ADEQ
Arizona Department of Environmental Quality

2021 Regional Haze Four Factor Initial Control Determination

Nonpoint Source: Non-Residential Construction (Industrial, Commercial, Institutional)

Air Quality Division
December 2, 2020

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1 ADEQ Initial Regional Haze Four Factor Control Determination

1.1 ADEQ Initial Control Determination for Non-Residential Construction

ADEQ's initial decision is to find that it is reasonable to require additional Non-Residential Construction controls during this planning period in order to make reasonable progress toward natural visibility conditions. ADEQ proposes the following controls as being reasonable based on review of the four statutory factors:

1) Apply acrylic polymer or gravel to unpaved parking and staging areas at sites >34 acres
2) Limit vehicle speed at work sites > 34 acres to 15 mph without signage

1.2 ADEQ Control Determination Finalization Timeline

In order to meet the State rulemaking process timeframe for proposed rule inclusion in the July 31st, 2021 Regional Haze state implementation plan (SIP) submittal, ADEQ must finalize all four factor analyses as expeditiously as possible. To provide an opportunity for interested stakeholders to review and comment on ADEQ's initial decision prior to finalization, the department intends to post initial decisions on the agency webpage along with the original source submitted four factor analyses. Once ADEQ has reviewed relevant stakeholder comments, the agency will revise its initial decisions if necessary and post final decisions (see Figure 1). ADEQ welcomes feedback on these initial decisions and invites any interested party to send their comments by **December 31st 2020** to:

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Please note that this review and feedback opportunity does not constitute an official state implementation plan or state rulemaking comment period. The agency intends to provide an official 30 day comment period on any proposed SIP or rulemaking action in accordance with Arizona Revised Statutes §§ 41-1023, 49-425, and 49-444.

Figure 1: Four Factor Control Determination Process Map

2 ADEQ Four Factor Analysis

2.1 Summary

Air Quality Improvement Planning (AQIP) value stream staff evaluated control strategies to mitigate PM_{10}[1] emissions from non-residential construction sources that are located within 50 kilometers (km) of the Chiricahua National Monument (NM) and Wilderness Area, Galiuro Wilderness Area, Saguaro National Park (NP), and Superstition Wilderness Area.

Based on a review of available controls and consideration of stakeholder input on the required four statutory factors, AQIP staff present the following control options as technically feasible and generally cost effective.

Table 1: Proposed Measures for ICI Construction

Measure Description and Applicability
Apply acrylic polymer to unpaved parking and staging areas
Apply gravel to unpaved parking and staging areas
Limit vehicle speed at work site to 15 mph without signage

2.2 ADEQ Source Screening Methodology

2.2.1 Significantly Contributing PM Species

To screen out particulate matter (PM) species that make only a small contribution to overall anthropogenic light extinction at Class I areas within the State of Arizona, ADEQ evaluated the impacts of particulate species[2] on the 20% most impaired days.[3] The results of this analysis showed that sulfate, nitrate, and coarse mass [i.e., PM_{10}] account for 72% - 89% (average 80%) of anthropogenic light extinction in these areas. ADEQ determined that these three species should be further evaluated for source controls during this planning period in order to maximize the benefit of any potential new control strategies.

2.2.2 Nonpoint Source Screening Methodology

ADEQ employed the following approach when screening nonpoint sources for the four-factor analysis:[4]

[1] Particulate matter 10 micrometers or less in diameter (PM_{10}).
[2] Species evaluated included ammonium sulfate (sulfate), ammonium nitrate (nitrate), organic mass carbon (OMC), light absorbing carbon (LAC), [fine] soil, and coarse mass (CM).
[3] See *ADEQ 2021 Regional Haze State Implementation Plan Source Screening Methodology*, August 16, 2019.
[4] *Ibid*.

1. Gather 2014 EPA NEIv2[5] county-level nonpoint datasets for the State of Arizona.
2. Isolate source classification code (SCC) annual emissions (tons/year) for PM_{10}-primary, nitrogen oxides, and sulfur dioxide.
3. Remove PM_{10}-primary emissions from consideration for those counties that are not located within 50 km of a Class I area since PM_{10} does not generally experience high transport distances.
4. Sum the remaining SCC-specific PM_{10} primary, nitrogen oxides, and sulfur dioxide annual emissions to calculate "Q".
5. Sort all SCCs from highest to lowest "Q".
6. Determine the "Q"-threshold which achieved inclusion of the SCCs with the largest "Q's" until >80% of total "Q" emissions across all SCCs are accounted for (i.e. "Q" >13,500 tons per year includes 6 sectors which account for 81.6% of the total statewide nonpoint "Q").
7. Isolate those sources with a "Q" value greater than 13,500 tpy.

Based on the approach outlined above, the nonpoint source sectors that were screened into a 4-factor analysis are presented in *Table 3*.

Table 2 Arizona Nonpoint Source Sectors with a Q >13,500 tons/year (tpy)

SCC	NO_x	PM_{10}	SO_2	Q	Sector
2285002006	18,045	541	11	18,597	Mobile - Locomotives
2294000000	0	14,501	0	14,501	Dust - Paved Road Dust
2296000000	0	107,924	0	107,924	Dust - Unpaved Road Dust
2311020000	0	15,536	0	15,536	Dust - Industrial/Commercial/Institutional Construction Dust
2325000000	0	44,753	0	44,753	Industrial Processes - Mining
2701220000	13,912	0	0	13,912	Biogenics - Vegetation and Soil

The evaluation of emissions reduction strategies for nonpoint sources during this planning cycle is focused on potential dust control measures for the paved and unpaved roads, mining and quarrying, and non-residential construction source sectors. Locomotive and Biogenic NOx emissions were not considered in this round because these sectors are generally controlled at the federal level or are mostly uncontrollable. Additionally, to make the best use of limited resources ADEQ chose to focus on the four source sectors with the highest likelihood of presenting achievable control measures at the state level.

[5] National Emissions Inventory, version 2.

2.3 Emissions Control Evaluation Areas

For the period 2013-2017 anthropogenic coarse mass emissions were found to have the highest impacts (on most impaired days) on the following IMPROVE monitoring sites and corresponding Class I areas.[6, 7]

- Chiricahua NM and Wilderness Area (IMPROVE Site: Chiricahua NM, CHIR1)
- Galiuro Wilderness Area (IMPROVE Site: Chiricahua NM, CHIR1)
- Saguaro NP (IMPROVE Site: Saguaro NP – East Unit, SAGU1)
- Superstition Wilderness Area (IMPROVE Site: Tonto NM, TONT1)

Since PM_{10} does not generally experience high transport distances, evaluation of emissions reduction strategies for paved and unpaved roads, mining and quarrying, and non-residential construction is limited to nonpoint sources within 50 km of these Class I areas.[8]

2.4 Source Sector Overview

Consideration of potential controls for the highest contributing sources is based on the location of the emitting sources (i.e., are they within 50 km of the "high impact" Class I areas)[9] and on the emitting activities used to calculate sector emissions for these areas. According to NEI documentation, emissions estimates for industrial, commercial, and institutional (ICI) construction (EPA National Emission Inventory Source Classification Code: 2311020000) are based on the following activities.[10]

- General construction activities
- Earthmoving
- Material handling, transport, storage
- Activity on disturbed surfaces
- Emissions from uncovered haul trucks

[6] See *ADEQ 2021 Regional Haze State Implementation Plan Source Screening Methodology*, August 16, 2019.
[7] Each of these sites exhibited coarse mass impacts on the most impaired days of > 10% of the total anthropogenic extinction (Mm-1) during the 2013-2017 period.
[8] See *Map of Coarse Mass Areas and 50 km Buffers*.
[9] *Ibid*.
[10] See EPA's "Non-Residential Construction (2014_nonresidential_construction_2311020000_documentation_v2.1 (4).docx)."

2.5 Analysis of Available PM_{10} Control Measures

To begin the evaluation of potential new measures for control of PM_{10} emissions from non-residential construction, ADEQ developed a list of "available" measures from review of EPA guidance and control strategies adopted by state and local agencies. The list includes measures contained in the 1990 Clean Air Act (CAA) Preamble, *Appendix C1 Available Fugitive Dust Control Measures* (57 FR 18070 18077, April 28, 1992). ADEQ also reviewed best available control measures (BACM) evaluated as part of the control strategies in PM_{10} nonattainment area plans developed by numerous jurisdictions in the U.S. Southwest including the following.

- Pinal County Air Quality Control District, Arizona
- Maricopa County Air Quality Department, Arizona
- San Joaquin Valley Air Pollution Control District (SJVAPCD), California
- Imperial County Air Pollution Control District (ICAPCD), California
- Clark County Department of Air Quality, Nevada
- South Coast Air Quality Management District (SCAQMD), California

Each of the listed measures were evaluated for technical feasibility and the four statutory factors required under the Regional Haze Rule.[11] The list of measures and a summary table of the technical feasibility and four-factor analysis conclusions are included in Section VI.A. Discussion of the reasons for including or rejecting individual measures, in whole or in part, from the Long Term Strategy (LTS) follows in Section VI.B.

[11] See Final Rule: Protection of Visibility: Amendments to Requirements for State Plans, 82 FR 3078, January 10, 2017

2.6 Four-Factor Analysis Review – Non-Residential Construction (Industrial, Commercial, Institutional)

2.6.1 Four-Factor Analysis Summary

List of Available PM_{10} Control Measures						
Available PM_{10} Control Measure for Consideration	**Technically Feasible**	**[1] Cost of Compliance**		**[2] Time Necessary for Compliance**	**[3] Energy and Non-AQ Environmental Impacts of Compliance**	**[4] Remaining Useful Life of Potentially Affected Sources**
		Annualized Costs	**Cost Effectiveness ($/ton)**			
1. Require dust control plans [permit] for construction or land clearing projects. (Data references: 1, 3)	Yes	$530.97 /acre-year	$7,656/ton	Within 3 years of EPA approval of the SIP	None	N/A
2. Require haul trucks to be covered / Control freeboard and spillage from haul vehicles. [material transport] (1)	Yes	$2,206/truck-year	$5,567/ton	Within 3 years of EPA approval of the SIP	Unknown	Unknown

List of Available PM_{10} Control Measures						
Available PM_{10} Control Measure for Consideration	**Technically Feasible**	**[1] Cost of Compliance**		**[2] Time Necessary for Compliance**	**[3] Energy and Non-AQ Environmental Impacts of Compliance**	**[4] Remaining Useful Life of Potentially Affected Sources**
		Annualized Costs	**Cost Effectiveness ($/ton)**			
3. Alter load-in load-out procedures (e.g., load on downwind side, watering, empty loader slowly, keep bucket close to truck while dumping). [material handling] (2)	Yes	$4,364-$4,431/year – watering bulk material handling (based on $5-$12/1,000 gallons of water)	$17,387-$17,652/ton	Within 3 years of EPA approval of the SIP	None	N/A
4. Utilize trackout control device, gravel pad, or other means to stabilize access points where unpaved traffic surfaces adjoin paved roads. (3)	Yes	$6,073 – pipe grid	$147,284/ton	Within 3 years of EPA approval of the SIP	None	Pipe grid can be used for up to 5 years at existing or removed and used again at another project.
		$3,500 – gravel pad	$70,779/ton			
5. Provide for rapid clean-up of mud/dirt track out, material spills, on paved roads. (1)	Yes	$1,148/mile-year – frequent sweeping	$6,916/ton	Within 3 years of EPA approval of the SIP	Additional fuel/water for operation. Mobilization/transportation costs of sweeper depending on remoteness of site.	Unknown
		$698 /spill – spill cleanup	$7,031/ton			

List of Available PM_{10} Control Measures						
Available PM_{10} Control Measure for Consideration	**Technically Feasible**	**[1] Cost of Compliance**		**[2] Time Necessary for Compliance**	**[3] Energy and Non-AQ Environmental Impacts of Compliance**	**[4] Remaining Useful Life of Potentially Affected Sources**
		Annualized Costs	**Cost Effectiveness ($/ton)**			
6. Apply water to disturbed surfaces and dust generating operations (pre-watering, operational). (2)	Yes	$8,333-$9,183/acre-yr – unpaved traffic areas (based on $5-$12/1,000 gallons of water)	$7,959-$8,770/ton	Within 3 years of EPA approval of the SIP	Water costs varies by county/water district and depending on existing infrastructure.	Unknown
		$28,064-$32,313/yr – open areas (based on $5-$12/1,000 gallons of water)	$1,194,223 - $1,375,027/ton			
7. Apply chemical stabilizers/dust suppressants to unpaved parking and staging areas. (1, 2)	Yes	$402/acre-year Acrylic polymer	$479/ton	Within 3 years of EPA approval of the SIP	Fuel to transport products. Cost to remove.	Unknown
		$1,374/acre-year Gravel	$2,181/ton			
		$12,716/acre-year Paving	$5,861/ton			
8. Limit, restrict or reroute motor vehicle access to work site.	Yes	$17,791 /site – fencing for 34 acre lot and signage (6 signs)	$58,186/ton	Within 3 years of EPA approval of the SIP	Unknown	Noncommercial/barbed wire fencing has a useful life of 10 years. Signage has a useful life of up to 5 years, when

List of Available PM_{10} Control Measures						
Available PM_{10} Control Measure for Consideration	**Technically Feasible**	**[1] Cost of Compliance**		**[2] Time Necessary for Compliance**	**[3] Energy and Non-AQ Environmental Impacts of Compliance**	**[4] Remaining Useful Life of Potentially Affected Sources**
		Annualized Costs	**Cost Effectiveness ($/ton)**			
[Reduce vehicle disturbance of unpaved surfaces (access/haul roads, staging areas, parking areas/lots, etc.).] (4)						reflectivity begins to wear off. Project specific signage less than 1 year depending on material.
9. Limit vehicle speed at work site. (3)	Yes	$207 per project	$1,605 /ton	Within 3 years of EPA approval of the SIP	Unknown	Five years before reflectivity on signs begins to wear off.
		$1,600 for four signs posted > 34 acres	$8,114 /ton			

References:

1. Revised MAG 1999 Serious Area Particulate Plan for PM-10 for the Maricopa County Nonattainment Area, Appendix F
2. 2001 San Joaquin Valley Cost Effectiveness Analysis of Regulation VIII
3. 2003 San Joaquin Valley BACM Technological and Economic Feasibility Analysis - https://www.valleyair.org/Air_Quality_Plans/docs/2003%20PM10%20Plan/PDF%202003%20PM10%20Plan%20adpt%20app/App%20G-Exhibit%20A%20(entire).pdf
4. Measure 4 of the West Pinal County PM_{10} Nonattainment Area SIP, Appendix F

2.6.2 Four-Factor Analysis Discussion

2.6.2.1 Require dust control plans [permit] for construction or land clearing projects.

2.6.2.1.1 Technical Feasibility

ADEQ has determined that requiring dust control plans for construction or land clearing projects is technically feasible.

2.6.2.1.2 Cost of Compliance – Factor 1

ADEQ used cost estimates from the 1999 MAG PM10 Plan for a dust control plan, adjusted for inflation.

Table 3 Dust Control Plan Costs

Measure Description	Capital Cost	Annualized Capital Cost	Annual Implementation /Maintenance Cost	Total Annual Cost	Control Effectiveness (%)	Cost Effectiveness ($/ton)
Dust Control Plan	--	--	$22,257.04 /project	$530.97 /acre	77.6%	$7,656.36

Table 4 Dust Control Plan Emissions

Measure	Baseline Emissions with Existing Measures (tons/yr-acre)	Emissions Reductions from New Measures (tons/yr-acre)
Dust Control Plan	0.029	0.010

2.6.2.1.3 Time Necessary for Compliance – Factor 2

Within 3 years of EPA approval of the SIP. Full compliance depends on enforcement and outreach.

2.6.2.1.4 Energy and Non-Air Quality Environmental Impacts of Compliance – Factor 3

Not applicable.

2.6.2.1.5 Remaining Useful Life of Potentially Affected Sources – Factor 4

Not applicable.

2.6.2.2 Require haul trucks to be covered / Control freeboard and spillage from haul vehicles. Material Transport

2.6.2.2.1 Technical Feasibility

Requiring haul trucks to be covered is technically feasible at construction sites.

2.6.2.2.2 Cost of Compliance – Factor 1

ADEQ used cost estimates from the 1999 MAG PM10 Plan for a dust control plan, adjusted for inflation. The cost-effectiveness evaluated by MAG includes the implementation of covered haul trucks and a freeboard of 6" or more. ADEQ calculated the annualized capital cost assuming 4.75% interest and a useful life of 8 years.

Table 5 Truck Cover Costs

Measure Description	Capital Cost	Annualized Capital Cost	Annual Implementation /Maintenance Cost	Total Annual Cost	Control Effectiveness (%)	Cost Effectiveness ($/ton)
Truck Covers	$10,848	$2,204	$2.19	$2,206.19	99%	$5,566.59

Table 6 Truck Cover Emissions

Measure	Baseline Emissions with Existing Measures (tons/yr-truck)	Emissions Reductions from New Measures (tons/yr-truck)
Truck Covers	0.400	0.396

2.6.2.2.3 Time Necessary for Compliance – Factor 2

Within 3 years of EPA approval of the SIP. Full compliance depends on enforcement and outreach.

2.6.2.2.4 Energy and Non-Air Quality Environmental Impacts of Compliance – Factor 3

Not applicable.

2.6.2.2.5 Remaining Useful Life of Potentially Affected Sources – Factor 4

The useful life of a truck cover is 8 years.

2.6.2.3 Alter load-in load-out procedures (e.g., load on downwind side, watering, empty loader slowly, keep bucket close to truck while dumping).

2.6.2.3.1 Technical Feasibility

ADEQ has determined that it is technically feasible to water bulk material.

2.6.2.3.2 Cost of Compliance – Factor 1

ADEQ used cost estimates from the 2001 San Joaquin Valley Cost Effectiveness Analysis of Regulation VIII adjusted for inflation. The cost of water was updated to a range of $5-$12 for 1,000 gallons based on the Arizona Chapter Associated General Contractors' (AZAGC) comments regarding the wide range in water costs based on the water district and existing infrastructure. Additionally, the watering frequency was updated to better represent southern Arizona climate conditions.

Table 7 Watering Bulk Material Costs

Measure Description	Capital Cost	Annualized Capital Cost	Annual Implementation /Maintenance Cost	Total Annual Cost	Control Effectiveness (%)	Cost Effectiveness ($/ton)
Watering	--	--	$4,364 - $4,431	$4,364 - $4,431	50%	$17,387- $17,652

Table 8 Watering Bulk Material Emissions

Measure	Baseline Emissions with Existing Measures (tons/yr-project)	Emissions Reductions from New Measures (tons/yr-project)
Watering	0.502	0.251

2.6.2.3.3 Time Necessary for Compliance – Factor 2

Within 3 years of EPA approval of the SIP. Full compliance depends on enforcement and outreach.

2.6.2.3.4 Energy and Non-Air Quality Environmental Impacts of Compliance – Factor 3

This will lead to increased water usage in some areas of the State that may potentially suffer from water limitations.

2.6.2.3.5 Remaining Useful Life of Potentially Affected Sources – Factor 4

Not applicable.

2.6.2.4 Utilize trackout control device, gravel pad, or other means to stabilize access points where unpaved traffic surfaces adjoin paved roads.

2.6.2.4.1 Technical Feasibility

The use of a pipe grid or gravel pad as a trackout control device is technically feasible.

2.6.2.4.2 Cost of Compliance – Factor 1

ADEQ used cost estimates, updated to reflect increase due to inflation, from the 2003 San Joaquin Valley plan for both a trackout control devices. For the pipe grid estimates, AZAGC provided a cost estimate, which was annualized over 5 years at a 4.75% rate. AZAGC also provided a maintenance expense for the gravel of $1,800 required three times annually for a one-year job. Administrative, tax, and insurance costs were estimated at 4% of the capital cost.

For the gravel pad control device, the San Joaquin Valley calculation was updated with the cost of installing a gravel pad, including material and labor, provided by AZAGC.

Table 9 Trackout Control Costs

Measure Description	Capital Cost	Annualized Capital Cost	Annual Implementation /Maintenance Cost	Total Annual Cost	Control Effectiveness (%)	Cost Effectiveness ($/ton)
Pipe grid	$2,500	$572.50	$5,500	$6,073	80%	$147,284
Gravel pad				$3,500	46%	$70,779

Table 10 Trackout Control Emissions

Measure	Baseline Emissions with Existing Measures (tons/yr-project)	Emissions Reductions from New Measures (tons/yr-project)
Pipe grid	0.052	0.041
Gravel pad	0.107	0.049

2.6.2.4.3 Time Necessary for Compliance – Factor 2

Within 3 years of EPA approval of the SIP. Full compliance depends on enforcement and outreach.

2.6.2.4.4 Energy and Non-Air Quality Environmental Impacts of Compliance – Factor 3

Not Applicable.

2.6.2.4.5 Remaining Useful Life of Potentially Affected Sources – Factor 4

Pipe grid can be used for up to 5 years at existing project or removed and used again at another project.

2.6.2.5 Provide for rapid clean-up of mud/dirt track out, material spills, on paved roads.

2.6.2.5.1 Technical Feasibility

The cleanup or sweeping of trackout/material spills on paved roads is technically feasible.

2.6.2.5.2 Cost of Compliance – Factor 1

ADEQ used a mid-point purchase cost from the 2020 MAG sweeper applications to gauge the price of a PM10 certified sweeper in Arizona. ADEQ used for a capital recovery factor of .1516, assuming 4.75% interest rate, and a useful life of eight years. ADEQ included the cost of taxes, insurance and administrative costs at approximately 4% of capital costs, $10,800.

ADEQ calculated emissions using CMAQ methodology, which includes a sweeping schedule of 14 days per circuit along freeways and principal arterials.[12] ADEQ assumed 11,250 ADT for freeways and 5250 ADT for principal arterials. The CMAQ methodology only calculates the annual emissions reduction for street sweeping.

For the rapid cleanup calculation, ADEQ used methodology from the 2003 San Joaquin Valley plan which includes the deposition clean up time, response driving time, with labor, equipment, and disposal costs. ADEQ used 2016 labor rates from Pinal County public works including two maintenance workers and one foreman.[13]

Table 11 Trackout Cleanup Costs

Measure Description	Capital Costs	Annualized Capital Cost	Annual Implementation/ Maintenance Cost	Total Annual Cost	Control Effectiveness (%)	Cost Effectiveness ($/ton)
Sweeping	$270,000	$41,364	$130,800	$172,164	16-26%	$6,916
Measure Description	Enforcement Costs	Equipment/ Labor Costs	Disposal Cost	Total Cost per Incident	Control Effectiveness (%)	Cost Effectiveness ($/ton)
Rapid Cleanup	$20	$664	$14	$698	100%	$7,031

Table 12 Trackout Cleanup Emissions

Measure	Baseline Emissions with Existing Measures (tons/yr-sweeper)	Emissions Reductions from New Measures (tons/yr-sweeper)
Sweeping	--	24.9

[12] https://www.azmag.gov/Portals/0/Documents/CMAQ_2011-04-05_Final-CMAQ-Methodologies_3-31-2011.pdf?ver=2017-04-06-110853-827
[13] https://www.pinalcountyaz.gov/HR/Documents/salaries.pdf

Measure	Baseline Emissions with Existing Measures (tons/yr-spill)	Emissions Reductions from New Measures (tons/yr-spill)
Rapid Cleanup	0.1	0.0992

2.6.2.5.3 Time Necessary for Compliance – Factor 2

Within 3 years of EPA approval of the SIP. Full compliance depends on enforcement and outreach.

2.6.2.5.4 Energy and Non-Air Quality Environmental Impacts of Compliance – Factor 3

Additional fuel and water usage for operation depending on remoteness of site.

2.6.2.5.5 Remaining Useful Life of Potentially Affected Sources – Factor 4

A street sweeper has a useful life of 8 years.

2.6.2.6 Apply water to disturbed surfaces and dust generating operations (pre-watering, operational).

2.6.2.6.1 Technical Feasibility

The application of water to disturbed surfaces and unpaved traffic areas is technically feasible.

2.6.2.6.2 Cost of Compliance – Factor 1

The 2001 San Joaquin Valley plan cost estimates for watering were used for both control measures and grown for inflation, as appropriate. For both controls the cost of water was updated to a range of $5-$12 for 1,000 gallons based on the AZAGC's comments regarding the wide range in water costs based on the water district and existing infrastructure. The labor and equipment cost was updated based on AZAGC's comments of $65/hr for water truck and $200/month plus $400 for backflow meter. Additionally, the watering frequency was updated to better represent southern Arizona climate conditions.

Table 13 Water Application Costs

Measure Description	Capital Cost	Annual Water Cost	Annual Implementation /Maintenance Cost	Total Annual Cost	Control Effectiveness (%)	Cost Effectiveness ($/ton)
Watering Unpaved Traffic Areas	--	$607 - $1,457	$7,726	$8,333 - $9,183	50%	$7,959 - $8,770
Watering Open Areas	--	$3,035 - $7,284	$25,029	$28,064 - $32,313	50%	$1,194,223 - $1,375,027

Table 14 Water Application Emissions

Measure	Baseline Emissions with Existing Measures (tons/yr-project)	Emissions Reductions from New Measures (tons/yr-project)
Watering Unpaved Traffic Areas	2.094	1.047
Watering Open Areas	0.047	0.024

2.6.2.6.3 Time Necessary for Compliance – Factor 2

Within 3 years of EPA approval of the SIP. Full compliance depends on enforcement and outreach.

2.6.2.6.4 Energy and Non-Air Quality Environmental Impacts of Compliance – Factor 3

Water availability in remote sites may be limited and could further stress the local desert environment.

2.6.2.6.5 Remaining Useful Life of Potentially Affected Sources – Factor 4

Not applicable.

2.6.2.7 Apply chemical stabilizers/dust suppressants to unpaved parking and staging areas.

2.6.2.7.1 Technical Feasibility

ADEQ has determined that the application of stabilizers or chemical dust suppressants to unpaved parking and staging areas is technically feasible. This is applicable unpaved parking lots and equipment staging areas on the construction site and is not intended as a control for areas of active construction.

2.6.2.7.2 Cost of Compliance – Factor 1

The cost estimates, updated to reflect the increase due to inflation, from the 2001 San Joaquin Valley plan were used for the acrylic polymer and gravel controls, with updates provided by AZAGC. For acrylic polymer AZAGC provided a cost of $750 per acre, which was annualized over two years at a 4.75% interest rate. AZAGC provided a cost estimate of $8,000 per acre for gravel, based on a cost of $20 per ton of gravel and 400 tons needed per acre at two inches thick. This cost for gravel was annualized over 10 years at a 4.75% interest rate.

The 1999 MAG PM10 Plan's cost estimate for paving was used with an update to the cost of asphalt. AZAGC provided an updated cost estimate for asphalt of $100 per ton, with 550 tons needed per acre at two inches thick. This cost, along with the costs for the subgrade preparation and aggregate base installation, which were both adjusted for inflation, were annualized over 20 years at a 4.75% interest rate. ADEQ included the cost of taxes, insurance and administrative costs at approximately 4% of capital costs.

Table 15 Dust Suppressants Costs

Measure Description	Capital Cost	Annualized Capital Cost	Annual Implementation /Maintenance Cost	Total Annual Cost	Control Effectiveness (%)	Cost Effectiveness ($/ton)
Acrylic Polymer	$750/acre	$402	--	$402	80%	$479
Gravel	$8,000/acre	$1,024	$350	$1,374	60%	$2,181
Paving	$101,776/acre	$7,995	$4,722	$12,716	99%	$5,861

Table 16 Dust Suppressants Emissions

Measure	Baseline Emissions with Existing Measures (tons/yr-project)	Emissions Reductions from New Measures (tons/yr-project)
Acrylic Polymer	1.047	0.840
Gravel	1.047	0.630
Paving	0.006	0.006

2.6.2.7.3 Time Necessary for Compliance – Factor 2

Within 3 years of EPA approval of the SIP. Full compliance depends on enforcement and outreach.

2.6.2.7.4 Energy and Non-Air Quality Environmental Impacts of Compliance – Factor 3

Potential environmental impacts from dust suppressant may include surface and ground water deterioration, soil contamination, toxicity to soil and water biota, toxicity to humans during and after applications, air pollution from collective dust suppressant components, changes in the hydrologic characteristics of the soils and impacts on native flora and fauna populations.

2.6.2.7.5 Remaining Useful Life of Potentially Affected Sources – Factor 4

The useful life of acrylic polymer dust suppressant is 2 years, gravel is 10 years, and paving is 20 years.

2.6.2.8 Limit, restrict or reroute motor vehicle access to work site.

2.6.2.8.1 Technical Feasibility

The limiting of trespassing on work sites through the use of signage and physical barriers is technically feasible.

2.6.2.8.2 Cost of Compliance – Factor 1

Estimated from Measure 4 of the West Pinal County PM10 Nonattainment Area SIP, Appendix F (pg. 44): Limit trespass in open areas and vacant lots. Values were scaled assuming an average 34 acre[14] square ICI construction site with 6 signs (1 on each side and one for each of 2 access points). The cost to fence a 34 acre lot would be $92,131 (assuming $12 per linear foot of fencing) and $2,229 for signage for a total cost of $94,360 for each site. #5 control efficiency reported in West Pinal County PM10 Nonattainment Area SIP, assuming a rule effectiveness of 85% and rule penetration of 99.5% results in a control effectiveness of 2.54%. Pinal County commercial EF is 0.032 tons/acre-month. Assuming 12 month average permit length and 34 acres per site, the total emissions per site are 12.05 tons/site. 92.3% of total site emissions are related to some portion of travel. Therefore, 0.306 ton/site would be controllable by access restriction.

Table 17 Limit Motor Vehicle Access Costs

Measure Description	Capital Cost	Annualized Capital Cost	Annual Implementation /Maintenance Cost	Total Annual Cost	Control Effectiveness (%)	Cost Effectiveness ($/ton)
Limit trespass	$94,360	$14,016	--	$17,791	3%	$58,186 /ton

Table 18 Limit Motor Vehicle Access Emissions

Measure	Baseline Emissions with Existing Measures (tons/yr-project)	Emissions Reductions from New Measures (tons/yr-project)
Limit trespass	12.05	0.306

2.6.2.8.3 Time Necessary for Compliance – Factor 2

Within 3 years of EPA approval of the SIP. Full compliance depends on enforcement and outreach.

2.6.2.8.4 Energy and Non-Air Quality Environmental Impacts of Compliance – Factor 3

Not applicable.

[14] ADEQ assumed a 34 acre lot, as this is what was estimated to equate to ~100 tpy of PM_{10} emissions. ADEQ relied on a 0.27 tons/acre-month emission factor to estimate this emission rate. The 0.27 tons/acre-month emission rate is consistent with the uncontrolled ICI construction emission rate utilized in the 2015 West Pinal Moderate PM10 Nonattainment Area SIP.

2.6.2.8.5 Remaining Useful Life of Potentially Affected Sources – Factor 4

Noncommercial/barbed wire fencing has a useful life of 10 years. Signage has a useful life of up to 5 years, when reflectivity begins to wear off. Project specific signage less than 1 year depending on material.

2.6.2.9 Limit vehicle speed at work site.

2.6.2.9.1 Technical Feasibility

It is technically feasible to limit vehicle speed at work sites to 15 mph and to post signage indicating speed limits.

2.6.2.9.2 Cost of Compliance – Factor 1

The 2003 San Joaquin Valley plan cost estimate for limiting vehicle speed was used and adjusted for inflation. The 2003 San Joaquin Valley cost estimate for posting signage was updated with a cost for four signs of $1,600 provided by the AZAGC. Additionally, ADEQ assumed a 34 acre construction lot.

Table 19 Limit Vehicle Speed Costs

Measure Description	Capital Cost	Annualized Capital Cost	Annual Implementation /Maintenance Cost	Total Annual Cost	Control Effectiveness (%)	Cost Effectiveness ($/ton)
Speed limit reduction	$1,268.00	$194.20	$184.10	$207.41	50%	$1,605.30
Post signage	$1,600.00		--	$1,600.00	75%	$8,113.59

Table 20 Limit Vehicle Speed Emissions

Measure	Baseline Emissions with Existing Measures (tons/yr-project)	Emissions Reductions from New Measures (tons/yr-project)
Speed limit reduction	1.047	0.129
Post signage	1.047	0.197

2.6.2.9.3 Time Necessary for Compliance – Factor 2

Within 3 years of EPA approval of the SIP. Full compliance depends on enforcement and outreach.

2.6.2.9.4 Energy and Non-Air Quality Environmental Impacts of Compliance – Factor 3

Not applicable.

2.6.2.9.5 Remaining Useful Life of Potentially Affected Sources – Factor 4

The reflectivity of signs will begin to wear off after 5 years.