak flows at critical locations in the final drainage report for the Project. The Rational Method will be applied as outlined in section 3 of the Drainage Design Manual for Maricopa County: Hydrology. Peak flows will be calculated as follows:

$$Q = C \times I \times A_d$$

where:

Q = Peak Discharge (cfs)

C = Composite runoff coefficient

I = Rainfall Intensity corresponding to Tc

A_d = Area in acres

The runoff coefficients, C, are computed using Table 6.3 from the *Drainage Policies and Standards Manual Standard*. The calculations for the runoff coefficients in the future condition are provided in Appendix B.

Peak flow calculations have been provided within Appendix B. Drainage areas can be referenced on the Drainage Exhibit provided in Figure 3 of Appendix A.

4.1 Time of Concentration

Inlet time will be estimated and system time will be established based on summation of travel time in system and initial time of concentration based upon the following equation:

$$T_c = 11.4L^{0.5} \times K_b^{0.52} \times S^{-0.31} \times i^{-0.38}$$

where:

T_c = Time of concentration (hrs): minimum of 10 minutes

L = Length of the longest flow path (miles)

K_b = Watershed resistance coefficient

S = Watercourse slope (ft/mi)

i = Rainfall intensity (in/hr)

Time of concentration minimum of 10 minutes for residential developments is per City of Buckeye Storm Water Drainage Design Manual Section 3.2-1. Intensity will be estimated by linearly interpolating the site specific I-D-F curve that is derived from the NOAA ATLAS 14 data at a specific time of concentration.

As can be seen, the time of concentration is a function of the intensity and the intensity is a function of the time of concentration. Therefore, the equations will be iterated until both equations can be satisfied. When both equations are satisfied for each sub basin area the resulting values will be applied to that sub basin area and the peak flow at the concentration point will be calculated.

The time of concentration will be calculated from the high point of the sub basin area to the low point of the sub basin area. For most of the project, runoff will start in a residential lot and drain to the street and then the street will drain to a low point where drainage will be conveyed to a retention basin. In this circumstance, the drainage length “ L ” will be measured from the high point in the lot to the low point in the street along the flow line. The slope of the watercourse “ S ” will be calculated by dividing the difference in the high point elevation and the low point elevation by the drainage length

“L”. The minimum time of concentration allowable for a residential development per City of Buckeye requirements is 10 mins.

The Final Drainage Report will include peak flow calculations and a drainage map that will include concentration points.

4.2 Manning's Equation

The street capacities are calculated using Manning's equation:

$$Q = (1.486/n) \cdot A R^{2/3} S^{0.5}$$

where:

S = Street longitudinal slope (ft/ft)

A = Flow Area (sq. ft)

R = Hydraulic Radius (ft)

n = Manning's roughness coefficient = (0.015)

The Manning's Equation calculations are to be included in the Final Drainage Report.

4.3 Catch Basin Design

The inlet capacity of an in-sump catch basin is determined by considering the opening of the curb.

$$Q_i = C_{weir} \times P \times d^{1.5}$$

where:

Q_i = Inlet capacity (cfs)

C_{weir} = Weir coefficient (3.0)

P = Curb opening perimeter excluding the curb length (ft)

d = Curb depth at the grate (ft)

The capacity of the rectangular weir outfall is determined by as follows:

$$Q_i = C_{weir} \times P \times d^{1.5}$$

where:

Q_i = Weir Capacity (cfs)

C_{weir} = Weir coefficient (2.8)

L = Length of Weir (ft)

d = Depth of Weir (ft)

Inlet capacity calculations will be included in the Final Drainage Report.

4.1 Retention Basin Dewatering

Drywells will be used to facilitate percolation of the runoff. Maricopa County standards require all retention basins to drain their volume from the 100-year, 2-hour storm event within a 36-hour period. The maximum flow rate of each dry well to dewater the basin is 0.1 cfs. Dewatering calculations will be provided in the Final Drainage Report.

4.1 Street Hydraulics

Local streets will be designed to convey the 10-year peak flow below the top of curb and the 100-year peak flow within the right of way at a depth no greater than 8" deep.

Where 4" roll curb is not able to convey its runoff as described above 6" vertical curb will be installed. Where 6" vertical curb is not able to convey its runoff as described above the drainage will be captured by storm drains or other drainage ways upstream of the calculated location where the 6" vertical curb capacity is exceeded.

Calculations using Manning's Equation that verify the calculated peak flow rates to be conveyed in the streets as described above will be provide in the Final Drainage Report.

5.0 Ultimate Outfall

The ultimate outfall of the Project is located within the southeast corner at the centerline of Roeser Road at an approximate elevation of 943.94 feet.

The building finished floor will be designed to be a minimum of 14" above low top of curb in front of lot, a minimum of 1' above the ultimate outfall and will also need to be at least 1' above adjacent retention basin emergency outfall elevation and at least 1' above adjacent 100-year water surface.

6.0 Conclusions

This report concluded that:

- This site will create no adverse impacts on any downstream property and will not increase the existing flows onto downstream property.

- The finished floor for all homes will be a minimum of 18 inches above basin drainage area outfall.
- Retention requirements for onsite storm water and offsite storm water have been met by onsite surface retention basins.
- Dry wells will be installed to drain the retention basin within 36 hours.
- The Project will have an ultimate outfall elevation of approximately 943.94 feet.

7.0 References

City of Buckeye, Storm Water Drainage System Design Manual DM 500. August 2012

Flood Control District of Maricopa County, 2013 Drainage Design Manual for Maricopa County, AZ. Volume 1, Hydrology & Volume 2, Hydraulics

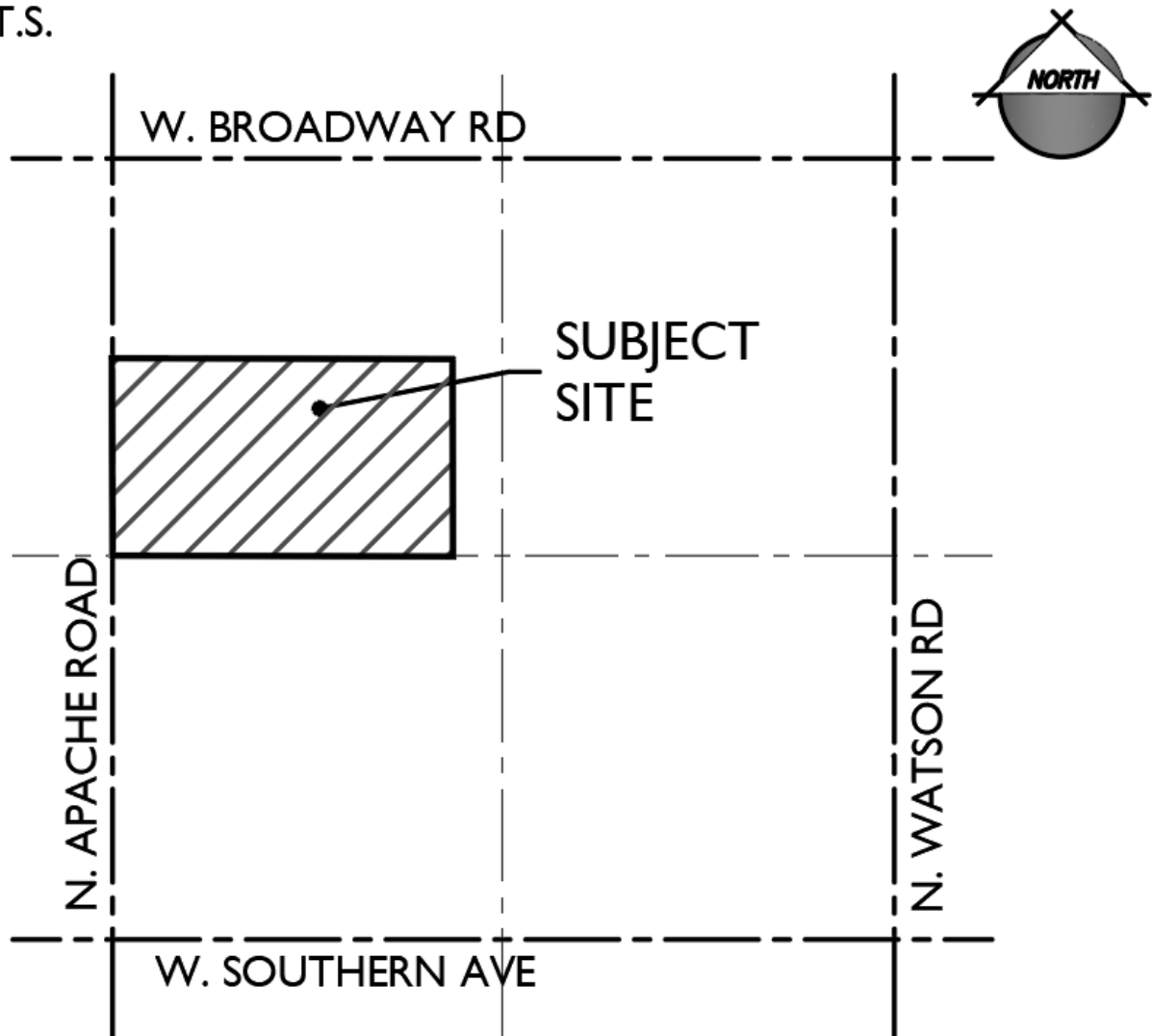
NOAA Atlas 14, Volume 1, Version 5. National Weather Service. March 2011

Appendix A

Figures

VICINITY MAP

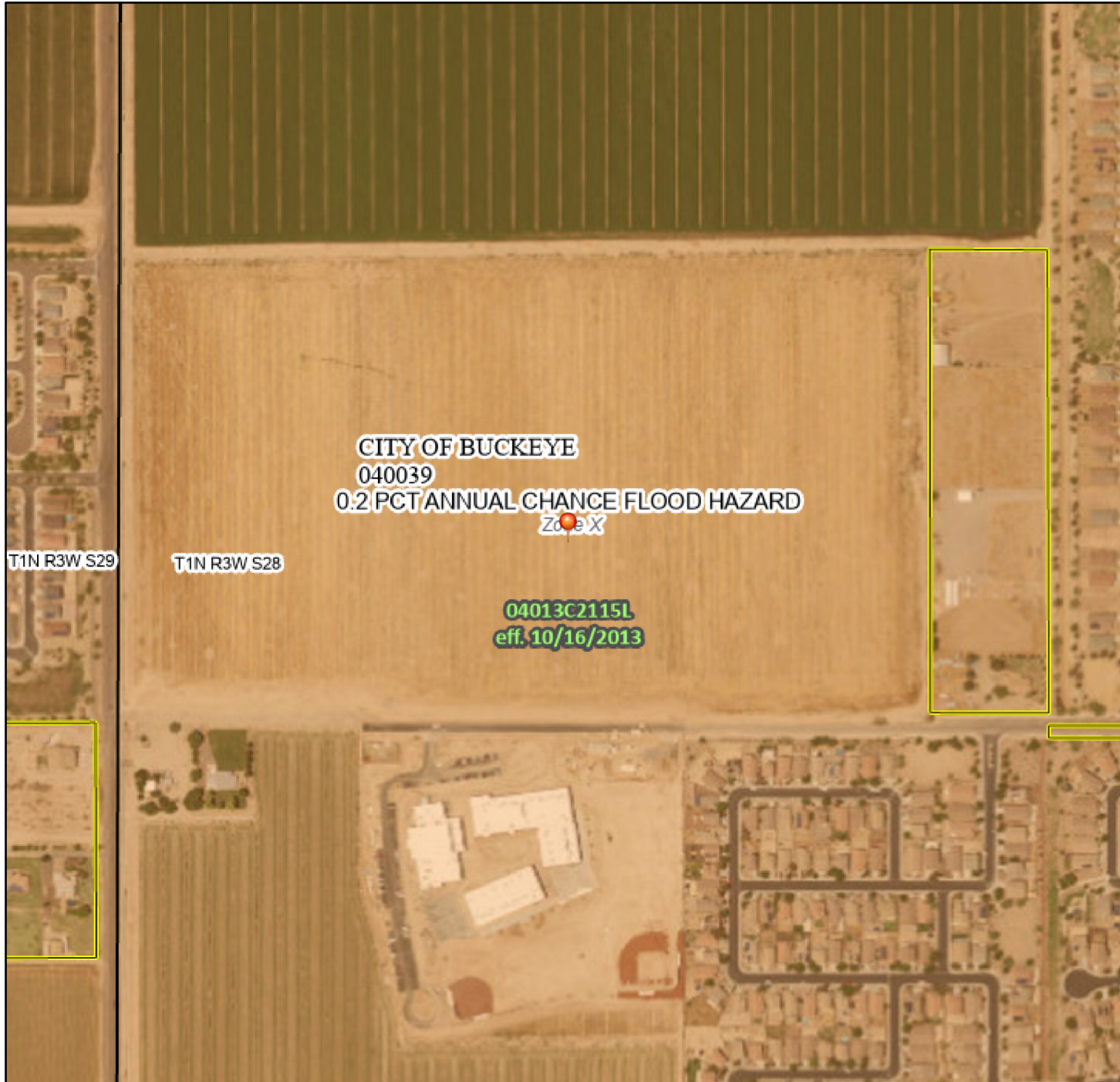
N.T.S.



National Flood Hazard Layer FIRMette



112°34'29"W 33°24'17"N



0 250 500 1,000 1,500 2,000 Feet 1:6,000

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) Zone A, V, A99
		With BFE or Depth Zone AE, AO, AH, VE, AR
		Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD		0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
		Future Conditions 1% Annual Chance Flood Hazard Zone X
		Area with Reduced Flood Risk due to Levee. See Notes. Zone X
		Area with Flood Risk due to Levee Zone D
OTHER AREAS		NO SCREEN Area of Minimal Flood Hazard Zone X
		Effective LOMRs
		Area of Undetermined Flood Hazard Zone D
GENERAL STRUCTURES		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall
OTHER FEATURES		20.2 Cross Sections with 1% Annual Chance Water Surface Elevation
		17.5
		Coastal Transect
		Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary
		Coastal Transect Baseline
MAP PANELS		Digital Data Available
		No Digital Data Available
		Unmapped



The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

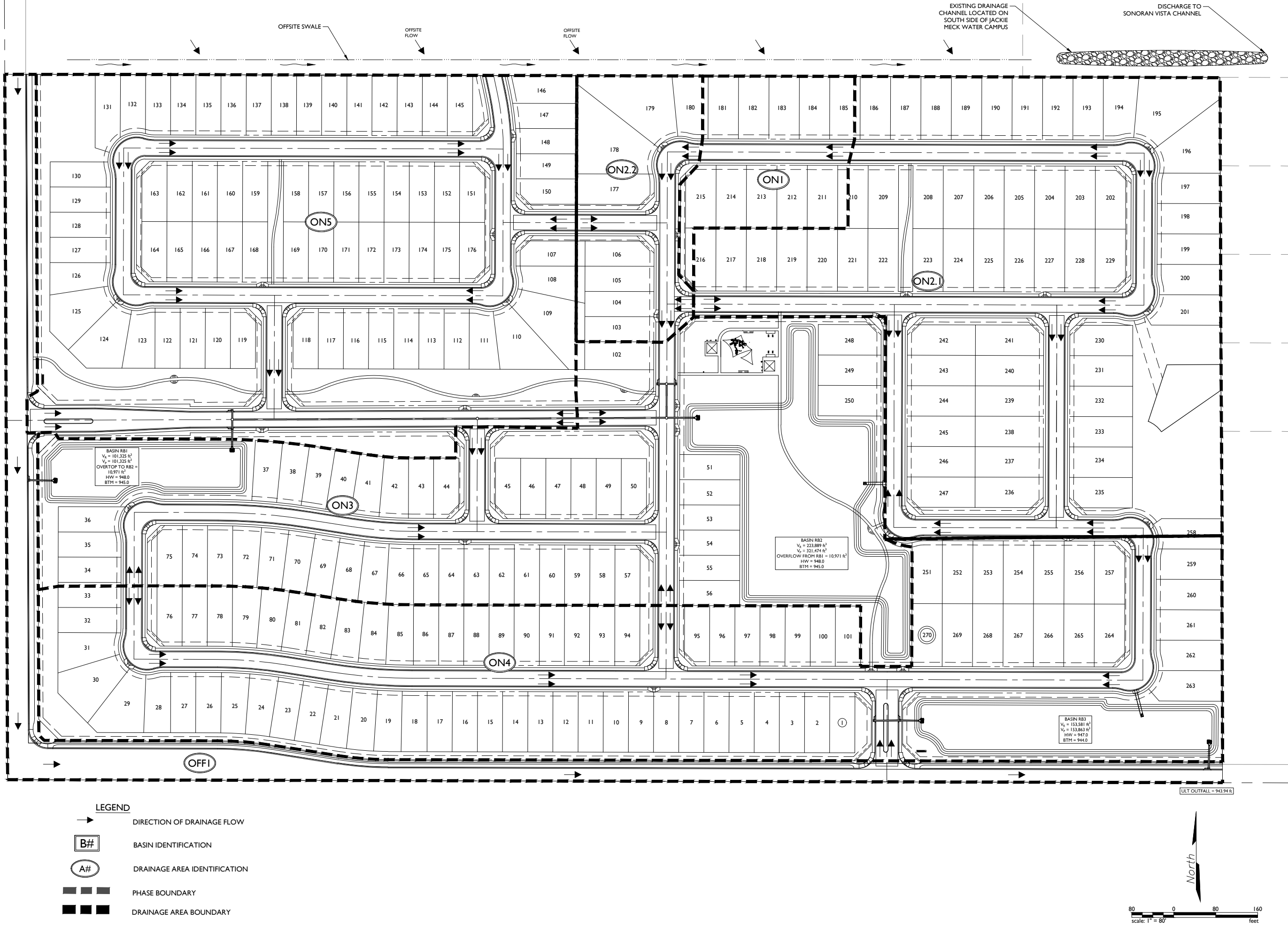
This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 7/8/2021 at 10:51 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

20-1512 - Montana Vista

Dec 14, 2021 2:34pm S:\Projects\2020\20-1512\Civil\Preliminary\Design\Drainage\20-1512 - Prelim Drainage Exhibit.dwg cstele



1130 N Alma School Road
Suite 120
Mesa, AZ 85201
T: 480.503.2250 | F: 480.503.2258
www.epsgroupinc.com

Project: Montana Vista
Buckeye, AZ

Revisions:

No.	Description	By	Date

Call at least two full working days before you begin construction.

DESIGNED BY: EPS
DRAWN BY: AJP

Job No.
20-1512

EX03

Sheet No.
1 of 1

Appendix B

Drainage Calculations

Retention Calculations

Project: Montana Vista

Storm Event: 100-yr 2-hr

Prepared by: Colin Steele

Date: 11/15/2021

$$V = C * A * P / 12^{(1)}$$

Where:

V = Runoff Volume

C = Runoff Coefficient

A = Drainage Area

P = 2.33 in

Surface Retention Basin Volume Calculations

Basin ID	Elevation	Area (ft ²)	Incremental Volume (ft ³)	Volume Provided, V _p (ft ³)
RB1	947	28,289		
	948	31,885	30,087	
	949	35,598	33,742	
	950	39,395	37,497	101,325
RB2	945	94,767		
	946	102,932	98,850	
	947	111,317	107,125	
	948	119,683	115,500	321,474
RB3	944	43,649		
	945	48,676	46,163	
	946	53,828	51,252	
	947	59,069	56,449	153,863

Retention Calculations

Project: Montana Vista

Storm Event: 100-yr 2-hr

Prepared by: Colin Steele

Date: 11/15/2021

Volume Required and Summary

Basin ID	Sub-Basin ID	Sub Basin Area Description	Contributing Area (ft ²)	C =	Volume Required, V _R (ft ³)	Volume Provided, V _P (ft ³)	Estimated Water Depth (ft)
RB1	ON5	Onsite	722,939	0.80	112,296		
		Overtop to RB2			-10,971		
		Total	722,939	0.80	101,325	101,325	0.00
RB2	ON2.1	Onsite	767,571	0.80	119,229		
	ON2.2	Onsite	100,992	0.80	15,687		
	ON1	Onsite	97,167	0.80	15,093		
	ON3	Onsite	475,613	0.80	73,878		
		Overflow from RB1			10,971		
		Total	868,563	0.80	223,889	321,474	2.09
RB3	OFF1	Offsite	187,254	0.95	34,541		
	ON4	Onsite	766,356	0.80	119,041		
		Total	953,610	0.83	153,581	153,863	2.99

Notes: C coefficients from City of Buckeye DM-500 3.2-2

Appendix C

NOAA Atlas 14



NOAA Atlas 14, Volume 1, Version 5
Location name: Buckeye, Arizona, USA*
Latitude: 33.4014°, Longitude: -112.5705°
Elevation: 953.7 ft**
 * source: ESRI Maps
 ** source: USGS



POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

[PF_tabular](#) | [PF_graphical](#) | [Maps_&_aerials](#)

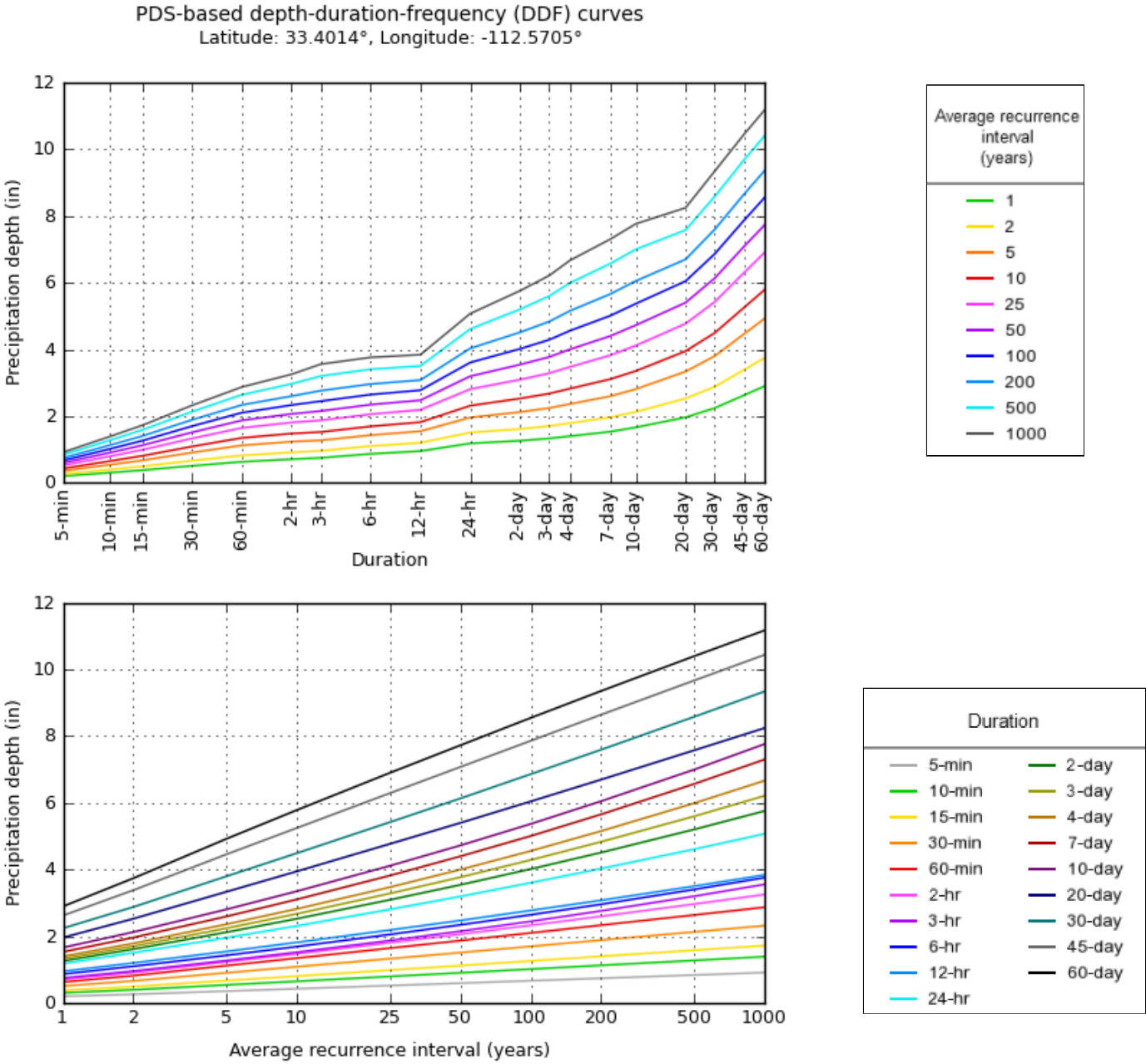
PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches) ¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.200 (0.164-0.247)	0.261 (0.214-0.323)	0.356 (0.292-0.440)	0.428 (0.348-0.526)	0.523 (0.419-0.641)	0.595 (0.472-0.729)	0.668 (0.522-0.819)	0.742 (0.570-0.910)	0.839 (0.629-1.03)	0.913 (0.670-1.13)
10-min	0.304 (0.249-0.376)	0.397 (0.326-0.492)	0.543 (0.444-0.669)	0.651 (0.529-0.800)	0.796 (0.638-0.976)	0.906 (0.719-1.11)	1.02 (0.794-1.25)	1.13 (0.868-1.39)	1.28 (0.957-1.57)	1.39 (1.02-1.71)
15-min	0.377 (0.309-0.466)	0.492 (0.404-0.610)	0.672 (0.550-0.830)	0.807 (0.656-0.992)	0.987 (0.792-1.21)	1.12 (0.891-1.38)	1.26 (0.984-1.54)	1.40 (1.08-1.72)	1.58 (1.19-1.95)	1.72 (1.26-2.13)
30-min	0.508 (0.416-0.628)	0.663 (0.545-0.822)	0.906 (0.741-1.12)	1.09 (0.884-1.34)	1.33 (1.07-1.63)	1.51 (1.20-1.85)	1.70 (1.33-2.08)	1.89 (1.45-2.31)	2.13 (1.60-2.62)	2.32 (1.70-2.86)
60-min	0.629 (0.515-0.777)	0.820 (0.674-1.02)	1.12 (0.917-1.38)	1.35 (1.09-1.65)	1.65 (1.32-2.02)	1.87 (1.49-2.29)	2.10 (1.64-2.57)	2.33 (1.79-2.86)	2.64 (1.98-3.25)	2.87 (2.11-3.54)
2-hr	0.707 (0.593-0.854)	0.913 (0.768-1.11)	1.23 (1.03-1.49)	1.48 (1.23-1.78)	1.81 (1.48-2.17)	2.06 (1.67-2.47)	2.33 (1.85-2.79)	2.60 (2.03-3.11)	2.97 (2.26-3.57)	3.25 (2.42-3.94)
3-hr	0.748 (0.630-0.904)	0.958 (0.812-1.16)	1.27 (1.07-1.54)	1.52 (1.27-1.83)	1.87 (1.54-2.24)	2.15 (1.74-2.58)	2.45 (1.95-2.93)	2.76 (2.15-3.31)	3.20 (2.41-3.85)	3.56 (2.61-4.30)
6-hr	0.867 (0.745-1.03)	1.10 (0.950-1.31)	1.43 (1.23-1.70)	1.69 (1.44-2.00)	2.06 (1.72-2.42)	2.34 (1.93-2.76)	2.65 (2.14-3.12)	2.96 (2.35-3.50)	3.41 (2.62-4.05)	3.76 (2.82-4.49)
12-hr	0.950 (0.829-1.11)	1.20 (1.05-1.41)	1.55 (1.34-1.80)	1.82 (1.57-2.11)	2.19 (1.86-2.53)	2.47 (2.08-2.86)	2.78 (2.30-3.22)	3.08 (2.50-3.59)	3.50 (2.77-4.12)	3.84 (2.97-4.56)
24-hr	1.18 (1.07-1.31)	1.51 (1.36-1.67)	1.96 (1.76-2.17)	2.31 (2.08-2.55)	2.81 (2.51-3.10)	3.20 (2.84-3.52)	3.61 (3.17-3.96)	4.03 (3.51-4.43)	4.61 (3.97-5.09)	5.07 (4.33-5.61)
2-day	1.26 (1.13-1.41)	1.61 (1.45-1.80)	2.12 (1.90-2.37)	2.53 (2.26-2.82)	3.09 (2.75-3.45)	3.54 (3.13-3.94)	4.02 (3.52-4.47)	4.51 (3.93-5.04)	5.20 (4.47-5.84)	5.76 (4.89-6.48)
3-day	1.33 (1.20-1.49)	1.70 (1.53-1.90)	2.24 (2.02-2.50)	2.67 (2.40-2.98)	3.28 (2.93-3.65)	3.77 (3.35-4.19)	4.29 (3.77-4.77)	4.83 (4.22-5.38)	5.60 (4.82-6.25)	6.21 (5.30-6.96)
4-day	1.40 (1.27-1.56)	1.79 (1.62-1.99)	2.36 (2.13-2.63)	2.82 (2.54-3.13)	3.47 (3.11-3.85)	4.00 (3.56-4.43)	4.56 (4.03-5.06)	5.16 (4.51-5.72)	5.99 (5.17-6.66)	6.67 (5.70-7.44)
7-day	1.53 (1.39-1.71)	1.96 (1.78-2.19)	2.60 (2.34-2.90)	3.11 (2.80-3.46)	3.82 (3.43-4.25)	4.40 (3.91-4.89)	5.01 (4.42-5.58)	5.66 (4.95-6.30)	6.57 (5.67-7.33)	7.30 (6.24-8.17)
10-day	1.66 (1.50-1.85)	2.13 (1.93-2.37)	2.81 (2.54-3.12)	3.35 (3.02-3.72)	4.11 (3.69-4.56)	4.72 (4.21-5.24)	5.37 (4.75-5.96)	6.05 (5.32-6.72)	7.00 (6.07-7.78)	7.76 (6.67-8.65)
20-day	1.96 (1.78-2.16)	2.53 (2.30-2.79)	3.34 (3.03-3.67)	3.95 (3.58-4.34)	4.77 (4.31-5.25)	5.40 (4.86-5.94)	6.05 (5.41-6.66)	6.70 (5.97-7.39)	7.58 (6.69-8.38)	8.24 (7.23-9.14)
30-day	2.24 (2.02-2.48)	2.88 (2.60-3.19)	3.80 (3.42-4.21)	4.49 (4.04-4.97)	5.42 (4.85-5.99)	6.13 (5.47-6.78)	6.86 (6.09-7.60)	7.60 (6.70-8.42)	8.58 (7.50-9.55)	9.34 (8.11-10.4)
45-day	2.62 (2.37-2.90)	3.38 (3.06-3.74)	4.46 (4.02-4.93)	5.25 (4.72-5.80)	6.29 (5.64-6.95)	7.08 (6.32-7.82)	7.86 (6.99-8.70)	8.65 (7.64-9.57)	9.67 (8.49-10.8)	10.4 (9.10-11.6)
60-day	2.90 (2.63-3.19)	3.74 (3.39-4.12)	4.92 (4.45-5.41)	5.79 (5.22-6.35)	6.90 (6.21-7.59)	7.73 (6.93-8.50)	8.55 (7.63-9.41)	9.36 (8.32-10.3)	10.4 (9.19-11.5)	11.2 (9.81-12.4)

¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).
 Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.
 Please refer to NOAA Atlas 14 document for more information.

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PF graphical



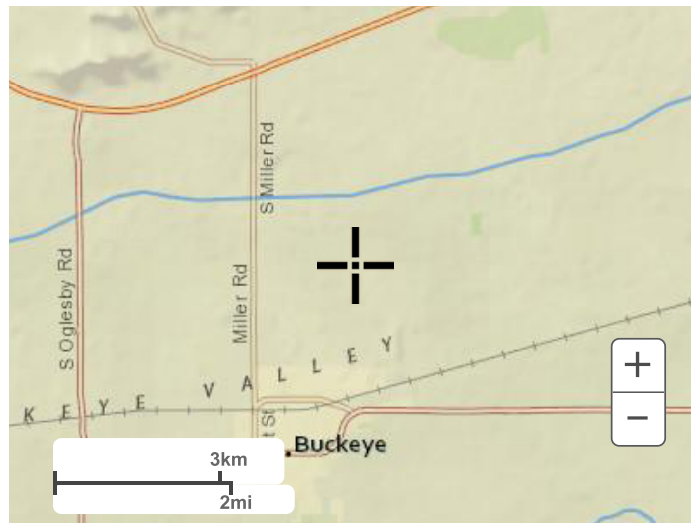
NOAA Atlas 14, Volume 1, Version 5

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Maps & aerials

Small scale terrain



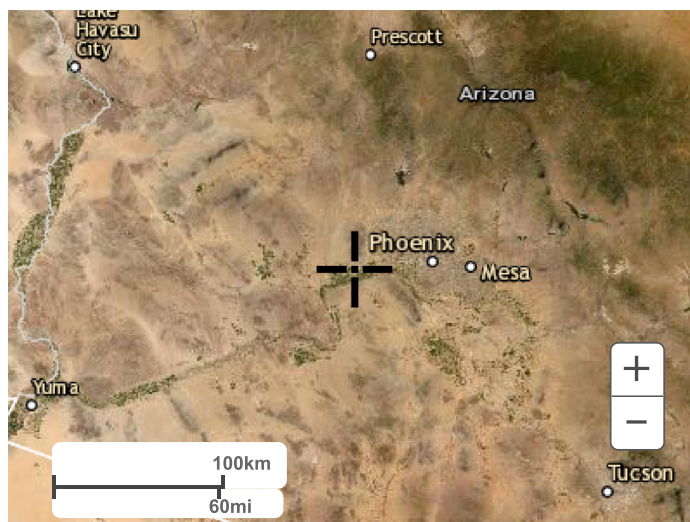
Large scale terrain



Large scale map



Large scale aerial



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Silver Spring, MD 20910
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Appendix D

Excerpts From: Offsite Drainage Report for Montana Vista / Sonoran Vista

OFFSITE DRAINAGE REPORT

MONTANA VISTA / SONORAN VISTA

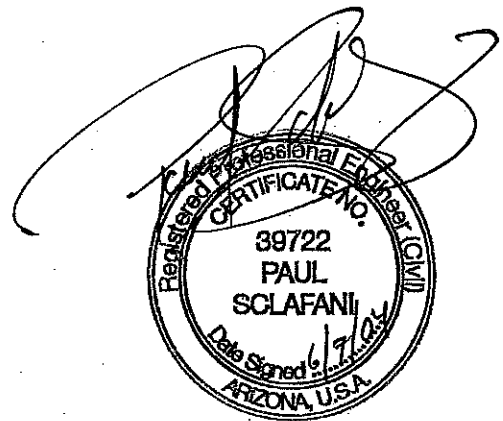
JN 45101993

Prepared For:

Sonoran Vista Investors, L.L.C., Apache 70 Investors, L.L.C.
C/O Kalish And Kalish
8238 East Thomas Road, Suite 102A
Scottsdale, AZ 85251
Attn.: Joe Kalish
Phone: (480) 990-9091
Fax: (480) 990-9094

Prepared By:

RBF Consulting
16605 North 28th Avenue, Suite 100
Phoenix, AZ 85053-7550
Phone: 602-467-2200
Fax: 602-467-2201



June 7, 2004

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Appendix A Project Information

Appendix B Hydrology

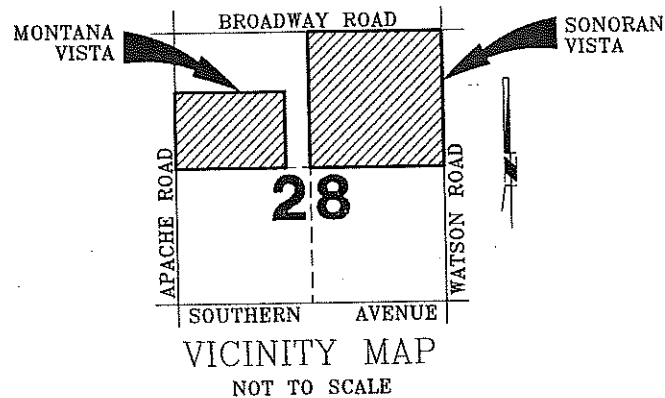
Appendix C RID Analysis

Appendix D Onsite Channels

1.0 Introduction

1.1 Site Description

The proposed Montana Vista / Sonoran Vista developments consist of two single-family residential developments covering approximately 80 and 163 acres, respectively.



Montana Vista / Sonoran Vista Vicinity Map

1.2 Project Location

This drainage report evaluates the offsite drainage for two projects being considered for development. These two sites are Montana Vista and Sonoran Vista.

1.2.1 Montana Vista

The Montana Vista development is located within a portion of the south half of the northwest quarter of Section 28 in Township 1 North, Range 3 West of the Gila and Salt River Base and Meridian, Maricopa County, Arizona. Roeser Road bound the site on the south and Apache Road on the west (See Vicinity Map).

1.2.2 Sonoran Vista

The Sonoran Vista development is located within the northeast quarter of Section 28 in Township 1 North, Range 3 West of the Gila and Salt River Base and Meridian, Maricopa County, Arizona. Roeser Road bounds the site on the south, Watson Road on the east and Broadway Road on the north (See Vicinity Map).

1.3 Topographic Conditions

The proposed Montana Vista / Sonoran Vista developments consist primarily of undeveloped agricultural land. The existing ground tends to slope at a flat uniform grade to the southeast at approximately 1.0%. Runoff is mainly shallow sheet flow directed across the agricultural field. Roadways and irrigation ditches disrupt the direction of natural flow and tend to concentrate runoff.

1.4 FEMA Flood Insurance Map

FEMA's Flood Insurance Rate Maps (FIRM) 04013C2040F and 04013C2045F classify the project sites as Zone X, "Areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 100-year flood." The FIRMs for this project area are shown in Appendix A.

2.0 Existing Studies

In order to evaluate the drainage at the site, existing drainage studies that have been previously completed in the area were evaluated.

2.1 Buckeye Area Flood Delineation Study (FDS)

The Montana Vista / Sonoran Vista development areas were previously studied as part of the Buckeye Area Flood Delineation Study completed for the Flood Control District of Maricopa County by McLaughlin Kmetty Engineers, Ltd. The results of the study were evaluated for this project, and are described in greater detail in Section 3.0, Offsite Drainage. An excerpt from this study can be found in Appendix A.

3.0 Offsite Drainage

As previously mentioned, the drainage for the project area has already been analyzed in the Buckeye Area FDS. The Buckeye Area FDS studied 61.5 square miles of watershed in the limited detail appropriate for a study of this size.

The results of the FDS were evaluated for accuracy and applicability. It was found that an independent detailed analysis would be necessary to properly evaluate the flows impacting the site. The initial part of this analysis was to establish the geometry of sub basins, which contribute to flows that impact the site.

3.1 Sub Basin Delineation

This delineation was accomplished with the aid of 2-foot and 10-foot topo data from the Flood Control District of Maricopa County, information gathered as part of an on-site investigation, as well as information gained from experience with similar and adjacent analyses performed by RBF Consulting in the past. Based upon the gathered information, the geographical delineation of the sub basins differs from that of the FDS in the following ways (our delineation is shown on the Drainage Map in Appendix B, and that of the FDS is shown on the Excerpt From Buckeye FDS in Appendix A):

- The eastern triangular portion of the FDS Basin 10 actually drains south to FDS Basin 23.
- The remaining portion of FDS Basin 10 crosses Miller Road at concentration point L1.
- FDS Basin 22 concentrates on its south border, approximately 1000 feet east of Miller Road, where it weirs over the RID canal (assumed full) and into FDS Basin 37.
- FDS Basin 11 crosses Watson Road at concentration point N1. This flow combines with others from the east side of Watson Road and then weirs over the RID canal (assumed full) approximately 2300 feet east of Watson Road.

- FDS Basin 23 flows do not concentrate at concentration point N2. These flows gather along the north bank of the RID canal. They then migrate southwest to a point approximately 1500 feet east of Apache Road where they weir over the RID canal (assumed full).
- FDS Basin 38 (as well as the north west most one-eighth section of FDS basin 49) was divided up into pieces, each one-eighth of a section in size (as shown on the offsite drainage map for sub basins 4, 5, 6, 7, and 8). This was done as this area consists of agricultural fields of this size and configuration. These sub basins drain to their southeast corners due to topography and to tailwater berms, which exist along their south and west borders.

3.2 Crossing of the RID Canal

The locations for weir flow over the banks of the RID canal, as well as reservoir storage behind the RID canal, were analyzed using the 2-foot FCDMC topo data.

The following assumptions were made in analyzing the weir flow over the RID canal:

- The RID canal was assumed to be flowing full at all locations.
- The effect of the current of the RID flow on the weiring flows is negligible.
- Water which weirs over the north bank, will continue over the south bank, in the same location, as long as the south bank is the lower of the two. This is the case for all three locations, as shown on the RID Profile in Appendix C.

The drainage HEC-1 model, which utilizes the reservoir stage storage relationship behind the canal, and the weir flow stage discharge relationship over it, was used to calculate the peak flowrates over the canal.

These analyses showed three areas of weir flow between Rainbow Road and Miller Road whose locations and peak flow rates are as follows:

1. 1,364 cfs east of Watson Road (STOR. 3).
2. 399 cfs centered approximately 0.3 mi east of Apache Road (STOR. 2).
3. 319 cfs east of Miller Road (STOR. 1).

These data and the analyses are contained in Appendix C.

3.3 Routing Below the RID Canal

The three locations of weir flow were analyzed to find which, if any, would impact the project site. It was found that the flow east of Watson Road continues south without ever heading west toward the project site or Watson Road. It was also found that the flow just East of Miller Road continues south without ever heading east toward Apache Road or the project site. The flow just East of Apache Road (STOR. 2), however, heads southeast then south, eventually impacting the project site. After overtopping the RID canal, the flow moves to the southeast corner of sub basin 4 (as shown in the Offsite Drainage Map) where it combines with the runoff from sub basin 4 at C24. This flow then continues south along the mid-section line to Broadway Road where it combines with the runoff from sub basin 6 at C246. At and around the area of the intersection of the mid section line and Broadway Road a flow split occurs. This split was analyzed using HEC-RAS by modeling the flow, which splits off to the east as a lateral weir. Results of this analysis are contained in Appendix D.

The analysis calculated that, in the existing state (based upon existing topography), 164 cfs would continue to head south from this location and later join with the flow from sub basin 8, and 231 cfs would break off to the east (whether south east across the Sonoran Vista site, or east along the Broadway Road alignment), eventually concentrating at the southeast corner of the Sonoran Vista site. Runoff flows from sub basins 3, 5 and 7 also concentrate in their southeast corners where they join flows from upstream, and travel south along Watson Road, where they eventually join the previously mentioned split flow at C2-7. This combined flow at C2-7 is 373 cfs.

Analysis of the surrounding topography showed that flows carried in the right-of-way of Apache Road are not a threat to the west border of Montana Vista. This is due to the fact that the fields on the west side of Apache Road, north of the site, tend to route their flows directly to the field to the south, and that the elevation of the irrigation channel on the east side of Apache Road (along the west side of Montana Vista) is sufficiently higher than that of the west side of the road.

An existing farm road on the site currently provides some protection to the north border of the Montana Vista site. This elevated road directs flow around the property, east to the mid section line.

Peak (100 yr, 6 hr) flows for all sub basins and routing are shown on the offsite drainage map in Appendix B. The HEC-1 models (100 yr, 6hr and 100 yr, 24 hr), as well as all input data from which these results were derived, are contained in Appendix B.

4.0 Recommendations

In order to address the offsite flows that will be impacting this development, it will be necessary to construct various onsite improvements. These improvements include drainage channels that will be constructed along the northern, western, and eastern boundaries. FlowMaster® developed by Haestad Methods, Inc. was utilized to apply Manning's equation to the proposed channels. Final design of the channels shall incorporate more sophisticated methods of analyses.

Based on the HEC-1 analysis, 164 cfs will be directed south along the western boundary of the site. This flow was calculated using existing topography, which includes a significant dirt berm on the south side of Broadway Road between Apache Road and the mid-section line. The berm was constructed, and is currently maintained, by the farmer/owner of the land that is sub basin 8. The analysis of the current condition of the berm shows that overtopping is limited to the area adjacent to the mid section line where a farm road crosses the berm heading south. However, it cannot be safely assumed that the berm will be sufficiently maintained to hinder flows as it would in its current condition. Therefore, the southbound channel along the mid section line (West Channel) was designed to handle the entire flow (402 cfs north section, 420 cfs south section), which concentrates at the corner of Broadway Road and the mid section line.

The West Channel will be placed in a tract along the west boundary of the Sonoran Vista site. This tract will also contain a buried pipe, which will convey the irrigation flows that were previously carried by the RID lateral that runs north to south in this location.

The design for the West Channel consist of two parts: the north part, which carries flows from Broadway Road to a point parallel with the north boundary of the Montana Vista site, and the south part, which carries flows from the end of the north part directly south to the project boundary, where it will connect to a similar channel designed as part of the Riata West development. If the berm along the south side of Broadway Road is maintained in its current condition, the discharge flowing south was determined to be 164 cfs for the north part and 200 cfs for the south part of the West Channel. In order to protect our site from flooding, regardless of the stability of the berm, the West Channel was designed for the entire flow, and the North Channel was designed for the breakout flow of 231 cfs.

It is recommended that the West Channel north portion have a trapezoidal cross section with a bottom width of at least 15 feet, 4:1 side slopes, and a longitudinal slope of approximately 0.53 % so that the flow of 402 cfs can be accommodated at 3 feet of depth. It is recommended that the West Channel south portion have a trapezoidal cross section with a bottom width of at least 16 feet, 4:1 side slopes, and a longitudinal slope of approximately 0.53 % so that the flow of 420 cfs can be accommodated at 3 feet of depth. Both channel designs shall extend one foot above the proposed water surface for freeboard.

The North Channel is designed to carry the 231 cfs from the northwest corner of the property to the intersection of Broadway and Watson Roads. Our work indicates that most of the upstream flow should intersect Broadway Road near the west property line of Sonoran Vista. Based on a variety of issues, we believe it is important to provide a channel along the north side of Sonoran Vista to ensure that the site will be adequately protected from:

- Potential for weir flow easterly over the berm and irrigation ditch north of the mid-section line.
- Potential local overflows from the drainage area north of Sonoran Vista, between the mid-section line and Watson Road.
- The potential for significant flows to be divided easterly along Broadway Road due to agricultural improvements, ditches and berms both north and south of the road, as well as highway road ditch grading.

It is recommended that the North Channel have a cross section that includes the public utility easement on the north side with a side slope of 8:1 for the first vertical foot. The remaining side slopes will be 4:1, with a bottom width of at least 18 feet, and a longitudinal slope of approximately 0.15 % so that the flow can be accommodated at 3 feet of depth. We have discussed the option of not including freeboard along the north side of the North Channel with the town engineer and understand that conceptually he could agree to waive the freeboard requirement in this case for the following reasons:

- There is currently some conveyance along Broadway Road during flooding events.
- We believe that most of this flow is conveyed within the road right-of-way, related berms and irrigation ditches.
- The development and commercial property (which lies in the northeast corner of the Sonoran Vista site) shall, on the south side of the North Channel, either provide the freeboard required, or be raised 1' above the channel.
- Within the foreseeable future, as the property to the north is developed, the runoff values shown in this report will be reduced considerably.

The design for the East Channel consist of two parts: the north part, which carries flows (368 cfs) from Broadway Road, along Watson Road, to a point parallel with the north boundary of the Montana Vista site (which coincides with the south end of the commercial site), and the south part, which carries flows (383 cfs) from the end of the north part directly south to the project boundary, where it will connect to a similar channel designed as part of the Riata West development. It is recommended that the East Channel north portion have a trapezoidal cross section with a bottom width of at least 13 feet, 4:1 side slopes, and a longitudinal slope of approximately 0.55 % so that the flow of 373 cfs can be accommodated at 3 feet of depth. It is recommended that the East Channel south portion have a trapezoidal cross section with a bottom width of at least 14 feet, 4:1 side slopes, and a longitudinal slope of approximately 0.55 % so that the flow of 387 cfs can be accommodated at 3 feet of depth. Both channel designs shall extend one foot above the proposed water surface for freeboard.

The slopes of the East and West Channels were limited in design to those that would keep velocities during peak flow conditions at or below approximately 5 fps (to prevent channel erosion). The design slopes for these channels are shallower than those of the existing ground. To construct these slopes, it is recommended that either: channel start and end grades be adjusted, culvert invert elevations be adjusted, or drop structures be installed.

All road crossings of channels should incorporate culverts designed to convey the anticipated 100-year flows listed herein while requiring a maximum head of 4 feet.

The alignments of the channels are shown in the Channel Map in Appendix D. It is recommended that the starting point of the West Channel extend to the northwest corner of the site. The North Channel should begin only after the width of the West Channel, as shown in the Channel Map. It is also recommended that where the North Channel meets the East Channel, a radius 3 times the top width be utilized to make the 90-degree transition, as per the Drainage Design Manual for Maricopa County, Volume II, Hydraulics.

The design of Montana Vista should incorporate a raised road on the north side (similar to the existing condition), raised lots, and a drainage ditch or some combination thereof to direct flows easterly around the property. To provide an appropriate level of protection, these improvements for Montana Vista should be designed on the need to direct approximately 400 cfs of sheet flow across the north end of the property to the channel along the west side of Sonoran Vista. The elevation advantage of the irrigation channel on the east side of Apache Road over that of the west side should be maintained to protect the site from any flows in the right-of-way of Apache Road.

Any pass through offsite flows, and any excess onsite flows (in excess of the required retention or from events larger than the design storm) from Montana Vista should be discharged along the natural drainage course on Roeser Road easterly to the channel along the west side of Sonoran Vista.

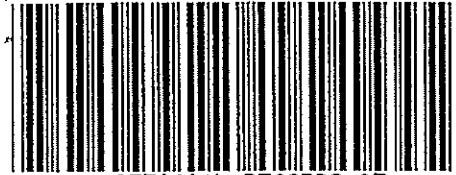
Analyses of the channels can be found in Appendix D.

5.0 Conclusion

This preliminary drainage report outlines the improvements that will be necessary to protect the Sonoran Vista and Montana Vista developments from the negative impacts of offsite flows which have been predicted to impact these sites. Much of the offsite runoff, which impacts the site, is uncontrolled runoff from agricultural areas to the north. It should be noted that as those areas are developed and appropriate retention is provided, the need for these channels in the future will be diminished. Additional review of this issue may be appropriate if the upstream area is developed prior to Sonoran Vista. The analysis presented within this report is based on approximate methodology. Further analysis will be necessary before final design of the onsite drainage structures are complete.

Appendix E

Agreement for Cooperation (with Vista Bonita



OFFICIAL RECORDS OF
MARICOPA COUNTY RECORDER
HELEN PURCELL
2006-1039061 08/03/06 03:12 PM
1 OF 1

MARTINEZB

AFTER RECORDING RETURN TO:

Robert M. Karber
P.K. Development, L.L.C.
11811 North Tatum Boulevard, Suite 1080
Phoenix, Arizona 85028

AGREEMENT FOR COOPERATION

THIS AGREEMENT FOR COOPERATION ("Agreement") is entered into to be effective as of the 25th day of May, 2006 by and between P.K. DEVELOPMENT, L.L.C., an Arizona limited liability company ("PKD") and by SAPPHIRE, LLC, a New Mexico limited liability company, ("Sapphire").

RECITALS:

A. WHEREAS the parties each own property which shares a common boundary in the Town of Buckeye. The PKD property is known as the "Montana Vista Property" (legally described on Exhibit "A-1" attached hereto) and the Sapphire property is known as the "Vista Bonita Property" (legally described on Exhibit "A-2" and attached hereto); and

B. WHEREAS the parties believe it is in their mutual best interests to cooperate and collaborate with respect to certain development issues with respect to grading, drainage and other issues.

AGREEMENT:

THEREFORE, for valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties agree as follows:

1. The parties recognize the need to abandon the private irrigation ditch along their common property line and to relocate the irrigation turnout which serves the Hunt Property prior to the development of either property. The parties further recognize the need to construct a berm and wall along the common property line and generally agree that the configuration as shown on the attached Exhibit "C", section A-A is appropriate.

2. Each party agrees to provide temporary access or construction easements for irrigation, drainage, grading or other purposes as may be reasonably necessary to develop the properties as may be requested or required by the Town of Buckeye (the "Town"), the Roosevelt Irrigation District (the "RID"), Maricopa County or any other governmental authority. The parties shall cooperate in good faith to resolve any conflicts or disputes with respect to any easements, agreements or other documents requested or required hereunder. Each party will provide to the other, within its respective property, temporary construction easements, rights-of-way dedications and public utility easements as are reasonably required by the other to facilitate the development of the road and irrigation improvements described herein.

3. Both parties hereby agree to terminate agricultural production on their respective properties on or before July 1, 2006.

WESTERN BOUNDARY ISSUES:

4. On the western boundary of each property lies an RID lateral. Apache Road is located immediately west of the lateral. Both parties agree to collaborate on the design and construction of piping and/or tiling of the lateral, and, to the extent practicable, will coordinate the relocation and/or tiling/piping of the lateral along the frontages of their respective properties, including providing such appropriate easements as reasonably requested by the RID.

5. Both parties agree to dedicate such portions of their property for Apache Road and to provide half street improvements for Apache Road along their respective western borders and frontage as required by the Town and will cooperate to the extent possible on the timing of such right-of-way dedications and the improvements to be constructed thereon.

COMMON BOUNDARY ISSUES:

6. Following is a description of certain improvements (the "Common Boundary Improvements") required along the common boundary of the properties, i.e. the southern boundary of the Vista Bonita Property and the northern boundary of the Montana Vista Property (the "Common Boundary"), together with the allocation and timing of payment of the costs of such Common Boundary Improvements.

a. The parties agree that it will be necessary to abandon and remove the private irrigation ditch located along the Common Boundary required to deliver irrigation water to the Hunt property located immediately east of the Montana Vista Property (the "Hunt Ditch"). Upon abandonment and removal of the Hunt Ditch, a new irrigation turnout and additional improvements will be necessary to provide the delivery of irrigation water to the Hunt property. The parties further agree that the cost of the abandonment of the Hunt ditch and the construction of the Hunt irrigation turnout and related improvements are to be evenly split (50% / 50%) between Sapphire and PKD. Each shall pay their share upon request for same D.R. Horton – Continental Series ("Horton"), the developer of the Sonoran Vista project ("Sonoran Vista"), pursuant to the agreement identified in Paragraph 6(d)(ii) below. A depiction of the proposed irrigation improvements to replace the existing Hunt Ditch and needed to serve the Hunt property is attached hereto as Exhibit "D".

b. The parties shall construct a perimeter wall on the Common Boundary.

c. In accordance with the grading plans for the Montana Vista Property entitled "Grading and Drainage Plans for Montana Vista" sheets 1 through 11, prepared by Musser Engineering Consultants, Inc., and dated June 20, 2005, the parties shall also be required to relocate an existing tailwater ditch (if necessary to permit farming on the Vista Bonita Property), an existing dirt farm access road, and to install a dirt berm along the Common Boundary (the "Grading Common Boundary Improvements"). The berm is required to accommodate the grade difference between the properties and to ensure that the common wall described in Paragraph 6(c) will be not less than six (6) feet in height nor more than eight (8) feet in height (or such other height as may be required by the Town) on either side of its face at

grade. Depiction of the proposed grading modifications along the Common Boundary are attached hereto as Exhibit "B" and Exhibit "C".

d. The party first commencing construction on its property shall be responsible for completion of the Common Boundary Improvements (the "Constructing Party"), provided that the Constructing Party shall be reimbursed for fifty percent (50%) of the costs of Common Boundary Improvements by the party that does not construct such Common Boundary Improvements (the "Non-Constructing Party") at the time the Non-Constructing Party commences its on-site construction, provided that:

i. the cost for the portion of the perimeter wall east of the Common Boundary, i.e. between the Vista Bonita Property and the Hunt property, shall be paid solely by Sapphire and is to be constructed as a part of the subdivision improvements to the Vista Bonita Property; and

ii. PKD may enter into an agreement with Horton pertaining to the abandonment of the private irrigation ditch located along the common boundary of the Montana Vista Property and Sonoran Vista. The parties understand and agree that the modifications to the Hunt irrigation delivery system described in Paragraph 6(a) must be constructed concurrently with the piping of the irrigation lateral along the Montana Vista Property/Sonoran Vista mid-section line by Horton. Therefore, the parties agree that amounts payable by PKD and Sapphire pursuant to Paragraph 6(a) above shall be due and payable subject to the terms of the agreement between PKD and Horton.

e. If both parties commence improvements to their respective properties at approximately the same time, then each party agrees to be responsible for one half (1/2) of the costs of the Common Boundary Improvements as and when such costs become due and owing.

7. The parties further agree that the Town requires a temporary retention basin in the southeast corner of the Vista Bonita Property to facilitate control of the discharges of offsite drainage to the RID lateral canal and to the drainage channel within the Sonoran Vista property (the "Temporary Retention Basin"). A depiction of the proposed Temporary Retention Basin is attached hereto as Exhibit "B". Sapphire shall permit PKD to construct and maintain, at PKD's sole cost and expense, the Temporary Retention Basin and shall provide a temporary construction easement over the southerly 100 feet of the Vista Bonita Property. Likewise, until the Vista Bonita Property is developed and improved, PKD agrees to maintain and/or pay for the maintenance of the Temporary Drainage Easement and any other drainage ditch, including a replacement tailwater ditch along the southern boundary of the Vista Bonita Property, in order to ensure and minimize the potential for discharge of irrigation or drainage flows onto the Montana Vista Property. Although Sapphire shall notify PKD upon obtaining any knowledge of any problems or needs for repairs or maintenance to such Temporary Retention Basin and/or drainage ditch, PKD shall be solely responsible, and does hereby release Sapphire from any claims for damages or other liability occasioned as a result of the ditch failing to be maintained in a good and working condition.

8. PKD shall provide a temporary construction easement over the northerly 100 feet of the Montana Vista Property for construction of the berm described in Paragraph 6(c), down

slope to the Montana Vista Property, if required to accommodate the improvement of the Vista Bonita Property. Any compensation due to the farmer of the Montana Vista Property for crop loss or damage (to the crop in the field prior to July 1, 2006) resulting from the work along the common boundary line shall be paid by Sapphire. The parties believe this amount will not exceed \$200.00 per acre. Any crop loss or damage after July 1, 2006 shall be the responsibility of PKD.

9. If either party desires to farm its parcel after July 1, 2006, then it shall notify the other party and reasonable accommodations shall be made by each party to allow for such farming operations.

MISCELLANEOUS:

10. Sapphire shall retain the existing dirt berm which located along the northerly side of the Vista Bonita Property (i.e., immediately south of Broadway Road) or to replace it with a comparable facility in order to divert the flow of stormwater which enters the Vista Bonita Property from the north. Sapphire shall use commercially reasonable efforts to enter into an agreement with Horton to discharge such offsite drainage to the drainage channel running north-south along the western portion of Sonoran Vista. Additional improvements may be needed to the Vista Bonita Property to prevent tailwater and stormwater runoff from the Vista Bonita Property from flowing onto the Montana Vista Property. The parties agree to collaborate and cooperate to provide a mutually acceptable solution to these issues throughout the course of the development process, including, without limitation, providing temporary facilities and easements.

11. Concurrently with the submission to the Town of any engineering or improvement plans, including any phased submittals, which include any of the improvements described in this Agreement, the party making such submittal shall provide the other with two sets of the appropriate plans for review and comment. Such comments may include requested revisions of the plans. The parties shall cooperate in good faith to resolve any conflicts. In the event no comments or requests for revisions are provided within the fifteen (15) business day period, then the plans shall be deemed to have been approved.

12. Both parties recognize that the current plans for Vista Bonita include a small area (consisting of about 6 lots and the street improvements) that will drain directly to the Montana Vista Property. To avoid costly improvements that Sapphire would incur to retain the small amount of water on the Vista Bonita Property, PKD hereby agrees to accept the flow for the developed condition only) and shall provide retention for same as required by the Town at no cost to Sapphire. Notwithstanding the foregoing, Sapphire shall be responsible for all interim storm water control, subsequent to the start of development.

13. Prior to commencement of any work described herein, the party desiring to commence the work shall obtain an engineer's estimate of the cost of the work and shall provide such estimate to the other party for review and approval. In the event no comments or requests for revisions are provided within fifteen (15) business days from receipt of the engineer's estimate, the estimate shall be deemed approved. If a party objects to the engineer's estimate

during such 15-day period, the parties shall meet within five (5) business days of such objection to negotiate in good faith to resolve such objections.

14. Prior to entry upon another party's property, all parties agree to maintain commercial liability insurance covering the activities of itself and its agents, contractors and subcontractors upon the property, with a combined single limit of at least One Million Dollars (\$1,000,000) primary coverage for bodily and personal injury and property damage. The party performing or causing work to be performed on the other party's property, agree to indemnify and hold the current owner of the property harmless from all losses, damages, liabilities, actions, suits, proceedings, claims, demands, assessments, judgments, costs and expenses, including reasonable attorneys' fees, arising from the entry of the party performing or causing work to be performed upon the property. All parties shall keep all property free and clear of all liens arising out of their activities conducted on another party's property.

15. The obligation of either party (the "Paying Party") to reimburse the other (the "Requesting Party") for work done pursuant to this Agreement is conditioned upon the Requesting Party providing the Paying Party with: (i) an accounting of the proposed reimbursement amount, together with copies of all invoices, bills, statements and other reasonable evidence of the actual, out-of-pocket costs and expenses comprising the reimbursement amount, (ii) full and final lien waivers from each contract, subcontractor, engineer, design professional or consultant engaged in connection with the work that is the subject of the reimbursement, and (iii) a non-exclusive assignment of all warranties related to the work that is the subject of the reimbursement request. The Paying Party shall pay the reimbursement amount on or before thirty (30) days following the request therefor.

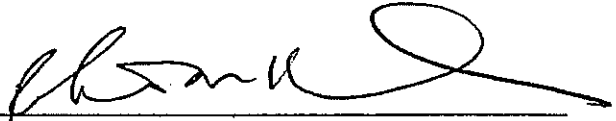
16. This Agreement is being recorded for the sole purpose of providing constructive notice of its existence, and the benefits conferred to and the covenants imposed upon the respective parties. This Agreement shall be appurtenant to the parcels described herein and shall be enforceable and binding by and upon each party, and their respective successors and assigns.

17. Notwithstanding anything to the contrary, from and after the date a certificate of occupancy is issued with respect to any portion of the real property referred to herein, that is developed into a residential lot, this Agreement shall not be binding on or impose any obligation on such residential lot and shall be deemed automatically released as to such residential lot, without the need for any further action, on the issuance of a certificate of occupancy with respect to such residential lot.

18. This Agreement may be executed in multiple counterparts, each of which shall be an original, but all of which shall constitute one and the same document.

IN WITNESS WHEREOF the parties have executed this Agreement to be effective as of the date first written above.

P.K. DEVELOPMENT LLC, an Arizona limited liability company



Robert M. Karber, Authorized Agent

STATE OF ARIZONA)
) ss.
COUNTY OF MARICOPA)

The foregoing document was acknowledged before me this 29th day of ^{May}~~April~~, 2006, by Robert M. Karber, the Authorized Agent of P.K. Development, L.L.C., an Arizona limited liability company, on behalf of said Company.

IN WITNESS WHEREOF, I hereunto set my hand and official seal.


Notary Public

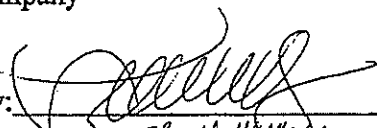
My Commission Expires:

5-21-08



Notary Public State of Arizona
Maricopa County
Lynn Hart
Expires May 21, 2008

SAPPHIRE, LLC, a New Mexico limited liability company

By: 

Name: LEE W. WYMER

Its: AUTHORIZED AGENT

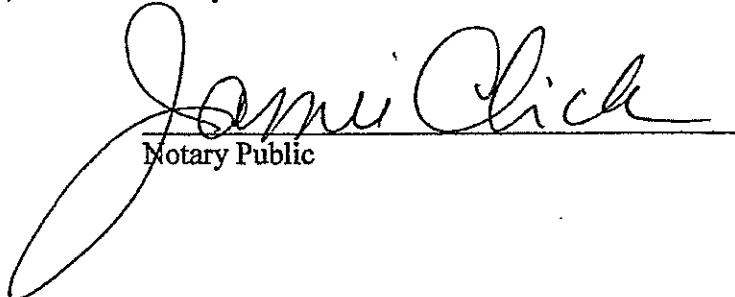
STATE OF ARIZONA)

) ss.

COUNTY OF MARICOPA)

The foregoing document was acknowledged before me this 17 day of ^{May} ~~April~~, 2006, by Lee W. Wymer, the Authorized Agent of Sapphire, LLC, a New Mexico limited liability company, on behalf of said Company.

IN WITNESS WHEREOF, I hereunto set my hand and official seal.


Notary Public

My Commission Expires:



JAMIE CHICK
Notary Public - Arizona
Maricopa County
Expires 06/06/07

EXHIBIT "A-1"

LEGAL DESCRIPTION

(MONTANA VISTA (GROSS) LESS THE WELL SITE)

MAY 20, 2005

THAT PORTION OF THE NORTHWEST QUARTER OF SECTION 28, TOWNSHIP 1 NORTH, RANGE 3 WEST, OF THE GILA AND SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA, MORE SPECIFICALLY DESCRIBED AS THE FOLLOWING PARCELS 1, 2, & 3;

PARCEL NO. 1

THE SOUTHERLY 1345.00 FEET, OF THE NORTHWEST QUARTER, OF SECTION 28, TOWNSHIP 1 NORTH, RANGE 3 WEST, OF THE GILA AND SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA;

EXCEPT THE EAST ONE HALF, OF THE EAST ONE HALF, OF THE EAST ONE HALF, OF THE NORTHEAST QUARTER, OF SAID SECTION 28; AND

ALSO EXCEPT THE SOUTH ONE HALF, OF THE SOUTHWEST QUARTER, OF THE NORTHWEST QUARTER, OF SAID SECTION 28;

PARCEL NO. 2

THE NORTH HALF, OF THE SOUTH HALF, OF THE SOUTHWEST QUARTER, OF THE NORTHWEST QUARTER, OF SECTION 28, TOWNSHIP 1 NORTH, RANGE 3 WEST OF THE GILA AND SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA;

PARCEL NO. 3

THE SOUTH HALF, OF THE SOUTH HALF, OF THE SOUTHWEST QUARTER, OF THE NORTHWEST QUARTER, OF SECTION 28, TOWNSHIP 1 NORTH, RANGE 3 WEST OF THE GILA AND SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA;

EXCEPT THE FOLLOWING DESCRIBED PARCEL "A";

PARCEL "A"

COMMENCING AT THE WEST QUARTER CORNER OF SAID SECTION 28, SAID POINT ALSO BEING THE CENTERLINE INTERSECTION OF APACHE ROAD AND ROESER ROADS; THENCE SOUTH 89°50'48" EAST, ALONG THE MID-SECTION LINE, A DISTANCE OF 2,317.54 FEET; THENCE NORTH 00°12'11" WEST, A DISTANCE OF 748.24 FEET TO THE TRUE POINT OF BEGINNING; THENCE SOUTH 55°10'37" WEST, A DISTANCE OF 138.22 FEET, TO THE BEGINNING OF A NON-TANGENT CURVE CONCAVE SOUTHWESTERLY, WITH A RADIUS OF 50 FEET AND A RADIAL BEARING OF NORTH 55°10'37" EAST; THENCE NORTHERLY ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 36°51'04", WITH A CURVE LENGTH OF ABOUT 32.16 FEET; THENCE NORTH 18°19'33" EAST, A DISTANCE OF 113.44 FEET; THENCE NORTH 89°41'38" EAST, DISTANCE OF 102.95 FEET; THENCE SOUTH 00°12'11" EAST, A DISTANCE OF 48.22 FEET TO THE POINT OF BEGINNING. AREA - 10,903± SQ. FT.

BASIS OF BEARINGS – NORTH 89°40'30" EAST FOR THE SOUTH LINE OF THE SOUTHEAST QUARTER OF SECTION 20, T 1 N, R 3 W, G&SR B&M AS SHOWN ON THE FINAL PLAT FOR "ESTRELLA VISTA AT BUCKEYE" PER PLAT RECORDED IN BOOK 698, PAGE 43, MCR.

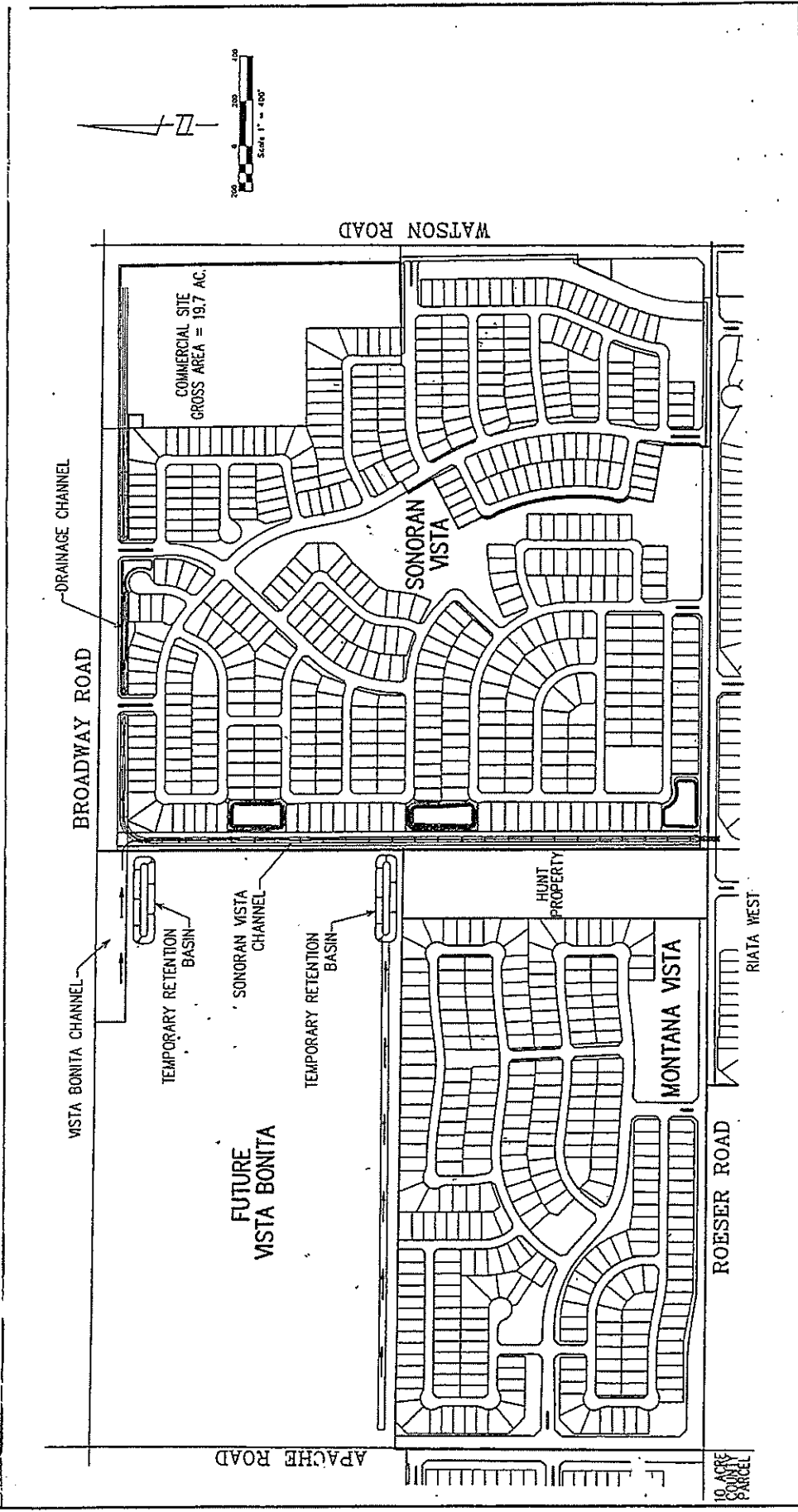
AREA – 71.31 ACRES (GROSS)

EXHIBIT "A-2"

LEGAL DESCRIPTION
(Per Preliminary Title Report dated 11/8/04)

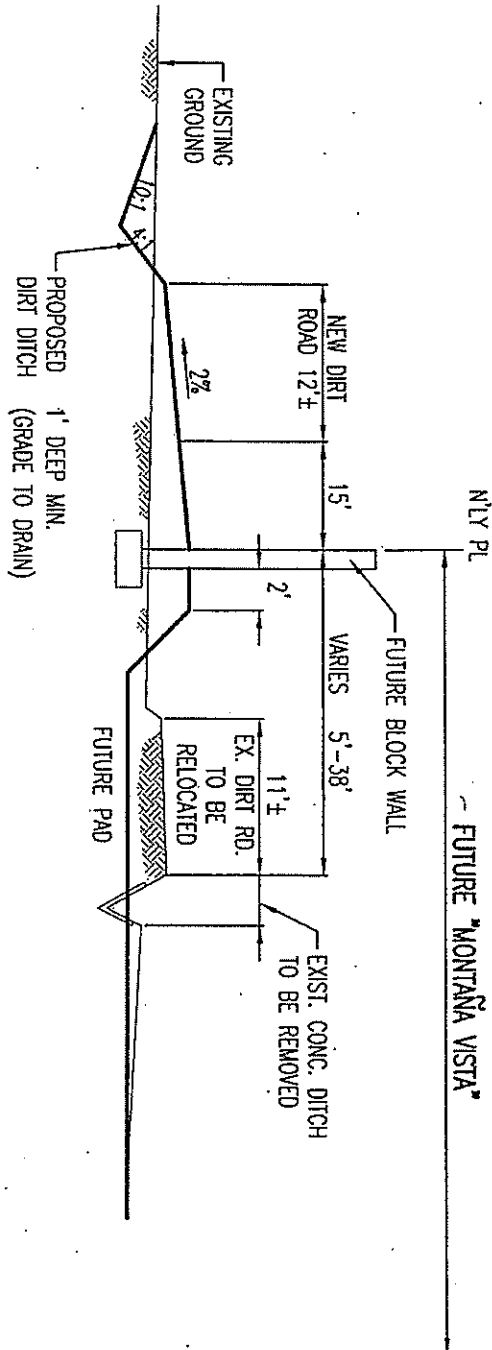
VISTA BONITA

The North half of the Northwest Quarter of Section 28, Township 1 North, Range 3 West of the Gila and Salt River Base and Meridian, Maricopa County, Arizona; except the East 261.00 Feet of the West 1218.00 Feet of the North 358.50 Feet of said Northwest Quarter; and except any part lying within the South 1345 Feet of the Northwest Quarter; and except the North 33 Feet; and except the West 40 Feet.



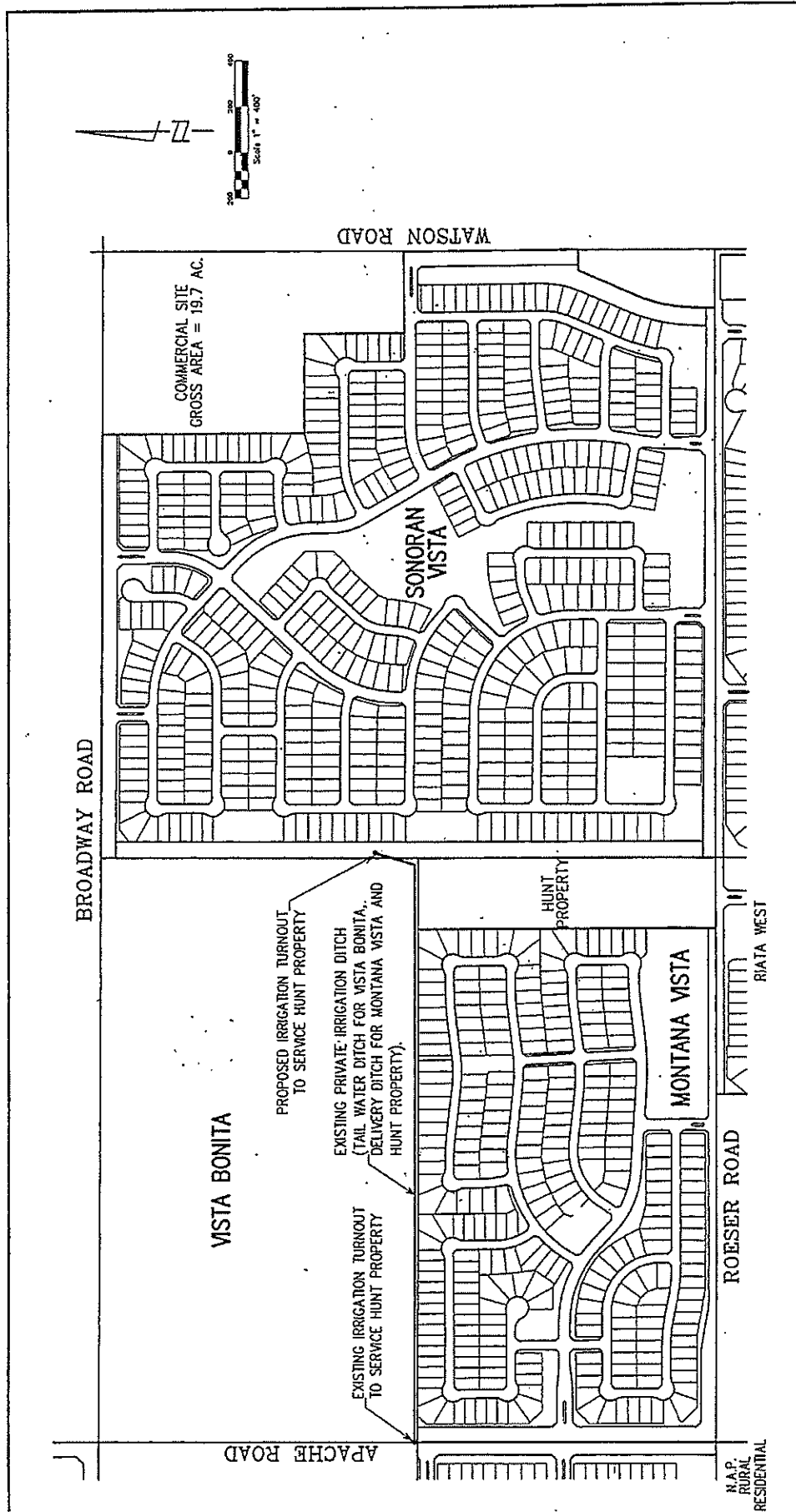
10 ACRES 8 PARCELS	EXHIBIT "B"	SCALE: 1" = 400'
DATE: 5/20/05	DRAINAGE IMPROVEMENTS AT VISTA BONITA ALONG THE SONORAN VISTA CHANNEL	MUSSEY ENGINEERING CONSULTANTS, INC. 61 W. ELLIOT, SUITE 111 TEMPE, AZ 85284 PHONE: (480) 820-8608 FAX: (480) 820-8628

Exhibit "C"



SECTION "A-A"
(AT NLY P/L) N.T.S.

DATE: 4/12/04



SCALE: 1" = 400'	EXHIBIT "D"	MUSSEY ENGINEERING CONSULTANTS, INC.
DATE: 5/20/05	REQUIRED IRRIGATION MODIFICATIONS TO SERVE THE HUNT PROPERTY	51 W. ELLIOT SUITE 111 TAMPA, AZ 85284 PHONE: (408) 820-8809 FAX: (408) 820-8823

Record

Unofficial
Document

MAR:

20060

1

CHICAGO TITLE INSURANCE COMPANY

When Recorded, Mail to:

P.K. Development, L.L.C.
11811 North Tatum Blvd., Suite 1080
Phoenix, Arizona 85028

25174:

more:

2422829 19

**COURTESY RECORDING
NO TITLE LIABILITY
TEMPORARY GRADING, DRAINAGE AND
MAINTENANCE EASEMENT AGREEMENT**

Vista Bonita Investors, L.L.C., an Arizona limited liability company (Grantor), and P.K. Development, L.L.C., an Arizona limited liability company (Grantee), enter into this Temporary Grading, Drainage and Maintenance Easement Agreement (the "Agreement") as of the 20th day of March, 2006, to construct temporary facilities, along the common property line, to direct irrigation tail water and drainage flows around Montana Vista II. Both Parties understand that said facilities will be abandoned in the future when the Ladra property is developed (as Vista Bonita or otherwise as outlined in the preliminary plat and drainage report for Vista Bonita). Grantor and Grantee are sometimes each referred to in this Agreement as a "Party" and collectively as the "Parties."

RECITALS

A. Grantor is the owner of fee simple title to that certain real property located in Maricopa County, Arizona, more particularly described in Exhibit "A" attached hereto and incorporated herein by this reference (the "Grantor's Property");

B. Grantee is the owner of fee simple title to that certain real property located in Maricopa County, Arizona, more particularly described in Exhibit "B" attached hereto and incorporated herein by this reference (the "Grantee's Property"). Grantee's Property, which is known as "Montana Vista II", is adjacent to Grantor's Property.

C. The Parties desire that Grantor grant and convey to Grantee a temporary drainage easement upon, under, over, and across that certain strip of real property more particularly described in Exhibit "C" attached hereto and incorporated herein by this reference (the "Easement Property").

AGREEMENT

NOW, THEREFORE, in consideration of the covenants herein contained and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Grantor and Grantee hereby agree as follows:

1. Incorporation of Recitals. The foregoing Recitals are incorporated herein by this reference and made a part hereof.

2. Grant of Easement. Grantor hereby grants, conveys, transfers, and sets over to Grantee, its heirs, successors, and assigns a temporary, non-exclusive grading and drainage easement (the "Easement") upon, under, over, and across the Easement Property for the purpose of: (a) the retention of stormwater drainage flows from the Grantor's Property; (b) Grantee constructing; a drainage and tail water collection channel, a berm, retention basin, irrigation tail water sump, and related facilities on the Easement Property in accordance with the grading and drainage plans and reports submitted to the Town of Buckeye as for Montana Vista II subdivision; and (c) Grantee maintaining and repairing the Easement Property as may be required or permitted under Paragraph 3 or 4 below. Any construction on the Easement Property shall be in a lien-free manner.

3. Maintenance and Repair of Easement Property. The Easement Property shall be maintained and repaired as an irrigation sump, a stormwater retention basin, and a drainageway (the "Drainage Facility") in accordance with the above described plans as are finally approved by the Town of Buckeye. With the grant of the easement described herein, Grantee will have the right to construct Drainage Facilities which may serve as a drainageway and sump for agricultural purposes and also serve as a Drainage Facility to retain stormwater drainage flows from Grantor's Property and direct floodwater around Grantee's Property per the plans approved by the Town of Buckeye. Grantee shall be responsible for repair and maintenance in order to effect the operation of the Drainage Facility and the approved drainage plan and shall not interfere with any of Grantor's agricultural uses or use of the Drainage Facility as a sump for agricultural purposes. Grantor may, at Grantor's discretion, continue or cease to maintain the drainageway and sump for agricultural purposes, but this Agreement does not obligate Grantor to continue or cease such activity. Grantor shall not impede the operation of the Drainage Facility for stormwater retention or as a drainageway around or to Grantee's Property.

4. Failure to Maintain and Repair the Easement Property. If either Party should fail to perform its repair or maintenance obligations as required by Paragraph 3 above in a timely manner and such failure is not remedied within ten (10) days after receiving written notice thereof (but if such failure to repair or maintain causes or threatens to cause an emergency, no such prior notice shall be necessary), then the other Party shall have the right (but not the obligation) to enter the Easement Property and perform any such repairs and maintenance. Notwithstanding the terms of this Agreement, if any act of a Party or its tenants, guests, invitees, licensees, agents, or representatives for whom the Party may be liable under any applicable law causes the need for the Drainage Facility or the Easement Property (or improvements located thereon) to be repaired, then the Party responsible for such damage shall cause the damage to be immediately repaired at such Party's sole cost and expense, said repairs to be commenced no later than ten (10) days after receiving written notice from the complaining Party of such damage, and thereafter such repair shall be diligently pursued to completion.

5. Indemnity. Grantor and Grantee agree to indemnify' and hold harmless the other for, from, and against any and all claims, demands, causes of action, liabilities, costs, and expenses (including, but not limited to, reasonable attorneys' fees and court costs) in connection with loss of life, personal injury, and/or damage to any property (collectively referred to as "Liabilities") caused by the act, omission, fault, or negligence (collectively referred to as "Act")

of the indemnitor or any tenant, guest, invitee, licensee, agent, or representative of the indemnitor, which Liabilities or Act arise or occur on or about the Easement Property. Grantee hereby agrees to defend and hold Grantor harmless for, from, and against any and all claims or actions arising from the existence, design, construction, maintenance, destruction, or failure of the Drainage Facility and improvements on the Easement Property.

6. Remedies. In the event of any breach or default in or of this Agreement or terms or provisions hereof by any Party hereto, the other Party shall be entitled to pursue any right or remedy available at law or in equity. In the event either Party finds it necessary to employ legal counsel to bring an action or other proceeding against any other Party to enforce any of the terms, covenants, or conditions hereof, the Party prevailing in such action or other proceeding shall be entitled to recover its reasonable costs and attorneys' fees.

7. Covenants Run with Land. Until terminated as provided in Paragraph 12 hereof, this Agreement shall constitute a covenant running with the land, and shall be binding upon Grantor and Grantee together with their respective heirs, successors, and assigns.

8. Integration. Merger, and Modification. This Agreement constitutes the entire agreement of the Parties with respect to the Drainage Facility and the Easement Property. All prior and contemporaneous agreements, representations, and understandings, whether oral or written, are superseded by and merged into this Agreement. Grantor and Grantee acknowledge that there are no oral promises, conditions, representations, understandings, or terms of any kind relative to the Drainage Facility and/or the Easement Property that are not contained herein. This Agreement may not be amended or modified Unofficial Document by a document in writing, signed by both Parties.

9. Further Acts. Each Party shall execute and deliver all such documents and perform all such acts as reasonably necessary, from time to time, to carry out the matters contemplated by this Agreement.

10. Governing Law. This Agreement is entered into in Arizona and shall be construed and interpreted under the laws of the State of Arizona.

11. Severability. If any provision of this Agreement is declared void or unenforceable, such provision shall be severed from this Agreement and the remaining parts hereof shall remain in full force and effect as though such invalid, illegal, or unenforceable portion had never been part of this Agreement, provided that the intent of the Parties is preserved.

12. Termination of Agreement. This Agreement shall automatically terminate when Grantor or its successors or assigns: (a) records a subdivision plat for Grantor's Property (the "Plat"); and (b) records a declaration stating that the required drainage improvements set forth on the improvement plans associated with that Plat have been constructed. Both parties understand that this declaration will be recorded after the Ladra Property (future Vista Bonita) is graded in accordance with the approved plans for that project. Both parties understand that the grading of

Vista Bonita will eliminate the need for the temporary facilities (and or will include similar permanent facilities at similar locations to be constructed and maintained by the Vista Bonita HOA). Nothing included herein is intended to prevent or interfere with the grading or construction of the final approved subdivision improvements, as approved by the Town of Buckeye, within the Ladra Property. Such declaration also may include a notice that this Agreement is terminated.

Dated as of the date first set forth above.

[SIGNATURE PAGES FOLLOW]

GRANTOR:

VISTA BONITA INVESTORS, an Arizona
limited liability company

By: Joseph J. Kalish
Joseph J. Kalish
Its: Managing Member

GRANTEE:

Unofficial Document

P.K. DEVELOPMENT, L.L.C., an Arizona
limited liability company

By: [Signature]
Its: Authorized Agent

STATE OF ARIZONA)
)ss.
County of Maricopa)

On this 20th day of ~~February~~ **MARCH**, 2006, before me the undersigned, personally Joseph J. Kalish, personally known to me or proved to me on the basis of satisfactory evidence to be such person, and who acknowledged himself to be the Managing Member of Vista Bonita Investors, L.L.C., an Arizona limited liability company, and that he, as such being authorized to do so, executed the foregoing instrument by signing the name of the partnership by himself in such capacity and acknowledged that he executed the same for and on behalf of the partnership for the purposes herein contained.



JEANNE MURPHY
Notary Public - Arizona
Maricopa County
Expires 02/16/08

[Signature]
Notary Public

My commission expires:

STATE OF ARIZONA)
)ss.
County of Maricopa)



CHRISTINE KING
Notary Public - Arizona
Maricopa County
Expires 05/24/09

On this 22nd day of March, 2006, before me the undersigned, personally appeared ROBERT M. FALBER, personally known to me or proved to me on the basis of satisfactory evidence to be such person, and who acknowledged himself to be a Authorized Agent of P.K. Development, L.L.C., an Arizona limited liability company, and that he, as such being authorized to do so, executed the foregoing instrument by signing the name of the limited liability company by himself in such capacity and acknowledged that he executed the same for and on behalf of the limited liability company for the purposes herein contained.



Notary Public

My commission expires:

Unofficial Document

5-24-09

EXHIBIT "A"
GRANTOR'S PROPERTY

LEGAL DESCRIPTION

(For the Ladra Property - future VISTA BONITA per preliminary Title Report dated 11/8/04)

The North half of the Northwest Quarter of Section 28, Township 1 North, Range 3 West of the Gila and Salt River Base and Meridian, Maricopa County, Arizona;

Except the East 261.00 Feet of the West 1218.00 Feet of the North 358.50 Feet of said Northwest Quarter; and

Except any part lying within the South 1345 Feet of the Northwest Quarter; and

Except the North 33 Feet; and except the West 40 Feet.

Unofficial Document

EXHIBIT "B"
GRANTEE'S PROPERTY
LEGAL DESCRIPTION
(Montana Vista II - Gross Area)

THAT PORTION OF THE NORTHWEST QUARTER OF SECTION 28, TOWNSHIP 1 NORTH, RANGE 3 WEST, OF THE GILA AND SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA, MORE SPECIFICALLY DESCRIBED AS THE FOLLOWING PARCELS:

PARCEL NO. 1

THE SOUTHERLY 1345.00 FEET, OF THE NORTHWEST QUARTER, OF SECTION 28, TOWNSHIP 1 NORTH, RANGE 3 WEST, OF THE GILA AND SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA;

EXCEPT THE EAST ONE HALF, OF THE EAST ONE HALF, OF THE EAST ONE HALF, OF THE NORTHEAST QUARTER, OF SAID SECTION 28; AND

ALSO EXCEPT THE SOUTH ONE HALF, OF THE SOUTHWEST QUARTER, OF THE NORTHWEST QUARTER, OF SAID SECTION 28.

Unofficial Document

PARCEL NO. 2

THE NORTH HALF, OF THE SOUTH HALF, OF THE SOUTHWEST QUARTER, OF THE NORTHWEST QUARTER, OF SECTION 28, TOWNSHIP 1 NORTH, RANGE 3 WEST OF THE GILA AND SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA.

PARCEL NO. 3

THE SOUTH HALF, OF THE SOUTH HALF, OF THE SOUTHWEST QUARTER, OF THE NORTHWEST QUARTER, OF SECTION 28, TOWNSHIP 1 NORTH, RANGE 3 WEST OF THE GILA AND SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA.

AREA - 71.56 ACRES (GROSS)

EXHIBIT "C"
EASEMENT PROPERTY
LEGAL DESCRIPTION
FOR TEMPORARY GRADING AND DRAINAGE IMPROVEMENTS
WITHIN THE SOUTHERLY PORTION OF VISTA BONITA

THE SOUTH 60.00 FEET TOGETHER WITH THE EAST 1000.00 FEET OF THE NORTH 100.00 FEET OF THE SOUTH 160.00 FEET OF THE FOLLOWING DESCRIBED PROPERTY:

THE NORTH HALF OF THE NORTHWEST QUARTER OF SECTION 28, TOWNSHIP 1 NORTH, RANGE 3 WEST OF THE GILA AND SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA; EXCEPT THE EAST 261.00 FEET OF THE WEST 1218.00 FEET OF THE NORTH 358.50 FEET OF SAID NORTHWEST QUARTER; AND EXCEPT ANY PART LYING WITHIN THE SOUTH 1345 FEET OF THE NORTHWEST QUARTER; AND EXCEPT THE NORTH 33 FEET; AND EXCEPT THE WEST 40 FEET.

AREA = 6 ACRES MORE OR LESS

Unofficial Document

Unofficial
Document

MARJ

200606

F

143500

Chilcc

WHEN RECORDED RETURN TO:

James B. Connor, Esq.
Gallagher & Kennedy, P.A.
2575 East Camelback Road
Phoenix, Arizona 85016

**RATIFICATION OF TEMPORARY GRADING, DRAINAGE
AND MAINTENANCE EASEMENT AGREEMENT**

THIS RATIFICATION OF TEMPORARY GRADING, DRAINAGE AND MAINTENANCE EASEMENT AGREEMENT (this "Ratification") is entered into to be effective as of this 10th day of May, 2006 and is executed by SAPPHIRE, LLC, a New Mexico limited liability company, as owner of the property described on Exhibit "A" attached hereto.

By execution below, Sapphire LLC hereby ratifies and confirms that the Temporary Grading, Drainage and Maintenance Easement Agreement (the "Easement") dated March 20, 2006 and recorded March 27, 2006 as Inst. No. 2006-0409165, Official Records of Maricopa County, Arizona, executed by Vista Bonita Investors, LLC, an Arizona limited liability company, and P.K. Development, L.L.C., an Arizona limited liability company, is binding and enforceable upon the Property (also described as the "Grantor's Property" in said easement). Accordingly, said Easement is hereby ratified and binding on the Property to the full extent as if Sapphire, LLC as the original named "Grantor" and signor of said Easement.

[SIGNATURE PAGE FOLLOWS.]

IN WITNESS WHEREOF, the undersigned has executed this Ratification to be effective as of the date first written above.

SAPPHIRE, LLC, a New Mexico limited liability company

By: [Signature]
Name: Sarah Grady
Its: manager

STATE OF New Mexico
COUNTY OF Sandoval ss.

On April 10th, 2006, before me, Leora E. Chavez, a Notary Public in and for said County and State, personally appeared Sarah Grady, personally known to me (or proved to me on the basis of satisfactory evidence) to be the person whose name is subscribed to the within instrument and acknowledged to me that s/he executed the same in his/her authorized capacity; and that by her/his signature on the instrument the person, or the entity upon behalf of which the person acted, executed the instrument.

IN WITNESS WHEREOF, I hereunto set my hand and official seal.



Unofficial Document

[Signature]
NOTARY PUBLIC

EXHIBIT "A"

The North half of the Northwest Quarter of Section 28, Township 1 North, Range 3 West of the Gila and Salt River Base and Meridian, Maricopa County, Arizona;

Except the East 261.00 Feet of the West 1218.00 Feet of the North 358.50 Feet of said Northwest Quarter; and

Except any part lying within the South 1345.00 Feet of the Northwest Quarter; and

Except the North 33.00 Feet; and except the West 40.00 feet.

Unofficial Document

GENERAL PERMITTING NOTES

1. ALL CONSTRUCTION IN THE PUBLIC RIGHTS-OF-WAY OR IN EASEMENTS GRANTED FOR PUBLIC USE MUST CONFORM TO THE LATEST MARICOPA ASSOCIATION OF GOVERNMENTS (MAG) UNIFORM STANDARD SPECIFICATIONS AND UNIFORM STANDARD DETAILS FOR PUBLIC WORKS CONSTRUCTION AS AMENDED BY THE LATEST VERSION OF THE CITY OF BUCKEYE DESIGN STANDARDS. IF THERE IS A CONFLICT, THE CITY OF BUCKEYE STANDARDS WILL GOVERN.
2. THE APPROVAL OF THE PLANS IS VALID FOR ONE (1) YEAR FROM THE DATE OF THE CITY ENGINEER'S SIGNATURE. IF AN ENCROACHMENT PERMIT FOR THE CONSTRUCTION HAS NOT BEEN ISSUED WITHIN ONE (1) YEAR, THE PLANS MUST BE RESUBMITTED TO THE CITY FOR REAPPROVAL.
3. A CITY OF BUCKEYE INSPECTOR WILL INSPECT ALL WORKS WITHIN THE CITY OF BUCKEYE RIGHTS-OF-WAY AND IN EASEMENTS. NOTIFY THE CITY 24 HOURS PRIOR TO THE INSPECTION BY CALLING (623) 349-6248.
4. CITY PERMITS ARE REQUIRED FOR ALL WORK IN PUBLIC RIGHTS-OF-WAY AND EASEMENTS GRANTED FOR PUBLIC PURPOSES. A CITY PERMIT WILL BE ISSUED BY THE CITY ONLY AFTER ALL FEES HAVE BEEN PAID AND THE PERMIT HAS AN APPROVED MARICOPA COUNTY ENVIRONMENTAL SERVICES DUST PERMIT AND AN APPROVED STORM WATER POLLUTION PREVENTION PLAN ATTACHED. THE SWPPP SHALL COMPLY WITH ALL FEDERAL, STATE, AND LOCAL REQUIREMENTS.
5. COPIES OF ALL PERMITS AND MOST RECENT APPROVED PLANS MUST BE RETAINED ON-SITE AND BE AVAILABLE FOR INSPECTION AT ALL TIMES. FAILURE TO PRODUCE THE REQUIRED PERMITS AND PLANS WILL RESULT IN IMMEDIATE SUSPENSION OF ALL WORK UNTIL PROPER PERMIT DOCUMENTATION AND/OR PLANS ARE OBTAINED. ALL OF THESE REQUIREMENTS APPLY TO ONSITE GRADING AND IMPROVEMENT PLANS.

STORM WATER DRAINAGE CERTIFICATE

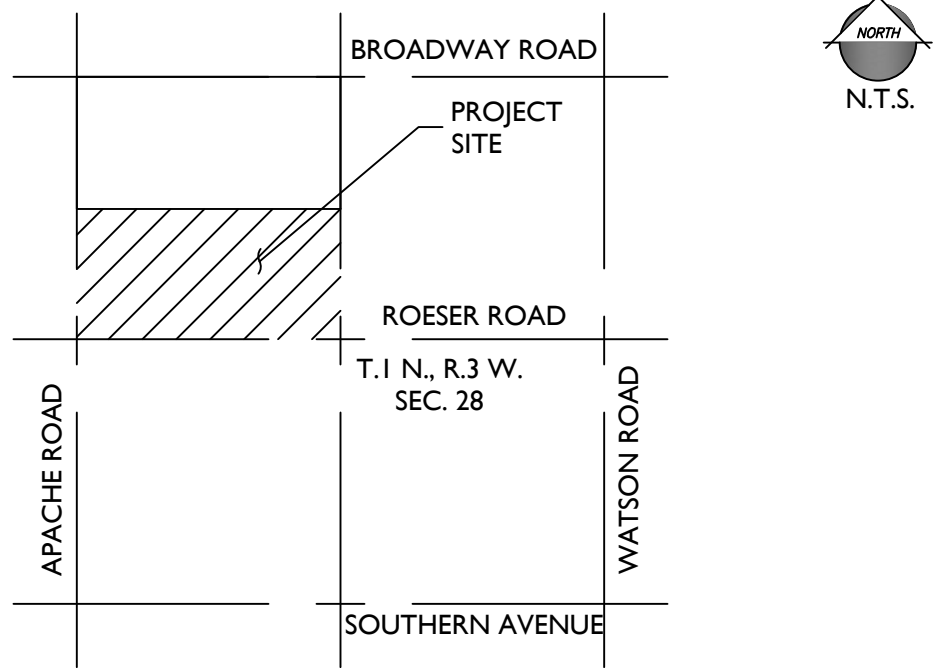
1. THE DEVELOPMENT WILL PROVIDE FOR ON-SITE RETENTION FOR THE RUNOFF FROM A 100-YEAR 2-HOUR STORM.
2. ALL FLOWS FROM THE 10-YEAR STORM WILL BE CONTAINED WITHIN THE STREET (FROM CURB TO CURB).
3. ALL STORM WATER RETENTION WILL BE DRAINED WITHIN 36-HOURS. IF BASINS DO NOT DRAIN WITHIN 36-HOURS, DEVELOPER/OWNER SHALL ENACT MEASURES TO CORRECT.
4. ALL DRAINAGE DESIGN WILL COMPLY WITH THE CITY OF BUCKEYE CURRENT GRADING AND DRAINAGE DESIGN STANDARDS.
5. FINISH FLOOR ELEVATIONS MUST BE A MINIMUM OF 14-INCHES ABOVE THE OUTFALL TOP OF CURB ELEVATION AND 12-INCHES ABOVE THE COMPUTED 100-YEAR WATER ELEVATIONS AND 1-FOOT ABOVE THE EMERGENCY OUTFALL ELEVATIONS AT ANY ADJACENT RETENTION BASIN, WHICH EVER IS GREATER.
6. ALL RETENTION BASINS SHALL HAVE A MINIMUM OF 1-FOOT OF FREEBOARD.

PRELIMINARY GRADING & DRAINAGE PLAN
FOR
MONTANA VISTA

BUCKEYE, ARIZONA

A PORTION OF THE NORTHWEST QUARTER OF SECTION 28, T.1 N., R.3 W.,
GILA AND SALT RIVER MERIDIAN, MARICOPA COUNTY, ARIZONA

VICINITY MAP



CIVIL ENGINEER:

EPS GROUP, INC.
1130 N. ALMA SCHOOL RD, SUITE 120
MESA, ARIZONA 85201
PHONE: (480) 503-2250
FAX: (480) 503-2258
CONTACT: MIKE LOTEMPPIO, P.E.
EMAIL: MIKE.LOTEMPPIO@EPSGROUPINC.COM

OWNER:

NAME: MV HOLDING COMPANY
ADDRESS: 1017 W HAPPY VALLEY ROAD,
PHOENIX, AZ 85085
PHONE: (602) 708-8550
CONTACT: LENN PRITCHARD
EMAIL: LENNP82601@GMAIL.COM

DEVELOPER:

NAME: BEAZER HOMES
ADDRESS: 1130 N ALMA SCHOOL ROAD, SUITE 110
MESA, AZ 85201
PHONE: (480) 323-5747
CONTACT: JAMES ALEXANDER
EMAIL: JAMES.ALEXANDER@BEAZER.COM

PROJECT DATA

APN: 504-41-006P, 504-41-006Q, 504-41-721, 504-41-722
ACREAGE: 71.32 AC
NUMBER OF LOTS: 276

DESCRIPTION		SHEET NO
COVER SHEET	CS01	1
PRELIMINARY GRADING & DRAINAGE PLANS	GD01 - GD04	2-5
GRADING SECTIONS	GS01	6

BASIS OF BEARING:

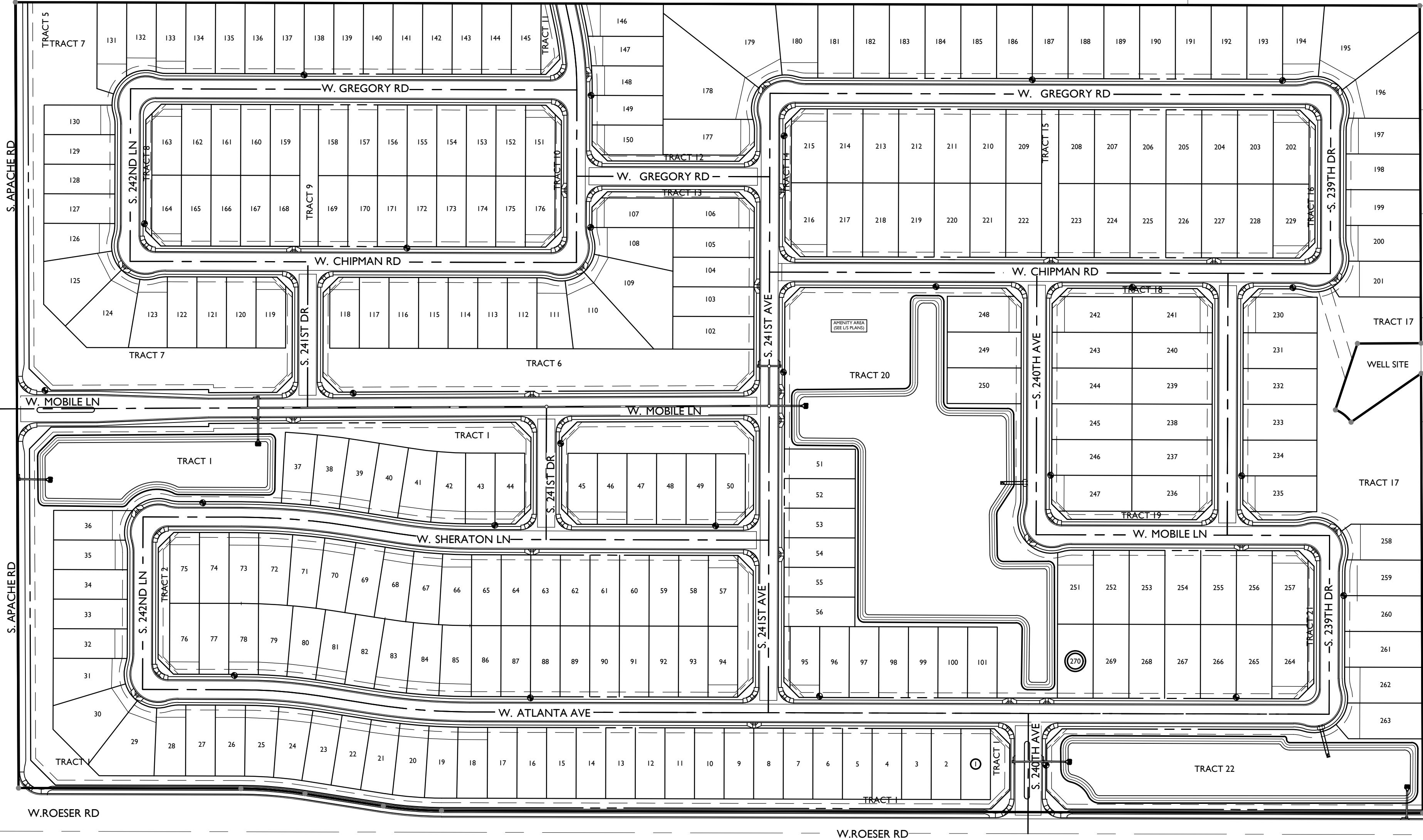
SOUTH LINE FO THE NORTHWEST QUARTER SECTION 28, TOWNSHIP 1 NORTH, RANGE 3 WEST, GILA & SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA.
(SOUTH 89° 51'27" EAST)

BENCHMARK:

NGS DESIGNATION 4AG1, A STAINLESS STEEL ROD UNDER ALUMINUM CAP LID, LOCATED 258' WEST OF THE CENTERLINE OF ROOKS ROAD , 30' SOUTH OF THE CENTERLINE OF BASELINE ROAD, 100' NORTH OF THE CENTERLINE OF RAILROAD TRACKS
ELEVATION = 892.40' (NAV 88' DATUM)

FLOODPLAIN STATEMENT:

THIS SITE IS LOCATED WITHIN FEMA FLOOD ZONE SHADED X AS SHOWN ON FEMA FLOOD INSURANCE RATE MAP NUMBER 04013C2115L DATED OCTOBER 16, 2013.



KEY MAP
SCALE: 1"=120'

STAKING NOTES:

CALL THE BLUE STAKE CENTER (263-1100) 48 HOURS BEFORE DIGGING FOR LOCATION OF UNDERGROUND UTILITIES. ALL OFFSET OR REFERENCE STAKES SET BY THE ENGINEER ARE TO BE MAINTAINED INTACT. NO CLAIMS FOR ADDITIONAL COMPENSATION FOR CORRECTIONS SHALL BE PRESENTED TO ANY PARTY UNLESS SUCH STAKES ARE PRESENT AND THEIR ORIGIN IS VERIFIED. IF STAKES ARE NOT MAINTAINED INTACT, ALL CORRECTIONS SHALL BE MADE BY THE CONTRACTOR AT HIS EXPENSE. ONE SET OF STAKES WILL BE FURNISHED BY THE OWNER FOR THE WATER LINE, WATER SERVICES, FIRE HYDRANT LOCATIONS AND GRADE, SEWER LINES AND SERVICES, CONCRETE SUBGRADE AND A.B.C.. ALL ADDITIONAL STAKING TO BE CHARGED TO THE CONTRACTOR. 24 WORKING HOUR NOTICE IS REQUIRED FOR STAKING BY THE SUBDIVISION ENGINEER.

COORDINATION LIST		
DESCRIPTION	REPRESENTATIVE	DATE SUBMITTED
WATER	TOWN OF BUCKEYE	
SEWER	TOWN OF BUCKEYE	
ELECTRIC	APS	
GAS	SOUTHWEST GAS	
FIRE	TOWN OF BUCKEYE	
TELEPHONE	QWEST COMMUNICATIONS	
CABLE TV	COX COMMUNICATIONS	
REFUSE	TOWN OF BUCKEYE	

PLZS-21-00130

4TH REVIEW
RECEIVED
Dec 14 21
CITY OF BUCKEYE
PLANNING & ZONING
DM

Montana Vista

Buckeye, Arizona

Cover Sheet

Project:

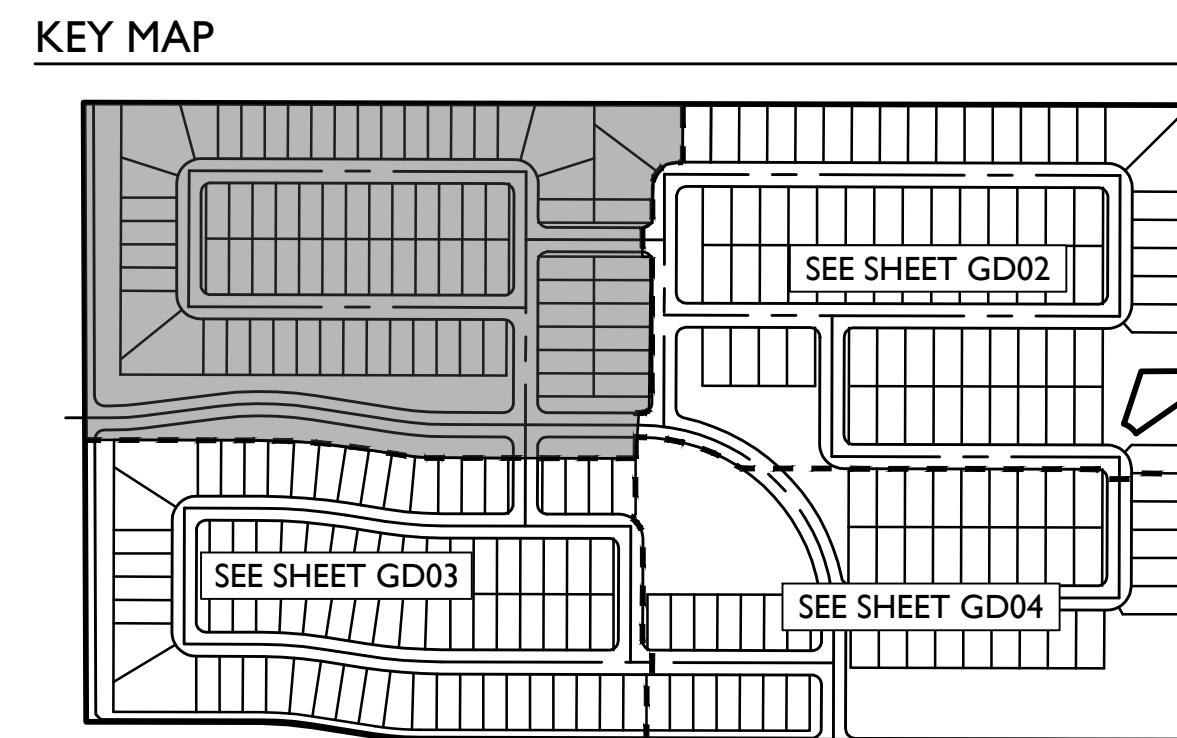
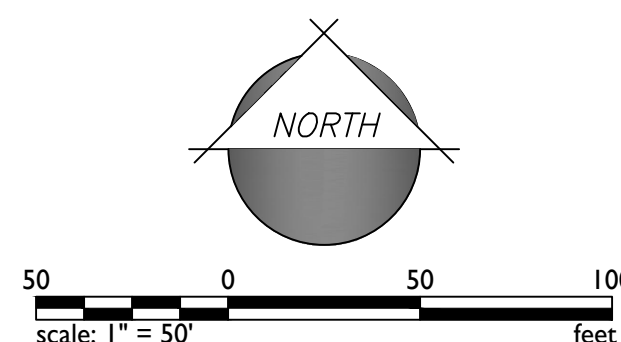
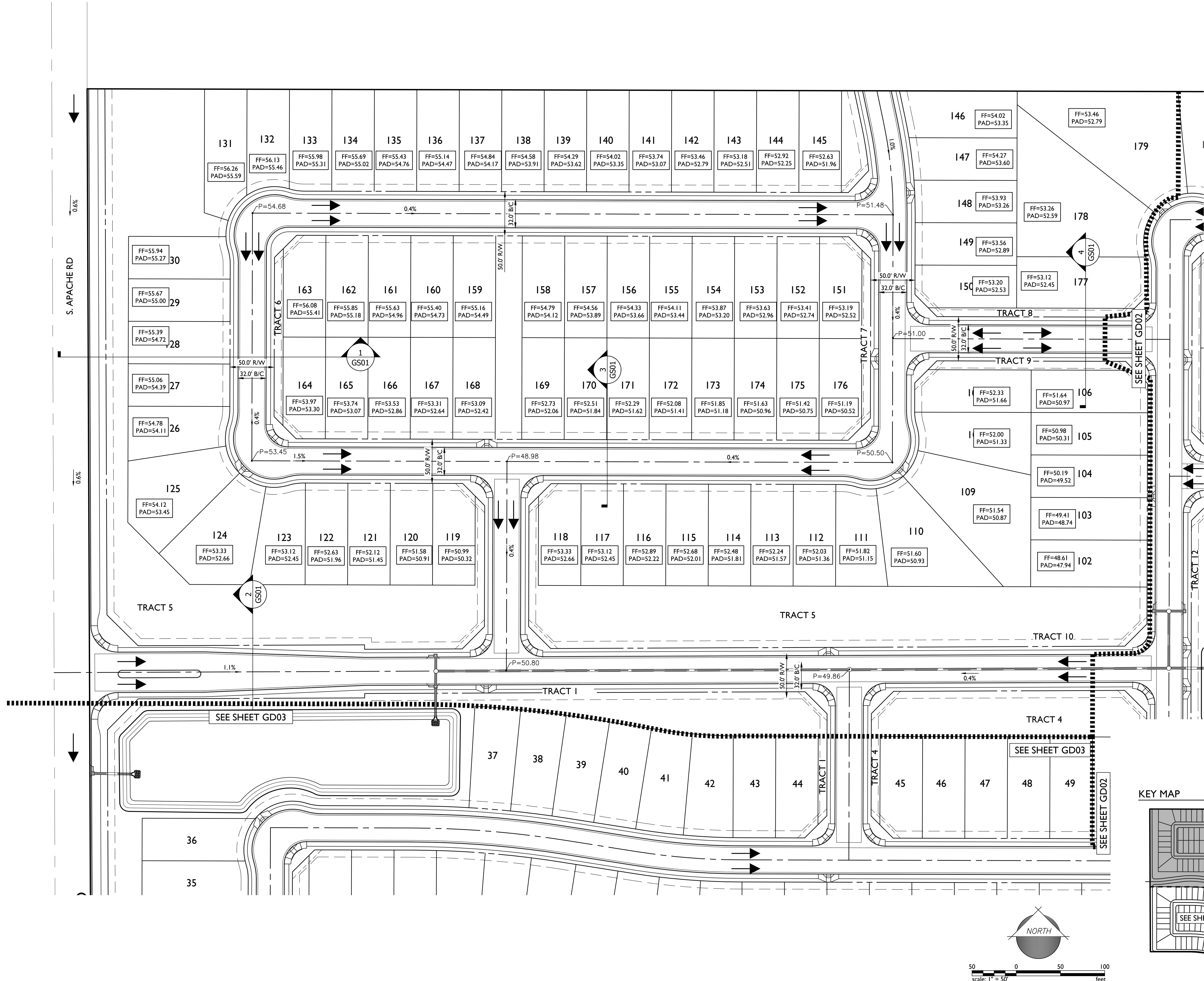
Revisions:



Designer:
Drawn by:



Job No.
20-1512
CS01
Sheet No.
1
of 6



1130 N Alma School Road
Suite 120
Mesa, AZ 85201
T: 480.503.2350 | F: 480.503.2358
www.epsgroupinc.com

Montana Vista
Buckeye, Arizona

Preliminary Grading & Drainage Plan

Project:

Revisions:

Call at least two full working days before you begin excavation.

ARIZONA

Small text: (Seal 6-11-11 and 1-10-2015) (Professional Engineer License 43727) in Maricopa County (002263-1100)

Designer:
Drawn by:

Professional Engineer Seal:
MICHAEL E. LOTEMPIO
43727
Arizona, U.S.A.
Date Signed: 11/17/2021

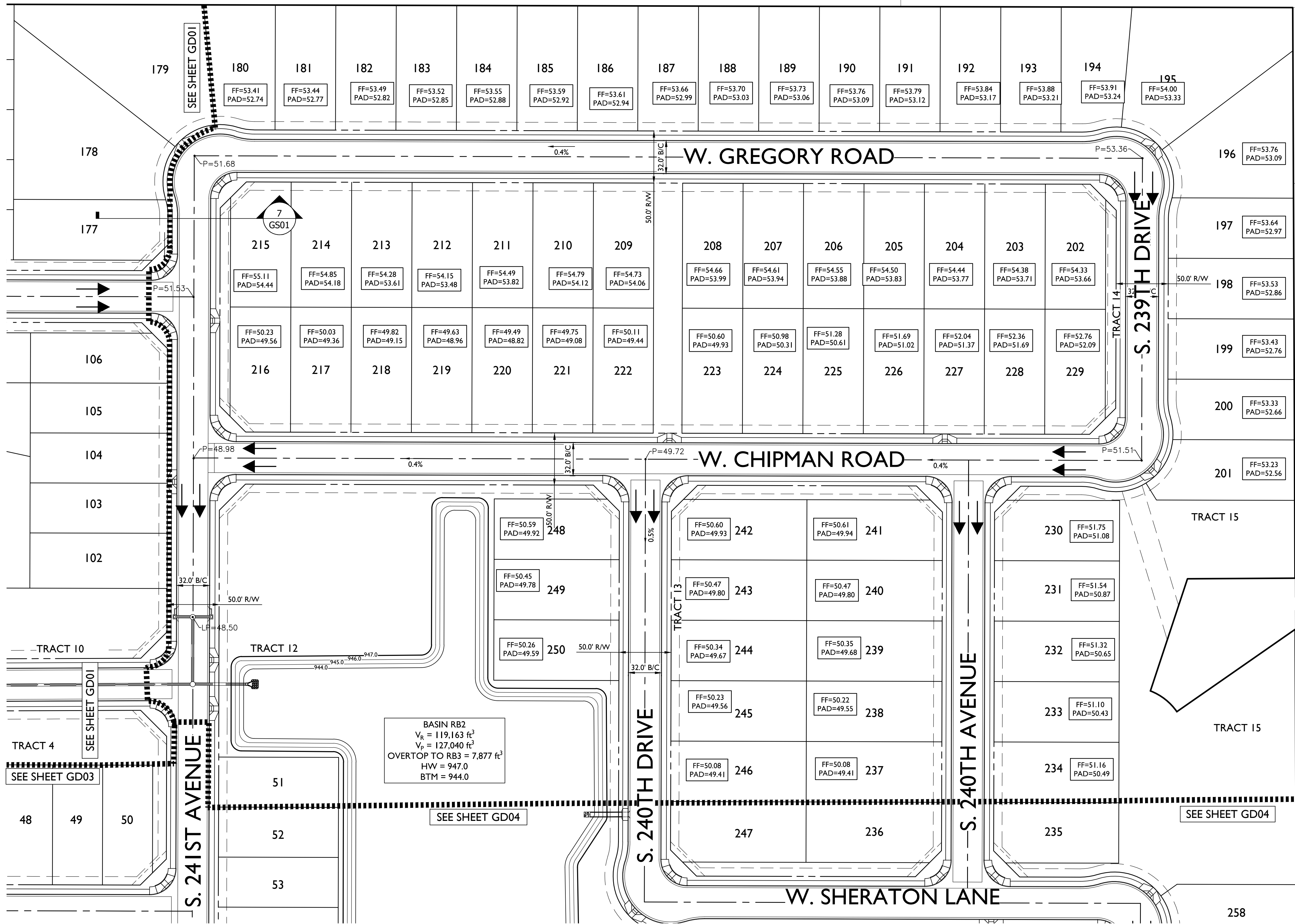
Job No.
20-1512

GD01

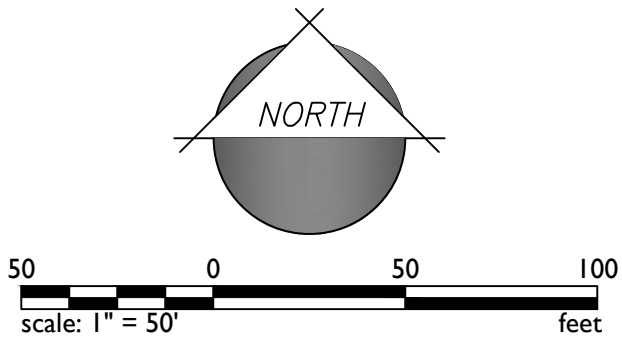
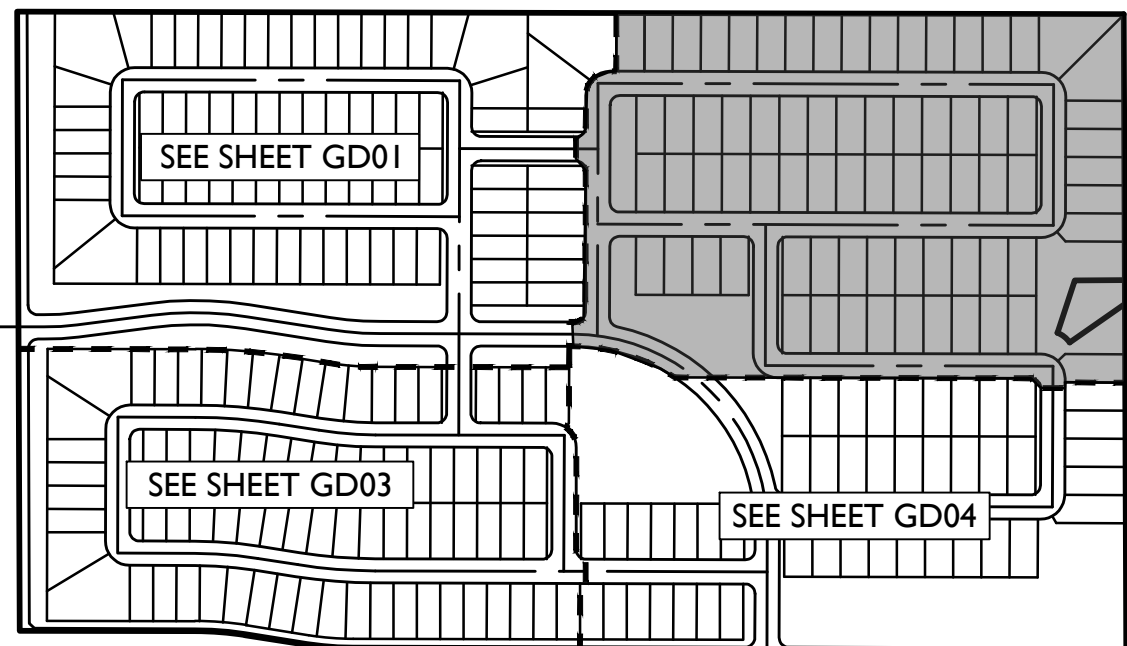
Sheet No.
2
of 6

Dec 13, 2021 5:16pm S:\Projects\2020\20-1512\Civil\Preliminary\Prelim Grading & Drainage\20-1512 - GD02.dwg

csteele



KEY MAP



1130 N Alma School Road
Suite 120
Mesa, AZ 85201
T: 480.503.2350 | F: 480.503.2358
www.epsgroupinc.com

EPS
GROUP

Project:

Montana Vista
Buckeye, Arizona

Revisions:

No.	Description	By	Date

Designer:

Drawn by:

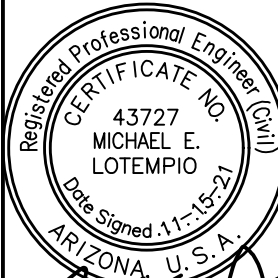
Job No.

20-1512

GD02

Sheet No.

3
of 6



Sheet No.
4
of 6

Designer:
Drawn by:

[illegible]

Project:

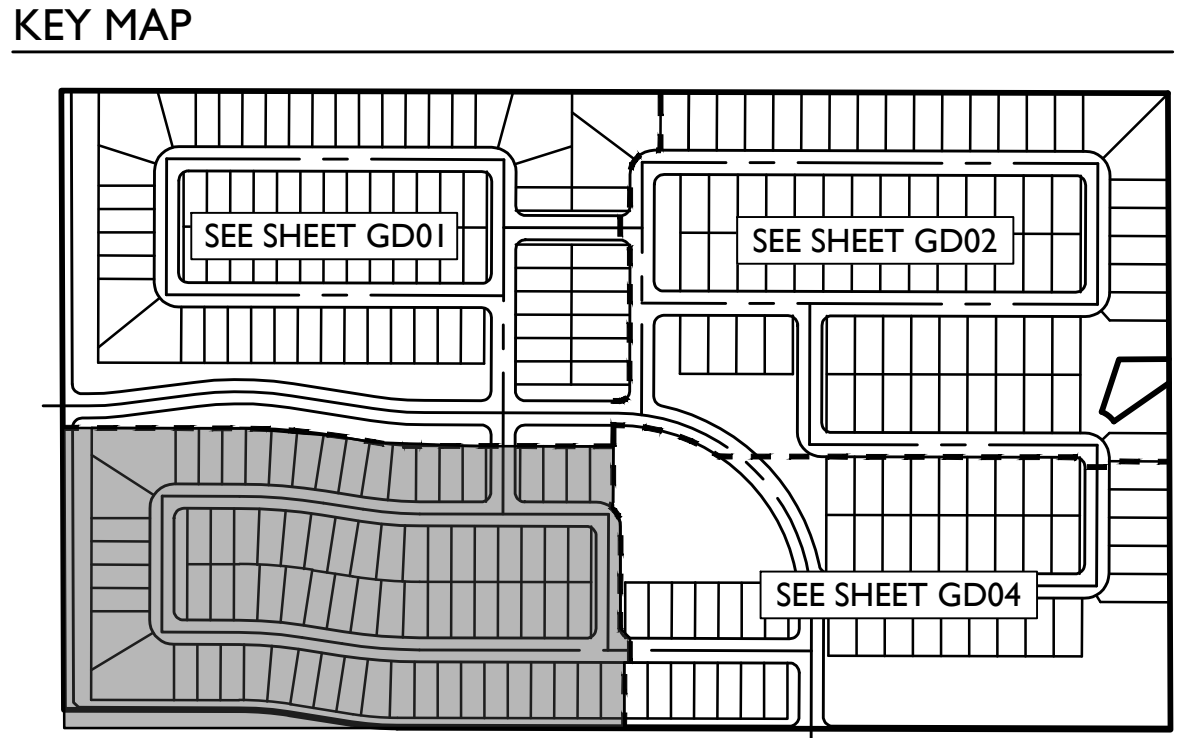
Montana Vista

Buckeye, Arizona

Montana Vista
Buckeye, Arizona

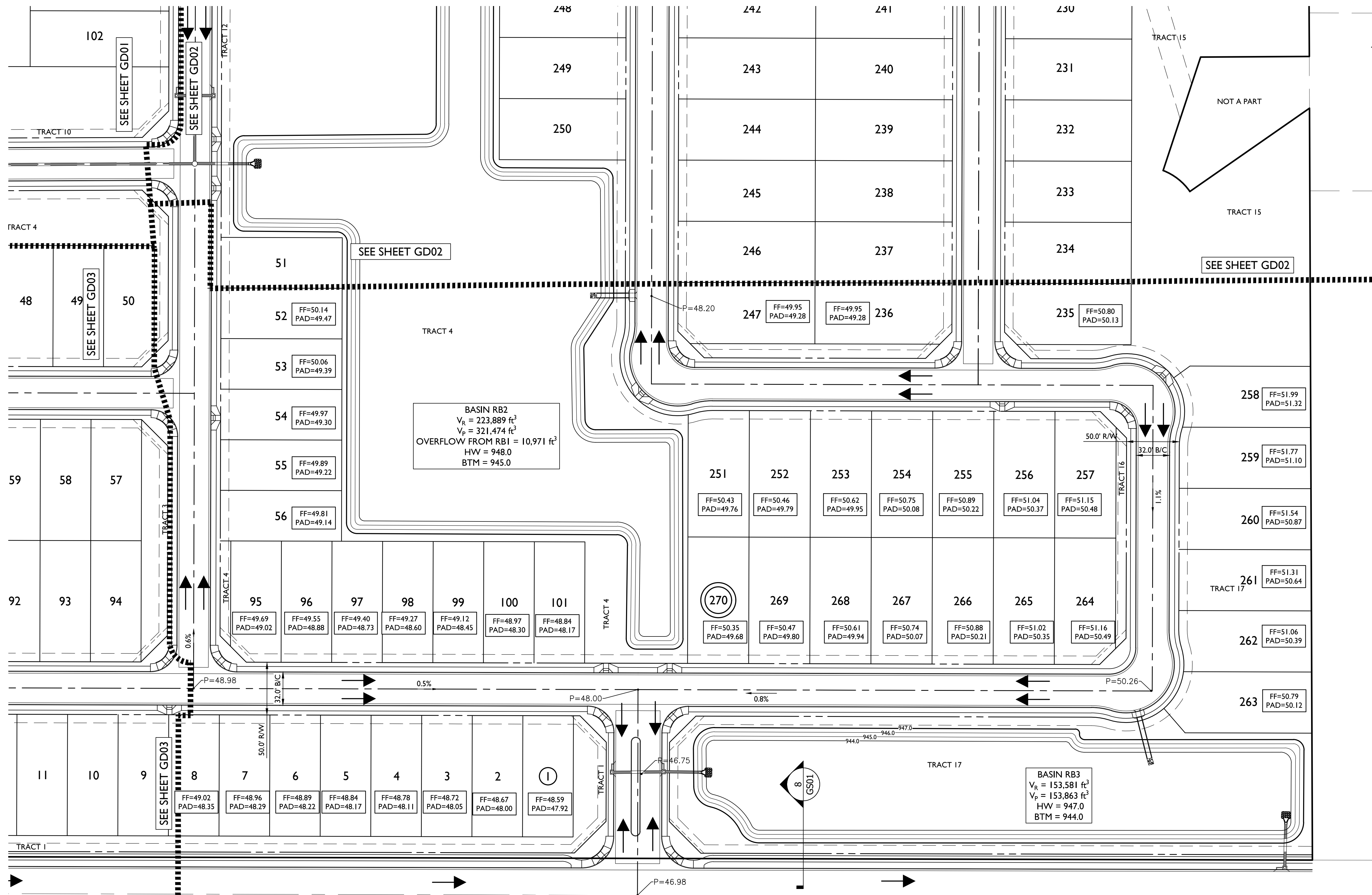


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Suite 120
Mesa, AZ 85201
T:480.503.2250 | F:480.503.2258
www.epsgroupinc.com

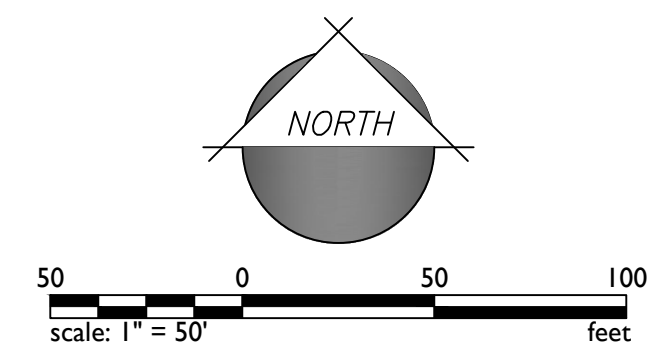
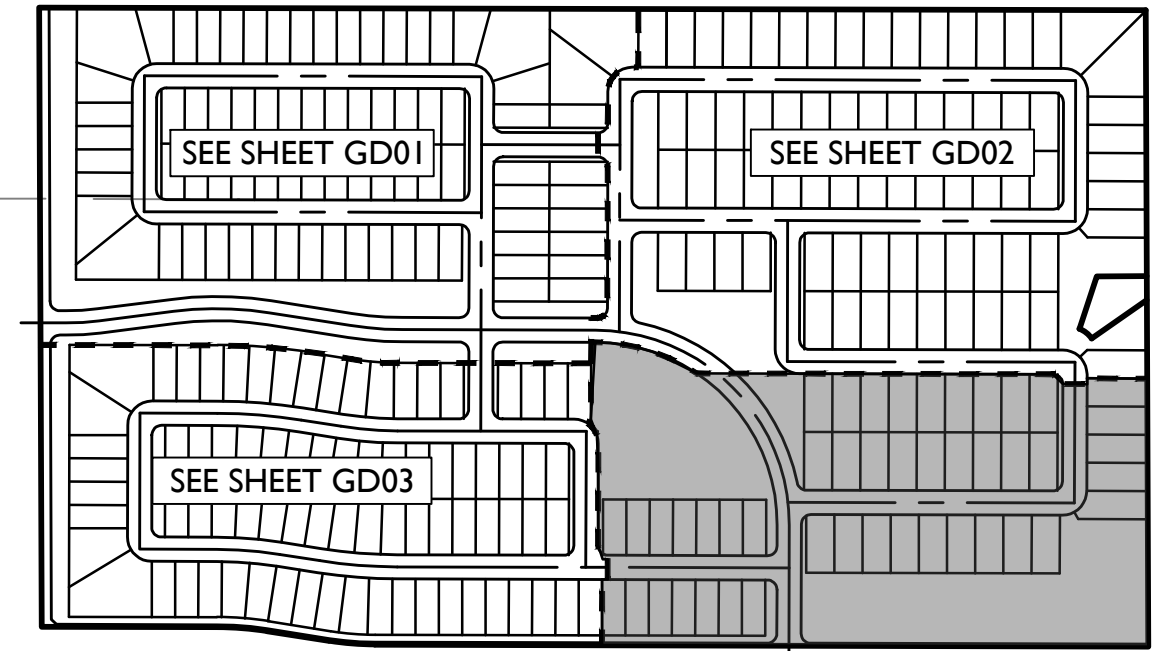


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csteele



KEY MAP



1130 N Alma School Road
Suite 120
Mesa, AZ 85201
T: 480.503.2350 | F: 480.503.2358
www.epsgroupinc.com



Montana Vista
Buckeye, Arizona

Preliminary Grading & Drainage Plan

Project:

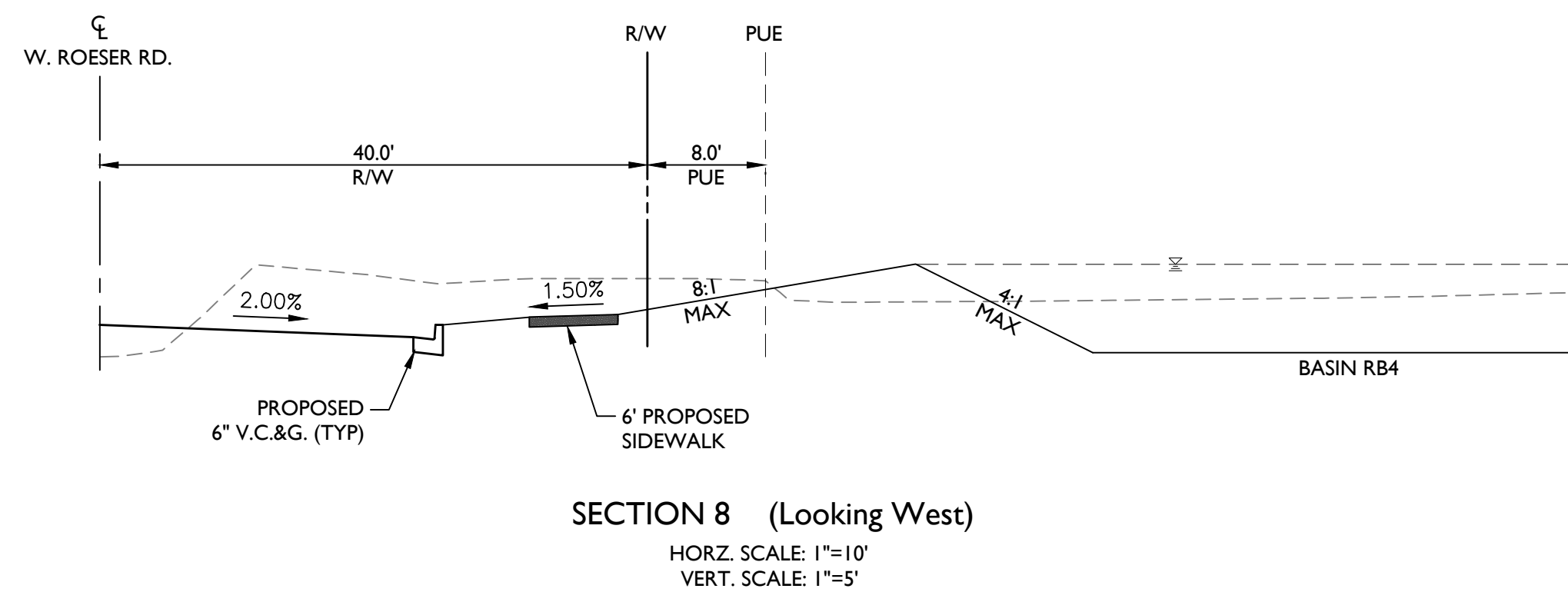
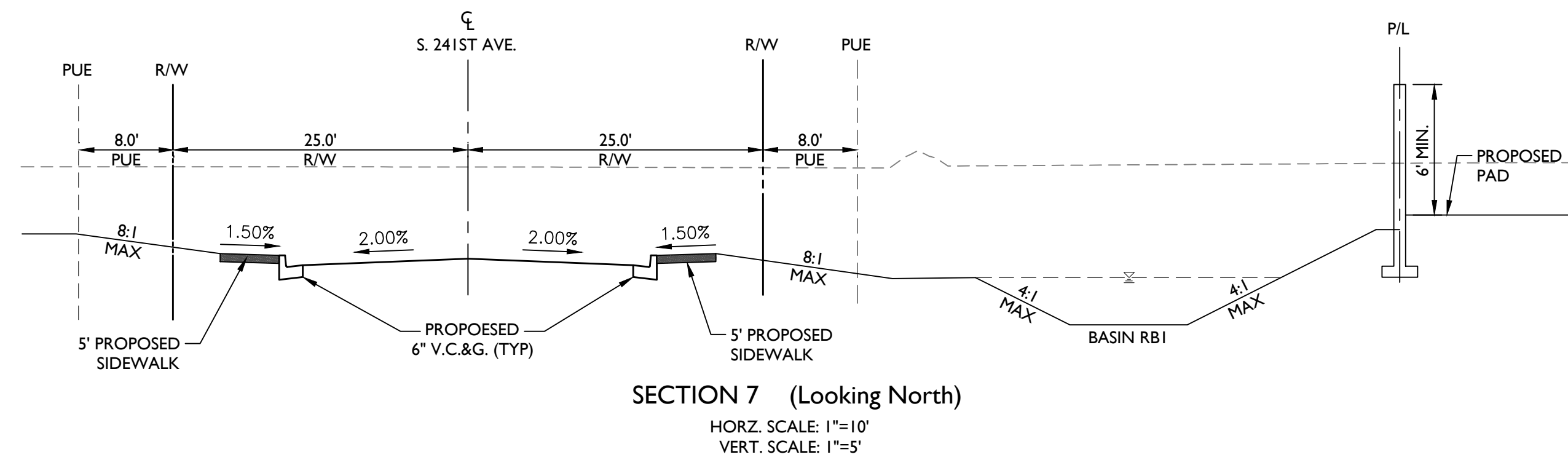
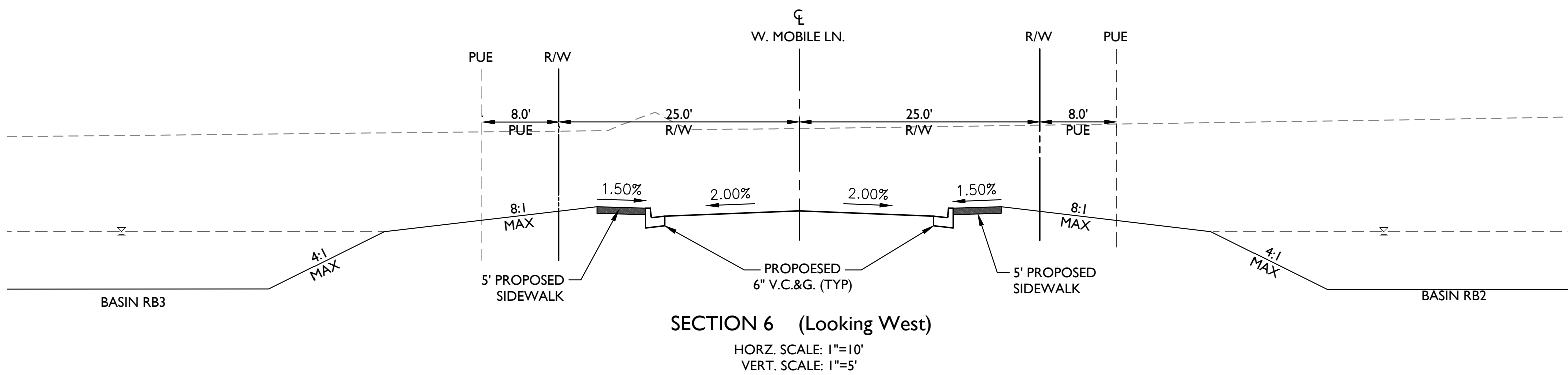
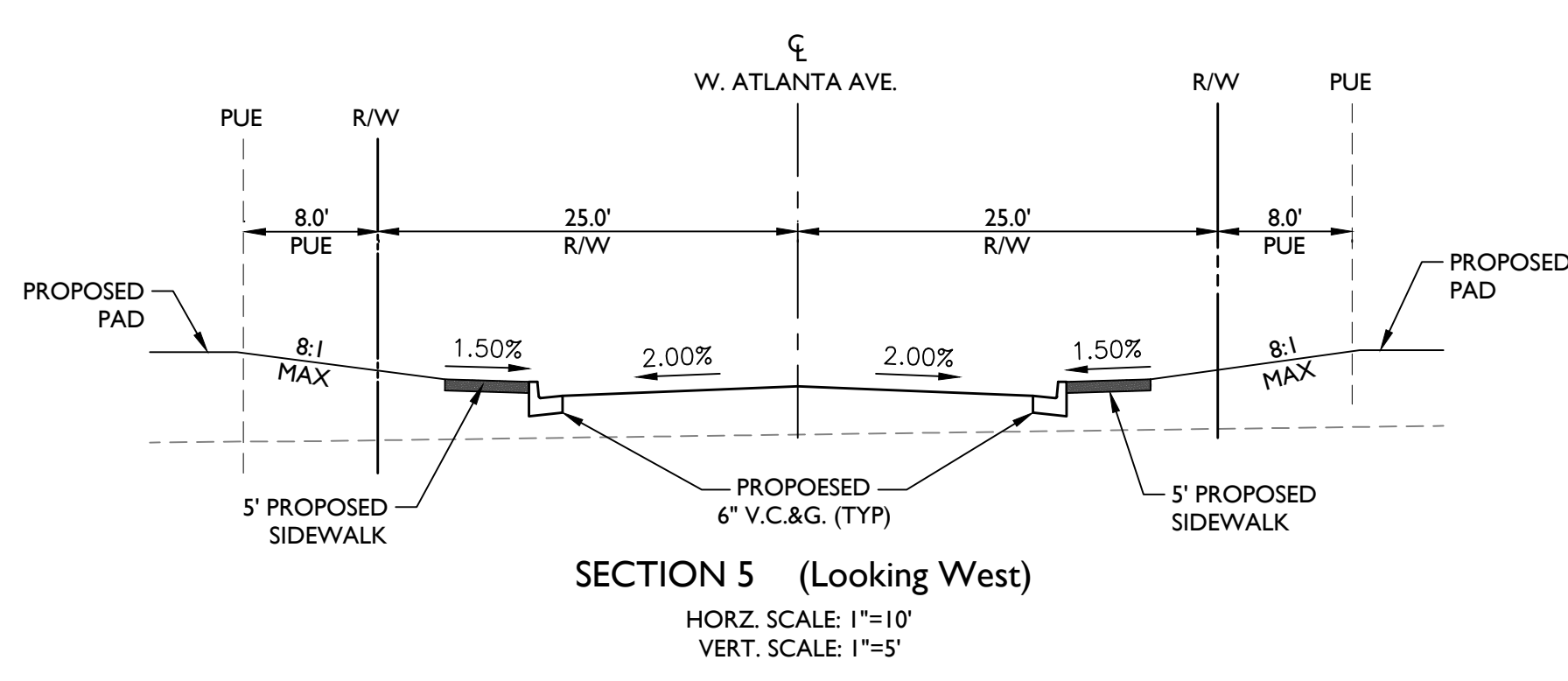
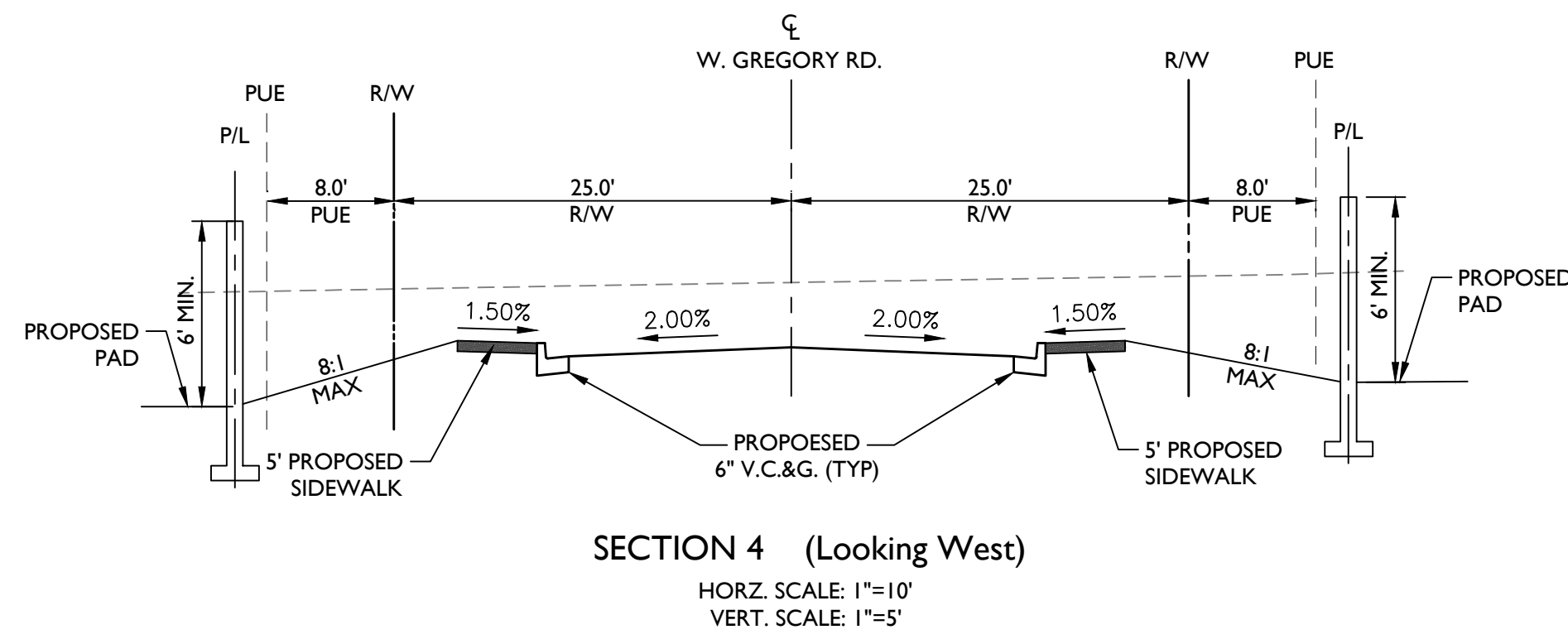
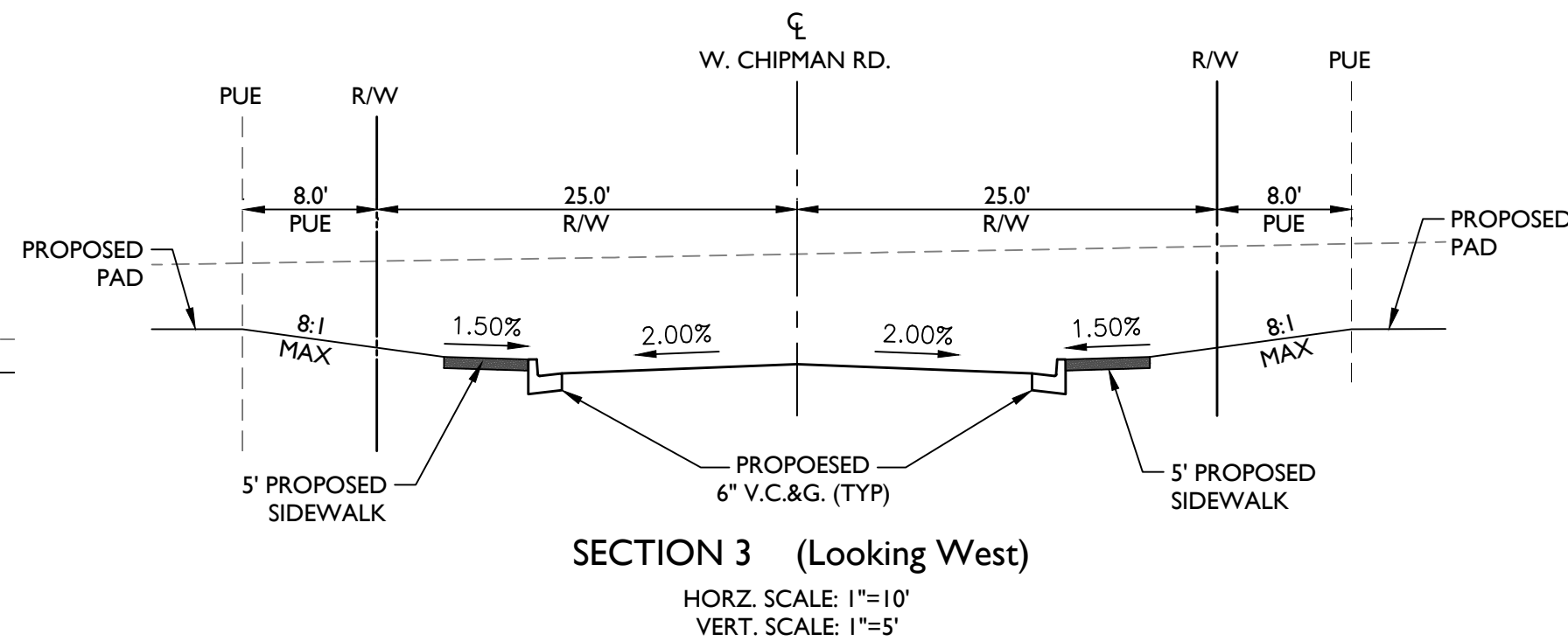
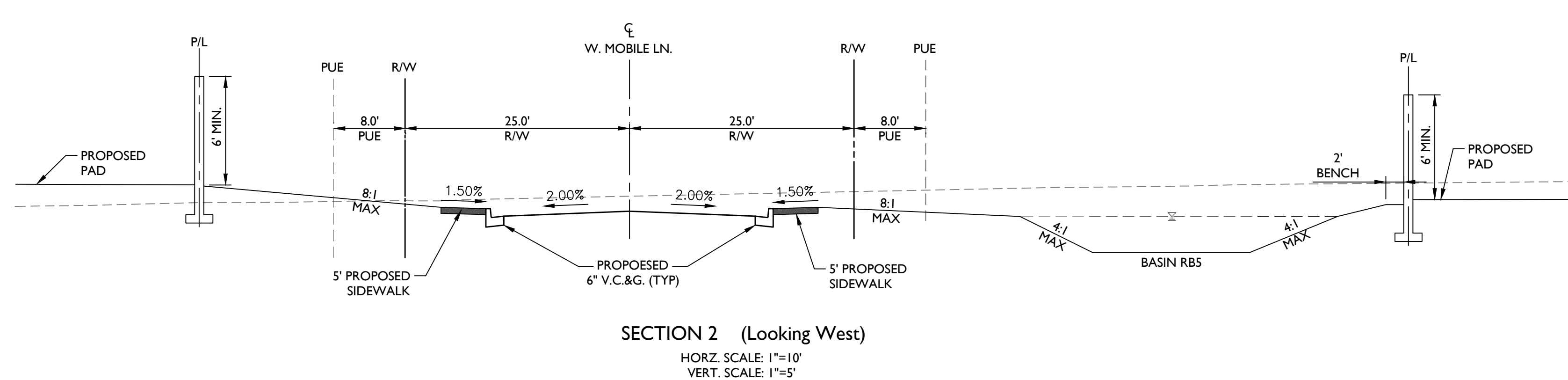
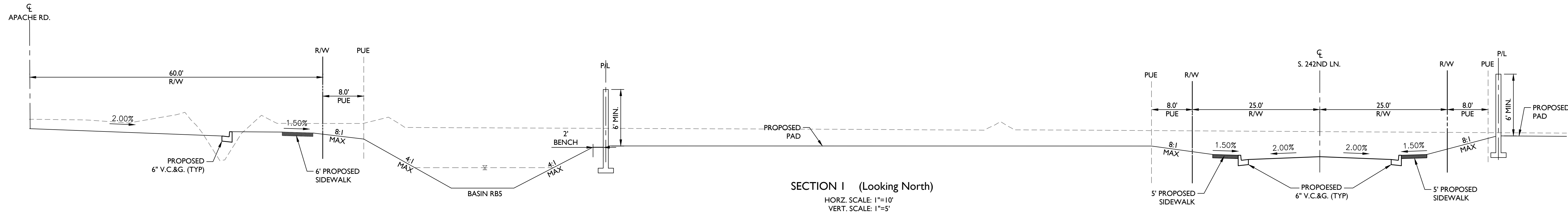
Revisions:

Call at least two full working days
before you begin excavation.
ARIZONA
State Seal No. 1480 (2004) (11/15/2004)
in Maricopa County: (602)263-1100

Designer:
Drawn by:



Job No.
20-1512
GD04
Sheet No.
5
of 6



PLZS-21-00130

**4TH REVIEW
RECEIVED
Dec 14 21
CITY OF BUCKEYE
PLANNING & ZONING
DM**



Preliminary Sewer Report

For

Montana Vista

Prepared By:
EPS Group, inc.

1130 N. Alma School Rd, Suite 120
Mesa, Az 85201

Contact: Mike LoTempio
Phone: 480.503.2250

Email: Mike.LoTempio@epsgroupinc.com

Prepared For:
Beazer Homes

1130 N Alma School Rd, #110
Mesa, Az 85201

Contact: James Alexander
Phone: 480-232-5747

Email: james.alexander@beazer.com



Project No. 20-1512
Date: December 2021

1130 N. Alma School Road
Suite 120
Mesa, AZ 85201
480.503.2250

Table of Contents

1.0	Executive Summary	I
2.0	Introduction	I
3.0	Project Location	I
4.0	Existing Conditions.....	I
5.0	Tributary Area.....	2
6.0	Sewer System Design.....	2
6.1	Design Criteria	2
6.2	Calculations	2
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8.0	Conclusions	3

Appendices

Appendix A: Vicinity Map

Appendix B: SewerCAD Model

Appendix C: SewerCAD Output

Appendix D: Will Serve Letter and Sewer Capacity Letter

1.0 Executive Summary

The Montana Vista wastewater conveyance gravity system will consist entirely of 8" gravity fed VCP pipe placed at a minimum slope of 0.40%. This system will tie into the existing 10" sewer main located in Apache Road at the western border of the site, ultimately flowing south and then west along Beloit Road to the new Wastewater Plant. The Montana Vista wastewater system will produce an average daily flow of 69,120 gallons of wastewater per day (0.107 cfs), and at peak, 276,480 gallons of wastewater per day (0.428 cfs). This system has been designed according to the June 2020 City of Buckeye Design Engineering Standards Section 4-1.

2.0 Introduction

The City of Buckeye Engineering Standards Section 4-1 Adopted June 2020 have been met and satisfied. All internal sewer lines will be 8" VCP pipe and will tie into the existing 10" sewer main in Apache Rd.

Montana Vista (the Project) is a new 71.32-acre, 270 lot sub-division located in Buckeye, Arizona.

This report will review the design of the project public sewer system in order to ensure that the system complies with all applicable design criteria presented by the City of Buckeye and Maricopa County. The City of Buckeye will be the sewer provider for this site. Wastewater flow from the development will flow west to the existing 10" sewer main in Apache Rd. From there it will gravity south until it reaches the City of Buckeye Central Wastewater Treatment Plant.

3.0 Project Location

The project is located at the NEC of Roeser Rd and Apache Rd in the City of Buckeye. The project is bounded by undeveloped, planned residential land to the north, west, and south. Single family residential (zoned RU-43) lots border the development to the east. The project is further located within a portion of the Northwest quarter of Section 28, Township 1 North, Range 3 West, of the Gila and Salt River Base and Meridian Maricopa County, Assessor Parcel Numbers (APN) 504-41-006P, 504-41-006Q, 504-41-721, and 504-41-722. See Appendix A, for Vicinity Map.

4.0 Existing Conditions

The onsite sewer will be tying in to the existing 10" main located in Apache Road on the west side of the project site. The existing main gravities south and then west along Beloit Rd and discharges to the Central Wastewater Plant. The existing site generally slopes from northwest to southeast, from general elevation 961 ft to 947

ft. The existing land to the north is agricultural farm land to be developed into the Vista Bonita sub-division and the new Jackie Meck Water Campus, the existing land to the east is the Sonoran Vista sub-division development, the existing land to the south is partly agricultural farm land and partly the Riata West developed sub-division.

5.0 Tributary Area

There will be no upstream areas tributary to the proposed Montana Vista subdivision sewer system. The up-stream area directly north, the proposed Vista Bonita residential sub-division, will be flowing directly into the existing 10" sewer main in Apache Rd bypassing the Montana Vista sewer system.

6.0 Sewer System Design

6.1 Design Criteria

The calculations of sewer flow and pipe sizing in this report are based on system design criteria in The City of Buckeye Engineering Design Standards Section 4-1 Adopted June 2020.

The sewer flows for the project site have been calculated as follows, based on Table 1 in The City Of Buckeye Engineering Design Standards Section 4-1 Adopted June 2020. (Page 15):

$$\text{Average Day Flow} = 80 \frac{g}{\text{person}} * 3.2 \frac{\text{persons}}{DU} * 270 DU = \mathbf{69,120 gpd}$$

$$\begin{aligned} \text{Peak Day Flow} &= 80 \frac{g}{\text{person}} * 3.2 \frac{\text{persons}}{DU} * 270 DU * 4(\text{peaking factor}) \\ &= 276,480 gpd = 192.0 gpm = 0.428 cfs \end{aligned}$$

6.2 Calculations

The calculations of sewer flow and pipe sizing in this report are based on system design criteria in The City of Buckeye Engineering Design Standards Section 4-1 Adopted June 2020.

Line Capacity (Q):

$$Q = \frac{1.49}{n} AR^{2/3} S^{1/2}$$

Where

$n = 0.013$

A = Cross Sectional Area

R = Hydraulic Radius

See Appendix C for sewer calculations

The new system will be served by the City of Buckeye sewer treatment plant and the project location lies within the Watson Rd CFD. Existing sewer lines from the City's treatment plant running east along Beloit Road and north along Apache Road extend along the project frontage. The project will have one connection to the existing 10" sewer line in Apache Road located on the west side of the project. A will serve letter has been obtained from the City of Buckeye documenting that this project is in the City of Buckeye sewer service area and the City of Buckeye will serve the development. The will serve letter can be found in Appendix D of this report. A sewer capacity letter has been received from the City of Buckeye to demonstrate there is capacity to serve the development. The sewer capacity letter can be found in Appendix D of this report. Off-site improvements or participation in off-site improvements are not necessary for this project. The internal wastewater conveyance gravity system will consist of 8" diameter VCP pipe placed at a minimum slope of 0.40% or greater. The fully built-out system will be designed to handle the peak flow generated by the proposed development.

7.0 Modeling

See Appendix B

8.0 Conclusions

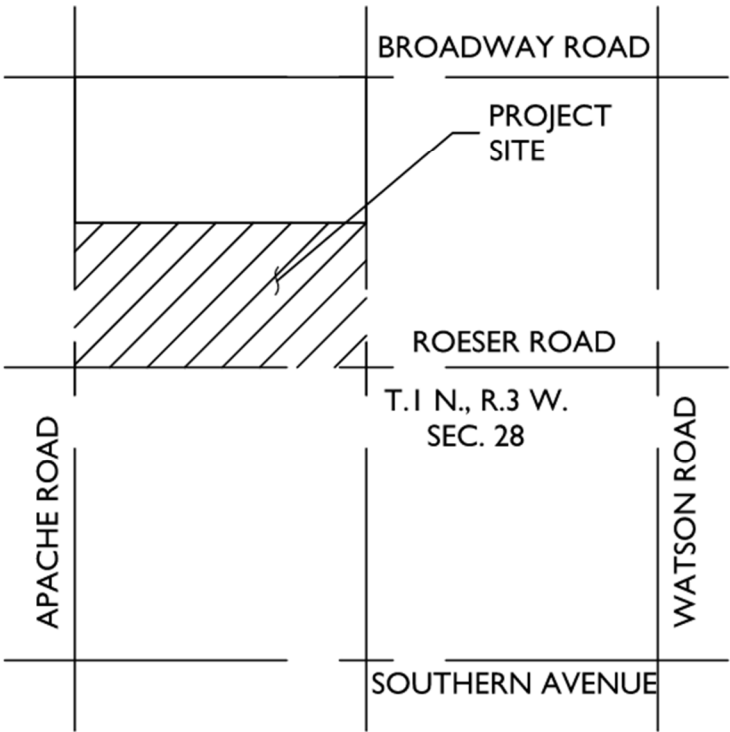
This report for Montana Vista concludes the following:

- City of Buckeye design standards have been met.
- The internal wastewater conveyance gravity system will consist of 8" diameter VCP pipe placed at a minimum slope of 0.40% or greater.
- The project will connect to an existing 10" sewer line in Apache Road.
- System will produce, at peak, 276,480 gallons of wastewater per day (0.428 cfs).

Appendix A:

Vicinity Map

VICINITY MAP

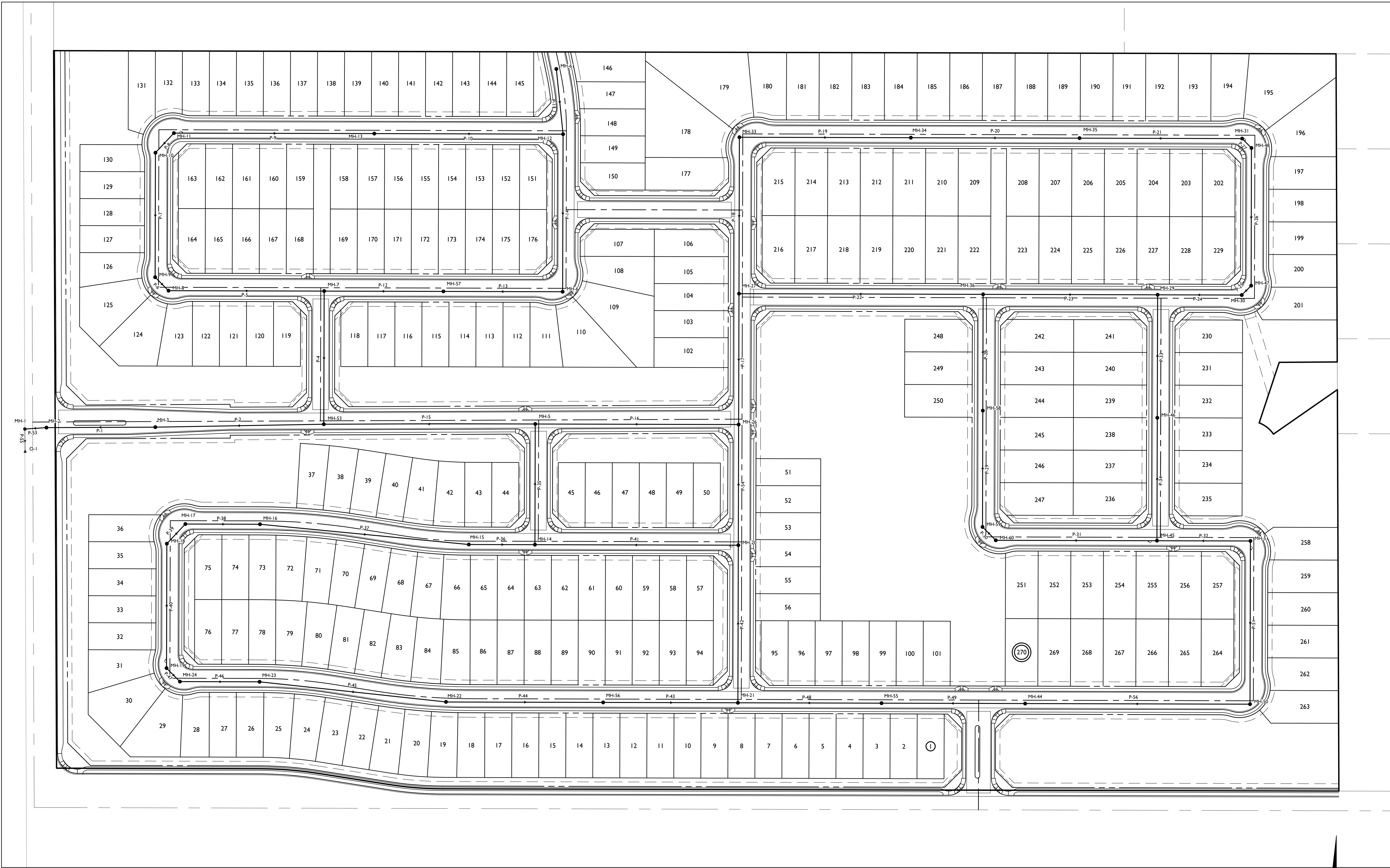


Appendix B:
SewerCAD Model

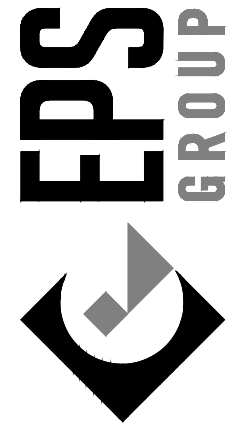
20-1512 - Montana Vista - SewerCAD Model

Dec 13, 2021 10:19am S:\Projects\2020\20-1512\Civil\Preliminary\Design\Sewer\SewerCAD\20-1512 SewerCAD.dwg

NOTE: ALL INTERNAL SEWER LINES ARE 8" VCP



1130 N Alma School Road
Suite 120
Mesa, AZ 85201
T:480.503.2250 | F:480.503.2258
www.epsgroupinc.com



Project: 20-1512 - Montana Vista
Buckeye, Arizona
Preliminary SewerCAD Model

Revisions:

Call at least two full working days
before any work begins
ARIZONA 811
Dig & Fill or 1-800-874-8111 (Toll-Free)
in Maricopa County (602)855-1100
Designer: XXX
Drawn by: XXX

Job No.
21-1512
SW01
Sheet No.
1
OF 1

Appendix C:
SewerCAD Output

FlexTable: Conduit Table
Active Scenario: ADF

ID	Label	Start Node	Stop Node	Invert (Start) (ft)	Invert (Stop) (ft)	Cover (Start) (ft)	Cover (Stop) (ft)	Length (Scaled) (ft)	Slope (Calculated) (ft/ft)	Diameter (in)	Material	Manning's n	Flow (gpd)	Capacity (Design) (gpd)	Flow / Capacity (Design) (%)	Depth/Rise (%)	Velocity (ft/s)
34	P-1	MH-3	MH-2	931.93	931.16	18.67	21.51	193.3	0.0040	8.0	Vitrified Clay	0.013	69,120.00	492,911.11	14.0	25.8	1.54
36	P-2	MH-53	MH-3	933.13	931.93	13.20	18.67	299.4	0.0040	8.0	Vitrified Clay	0.013	69,120.00	494,410.36	14.0	25.3	1.54
82	P-4	MH-7	MH-53	934.18	933.23	14.10	13.10	236.6	0.0040	8.0	Vitrified Clay	0.013	17,920.00	494,878.01	3.6	19.3	1.01
83	P-5	MH-8	MH-7	935.37	934.28	16.98	14.01	276.5	0.0040	8.0	Vitrified Clay	0.013	4,608.00	491,220.42	0.9	10.0	0.70
84	P-6	MH-9	MH-8	935.51	935.37	17.16	16.98	33.7	0.0040	8.0	Vitrified Clay	0.013	2,048.00	495,868.12	0.4	5.7	0.53
85	P-7	MH-10	MH-9	936.39	935.51	17.29	17.15	221.2	0.0040	8.0	Vitrified Clay	0.013	1,536.00	492,603.89	0.3	4.4	0.49
86	P-8	MH-11	MH-10	936.75	936.39	17.03	17.29	47.9	0.0075	8.0	Vitrified Clay	0.013	256.00	677,012.60	0.0	2.7	0.91
87	P-9	MH-11	MH-13	941.30	938.63	12.48	13.54	356.0	0.0075	8.0	Vitrified Clay	0.013	3,840.00	676,382.94	0.6	6.8	0.81
88	P-10	MH-13	MH-12	938.63	937.28	13.54	13.51	335.3	0.0040	8.0	Vitrified Clay	0.013	6,912.00	495,577.94	1.4	8.6	0.80
89	P-11	MH-61	MH-12	938.26	937.38	13.44	13.41	116.4	0.0075	8.0	Vitrified Clay	0.013	768.00	677,552.13	0.1	2.4	0.50
90	P-12	MH-57	MH-7	935.12	934.28	13.77	14.00	211.8	0.0040	8.0	Vitrified Clay	0.013	13,312.00	491,818.98	2.7	12.1	0.99
91	P-13	MH-6	MH-57	935.96	935.12	13.65	13.77	211.8	0.0040	8.0	Vitrified Clay	0.013	11,264.00	491,841.93	2.3	10.7	0.90
92	P-14	MH-12	MH-6	937.18	936.06	13.61	13.55	280.0	0.0040	8.0	Vitrified Clay	0.013	8,960.00	493,930.43	1.8	9.8	0.87
93	P-15	MH-5	MH-53	934.63	933.13	14.68	13.20	375.6	0.0040	8.0	Vitrified Clay	0.013	51,200.00	493,524.19	10.4	23.5	1.41
94	P-16	MH-26	MH-5	936.08	934.63	14.29	14.68	361.3	0.0040	8.0	Vitrified Clay	0.013	41,216.00	494,778.00	8.3	20.5	1.36
95	P-17	MH-27	MH-26	937.11	936.18	10.21	14.19	232.5	0.0040	8.0	Vitrified Clay	0.013	22,272.00	493,893.73	4.5	16.9	1.10
96	P-18	MH-33	MH-27	938.22	937.11	14.32	10.21	278.0	0.0040	8.0	Vitrified Clay	0.013	9,216.00	493,487.59	1.9	12.0	0.85
97	P-19	MH-34	MH-33	939.54	938.32	13.47	14.22	304.5	0.0040	8.0	Vitrified Clay	0.013	8,192.00	494,350.11	1.7	9.1	0.84
98	P-20	MH-35	MH-34	940.74	939.54	12.09	13.47	299.8	0.0040	8.0	Vitrified Clay	0.013	5,376.00	494,085.56	1.1	8.1	0.72
99	P-21	MH-31	MH-35	942.90	940.74	8.92	12.09	288.7	0.0075	8.0	Vitrified Clay	0.013	2,816.00	675,512.37	0.4	6.0	0.73
100	P-22	MH-36	MH-27	938.94	937.21	9.52	10.11	433.7	0.0040	8.0	Vitrified Clay	0.013	12,288.00	493,273.93	2.5	12.6	0.94
101	P-23	MH-29	MH-36	940.18	938.94	9.74	9.52	310.0	0.0040	8.0	Vitrified Clay	0.013	6,400.00	493,906.70	1.3	9.3	0.76
102	P-24	MH-30	MH-29	940.78	940.18	9.88	9.74	149.4	0.0040	8.0	Vitrified Clay	0.013	2,048.00	494,960.90	0.4	6.3	0.53
103	P-25	MH-47	MH-30	940.87	940.78	9.93	9.88	23.5	0.0040	8.0	Vitrified Clay	0.013	1,536.00	495,887.26	0.3	4.4	0.48
104	P-26	MH-48	MH-47	941.85	940.87	9.85	9.93	244.7	0.0040	8.0	Vitrified Clay	0.013	1,280.00	494,273.47	0.3	4.0	0.47
105	P-27	MH-31	MH-48	942.02	941.85	9.80	9.86	23.6	0.0075	8.0	Vitrified Clay	0.013	0.00	677,286.48	0.0	1.9	0.00
106	P-28	MH-58	MH-36	939.87	939.04	7.98	9.42	206.7	0.0040	8.0	Vitrified Clay	0.013	4,096.00	494,913.99	0.8	8.5	0.69
107	P-29	MH-59	MH-58	940.70	939.87	7.45	7.98	206.7	0.0040	8.0	Vitrified Clay	0.013	2,560.00	494,930.17	0.5	5.7	0.58
108	P-30	MH-60	MH-59	940.83	940.70	7.47	7.45	33.4	0.0040	8.0	Vitrified Clay	0.013	1,792.00	496,054.12	0.4	4.8	0.51
109	P-31	MH-45	MH-60	941.98	940.83	8.25	7.47	286.4	0.0040	8.0	Vitrified Clay	0.013	1,792.00	494,917.25	0.4	4.4	0.52
110	P-32	MH-51	MH-45	943.22	941.98	7.48	8.25	166.0	0.0075	8.0	Vitrified Clay	0.013	512.00	674,984.72	0.1	3.2	0.43
111	P-33	MH-46	MH-29	941.15	940.28	8.12	9.64	218.5	0.0040	8.0	Vitrified Clay	0.013	3,072.00	492,816.59	0.6	6.7	0.63
112	P-34	MH-45	MH-46	942.79	941.15	7.44	8.12	218.5	0.0075	8.0	Vitrified Clay	0.013	1,536.00	676,624.34	0.2	4.8	0.48
113	P-35	MH-14	MH-5	935.59	934.73	14.22	14.58	214.4	0.0040	8.0	Vitrified Clay	0.013	9,984.00	494,581.93	2.0	15.7	0.90
114	P-36	MH-15	MH-14	936.16	935.69	14.15	14.12	117.5	0.0040	8.0	Vitrified Clay	0.013	6,656.00	494,002.20	1.3	8.7	0.82
115	P-37	MH-16	MH-15	937.65	936.16	14.28	14.15	372.7	0.0040	8.0	Vitrified Clay	0.013	5,632.00	493,779.92	1.1	7.7	0.73
116	P-38	MH-17	MH-16	938.18	937.65	14.36	14.28	132.6	0.0040	8.0	Vitrified Clay	0.013	2,048.00	493,779.31	0.4	6.1	0.53
117	P-39	MH-18	MH-17	938.37	938.18	14.40	14.36	48.0	0.0040	8.0	Vitrified Clay	0.013	1,280.00	491,233.22	0.3	4.2	0.46
118	P-40	MH-19	MH-18	940.02	938.37	12.51	14.40	221.0	0.0075	8.0	Vitrified Clay	0.013	1,280.00	674,785.35	0.2	3.5	0.57
119	P-41	MH-20	MH-14	937.14	935.69	11.13	14.12	361.3	0.0040	8.0	Vitrified Clay	0.013	3,328.00	494,784.60	0.7	7.7	0.64
120	P-42	MH-21	MH-20	938.36	937.24	9.19	11.03	280.0	0.0040	8.0	Vitrified Clay	0.013	18,176.00	493,931.98	3.7	12.9	1.07
121	P-43	MH-56	MH-21	939.42	938.46	9.14	9.09	239.3	0.0040	8.0	Vitrified Clay	0.013	10,240.00	494,640.94	2.1	11.3	0.91
122	P-44	MH-22	MH-56	940.38	939.42	9.26	9.14	279.2	0.0034	8.0	Vitrified Clay	0.013	7,936.00	457,920.15	1.7	9.3	0.81
123	P-45	MH-23	MH-22	941.87	940.38	9.73	9.26	333.1	0.0045	8.0	Vitrified Clay	0.013	5,376.00	522,344.32	1.0	8.1	0.72
124	P-46	MH-24	MH-23	942.44	941.87	9.87	9.73	141.5	0.0040	8.0	Vitrified Clay	0.013	1,792.00	495,721.52	0.4	5.9	0.52
125	P-47	MH-19	MH-24	942.69	942.44	9.84	9.87	33.7	0.0075	8.0	Vitrified Clay	0.013	512.00	677,662.40	0.1	3.3	0.43
126	P-48	MH-55	MH-21	939.48	938.46	7.03	9.09	255.1	0.0040	8.0	Vitrified Clay	0.013	7,168.00	493,822.98	1.5	10.5	0.82
127	P-49	MH-44	MH-55	940.50	939.48	8.50	7.03	255.1	0.0040	8.0	Vitrified Clay	0.013	4,352.00	493,822.98	0.9	7.4	0.67
129	P-51	MH-51	MH-50	944.37	942.20	6.33	2.13	290.0	0.0075	8.0	Vitrified Clay	0.013	1,536.00	675,566.35	0.2	4.3	0.61
131	P-53	MH-2	MH-1	931.16	931.00	21.52	22.33	38.6	0.0040	8.0	Vitrified Clay	0.013	69,120.00	495,409.07	14.0	24.4	1.45
132	P-54	MH-20	MH-26	937.24	936.18	11.03	14.19	214.4	0.0049	8.0	Vitrified Clay	0.013	18,944.00	549,088.01	3.5	16.1	1.10
137	P-55	MH-1	O-1	931.00	930.84	22.33	22.49	40.1	0.0040	8.0	Vitrified Clay	0.013	69,120.00	493,577.86	14.0	21.1	1.47
138	P-56	MH-50	MH-44	942.10	940.50	2.23	8.51	399.5	0.0040	8.0	Vitrified Clay	0.013	3,072.00	494,959.50	0.6	5.9	0.58

FlexTable: Manhole Table
Active Scenario: ADF

ID	Label	Elevation (Rim) (ft)	Elevation (Invert) (ft)	Depth (Structure) (ft)	Flow (Total In) (gpd)	Flow (Total Out) (gpd)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Headloss Method	Velocity (In) (ft/s)	Velocity (Out) (ft/s)
37	MH-1	954.00	931.00	23.00	69,120.00	69,120.00	931.15	931.15	Standard	1.83	1.47
31	MH-2	953.34	931.16	22.18	69,120.00	69,120.00	931.31	931.31	Standard	1.45	1.45
32	MH-3	951.27	931.93	19.34	69,120.00	69,120.00	932.07	932.07	Standard	1.54	1.54
38	MH-5	949.98	934.63	15.35	51,200.00	51,200.00	934.74	934.74	Standard	0.28	1.41
49	MH-6	950.28	935.96	14.32	8,960.00	11,264.00	935.83	935.83	Standard	0.71	0.90
41	MH-7	948.95	934.28	14.67	17,920.00	17,920.00	934.06	934.06	Standard	0.75	1.01
42	MH-8	953.02	935.37	17.65	2,048.00	4,608.00	935.21	935.21	Standard	0.31	0.70
43	MH-9	953.33	935.51	17.82	1,536.00	2,048.00	935.33	935.33	Standard	0.40	0.53
44	MH-10	954.35	936.39	17.96	256.00	1,536.00	936.22	936.22	Standard	0.08	0.49
45	MH-11	954.45	941.30	13.15	0.00	4,096.00	941.11	941.11	Standard	0.41	0.41
47	MH-12	951.46	937.18	14.28	7,680.00	8,960.00	937.04	937.04	Standard	0.67	0.87
46	MH-13	952.84	938.63	14.21	3,840.00	6,912.00	938.48	938.48	Standard	0.80	0.80
51	MH-14	950.48	935.69	14.79	9,984.00	9,984.00	935.62	935.62	Standard	0.60	0.90
52	MH-15	950.98	936.16	14.82	5,632.00	6,656.00	936.18	936.18	Standard	0.69	0.82
53	MH-16	952.60	937.65	14.95	2,048.00	5,632.00	937.67	937.67	Standard	0.26	0.73
54	MH-17	953.21	938.18	15.03	1,280.00	2,048.00	938.18	938.18	Standard	0.33	0.53
55	MH-18	953.44	938.37	15.07	1,280.00	1,280.00	938.37	938.37	Standard	0.46	0.46
56	MH-19	953.20	942.69	10.51	0.00	1,792.00	942.67	942.67	Standard	0.42	0.42
62	MH-20	948.94	937.14	11.80	18,176.00	22,272.00	937.20	937.20	Standard	1.05	1.10
61	MH-21	948.22	938.36	9.86	17,408.00	18,176.00	938.42	938.42	Standard	0.60	1.07
59	MH-22	950.31	940.38	9.93	5,376.00	7,936.00	940.41	940.41	Standard	0.55	0.81
58	MH-23	952.27	941.87	10.40	1,792.00	5,376.00	941.89	941.89	Standard	0.24	0.72
57	MH-24	952.98	942.44	10.54	512.00	1,792.00	942.44	942.44	Standard	0.15	0.52
39	MH-26	951.04	936.18	14.86	41,216.00	41,216.00	936.28	936.28	Standard	0.62	1.36
72	MH-27	947.99	937.11	10.88	21,504.00	22,272.00	937.18	937.18	Standard	0.61	1.10
80	MH-29	950.59	940.18	10.41	5,120.00	6,400.00	940.20	940.20	Standard	0.37	0.76
79	MH-30	951.33	940.78	10.55	1,536.00	2,048.00	940.78	940.78	Standard	0.40	0.53
76	MH-31	952.49	942.90	9.59	0.00	2,816.00	942.91	942.91	Standard	0.73	0.73
73	MH-33	953.21	938.22	14.99	8,192.00	9,216.00	938.25	938.25	Standard	0.76	0.85
74	MH-34	953.68	939.54	14.14	5,376.00	8,192.00	939.57	939.57	Standard	0.55	0.84
75	MH-35	953.50	940.74	12.76	2,816.00	5,376.00	940.76	940.76	Standard	0.38	0.72
71	MH-36	949.13	938.94	10.19	10,496.00	12,288.00	938.98	938.98	Standard	0.49	0.94
64	MH-44	949.67	940.50	9.17	3,072.00	4,352.00	940.51	940.51	Standard	0.38	0.67
67	MH-45	950.90	941.98	8.92	512.00	3,328.00	941.98	941.98	Standard	0.16	0.48
81	MH-46	949.94	941.15	8.79	1,536.00	3,072.00	941.16	941.16	Standard	0.31	0.63
78	MH-47	951.47	940.87	10.60	1,280.00	1,536.00	940.87	940.87	Standard	0.40	0.48
77	MH-48	952.37	941.85	10.52	0.00	1,280.00	941.85	941.85	Standard	0.46	0.46
65	MH-50	945.00	942.20	2.80	1,536.00	3,072.00	942.20	942.20	Standard	0.58	0.58
66	MH-51	951.37	944.37	7.00	0.00	2,048.00	943.20	943.20	Standard	0.42	0.42
35	MH-53	947.00	933.13	13.87	69,120.00	69,120.00	933.27	933.27	Standard	1.14	1.54
63	MH-55	947.18	939.48	7.70	4,352.00	7,168.00	939.50	939.50	Standard	0.50	0.82
60	MH-56	949.23	939.42	9.81	7,936.00	10,240.00	939.45	939.45	Standard	0.70	0.91
50	MH-57	949.56	935.12	14.44	11,264.00	13,312.00	934.99	934.99	Standard	0.83	0.99
70	MH-58	948.52	939.87	8.65	2,560.00	4,096.00	939.88	939.88	Standard	0.43	0.69
69	MH-59	948.82	940.70	8.12	1,792.00	2,560.00	940.70	940.70	Standard	0.40	0.57
68	MH-60	948.97	940.83	8.14	1,792.00	1,792.00	940.83	940.83	Standard	0.51	0.51
48	MH-61	952.37	938.26	14.11	0.00	768.00	938.07	938.07	Standard	0.50	0.50

FlexTable: Outfall Table
Active Scenario: ADF

ID	Label	Elevation (Ground) (ft)	Elevation (Invert) (ft)	Boundary Condition Type	Hydraulic Grade (ft)	Flow (Total Out) (gpd)
136	O-1	954.00	930.84	Free Outfall	930.97	69,120.00

FlexTable: Conduit Table
Active Scenario: PDF

ID	Label	Start Node	Stop Node	Invert (Start) (ft)	Invert (Stop) (ft)	Cover (Start) (ft)	Cover (Stop) (ft)	Length (Scaled) (ft)	Slope (Calculated) (ft/ft)	Diameter (in)	Material	Manning's n	Flow (gpd)	Capacity (Design) (gpd)	Flow / Capacity (Design) (%)	Depth/Rise (%)	Velocity (ft/s)
34	P-1	MH-3	MH-2	931.93	931.16	18.67	21.51	193.3	0.0040	8.0	Vitrified Clay	0.013	276,480.01	492,911.11	56.1	53.1	2.25
36	P-2	MH-53	MH-3	933.13	931.93	13.20	18.67	299.4	0.0040	8.0	Vitrified Clay	0.013	276,480.01	494,410.36	55.9	53.5	2.25
82	P-4	MH-7	MH-53	934.18	933.23	14.10	13.10	236.6	0.0040	8.0	Vitrified Clay	0.013	71,680.00	494,878.01	14.5	32.1	1.56
83	P-5	MH-8	MH-7	935.37	934.28	16.98	14.01	276.5	0.0040	8.0	Vitrified Clay	0.013	18,432.00	491,220.42	3.8	12.3	1.04
84	P-6	MH-9	MH-8	935.51	935.37	17.16	16.98	33.7	0.0040	8.0	Vitrified Clay	0.013	8,192.00	495,868.12	1.7	11.1	0.82
85	P-7	MH-10	MH-9	936.39	935.51	17.29	17.15	221.2	0.0040	8.0	Vitrified Clay	0.013	6,144.00	492,603.89	1.2	8.1	0.74
86	P-8	MH-11	MH-10	936.75	936.39	17.03	17.29	47.9	0.0075	8.0	Vitrified Clay	0.013	1,024.00	677,012.60	0.2	5.4	0.54
87	P-9	MH-11	MH-13	941.30	938.63	12.48	13.54	356.0	0.0075	8.0	Vitrified Clay	0.013	15,360.00	676,382.94	2.3	13.2	1.23
88	P-10	MH-13	MH-12	938.63	937.28	13.54	13.51	335.3	0.0040	8.0	Vitrified Clay	0.013	27,648.00	495,577.94	5.6	15.0	1.18
89	P-11	MH-61	MH-12	938.26	937.38	13.44	13.41	116.4	0.0075	8.0	Vitrified Clay	0.013	3,072.00	677,552.13	0.5	4.8	0.76
90	P-12	MH-57	MH-7	935.12	934.28	13.77	14.00	211.8	0.0040	8.0	Vitrified Clay	0.013	53,248.00	491,818.98	10.8	20.9	1.43
91	P-13	MH-6	MH-57	935.96	935.12	13.65	13.77	211.8	0.0040	8.0	Vitrified Clay	0.013	45,056.00	491,841.93	9.2	21.3	1.36
92	P-14	MH-12	MH-6	937.18	936.06	13.61	13.55	280.0	0.0040	8.0	Vitrified Clay	0.013	35,840.00	493,930.43	7.3	17.1	1.27
93	P-15	MH-5	MH-53	934.63	933.13	14.68	13.20	375.6	0.0040	8.0	Vitrified Clay	0.013	204,800.01	493,524.19	41.5	49.2	2.09
94	P-16	MH-26	MH-5	936.08	934.63	14.29	14.68	361.3	0.0040	8.0	Vitrified Clay	0.013	164,864.00	494,778.00	33.3	42.3	1.97
95	P-17	MH-27	MH-26	937.11	936.18	10.21	14.19	232.5	0.0040	8.0	Vitrified Clay	0.013	89,088.00	493,893.73	18.0	27.1	1.66
96	P-18	MH-33	MH-27	938.22	937.11	14.32	10.21	278.0	0.0040	8.0	Vitrified Clay	0.013	36,864.00	493,487.59	7.5	23.6	1.29
97	P-19	MH-34	MH-33	939.54	938.32	13.47	14.22	304.5	0.0040	8.0	Vitrified Clay	0.013	32,768.00	494,350.11	6.6	16.4	1.24
98	P-20	MH-35	MH-34	940.74	939.54	12.09	13.47	299.8	0.0040	8.0	Vitrified Clay	0.013	21,504.00	494,085.56	4.4	15.8	1.10
99	P-21	MH-31	MH-35	942.90	940.74	8.92	12.09	288.7	0.0075	8.0	Vitrified Clay	0.013	11,264.00	675,512.37	1.7	11.6	1.12
100	P-22	MH-36	MH-27	938.94	937.21	9.52	10.11	433.7	0.0040	8.0	Vitrified Clay	0.013	49,152.00	493,273.93	10.0	20.1	1.40
101	P-23	MH-29	MH-36	940.18	938.94	9.74	9.52	310.0	0.0040	8.0	Vitrified Clay	0.013	25,600.00	493,906.70	5.2	18.4	1.15
102	P-24	MH-30	MH-29	940.78	940.18	9.88	9.74	149.4	0.0040	8.0	Vitrified Clay	0.013	8,192.00	494,960.90	1.7	12.2	0.82
103	P-25	MH-47	MH-30	940.87	940.78	9.93	9.88	23.5	0.0040	8.0	Vitrified Clay	0.013	6,144.00	495,887.26	1.2	8.4	0.75
104	P-26	MH-48	MH-47	941.85	940.87	9.85	9.93	244.7	0.0040	8.0	Vitrified Clay	0.013	5,120.00	494,273.47	1.0	7.9	0.71
105	P-27	MH-31	MH-48	942.02	941.85	9.80	9.86	23.6	0.0075	8.0	Vitrified Clay	0.013	0.00	677,286.48	0.0	3.8	0.00
106	P-28	MH-58	MH-36	939.87	939.04	7.98	9.42	206.7	0.0040	8.0	Vitrified Clay	0.013	16,384.00	494,913.99	3.3	11.6	1.01
107	P-29	MH-59	MH-58	940.70	939.87	7.45	7.98	206.7	0.0040	8.0	Vitrified Clay	0.013	10,240.00	494,930.17	2.1	11.2	0.88
108	P-30	MH-60	MH-59	940.83	940.70	7.47	7.45	33.4	0.0040	8.0	Vitrified Clay	0.013	7,168.00	496,054.12	1.4	9.2	0.79
109	P-31	MH-45	MH-60	941.98	940.83	8.25	7.47	286.4	0.0040	8.0	Vitrified Clay	0.013	7,168.00	494,917.25	1.4	8.8	0.79
110	P-32	MH-51	MH-45	943.22	941.98	7.48	8.25	166.0	0.0075	8.0	Vitrified Clay	0.013	2,048.00	674,984.72	0.3	52.0	0.66
111	P-33	MH-46	MH-29	941.15	940.28	8.12	9.64	218.5	0.0040	8.0	Vitrified Clay	0.013	12,288.00	492,816.59	2.5	10.1	0.92
112	P-34	MH-45	MH-46	942.79	941.15	7.44	8.12	218.5	0.0075	8.0	Vitrified Clay	0.013	6,144.00	676,624.34	0.9	8.8	0.93
113	P-35	MH-14	MH-5	935.59	934.73	14.22	14.58	214.4	0.0040	8.0	Vitrified Clay	0.013	39,936.00	494,581.93	8.1	24.6	1.31
114	P-36	MH-15	MH-14	936.16	935.69	14.15	14.12	117.5	0.0040	8.0	Vitrified Clay	0.013	26,624.00	494,002.20	5.4	14.8	1.17
115	P-37	MH-16	MH-15	937.65	936.16	14.28	14.15	372.7	0.0040	8.0	Vitrified Clay	0.013	22,528.00	493,779.92	4.6	15.2	1.11
116	P-38	MH-17	MH-16	938.18	937.65	14.36	14.28	132.6	0.0040	8.0	Vitrified Clay	0.013	8,192.00	493,779.31	1.7	11.8	0.82
117	P-39	MH-18	MH-17	938.37	938.18	14.40	14.36	48.0	0.0040	8.0	Vitrified Clay	0.013	5,120.00	491,233.22	1.0	8.1	0.70
118	P-40	MH-19	MH-18	940.02	938.37	12.51	14.40	221.0	0.0075	8.0	Vitrified Clay	0.013	5,120.00	674,785.35	0.8	6.7	0.88
119	P-41	MH-20	MH-14	937.14	935.69	11.13	14.12	361.3	0.0040	8.0	Vitrified Clay	0.013	13,312.00	494,784.60	2.7	10.5	0.95
120	P-42	MH-21	MH-20	938.36	937.24	9.19	11.03	280.0	0.0040	8.0	Vitrified Clay	0.013	72,704.00	493,931.98	14.7	25.5	1.57
121	P-43	MH-56	MH-21	939.42	938.46	9.14	9.09	239.3	0.0040	8.0	Vitrified Clay	0.013	40,960.00	494,640.94	8.3	18.3	1.33
122	P-44	MH-22	MH-56	940.38	939.42	9.26	9.14	279.2	0.0034	8.0	Vitrified Clay	0.013	31,744.00	457,920.15	6.9	18.6	1.17
123	P-45	MH-23	MH-22	941.87	940.38	9.73	9.26	333.1	0.0045	8.0	Vitrified Clay	0.013	21,504.00	522,344.32	4.1	15.8	1.14
124	P-46	MH-24	MH-23	942.44	941.87	9.87	9.73	141.5	0.0040	8.0	Vitrified Clay	0.013	7,168.00	495,721.52	1.4	11.1	0.79
125	P-47	MH-19	MH-24	942.69	942.44	9.84	9.87	33.7	0.0075	8.0	Vitrified Clay	0.013	2,048.00	677,662.40	0.3	6.2	0.67
126	P-48	MH-55	MH-21	939.48	938.46	7.03	9.09	255.1	0.0040	8.0	Vitrified Clay	0.013	28,672.00	493,822.98	5.8	15.3	1.19
127	P-49	MH-44	MH-55	940.50	939.48	8.50	7.03	255.1	0.0040	8.0	Vitrified Clay	0.013	17,408.00	493,822.98	3.5	14.6	1.03
129	P-51	MH-51	MH-50	944.37	942.20	6.33	2.13	290.0	0.0075	8.0	Vitrified Clay	0.013	6,144.00	675,566.35	0.9	6.7	0.93
131	P-53	MH-2	MH-1	931.16	931.00	21.52	22.33	38.6	0.0040	8.0	Vitrified Clay	0.013	276,480.01	495,409.07	55.8	53.5	2.26
132	P-54	MH-20	MH-26	937.24	936.18	11.03	14.19	214.4	0.0049	8.0	Vitrified Clay	0.013	75,776.00	549,088.01	13.8	24.9	1.71
137	P-55	MH-1	O-1	931.00	930.84	22.33	22.49	40.1	0.0040	8.0	Vitrified Clay	0.013	276,480.01	493,577.86	56.0	49.6	2.25
138	P-56	MH-50	MH-44	942.10	940.50	2.23	8.51	399.5	0.0040	8.0	Vitrified Clay	0.013	12,288.00	494,959.50	2.5	12.2	0.93

FlexTable: Manhole Table

Active Scenario: PDF

ID	Label	Elevation (Rim) (ft)	Elevation (Invert) (ft)	Depth (Structure) (ft)	Flow (Total In) (gpd)	Flow (Total Out) (gpd)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Headloss Method	Velocity (In) (ft/s)	Velocity (Out) (ft/s)
37	MH-1	954.00	931.00	23.00	276,480.01	276,480.01	931.36	931.36	Standard	2.25	2.25
31	MH-2	953.34	931.16	22.18	276,480.01	276,480.01	931.51	931.51	Standard	2.29	2.26
32	MH-3	951.27	931.93	19.34	276,480.01	276,480.01	932.29	932.29	Standard	2.25	2.25
38	MH-5	949.98	934.63	15.35	204,800.01	204,800.01	934.93	934.93	Standard	0.71	2.09
49	MH-6	950.28	935.96	14.32	35,840.00	45,056.00	936.10	936.10	Standard	1.54	1.36
41	MH-7	948.95	934.28	14.67	71,680.00	71,680.00	934.35	934.35	Standard	1.71	1.56
42	MH-8	953.02	935.37	17.65	8,192.00	18,432.00	935.46	935.46	Standard	0.46	1.04
43	MH-9	953.33	935.51	17.82	6,144.00	8,192.00	935.57	935.57	Standard	0.68	0.82
44	MH-10	954.35	936.39	17.96	1,024.00	6,144.00	936.44	936.44	Standard	0.12	0.74
45	MH-11	954.45	941.30	13.15	0.00	16,384.00	936.77	936.77	Standard	0.54	0.54
47	MH-12	951.46	937.18	14.28	30,720.00	35,840.00	937.30	937.30	Standard	1.44	1.27
46	MH-13	952.84	938.63	14.21	15,360.00	27,648.00	938.74	938.74	Standard	1.18	1.18
51	MH-14	950.48	935.69	14.79	39,936.00	39,936.00	935.72	935.72	Standard	1.42	1.31
52	MH-15	950.98	936.16	14.82	22,528.00	26,624.00	936.27	936.27	Standard	0.99	1.17
53	MH-16	952.60	937.65	14.95	8,192.00	22,528.00	937.75	937.75	Standard	0.40	1.11
54	MH-17	953.21	938.18	15.03	5,120.00	8,192.00	938.24	938.24	Standard	0.51	0.82
55	MH-18	953.44	938.37	15.07	5,120.00	5,120.00	938.42	938.42	Standard	0.70	0.70
56	MH-19	953.20	942.69	10.51	0.00	7,168.00	942.72	942.72	Standard	0.66	0.66
62	MH-20	948.94	937.14	11.80	72,704.00	89,088.00	937.41	937.41	Standard	1.64	1.71
61	MH-21	948.22	938.36	9.86	69,632.00	72,704.00	938.53	938.53	Standard	1.59	1.57
59	MH-22	950.31	940.38	9.93	21,504.00	31,744.00	940.50	940.50	Standard	0.79	1.17
58	MH-23	952.27	941.87	10.40	7,168.00	21,504.00	941.96	941.96	Standard	0.38	1.13
57	MH-24	952.98	942.44	10.54	2,048.00	7,168.00	942.50	942.50	Standard	0.23	0.79
39	MH-26	951.04	936.18	14.86	164,864.00	164,864.00	936.35	936.35	Standard	1.74	1.97
72	MH-27	947.99	937.11	10.88	86,016.00	89,088.00	937.30	937.30	Standard	1.67	1.66
80	MH-29	950.59	940.18	10.41	20,480.00	25,600.00	940.28	940.28	Standard	1.16	1.15
79	MH-30	951.33	940.78	10.55	6,144.00	8,192.00	940.84	940.84	Standard	0.62	0.82
76	MH-31	952.49	942.90	9.59	0.00	11,264.00	942.96	942.96	Standard	1.12	1.12
73	MH-33	953.21	938.22	14.99	32,768.00	36,864.00	938.34	938.34	Standard	1.50	1.29
74	MH-34	953.68	939.54	14.14	21,504.00	32,768.00	939.66	939.66	Standard	0.81	1.24
75	MH-35	953.50	940.74	12.76	11,264.00	21,504.00	940.83	940.83	Standard	0.57	1.10
71	MH-36	949.13	938.94	10.19	41,984.00	49,152.00	939.08	939.08	Standard	0.73	1.40
64	MH-44	949.67	940.50	9.17	12,288.00	17,408.00	940.59	940.59	Standard	0.67	1.03
67	MH-45	950.90	941.98	8.92	2,048.00	13,312.00	942.84	942.84	Standard	0.01	0.93
81	MH-46	949.94	941.15	8.79	6,144.00	12,288.00	941.22	941.22	Standard	0.46	0.92
78	MH-47	951.47	940.87	10.60	5,120.00	6,144.00	940.93	940.93	Standard	0.55	0.75
77	MH-48	952.37	941.85	10.52	0.00	5,120.00	941.90	941.90	Standard	0.71	0.71
65	MH-50	945.00	942.20	2.80	6,144.00	12,288.00	942.17	942.17	Standard	0.93	0.93
66	MH-51	951.37	944.37	7.00	0.00	8,192.00	943.25	943.25	Standard	0.66	0.66
35	MH-53	947.00	933.13	13.87	276,480.01	276,480.01	933.49	933.49	Standard	1.67	2.25
63	MH-55	947.18	939.48	7.70	17,408.00	28,672.00	939.59	939.59	Standard	0.72	1.19
60	MH-56	949.23	939.42	9.81	31,744.00	40,960.00	939.55	939.55	Standard	1.03	1.32
50	MH-57	949.56	935.12	14.44	45,056.00	53,248.00	935.27	935.27	Standard	1.21	1.43
70	MH-58	948.52	939.87	8.65	10,240.00	16,384.00	939.95	939.95	Standard	0.63	1.01
69	MH-59	948.82	940.70	8.12	7,168.00	10,240.00	940.77	940.77	Standard	0.61	0.88
68	MH-60	948.97	940.83	8.14	7,168.00	7,168.00	940.89	940.89	Standard	0.79	0.79
48	MH-61	952.37	938.26	14.11	0.00	3,072.00	938.29	938.29	Standard	0.75	0.75

FlexTable: Outfall Table

Active Scenario: PDF

ID	Label	Elevation (Ground) (ft)	Elevation (Invert) (ft)	Boundary Condition Type	Hydraulic Grade (ft)	Flow (Total Out) (gpd)
136	O-1	954.00	930.84	Free Outfall	931.15	276,480.01

Appendix D:

Will Serve Letter and Sewer Capacity Letter

June 2, 2021

Beazer Homes Holdings, LLC
5417 W Pleasant Ln
Phoenix, AZ 85041

Re: Will Serve Letter
Montana Vista
NEC of Apache and Roeser Roads
APNs: 504-41-006P, -006Q, -721, and -722
71.48 (gross) acres

To Whom It May Concern,

The above referenced development, near the northeast corner of Apache and Roeser Roads, is located within the City of Buckeye (City) corporate limits and water and wastewater service can be provided. The City's water and wastewater facilities are located in public easements and/or right-of-ways adjacent to the property and service can be provided in accordance with the City's standards, guidelines, and ordinances.

If you have any questions, feel free to contact me at (623) 349-6188 or jhumble@buckeyeaz.gov.

Sincerely,



James Humble, P.E.
Sr. Civil Engineer



CITY OF BUCKEYE
Water Resources Department

November 16, 2021

Subdivision Program
Maricopa County Environmental Services Department
1001 N. Central Avenue, Suite 150
Phoenix, AZ 85004

Re: Sewer Capacity Letter
Montana Vista – 278 lots, 71 Acres – Residential Development
NEC of Apache Rd and Roeser Rd

To whom it may concern:

This letter is to confirm that the City of Buckeye (City) Central Wastewater Treatment Plant (CWWTP) has the sewer treatment capacity for the above-mentioned development. Montana Vista is a residential development with a total of 278 lots that will generate approximately 172,523 gallons of wastewater per day during peak day conditions. This additional wastewater flow will not have any adverse impacts to the City's treatment or collection facilities or cause the City to exceed any conditions of its Aquifer Protection Permit for the CWWTP.

All downstream sewer collection lines and appurtenances have been designed in accordance with the City's current Engineering Design Standards and Guidelines.

If you have any questions or need additional information, please contact me directly at (623) 349-6188 or by email at jhumble@buckeyeaz.gov.

Sincerely,

James Humble, P.E.
Sr. Civil Engineer

PLZS-21-00130

**4TH REVIEW
RECEIVED
Dec 14 21
CITY OF BUCKEYE
PLANNING & ZONING
DM**



Preliminary Water Report

For

Montana Vista

Prepared By:
EPS Group, inc.

1130 N. Alma School Rd, Suite 120
Mesa, Az 85201

Contact: Mike LoTempio
Phone: 480.503.2250

Email: Mike.LoTempio@epsgruoinc.com

Prepared For:
Beazer Homes

1130 N Alma School Rd, #110
Mesa, Az 85201

Contact: James Alexander
Phone: 480-232-5747

Email: james.alexander@beazer.com



Expires: 12/31/21

Project No. 20-1512
Date: December 2021

1130 N. Alma School Road
Suite 120
Mesa, AZ 85201
480.503.2250

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Appendices

Appendix A: Vicinity Map

Appendix B: Water Model

Appendix C: Water Demand Calcs

Appendix D: Flow Test

1.0 Executive Summary

Montana Vista (the Project) is a new 71.32-acre, 270 lot sub-division located in Buckeye, Arizona. The City of Buckeye new Jackie A. Meck Water Campus will serve the project. The Project will have two connection points; one to the existing 16-inch waterline in Apache Road and one to the existing 12-inch waterline in Roeser Road. The new internal waterlines will be 8" in diameter PVC and will provide sufficient water and pressure to meet the max day plus fire flow requirements of the project. The peak hour demand for the project is 203.7 gpm. The City of Buckeye Water Engineering Design Standards Section 3-1 Adopted June, 2020 have been met.

2.0 Introduction

Montana Vista (the Project) is a proposed 71.32-acre, 270 lot sub-division located in Buckeye, Arizona.

This report will review the design of the Montana Vista water system in order to ensure that the system complies with all applicable design criteria in the 2020 City of Buckeye Water Engineering Design Standards and Maricopa County. The City of Buckeye will be providing water services for this site. The City's new Jackie A. Meck Water Campus will service this area.

3.0 Project Location

The project is located at the NEC of Roeser Rd and Apache Rd in the City of Buckeye. The project is bounded by undeveloped, planned residential land to the north, west, and south. Single family residential (zoned RU-43) lots border the development to the east. The project is further located within a portion of the Northwest quarter of Section 28, Township 1 North, Range 3 West, of the Gila and Salt River Base and Meridian Maricopa County, Assessor Parcel Numbers (APN) 504-41-006P, 504-41-006Q, 504-41-721, and 504-41-722. See Appendix A, for Vicinity Map.

4.0 Existing Conditions

Existing 24" water mains in adjacent Apache Road and Broadway Road provide service for pressure zone 2, so they will not be utilized for this development. There is a 16" water line located along the western side of the property in Apache Road that connects to the Jackie Meck Water Campus. There is also an existing 12" water line within Roeser Road located along the southern border of the property. The existing site generally slopes from northwest to southeast, from general elevation 961 ft to 947 ft. To the north is agricultural farm land to be developed into the future Vista Bonita sub-division and the

new Jackie Meck Water Campus. To the east is the Sonoran Vista sub-division, the existing land to the south is partly agricultural farm land and partly the Riata West developed sub-division.

5.0 Service Area

This development lies within City of Buckeye water service area and will be served by pressure zone I waterlines. There is an existing 16" water line located in Apache Road that connects to the Jackie Meck Water Campus. The second connection will be to an existing 12" water line within Roeser Road located along the southern border of the property.

6.0 Water System Design

6.1 Water System

The new internal waterlines will be 8" in diameter PVC and will provide sufficient water and pressure to meet the max day plus fire flow requirements of the project.

6.2 Design Criteria

The calculations of water flows and pipe sizing in this report are based on system design criteria in The City of Buckeye Engineering Design Standards Section 3-1 Adopted June 2020.

The system was designed to maintain pressure between 50 and 110 psi during peak flow, with a flow velocity less than or equal to 5 feet per second for average day, maximum day and peak hour flows. The minimum allowable pressure under max day plus fire flow conditions is 20 psi with a velocity less than or equal to 10 feet per second. Pressure reducing valves are required on all residential lots.

6.3 Hydrant Flow Test

A Hydrant Flow Test was performed and used for the model. A safety factor of 10 psi has already been applied to this data. A copy of the fire flow test conducted by Steven Saethre & Eder Cueva of EJ Flow tests is shown in Appendix E.

Flow Test	
Static Pressure	46.8 psi
Residual Pressure	30.8 psi
Flow Rate	1,634 gpm

6.4 Domestic Water Demand Calculations

Water demand for the Project is based on single-family criteria found in Table I of the City of Buckeye Water Engineering Design Standards Section 3-I Adopted June, 2020.

Average Day Demand for Low and Medium Density Residential =

$$3.2 \text{ Capita/DU} \times 113 \text{ gallons/day} = 362 \text{ gallons/DU}$$

$$\text{Max Day Demand} = 1.8 \times \text{Average Day}$$

$$\text{Peak Hr Demand} = 3.0 \times \text{Average Day}$$

The domestic water demand that the project site is designed for are as follows:

$$\text{Average Day Demand} = 362 \frac{\text{gallons}}{\text{DU}} * 270 \text{ units} = 97,740 \text{ gpd} = 67.9 \text{ gpm}$$

$$\text{Max Day Demand} = 362 \frac{\text{gallons}}{\text{DU}} * 270 \text{ units} * 1.8 = 175,932 \text{ gpd} = 122.2 \text{ gpm} =$$

$$\text{Peak Hour Demand} = 362 \frac{\text{gallons}}{\text{DU}} * 270 \text{ units} * 3.0 = 293,220 \text{ gpd} = 203.7 \text{ gpm}$$

Fire Flow = 1,500 gpm for duration of 2 hours

6.5 Pressure Analysis

The water system was modeled using Bentley WaterCAD V8i. The system was evaluated for the average day demand, maximum day demand, maximum day plus fire flow, and the peak hour demand. It was determined that 8-inch PVC onsite waterline would be efficient to effectively convey water throughout the development, meeting 2012 IFC fire flow demands and City of Buckeye Engineering Design Standards.

Scenario	Min Pressure (psi)	Max Pressure (psi)	Max Velocity (ft/s)
Average Day Demand	55	58	0.22
Maximum Day Demand	55	58	0.39
Max Day + Fire Flow	31	---	9.8
Peak Hour Demand	55	58	0.65

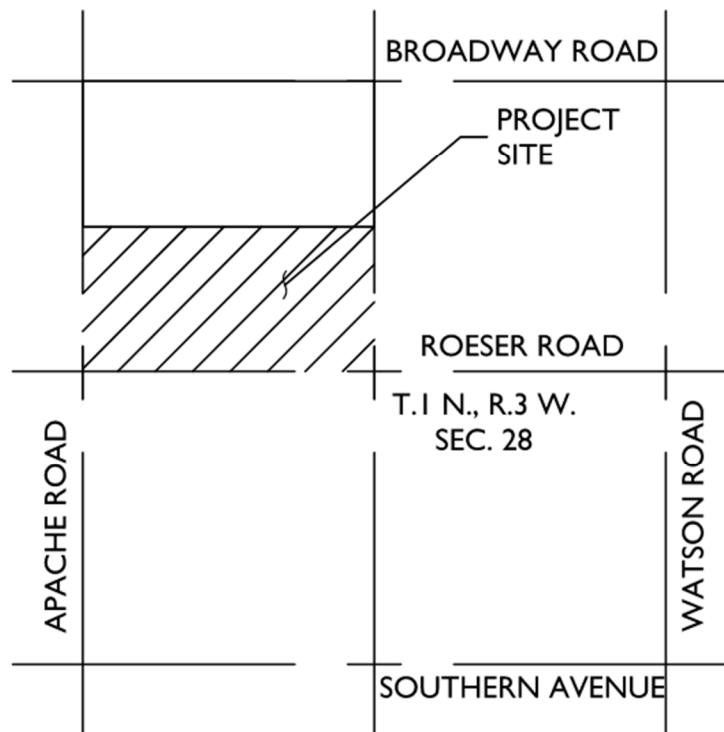
See Appendix B for the WaterCAD model exhibit and Appendix C for WaterCAD analysis results.

7.0 Conclusions

- The City of Buckeye Water Engineering Design Standards Section 3-1 Adopted June, 2020 have been met.
- The project will connect to the existing 12" line in Roeser Road and to the existing 16" waterline in Apache Road.
- A minimum of 50 psi system pressure is maintained during Average Day, Max Day, and Peak Hour conditions and all pipe velocities are below 5 ft/s.
- A minimum of 20 psi system pressure is maintained during Max Day + Fire Flow Condition all pipe velocities are below 10 ft/s.
- The peak hour demand for the project is 203.7 gpm.

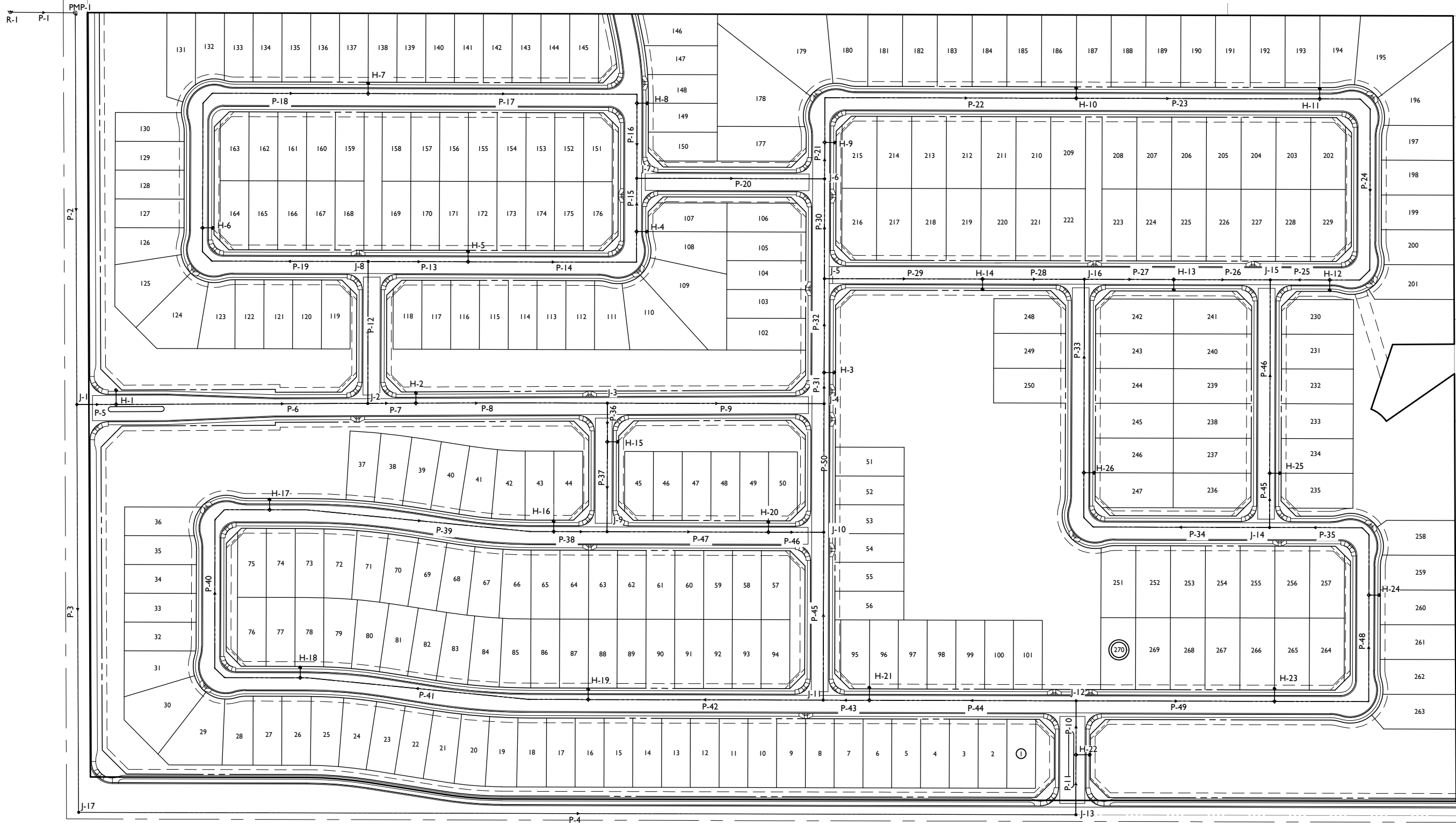
Appendix A:
Vicinity Map

VICINITY MAP



Appendix B:

Water Model



North



1130 N Alma School Road
Suite 120
Mesa, AZ 85201
T: 480.503.2250 | F: 480.503.2258
www.epsgroupinc.com



20-1512 - Montana Vista
Buckeye, AZ

Project:

Revisions:



Call at least two full working days before you begin excavation.
DESIGNER: EPS GROUP, INC.
DRAWN BY: EPS GROUP, INC.

Designer: EPS
Drawn by: EPS

Job No.

20-1512

Sheet No.

1
OF 1

Appendix C:
Water Demand Calcs

WaterCAD Summary

Project: Montana Vista

Scenario: Average Day Demand

Prepared by: Colin Steele

Date: 12/14/2021

Pipe Table

Label	Start Node	Stop Node	Length (Scaled) (ft)	Diameter (in)	Material	Flow (gpm)	Hazen-Williams C	Headloss Gradient ft/1000ft	Velocity (ft/s)
P-1	R-1	PMP-1	108	60	PVC	68	130	0	0.01
P-2	PMP-1	J-1	653	16	Ductile Iron	68	110	0	0.11
P-3	J-1	J-17	680	16	Ductile Iron	33	110	0	0.05
P-4	J-17	J-13	1,663	12	Ductile Iron	33	110	0	0.09
P-5	J-1	H-1	66	8	PVC	35	130	0	0.22
P-6	H-1	J-2	420	8	PVC	35	130	0.037	0.22
P-7	J-2	H-2	80	8	PVC	15	130	0.008	0.09
P-8	H-2	J-3	319	8	PVC	15	130	0.007	0.09
P-9	J-3	J-4	361	8	PVC	7	130	0.002	0.04
P-10	J-12	H-22	90	8	PVC	-33	130	0.033	0.21
P-11	H-22	J-13	100	8	PVC	-33	130	0.033	0.21
P-12	J-2	J-8	237	8	PVC	20	130	0.013	0.13
P-13	J-8	H-5	167	8	PVC	6	130	0.001	0.04
P-14	H-5	H-4	332	8	PVC	6	130	0.001	0.04
P-15	H-4	J-7	89	8	PVC	6	130	0.001	0.04
P-16	J-7	H-8	125	8	PVC	-4	130	0.001	0.02
P-17	H-8	H-7	463	8	PVC	-4	130	0.001	0.02
P-18	H-7	H-6	491	8	PVC	-4	130	0	0.02
P-19	H-6	J-8	322	8	PVC	-4	130	0.001	0.02
P-20	J-7	J-6	313	8	PVC	3	130	0	0.02
P-21	J-6	H-9	61	8	PVC	1	130	0	0.01
P-22	H-9	H-10	494	8	PVC	1	130	0	0.01
P-23	H-10	H-11	406	8	PVC	1	130	0	0.01
P-24	H-11	H-12	434	8	PVC	1	130	0	0.01
P-25	H-12	J-15	99	8	PVC	1	130	0	0.01
P-26	J-15	H-13	161	8	PVC	-3	130	0	0.02
P-27	H-13	J-16	149	8	PVC	-3	130	0.001	0.02
P-28	J-16	H-14	170	8	PVC	-2	130	0	0.01
P-29	H-14	J-5	264	8	PVC	-2	130	0	0.01
P-30	J-5	J-6	167	8	PVC	4	130	0.001	0.03
P-31	J-4	H-3	52	8	PVC	8	130	0.002	0.05
P-32	H-3	J-5	156	8	PVC	8	130	0.002	0.05
P-33	J-16	H-26	323	8	PVC	-4	130	0.001	0.03
P-34	H-26	J-14	391	8	PVC	-4	130	0.001	0.03
P-35	J-14	H-24	272	8	PVC	-11	130	0.004	0.07
P-36	J-3	H-15	65	8	PVC	8	130	0.002	0.05
P-37	H-15	J-9	150	8	PVC	8	130	0.002	0.05
P-38	J-9	H-16	89	8	PVC	-1	130	0	0.01
P-39	H-16	H-17	476	8	PVC	-1	130	0	0.01
P-40	H-17	H-18	495	8	PVC	-1	130	0	0.01
P-41	H-18	H-19	482	8	PVC	-1	130	0	0.01
P-42	H-19	J-11	392	8	PVC	-1	130	0	0.01
P-43	J-11	H-21	77	8	PVC	-17	130	0.011	0.11
P-44	H-21	J-12	345	8	PVC	-17	130	0.01	0.11
P-45	J-11	J-10	280	8	PVC	3	130	0	0.02
P-45	J-14	H-25	90	6	PVC	3	130	0.001	0.03
P-46	J-10	H-20	92	8	PVC	-1	130	0	0.01
P-46	H-25	J-15	322	6	PVC	3	130	0.002	0.03
P-47	H-20	J-9	269	8	PVC	-1	130	0	0.01

WaterCAD Summary

Project: Montana Vista

Scenario: Average Day Demand

Prepared by: Colin Steele

Date: 12/14/2021

P-48	H-24	H-23	335	8	PVC	-11	130	0.005	0.07
P-49	H-23	J-12	331	8	PVC	-11	130	0.004	0.07
P-50	J-10	J-4	214	8	PVC	2	130	0	0.01

Junction Table

Label	Elevation (ft)	Pressure (psi)	Pressure Head (ft)	Demand (gpm)	Hydraulic Grade (ft)
J-1	953.53	55	127.47	0	1,081.00
J-2	951.74	56	129.24	0	1,080.98
J-3	947.50	58	133.48	0	1,080.98
J-4	947.25	58	133.73	0	1,080.98
J-12	952.11	56	128.87	4	1,080.98
J-13	946.02	58	134.97	0	1,080.99
J-9	948.64	57	132.34	8	1,080.98
J-11	946.93	58	134.05	13	1,080.98
J-5	948.28	57	132.70	2	1,080.98
J-16	948.67	57	132.31	3	1,080.98
J-6	950.94	56	130.04	7	1,080.98
J-7	950.82	56	130.16	7	1,080.98
J-8	951.08	56	129.90	11	1,080.98
J-17	948.98	57	132.02	0	1,081.00
J-15	950.46	56	130.52	7	1,080.98
J-10	946.00	58	134.98	3	1,080.98
J-14	950.98	56	130.00	4	1,080.98

WaterCAD Summary

Project: Montana Vista

Scenario: Maximum Day Demand

Prepared by: Colin Steele

Date: 12/14/2021

Pipe Table

Label	Start Node	Stop Node	Length (Scaled) (ft)	Diameter (in)	Material	Flow (gpm)	Hazen-Williams C	Headloss Gradient ft/1000ft	Velocity (ft/s)
P-1	R-1	PMP-1	108	60	PVC	122	130	0	0.01
P-2	PMP-1	J-1	653	16	Ductile Iron	122	110	0	0.19
P-3	J-1	J-17	680	16	Ductile Iron	59	110	0	0.09
P-4	J-17	J-13	1,663	12	Ductile Iron	59	110	0	0.17
P-5	J-1	H-1	66	8	PVC	63	130	0	0.40
P-6	H-1	J-2	420	8	PVC	63	130	0.111	0.40
P-7	J-2	H-2	80	8	PVC	27	130	0.023	0.17
P-8	H-2	J-3	319	8	PVC	27	130	0.022	0.17
P-9	J-3	J-4	361	8	PVC	12	130	0.005	0.08
P-10	J-12	H-22	90	8	PVC	-59	130	0.096	0.37
P-11	H-22	J-13	100	8	PVC	-59	130	0.095	0.37
P-12	J-2	J-8	237	8	PVC	37	130	0.041	0.24
P-13	J-8	H-5	167	8	PVC	11	130	0.004	0.07
P-14	H-5	H-4	332	8	PVC	11	130	0.004	0.07
P-15	H-4	J-7	89	8	PVC	11	130	0.005	0.07
P-16	J-7	H-8	125	8	PVC	-7	130	0.002	0.04
P-17	H-8	H-7	463	8	PVC	-7	130	0.002	0.04
P-18	H-7	H-6	491	8	PVC	-7	130	0.002	0.04
P-19	H-6	J-8	322	8	PVC	-7	130	0.002	0.04
P-20	J-7	J-6	313	8	PVC	5	130	0.001	0.03
P-21	J-6	H-9	61	8	PVC	1	130	0	0.01
P-22	H-9	H-10	494	8	PVC	1	130	0	0.01
P-23	H-10	H-11	406	8	PVC	1	130	0	0.01
P-24	H-11	H-12	434	8	PVC	1	130	0	0.01
P-25	H-12	J-15	99	8	PVC	1	130	0.001	0.01
P-26	J-15	H-13	161	8	PVC	-5	130	0.002	0.03
P-27	H-13	J-16	149	8	PVC	-5	130	0.001	0.03
P-28	J-16	H-14	170	8	PVC	-3	130	0.001	0.02
P-29	H-14	J-5	264	8	PVC	-3	130	0	0.02
P-30	J-5	J-6	167	8	PVC	8	130	0.002	0.05
P-31	J-4	H-3	52	8	PVC	15	130	0.007	0.09
P-32	H-3	J-5	156	8	PVC	15	130	0.007	0.09
P-33	J-16	H-26	323	8	PVC	-8	130	0.002	0.05
P-34	H-26	J-14	391	8	PVC	-8	130	0.002	0.05
P-35	J-14	H-24	272	8	PVC	-21	130	0.013	0.13
P-36	J-3	H-15	65	8	PVC	15	130	0.008	0.09
P-37	H-15	J-9	150	8	PVC	15	130	0.007	0.09
P-38	J-9	H-16	89	8	PVC	-2	130	0	0.01
P-39	H-16	H-17	476	8	PVC	-2	130	0	0.01
P-40	H-17	H-18	495	8	PVC	-2	130	0	0.01
P-41	H-18	H-19	482	8	PVC	-2	130	0	0.01
P-42	H-19	J-11	392	8	PVC	-2	130	0	0.01
P-43	J-11	H-21	77	8	PVC	-31	130	0.029	0.20
P-44	H-21	J-12	345	8	PVC	-31	130	0.029	0.20
P-45	J-11	J-10	280	8	PVC	6	130	0.001	0.04
P-45	J-14	H-25	90	6	PVC	5	130	0.005	0.06
P-46	J-10	H-20	92	8	PVC	-2	130	0	0.02
P-46	H-25	J-15	322	6	PVC	5	130	0.005	0.06
P-47	H-20	J-9	269	8	PVC	-2	130	0	0.02

WaterCAD Summary

Project: Montana Vista

Scenario: Maximum Day Demand

Prepared by: Colin Steele

Date: 12/14/2021

P-48	H-24	H-23	335	8	PVC	-21	130	0.014	0.13
P-49	H-23	J-12	331	8	PVC	-21	130	0.014	0.13
P-50	J-10	J-4	214	8	PVC	3	130	0.001	0.02

Junction Table

Label	Elevation (ft)	Pressure (psi)	Pressure Head (ft)	Demand (gpm)	Hydraulic Grade (ft)
J-1	953.53	55	127.26	0	1,080.79
J-2	951.74	56	129.00	0	1,080.74
J-3	947.50	58	133.23	0	1,080.73
J-4	947.25	58	133.48	0	1,080.73
J-12	952.11	56	128.63	7	1,080.74
J-13	946.02	58	134.74	0	1,080.76
J-9	948.64	57	132.09	14	1,080.73
J-11	946.93	58	133.80	24	1,080.73
J-5	948.28	57	132.45	3	1,080.73
J-16	948.67	57	132.06	6	1,080.73
J-6	950.94	56	129.79	12	1,080.73
J-7	950.82	56	129.91	13	1,080.73
J-8	951.08	56	129.65	19	1,080.73
J-17	948.98	57	131.81	0	1,080.79
J-15	950.46	56	130.27	12	1,080.73
J-10	946.00	58	134.73	5	1,080.73
J-14	950.98	56	129.75	7	1,080.73

WaterCAD Summary

Project: Montana Vista

Scenario: Maximum Day Demand + Fire Flow

Prepared by: Colin Steele

Date: 12/14/2021

Fire Flow Node Table

Node of Applied Fire Flow	Elevation (ft)	MDD+FF = Total Fire Flow Needed	Fire Flow (Needed gpm)	Flow (Total Available gpm)	Satisfies Fire Flow Constraints?	Pressure (Residual Lower Limit psi)	Pressure (Calculated Residual psi)	Junction w/ Minimum Pressure (System)	Velocity of Maximum Pipe (ft/s)	Pipe w/ Maximum Velocity (psi)
H-1	953	1,622	1,500.00	1,759	TRUE	20	33	H-7	9.8	P-5
H-2	950	1,622	1,500.00	2,101	TRUE	20	20	H-7	9.16	P-7
H-22	945	1,559	1,500.00	2,135	TRUE	20	20	J-12	8.59	P-11
H-5	950	1,559	1,500.00	1,992	TRUE	20	21	H-7	7.89	P-13
H-6	953	1,563	1,500.00	1,886	TRUE	20	22	H-7	7.89	P-19
H-8	952	1,563	1,500.00	1,944	TRUE	20	20	H-7	8.98	P-16
H-4	950	1,527	1,500.00	2,000	TRUE	20	20	H-7	7.9	P-15
H-9	951	1,527	1,500.00	1,927	TRUE	20	23	H-10	9.8	P-21
H-10	952	1,512	1,500.00	1,872	TRUE	20	22	H-11	7.03	P-22
H-11	953	1,559	1,500.00	1,850	TRUE	20	23	H-10	6.49	P-6
H-12	951	1,559	1,500.00	1,922	TRUE	20	21	H-11	8.18	P-25
H-14	948	1,537	1,500.00	2,031	TRUE	20	20	H-11	7.33	P-29
H-26	949	1,511	1,500.00	1,953	TRUE	20	22	J-14	6.73	P-33
H-24	950	1,511	1,500.00	1,964	TRUE	20	21	J-14	6.92	P-11
H-15	949	1,511	1,500.00	2,069	TRUE	20	20	H-17	8.36	P-36
H-17	953	1,507	1,500.00	1,859	TRUE	20	22	H-18	7.18	P-39
H-18	952	1,507	1,500.00	1,843	TRUE	20	23	H-17	6.36	P-6
H-19	949	1,507	1,500.00	1,937	TRUE	20	20	H-18	8.21	P-42
H-7	954	1,507	1,500.00	1,850	TRUE	20	23	H-6	7.03	P-12
H-13	950	1,505	1,500.00	1,975	TRUE	20	20	H-12	7.52	P-27
H-20	948	1,501	1,500.00	2,065	TRUE	20	20	H-17	8.15	P-46
H-3	946	1,501	1,500.00	2,085	TRUE	20	20	H-11	7.84	P-31
H-25	951	1,501	1,500.00	1,553	TRUE	20	38	J-14	9.8	P-45
H-21	947	1,501	1,500.00	2,077	TRUE	20	20	H-18	7.25	P-11
H-16	949	1,501	1,500.00	1,962	TRUE	20	21	H-17	9.8	P-38
H-23	951	1,505	1,500.00	1,993	TRUE	20	22	H-24	8.36	P-49
J-1	954	1,505	1,500.00	2,327	TRUE	20	20	H-7	3.91	P-2
J-2	952	1,503	1,500.00	2,099	TRUE	20	20	H-7	8.29	P-6
J-3	948	1,503	1,500.00	2,081	TRUE	20	20	H-17	7.52	P-6
J-4	947	1,508	1,500.00	2,090	TRUE	20	20	H-17	7.38	P-6
J-12	952	1,515	1,500.00	2,111	TRUE	20	21	H-23	7.98	P-11
J-13	946	1,515	1,500.00	2,171	TRUE	20	20	J-12	5.31	P-6
J-9	949	1,508	1,500.00	2,053	TRUE	20	20	H-17	7.17	P-6
J-11	947	1,508	1,500.00	2,086	TRUE	20	20	H-18	7.09	P-11
J-5	948	1,521	1,500.00	2,058	TRUE	20	20	H-11	7.27	P-6
J-16	949	1,515	1,500.00	2,024	TRUE	20	20	H-11	6.92	P-6
J-6	951	1,515	1,500.00	2,048	TRUE	20	20	H-9	7.32	P-6
J-7	951	1,502	1,500.00	2,009	TRUE	20	20	H-7	7.46	P-6
J-8	951	1,502	1,500.00	2,025	TRUE	20	20	H-6	8.36	P-12
J-17	949	1,502	1,500.00	2,307	TRUE	20	20	H-7	3.88	P-2
J-15	950	1,502	1,500.00	1,967	TRUE	20	20	H-12	6.72	P-6
J-10	946	1,502	1,500.00	2,078	TRUE	20	20	H-17	7.18	P-6
J-14	951	1,531	1,500.00	1,962	TRUE	20	21	H-25	6.76	P-11

WaterCAD Summary

Project: Montana Vista

Scenario: Peak Hour Demand

Prepared by: Colin Steele

Date: 12/14/2021

Pipe Table

Label	Start Node	Stop Node	Length (Scaled) (ft)	Diameter (in)	Material	Flow (gpm)	Hazen-Williams C	Headloss Gradient ft/1000ft	Velocity (ft/s)
P-1	R-1	PMP-1	108	60	PVC	203	130	0	0.02
P-2	PMP-1	J-1	653	16	Ductile Iron	203	110	0	0.32
P-3	J-1	J-17	680	16	Ductile Iron	97	110	0	0.16
P-4	J-17	J-13	1,663	12	Ductile Iron	97	110	0	0.28
P-5	J-1	H-1	66	8	PVC	105	130	0	0.67
P-6	H-1	J-2	420	8	PVC	105	130	0.282	0.67
P-7	J-2	H-2	80	8	PVC	44	130	0.056	0.28
P-8	H-2	J-3	319	8	PVC	44	130	0.056	0.28
P-9	J-3	J-4	361	8	PVC	19	130	0.013	0.12
P-10	J-12	H-22	90	8	PVC	-97	130	0.244	0.62
P-11	H-22	J-13	100	8	PVC	-97	130	0.245	0.62
P-12	J-2	J-8	237	8	PVC	61	130	0.104	0.39
P-13	J-8	H-5	167	8	PVC	18	130	0.011	0.12
P-14	H-5	H-4	332	8	PVC	18	130	0.011	0.12
P-15	H-4	J-7	89	8	PVC	18	130	0.011	0.12
P-16	J-7	H-8	125	8	PVC	-11	130	0.005	0.07
P-17	H-8	H-7	463	8	PVC	-11	130	0.005	0.07
P-18	H-7	H-6	491	8	PVC	-11	130	0.004	0.07
P-19	H-6	J-8	322	8	PVC	-11	130	0.005	0.07
P-20	J-7	J-6	313	8	PVC	9	130	0.003	0.06
P-21	J-6	H-9	61	8	PVC	2	130	0	0.02
P-22	H-9	H-10	494	8	PVC	2	130	0	0.02
P-23	H-10	H-11	406	8	PVC	2	130	0	0.02
P-24	H-11	H-12	434	8	PVC	2	130	0	0.02
P-25	H-12	J-15	99	8	PVC	2	130	0	0.02
P-26	J-15	H-13	161	8	PVC	-9	130	0.003	0.06
P-27	H-13	J-16	149	8	PVC	-9	130	0.002	0.06
P-28	J-16	H-14	170	8	PVC	-6	130	0.001	0.04
P-29	H-14	J-5	264	8	PVC	-6	130	0.001	0.04
P-30	J-5	J-6	167	8	PVC	13	130	0.007	0.08
P-31	J-4	H-3	52	8	PVC	24	130	0.019	0.15
P-32	H-3	J-5	156	8	PVC	24	130	0.018	0.15
P-33	J-16	H-26	323	8	PVC	-13	130	0.006	0.08
P-34	H-26	J-14	391	8	PVC	-13	130	0.006	0.08
P-35	J-14	H-24	272	8	PVC	-34	130	0.035	0.22
P-36	J-3	H-15	65	8	PVC	24	130	0.019	0.16
P-37	H-15	J-9	150	8	PVC	24	130	0.019	0.16
P-38	J-9	H-16	89	8	PVC	-3	130	0	0.02
P-39	H-16	H-17	476	8	PVC	-3	130	0	0.02
P-40	H-17	H-18	495	8	PVC	-3	130	0	0.02
P-41	H-18	H-19	482	8	PVC	-3	130	0	0.02
P-42	H-19	J-11	392	8	PVC	-3	130	0	0.02
P-43	J-11	H-21	77	8	PVC	-51	130	0.074	0.33
P-44	H-21	J-12	345	8	PVC	-51	130	0.075	0.33
P-45	J-11	J-10	280	8	PVC	9	130	0.003	0.06
P-45	J-14	H-25	90	6	PVC	9	130	0.012	0.10
P-46	J-10	H-20	92	8	PVC	-4	130	0	0.03
P-46	H-25	J-15	322	6	PVC	9	130	0.012	0.10
P-47	H-20	J-9	269	8	PVC	-4	130	0.001	0.03

WaterCAD Summary

Project: Montana Vista

Scenario: Peak Hour Demand

Prepared by: Colin Steele

Date: 12/14/2021

P-48	H-24	H-23	335	8	PVC	-34	130	0.035	0.22
P-49	H-23	J-12	331	8	PVC	-34	130	0.035	0.22
P-50	J-10	J-4	214	8	PVC	5	130	0.001	0.03

Junction Table

Label	Elevation (ft)	Pressure (psi)	Pressure Head (ft)	Demand (gpm)	Hydraulic Grade (ft)
J-1	953.53	55	126.77	0	1,080.30
J-2	951.74	56	128.43	0	1,080.17
J-3	947.50	57	132.65	0	1,080.15
J-4	947.25	57	132.89	0	1,080.14
J-12	952.11	55	128.06	12	1,080.17
J-13	946.02	58	134.20	0	1,080.22
J-9	948.64	57	131.50	23	1,080.14
J-11	946.93	58	133.21	39	1,080.14
J-5	948.28	57	131.86	5	1,080.14
J-16	948.67	57	131.47	10	1,080.14
J-6	950.94	56	129.20	20	1,080.14
J-7	950.82	56	129.32	21	1,080.14
J-8	951.08	56	129.06	32	1,080.14
J-17	948.98	57	131.32	0	1,080.30
J-15	950.46	56	129.68	20	1,080.14
J-10	946.00	58	134.14	9	1,080.14
J-14	950.98	56	129.16	12	1,080.14

Appendix D:
Flow Test



Flow Test Summary

Project Name: EJFT 21176 - Vista Bonita
Project Address: Apache Rd & Broadway Rd, Buckeye, AZ 85326
Date of Flow Test: 2021-05-10
Time of Flow Test: 8:10 AM
Data Reliable Until: 2021-11-10
Conducted By: Steven Saethre & Eder Cueva (EJ Flow Tests) 602.999.7637
Witnessed By: George Rohrback (Buckeye FD) 623.349.6738
City Forces Contacted: Buckeye FD (623.349.6738) & COB Water (623.694.3229)
Permit Number: FDP-21-0095

Note Ramon V. & Daniel M. (COB Water) 623.694.3229 also witnessed.

Raw Flow Test Data

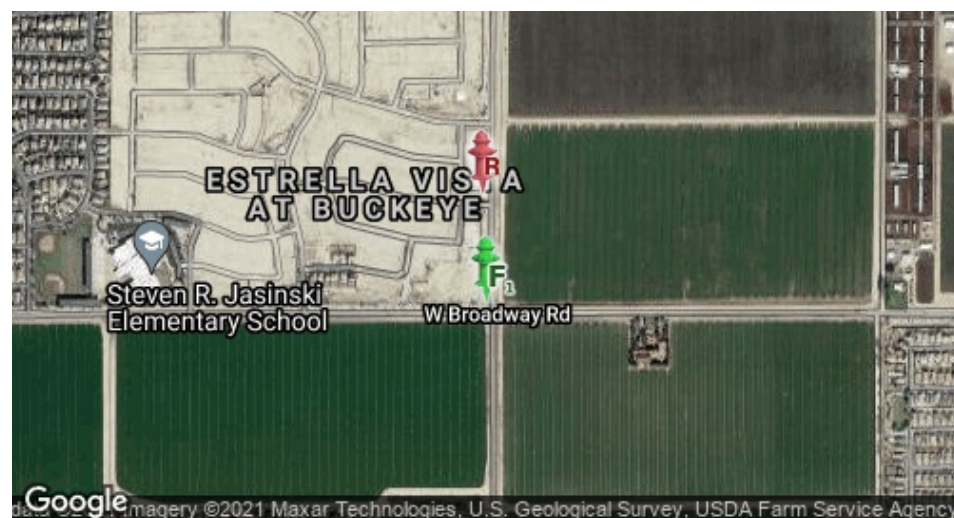
Static Pressure: 52.0 PSI
Residual Pressure: 36.0 PSI
Flowing GPM: 1,634
GPM @ 20 PSI: 2,376

Data with a 10 % Safety Factor

Static Pressure: 46.8 PSI
Residual Pressure: 30.8 PSI
Flowing GPM: 1,634
GPM @ 20 PSI: 2,159

Hydrant F₁

Pitot Pressure (1): 21 PSI
Coefficient of Discharge (1): 0.9
Hydrant Orifice Diameter (1): 4 inches
Additional Coefficient 0.83 on orifice #1



Static-Residual Hydrant

Flow Hydrant

Distance Between F₁ and R
725 ft (measured linearly)

Static-Residual Elevation
978 ft (above sea level)

Flow Hydrant (F₁) Elevation
973 ft (above sea level)

Elevation & distance values are approximate

EJ Flow Tests, LLC

21505 North 78th Ave. | Suite 130 | Peoria, Arizona 85382 | (602) 999-7637 | www.ejengineering.com
John L. Echeverri | NICET Level IV 78493 SME | C-16 FP Contractor ROC 271705 AZ | NFPA CFPS 1915
www.flowtestsummary.com

Page 1

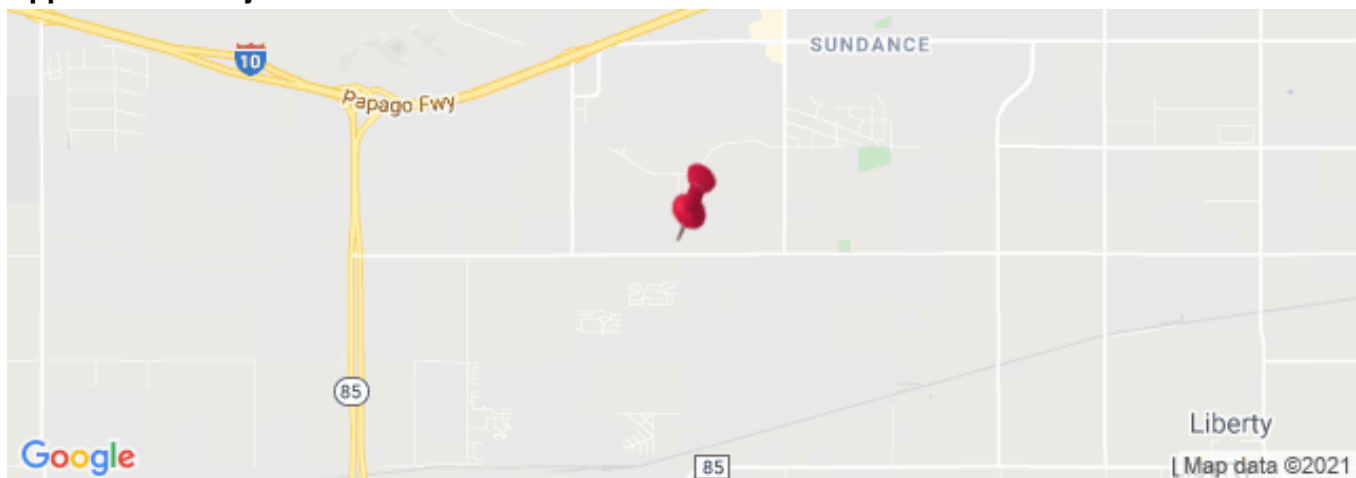
Static-Residual Hydrant



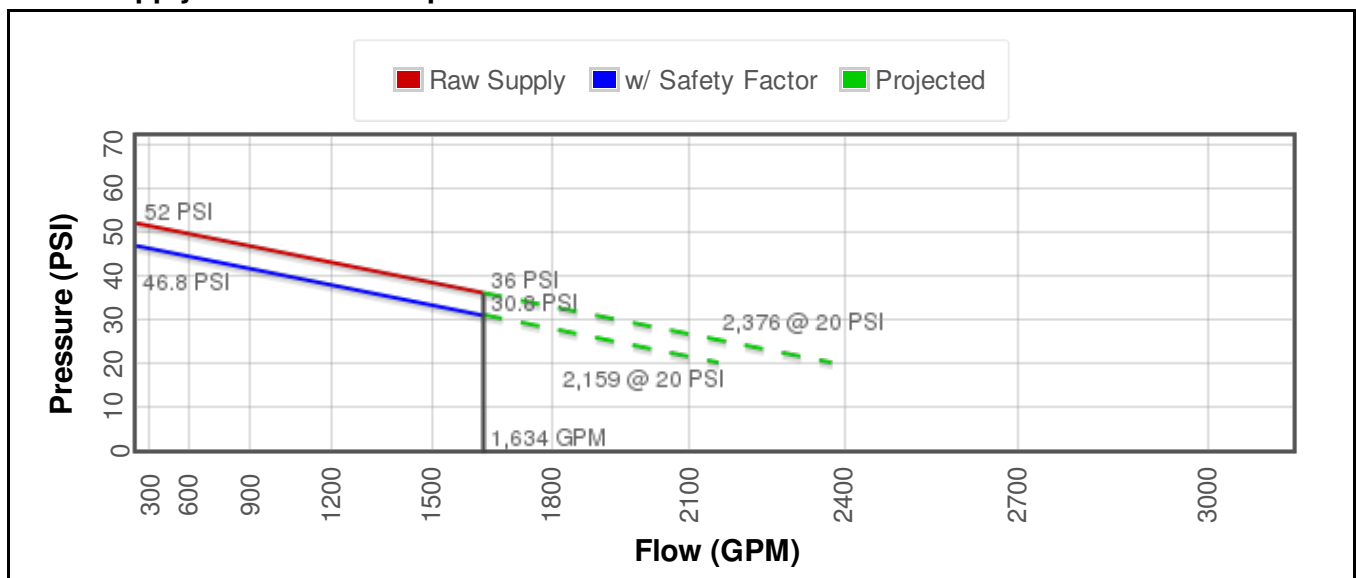
Flow Hydrant (only hydrant F1 shown for clarity)



Approximate Project Site



Water Supply Curve N^{1.85} Graph



CITY OF BUCKEYE
Regular Planning & Zoning Commission
PLANNING ACTION REPORT

MEETING DATE: 01/11/22	AGENDA ITEM: 4.B. Amendment to Building Regulations (Fire Code Updates)
DATE PREPARED: 01/08/22	DISTRICT NO.: All
STAFF LIAISON: Jake Rhoades, Fire Chief, jrhoades@buckeyeaz.gov, (623) 349-6700	
DEPARTMENT: Fire	AGENDA ITEM TYPE: Public Hearing / Non Consent - New Business

ACTION/MOTION: (This language identifies the formal motion to be made by the Voting Members)
 Motion to recommend approval by City Council of an amendment to the Code of Buckeye, Chapter 15 Building Regulations, Section 15-2-10 Fire Code, adopting local amendments to the 2018 International Fire Code.

RELEVANT GOALS:

GOAL 3: A Well-Planned Urban Community

ADDITIONAL RELEVANT GOALS:

GOAL 5: Responsive and Accountable Government and Effective Public Services

SUMMARY

PROJECT DESCRIPTION:

The State of Arizona has adopted the 2018 International Fire Code effective January 7, 2022. In order to be compliant with the amendments to the 2018 International Fire Code, the Buckeye Fire Department proposes amendments to the Code of Buckeye, Chapter 15 Building Regulations, related to Section 15-2-10 Fire Code. Other Arizona municipalities have adopted local amendments to the 2018 International Fire Code with other local municipalities following suit.

BENEFITS:

The adoption of the proposed amendments will result in compliance with the 2018 International Fire Code. The approval of these amendments provides for the continuance of well-planned communities and ensures responsive, accountable, and effective public services for the citizens of Buckeye.

FUTURE ACTION:

If approved, the Commission's recommendation will be forwarded to City Council for its consideration and approval of an amendment to the Code of Buckeye, Chapter 15 Building Regulations, Section 15-2-10 Fire Code, adopting local amendments to the 2018 International Fire Code.

FINANCIAL IMPACT STATEMENT:

There is no financial impact to the City.

CURRENT FISCAL YEAR TOTAL COST:

N/A

BUDGETED:

No

FISCAL YEAR:

2022

FUND/DEPARTMENT:

Fire

Items related to a project or facility location must include an attached vicinity map for Council Review.

ATTACHMENTS:

[Buckeye 2018 IFC Amendments.pdf](#)

[Explanatory Legislative Version of Buckeye Amendments to 2018 International Fire Code.pdf](#)

CITY OF BUCKEYE AMENDMENTS TO THE 2018 INTERNATIONAL FIRE CODE

Amending the City of Buckeye Code of Ordinances, Chapter 15 – BUILDING REGULATIONS, Article 15-2 – BUILDING CODES by amending Section 15-2-10 – Fire Code, to read as follows:

CHAPTER 15 - BUILDING REGULATIONS

* * *

Article 15-2 – BUILDING CODES

* * *

Section 15-2-10 Fire Code

- A. Fire Code Adopted. That certain document designated and marked as the International Fire Code, 2018 Edition, as published by the International Code Council, three (3) paper copies or one (1) paper copy and one (1) electronic copy of which are on file in the office of the city clerk, is hereby adopted by reference as the City's uniform fire code as if fully set forth herein and it is hereby declared to be unlawful to be in violation of any provision of the City's uniform fire code or cause or permit the same to be done, contrary to or in violation of any of the provisions of the City's uniform fire code as hereby adopted by the City Council.
- B. Appeals. Whenever the fire chief disapproves an application or refuses to grant a permit applied for, or when it is claimed that the provisions of the code do not apply or that the true intent and meaning of the code have been misconstrued or wrongly interpreted, the applicant may appeal from the decision of the Fire Chief to City Council within 30 days from the date of the decision appealed.
- C. New Materials, Processes or Occupancies Which May Require Permits. The fire chief or his designee and the fire marshal shall act as a committee to determine and specify, after giving affected persons an opportunity to be heard, any new materials, processes or occupancies for which permits are required in addition to those now enumerated in the International Fire Code. This information shall be posted in a conspicuous place at the fire station and copies thereof shall be distributed to interested persons.
- D. Deletions, Modifications, and Amendments. The following Sections of the 2018 Edition of the International Fire Code are amended as follows:

Section 101.1 Title. "City of Buckeye" is inserted as the name of jurisdiction.

Section 101.2.1 Appendices is deleted in its entirety and replaced with the following:

101.2.1 Appendices. The following appendices are adopted by City of Buckeye:

Appendix A: Board of Appeals

Appendix B: Fire Flow Requirements for Buildings

- Appendix C: Fire Hydrant Locations and Distribution
- Appendix D: Fire apparatus Access Roads
- Appendix E: Hazard Categories
- Appendix F: Hazard Ranking
- Appendix H: Hazardous Materials Management Plan (HMMP) and Hazardous Materials Inventory Statement (HMIS) Instructions
- Appendix I: Fire Protection Systems – Noncompliant Conditions
- Appendix J: Building Information Sign
- Appendix K: Construction Requirements for Existing Ambulatory Care Facilities
- Appendix L: Requirements for Fire Fighter Air Replenishment Systems
- Appendix N: Indoor Trade Show and Exhibitions
- Appendix O: Regional Wireless Cooperative, Policies and Procedures

Section 102.10 Administration; applicability; conflicting provisions is amended to read as follows:

102.10 Conflicting provisions. Where there is conflict between a general requirement and a specific requirement, the specific requirement shall be applicable. Where there is a conflict between this Code and another Code, rule or regulation of the City of Buckeye, the more stringent shall apply.

Section 104.8 Modifications is amended by adding the following sentence to the beginning of the Section:

“The designated fire code official may develop guidance and details that are not consistent with the provisions of this code to assist those entities subject to this code comply with the provisions of this code.”

Section 107 Inspections is amended by adding the following new subsection:

107.2.2 Special inspections. The fire code official is authorized to appoint qualified persons or agencies having special technical skills as special inspectors or plan reviewers and accept their inspection, plan review and evaluation of specialized fire protection equipment or systems.

Section 110 Violations is amended by adding the following new subsection:

110.4.2 Abatement of environmental, health, fire or life safety hazards by fire code official. If any person fails to comply with the orders of the Fire Code Official, or if the Fire Code Official is unable to locate the owner, operator, occupant or other person responsible within a reasonable time, the Fire Code Official or any authorized representative may take such steps as are necessary to abate the hazard for the protection and safety of the public. In no event is notice necessary before abatement, when the hazard is a clear and present danger to the public welfare. All costs and attorney fees related to such abatement shall become a lien on the subject property.

Section 202 General definitions is amended to read as follows:

AUTHORIZED EMERGENCY VEHICLE. Is any of the following, per A.R.S. 28-101:

1. A fire department vehicle,
2. A police vehicle,
3. An ambulance or emergency vehicle of a municipal department or public service corporation that is designated or authorized by the department or a local authority, or
4. Any other ambulance, fire truck or rescue vehicle that is authorized by the department in its sole discretion and that meets liability insurance requirements prescribed by the department.”

CUSTODIAL CARE. Non-medical care that helps an individual with his or her activities of daily living, preparation of special diets and self-administration of medication not requiring constant attention of medical personnel. Providers of custodial care are not required to undergo medical training.

FIRE HAZARD. Is any thing or act which increases or could cause an increase of the hazard or menace of fire to a greater degree than that customarily recognized as normal by persons in the public service regularly engaged in preventing, suppressing or extinguishing fire or any thing or act which could obstruct, delay, hinder or interfere with the operation of the fire department or the egress of occupants in the event of fire.

PERSONAL CARE SERVICE is deleted in its entirety and replaced with the following:

PERSONAL CARE SERVICE. Assistance with activities of daily living that can be performed by persons without professional skills or professional training and includes the coordination or provision of intermittent nursing services and administration of medications or treatments.

OCCUPANCY CLASSIFICATION.

Institutional Group I-1. This occupancy shall include buildings, structures or portions thereof for more than 10 persons who reside on a 24-hour basis in a supervised environment, receive custodial care, and are capable of self-preservation, except as provided for assisted living centers. This group shall include, but not be limited to, the following:

- Alcohol and drug centers
- Assisted living centers
- Congregate care facilities
- Convalescent facilities
- Group homes
- Halfway houses
- Residential board and custodial care facilities
- Social rehabilitation facilities

Six to 16 persons receiving custodial care is deleted in its entirety and replaced with the following:

Six to 10 persons receiving custodial care. A facility such as above, housing not fewer than six and not more than 10 persons receiving such care, shall be classified as Group R-4.

Institutional Group I-2 is deleted in its entirety and replaced with the following:

Institutional Group I-2. This occupancy shall include buildings and structures used for medical care on a 24-hour basis for more than five persons who are incapable of self-preservation. This group shall include, but not be limited to, the following:

- Foster care facilities
- Detoxification facilities
- Hospitals
- Assisted Living Centers
- Psychiatric hospitals

Arizona State Department of Health Facilities. All facilities as licensed by the State of Arizona Department of Health, further known as, but not limited to, direct care, personal care, supervisory care and behavioral residential agency, housing at least six and not more than 10 persons shall be considered a Group R-4.

Residential Group R-3 “Congregate living facilities” is amended to read as follows:

Congregate living facilities (nontransient) with 10 or fewer occupants

Care facilities within a dwelling is deleted in its entirety and replaced with the following:

Care facilities within a dwelling. Licensed care facilities for 10 or fewer persons receiving care that are within a single-family dwelling are permitted.

Residential Group R-4 is deleted in its entirety and replaced with the following:

Residential Group R-4. This occupancy shall include buildings, structures or portions thereof for more than five but not more than 10 persons, excluding staff, who reside on a 24-hour basis in a supervised residential environment and receive custodial care. The persons receiving care are capable of self-preservation, except as provided for assisted living homes. This group shall include, but not be limited to, the following:

- Halfway houses
- Residential board and custodial care facilities
- Social rehabilitation facilities

Group R-4 occupancies shall meet the requirements for construction as defined for Group R-3 or one- and two-family dwellings, except as otherwise provided for in this code.

Condition 1. This occupancy condition shall include facilities licensed to provide supervisory care services, in which occupants are capable of self-preservation by responding to an emergency situation without physical assistance from staff. Condition facilities housing more than 10 persons shall be classified as Group I-2.

Condition 2. This occupancy condition shall include facilities licensed to provide personal or directed care services, in which occupants are incapable of self-preservation by responding to an emergency situation without physical assistance from staff. Condition 2 facilities housing more than 10 persons shall be classified as Group I-2.

SINGLE FAMILY DWELLING. A single family dwelling is less than 5000 square feet measured under the roof line, remote and detached from all other structures and property lines and meets all set back requirements as outlined in the current City of Buckeye Development Code or Standards.

NATIONAL INSTITUTE FOR THE CERTIFICATION OF ENGINEERING TECHNOLOGIES. Is hereafter referred to as NICET (1420 King Street, Alexandria, VA, 22314-2915).

SKY LANTERN. Is a device designed to carry an open flame as an airborne light. It is also known as kongming lantern, wish lantern, sky candle, fire balloon, etc.

Section 308.1.1 Where prohibited is amended by adding the following new subsection:

308.1.1.1 Sky lantern. The lighting of, and the release of, sky lanterns shall be prohibited

Section 308.1.4 Open-flame cooking devices is amended to read as follows and to add the following new subsection:

308.1.4 Open-flame cooking devices. Charcoal burners, portable barbecues and other open flame devices shall not be operated on combustible balconies or within 10 feet (3048mm) of combustible construction.

Exception:

Single family dwellings.

308.1.4.1 Liquefied- petroleum-gas-fueled cooking devices. No person shall use individual fixed or portable LP-gas burners or barbecues on or under any attached covered patios, balconies, covered walkways, stair or roof overhangs and shall not be located within 10 feet (3,048 mm) of combustible construction. Liquid propane grills are not allowed above the ground floor and LP cylinders shall not be stored in or transported through the building.

Exception:

Single family dwellings.

Section 503 Fire apparatus access roads is amended by amending subsection 503.1.2.1 to read as follows and to add the following new subsections:

503.1.2.1 Additional access. Residential developments where the number of dwelling units exceeds 20 shall be provided with two separate and approved fire apparatus access roads.

503.1.4 Temporary fire apparatus access roads. Temporary fire apparatus access roads, such as those used for fire department access during construction, must comply with Section 503.1.7.

503.1.5 Required access. Fire apparatus access is required within 150 feet of all points on the exterior of the building.

503.1.6 Width. Temporary fire apparatus access roads shall be a minimum of 20 feet in width.

503.1.7 Surface. The access roadway surface is usable in all weather conditions. Temporary fire apparatus access roads shall be constructed as follows: Minimum 6 inches of native soil compacted to 95% of standard proctor density (ASTM D698), and Minimum 4 inches of aggregate base compacted to 100% of standard proctor density (ASTM D698). The surface of temporary fire apparatus access roads may differ from the above requirements if it is shown that the surface provided is sufficient to support an imposed live load of 75,000 pounds with a maximum axle load of 24,000 pounds.

503.1.8 Stabilization. Curbs are not required for temporary fire apparatus access roads.

Section 503.3 Marking is amended to read as follows:

Where required by the fire code official, approved signs or other approved notices shall be provided for fire apparatus access roads (fire lanes) to identify such roads or prohibit the obstruction thereof on public and private property. Signs or notices shall be maintained in a clean and legible condition at all times and shall be replaced or repaired when necessary to provide adequate visibility. All fire lanes shall be marked in the following manner:

1. Fire lane signs per City of Buckeye will adhere to standard detail specifications (City of Buckeye detail number 31452).
2. Curb, street or driveway will be painted red to indicate fire lane and labeled "FIRE LANE NO PARKING" in white block letters 3 inches (76.2mm) in height with a 3/4 in. (19.5 mm) stroke, on the vertical face of the curb to indicate a fire lane.
3. Lettering shall not be greater than 75'-0" (15.24m) apart and shall be posted at the beginning and end of the fire lane.
4. It shall be unlawful for any vehicle, equipment or device to park in or block the fire lane. Any vehicle, equipment or device found parked in or blocking a fire lane shall be cited by the police or the fire department.

Exception:

Authorized emergency vehicles.

Section 503.6 Security gates is amended by adding the following new sub-sections:

503.6.1 Fire department access limiting gates. All gates limiting access will be required to provide emergency Access controls for Fire Department entry.

503.6.2 Gate operations. Operation of the gate shall be by pre-emption device and key switch.

503.6.3 Permit required. Gate Access information and scale plans shall be submitted to the Fire Department for a permit.

503.6.4 Minimum installation standards. The installation of preemption devices shall comply with the following:

1. Traffic Preemption opening device shall be on all motorized gates. Opticom, 3M, or Tomar, Model Specified by the Fire Department at time of installation shall be used.
2. Detectors shall be mounted 8 to 10 feet above grade.
3. Detectors shall be located a minimum of 18 inches behind the gate on the property side.
4. Detectors shall be mounted on a separate 4 inch by 4 inch metal post and not on the guidepost. The metal post shall be secured in concrete a minimum of 18 inches below grade.
5. Detectors shall activate at a minimum of 150 feet from the gate.
6. Detectors shall point toward both the approach and the exit path of the emergency vehicle.”
7. The sight path of the detector shall be free of visual obstructions such as signs, covered parking, canopies and vegetation.
8. Individual detectors shall be mounted together with the power module in a dual detector-mounting box. Detectors shall be approved by the fire department. A list of approved devices will be maintained by the fire department and available to the public.

503.6.5 Gate access roadways. The gates shall be designed so that the access roadway or turning radius (WB50) shall not be obstructed by the operation of the gate. Minimum set back from the public streets shall be a distance determined by the City Engineer and allow the emergency vehicle the ability to safely operate the lock box or panel. Turning radius from the public street shall be WB50.

503.6.6 Keyed access. The lock box, padlock or key switch, must be an approved model utilized by the Buckeye Fire Department. Lock Box Authorized Forms may be picked up at the City of Buckeye Fire Department, Monday through Thursday, 7:00 am to 6:00 pm.

503.6.7 Access controls. Access controls shall be exterior to the gate and located for activation by the vehicle operator without dismounting from the vehicle. The height of the lock box/control panel shall be sixty (60) inches to sixty six (66) inches, measured from the finished grade line of the street.

503.6.8 Access signage. The control pedestal must be identified with a minimum six (6) inch by ten (10) inch sign with white reflective letters on a red background. This sign must be securely fastened to the pedestal and legible from the approaching vehicle, and read: EMERGENCY FIRE DEPARTMENT ACCESS.

503.6.9 Gate operation. Gates must fully open within fifteen (15) seconds of activation and remain in the open position for thirty minutes or until closed by the Fire Department.

503.6.10 Fail safe operation. Battery back-up for all motorized gates is required, unless the gate fails safe (open) in the event of a power failure.

Section 503.7 Hillside building requirements. Residential developments where the access and operations of emergency services is determined by the Fire Code Official to be impacted by the terrain or other geographical issues may require additional fire protection and safety requirements for construction. These requirements include, but are not limited to:

1. All Structures are to be fully protected by an automatic fire sprinkler system including the attic.
2. On all driveways exceeding 150 feet or of a design that would impair access, a horizontal standpipe will be required.
3. All lots will require an operational platform of 400 square feet and of a design approved by the Fire Code Official.
4. Pullouts constructed of an all-weather surface will be required next to fire hydrants on all private drives or access roadways less than 20 feet in width.
5. Grades exceeding 15% will require flat areas for acceleration and staging.

Section 505.1 Address identification is amended to read as follows and to add the following new subsections:

505.1 Address identification. New and existing buildings shall have approved address numbers, building numbers or approved building identification placed in a position that is plainly legible and visible from the street or road fronting the property. Where access is by means of a private road and the building address cannot be viewed from the public way, a monument, pole or other approved sign or means shall be used to identify the structure. These numbers shall contrast with their background. Address numbers shall be Arabic numerals or alphabet letters. Address numbers shall be maintained.

505.1.2 Address identification multi-family residential. Within multi-family residential complexes, the building(s) nearest the street must identify the street number of the complex with minimum eighteen (18) inch high contrasting numbers/letters with a three (3) inch stroke width. All buildings within the complex shall identify the building number/letter with minimum eighteen (18) inch high contrasting numbers/letters with a three (3) inch stroke width. Buildings are required to provide two (2) or more building identification signs per each one hundred (100) feet of the length of the building elevation. All buildings within the complex shall include apartment spread numbers (e.g. Units 201-210) identified with minimum seven (7) inch high contrasting numbers/letters with a one (1) inch stroke width. Each individual unit shall be identified near the unit entryway using minimum four (4) inch high contrasting numbers/letters with a five-eighths (5/8) inch minimum stroke width.

505.1.3 Address identification commercial/employment. All commercial and employment buildings shall identify the street number of the building with minimum eighteen (18) inch high contrasting numbers/letters with a three (3) inch stroke width. All commercial and employment buildings within multi-building complexes must identify the building number/letter with minimum eighteen (18) inch high contrasting numbers/letters with a three (3) inch stroke width. Each individual unit shall be identified near the primary unit entryway using minimum six (6) inch high contrasting numbers/letters with a one (1) inch stroke width. Individual unit or suite numbers shall be a minimum of 4 inches (102 mm) high with a minimum stroke width of 0.5 inch (12.7 mm). Rear doors of commercial buildings with individual suites (strip malls) shall be identified using minimum six (6) inch high contrasting numbers/letters with a one (1) inch stroke width.

505.1.4 Address identification one- and two-family residential dwellings. One- and two-family dwelling shall be a minimum of 4 inches (102 mm) high with a minimum stroke width of 0.5 inch (12.7 mm).

Section 506.1 Where required is amended to read as follows:

506.1 Where required. Where access to or within a structure or an area is restricted because of secured openings or where immediate access is necessary for lifesaving or fire- fighting purposes, or where there is an automatic fire sprinkler or fire alarm system, the Fire Official is authorized to require a key box to be installed in an accessible location(s). The key box shall be an approved type and shall contain keys to gain access as required by the Fire Official.

Section 507 Fire Protection Water Supplies is amended by amending Section 507.1 to read as follows, and by adding new subsections 507.1.2, 507.5.2.1, 507.5.7, and 507.8 to read as follows:

507.1 Required water supply. Water supplies for automatic and manual fire suppression and fire hydrants shall be in accordance with Appendix B. When water is not available, or if the flow rate, pressure, or duration of the water available from the City of Buckeye or Private water Company does not meet the minimum requirements of this code, the owner shall be responsible for installing the entire infrastructure required to meet the fire flow, pressure, and duration requirements of this code.

507.1.2 Failure to provide water supply. Failure to provide the required water supply necessary for fire protection shall be considered a hazard to life or property and is subject to enforcement under Section 110 of this code.

507.5.2.1 Inspection of private water supply systems. Private water supply system installations and modifications shall be subject to field inspection and tests by the Fire Department.

507.5.7 Height. Fire hydrants shall be installed so that the centerline of the lowest outlet is not less than 18 inches above grade and the highest outlet does not exceed 30 inches above grade.

507.5.8 Color of hydrants. The color of hydrants shall be fire hydrant yellow. Private fire hydrants shall have the bonnet painted reflective white. Hydrants not intended for fire department use shall have the bonnet painted black.

Section 510 Emergency Responder Radio Coverage is amended by adding the following new subsections to read as follows:

510.01 Purpose. The purpose of this article is to provide minimum standards to insure a reasonable degree of reliability for emergency services communications from within certain buildings and structures within the City of Buckeye to and from emergency communications centers. It is the responsibility of the emergency service provider to get the signal to and from the building site.

510.02 Scope. The provisions of this article shall apply to new buildings and structures of construction greater than fifty thousand (50,000) square feet or modifications made within any twelve (12) month period and exceed fifty percent (50%) of the value of the existing building(s) or structure(s), or the use of the property is expanded or enlarged by fifty percent (50%), which have not received a final inspection prior to the adoption of these provisions; and All basements or sub-level parking structures over ten thousand (10,000) square feet where the design occupant load is greater than fifty (50), regardless of the occupancy. For the purpose of this section, area separation walls cannot be used to define separate buildings.

Section 510.03 Radio coverage. Except as otherwise provided in this article, no person shall erect construct or modify any building or structure or any part thereof, or cause the same to be done which fails to support adequate radio coverage for firefighters and police officers and other public safety personnel. A final inspection shall not be approved for any building or structure that fails to comply with this requirement.

Section 510.04 Regional Wireless Cooperative. In addition to the requirements of section 510, compliance with appendix “O” is required

Section 510.3.1 Permit and approval. The City's Telecommunications unit with consideration of the appropriate police, fire and emergency medical department services, at the time the building permit is issued, shall determine the frequency range or ranges that must be supported. For the purpose of this section, adequate radio coverage shall constitute a successful communications test between the building and the communications centers for all appropriate emergency service providers for the building.

Section 901 General is amended by adding the following new sub-sections to read as follows:

901.2.2 Plan certification for fire alarm systems and occupant notification. All fire alarm and occupant notification system plans submitted to the fire department for review and approval shall bear a qualified registrants seal or review certification of a minimum level III NICET in Fire Alarms.

901.2.3 Plan certification for fire sprinkler systems. All fire sprinkler plans submitted to the fire department for review and approval shall bear a qualified registrant’s seal or review certification of a minimum level III NICET in fire sprinklers in accordance with fire department Interpretation and Applications Manual.

901.2.4 Plan certification for all other fire protection systems. Plan certification for all other fire protection systems will be accompanied by a certification of competence when required.

901.2.5 On-site plans. Plans and specifications shall be submitted to the fire department for review and approval prior to construction. One set of fire department approved plans shall be on the job site for each inspection.

Section 901.5.1 Occupancy is amended to read as follows:

901.5.1 It shall be unlawful to use, occupy or furnish any portion of a structure until the fire protection systems of the structure have been tested and approved.

Section 901.7 Systems out of service is amended by adding the following sentence at the end of the section: "No required fire sprinkler system or fire alarm system shall be placed out of service for more than 8 hours in any one day without written authorization by the fire code official."

Section 903.2 Where required is amended to read as follows:

903.2 Where required. An automatic sprinkler system shall be installed throughout all levels of new Groups A, B, E, F, H, I, M, R, S and U occupancies of more than zero (0) square feet.

Exceptions:

The following accessory structures shall be exempt from fire sprinkler requirements:

1. Gazebos and Ramada's for residential and public use.
2. Independent rest room buildings that are associated with golf courses, parks and similar uses.
3. Guardhouses for residential and commercial developments.
4. Detached non-combustible carports or parking structures for residential and commercial developments with covered parking. Each non-combustible carport shall not exceed 2,000 square feet, and shall be separated from other parking structures by a minimum of ten (10) feet from the main building. Where there are a group of carports and each one does not exceed 2,000 square feet, the minimum separation required between carports shall be ten (10) feet.
5. Barns and agricultural buildings for private, residential, non-commercial use, not exceeding 1,500 square feet (139.35m²) with no habitable areas.
6. Detached storage sheds for private, residential, non-commercial use, not exceeding 1,500 square feet (139.35 m²).
7. Detached 1, 2 and 3 car garages (without habitable spaces) in existing R-3 developed parcels.
8. Non-combustible detached wash racks and canopies with flame retardant sunscreen.
9. Open shade horse stalls of non-combustible construction for private, residential, non-commercial use, not exceeding 5,000 square feet (464.52 m²) and no storage of combustible products, vehicles, or agricultural equipment.
10. Telecommunications building:
 - a. A minimum of 20 feet shall be provided from the structure(s) to the closest building on the site.
 - b. A minimum of 20 feet shall be provided from the structure(s) to the property line.
 - c. A fire hydrant shall be located a maximum of 350 feet from the structure or an approved distance approved by the Fire Marshal.

- d. Clear and unobstructed 20 foot fire apparatus access shall be provided to the structure(s).
 - e. Recommended a basic fire alarm with smoke detection tied into the SCADA system, for early detection and notification.
 - f. An approved Fire Suppression System may be required based on location and or single source infrastructure coverage area.
 - g. The storage or use of flammable liquids or any other hazardous materials in the structure is prohibited.
 - h. Independent structure of noncombustible construction will be limited to 200 square foot or less.
10. Special use non-combustible structures as approved by the chief.

Section 903.2.1 Group A is amended to read as follows:

903.2.1 Group A. An automatic sprinkler system shall be installed throughout all Group A occupancies in accordance with NFPA 13 Installation of Sprinkler Systems and Fire Department Interpretation and Applications Manual.

Exceptions:

- 1. An automatic sprinkler system need not be provided when the floor area of a temporary amusement building is less than 1,000 square feet and the exit travel distance from any point is less than 50 feet.
- 2. Press boxes and storage facilities less than 1,000 square feet in area and in conjunction with outdoor seating facilities where all means of egress in the seating area are essentially open to the outside.

Section 903 Automatic sprinkler systems is amended by adding new sub-sections to read as follows:

903.2.2.1 Group B occupancies. An automatic sprinkler system shall be installed throughout all Group B occupancies in accordance with NFPA 13 Installation of Sprinkler Systems as modified by Fire Department Interpretation and Applications Manual.

903.3.2.3 Group E. An automatic sprinkler system shall be installed throughout all Group E occupancies in accordance with NFPA 13 Installation of Sprinkler Systems and Fire Department Interpretation and Applications Manual.

903.2.4 Group F. An automatic sprinkler system shall be installed throughout all Group F occupancies in accordance with NFPA 13 Installation of Sprinkler Systems and Fire Department Interpretation and Applications Manual.

903.2.5 Group H. An automatic sprinkler system shall be installed throughout all Group H occupancies in accordance with NFPA 13 Installation of Sprinkler Systems and Fire Department Interpretation and Applications Manual.

Section 903.2.5 Group H is amended by deleting sub-section 903.2.5.1 entitled “General.”

Section 903.2.5 Group H is amended by deleting sub-section 903.2.5.2 entitled “Group H-5 occupancies.”

Section 903.2.5 Group H is amended by deleting sub-section 903.2.5.3 entitled “Pyroxylin Plastics.”

Section 903.2.6 Group I is amended to read as follows:

903.2.6 Group I. An automatic sprinkler system shall be installed throughout all Group I occupancies in accordance with NFPA 13 Installation of Sprinkler Systems and Fire Department Interpretation and Applications Manual.

Exception:

In jails, prisons and reformatories, the piping system may be dry, provided a manually operated valve is installed at a continuously monitored location. Opening of the valve will cause the piping system to be charged. Sprinkler heads in such systems shall be equipped with fusible elements or the system shall be designed as required for deluge systems in the Building Code.

Section 903.2.7 Group M is amended to read as follows:

903.2.7 Group M. An automatic sprinkler system shall be installed throughout all Group M occupancies in accordance with NFPA 13 Installation of Sprinkler Systems and Fire Department Interpretation and Applications Manual.

Section 903.2.8 Group R is amended to read as follows:

903.2.8 Group R. An automatic sprinkler system shall be installed throughout all Group R occupancies in accordance with NFPA 13, 13-R, or 13D Installation of Sprinkler Systems and Fire Department Interpretation and Applications Manual.

Exception:

Single Family Dwellings less than 5000 square feet measured under the roof line, remote and detached from all other structures and property lines and meets all set back requirements as outlined in the current City of Buckeye development rules or standards.

Zero lot lines, Z-lots, court homes, cluster homes, condominiums, patio homes, townhomes and non-traditional housing units are not considered a single family structure and all other housing units by their design, construction or location, present access issues for Fire Department response and are required to be protected throughout with an approved automatic sprinkler system.

Section 903.2.9 Group S is amended to read as follows:

903.2.9 Group S. An automatic sprinkler system shall be installed throughout all Group S occupancies in accordance with NFPA 13 Installation of Sprinkler Systems and Fire Department Interpretation and Applications Manual.

Section 903.2.9.1 Repair garages is amended to read as follows:

903.2.9.1 Repair garages. An automatic sprinkler system shall be installed throughout all repair garages in accordance with NFPA 13 Installation of Sprinkler Systems as modified by Fire Department Interpretation and Applications Manual.

Section 903.2.9.2 Bulk storage of tires is amended to read as follows:

903.2.9.2 Bulk storage of tires. An automatic sprinkler system shall be installed throughout all bulk tire storage facilities in accordance with NFPA 13 Installation of Sprinkler Systems as modified by Fire Department Interpretation and Applications Manual.

Section 903.2.10 Group S-2 is amended to read as follows:

903.2.10 Group S-2 occupancies. An automatic sprinkler system shall be installed throughout all Group S-2 occupancies in accordance with NFPA 13 Installation of Sprinkler Systems as modified by Fire Department Interpretation and Applications Manual.

Section 903.2.10.1 Commercial parking garages is amended to read as follows:

903.2.10.1 Commercial parking garages. An automatic sprinkler system shall be installed throughout all commercial parking garages in accordance with NFPA 13 Installation of Sprinkler Systems as modified by Fire Department Interpretation and Applications Manual.

Section 903.2.11.1 Stories without openings is amended by adding a new sub-section as follows:

903.2.11.1.4 Windowless stories in all occupancies. An automatic sprinkler system shall be installed throughout all Windowless stories in all occupancies in accordance with NFPA 13 Installation of Sprinkler Systems as modified by Fire Department Interpretation and Applications Manual.

Section 903.2.11.3 Buildings 55 feet or more in height is amended to read as follows:

903.2.11.3. Buildings 55 feet or more in height. An automatic sprinkler system shall be installed throughout all buildings 55 feet or more in height in accordance with NFPA 13 Installation of Sprinkler Systems as modified by Fire Department Interpretation and Applications Manual.

Section 903.3 Installation requirements is amended to read as follows:

903.3 Installation requirements. Automatic sprinkler systems shall be designed and installed in accordance with NFPA 13, 13-R, 13-D 13 Installation of Sprinkler Systems as modified by Fire Department Interpretation and Applications Manual.

Section 903.4.1 Monitoring is amended by adding the following new subsection:

903.4.1.2. Fire sprinkler monitoring systems. A minimum of 1 listed all-weather horn strobe will be required at the front of a building in the common area, the notification device shall be audible in all occupied suites

Section 907.2.7 Group M is amended by adding the following new subsection:

907.2.7.1.2. Fire sprinkler monitoring systems. A minimum of 1 listed all-weather horn strobe will be required at the front of a building in the common area, the notification device shall be audible in all occupied suites.

Section 1017.2.2 Groups F-1 and S-1 increase is amended by adding the following new sub-section:

1017.2.2.1 Group F-1 and S-1 with a storage area greater than 500,000 square feet (46,451 m²). When storage areas in Group F-1 and S-1 occupancies are greater than 500,000 square feet a technical report prepared by an Arizona professional shall be submitted for review and approval by the *fire code official*. Additional fire protection or life safety systems, or both, may be required by the Fire Marshal.

Chapter 12 Energy Systems is deleted in its entirety and replaced with the following.

CHAPTER 12 ENERGY SYSTEMS

User note:

About this chapter: Chapter 12 was added to address the current energy systems found in this code, and is provided for the introduction of a wide range of systems to generate and store energy in, on and adjacent to buildings and facilities. The expansion of such energy systems is related to meeting today's energy, environmental and economic challenges. Ensuring appropriate criteria to address the safety of such systems in building and fire codes is an important part of protecting the public at large, building occupants and emergency responders. More specifically, this chapter addresses standby and emergency power, photovoltaic systems, fuel cell energy systems, battery storage systems and capacitor energy storage.

SECTION 1201 GENERAL

1201.1 Scope. The provisions of this chapter shall apply to the installation, operation and maintenance of energy systems used for generating or storing energy. It shall not apply to equipment associated with the generation, control, transformation, transmission, or distribution of energy installations that is under the exclusive control of an electric utility or lawfully designated agency.

1201.2 Electrical wiring and equipment. Electrical wiring and equipment used in connection with energy systems shall be installed and maintained in accordance with Chapter 12 and NFPA 70.

1201.3 Mixed system installation. Where approved, the aggregate kWh energy in a fire area shall not exceed the maximum quantity specified for any of the energy systems in this chapter. Where required by the *fire code official*, a hazard mitigation analysis shall be provided and approved in accordance with Section 104.7.2 to evaluate any potential adverse interaction between the various energy systems and technologies.

SECTION 1202

DEFINITIONS

1202.1 Definitions. The following terms are defined in Chapter 2:

BATTERY SYSTEM, STATIONARY STORAGE.

BATTERY TYPES.

LEAD-ACID BATTERY.

CAPACITOR ARRAY.

CAPACITOR ENERGY STORAGE SYSTEM.

CRITICAL CIRCUIT.

EMERGENCY POWER SYSTEM.

ENERGY MANAGEMENT SYSTEM.

FUEL CELL POWER SYSTEM, STATIONARY.

STANDBY POWER SYSTEM.

STATIONARY BATTERY ARRAY.

STATIONARY FUEL CELL POWER SYSTEM.

SECTION 1203

EMERGENCY AND STANDBY POWER SYSTEMS

1203.1 General. Emergency power systems and standby power systems required by this code or the *International Building Code* shall comply with Sections 1203.1.1 through 1203.1.9.

1203.1.1 Stationary generators. Stationary emergency and standby power generators required by this code shall be listed in accordance with UL 2200. *Associated flammable or combustible liquid tanks shall also comply with Chapters 50 and 57 of this code.

1203.1.2 Fuel line piping protection. Fuel lines supplying a generator set inside a high-rise building shall be separated from areas of the building other than the room the generator is located in by an approved method, or an assembly that has a fire-resistance rating of not less than 2 hours. Where the building is protected throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1, the required fire-resistance rating shall be reduced to 1 hour.

1203.1.3 Installation. Emergency power systems and standby power systems shall be installed in accordance with the *International Building Code*, NFPA 70, NFPA 110 and NFPA 111.

1203.1.4 Load transfer. Emergency power systems shall automatically provide secondary power within 10 seconds after primary power is lost, unless specified otherwise in this code. Standby power systems shall automatically provide secondary power within 60 seconds after primary power is lost, unless specified otherwise in this code.

1203.1.5 Load duration. Emergency power systems and standby power systems shall be designed to provide the required power for a minimum duration of 2 hours without being refueled or recharged, unless specified otherwise in this code.

1203.1.6 Uninterruptable power source. An uninterrupted source of power shall be provided for equipment where required by the manufacturer's instructions, the listing, this code or applicable referenced standards.

1203.1.7 Interchangeability. Emergency power systems shall be an acceptable alternative for installations that require standby power systems.

1203.1.8 Group I-2 occupancies. In Group I-2 occupancies located in flood hazard areas established in Section 1612.3 of the International Building Code and where new or replacement essential electrical systems are installed and where new essential electrical system generators are installed, the systems and generators shall be located and installed in accordance with ASCE 24. Where connections for hook up of temporary generators are provided, the connections shall be located at or above the elevation required in ASCE 24.

1203.1.9 Maintenance. Existing installations shall be maintained in accordance with the original approval and Section 1203.4.

1203.2 Where required. Emergency and standby power systems shall be provided where required by Sections 1203.2.1 through 1203.2.18.

1203.2.1 Ambulatory care facilities. Essential electrical systems for ambulatory care facilities shall be in accordance with Section 422.6 of the *International Building Code*.

1203.2.2 Elevators and platform lifts. Standby power shall be provided for elevators and platform lifts as required in Sections 606.2, 1009.4.1, and 1009.5.

1203.2.3 Emergency responder radio coverage systems. Standby power shall be provided for emergency responder radio coverage systems as required in Section 510.4.2.3. The standby power supply shall be capable of operating the emergency responder radio coverage system for a duration of not less than 24 hours.

1203.2.4 Emergency voice/alarm communication systems. Emergency power shall be provided for emergency voice/alarm communication systems as required in Section 907.5.2.2.5. The system shall be capable of powering the required load for a duration of not less than 24 hours, as required in NFPA 72.

1203.2.5 Exit signs. Emergency power shall be provided for exit signs as required in Section 1013.6.3. The system shall be capable of powering the required load for a duration of not less than 90 minutes.

1203.2.6 Gas detection systems. Emergency power shall be provided for gas detection systems where required by Sections 1203.2.9 and 1203.2.16. Standby power shall be provided for gas detection systems where required by Section 916.5.

1203.2.7 Group I-2 occupancies. Essential electrical systems for Group I-2 occupancies shall be in accordance with Section 407.11 of the *International Building Code*.

1203.2.8 Group I-3 occupancies. Power-operated sliding doors or power-operated locks for swinging doors in Group I-3 occupancies shall be operable by a manual release mechanism at the door. Emergency power shall be provided for the doors and locks.

Exceptions:

1. Emergency power is not required in facilities where provisions for remote locking and unlocking of occupied rooms in Occupancy Condition 4 are not required as set forth in the *International Building Code*.
2. Emergency power is not required where remote mechanical operating releases are provided.

1203.2.9 Hazardous materials. Emergency and standby power shall be provided in occupancies with hazardous materials as required in the following sections: 1. Sections 5004.7 and 5005.1.5 for hazardous materials. 2. Sections 6004.2.2.8 and 6004.3.4.2 for highly toxic and toxic gases. 3. Section 6204.1.11 for organic peroxides.

1203.2.10 High-rise buildings. Standby power and emergency power shall be provided for high-rise buildings as required in Section 403 of the *International Building Code*, and shall be in accordance with Section 1203.

1203.2.11 Horizontal sliding doors. Standby power shall be provided for horizontal sliding doors as required in Section 1010.1.4.3. The standby power supply shall have a capacity to operate not fewer than 50 closing cycles of the door.

1203.2.12 Hydrogen fuel gas rooms. Standby power shall be provided for hydrogen fuel gas rooms as required by Section 5808.7.

1203.2.13 Laboratory suites. Standby or emergency power shall be provided in accordance with Section 5004.7 where *laboratory suites* are located above the sixth story above grade plane or located in a story below grade plane.

1203.2.14 Means of egress illumination. Emergency power shall be provided for *means of egress* illumination in accordance with Sections 1008.3 and 1104.5.1.

1203.2.15 Membrane structures. Standby power shall be provided for auxiliary inflation systems in permanent membrane structures in accordance with Section 2702 of the *International Building Code*. Auxiliary inflation systems shall be provided in temporary air-supported and air inflated membrane structures in accordance with Section 3103.10.4.

1203.2.16 Semiconductor fabrication facilities. Emergency power shall be provided for semiconductor fabrication facilities as required in Section 2703.15.

1203.2.17 Smoke control systems. Standby power shall be provided for smoke control systems as required in Section 909.11.

1203.2.18 Underground buildings. Emergency and standby power shall be provided in underground buildings as required in Section 405 of the *International Building Code* and shall be in accordance with Section 1203.

1203.2.19 Connected facilities. Power and lighting facilities or the *fire command center* and elevators specified in Sections 403.4.8.2 and 403.6 of the *International Building Code*, as applicable, and electrically powered fire pumps required to maintain pressure, shall be transferable to the standby source. Standby power shall be provided for at least one elevator to serve all floors and be transferable to any elevator.

1203.3 Critical circuits. Cables used for survivability of required critical circuits shall be listed in accordance with UL 2196. Electrical circuit protective systems shall be installed in accordance with their listing requirements.

1203.4 Maintenance. Emergency and standby power systems shall be maintained in accordance with NFPA 110 and NFPA 111 such that the system is capable of supplying service within the time specified for the type and duration required.

1203.4.1 Group I-2. In Group I-2 occupancies, emergency and standby power systems shall be maintained in accordance with NFPA 99.

1203.4.2 Schedule. Inspection, testing and maintenance of emergency and standby power systems shall be in accordance with an approved schedule established upon completion and approval of the system installation.

1203.4.3 Records. Records of the inspection, testing and maintenance of emergency and standby power systems shall include the date of service, name of the servicing technician, a summary of conditions noted and a detailed description of any conditions requiring correction and what corrective action was taken. Such records shall be maintained.

1203.4.4 Switch maintenance. Emergency and standby power system transfer switches shall be included in the inspection, testing and maintenance schedule required by Section 1203.4.2. Transfer switches shall be maintained free from accumulated dust and dirt. Inspection shall include examination of the transfer switch contacts for evidence of deterioration. When evidence of contact deterioration is detected, the contacts shall be replaced in accordance with the transfer switch manufacturer's instructions.

1203.5 Operational inspection and testing. Emergency power systems, including all appurtenant components, shall be inspected and tested under load in accordance with NFPA 110 and NFPA 111.

Exception: Where the emergency power system is used for standby power or peak load shaving, such use shall be recorded and shall be allowed to be substituted for scheduled testing of the generator set, provided that appropriate records are maintained.

1203.5.1 Group I-2. In Group I-2 occupancies, emergency and standby power systems shall be inspected and tested under load in accordance with NFPA 99.

1203.5.2 Transfer switch test. The test of the transfer switch shall consist of electrically operating the transfer switch from the normal position to the alternate position and then return to the normal position.

1203.6 Supervision of maintenance and testing. Routine maintenance, inspection and operational testing shall be overseen by a properly instructed individual.

SECTION 1204

SOLAR PHOTOVOLTAIC POWER SYSTEMS

1204.1 General. Solar photovoltaic systems shall be installed in accordance with Sections 1204.2 through 1204.5, and the *International Building Code* or *International Residential Code*. The electrical portion of solar PV systems shall be installed in accordance with NFPA 70.

***1204.1.1 Permits.** Permits shall be obtained for solar voltaic systems in accordance with Section 105.7.21

Exception: Solar photovoltaic systems with less than 3 kW alternating current nameplate rating.

***1204.1.2 Marking.** Marking is required on interior and exterior direct-current (DC) conduit, enclosures, race- ways, cable assemblies, junction boxes, combiner boxes and disconnects.

1204.1.2.1 Materials. The materials used for marking shall be reflective, weather resistant and suitable for the environment. Marking as required in Sections 1204.1.2 through 1204.1.3 shall have all letters capitalized with a minimum height of 3/8 inch (9.5 mm) white on red background.

***1204.1.2.2 Marking content.** The marking shall contain the words “WARNING: PHOTOVOLTAIC POWER SOURCE.”

***1204.1.2.3 Main service disconnect.** The marking shall be placed adjacent to the main service disconnect in a location clearly visible from the location where the disconnect is operated.

***1204.1.3 Location of marking.** Marking shall be placed on interior and exterior DC conduit, raceways, enclosures and cable assemblies every 10 feet (3048 mm), within 1 foot (305 mm) of turns or bends and within 1 foot (305 mm) above and below penetrations of roof/ceiling assemblies, walls or barriers.

1204.2 Access and pathways. Roof access, pathways, and spacing requirements shall be provided in accordance with Sections 1204.2.1 through 1204.3.3. Pathways shall be over areas capable of supporting fire fighters accessing the roof. Pathways shall be located in areas with minimal obstructions, such as vent pipes, conduit or mechanical equipment.

*Residential structures shall be designed so that each photovoltaic array is not greater than 150 feet (45 720 mm) by 150 feet (45 720 mm) in either axis.

Exception:

1. Detached, uninhabitable Group U structures including, but not limited to, *detached garages serving Group R-3 buildings, parking shade structures, carports, solar trellises and similar structures.

***1204.2.1 Solar photovoltaic systems for Group R-3 buildings.** Solar photovoltaic systems for Group R-3 buildings shall comply with Sections 1204.2.1.1 through *1204.2.1.5.

*Removed both exceptions

***1204.2.1.1 Roof access points.** Roof access points shall be located in areas that do not require the placement of ground ladders over openings such as windows or doors and located at strong points of building construction in locations where the access point does not conflict with overhead obstructions such as tree limbs, wires, or signs.

***1204.2.1.2 Residential buildings with hip roof layouts.** Panels or modules installed on residential buildings with hip roof layouts shall be located in a manner that provides two 3-foot-wide (914 mm) clear access pathway from the eave to the ridge on each roof slope where panels or modules are located.

***1204.2.1.3 Residential buildings with a single ridge.** Panels/modules installed on residential buildings with a single ridge shall be located in a manner that provides two 3-foot-wide (914 mm) access pathways from the eave to the ridge on each roof slope where panels/modules are located.

***1204.2.1.4 Residential buildings with roof hips and valleys.** Panels or modules installed on residential buildings with roof hips and valleys shall be located not closer than 18 inches (457 mm) to a hip or a valley where panels or modules are to be placed on both sides of a hip or valley. Where panels are to be located on only one side of a hip or valley that is of equal length, the panels shall be permitted to be placed directly adjacent to the hip or valley.

***1204.2.1.5 Residential building smoke ventilation.** Panels/modules installed on residential buildings shall be located no higher than 3 feet (914 mm) below the ridge in order to allow for fire department smoke ventilation operations.

1204.2.2 Emergency escape and rescue openings. Panels and modules installed on Group R-3 buildings shall not be placed on the portion of a roof that is below an emergency escape and rescue opening. A pathway of not less than 36 inches (914 mm) wide shall be provided to the emergency escape and rescue opening.

1204.3 Other than Group R-3 buildings. Access to systems for buildings, other than those containing Group R-3 occupancies, shall be provided in accordance with Sections 1204.3.1 through 1204.3.3.

Exception: Where it is determined by the *fire code official* that the roof configuration is similar to that of a Group R-3 occupancy, the residential access and ventilation requirements in Sections 1204.2.1.1 through *1204.2.1.5 are a suitable alternative.

1204.3.1 Perimeter pathways. There shall be a minimum 6-foot-wide (1829 mm) clear perimeter around the edges of the roof.

Exception: Where either axis of the building is 250 feet (76 200 mm) or less, the clear perimeter around the edges of the roof shall be permitted to be reduced to a minimum width of 4 feet (1219 mm).

1204.3.2 Interior pathways. Interior pathways shall be provided between array sections to meet the following requirements:

1. Pathways shall be provided at intervals not greater than 150 feet (45 720 mm) throughout the length and width of the roof.
2. A pathway not less than 4 feet (1219 mm) wide in a straight line to roof standpipes or ventilation hatches.
3. A pathway not less than 4 feet (1219 mm) wide around roof access hatches, with no fewer than one such pathway to a parapet or roof edge.
- *4. The pathway shall be over areas capable of supporting the live load of firefighters accessing the roof.
- *5. The centerline axis pathways shall be provided in both axes of the roof. Centerline axis pathways shall run where the roof structure is capable of supporting the live load of fire fighters accessing the roof.

1204.3.3 Smoke ventilation. The solar installation shall be designed to meet the following requirements:

1. Where nongravity-operated smoke and heat vents occur, a pathway not less than 4 feet (1219 mm) wide shall be provided bordering all sides.
2. Smoke ventilation options between array sections shall be one of the following:
 - 2.1. A pathway not less than 8 feet (2438 mm) wide.
 - 2.2. Where gravity-operated dropout smoke and heat vents occur, a pathway not less than 4 feet (1219 mm) wide on no fewer than one side.
 - 2.3. A pathway not less than 4 feet (1219 mm) wide bordering 4-foot by 8-foot (1219 mm by 2438 mm) venting cutouts every 20 feet (6096 mm) on alternating sides of the pathway.
- *3. Arrays shall be not greater than 150 feet (45 720 mm) by 150 feet (45 720 mm) in distance in either axis in order to create opportunities for fire department smoke ventilation operations.

1204.4 Ground-mounted photovoltaic panel systems. Ground-mounted photovoltaic panel systems shall comply with Section 1204.1 and this section. Setback requirements shall not apply to ground-mounted, free-standing photovoltaic arrays. A clear, brush-free area of 10 feet (3048 mm) shall be required for ground-mounted photovoltaic arrays.

1204.5 Buildings with rapid shutdown. Buildings with rapid shutdown solar photovoltaic systems shall have permanent labels in accordance with Sections 1204.5.1 through 1204.5.3.

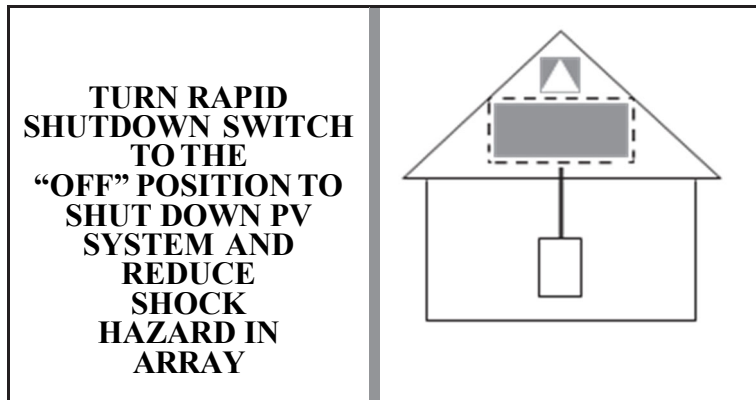
1204.5.1 Rapid shutdown type. The type of solar photovoltaic system rapid shutdown shall be labeled with one of the following:

1. For solar photovoltaic systems that shut down the array and the conductors leaving the array, a label shall be provided. The first two lines of the label shall be uppercase characters with a minimum height of 3/8 inch (10 mm) in black on a yellow background. The remaining characters shall be uppercase with a minimum height of 3/16 inch (5 mm) in black on a white background. The label shall be in accordance with Figure 1204.5.1(1) and state the following:

SOLAR PV SYSTEM EQUIPPED WITH
RAPID SHUTDOWN. TURN RAPID
SHUTDOWN SWITCH TO THE “OFF”
POSITION TO SHUT DOWN PV SYSTEM
AND REDUCE SHOCK HAZARD IN
ARRAY.

2. For photovoltaic systems that only shut down conductors leaving the array, a label shall be provided. The first two lines of the label shall be uppercase characters with a minimum height of 3/8 inch (10 mm) in white on a red background and the remaining characters shall be capitalized with a minimum height of 3/16 inch (5 mm) in black on a white back-ground.

SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN



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FIGURE 1204.5.1(1)
LABEL FOR SOLAR PV SYSTEMS THAT REDUCE SHOCK HAZARD WITHIN ARRAY AND SHUT DOWN CONDUCTORS LEAVING ARRAY

The label shall be in accordance with Figure 1204.5.1(2) and state the following:

THIS SOLAR PV SYSTEM EQUIPPED
 WITH RAPID SHUTDOWN. TURN RAPID
 SHUTDOWN SWITCH TO THE “OFF”
 POSITION TO SHUT DOWN CONDUCTORS
 OUTSIDE THE ARRAY. CONDUCTORS
 WITHIN ARRAY REMAIN
 ENERGIZED IN SUNLIGHT.

1204.5.1.1 Diagram. The labels in Section 1204.5.1 shall include a simple diagram of a building with a roof. Diagram sections in red signify sections of the solar photovoltaic system that are not shut down when the rapid shutdown switch is turned off.

1204.5.1.2 Location. The rapid shutdown label in Section 1204.5.1 shall be located not greater than 3 feet (914 mm) from the service disconnecting means to which the photovoltaic systems are connected, and shall indicate the location of all identified rapid shutdown switches if not at the same location.

1204.5.2 Buildings with more than one rapid shutdown type. Solar photovoltaic systems that contain rapid shutdown in accordance with both Items 1 and 2 of Section 1204.5.1 or solar photovoltaic systems where only portions of the systems on the building contain rapid shutdown, shall provide a detailed plan view diagram of the roof showing each different photovoltaic system and a dotted line around areas that remain energized after the rapid shutdown switch is operated.

1204.5.3 Rapid shutdown switch. A rapid shutdown switch shall have a label located not greater than 3 feet (914 mm) from the switch that states the following:

RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM

SECTION 1205 STATIONARY FUEL CELL POWER SYSTEMS

1205.1 General. Stationary fuel cell power systems in new and existing occupancies shall comply with this section.

1205.2 Permits. Permits shall be obtained for *stationary fuel cell power systems* as set forth in Section 105.7.10.

1205.3 Equipment. Stationary fuel cell power systems shall comply with the following:

1. *Prepackaged fuel cell power systems* shall be listed and labeled in accordance with CSA FC 1.
2. The modules and components in a *pre-engineered fuel cell power system* shall be listed and labeled in accordance with CSA FC 1 and interconnected to complete the assembly of the system at the job site in accordance with the manufacturer's instructions and the module and component listings.
3. *Field-fabricated fuel cell power systems* shall be approved based on a review of the technical report provided in accordance with Section 104.7.2. The report shall be prepared by and bear the stamp of a registered design professional and shall include:
 - 3.1. A fire risk evaluation.
 - 3.2. An evaluation demonstrating that modules and components in the fuel cell power system comply with applicable requirements in CSA FC 1.
 - 3.3. Documentation of the fuel cell power system's compliance with applicable NFPA 2 and NFPA 853 construction requirements.

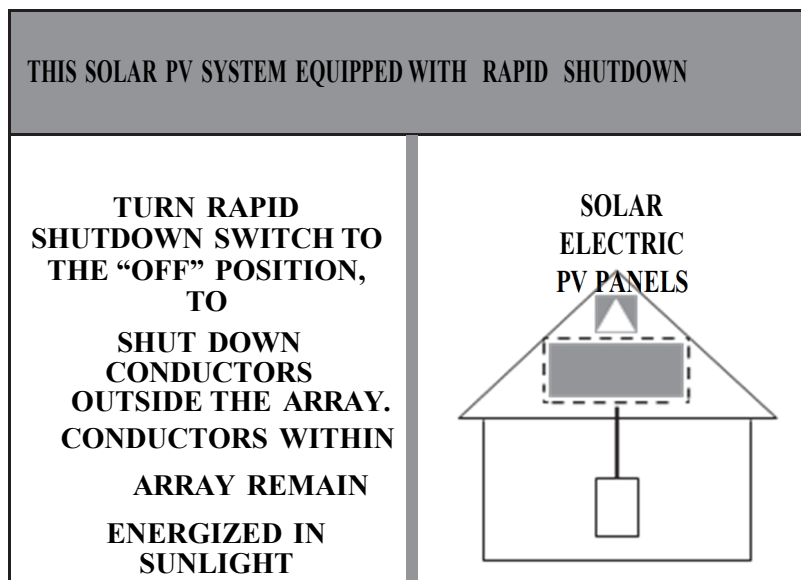


FIGURE 1204.5.1(2)

LABEL FOR SOLAR PV SYSTEMS THAT ONLY SHUT DOWN CONDUCTORS LEAVING THE ARRAY

1205.4 Installation. Stationary fuel cell power systems shall be installed and maintained in accordance with NFPA 70 and NFPA 853, the manufacturer's installation instructions, and the listing. *Stationary fuel cell power systems* fueled by hydrogen shall be installed and maintained in accordance with NFPA 2 and NFPA 70, the manufacturer's installation instructions and the listing.

1205.5 Residential use. *Stationary fuel cell power systems* shall not be installed in Group R-3 and R-4 buildings, or dwelling units associated with Group R-2 buildings unless they are specifically listed for residential use.

1205.6 Indoor installations. *Stationary fuel cell power systems* installed in indoor locations shall comply with Sections 1205.6 through 1205.6.2. For purposes of this section, an indoor location includes a roof and 50 percent or greater enclosing walls.

1205.6.1 Listed. Stationary fuel cell power systems installed indoors shall be specifically listed and labeled for indoor use.

1205.6.2 Separation. Rooms containing *stationary fuel cell power systems* shall be separated from the following occupancies by fire barriers or horizontal assemblies, or both, constructed in accordance with the *International Building Code*.

1. Group B, F, M, S and U occupancies by 1-hour fire resistance rated construction.
2. Group A, E, I and R occupancies by 2-hour fire resistance rated construction.

Exception: Stationary fuel cell power systems with an aggregate rating less than 50 kW shall not be required to be separated from other occupancies provided that the systems comply with Section 9.3 of NFPA 853.

1205.7 Vehicle impact protection. Where *stationary fuel cell power systems* are subject to impact by a motor vehicle, vehicle impact protection shall be provided in accordance with Section 312.

1205.8 Outdoor installation. Stationary fuel cell power systems located outdoors shall be separated by not less than 5 feet (1524 mm) from the following:

1. Lot lines.
2. Public ways.
3. Buildings.
4. Stored combustible materials.
5. Hazardous materials.
6. High-piled stock.
7. Any portion of a designated means of egress system.
8. Other exposure hazards.

1205.9 Fuel supply. The design, location and installation of the fuel supply for *stationary fuel cell power systems* shall comply with Chapter 53, Chapter 58 and the *International Fuel Gas Code*, based on the particular fuel being supplied to the system.

1205.10 Manual shutoff. Access to a manual shutoff valve shall be provided for the fuel piping within 6 feet (1829 mm) of any fuel storage tank serving the fuel cell and within 6 feet (1829 mm) of the power system. If the fuel tank and the *stationary fuel cell power system* are less than 12 feet (3658 mm) apart, a single shutoff valve shall be permitted. If the *stationary fuel cell power system* is located indoors, the shutoff valve shall be located outside of the room in which the system is installed, unless otherwise approved by the *fire code official*.

1205.11 Ventilation and exhaust. Ventilation and exhaust for stationary fuel cell power systems shall be provided in accordance with NFPA 853.

1205.12 Fire suppression. Fire suppression for stationary fuel cell power system installations shall be provided in accordance with NFPA 853.

1205.13 Gas detection systems. Stationary fuel cell power systems shall be provided with a gas detection system. Detection shall be provided in approved locations in the fuel cell power system enclosure, the exhaust system or the room that encloses the fuel cell power system. The system shall be designed to activate at a flammable gas concentration of not more than 25 percent of the lower flammable limit (LFL).

1205.13.1 System activation. The activation of the gas detection system shall automatically:

1. Close valves between the gas supply and the fuel cell power system.
2. Shut down the fuel cell power system.
3. Initiate local audible and visible alarms in approved locations.

SECTION 1206 ELECTRICAL ENERGY STORAGE SYSTEMS

1206.1 Scope. The provisions in this section are applicable to energy storage systems designed to provide electrical power to a building or facility. These systems are used to provide standby or emergency power, an uninterruptable power supply, load shedding, load sharing or similar capabilities. *Energy storage systems in Group R-3 and R-4 occupancies shall be in accordance with Sections 1206.2.1 and 1206.4. Approved signage is required for all installations in accordance with Section 1206.2.8.6.

1206.2 Stationary storage battery systems. Stationary storage battery systems having capacities exceeding the values shown in Table 1206.2 shall comply with Section 1206.2.1 through 1206.2.13.6, as applicable. *Approved signage is required for all installations in accordance with Section 1206.2.8.6.

1206.2.1 Permits. Permits shall be obtained for the construction of stationary storage battery systems *with a capacity of 3 kWh or more, in accordance with Section 105.7.2.

1206.2.2 Construction documents. The following information shall be provided with the permit application:

1. Location and layout diagram of the room in which the stationary storage battery system is to be installed.
2. Details on hourly fire-resistance-rated assemblies provided.
3. Quantities and types of storage batteries and battery systems.
4. Manufacturer's specifications, ratings and listings of storage batteries and battery systems.
5. Details on energy management systems.

6. Location and content of signage.
7. Details on fire-extinguishing, smoke detection and ventilation systems.
8. Rack storage arrangement, including seismic support criteria.

TABLE 1206.2
BATTERY STORAGE SYSTEM THRESHOLD QUANTITIES.

BATTERY TECHNOLOGY	CAPACITY^a
Flow batteries ^b	20 kWh
Lead acid, all types	70 kWh
Lithium, all types	20 kWh
Nickel cadmium (Ni-Cd)	70 kWh
Sodium, all types	20 kWh ^c
Other battery technologies	10 kWh

For SI: 1 kilowatt hour = 3.6 megajoules.

- a. For batteries rated in amp-hours, kWh shall equal rated voltage times amp-hour rating divided by 1000.
- b. Shall include vanadium, zinc-bromine, polysulfide-bromide, and other flowing electrolyte-type technologies.
- c. 70 kWh for sodium-ion technologies.

1206.2.3 Hazard mitigation analysis. A failure modes and effects analysis (FMEA) or other approved hazard mitigation analysis shall be provided in accordance with Section 104.7.2 under any of the following conditions:

1. Battery technologies not specifically identified in Table 1206.2 are provided.
2. More than one stationary storage battery technology is provided in a room or indoor area where there is a potential for adverse interaction between technologies.
3. Where allowed as a basis for increasing maximum allowable quantities in accordance with Section 1206.2.9.
- *4. Where required by the *fire code official*.

1206.2.3.1 Fault condition. The hazard mitigation analysis shall evaluate the consequences of the following failure modes, and others deemed necessary by the *fire code official*. Only single-failure modes shall be considered.

1. Thermal runaway condition in a single-battery storage rack, module or array.
2. Failure of any energy management system.
3. Failure of any required ventilation system.
4. Voltage surges on the primary electric supply.
5. Short circuits on the load side of the stationary battery storage system.
6. Failure of the smoke detection, fire-extinguishing or gas detection system.
7. Spill neutralization not being provided or failure of the secondary containment system.
- *8. Failure of temperature control.

1206.2.3.2 Analysis approval. The *fire code official* is authorized to approve the hazardous mitigation analysis provided that the hazard mitigation analysis demonstrates all of the following:

1. Fires or explosions will be contained within unoccupied battery storage rooms for the minimum duration of the fire-resistance-rated walls identified in Table 509.1 of the *International Building Code*.
2. Fires and explosions in battery cabinets in occupied work centers will be detected in time to allow occupants within the room to evacuate safely.
3. Toxic and highly toxic gases released during fires and other fault conditions shall not reach concentrations in excess of Immediately Dangerous to Life or Health (IDLH) levels in the building or adjacent means of egress routes during the time deemed necessary to evacuate from that area.
4. Flammable gases released from batteries during charging, discharging and normal operation shall not exceed 10 percent of their lower flammability limit (LFL).
5. Flammable gases released from batteries during fire, overcharging and other abnormal conditions shall not create an explosion hazard that will injure occupants or emergency responders.

1206.2.3.3 Additional protection measures. Construction, equipment and systems that are required for the stationary storage battery system to comply with the hazardous mitigation analysis, including but not limited to those specifically described in Section 1206.2, shall be installed, maintained and tested in accordance with nationally recognized standards and specified design parameters.

1206.2.3.4 Large-scale fire testing. Where required in Section 1206, large-scale fire testing shall be conducted on a representative stationary storage battery system, in accordance with UL 9540A. The testing shall be conducted or witnessed and reported by an approved testing laboratory. The test report shall be provided to the *fire code official* for review and approval in accordance with Section 104.7.2.

1206.2.3.5 Fire remediation. Where a fire or other event has damaged a stationary storage battery system and ignition, or re-ignition of the stationary storage battery system is possible, the *fire code official* may require the system owner, agent, or lessee to take actions, at their expense, to mitigate the hazard or remove the damaged equipment from the premise, to a safe location.

***1206.2.3.6 Forensic analysis.** The *fire code official* may also require a forensic analysis of the cause of failure by an independent laboratory approved by the *fire code official* in accordance with Section 104.10.2.

1206.2.4 Seismic and structural design. Stationary storage battery systems shall comply with the seismic design requirements in Chapter 16 of the *International Building Code* and shall not exceed the floor-loading limitation of the building.

1206.2.5 Vehicle impact protection. Where stationary storage battery systems are subject to impact by a motor vehicle, including fork lifts, vehicle impact protection shall be provided in accordance with Section 312.

1206.2.6 Combustible storage. Combustible materials not related to the stationary storage battery system shall not be stored in battery rooms, cabinets or enclosures. Combustible materials in occupied work centers covered by Section 1206.2.8.5 shall not be stored less than 3 feet (915 mm) from battery cabinets.

1206.2.7 Testing, maintenance and repair. Storage batteries and associated equipment and systems shall be tested and maintained in accordance with the manufacturer's instructions. Any storage batteries or system components used to replace existing units shall be compatible with the battery charger, energy management

systems, other storage batteries and other safety systems. Introducing other types of storage batteries into the stationary storage battery system or other types of electrolytes into flow battery systems shall be treated as a new installation and require approval by the *fire code official* before the replacements are introduced into service.

1206.2.8 Location and construction. Rooms and areas containing stationary storage battery systems shall be designed, located and constructed in accordance with Sections 1206.2.8.1 through 1206.2.8.7.4.

1206.2.8.1 Location. Stationary storage battery systems shall not be located in the following areas:

1. Where the floor is located more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access,
2. Where the floor level is located below the lowest level of exit discharge.

Exceptions:

1. Lead acid and nickel cadmium stationary storage battery systems less than 50 VAC and 60 VDC installed in facilities under the exclusive control of communications utilities in accordance with NFPA 76.
2. Where approved, installations shall be permitted in underground vaults complying with NFPA 70, Article 450, Part III.
3. Where approved by the *fire code official*, installations shall be permitted on higher and lower floors.
4. Installations on noncombustible rooftops of buildings exceeding 75 feet (22 860 mm) in height that do not obstruct fire department rooftop operations, where *approved* by the *fire code official*.

1206.2.8.2 Separation. Rooms containing stationary storage battery systems shall be separated from other areas of the building in accordance with Section 509.1 of the *International Building Code*. Battery systems shall be allowed to be in the same room with the equipment they support.

1206.2.8.3 Stationary battery arrays. Storage batteries, prepackaged stationary storage battery systems and pre-engineered stationary storage battery systems shall be segregated into stationary battery arrays not exceeding 50 kWh (180 megajoules) each. Each stationary battery array shall be spaced not less than 3 feet (914 mm) from other stationary battery arrays and from walls in the storage room or area. The storage arrangements shall comply with Chapter 10.

Exceptions:

1. Lead acid and nickel cadmium storage battery arrays.
2. Listed pre-engineered stationary storage battery systems and prepackaged stationary storage battery systems shall not exceed 250 kWh (900 megajoules) each, *where *approved* by the *fire code official*.
3. The *fire code official* is authorized to approve listed, pre-engineered and prepackaged battery arrays with larger capacities or smaller battery array spacing if large-scale fire and fault condition testing conducted or witnessed and reported by an approved testing laboratory is provided showing that a fire involving one array will not propagate to an adjacent array, and be contained within the room for a duration equal to the fire-resistance rating of the room separation specified in Table 509 of the *International Building Code*.

1206.2.8.4 Separate rooms. Where stationary batteries are installed in a separate equipment room that can be accessed only by authorized personnel, they shall be permitted to be installed on an open rack for ease of maintenance.

1206.2.8.5 Occupied work centers. Where stationary storage batteries are located in an occupied work center, they shall be housed in a noncombustible cabinet or other enclosure to prevent access by unauthorized personnel.

1206.2.8.5.1 Cabinets. Where stationary batteries are contained in cabinets in occupied work centers, the cabinet enclosures shall be located within 10 feet (3048 mm) of the equipment that they support.

1206.2.8.6 Signage. Approved signs shall be provided on or adjacent to all entry for battery storage rooms or areas and on enclosures of battery storage cabinets and walk-in units located outdoors, on rooftops or in open parking garages. Signs designed to meet both the requirements of this section and NFPA 70 shall be permitted. The signage shall include the following or equivalent:

1. "Energy Storage System", "Battery Storage System", "Capacitor Energy Storage System", or the equivalent.
2. The identification of the electrochemical battery energy storage system technology present. "Energized Electrical Circuits"
3. If water reactive electrochemical battery energy storage system are present, the signage shall include "APPLY NO WATER"
4. Current contact information, including phone number, for personnel authorized to service the equipment and fire mitigation personnel.

Exception: Existing stationary storage battery systems shall be permitted to include the signage required at the time it was installed.

1206.2.8.6.1 Electrical disconnects. Where the stationary storage battery system disconnecting means is not within sight of the main service disconnecting means, placards or directories shall be installed at the location of the main service disconnecting means indicating the location of stationary storage battery system disconnecting means in accordance with NFPA 70.

1206.2.8.6.2 Cabinet signage. Battery storage cabinets provided in occupied work centers in accordance with Section 1206.2.8.5 shall have exterior labels that identify the manufacturer and model number of the system and electrical rating (voltage and current) of the contained battery system. There shall be signs within the cabinet that indicate the relevant electrical and chemical hazards, as required by Section 1206.2.12.

1206.2.8.7 Outdoor installations. Stationary storage battery systems located outdoors shall comply with Sections 1206.2.8.7 through 1206.2.8.7.4, in addition to all applicable requirements of Section 1206.2. Installations in outdoor enclosures or containers that can be occupied for servicing, testing, maintenance and other functions shall be treated as battery storage rooms.

Remote outdoor installations include stationary battery systems located more than 100 feet from buildings, property lines, public ways, stored combustible storage, hazardous materials, high piled stock and other exposure hazards.

Installations near exposures include all outdoor stationary battery systems that are not more than 100 feet from buildings, property lines, public ways, stored combustible storage, hazardous materials, high piled stock and other exposure hazards.

Exception: Stationary battery arrays in noncombustible containers shall not be required to be spaced 3 feet (914 mm) from the container walls.

**TABLE 1206.2.8.7
OUTDOOR INSTALLATIONS**

Compliance Required	Remote Installations	Installations Near Exposures
General installation requirements	Yes	Yes
Size and separation	No	Yes ^a
Smoke and automatic fire detection	Yes	Yes
Fire suppression systems	Yes ^b	Yes
Maximum enclosure size	Yes	Yes
Vegetation control	Yes	Yes
Means of egress separation	Yes	Yes
Clearance to exposures	Yes	Yes
Technology-specific protection	Yes	Yes

a. In outdoor walk-in units, spacing is not required between energy storage systems units and the walls of the enclosure.

b. Where approved by the *fire code official*, fire suppression systems are permitted to be omitted.

1206.2.8.7.1 Separation. Stationary storage battery systems located outdoors shall be separated by not less than *10 feet (3048 mm) from the following:

1. Lot lines.
2. Public ways.
3. Buildings.
4. Stored combustible materials.
5. Hazardous materials.

6. High-piled stock.
7. Other exposure hazards.

Exception: The *fire code official* is authorized to approve smaller separation distances if largescale fire and fault condition testing conducted or witnessed and reported by an approved testing laboratory is provided showing that a fire involving the system will not adversely impact occupant egress from adjacent buildings, or adversely impact adjacent stored materials or structures.

1206.2.8.7.2 Means of egress. Stationary storage battery systems located outdoors shall be separated from any *means of egress* as required by the *fire code official* to ensure safe egress under fire conditions, but not less than 10 feet (3048 mm).

Exception: The *fire code official* is authorized to approve lesser separation distances if large-scale fire and fault condition testing conducted or witnessed and reported by an *approved* testing laboratory is provided showing that a fire involving the system will not adversely impact occupant egress.

1206.2.8.7.3 Security of outdoor areas. Outdoor areas in which stationary storage battery systems are located shall be secured against unauthorized entry and safeguarded in an approved manner.

1206.2.8.7.4 Walk-in units. Where a stationary storage battery system includes an outer enclosure, the unit shall only be entered for inspection, maintenance and repair of batteries and electronics, and shall not be occupied for other purposes.

1206.2.9 Maximum allowable quantities. *Fire areas* within buildings containing stationary storage battery systems exceeding the maximum allowable quantities in Table 1206.2.9 shall comply with all applicable Group H occupancy requirements in this code and the *International Building Code*.

Exception: Where approved by the *fire code official*, areas containing stationary storage batteries that exceed the amounts in Table 1206.2.9 shall be treated as incidental use areas and not Group H occupancies based on a hazardous mitigation analysis in accordance with Section 1206.2.3 and large-scale fire and fault condition testing conducted or witnessed and reported by an approved testing laboratory.

1206.2.9.1 Mixed battery systems. Where areas within buildings contain different types of storage battery technologies, the total aggregate quantities of batteries shall be determined based on the sum of percentages of each battery type quantity divided by the maximum allowable quantity of each battery type. If the sum of the percentages exceeds 100 percent, the area shall be treated as a Group H occupancy in accordance with Table 1206.2.9.

1206.2.10 Storage batteries and equipment. The design and installation of storage batteries and related equipment shall comply with Sections 1206.2.10.1 through 1206.2.10.8.

Battery storage system installations shall comply with the requirements of this section and the applicable requirements of Table 1206.2.10

1206.2.10.1 Listings. Storage batteries and battery storage systems shall comply with the following:

1. Storage batteries shall be listed in accordance with UL 1973.
2. Prepackaged and pre-engineered stationary storage battery systems shall be listed in accordance with UL 9540.

Exception: Lead-acid batteries are not required to be listed.

1206.2.10.2 Prepackaged and pre-engineered systems. Prepackaged and pre-engineered stationary storage battery systems shall be installed in accordance with their listing and the manufacturer's instructions.

**TABLE 1206.2.9
MAXIMUM ALLOWABLE BATTERY QUANTITIES**

BATTERY TECHNOLOGY	MAXIMUM ALLOWABLE	GROUP H
Flow batteries ^b	600 kWh	Group H-2
Lead acid, all types	Unlimited	Not Applicable
Lithium, all types	600 kWh	Group H-2
Nickel cadmium (Ni-Cd)	Unlimited	Not Applicable
Sodium, all types	600 kWh	Group H-2
Other battery technologies	200 kWh	Group H-2 ^c

For SI: 1 kilowatt hour = 3.6 megajoules.

- For batteries rated in amp-hours, Kilowatt-hours (kWh) shall equal rated battery voltage times the amp-hour rating divided by 1,000.
- Shall include vanadium, zinc-bromine, polysulfide-bromide, and other flowing electrolyte-type technologies.
- Shall be a Group H-4 occupancy if the *fire code official* determines that a fire or thermal runaway involving the battery technology does not represent a significant fire hazard.

**TABLE 1206.2.10
BATTERY TECHNOLOGY SPECIFIC**

Compliance Required ^b	Battery Technology				Other Battery Storage Systems and Battery Technologies ^b
	Lead-acid	Ni-Cad & Ni-MH	Lithium-ion	Flow	
Exhaust ventilation	Yes	Yes	Yes	Yes	Yes
Spill control and neutralization	Yes ^c	Yes ^c	No	Yes	Yes
Explosion control	Yes ^a	Yes ^a	Yes	Yes	Yes
Safety Caps	Yes	Yes	No	Yes	Yes
Thermal runaway	Yes ^d	Yes	Yes ^e	Yes	Yes ^e

- Not required for lead-acid and nickel cadmium batteries at facilities under the exclusive control of communications utilities that comply with NFPA 76 and operate at less than 50 VAC and 60 VDC.
- Protection shall be provided unless documentation acceptable to the *fire code official*, in accordance with 2021 *International Fire Code* Section 104.7.2, provides justification why the protection is not necessary based on the technology used.
- Applicable to vented (i.e. flooded) type nickel cadmium and lead acid batteries.
- Not required for vented (i.e. flooded) type lead acid batteries.
- The thermal runaway protection is permitted to be part of a battery management system that has been evaluated with the battery in accordance with UL 1973.

1206.2.10.3 Energy management system. An approved energy management system shall be provided for battery technologies other than lead-acid and nickel cadmium for monitoring and balancing cell voltages, currents and temperatures within the manufacturer's specifications. The system shall transmit an alarm signal to an approved location and to an *approved* annunciator panel if potentially hazardous temperatures or other conditions such as short circuits, over voltage or under voltage are detected.

1206.2.10.3.1 Annunciator panel. The *approved* annunciator panel shall visibly indicate any hazardous temperature or other conditions. The location of the annunciator panel shall be approved by the *fire code official*.

1206.2.10.4 Battery chargers. Battery chargers shall be compatible with the battery chemistry and the manufacturer's electrical ratings and charging specifications. Battery chargers shall be listed and labeled in accordance with UL 1564 or provided as part of a listed pre-engineered or prepackaged stationary storage battery system.

1206.2.10.5 Inverters. Inverters shall be listed and labeled in accordance with UL 1741. Only inverters listed and labeled for utility interactive system use and identified as interactive shall be allowed to operate in parallel with the electric utility power system to supply power to common loads.

1206.2.10.6 Safety caps. Where required by Table 1206.2.10, batteries shall be provided with flame-arresting safety caps.

1206.2.10.7 Thermal runaway. Where required by Table 1206.2.10 storage batteries shall be provided with a listed device or other approved method to prevent, detect and control thermal runaway.

1206.2.10.8 Toxic and highly toxic gas. Stationary storage battery systems that have the potential to release toxic and highly toxic gas during charging, discharging and normal use conditions shall comply with Section 1206.2.11.3 and Chapter 60.

1206.2.11 Fire protection and life safety systems. Fire protection and life safety systems shall be provided in accordance with Sections 1206.2.11.1 through 1206.2.11.7. All alarm, and supervisory signals from the fire protection and life safety systems shall be transmitted to a central station, proprietary or remote station service in accordance with NFPA 72, and to an approved annunciator panel.

1206.2.11.1 Fire-extinguishing systems. Rooms and areas within buildings and walk-in units containing electrochemical battery energy storage systems shall be equipped with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1. Commodity classifications for specific technologies of storage batteries shall be in accordance with Chapter 5 of NFPA 13. If the storage battery types are not addressed in Chapter 5 of NFPA 13, the *fire code official* is authorized to approve the fire-extinguishing system based on full scale fire and fault condition testing conducted or witnessed and reported by an *approved* laboratory.

Exception: Spaces or areas containing stationary storage battery systems used exclusively for telecommunications equipment in accordance with Section 903.2.

1206.2.11.1.1 Fire-extinguishing systems. Rooms and areas within buildings and walk-in units containing electrochemical battery energy storage systems shall be protected by an automatic fire suppression system designed and installed in accordance with the most stringent of the following:

1. An *automatic sprinkler system* designed and installed in accordance with Section 903.3.1.1 with a minimum density of 0.6 gpm/ft.² based on the fire area or 2,500 square feet (232 m²) design area, whichever is smaller.
2. Where *approved*, an automatic sprinkler system designed and installed in accordance with Section 903.3.1.1 with a sprinkler hazard classification based on large-scale fire testing.
3. An alternate automatic fire extinguishing system designed and installed in accordance with Section 904, provided the installation is approved by the *fire code official* based on large scale fire testing

Exception: Fire suppression systems for lead acid and nickel cadmium battery systems at facilities under the exclusive control of communications utilities that operate at less than 50 VAC and 60 VDC shall be provided where required by NFPA 76.

1206.2.11.1.2 Fire department connections. Fire Department connections shall be installed in an *approved* location.

1206.2.11.1.3 Hydrants. Fire hydrants shall be installed and maintained in accordance with Chapters 5 and 9.

1206.2.11.1.4 Alternative fire-extinguishing systems. Battery systems that utilize water-reactive materials shall be protected by an *approved* alternative automatic fire extinguishing system in accordance with Section 904. The system shall be listed for protecting the type, arrangement and quantities of storage batteries in the room. The *fire code official* shall be permitted to approve the alternative fire extinguishing system based on full-scale fire and fault condition testing conducted or witnessed and reported by an *approved* laboratory.

1206.2.11.2 Smoke detection system. An *approved automatic smoke detection system* shall be installed in rooms containing *stationary storage battery systems* in accordance with Section 907.2.

1206.2.11.3 *Exhaust ventilation. Where required by Table 1206.2.10, ventilation of rooms containing stationary storage battery systems shall be provided in accordance with the *International Mechanical Code* and one of the following:

1. The ventilation system shall be designed to limit the maximum concentration of flammable gas to 10 percent of the lower flammability limit, or for hydrogen, 1.0 percent of the total volume of the room.
2. Continuous ventilation shall be provided at a rate of not less than 1 cubic foot per minute (cfm) per square foot [0.00508 m³/(s • m²)] of floor area, but not less than 150 cfm (4 m³/min). The exhaust system shall be designed to provide air movement across all parts of the floor for gases having a vapor density greater than air and across all parts of the vault ceiling for gases having a vapor density less than air.

1206.2.11.3.1 Cabinet ventilation. Where cabinets located in occupied spaces contain storage batteries that are required by Table 1206.2.10 to be provided with ventilation, the cabinet shall be provided with ventilation in accordance with Section 1206.2.11.3.

1206.2.11.3.2 Supervision. Required mechanical ventilation systems for rooms and cabinets containing storage batteries shall be supervised by an *approved* central station, proprietary or remote station service or shall initiate an audible and visual signal at an *approved* constantly attended on-site location.

1206.2.11.3.3 Standby power. Mechanical exhaust ventilation shall be provided with not less than 6 hours of standby power in accordance with *International Building Code*.

Separation shall be in accordance with NFPA 70.

Where the building, or a portion of the building, served by the mechanical exhaust ventilation is intended to remain operational / occupied during a utility power outage, through the use of an electrical standby power system, whether required or optional; the mechanical exhaust ventilation shall be connected to both the normal electrical service and emergency or standby power system for equivalent time periods.

1206.2.11.3.4 Mechanical exhaust ventilation controls. Clearly identified separate switches shall be provided both to activate the mechanical exhaust ventilation system and to shutoff the ventilation system.

1206.2.11.4 Gas detection system. Where required by Section 1206.2.3 or 1206.2.10.8 rooms containing stationary storage battery systems shall be protected by a gas detection system complying with Section 916. The gas detection system shall be designed to activate where the level of flammable gas exceeds 10 percent of the lower flammable limit (LFL), or where the level of toxic or highly toxic gas exceeds one half of the IDLH.

1206.2.11.4.1 System activation. Activation of the gas detection system shall result in all the following:

1. Initiation of distinct audible and visible alarms in the battery storage room.
2. Transmission of an alarm to an approved location.
3. De-energizing of the battery charger.
4. Activation of the mechanical ventilation system, where the system is interlocked with the gas detection system.

Exception: Lead-acid and nickel-cadmium stationary storage battery systems shall not be required to comply with Items 1, 2 and 3.

1206.2.11.5 Spill control and neutralization. Where required by Table 1206.2.10, approved methods and materials shall be provided for the control and neutralization of spills of electrolyte or other hazardous materials in areas containing stationary storage batteries as follows:

1. For batteries with free-flowing electrolyte, the method and materials shall be capable of neutralizing a spill of the total capacity from the largest cell or block to a pH between 5.0 and 9.0.
2. For batteries with immobilized electrolyte, the method and material shall be capable of neutralizing a spill of 3.0 percent of the capacity of the largest cell or block in the room to a pH between 5.0 and 9.0.

1206.2.11.5.1 Spill control barrier. Each rack of batteries, or group of racks shall be provided with a liquid-tight 4-inch (102 mm) spill control barrier that extends at least 1-inch (25 mm) beyond the battery rack in all directions.

1206.2.11.6 Explosion Control. Where required by Table 1206.2.10, explosion control, complying with Section 911, NFPA 68 and NFPA 69, shall be provided for rooms, areas or walk-in units containing electrochemical battery energy storage system technologies.

Exceptions:

1. Where approved, explosion control is permitted to be waived by the *fire code official* based on large-scale fire testing demonstrating that flammable gases are not liberated from electrochemical battery energy storage system cells or modules.
2. Where approved, explosion control is permitted to be waived by the *fire code official* based on documentation provided in accordance with *Section 104.7* that demonstrating that the electrochemical battery energy storage system technology to be used does not have the potential to release flammable gas concentrations in excess of 25 percent of the lower flammable limit (LFL) anywhere in the room, area, walk-in unit or structure under thermal runaway or other fault conditions.

1206.2.11.7 Emergency energy release. An approved means must be provided to safely release stored energy from the batteries in an emergency situation.

1206.2.12 Specific battery-type requirements. This section includes requirements applicable to specific types of storage batteries. Stationary storage battery systems with more than one type of storage battery shall comply with requirements applicable to each battery type.

Ventilation, spill control and neutralization, explosion control, safety caps and thermal runaway shall be required in accordance with Table 1206.2.10

1206.2.12.1 Lead-acid storage batteries. Stationary storage battery systems utilizing lead-acid storage batteries shall comply with the following:

1. The signage required by Section 1206.2.8.6 shall indicate the room contains lead-acid batteries.

1206.2.12.2 Nickel-cadmium (Ni-Cd) storage batteries. *Stationary storage battery systems* utilizing nickel cadmium (Ni-Cd) storage batteries shall comply with the following:

1. The signage required by Section 1206.2.8.6 shall indicate the room contains lead-acid batteries.

1206.2.12.3 Lithium-ion storage batteries. The signage in Section 1206.2.8.6 shall indicate the type of lithium batteries contained in the room.

1206.2.12.4 Sodium-beta storage batteries. *Stationary storage battery systems* utilizing sodium-beta storage batteries shall comply with the following:

1. The signage in Section 1206.2.8.6 shall indicate the type of sodium batteries in the room and include the instructions, "APPLY NO WATER."

1206.2.12.5 Flow storage batteries. Stationary storage battery systems utilizing flow storage batteries shall comply with the following:

1. The signage required in Section 1206.2.8.6 shall indicate the type of flow batteries in the room.

1206.2.12.6 Other battery technologies. *Stationary storage battery systems* utilizing battery technologies other than those described in Sections 1206.2.12.1 through 1206.2.12.5 shall comply with the following:

1. Gas detection systems complying with Section 916 shall be provided in accordance with Section 1206.2.11.4 where the batteries have the potential to produce toxic or highly toxic gas in the storage room or cabinet in excess of the permissible exposure limits (PEL) during charging, discharging and normal system operation.
2. In addition to the signage required in Section 1206.2.8.6, the marking shall identify the type of batteries present, describe the potential hazards associated with the battery type, and indicate that the room contains energized electrical circuits.

1206.2.13 Special Installations. Rooftop and open parking garage battery energy storage system installations shall comply with Sections 1206.2.13.1 through 1206.2.13.6. Signage shall comply with Section 1206.2.8.6.

1206.2.13.1 Rooftop installations. For the purpose of Table 1206.2.13, rooftop installations are those located on the roofs of buildings.

1206.2.13.2 Open parking garage installations. For the purposes of Table 1206.2.13, open parking garage installations are those located in a structure or portion of a structure that complies with Section 406.5 of the *International Building Code*.

**TABLE 1206.2.13
SPECIAL INSTALLATIONS**

Compliance Required	Rooftops	Open Parking Garages
General Installation Requirements	Yes	Yes
Size and separation	Yes	Yes
Smoke and automatic fire detection	Yes	Yes
Maximum enclosure size	Yes	Yes
Means of egress separation	Yes	Yes
Clearance to exposures	Yes	Yes
Fire suppression systems	Yes	Yes
Technology specific protection	Yes	Yes

1206.2.13.3 Clearance to exposures. Battery storage systems located on rooftops and in open parking garages shall be separated by not less than 10 feet (3048 mm) from the following exposures:

1. Buildings, except the building on which rooftop battery energy storage system is mounted
2. Any portion of the building on which a rooftop system is mounted that is elevated above the rooftop on which the system is installed

3. Lot lines
4. Public ways
5. Stored combustible materials
6. Locations where motor vehicles can be parked
7. Hazardous materials
8. Other exposure hazards

Exceptions:

1. Clearances are permitted to be reduced to 3 feet (914 mm) where a 1-hour freestanding fire barrier, suitable for exterior use, and extending 5 feet (1524 mm) above and 5 feet (1524 mm) beyond the physical boundary of the battery energy storage system, installation is provided to protect the exposure.
2. Clearances are permitted to be reduced to 3 feet (914 mm) where a weatherproof enclosure constructed of noncombustible materials is provided over the battery energy storage system and it has been demonstrated that a fire within the enclosure will not ignite combustible materials outside the enclosure.

1206.2.13.4 Fire suppression systems. Battery storage systems located in walk-in units on rooftops or in walk-in units in open parking garages shall be provided with automatic fire suppression systems within the battery energy storage system enclosure in accordance with Section 1206.2.11.1. Areas containing battery energy storage systems other than walk-in units in open parking structures on levels not open above to the sky shall be provided with an automatic fire suppression system complying with Section 1206.2.11.1.

1206.2.13.5 Rooftop installations. Battery storage systems and associated equipment that are located on rooftops and not enclosed by building construction shall comply with the following:

1. Stairway access to the roof for emergency response and fire department personnel shall be provided either through a bulkhead from the interior of the building or a stairway on the exterior of the building.
2. Service walkways not less than 5 feet (1524 mm) in width shall be provided for service and emergency personnel from the point of access to the roof to the system.
3. Battery storage systems and associated equipment shall be located from the edge of the roof a distance equal to at least the height of the system, equipment, or component but not less than 5 feet (1524 mm).
4. The roofing materials under and within 5 feet (1524 mm) horizontally from a battery storage systems or associated equipment shall be noncombustible or shall have a Class A rating when tested in accordance with ASTM E108 or UL 790.
5. A Class I standpipe outlet shall be installed at an approved location on the roof level of the building or in the stairway bulkhead at the top level.
6. The battery storage systems shall be not less than 10 feet (3048 mm) from the fire service access point on the rooftop.

1206.2.13.6 Open parking garages. Battery storage systems and associated equipment that are located in open parking garages shall comply with all of the following:

1. Battery storage systems shall not be located within 50 feet (15 240 mm) of air inlets for building HVAC systems.

Exception: This distance shall be permitted to be reduced to 25 feet (7620 mm) if the automatic fire alarm system monitoring the radiant-energy-sensing detectors de-energizes the ventilation system connected to the air intakes upon detection of fire.

2. Battery storage systems shall not be located within 25 feet (7620 mm) of exits leading from the attached building where located on a covered level of the parking structure not directly open to the sky above.
3. An approved fence with a locked gate or other approved barrier shall be provided to keep the general public not less than 5 feet (1024 mm) from the outer enclosure of the battery energy storage system.

1206.3 Capacitor energy storage systems. Capacitor energy storage systems having capacities exceeding 3 kWh (10.8 megajoules) shall comply with Sections 1206.3 through 1206.3.2.6.1.

Exception: Capacitors regulated by NFPA 70, Chapter 460, and capacitors included as a component part of other listed electrical equipment are not required to comply with this section.

1206.3.1 Permits. Permits shall be obtained for the installation of capacitor energy storage systems in accordance with Section 105.7.3.

1206.3.2 Location and construction. Rooms and areas containing capacitor energy storage systems shall be designed, located and constructed in accordance with Sections 1206.3.2 through 1206.3.2.5.

1206.3.2.1 Location. Capacitor energy storage systems shall not be located in areas where the floor is located more than 75 feet (22 860 mm) above the lowest level of fire department vehicle access, or where the floor level is more than 30 feet (9144 mm) below the finished floor of the lowest level of exit discharge.

1206.3.2.2 Separation. Rooms containing capacitor energy storage systems shall be separated from the following occupancies by fire barriers or horizontal assemblies, or both, constructed in accordance with the *International Building Code*.

1. Group B, F, M, S and U occupancies by 1-hour fire-resistance-rated construction.
2. Group A, E, I and R occupancies by 2-hour fire resistance rated construction.

1206.3.2.3 Capacitor arrays. Capacitor energy storage systems shall be segregated into capacitor arrays not exceeding 50 kWh each. Each array shall be spaced not less than 3 feet (914 mm) from other arrays and from walls in the storage room or area. The storage arrangements shall comply with Chapter 10.

Exception: Capacitor energy storage systems in noncombustible containers located outdoors shall not be required to be spaced 3 feet (914 mm) from the container walls.

1206.3.2.4 Signage. Approved signs shall be provided on doors or in locations adjacent to the entrances to capacitor energy storage system rooms and shall include the following or equivalent verbiage and information:

1. "CAPACITOR ENERGY STORAGE ROOM."

2. “THIS ROOM CONTAINS ENERGIZED ELECTRICAL CIRCUITS.”
3. An identification of the type of capacitors present and the potential hazards associated with the capacitor type.

1206.3.2.5 Electrical disconnects. Where the capacitor energy storage system disconnecting means is not within sight of the main service disconnecting means, placards or directories shall be installed at the location of the main service disconnecting means identifying the location of the capacitor energy storage system disconnecting means in accordance with NFPA 70.

1206.3.2.6 Outdoor installation. Capacitor energy systems located outdoors shall comply with Sections 1206.3.2.6 through 1206.3.2.6.4 in addition to all applicable requirements of Section 1206.3. Installations in outdoor enclosures or containers that can be occupied for servicing, testing, maintenance and other functions shall be treated as capacitor storage rooms.

Exception: Capacitor arrays in noncombustible containers shall not be required to be spaced 3 feet (914 mm) from the container walls.

1206.3.2.6.1 Separation. Capacitor energy systems located outdoors shall be not less than 5 feet (1524 mm) from the following:

1. Lot lines.
2. Public ways.
3. Buildings.
4. Stored combustible materials.
5. Hazardous materials.
6. High-piled stock.
7. Other exposure hazards.

Exception: The *fire code official* is authorized to approve lesser separation distances if large-scale fire and fault condition testing conducted or witnessed and reported by an approved testing laboratory is provided showing that a fire involving the system will not adversely impact occupant egress from adjacent buildings, or adversely impact adjacent stored materials or structures.

1206.3.2.6.2 Means of egress. *Capacitor energy storage systems* located outdoors shall be separated from any means of egress as required by the *fire code official* to ensure safe egress under fire conditions, but not less than 10 feet (3048 mm).

Exception: The *fire code official* is authorized to approve lesser separation distances if large-scale fire and fault condition testing conducted or witnessed and reported by an approved testing laboratory is provided showing that a fire involving the system will not adversely impact occupant egress.

1206.3.2.6.3 Security of outdoor areas. Outdoor areas in which *capacitor energy storage systems* are located shall be secured against unauthorized entry and safeguarded in an approved manner.

1206.3.2.6.4 Walk-in units. Where a capacitor energy storage system includes an outer enclosure, the unit shall only be entered for inspection, maintenance and repair of capacitors and electronics, and shall not be occupied for other purposes.

1206.3.3 Maximum allowable quantities. Fire areas within buildings containing *capacitor energy storage systems* that exceed 600 kWh of energy capacity shall comply with all applicable Group H occupancy requirements in this code and the *International Building Code*.

1206.3.4 Capacitors and equipment. The design and installation of *capacitor energy storage systems* and related equipment shall comply with Sections 1206.3.4.1 through 1206.3.4.5.

1206.3.4.1 Listing. Capacitors and *capacitor energy storage systems* shall comply with the following:

1. Capacitors shall be listed in accordance with UL 1973.
2. Prepackaged and pre-engineered stationary capacitor energy storage systems shall be listed in accordance with UL 9540.

1206.3.4.2 Prepackaged and pre-engineered systems. In addition to other applicable requirements of this code, prepackaged and pre-engineered *capacitor energy storage systems* shall be installed in accordance with their listing and the manufacturer's instructions.

1206.3.4.3 Energy management system. An approved energy management system shall be provided for monitoring and balancing capacitor voltages, currents and temperatures within the manufacturer's specifications. The system shall transmit an alarm signal to an approved location if potentially hazardous temperatures or other conditions such as short circuits, over voltage or under voltage are detected.

1206.3.4.4 Capacitor chargers. Capacitor chargers shall be compatible with the capacitor manufacturer's electrical ratings and charging specifications. Capacitor chargers shall be listed and labeled in accordance with UL 1564 or provided as part of a listed pre-engineered or prepackaged *capacitor energy storage system*.

1206.3.4.5 Toxic and highly toxic gas. *Capacitor energy storage systems* that have the potential to release toxic and highly toxic materials during charging, discharging and normal use conditions shall comply with Chapter 60.

1206.3.5 Fire-extinguishing and detection systems. Fire-extinguishing and smoke detection systems shall be provided in *capacitor energy storage system* rooms in accordance with Sections 1206.3.5.1 through 1206.3.5.2.

1206.3.5.1 Fire-extinguishing systems. Rooms containing *capacitor energy storage systems* shall be equipped with an *automatic sprinkler system* installed in accordance with Section 903.3.1.1. Commodity classifications for specific capacitor technologies shall be in accordance with Chapter 5 of NFPA 13. If the capacitor types are not addressed in Chapter 5 of NFPA 13, the *fire code official* is authorized to approve the *automatic sprinkler system* based on full-scale fire and fault condition testing conducted by an *approved* laboratory.

1206.3.5.1.1 Alternative fire-extinguishing systems. *Capacitor energy storage systems* that utilize water-reactive materials shall be protected by an approved alternative *automatic fire-extinguishing*

system in accordance with Section 904. The system shall be listed for protecting the type, arrangement and quantities of capacitors in the room. The *fire code official* shall be permitted to approve the system based on full-scale fire and fault condition testing conducted by an *approved* laboratory.

1206.3.5.2 Smoke detection system. An approved *automatic smoke detection system* shall be installed in rooms containing *capacitor energy storage systems* in accordance with Section 907.2.

1206.3.5.3 Ventilation. Where capacitors release flammable gases during normal operating conditions, ventilation of rooms containing capacitor energy storage systems shall be provided in accordance with the *International Mechanical Code* and one of the following:

1. The ventilation system shall be designed to limit the maximum concentration of flammable gas to 25 percent of the lower flammability limit.
2. Continuous ventilation shall be provided at a rate of not less than 1 cubic foot per minute (cfm) per square foot [$0.00508 \text{ m}^3/(\text{s} \cdot \text{m}^2)$] of floor area, but not less than 150 cfm (4 m^3/min).

The exhaust system shall be designed to provide air movement across all parts of the floor for gases having a vapor density greater than air and across all parts of the ceiling for gases having a vapor density less than air.

1206.3.5.3.1 Supervision. Required mechanical ventilation systems for rooms containing *capacitor energy storage systems* shall be supervised by an *approved* central station, proprietary or remote station service, or shall initiate an audible and visible signal at an *approved*, constantly attended on-site location.

1206.3.5.4 Spill control and neutralization. Where capacitors contain liquid electrolyte, *approved* methods and materials shall be provided for the control and neutralization of spills of electrolyte or other hazardous materials in areas containing capacitors as follows:

1. For capacitors with free-flowing electrolyte, the method and materials shall be capable of neutralizing a spill of the total capacity from the largest cell or block to a pH between 5.0 and 9.0.
2. For capacitors with immobilized electrolyte, the method and material shall be capable of neutralizing a spill of 3.0 percent of the capacity of the largest cell or block in the room to a pH between 5.0 and 9.0.

1206.3.6 Testing, maintenance and repair. Capacitors and associated equipment and systems shall be tested and maintained in accordance with the manufacturer's instructions. Any capacitors or system components used to replace existing units shall be compatible with the capacitor charger, energy management systems, other capacitors, and other safety systems. Introducing different capacitor technologies into the capacitor energy storage system shall be treated as a new installation and require approval by the *fire code official* before the replacements are introduced into service.

1206.4 Energy storage system in Group R-3 and R-4 occupancies. Energy storage systems in Group R-3 and R-4 occupancies shall be installed and maintained in accordance with this section. The temporary use of an owner or occupant's electric-powered vehicle as an energy storage system shall be in accordance with this section.

***Exception:** Energy storage systems in Group R-3 and R-4 occupancies with a capacity of 3 kWh or less.

1206.4.1 Equipment listings. Energy storage system shall be listed and labeled for residential use in accordance with UL 9540.

Exceptions:

1. Where *approved*, repurposed unlisted battery systems from electric vehicles may be installed outdoors or in detached dedicated cabinets located not less than 5 feet (1524 mm) from exterior walls, property lines and public ways.
2. Energy storage systems less than 1 kWh.

1206.4.2 Installation. Energy storage system shall be installed in accordance with the manufacturer's instructions and their listing.

1206.4.2.1 Spacing. Individual units shall be separated from each other by at least 3 feet (914 mm) of spacing unless smaller separation distances are documented and approved by the *fire code official* to be adequate based on large-scale fire testing.

1206.4.3 Location. Energy storage systems shall only be installed in the following locations:

1. Detached garages and detached accessory structures.
2. Attached garages separated from the dwelling unit living space and sleeping units in accordance with Section 406.3.2 of the *International Building Code*.
3. Outdoors on exterior walls in accordance with 1206.4.3.1
- *4. Other locations with Fire Marshal approval.

1206.4.3.1 Exterior wall and outdoor installations. Energy storage systems shall be permitted to be installed outdoors on exterior walls of buildings or on the ground where all of the following conditions are met:

1. The maximum energy capacity of individual energy storage system units shall not exceed 20 kWh.
- *2. The installation is in accordance with zoning setback requirements.
3. The energy storage system shall be installed in accordance with the manufacturer's instructions and their listing.
4. Individual energy storage system units shall be separated from each other by not less than 3 feet (914 mm).
5. The energy storage system shall be separated from doors, windows, operable openings into buildings, or HVAC inlets by at least 5 feet (1524 mm).

Exception: Where approved by the *fire code official*, smaller separation distances in Items 4 and 5 may be permitted based on large scale fire testing

1206.4.4 Energy ratings. Individual energy storage systems units shall have a maximum rating of 20 kWh. The aggregate rating structure shall not exceed:

*Removed # 1

1. 80 kWh in attached or detached garages and detached accessory structures.
2. 80 kWh on exterior walls.
3. 80 kWh outdoors on the ground.

1206.4.5 Electrical installation. Energy storage system shall be installed in accordance with NFPA 70. Inverters shall be listed and labeled in accordance with UL 1741 or provided as part of the UL 9540 listing. Systems connected to the utility grid shall use inverters listed for utility interaction.

1206.4.6 Fire detection. Rooms and areas within dwellings units, sleeping units and attached garages in which energy storage systems are installed shall be protected by smoke alarms in accordance with Section 907.2.10. A heat detector listed and interconnected to the smoke alarms shall be installed in locations within dwelling units, sleeping units and attached garages where smoke alarms cannot be installed based on their listing.

1206.4.7 Protection from impact. Stationary storage battery systems installed in a location subject to vehicle damage shall be protected by approved barriers. Appliances in garages shall also be installed in accordance with Section 304.3 of the *International Mechanical Code*.

1206.4.8 Ventilation. Indoor installations of energy storage systems that include batteries that produce hydrogen or other flammable gases during charging shall be provided with ventilation in accordance with Section 1206.2.11.3.

1206.4.9 Toxic and highly toxic gas. Energy storage systems that have the potential to release toxic or highly toxic gas during charging, discharging and normal use conditions shall not be installed within Group R-3 or R-4 occupancies.

* * *

Section 2301.4 Indoor motor fuel-dispensing facilities is amended to read as follows:

2301.4 Indoor service stations. Motor vehicle fuel-dispensing stations located inside buildings are prohibited within the entire City of Buckeye.

Exception:

Single family residences for alternative fuels when installed with applicable standards.

Sub-section “2301.4.1 Protection of floor openings in indoor motor fuel dispensing facilities is deleted.

Section 3310 Access for Fire Fighting is amended to add a new subsection:

3310.3 Access road and signage. During construction, approved signs shall be located to direct emergency responders into and through the construction site as required by the Fire Code Official

Section 5001.5.1 Hazardous materials management plan is amended to read as follows:

5001.5.1 Hazardous materials management plan. When required by the fire code official, each application for a permit shall include a Hazardous Materials Management Plan (HMMP). The HMMP shall include a facility site plan and include the information set forth below. HMMP shall be submitted annually or more often if the hazardous material amounts change by greater than 10% in any single category or overall. HMMP shall be submitted electronically in a format acceptable to the Buckeye Fire Department. The submittal shall be required to determine Fire Code Permitting criteria for

storage, use, and/or handling of hazardous materials within the City of Buckeye. Any electronic submittal is acceptable as long as the data will import or interface with the software program currently being used by the Fire Department. Electronic reporting shall be required for all new and existing facilities upon permit renewal.

1. Storage and use areas.
2. Maximum amount of each material stored or used in each area.
3. Range of container sizes.
4. Locations of emergency isolation and mitigation valves and devices.
5. Product conveying piping containing liquids or gases, other than utility-owned fuel gas lines and low pressure fuel gas lines.
6. On and off positions of valves for valves that are of the self-indicating type.
7. Storage plan showing the intended storage arrangement, including the location and dimensions of aisles.
8. The location and type of emergency equipment. The plans shall be legible and drawn approximately to scale. Separate distribution systems are allowed to be shown on separate pages.

Section 5001.5.2 Hazardous materials inventory statement is amended to read as follows:

5001.5.2 Hazardous materials inventory statement (HMIS). Where required by the fire code official, an application for a permit shall include an HMIS, such as SARA (Superfund Amendments and Reauthorization Act of 1986) Title III, Tier II Report, or other approved statement. The HMIS shall include the information set forth below. A HMIS shall be submitted annually or more often if the hazardous material amounts change by greater than 10% in any single category or overall. HMIS shall be submitted electronically in a format acceptable to the City of Buckeye Fire Department. The submittal shall be required to determine Fire Code Permitting criteria for storage, use, and/or handling of hazardous materials within the City of Buckeye. Any electronic submittal is acceptable as long as the data will import or interface with the software program currently being used by the Fire Department. Electronic reporting shall be required for all new and existing facilities upon permit renewal.

1. Manufacturer's name.
2. Chemical name, trade names, hazardous ingredients.
3. Hazard classification.
4. MSDS or equivalent.
5. United Nations (UN), North America (NA) or the Chemical Abstract Service identification number.
6. Maximum quantity stored or used on site at one time.
7. Storage conditions related to the storage type, temperature and pressure.

Section 5505 Use, Dispensing and Handling is amended by adding the following new subsection:

5505.4.5 Trans-filling of liquid oxygen. In addition to the requirements of this section, when trans-filling of liquefied oxygen is performed inside buildings for respiration purposes, the maximum aggregate quantity of all containers shall be limited to 72 pounds (32.7 kg). Trans-filling shall be on bare concrete floors with no combustible seams. The room shall be separated from the means of egress by one-hour fire barriers. The room shall have ventilation to handle off gassing of the containers. Refer

to pamphlet CGA P-2.6, 1995 edition, and NFPA 99 2005 Edition. Trans-filling of Liquid Oxygen to be used for Respiration, for the requirements within health care, residential care, and assisted living facilities.

Section 5704.2.13.1.4 Tanks abandoned in place is amended to read as follows:

5704.2.13.1.4 Tanks abandoned in place. The abandonment of tanks in place shall be prohibited within the entire City of Buckeye.

APPENDIX L REQUIREMENTS FOR FIREFIGHTER AIR REPLENISHMENT SYSTEMS

Section LI01.1 "Scope," is deleted in its entirety and replaced with the following:

LI01.1 Scope. Firefighter air replenishment systems (FARS) shall be provided in accordance with this appendix.

Section LI01.2 "When required," is added to read as follows:

LI01.2 When required. A Fire Fighter Air Replenishment System (FARS) shall be required in all new buildings or structures that meet any of the following:

1. The building or structure has five (5) or more floors above grade; or
2. The building or structure is a high rise building as defined by the International Building Code as adopted and amended by the governing authority; or
3. The building, structure or components thereof are underground and the square footage of the underground building, structure, or component thereof is ten thousand (10,000) feet or more and is located either more than two (2) floors below grade or more than thirty (30) feet below grade.

APPENDIX O
Regional Wireless Cooperative Policies and Procedures
Is added

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REGIONAL WIRELESS COOPERATIVE POLICIES AND PROCEDURES		 Regional Wireless Cooperative	
		No.	0-12.12
Subject:	Effective Date		
Emergency Responder Radio Coverage Systems Policy	05/24/2012		
	Rev: 09/29/2020		
	04/10/2019		

1.0 Purpose

- 1.1. The purpose of this policy is to provide standards for the deployment of Emergency Responder Radio Coverage Systems (ERRCS) to improve radio signal coverage inside of buildings and underground spaces on the Regional Wireless Cooperative (RWC) network.

2.0 Owner

- 2.1. RWC Operations Working Group (OWG).

3.0 Applies To

- 3.1. Any entity installing an ERRCS within the RWC service area and on the radio frequencies licensed from the Federal Communications Commission (FCC) by RWC Member(s.)

4.0 Background

- 4.1. An ERRCS is used to enhance radio signals within buildings, structures or other locations where signals would otherwise be inadequate.
- 4.2. An improperly installed or maintained ERRCS can cause interference or degrade radio performance putting first responder safety at risk.
- 4.3. FCC 47 CFR Part 90.219 Use of Signal Boosters and 47 CFR Part 2 FCC Certification Requirements govern use and certification of radio amplification systems.
- 4.4. An ERRCS may include Bi-Directional Amplifiers (BOA), Distributed Antenna Systems (DAS) or other active devices designed to amplify radio signals.

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5.0 Policy Statement

- 5.1. Entities desiring to operate an ERRCS on RWC Member-licensed frequencies and within the service area of the RWC network must obtain written consent and approval from the licensee per FCC 47 CFR 90.219 (b)(1)(ii).
 - 5.1.1. A Rebroadcast Authorization Form must be submitted prior to any ERRCS installation. This form can be found at rwcaz.org.
- 5.2. RWC network licensed frequencies are managed by the RWC Administrative Manager.
- 5.3. Enhancement of the RWC VHF Fire Hazard Zone network will not be allowed.

6.0 Supporting Rules

- 6.1. Documents required by the RWC for review when applying for Re-Broadcast Authorization:
 - 6.1.1. Complete ERRCS design including site floorplan with antenna and equipment locations and a riser block diagram showing all floors.
 - 6.1.2. Itemized list of system components including manufacturer make and model numbers.
 - 6.1.3. Baseline pre-treatment signal level testing documentation based on RWC donor site and channel data.
- 6.2. As of the date of this policy, Class A amplifiers (see FCC 47 CFR 90.219 (a)) must be used for any ERRCS installed to operate on the RWC 700 MHz P25 network.
 - 6.2.1. Existing Class B amplifiers must continue to be maintained on an annual basis. If an existing Class B amplifier fails it must be replaced with a Class A amplifier.
- 6.3. ERRCS installation contractors must follow the Authority Having Jurisdiction (AHJ) fire code pertaining to ERRCS installations.
- 6.4. Installation of an ERRCS must follow National Fire Protection Association and/or National Electrical Code jurisdictional standards.
- 6.5. ERRCS owner or installation contractor must submit required documents including the RWC Rebroadcast Authorization form. Required forms and documents can be found at rwcaz.org.
 - 6.5.1. Installation of any ERRCS will not be allowed until the required documents are submitted and approved by the RWC. Once approved, the RWC will provide frequencies and subsite location to use.
- 6.6. The RWC does not require entities to maintain any minimum coverage requirements within buildings or structures.

7.0 Responsibilities

- 7.1. Prior to being energized the system design must be provided to the RWC.



REGIONAL WIRELESS COOPERATIVE

Radio Amplification System
Rebroadcast Authorization Application

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- 7.2. ERRCS RF energy for the uplink is extremely important. Contractor must contact the RWC to arrange the testing process required for energizing an ERRCS.
- 7.3. Once the ERRCS is energized, detailed measurements of signal strength of all areas enhanced must be provided.
- 7.4. New and existing radio amplification systems (signal booster), must be registered with the FCC (<https://signalboosters.fcc.gov/signal-boosters/>.)
- 7.5. In the event of interference or malfunction of an ERRCS, the entity responsible for its installation and/or operation shall discontinue operation of the system until it is repaired or interference has been eliminated.
- 7.5.1. The RWC will work with an offending entity to resolve problems due to interference, pursuant to CFR 90.173(b).
- 7.5.2. The RWC will de-energize any ERRCS that is causing interference and cannot be resolved immediately.

8.0 Conditions for Exemption or Waiver

- 8.1. As provided in the Waiver or Exception Policy.

9.0 Applicable Policies and/or Procedures

- 9.1. As listed at www.rwcaz.org.

Pursuant to the Regional Wireless Cooperative (RWC) Radio Amplification Systems Policy (see attached policy), Section 5.1; entities desiring to operate radio amplification systems on a RWC Member's licensed frequencies and within the service area of the RWC network must obtain written consent and approval from the licensee. This document serves as both application for authorization and written consent and approval when completed by both applicant and licensee.

PAGE 1 - APPLICANT INFORMATION (To be completed by applicant)

Proposed Amplification System Site Information:

Location Name: _____

Street Address: _____

City: _____ State: _____ Zip Code: _____



REGIONAL WIRELESS COOPERATIVE

Radio Amplification System
Rebroadcast Authorization Application

Facility Owner Contact Information:

Name: _____

Address: _____

City: _____ State: _____ Zip: _____

Phone: _____

Email: _____

Engineering Agent/Vendor Contact Information:

Name: _____

Address: _____

City: _____ State: _____ Zip: _____

Phone: _____

Email: _____

Facility Occupant Contact

Information Name: _____

_____ Address: _____

_____ City: _____

_____ State: _____ Zip: _____

Phone: _____

Email: _____

Additional

System Activation and Donor Antenna:

Expected system activation date: _____

System design is FCC Part 90:

☐ Class A or ☐ Class

B Donor Antenna Latitude: ° ' " _____

Donor Antenna Longitude ° ' " _____

_____ " _____

Donor Antenna Height Above Ground_Ft. _____

Attachments to be Provided with Application:

☐ Facility floor plan for all building levels including square footage of each floor.

☐ System design including block diagram and itemized list of system components including manufacturer and make/model numbers.

Submit Application and Attachments to (Completed by RWC):

stuart.snow@phoenix.gov

cc email to: _____

cc email to: _____

cc email to: _____

PAGE 2 - LICENSEE AUTHORIZATION (To be completed by licensee)

Donor Site Information:

Donor Site: _____

Street Address: _____

City: _____ FCC Call Sign: _____

Donor Site Latitude: ° __ ' ____ " ____

Donor Site Longitude ° __ ' ____ " ____

Donor Antenna Site Distance __ Miles. Donor Antenna Site Azimuth __ Degrees

FCC REGISTRATION REQUIREMENTS

FCC regulations Section 90.219(d)(5)1 of the Commission's rules require that all Part 90 **Class B** signal booster installations must be registered with the FCC. If this installation is a Class B system it must be registered via the FCC online registration tool within 15 days of system activation. ***Failure to comply with this requirement will result in revocation of this authorization.***

The FCC's Part 90 Class B signal booster registration tool is available at:

www.fcc.gov/signal-boosters/registration

LICENSEE AUTHORIZATION

In consideration of review of the information and requirements provided on this application, the authorized agent of the licensee operating on a RWC Member's licensed frequencies and within the service area of the RWC network hereby consents and approves activation of the radio amplification system as documented herein.

Authorized signature: _____ Title: _____

Print Name: _____ Entity: _____

Date: _____

CITY OF BUCKEYE AMENDMENTS TO THE 2018 INTERNATIONAL FIRE CODE

Amending the City of Buckeye Code of Ordinances, Chapter 15 – BUILDING REGULATIONS, Article 15-2 – BUILDING CODES by amending Section 15-2-10 – Fire Code, to read as follows:

CHAPTER 15 - BUILDING REGULATIONS

* * *

Article 15-2 – BUILDING CODES

* * *

Section 15-2-10 Fire Code

- A. ~~A. Fire Code Adopted.~~ That for the purpose of prescribing regulations governing conditions hazardous to life and property from fire, hazardous materials or for explosion, that certain Code known ~~CERTAIN~~ DOCUMENT DESIGNATED AND MARKED as the International Fire Code, ~~including all Appendix Chapters and Appendix Standards~~ 2018 EDITION, AS published by the International Fire Code Council, ~~being particularly the 2012 Edition thereof and the whole thereof, save and except such portions as are hereinafter deleted, modified or amended by the City,~~ three (3) paper copies OR ONE (1) PAPER COPY AND ONE (1) ELECTRONIC COPY of which ~~have been and are now filed~~ ON FILE in the office of the City Clerk of the City of Buckeye and the same are CITY CLERK, IS hereby adopted and incorporated as BY REFERENCE AS THE CITY'S UNIFORM FIRE CODE AS IF fully as if set out at length FORTH herein; and from the date on which this ordinance shall take effect, the provision thereof shall be controlling within IT IS HEREBY DECLARED TO BE UNLAWFUL TO BE IN VIOLATION OF ANY PROVISION OF THE CITY'S UNIFORM FIRE CODE OR CAUSE OR PERMIT THE SAME TO BE DONE, CONTRARY TO OR IN VIOLATION OF ANY OF the limits PROVISIONS of the City of Buckeye'S UNIFORM FIRE CODE AS HEREBY ADOPTED BY THE CITY COUNCIL.
- B. ~~B. Appeals.~~ Whenever the fire chief disapproves an application or refuses to grant a permit applied for, or when it is claimed that the provisions of the code do not apply or that the true intent and meaning of the code have been misconstrued or wrongly interpreted, the applicant may appeal from the decision of the Fire Chief to City Council within 30 days from the date of the decision appealed.
- C. ~~C. New Materials, Process~~ PROCESSES or Occupancies Which May Require Permits. The fire chief or his designee and the fire marshal shall act as a committee to determine and specify, after giving affected persons an opportunity to be heard, any new materials, ~~process~~ PROCESSES or occupancies for which permits are required in addition to those now enumerated in the International Fire Code. This information shall be posted in a conspicuous place at the fire station and ~~distribute~~ copies thereof SHALL BE DISTRIBUTED to interested persons.
- D. Deletions, Modifications, and Amendments. The following Sections of the ~~2012~~ 2018 Edition of the International Fire Code are amended as follows:

SECTION 101.1 TITLE. “CITY OF BUCKEYE” IS INSERTED AS THE NAME OF JURISDICTION.

SECTION 101.2.1 APPENDICES IS DELETED IN ITS ENTIRETY AND REPLACED WITH THE FOLLOWING:

101.2.1 APPENDICES. THE FOLLOWING APPENDICES ARE ADOPTED BY CITY OF BUCKEYE:

APPENDIX A:	BOARD OF APPEALS
APPENDIX B:	FIRE FLOW REQUIREMENTS FOR BUILDINGS
APPENDIX C:	FIRE HYDRANT LOCATIONS AND DISTRIBUTION
APPENDIX D:	FIRE APPARATUS ACCESS ROADS
APPENDIX E:	HAZARD CATEGORIES
APPENDIX F:	HAZARD RANKING
APPENDIX H:	HAZARDOUS MATERIALS MANAGEMENT PLAN (HMMP) AND HAZARDOUS MATERIALS INVENTORY STATEMENT (HMIS) INSTRUCTIONS
APPENDIX I:	FIRE PROTECTION SYSTEMS – NONCOMPLIANT CONDITIONS
APPENDIX J:	BUILDING INFORMATION SIGN
APPENDIX K:	CONSTRUCTION REQUIREMENTS FOR EXISTING AMBULATORY CARE FACILITIES
APPENDIX L:	REQUIREMENTS FOR FIRE FIGHTER AIR REPLENISHMENT SYSTEMS
APPENDIX N:	INDOOR TRADE SHOW AND EXHIBITIONS
APPENDIX O:	REGIONAL WIRELESS COOPERATIVE, POLICIES AND PROCEDURES

Section 102.10 Administration; applicability; conflicting provisions. ~~Amend~~ IS AMENDED to read as follows:

102.10 Conflicting provisions. Where there is conflict between a general requirement and a specific requirement, the specific requirement shall be applicable. Where there is a conflict between this Code and another Code, rule or regulation of the City of Buckeye, the more stringent shall apply.

Section 104.8, ~~entitled “ Modifications,”~~ is hereby amended by adding ~~a~~ THE FOLLOWING sentence to the beginning of the Section ~~to read as follows:~~

““The designated fire code official may develop guidance and details that are not consistent with the provisions of this code to assist those entities subject to this code comply with the provisions of this code.”

Section 106.107 Inspections is hereby amended by adding ~~a~~ THE FOLLOWING new subsection:

106.2107.2.2 Special inspections. The fire code official is authorized to appoint qualified persons or agencies having special technical skills as special inspectors or plan reviewers and accept their inspection, plan review and evaluation of specialized fire protection equipment or systems.

Section 109.110 Violations is hereby amended by adding ~~a~~ THE FOLLOWING new subsection:

109.4.2

110.4.2 Abatement of environmental, health, fire or life safety hazards by fire code official. If any person fails to comply with the orders of the Fire Code Official, or if the Fire Code Official is unable to locate the owner, operator, occupant or other person responsible within a reasonable time, the Fire Code Official or any authorized representative may take such steps as are necessary to abate the hazard for the protection and safety of the public. In no event is notice necessary before abatement, when the hazard is a clear and present danger to the public welfare. All costs and attorney fees related to such abatement shall become a lien on the subject property.

Section 202 General definitions is hereby amended by adding new definitions TO READ AS FOLLOWS:

~~Authorized emergency vehicle~~ is **AUTHORIZED EMERGENCY VEHICLE.** IS any of the following, per A.R.S. 28-101:

1. ~~1-~~A fire department vehicle,
2. ~~2-~~A police vehicle,
3. ~~3-~~An ambulance or emergency vehicle of a municipal department or public service corporation that is designated or authorized by the department or a local authority, or
4. ~~4-~~Any other ambulance, fire truck or rescue vehicle that is authorized by the department in its sole discretion and that meets liability insurance requirements prescribed by the department.”

~~Fire Hazard~~ which is anything

CUSTODIAL CARE. NON-MEDICAL CARE THAT HELPS AN INDIVIDUAL WITH HIS OR HER ACTIVITIES OF DAILY LIVING, PREPARATION OF SPECIAL DIETS AND SELF-ADMINISTRATION OF MEDICATION NOT REQUIRING CONSTANT ATTENTION OF MEDICAL PERSONNEL. PROVIDERS OF CUSTODIAL CARE ARE NOT REQUIRED TO UNDERGO MEDICAL TRAINING.

FIRE HAZARD. IS ANY THING or act which increases or could cause an increase of the hazard or menace of fire to a greater degree than that customarily recognized as normal by persons in the public service regularly engaged in preventing, suppressing or extinguishing fire or ~~anything~~ ANY THING or act which could obstruct, delay, hinder or interfere with the operation of the fire department or the egress of occupants in the event of fire.

~~Single Family Dwelling.~~ A

PERSONAL CARE SERVICE IS DELETED IN ITS ENTIRETY AND REPLACED WITH THE FOLLOWING:

PERSONAL CARE SERVICE. ASSISTANCE WITH ACTIVITIES OF DAILY LIVING THAT CAN BE PERFORMED BY PERSONS WITHOUT PROFESSIONAL SKILLS OR PROFESSIONAL TRAINING AND INCLUDES THE COORDINATION OR PROVISION OF INTERMITTENT NURSING SERVICES AND ADMINISTRATION OF MEDICATIONS OR TREATMENTS.

OCCUPANCY CLASSIFICATION.

INSTITUTIONAL GROUP I-1. THIS OCCUPANCY SHALL INCLUDE BUILDINGS, STRUCTURES OR PORTIONS THEREOF FOR MORE THAN 10 PERSONS WHO RESIDE ON A 24-HOUR BASIS IN A SUPERVISED ENVIRONMENT, RECEIVE CUSTODIAL CARE, AND ARE CAPABLE OF SELF-PRESERVATION, EXCEPT AS PROVIDED FOR ASSISTED LIVING CENTERS. THIS GROUP SHALL INCLUDE, BUT NOT BE LIMITED TO, THE FOLLOWING:

ALCOHOL AND DRUG CENTERS
ASSISTED LIVING CENTERS
CONGREGATE CARE FACILITIES
CONVALESCENT FACILITIES
GROUP HOMES
HALFWAY HOUSES
RESIDENTIAL BOARD AND CUSTODIAL CARE FACILITIES
SOCIAL REHABILITATION FACILITIES

SIX TO 16 PERSONS RECEIVING CUSTODIAL CARE IS DELETED IN ITS ENTIRETY AND REPLACED WITH THE FOLLOWING:

SIX TO 10 PERSONS RECEIVING CUSTODIAL CARE. A FACILITY SUCH AS ABOVE, HOUSING NOT FEWER THAN SIX AND NOT MORE THAN 10 PERSONS RECEIVING SUCH CARE, SHALL BE CLASSIFIED AS GROUP R-4.

INSTITUTIONAL GROUP I-2 IS DELETED IN ITS ENTIRETY AND REPLACED WITH THE FOLLOWING:

INSTITUTIONAL GROUP I-2. THIS OCCUPANCY SHALL INCLUDE BUILDINGS AND STRUCTURES USED FOR MEDICAL CARE ON A 24-HOUR BASIS FOR MORE THAN FIVE PERSONS WHO ARE INCAPABLE OF SELF-PRESERVATION. THIS GROUP SHALL INCLUDE, BUT NOT BE LIMITED TO, THE FOLLOWING:

FOSTER CARE FACILITIES
DETOXIFICATION FACILITIES
HOSPITALS
ASSISTED LIVING CENTERS
PSYCHIATRIC HOSPITALS

ARIZONA STATE DEPARTMENT OF HEALTH FACILITIES. ALL FACILITIES AS LICENSED BY THE STATE OF ARIZONA DEPARTMENT OF HEALTH, FURTHER KNOWN AS, BUT NOT LIMITED TO, DIRECT CARE, PERSONAL CARE, SUPERVISORY CARE AND BEHAVIORAL RESIDENTIAL AGENCY, HOUSING AT LEAST SIX AND NOT MORE THAN 10 PERSONS SHALL BE CONSIDERED A GROUP R-4.

RESIDENTIAL GROUP R-3 “CONGREGATE LIVING FACILITIES” IS AMENDED TO READ AS FOLLOWS:

CONGREGATE LIVING FACILITIES (NONTRANSIENT) WITH 10 OR FEWER OCCUPANTS

CARE FACILITIES WITHIN A DWELLING IS DELETED IN ITS ENTIRETY AND REPLACED WITH THE FOLLOWING:

CARE FACILITIES WITHIN A DWELLING. LICENSED CARE FACILITIES FOR 10 OR FEWER PERSONS RECEIVING CARE THAT ARE WITHIN A single -family dwelling ARE PERMITTED.

RESIDENTIAL GROUP R-4 IS DELETED IN ITS ENTIRETY AND REPLACED WITH THE FOLLOWING:

RESIDENTIAL GROUP R-4. THIS OCCUPANCY SHALL INCLUDE BUILDINGS, STRUCTURES OR PORTIONS THEREOF FOR MORE THAN FIVE BUT NOT MORE THAN 10 PERSONS, EXCLUDING STAFF, WHO RESIDE ON A 24-HOUR BASIS IN A SUPERVISED RESIDENTIAL ENVIRONMENT AND RECEIVE CUSTODIAL CARE. THE PERSONS RECEIVING CARE ARE CAPABLE OF SELF-PRESERVATION, EXCEPT AS PROVIDED FOR ASSISTED LIVING HOMES. THIS GROUP SHALL INCLUDE, BUT NOT BE LIMITED TO, THE FOLLOWING:

HALFWAY HOUSES
RESIDENTIAL BOARD AND CUSTODIAL CARE
FACILITIES
SOCIAL REHABILITATION FACILITIES

GROUP R-4 OCCUPANCIES SHALL MEET THE REQUIREMENTS FOR CONSTRUCTION AS DEFINED FOR GROUP R-3 OR ONE- AND TWO-FAMILY DWELLINGS, EXCEPT AS OTHERWISE PROVIDED FOR IN THIS CODE.

CONDITION 1. THIS OCCUPANCY CONDITION SHALL INCLUDE FACILITIES LICENSED TO PROVIDE SUPERVISORY CARE SERVICES, IN WHICH OCCUPANTS ARE CAPABLE OF SELF-PRESERVATION BY RESPONDING TO AN EMERGENCY SITUATION WITHOUT PHYSICAL ASSISTANCE FROM STAFF. CONDITION FACILITIES HOUSING MORE THAN 10 PERSONS SHALL BE CLASSIFIED AS GROUP I-2.

CONDITION 2. THIS OCCUPANCY CONDITION SHALL INCLUDE FACILITIES LICENSED TO PROVIDE PERSONAL OR DIRECTED CARE SERVICES, IN WHICH OCCUPANTS ARE INCAPABLE OF

SELF-PRESERVATION BY RESPONDING TO AN EMERGENCY SITUATION WITHOUT PHYSICAL ASSISTANCE FROM STAFF. CONDITION 2 FACILITIES HOUSING MORE THAN 10 PERSONS SHALL BE CLASSIFIED AS GROUP I-2.

SINGLE FAMILY DWELLING. A SINGLE FAMILY DWELLING is less than 5000 square feet measured under the roof line, remote and detached from all other structures and property lines and meets all set back requirements as outlined in the current City of Buckeye Development Code or Standards.

~~National Institute for the Certification of Engineering Technologies, which is~~

NATIONAL INSTITUTE FOR THE CERTIFICATION OF ENGINEERING TECHNOLOGIES. IS hereafter referred to as NICET (1420 King Street, Alexandria, VA, 22314-2915).

~~Sky Lantern. A sky lantern is~~

SKY LANTERN. IS a device designed to carry an open flame as an airborne light. It is also known as kongming lantern, ~~which~~wish lantern, sky candle, fire balloon, etc.

Section 308.1.1 ~~entitled, "Where prohibited," is hereby amended by adding a~~THE FOLLOWING new subsection:

308.1.1.1 Sky lantern. The lighting of, and the release of, sky lanterns shall be prohibited.

Section 308.1.4 OPEN-FLAME COOKING DEVICES IS AMENDED TO READ AS FOLLOWS AND TO ADD THE FOLLOWING NEW SUBSECTION:

308.1.4 Open-flame cooking devices ~~is hereby amended to read as follows:~~

3081.4 Open-flame cooking devices. Charcoal burners, portable barbecues and other open flame devices shall not be operated on combustible balconies or within 10 feet (3,048–3048mm) of combustible construction.

Exception:

Single family dwellings.

~~Section 308.1.4.1 Liquefied-petroleum-gas-fueled cooking devices. Amend to read as follows:~~

308.1.4.1 Liquefied- petroleum-gas-fueled cooking devices. No person shall use individual fixed or portable LP-gas burners or barbecues on or under any attached covered patios, balconies, covered walkways, stair or roof overhangs and shall not be located within 10 feet (3,048 mm) of combustible construction. Liquid propane grills are not allowed above the ground floor and LP cylinders shall not be stored in or transported through the building.

Exception:

Single family dwellings.

Section 503 Fire apparatus access roads is hereby amended by adding AMENDING SUBSECTION 503.1.2.1 TO READ AS FOLLOWS AND TO ADD THE FOLLOWING new subsections:

503.1.2.1 Additional access. Residential developments where the number of dwelling units exceeds ~~40~~20 shall be provided with two separate and approved fire apparatus access roads.

503.1.4 Temporary fire apparatus access roads. Temporary fire apparatus access roads, such as those used for fire department access during construction, must comply with Section 503.1.7.

503.1.5 Required access. Fire apparatus access is required within 150 feet of all points on the exterior of the building.

503.1.6 Width. Temporary fire apparatus access roads shall be a minimum of 20 feet in width.

503.1.7 Surface. The access roadway surface is usable in all weather conditions. Temporary fire apparatus access roads shall be constructed as follows: Minimum 6 inches of native soil compacted to 95% of standard proctor density (ASTM D698), and Minimum 4 inches of aggregate base compacted to 100% of standard proctor density (ASTM D698). The surface of temporary fire apparatus access roads may differ from the above requirements if it is shown that the surface provided is sufficient to support an imposed live load of 75,000 pounds with a maximum axle load of 24,000 pounds.

503.1.8 Stabilization. Curbs are not required for temporary fire apparatus access roads.

Section 503.3 Marking.~~Amend~~ IS AMENDED to read as follows:

Where required by the fire code official, approved signs or other approved notices shall be provided for fire apparatus access roads (fire lanes) to identify such roads or prohibit the obstruction thereof on public and private property. Signs or notices shall be maintained in a clean and legible condition at all times and shall be replaced or repaired when necessary to provide adequate visibility. All fire lanes shall be marked in the following manner:

1. ~~1-~~Fire lane signs per City of Buckeye will adhere to standard detail specifications (City of Buckeye detail number ~~B-36531452~~).
2. ~~2-~~Curb, street or driveway will be painted red to indicate fire lane and labeled "'FIRE LANE NO PARKING'" in white block letters 3 inches (76.2 mm) in height with a $\frac{3}{4}$ in. (19.5 mm) stroke, on the vertical face of the curb to indicate a fire lane.
3. ~~3-~~Lettering shall not be greater than 75'-0" (15.24 m) apart and shall be posted at the beginning and end of the fire lane.
4. ~~4-~~It shall be unlawful for any vehicle, equipment or device to park in or block the fire lane. Any vehicle, equipment or device found parked in or blocking a fire lane shall be cited by the police or the fire department.

Exception:

Authorized emergency vehicles.

Section 503.6 Security gates. ~~Amend~~ IS AMENDED by adding THE FOLLOWING ~~new sub~~ sections:

503.6.6~~503.6.1~~ Fire department access limiting gates. All gates limiting access will be required to provide emergency Access controls for Fire Department entry.

503.6.7~~503.6.2~~ Gate operations. Operation of the gate shall be by pre-emption device and key switch.

503.6.8~~503.6.3~~ Permit required. Gate Access information and scale plans shall be submitted to the Fire Department for a permit.

503.6.9~~503.6.4~~ Minimum installation standards. The installation of preemption devices shall comply with the following:

1. ~~1-~~Traffic Preemption opening device shall be on all motorized gates. Opticom, 3M, OR TOMAR, Model Specified by the Fire Department at time of installation shall be used.
2. ~~2-~~Detectors shall be mounted 8 to 10 feet above grade.
3. ~~3-~~Detectors shall be located a minimum of 18 inches behind the gate on the property side.
4. ~~4-~~Detectors shall be mounted on a separate 4 inch by 4 inch metal post and not on the guidepost. The metal post shall be secured in concrete a minimum of 18 inches below grade.
5. ~~5-~~Detectors shall activate at a minimum of 150 feet from the gate.
6. ~~6-~~Detectors shall point toward both the approach and the exit path of the emergency vehicle.”
7. ~~7-~~The sight path of the detector shall be free of visual obstructions such as signs, covered parking, canopies and vegetation.
8. ~~8-~~Individual detectors shall be mounted together with the power module in a dual detector-mounting box. Detectors shall be approved by the fire department. A list of approved devices will be maintained by the fire department and available to the public.

503.6.5 Gate access roadways. The gates shall be designed so that the access roadway or turning radius (WB50) shall not be obstructed by the operation of the gate. Minimum set back from the public streets shall be a distance determined by the City Engineer and allow the emergency vehicle the ability to safely operate the lock box or panel. Turning radius from the public street shall be WB50.

503.6.6 Keyed access. The lock box, padlock or key switch, must be an approved model utilized by the Buckeye Fire Department. Lock Box Authorized Forms may be picked up at the City of Buckeye Fire Department, Monday through Thursday, 7:00 am to 6:00 pm.

503.6.7 Access controls. Access controls shall be exterior to the gate and located for activation by the vehicle operator without dismounting from the vehicle. The height of the lock box/control panel shall be sixty (60) inches to sixty six (66) inches, measured from the finished grade line of the street.

503.6.8 Access signage. The control pedestal must be identified with a minimum six (6) inch by ~~Ten~~TEN (10) inch sign with white reflective letters on a red background. This sign must be securely fastened to the pedestal and legible from the approaching vehicle, and read: EMERGENCY FIRE DEPARTMENT ACCESS.

503.6.9 Gate operation. Gates must fully open within fifteen (15) seconds of activation and remain in the open position for thirty minutes or until closed by the Fire Department.

503.6.10 Fail safe operation. Battery back-up for all motorized gates is required, unless the gate fails safe (open) in the event of a power failure.

~~Section 503 Fire apparatus access roads. Amend by adding a new subsection:~~

Section 503.7 Hillside building requirements. Residential developments where the access and operations of emergency services is determined by the Fire Code Official to be impacted by the terrain or other geographical issues may require additional fire protection and safety requirements for construction. These requirements include, but are not limited to:

1. ~~1-~~All Structures are to be fully protected by an automatic fire sprinkler system including the attic.
2. ~~2-~~On all driveways exceeding 150 feet or of a design that would impair access, a horizontal standpipe will be required.
3. ~~3-~~All lots will require an operational platform of 400 square feet and of a design approved by the Fire Code Official.
4. ~~4-~~Pullouts constructed of an all-weather surface will be required next to fire hydrants on all private drives or access roadways less than 20 feet in width.
5. ~~5-~~Grades exceeding 15% will require flat areas for acceleration and staging.

Section 505 Premises~~505.1 Address identification is hereby amended to read as follows AND TO ADD THE FOLLOWING NEW SUBSECTIONS:~~

505.1 Address numbers IDENTIFICATION. New and existing buildings shall have approved address numbers, building numbers or approved building identification placed in a position that is plainly legible and visible from the street or road fronting the property. WHERE ACCESS IS BY MEANS OF A PRIVATE ROAD AND THE BUILDING ADDRESS CANNOT BE VIEWED FROM THE PUBLIC WAY, A MONUMENT, POLE OR OTHER APPROVED SIGN OR MEANS SHALL BE USED TO IDENTIFY THE STRUCTURE. These numbers shall contrast with their background. Address numbers shall be Arabic numerals or alphabet letters. ADDRESS NUMBERS SHALL BE MAINTAINED.

505.1.2 Address and building numbers for commercial properties shall be a IDENTIFICATION MULTI-FAMILY RESIDENTIAL. WITHIN MULTI-FAMILY RESIDENTIAL COMPLEXES, THE BUILDING(S) NEAREST THE STREET MUST IDENTIFY THE STREET NUMBER OF THE COMPLEX WITH minimum of 12 inches (305 mm) EIGHTEEN (18) INCH high CONTRASTING NUMBERS/LETTERS with a minimum THREE (3) INCH stroke width of 2.0 inch (51 mm). Units within a building. ALL BUILDINGS WITHIN THE COMPLEX SHALL IDENTIFY THE BUILDING NUMBER/LETTER WITH MINIMUM EIGHTEEN (18) INCH HIGH CONTRASTING NUMBERS/LETTERS WITH A THREE (3) INCH STROKE WIDTH. BUILDINGS ARE REQUIRED TO PROVIDE TWO (2) OR MORE BUILDING IDENTIFICATION SIGNS

PER EACH ONE HUNDRED (100) FEET OF THE LENGTH OF THE BUILDING ELEVATION. ALL BUILDINGS WITHIN THE COMPLEX SHALL INCLUDE APARTMENT SPREAD NUMBERS (E.G. UNITS 201-210) IDENTIFIED WITH MINIMUM SEVEN (7) INCH HIGH CONTRASTING NUMBERS/LETTERS WITH A ONE (1) INCH STROKE WIDTH. EACH INDIVIDUAL UNIT SHALL BE IDENTIFIED NEAR THE UNIT ENTRYWAY USING MINIMUM FOUR (4) INCH HIGH CONTRASTING NUMBERS/LETTERS WITH A FIVE-EIGHTHS (5/8) INCH MINIMUM STROKE WIDTH.

505.1.3 ADDRESS IDENTIFICATION COMMERCIAL/EMPLOYMENT. ALL COMMERCIAL AND EMPLOYMENT BUILDINGS SHALL IDENTIFY THE STREET NUMBER OF THE BUILDING WITH MINIMUM EIGHTEEN (18) INCH HIGH CONTRASTING NUMBERS/LETTERS WITH A THREE (3) INCH STROKE WIDTH. ALL COMMERCIAL AND EMPLOYMENT BUILDINGS WITHIN MULTI-BUILDING COMPLEXES MUST IDENTIFY THE BUILDING NUMBER/LETTER WITH MINIMUM EIGHTEEN (18) INCH HIGH CONTRASTING NUMBERS/LETTERS WITH A THREE (3) INCH STROKE WIDTH. EACH INDIVIDUAL UNIT shall be identified NEAR THE PRIMARY UNIT ENTRYWAY USING ~~minimum of 6 inches (152 mm)~~ SIX (6) INCH high CONTRASTING NUMBERS/LETTERS with a ~~minimum~~ ONE (1) INCH stroke width ~~of 1.0 inch (25.4 mm)~~. Individual unit or suite numbers shall be a minimum of 4 inches (102 mm) high with a minimum stroke width of 0.5 inch (12.7 mm). REAR DOORS OF COMMERCIAL BUILDINGS WITH INDIVIDUAL SUITES (STRIP MALLS) SHALL BE IDENTIFIED USING MINIMUM SIX (6) INCH HIGH CONTRASTING NUMBERS/LETTERS WITH A ONE (1) INCH STROKE WIDTH.

505.1.4 ADDRESS IDENTIFICATION ONE- AND TWO-FAMILY RESIDENTIAL DWELLINGS. One- and two -family dwelling shall be a minimum of 4 inches (102 mm) high with a minimum stroke width of 0.5 inch (12.7 mm). ~~Where access is by means of a private road and the building cannot be viewed from the public way, a monument, pole or other sign or means shall be used to identify the structure. Address numbers shall be maintained.~~

Section 506.1 ~~Fire service features; key boxes.~~ Amend WHERE REQUIRED IS AMENDED to read as follows:

506.1 Where required. Where access to or within a structure or an area is restricted because of secured openings or where immediate access is necessary for life-saving or fire- fighting purposes, or where there is an automatic fire sprinkler or fire alarm system, the Fire Official is authorized to require a key box to be installed in an accessible location(s). The key box shall be an approved type and shall contain keys to gain access as required by the Fire Official.

Section 507.1 ~~Required water supply.~~ Amend 507 FIRE PROTECTION WATER SUPPLIES IS AMENDED BY AMENDING SECTION 507.1 TO READ AS FOLLOWS, AND BY ADDING NEW SUBSECTIONS 507.1.2, 507.5.2.1, 507.5.7, AND 507.8 to read as follows:

507.1 Required water supply. Water supplies for automatic and manual fire suppression and fire hydrants shall be in accordance with Appendix B. When water is not available, or if the flow rate, pressure, or duration of the water available from the City of Buckeye or Private water Company does not meet the minimum requirements of this code, the owner shall be responsible for installing the entire infrastructure required to meet the fire flow, pressure, and duration requirements of this code.

~~Section 507 Fire protection water supplies. Amend by adding new subsections:~~

507.1.2 Failure to provide water supply. Failure to provide the required water supply necessary for fire protection shall be considered a hazard to life or property and is subject to enforcement under Section ~~409~~110 of this code.

507.5.2.1 Inspection of private water supply systems. Private water supply system installations and modifications shall be subject to field inspection and tests by the Fire Department.

507.5.5 ~~507.5.7~~ Height. Fire hydrants shall be installed so that the centerline of the lowest outlet is not less than 18 inches above grade and the highest outlet does not exceed 30 inches above grade.

507.5.6 ~~507.5.8~~ Color of hydrants. The color of hydrants shall be fire hydrant yellow. Private fire hydrants shall have the bonnet painted reflective white. Hydrants not intended for fire department use shall have the bonnet painted black.

~~Section 510 Emergency responder radio coverage. Amend~~**RESPONDER RADIO COVERAGE IS AMENDED** by adding THE FOLLOWING new subsections TO READ AS FOLLOWS:

~~510.00~~ ~~510.01~~ Purpose. The purpose of this article is to provide minimum standards to insure a reasonable degree of reliability for emergency services communications from within certain buildings and structures within the City of Buckeye to and from emergency communications centers. It is the responsibility of the emergency service provider to get the signal to and from the building site.

~~510.01~~ ~~510.02~~ Scope. The provisions of this article shall apply to new buildings and structures of construction greater than fifty thousand (50,000) square feet or modifications made within any twelve (12) month period and exceed fifty percent (50%) of the value of the existing building(s) or structure(s), or the use of the property is expanded or enlarged by fifty percent (50%), which have not received a final inspection prior to the adoption of these provisions; and All basements or sub-level parking structures over ten thousand (10,000) square feet where the design occupant load is greater than fifty (50), regardless of the occupancy. For the purpose of this section, area separation walls cannot be used to define separate buildings.

Section 510.03 Radio coverage. Except as otherwise provided in this article, no person shall erect construct or modify any building or structure or any part thereof, or cause the same to be done which fails to support adequate radio coverage for firefighters and police officers and other public safety personnel. A final inspection shall not be approved for any building or structure that fails to comply with this requirement.

SECTION 510.04 REGIONAL WIRELESS COOPERATIVE. IN ADDITION TO THE REQUIREMENTS OF SECTION 510, COMPLIANCE WITH APPENDIX “O” IS REQUIRED.

Section 510.3.1 Permit and approval. The City's Telecommunications unit with consideration of the appropriate police, fire and emergency medical department services, at the time the building permit is issued, shall determine the frequency range or ranges that must be supported. For the purpose of this section, adequate radio coverage shall constitute a successful communications test between the building and the communications centers for all appropriate emergency service providers for the building.

Section 901 ~~Fire protection systems~~ GENERAL is hereby amended by adding THE FOLLOWING new sub-sections TO READ AS FOLLOWS:

901.2.2 ~~901.2.2~~ Plan certification for fire alarm systems and occupant notification. All fire alarm and occupant notification system plans submitted to the fire department for review and approval shall bear a qualified registrants seal or review certification of a minimum level III NICET in Fire Alarms.

901.2.3 ~~901.2.3~~ Plan certification for fire sprinkler systems. All fire sprinkler plans submitted to the fire department for review and approval shall bear a qualified registrant's seal or review certification of a minimum level III NICET in fire sprinklers in accordance with fire department Interpretation and Applications Manual.

901.2.4 ~~901.2.4~~ Plan certification for all other fire protection systems. Plan certification for all other fire protection systems will be accompanied by a certification of competence when required.

901.2.5 ~~901.2.5~~ On-site plans. Plans and specifications shall be submitted to the fire department for review and approval prior to construction. One set of fire department approved plans shall be on the job site for each inspection.

SECTION 901.5.1 OCCUPANCY IS AMENDED TO READ AS FOLLOWS:

901.5.1 IT SHALL BE UNLAWFUL TO USE, OCCUPY OR FURNISH ANY PORTION OF A STRUCTURE UNTIL THE FIRE PROTECTION SYSTEMS OF THE STRUCTURE HAVE BEEN TESTED AND APPROVED.

Section 901.7 Systems out of service is amended by adding the following sentence at the end of the section: "No required fire sprinkler system or fire alarm system shall be placed out of service for more than 8 hours in any one day without written authorization by the fire code official."

Section 903.2 Where required is amended to read as follows:

903.2 Where required. An automatic sprinkler system shall be installed throughout all levels of new Groups A, B, E, F, H, I, M, R, S and U occupancies of more than zero (0) square feet.

Exceptions:

The following accessory structures shall be exempt from fire sprinkler requirements:

1. ~~1. Gazebo and Ramada's for residential and public use.~~
2. ~~2. Independent rest room buildings that are associated with golf courses, parks and similar uses.~~
3. ~~3. Guardhouses for residential and commercial developments.~~
4. ~~4. Detached non-combustible carports or parking structures for residential and commercial developments with covered parking less than 15,000 square feet (1,394 m²).~~ EACH NON-COMBUSTIBLE CARPORT SHALL NOT EXCEED 2,000 SQUARE FEET, AND SHALL BE SEPARATED FROM OTHER PARKING STRUCTURES BY A MINIMUM OF TEN (10) FEET FROM THE MAIN BUILDING. WHERE THERE ARE A GROUP OF CARPORTS AND EACH ONE DOES NOT EXCEED 2,000 SQUARE FEET, THE MINIMUM SEPARATION REQUIRED BETWEEN CARPORTS SHALL BE TEN (10) FEET.
5. ~~5. Barns and agricultural buildings for private, residential, non-commercial use, not exceeding 1,500 square feet (139.35 m²) with no habitable areas.~~
6. ~~6. Detached storage sheds for private, residential, non-commercial use, not exceeding 1,500 square feet (139.35 m²).~~
7. ~~7. Detached 1, 2 and 3 car garages (without habitable spaces) in existing R-3 developed parcels.~~
8. ~~8. Fabric covered shade structures.~~
9. ~~9. —~~
8. NON-COMBUSTIBLE DETACHED WASH RACKS AND CANOPIES WITH FLAME RETARDANT SUNSCREEN.
9. Open shade horse stalls of non-combustible construction for private, residential, non-commercial use, not exceeding 5,000 square feet (464.52 m²) and no storage of combustible products, vehicles, or agricultural equipment.
10. TELECOMMUNICATIONS BUILDING:
 - A. A MINIMUM OF 20 FEET SHALL BE PROVIDED FROM THE STRUCTURE(S) TO THE CLOSEST BUILDING ON THE SITE.
 - B. A MINIMUM OF 20 FEET SHALL BE PROVIDED FROM THE STRUCTURE(S) TO THE PROPERTY LINE.
 - C. A FIRE HYDRANT SHALL BE LOCATED A MAXIMUM OF 350 FEET FROM THE STRUCTURE OR AN APPROVED DISTANCE APPROVED BY THE FIRE MARSHAL.
 - D. CLEAR AND UNOBSTRUCTED 20 FOOT FIRE APPARATUS ACCESS SHALL BE PROVIDED TO THE STRUCTURE(S).
 - E. RECOMMENDED A BASIC FIRE ALARM WITH SMOKE DETECTION TIED INTO THE SCADA SYSTEM, FOR EARLY DETECTION AND NOTIFICATION.
 - F. AN APPROVED FIRE SUPPRESSION SYSTEM MAY BE REQUIRED BASED ON LOCATION AND OR SINGLE SOURCE INFRASTRUCTURE COVERAGE AREA.
 - G. THE STORAGE OR USE OF FLAMMABLE LIQUIDS OR ANY OTHER HAZARDOUS MATERIALS IN THE STRUCTURE IS PROHIBITED.
 - H. INDEPENDENT STRUCTURE OF NONCOMBUSTIBLE CONSTRUCTION WILL BE LIMITED TO 200 SQUARE FOOT OR LESS.
10. Special use non-combustible structures as approved by the chief.

Section 903.2.1 Group A is hereby amended to read as follows:

903.2.1 Group A. An automatic sprinkler system shall be installed throughout all Group A occupancies in accordance with NFPA 13 Installation of Sprinkler Systems and Fire Department Interpretation and Applications Manual.

Exceptions:

1. ~~1-~~An automatic sprinkler system need not be provided when the floor area of a temporary amusement building is less than 1,000 square feet and the exit travel distance from any point is less than 50 feet.
2. ~~2-~~Press boxes and storage facilities less than 1,000 square feet in area and in conjunction with outdoor seating facilities where all means of egress in the seating area are essentially open to the outside.

Section 903 Automatic sprinkler systems. ~~Amend~~ IS AMENDED by adding new sub-sections TO READ AS FOLLOWS:

903.2.2.1 Group B occupancies. An automatic sprinkler system shall be installed throughout all Group B occupancies in accordance with NFPA 13 Installation of Sprinkler Systems as modified by Fire Department Interpretation and Applications Manual.

903.3.2.3 Group E. An automatic sprinkler system shall be installed throughout all Group E occupancies in accordance with NFPA 13 Installation of Sprinkler Systems and Fire Department Interpretation and Applications Manual.

903.2.4 Group F. An automatic sprinkler system shall be installed throughout all Group F occupancies in accordance with NFPA 13 Installation of Sprinkler Systems and Fire Department Interpretation and Applications Manual.

903.2.5 Group H. An automatic sprinkler system shall be installed throughout all Group H occupancies in accordance with NFPA 13 Installation of Sprinkler Systems and Fire Department Interpretation and Applications Manual.

~~Section 903.2.5 Group H.~~ Amend by deleting subsection 903.2.5.1 entitled "General."

Section 903.2.5 Group H is hereby AMENDED BY DELETING SUB-SECTION 903.2.5.1 ENTITLED "GENERAL."

SECTION 903.2.5 GROUP H IS amended by deleting sub=section 903.2.5.2 entitled "'Group H-5 occupancies.'"

Section 903.2.5 Group H. ~~Amend~~ IS AMENDED by deleting sub=section 903.2.5.3 entitled "'Pyroxylin Plastics.'"

Section 903.2.6 Group I. ~~Amend~~ IS AMENDED to read as follows:

903.2.6 Group I. An automatic sprinkler system shall be installed throughout all Group I occupancies in accordance with NFPA 13 Installation of Sprinkler Systems and Fire Department Interpretation and Applications Manual.

Exception:

In jails, prisons and reformatories, the piping system may be dry, provided a manually operated valve is installed at a continuously monitored location. Opening of the valve will cause the piping system to be charged. Sprinkler heads in such systems shall be equipped with fusible elements or the system shall be designed as required for deluge systems in the Building Code.

Section 903.2.7 Group M.~~Amend~~ IS AMENDED to read as follows:

903.2.7 Group M. An automatic sprinkler system shall be installed throughout all Group M occupancies in accordance with NFPA 13 Installation of Sprinkler Systems and Fire Department Interpretation and Applications Manual.

Section 903.2.8 Group R is ~~hereby~~ amended to read as follows:

903.2.8 Group R. An automatic sprinkler system shall be installed throughout all Group R occupancies in accordance with NFPA 13, 13-R, or 13D Installation of Sprinkler Systems and Fire Department Interpretation and Applications Manual.

Exception:

Single Family Dwellings less than 5000 square feet measured under the roof line, remote and detached from all other structures and property lines and meets all set back requirements as outlined in the current City of Buckeye development rules or standards.

Zero lot lines, Z-lots, court homes, cluster homes, condominiums, patio homes, townhomes and non-traditional housing units are not considered a single family structure and all other housing units by their design, construction or location, present access issues for Fire Department response and are required to be protected throughout with an approved automatic sprinkler system.

Section 903.2.9 Group S.~~Amend~~ IS AMENDED to read as follows:

903.2.9 Group S. An automatic sprinkler system shall be installed throughout all Group S occupancies in accordance with NFPA 13 Installation of Sprinkler Systems and Fire Department Interpretation and Applications Manual.

Section 903.2.9.1 Repair garages.~~Amend~~ IS AMENDED to read as follows:

903.2.9.1 Repair garages. An automatic sprinkler system shall be installed throughout all repair garages in accordance with NFPA 13 Installation of Sprinkler Systems as modified by Fire Department Interpretation and Applications Manual.

Section 903.2.9.2 Bulk storage of tires.~~Amend~~ IS AMENDED to read as follows:

903.2.9.2 Bulk storage of tires. An automatic sprinkler system shall be installed throughout all bulk tire storage facilities in accordance with NFPA 13 Installation of Sprinkler Systems as modified by Fire Department Interpretation and Applications Manual.

Section 903.2.10 Group S-2 is hereby amended to read as follows:

903.2.10 Group S-2 occupancies. An automatic sprinkler system shall be installed throughout all Group S-2 occupancies in accordance with NFPA 13 Installation of Sprinkler Systems as modified by Fire Department Interpretation and Applications Manual.

Section 903.2.10.1 Commercial parking garages. Amend IS AMENDED to read as follows:

903.2.10.1 Commercial parking garages. An automatic sprinkler system shall be installed throughout all commercial parking garages in accordance with NFPA 13 Installation of Sprinkler Systems as modified by Fire Department Interpretation and Applications Manual.

Section 903.2.11.1 Stories without openings. Amend IS AMENDED by adding a new sub=section as follows:

903.2.11.1.4 Windowless stories in all occupancies. An automatic sprinkler system shall be installed throughout all Windowless stories in all occupancies in accordance with NFPA 13 Installation of Sprinkler Systems as modified by Fire Department Interpretation and Applications Manual.

Section 903.2.11.3 Buildings 55 feet or more in height is hereby amended to read as follows:

903.2.11.3. Buildings 55 feet or more in height. An automatic sprinkler system shall be installed throughout all buildings 55 feet or more in height in accordance with NFPA 13 Installation of Sprinkler Systems as modified by Fire Department Interpretation and Applications Manual.

Section 903.3 Installation requirements. Amend IS AMENDED to read as follows:

903.3 Installation requirements. Automatic sprinkler systems shall be designed and installed in accordance with NFPA 13, 13-R, 13-D 13 Installation of Sprinkler Systems as modified by Fire Department Interpretation and Applications Manual.

Section 1016 Exit access travel distance. Amend **903.4.1 MONITORING** IS AMENDED by adding a THE FOLLOWING new subsection as follows:

1016.2.2 Group

903.4.1.2. FIRE SPRINKLER MONITORING SYSTEMS. A MINIMUM OF 1 LISTED ALL-WEATHER HORN STROBE WILL BE REQUIRED AT THE FRONT OF A BUILDING IN THE COMMON AREA, THE NOTIFICATION DEVICE SHALL BE AUDIBLE IN ALL OCCUPIED SUITES

SECTION 907.2.7 GROUP M IS AMENDED BY ADDING THE FOLLOWING NEW SUBSECTION:

907.2.7.1.2. FIRE SPRINKLER MONITORING SYSTEMS. A MINIMUM OF 1 LISTED ALL-WEATHER HORN STROBE WILL BE REQUIRED AT THE FRONT OF A BUILDING IN THE

COMMON AREA, THE NOTIFICATION DEVICE SHALL BE AUDIBLE IN ALL OCCUPIED SUITES.

SECTION 1017.2.2 GROUPS F-1 and S-1 increase. ~~The maximum exit access travel distance shall be 400 feet (122 m) in Group F-1 and S-1 occupancies where all of~~ IS AMENDED BY ADDING the following are met
NEW SUB-SECTION:

- ~~1. The portion of the building classified as Group F-1 or S-1 is limited to one story in height.~~
- ~~2. The minimum height from the finish floor to the bottom of the ceiling or roof slab or deck is 24 feet (7,315 mm); and~~
- ~~3. The building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 and Chapter 32 of this code.~~
- ~~4. Additional building access shall be provided in accordance with this code, Sections 3206.6 through 3206.6.1.3.~~

1016.2.2.1

1017.2.2.1 Group F-1 and S-1 with a storage area greater than 500,000 square feet (46,451 m²). When storage areas in Group F-1 and S-1 occupancies are greater than 500,000 square feet a technical report prepared by an Arizona professional shall be submitted for review and approval by the *fire code official*. Additional fire protection or life safety systems, or both, may be required by the Fire Marshal.

CHAPTER 12 ENERGY SYSTEMS IS DELETED IN ITS ENTIRETY AND REPLACED WITH THE FOLLOWING.

CHAPTER 12 ENERGY SYSTEMS

USER NOTE:

ABOUT THIS CHAPTER: CHAPTER 12 WAS ADDED TO ADDRESS THE CURRENT ENERGY SYSTEMS FOUND IN THIS CODE, AND IS PROVIDED FOR THE INTRODUCTION OF A WIDE RANGE OF SYSTEMS TO GENERATE AND STORE ENERGY IN, ON AND ADJACENT TO BUILDINGS AND FACILITIES. THE EXPANSION OF SUCH ENERGY SYSTEMS IS RELATED TO MEETING TODAY'S ENERGY, ENVIRONMENTAL AND ECONOMIC CHALLENGES. ENSURING APPROPRIATE CRITERIA TO ADDRESS THE SAFETY OF SUCH SYSTEMS IN BUILDING AND FIRE CODES IS AN IMPORTANT PART OF PROTECTING THE PUBLIC AT LARGE, BUILDING OCCUPANTS AND EMERGENCY RESPONDERS. MORE SPECIFICALLY, THIS CHAPTER ADDRESSES STANDBY AND EMERGENCY POWER, PHOTOVOLTAIC SYSTEMS, FUEL CELL ENERGY SYSTEMS, BATTERY STORAGE SYSTEMS AND CAPACITOR ENERGY STORAGE.

SECTION 1201 GENERAL

1201.1 SCOPE. THE PROVISIONS OF THIS CHAPTER SHALL APPLY TO THE INSTALLATION, OPERATION AND MAINTENANCE OF ENERGY SYSTEMS USED FOR GENERATING OR STORING

ENERGY. IT SHALL NOT APPLY TO EQUIPMENT ASSOCIATED WITH THE GENERATION, CONTROL, TRANSFORMATION, TRANSMISSION, OR DISTRIBUTION OF ENERGY INSTALLATIONS THAT IS UNDER THE EXCLUSIVE CONTROL OF AN ELECTRIC UTILITY OR LAWFULLY DESIGNATED AGENCY.

1201.2 ELECTRICAL WIRING AND EQUIPMENT. ELECTRICAL WIRING AND EQUIPMENT USED IN CONNECTION WITH ENERGY SYSTEMS SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH CHAPTER 12 AND NFPA 70.

1201.3 MIXED SYSTEM INSTALLATION. WHERE APPROVED, THE AGGREGATE KWH ENERGY IN A FIRE AREA SHALL NOT EXCEED THE MAXIMUM QUANTITY SPECIFIED FOR ANY OF THE ENERGY SYSTEMS IN THIS CHAPTER. WHERE REQUIRED BY THE *FIRE CODE OFFICIAL*, A HAZARD MITIGATION ANALYSIS SHALL BE PROVIDED AND APPROVED IN ACCORDANCE WITH SECTION 104.7.2 TO EVALUATE ANY POTENTIAL ADVERSE INTERACTION BETWEEN THE VARIOUS ENERGY SYSTEMS AND TECHNOLOGIES.

SECTION 1202 DEFINITIONS

1202.1 DEFINITIONS. THE FOLLOWING TERMS ARE DEFINED IN CHAPTER 2:

BATTERY SYSTEM, STATIONARY STORAGE.

BATTERY TYPES.

LEAD-ACID BATTERY.

CAPACITOR ARRAY.

CAPACITOR ENERGY STORAGE SYSTEM.

CRITICAL CIRCUIT.

EMERGENCY POWER SYSTEM.

ENERGY MANAGEMENT SYSTEM.

FUEL CELL POWER SYSTEM, STATIONARY.

STANDBY POWER SYSTEM.

STATIONARY BATTERY ARRAY.

STATIONARY FUEL CELL POWER SYSTEM.

SECTION 1203 EMERGENCY AND STANDBY POWER SYSTEMS

1203.1 GENERAL. EMERGENCY POWER SYSTEMS AND STANDBY POWER SYSTEMS REQUIRED BY THIS CODE OR THE *INTERNATIONAL BUILDING CODE* SHALL COMPLY WITH SECTIONS 1203.1.1 THROUGH 1203.1.9.

1203.1.1 STATIONARY GENERATORS. STATIONARY EMERGENCY AND STANDBY POWER GENERATORS REQUIRED BY THIS CODE SHALL BE LISTED IN ACCORDANCE WITH UL 2200. *ASSOCIATED FLAMMABLE OR COMBUSTIBLE LIQUID TANKS SHALL ALSO COMPLY WITH CHAPTERS 50 AND 57 OF THIS CODE.

1203.1.2 FUEL LINE PIPING PROTECTION. FUEL LINES SUPPLYING A GENERATOR SET INSIDE A HIGH-RISE BUILDING SHALL BE SEPARATED FROM AREAS OF THE BUILDING

OTHER THAN THE ROOM THE GENERATOR IS LOCATED IN BY AN APPROVED METHOD, OR AN ASSEMBLY THAT HAS A FIRE-RESISTANCE RATING OF NOT LESS THAN 2 HOURS. WHERE THE BUILDING IS PROTECTED THROUGHOUT WITH AN AUTOMATIC SPRINKLER SYSTEM INSTALLED IN ACCORDANCE WITH SECTION 903.3.1.1, THE REQUIRED FIRE-RESISTANCE RATING SHALL BE REDUCED TO 1 HOUR.

1203.1.3 INSTALLATION. EMERGENCY POWER SYSTEMS AND STANDBY POWER SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH THE *INTERNATIONAL BUILDING CODE*, NFPA 70, NFPA 110 AND NFPA 111.

1203.1.4 LOAD TRANSFER. EMERGENCY POWER SYSTEMS SHALL AUTOMATICALLY PROVIDE SECONDARY POWER WITHIN 10 SECONDS AFTER PRIMARY POWER IS LOST, UNLESS SPECIFIED OTHERWISE IN THIS CODE. STANDBY POWER SYSTEMS SHALL AUTOMATICALLY PROVIDE SECONDARY POWER WITHIN 60 SECONDS AFTER PRIMARY POWER IS LOST, UNLESS SPECIFIED OTHERWISE IN THIS CODE.

1203.1.5 LOAD DURATION. EMERGENCY POWER SYSTEMS AND STANDBY POWER SYSTEMS SHALL BE DESIGNED TO PROVIDE THE REQUIRED POWER FOR A MINIMUM DURATION OF 2 HOURS WITHOUT BEING REFUELED OR RECHARGED, UNLESS SPECIFIED OTHERWISE IN THIS CODE.

1203.1.6 UNINTERRUPTABLE POWER SOURCE. AN UNINTERRUPTED SOURCE OF POWER SHALL BE PROVIDED FOR EQUIPMENT WHERE REQUIRED BY THE MANUFACTURER'S INSTRUCTIONS, THE LISTING, THIS CODE OR APPLICABLE REFERENCED STANDARDS.

1203.1.7 INTERCHANGEABILITY. EMERGENCY POWER SYSTEMS SHALL BE AN ACCEPTABLE ALTERNATIVE FOR INSTALLATIONS THAT REQUIRE STANDBY POWER SYSTEMS.

1203.1.8 GROUP I-2 OCCUPANCIES. IN GROUP I-2 OCCUPANCIES LOCATED IN FLOOD HAZARD AREAS ESTABLISHED IN SECTION 1612.3 OF THE *INTERNATIONAL BUILDING CODE* AND WHERE NEW OR REPLACEMENT ESSENTIAL ELECTRICAL SYSTEMS ARE INSTALLED AND WHERE NEW ESSENTIAL ELECTRICAL SYSTEM GENERATORS ARE INSTALLED, THE SYSTEMS AND GENERATORS SHALL BE LOCATED AND INSTALLED IN ACCORDANCE WITH ASCE 24. WHERE CONNECTIONS FOR HOOK UP OF TEMPORARY GENERATORS ARE PROVIDED, THE CONNECTIONS SHALL BE LOCATED AT OR ABOVE THE ELEVATION REQUIRED IN ASCE 24.

1203.1.9 MAINTENANCE. EXISTING INSTALLATIONS SHALL BE MAINTAINED IN ACCORDANCE WITH THE ORIGINAL APPROVAL AND SECTION 1203.4.

1203.2 WHERE REQUIRED. EMERGENCY AND STANDBY POWER SYSTEMS SHALL BE PROVIDED WHERE REQUIRED BY SECTIONS 1203.2.1 THROUGH 1203.2.18.

1203.2.1 AMBULATORY CARE FACILITIES. ESSENTIAL ELECTRICAL SYSTEMS FOR AMBULATORY CARE FACILITIES SHALL BE IN ACCORDANCE WITH SECTION 422.6 OF THE *INTERNATIONAL BUILDING CODE*.

1203.2.2 ELEVATORS AND PLATFORM LIFTS. STANDBY POWER SHALL BE PROVIDED FOR ELEVATORS AND PLATFORM LIFTS AS REQUIRED IN SECTIONS 606.2, 1009.4.1, AND 1009.5.

1203.2.3 EMERGENCY RESPONDER RADIO COVERAGE SYSTEMS. STANDBY POWER SHALL BE PROVIDED FOR EMERGENCY RESPONDER RADIO COVERAGE SYSTEMS AS REQUIRED IN SECTION 510.4.2.3. THE STANDBY POWER SUPPLY SHALL BE CAPABLE OF OPERATING THE EMERGENCY RESPONDER RADIO COVERAGE SYSTEM FOR A DURATION OF NOT LESS THAN 24 HOURS.

1203.2.4 EMERGENCY VOICE/ALARM COMMUNICATION SYSTEMS. EMERGENCY POWER SHALL BE PROVIDED FOR EMERGENCY VOICE/ALARM COMMUNICATION SYSTEMS AS REQUIRED IN SECTION 907.5.2.2.5. THE SYSTEM SHALL BE CAPABLE OF POWERING THE REQUIRED LOAD FOR A DURATION OF NOT LESS THAN 24 HOURS, AS REQUIRED IN NFPA 72.

1203.2.5 EXIT SIGNS. EMERGENCY POWER SHALL BE PROVIDED FOR EXIT SIGNS AS REQUIRED IN SECTION 1013.6.3. THE SYSTEM SHALL BE CAPABLE OF POWERING THE REQUIRED LOAD FOR A DURATION OF NOT LESS THAN 90 MINUTES.

1203.2.6 GAS DETECTION SYSTEMS. EMERGENCY POWER SHALL BE PROVIDED FOR GAS DETECTION SYSTEMS WHERE REQUIRED BY SECTIONS 1203.2.9 AND 1203.2.16. STANDBY POWER SHALL BE PROVIDED FOR GAS DETECTION SYSTEMS WHERE REQUIRED BY SECTION 916.5.

1203.2.7 GROUP I-2 OCCUPANCIES. ESSENTIAL ELECTRICAL SYSTEMS FOR GROUP I-2 OCCUPANCIES SHALL BE IN ACCORDANCE WITH SECTION 407.11 OF THE *INTERNATIONAL BUILDING CODE*.

1203.2.8 GROUP I-3 OCCUPANCIES. POWER-OPERATED SLIDING DOORS OR POWER-OPERATED LOCKS FOR SWINGING DOORS IN GROUP I-3 OCCUPANCIES SHALL BE OPERABLE BY A MANUAL RELEASE MECHANISM AT THE DOOR. EMERGENCY POWER SHALL BE PROVIDED FOR THE DOORS AND LOCKS.

EXCEPTIONS:

1. EMERGENCY POWER IS NOT REQUIRED IN FACILITIES WHERE PROVISIONS FOR REMOTE LOCKING AND UNLOCKING OF OCCUPIED ROOMS IN OCCUPANCY CONDITION 4 ARE NOT REQUIRED AS SET FORTH IN THE *INTERNATIONAL BUILDING CODE*.
2. EMERGENCY POWER IS NOT REQUIRED WHERE REMOTE MECHANICAL OPERATING RELEASES ARE PROVIDED.

1203.2.9 HAZARDOUS MATERIALS. EMERGENCY AND STANDBY POWER SHALL BE PROVIDED IN OCCUPANCIES WITH HAZARDOUS MATERIALS AS REQUIRED IN THE FOLLOWING SECTIONS: 1. SECTIONS 5004.7 AND 5005.1.5 FOR HAZARDOUS MATERIALS. 2. SECTIONS 6004.2.2.8 AND 6004.3.4.2 FOR HIGHLY TOXIC AND TOXIC GASES. 3. SECTION 6204.1.11 FOR ORGANIC PEROXIDES.

1203.2.10 HIGH-RISE BUILDINGS. STANDBY POWER AND EMERGENCY POWER SHALL BE PROVIDED FOR HIGH-RISE BUILDINGS AS REQUIRED IN SECTION 403 OF THE *INTERNATIONAL BUILDING CODE*, AND SHALL BE IN ACCORDANCE WITH SECTION 1203.

1203.2.11 HORIZONTAL SLIDING DOORS. STANDBY POWER SHALL BE PROVIDED FOR HORIZONTAL SLIDING DOORS AS REQUIRED IN SECTION 1010.1.4.3. THE STANDBY POWER SUPPLY SHALL HAVE A CAPACITY TO OPERATE NOT FEWER THAN 50 CLOSING CYCLES OF THE DOOR.

1203.2.12 HYDROGEN FUEL GAS ROOMS. STANDBY POWER SHALL BE PROVIDED FOR HYDROGEN FUEL GAS ROOMS AS REQUIRED BY SECTION 5808.7.

1203.2.13 LABORATORY SUITES. STANDBY OR EMERGENCY POWER SHALL BE PROVIDED IN ACCORDANCE WITH SECTION 5004.7 WHERE *LABORATORY SUITES* ARE LOCATED ABOVE THE SIXTH STORY ABOVE GRADE PLANE OR LOCATED IN A STORY BELOW GRADE PLANE.

1203.2.14 MEANS OF EGRESS ILLUMINATION. EMERGENCY POWER SHALL BE PROVIDED FOR *MEANS OF EGRESS* ILLUMINATION IN ACCORDANCE WITH SECTIONS 1008.3 AND 1104.5.1.

1203.2.15 MEMBRANE STRUCTURES. STANDBY POWER SHALL BE PROVIDED FOR AUXILIARY INFLATION SYSTEMS IN PERMANENT MEMBRANE STRUCTURES IN ACCORDANCE WITH SECTION 2702 OF THE *INTERNATIONAL BUILDING CODE*. AUXILIARY INFLATION SYSTEMS SHALL BE PROVIDED IN TEMPORARY AIR-SUPPORTED AND AIR INFLATED MEMBRANE STRUCTURES IN ACCORDANCE WITH SECTION 3103.10.4.

1203.2.16 SEMICONDUCTOR FABRICATION FACILITIES. EMERGENCY POWER SHALL BE PROVIDED FOR SEMICONDUCTOR FABRICATION FACILITIES AS REQUIRED IN SECTION 2703.15.

1203.2.17 SMOKE CONTROL SYSTEMS. STANDBY POWER SHALL BE PROVIDED FOR SMOKE CONTROL SYSTEMS AS REQUIRED IN SECTION 909.11.

1203.2.18 UNDERGROUND BUILDINGS. EMERGENCY AND STANDBY POWER SHALL BE PROVIDED IN UNDERGROUND BUILDINGS AS REQUIRED IN SECTION 405 OF THE *INTERNATIONAL BUILDING CODE* AND SHALL BE IN ACCORDANCE WITH SECTION 1203.

1203.2.19 CONNECTED FACILITIES. POWER AND LIGHTING FACILITIES OR THE *FIRE COMMAND CENTER* AND ELEVATORS SPECIFIED IN SECTIONS 403.4.8.2 AND 403.6 OF THE *INTERNATIONAL BUILDING CODE*, AS APPLICABLE, AND ELECTRICALLY POWERED FIRE PUMPS REQUIRED TO MAINTAIN PRESSURE, SHALL BE TRANSFERABLE TO THE STANDBY SOURCE. STANDBY POWER SHALL BE PROVIDED FOR AT LEAST ONE ELEVATOR TO SERVE ALL FLOORS AND BE TRANSFERABLE TO ANY ELEVATOR.

1203.3 CRITICAL CIRCUITS. CABLES USED FOR SURVIVABILITY OF REQUIRED CRITICAL CIRCUITS SHALL BE LISTED IN ACCORDANCE WITH UL 2196. ELECTRICAL CIRCUIT

PROTECTIVE SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH THEIR LISTING REQUIREMENTS.

1203.4 MAINTENANCE. EMERGENCY AND STANDBY POWER SYSTEMS SHALL BE MAINTAINED IN ACCORDANCE WITH NFPA 110 AND NFPA 111 SUCH THAT THE SYSTEM IS CAPABLE OF SUPPLYING SERVICE WITHIN THE TIME SPECIFIED FOR THE TYPE AND DURATION REQUIRED.

1203.4.1 GROUP I-2. IN GROUP I-2 OCCUPANCIES, EMERGENCY AND STANDBY POWER SYSTEMS SHALL BE MAINTAINED IN ACCORDANCE WITH NFPA 99.

1203.4.2 SCHEDULE. INSPECTION, TESTING AND MAINTENANCE OF EMERGENCY AND STANDBY POWER SYSTEMS SHALL BE IN ACCORDANCE WITH AN APPROVED SCHEDULE ESTABLISHED UPON COMPLETION AND APPROVAL OF THE SYSTEM INSTALLATION.

1203.4.3 RECORDS. RECORDS OF THE INSPECTION, TESTING AND MAINTENANCE OF EMERGENCY AND STANDBY POWER SYSTEMS SHALL INCLUDE THE DATE OF SERVICE, NAME OF THE SERVICING TECHNICIAN, A SUMMARY OF CONDITIONS NOTED AND A DETAILED DESCRIPTION OF ANY CONDITIONS REQUIRING CORRECTION AND WHAT CORRECTIVE ACTION WAS TAKEN. SUCH RECORDS SHALL BE MAINTAINED.

1203.4.4 SWITCH MAINTENANCE. EMERGENCY AND STANDBY POWER SYSTEM TRANSFER SWITCHES SHALL BE INCLUDED IN THE INSPECTION, TESTING AND MAINTENANCE SCHEDULE REQUIRED BY SECTION 1203.4.2. TRANSFER SWITCHES SHALL BE MAINTAINED FREE FROM ACCUMULATED DUST AND DIRT. INSPECTION SHALL INCLUDE EXAMINATION OF THE TRANSFER SWITCH CONTACTS FOR EVIDENCE OF DETERIORATION. WHEN EVIDENCE OF CONTACT DETERIORATION IS DETECTED, THE CONTACTS SHALL BE REPLACED IN ACCORDANCE WITH THE TRANSFER SWITCH MANUFACTURER'S INSTRUCTIONS.

1203.5 OPERATIONAL INSPECTION AND TESTING. EMERGENCY POWER SYSTEMS, INCLUDING ALL APPURTENANT COMPONENTS, SHALL BE INSPECTED AND TESTED UNDER LOAD IN ACCORDANCE WITH NFPA 110 AND NFPA 111.

EXCEPTION: WHERE THE EMERGENCY POWER SYSTEM IS USED FOR STANDBY POWER OR PEAK LOAD SHAVING, SUCH USE SHALL BE RECORDED AND SHALL BE ALLOWED TO BE SUBSTITUTED FOR SCHEDULED TESTING OF THE GENERATOR SET, PROVIDED THAT APPROPRIATE RECORDS ARE MAINTAINED.

1203.5.1 GROUP I-2. IN GROUP I-2 OCCUPANCIES, EMERGENCY AND STANDBY POWER SYSTEMS SHALL BE INSPECTED AND TESTED UNDER LOAD IN ACCORDANCE WITH NFPA 99.

1203.5.2 TRANSFER SWITCH TEST. THE TEST OF THE TRANSFER SWITCH SHALL CONSIST OF ELECTRICALLY OPERATING THE TRANSFER SWITCH FROM THE NORMAL POSITION TO THE ALTERNATE POSITION AND THEN RETURN TO THE NORMAL POSITION.

1203.6 SUPERVISION OF MAINTENANCE AND TESTING. ROUTINE MAINTENANCE, INSPECTION AND OPERATIONAL TESTING SHALL BE OVERSEEN BY A PROPERLY INSTRUCTED INDIVIDUAL.

SECTION 1204 SOLAR PHOTOVOLTAIC POWER SYSTEMS

1204.1 GENERAL. SOLAR PHOTOVOLTAIC SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH SECTIONS 1204.2 THROUGH 1204.5, AND THE *INTERNATIONAL BUILDING CODE* OR *INTERNATIONAL RESIDENTIAL CODE*. THE ELECTRICAL PORTION OF SOLAR PV SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH NFPA 70.

***1204.1.1 PERMITS.** PERMITS SHALL BE OBTAINED FOR SOLAR VOLTAIC SYSTEMS IN ACCORDANCE WITH SECTION 105.7.21

EXCEPTION: SOLAR PHOTOVOLTAIC SYSTEMS WITH LESS THAN 3 KW ALTERNATING CURRENT NAMEPLATE RATING.

***1204.1.2 MARKING.** MARKING IS REQUIRED ON INTERIOR AND EXTERIOR DIRECT-CURRENT (DC) CONDUIT, ENCLOSURES, RACE- WAYS, CABLE ASSEMBLIES, JUNCTION BOXES, COMBINER BOXES AND DISCONNECTS.

1204.1.2.1 MATERIALS. THE MATERIALS USED FOR MARKING SHALL BE REFLECTIVE, WEATHER RESISTANT AND SUITABLE FOR THE ENVIRONMENT. MARKING AS REQUIRED IN SECTIONS 1204.1.2 THROUGH 1204.1.3 SHALL HAVE ALL LETTERS CAPITALIZED WITH A MINIMUM HEIGHT OF 3/8 INCH (9.5 MM) WHITE ON RED BACKGROUND.

***1204.1.2.2 MARKING CONTENT.** THE MARKING SHALL CONTAIN THE WORDS “WARNING: PHOTOVOLTAIC POWER SOURCE.”

***1204.1.2.3 MAIN SERVICE DISCONNECT.** THE MARKING SHALL BE PLACED ADJACENT TO THE MAIN SERVICE DISCONNECT IN A LOCATION CLEARLY VISIBLE FROM THE LOCATION WHERE THE DISCONNECT IS OPERATED.

***1204.1.3 LOCATION OF MARKING.** MARKING SHALL BE PLACED ON INTERIOR AND EXTERIOR DC CONDUIT, RACEWAYS, ENCLOSURES AND CABLE ASSEMBLIES EVERY 10 FEET (3048 MM), WITHIN 1 FOOT (305 MM) OF TURNS OR BENDS AND WITHIN 1 FOOT (305 MM) ABOVE AND BELOW PENETRATIONS OF ROOF/CEILING ASSEMBLIES, WALLS OR BARRIERS.

1204.2 ACCESS AND PATHWAYS. ROOF ACCESS, PATHWAYS, AND SPACING REQUIREMENTS SHALL BE PROVIDED IN ACCORDANCE WITH SECTIONS 1204.2.1 THROUGH 1204.3.3. PATHWAYS SHALL BE OVER AREAS CAPABLE OF SUPPORTING FIRE FIGHTERS ACCESSING THE ROOF. PATHWAYS SHALL BE LOCATED IN AREAS WITH MINIMAL OBSTRUCTIONS, SUCH AS VENT PIPES, CONDUIT OR MECHANICAL EQUIPMENT.

***RESIDENTIAL STRUCTURES** SHALL BE DESIGNED SO THAT EACH PHOTOVOLTAIC ARRAY IS NOT GREATER THAN 150 FEET (45 720 MM) BY 150 FEET (45 720 MM) IN EITHER AXIS.

EXCEPTION:

1. DETACHED, UNINHABITABLE GROUP U STRUCTURES INCLUDING, BUT NOT LIMITED TO,
*DETACHED GARAGES SERVING GROUP R-3 BUILDINGS, PARKING SHADE STRUCTURES,
CARPORTS, SOLAR TRELLISES AND SIMILAR STRUCTURES.

***1204.2.1 SOLAR PHOTOVOLTAIC SYSTEMS FOR GROUP R-3 BUILDINGS.** SOLAR PHOTOVOLTAIC SYSTEMS FOR GROUP R-3 BUILDINGS SHALL COMPLY WITH SECTIONS 1204.2.1.1 THROUGH *1204.2.1.5.

*REMOVED BOTH EXCEPTIONS

***1204.2.1.1 ROOF ACCESS POINTS.** ROOF ACCESS POINTS SHALL BE LOCATED IN AREAS THAT DO NOT REQUIRE THE PLACEMENT OF GROUND LADDERS OVER OPENINGS SUCH AS WINDOWS OR DOORS AND LOCATED AT STRONG POINTS OF BUILDING CONSTRUCTION IN LOCATIONS WHERE THE ACCESS POINT DOES NOT CONFLICT WITH OVERHEAD OBSTRUCTIONS SUCH AS TREE LIMBS, WIRES, OR SIGNS.

***1204.2.1.2 RESIDENTIAL BUILDINGS WITH HIP ROOF LAYOUTS.** PANELS OR MODULES INSTALLED ON RESIDENTIAL BUILDINGS WITH HIP ROOF LAYOUTS SHALL BE LOCATED IN A MANNER THAT PROVIDES TWO 3-FOOT-WIDE (914 MM) CLEAR ACCESS PATHWAY FROM THE EAVE TO THE RIDGE ON EACH ROOF SLOPE WHERE PANELS OR MODULES ARE LOCATED.

***1204.2.1.3 RESIDENTIAL BUILDINGS WITH A SINGLE RIDGE.** PANELS/MODULES INSTALLED ON RESIDENTIAL BUILDINGS WITH A SINGLE RIDGE SHALL BE LOCATED IN A MANNER THAT PROVIDES TWO 3-FOOT-WIDE (914 MM) ACCESS PATHWAYS FROM THE EAVE TO THE RIDGE ON EACH ROOF SLOPE WHERE PANELS/MODULES ARE LOCATED.

***1204.2.1.4 RESIDENTIAL BUILDINGS WITH ROOF HIPS AND VALLEYS.** PANELS OR MODULES INSTALLED ON RESIDENTIAL BUILDINGS WITH ROOF HIPS AND VALLEYS SHALL BE LOCATED NOT CLOSER THAN 18 INCHES (457 MM) TO A HIP OR A VALLEY WHERE PANELS OR MODULES ARE TO BE PLACED ON BOTH SIDES OF A HIP OR VALLEY. WHERE PANELS ARE TO BE LOCATED ON ONLY ONE SIDE OF A HIP OR VALLEY THAT IS OF EQUAL LENGTH, THE PANELS SHALL BE PERMITTED TO BE PLACED DIRECTLY ADJACENT TO THE HIP OR VALLEY.

***1204.2.1.5 RESIDENTIAL BUILDING SMOKE VENTILATION.** PANELS/MODULES INSTALLED ON RESIDENTIAL BUILDINGS SHALL BE LOCATED NO HIGHER THAN 3 FEET (914 MM) BELOW THE RIDGE IN ORDER TO ALLOW FOR FIRE DEPARTMENT SMOKE VENTILATION OPERATIONS.

1204.2.2 EMERGENCY ESCAPE AND RESCUE OPENINGS. PANELS AND MODULES INSTALLED ON GROUP R-3 BUILDINGS SHALL NOT BE PLACED ON THE PORTION OF A ROOF THAT IS BELOW AN EMERGENCY ESCAPE AND RESCUE OPENING. A PATHWAY OF NOT LESS THAN 36 INCHES (914 MM) WIDE SHALL BE PROVIDED TO THE EMERGENCY ESCAPE AND RESCUE OPENING.

1204.3 OTHER THAN GROUP R-3 BUILDINGS. ACCESS TO SYSTEMS FOR BUILDINGS, OTHER THAN THOSE CONTAINING GROUP R-3 OCCUPANCIES, SHALL BE PROVIDED IN ACCORDANCE WITH SECTIONS 1204.3.1 THROUGH 1204.3.3.

EXCEPTION: WHERE IT IS DETERMINED BY THE *FIRE CODE OFFICIAL* THAT THE ROOF CONFIGURATION IS SIMILAR TO THAT OF A GROUP R-3 OCCUPANCY, THE RESIDENTIAL ACCESS AND VENTILATION REQUIREMENTS IN SECTIONS 1204.2.1.1 THROUGH *1204.2.1.5 ARE A SUITABLE ALTERNATIVE.

1204.3.1 PERIMETER PATHWAYS. THERE SHALL BE A MINIMUM 6-FOOT-WIDE (1829 MM) CLEAR PERIMETER AROUND THE EDGES OF THE ROOF.

EXCEPTION: WHERE EITHER AXIS OF THE BUILDING IS 250 FEET (76 200 MM) OR LESS, THE CLEAR PERIMETER AROUND THE EDGES OF THE ROOF SHALL BE PERMITTED TO BE REDUCED TO A MINIMUM WIDTH OF 4 FEET (1219 MM).

1204.3.2 INTERIOR PATHWAYS. INTERIOR PATHWAYS SHALL BE PROVIDED BETWEEN ARRAY SECTIONS TO MEET THE FOLLOWING REQUIREMENTS:

1. PATHWAYS SHALL BE PROVIDED AT INTERVALS NOT GREATER THAN 150 FEET (45 720 MM) THROUGHOUT THE LENGTH AND WIDTH OF THE ROOF.
2. A PATHWAY NOT LESS THAN 4 FEET (1219 MM) WIDE IN A STRAIGHT LINE TO ROOF STANDPIPES OR VENTILATION HATCHES.
3. A PATHWAY NOT LESS THAN 4 FEET (1219 MM) WIDE AROUND ROOF ACCESS HATCHES, WITH NO FEWER THAN ONE SUCH PATHWAY TO A PARAPET OR ROOF EDGE.
- *4. THE PATHWAY SHALL BE OVER AREAS CAPABLE OF SUPPORTING THE LIVE LOAD OF FIREFIGHTERS ACCESSING THE ROOF.
- *5. THE CENTERLINE AXIS PATHWAYS SHALL BE PROVIDED IN BOTH AXES OF THE ROOF. CENTERLINE AXIS PATHWAYS SHALL RUN WHERE THE ROOF STRUCTURE IS CAPABLE OF SUPPORTING THE LIVE LOAD OF FIRE FIGHTERS ACCESSING THE ROOF.

1204.3.3 SMOKE VENTILATION. THE SOLAR INSTALLATION SHALL BE DESIGNED TO MEET THE FOLLOWING REQUIREMENTS:

1. WHERE NONGRAVITY-OPERATED SMOKE AND HEAT VENTS OCCUR, A PATHWAY NOT LESS THAN 4 FEET (1219 MM) WIDE SHALL BE PROVIDED BORDERING ALL SIDES.
2. SMOKE VENTILATION OPTIONS BETWEEN ARRAY SECTIONS SHALL BE ONE OF THE FOLLOWING:
 - 2.1. A PATHWAY NOT LESS THAN 8 FEET (2438 MM) WIDE.
 - 2.2. WHERE GRAVITY-OPERATED DROPOUT SMOKE AND HEAT VENTS OCCUR, A PATHWAY NOT LESS THAN 4 FEET (1219 MM) WIDE ON NO FEWER THAN ONE SIDE.
 - 2.3. A PATHWAY NOT LESS THAN 4 FEET (1219 MM) WIDE BORDERING 4-FOOT BY 8-FOOT (1219 MM BY 2438 MM) VENTING CUTOUTS EVERY 20 FEET (6096 MM) ON ALTERNATING SIDES OF THE PATHWAY.
- *3. ARRAYS SHALL BE NOT GREATER THAN 150 FEET (45 720 MM) BY 150 FEET (45 720 MM) IN DISTANCE IN EITHER AXIS IN ORDER TO CREATE OPPORTUNITIES FOR FIRE DEPARTMENT SMOKE VENTILATION OPERATIONS.

1204.4 GROUND-MOUNTED PHOTOVOLTAIC PANEL SYSTEMS. GROUND-MOUNTED PHOTOVOLTAIC PANEL SYSTEMS SHALL COMPLY WITH SECTION 1204.1 AND THIS SECTION. SETBACK REQUIREMENTS SHALL NOT APPLY TO GROUND-MOUNTED, FREE-STANDING PHOTOVOLTAIC ARRAYS. A CLEAR, BRUSH-FREE AREA OF 10 FEET (3048 MM) SHALL BE REQUIRED FOR GROUND-MOUNTED PHOTOVOLTAIC ARRAYS.

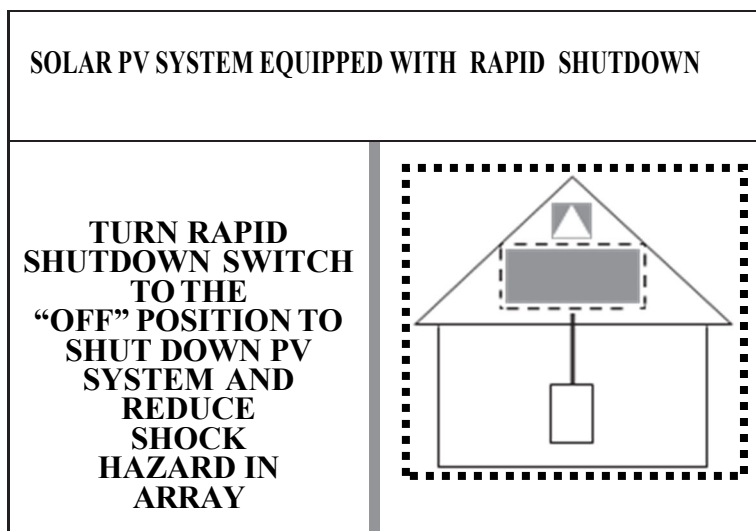
1204.5 BUILDINGS WITH RAPID SHUTDOWN. BUILDINGS WITH RAPID SHUTDOWN SOLAR PHOTOVOLTAIC SYSTEMS SHALL HAVE PERMANENT LABELS IN ACCORDANCE WITH SECTIONS 1204.5.1 THROUGH 1204.5.3.

1204.5.1 RAPID SHUTDOWN TYPE. THE TYPE OF SOLAR PHOTOVOLTAIC SYSTEM RAPID SHUTDOWN SHALL BE LABELED WITH ONE OF THE FOLLOWING:

1. FOR SOLAR PHOTOVOLTAIC SYSTEMS THAT SHUT DOWN THE ARRAY AND THE CONDUCTORS LEAVING THE ARRAY, A LABEL SHALL BE PROVIDED. THE FIRST TWO LINES OF THE LABEL SHALL BE UPPERCASE CHARACTERS WITH A MINIMUM HEIGHT OF 3/8 INCH (10 MM) IN BLACK ON A YELLOW BACKGROUND. THE REMAINING CHARACTERS SHALL BE UPPERCASE WITH A MINIMUM HEIGHT OF 3/16 INCH (5 MM) IN BLACK ON A WHITE BACKGROUND. THE LABEL SHALL BE IN ACCORDANCE WITH FIGURE 1204.5.1(1) AND STATE THE FOLLOWING:

SOLAR PV SYSTEM EQUIPPED WITH
RAPID SHUTDOWN. TURN RAPID
SHUTDOWN SWITCH TO THE “OFF”
POSITION TO SHUT DOWN PV SYSTEM
AND REDUCE SHOCK HAZARD IN
ARRAY.

2. FOR PHOTOVOLTAIC SYSTEMS THAT ONLY SHUT DOWN CONDUCTORS LEAVING THE ARRAY, A LABEL SHALL BE PROVIDED. THE FIRST TWO LINES OF THE LABEL SHALL BE UPPERCASE CHARACTERS WITH A MINIMUM HEIGHT OF 3/8 INCH (10 MM) IN WHITE ON A RED BACKGROUND AND THE REMAINING CHARACTERS SHALL BE CAPITALIZED WITH A MINIMUM HEIGHT OF 3/16 INCH (5 MM) IN BLACK ON A WHITE BACK-GROUND.



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FIGURE 1204.5.1(1)

LABEL FOR SOLAR PV SYSTEMS THAT REDUCE SHOCK HAZARD WITHIN ARRAY AND SHUT DOWN CONDUCTORS LEAVING ARRAY

THE LABEL SHALL BE IN ACCORDANCE WITH FIGURE 1204.5.1(2) AND STATE THE FOLLOWING:

THIS SOLAR PV SYSTEM EQUIPPED
WITH RAPID SHUTDOWN. TURN RAPID
SHUTDOWN SWITCH TO THE “OFF”
POSITION TO SHUT DOWN CONDUCTORS
OUTSIDE THE ARRAY. CONDUCTORS
WITHIN ARRAY REMAIN
ENERGIZED IN SUNLIGHT.

1204.5.1.1 DIAGRAM. THE LABELS IN SECTION 1204.5.1 SHALL INCLUDE A SIMPLE DIAGRAM OF A BUILDING WITH A ROOF. DIAGRAM SECTIONS IN RED SIGNIFY SECTIONS OF THE SOLAR PHOTOVOLTAIC SYSTEM THAT ARE NOT SHUT DOWN WHEN THE RAPID SHUTDOWN SWITCH IS TURNED OFF.

1204.5.1.2 LOCATION. THE RAPID SHUTDOWN LABEL IN SECTION 1204.5.1 SHALL BE LOCATED NOT GREATER THAN 3 FEET (914 MM) FROM THE SERVICE DISCONNECTING MEANS TO WHICH THE PHOTOVOLTAIC SYSTEMS ARE CONNECTED, AND SHALL INDICATE THE LOCATION OF ALL IDENTIFIED RAPID SHUTDOWN SWITCHES IF NOT AT THE SAME LOCATION.

1204.5.2 BUILDINGS WITH MORE THAN ONE RAPID SHUTDOWN TYPE. SOLAR PHOTOVOLTAIC SYSTEMS THAT CONTAIN RAPID SHUTDOWN IN ACCORDANCE WITH BOTH ITEMS 1 AND 2 OF SECTION 1204.5.1 OR SOLAR PHOTOVOLTAIC SYSTEMS WHERE ONLY PORTIONS OF THE SYSTEMS ON THE BUILDING CONTAIN RAPID SHUTDOWN, SHALL PROVIDE A DETAILED PLAN VIEW DIAGRAM OF THE ROOF SHOWING EACH DIFFERENT PHOTOVOLTAIC SYSTEM AND A DOTTED LINE AROUND AREAS THAT REMAIN ENERGIZED AFTER THE RAPID SHUTDOWN SWITCH IS OPERATED.

1204.5.3 RAPID SHUTDOWN SWITCH. A RAPID SHUTDOWN SWITCH SHALL HAVE A LABEL LOCATED NOT GREATER THAN 3 FEET (914 MM) FROM THE SWITCH THAT STATES THE FOLLOWING:

RAPID SHUTDOWN SWITCH
FOR SOLAR PV SYSTEM

**SECTION 1205
STATIONARY FUEL CELL POWER SYSTEMS**

1205.1 GENERAL. STATIONARY FUEL CELL POWER SYSTEMS IN NEW AND EXISTING OCCUPANCIES SHALL COMPLY WITH THIS SECTION.

1205.2 PERMITS. PERMITS SHALL BE OBTAINED FOR *STATIONARY FUEL CELL POWER SYSTEMS* AS SET FORTH IN SECTION 105.7.10.

1205.3 EQUIPMENT. STATIONARY FUEL CELL POWER SYSTEMS SHALL COMPLY WITH THE FOLLOWING:

1. *PREPACKAGED FUEL CELL POWER SYSTEMS* SHALL BE LISTED AND LABELED IN ACCORDANCE WITH CSA FC 1.
2. THE MODULES AND COMPONENTS IN A *PRE-ENGINEERED FUEL CELL POWER SYSTEM* SHALL BE LISTED AND LABELED IN ACCORDANCE WITH CSA FC 1 AND INTERCONNECTED TO COMPLETE THE ASSEMBLY OF THE SYSTEM AT THE JOB SITE IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS AND THE MODULE AND COMPONENT LISTINGS.
3. *FIELD-FABRICATED FUEL CELL POWER SYSTEMS* SHALL BE APPROVED BASED ON A REVIEW OF THE TECHNICAL REPORT PROVIDED IN ACCORDANCE WITH SECTION 104.7.2. THE REPORT SHALL BE PREPARED BY AND BEAR THE STAMP OF A REGISTERED DESIGN PROFESSIONAL AND SHALL INCLUDE:
 - 3.1. A FIRE RISK EVALUATION.
 - 3.2. AN EVALUATION DEMONSTRATING THAT MODULES AND COMPONENTS IN THE FUEL CELL POWER SYSTEM COMPLY WITH APPLICABLE REQUIREMENTS IN CSA FC 1.
 - 3.3. DOCUMENTATION OF THE FUEL CELL POWER SYSTEM'S COMPLIANCE WITH APPLICABLE NFPA 2 AND NFPA 853 CONSTRUCTION REQUIREMENTS.

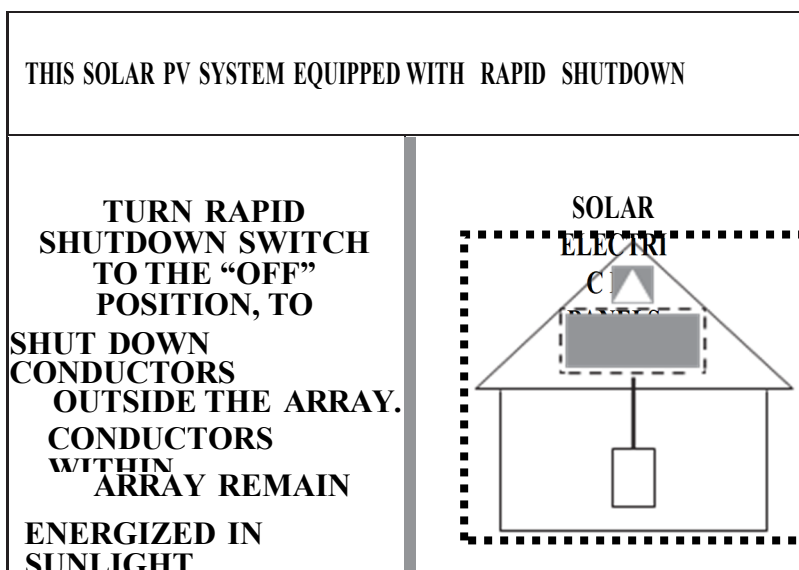


FIGURE 1204.5.1(2)

**LABEL FOR SOLAR PV SYSTEMS THAT ONLY SHUT DOWN CONDUCTORS LEAVING THE
ARRAY**

1205.4 INSTALLATION. STATIONARY FUEL CELL POWER SYSTEMS SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH NFPA 70 AND NFPA 853, THE MANUFACTURER'S INSTALLATION INSTRUCTIONS, AND THE LISTING. *STATIONARY FUEL CELL POWER SYSTEMS* FUELED BY HYDROGEN SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH NFPA 2 AND NFPA 70, THE MANUFACTURER'S INSTALLATION INSTRUCTIONS AND THE LISTING.

1205.5 RESIDENTIAL USE. *STATIONARY FUEL CELL POWER SYSTEMS* SHALL NOT BE INSTALLED IN GROUP R-3 AND R-4 BUILDINGS, OR DWELLING UNITS ASSOCIATED WITH GROUP R-2 BUILDINGS UNLESS THEY ARE SPECIFICALLY LISTED FOR RESIDENTIAL USE.

1205.6 INDOOR INSTALLATIONS. *STATIONARY FUEL CELL POWER SYSTEMS* INSTALLED IN INDOOR LOCATIONS SHALL COMPLY WITH SECTIONS 1205.6 THROUGH 1205.6.2. FOR PURPOSES OF THIS SECTION, AN INDOOR LOCATION INCLUDES A ROOF AND 50 PERCENT OR GREATER ENCLOSING WALLS.

1205.6.1 LISTED. STATIONARY FUEL CELL POWER SYSTEMS INSTALLED INDOORS SHALL BE SPECIFICALLY LISTED AND LABELED FOR INDOOR USE.

1205.6.2 SEPARATION. ROOMS CONTAINING *STATIONARY FUEL CELL POWER SYSTEMS* SHALL BE SEPARATED FROM THE FOLLOWING OCCUPANCIES BY FIRE BARRIERS OR HORIZONTAL ASSEMBLIES, OR BOTH, CONSTRUCTED IN ACCORDANCE WITH THE *INTERNATIONAL BUILDING CODE*.

1. GROUP B, F, M, S AND U OCCUPANCIES BY 1-HOUR FIRE RESISTANCE RATED CONSTRUCTION.
2. GROUP A, E, I AND R OCCUPANCIES BY 2-HOUR FIRE RESISTANCE RATED CONSTRUCTION.

EXCEPTION: STATIONARY FUEL CELL POWER SYSTEMS WITH AN AGGREGATE RATING LESS THAN 50 KW SHALL NOT BE REQUIRED TO BE SEPARATED FROM OTHER OCCUPANCIES PROVIDED THAT THE SYSTEMS COMPLY WITH SECTION 9.3 OF NFPA 853.

1205.7 VEHICLE IMPACT PROTECTION. WHERE *STATIONARY FUEL CELL POWER SYSTEMS* ARE SUBJECT TO IMPACT BY A MOTOR VEHICLE, VEHICLE IMPACT PROTECTION SHALL BE PROVIDED IN ACCORDANCE WITH SECTION 312.

1205.8 OUTDOOR INSTALLATION. STATIONARY FUEL CELL POWER SYSTEMS LOCATED OUTDOORS SHALL BE SEPARATED BY NOT LESS THAN 5 FEET (1524 MM) FROM THE FOLLOWING:

1. LOT LINES.
2. PUBLIC WAYS.
3. BUILDINGS.
4. STORED COMBUSTIBLE MATERIALS.
5. HAZARDOUS MATERIALS.
6. HIGH-PILED STOCK.

7. ANY PORTION OF A DESIGNATED MEANS OF EGRESS SYSTEM.
8. OTHER EXPOSURE HAZARDS.

1205.9 FUEL SUPPLY. THE DESIGN, LOCATION AND INSTALLATION OF THE FUEL SUPPLY FOR *STATIONARY FUEL CELL POWER SYSTEMS* SHALL COMPLY WITH CHAPTER 53, CHAPTER 58 AND THE *INTERNATIONAL FUEL GAS CODE*, BASED ON THE PARTICULAR FUEL BEING SUPPLIED TO THE SYSTEM.

1205.10 MANUAL SHUTOFF. ACCESS TO A MANUAL SHUTOFF VALVE SHALL BE PROVIDED FOR THE FUEL PIPING WITHIN 6 FEET (1829 MM) OF ANY FUEL STORAGE TANK SERVING THE FUEL CELL AND WITHIN 6 FEET (1829 MM) OF THE POWER SYSTEM. IF THE FUEL TANK AND THE *STATIONARY FUEL CELL POWER SYSTEM* ARE LESS THAN 12 FEET (3658 MM) APART, A SINGLE SHUTOFF VALVE SHALL BE PERMITTED. IF THE *STATIONARY FUEL CELL POWER SYSTEM* IS LOCATED INDOORS, THE SHUTOFF VALVE SHALL BE LOCATED OUTSIDE OF THE ROOM IN WHICH THE SYSTEM IS INSTALLED, UNLESS OTHERWISE APPROVED BY THE *FIRE CODE OFFICIAL*.

1205.11 VENTILATION AND EXHAUST. VENTILATION AND EXHAUST FOR STATIONARY FUEL CELL POWER SYSTEMS SHALL BE PROVIDED IN ACCORDANCE WITH NFPA 853.

1205.12 FIRE SUPPRESSION. FIRE SUPPRESSION FOR STATIONARY FUEL CELL POWER SYSTEM INSTALLATIONS SHALL BE PROVIDED IN ACCORDANCE WITH NFPA 853.

1205.13 GAS DETECTION SYSTEMS. STATIONARY FUEL CELL POWER SYSTEMS SHALL BE PROVIDED WITH A GAS DETECTION SYSTEM. DETECTION SHALL BE PROVIDED IN APPROVED LOCATIONS IN THE FUEL CELL POWER SYSTEM ENCLOSURE, THE EXHAUST SYSTEM OR THE ROOM THAT ENCLOSES THE FUEL CELL POWER SYSTEM. THE SYSTEM SHALL BE DESIGNED TO ACTIVATE AT A FLAMMABLE GAS CONCENTRATION OF NOT MORE THAN 25 PERCENT OF THE LOWER FLAMMABLE LIMIT (LFL).

1205.13.1 SYSTEM ACTIVATION. THE ACTIVATION OF THE GAS DETECTION SYSTEM SHALL AUTOMATICALLY:

1. CLOSE VALVES BETWEEN THE GAS SUPPLY AND THE FUEL CELL POWER SYSTEM.
2. SHUT DOWN THE FUEL CELL POWER SYSTEM.
3. INITIATE LOCAL AUDIBLE AND VISIBLE ALARMS IN APPROVED LOCATIONS.

SECTION 1206 ELECTRICAL ENERGY STORAGE SYSTEMS

1206.1 SCOPE. THE PROVISIONS IN THIS SECTION ARE APPLICABLE TO ENERGY STORAGE SYSTEMS DESIGNED TO PROVIDE ELECTRICAL POWER TO A BUILDING OR FACILITY. THESE SYSTEMS ARE USED TO PROVIDE STANDBY OR EMERGENCY POWER, AN UNINTERRUPTABLE POWER SUPPLY, LOAD SHEDDING, LOAD SHARING OR SIMILAR CAPABILITIES. *ENERGY STORAGE SYSTEMS IN GROUP R-3 AND R-4 OCCUPANCIES SHALL BE IN ACCORDANCE WITH SECTIONS 1206.2.1 AND 1206.4. APPROVED SIGNAGE IS REQUIRED FOR ALL INSTALLATIONS IN ACCORDANCE WITH SECTION 1206.2.8.6.

1206.2 STATIONARY STORAGE BATTERY SYSTEMS. STATIONARY STORAGE BATTERY SYSTEMS HAVING CAPACITIES EXCEEDING THE VALUES SHOWN IN TABLE 1206.2 SHALL COMPLY WITH SECTION 1206.2.1 THROUGH 1206.2.13.6, AS APPLICABLE. *APPROVED SIGNAGE IS REQUIRED FOR ALL INSTALLATIONS IN ACCORDANCE WITH SECTION 1206.2.8.6.

1206.2.1 PERMITS. PERMITS SHALL BE OBTAINED FOR THE CONSTRUCTION OF STATIONARY STORAGE BATTERY SYSTEMS *WITH A CAPACITY OF 3 KWH OR MORE, IN ACCORDANCE WITH SECTION 105.7.2.

1206.2.2 CONSTRUCTION DOCUMENTS. THE FOLLOWING INFORMATION SHALL BE PROVIDED WITH THE PERMIT APPLICATION:

1. LOCATION AND LAYOUT DIAGRAM OF THE ROOM IN WHICH THE STATIONARY STORAGE BATTERY SYSTEM IS TO BE INSTALLED.
2. DETAILS ON HOURLY FIRE-RESISTANCE-RATED ASSEMBLIES PROVIDED.
3. QUANTITIES AND TYPES OF STORAGE BATTERIES AND BATTERY SYSTEMS.
4. MANUFACTURER'S SPECIFICATIONS, RATINGS AND LISTINGS OF STORAGE BATTERIES AND BATTERY SYSTEMS.
5. DETAILS ON ENERGY MANAGEMENT SYSTEMS.
6. LOCATION AND CONTENT OF SIGNAGE.
7. DETAILS ON FIRE-EXTINGUISHING, SMOKE DETECTION AND VENTILATION SYSTEMS.
8. RACK STORAGE ARRANGEMENT, INCLUDING SEISMIC SUPPORT CRITERIA.

**TABLE 1206.2
BATTERY STORAGE SYSTEM THRESHOLD QUANTITIES.**

BATTERY TECHNOLOGY	CAPACITY^A
FLOW BATTERIES ^B	20 KWH
LEAD ACID, ALL TYPES	70 KWH
LITHIUM, ALL TYPES	20 KWH
NICKEL CADMIUM (NI-CD)	70 KWH
SODIUM, ALL TYPES	20 KWH ^C
OTHER BATTERY TECHNOLOGIES	10 KWH

FOR SI:1 KILOWATT HOUR = 3.6 MEGAJOULES.

- A. FOR BATTERIES RATED IN AMP-HOURS, KWH SHALL EQUAL RATED VOLTAGE TIMES AMP-HOUR RATING DIVIDED BY 1000.
- B. SHALL INCLUDE VANADIUM, ZINC-BROMINE, POLYSULFIDE-BROMIDE, AND OTHER FLOWING ELECTROLYTE-TYPE TECHNOLOGIES.
- C. 70 KWH FOR SODIUM-ION TECHNOLOGIES.

1206.2.3 HAZARD MITIGATION ANALYSIS. A FAILURE MODES AND EFFECTS ANALYSIS (FMEA) OR OTHER APPROVED HAZARD MITIGATION ANALYSIS SHALL BE PROVIDED IN ACCORDANCE WITH SECTION 104.7.2 UNDER ANY OF THE FOLLOWING CONDITIONS:

1. BATTERY TECHNOLOGIES NOT SPECIFICALLY IDENTIFIED IN TABLE 1206.2 ARE PROVIDED.
2. MORE THAN ONE STATIONARY STORAGE BATTERY TECHNOLOGY IS PROVIDED IN A ROOM OR INDOOR AREA WHERE THERE IS A POTENTIAL FOR ADVERSE INTERACTION BETWEEN TECHNOLOGIES.
3. WHERE ALLOWED AS A BASIS FOR INCREASING MAXIMUM ALLOWABLE QUANTITIES IN ACCORDANCE WITH SECTION 1206.2.9.
- *4. WHERE REQUIRED BY THE *FIRE CODE OFFICIAL*.

1206.2.3.1 FAULT CONDITION. THE HAZARD MITIGATION ANALYSIS SHALL EVALUATE THE CONSEQUENCES OF THE FOLLOWING FAILURE MODES, AND OTHERS DEEMED NECESSARY BY THE *FIRE CODE OFFICIAL*. ONLY SINGLE-FAILURE MODES SHALL BE CONSIDERED.

1. THERMAL RUNAWAY CONDITION IN A SINGLE-BATTERY STORAGE RACK, MODULE OR ARRAY.
2. FAILURE OF ANY ENERGY MANAGEMENT SYSTEM.
3. FAILURE OF ANY REQUIRED VENTILATION SYSTEM.
4. VOLTAGE SURGES ON THE PRIMARY ELECTRIC SUPPLY.
5. SHORT CIRCUITS ON THE LOAD SIDE OF THE STATIONARY BATTERY STORAGE SYSTEM.
6. FAILURE OF THE SMOKE DETECTION, FIRE-EXTINGUISHING OR GAS DETECTION SYSTEM.
7. SPILL NEUTRALIZATION NOT BEING PROVIDED OR FAILURE OF THE SECONDARY CONTAINMENT SYSTEM.
- *8. FAILURE OF TEMPERATURE CONTROL.

1206.2.3.2 ANALYSIS APPROVAL. THE *FIRE CODE OFFICIAL* IS AUTHORIZED TO APPROVE THE HAZARDOUS MITIGATION ANALYSIS PROVIDED THAT THE HAZARD MITIGATION ANALYSIS DEMONSTRATES ALL OF THE FOLLOWING:

1. FIRES OR EXPLOSIONS WILL BE CONTAINED WITHIN UNOCCUPIED BATTERY STORAGE ROOMS FOR THE MINIMUM DURATION OF THE FIRE-RESISTANCE-RATED WALLS IDENTIFIED IN TABLE 509.1 OF THE *INTERNATIONAL BUILDING CODE*.
2. FIRES AND EXPLOSIONS IN BATTERY CABINETS IN OCCUPIED WORK CENTERS WILL BE DETECTED IN TIME TO ALLOW OCCUPANTS WITHIN THE ROOM TO EVACUATE SAFELY.
3. TOXIC AND HIGHLY TOXIC GASES RELEASED DURING FIRES AND OTHER FAULT CONDITIONS SHALL NOT REACH CONCENTRATIONS IN EXCESS OF IMMEDIATELY DANGEROUS TO LIFE OR HEALTH (IDLH) LEVELS IN THE BUILDING OR ADJACENT MEANS OF EGRESS ROUTES DURING THE TIME DEEMED NECESSARY TO EVACUATE FROM THAT AREA.
4. FLAMMABLE GASES RELEASED FROM BATTERIES DURING CHARGING, DISCHARGING AND NORMAL OPERATION SHALL NOT EXCEED 10 PERCENT OF THEIR LOWER FLAMMABILITY LIMIT (LFL).
5. FLAMMABLE GASES RELEASED FROM BATTERIES DURING FIRE, OVERCHARGING AND OTHER ABNORMAL CONDITIONS SHALL NOT CREATE AN EXPLOSION HAZARD THAT WILL INJURE OCCUPANTS OR EMERGENCY RESPONDERS.

1206.2.3.3 ADDITIONAL PROTECTION MEASURES. CONSTRUCTION, EQUIPMENT AND SYSTEMS THAT ARE REQUIRED FOR THE STATIONARY STORAGE BATTERY SYSTEM TO COMPLY WITH THE HAZARDOUS MITIGATION ANALYSIS, INCLUDING BUT NOT LIMITED TO THOSE SPECIFICALLY DESCRIBED IN SECTION 1206.2, SHALL BE INSTALLED, MAINTAINED AND TESTED IN ACCORDANCE WITH NATIONALLY RECOGNIZED STANDARDS AND SPECIFIED DESIGN PARAMETERS.

1206.2.3.4 LARGE-SCALE FIRE TESTING. WHERE REQUIRED IN SECTION 1206, LARGE-SCALE FIRE TESTING SHALL BE CONDUCTED ON A REPRESENTATIVE STATIONARY STORAGE BATTERY SYSTEM, IN ACCORDANCE WITH UL 9540A. THE TESTING SHALL BE CONDUCTED OR WITNESSED AND REPORTED BY AN APPROVED TESTING LABORATORY. THE TEST REPORT SHALL BE PROVIDED TO THE *FIRE CODE OFFICIAL* FOR REVIEW AND APPROVAL IN ACCORDANCE WITH SECTION 104.7.2.

1206.2.3.5 FIRE REMEDIATION. WHERE A FIRE OR OTHER EVENT HAS DAMAGED A STATIONARY STORAGE BATTERY SYSTEM AND IGNITION, OR RE-IGNITION OF THE STATIONARY STORAGE BATTERY SYSTEM IS POSSIBLE, THE *FIRE CODE OFFICIAL* MAY REQUIRE THE SYSTEM OWNER, AGENT, OR LESSEE TO TAKE ACTIONS, AT THEIR EXPENSE, TO MITIGATE THE HAZARD OR REMOVE THE DAMAGED EQUIPMENT FROM THE PREMISE, TO A SAFE LOCATION.

***1206.2.3.6 FORENSIC ANALYSIS.** THE *FIRE CODE OFFICIAL* MAY ALSO REQUIRE A FORENSIC ANALYSIS OF THE CAUSE OF FAILURE BY AN INDEPENDENT LABORATORY APPROVED BY THE *FIRE CODE OFFICIAL* IN ACCORDANCE WITH SECTION 104.10.2.

1206.2.4 SEISMIC AND STRUCTURAL DESIGN. STATIONARY STORAGE BATTERY SYSTEMS SHALL COMPLY WITH THE SEISMIC DESIGN REQUIREMENTS IN CHAPTER 16 OF THE *INTERNATIONAL BUILDING CODE* AND SHALL NOT EXCEED THE FLOOR-LOADING LIMITATION OF THE BUILDING.

1206.2.5 VEHICLE IMPACT PROTECTION. WHERE STATIONARY STORAGE BATTERY SYSTEMS ARE SUBJECT TO IMPACT BY A MOTOR VEHICLE, INCLUDING FORK LIFTS, VEHICLE IMPACT PROTECTION SHALL BE PROVIDED IN ACCORDANCE WITH SECTION 312.

1206.2.6 COMBUSTIBLE STORAGE. COMBUSTIBLE MATERIALS NOT RELATED TO THE STATIONARY STORAGE BATTERY SYSTEM SHALL NOT BE STORED IN BATTERY ROOMS, CABINETS OR ENCLOSURES. COMBUSTIBLE MATERIALS IN OCCUPIED WORK CENTERS COVERED BY SECTION 1206.2.8.5 SHALL NOT BE STORED LESS THAN 3 FEET (915 MM) FROM BATTERY CABINETS.

1206.2.7 TESTING, MAINTENANCE AND REPAIR. STORAGE BATTERIES AND ASSOCIATED EQUIPMENT AND SYSTEMS SHALL BE TESTED AND MAINTAINED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS. ANY STORAGE BATTERIES OR SYSTEM COMPONENTS USED TO REPLACE EXISTING UNITS SHALL BE COMPATIBLE WITH THE BATTERY CHARGER, ENERGY MANAGEMENT SYSTEMS, OTHER STORAGE BATTERIES AND OTHER SAFETY SYSTEMS. INTRODUCING OTHER TYPES OF STORAGE BATTERIES INTO THE STATIONARY STORAGE BATTERY SYSTEM OR OTHER TYPES OF ELECTROLYTES INTO

FLOW BATTERY SYSTEMS SHALL BE TREATED AS A NEW INSTALLATION AND REQUIRE APPROVAL BY THE *FIRE CODE OFFICIAL* BEFORE THE REPLACEMENTS ARE INTRODUCED INTO SERVICE.

1206.2.8 LOCATION AND CONSTRUCTION. ROOMS AND AREAS CONTAINING STATIONARY STORAGE BATTERY SYSTEMS SHALL BE DESIGNED, LOCATED AND CONSTRUCTED IN ACCORDANCE WITH SECTIONS 1206.2.8.1 THROUGH 1206.2.8.7.4.

1206.2.8.1 LOCATION. STATIONARY STORAGE BATTERY SYSTEMS SHALL NOT BE LOCATED IN THE FOLLOWING AREAS:

1. WHERE THE FLOOR IS LOCATED MORE THAN 75 FEET (22 860 MM) ABOVE THE LOWEST LEVEL OF FIRE DEPARTMENT VEHICLE ACCESS,
2. WHERE THE FLOOR LEVEL IS LOCATED BELOW THE LOWEST LEVEL OF EXIT DISCHARGE.

EXCEPTIONS:

1. LEAD ACID AND NICKEL CADMIUM STATIONARY STORAGE BATTERY SYSTEMS LESS THAN 50 VAC AND 60 VDC INSTALLED IN FACILITIES UNDER THE EXCLUSIVE CONTROL OF COMMUNICATIONS UTILITIES IN ACCORDANCE WITH NFPA 76.
2. WHERE APPROVED, INSTALLATIONS SHALL BE PERMITTED IN UNDERGROUND VAULTS COMPLYING WITH NFPA 70, ARTICLE 450, PART III.
3. WHERE APPROVED BY THE *FIRE CODE OFFICIAL*, INSTALLATIONS SHALL BE PERMITTED ON HIGHER AND LOWER FLOORS.
4. INSTALLATIONS ON NONCOMBUSTIBLE ROOFTOPS OF BUILDINGS EXCEEDING 75 FEET (22 860 MM) IN HEIGHT THAT DO NOT OBSTRUCT FIRE DEPARTMENT ROOFTOP OPERATIONS, WHERE *APPROVED* BY THE *FIRE CODE OFFICIAL*.

1206.2.8.2 SEPARATION. ROOMS CONTAINING STATIONARY STORAGE BATTERY SYSTEMS SHALL BE SEPARATED FROM OTHER AREAS OF THE BUILDING IN ACCORDANCE WITH SECTION 509.1 OF THE *INTERNATIONAL BUILDING CODE*. BATTERY SYSTEMS SHALL BE ALLOWED TO BE IN THE SAME ROOM WITH THE EQUIPMENT THEY SUPPORT.

1206.2.8.3 STATIONARY BATTERY ARRAYS. STORAGE BATTERIES, PREPACKAGED STATIONARY STORAGE BATTERY SYSTEMS AND PRE-ENGINEERED STATIONARY STORAGE BATTERY SYSTEMS SHALL BE SEGREGATED INTO STATIONARY BATTERY ARRAYS NOT EXCEEDING 50 KWH (180 MEGAJOULES) EACH. EACH STATIONARY BATTERY ARRAY SHALL BE SPACED NOT LESS THAN 3 FEET (914 MM) FROM OTHER STATIONARY BATTERY ARRAYS AND FROM WALLS IN THE STORAGE ROOM OR AREA. THE STORAGE ARRANGEMENTS SHALL COMPLY WITH CHAPTER 10.

EXCEPTIONS:

1. LEAD ACID AND NICKEL CADMIUM STORAGE BATTERY ARRAYS.
2. LISTED PRE-ENGINEERED STATIONARY STORAGE BATTERY SYSTEMS AND PREPACKAGED STATIONARY STORAGE BATTERY SYSTEMS SHALL NOT EXCEED 250 KWH (900 MEGAJOULES) EACH, *WHERE *APPROVED* BY THE *FIRE CODE OFFICIAL*.

3. THE *FIRE CODE OFFICIAL* IS AUTHORIZED TO APPROVE LISTED, PRE-ENGINEERED AND PREPACKAGED BATTERY ARRAYS WITH LARGER CAPACITIES OR SMALLER BATTERY ARRAY SPACING IF LARGE-SCALE FIRE AND FAULT CONDITION TESTING CONDUCTED OR WITNESSED AND REPORTED BY AN APPROVED TESTING LABORATORY IS PROVIDED SHOWING THAT A FIRE INVOLVING ONE ARRAY WILL NOT PROPAGATE TO AN ADJACENT ARRAY, AND BE CONTAINED WITHIN THE ROOM FOR A DURATION EQUAL TO THE FIRE-RESISTANCE RATING OF THE ROOM SEPARATION SPECIFIED IN TABLE 509 OF THE *INTERNATIONAL BUILDING CODE*.

1206.2.8.4 SEPARATE ROOMS. WHERE STATIONARY BATTERIES ARE INSTALLED IN A SEPARATE EQUIPMENT ROOM THAT CAN BE ACCESSED ONLY BY AUTHORIZED PERSONNEL, THEY SHALL BE PERMITTED TO BE INSTALLED ON AN OPEN RACK FOR EASE OF MAINTENANCE.

1206.2.8.5 OCCUPIED WORK CENTERS. WHERE STATIONARY STORAGE BATTERIES ARE LOCATED IN AN OCCUPIED WORK CENTER, THEY SHALL BE HOUSED IN A NONCOMBUSTIBLE CABINET OR OTHER ENCLOSURE TO PREVENT ACCESS BY UNAUTHORIZED PERSONNEL.

1206.2.8.5.1 CABINETS. WHERE STATIONARY BATTERIES ARE CONTAINED IN CABINETS IN OCCUPIED WORK CENTERS, THE CABINET ENCLOSURES SHALL BE LOCATED WITHIN 10 FEET (3048 MM) OF THE EQUIPMENT THAT THEY SUPPORT.

1206.2.8.6 SIGNAGE. APPROVED SIGNS SHALL BE PROVIDED ON OR ADJACENT TO ALL ENTRY FOR BATTERY STORAGE ROOMS OR AREAS AND ON ENCLOSURES OF BATTERY STORAGE CABINETS AND WALK-IN UNITS LOCATED OUTDOORS, ON ROOFTOPS OR IN OPEN PARKING GARAGES. SIGNS DESIGNED TO MEET BOTH THE REQUIREMENTS OF THIS SECTION AND NFPA 70 SHALL BE PERMITTED. THE SIGNAGE SHALL INCLUDE THE FOLLOWING OR EQUIVALENT:

1. "ENERGY STORAGE SYSTEM", "BATTERY STORAGE SYSTEM", "CAPACITOR ENERGY STORAGE SYSTEM", OR THE EQUIVALENT.
2. THE IDENTIFICATION OF THE ELECTROCHEMICAL BATTERY ENERGY STORAGE SYSTEM TECHNOLOGY PRESENT. "ENERGIZED ELECTRICAL CIRCUITS"
3. IF WATER REACTIVE ELECTROCHEMICAL BATTERY ENERGY STORAGE SYSTEM ARE PRESENT, THE SIGNAGE SHALL INCLUDE "APPLY NO WATER"
4. CURRENT CONTACT INFORMATION, INCLUDING PHONE NUMBER, FOR PERSONNEL AUTHORIZED TO SERVICE THE EQUIPMENT AND FIRE MITIGATION PERSONNEL.

EXCEPTION: EXISTING STATIONARY STORAGE BATTERY SYSTEMS SHALL BE PERMITTED TO INCLUDE THE SIGNAGE REQUIRED AT THE TIME IT WAS INSTALLED.

1206.2.8.6.1 ELECTRICAL DISCONNECTS. WHERE THE STATIONARY STORAGE BATTERY SYSTEM DISCONNECTING MEANS IS NOT WITHIN SIGHT OF THE MAIN SERVICE DISCONNECTING MEANS, PLACARDS OR DIRECTORIES SHALL BE INSTALLED AT THE LOCATION OF THE MAIN SERVICE DISCONNECTING MEANS INDICATING THE LOCATION

OF STATIONARY STORAGE BATTERY SYSTEM DISCONNECTING MEANS IN ACCORDANCE WITH NFPA 70.

1206.2.8.6.2 CABINET SIGNAGE. BATTERY STORAGE CABINETS PROVIDED IN OCCUPIED WORK CENTERS IN ACCORDANCE WITH SECTION 1206.2.8.5 SHALL HAVE EXTERIOR LABELS THAT IDENTIFY THE MANUFACTURER AND MODEL NUMBER OF THE SYSTEM AND ELECTRICAL RATING (VOLTAGE AND CURRENT) OF THE CONTAINED BATTERY SYSTEM. THERE SHALL BE SIGNS WITHIN THE CABINET THAT INDICATE THE RELEVANT ELECTRICAL AND CHEMICAL HAZARDS, AS REQUIRED BY SECTION 1206.2.12.

1206.2.8.7 OUTDOOR INSTALLATIONS. STATIONARY STORAGE BATTERY SYSTEMS LOCATED OUTDOORS SHALL COMPLY WITH SECTIONS 1206.2.8.7 THROUGH 1206.2.8.7.4, IN ADDITION TO ALL APPLICABLE REQUIREMENTS OF SECTION 1206.2. INSTALLATIONS IN OUTDOOR ENCLOSURES OR CONTAINERS THAT CAN BE OCCUPIED FOR SERVICING, TESTING, MAINTENANCE AND OTHER FUNCTIONS SHALL BE TREATED AS BATTERY STORAGE ROOMS.

REMOTE OUTDOOR INSTALLATIONS INCLUDE STATIONARY BATTERY SYSTEMS LOCATED MORE THAN 100 FEET FROM BUILDINGS, PROPERTY LINES, PUBLIC WAYS, STORED COMBUSTIBLE STORAGE, HAZARDOUS MATERIALS, HIGH PILED STOCK AND OTHER EXPOSURE HAZARDS.

INSTALLATIONS NEAR EXPOSURES INCLUDE ALL OUTDOOR STATIONARY BATTERY SYSTEMS THAT ARE NOT MORE THAN 100 FEET FROM BUILDINGS, PROPERTY LINES, PUBLIC WAYS, STORED COMBUSTIBLE STORAGE, HAZARDOUS MATERIALS, HIGH PILED STOCK AND OTHER EXPOSURE HAZARDS.

EXCEPTION: STATIONARY BATTERY ARRAYS IN NONCOMBUSTIBLE CONTAINERS SHALL NOT BE REQUIRED TO BE SPACED 3 FEET (914 MM) FROM THE CONTAINER WALLS.

**TABLE 1206.2.8.7
OUTDOOR INSTALLATIONS**

COMPLIANCE REQUIRED	REMOTE INSTALLATIONS	INSTALLATIONS NEAR EXPOSURES
GENERAL INSTALLATION REQUIREMENTS	YES	YES
SIZE AND SEPARATION	NO	YES ^A
SMOKE AND AUTOMATIC	YES	YES

FIRE DETECTION		
FIRE SUPPRESSION SYSTEMS	YES ^B	YES
MAXIMUM ENCLOSURE SIZE	YES	YES
VEGETATION CONTROL	YES	YES
MEANS OF EGRESS SEPARATION	YES	YES
CLEARANCE TO EXPOSURES	YES	YES
TECHNOLOGY-SPECIFIC PROTECTION	YES	YES

A. IN OUTDOOR WALK-IN UNITS, SPACING IS NOT REQUIRED BETWEEN ENERGY STORAGE SYSTEMS UNITS AND THE WALLS OF THE ENCLOSURE.

B. WHERE APPROVED BY THE *FIRE CODE OFFICIAL*, FIRE SUPPRESSION SYSTEMS ARE PERMITTED TO BE OMITTED.

1206.2.8.7.1 SEPARATION. STATIONARY STORAGE BATTERY SYSTEMS LOCATED OUTDOORS SHALL BE SEPARATED BY NOT LESS THAN *10 FEET (3048 MM) FROM THE FOLLOWING:

1. LOT LINES.
2. PUBLIC WAYS.
3. BUILDINGS.
4. STORED COMBUSTIBLE MATERIALS.
5. HAZARDOUS MATERIALS.
6. HIGH-PILED STOCK.
7. OTHER EXPOSURE HAZARDS.

EXCEPTION: THE *FIRE CODE OFFICIAL* IS AUTHORIZED TO APPROVE SMALLER SEPARATION DISTANCES IF LARGESCALE FIRE AND FAULT CONDITION TESTING CONDUCTED OR WITNESSED AND REPORTED BY AN APPROVED TESTING LABORATORY IS PROVIDED SHOWING THAT A FIRE INVOLVING THE SYSTEM WILL NOT ADVERSELY IMPACT OCCUPANT EGRESS FROM ADJACENT BUILDINGS, OR ADVERSELY IMPACT ADJACENT STORED MATERIALS OR STRUCTURES.

1206.2.8.7.2 MEANS OF EGRESS. STATIONARY STORAGE BATTERY SYSTEMS LOCATED OUTDOORS SHALL BE SEPARATED FROM ANY *MEANS OF EGRESS* AS REQUIRED BY THE *FIRE CODE OFFICIAL* TO ENSURE SAFE EGRESS UNDER FIRE CONDITIONS, BUT NOT LESS THAN 10 FEET (3048 MM).

EXCEPTION: THE *FIRE CODE OFFICIAL* IS AUTHORIZED TO APPROVE LESSER SEPARATION DISTANCES IF LARGE-SCALE FIRE AND FAULT CONDITION TESTING CONDUCTED OR WITNESSED AND REPORTED BY AN *APPROVED* TESTING LABORATORY IS PROVIDED SHOWING THAT A FIRE INVOLVING THE SYSTEM WILL NOT ADVERSELY IMPACT OCCUPANT EGRESS.

1206.2.8.7.3 SECURITY OF OUTDOOR AREAS. OUTDOOR AREAS IN WHICH STATIONARY STORAGE BATTERY SYSTEMS ARE LOCATED SHALL BE SECURED AGAINST UNAUTHORIZED ENTRY AND SAFEGUARDED IN AN APPROVED MANNER.

1206.2.8.7.4 WALK-IN UNITS. WHERE A STATIONARY STORAGE BATTERY SYSTEM INCLUDES AN OUTER ENCLOSURE, THE UNIT SHALL ONLY BE ENTERED FOR INSPECTION, MAINTENANCE AND REPAIR OF BATTERIES AND ELECTRONICS, AND SHALL NOT BE OCCUPIED FOR OTHER PURPOSES.

1206.2.9 MAXIMUM ALLOWABLE QUANTITIES. *FIRE AREAS* WITHIN BUILDINGS CONTAINING STATIONARY STORAGE BATTERY SYSTEMS EXCEEDING THE MAXIMUM ALLOWABLE QUANTITIES IN TABLE 1206.2.9 SHALL COMPLY WITH ALL APPLICABLE GROUP H OCCUPANCY REQUIREMENTS IN THIS CODE AND THE *INTERNATIONAL BUILDING CODE*.

EXCEPTION: WHERE APPROVED BY THE *FIRE CODE OFFICIAL*, AREAS CONTAINING STATIONARY STORAGE BATTERIES THAT EXCEED THE AMOUNTS IN TABLE 1206.2.9 SHALL BE TREATED AS INCIDENTAL USE AREAS AND NOT GROUP H OCCUPANCIES BASED ON A HAZARDOUS MITIGATION ANALYSIS IN ACCORDANCE WITH SECTION 1206.2.3 AND LARGE-SCALE FIRE AND FAULT CONDITION TESTING CONDUCTED OR WITNESSED AND REPORTED BY AN APPROVED TESTING LABORATORY.

1206.2.9.1 MIXED BATTERY SYSTEMS. WHERE AREAS WITHIN BUILDINGS CONTAIN DIFFERENT TYPES OF STORAGE BATTERY TECHNOLOGIES, THE TOTAL AGGREGATE QUANTITIES OF BATTERIES SHALL BE DETERMINED BASED ON THE SUM OF PERCENTAGES OF EACH BATTERY TYPE QUANTITY DIVIDED BY THE MAXIMUM ALLOWABLE QUANTITY OF EACH BATTERY TYPE. IF THE SUM OF THE PERCENTAGES EXCEEDS 100 PERCENT, THE AREA SHALL BE TREATED AS A GROUP H OCCUPANCY IN ACCORDANCE WITH TABLE 1206.2.9.

1206.2.10 STORAGE BATTERIES AND EQUIPMENT. THE DESIGN AND INSTALLATION OF STORAGE BATTERIES AND RELATED EQUIPMENT SHALL COMPLY WITH SECTIONS 1206.2.10.1 THROUGH 1206.2.10.8.

BATTERY STORAGE SYSTEM INSTALLATIONS SHALL COMPLY WITH THE REQUIREMENTS OF THIS SECTION AND THE APPLICABLE REQUIREMENTS OF TABLE 1206.2.10

1206.2.10.1 LISTINGS. STORAGE BATTERIES AND BATTERY STORAGE SYSTEMS SHALL COMPLY WITH THE FOLLOWING:

1. STORAGE BATTERIES SHALL BE LISTED IN ACCORDANCE WITH UL 1973.
2. PREPACKAGED AND PRE-ENGINEERED STATIONARY STORAGE BATTERY SYSTEMS SHALL BE LISTED IN ACCORDANCE WITH UL 9540.

EXCEPTION: LEAD-ACID BATTERIES ARE NOT REQUIRED TO BE LISTED.

1206.2.10.2 PREPACKAGED AND PRE-ENGINEERED SYSTEMS. PREPACKAGED AND PRE-ENGINEERED STATIONARY STORAGE BATTERY SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH THEIR LISTING AND THE MANUFACTURER’S INSTRUCTIONS.

**TABLE 1206.2.9
MAXIMUM ALLOWABLE BATTERY QUANTITIES**

BATTERY TECHNOLOGY	MAXIMUM ALLOWABLE	GROUP H
FLOW BATTERIES ^B	600 KWH	GROUP H-2
LEAD ACID, ALL TYPES	UNLIMITED	NOT APPLICABLE
LITHIUM, ALL TYPES	600 KWH	GROUP H-2
NICKEL CADMIUM (NI-CD)	UNLIMITED	NOT APPLICABLE
SODIUM, ALL TYPES	600 KWH	GROUP H-2
OTHER BATTERY	200 KWH	GROUP H-2 ^C

FOR SI:1 KILOWATT HOUR = 3.6 MEGAJOULES.

- a. FOR BATTERIES RATED IN AMP-HOURS, KILOWATT-HOURS (KWH) SHALL EQUAL RATED BATTERY VOLTAGE TIMES THE AMP-HOUR RATING DIVIDED BY 1,000.
- b. SHALL INCLUDE VANADIUM, ZINC-BROMINE, POLYSULFIDE-BROMIDE, AND OTHER FLOWING ELECTROLYTE-TYPE TECHNOLOGIES.
- c. SHALL BE A GROUP H-4 OCCUPANCY IF THE *FIRE CODE OFFICIAL* DETERMINES THAT A FIRE OR THERMAL RUNAWAY INVOLVING THE BATTERY TECHNOLOGY DOES NOT REPRESENT A SIGNIFICANT FIRE HAZARD.

**TABLE 1206.2.10
BATTERY TECHNOLOGY SPECIFIC**

COMPLIANCE REQUIRED ^B	BATTERY TECHNOLOGY				OTHER BATTERY STORAGE SYSTEMS AND BATTERY TECHNOLOGIES ^B
	LEAD- ACID	NI-CAD & NI- MH	LITHIUM- ION	FLOW	
EXHAUST VENTILATION	YES	YES	YES	YES	YES
SPILL CONTROL AND NEUTRALIZATION	YES ^C	YES ^C	NO	YES	YES
EXPLOSION CONTROL	YES ^A	YES ^A	YES	YES	YES
SAFETY CAPS	YES	YES	NO	YES	YES
THERMAL RUNAWAY	YES ^D	YES	YES ^E	YES	YES ^E

- c. NOT REQUIRED FOR LEAD-ACID AND NICKEL CADMIUM BATTERIES AT FACILITIES UNDER THE EXCLUSIVE CONTROL OF COMMUNICATIONS UTILITIES THAT COMPLY WITH NFPA 76 AND OPERATE AT LESS THAN 50 VAC AND 60 VDC.

- d. PROTECTION SHALL BE PROVIDED UNLESS DOCUMENTATION ACCEPTABLE TO THE *FIRE CODE OFFICIAL*, IN ACCORDANCE WITH 2021 *INTERNATIONAL FIRE CODE* SECTION 104.7.2, PROVIDES JUSTIFICATION WHY THE PROTECTION IS NOT NECESSARY BASED ON THE TECHNOLOGY USED.
- e. APPLICABLE TO VENTED (I.E. FLOODED) TYPE NICKEL CADMIUM AND LEAD ACID BATTERIES.
- f. NOT REQUIRED FOR VENTED (I.E. FLOODED) TYPE LEAD ACID BATTERIES.
- g. THE THERMAL RUNAWAY PROTECTION IS PERMITTED TO BE PART OF A BATTERY MANAGEMENT SYSTEM THAT HAS BEEN EVALUATED WITH THE BATTERY IN ACCORDANCE WITH UL 1973.

1206.2.10.3 ENERGY MANAGEMENT SYSTEM. AN APPROVED ENERGY MANAGEMENT SYSTEM SHALL BE PROVIDED FOR BATTERY TECHNOLOGIES OTHER THAN LEAD-ACID AND NICKEL CADMIUM FOR MONITORING AND BALANCING CELL VOLTAGES, CURRENTS AND TEMPERATURES WITHIN THE MANUFACTURER'S SPECIFICATIONS. THE SYSTEM SHALL TRANSMIT AN ALARM SIGNAL TO AN APPROVED LOCATION AND TO AN *APPROVED* ANNUNCIATOR PANEL IF POTENTIALLY HAZARDOUS TEMPERATURES OR OTHER CONDITIONS SUCH AS SHORT CIRCUITS, OVER VOLTAGE OR UNDER VOLTAGE ARE DETECTED.

1206.2.10.3.1 ANNUNCIATOR PANEL. THE *APPROVED* ANNUNCIATOR PANEL SHALL VISIBLY INDICATE ANY HAZARDOUS TEMPERATURE OR OTHER CONDITIONS. THE LOCATION OF THE ANNUNCIATOR PANEL SHALL BE APPROVED BY THE *FIRE CODE OFFICIAL*.

1206.2.10.4 BATTERY CHARGERS. BATTERY CHARGERS SHALL BE COMPATIBLE WITH THE BATTERY CHEMISTRY AND THE MANUFACTURER'S ELECTRICAL RATINGS AND CHARGING SPECIFICATIONS. BATTERY CHARGERS SHALL BE LISTED AND LABELED IN ACCORDANCE WITH UL 1564 OR PROVIDED AS PART OF A LISTED PRE-ENGINEERED OR PREPACKAGED STATIONARY STORAGE BATTERY SYSTEM.

1206.2.10.5 INVERTERS. INVERTERS SHALL BE LISTED AND LABELED IN ACCORDANCE WITH UL 1741. ONLY INVERTERS LISTED AND LABELED FOR UTILITY INTERACTIVE SYSTEM USE AND IDENTIFIED AS INTERACTIVE SHALL BE ALLOWED TO OPERATE IN PARALLEL WITH THE ELECTRIC UTILITY POWER SYSTEM TO SUPPLY POWER TO COMMON LOADS.

1206.2.10.6 SAFETY CAPS. WHERE REQUIRED BY TABLE 1206.2.10, BATTERIES SHALL BE PROVIDED WITH FLAME-ARRESTING SAFETY CAPS.

1206.2.10.7 THERMAL RUNAWAY. WHERE REQUIRED BY TABLE 1206.2.10 STORAGE BATTERIES SHALL BE PROVIDED WITH A LISTED DEVICE OR OTHER APPROVED METHOD TO PREVENT, DETECT AND CONTROL THERMAL RUNAWAY.

1206.2.10.8 TOXIC AND HIGHLY TOXIC GAS. STATIONARY STORAGE BATTERY SYSTEMS THAT HAVE THE POTENTIAL TO RELEASE TOXIC AND HIGHLY TOXIC GAS DURING

CHARGING, DISCHARGING AND NORMAL USE CONDITIONS SHALL COMPLY WITH SECTION 1206.2.11.3 AND CHAPTER 60.

1206.2.11 FIRE PROTECTION AND LIFE SAFETY SYSTEMS. FIRE PROTECTION AND LIFE SAFETY SYSTEMS SHALL BE PROVIDED IN ACCORDANCE WITH SECTIONS 1206.2.11.1 THROUGH 1206.2.11.7. ALL ALARM, AND SUPERVISORY SIGNALS FROM THE FIRE PROTECTION AND LIFE SAFETY SYSTEMS SHALL BE TRANSMITTED TO A CENTRAL STATION, PROPRIETARY OR REMOTE STATION SERVICE IN ACCORDANCE WITH NFPA 72, AND TO AN APPROVED ANNUNCIATOR PANEL.

1206.2.11.1 FIRE-EXTINGUISHING SYSTEMS. ROOMS AND AREAS WITHIN BUILDINGS AND WALK-IN UNITS CONTAINING ELECTROCHEMICAL BATTERY ENERGY STORAGE SYSTEMS SHALL BE EQUIPPED WITH AN *AUTOMATIC SPRINKLER SYSTEM* INSTALLED IN ACCORDANCE WITH SECTION 903.3.1.1. COMMODITY CLASSIFICATIONS FOR SPECIFIC TECHNOLOGIES OF STORAGE BATTERIES SHALL BE IN ACCORDANCE WITH CHAPTER 5 OF NFPA 13. IF THE STORAGE BATTERY TYPES ARE NOT ADDRESSED IN CHAPTER 5 OF NFPA 13, THE *FIRE CODE OFFICIAL* IS AUTHORIZED TO APPROVE THE FIRE-EXTINGUISHING SYSTEM BASED ON FULL SCALE FIRE AND FAULT CONDITION TESTING CONDUCTED OR WITNESSED AND REPORTED BY AN *APPROVED* LABORATORY.

EXCEPTION: SPACES OR AREAS CONTAINING STATIONARY STORAGE BATTERY SYSTEMS USED EXCLUSIVELY FOR TELECOMMUNICATIONS EQUIPMENT IN ACCORDANCE WITH SECTION 903.2.

1206.2.11.1.1 FIRE-EXTINGUISHING SYSTEMS. ROOMS AND AREAS WITHIN BUILDINGS AND WALK-IN UNITS CONTAINING ELECTROCHEMICAL BATTERY ENERGY STORAGE SYSTEMS SHALL BE PROTECTED BY AN AUTOMATIC FIRE SUPPRESSION SYSTEM DESIGNED AND INSTALLED IN ACCORDANCE WITH THE MOST STRINGENT OF THE FOLLOWING:

1. AN *AUTOMATIC SPRINKLER SYSTEM* DESIGNED AND INSTALLED IN ACCORDANCE WITH SECTION 903.3.1.1 WITH A MINIMUM DENSITY OF 0.6 GPM/FT.² BASED ON THE FIRE AREA OR 2,500 SQUARE FEET (232 M²) DESIGN AREA, WHICHEVER IS SMALLER.
2. WHERE *APPROVED*, AN AUTOMATIC SPRINKLER SYSTEM DESIGNED AND INSTALLED IN ACCORDANCE WITH SECTION 903.3.1.1 WITH A SPRINKLER HAZARD CLASSIFICATION BASED ON LARGE-SCALE FIRE TESTING.
3. AN ALTERNATE AUTOMATIC FIRE EXTINGUISHING SYSTEM DESIGNED AND INSTALLED IN ACCORDANCE WITH SECTION 904, PROVIDED THE INSTALLATION IS APPROVED BY THE *FIRE CODE OFFICIAL* BASED ON LARGE SCALE FIRE TESTING

EXCEPTION: FIRE SUPPRESSION SYSTEMS FOR LEAD ACID AND NICKEL CADMIUM BATTERY SYSTEMS AT FACILITIES UNDER THE EXCLUSIVE CONTROL OF COMMUNICATIONS UTILITIES THAT OPERATE AT LESS THAN 50 VAC AND 60 VDC SHALL BE PROVIDED WHERE REQUIRED BY NFPA 76.

1206.2.11.1.2 FIRE DEPARTMENT CONNECTIONS. FIRE DEPARTMENT CONNECTIONS SHALL BE INSTALLED IN AN *APPROVED* LOCATION.

1206.2.11.1.3 HYDRANTS. FIRE HYDRANTS SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH CHAPTERS 5 AND 9.

1206.2.11.1.4 ALTERNATIVE FIRE-EXTINGUISHING SYSTEMS. BATTERY SYSTEMS THAT UTILIZE WATER-REACTIVE MATERIALS SHALL BE PROTECTED BY AN *APPROVED* ALTERNATIVE AUTOMATIC FIRE EXTINGUISHING SYSTEM IN ACCORDANCE WITH SECTION 904. THE SYSTEM SHALL BE LISTED FOR PROTECTING THE TYPE, ARRANGEMENT AND QUANTITIES OF STORAGE BATTERIES IN THE ROOM. THE *FIRE CODE OFFICIAL* SHALL BE PERMITTED TO APPROVE THE ALTERNATIVE FIRE EXTINGUISHING SYSTEM BASED ON FULL-SCALE FIRE AND FAULT CONDITION TESTING CONDUCTED OR WITNESSED AND REPORTED BY AN *APPROVED* LABORATORY.

1206.2.11.2 SMOKE DETECTION SYSTEM. AN *APPROVED AUTOMATIC SMOKE DETECTION SYSTEM* SHALL BE INSTALLED IN ROOMS CONTAINING *STATIONARY STORAGE BATTERY SYSTEMS* IN ACCORDANCE WITH SECTION 907.2.

1206.2.11.3 *EXHAUST VENTILATION. WHERE REQUIRED BY TABLE 1206.2.10, VENTILATION OF ROOMS CONTAINING STATIONARY STORAGE BATTERY SYSTEMS SHALL BE PROVIDED IN ACCORDANCE WITH THE *INTERNATIONAL MECHANICAL CODE* AND ONE OF THE FOLLOWING:

1. THE VENTILATION SYSTEM SHALL BE DESIGNED TO LIMIT THE MAXIMUM CONCENTRATION OF FLAMMABLE GAS TO 10 PERCENT OF THE LOWER FLAMMABILITY LIMIT, OR FOR HYDROGEN, 1.0 PERCENT OF THE TOTAL VOLUME OF THE ROOM.
2. CONTINUOUS VENTILATION SHALL BE PROVIDED AT A RATE OF NOT LESS THAN 1 CUBIC FOOT PER MINUTE (CFM) PER SQUARE FOOT [$0.00508 \text{ M}^3/(\text{S} \cdot \text{M}^2)$] OF FLOOR AREA, BUT NOT LESS THAN 150 CFM ($4 \text{ M}^3/\text{MIN}$). THE EXHAUST SYSTEM SHALL BE DESIGNED TO PROVIDE AIR MOVEMENT ACROSS ALL PARTS OF THE FLOOR FOR GASES HAVING A VAPOR DENSITY GREATER THAN AIR AND ACROSS ALL PARTS OF THE VAULT CEILING FOR GASES HAVING A VAPOR DENSITY LESS THAN AIR.

1206.2.11.3.1 CABINET VENTILATION. WHERE CABINETS LOCATED IN OCCUPIED SPACES CONTAIN STORAGE BATTERIES THAT ARE REQUIRED BY TABLE 1206.2.10 TO BE PROVIDED WITH VENTILATION, THE CABINET SHALL BE PROVIDED WITH VENTILATION IN ACCORDANCE WITH SECTION 1206.2.11.3.

1206.2.11.3.2 SUPERVISION. REQUIRED MECHANICAL VENTILATION SYSTEMS FOR ROOMS AND CABINETS CONTAINING STORAGE BATTERIES SHALL BE SUPERVISED BY AN *APPROVED* CENTRAL STATION, PROPRIETARY OR REMOTE STATION SERVICE OR SHALL INITIATE AN AUDIBLE AND VISUAL SIGNAL AT AN *APPROVED* CONSTANTLY ATTENDED ON-SITE LOCATION.

1206.2.11.3.3 STANDBY POWER. MECHANICAL EXHAUST VENTILATION SHALL BE PROVIDED WITH NOT LESS THAN 6 HOURS OF STANDBY POWER IN ACCORDANCE WITH *INTERNATIONAL BUILDING CODE*. SEPARATION SHALL BE IN ACCORDANCE WITH NFPA 70.

WHERE THE BUILDING, OR A PORTION OF THE BUILDING, SERVED BY THE MECHANICAL EXHAUST VENTILATION IS INTENDED TO REMAIN OPERATIONAL / OCCUPIED DURING A UTILITY POWER OUTAGE, THROUGH THE USE OF AN ELECTRICAL STANDBY POWER SYSTEM, WHETHER REQUIRED OR OPTIONAL; THE MECHANICAL EXHAUST VENTILATION SHALL BE CONNECTED TO BOTH THE NORMAL ELECTRICAL SERVICE AND EMERGENCY OR STANDBY POWER SYSTEM FOR EQUIVALENT TIME PERIODS.

1206.2.11.3.4 MECHANICAL EXHAUST VENTILATION CONTROLS. CLEARLY IDENTIFIED SEPARATE SWITCHES SHALL BE PROVIDED BOTH TO ACTIVATE THE MECHANICAL EXHAUST VENTILATION SYSTEM AND TO SHUTOFF THE VENTILATION SYSTEM.

1206.2.11.4 GAS DETECTION SYSTEM. WHERE REQUIRED BY SECTION 1206.2.3 OR 1206.2.10.8 ROOMS CONTAINING STATIONARY STORAGE BATTERY SYSTEMS SHALL BE PROTECTED BY A GAS DETECTION SYSTEM COMPLYING WITH SECTION 916. THE GAS DETECTION SYSTEM SHALL BE DESIGNED TO ACTIVATE WHERE THE LEVEL OF FLAMMABLE GAS EXCEEDS 10 PERCENT OF THE LOWER FLAMMABLE LIMIT (LFL), OR WHERE THE LEVEL OF TOXIC OR HIGHLY TOXIC GAS EXCEEDS ONE HALF OF THE IDLH.

1206.2.11.4.1 SYSTEM ACTIVATION. ACTIVATION OF THE GAS DETECTION SYSTEM SHALL RESULT IN ALL THE FOLLOWING:

1. INITIATION OF DISTINCT AUDIBLE AND VISIBLE ALARMS IN THE BATTERY STORAGE ROOM.
2. TRANSMISSION OF AN ALARM TO AN APPROVED LOCATION.
3. DE-ENERGIZING OF THE BATTERY CHARGER.
4. ACTIVATION OF THE MECHANICAL VENTILATION SYSTEM, WHERE THE SYSTEM IS INTERLOCKED WITH THE GAS DETECTION SYSTEM.

EXCEPTION: LEAD-ACID AND NICKEL-CADMIUM STATIONARY STORAGE BATTERY SYSTEMS SHALL NOT BE REQUIRED TO COMPLY WITH ITEMS 1, 2 AND 3.

1206.2.11.5 SPILL CONTROL AND NEUTRALIZATION. WHERE REQUIRED BY TABLE 1206.2.10, APPROVED METHODS AND MATERIALS SHALL BE PROVIDED FOR THE CONTROL AND NEUTRALIZATION OF SPILLS OF ELECTROLYTE OR OTHER HAZARDOUS MATERIALS IN AREAS CONTAINING STATIONARY STORAGE BATTERIES AS FOLLOWS:

1. FOR BATTERIES WITH FREE-FLOWING ELECTROLYTE, THE METHOD AND MATERIALS SHALL BE CAPABLE OF NEUTRALIZING A SPILL OF THE TOTAL CAPACITY FROM THE LARGEST CELL OR BLOCK TO A PH BETWEEN 5.0 AND 9.0.
2. FOR BATTERIES WITH IMMOBILIZED ELECTROLYTE, THE METHOD AND MATERIAL SHALL BE CAPABLE OF NEUTRALIZING A SPILL OF 3.0 PERCENT OF THE CAPACITY OF THE LARGEST CELL OR BLOCK IN THE ROOM TO A PH BETWEEN 5.0 AND 9.0.

1206.2.11.5.1 SPILL CONTROL BARRIER. EACH RACK OF BATTERIES, OR GROUP OF RACKS SHALL BE PROVIDED WITH A LIQUID-TIGHT 4-INCH (102 MM) SPILL CONTROL

BARRIER THAT EXTENDS AT LEAST 1-INCH (25 MM) BEYOND THE BATTERY RACK IN ALL DIRECTIONS.

1206.2.11.6 EXPLOSION CONTROL. WHERE REQUIRED BY TABLE 1206.2.10, EXPLOSION CONTROL, COMPLYING WITH SECTION 911, NFPA 68 AND NFPA 69, SHALL BE PROVIDED FOR ROOMS, AREAS OR WALK-IN UNITS CONTAINING ELECTROCHEMICAL BATTERY ENERGY STORAGE SYSTEM TECHNOLOGIES.

EXCEPTIONS:

1. WHERE APPROVED, EXPLOSION CONTROL IS PERMITTED TO BE WAIVED BY THE *FIRE CODE OFFICIAL* BASED ON LARGE- SCALE FIRE TESTING DEMONSTRATING THAT FLAMMABLE GASES ARE NOT LIBERATED FROM ELECTROCHEMICAL BATTERY ENERGY STORAGE SYSTEM CELLS OR MODULES.
2. WHERE APPROVED, EXPLOSION CONTROL IS PERMITTED TO BE WAIVED BY THE *FIRE CODE OFFICIAL* BASED ON DOCUMENTATION PROVIDED IN ACCORDANCE WITH *SECTION 104.7* THAT DEMONSTRATING THAT THE ELECTROCHEMICAL BATTERY ENERGY STORAGE SYSTEM TECHNOLOGY TO BE USED DOES NOT HAVE THE POTENTIAL TO RELEASE FLAMMABLE GAS CONCENTRATIONS IN EXCESS OF 25 PERCENT OF THE LOWER FLAMMABLE LIMIT (LFL) ANYWHERE IN THE ROOM, AREA, WALK-IN UNIT OR STRUCTURE UNDER THERMAL RUNAWAY OR OTHER FAULT CONDITIONS.

1206.2.11.7 EMERGENCY ENERGY RELEASE. AN APPROVED MEANS MUST BE PROVIDED TO SAFELY RELEASE STORED ENERGY FROM THE BATTERIES IN AN EMERGENCY SITUATION.

1206.2.12 SPECIFIC BATTERY-TYPE REQUIREMENTS. THIS SECTION INCLUDES REQUIREMENTS APPLICABLE TO SPECIFIC TYPES OF STORAGE BATTERIES. STATIONARY STORAGE BATTERY SYSTEMS WITH MORE THAN ONE TYPE OF STORAGE BATTERY SHALL COMPLY WITH REQUIREMENTS APPLICABLE TO EACH BATTERY TYPE. VENTILATION, SPILL CONTROL AND NEUTRALIZATION, EXPLOSION CONTROL, SAFETY CAPS AND THERMAL RUNAWAY SHALL BE REQUIRED IN ACCORDANCE WITH TABLE 1206.2.10

1206.2.12.1 LEAD-ACID STORAGE BATTERIES. STATIONARY STORAGE BATTERY SYSTEMS UTILIZING LEAD-ACID STORAGE BATTERIES SHALL COMPLY WITH THE FOLLOWING:

1. THE SIGNAGE REQUIRED BY SECTION 1206.2.8.6 SHALL INDICATE THE ROOM CONTAINS LEAD-ACID BATTERIES.

1206.2.12.2 NICKEL-CADMIUM (NI-CD) STORAGE BATTERIES. *STATIONARY STORAGE BATTERY SYSTEMS* UTILIZING NICKEL CADMIUM (NI-CD) STORAGE BATTERIES SHALL COMPLY WITH THE FOLLOWING:

1. THE SIGNAGE REQUIRED BY SECTION 1206.2.8.6 SHALL INDICATE THE ROOM CONTAINS LEAD-ACID BATTERIES.

1206.2.12.3 LITHIUM-ION STORAGE BATTERIES. THE SIGNAGE IN SECTION 1206.2.8.6 SHALL INDICATE THE TYPE OF LITHIUM BATTERIES CONTAINED IN THE ROOM.

1206.2.12.4 SODIUM-BETA STORAGE BATTERIES. *STATIONARY STORAGE BATTERY SYSTEMS* UTILIZING SODIUM-BETA STORAGE BATTERIES SHALL COMPLY WITH THE FOLLOWING:

1. THE SIGNAGE IN SECTION 1206.2.8.6 SHALL INDICATE THE TYPE OF SODIUM BATTERIES IN THE ROOM AND INCLUDE THE INSTRUCTIONS, “APPLY NO WATER.”

1206.2.12.5 FLOW STORAGE BATTERIES. *STATIONARY STORAGE BATTERY SYSTEMS* UTILIZING FLOW STORAGE BATTERIES SHALL COMPLY WITH THE FOLLOWING:

1. THE SIGNAGE REQUIRED IN SECTION 1206.2.8.6 SHALL INDICATE THE TYPE OF FLOW BATTERIES IN THE ROOM.

1206.2.12.6 OTHER BATTERY TECHNOLOGIES. *STATIONARY STORAGE BATTERY SYSTEMS* UTILIZING BATTERY TECHNOLOGIES OTHER THAN THOSE DESCRIBED IN SECTIONS 1206.2.12.1 THROUGH 1206.2.12.5 SHALL COMPLY WITH THE FOLLOWING:

1. GAS DETECTION SYSTEMS COMPLYING WITH SECTION 916 SHALL BE PROVIDED IN ACCORDANCE WITH SECTION 1206.2.11.4 WHERE THE BATTERIES HAVE THE POTENTIAL TO PRODUCE TOXIC OR HIGHLY TOXIC GAS IN THE STORAGE ROOM OR CABINET IN EXCESS OF THE PERMISSIBLE EXPOSURE LIMITS (PEL) DURING CHARGING, DISCHARGING AND NORMAL SYSTEM OPERATION.
2. IN ADDITION TO THE SIGNAGE REQUIRED IN SECTION 1206.2.8.6, THE MARKING SHALL IDENTIFY THE TYPE OF BATTERIES PRESENT, DESCRIBE THE POTENTIAL HAZARDS ASSOCIATED WITH THE BATTERY TYPE, AND INDICATE THAT THE ROOM CONTAINS ENERGIZED ELECTRICAL CIRCUITS.

1206.2.13 SPECIAL INSTALLATIONS. ROOFTOP AND OPEN PARKING GARAGE BATTERY ENERGY STORAGE SYSTEM INSTALLATIONS SHALL COMPLY WITH SECTIONS 1206.2.13.1 THROUGH 1206.2.13.6. SIGNAGE SHALL COMPLY WITH SECTION 1206.2.8.6.

1206.2.13.1 ROOFTOP INSTALLATIONS. FOR THE PURPOSE OF TABLE 1206.2.13, ROOFTOP INSTALLATIONS ARE THOSE LOCATED ON THE ROOFS OF BUILDINGS.

1206.2.13.2 OPEN PARKING GARAGE INSTALLATIONS. FOR THE PURPOSES OF TABLE 1206.2.13, OPEN PARKING GARAGE INSTALLATIONS ARE THOSE LOCATED IN A STRUCTURE OR PORTION OF A STRUCTURE THAT COMPLIES WITH SECTION 406.5 OF THE *INTERNATIONAL BUILDING CODE*.

**TABLE 1206.2.13
SPECIAL INSTALLATIONS**

COMPLIANCE REQUIRED	ROOFT OPS	OPEN PARKING GARAGE S
GENERAL INSTALLATION REQUIREMENTS	YES	YES

SIZE AND SEPARATION	YES	YES
SMOKE AND AUTOMATIC FIRE DETECTION	YES	YES
MAXIMUM ENCLOSURE SIZE	YES	YES
MEANS OF EGRESS SEPARATION	YES	YES
CLEARANCE TO EXPOSURES	YES	YES
FIRE SUPPRESSION SYSTEMS	YES	YES
TECHNOLOGY SPECIFIC PROTECTION	YES	YES

1206.2.13.3 CLEARANCE TO EXPOSURES. BATTERY STORAGE SYSTEMS LOCATED ON ROOFTOPS AND IN OPEN PARKING GARAGES SHALL BE SEPARATED BY NOT LESS THAN 10 FEET (3048 MM) FROM THE FOLLOWING EXPOSURES:

1. BUILDINGS, EXCEPT THE BUILDING ON WHICH ROOFTOP BATTERY ENERGY STORAGE SYSTEM IS MOUNTED
2. ANY PORTION OF THE BUILDING ON WHICH A ROOFTOP SYSTEM IS MOUNTED THAT IS ELEVATED ABOVE THE ROOFTOP ON WHICH THE SYSTEM IS INSTALLED
3. LOT LINES
4. PUBLIC WAYS
5. STORED COMBUSTIBLE MATERIALS
6. LOCATIONS WHERE MOTOR VEHICLES CAN BE PARKED
7. HAZARDOUS MATERIALS
8. OTHER EXPOSURE HAZARDS

EXCEPTIONS:

1. CLEARANCES ARE PERMITTED TO BE REDUCED TO 3 FEET (914 MM) WHERE A 1-HOUR FREESTANDING FIRE BARRIER, SUITABLE FOR EXTERIOR USE, AND EXTENDING 5 FEET (1524 MM) ABOVE AND 5 FEET (1524 MM) BEYOND THE PHYSICAL BOUNDARY OF THE BATTERY ENERGY STORAGE SYSTEM, INSTALLATION IS PROVIDED TO PROTECT THE EXPOSURE.
2. CLEARANCES ARE PERMITTED TO BE REDUCED TO 3 FEET (914 MM) WHERE A WEATHERPROOF ENCLOSURE CON-STRUCTED OF NONCOMBUSTIBLE MATERIALS IS PROVIDED OVER THE BATTERY ENERGY STORAGE SYSTEM AND IT HAS BEEN DEMONSTRATED THAT A FIRE WITHIN THE ENCLOSURE WILL NOT IGNITE COMBUSTIBLE MATERIALS OUTSIDE THE ENCLOSURE.

1206.2.13.4 FIRE SUPPRESSION SYSTEMS. BATTERY STORAGE SYSTEMS LOCATED IN WALK-IN UNITS ON ROOFTOPS OR IN WALK-IN UNITS IN OPEN PARKING GARAGES SHALL

BE PROVIDED WITH AUTOMATIC FIRE SUPPRESSION SYSTEMS WITHIN THE BATTERY ENERGY STORAGE SYSTEM ENCLOSURE IN ACCORDANCE WITH SECTION 1206.2.11.1. AREAS CONTAINING BATTERY ENERGY STORAGE SYSTEMS OTHER THAN WALK-IN UNITS IN OPEN PARKING STRUCTURES ON LEVELS NOT OPEN ABOVE TO THE SKY SHALL BE PROVIDED WITH AN AUTOMATIC FIRE SUPPRESSION SYSTEM COMPLYING WITH SECTION 1206.2.11.1.

1206.2.13.5 ROOFTOP INSTALLATIONS. BATTERY STORAGE SYSTEMS AND ASSOCIATED EQUIPMENT THAT ARE LOCATED ON ROOFTOPS AND NOT ENCLOSED BY BUILDING CONSTRUCTION SHALL COMPLY WITH THE FOLLOWING:

1. STAIRWAY ACCESS TO THE ROOF FOR EMERGENCY RESPONSE AND FIRE DEPARTMENT PERSONNEL SHALL BE PROVIDED EITHER THROUGH A BULKHEAD FROM THE INTERIOR OF THE BUILDING OR A STAIRWAY ON THE EXTERIOR OF THE BUILDING.
2. SERVICE WALKWAYS NOT LESS THAN 5 FEET (1524 MM) IN WIDTH SHALL BE PROVIDED FOR SERVICE AND EMERGENCY PERSONNEL FROM THE POINT OF ACCESS TO THE ROOF TO THE SYSTEM.
3. BATTERY STORAGE SYSTEMS AND ASSOCIATED EQUIPMENT SHALL BE LOCATED FROM THE EDGE OF THE ROOF A DISTANCE EQUAL TO AT LEAST THE HEIGHT OF THE SYSTEM, EQUIPMENT, OR COMPONENT BUT NOT LESS THAN 5 FEET (1524 MM).
4. THE ROOFING MATERIALS UNDER AND WITHIN 5 FEET (1524 MM) HORIZONTALLY FROM A BATTERY STORAGE SYSTEMS OR ASSOCIATED EQUIPMENT SHALL BE NONCOMBUSTIBLE OR SHALL HAVE A CLASS A RATING WHEN TESTED IN ACCORDANCE WITH ASTM E108 OR UL 790.
5. A CLASS I STANDPIPE OUTLET SHALL BE INSTALLED AT AN APPROVED LOCATION ON THE ROOF LEVEL OF THE BUILDING OR IN THE STAIRWAY BULKHEAD AT THE TOP LEVEL.
6. THE BATTERY STORAGE SYSTEMS SHALL BE NOT LESS THAN 10 FEET (3048 MM) FROM THE FIRE SERVICE ACCESS POINT ON THE ROOFTOP.

1206.2.13.6 OPEN PARKING GARAGES. BATTERY STORAGE SYSTEMS AND ASSOCIATED EQUIPMENT THAT ARE LOCATED IN OPEN PARKING GARAGES SHALL COMPLY WITH ALL OF THE FOLLOWING:

1. BATTERY STORAGE SYSTEMS SHALL NOT BE LOCATED WITHIN 50 FEET (15 240 MM) OF AIR INLETS FOR BUILDING HVAC SYSTEMS.

EXCEPTION: THIS DISTANCE SHALL BE PERMITTED TO BE REDUCED TO 25 FEET (7620 MM) IF THE AUTOMATIC FIRE ALARM SYSTEM MONITORING THE RADIANT-ENERGY-SENSING DETECTORS DE-ENERGIZES THE VENTILATION SYSTEM CONNECTED TO THE AIR INTAKES UPON DETECTION OF FIRE.

2. BATTERY STORAGE SYSTEMS SHALL NOT BE LOCATED WITHIN 25 FEET (7620 MM) OF EXITS LEADING FROM THE ATTACHED BUILDING WHERE LOCATED ON A COVERED LEVEL OF THE PARKING STRUCTURE NOT DIRECTLY OPEN TO THE SKY ABOVE.

3. AN APPROVED FENCE WITH A LOCKED GATE OR OTHER APPROVED BARRIER SHALL BE PROVIDED TO KEEP THE GENERAL PUBLIC NOT LESS THAN 5 FEET (1024 MM) FROM THE OUTER ENCLOSURE OF THE BATTERY ENERGY STORAGE SYSTEM.

1206.3 CAPACITOR ENERGY STORAGE SYSTEMS. CAPACITOR ENERGY STORAGE SYSTEMS HAVING CAPACITIES EXCEEDING 3 KWH (10.8 MEGAJOULES) SHALL COMPLY WITH SECTIONS 1206.3 THROUGH 1206.3.2.6.1.

EXCEPTION: CAPACITORS REGULATED BY NFPA 70, CHAPTER 460, AND CAPACITORS INCLUDED AS A COMPONENT PART OF OTHER LISTED ELECTRICAL EQUIPMENT ARE NOT REQUIRED TO COMPLY WITH THIS SECTION.

1206.3.1 PERMITS. PERMITS SHALL BE OBTAINED FOR THE INSTALLATION OF CAPACITOR ENERGY STORAGE SYSTEMS IN ACCORDANCE WITH SECTION 105.7.3.

1206.3.2 LOCATION AND CONSTRUCTION. ROOMS AND AREAS CONTAINING CAPACITOR ENERGY STORAGE SYSTEMS SHALL BE DESIGNED, LOCATED AND CONSTRUCTED IN ACCORDANCE WITH SECTIONS 1206.3.2 THROUGH 1206.3.2.5.

1206.3.2.1 LOCATION. CAPACITOR ENERGY STORAGE SYSTEMS SHALL NOT BE LOCATED IN AREAS WHERE THE FLOOR IS LOCATED MORE THAN 75 FEET (22 860 MM) ABOVE THE LOWEST LEVEL OF FIRE DEPARTMENT VEHICLE ACCESS, OR WHERE THE FLOOR LEVEL IS MORE THAN 30 FEET (9144 MM) BELOW THE FINISHED FLOOR OF THE LOWEST LEVEL OF EXIT DISCHARGE.

1206.3.2.2 SEPARATION. ROOMS CONTAINING CAPACITOR ENERGY STORAGE SYSTEMS SHALL BE SEPARATED FROM THE FOLLOWING OCCUPANCIES BY FIRE BARRIERS OR HORIZONTAL ASSEMBLIES, OR BOTH, CONSTRUCTED IN ACCORDANCE WITH THE *INTERNATIONAL BUILDING CODE*.

1. GROUP B, F, M, S AND U OCCUPANCIES BY 1-HOUR FIRE-RESISTANCE-RATED CONSTRUCTION.
2. GROUP A, E, I AND R OCCUPANCIES BY 2-HOUR FIRE RESISTANCE RATED CONSTRUCTION.

1206.3.2.3 CAPACITOR ARRAYS. CAPACITOR ENERGY STORAGE SYSTEMS SHALL BE SEGREGATED INTO CAPACITOR ARRAYS NOT EXCEEDING 50 KWH EACH. EACH ARRAY SHALL BE SPACED NOT LESS THAN 3 FEET (914 MM) FROM OTHER ARRAYS AND FROM WALLS IN THE STORAGE ROOM OR AREA. THE STORAGE ARRANGEMENTS SHALL COMPLY WITH CHAPTER 10.

EXCEPTION: CAPACITOR ENERGY STORAGE SYSTEMS IN NONCOMBUSTIBLE CONTAINERS LOCATED OUTDOORS SHALL NOT BE REQUIRED TO BE SPACED 3 FEET (914 MM) FROM THE CONTAINER WALLS.

1206.3.2.4 SIGNAGE. APPROVED SIGNS SHALL BE PROVIDED ON DOORS OR IN LOCATIONS ADJACENT TO THE ENTRANCES TO CAPACITOR ENERGY STORAGE SYSTEM ROOMS AND SHALL INCLUDE THE FOLLOWING OR EQUIVALENT VERBIAGE AND INFORMATION:

1. "CAPACITOR ENERGY STORAGE ROOM."
2. "THIS ROOM CONTAINS ENERGIZED ELECTRICAL CIRCUITS."
3. AN IDENTIFICATION OF THE TYPE OF CAPACITORS PRESENT AND THE POTENTIAL HAZARDS ASSOCIATED WITH THE CAPACITOR TYPE.

1206.3.2.5 ELECTRICAL DISCONNECTS. WHERE THE CAPACITOR ENERGY STORAGE SYSTEM DISCONNECTING MEANS IS NOT WITHIN SIGHT OF THE MAIN SERVICE DISCONNECTING MEANS, PLACARDS OR DIRECTORIES SHALL BE INSTALLED AT THE LOCATION OF THE MAIN SERVICE DISCONNECTING MEANS IDENTIFYING THE LOCATION OF THE CAPACITOR ENERGY STORAGE SYSTEM DISCONNECTING MEANS IN ACCORDANCE WITH NFPA 70.

1206.3.2.6 OUTDOOR INSTALLATION. CAPACITOR ENERGY SYSTEMS LOCATED OUTDOORS SHALL COMPLY WITH SECTIONS 1206.3.2.6 THROUGH 1206.3.2.6.4 IN ADDITION TO ALL APPLICABLE REQUIREMENTS OF SECTION 1206.3. INSTALLATIONS IN OUTDOOR ENCLOSURES OR CONTAINERS THAT CAN BE OCCUPIED FOR SERVICING, TESTING, MAINTENANCE AND OTHER FUNCTIONS SHALL BE TREATED AS CAPACITOR STORAGE ROOMS.

EXCEPTION: CAPACITOR ARRAYS IN NONCOMBUSTIBLE CONTAINERS SHALL NOT BE REQUIRED TO BE SPACED 3 FEET (914 MM) FROM THE CONTAINER WALLS.

1206.3.2.6.1 SEPARATION. CAPACITOR ENERGY SYSTEMS LOCATED OUTDOORS SHALL BE NOT LESS THAN 5 FEET (1524 MM) FROM THE FOLLOWING:

1. LOT LINES.
2. PUBLIC WAYS.
3. BUILDINGS.
4. STORED COMBUSTIBLE MATERIALS.
5. HAZARDOUS MATERIALS.
6. HIGH-PILED STOCK.
7. OTHER EXPOSURE HAZARDS.

EXCEPTION: THE *FIRE CODE OFFICIAL* IS AUTHORIZED TO APPROVE LESSER SEPARATION DISTANCES IF LARGE-SCALE FIRE AND FAULT CONDITION TESTING CONDUCTED OR WITNESSED AND REPORTED BY AN APPROVED TESTING LABORATORY IS PROVIDED SHOWING THAT A FIRE INVOLVING THE SYSTEM WILL NOT ADVERSELY IMPACT OCCUPANT EGRESS FROM ADJACENT BUILDINGS, OR ADVERSELY IMPACT ADJACENT STORED MATERIALS OR STRUCTURES.

1206.3.2.6.2 MEANS OF EGRESS. CAPACITOR ENERGY STORAGE SYSTEMS LOCATED OUTDOORS SHALL BE SEPARATED FROM ANY MEANS OF EGRESS AS REQUIRED BY THE *FIRE CODE OFFICIAL* TO ENSURE SAFE EGRESS UNDER FIRE CONDITIONS, BUT NOT LESS THAN 10 FEET (3048 MM).

EXCEPTION: THE *FIRE CODE OFFICIAL* IS AUTHORIZED TO APPROVE LESSER SEPARATION DISTANCES IF LARGE-SCALE FIRE AND FAULT CONDITION TESTING

CONDUCTED OR WITNESSED AND REPORTED BY AN APPROVED TESTING LABORATORY IS PROVIDED SHOWING THAT A FIRE INVOLVING THE SYSTEM WILL NOT ADVERSELY IMPACT OCCUPANT EGRESS.

1206.3.2.6.3 SECURITY OF OUTDOOR AREAS. OUTDOOR AREAS IN WHICH *CAPACITOR ENERGY STORAGE SYSTEMS* ARE LOCATED SHALL BE SECURED AGAINST UNAUTHORIZED ENTRY AND SAFEGUARDED IN AN APPROVED MANNER.

1206.3.2.6.4 WALK-IN UNITS. WHERE A CAPACITOR ENERGY STORAGE SYSTEM INCLUDES AN OUTER ENCLOSURE, THE UNIT SHALL ONLY BE ENTERED FOR INSPECTION, MAINTENANCE AND REPAIR OF CAPACITORS AND ELECTRONICS, AND SHALL NOT BE OCCUPIED FOR OTHER PURPOSES.

1206.3.3 MAXIMUM ALLOWABLE QUANTITIES. FIRE AREAS WITHIN BUILDINGS CONTAINING *CAPACITOR ENERGY STORAGE SYSTEMS* THAT EXCEED 600 KWH OF ENERGY CAPACITY SHALL COMPLY WITH ALL APPLICABLE GROUP H OCCUPANCY REQUIREMENTS IN THIS CODE AND THE *INTERNATIONAL BUILDING CODE*.

1206.3.4 CAPACITORS AND EQUIPMENT. THE DESIGN AND INSTALLATION OF *CAPACITOR ENERGY STORAGE SYSTEMS* AND RELATED EQUIPMENT SHALL COMPLY WITH SECTIONS 1206.3.4.1 THROUGH 1206.3.4.5.

1206.3.4.1 LISTING. CAPACITORS AND *CAPACITOR ENERGY STORAGE SYSTEMS* SHALL COMPLY WITH THE FOLLOWING:

1. CAPACITORS SHALL BE LISTED IN ACCORDANCE WITH UL 1973.
2. PREPACKAGED AND PRE-ENGINEERED STATIONARY CAPACITOR ENERGY STORAGE SYSTEMS SHALL BE LISTED IN ACCORDANCE WITH UL 9540.

1206.3.4.2 PREPACKAGED AND PRE-ENGINEERED SYSTEMS. IN ADDITION TO OTHER APPLICABLE REQUIREMENTS OF THIS CODE, PREPACKAGED AND PRE-ENGINEERED *CAPACITOR ENERGY STORAGE SYSTEMS* SHALL BE INSTALLED IN ACCORDANCE WITH THEIR LISTING AND THE MANUFACTURER'S INSTRUCTIONS.

1206.3.4.3 ENERGY MANAGEMENT SYSTEM. AN APPROVED ENERGY MANAGEMENT SYSTEM SHALL BE PROVIDED FOR MONITORING AND BALANCING CAPACITOR VOLTAGES, CURRENTS AND TEMPERATURES WITHIN THE MANUFACTURER'S SPECIFICATIONS. THE SYSTEM SHALL TRANSMIT AN ALARM SIGNAL TO AN APPROVED LOCATION IF POTENTIALLY HAZARDOUS TEMPERATURES OR OTHER CONDITIONS SUCH AS SHORT CIRCUITS, OVER VOLTAGE OR UNDER VOLTAGE ARE DETECTED.

1206.3.4.4 CAPACITOR CHARGERS. CAPACITOR CHARGERS SHALL BE COMPATIBLE WITH THE CAPACITOR MANUFACTURER'S ELECTRICAL RATINGS AND CHARGING SPECIFICATIONS. CAPACITOR CHARGERS SHALL BE LISTED AND LABELED IN ACCORDANCE WITH UL 1564 OR PROVIDED AS PART OF A LISTED PRE-ENGINEERED OR PREPACKAGED *CAPACITOR ENERGY STORAGE SYSTEM*.

1206.3.4.5 TOXIC AND HIGHLY TOXIC GAS. *CAPACITOR ENERGY STORAGE SYSTEMS* THAT HAVE THE POTENTIAL TO RELEASE TOXIC AND HIGHLY TOXIC MATERIALS DURING

CHARGING, DISCHARGING AND NORMAL USE CONDITIONS SHALL COMPLY WITH CHAPTER 60.

1206.3.5 FIRE-EXTINGUISHING AND DETECTION SYSTEMS. FIRE-EXTINGUISHING AND SMOKE DETECTION SYSTEMS SHALL BE PROVIDED IN *CAPACITOR ENERGY STORAGE SYSTEM* ROOMS IN ACCORDANCE WITH SECTIONS 1206.3.5.1 THROUGH 1206.3.5.2.

1206.3.5.1 FIRE-EXTINGUISHING SYSTEMS. ROOMS CONTAINING *CAPACITOR ENERGY STORAGE SYSTEMS* SHALL BE EQUIPPED WITH AN *AUTOMATIC SPRINKLER SYSTEM* INSTALLED IN ACCORDANCE WITH SECTION 903.3.1.1. COMMODITY CLASSIFICATIONS FOR SPECIFIC CAPACITOR TECHNOLOGIES SHALL BE IN ACCORDANCE WITH CHAPTER 5 OF NFPA 13. IF THE CAPACITOR TYPES ARE NOT ADDRESSED IN CHAPTER 5 OF NFPA 13, THE *FIRE CODE OFFICIAL* IS AUTHORIZED TO APPROVE THE *AUTOMATIC SPRINKLER SYSTEM* BASED ON FULL-SCALE FIRE AND FAULT CONDITION TESTING CONDUCTED BY AN *APPROVED* LABORATORY.

1206.3.5.1.1 ALTERNATIVE FIRE-EXTINGUISHING SYSTEMS. *CAPACITOR ENERGY STORAGE SYSTEMS* THAT UTILIZE WATER-REACTIVE MATERIALS SHALL BE PROTECTED BY AN APPROVED ALTERNATIVE *AUTOMATIC FIRE-EXTINGUISHING SYSTEM* IN ACCORDANCE WITH SECTION 904. THE SYSTEM SHALL BE LISTED FOR PROTECTING THE TYPE, ARRANGEMENT AND QUANTITIES OF CAPACITORS IN THE ROOM. THE *FIRE CODE OFFICIAL* SHALL BE PERMITTED TO APPROVE THE SYSTEM BASED ON FULL-SCALE FIRE AND FAULT CONDITION TESTING CONDUCTED BY AN *APPROVED* LABORATORY.

1206.3.5.2 SMOKE DETECTION SYSTEM. AN APPROVED *AUTOMATIC SMOKE DETECTION SYSTEM* SHALL BE INSTALLED IN ROOMS CONTAINING *CAPACITOR ENERGY STORAGE SYSTEMS* IN ACCORDANCE WITH SECTION 907.2.

1206.3.5.3 VENTILATION. WHERE CAPACITORS RELEASE FLAMMABLE GASES DURING NORMAL OPERATING CONDITIONS, VENTILATION OF ROOMS CONTAINING CAPACITOR ENERGY STORAGE SYSTEMS SHALL BE PROVIDED IN ACCORDANCE WITH THE *INTERNATIONAL MECHANICAL CODE* AND ONE OF THE FOLLOWING:

1. THE VENTILATION SYSTEM SHALL BE DESIGNED TO LIMIT THE MAXIMUM CONCENTRATION OF FLAMMABLE GAS TO 25 PERCENT OF THE LOWER FLAMMABILITY LIMIT.
2. CONTINUOUS VENTILATION SHALL BE PROVIDED AT A RATE OF NOT LESS THAN 1 CUBIC FOOT PER MINUTE (CFM) PER SQUARE FOOT $[0.00508 \text{ M}^3/(\text{S} \cdot \text{M}^2)]$ OF FLOOR AREA, BUT NOT LESS THAN 150 CFM (4 M³/MIN).

THE EXHAUST SYSTEM SHALL BE DESIGNED TO PROVIDE AIR MOVEMENT ACROSS ALL PARTS OF THE FLOOR FOR GASES HAVING A VAPOR DENSITY GREATER THAN AIR AND ACROSS ALL PARTS OF THE CEILING FOR GASES HAVING A VAPOR DENSITY LESS THAN AIR.

1206.3.5.3.1 SUPERVISION. REQUIRED MECHANICAL VENTILATION SYSTEMS FOR ROOMS CONTAINING *CAPACITOR ENERGY STORAGE SYSTEMS* SHALL BE SUPERVISED BY AN *APPROVED* CENTRAL STATION, PROPRIETARY OR REMOTE STATION SERVICE, OR

SHALL INITIATE AN AUDIBLE AND VISIBLE SIGNAL AT AN *APPROVED*, CONSTANTLY ATTENDED ON-SITE LOCATION.

1206.3.5.4 SPILL CONTROL AND NEUTRALIZATION. WHERE CAPACITORS CONTAIN LIQUID ELECTROLYTE, *APPROVED* METHODS AND MATERIALS SHALL BE PROVIDED FOR THE CONTROL AND NEUTRALIZATION OF SPILLS OF ELECTROLYTE OR OTHER HAZARDOUS MATERIALS IN AREAS CONTAINING CAPACITORS AS FOLLOWS:

1. FOR CAPACITORS WITH FREE-FLOWING ELECTROLYTE, THE METHOD AND MATERIALS SHALL BE CAPABLE OF NEUTRALIZING A SPILL OF THE TOTAL CAPACITY FROM THE LARGEST CELL OR BLOCK TO A PH BETWEEN 5.0 AND 9.0.
2. FOR CAPACITORS WITH IMMOBILIZED ELECTROLYTE, THE METHOD AND MATERIAL SHALL BE CAPABLE OF NEUTRALIZING A SPILL OF 3.0 PERCENT OF THE CAPACITY OF THE LARGEST CELL OR BLOCK IN THE ROOM TO A PH BETWEEN 5.0 AND 9.0.

1206.3.6 TESTING, MAINTENANCE AND REPAIR. CAPACITORS AND ASSOCIATED EQUIPMENT AND SYSTEMS SHALL BE TESTED AND MAINTAINED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS. ANY CAPACITORS OR SYSTEM COMPONENTS USED TO REPLACE EXISTING UNITS SHALL BE COMPATIBLE WITH THE CAPACITOR CHARGER, ENERGY MANAGEMENT SYSTEMS, OTHER CAPACITORS, AND OTHER SAFETY SYSTEMS. INTRODUCING DIFFERENT CAPACITOR TECHNOLOGIES INTO THE CAPACITOR ENERGY STORAGE SYSTEM SHALL BE TREATED AS A NEW INSTALLATION AND REQUIRE APPROVAL BY THE *FIRE CODE OFFICIAL* BEFORE THE REPLACEMENTS ARE INTRODUCED INTO SERVICE.

1206.4 ENERGY STORAGE SYSTEM IN GROUP R-3 AND R-4 OCCUPANCIES. ENERGY STORAGE SYSTEMS IN GROUP R-3 AND R-4 OCCUPANCIES SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THIS SECTION. THE TEMPORARY USE OF AN OWNER OR OCCUPANT'S ELECTRIC-POWERED VEHICLE AS AN ENERGY STORAGE SYSTEM SHALL BE IN ACCORDANCE WITH THIS SECTION.

***EXCEPTION:** ENERGY STORAGE SYSTEMS IN GROUP R-3 AND R-4 OCCUPANCIES WITH A CAPACITY OF 3 KWH OR LESS.

1206.4.1 EQUIPMENT LISTINGS. ENERGY STORAGE SYSTEM SHALL BE LISTED AND LABELED FOR RESIDENTIAL USE IN ACCORDANCE WITH UL 9540.

EXCEPTIONS:

1. WHERE *APPROVED*, REPURPOSED UNLISTED BATTERY SYSTEMS FROM ELECTRIC VEHICLES MAY BE INSTALLED OUTDOORS OR IN DETACHED DEDICATED CABINETS LOCATED NOT LESS THAN 5 FEET (1524 MM) FROM EXTERIOR WALLS, PROPERTY LINES AND PUBLIC WAYS.
2. ENERGY STORAGE SYSTEMS LESS THAN 1 KWH.

1206.4.2 INSTALLATION. ENERGY STORAGE SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS AND THEIR LISTING.

1206.4.2.1 SPACING. INDIVIDUAL UNITS SHALL BE SEPARATED FROM EACH OTHER BY AT LEAST 3 FEET (914 MM) OF SPACING UNLESS SMALLER SEPARATION DISTANCES ARE DOCUMENTED AND APPROVED BY THE *FIRE CODE OFFICIAL* TO BE ADEQUATE BASED ON LARGE-SCALE FIRE TESTING.

1206.4.3 LOCATION. ENERGY STORAGE SYSTEMS SHALL ONLY BE INSTALLED IN THE FOLLOWING LOCATIONS:

1. DETACHED GARAGES AND DETACHED ACCESSORY STRUCTURES.
2. ATTACHED GARAGES SEPARATED FROM THE DWELLING UNIT LIVING SPACE AND SLEEPING UNITS IN ACCORDANCE WITH SECTION 406.3.2 OF THE *INTERNATIONAL BUILDING CODE*.
3. OUTDOORS ON EXTERIOR WALLS IN ACCORDANCE WITH 1206.4.3.1
- *4. OTHER LOCATIONS WITH FIRE MARSHAL APPROVAL.

1206.4.3.1 EXTERIOR WALL AND OUTDOOR INSTALLATIONS. ENERGY STORAGE SYSTEMS SHALL BE PERMITTED TO BE INSTALLED OUTDOORS ON EXTERIOR WALLS OF BUILDINGS OR ON THE GROUND WHERE ALL OF THE FOLLOWING CONDITIONS ARE MET:

1. THE MAXIMUM ENERGY CAPACITY OF INDIVIDUAL ENERGY STORAGE SYSTEM UNITS SHALL NOT EXCEED 20 KWH.
- *2. THE INSTALLATION IS IN ACCORDANCE WITH ZONING SETBACK REQUIREMENTS.
3. THE ENERGY STORAGE SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS AND THEIR LISTING.
4. INDIVIDUAL ENERGY STORAGE SYSTEM UNITS SHALL BE SEPARATED FROM EACH OTHER BY NOT LESS THAN 3 FEET (914 MM).
5. THE ENERGY STORAGE SYSTEM SHALL BE SEPARATED FROM DOORS, WINDOWS, OPERABLE OPENINGS INTO BUILDINGS, OR HVAC INLETS BY AT LEAST 5 FEET (1524 MM).

EXCEPTION: WHERE APPROVED BY THE *FIRE CODE OFFICIAL*, SMALLER SEPARATION DISTANCES IN ITEMS 4 AND 5 MAY BE PERMITTED BASED ON LARGE SCALE FIRE TESTING

1206.4.4 ENERGY RATINGS. INDIVIDUAL ENERGY STORAGE SYSTEMS UNITS SHALL HAVE A MAXIMUM RATING OF 20 KWH. THE AGGREGATE RATING STRUCTURE SHALL NOT EXCEED:

*REMOVED # 1

1. 80 KWH IN ATTACHED OR DETACHED GARAGES AND DETACHED ACCESSORY STRUCTURES.
2. 80 KWH ON EXTERIOR WALLS.
3. 80 KWH OUTDOORS ON THE GROUND.

1206.4.5 ELECTRICAL INSTALLATION. ENERGY STORAGE SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH NFPA 70. INVERTERS SHALL BE LISTED AND LABELED IN ACCORDANCE WITH UL 1741 OR PROVIDED AS PART OF THE UL 9540 LISTING. SYSTEMS CONNECTED TO THE UTILITY GRID SHALL USE INVERTERS LISTED FOR UTILITY INTERACTION.

1206.4.6 FIRE DETECTION. ROOMS AND AREAS WITHIN DWELLINGS UNITS, SLEEPING UNITS AND ATTACHED GARAGES IN WHICH ENERGY STORAGE SYSTEMS ARE INSTALLED SHALL BE PROTECTED BY SMOKE ALARMS IN ACCORDANCE WITH SECTION 907.2.10. A HEAT DETECTOR LISTED AND INTERCONNECTED TO THE SMOKE ALARMS SHALL BE INSTALLED IN LOCATIONS WITHIN DWELLING UNITS, SLEEPING UNITS AND ATTACHED GARAGES WHERE SMOKE ALARMS CANNOT BE INSTALLED BASED ON THEIR LISTING.

1206.4.7 PROTECTION FROM IMPACT. STATIONARY STORAGE BATTERY SYSTEMS INSTALLED IN A LOCATION SUBJECT TO VEHICLE DAMAGE SHALL BE PROTECTED BY APPROVED BARRIERS. APPLIANCES IN GARAGES SHALL ALSO BE INSTALLED IN ACCORDANCE WITH SECTION 304.3 OF THE *INTERNATIONAL MECHANICAL CODE*.

1206.4.8 VENTILATION. INDOOR INSTALLATIONS OF ENERGY STORAGE SYSTEMS THAT INCLUDE BATTERIES THAT PRODUCE HYDROGEN OR OTHER FLAMMABLE GASES DURING CHARGING SHALL BE PROVIDED WITH VENTILATION IN ACCORDANCE WITH SECTION 1206.2.11.3.

1206.4.9 TOXIC AND HIGHLY TOXIC GAS. ENERGY STORAGE SYSTEMS THAT HAVE THE POTENTIAL TO RELEASE TOXIC OR HIGHLY TOXIC GAS DURING CHARGING, DISCHARGING AND NORMAL USE CONDITIONS SHALL NOT BE INSTALLED WITHIN GROUP R-3 OR R-4 OCCUPANCIES.

* * *

Section 2301.4 Indoor motor fuel-dispensing facilities. ~~Amend~~ IS AMENDED to read as follows:

2301.4 Indoor service stations. Motor vehicle fuel-dispensing stations located inside buildings are prohibited within the entire City of Buckeye.

Exception:

Single family residences for alternative fuels when installed with applicable standards.

~~Section 2301.4, entitled "Indoor motor fuel-dispensing facilities," is hereby amended by deleting subsection "2301.4.2"~~

SUB-SECTION "2301.4.1 Protection of floor openings in indoor motor fuel- dispensing facilities IS DELETED."

Section 3310 Access for Fire Fighting. ~~Amend~~ IS AMENDED to read as follows **ADD A NEW SUBSECTION:**

3310.3 Access road and signage. During construction, approved signs shall be located to direct emergency responders into and through the construction site as required by the Fire Code Official.

Section 5001.5.1 Hazardous materials management plan is hereby amended to read as follows:

5001.5.1 Hazardous materials management plan. When required by the fire code official, each application for a permit shall include a Hazardous Materials Management Plan (HMMP). The HMMP shall include a facility site plan and include the information set forth below. HMMP shall be submitted annually or more often if the hazardous material amounts change by greater than 10% in any single category or overall. HMMP shall be submitted electronically in a format acceptable to the Buckeye Fire Department. The submittal shall be required to determine Fire Code Permitting criteria for storage, use, and/or handling of hazardous materials within the City of Buckeye. Any electronic submittal is acceptable as long as the data will import or interface with the software program currently being used by the Fire Department. Electronic reporting shall be required for all new and existing facilities upon permit renewal.

1. ~~1-~~Storage and use areas.
2. ~~2-~~Maximum amount of each material stored or used in each area.
3. ~~3-~~Range of container sizes.
4. ~~4-~~Locations of emergency isolation and mitigation valves and devices.
5. ~~5-~~Product conveying piping containing liquids or gases, other than utility-owned fuel gas lines and low pressure fuel gas lines.
6. ~~6-~~On and off positions of valves for valves that are of the self-indicating type.
7. ~~7-~~Storage plan showing the intended storage arrangement, including the location and dimensions of aisles.
8. ~~8-~~The location and type of emergency equipment. The plans shall be legible and drawn approximately to scale. Separate distribution systems are allowed to be shown on separate pages.

Section 5001.5.2 Hazardous materials inventory statement is ~~hereby~~ amended to read as follows:

5001.5.2 Hazardous materials inventory statement (HMIS). Where required by the fire code official, an application for a permit shall include an HMIS, such as SARA (Superfund Amendments and Reauthorization Act of 1986) Title III, Tier II Report, or other approved statement. The HMIS shall include the information set forth below. A HMIS shall be submitted annually or more often if the hazardous material amounts change by greater than 10% in any single category or overall. HMIS shall be submitted electronically in a format acceptable to the City of Buckeye Fire Department. The submittal shall be required to determine Fire Code Permitting criteria for storage, use, and/or handling of hazardous materials within the City of Buckeye. Any electronic submittal is acceptable as long as the data will import or interface with the software program currently being used by the Fire Department. Electronic reporting shall be required for all new and existing facilities upon permit renewal.

1. ~~1-~~Manufacturer's name.
2. ~~2-~~Chemical name, trade names, hazardous ingredients.
3. ~~3-~~Hazard classification.
4. ~~4-~~MSDS or equivalent.
5. ~~5-~~United Nations (UN), North America (NA) or the Chemical Abstract Service identification number.
6. ~~6-~~Maximum quantity stored or used on site at one time.
7. ~~7-~~Storage conditions related to the storage type, temperature and pressure.

Section 5505 Use, DISPENSING and ~~handling~~HANDLING is ~~hereby~~ amended by adding a THE FOLLOWING new subsection:

5505.4.4

5505.4.5 Trans-filling of liquid oxygen. In addition to the requirements of this section, when trans-filling of liquefied oxygen is performed inside buildings for respiration purposes, the maximum aggregate quantity of all containers shall be limited to 72 pounds (32.7 kg). Trans-filling shall be on bare concrete floors with no combustible seams. The room shall be separated from the means of egress by one-hour fire barriers. The room shall have ventilation to handle off gassing of the containers. Refer to pamphlet CGA P-2.6, 1995 edition, and NFPA 99 2005 Edition. Trans-filling of Liquid Oxygen to be used for Respiration, for the requirements within health care, residential care, and assisted living facilities.

Section 5704.2.13.1.4 Tanks abandoned in place is ~~hereby~~ amended to read as follows:

5704.2.13.1.4 Tanks abandoned in place. The abandonment of tanks in place shall be prohibited within the entire City of Buckeye.

~~(Ord. No. 42-10, § 2(25-2-10), 12-7-2010; Ord. No. 20-13, § 3, 12-17-2013)~~

**APPENDIX L
REQUIREMENTS FOR FIREFIGHTER AIR REPLENISHMENT SYSTEMS**

SECTION LLOL.1 "SCOPE," IS DELETED IN ITS ENTIRETY AND REPLACED WITH THE FOLLOWING:

LLOL.1 SCOPE. FIREFIGHTER AIR REPLENISHMENT SYSTEMS (FARS) SHALL BE PROVIDED IN ACCORDANCE WITH THIS APPENDIX.

SECTION LLOL.2 "WHEN REQUIRED," IS ADDED TO READ AS FOLLOWS:

LLOL.2 WHEN REQUIRED. A FIRE FIGHTER AIR REPLENISHMENT SYSTEM (FARS) SHALL BE REQUIRED IN ALL NEW BUILDINGS OR STRUCTURES THAT MEET ANY OF THE FOLLOWING:

1. THE BUILDING OR STRUCTURE HAS FIVE (5) OR MORE FLOORS ABOVE GRADE;
OR
2. THE BUILDING OR STRUCTURE IS A HIGH RISE BUILDING AS DEFINED BY THE INTERNATIONAL BUILDING CODE AS ADOPTED AND AMENDED BY THE GOVERNING AUTHORITY; OR
3. THE BUILDING, STRUCTURE OR COMPONENTS THEREOF ARE UNDERGROUND AND THE SQUARE FOOTAGE OF THE UNDERGROUND BUILDING, STRUCTURE, OR COMPONENT THEREOF IS TEN THOUSAND (10,000) FEET OR MORE AND IS LOCATED EITHER MORE THAN TWO (2)

FLOORS BELOW GRADE OR MORE THAN THIRTY (30) FEET BELOW GRADE.

APPENDIX O
REGIONAL WIRELESS COOPERATIVE POLICIES AND PROCEDURES
IS ADDED

PAGE 1 OF 3

REGIONAL WIRELESS COOPERATIVE POLICIES AND PROCEDURES	
Regional Wireless Cooperative	
No.	
0-12.12	
Subject:	
Effective Date	
05/24/2012	
Emergency Responder Radio Coverage Systems Policy	
Rev: 09/29/2020	
04/10/2019	

1.0 Purpose

- 1.1. The purpose of this policy is to provide standards for the deployment of Emergency Responder Radio Coverage Systems (ERRCS) to improve radio signal coverage inside of buildings and underground spaces on the Regional Wireless Cooperative (RWC) network.

2.0 Owner

- 2.1. RWC Operations Working Group (OWG).

3.0 Applies To

- 3.1. Any entity installing an ERRCS within the RWC service area and on the radio frequencies licensed from the Federal Communications Commission (FCC) by RWC Member(s.)

4.0 Background

- 4.1. An ERRCS is used to enhance radio signals within buildings, structures or other locations where signals would otherwise be inadequate.
- 4.2. An improperly installed or maintained ERRCS can cause interference or degrade radio performance putting first responder safety at risk.
- 4.3. FCC 47 CFR Part 90.219 Use of Signal Boosters and 47 CFR Part 2 FCC Certification

Requirements govern use and certification of radio amplification systems.

- 4.4. An ERRCS may include Bi-Directional Amplifiers (BOA), Distributed Antenna Systems (DAS) or other active devices designed to amplify radio signals.

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5.0 Policy Statement

- 5.1. Entities desiring to operate an ERRCS on RWC Member-licensed frequencies and within the service area of the RWC network must obtain written consent and approval from the licensee per FCC 47 CFR 90.219 (b)(1)(ii).
 - 5.1.1. A Rebroadcast Authorization Form must be submitted prior to any ERRCS installation. This form can be found at rwcaz.org.
- 5.2. RWC network licensed frequencies are managed by the RWC Administrative Manager.
- 5.3. Enhancement of the RWC VHF Fire Hazard Zone network will not be allowed.

6.0 Supporting Rules

- 6.1. Documents required by the RWC for review when applying for Re-Broadcast Authorization:
 - 6.1.1. Complete ERRCS design including site floorplan with antenna and equipment locations and a riser block diagram showing all floors.
 - 6.1.2. Itemized list of system components including manufacturer make and model numbers.
 - 6.1.3. Baseline pre-treatment signal level testing documentation based on RWC donor site and channel data.
- 6.2. As of the date of this policy, Class A amplifiers (see FCC 47 CFR 90.219 (a)) must be used for any ERRCS installed to operate on the RWC 700 MHz P25 network.
 - 6.2.1. Existing Class B amplifiers must continue to be maintained on an annual basis. If an existing Class B amplifier fails it must be replaced with a Class A amplifier.
- 6.3. ERRCS installation contractors must follow the Authority Having Jurisdiction (AHJ) fire code pertaining to ERRCS installations.
- 6.4. Installation of an ERRCS must follow National Fire Protection Association and/or National Electrical Code jurisdictional standards.
- 6.5. ERRCS owner or installation contractor must submit required documents including the RWC Rebroadcast Authorization form. Required forms and documents can be found at rwcaz.org.
 - 6.5.1. Installation of any ERRCS will not be allowed until the required documents are submitted and approved by the RWC. Once approved, the RWC will provide frequencies and subsite location to use.
- 6.6. The RWC does not require entities to maintain any minimum coverage requirements within buildings or structures.

7.0 Responsibilities

7.1. Prior to being energized the system design must be provided to the RWC.



REGIONAL WIRELESS COOPERATIVE

Radio Amplification System
Rebroadcast Authorization Application

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- 7.2. ERRCS RF energy for the uplink is extremely important. Contractor must contact the RWC to arrange the testing process required for energizing an ERRCS.
- 7.3. Once the ERRCS is energized, detailed measurements of signal strength of all areas enhanced must be provided.
- 7.4. New and existing radio amplification systems (signal booster), must be registered with the FCC (<https://signalboosters.fcc.gov/signal-boosters/>.)
- 7.5. In the event of interference or malfunction of an ERRCS, the entity responsible for its installation and/or operation shall discontinue operation of the system until it is repaired or interference has been eliminated.
 - 7.5.1. The RWC will work with an offending entity to resolve problems due to interference, pursuant to CFR 90.173(b).
 - 7.5.2. The RWC will de-energize any ERRCS that is causing interference and cannot be resolved immediately.

8.0 Conditions for Exemption or Waiver

- 8.1. As provided in the Waiver or Exception Policy.

9.0 Applicable Policies and/or Procedures

- 9.1. As listed at www.rwcaz.org.

Pursuant to the Regional Wireless Cooperative (RWC) Radio Amplification Systems Policy (see attached policy), Section 5.1; entities desiring to operate radio amplification systems on a RWC Member's licensed frequencies and within the service area of the RWC network must obtain written consent and approval from the licensee. This document serves as both application for authorization and written consent and approval when completed by both applicant and licensee.

PAGE 1 - APPLICANT INFORMATION (To be completed by applicant)

Proposed Amplification System Site Information:

Location Name: _____

Street Address: _____

City: _____ State: _____ Zip Code: _____



REGIONAL WIRELESS COOPERATIVE

Radio Amplification System
Rebroadcast Authorization Application

Facility Owner Contact Information:

Name: _____

Address: _____

City: _____ State: _____ Zip: _____

Phone: _____

Email: _____

Engineering Agent/Vendor Contact Information:

Name: _____

Address: _____

City: _____ State: _____ Zip: _____

Phone: _____

Email: _____

Facility Occupant Contact

Information Name: _____

Address: _____

City: _____

State: _____ Zip: _____

Phone: _____

Email: _____

System Activation and Donor Antenna:

Expected system activation date: _____

System design is FCC Part 90:

☐ Class A or ☐ Class

B Donor Antenna Latitude: ° ‘ “ _____

Donor Antenna Longitude ° ‘ _____

_____ “

Donor Antenna Height Above Ground Ft.

Attachments to be Provided with Application:

☐ Facility floor plan for all building levels including square footage of each floor.

☐ System design including block diagram and itemized list of system components including manufacturer and make/model numbers.

Submit Application and Attachments to (Completed by RWC):

stuart.snow@phoenix.gov

cc email to: _____

cc email to: _____

cc email to: _____

PAGE 2 - LICENSEE AUTHORIZATION (To be completed by licensee)

Donor Site Information:

Donor Site: _____

Street Address: _____

City: _____ FCC Call Sign: _____

Donor Site Latitude: ° ‘ “ _____

Donor Site Longitude ° ‘ “ _____

Donor Antenna Site Distance _____ Miles. Donor Antenna Site Azimuth _____ Degrees

FCC REGISTRATION REQUIREMENTS

FCC regulations Section 90.219(d)(5)1 of the Commission’s rules require that all Part 90 **Class B** signal booster installations must be registered with the FCC. If this installation is a Class B system it must be registered via the FCC online registration tool within 15 days of system activation. ***Failure to comply with this requirement will result in revocation of this authorization.***

The FCC’s Part 90 Class B signal booster registration tool is available at:

www.fcc.gov/signal-boosters/registration

LICENSEE AUTHORIZATION

In consideration of review of the information and requirements provided on this application, the authorized agent of the licensee operating on a RWC Member’s licensed frequencies and within the service area of the RWC network hereby consents and approves activation of the radio amplification system as documented herein.

Authorized signature: _____ Title: _____

Print Name: _____ Entity: _____

Date: _____