New Mexico State University

Transportation Asset Master Plan

November 2020

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New Mexico State University

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Bohannan Huston

New Mexico State University Transportation Asset Management Plan

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INTRODUCTION

Plan Overview

Founded in 1888, New Mexico State University has grown from a small land-grant college, to one of the Southwest's premier research institutions. Located at the intersection of I-25 and I-10 in the southern portion of Las Cruces, the main campus of NMSU encompasses approximately 400 acres, and includes the NMSU Golf Course, Aggie Memorial Stadium, the Pan American Center, and several other recreational and educational facilities. The campus also houses both Doña Ana Community College, and the Burrell College of Osteopathic Medicine, which combine with NMSU to create a total enrollment of 22,512 students. When combined with faculty and staff, the campus houses a total population of approximately 26,869 students and staff, as shown in **Table 1**.

Table 1: NMSU Las Cruces Campus - Total Population	
NMSU Students	14,296
NMSU Faculty	1,067
NMSU Staff	2,444
DACC Students	8,054
DACC Faculty	536
DACC Staff	310
Burrell College Students	162
TOTAL	**26,869**

Though there are a total of 3,925 total bedrooms available for on-campus residence, along with privately-owned apartment complexes and housing options near the campus that are accessible to students by means other than driving, NMSU can be primarily be considered a commuter school with a large number of trips take place to campus each day. To accommodate the high number of driving trips to campus and to support the growth of the university, NMSU has created its own internal transportation network of roadways, sidewalks, and paths – all of which must be maintained by the university.

Figure 1: NMSU TAMP Development Process

In accordance with best practices for a major research institution, NMSU utilizes transportation asset management to allocate funding for transportation projects throughout campus. By applying federal roadway evaluation principles at the campus level, the *New Mexico State University Transportation Asset Management Plan* (TAMP) evaluates campus roadway needs and establishes priority levels to determine the best use of roadway improvement funds. The plan also evaluates pedestrian facilities proximate to campus roadways to ensure compliance with federal ADA requirements. The general process of developing the NMSU TAMP can be seen in **Figure 1**.

TAMP Scope and Products

The TAMP covers all University-owned and/or maintained roadways, sidewalks or walking paths adjacent to roadways, curb ramps, and intersections within the New Mexico State University main campus. Roadways owned and operated by federal, state, or City of Las Cruces governments are not included in the NMSU TAMP.

Rather than providing a list of improvements, which can quickly become outdated, this plan provides tools that NMSU can use to better understand infrastructure needs and select projects over time. Using this plan, NMSU staff can identify the highest priority roadways within campus, view individual roadway conditions, and calculate cost estimates for potential roadway improvement projects. Ultimately, the NMSU TAMP contains three primary products:

1. ***The designation of roadway tiers*** – based on a quantitative analysis of multiple evaluation criteria, including roadway access to the external City of Las Cruces roadway network, access to major buildings and facilities, access to parking, access to transit, existing bike facilities, and the role the roadway plays in overall campus circulation and connectivity.
2. ***The evaluation of existing roadway, sidewalk, and curb ramp conditions*** – based on both a desktop and in-person review of conditions using an evaluation scale established within the TAMP, federal ADA requirements, and City of Las Cruces design standards.
3. ***Cost estimates*** – based upon average NMDOT unit bid prices, that can be used to calculate the cost of roadway and ADA improvements, given the observed roadway and sidewalk conditions/ADA compliance.

In conjunction, these products can help NMSU staff identify improvements for roadway and ADA projects across campus. It is important to note that this plan considers existing infrastructure only and is not meant to identify future infrastructure additions to the campus roadway network.

GIS-BASED PLANNING TOOL

The primary products of the TAMP are accompanied by a GIS-based planning tool that depicts roadway and sidewalk conditions and roadway priorities to assist in managing the campus transportation network. Using this tool, university staff can access data related to road surface quality, roadway functions and connectivity, ADA compliance, and other criteria that may influence potential infrastructure investments and the frequency with which maintenance is scheduled. Ultimately, the tool acts as an interactive application of the NMSU university planning process, allowing staff to easily understand if a given road is a good candidate for improvements.

Figure 2: Primary Plan Products

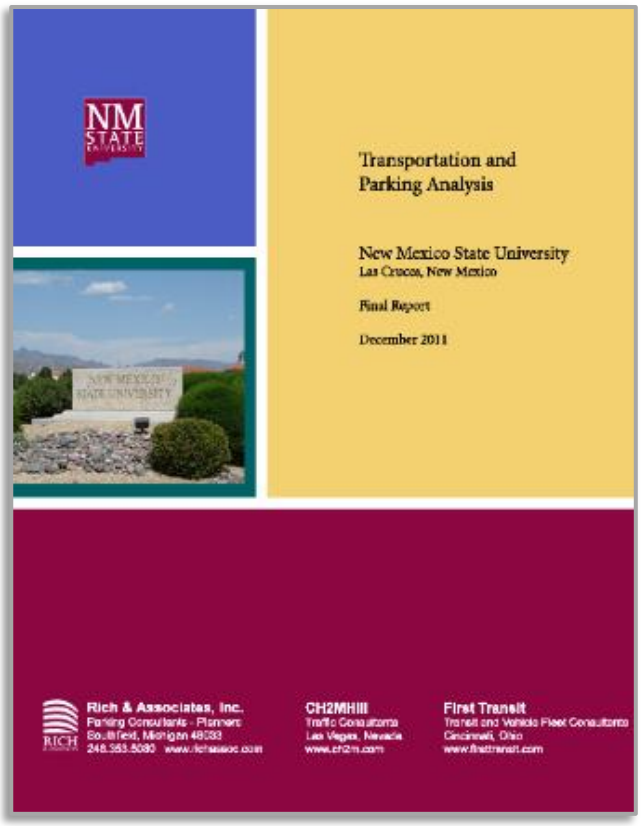
PRIORITY ROADWAY TIERS | ***PAVEMENT CONDITIONS*** | ***SIDEWALKS CONDITIONS*** | ***COST ESTIMATES*** | ***ONLINE GIS PLANNING TOOL***

EXISTING POLICY GUIDANCE

Understanding prior NMSU planning efforts is important to the TAMP planning process to ensure that the visions, goals, and objectives set forth through those efforts are maintained in current initiatives. The following section contains a summary of past and on-going planning efforts on the NMSU campus that are pertinent to transportation and parking. The information on existing and proposed transportation-related initiatives was used to help determine travel patterns and designate roadway tiers.

Master Plan for Transportation and Parking Services (2018)

The NMSU master plan for transportation and parking services, entitled *Transportation and Parking Analysis,* builds upon the overall goals of the 2006 *Campus Master Plan* by providing a comprehensive guide for the transportation needs of the University community. In particular, the document reviews the operation of the campus shuttle bus system and use of university and fleet vehicles, the capability of the parking system to meet the on-campus parking requirements of each of the various constituent groups and how the existing roadways and transportation infrastructure is able to mitigate pedestrian/vehicle conflicts. The plan also provides recommendations to alleviate deficiencies in the transportation and parking system in order to maintain the University as the preeminent educational and research institution of New Mexico.



TRANPORTATION AND PARKING ANALYSIS SUMMARY

Parking	The existing placement and utilization of many parking areas creates numerous opportunities for vehicle / pedestrian conflicts. Large contingents of students walking (or, in some cases, on bicycles or skateboards) to or from parking areas, classroom buildings or residential locations create significant delays for motorists. Additionally, inattentiveness by students or other pedestrians creates situations where these pedestrians will step into roadways with the expectation that the vehicle will always see them and be able to stop
	There are perceptions and opinions by many students (and some faculty/staff) that the present parking supply does not adequately meet their needs. The occupancy survey conducted by the team on Wednesday, October 20, 2010, found that while only 56 percent of the total available supply on campus was occupied at peak time, many parking areas designated for specific groups (such as commuter or faculty/staff lots) are virtually full at peak time. Much of the "surplus" capacity consists of free or peripheral spaces, particularly at the east end of campus. Unused "reserved" or numerous vacant service vehicle spaces around campus further add to the apparent surplus capacity.
	Lots designated for commuter students are heavily used with virtually 100 percent occupancy from early morning through early afternoon.
	Designated Faculty/Staff parking was observed peaking at just over 90 percent occupied during the late morning on the survey date. There was a drop off during the lunch period before rising back to nearly 90 percent during mid-afternoon.
	The cost of parking is very low compared to many other institutions.
	One parking area (Lot 15), formerly heavily used by students, was temporarily eliminated to become the site of the new Barnes and Noble Bookstore. This lot is back in service as primary visitor parking for the bookstore. Continued growth and development of the campus, as detailed in the Master Plan, will further eliminate existing parking lots within the core area.
Aggie Transit	The present shuttle bus system is used below its potential because of the relatively long headways between buses and the lack of timely service.
	The on-campus shuttle system does not interface with the City bus system, therefore not providing wider transportation opportunities for students in and around Las Cruces.
	The campus bus system lacks identification.
	Students indicated that they are unfamiliar with the routes and schedules.
	Traffic congestion on Stewart Street creates delays and contributes to the extended headways.
Road Runner	There is limited City bus service.
	The existing City bus service is not student friendly.
	There is a lack of available funding to grow the system.
Traffic / Roadways	The volume of traffic on Stewart and locations of parking areas on either side of Stewart creates numerous vehicle / pedestrian conflicts.
	Pedestrian travel slows down general vehicle and shuttle bus service along this corridor.
	Opportunities exists to create dedicated vehicle, transit and bike lanes on some major campus routes that should limit the opportunities for vehicle / pedestrian conflict while simultaneously enhancing the flow of vehicle traffic and increasing the ability of patrons to use the parking efficiently.

ADA Compliance

In addition to assessing existing transportation conditions, this document is also a result of a Federal mandate that ensures the rights of handicapped individuals in the United States are protected and preserved. Section 504 of the Rehabilitation Act of 1973 states:

> *No otherwise qualified handicapped individual in the United States shall, solely by reason of handicap, be excluded from the participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving federal financial assistance.*

Building upon the Rehabilitation Act, Congress passed the Americans with Disabilities Act (ADA) in 1990. Title II of the ADA covers programs, activities, and serviced public entities such as public universities, and provides protections to individuals with disabilities that are at least equal to those provided by the nondiscrimination provisions of Title V of the Rehabilitation Act. Title II of the ADA further provides that public entities must identify and evaluate all programs, activities, and services and review all policies, practices, and procedures that govern administration of the entity's programs, activities and services. The key goals of the ADA are to ensure that all people with disabilities have equality of opportunity, economic self-sufficiency, and full participation in lifestyle and living conditions.

NMSU is classified as a "public entity" according to Title II of the ADA. As such, NMSU must strive to eliminate barriers that may prevent persons with disabilities from accessing campus facilities or from utilizing NMSU's transportation network with independent mobility. This plan contains the findings of a survey and a review of NMSU's facilities regarding handicap access. The technical requirements for curb ramps and sidewalks utilized for the TAMP are described in more detail below.

Sidewalk Standards

EVALUATION

The physical conditions and overall ADA compliance of existing campus sidewalk facilities were evaluated as part of the NMSU TAMP. The *Public Right of Way Access Guidelines* (PROWAG) contain the primary standards and guidelines used to evaluate existing facility compliance in this Plan. These standards are intended to be applied to all sidewalk construction undertaken by NMSU within campus right of way and/or where land easements exist.

The guidelines and standards set forth by the United States Access Board, 36 CFR 1190, Chapter R3 *Technical Requirements*, were also consulted to conduct this assessment and identify ADA-related deficiencies. PROWAG guidelines can be found using the following hyperlink:

https://www.access-board.gov/guidelines-and-standards/streets-sidewalks/public-rights-of-way/proposed-rights-of-way-guidelines/chapter-r3-technical-requirements

PEDESTRIAN ACCESS ROUTE

According to the United States Access Board, a pedestrian access route (PAR) is defined as one or more of the following features:

- Sidewalk;
- Pedestrian street crossing or at-grade rail crossing;
- Pedestrian overpass or underpass; and
- Curb ramps and blended transitions.

New construction, reconstruction, or roadway alterations of the above listed PAR features must comply with various technical requirements. Requirements which apply to all PAR features, including sidewalk, are as follows:

- A clear width of 4-foot minimum, this width is independent of the curb width.
- Median refuge islands shall have a clear width of 5-foot minimum.
- Where the clear width is less than 5 feet, passing spaces shall be provided every 200 feet.
- Passing spaces shall be a minimum of 5-foot by 5-foot, see **Figure 3.**
- Where a PAR is within a roadway right of way, the grade shall not exceed the grade of the roadway. In any other cases, the PAR shall not exceed 5%.
- The grade at a pedestrian street crossing shall not exceed 5%.
- The cross slope, which is measured perpendicular to the direction of pedestrian travel, shall not exceed 2%.
- Surfaces shall be firm, stable and slip resistant.
- The vertical alignment shall be flush with discontinuities of ½-inch maximum.
- Horizontal openings, such as grates and joints, shall not have an opening more than ½-inch in diameter.
- Pedestrian gates at any sidewalk or path crossings over Rail Roads.

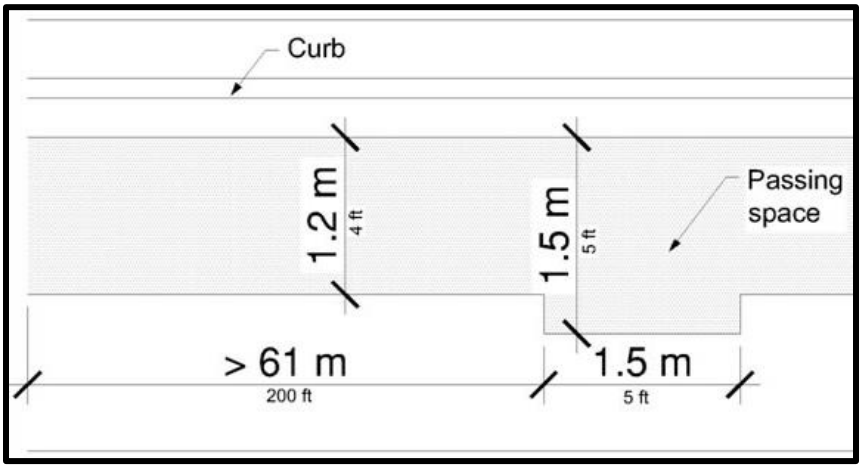


Figure 3: Passing Space [1]

[1] https://www.access-board.gov/guidelines-and-standards/streets-sidewalks/public-rights-of-way/proposed-rights-of-way-guidelines/chapter-r3-technical-requirements

Where obstructions are present within a sidewalk, a minimum clear width of 4-foot must be maintained around the obstruction. If an obstruction is too costly to relocate, options to widen the sidewalk around the obstruction may be possible, as show in **Figure 3**. Based on the survey of NMSU's sidewalk and curb ramp facilities, minimal obstructions which interfere with or prevent pedestrian mobility were observed within the sidewalk and ramp areas.

Curb Ramp Standards

GENERAL CONSIDERATIONS

To ensure that persons with disabilities can maintain easy access to sidewalks, each individual sidewalk must provide curb ramps that are in line with current ADA standards. As part of the sidewalk evaluation contained within the TAMP, all existing curb ramps on campus were evaluated for their overall condition and ADA compliance. PROWAG and the *City of Las Cruces Design Standards* contain the primary standards and guidelines used to evaluate curb ramp facility ADA compliance in the TAMP. These standards are intended to be applied to all curb ramp construction undertaken by NMSU within campus right of way and/or where land easements exist.

There are currently two types of curb ramps recognized in the PROWAG standards: perpendicular curb ramps and parallel curb ramps. Perpendicular curb ramps can be provided where the sidewalk is at least 12 ft wide. Parallel curb ramps can be provided where the sidewalk is at least 4 ft wide. Parallel and perpendicular curb ramps can also be combined in which a parallel curb ramp is used to lower the sidewalk to a mid-landing, and a short perpendicular curb ramp connects the landing to the street. Combination curb ramps can be provided where the sidewalk is at least 6 ft wide.

To provide clarification on the different types of curb ramps found throughout campus, the PROWAG requirements for these curb ramp types are described in **Appendix C**. Along with definitions of the individual curb ramp types, the technical requirements for the curb ramp have been provided, as well as a visual aid. Visual diagrams of the individual curb ramp types area also provided from the *City of Las Cruces Design Standards* for further clarification.

*NOTE: This document is not a design guide and should not be referenced for any individual curb ramp project. See **the City of Las Cruces Design Standards** for additional guidance on implementation.*

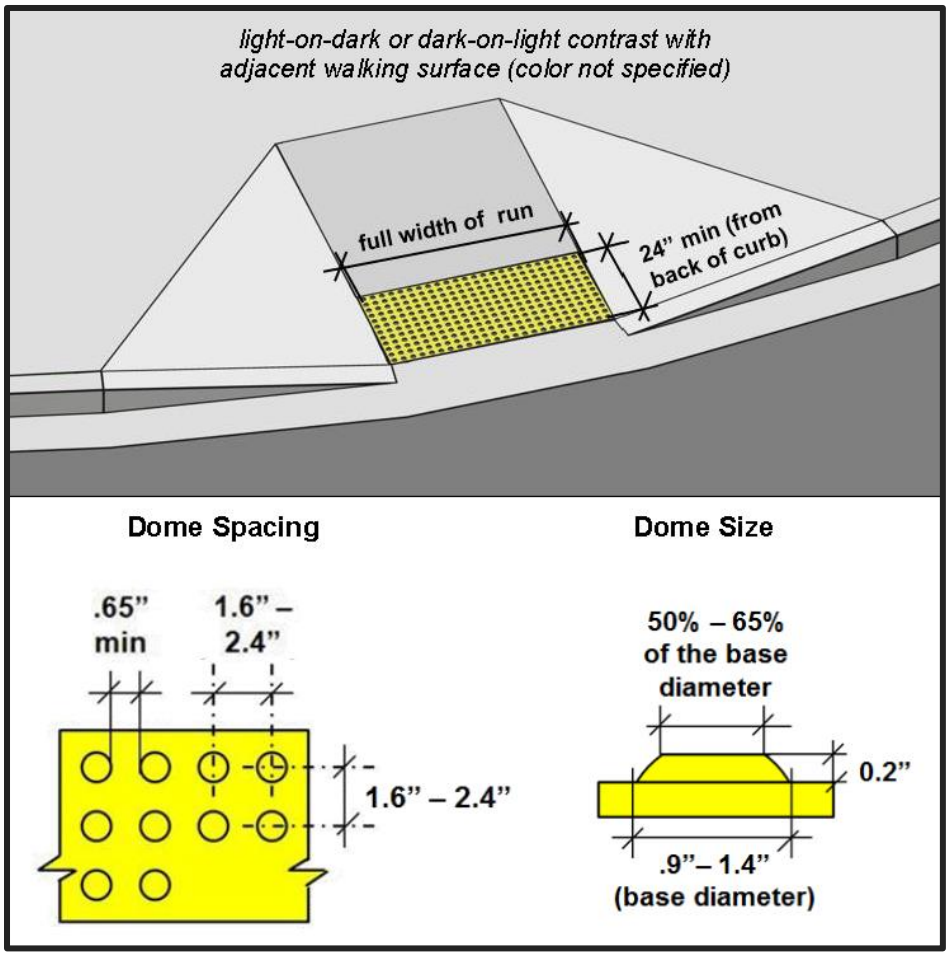
DETECTABLE WARNING SURFACES

Detectable warning surfaces (DWS) provide a textured and visual surface that enables users to distinguish the curb line or entrance to the roadway. The warning surface can easily be detected underfoot and provides warning to users with vision impairments. As part of the curb ramp evaluation, the presence of DWSs was indicated within the GIS inventory for all existing curb ramps at an intersection.

The following technical requirements for detectable warning surfaces include:

- Dome sizes shall be between 0.9-inches and 1.4-inches in diameter.
- Dome spacing shall have a center-to center spacing of 1.6-inches to 2.4-inches.
- Warning surface shall contract visually with the adjacent curb and gutter (e.g. light on dark or dark on light).
- Size shall extend the width of the ramp by 2-foot minimum, in the direction of travel.

Figure 4: Detectable Warning Surface Detail [2]



Evaluation Methodology

This TAMP contains a detailed analysis of current roadway pavement conditions, existing curb ramp and sidewalk dimensions and overall condition, as well as noting any physical barriers that impede pedestrian access. The data collection for this plan was completed in 2020 by Bohannan Huston, Inc. For this evaluation, each roadway, sidewalk, and curb ramp on campus was documented based on satellite and street view imagery, as further described in this section. The analysis is contained in a GIS database maintained and managed by NMSU, which documents the conditions and barriers present at the time of the 2020 data collection.

The roadway and sidewalk conditions information contained within this plan are intended to be complementary to the roadway tiers. Collectively, this information can assist NMSU in identifying projects and addressing poor conditions of infrastructure on priority routes. It is important to note that the

[2] https://www.access-board.gov/guidelines-and-standards/buildings-and-sites/about-the-ada-standards/guide-to-the-ada-standards/single-file-version#ar

conditions within this plan reflect a snapshot in time, and the actual conditions will change following the completion of this plan. While roadway and sidewalk conditions may change over time, the evaluation method used in this plan can be replicated to evaluate future roadways conditions. To ensure the accuracy of the roadway conditions used in the project selection process, an evaluation of existing conditions should be performed periodically to update the data used in the GIS planning tool.

Roadway Pavement Evaluation

Paved roads were assigned a condition of g*ood, fair* or *poor* using a modified PASER Rating Scale. The PASER rating scale, shown in **Table 2,** was developed by the University of Wisconsin-Madison Transportation Information Center. The method allows for roads to be rated efficiently since individual distresses are not measured. The rating system includes a description of the distresses likely to be found for each value. Not all the distresses listed will be found in an individual segment.

Most pavement distresses are caused by aging, weather, or traffic loading. The oil in asphalt pavement begins to evaporate as it sits in the sun, and weathered pavement begins to lose small rocks from the surface. Pavement also becomes brittle causing cracks to appear. Eventually the cracks grow to form larger block cracking. Moisture entering the cracks washes out the fine soils underneath causing the cracks to get wider. This weather-related distress begins on top of the pavement and works its way to the bottom. It can be slowed considerably by routinely adding a seal coat to the surface and by sealing the cracks.

When pavement reaches the end of its design life, structural failure appears in the form of alligator cracking, potholes, and depressions. Structural distress can also happen when moisture entering cracks washes out the fine soils underneath so that the subgrade no longer completely supports the pavement. Examples of these types of distresses are shown in **Table 3**.

Table 2: PASER Rating System

Surface Rating	Visible Distress*	General Condition/ Treatment Measures
10 ***Excellent***	None.	New construction.
9 ***Excellent***	None.	Recent overlay – like new.
8 ***Very Good***	No longitudinal cracks except reflection of paving joints. Occasional transverse cracks widely spaced (40' or greater). All cracks sealed or tight (open less than ¼").	Recent sealcoat or new cold mix. Little or no maintenance required.
7 ***Good***	Very slight or no raveling, surface shows some traffic wear. Longitudinal cracks (open ¼") due to reflection or paving joints. Transverse cracks (open ¼") spaced 10' or more apart, little or slight crack raveling. No patching or very few patches in excellent condition.	First signs of aging. Maintain with routine crack filling.
6 ***Good***	Slight raveling (loss of fines) and traffic wear. Longitudinal cracks (open ¼" – ½"), some spaced less than 10' apart. First signs of block cracking. Slight to moderate flushing or polishing. Occasional patching in good condition.	Shows signs of aging. Sound structural condition. Could extend life with sealcoat.
5 ***Fair***	Moderate to severe raveling (loss of fine and coarse aggregate). Longitudinal and transverse cracks (open ½") show first signs of slight raveling and secondary cracks. First signs of longitudinal cracks near pavement edge. Block cracking up to 50% of surface. Extensive to severe flushing or polishing. Some patching or edge wedging in good condition.	Surface aging. Sound structural condition. Needs sealcoat or thin non-structural overlay (less than 2").
4 ***Fair***	Severe surface raveling. Multiple longitudinal and transverse cracking with slight raveling. Longitudinal cracking in wheel path. Block cracking (over 50% of surface). Patching in fair condition. Slight rutting or distortions (1/2" deep or less).	Significant aging and first signs of need for strengthening. Would benefit from a structural overlay (2" or more).
3 ***Poor***	Closely spaced longitudinal and transverse cracks often showing raveling or crack erosion. Severe block cracking. Some alligator cracking (less than 25% of surface). Patches in fair to poor condition. Moderate rutting or distortion (1" to 2" deep). Occasional potholes.	Needs patching and repair prior to major overlay. Milling and removal of deterioration extends life of overlay.
2 ***Very Poor***	Alligator cracking (over 25% of surface). Severe distortions (over 2" deep). Extensive patching in poor condition. Potholes.	Severe deterioration. Needs reconstruction with extensive base repair. Pulverization of old pavement is effective.
1 ***Failed***	Severe distress with extensive loss of surface integrity.	Failed. Needs total reconstruction.

Individual pavements may not have all types of distresses listed above for any rating and may only have one or two types total.

Table 3: Pavement Distresses

Weather Related Distresses

Weathering and Raveling occurs when the asphalt on the surface of the pavement begins to evaporate. Small aggregate is lost from the surface.

Longitudinal and transverse cracking is due to hardening of the asphalt surface and daily temperature cycling.

Block Cracking occurs when the longitudinal and transverse cracking joins to form blocks. It indicates that the pavement has hardened significantly.

Edge Breaking occurs within 1-2 feet of the edge of the pavement and can be caused by traffic loading or weakened subgrade.

Structural Distresses

Alligator Cracking is caused by repeated heavy loads or poor subgrade support. The cracking starts at the bottom of the pavement and propagates to the surface.

Potholes occur when pieces of the pavement are lost and moisture collects inside the hole.

Depressions are localized areas with elevations lower than the surrounding pavement which are caused by settlement of the foundation.

Rutting is a permanent deformation in any of the pavement layers or subgrades. Ruts are created when the pavement material moves due to traffic loading.

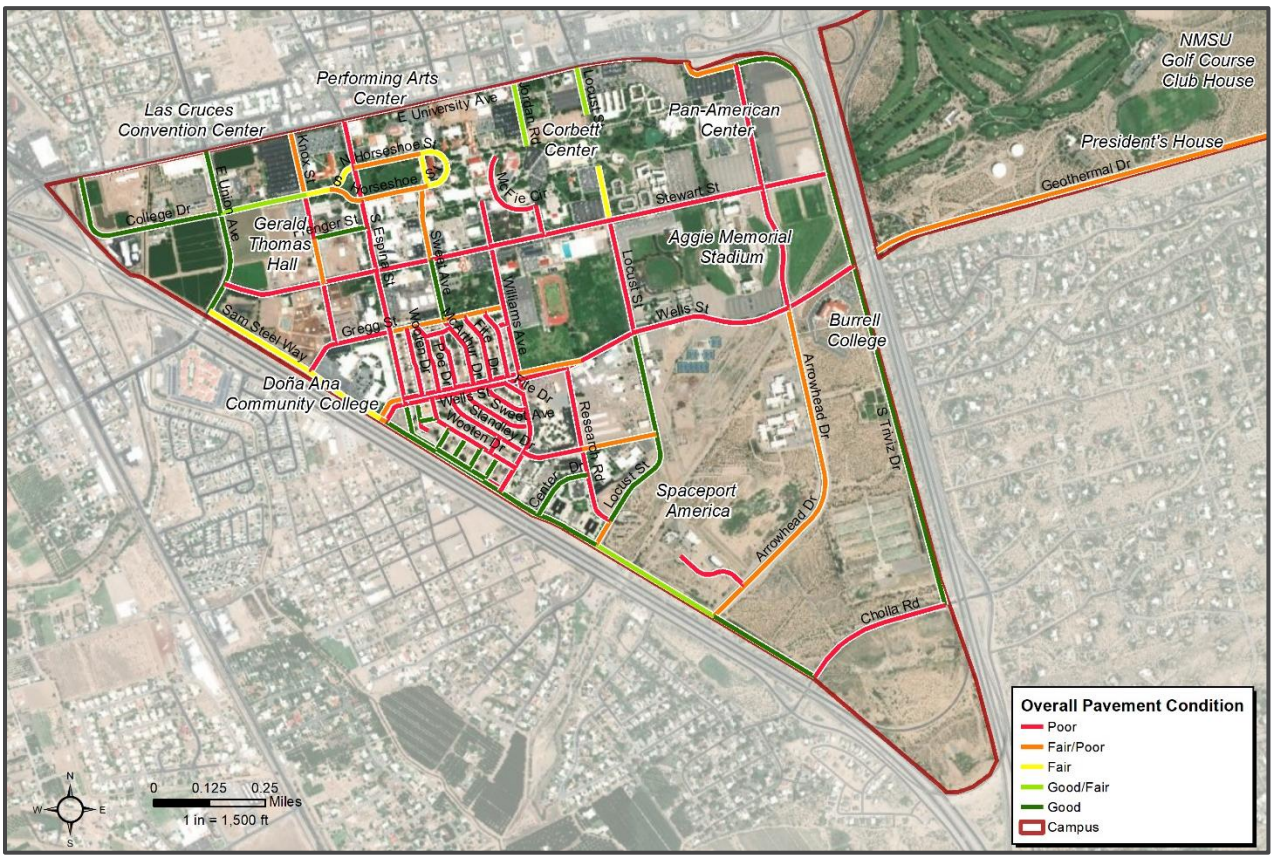
The modified rating system applied for paved NMSU roads is shown in **Table 4**. Roads in good condition range from new roads to those showing the first signs of aging. Roads in fair condition show significant aging but are still sound structurally. Roads in poor condition have significant structural distress. A summary of the roadway conditions observed during the pavement evaluation can be found in **Table 5** and **Figure 5**, based upon Google satellite and street-view imagery from 2015 to 2019.

Table 4: Modified PASER Rating System

Surface Rating / General Condition	Visible Distress	Treatment Measures
Good (7-10) – No or Minimal Signs of Aging	New or recently resurfaced roads. No or minimal significant structural distresses visible. First signs of cracking possible.	Little to no signs of aging. Maintain with routine crack filling.
Good/Fair (6) – First Signs of Aging	Slight raveling (loss of fines) and traffic wear. Longitudinal cracks (open ¼" – ½"), some spaced less than 10' apart. First signs of block cracking. Slight to moderate flushing or polishing. Occasional patching in good condition.	Shows signs of aging. Sound structural condition. Could extend life with sealcoat.
Fair (5) - Significant Aging	Longitudinal and transverse cracks show first signs of slight raveling and secondary cracks. Longitudinal cracks in wheel path. May have edge breaking. Block cracking over 50-100% of surface. Patching in fair condition.	Would benefit from a high-density seal coat or a structural overlay of 2" or more.
Fair/Poor (4) - Strengthening Needed	Severe surface raveling. Multiple longitudinal and transverse cracking with slight raveling. Longitudinal cracking in wheel path. Block cracking (over 50% of surface). Patching in fair condition. Slight rutting or distortions (1/2" deep or less).	Significant aging and first signs of need for strengthening. Would benefit from a structural overlay (2" or more).
Poor (1-3) - Structural Deterioration	Severe block cracking. Alligator cracking. Extensive patching in poor condition. Potholes.	Needs patching and mill & overlay or reconstruction.

Table 5: Current Pavement Conditions of NMSU-Owned Roadways		
Pavement Condition	**Total Length (mi.)**	**Percent of Total**
Good	1.86	14.0%
Good/Fair	0.46	3.5%
Fair	0.47	3.5%
Fair/Poor	2.31	17.3%
Poor	8.23	61.8%
TOTAL	***13.33***	***100%***

Figure 5: Overall Pavement Condition



Sidewalk Evaluation

The sidewalk evaluation within this plan is based on Google satellite and street-level imagery taken from 2015 to 2019. For each individual segment of sidewalk, a sidewalk evaluation consists of the following considerations:

- Asset ID
- Street Name
- Sidewalk Width
- Sidewalk Length
- Physical Conditions Assessment
- Obstructions
- Imagery Dates
- Notes

Sidewalk conditions information collected for this plan is contained in a GIS-based inventory. The "Notes" field within the inventory is provided to catalog detailed descriptions of observed obstructions, or to list any factors that may not be described within the available obstruction type section listed above. In instances where a sidewalk had varying lengths within a single segment, the smallest width was recorded.

Figure 6: Gregg St. Sidewalk Obstruction - Sidewalk Gap and Signpost

Curb Ramp and Intersection Evaluation

As part of the evaluation process, the individual characteristics of the curb ramps found at each individual intersection and the overall condition of the curb ramp were documented in GIS based on Google Street View imagery taken between 2015 and 2019. First, the total number of curb ramps present are identified, along with the total number of ramps missing from an intersection, and the total existing and missing warning surfaces. Following this assessment, a visual assessment of potential slope and width issues is performed. Identifying all obstructions found within existing curb ramps and crosswalks is also one of the key aspects of this evaluation. When identifying obstructions within the GIS attribute table, a "Yes" or "No" input was provided for the presence of obstructions, and if the input was "Yes," the total number of obstructions is listed, along with a description of the individual obstructions. Distinguishing between observed obstructions is done in order to determine associated costs to relocate, remove and/or replace each obstruction. Where GIS fields were inapplicable, an "N/A" was used as the input for the evaluation criteria for the coinciding ramp(s).

The following **attributes/characteristics** were provided for each individual curb ramp within the GIS file:

- Ramp Condition (Good, Fair, Poor)
- Total Ramp Present
- Total Ramps Missing
- Total Warning Surfaces Present
- Total Warning Surfaces Missing
- Slope Improvements Needed (Y/N)
- Width Improvements Needed (Y/N)
- Obstructions (Y/N)
- Push Button Needed (Y/N)
- Ramp Connects to Sidewalk (Y/N)
- Crosswalk Obstructions (Y/N)

When rating the physical conditions of a curb ramp, the **assessment criteria** were as follows:

- **Good** - Ramp is level with no uprooting
- **Fair** - Ramp has minimal uprooting or cracking
- **Poor** - Ramp has major uprooting or cracking and poses a hazard to pedestrians

To conclude the curb ramp evaluation, a comment box is provided within the GIS file to note more detailed descriptions of observed obstructions, or to list any obstructions that may not be described within the available obstruction type section listed above. Summaries of the sidewalk and curb ramp conditions observed during the evaluation can be found in **Table 6** and **Table 7.** The overall ADA compliance of both sidewalks and curb ramps are contained in **Figure 7**.

Table 6: Sidewalk Summary

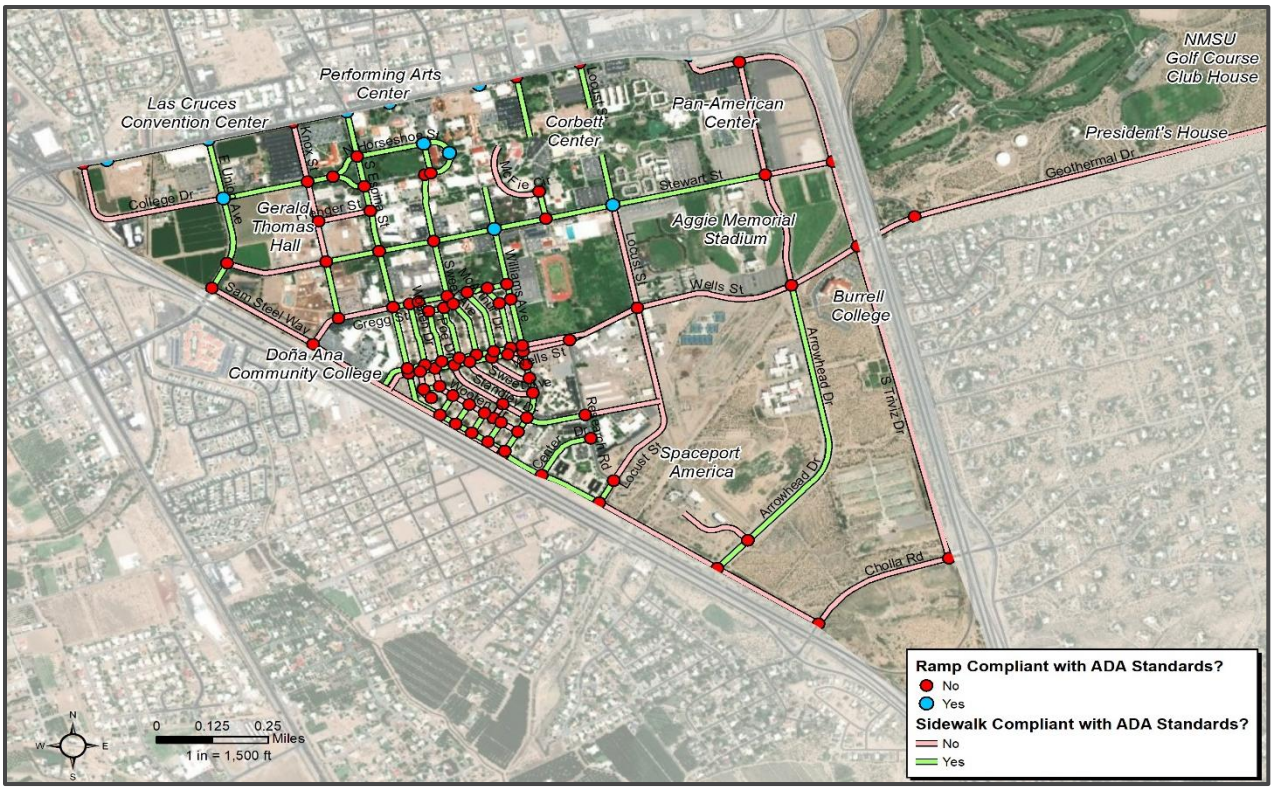
Criteria	*Total*	*Percentage of Total*
Total Roadway Segment Evaluated	133	*100.0%*
Segments with Sidewalk Present	115	*86.5%*
Segments with No Sidewalk Present	18	*13.5%*
Segments with Obstructions Present	4	*3.0%*
Segments with Sidewalk Gaps	7	*5.3%*
Segments <4 ft ADA Width Requirement	13	*9.8%*
Segments with Non-ADA-compliant Slope	2	*1.5%*
Sidewalk Segments Complaint with ADA Standards*	**92**	***69%***

**ADA compliance was determined by identifying the campus sidewalks which maintain gaps and obstructions, and nonconforming slope or width. As some sidewalks may contain multiple issues which make them noncompliant, the total amount of noncompliant sidewalks will not add up to the total amount of issues observed.*

Table 7: Curb Ramp Summary		
Criteria	***Total***	***Percentage of Total***
Total Intersections Evaluated	**97**	*100.0%*
Intersections with Curb Ramps Missing	**51**	*52.6%*
Intersections with Width Improvements Needed	**61**	*62.9%*
Intersections with Slope Improvements Needed	**61**	*62.9%*
Intersections with Missing Warning Surfaces	**81**	*83.5%*
Intersections with Missing Sidewalk Connections	**12**	*12.4%*
Intersections with Missing Push Buttons	**1**	*1.0%*
Intersections with Curb Ramp Obstructions	**1**	*1.0%*
Intersections with Crosswalk Obstructions	**5**	*5.2%*
Total Intersections Compliant with ADA Standards*	**10**	***10.3%***

**ADA compliance was determined by identifying the campus intersections which lack ramps or warning surfaces, contain obstructions, or have nonconforming slope or width. As some intersections may contain multiple issues which make them noncompliant, the total amount of noncompliant sidewalks will not add up to the total amount of issues observed.*

Figure 7: Overall ADA Compliance - Curb Ramps and Sidewalks



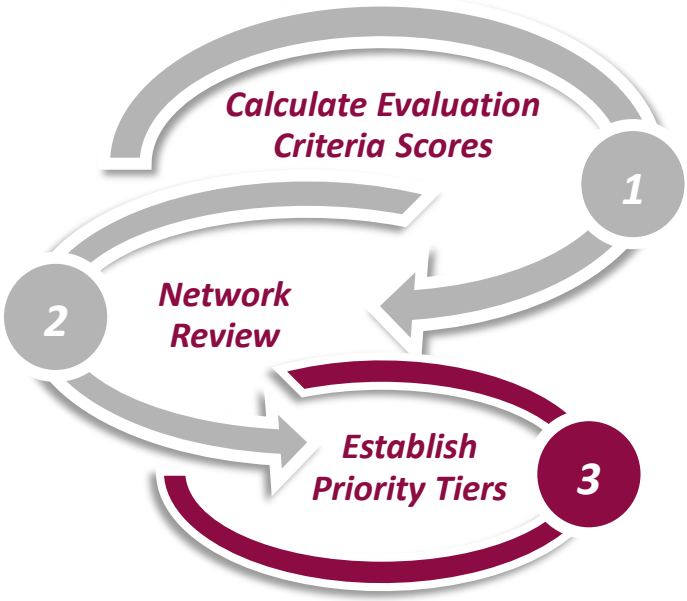
STUDY ASSUMPTIONS AND LIMITATIONS

Since the TAMP was developed during the middle of the COVID-19 pandemic, infrastructure conditions evaluations were conducted primarily through a desktop-based review rather than in-person. The most recent aerial imagery and Google Street View imagery are from 2015 to 2019, and were considered sufficiently accurate to conduct the evaluations contained in this document. However, the sidewalk and curb ramp imagery used in this evaluation is not adequate to determine if slopes or cross slopes are within the ADA standards and guidelines. Therefore, slope information will be updated based on a field review analysis during a detailed project scoping and design effort for future maintenance or improvements.

Roadway Priority Tiers

Priority Tier designations are given to roadways based on both the function of the specific roadway within campus, and the general connections provided by the roadway. Priority tiers were established based upon a combination of several qualitative and quantitative criteria, utilizing a point system for each of the various criteria. This section contains descriptions of the evaluation criteria used in the designation of roadway priority tiers. While the roadway and sidewalk conditions will change over time, the roadway tiers are unlikely to change unless there are major developments on the NMSU campus that alter traffic patterns and the role and function of existing campus roads.

Figure 8: Roadway Priority Tier Development Process



Priority Tier Scoring and Evaluation Criteria

Priority tier scoring was accomplished by assigning a value (3,2,1) to each roadway segment owned and maintained by NMSU based on the access provided or role served within campus. Scores are summarized for each roadway segment and all segments were assigned a priority tier level. A qualitative review and "smoothing" process was then applied to ensure that adjacent segments are assigned consistent tier levels.

Evaluation criteria include:

- Access to The External City of Las Cruces Roadway Network
- Access to Major Buildings/Facilities
- Access to Parking
- Access to Transit
- Existing Bike Facilities
- Role in Campus Circulation and Connectivity

Priority Tier Criteria

Descriptions of the individual priority tier scoring criteria, and the values applied to the scoring criteria, can be found below. Maps depicting the individual priority tier criteria are available in **Appendix A -** Existing Conditions Maps

ACCESS TO EXTERNAL ROADWAY NETWORK

Campus roadways that provide access to the external City of Las Cruces street network are essential to the overall travel flow both within the campus and across the city as a whole. These routes are also subject

to increased traffic volumes, which leads to greater overall wear and tear. Project scoring reflects the level of access provided by NMSU roadways to the external City of Las Cruces roadway network. Roadways with direct primary and secondary access received higher scores than roadways that provide indirect or no access.

Scoring Values

- ***3*** - Provides primary access to the external City of Las Cruces street network
- ***2*** - Provides secondary access to the external City of Las Cruces street network
- ***1*** - Provides indirect access to the external City of Las Cruces street network
- ***0*** - Does not provide access to the external City of Las Cruces street network

ACCESS TO MAJOR BUILDINGS/FACILITIES

On-campus buildings and facilities provide the space for the various activities that make up campus life. Larger building and facilities, such as academic and residential halls and athletic facilities, will inherently generate larger amounts of travel demand than smaller campus facilities. Project scoring reflects this travel demand, with roadways providing access to major buildings/facilities generating more points than those providing access to minor or other buildings/facilities, or which provide no access to them.

Scoring Values

- ***3*** – Provides access to major buildings that are greater than 100,000 square feet and/or designated as key destinations (Tier 1)
- ***2*** - Provides access to minor buildings that are between 50,000-10,000 square feet (Tier 2)
- ***1*** - Provides access to other buildings that are between 25,000-50,000 square feet (Tier 3)
- ***0*** - Provides access to other buildings that are less than 25,000 square feet (Tier 3)

ACCESS TO PARKING

As a largely commuter-based student body, on-campus parking remains essential to serving the transportation needs of NMSU students, faculty, and staff. If parking supplies are less than actual demand, drivers will cruise in search of available parking, which increases both greenhouse gas emissions and the overall likelihood of a crash. As the ultimate destination for vehicles on campus, parking also leads to increased wear and tear along routes that lead to parking facilities. Project scoring reflects the significant role parking plays in the overall transportation system, with roadways that provide access to major parking lots and/or on-street parking scoring higher than those that provide access to minor parking lots and/or on-street parking or no access to them.

Scoring Values

- ***3*** - Provides access to major parking lots and/or on-street parking that have greater than 500 parking spaces (Tier 1)
- ***2*** - Provides access to minor parking lots and/or on-street parking that have between 250-500 parking spaces (Tier 2)
- ***1*** - Provides access other parking lots and/or on-street parking that have less than 250 parking spaces (Tier 3)
- ***0*** - Does not provide access to parking lots and/or on-street parking (Tier 3)

ACCESS TO TRANSIT

A successful campus shuttle system, paired with the greater City of Las Cruces RoadRUNNER transit system, can help reduce the burden on existing transportation facilities by reducing overall congestion on campus, and allowing for greater flexibility in the placement of parking facilities farther from central campus. RoadRUNNER routes along campus allow for students, faculty, and staff to easily commute to campus without the need for a car. Transit usage also supports walking and biking, which increases transportation options and connectivity on campus. Project scoring reflects the proximity of a roadway to both Aggie Transit and RoadRUNNER Transit Stops, with roadways providing direct access to transit routes scoring higher than those that provide indirect or no access to these routes.

Scoring Values

- ***3*** - Provides direct access to an Aggie Transit or RoadRUNNER Transit stop(s)
- ***2*** - Provides indirect access to an Aggie Transit or RoadRUNNER Transit stop(s)
- ***1*** - Does not provide access to an Aggie Transit or RoadRUNNER Transit stop(s)

EXISTING BICYCLE FACILITIES/ROUTES

Bicycle facilities have become essential for a successful campus transportation system. In addition to reducing traffic congestion and pollution caused by motor vehicles, bicycle facilities provide recreational opportunities, encourage healthy lifestyles, and enhance the quality of life on campus. Varying levels of bicycle facilities exist, which can be located within and outside of roadway right-of-way. On-road facilities include bike lanes which provide dedicated space for bicyclists, as well as 'share the road' bike routes that typically include improved shoulders, signage, and occasional pavement markings. Whether a roadway is considered a “high-stress” or “low-stress” roadway also plays a factor in the overall bike-friendliness of a roadway. High-stress roads have higher traffic levels and faster speed limits that can be intimidating to inexperienced bicyclists. Conversely, low-stress roads maintain low speeds and low traffic, such as residential streets, that feel comfortable to ride on for most bicyclists. Project scoring reflects the level of bicycle facilities provided by a roadway, with roadways that offer on-street bicycle facilities, such as bike lanes or low-stress environments scoring higher than roadways that do not have bicycle facilities.

Scoring Values

- ***3*** - Is an established bike facility with on-street bike lanes and provides the most comfortable environment for biking
- ***2*** - Is a low-stress roadway with sharrows or signage that provides a bike-friendly environment for biking
- ***1*** - Is a low-stress roadway, such as a residential street, that does not have on-street bike facilities but still provides a bike-friendly environment for biking
- ***0*** - Is a high-stress roadway that does not have on-street bike facilities and does not provide a bike-friendly environment for biking

ROLE IN CAMPUS CIRCULATION AND CONNECTIVITY

Roadways provide varying levels of connectivity for the overall campus roadway network, with some roadways spanning and providing access to nearly the entirety of campus, while some provide access to only a singular facility. Project scoring reflects the varying levels of connectivity, with routes that provide a high level of network connectivity to external City of Las Cruces street network receiving more points than roadways with lower levels of network connectivity to this network.

Scoring Values

- ***3*** - Provides a high level of network connectivity to the external City of Las Cruces street network
- ***2*** - Provides a medium level of network connectivity to the external City of Las Cruces street network
- ***1*** - Provides a low level of network connectivity to the external City of Las Cruces street network

Roadway Tiers

Figure 9 shows the final roadways tiers utilizing the roadway evaluation criteria outlined in the TAMP. While individual roadway conditions may be subject to change, the established priority tiers should remain constant.

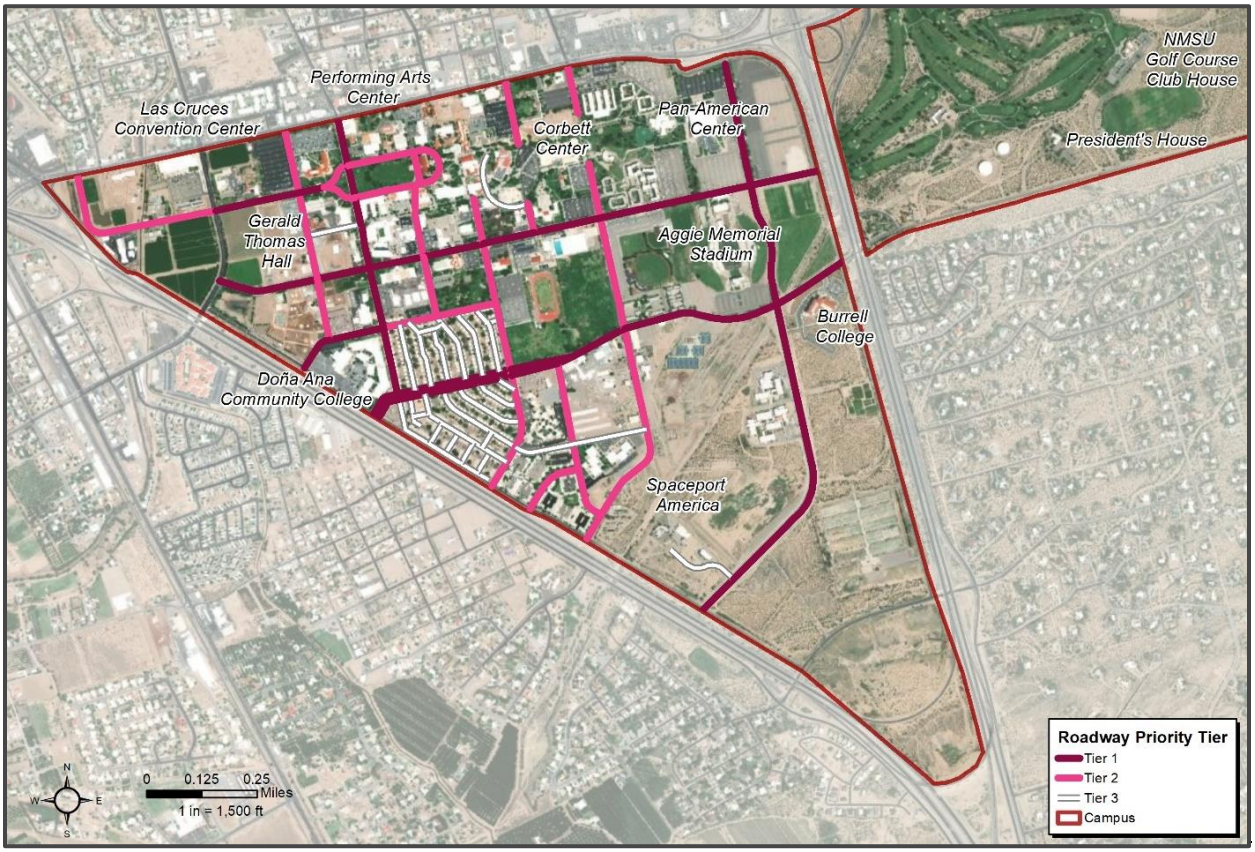
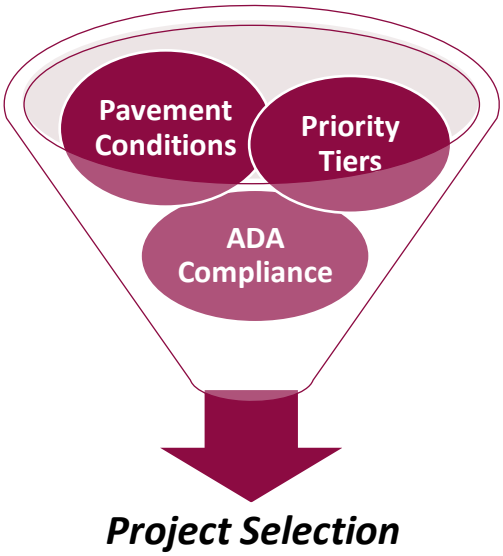


Figure 9: Roadway Priority Tiers

Project Selection

The roadway conditions, ADA compliance, and established roadway tiers contained within this plan are not meant to exist in isolation. Instead, this data should be utilized by NMSU staff as part of a toolkit to help identify potential roadway improvement projects. Using the pavement conditions information, staff can identify the roadways in the greatest need of repair. Furthermore, the ADA compliance of adjacent sidewalks and curb ramps can also be identified and considered for inclusion in potential roadway projects. Staff can then cross-reference these roadways with the established roadway tiers to prioritize roadway projects which will have the greatest overall effect on the campus roadway network. It is important to note that while roadway conditions may change over time, the established priority tiers levels should remain constant.

Figure 10: Project Selection Process



Cost Estimates

To provide further guidance for NMSU decision-makers related to management of transportation assets across camps, this section provides cost estimates to illustrate the financial resources needed to achieve various infrastructure improvements. In particular, these estimates can be used to establish the funds required to bridge the gap between the observed conditions and the conditions desired by the university (i.e. extending the useful life of existing transportation assets). Observed ADA improvements, which coincide with a roadway improvement project, can also be accounted for in these cost estimates, when appropriate.

Using the PASER ratings assigned to each roadway, NMSU staff can identify the typical treatment needed and information required to estimate costs of improving a roadway to "like-new" condition using average unit bid prices from NMDOT roadway projects. **Table 8** provides cost estimates for preferred improvements based upon the observed roadway conditions. To account for any necessary ADA improvements needed along a roadway, average ADA improvement costs have also been identified in **Table 9** and can be added to estimated costs of the improvements needed for a roadway. Finally, several miscellaneous contingency costs which coincide with roadway improvement projects have been provided to finalize the cost estimate (see **Table 10**).

It is important to note that these cost estimates are for high level budgeting and planning purposes only, and individual costs will vary based on specific project conditions.

Table 8: Cost-to-Repair Estimates - Pavement [1]

PASER Rating	Improvement Type	Item Description	Unit	Unit Price [2]	Total $/SY
Good (6-10)	Asphalt Sealer	FOG SEAL	SY	0.28	**0.28**
	Crack Seal	HOT POURED CRACK SEALING	SY	1.00	**1.00**
Fair (4-5)	Chip Seal	DOUBLE PENETRATION ASPHALT SURFACING	SY	2.15	**2.15**
	Slurry Seal	MICROSURFACING	SY	4.00	**4.00**
	NovaChip Overlay	PLANT MIX WEARING COURSE OVERLAY	SY	10.00	**10.00**
	SP-IV Overlay	ASPHALT MATERIAL FOR TACK COAT	SY	0.18	**16.18**
		MINOR PAVEMENT HMA SP-IV (2" THK)	SY	16.00	
Poor (1-3)	Mill and Inlay	ASPHALT MATERIAL FOR TACK COAT	SY	0.18	**18.68**
		COLD MILLING 2" (ASPHALT)	SY	2.50	
		MINOR PAVEMENT HMA SP-IV (2" THK)	SY	16.00	
	Reconstruction	SUBGRADE PREPARATION	SY	2.22	**43.07**
		BASE COURSE 6"	SY	11.00	
		PRIME COAT MATERIAL	SY	1.19	
		MINOR PAVEMENT HMA SP-IV (3" THK)	SY	20.00	
		REMOVAL OF SURFACING	SY	8.66	

1. This estimate of construction costs is only an opinion. BHI cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from this opinion.

2. Unit prices were based on New Mexico Department of Transportation awarded average unit bid prices for years 2017, 2018 and 2019.

Table 9: Cost-to-Repair Estimates - ADA Improvements/Curb & Gutter [1]

Improvement Type	Item Description	Unit	Unit Price [2]
Sidewalk Crack Sealing	CRACK SEALING	LF	20.15
Sidewalk Reconstruction	CONCRETE SIDEWALK 4"	SY	71.44
	REMOVAL OF SURFACING	SY	8.66
Sidewalk Passing Zone [3,4]	CONCRETE SIDEWALK 4"	SY	71.44
ADA Ramp Improvements	REMOVAL OF SURFACING	SY	8.66
	CONCRETE SIDEWALK 6"	SY	95.63
	HEADER CURB	LF	24.56
	DETECTABLE WARNING SURFACE	SF	45.00
Standard C&G Reconstruction	REMOVAL OF SURFACING	SY	8.66
	CONCRETE VERTICAL CURB & GUTTER 6"X24"	LF	21.94

1. This estimate of construction costs is only an opinion. BHI cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from this opinion.

2. Unit prices were based on New Mexico Department of Transportation awarded average unit bid prices for years 2017, 2018 and 2019.

3. Where obstructions are present within a sidewalk, a minimum clear width of 4-ft must be maintained around the obstruction. If an obstruction is too costly to relocate, widening of the sidewalk around the obstruction may be possible. Concrete paving necessary to maintain adequate distance from the obstruction is measured and paid for on a square yard basis.

4. Where the clear width of pedestrian access routes is less than 5-ft, passing spaces shall be provided at intervals of 200-ft maximum. Passing spaces shall be 5-ft minimum by 5-ft minimum.

Table 10: Cost-to-Repair Estimates - Miscellaneous/Contingencies

Item Description	Minimum Price [2]
Miscellaneous Construction Items (3% Of Paving Treatment Subtotal) [1]	$2,000
Mobilization/Demobilization (12% Of Construction Total)	$10,000
Traffic Control Plan (5% Of Construction Total)	$5,000
Material Testing (5% Of Construction Total)	$5,000
Construction Staking (3% Of Construction Total)	$1,000
Administrative/Bonding/Overhead/Profit (20% Of Construction Total)	$15,000

1. Miscellaneous bid item includes but is not limited to items such as driving lane pavement markings, cross walk striping, painted word/symbols, traffic signage, etc.

2. Individual miscellaneous and contingency amounts to be determined by the percentage as described by the bid item or the estimated minimum cost, whichever is greater.

Example Cost Estimate

As stated in the prior section, the purpose of the included cost estimates is to assist NMSU staff in their planning efforts to approximate the costs of ensuring their transportation system is in good condition. Combined with the process of establishing the high priority roadways, the cost estimates also help NMSU budget and plan for annual roadway expenditures. To illustrate exactly how to calculate the cost estimate for a roadway improvement project, a segment of Locust St, from Stewart to Wells has been included in **Table 11** as an example cost estimate.

To calculate the estimate cost of a project, the square yardage of a roadway is multiplied by the treatment options that coincide with the roadway's PASER rating. The costs of various contingency items are then added to overall cost, along with any ADA improvements which coincide with the project area. These items are then added together to generate a final cost estimate for a roadway project. Unit prices for these cost estimates are based on New Mexico Department of Transportation awarded average unit bid prices for years 2017, 2018 and 2019.

Table 11: Example Cost Estimate [1, 2, 3, 5]
Locust St. - From Stewart St. to Wells St.
PASER Condition Rating: 2 - Poor

Item Description	Unit	Unit Price	Quantity	Extension
Mill and Inlay				
1. Asphalt Material for Tack Coat	SY	0.18	6,453.33	1,174.08
2. Cold Milling 2" (Asphalt)	SY	2.5	6,453.33	16,133.33
3. Minor Pavement HMA SP-IV (2" THK)	SY	16	6,453.33	103,253.33
SUBTOTAL MILL AND INLAY				*$120,560.74*
Miscellaneous Items				
4. Miscellaneous Construction Items [4]		3%		3,616.82
SUBTOTAL MISCELLANEOUS ITEMS				*$3,616.82*
CONSTRUCTION SUBTOTAL - MILL & INLAY/ MISCELLANEOUS ITEMS				*$124,177.57*
Contingencies				
Mobilization/Demobilization		12%		15,000
Traffic Control Plan		5%		6,500
Material Testing		5%		6,500
Construction Staking		3%		4,000
Administrative / Bonding / Overhead / Profit		20%		25,000
SUBTOTAL CONTINGENCIES				*$57,000*
SUBTOTAL LOCUST ST PAVEMENT IMPROVEMENTS				*$181,177.57*
TAX		*8.3125%*		*$15,060.39*
TOTAL				**$196,237.95**

1. *This estimate of construction costs is only an opinion. BHI cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from this opinion.*
2. *This estimate is for paving improvements only. No improvements pertaining to ADA facilities, sidewalks, or curb and gutter are included in this example. Improvements to these elements would be in addition to this cost estimate.*
3. *This estimate is presented solely as an example of generating a pavement improvement cost estimation. Decisions on specific improvement methods shall be based on further site investigations.*
4. *Miscellaneous bid items include but is not limited to items such as driving lane pavement markings, crosswalk striping, painted word/symbols, traffic signage, etc.*
5. *Length x Width = 1,320' x 44'*

SUMMARY, NEXT STEPS & FUTURE CONSIDERATIONS

By applying federal roadway evaluation principles at the campus level, the *New Mexico State University Transportation Asset Management Plan* documents campus roadway needs, evaluates pedestrian facilities proximate to campus roadways to ensure compliance with federal ADA requirements, and establishes roadway priority tiers. Using this information, NMSU staff can identify and select the roadway improvement projects that will best improve the overall campus transportation network given the fiscal restraints of the university. Ultimately, NMSU can use this plan to establish high priority roadways, determine the approximate costs needed to improve those roadways, and ensure the transportation system of the university remains in good condition.

Next Steps & Future Considerations

How often should road and sidewalk conditions be evaluated? Recurring roadway evaluations on an annual or biannual basis could help to track pavement conditions over time and form the basis for the roadway infrastructure funding needs of the university. The GIS database which houses this data should also be updated to reflect the observed roadway conditions, including all maintenance activities.

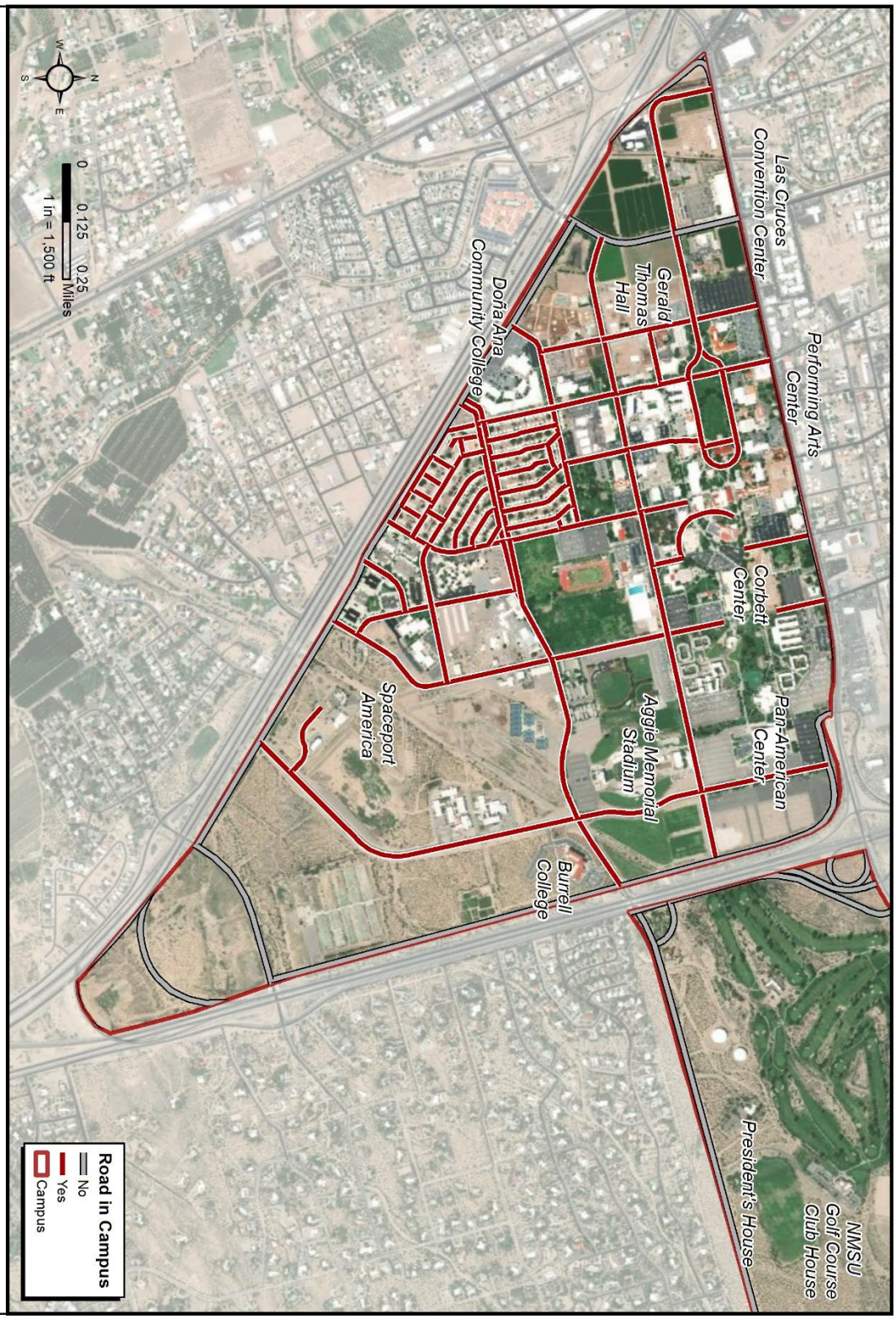
What will the footprint of campus be like going forward? Given current student body projections and future partnerships expected on campus, the infrastructure needs of NMSU could change drastically. To reflect these changes across campus, the inventory of campus infrastructure should be reviewed on an annual basis to reflect any newly constructed roadways, trails, or sidewalks. Furthermore, the assumptions regarding priority tiers should be revisited every five years to ensure they reflect the transportation needs and goals of the university.

What will transportation options look like on campus going forward? Given the rapid advancement of transportation technology, NMSU will have to account for new forms of transportation in the future, such as eScooters, plug-in electric cars, autonomous cars, and more. NMSU should account for new modes of transportation as they become popular on campus and can adapt the TAMP as needed to reflect their widespread usage. To accomplish this, noteworthy changes to travel behavior may warrant the inclusion of additional evaluation criteria in the assignment of priority roadway tiers.

APPENDIX A - EXISTING CONDITIONS MAPS

CONTENTS

- ***Campus Roadways***
- ***Pavement Conditions***
- ***Bicycle Facilities***
- ***Campus Buildings***
- ***Campus Parking***
- ***Campus Curb Ramps: Total Missing Curb Ramps***
- ***Transit Routes***



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Campus Roadways

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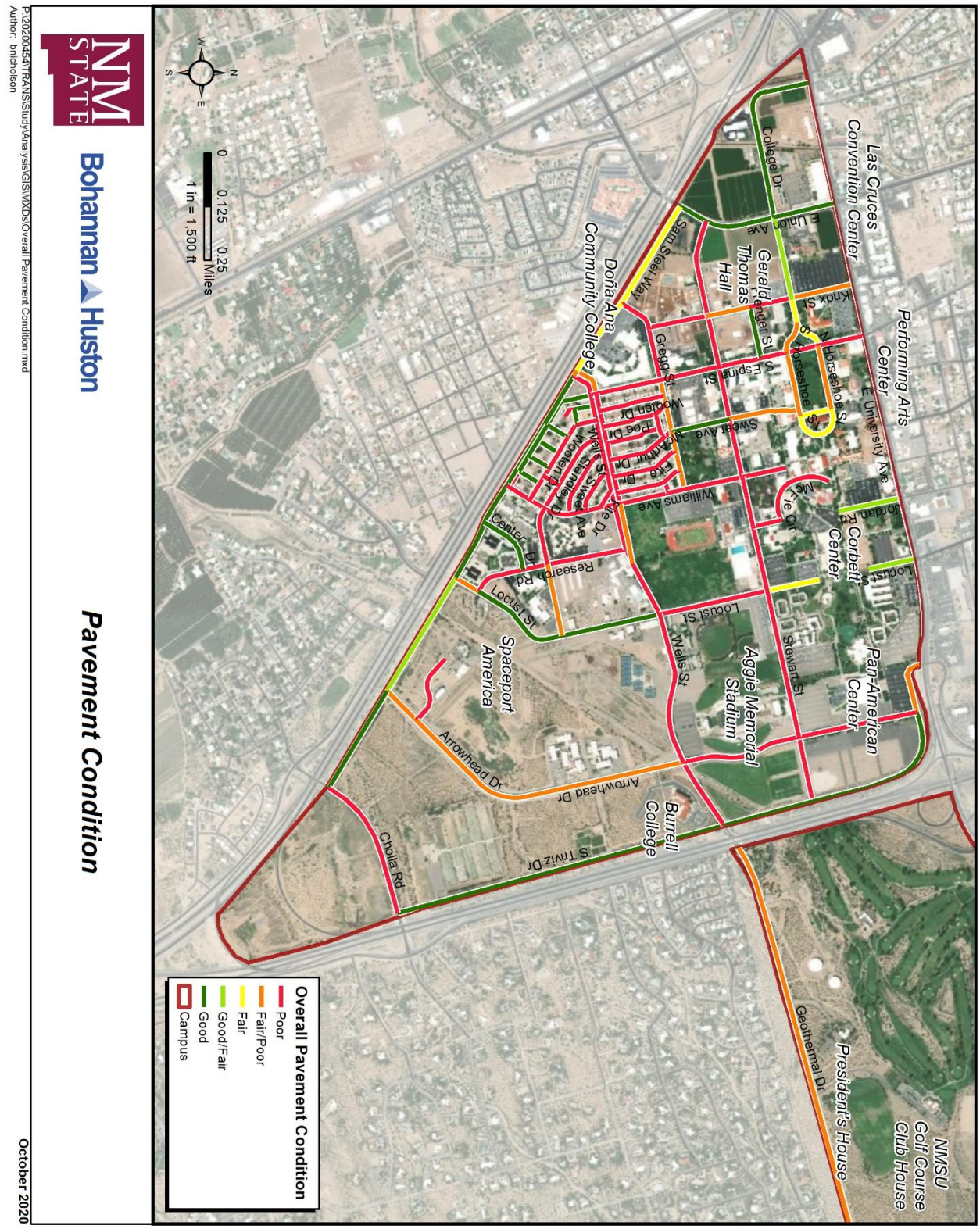
Author: bnicholson

October 2020


Overall Pavement Condition
Poor
Fair/Poor
Fair
Good/Fair
Good
Campus
0 0.125 0.25 Miles
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Pavement Condition
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Author: bnicholson
October 2020
Performing Arts Center
Las Cruces Convention Center
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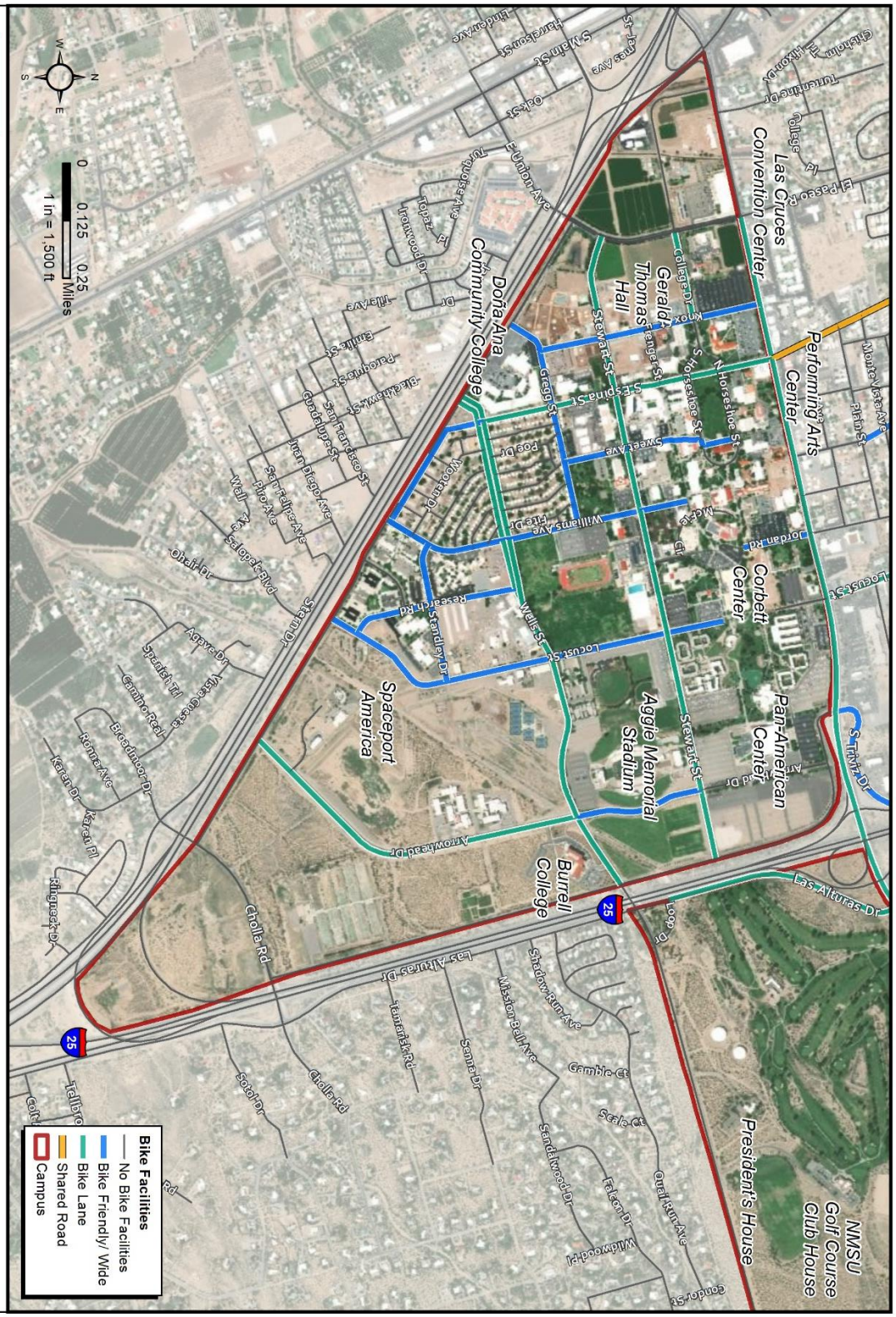
Knox St
N Horseshoe St
S Horseshoe St
College Dr
E Union Ave
Gerald Ringer Study
Thomas Hall
Espina St
Sweet Ave
Gregg St
Sam Steel Way
Doña Ana Community College
Moorer Dr
Toe Dr
McArthur Dr
Fite Dr
Williams Ave
Mc Ivie Cir
Jordan Rd
Corbett Center
Pan-American Center
Locust St
Stewart St
Wells St
Aggie Memorial Stadium
Burrell College
Arrowhead Dr
S Triviz Dr
Cholla Rd
Spaceport America
Research Rd
Center Dr
Locust St
Geothermal Dr
President's House
NMSU Golf Course Club House



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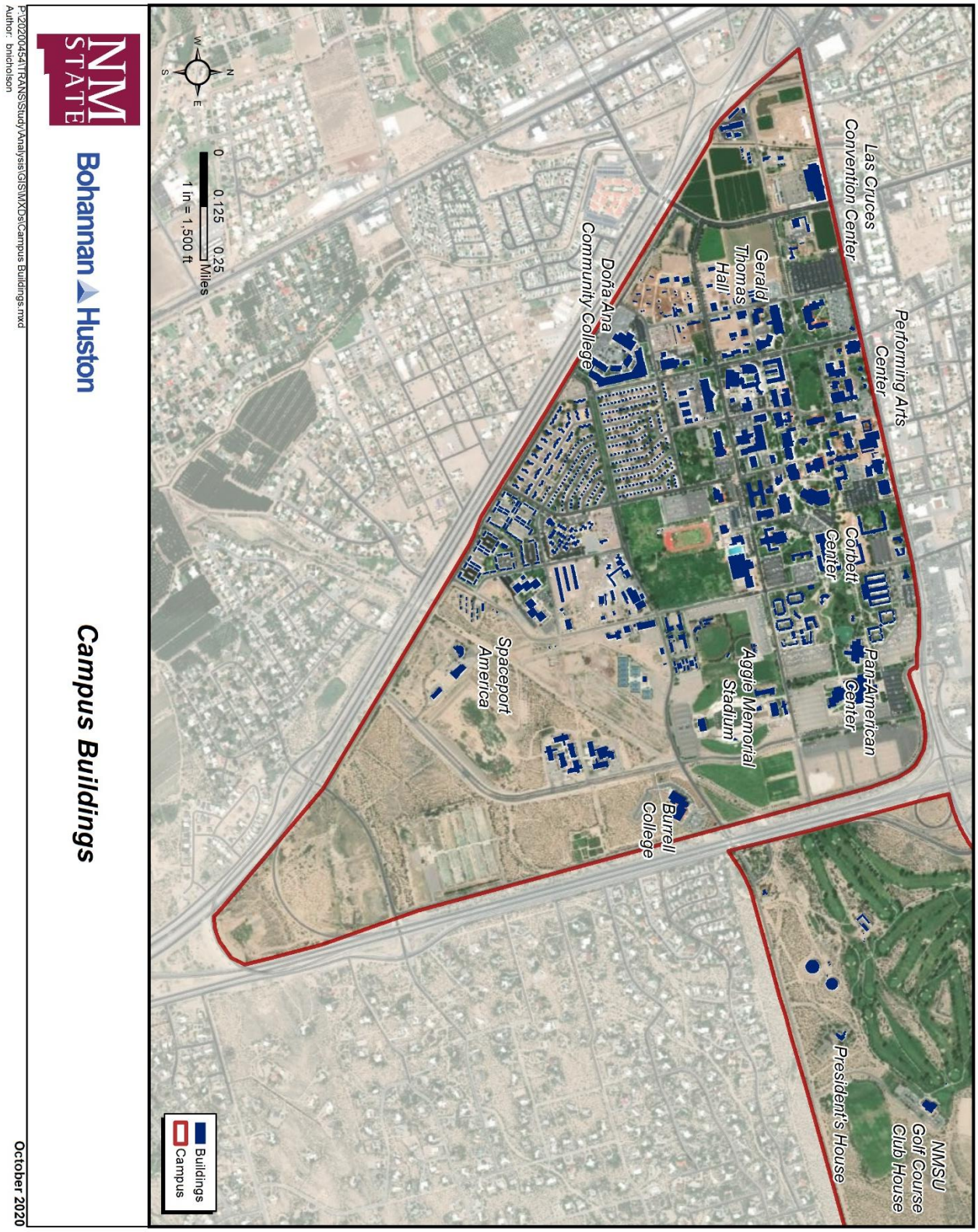
Las Cruces Convention Center
Performing Arts Center
Corbett Center
Pan-American Center
Gerald Thomas Hall
Aggie Memorial Stadium
Doña Ana Community College
Burrell College
Spaceport America
President's House
NMSU Golf Course Club House
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Campus Buildings
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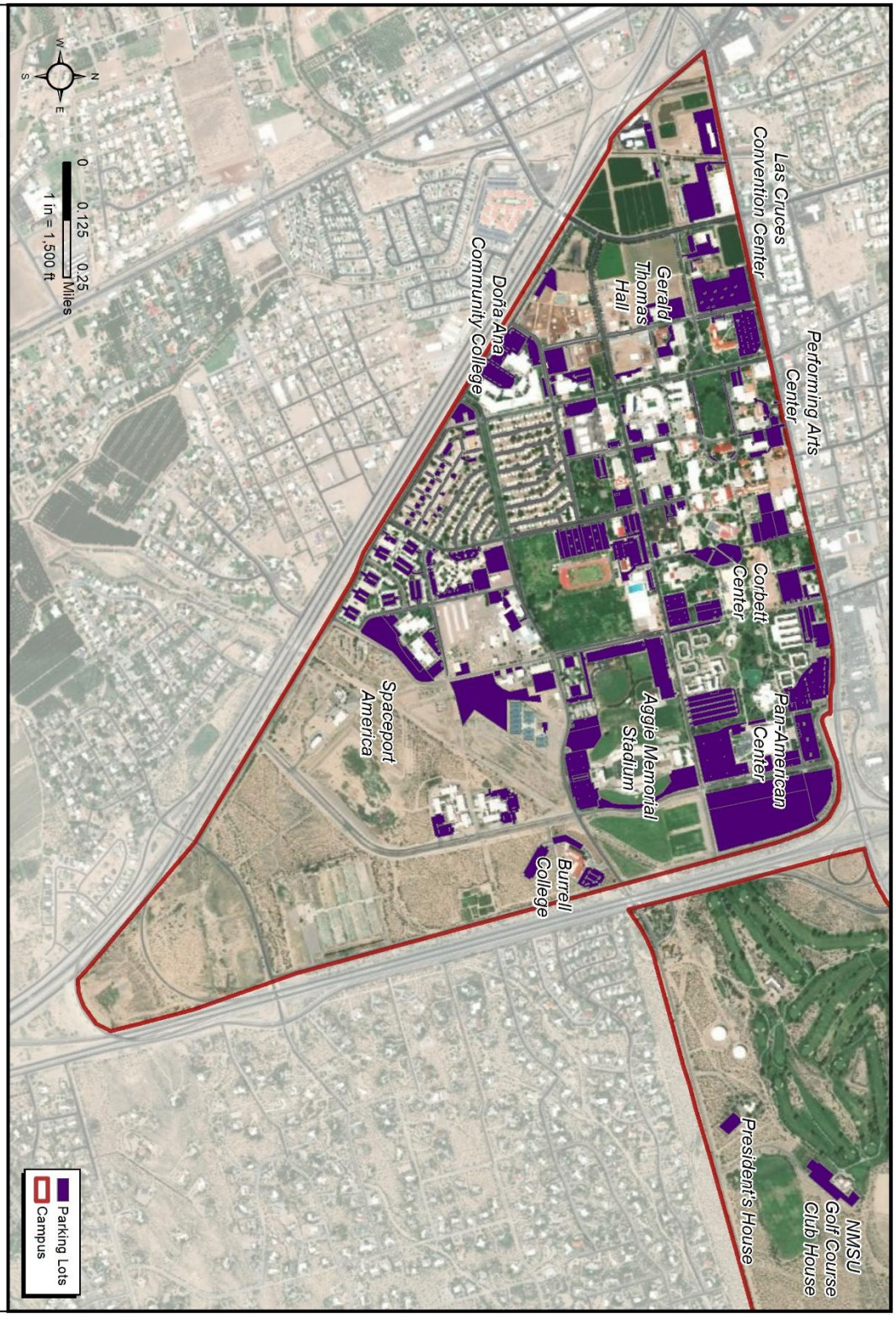
October 2020



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Campus Parking

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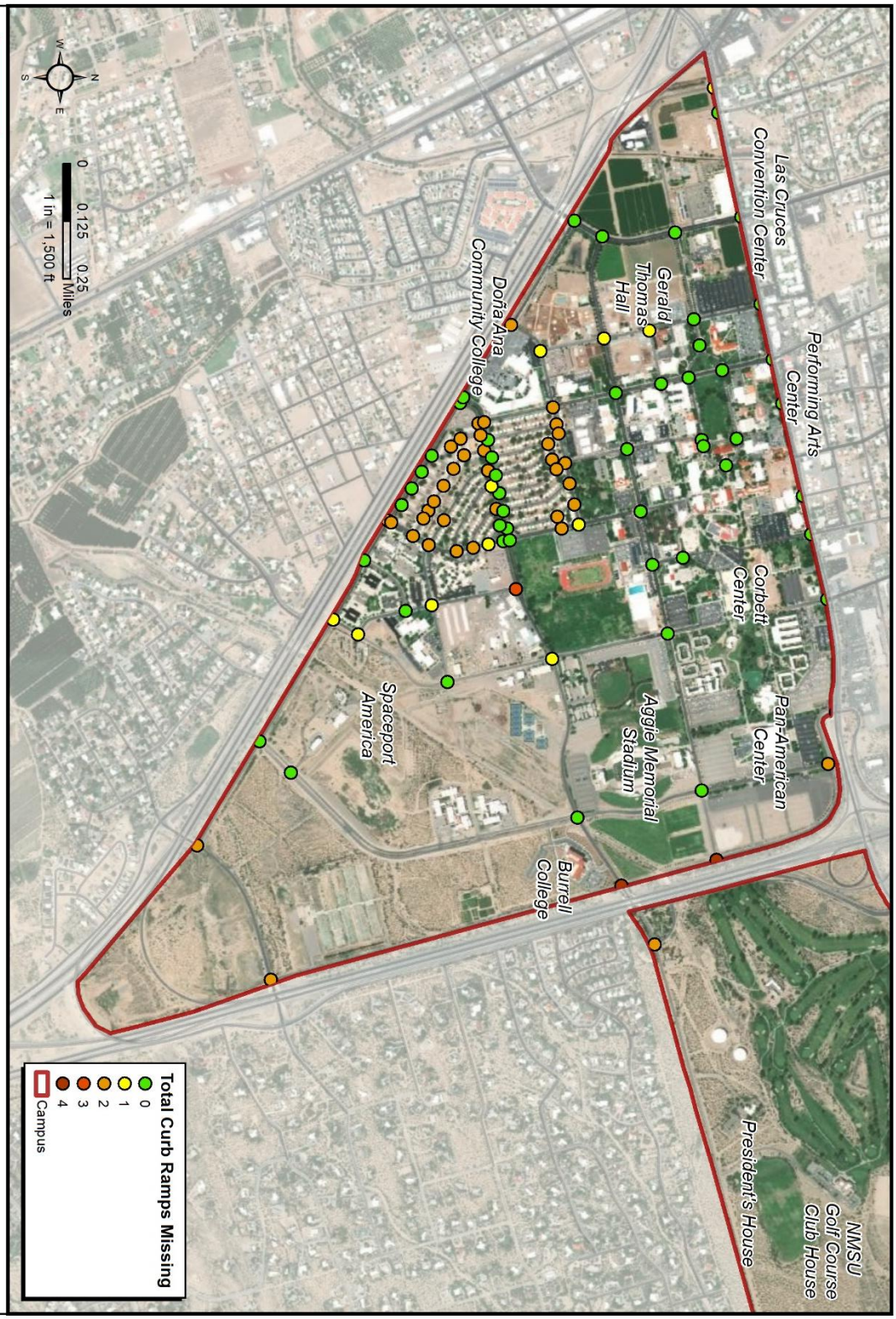
Author: bnicholson

October 2020



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Campus Curb Ramps: Total Missing Curb Ramps

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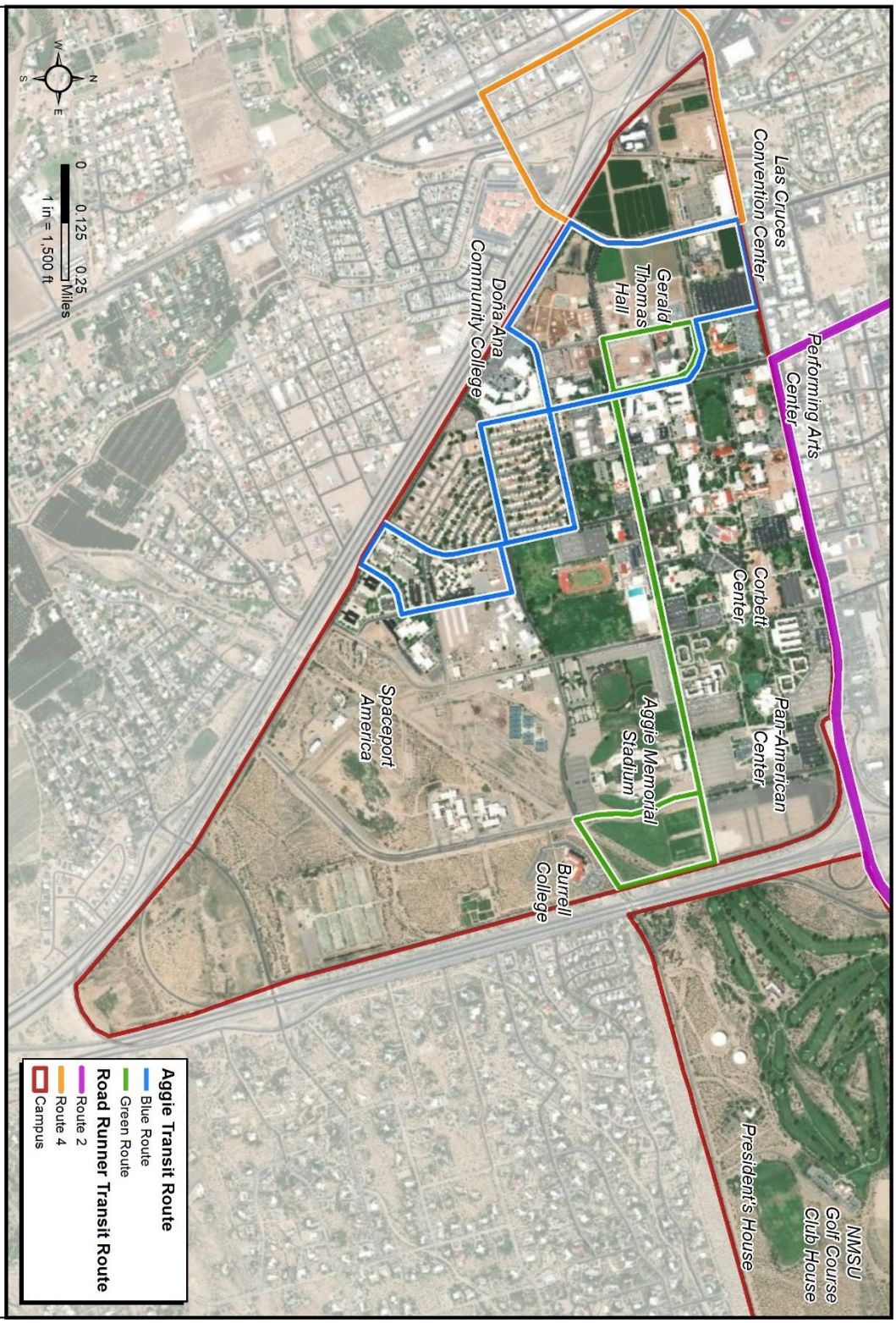

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Transit Routes

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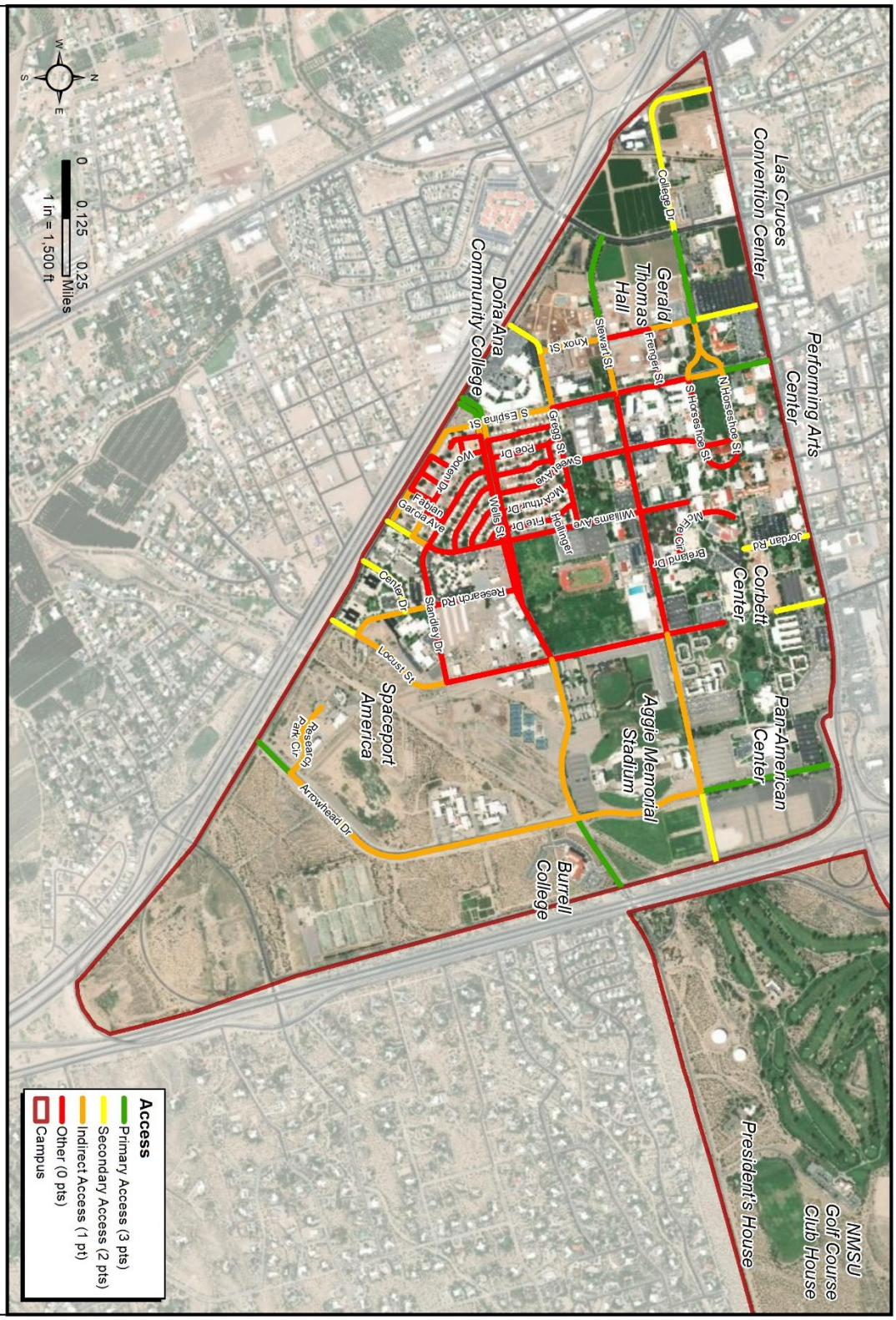
October 2020

Appendix B – Priority Tier Scoring Input Maps

Contents

- *Access to External Roadway Network*
- *Bike Facilities/Routes*
- *Building/Facility Access*
- *Parking Access*
- *Route Connectivity*
- *Transit Access*



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Access to External Roadway Network

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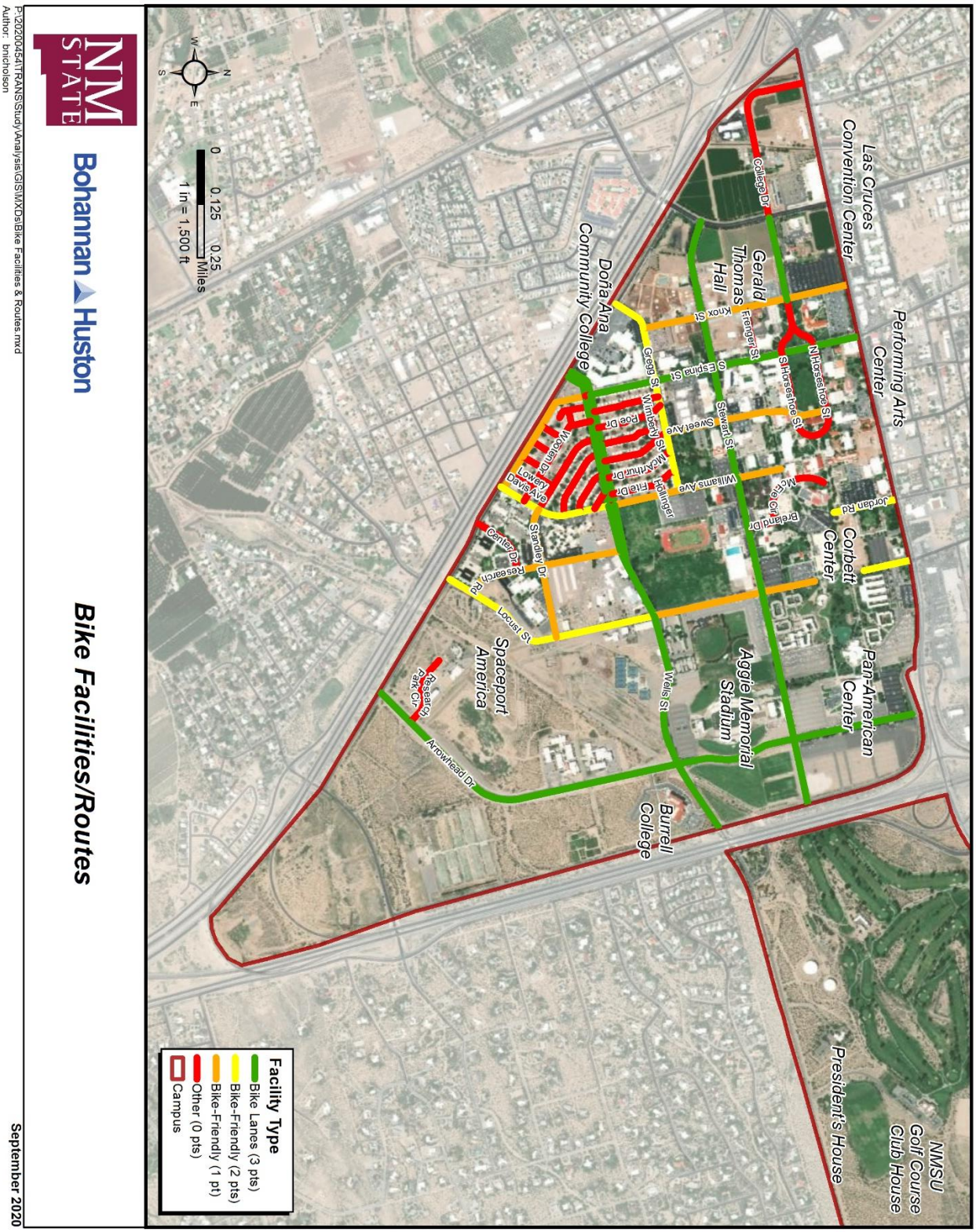
September 2020


Performing Arts Center
Las Cruces Convention Center
Pan-American Center
Corbett Center
Jordan Rd
NMSU Golf Course Club House
President's House
Aggie Memorial Stadium
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Wells St
Gerald Thomas Hall
College Dr
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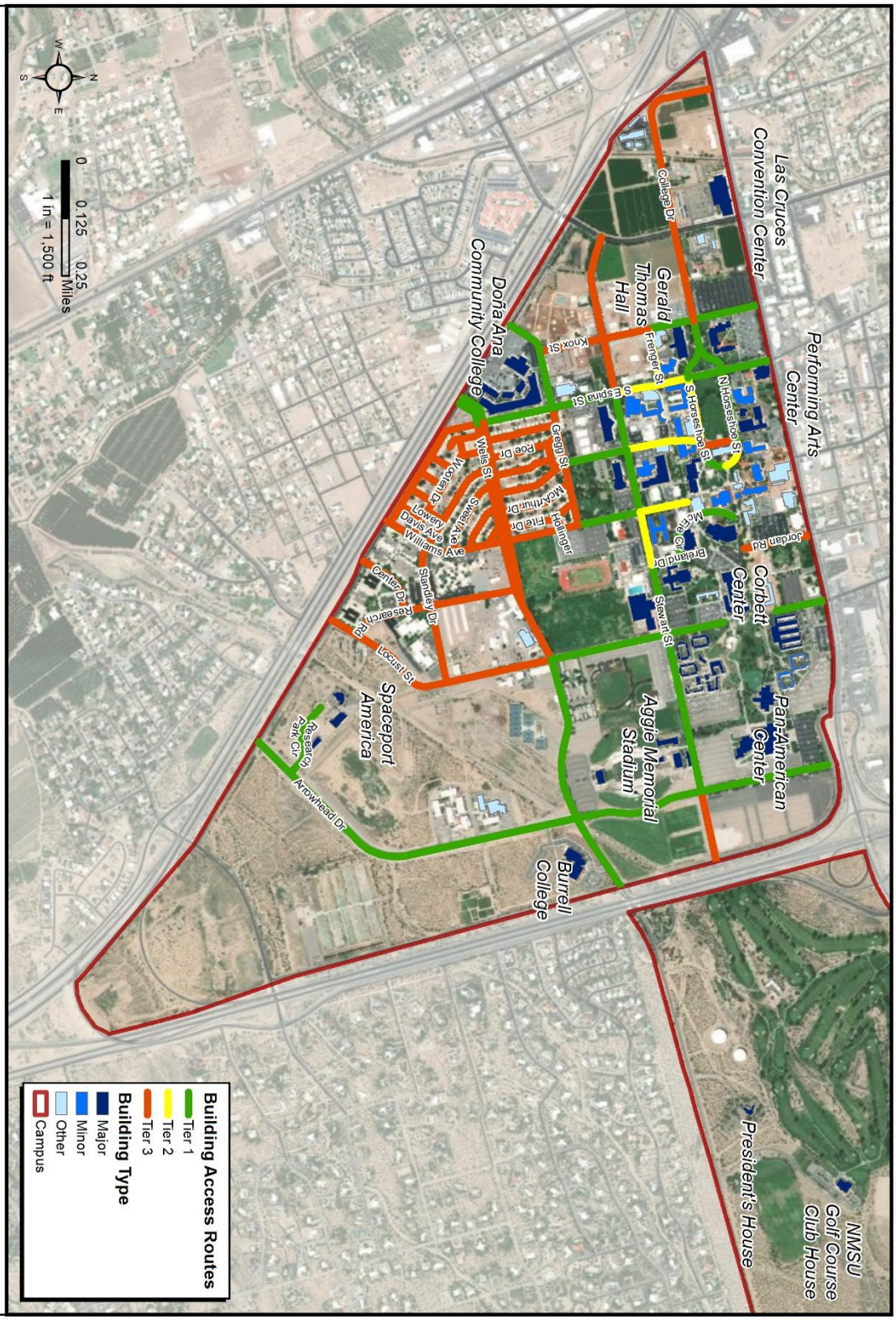
S Horseshoe St
Frenger St
Knox St
S Espina St
Stewart St
Sweet Ave
Williams Ave
McFie Dr
Breland Dr
Doña Ana Community College
Gregg St
Winbery St
Hollinger
Roe Dr
McArthur Dr
Filed Dr
Wolcott Dr
Lowery
Davis Ave
Standley Dr
Center Dr
Research Park Dr
Locust St
Spaceport America
Research Park Cir
Arrowhead Dr
Facility Type
Bike Lanes (3 pts)
Bike-Friendly (2 pts)
Other (0 pts)
Campus
N
S
E
W
0
0.125
0.25
Miles
1 in = 1,500 ft
Bohannan Huston
NM STATE
Bike Facilities/Routes
P:\2020\0454\TRANS\Study\Analysis\GIS\MXDs\Bike Facilities & Routes.mxd
Author: bnicholson
September 2020


Performing Arts Center
Las Cruces Convention Center
NMSU Golf Course Club House
President's House
Pan-American Center
Corbett Center
Aggie Memorial Stadium
Burrell College
Spaceport America
Doña Ana Community College
Gerald Thomas Hall
College Dr
Frenger St
S Horseshoe St
N Horseshoe St
Jordan Rd
Knox St
S Espina St
Gregg St
Poe Dr
Wells St
McArthur Dr
Holinger
Fiel Dr
Zuloaga Cir
Breland Dr
Stewart St
Sweetwater Ave
Lowell Ave
Davis Ave
Williams Ave
Standley Dr
Research Pd
Center Dr
Locust St
Research Park Cir
Arrowhead Dr
Building Access Routes
Tier 1
Tier 2
Tier 3
Building Type
Major
Minor
Other
Campus
0 0.125 0.25 Miles
1 in = 1,500 ft
N
E
S
W
Bohannan Huston
NM STATE
Building/Facility Access
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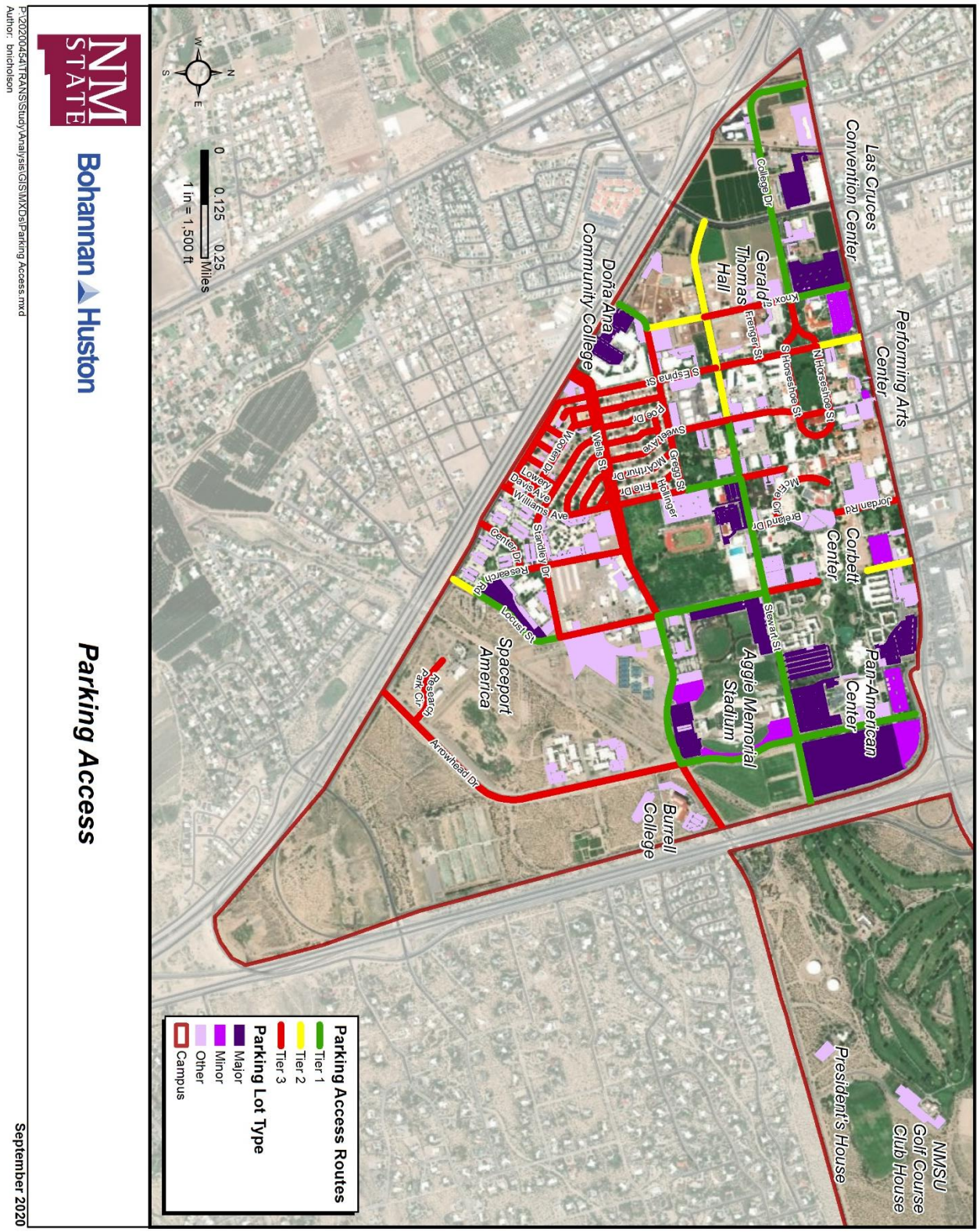
Author: bnichoison
September 2020



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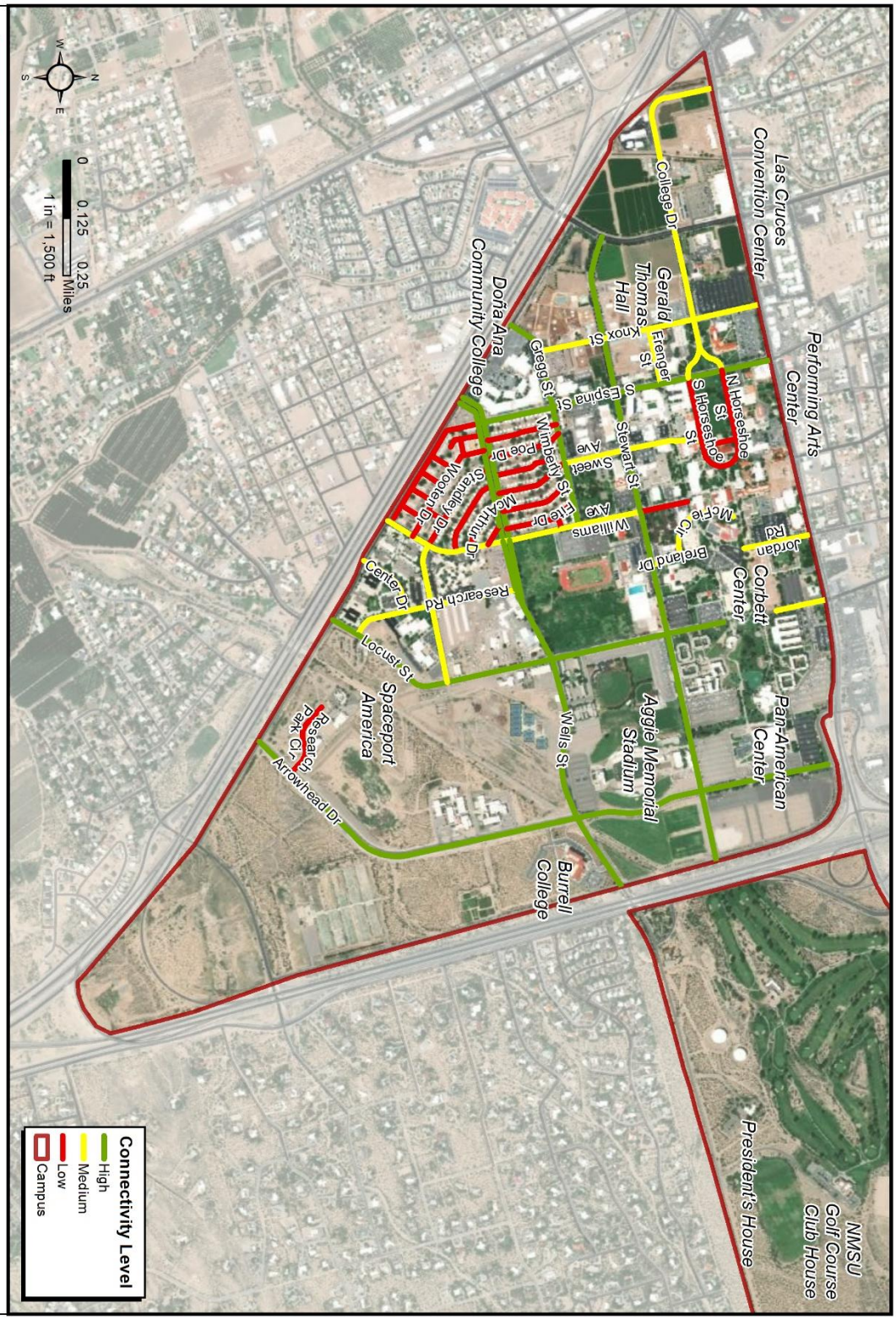
Author: bnicholson

September 2020



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Route Connectivity

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Author: bnicholson

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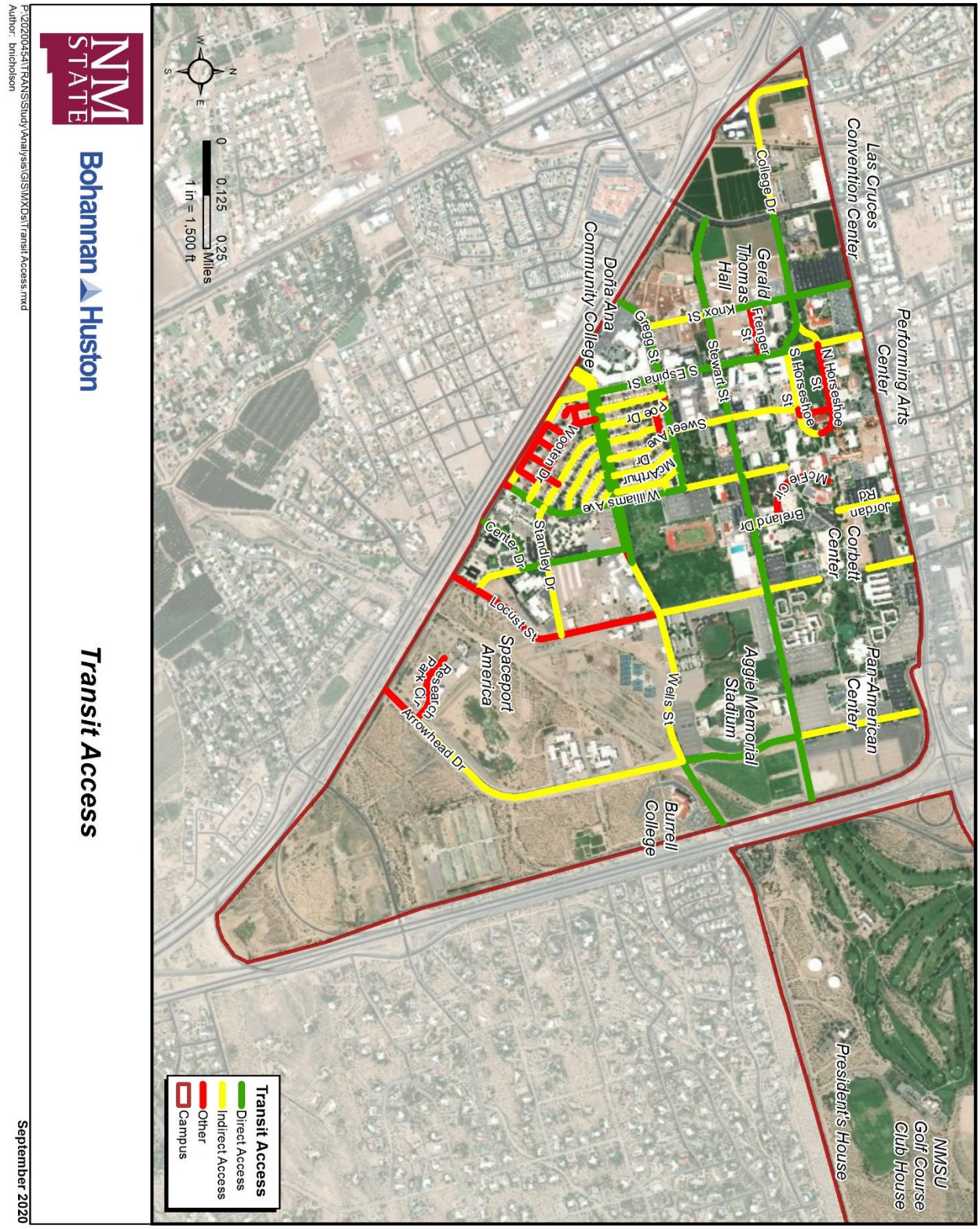
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Stewart St
S Espina St
Gregg St
Poe Dr
Sweet Ave
McArthur Dr
Williams Ave
Wooten Dr
Standley Dr
Center Dr
Locus St
Research Park Cir
Arrowhead Dr
Wells St
Breland Dr
McFie Cir
Jordan Rd
College Dr
Transit Access
Direct Access
Indirect Access
Other
Campus
0 0.125 0.25 Miles
1 in = 1,500 ft
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NM STATE
Bohannan Huston
Transit Access
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Author: bnicholson
September 2020

APPENDIX C – CURB RAMP TECHNICAL REQUIREMENTS

PERPENDICULAR CURB RAMPS

Perpendicular curb ramps have a running slope that cuts through, or is built up to, the curb at right angles, or meets the gutter break at right angles where the curb is curved. On large corner radiuses, it will be necessary to indent the gutter break on one side of the curb ramp in order for the curb ramp to meet the gutter break at right angles.

Technical requirements for perpendicular curb ramps include the following:

- Turning spaces or landings shall be a minimum of 4-foot by 4-foot. Where the landing is constrained at the back of the sidewalk, the turning space shall be a minimum of 4-foot by 5 foot, with the 5-foot dimension in the direction of the ramp.
- Slopes shall be 8.3% maximum and shall not require the ramp length to exceed 15-feet.
- Slopes of turning spaces or landings shall not exceed 2%.
- Flared sides shall not exceed 10%, measured parallel to the curb.

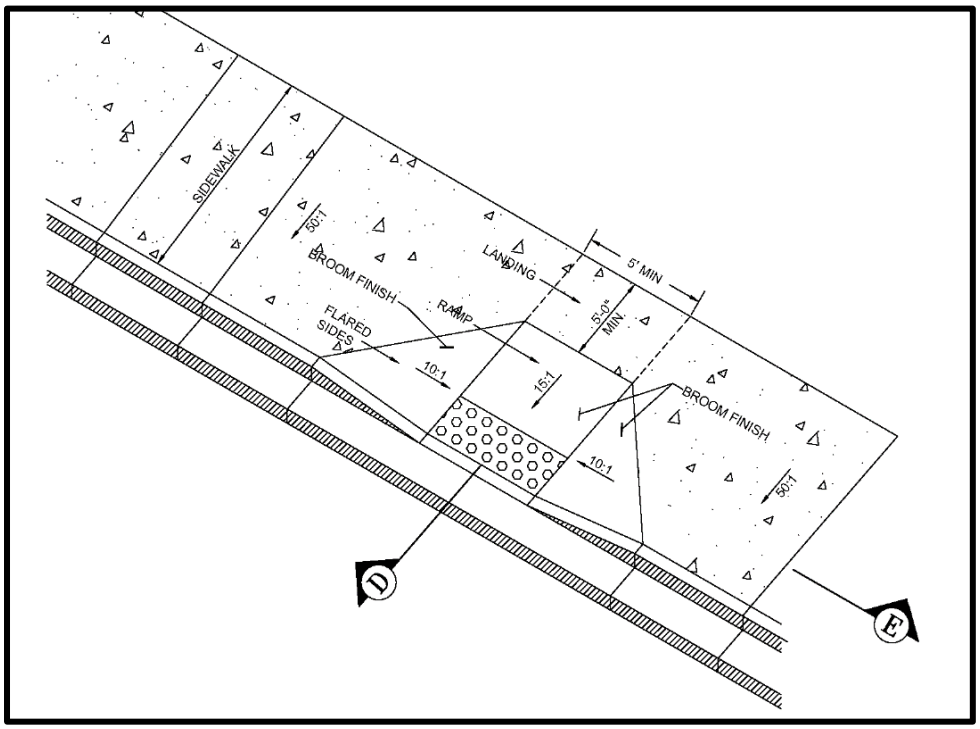

Figure 11: Perpendicular Curb Ramp Detail [3]

[3] City of Las Cruces Public Works / Engineering & Architecture Standards

PARALLEL CURB RAMPS

Parallel curb ramps have a running slope that is in-line with the direction of sidewalk travel. This characteristic lowers the sidewalk to a level turning space where a turn is made to enter the pedestrian street crossing.

Technical requirements for parallel curb ramps include the following:

- Turning spaces or landings shall be a minimum of 4-foot by 4-foot. Where the landing is constrained by more than two sides, the turning space shall be a minimum of 4-foot by 5 foot, with the 5-foot dimension in the direction of the street crossing.
- Slopes shall be 8.3% maximum and shall not require the ramp length to exceed 15-feet.
- Slopes of turning spaces or landings shall not exceed 2%.
- Flared sides shall not exceed 10%, measured parallel to the curb.

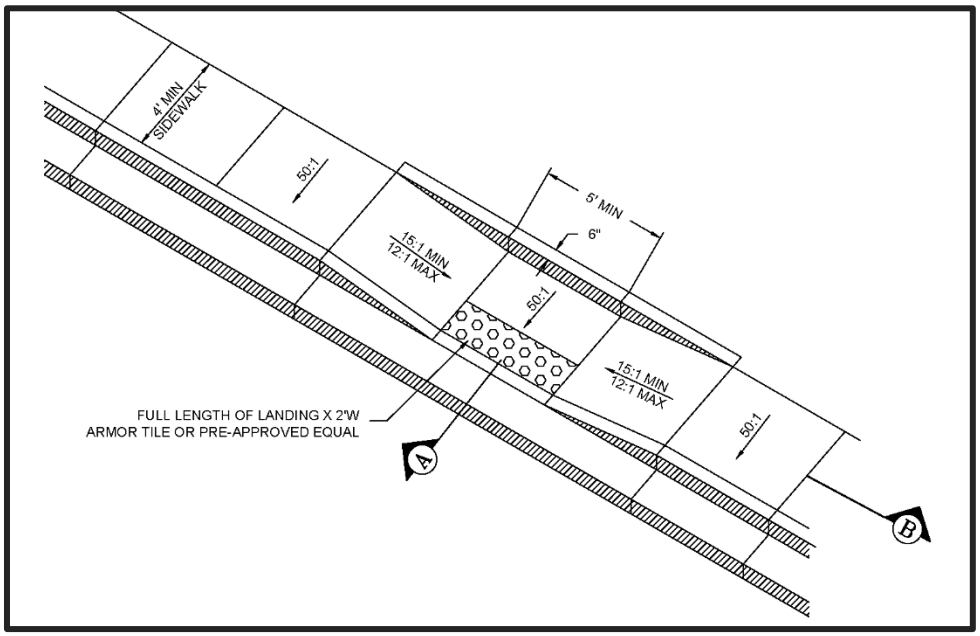

Figure 12: Parallel Curb Ramp Detail [4]

[4] City of Las Cruces Public Works / Engineering & Architecture Standards

DIAGONAL CURB RAMPS

If curb ramps are placed diagonally at an intersection, it is important that a minimum clear space of 48” long is available at the bottom that is outside the active vehicle traffic lanes and is located within marked crossings, where provided. A segment of curb at least 24” long beyond the flares must be provided on both sides of curb ramps with side flares within marked crossings. This curb segment provides an orienting cue at crossings for people with vision impairments.

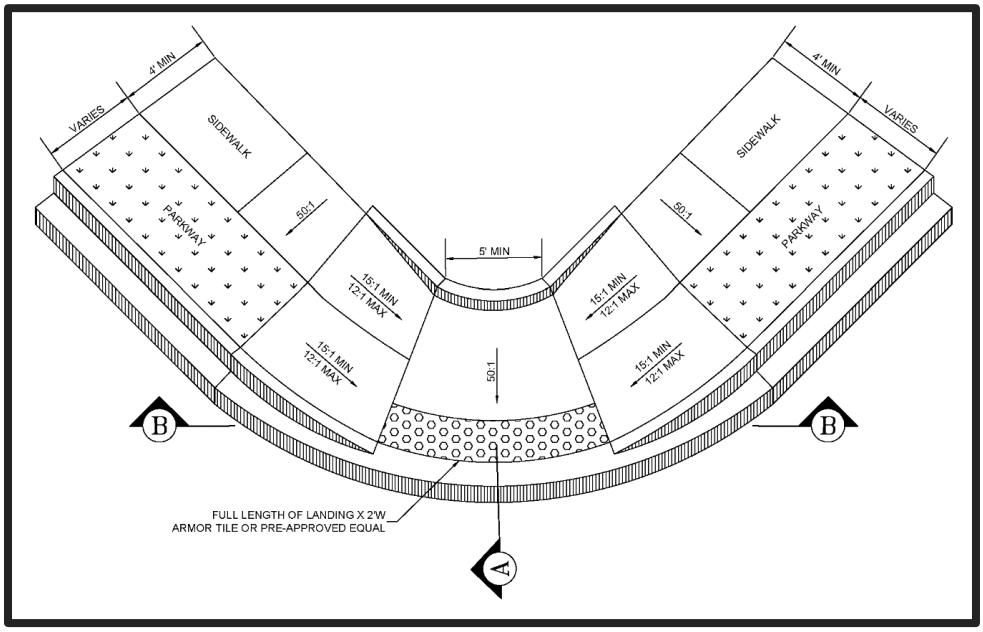

Figure 13: Diagonal Curb Ramp Detail [5]

[5] City of Las Cruces Public Works / Engineering & Architecture Standards

CURB RAMPS AT INTERSECTIONS

Curb ramps at marked crossings must be wholly contained within the crosswalk, excluding side flares. PROWAG standards *do not* require crossings to be marked, or to address how they are to be marked, but public street crossings *are* addressed by the Manual on Uniform Traffic Control Devices (MUTCD) for Streets and Highways. Curb ramps must be oriented so that the grade break is perpendicular to the curb ramp run to ensure a smooth transition to streets, including at corners with a wide radius. The curb ramp opening can be aligned with the curb line *or* more directionally oriented to the crosswalk.

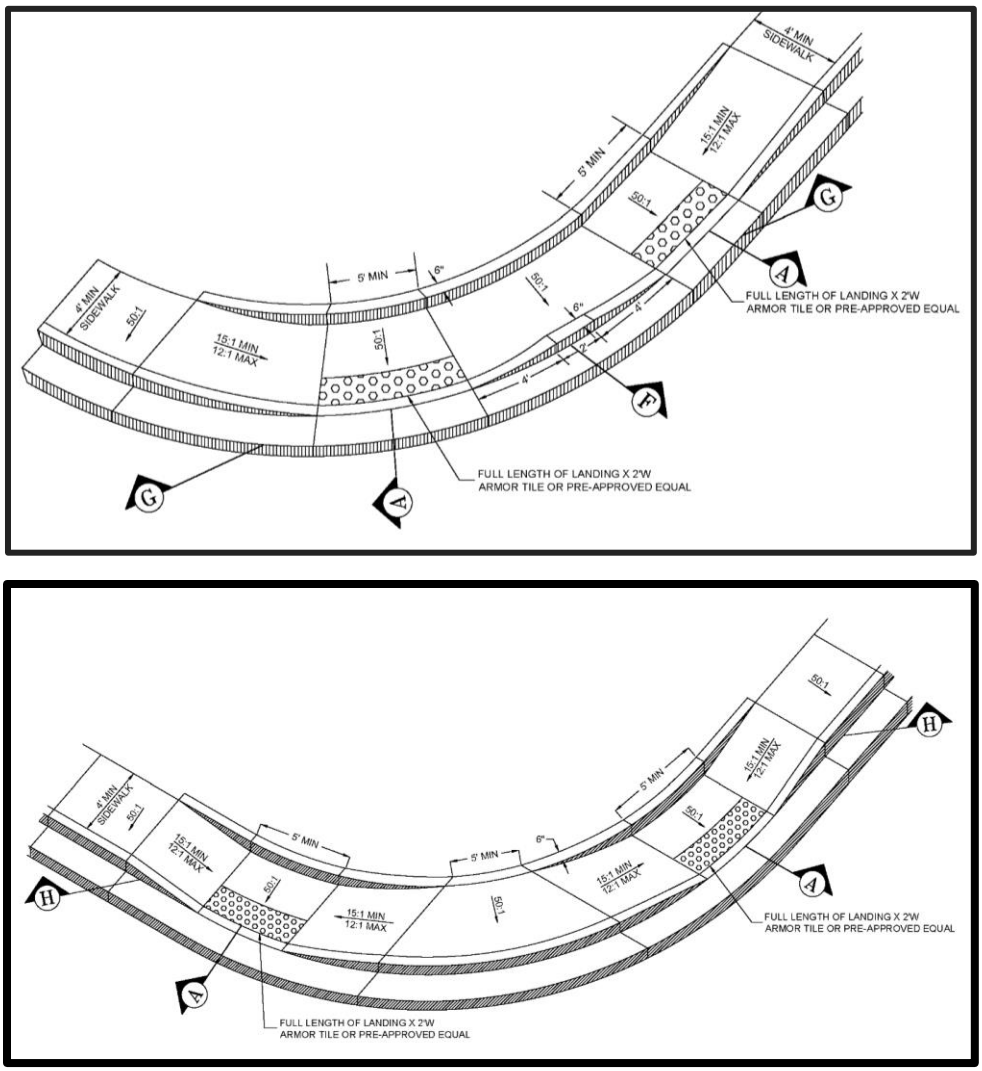

Figure 14: Curb Ramps at Intersection Detail [6]

[6] City of Las Cruces Public Works / Engineering & Architecture Standards

BLENDED TRANSITIONS

Blended transitions are raised pedestrian street crossings, depressed corners, or similar connections between pedestrian access routes at the level of the sidewalk and the level of the pedestrian street crossing with a grade of 5 percent or less. Blended transitions are suitable for a range of sidewalk conditions.

NOTE: The City of Las Cruces currently does not provide guidance for a blended transition within its Technical Standards. An image from the City of Albuquerque's ADA Plan Update has been used as a reference for the purposes of this plan.

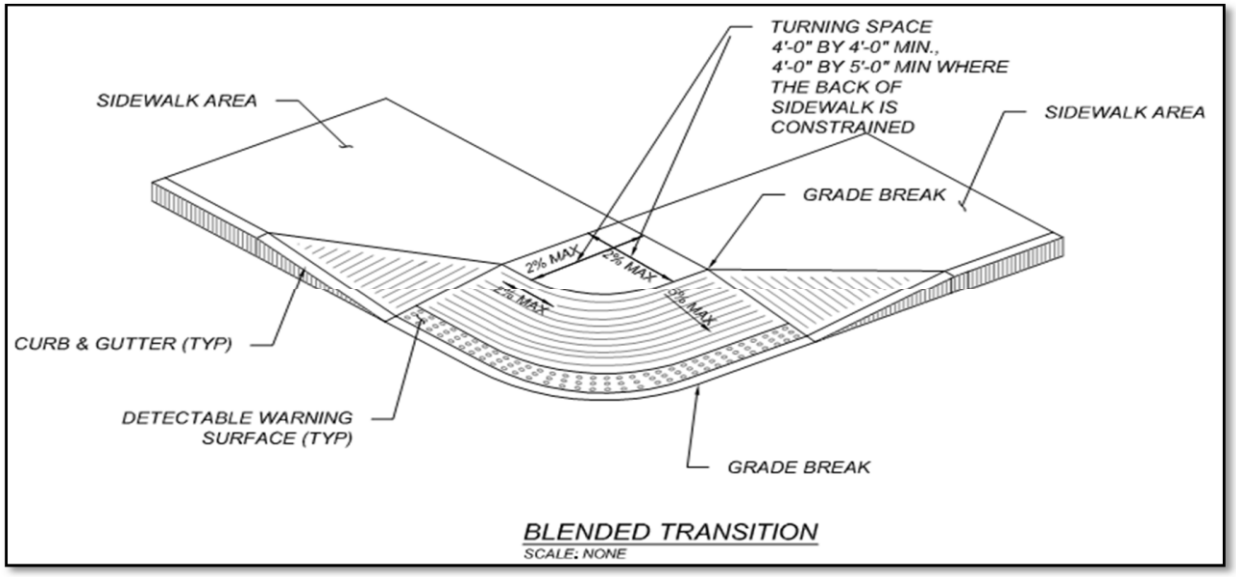

Figure 15: Blended Transition Detail [7]

[7] http://documents.cabq.gov/americans-with-disabilities-act/city-of-albuquerque-americans-with-disabilities-act-plan-update-draft-report.pdf

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