

D-42

Environmental Assessment
Reconstruct Monument Roads

CRATERS OF THE MOON

National Monument • Idaho

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June 1994

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PURPOSE AND NEED

The purpose and need for this federal action is to make a decision on reconstructing roads and some parking areas to meet safety standards in Craters of the Moon National Monument (NM). The National Park Service (NPS) proposed action is to reconstruct the roads and some associated parking areas in the monument. This action is needed because the roads are in poor condition and deteriorating and do not meet safety standards. Parking lot redesign is needed because they were not designed for the larger recreational vehicles (RVs) and busses now commonly found in the monument. These larger vehicles are forced to jockey and sometimes drive in the wrong direction to negotiate the parking areas causing serious safety problems.

BACKGROUND

The monument roads and parking areas were constructed and completed in 1958. The pavement cracked shortly after the asphalt was applied and the cracks have continued to expand. Although no major repair work has been implemented since the original construction was completed, some repair efforts have been conducted with minimal success. When constructed in 1958, there was essentially no large RV traffic in the monument and the roads were designed for a much smaller vehicle. Recreational vehicles are now common users of the roads and, because of narrow roadways and turning radii designed for smaller vehicles, RV users are experiencing problems. Additionally, visitation has grown considerably since 1958 placing more demands on the road system.

The 1982 Surface Transportation Assistance Act, Public Law 97-424, was enacted to address deteriorating road systems throughout the nation. The Federal Lands Highway Program (FLHP) was created by this law specifically to address roads on federally administered lands. This legislation enables the NPS to conduct a multi-year program of road improvements with funds to be obligated from the Highway Trust Fund.

In order to ensure the efficient expenditure of funds, FLHP requires advance planning. The NPS is systematically evaluating the roads in all areas under its jurisdiction. A 1991 Road System Evaluation (RSE) for Craters of the Moon NM constituted the advance planning for the monument road system. The purpose of the RSE was to inventory all existing public and administrative monument roads, evaluate the physical condition and operational characteristics of each road, and make improvement recommendations as warranted and consistent with approved planning direction and resource preservation.

INTERRELATIONSHIP WITH OTHER PLANS

The 1992 *Craters of the Moon National Monument General Management Plan and Environmental Assessment* (GMP) recognized the problems associated with the deteriorating monument road system and, partially based on the 1991 RSE, recommended improvements.

DESIGN GUIDELINES

It is not just the physical features of the monument roadways that make them important; the retention of the basic purpose and sensitive design philosophy of the earliest engineers are important features that should be considered. Despite minor changes in parking lot configurations, minor regrading to improve sight distance, and the use of modern building materials, the basic purpose and sensitive road design philosophy found in the monument must be preserved.

The reconstruction of monument roads, parking areas, pullouts, and associated facilities would be designed according to *National Park Service Road Standards*, 1984, and appropriate FHWA standards.

In conformance with applicable laws and regulations, specifically the Architectural Barriers Act of 1968 (P.L. 90-480), the Rehabilitation Act of 1973 (P.L. 93-112), and the 1984 Uniform Federal Accessibility Standards (UFAS), 49 CFR 31528, specific parking areas in parking lots, curb cuts, sidewalks, and all other facilities associated with this project would be handicap accessible.

Should the proposed action be selected, these guidelines would help provide direction for road reconstruction, and landscape and architectural design by identifying important features and recognizing precedence set by existing development.

ISSUES AND IMPACT TOPICS

ISSUES: Issues are problems or concerns that initiated the need for federal action. Issues and concerns affecting this plan were identified from past NPS planning efforts; in meetings with monument managers, Federal Highway planners, environmental groups, and input from other state and federal agencies. The major issues are:

- an inadequate and deteriorating road system including operational problems, maintenance, accidents and safety;
- natural resources: the proposed action with its associated construction activities could have various effects on natural resources such as soil, wildlife, vegetation, and air quality;
- visual and recreational values: the expansive views, kinds and varieties of lava and associated volcanic features, and quality recreation facilities are important visual and recreational resources;
- visitor safety: particularly with the larger RVs now common on monument roads, there are problems of inconsistent lane widths, precarious parking areas, and unsafe turnouts;
- effects of deteriorating roads on monument operations.

DERIVATION OF IMPACT TOPICS: Impact topics are the resources of concern that could be affected by the range of alternatives. Specific impact topics were developed for discussion focus to ensure that alternatives were compared on the basis of the most relevant topics. These impact topics were identified based on federal laws, regulations, and orders; NPS *Management Policies*, NPS knowledge of limited or easily impacted resources; and concerns expressed by the public or other agencies during planning for the 1992 GMP. A brief rationale for the selection of each impact topic is given below, as well as the rationale for dismissing specific topics from further consideration.

Biotic Communities: The 1969 National Environmental Policy Act (NEPA) calls for an examination of the impacts on the components of affected ecosystems. NPS policy is to protect the natural abundance and diversity of all the monument's naturally occurring communities. This impact topic addresses all impacted biotic communities.

Special Status Species (Threatened, Endangered, Candidate, and Rare Species): The 1973 Endangered Species Act requires an examination of impacts to all federally-listed threatened or endangered species. NPS policy requires examination of the impacts to state-listed threatened or endangered species and federal candidate species. There are no federal- or state-listed, proposed, or candidate threatened or endangered plants known to occur within the project area. There are several species of plants that occur close to the monument boundaries that are considered sensitive by the Natural Heritage Program of the Idaho Department of Fish and Game because of their rarity. Although the monument has not been surveyed for the presence of rare plants, it is very unlikely that any of the sensitive species occur close enough to the road corridor to be affected by any road work. A sensitive-plant survey would be made prior to any construction. Although there are no special status animal species that occur in the monument which would be affected by any road work, chipmunks and golden-mantled ground squirrels are protected nongame species in Idaho. A small number of individuals of these species could be affected by disturbance during construction but there would be no permanent adverse effects on populations as a whole.

The four to five acre contractor staging area (temporary offices, equipment and material storage, etc.) would be on private land, Bureau of Land Management (BLM) land, or a borrow site adjacent to the Arco airport which is owned by the City of Arco. If the contractor staging area would be on the private land or the Arco airport site, all clearances and permits would be the responsibility of the contractor or county or city.

The BLM site has been used for cinder mining and other activities. Although it is not anticipated that any special status species would be discovered, a survey for federal- and state-listed, proposed, candidate threatened or endangered plants and animals would take place prior to use of the site. If any such species are discovered at the site or if any such species would be affected by use of the site, the site would be eliminated from consideration.

It is anticipated that there would be no impact on any threatened or endangered species, or critical habitats in the monument or BLM staging area as the result of this project. Therefore, the topic of special status species was dismissed as an impact topic.

Scenic and Recreational Values: Conserving the scenery of national park units is a fundamental purpose of the 1916 National Park Service Organic Act. The 1924 authorizing legislation for Craters of the Moon NM specifically set aside areas to preserve their unusual intrinsic value or uniqueness or to protect features having inherently “weird and scenic” characteristics. Providing for visitor enjoyment is one of the fundamental purposes of the NPS according to the Organic Act. The 1990 *Craters of the Moon NM Statement for Management* established provisions for recreational uses by providing quality facilities for a more meaningful visitor experience.

There is some bicycle use on monument roads and there are occasional conflicts between bicyclists and vehicles, especially the larger RVs. Although there would continue to be occasional conflicts between bicycles and larger vehicles, the current 14-foot-wide roadway does provide adequate width to accommodate both types of vehicles. Moreover, to increase the road width to develop bicycle dedicated lanes would result in unacceptable environmental consequences. Therefore, the topic of increased road width to accommodate bicycle use was dismissed as an impact topic.

Floodplains/Wetlands: Executive Orders 11988 and 11990 require an examination of impacts to floodplains and wetlands; of potential risk involved in placing facilities within floodplains, and protecting wetlands. The 1988 NPS *Management Policies*, 1982 NPS-2 (*Planning Process Guidelines*), and 1982 NPS-12 (*NEPA Guideline*) provide direction on developments proposed in floodplains and wetlands. There are no floodplains within the project area and no jurisdictional wetlands would be disturbed as the result of the proposed alternative. Therefore, the topic of floodplains and wetlands was dismissed as an impact topic.

Air Quality: The 1955 Clean Air Act requires federal land managers to protect park and monument air quality, while the NPS *Management Policies* address the need to analyze air quality during park and monument planning. The Craters of the Moon Wilderness is a Class I area. In Class I areas, even a minimal change in air quality is considered significant. The portion of the monument that is not designated wilderness is designated as a Class II air quality area. Class II areas can have changes in air quality if these changes are the result of moderate, well-controlled growth.

Cultural Resources: The 1966 National Historic Preservation Act (16 USC 470 et seq.), NEPA, NPS Organic Act, NPS *Management Policies*, NPS-2, and NPS-28 (*Cultural Resource Management*) guidelines require the consideration of impacts on cultural resources. An archeological survey of the project area was conducted in June 1992. No resources were discovered within the project area, including the construction zone. A potential contractor staging area would be on BLM land about one mile east of the monument off Blizzard Mountain Road. This four to five acre site has been used for cinder mining and other activities. Although it is not anticipated that any cultural resources would be discovered, a cultural resource survey would take place prior to use of the site. If any resources are discovered at the site, appropriate mitigation would take place or the site would be eliminated from consideration.

It is anticipated there would be no impact on any cultural resources in the monument or staging area as the result of this project. Therefore, the topic of cultural (archeological and historic) resources was dismissed as an impact topic. However, there is potential for some disturbances to unknown archeological resources in connection with reconstruction actions. Should archeological resources be uncovered during construction, work will be stopped in the area of the find and the NPS would consult according to 36 CFR 800.11 and, as appropriate, provisions of the Native American Grave Protection and Repatriation Act of 1990.

Monument Operations: The roads are inadequate, in poor condition, and some portions are unsafe. Failure to take action now could result in closing some parts of the road system and monument. This would inconvenience visitors and disrupt monument operations.

ALTERNATIVES

No Action: This no action alternative would not improve the road condition, parking areas, sight distances, or create new pullouts. Current maintenance operations would continue, including routine road surface repair, as it is within the capabilities of the monuments' maintenance staff to perform. Although routine patching, applying chip-seal, ditch clearing, striping, and signing activities would continue, the overall condition of the road would not be improved and physical deterioration would continue. There would be no safety improvements or improvements to turnouts or parking areas.

Proposed Action (Preferred Alternative): This is the NPS preferred alternative. A principal objective of this project would be to meet safety standards while maintaining the non-intrusive and high aesthetic quality of the existing roads; all new work would be done in a manner similar to what now exists. Principal monument roads would be reconstructed on the existing horizontal and vertical alignments. The typical section would be two 11-foot travel lanes with 10-inch-wide curbs (Fig. 1). The one-lane section of the Loop Road would not be widened beyond existing width. Several of the larger parking lots would be completely redesigned and reconstructed, but the new work would be designed to blend with the old. Some portions of the spur roads to the parking areas would need minor realignment to accommodate the changes needed in the parking lots. The present pavement on the roads would be milled and recycled into the existing base; the pavement would not be widened. A new lift of polymerized hot asphaltic concrete (hot mix) would be placed on top of the base. New asphalt curbs would be constructed to replace those destroyed by the milling operation. Additional curbing may be constructed where needed to control traffic or runoff, or prevent vehicles from leaving the pavement so as to protect resources. All curbing would be back-filled to 4 inches below the top of the curb with cinders of a similar color as now exists. Special attention would be given to developing a mix design that is resistant to damage from thermally induced deformations. In some areas, additional crushed aggregate base material may need to be added to the cinder and recycled asphalt to provide extra strength.

The parking lots at the visitor center (Fig. 2), Inferno Cone (Fig. 3), Spatter Cones (Fig. 4), Tree Molds (Fig. 5), Big Sink (Fig. 6), Caves (Fig. 7), and Devil's Orchard (Fig. 8) would be redesigned, slightly expanded, and reconstructed to better accommodate RVs and other vehicles. The new lots would be designed to comply with current handicap access standards. Where necessary, sidewalks throughout the project area would be replaced using colored concrete to better match the background environment. Concrete surfaces (i.e., sidewalks) would be sealed.

The North Crater parking lots would be repaved, but not redesigned. Curbs and sidewalks would be repaired or replaced as needed. The small barrier island between the main road and Old Man parking area would be removed to ease vehicle congestion. The entrances to the west parking lot at the visitor center would be redesigned to form a better "T" intersection. The east parking lot would be redesigned to better accommodate RVs. This may include eliminating the island between the lot and the entrance road.

On Loop Road (Road 500) three new pulloffs would be developed at stations 163+20, 185+25, and 208+25 (Figs. 9, 10, 11, and 12). These pulloffs would be approximately 150 feet long, 12 feet wide, with 50 foot tapers. Loop Road is a one lane, one way road. Because of the impressive views in this area, the road is frequently blocked by visitors who park in the road while taking time to view the resource. These new pulloffs would provide parking areas for viewing the extensive lava flows, spectacular spring wildflower displays, and wildlife while allowing continuous traffic flow.

Near the North Crater parking area, from station 28+80 to 37+20, the curves would be slightly widened to improve sight distance. Some portions of the widening would take place slightly outside the present road bench (Fig. 13).

Monument information and traffic control signs would be evaluated and new signs added and old signs replaced as required. Interpretive displays would also be evaluated for replacement or relocation.

The FHWA would apply for and secure a National Pollution Discharge Elimination System (NPDES) permit is one is required.

This proposal is entirely consistent with the 1991 RSE and the 1992 GMP.

Construction Schedule and Costs: Construction would occur over an approximate six month time, roughly from April 1995 to September 1995, but this could change depending on weather conditions or funding. Revegetation would occur as construction is completed.

The cost of this project is estimated to be between \$2-3 million.

Mitigation

Mitigation measures are analyzed as part of the proposed action. These actions have been developed to lessen the adverse effects of the proposed action.

Visual Resources: Road design would emphasize visual quality while minimizing impacts to resources. Road improvements would be limited wherever possible to the minimum corridor necessary for a safe driving experience. Designs and colors of construction materials would blend with the surroundings. New parking lot designs would stay within the existing footprints as much as possible and maintain elements of the old designs such as curbs and sidewalks where feasible. Exposed culvert ends and flared end sections would be black asphalt coated to match cinders and reduce visibility; all new road and parking lot pavement would be black to match the black color of all existing pavement and the surrounding black lava. Appropriate fill slopes would be covered to a depth of 8 to 10 inches with cinders matching as closely as possible the native material; material for shoulder fill would be from material obtained from roadbed excavation. There are no borrow areas in the monument.

Existing concrete curbing would be preserved wherever possible. In areas where rock removal would be necessary in order to realign the roadbed, the rock would be removed with controlled blasting. Apparent residual drill hole scars would be removed.

Natural Resources: No known lava tube caves would be affected during road reconstruction. However, should road reconstruction activities reveal or open any lava tube caves, work would be halted in the discovery area and, in consultation with monument staff, the opening would be evaluated according to the 1988 Federal Caves Protection Act.

Whenever possible, regrading to improve sight distance would be confined to one side with the center line shifting accordingly to minimize impacts to natural features, or large cut and fill slopes along the roadside. Center line shifts would be dependent on existing geometry and would comply with standard safety design principles.

Minor short-term impacts to local water quality may occur during construction; however, erosion control measures would be implemented to minimize this impact. Sediment traps, erosion checks, and/or filters would be constructed preceding or following all culvert drains (if such drains are required) and in all other ditches before the water (runoff) leaves the project construction limits.

Temporary impacts associated with construction would occur, such as soil and vegetation disturbance and the possibility of soil erosion. In an effort to avoid introduction of exotic plant species, no imported topsoil or hay bales would be used. Traditional soil erosion control practices of jute matting or hydroseeding would not be used in the monument vegetation communities because of the large areas of cinders and sparse vegetation. An overabundance of vegetation resulting from jute or hydroseeding/mulch would be inappropriate. Standard erosion control measures such as silt fences and sand bags would be used to minimize any potential soil erosion.

Revegetation plantings would use native species from genetic stocks originating in the monument. An interagency agreement with the US Soil Conservation Service (SCS) Plant Materials Center in Aberdeen, Idaho, has been in effect since the spring of 1992. The SCS is working with the monument to collect seed and to produce container plants for revegetation. The species list includes antelope bitterbrush (*Purshia tridentata*), rabbitbrush (*Chrysothamnus nauseosus*), dwarf buckwheat (*Eriogonum ovalifolium* var. *depressum*), sulfur flower buckwheat (*Eriogonum umbellatum*), scorpionweed (*Phacelia hastata*), monkeyflower (*Mimulus* spp.), sagebrush (*Artemisia* spp.) and needlegrass (*Stipa* spp.). These early and midsuccessional species were selected for their ability to colonize disturbed sites. Revegetation efforts would be to reconstruct the natural spacing, abundance, and diversity of native plant species.

In most areas soils and vegetation are already impacted to a degree by existing facilities and human activity. Construction would take advantage of these previously disturbed areas wherever possible. Soils within the project construction limits would be compacted and trampled by the presence of construction equipment and workers. Soils would be susceptible to erosion until revegetation takes place.

Vegetation impacts and potential compaction and erosion of bare soils would be minimized by conserving topsoil in windrows, replacement of topsoil in as near as original location as possible, scarification, mulching, and seeding and/or planting with species native to the immediate area. This would reduce construction scars and erosion.

Any fill material needed beyond that produced from construction activities would be taken from monument approved sources outside the monument.

Removal of trees would be avoided in the roadway corridor and few trees (limber pine [*Pinus flexilis*]) would be removed for parking lot redesign. Affected limber pines would be removed and transplanted with a tree spade for revegetation in other areas, particularly around the visitor center, which is currently being relandscaped. All disturbed areas would be restored as nearly as possible to natural conditions shortly after construction.

Some petrochemicals from construction equipment could seep into the soil. To minimize the amount of petrochemicals seeping into the soil from construction equipment, the equipment would be checked frequently to identify and repair any leaks.

Fugitive dust plumes from construction equipment would intermittently increase airborne particulates in the area near the project site, but loading rates are expected to be low. To partially mitigate these effects, such activity would be coupled with water sprinkling to reduce dust.

Areas for truck and equipment storage and turnarounds in the monument would take advantage of previously disturbed areas and road reconstruction alignments. A potential contractor staging area would be on BLM land about one mile east of the monument off Blizzard Mountain Road. This site has been used for cinder mining and other activities. Although some leveling of the site may be necessary for contractor use, the site would be restored to original contours and revegetated once the project is complete.

All construction materials would be provided by the contractor from sources outside the monument. The batch plants for mixing asphalt concrete and portland cement concrete would also be located outside the monument at the airport borrow pit at the town of Arco, approximately 17 miles east of the monument. Any waste material would be disposed of outside the monument.

Construction workers and supervisors would be informed about the special sensitivity of monument values, regulations, and appropriate housekeeping.

Cultural Resources: There are no known archeological resources within the project area. Should unknown resources be uncovered during construction, work would be stopped in the discovery area and the NPS would consult according to 36 CFR 800.11 and, as appropriate, provisions of the Native American Graves Protection and Repatriation Act of 1990.

All construction employees would receive instruction in regard to the special sensitivity of cultural resources and actions appropriate if cultural resources are encountered.

Alternatives Considered but Dismissed: Several alternatives were considered in the planning process but dismissed because of previous policy decisions, unacceptable environmental or visitor use impacts, or funding constraints. These alternatives included the following:

- eliminate private vehicle traffic on monument roads through the establishment of some type of visitor transportation system

- restricting larger vehicles on monument roads

A public transportation (shuttle) system, either limited to the primary road system or the entire monument road network, was considered. This possibility is important because, with a shuttle, there would be a reduction in total vehicular traffic but an increasing use of bus-sized multipassenger vehicles. Despite the attractive feature of reducing total vehicular use, an extensive shuttle system was not considered viable because of its extremely high cost, and substantial impacts associated with providing concentrated visitor parking facilities at shuttle terminals. If cost factors became more favorable, a shuttle idea could again be considered.

Restricting larger vehicles from monument roads was considered. A large number of visitors arrive at and enter the monument in RVs or commercial tour busses and this use is increasing. Since there is no public transportation access into the monument, if these RVs and busses were restricted from monument roads the visitors would be denied the opportunity to access the monument and experience the resource. Therefore, this alternative was dismissed.

SUMMARY OF ENVIRONMENTAL CONSEQUENCES

Impacts To:	No Action Alternative	Proposed Action (Preferred Alternative)
Natural Resources	Limited to those associated with routine maintenance and minor repairs. Impacts from road failure could occur; drainage problems and other structural deficiencies would not be corrected under this alternative.	Limited in scope and most would occur in previously disturbed areas - less than 2 acres would be affected. Impacts to air and water quality would be short-term and localized. Areas affected by construction activities would be restored and revegetated.
Safety	The roadway would continue to be unsafe due to sharp curves for larger vehicles, lack of recovery area, poorly designed parking areas and, given the deteriorating physical condition of the road, accidents would be expected to continue.	Visitors would benefit from a safer road system. Road improvements would meet safety standards.
Scenic and Recreational Values	No effect on scenic values. Some visitors would continue to be frustrated by the fact that the road would not efficiently accommodate existing and predicted traffic volumes and all vehicle types.	Scenic values would not be appreciably affected. Recreational values enhanced due to improved roadway and parking facilities.
Visitor Use and Monument Operations	Would not appreciably extend the life of the roadway. Increased maintenance costs beyond the present \$4,000 per year as the road continues to deteriorate.	Over the short term, visitors would be inconvenienced by noise, dust, fumes, reconstruction vehicle movement, and traffic delays associated with road work, which would be expected to last an entire summer. Some visitors would be dissatisfied because specific features or visitor areas would be closed. Reconstruction-related delays and road closures advertized through the media could result in overall reduced visitation for the year in which reconstruction would occur. Actions would be taken to minimize nighttime, weekend, and holiday disruption to visitors and monument residents. Over the long term, the visitor experience would be positive, benefitting from a safer, more convenient road system that would contribute towards an enriched visitor experience. Although various portions of the road system would be closed during reconstruction activity, access would be provided immediately to any emergency vehicles.

EXISTING CONDITIONS

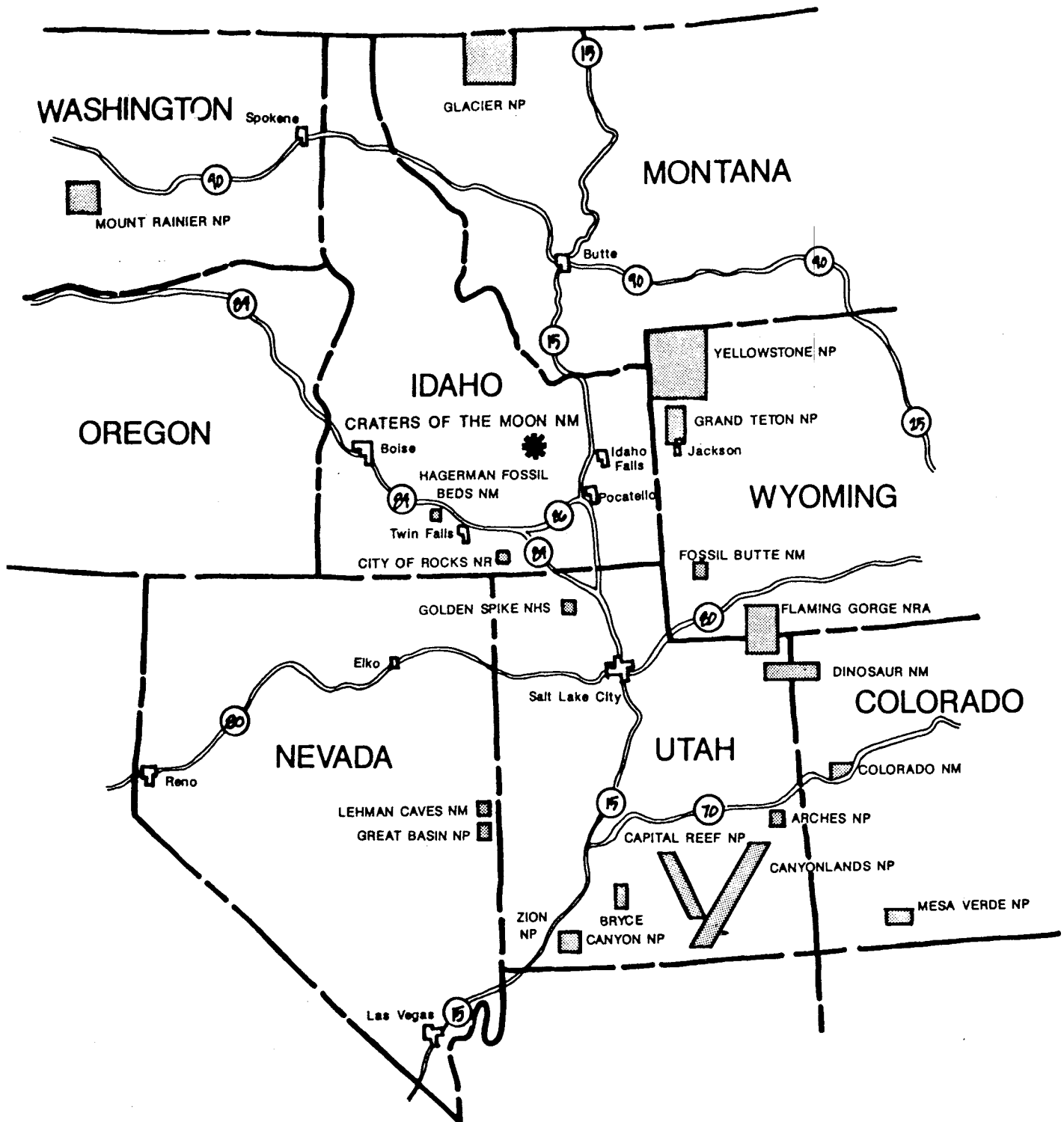
Location, Access, and Visitor Use: Craters of the Moon NM is in Butte and Blaine Counties in south central Idaho, 18 miles southwest of Arco (Location Map). The monument consists of approximately 54,000 acres on the northern margin of the Snake River plain. The monument is noted for the quantity and diversity of volcanic features it contains. These include some of the most recent lava flows in the continental United States.

Vehicle access is via US Routes 20/26/93 which pass through the northwest corner of the monument and are a popular tourist route connecting the Sun Valley and Yellowstone areas. Access via the closest interstate highways is I-84 from the west to US 93 at Twin Falls (91 miles to the monument); I-15 from the south at Pocatello to US 26 at Blackfoot (98 miles from Pocatello to the monument); or I-15 from the east to US 20 at Idaho Falls (85 miles to the monument). The closest major town to the north is Missoula, Montana, on I-90, approximately 300 miles from the monument.

The potential contractor staging areas are a borrow pit near the Arco airport, private land, and BLM land. The Arco airport is about 17 miles east of the monument. From the monument, Arco is accessed by US Routes 20/26/93. The private land and BLM sites are about one mile east of the monument and are also accessed by US Routes 20/26/93. Both the private land and BLM sites are accessed off Blizzard Mountain Road, which is a county road owned and maintained by Butte County. Blizzard Mountain Road is an access route for ranches, BLM grazing allotments, and the Champagne Mine. Blizzard Mountain Road swings north and reenters US Routes 20/26/93 about eight miles west of Arco.

Access roads to the monument from the west, south, and east traverse relatively level open sagebrush-grassland interspersed with lava flows from at least as far as the interstate highways. From the north, the terrain is more rolling, with the closest mountains being some 50 miles from the monument. All these access roads can be considered high speed thoroughfares.

Visitation in 1993 was about 238,508 people which represents about 79,503 vehicles (Table 1 and Graph 1). The majority of the visitor experience is day-use activities along monument roads. The entrance station is just south of the visitor center at the intersection with the campground loop road. Most people stop at the visitor center near the monument entrance, drive the loop road, stop at pullouts and parking areas where there are interpretive exhibits, walk some of the interpretive trails, and then leave the monument. A 52-unit campground and a group camping area are full most of the summer; but, other than this, there is very little overnight use. Due to the scarcity of water and rugged topography, the backcountry is seldom used. The typical visitor spends approximately 2.5 hours in the monument.



Location

Craters of the Moon

National Monument

United States Department of the Interior - National Park Service
DSC/Dec'90/131/20011



Table 1
Visitation at Craters of the Moon NM
1980 - 1993¹

YEAR	VISITORS	VEHICLES ²
1980	162,500	54,167
1981	236,500	78,834
1982	294,400	98,134
1983	273,700	79,233
1984	220,800	73,600
1985	172,500	57,500
1986	178,300	59,433
1987	202,800	67,600
1988	217,000	72,333
1989	189,000	63,000
1990	207,800	69,267
1991	217,879	83,333
1992	244,806	81,602
1993	238,508	79,503

¹ Source: NPS Park Statistical Abstracts for 1983, 1985, 1988, & 1989, 1992, and monument records.

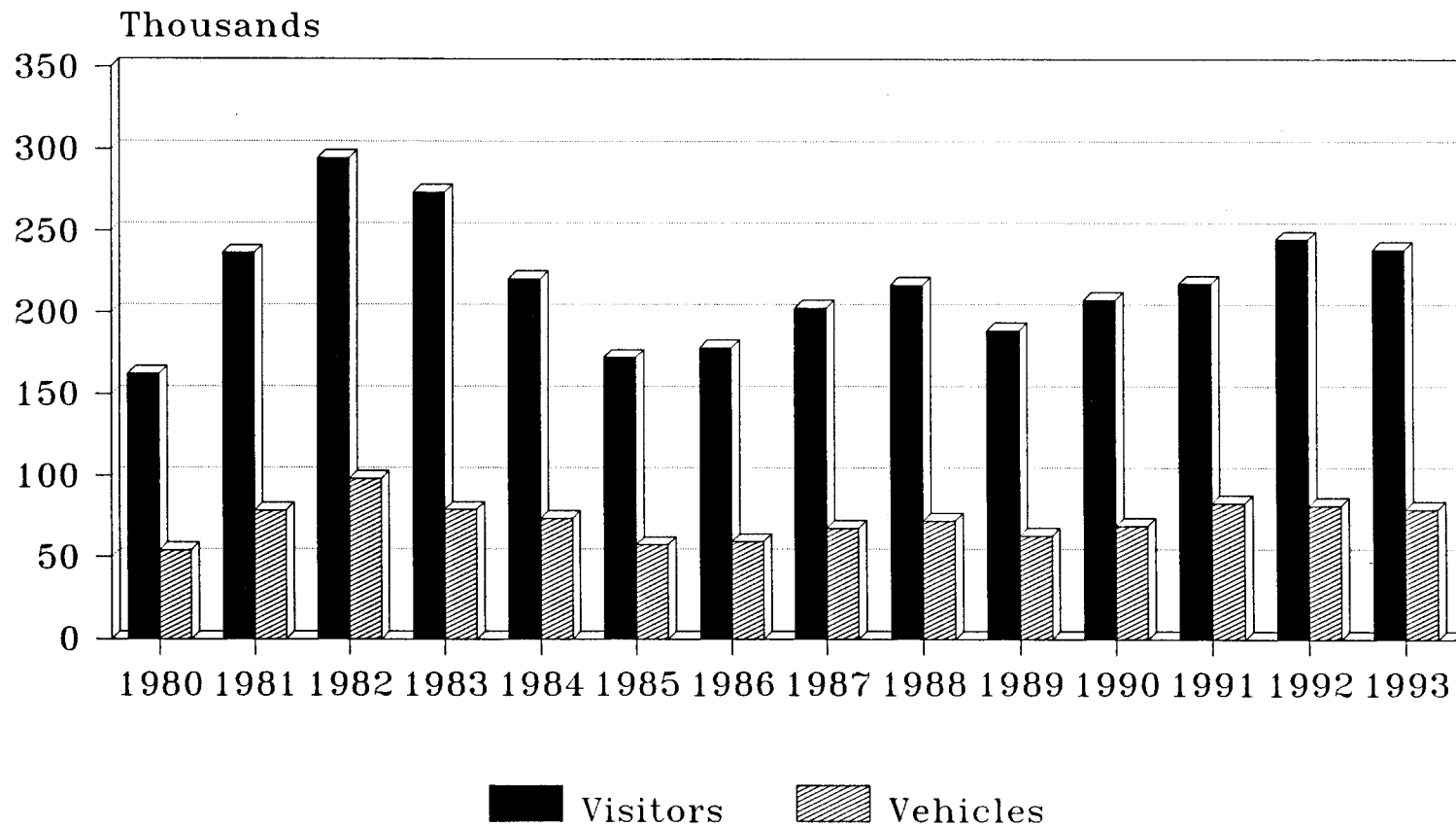
² Assuming an average of 3 persons per vehicle.

Monument Road Character/Architectural Details: The monument roads and parking areas were constructed in 1958 as part of the NPS Mission 66 program. In 1966, some new construction took place on Broken Top spur and some resurfacing was done to correct pavement cracking. For the most part, the road system was very well designed. The alignment hugs the landscape and creates very little visual intrusion. The road was designed so little cut or fill was needed. The loop portion of the road has one-way circulation, which allows visitors to concentrate on the scenery and not be distracted by on-coming traffic. Most of the parking areas are on spurs off the main loop road. Two-way traffic is maintained on the spur roads and the monument entrance road. The circulation system within the monument is relatively straightforward (Fig. 14).

Route 10, the Entrance Road, begins at US 93 and continues about 2 miles to the beginning of Route 500. Route 10 is a two lane road with two way traffic. Within the first mile are the visitor center, maintenance areas, residential area (Route 400), fee station, and campground (Route 200). All have parking areas and/or spur roads adjacent to or emanating from Route 10. Past the campground, several turnouts and parking areas are adjacent to the road. Route 100,

Craters of the Moon NM

Visitation 1980 – 1993



Graph 1

Devils Orchard Road, is a two lane/two way spur road from Route 10. Route 500 is a one lane/one way traffic loop road from which most of the monument's attractions are accessible. Route 500 also has turnouts and parking areas adjacent to it. The Tree Molds, Spatter Cone, and Caves Roads (Routes 101, 102 and 103 respectively) are two lane/two way spur roads from Route 500.

The monument road alignments are examples of what the NPS strives to achieve in road design. The curvilinear alignments continually change the views afforded the motorist; these changing views heighten the appreciation of important monument resources. The road follows the contours of the land without becoming an intrusion into the scene. Scars from cuts and fills are kept to a minimum. Slopes are gently rounded into the natural terrain. The roads adequately provide access to all the major features in the monument.

The black asphalt blends into the monument's environment because it matches the dark lava substrate. The asphalt curbing provides a neat yet non-disruptive delineation of the road. It also helps to prevent visitors from driving off the road which creates environmental damage and distracting tire scars.

There are currently few consistently used architectural themes at the monument for buildings or road details. The visitor center and administrative area feature Mission 66 building architecture. The dominant building material is earth-tone bricks or cinder blocks. The most recent addition to the monument, the campground amphitheater, uses wooden shingles.

Tan colored concrete is used in sidewalks around the visitor center and at turnouts. An attempt was made to use a darker colored concrete on the amphitheater sidewalk but the color lightened substantially in the intense sun; the amphitheater trail was restained in 1993. At Devil's Orchard, a recently developed interpretive trail was constructed with a darker colored concrete which more successfully blended with the natural environment. Sign posts and sign backs throughout the monument have all been painted black to reduce visibility from a distance.

Physical Condition of Roads: The paved roads are generally in poor to fair condition and exhibit extensive transverse cracking. The pavement cracked shortly after the asphalt was applied in 1958 and the cracks have continued to grow. These cracks are probably the result of the road originally being built on compacted cinder material with no aggregate base. When the cinder material crushes under the weight of traffic, the expansion and contraction of the pavement caused by extreme temperature variations cause transverse cracks to form every 50 to 100 feet. The cracks traverse the full width of the pavement and reflect through the curbing, where present. Because the pavement is more than 35 years old, it is dry and brittle and cracks are becoming more frequent.

No major repair work has been implemented since the original construction was completed. The monument has tried several crack filling and repair schemes over the years with limited success. Traditional methods of crack sealing with liquid sealant are useless as the sealant simply disappears in the porous cinders under the road. Several fabric materials have been used over the cracks with limited success.

Today, almost all the roads and parking areas contain very large and extensive cracks, some as much as 1 to 2 inches wide and 6 to 8 inches deep. The cracks in the roadway are generally transverse, similar to evenly spaced expansion joints. The cracks in the parking areas exhibit a more irregular pattern, but are still large singular cracks rather than groups of cracks as in alligator cracking.

Since there is no vertical displacement of the pavement at the cracks and no evidence of alligator cracking, it is believed that no major base failure has occurred. However, as more water seeps under the pavement through the cracks, deterioration of the base will occur and the road will fail.

The major roads in the monument have 6-inch-high bituminous asphalt curbs, often on both sides of the road. The curbs provide an important drainage function. In several places erosion is occurring around outlets, primarily because too much water is concentrated in one place. More outlets and/or drop inlets throughout the road system would reduce this problem. This would also remove excess water from the roadway which would otherwise drain through the cracks.

Operational Problems: In general, the curves are too narrow to accommodate large vehicles throughout the entire road system. Curve widening is the addition of width to the travel lanes in the curve with transitions back to the original lane width. During a recent field review, a tour bus was video taped as it drove through the monument providing documentation of which curves would need widening to keep the bus in its own lane. This problem is specific to large vehicles; passenger vehicles have no trouble staying in their lane.

Large vehicles also have trouble in all the parking areas. These parking areas were not designed with sufficient turning radii or circulation patterns to accommodate large vehicles. Many of the parking areas lack designated parking spaces for large vehicles.

The curbs, particularly when present on both sides of the road, prevent vehicles from randomly pulling off the roadway. This has a positive effect of reducing resource damage and potential damage to vehicles. However, there are only a few turnouts throughout the monument and opportunities to pull off are limited. Consequently, visitors frequently stop in the road, primarily on the one lane loop road, and block traffic.

There are also several operational problems specific to individual roads and parking areas. The major problems are congestion and confusion on Route 10 in front of the visitor center and the 18 percent grade at Big Sink viewing area on Route 500. The problem on Route 10 is a classic example of too much happening in a limited area combined with a backwards (left turns required) circulation pattern. The problem on Route 500 is the 18 percent (signed for 10 percent) downhill grade. This steep grade tends to intimidate drivers not accustomed to mountain driving. At the top of the grade, some drivers stop, lose their nerve, and attempt to back up seeking to return to the main road.

Maintenance: About \$4,000 (1993 dollars) is spent annually on general road maintenance. Monument staff performs routine maintenance on all the monument roads. Maintenance includes clearing ditches and drainages, and patching of cracks and small pot holes. The State of Idaho performs snow removal on US 20/26/93.

In winter, all roads are closed past the campground and groomed for cross country skiing. Snow removal to clear the road of drifts is required for seasonal opening. There is a need for snow pole sleeves along the monument roads and in the parking areas to reduce damage caused by snow removal equipment.

Accidents/Safety: Monument records indicate that there have been four motor vehicle accidents reported since 1988. Three occurred in parking areas (visitor center and the Caves parking areas). The fourth vehicle accident was a run-off-the-road accident in the S-curves on the Tree Mold spur road.

There have been two serious bicycle accidents, neither of which involved a motor vehicle. These accidents occurred at the bottom of the steep Big Sink viewing area downgrade and resulted in one fatality and one serious injury.

Natural Resources: The following discussion highlights elements that could influence roads and road design and are specific to this project. A more complete description of the natural and cultural environment of the monument can be found in the 1992 GMP.

Craters of the Moon NM preserves features of very recent volcanic activity. The monument includes a portion of the Great Rift, a weak zone in the earth's crust that cracked open and allowed basaltic lava to pour out. The monument contains volcanic features from one of four smaller rift zones that together make up the Great Rift. The monument contains in a small area almost all the different types of volcanic features possible in basalt flows.

The monument and other parts of the Great Rift are most significant because of the young age of the lava flows. There were eight fairly recent successive eruptive periods in the area that is now Craters of the Moon NM, the oldest beginning about 15,000 years ago and the most recent occurring about 2,000 years ago.

The northern portion of the monument is comprised of about 4,000 acres of Pioneer Mountain foothills. This area is predominantly sagebrush grassland with occasional patches of various trees where conditions permit. These foothills contain the only reliable surface water source in the monument, Little Cottonwood Creek, which disappears into the lava before reaching the highway. Except for isolated water holes in the lava flows, there are no other water sources in the monument.

The monument receives about 17 inches of annual precipitation at the headquarters. Most precipitation occurs as snow in December and January. Snow first falls in November and generally remains until at least April. The prevailing southwesterly winds cause the snow to

drift. Drifts can be as high as 15 feet in places and can persist well into May. July and August are the driest months. The monthly average maximum temperatures range from 28.9°F to 83.7°F. Freezing temperatures can occur in any month.

The portion of the monument that is not designated wilderness is designated as a Class II air quality area. The Craters of the Moon Wilderness is a Class I area. In Class I areas, even a minimal change in air quality is considered significant, while Class II areas can have changes in air quality if these changes are the result of moderate, well-controlled growth.

Visibility is one of the most important resources at the monument. The monument is used by the Environmental Protection Agency as a baseline reference for total suspended particulates, a measure of visual quality.

There have been no soil surveys for those portions of the monument reached by road. Soils are primarily windblown loess or have developed from the underlying basalt. The majority of the monument is covered by lava flows which are so new that little soil has formed.

There are three basic types of volcanic material over which the road passes — pahoehoe lava, aa lava, and cinders. Pahoehoe lava has a relatively smooth surface and occurs as sheets, rope-like wrinkles, pleats, and folds. Aa lava flows have rough, jagged surfaces, and may occur as separate chunks. Cinders are small, vesicular pieces of lava that were ejected from vents and had fallen back into a pile. Cinders may occur as cones, or on slopes or in relatively level fields.

Lava tubes are a significant component of the monument's resources. The caves are notable for their relatively young geologic age, excellent preservation of volcanic features and mineral deposits; as well as being an important source of water and shelter for area wildlife. The monument was established, in part, to help facilitate visitor use, scientific study, and preservation of these sensitive cave resources. At present, there are more than 70 inventoried lava cave tubes within monument boundaries.

The following description of monument vegetation concentrates on those types associated with the roads. The vegetation of the north end is briefly mentioned because it can be seen from monument roads. No road improvements are proposed for the north part of the monument.

The density of vegetation at the monument depends on the density of soil. Because the local volcanic activity is relatively recent, there are large areas of sparse or no vegetation cover because little or no soil has formed. In the newer lavas, vegetation occurs only where soil has blown into cracks and crevices. Cinder cones and cinder fields support a different type of vegetation than do the lavas. Cinder gardens are considered a distinct vegetation type. The gardens support a plant community that in its early successional stages produces a spectacular wildflower display. Typical wildflower species are dwarf buckwheat (*Eriogonum ovalifolium* var. *depressum*), silverleaf phacelia (*Phacelia hastata*), Douglas chaenactis (*Chaenactis douglasii*), monkeyflower (*Mimulus* spp.), dwarf onion (*Allium simillimum*), and bitterroot

Lewisia (*Lewisia redivia*). A shrub community dominated by antelope bitterbrush (*Purshia tridentata*) grows on cinder cones where soil develops. Where there is sufficient moisture, such as on north-facing slopes, limber pine occurs with the antelope bitterbrush. Where there has been enough time for soil to develop over the lavas, the dominant vegetation is shrubs (usually sagebrush [*Artemisia* spp.] and bitterbrush) and bunchgrasses, a combination termed "shrubsteppe." Rabbitbrush (*Chrysothamnus* spp.) is a common shrub that lines the roadway in places where there is sufficient soil. Typical grasses that grow in various locations according to soil depth and available moisture include bluebunch wheatgrass (*Agropyron spicatum*), Sandberg bluegrass (*Poa secunda*), needle-and-thread (*Stipa comata*), squirreltail (*Sitanion hystrix*), Indian ricegrass (*Oryzopsis hymenoides*), and Idaho fescue (*Festuca idahoensis*). The vegetation of the north end of the monument is dominated by shrubsteppe elements. There are patches of riparian vegetation and trees where conditions permit. Trees include Douglas-fir (*Pseudotsuga menziesii*) and quaking aspen (*Populus tremuloides*). Riparian areas support black cottonwood (*Populus trichocarpa*), willow (*Salix* spp.), and mountain alder (*Alnus incana*), with a dense layer of tall forbs.

The most commonly seen animals are horned lizards, mourning doves, sage grouse, killdeer, magpies, ravens, Clark's nutcrackers, common nighthawks, mountain bluebirds, great horned owls, golden eagles, bats, rabbits, chipmunks, ground squirrels, pocket gophers, pack rats, coyotes, mule deer, and pronghorn antelope.

Mule deer are resident in the monument from April to November. In the hot, dry summer, the deer are generally found in the cooler north end of the monument. About three percent of the herd is killed annually by vehicles. Most of those kills occurred during late summer when the deer in the north end would cross the highway to forage on the visitor center lawns and to drink from the sprinkler overflows. This is one of the reasons the visitor center lawns were removed in 1993; the visitor center area is currently being relandscaped.

The four to five acre potential contractor staging area on BLM land off Blizzard Mountain Road has been intensively used as a cinder mining source and has received much vehicle use. The site is cinder covered lava which supports sagebrush and grasses. Due to its use, however, much of the area is devoid of vegetation.

Cultural Resources: Archeology — Although there is evidence of human occupation dating back 10,000 years in the vicinity of what is now the monument, occupation of the monument area itself has been sparse; the area was inhabited only seasonally, during spring and summer. Five types of sites have been recorded within the monument: open sites, cave sites, rock structures, hunting blinds, and quarry sites. The larger open sites were probably camp sites. All the presumed camp sites are located on the northwestern sides of prominent geological features and thus sheltered from the prevailing winds. All are located near large lava sinks, which could have held water, or near intermittent streams. The distribution of sites, with larger sites in the northwestern section, is explained by easier travel in the foothills than over the lava flows, and by more plentiful game and water to the north. Sites become smaller, fewer, and more scattered as one proceeds south into the lava flows.

History — The Northern Shoshone and Bannock inhabited the area prior to the arrival of the first Europeans, fur trappers and traders, in the early 1800s. Beginning in the 1840s, Oregon-bound emigrants used Big Southern Butte, east of the monument, as a landmark. The emigrants avoided the lava fields by traveling around them to the south. Perceived hostilities with the Indians in the 1860s forced the emigrants to use Goodale's Cutoff to the north to skirt the lava. The Cutoff was used as a stage road until 1906. No physical evidence of the original cutoff remains in the monument boundaries. However, existing service roads roughly follow the alignment of the Cutoff.

Gold mining, a livestock industry, and farming developed around what is now the monument in the latter 1800s but very few people, including the Native Americans, ever ventured into the lava flows. Robert Limbert and a companion, W. L. Cole, explored what is now part of the monument in 1920. Limbert's photographs and description of a fantastic world of shapes, textures, and colors was instrumental in the establishment of Craters of the Moon NM.

ENVIRONMENTAL CONSEQUENCES

This section presents the environmental consequences of the alternatives and mitigation measures. This discussion provides the scientific and analytic basis for comparison of the alternatives.

No Action Alternative

Impacts on natural resources under the no action alternative would be limited to those associated with routine maintenance and minor repairs. Adverse impacts would occur only if drastic road failure occurred, which is possible because drainage problems and other structural deficiencies are not being corrected under this alternative. From a variety of engineering viewpoints such as poor turning radii (sharp curves) for larger vehicles, lack of recovery area, and poorly designed parking areas, the roadway would continue to be unsafe. No safety improvements would be made and, given the deteriorating physical condition of the road, accidents would be expected to continue. Although routine maintenance would continue, this alternative would not appreciably extend the life of the road, and the road would eventually deteriorate beyond the capabilities of monument maintenance staff to repair. Structural and drainage problems would continue to a point where major corrective action would be necessary. Some visitors would continue to be frustrated by the fact that the road would not efficiently accommodate existing and predicted traffic volumes and all vehicle types. No provisions would be made to improve turnouts and parking areas. Although funds would be saved with no reconstruction, this eventually would be negated by increased maintenance costs beyond the current annual \$4,000 spent on road repairs as the road continues to deteriorate.

Proposed Action (Preferred Alternative)

Natural Resources: The total area effected by the proposal is about 83,000 square feet (sq. ft.), or less than two acres, most of which is sparsely vegetated lava and/or cinders. The redesign and slight expansion of the parking lots at the visitor center, Inferno Cone, Spatter Cones, Tree Molds, Big Sink, Caves, and Devil's Orchard would collectively effect about 70,000 sq. ft. The three new pulloffs on the Loop Road would collectively effect about 4,500 sq. ft. Curve widening near the North Crater parking area would effect about 8,500 sq. ft. Most of the curve widening would occur within the existing road prism and require little cut or fill.

Ground within the project construction limits would be compacted and trampled by the presence of construction equipment and workers. Some petrochemicals from construction equipment would seep into the ground. The ground would be susceptible to erosion until revegetation takes place.

Air quality would be temporarily affected by dust and construction vehicle emissions. Hauling material and operating equipment during the construction period would result in increased vehicle exhaust and emissions. Hydrocarbons, NO_x, and SO₄ emissions would be rapidly dissipated by air drainage since air stagnation is rare at the project site during the anticipated construction period.

Overall, there would be a slight and temporary degradation of local air quality due to dust generated from construction activities and emissions from construction equipment. These effects would last only as long as construction activities take place and the monument's air quality would not be affected by the proposal.

Temporary impacts associated with construction would occur, such as ground and vegetation disturbance and the possibility of short term erosion. Some vegetation would be removed, mostly rabbitbrush. In all project areas the ground and vegetation are already impacted to a degree by existing facilities and human activity. Construction would take advantage of these previously disturbed areas wherever possible.

The areas of proposed road reconstruction and parking lot redesigns are sparsely vegetated with grasses and low shrubs. Topsoil found would be removed prior to construction, conserved in windrows, and re-spread in the immediate area. The use of conserved topsoil would help preserve micro-organisms and seeds of native plants. Revegetation would proceed according to guidelines established by the monument. Until such revegetation takes place, accepted erosion protection measures would be used. To protect the genetic integrity of the local flora, material used in revegetation would be native species from local or site-specific adapted genetic stocks. Seed sources and species used must be approved by monument staff. Exotic plants may tend to colonize the construction site quickly. To reduce this invasive process, revegetation would proceed as soon as possible to decrease the time available for colonization by exotic plants. To control possible introduction of exotic plants, any required fill material would be free of noxious weeds. The disturbed areas would be monitored after planting and non native or exotic plant species removed. Revegetation of the sites would be conducted by monument staff with funding provided by FLHP sources. Thus, vegetation impacts and potential erosion would be minimized by storing and replacing whatever topsoil is encountered and seeding and/or planting with plant species that originate from the immediate area. The overall goal is to avoid interfering with natural ecosystem processes and plant communities.

Loss of wildlife would be proportional to the amount of habitat lost. Near and at the road corridor there is very little habitat and wildlife has been previously affected through years of close association with the road and attendant human activity. The proposal would have no permanent effect on wildlife or habitat. During construction some small animals may be killed or forced to relocate to areas outside the construction zone. The overall effect of construction and post construction activities on wildlife populations at the project site would be negligible.

The dirt-surfaced, two-track Blizzard Mountain Road, the access road leading to the BLM site which could be used as a contractor staging area, would be gravel surfaced to accommodate larger contractor traffic.

Conclusion: Impacts to the natural community would be limited in scope and most would occur in previously disturbed areas - less than two acres would be affected. Impacts to air and water quality would be short-term and localized. Areas affected by construction activities would be restored and revegetated.

Impacts on Safety: Safety problems of inconsistent lane widths, precarious parking areas, and unsafe turnouts would be corrected. These beneficial changes could result in increased visitation and more traffic. The accident rate might also change. The higher safety standards of the road and improved sight distance could decrease vehicle accidents. However, improved road conditions could also encourage travelers to drive faster than posted speeds, possibly resulting in an increased accident rate. Visitors would benefit from an improved roadway that would meet safety standards and provide safer road conditions.

Conclusion: Visitors would benefit from a safer road system. Road improvements would meet safety standards.

Impacts on Scenic and Recreational Values: The design for road reconstruction would emphasize visual quality while minimizing impacts to resources. Some inconvenience and travel delays for visitors would be unavoidable. Visitors would be exposed to the usual inconveniences associated with highway construction as well as the associated noise and visual impacts. The visiting public would be well informed regarding the current construction and traffic situation within the monument. Opportunities for interpretation near construction sites could be utilized to enlist the cooperation and support of an understanding public.

Conclusion: Scenic and recreational values would not be appreciably affected. Recreational values enhanced due to improved roadway and parking facilities.

Impacts on Visitor Use and Monument Operations: During rehabilitation, the road system would remain open a majority of the time, but some parts of the two-way roadway would be reduced to one lane; traffic would be subject to alternating, one-way movement at the reconstruction zone. Flaggers would be used during work hours to control traffic. Due to unforeseen circumstances, it may be required to close the Loop Road completely for one or more days, however, efforts will be made to prevent and/or minimize full closures. One half of the one-way Loop Road would be closed for extended periods (weeks) while reconstruction is underway while the other half would remain open to two-way traffic with a pilot car. Closure of these one-way road segments would be required because the road width is inadequate for traffic to pass reconstruction work without significant resource damage. As a result, some portions of the monument would be unavailable for visitor use and enjoyment for as long as reconstruction activities are required for that particular road segment. For example, when the western half of the Loop Road is under reconstruction, the Spatter Cones area would not be available for visitor use. When the eastern half of the one-way Loop Road is under reconstruction, the Caves Area would not be available for visitor use. Additionally, parking lot reconstruction would at least temporarily prohibit visitor use at each of the major visitor sites while reconstruction is underway, but not all major sites would be closed simultaneously. The Idaho State Department of Transportation would receive notice of the reconstruction and closure scheduling, and the general public would be notified through public media and roadside signing. Construction signing would be installed to reduce traffic hazards due to construction.

During reconstruction activities, visitors using the road would be subject to noise, dust, and visual intrusion of reconstruction activities and equipment. At times, visitors could experience traffic delays usually not exceeding 30 minutes. Visitors caught in the delays would be frustrated and may consider the delays interminable.

Although there would be some reconstruction activities at night, the monument entrance road would be closed to reconstruction traffic from monument headquarters to the North Craters parking area from 9:00 pm to 7:00 am during weekdays. During weekends, the monument road from monument headquarters to North Craters parking lot would be closed to haul trucks from noon Saturday to 7:00 am Monday. Although reconstruction work could take place on weekends, at least one-half of the one lane Loop Road would remain open for visitor use. If no work takes place during weekends or holidays, the contractor would be responsible to leave the road surface in a drivable condition and the major sites accessible to visitors. No reconstruction would take place on legal holidays. These actions would minimize nighttime, weekend, and holiday disruption to visitors, campers and monument residents.

Over the short term, some visitors would be dissatisfied because they would be unable to visit a particular feature or features due to reconstruction or road closure. Efforts by monument staff to inform the public of reconstruction-related delays and road closures through the media could result in overall reduced visitation for the year in which reconstruction would occur. Additionally, the visitor experience would be adversely affected by noise, dust, fumes, delays, and construction vehicle traffic along monument roads for the duration of reconstruction activities, which would be expected to last for an entire summer.

The long term effect on the visitor experience would be positive. Circulation throughout the monument, road safety standards, driving comfort, and the visual quality of the road corridor would be improved. The rehabilitated road, turnouts, and parking areas would provide an enhanced visitor experience and reduce frustration for visitors, especially those operating large vehicles.

Although various portions of the road system would be closed during reconstruction activity, access would be provided immediately to any emergency vehicles.

The service life of monument roads, turnouts, and parking areas would be extended by several decades and meet NPS road standards.

Once rehabilitation was completed, there would be a shift from routine maintenance requirements (constant patching and minor repairs) to programs of preventive maintenance critical to attaining the full service life of the road. The improvements would make the road serviceable for several decades without major reconstruction needs.

Conclusion: Over the short term, visitors would be inconvenienced by noise, dust, fumes, reconstruction vehicle movement, and traffic delays associated with road work, which would be expected to last an entire summer. Some visitors would be dissatisfied because specific features

or visitor areas would be closed. Reconstruction-related delays and road closures advertized through the media could result in overall reduced visitation for the year in which reconstruction would occur. Actions would be taken to minimize nighttime, weekend, and holiday disruption to visitors and monument residents. Over the long term, the visitor experience would be positive, benefitting from a safer, more convenient road system that would contribute towards an enriched visitor experience. Although various portions of the road system would be closed during reconstruction activity, access would be provided immediately to any emergency vehicles.

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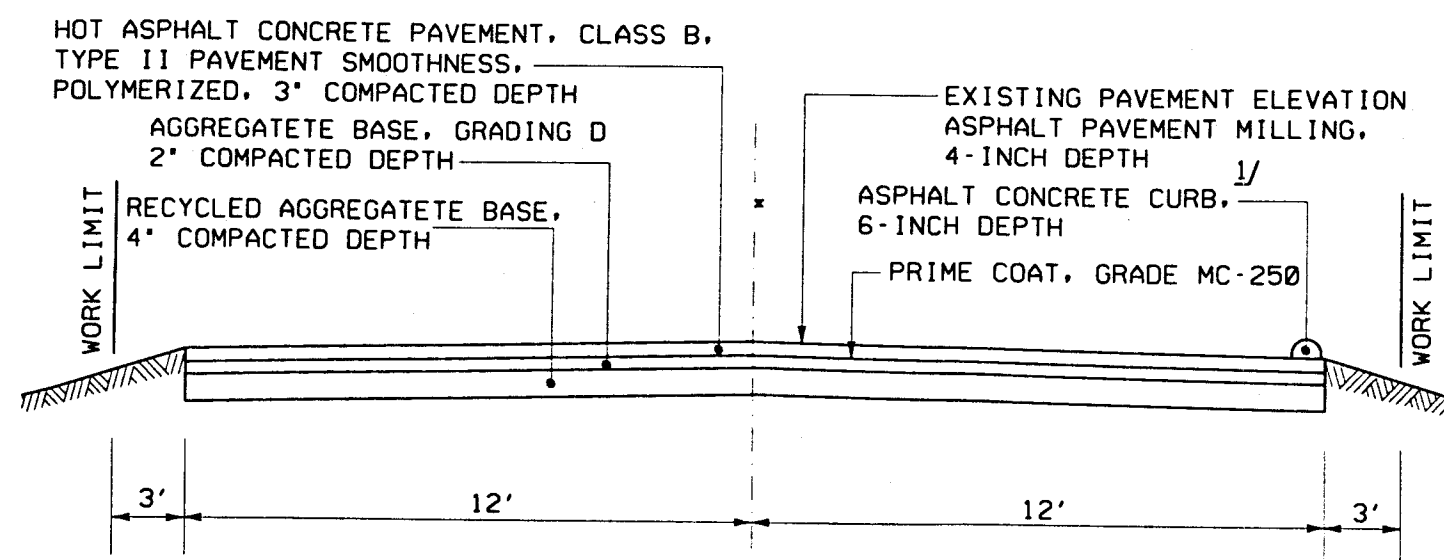
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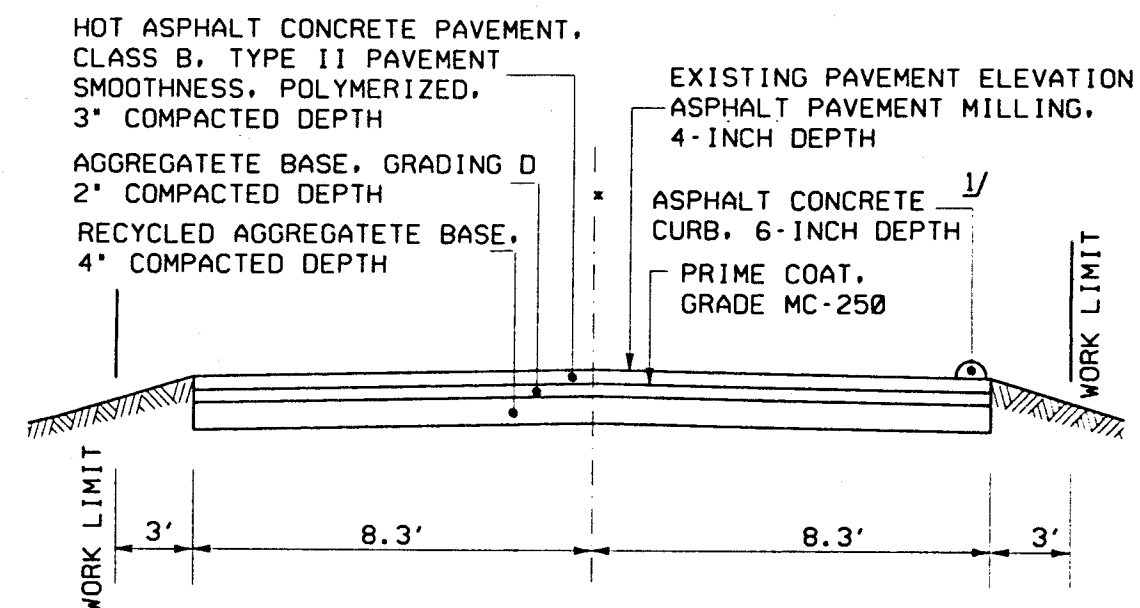
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Sta. 0+00 to 101+04 (Loop Road)
 Sta. 10+00 to 22+00 (Devils Orchard Road)
 Sta. 20+00 to 23+06 (Spatter Cone Road)
 Sta. 30+00 to 90+85 (Tree Molds Road)
 Sta. 40+00 to 43+05 (Caves Road)



Sta. 101+04 to 248+00 (Loop Road)

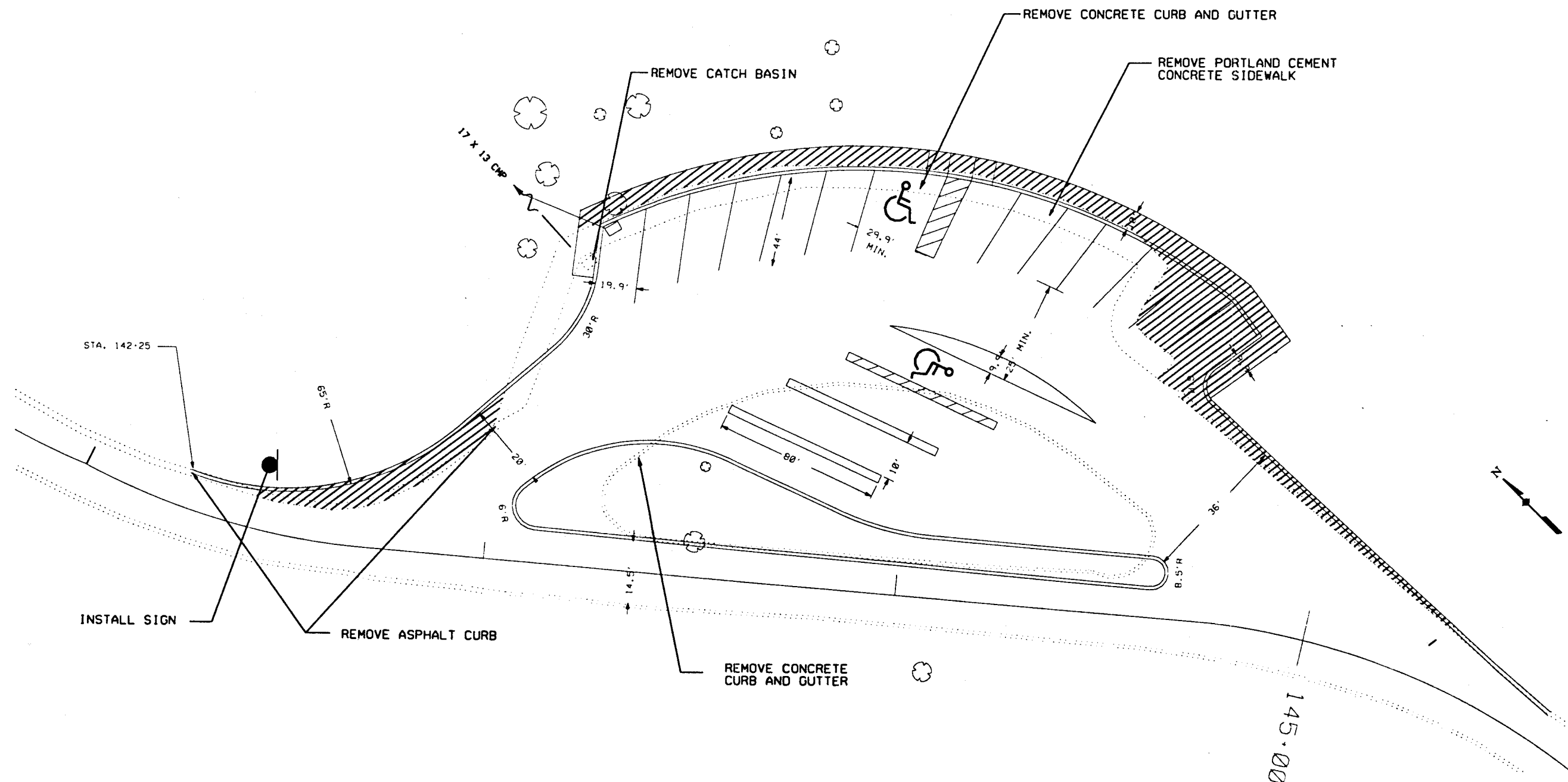


NPS PKG. No.: CRMO 138
 DSC/MAY'94/131/20025

TYPICAL SECTION

FIGURE 1

ON MICROFILM



PARKING AREA

15 parking spaces
4 RV's

AREA OF EXPANSION
(2385 sq ft approx.)

25 0 25 50
SCALE IN FEET

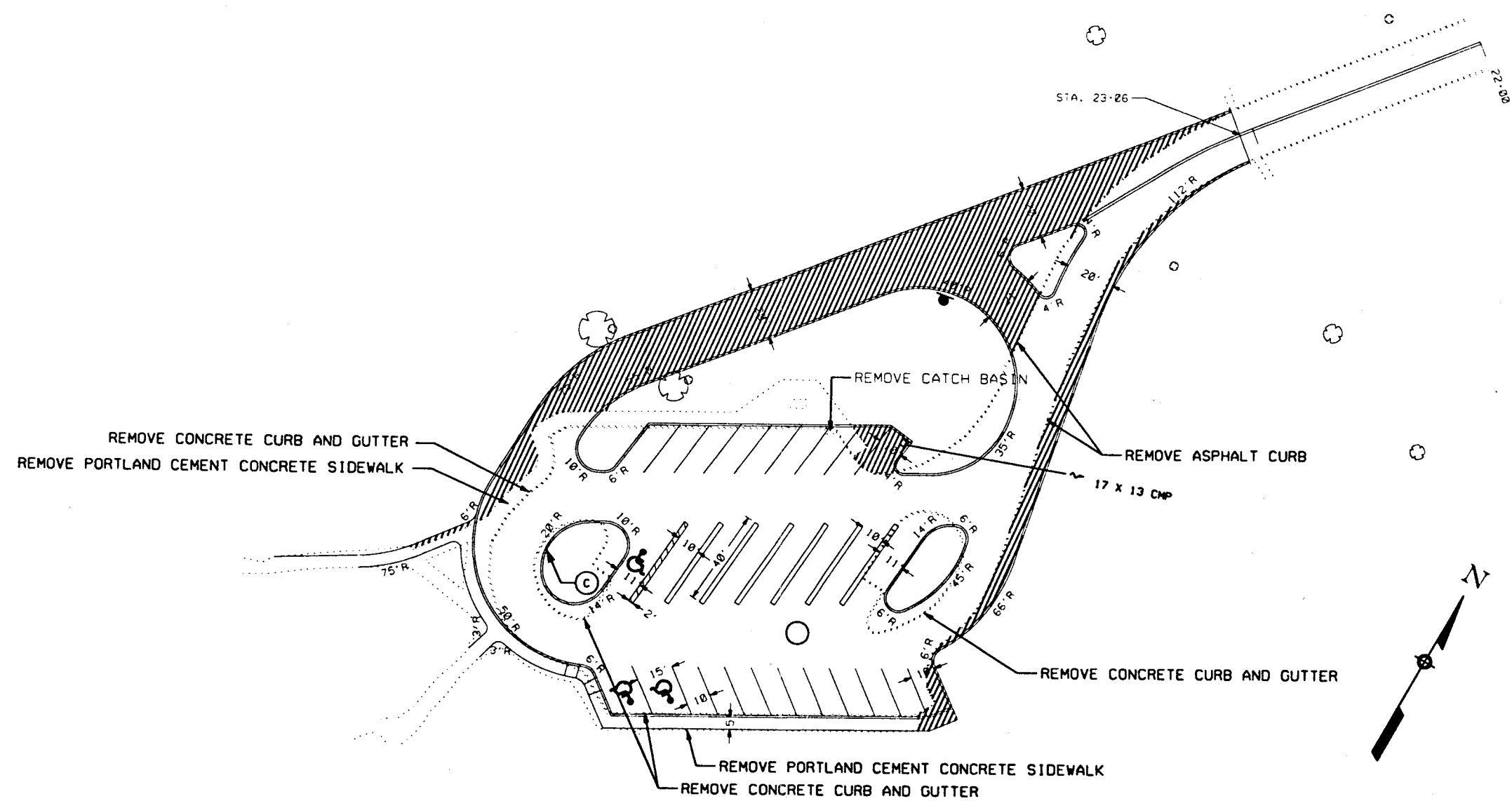
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NPS/DESIGNED:
T. CUOVERTH
NPS/CADD:
T. CUOVERTH
NPS/TECH. REVIEW:
NPS/DATE:
5/94

INFERNO CONE
PARKING AREA

FIGURE 3

ON MICROFILM



PARKING AREA
 21 parking spaces
 8 RV's

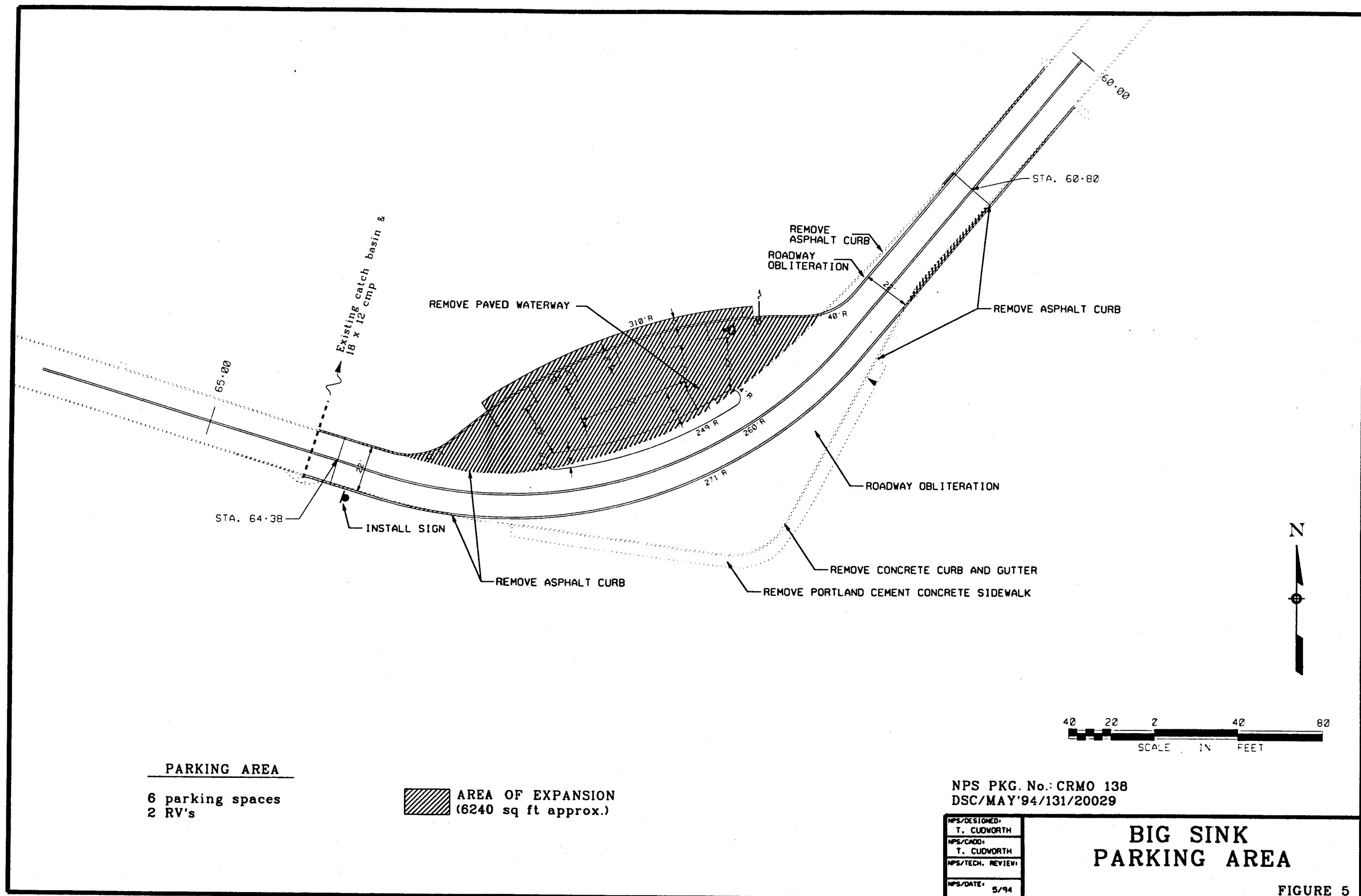
 **AREA OF EXPANSION**
 (6280 sq ft approx.)

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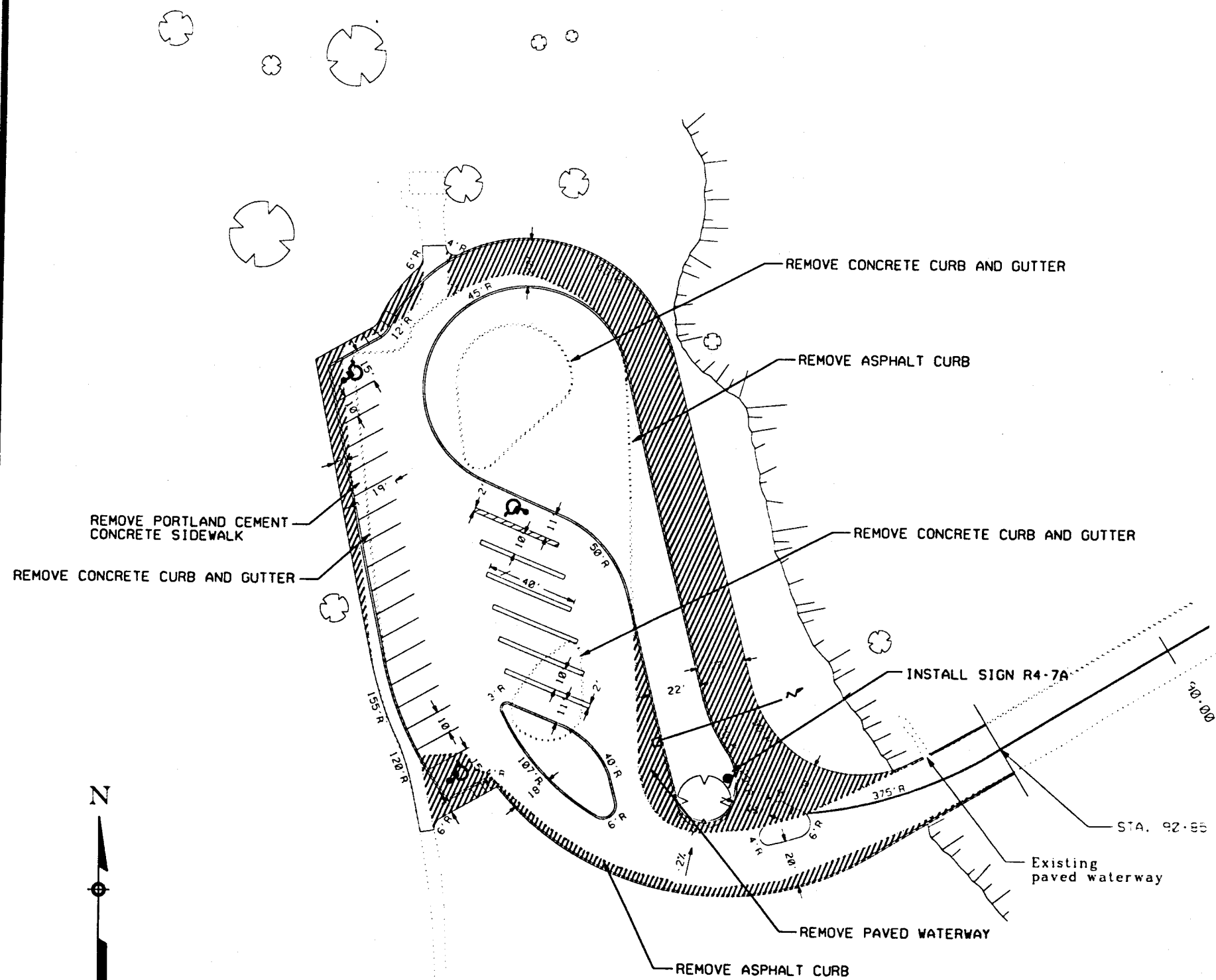
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SPATTER CONE PARKING AREA

FIGURE 4

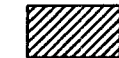


ON MICROFILM



PARKING AREA

17 parking spaces
7 RV's

 AREA OF EXPANSION
(7650 sq ft approx.)



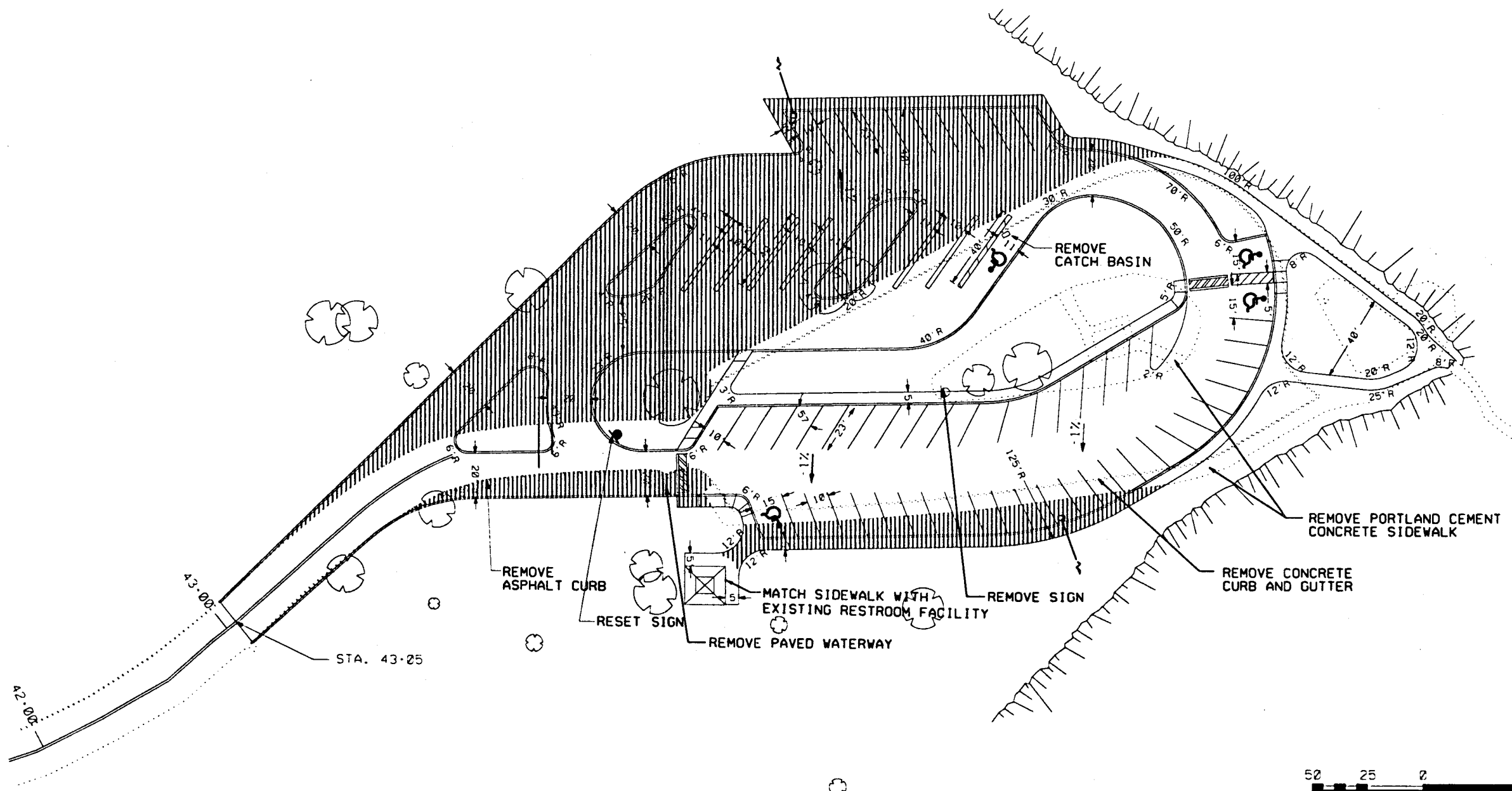
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NPS/TECH. REVIEW:	
NPS/DATE:	5/94

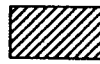
TREE MOLDS PARKING AREA

FIGURE 6

ON MICROFILM



PARKING AREA
 51 parking spaces
 9 RV's

 **AREA OF EXPANSION**
 (28,600 sq ft approx.)

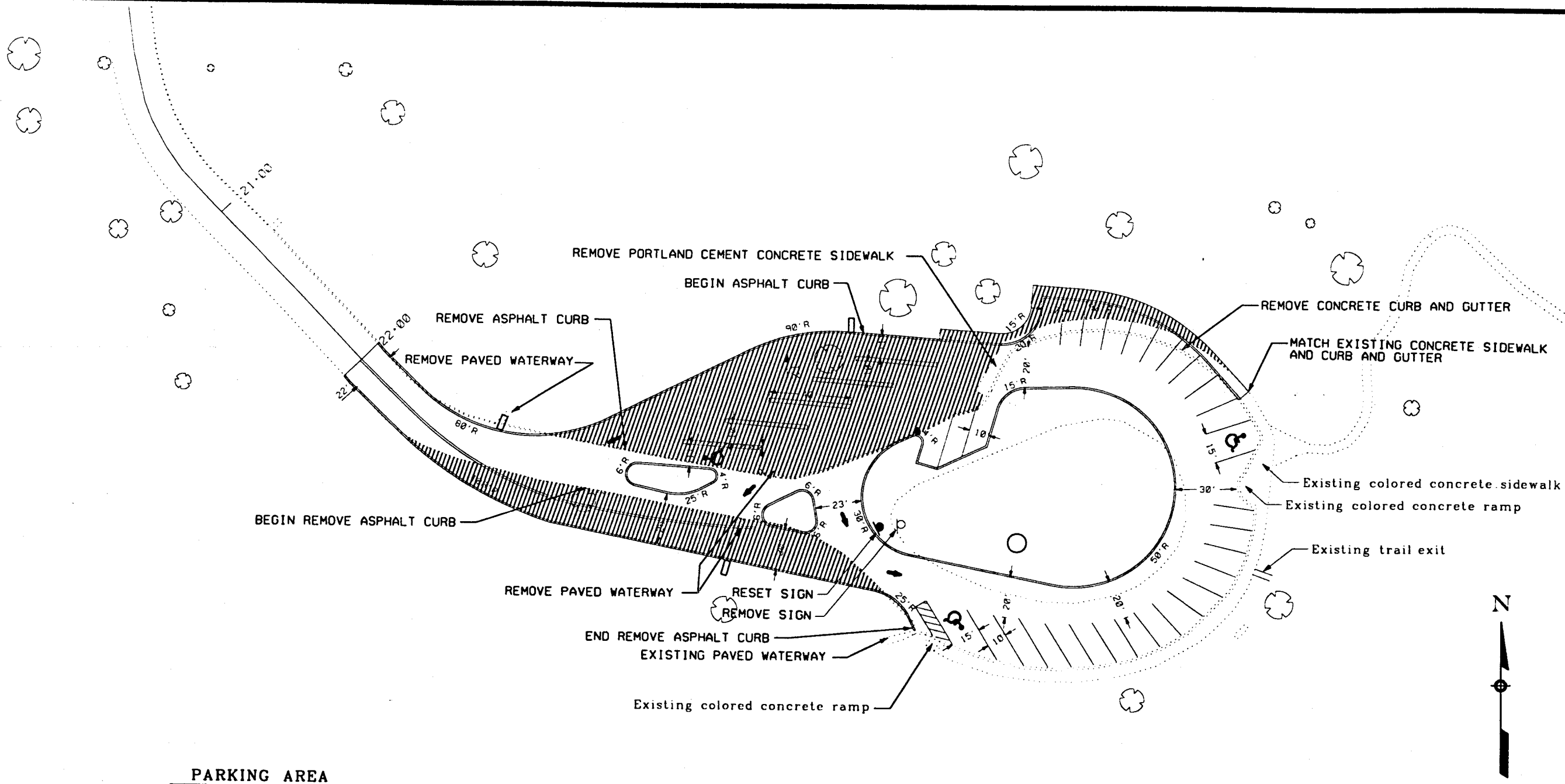
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CAVES PARKING AREA

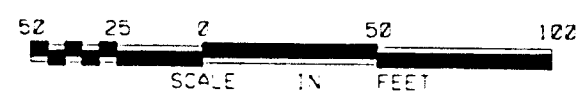
FIGURE 7

ON MICROFILM



PARKING AREA
 30 parking spaces
 6 RV's

 **AREA OF EXPANSION**
 (16,600 sq ft approx.)



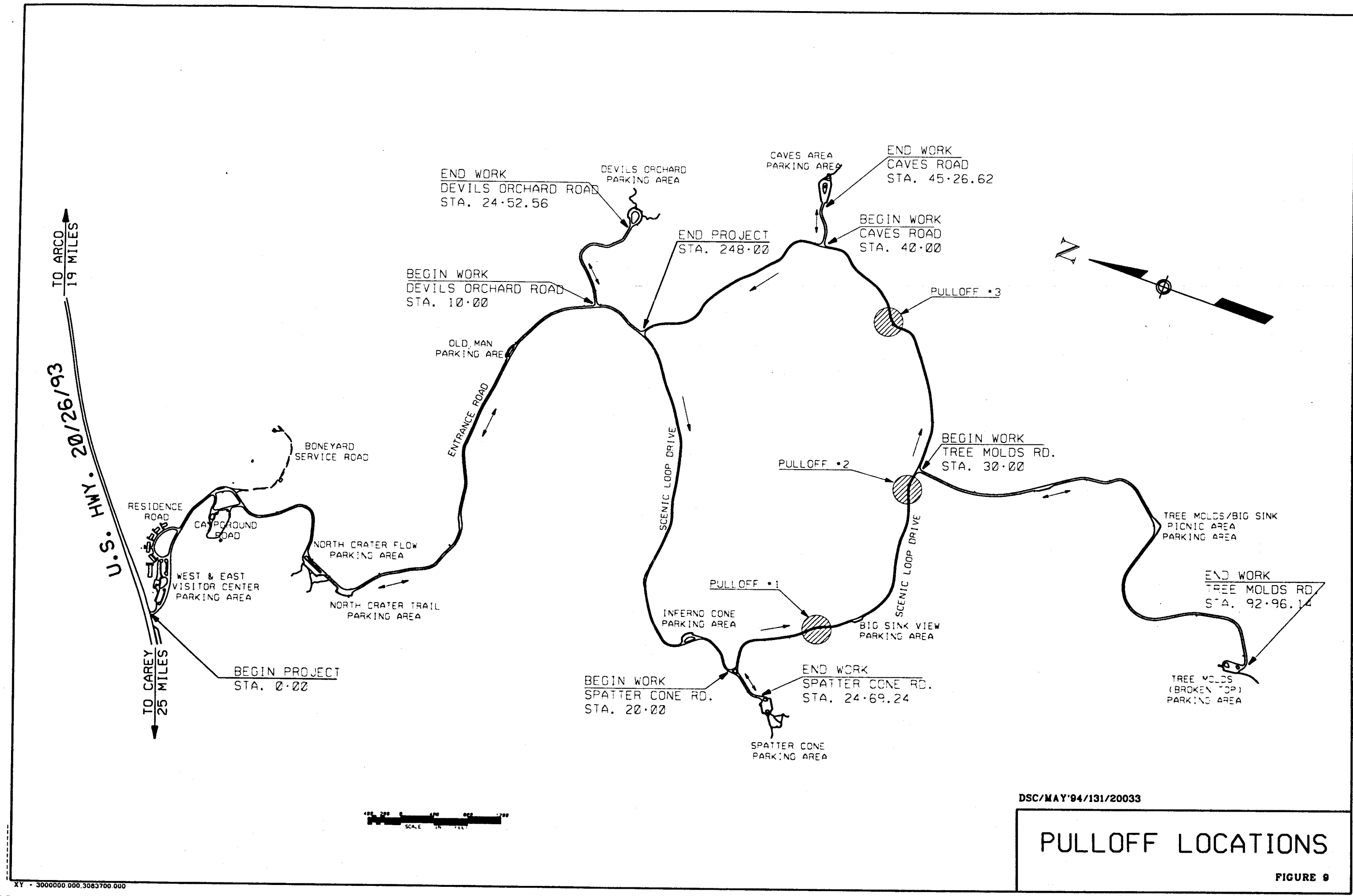
NPS PKG. No.: CRM 138
 DSC/MAY'94/131/20032

NPS\DESIGNED:	T. CUOVERTH
NPS\CADD:	T. CUOVERTH
NPS\TECH. REVIEW:	
NPS\DATE:	5/94

DEVILS ORCHARD PARKING AREA

FIGURE 8

ON MICROFILM



ON MICROFILM

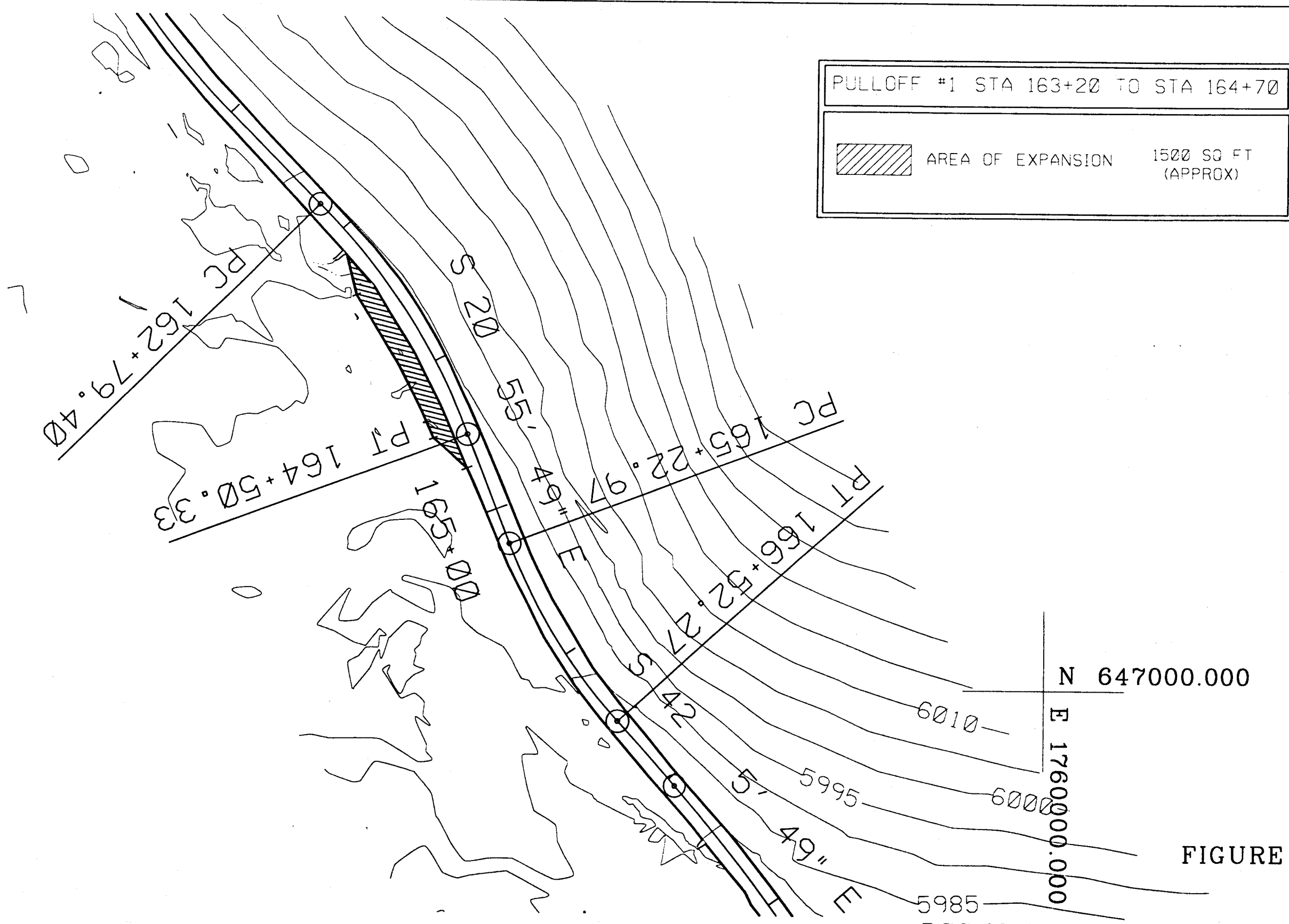


FIGURE 10

DSC/MAY'94/131/20034 (1 OF 4)

ON MICROFILM

PULLOFF #2 STA 185+75 TO STA 187+25

AREA OF EXPANSION 1520 SQ FT (APPROX)

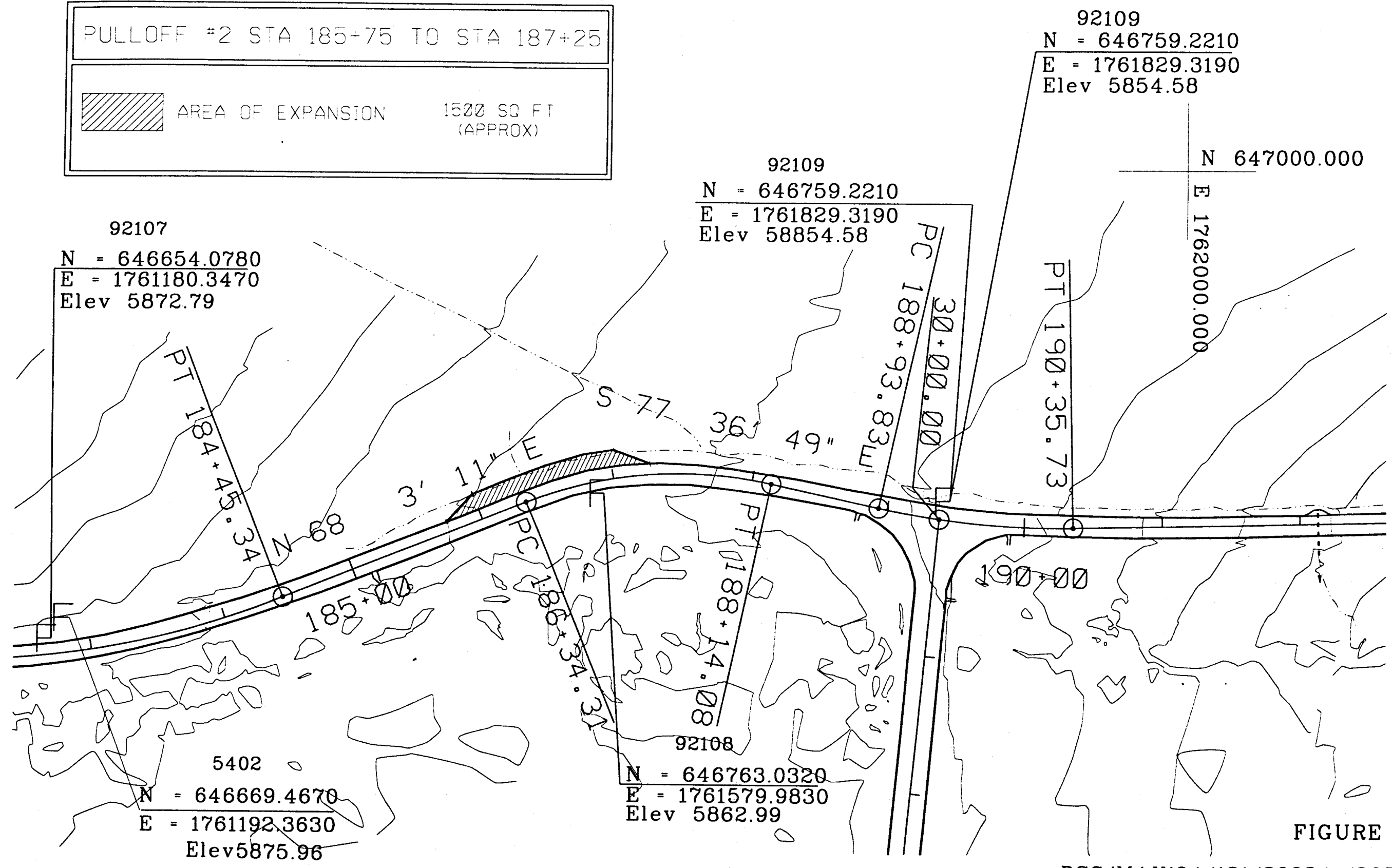


FIGURE 11

DSC/MAY'94/131/20034 (20F4)

92112
 N = 647634.5540
 E = 1763352.6190
 Elev 5787.12

N 58

210+00

PC 207+98.60

211+74.68

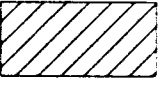
PULLOFF #3 STA 208+25 TO STA 209+75	
	AREA OF EXPANSION 1500 SQ FT (APPROX)

FIGURE 12

DSC/MAY'94/131/20034 (30F4)

ON MICROFILM

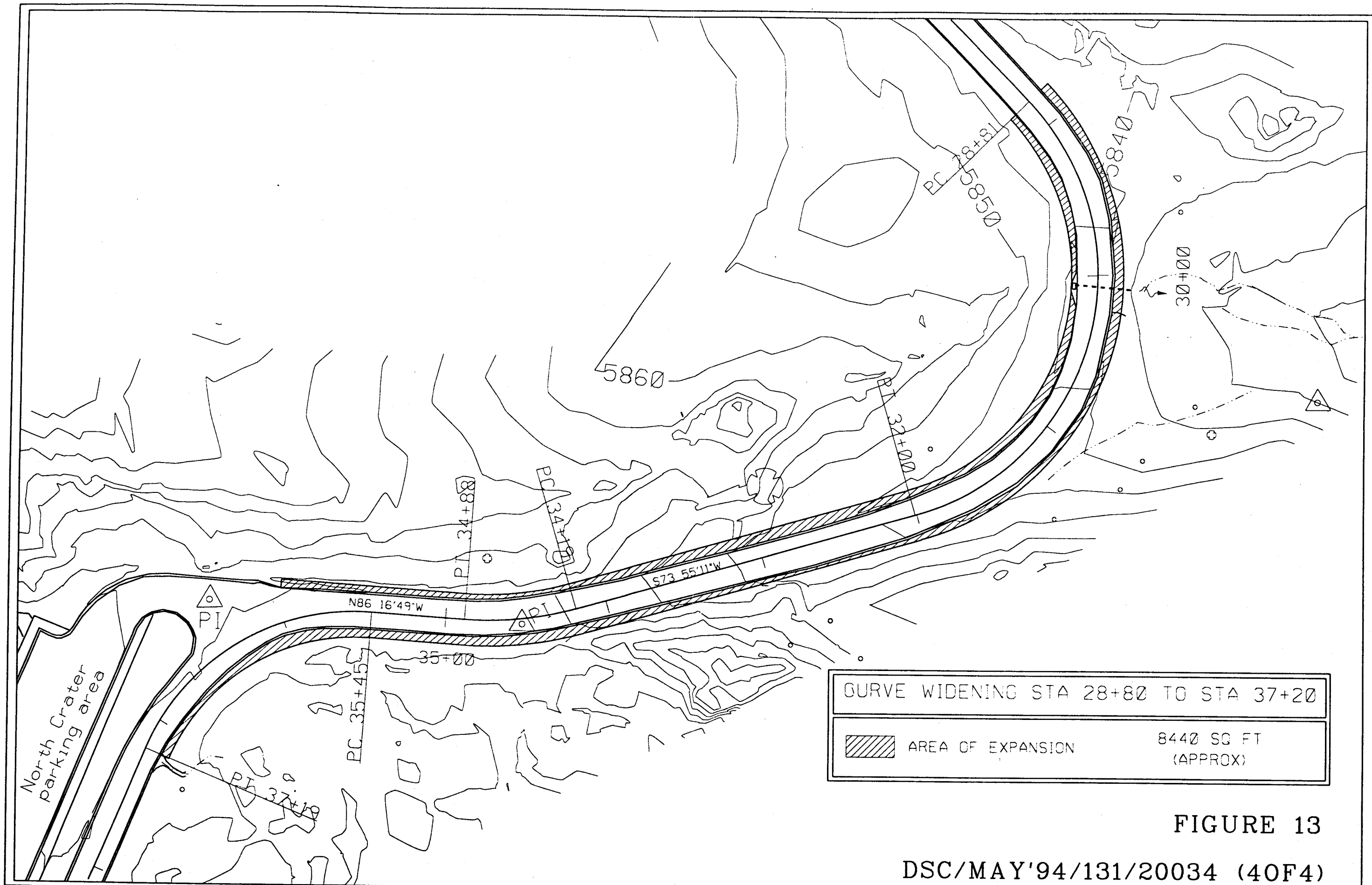


FIGURE 13

DSC/MAY'94/131/20034 (40F4)

ON MICROFILM

TO ARCO
19 MILES

U.S. HWY. 20/26/93

TO CAREY
25 MILES

RESIDENCE ROAD
CAMPGROUND ROAD
WEST & EAST VISITOR CENTER PARKING AREA

BEGIN PROJECT
STA. 0+00

BONEYARD SERVICE ROAD

NORTH CRATER FLOW PARKING AREA

NORTH CRATER TRAIL PARKING AREA

BEGIN WORK
DEVILS ORCHARD ROAD
STA. 10+00

END WORK
DEVILS ORCHARD ROAD
STA. 24+52.56

OLD MAN PARKING AREA

ENTRANCE ROAD

DEVILS ORCHARD PARKING AREA

END PROJECT
STA. 248+00

CAVES AREA PARKING AREA

END WORK
CAVES ROAD
STA. 45+26.62

BEGIN WORK
CAVES ROAD
STA. 40+00

BEGIN WORK
TREE MOLDS RD.
STA. 30+00

TREE MOLDS/BIG SINK
PICNIC AREA
PARKING AREA

END WORK
TREE MOLDS RD.
STA. 92+96.14

TREE MOLDS
(BROKEN TOP)
PARKING AREA

BIG SINK VIEW
PARKING AREA

INFERNO CONE
PARKING AREA

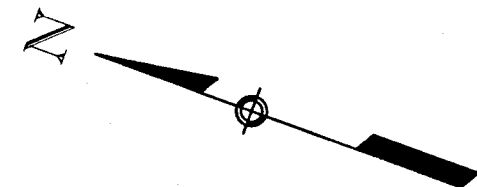
BEGIN WORK
SPATTER CONE RD.
STA. 20+00

END WORK
SPATTER CONE RD.
STA. 24+69.24

SPATTER CONE
PARKING AREA

SCENIC LOOP DRIVE

SCENIC LOOP DRIVE



DSC/MAY'94/131/20035

MONUMENT CIRCULATION

FIGURE 14

ON MICROFILM



As the nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

