Revised Risk Reduction Plan
Rule 1402

Prepared for:
Hixson Metal Finishing
Newport Beach, California

Prepared by:
Ramboll Environ US Corporation

Initial Submittal Date:
March 2, 2015

Revised Submittal Date:
June 5, 2015

Revised Submittal Date:
July 1, 2015

Joseph Hower, PE, DEE
Principal

RAMBOLL ENVIRON

Certification [(f)(3)(I)]

I certify that this Risk Reduction Plan meets the requirements for such plans set forth in South Coast Air Quality Management District Rule 1402(f)(3) and that I am officially responsible for the processes and operations of the Hixson Metal Finishing facility in Newport Beach, California.

Doug C. Greene

Douglas C. Greene
President

6-30-15

Date

Contents

Acronyms and Abbreviations

AB:	Assembly Bill
ARB:	(California) Air Resources Board
AER:	Annual Emissions Report
AERMOD:	American Meteorological Society/Environmental Protection Agency regulatory air dispersion model
Cr(VI):	Hexavalent chromium
CFM:	Cubic Feet Per Minute
HARP:	Hotspots Analysis and Reporting Program
HEPA:	High-efficiency particulate air
HI:	Hazard Index
HNO_3:	Nitric Acid
HRA:	Health Risk Assessment
MEIR:	Maximally Exposed Individual Resident
MEIW:	Maximally Exposed Individual Worker
MEISR:	Maximally Exposed Individual Sensitive Receptor
NBFD:	Newport Beach Fire Department
NDO:	Natural Draft Openings
NED:	National Elevation Dataset
NO_x:	Nitrogen Oxides
OEHHA:	Office of Environmental Health Hazard Assessment
PMI:	Point of Maximum Impact
PPM:	Parts Per Million
PTC	Permit to Construct
PTE	Permanent Total Enclosure
R&D:	Research and Development
RRP:	Risk Reduction Plan
SCAQMD:	South Coast Air Quality Management District
TAC:	Toxic Air Contaminant
ULPA:	Ultra-Low Penetration Air
USEPA:	United States Environmental Protection Agency
USGS:	United States Geological Survey
UTM:	Universal Transverse Mercator
WBAN:	Weather Bureau Army Navy

List of Units

g:	gram	s:	second
kg:	kilogram	yr:	year

Executive Summary

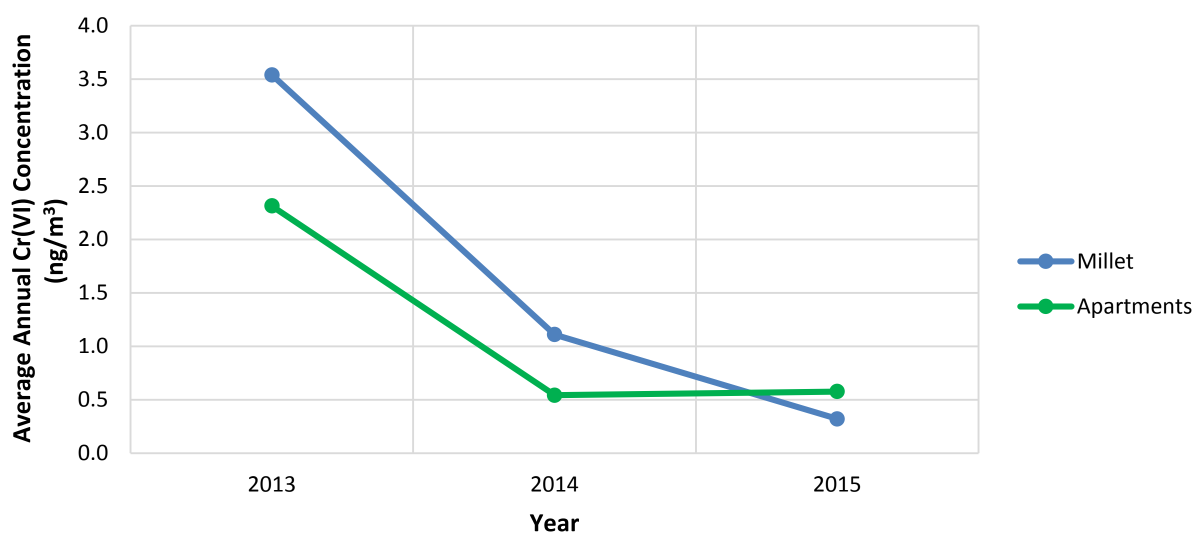
On November 14, 2014, Hixson Metal Finishing (“the Facility” or “Hixson”, SCAQMD Facility ID 011818) submitted a Health Risk Assessment (HRA) for its facility in Newport Beach, California, pursuant to the April 3, 2014 letter from Ms. Susan Nakamura, Director of Strategic Initiatives at the South Coast Air Quality Management District (SCAQMD or “the District”) and following the requirements of the Air Toxics "Hot Spots" Information and Assessment Act ([Assembly Bill] AB 2588) and SCAQMD Rule 1402. On May 8, 2015, SCAQMD approved the HRA with the following modifications: (1) expanded receptor network and (2) re-evaluation of the potential risks using the new version of the Hotspots Analysis and Reporting Program (HARP2) ([Air Resources Board] ARB 2015), which incorporates the new Office of Environmental Health Hazard Assessment (OEHHA) Risk Assessment Guidelines (OEHHA 2015). While the emissions and air dispersion modeling did not change in the modified version of the HRA, due to the revised risk assessment methodology, modeled cancer risks at residential receptors increased by a factor of about 3.7, due solely to the more stringent assumptions imposed under HARP2. Revisions in the risk assessment methodology include, among other things, refinements of the assumptions and methodologies relating to children, and refinements to intake rates for various exposure pathways including inhalation, soil, dermal, and home grown produce. References to the HRA throughout this report refer to the modified HRA as detailed in the May 8, 2015 letter from SCAQMD. The health risk parameters chosen in the HARP2 model are consistent with the SCAQMD Draft Supplemental Guidelines for Preparing Risk Assessments for the Air Toxics “Hot Spots” Information and Assessment Act (“Draft SCAQMD Supplemental Guidelines”) (SCAQMD 2015a).

Prior to the HRA approval, at the request of the SCAQMD, Hixson submitted an initial RRP on March 2, 2015, recognizing that much of the content presented in the RRP was subject to change based on comments received on the HRA, further discussions with SCAQMD, and other considerations regarding proposed Facility modifications. SCAQMD issued a letter on May 8, 2015 disapproving the March 2, 2015 RRP and making recommendations in a number of areas. Hixson submitted a revised RRP on June 5, 2015, pursuant to the direction of the May 8, 2015 letter from Mohsen Nazemi, Deputy Executive Officer at SCAQMD. SCAQMD issued a letter on June 26, 2015 disapproving the June 5, 2015 revised RRP and requesting additional revisions. The revised RRP, submitted on June 5, 2015, contained an attachment (Attachment 1) which proposed alternative risk reduction measures (Scenario C) that were under discussion with SCAQMD staff. Those alternative measures (a dual scrubber scenario), with certain modifications requested by SCAQMD staff, are essentially the same measures proposed in this revised RRP. The Facility submits this revised RRP in accordance with Rule 1402(f)(2) requirements and in response to feedback provided by SCAQMD to date.

Facility History

The District has been monitoring hexavalent chromium [Cr(VI)] concentrations at locations close to the Facility since 2003 (for the Millet monitor) and 2011 (for the Apartments monitor).[1] At the direction of SCAQMD, Hixson was required to prepare a HRA based exclusively on 2013 data (herein referred to as the "2013 HRA"), including the requirement to "reconcile the facility's Cr(VI) [hexavalent chromium] emissions and subsequent dispersion model results with the observed ambient Cr(VI) concentrations measured in 2013". However, the 2013 HRA results are not indicative of past long term operations or current and future operations at the Facility. 2013 is the peak year for Cr(VI) monitoring results at the Millet and Apartments monitors. Since 2013, as shown in Figure ES-1, below, the monitored concentrations have dropped significantly.[2] Since excess cancer risk is evaluated with 9-year, 25-year, 30-year, and 70-year periods, using monitoring results only from 2013 does not provide an accurate estimate of actual risk due to Facility operations, and, in effect, improperly skews the results, producing a higher modeled risk than actually exists from Facility operations.

Figure ES-1. Cr(VI) Annual Monitoring Trends



Further, since 2013, Hixson has made and implemented a number of sustainable changes in equipment operations, and Facility procedures that have effectively further reduced any potential Cr(VI) emissions and associated risks. These changes include the following:

- Installed covers on all heated tanks that contain Cr(VI);

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[1] Since January 2011, the SCAQMD has operated two Cr(VI) monitors located adjacent to the Facility, one at the Millet location and one at the Apartments location. The Millet monitor was first installed in 2003. A second monitor at Millet was added in January 2011, but has since been removed, therefore only monitoring results from the monitor originally installed at the Millet location were evaluated.

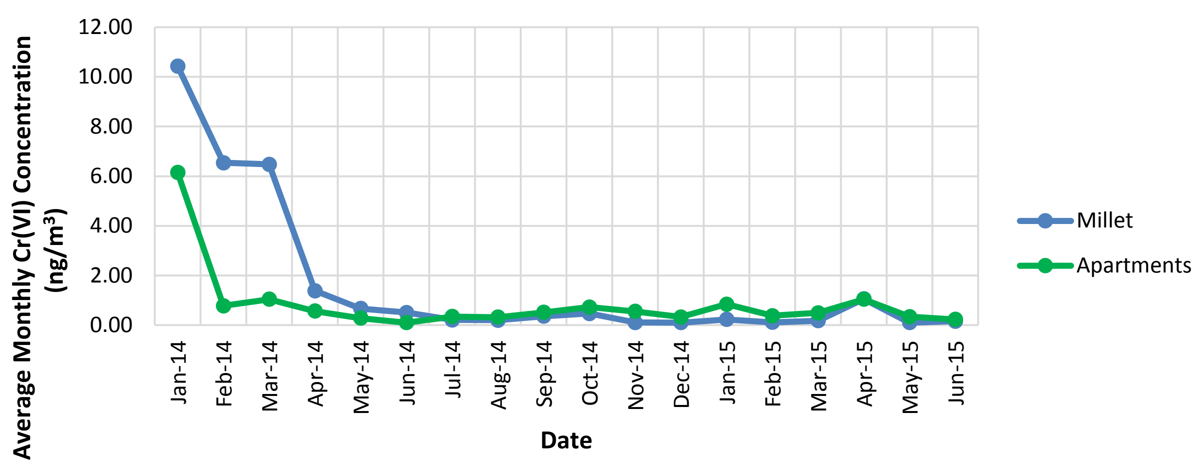
[2] 2015 average annual concentrations incorporate sampling data through June 22, 2015.

- Sealed the concrete floors of the High-efficiency particulate air (HEPA) chambers of both spray booths with an epoxy coating;
- Had both spray booths and HEPA chambers and filters professionally inspected by the manufacturers and corrected any issues found (replaced door seals, sealed small access holes);
- Had all gauges inspected and calibrated;
- Interviewed and re-trained all employees to report any fugitive emissions that may be witnessed;
- Retrained all employees in fugitive dust control and cleanup;
- Installed a high efficiency sanding and scuffing booth equipped with HEPA filtration in order to eliminate any fugitive emissions from those operations;
- Replaced the exhaust stack serving the number 2 spray booth;
- Increased wash down and mop up activities in all areas that may create chrome containing dust;
- Voluntarily replaced all HEPA filters in the spray booths and in the process upgrading them to Ultra-low particulate air (ULPA) (99.999%) filters;
- Installed a complete enclosure around spray booth number 2 in order to eliminate any possible fugitive emissions;
- Over the past several years, replaced and/or upgraded equipment in order to reduce chrome emissions and remain compliant with all SCAQMD rules and regulations. This includes the modification/replacement of both of the spray booths as well as the installation of a new scrubber system on the chromic anodizing tank (all have been upgraded to ULPA filters running at 99.999%);
- More recently, the Facility has voluntarily shut down anodizing operations and has worked with the District to test for chromium compounds within the solutions of every tank located within the anodizing line;
- Installed poly balls (turtles) in a number of processing tanks that contain Cr(VI) as part of their initial makeup;
- Conducted air monitoring tests above all tanks that contain Cr(VI) as part of their makeup and have provided all data to the District as it becomes available;
- Conducted recent source testing of the chromic anodizing tank (tank 70) that shows that emission levels are well within Rule 1469 parameters;
- Conducted ambient air monitoring in and around the chromic anodizing tank (tank 70) that indicates employee exposure to be minimal and within published guidelines and regulations;
- Conducted employee exposure monitoring in various locations of the Facility to ascertain that employee exposure levels to numerous metal compounds (in addition to chromium levels) are below occupational health levels;

- Worked with SCAQMD and modified production schedules in order to accommodate SCAQMD inspections and monitoring efforts so SCAQMD personnel could witness/test anodizing operations, spraying operations, and clean up and filter change operations;
- Encapsulated and shut down roof Fan No. 4 on Building 2;
- Modified the Tank 70 scrubber hood on the chromic acid anodize line, to include an enclosure around the work area.

The effectiveness of the significant and sustainable operational and procedural changes discussed above can be shown by looking at the results of the Cr(VI) monitoring stations nearby the Facility, shown in Figure ES-2 below. As can be seen from this figure, average Cr(VI) concentrations measured in the last full 12-month period (May, 2014 – April, 2015) at the Millet and Apartments monitors are, respectively, 97% and 92% below the average January, 2014 concentrations.

Figure ES-2. 2014-Current Cr(VI) Monitoring Trends



To account for these significant and sustainable changes and to serve as the baseline for this RRP, an additional HRA was prepared ("Baseline HRA") based on the last 12-months of monitoring data (May, 2014 – April, 2015) to more accurately reflect current operations at the Facility. As discussed in Section 3 below, the modeled cancer risks at the maximally exposed individual resident (MEIR) have been reduced by 86% in the Baseline HRA, as compared to the 2013 HRA. The RRP presented here builds from the results of this Baseline HRA, since the operational and procedural changes discussed above already have been implemented, are sustainable, and will continue to apply to future Facility operations.

The proposed Facility changes discussed in this revised RRP have been developed based on consultations with SCAQMD, as well as with Hixson's contractors, consultants, and vendors. Hixson believes that this RRP is responsive to the SCAQMD input and feedback provided thus far. This revised RRP presents and discusses risk reduction measures currently proposed (largely the measures set forth in Attachment 1, Scenario C, of Hixson's June 5, 2015 RRP) and provides an assessment of the expected emissions reductions and corresponding risk levels following completion of all measures proposed (or equivalent measures).

The additional risk reduction measures currently proposed and discussed in this RRP are as follows:

1. Construction of a Permanent Total Enclosure (PTE) for the Anodizing and Chemfilm operations in Building 2 in accordance with the United States Environmental Protection Agency (USEPA) Method 204, assuming approval by the City of Newport Beach (which, under the City's ordinances, must approve certain design features encompassed within this risk reduction measure). Based on discussions with City of Newport Beach staff, Hixson anticipates that the City will approve these design features.

   The proposed scrubber design includes the following primary elements:

   a. One dry scrubber (at 14,300 cfm; with 13,300 cfm supplied to Building 2 and 1,000 cfm supplied to the Waste Treatment area) equipped with Ultra-low particulate air (ULPA) filters will directly vent the Cr(VI)-containing tanks using hoods and push air.

   b. A separate, wet acid scrubber with mesh pads (at 9,000 cfm; with 7,000 cfm supplied to Building 2 and 1,000 cfm supplied to each of the General Plate and Precious Metals Departments) will be used to vent the entire building.

   c. Fast, self-opening and -closing doors will be installed at the southeast and northeast corners of the building, leaving only one opening of 10' by 10' during normal operations, and mitigating cross drafts that may occur within the building.

2. Tank 100 currently in the VacCad department in Building 1 will be relocated to the General Plate Department in Building 3.

3. Tanks 96, 99, 177, and 178 within the Electroless Nickel Department in Building 2 have been taken out of service.

4. Tanks 87, 97, and 98 have been moved from the Electroless Nickel Department to the Research and Development (R&D) area in Building 3.

5. Similar to Building 2, a new dry scrubber equipped with ULPA filters will be added to directly vent the Cr(VI)-containing tanks in Building 3. To handle any potential cyanide fumes, the General Plate and Precious Metals areas will share a cyanide mist eliminator. All cyanide-containing tanks will be equipped with a hood and directly vented to the mist eliminator. In addition to the dry scrubber and cyanide mist eliminator, these areas will be provided with additional ventilation from the wet acid scrubber with mesh pads discussed in Risk Reduction Measure #1.

6. The two chromic tanks that are now located in the Precious Metals Department will be moved to the General Plate Department. A wall will be placed at the entrance to the General Plate Department in Building 3 to make a PTE (in accordance with USEPA Method 204) with two openings that will be approximately 3 feet by 7 feet. The existing wall on the Precious Metals Department will remain, with a door opening of approximately 6 feet by 7 feet. As discussed in Risk Reduction Measure #5, the Cr(VI)-containing tanks in the General Plate Department will be vented to a dry scrubber equipped with ULPA

filtration and both the General Plate and Precious Metals Departments will have additional ventilation from the wet acid scrubber with mesh pads discussed in Risk Reduction Measure #1.

7. The Patio and Waste Treatment area in between Buildings 2 and 3 will be enclosed using a plastic curtains to make a PTE (in accordance with USEPA Method 204). The new proposed dry scrubber in Building 2, and discussed in Risk Reduction Measure #1 above, will pull approximate 1,000 cfm from this area to control any potential fugitive Cr(VI) emissions.
8. Covers will be installed over the tanks in the Waste Treatment area that would not be included in the enclosed area above. These tanks will include the lamella and final pH adjustment tanks.
9. The demasking operation in Building 3 will be moved to Building 4 and will be equipped with two downdraft tables, each venting to High-efficiency particulate air (HEPA) filters.
10. Storage of paint racks and supersacks have been moved from in-between Buildings 3 and 4 to inside Building 4. To control any potential fugitive Cr(VI) emissions from the storage of paint racks or supersacks, or from uncaptured emissions from painting, scuffing, or demasking operations, Building 4 will be enclosed to create a PTE in accordance with USEPA Method 204, and vented to a building-wide ULPA unit. A solid wall will be constructed on the central western section of the building, enclosing the paint, demasking, and final inspection area. Additionally, the roll-up door located at the southeast corner of the building will remain closed during normal operations. Should the door need to be opened for the transfer of any parts and/or materials, in additional to the building wide ventilation unit equipped with ULPA filters, a curtain of plastic strips will also be installed at the roll-up door to prevent any potential Cr(VI) emissions from escaping the building.
11. A HEPA filtration system will be installed at the exhaust of the vacuum metalizing chamber.
12. Unused ductwork on Building 2 will be inspected and sealed or removed to the extent practical.
13. In addition to policies and procedures already implemented, Hixson will implement other policies and procedures to further reduce the potential for fugitive emissions including:

    a. Regularly, at least daily, HEPA vacuuming of the paint rack and supersack storage area in Building 4, along with many other areas of the Facility.
    b. Continuing to evaluate its operations to further identify and alleviate or minimize the potential for fugitive emissions.

14. The sanding and scuffing booth in Building 4 will be equipped with an HEPA filtration unit and exhausted through the roof of Building 4 to two stacks, rather than within Building 4.

To accommodate all potential changes proposed above, Hixson is also proposing the following changes in source location and configuration:

1. Paint Booth 1, Oven 6, Oven 7, and all demasking, preparation, and packaging operations will be moved from Building 3 to Building 4. In order to maintain the production levels, the

addition of a paint booth (Paint Booth 3) and oven (Oven 14) will be required in Building 4. Masking, Masking supermarket, Maintenance, DI Water Supply, and the Steico cell will subsequently be moved to 861 Production Place (Building 5).

2. The new anodize line in Building 2 is currently being constructed, as indicated in previous PTCs submitted to SCAQMD.

Further, as mentioned above, Hixson has already made modifications to existing equipment to reduce both fugitive and point source emissions including, but not limited to, the following:

1. The exhaust stack on Paint Booth 2 was replaced due to the buildup of paint on the interior of the stack.
2. Hixson voluntarily upgraded the HEPA filters on Paint Booth 1, Paint Booth 2, and the Anodize Scrubber to 99.999% ULPA filters.
3. Hixson voluntarily purchased and installed a sanding/scuffing booth to eliminate possible fugitive emissions from the process of sanding/scuffing possible chrome containing primers prior to applying a topcoat.
4. All six of the abrasive blasting cabinets at the Facility are now enclosed. Four of the cabinets are located at the backside of Building 1 in an enclosed room and the other two cabinets are located in Building 3 in the preparation area of the General Plate line. Each of the cabinets is equipped with a filtration system that will provide adequate capture of particulate matter that is produced during the abrasive blasting process.
5. Hixson has voluntarily implemented many new policies and procedures to further reduce the potential of any fugitive emissions, which have added hundreds of hours annually to the tasks performed by the production and maintenance personnel. These procedures have modified and/or augmented the processes dealing with cleanup activities (i.e. HEPA vacuuming as opposed to sweeping), changes in filter removal and changes outs, the addition of chemical constituents to processing tanks and the handling of waste that may contain chromium compounds.
6. Over the past several years, Hixson has revised and submitted new permit applications due to changes recommended by SCAQMD staff and to address other changes voluntarily implemented by Hixson.

Based on the estimation of post-implementation risk discussed in Appendix A, and summarized in Section 6, if the proposed (or equivalent) risk reduction measures currently proposed and discussed further in Section 5 are approved by the SCAQMD and implemented by Hixson, modeled cancer risks at the maximum exposed individual resident (MEIR) are reduced to 0.8 in a million, modeled cancer risks at the maximum exposed individual worker (MEIW) are reduced to 0.4 in a million, both of which are below the SCAQMD Rule 1402 Action Risk Level of 25 in a million. Additionally, the modeled cancer burden will be reduced to 0, as the modeled cancer risk at the MEIR is below one in a million. The maximum chronic hazard indices (HIs) and maximum acute HIs all remain below the SCAQMD public notification thresholds. In summary, the Facility’s future operations and risk profile satisfy Rule 1402 standards, when the measures proposed (or equivalent measures) are implemented.

1 Introduction

On November 14, 2014, Hixson Metal Finishing ("the Facility" or "Hixson", SCAQMD Facility ID 011818) submitted a Health Risk Assessment (HRA) for its facility in Newport Beach, California, pursuant to the April 3, 2014 letter from Ms. Susan Nakamura, Director of Strategic Initiatives at the South Coast Air Quality Management District (SCAQMD or "the District") and following the requirements of the Air Toxics "Hot Spots" Information and Assessment Act ([Assembly Bill] AB 2588) and SCAQMD Rule 1402. On May 8, 2015, SCAQMD approved the HRA with the following modifications: (1) expanded receptor network and (2) re-evaluated the potential risks using the new version of the Hotspots Analysis and Reporting Program (HARP2) ([Air Resources Board] ARB 2015), which incorporates the new Office of Environmental Health Hazard Assessment (OEHHA) Risk Assessment Guidelines (OEHHA 2015). While the emissions and air dispersion modeling did not change in the modified version of the HRA, due to the revised risk assessment methodology, modeled cancer risks at residential receptors increased by a factor of about 3.7, due solely to the more stringent assumptions imposed under HARP2. Revisions in the risk assessment methodology include, among other things, refinements of the assumptions and methodologies relating to children, and refinements to intake rates for various exposure pathways including inhalation, soil, dermal, and home grown produce. References to the HRA throughout this report refer to the modified HRA as detailed in the May 8, 2015 letter from SCAQMD. The health risk parameters chosen in the HARP2 model are consistent with the SCAQMD Draft Supplemental Guidelines for Preparing Risk Assessments for the Air Toxics "Hot Spots" Information and Assessment Act ("Draft SCAQMD Supplemental Guidelines") (SCAQMD 2015a).

Prior to the HRA approval, at the request of the SCAQMD, Hixson submitted an initial RRP on March 2, 2015, recognizing that much of the content presented in the RRP was subject to change based on comments received on the HRA, further discussions with SCAQMD, and other considerations regarding proposed Facility modifications. SCAQMD issued a letter on May 8, 2015 disapproving the March 2, 2015 RRP and making recommendations in a number of areas. Hixson submitted a revised RRP on June 5, 2015, pursuant to the direction of the May 8, 2015 letter from Mohsen Nazemi, Deputy Executive Officer at SCAQMD. SCAQMD issued a letter on June 26, 2015 disapproving the June 5, 2015 revised RRP and requesting additional revisions. The revised RRP, submitted on June 5, 2015, contained an attachment (Attachment 1) which proposed alternative risk reduction measures (Scenario C) that were under discussion with SCAQMD staff. Those alternative measures (a dual scrubber scenario), with certain modifications requested by SCAQMD staff, are essentially the same measures proposed in this revised RRP. The Facility submits this revised RRP in accordance with Rule 1402(f)(2) requirements and in response to feedback provided by SCAQMD to date.

Rule 1402(f)(3) outlines the contents to be included in such Risk Reduction Plans. To facilitate review, this document follows that outline. The primary elements of this plan are as follows:

- A list of potential Facility changes and control measures currently being considered to further reduce emissions,
- A proposed schedule for implementing those measures, and

- A projection of the future expected risk from the Facility after implementation of all these potential (or equivalent) measures.

In compliance with Rule 1402, this revised RRP presents additional risk reduction measures the Facility is proposing to further reduce emissions, and to ensure that the risk reductions are sustainable. Hixson reserves the right to amend or modify this RRP depending on the results of future SCAQMD discussions and rulemaking that may impact the Facility.

2 Facility Identification [(f)(3)(A)]

This Plan is for the following facility:

Hixson Metal Finishing
829 Production Place
Newport Beach, California 92663

SCAQMD Facility ID 011818
SIC Code 3471, NAICS Code 332813

3 Risk Characterization [(f)(3)(B)]

The AB 2588 HRA for this Facility, submitted on November 14, 2014 and approved with modifications by SCAQMD on May 8, 2015, indicated the following theoretical risk metrics for the 2013 HRA, based on conservative modeling parameters. Model results are shown both for the health assessment guidelines in place at the time Hixson submitted the HRA on November 14, 2014 (using the HARP1 model) (ARB 2012) and per the current guidelines in place, which were used in the SCAQMD letter on May 8, 2015 (using the HARP2 model) (ARB 2015). The potential Facility emissions and air dispersion modeling in both 2013 scenarios are identical. These theoretical risks were calculated using potential emissions as presented in the 2013 Annual Emissions Report (AER) as well as potential fugitive hexavalent chromium [Cr(VI)] emissions as determined through modeling-monitoring reconciliation relying only on 2013 offsite monitoring data, as required by the SCAQMD.

Additionally, as discussed above, Hixson has already completed significant and sustainable operational and procedural changes to reduce both potential point source and fugitive Cr(VI) emissions. To demonstrate the reduction in nearby Cr(VI) concentrations, and the corresponding reduction in risk, that has occurred since 2013 operations, a Baseline HRA was prepared, which indicated the following theoretical risk metrics, based on conservative modeling parameters.

As will be discussed in detail below, based on the estimated emissions reductions associated with the proposed or equivalent Risk Reduction Measures discussed in Section 5, the Facility has projected the facility-wide risk that would remain after the implementation of the proposed measures (Post-Implementation HRA).

Risk/Hazard Index	**2013 HRA (HARP1)**	**2013 HRA (HARP2)**	**Baseline HRA**	**Post-Implementation HRA**
Maximally Exposed Individual Resident cancer risk	407 in one million	1502 in one million	211 in one million	0.8 in one million
Maximally Exposed Individual Resident cancer risk, without the home grown produce pathway	407 in one million	958 in one million	135 in one million	0.6 in one million
Maximally Exposed Individual Worker cancer risk	90 in one million	88 in one million	13 in one million	0.4 in one million
Cancer Burden	0.21	1.09	0.11	0
Maximum Chronic Hazard Index, Resident	0.03	0.04	0.05	0.002
Maximum Chronic Hazard Index, Worker	0.07	0.07	0.07	0.006
Maximum 8-hour Chronic Hazard Index	--	0.001	0.002	0.0002
Maximum Acute Hazard Index, PMI	0.15	0.15	0.25	0.04

Potential risks at the Maximally Exposed Individual Resident (MEIR) are presented both with and without the home grown produce pathway, as that pathway almost doubles the potential cancer risk. The home grown produce pathway assumes that 13.7% of a resident's total fruit and vegetable intake is composed of home grown produce; however, in an urban area such as Newport Beach or Costa Mesa, it is unlikely that many households have gardens large enough to produce this amount, if they have gardens at all. Therefore the average fraction of a resident's diet from home grown produce is expected to be much lower or nonexistent.

This RRP presents further changes that are proposed for implementation at the Facility, to further reduce risks in accordance with SCAQMD Rule 1402.

4 Sources For Risk Reduction [(f)(3)(C)]

As discussed above, since 2013, Hixson made significant and sustainable changes in equipment operations and procedures in an effort to further reduce potential Cr(VI) emissions and associated risks. To account for these changes and reflect current operations at the Facility, a Baseline HRA was prepared in addition to the 2013 HRA. The RRP presented here builds from the results of the Baseline HRA, since the operational and procedural changes discussed above are sustainable and will apply to future Facility operations.

Results of the Baseline HRA indicate that only the potential excess cancer risk calculated at the modeled MEIR exceeds the SCAQMD Rule 1402 Action Risk Level of 25 in a one million. Potential excess cancer risks calculated at the modeled Maximally Exposed Individual Worker (MEIW) and Maximally Exposed Individual Sensitive Receptor (MEISR), all chronic and acute HIs, and cancer burden are below SCAQMD Rule 1402 Action Risk Levels of 25 in one million, 3.0, and 0.5, respectively. As such, identification of sources from which risk needs to be reduced, as required in SCAQMD Rule 1402(f)3)(C), will focus on risks at the modeled MEIR.

As shown in the Baseline HRA, 98% of the calculated cancer risk at the modeled MEIR is due to potential Cr(VI) emissions and 2% due to potential cadmium emissions. Further, over 99% of the modeled cancer risk is from potential fugitive emission sources (located at or in-between Facility buildings). Therefore, the focus of risk reduction is on potential fugitive emissions sources of Cr(VI). Further control of these potential fugitive emissions will significantly reduce emissions and be sufficient to achieve the Action Risk Levels.

5 Evaluation and Specification of Available Risk Reduction Measures and Proposed Schedule [1402(f)(3)(D), (f)(3)(E), and (f)(3)(F)]

To reduce potential fugitive Cr(VI) emissions at the Facility, the following additional risk reduction measures are proposed by Hixson. While all or portions of some measures have already been completed or are underway, the Facility reserves the right to modify proposed measures discussed herein based on further discussions with SCAQMD and other considerations regarding proposed Facility modifications. Estimated emissions reductions presented below are approximate and are based on information known to date. Such estimates may be revised as a result of ongoing discussions with SCAQMD staff. Facility changes made before the baseline period of May 2014 to April 2015 were not accounted for as additional risk reduction measures below, as they are already taken into account in calculating estimated potential fugitive Cr(VI) emissions from current Facility operations, and serve as the baseline of this RRP.

The completion dates as provided in the following Risk Reduction Measures are based upon best estimates at this time. Future issues that may arise from permitting and approval from local and/or other agencies or delays in procurement of certain equipment may affect proposed schedules presented herein.

Risk Reduction Measure #1: Construction of a Permanent Total Enclosure (PTE) for the Anodizing and Chemfilm operations in Building 2 in accordance with the United States Environmental Protection Agency (USEPA) Method 204, assuming approval by the City of Newport Beach (which, under the City's ordinances, must approve certain design features encompassed within this risk reduction measure). Based on discussions with City of Newport Beach staff, Hixson anticipates that the City will approve these design features.

Details of the proposed scrubber design are included in Attachment 1, and include the following primary elements:

a. One dry scrubber (at 14,300 cfm; with 13,300 cfm supplied to Building 2 and 1,000 cfm supplied to the Waste Treatment area) equipped with Ultra-low particulate air (ULPA) filters will directly vent the Cr(VI)-containing tanks using hoods and push air.

b. A separate, wet acid scrubber with mesh pads (at 9,000 cfm; with 7,000 cfm supplied to Building 2 and 1,000 cfm supplied to each of the General Plate and Precious Metals Departments) will be used to vent the entire building.

c. Fast, self-opening and -closing doors will be installed at the southeast and northeast corners of the building, leaving only one opening of 10' by 10' during normal operations, and mitigating cross drafts that may occur within the building.

Preliminary approval to satisfy Section 2704.3.1 of the 2007 California Fire Code has been provided by the Newport Beach Fire Department (NBFD) for the latest scrubber design as indicated above. Final approval will require the submittal of modified plans and final signoff by the NBFD.

Assuming the final approval from the NBFD (which is anticipated), as well as further engineering design, the criteria to satisfy the definition of PTE under USEPA Method 204 will be met as follows:

- Per the current scrubber design specifications, both scrubbers (the proposed dry scrubber and the proposed wet acid scrubber with mesh pads) will be pulling a total of approximately 20,300 cubic feet per minute (cfm) (13,300 cfm from the dry scrubber and 7,000 cfm from the wet acid scrubber with mesh pads). Due to the proposed installation of the fast, self-opening and –closing doors, the natural draft openings (NDOs) in the building consists of one roll-up door, 10 feet by 10 feet (entry doors would be closed during routine operation), providing a maximum opening area of 100 square feet. The resulting inward facial velocity would then be 20,300/100 = 203 feet/minute. This meets the minimum average facial velocity of 200 feet/minute through all NDOs, as required by USEPA Method 204. The minimum required flow has conservatively been evaluated here. Final design may increase the flow of the wet acid scrubber with mesh pads (and therefore the dispersion of pollutants).
- The total area of the roll up doors does not exceed 5% of the surface area of the enclosure's walls, floor, and ceiling (100 square feet/26,000 total square feet = 0.38%).
- All Cr(VI) emissions will be captured and contained for discharge through the proposed dry scrubber equipped with ULPA filters. The proposed wet acid scrubber with mesh pads will serve as control for any non-Cr(VI) emissions, and will ensure that Building 2 is maintained as a PTE.
- Due to space restrictions within Building 2, the closest emission point will be within four equivalent opening diameters (i.e. 40 feet) from the NDOs. Therefore, Hixson requests that the SCAQMD approve this as a PTE as allowed by USEPA Method 204, as there is insufficient room to meet this criterion.

Regarding the anticipated particle size for emissions entering the proposed scrubbers with mesh pads, Hixson has gathered data from the scrubber manufacturer, Duall, and has researched available literature. There are a good number of studies that provide particle size information on electrolytic processes (usually for hard decorative chrome plating and chromic acid anodizing). Unfortunately, there have been no source tests performed applicable to particle formation or particle size measurements on a non-electrolytic (i.e. electroless) tank, such as those used at Hixson. However, the conclusions in these studies can be applied to particle formation or particle size measurements on non-electrolytic (i.e. electroless) tanks. The primary mechanism by which chromium containing particles are released from a plating solution is bubble generation and subsequent bubble bursting at the liquid surface. The bursting bubbles entrain liquid and particles into the air above the solution, which includes entrained chromium. The electroless process eliminates much of the bubble generation that occurs with an electrolytic process. Therefore, as a preliminary matter, particle emissions from an operating electroless plating bath are lower than those from an operating electrolytic plating bath.

In researching available studies, the general conclusions point to a mean particle diameter of 10 microns for particles escaping from the top of an electrolytic process tank and even larger mean particle sizes of approximately 40 microns resulting during mechanical processes (dipping parts, mechanical mixing, etc.).

The following is an excerpt is from a document provided by Duall (the manufacturer of the new scrubbers with mesh pads proposed to be used at Hixson) titled “Mist Elimination Design for Packed Bed Scrubbers”. We have provided this document as an attachment (Attachment 2).

> *“Processes that directly generate mist include many metal finishing operations. Lead-acid battery charging, aluminum anodizing and hard chrome plating all produce mist by formation of hydrogen which out-gasses from a liquid solution. Mist droplets become airborne as escaping bubbles burst through liquid surface films. Reaction of nitric acid (HNO_3) with metals such as stainless steel, gold, copper, aluminum, brass or magnesium produce nitrogen oxides (*NOx*) gases which, like hydrogen, entrain mist as they escape from the process liquid.*
>
> *Air agitation of liquids, mechanical disturbance of liquids from parts dipping, or nitrogen blow-off at the end of a storage tank filling cycle are additional ways of mechanically creating mists from liquids.*
>
> *Mists generated by out-gassing tend to be smaller than those generated by other mechanical means due to the somewhat uniform distribution of gas formation in solution. Number, size and geometry of parts processed at a given time all affect the mist size created by out-gassing. A population mean diameter estimate for these mists based on hard chrome plating studies is 10 microns. An estimate of population mean diameter for mists generated by the other mechanical means described above is 40 microns.”*

Estimated Emissions Reduction: All Building 2 potential fugitive Cr(VI) emissions, as estimated in the modeling-monitoring reconciliation performed over the baseline period of May 2014 through April 2015 (representative of current operations), will be captured and routed through the dry scrubber followed by ULPA filters, with a control efficiency of 99.999%. As Tank 70 will be reconfigured to route to the dry scrubber as well, all Tank 70 emissions have been routed through this new stack, though emissions estimates have been kept constant since the current Tank 70 control system includes an ULPA filtration system as well.

Estimated Cost: Installation cost is estimated at $325,000 and annual operational and maintenance costs are estimated at $254,064.

Estimated Completion Date: December 31, 2016.

Risk Reduction Measure #2: Tank 100 currently in the VacCad department in Building 1 will be relocated to the General Plate Department in Building 3.

Estimated Emissions Reduction: Due to the low activity and handling of Cr(VI)-containing materials in Building 1 and in between Building 1 and 2, these areas are not expected to be potential fugitive Cr(VI) emission sources. Therefore, any reduction in potential fugitive Cr(VI) emissions from the movement of Tank 100 to Building 3 is anticipated to have a minimal effect on the overall risk.

Estimated Cost: Installation cost is estimated at $14,000 with no annual operational and maintenance costs.

Estimated Completion Date: September 2015.

Risk Reduction Measure #3: Tanks 96, 99, 177, and 178 within the Electroless Nickel Department in Building 2 have been taken out of service.

Estimated Emissions Reduction: Since Building 2 is proposed to become a PTE, the corresponding reduction in pre-controlled emissions from these potential sources has not been estimated here and will not be accounted for in the evaluation of post-implementation risk. This reflects a conservative approach to the analysis.

Estimated Cost: The costs associated with this risk reduction measure are included under Risk Reduction Measure #5.

Estimated Completion Date: This measure has already been completed.

Risk Reduction Measure #4: As part of the overall Facility modifications designed to reduce total Cr(VI) emissions, Tanks 87, 97, and 98 have been moved from the Electroless Nickel Department to the Research and Development (R&D) area in Building 3.

Estimated Emissions Reduction**:** There are no chromic containing tanks in this area, therefore there is no direct corresponding fugitive Cr(VI) emissions reduction.

Estimated Cost: The costs associated with this risk reduction measure are included under Risk Reduction Measure #5.

Estimated Completion Date: This measure has already been completed.

Risk Reduction Measure #5: Similar to Building 2, a new dry scrubber equipped with ULPA filters will be added to directly vent the Cr(VI)-containing tanks in Building 3. To handle any potential cyanide fumes, the General Plate and Precious Metals areas will share a cyanide mist eliminator. All cyanide-containing tanks will be equipped with a hood and directly vented to the mist eliminator. In addition to the dry scrubber and cyanide mist eliminator, these areas will be provided with additional ventilation from the wet acid scrubber with mesh pads discussed in Risk Reduction Measure #1. Further details of these systems are provided in Attachment 1.

Estimated Emissions Reduction: Emissions reductions associated with the General Plate Department, Precious Metals Department, Patio, and Waste Treatment areas will be discussed in Risk Reduction Measures #6 and #7 below.

Estimated Cost: Installation cost is estimated at $655,000 and annual operational and maintenance costs are estimated at $35,000.

Estimated Completion Date: December 31, 2016.

Risk Reduction Measure #6: The two chromic tanks that are now located in the Precious Metals Department will be moved to the General Plate Department. A wall will be placed at the entrance to the General Plate Department in Building 3 to make a PTE (in accordance with USEPA Method 204) with two openings that will be approximately 3 feet by 7 feet. The existing wall on the Precious Metals Department will remain, with two door openings, each approximately 3 feet by 7 feet. As discussed in Risk Reduction Measure #5, the Cr(VI)-containing tanks in the General Plate Department will be vented to a dry scrubber equipped with ULPA filtration and both the General Plate and Precious Metals Departments will have additional ventilation from the wet acid scrubber with mesh pads discussed in Risk Reduction Measure #1. Please refer to the drawings provided in Attachment 1 for details on the proposed design.

The criteria to satisfy the definition of PTE under USEPA Method 204 in the General Plate Department will be met as follows:

- Per both scrubber (the proposed dry scrubber and the proposed wet acid scrubber with mesh pads) and the mist eliminator design specifications, a total of approximately 24,450 cfm will be pulled from the General Plate Department (1,000 from the wet acid scrubber with mesh pads; 13,250 cfm from the dry scrubber; and 10,200 cfm from the cyanide mist eliminator). The total NDOs in the General Plate Department will be 42 square feet (two openings, each 3 feet by 7 feet). The resulting inward facial velocity would then be 24,450/42 = 582 feet/minute. This meets the minimum average facial velocity of 200 feet/minute through all NDOs, as required by USEPA Method 204.
- The total area of the NDOs does not exceed 5% of the surface area of the enclosure’s walls, floor, and ceiling (42 square feet/3,950 total square feet = 1.1%).
- All Cr(VI) emissions will be captured and contained for discharge through the proposed dry scrubber equipped with ULPA filters. The cyanide mist eliminator will control any cyanide fumes and the proposed wet acid scrubber with mesh pads will serve as control for any other non-Cr(VI) emissions, and will ensure that the General Plate Department is maintained as a PTE.
- Due to space restrictions within the General Plate Department, the closest emission point will be within four equivalent opening diameters (i.e. 17.5 feet) from the NDOs. Therefore, Hixson requests the SCAQMD approve this exception as allowed in USEPA Method 204.

  <u>Estimated Emissions Reduction:</u> Since potential fugitive Cr(VI) emissions were estimated on a building-wide or area-wide level, engineering judgments based on Facility operations were required to quantify the modeled impact for each Risk Reduction Measure when only portions of operations within each building or breezeway are being modified. For purposes of estimating potential emissions reductions for this measure, the General Plate and Precious Metals Departments are assumed to each contribute 25% of the Building 3 potential fugitive Cr(VI) emissions as estimated for current operations in the Baseline HRA. Since the General Plate and Precious Metals Departments account for a significant portion of the Cr(VI) activity in Building 3, the assumption that these operations only account for 50% of the current emissions from Building 3 is designed to be conservative. All potential fugitive Cr(VI) emissions from the General Plate and Precious Metals Departments (50% of Building 3 potential fugitive Cr(VI) emissions as estimated for current operations in the Baseline HRA) will be contained with the General Plate Department and captured and routed through the new dry scrubber discussed in Risk Reduction

Measure #5, with a control efficiency of 99.999%, due to the presence of ULPA filters.

Estimated Cost: The costs associated with this risk reduction measure are included under Risk Reduction Measure #5.

Estimated Completion Date: December 31, 2016.

Risk Reduction Measure #7: The Patio and Waste Treatment area in between Buildings 2 and 3 will be fully enclosed using plastic curtains to make a PTE (in accordance with USEPA Method 204). The new proposed dry scrubber in Building 2, and discussed in Risk Reduction Measure #1 above, will pull approximate 1,000 cfm from this area to control any potential fugitive Cr(VI) emissions. Please refer to the drawings provided in Attachment 1 for details on the proposed design.

The F006 filter cake also resides in this area and will be located within the PTE. Please refer to Attachment 1 for further details on the proposed handling procedures of the filter cake.

The criteria to satisfy the definition of PTE under USEPA Method 204 will be met as follows:

- To ensure the minimum average facial velocity of 200 feet/minute, the total area of NDOs in the Patio and Waste Treatment area will be less than 5 square feet, as the pull from this area is currently designed at 1,000 cfm from the dry scrubber in Building 2.
- Since the total area of NDOs in the Patio and Waste Treatment area will be less than 5 square feet, the total area of the NDOs does not exceed 5% of the surface area of the enclosure's walls, floor, and ceiling (5 square feet/4,932 total square feet = 0.1%);
- All Cr(VI) emissions will be captured and contained for discharge through the proposed dry scrubber on Building 2 equipped with ULPA filters
- Due to space restrictions within the Patio and Waste Treatment area, the closest emission point may be within four equivalent opening diameters from the NDOs, depending on the final location and design of any NDOs. Therefore, Hixson requests the SCAQMD approve this exception as allowed in USEPA Method 204.

Estimated Emissions Reduction: Since potential fugitive Cr(VI) emissions were estimated on a building-wide or area-wide level, engineering judgments based on Facility operations were required to quantify the impact for each Risk Reduction Measure when only portions of operations within each building or breezeway are being modified. The primary source of potential fugitive Cr(VI) emissions in the area between Buildings 2 and 3 was the Patio and Waste Treatment area. The only portion of this area that will not be enclosed are the lamella and final pH adjustment tanks, discussed in Risk Reduction Measure # 8. SCAQMD has performed glass plate testing at the roll off bin, which is co-located with the lamella and final pH adjustment tanks, and emissions were minimal (a total accumulation of 14 parts per million (ppm) was measured over a period of 7 days). Therefore, for purposes of estimating potential emissions reductions for this measure, the remaining, enclosed portion of the Patio and Waste Treatment area is conservatively assumed to contribute 90% of the potential fugitive Cr(VI) emissions between Buildings 2 and 3 as estimated for current operations in the Baseline HRA. As discussed above, since the Patio and Waste Treatment area accounts for almost all Cr(VI) activity between Buildings 2 and 3, the assumption that these operations only account for 90% of the current emissions from between Buildings 2 and 3 is designed to be conservative. Further, if both Building 2 and the General Plate Department of Building 3 become PTEs, then the potential transfer of fugitive emissions originating from Buildings 2 and 3 and transferring into the area in between will be significantly reduced. This latter effective reduction in emissions has conservatively not been accounted for.

The enclosure around the Patio and Waste Treatment area and subsequent routing of potential Cr(VI) emissions to the new proposed dry scrubber in Building 2 is estimated to capture 100% of potential fugitive Cr(VI) emissions, per the definition of PTE, from the enclosed Waste Treatment area and subsequently control such emissions by an estimated control efficiency of 99.999%, due to the presence of ULPA filters.

<u>Estimated Cost:</u> The costs associated with this risk reduction measure are included under Risk Reduction Measure #5.

<u>Estimated Completion Date:</u> December 31, 2016.

Risk Reduction Measure #8: Covers will be installed over the tanks in the Waste Treatment area that would not be included in the enclosed area above. These tanks will include the lamella and final pH adjustment tanks. Please refer to the drawings provided in Attachment 1 for details on the proposed design.

<u>Estimated Emissions Reduction:</u> Since potential fugitive Cr(VI) emissions were estimated on a building-wide or area-wide level, engineering judgments based on Facility operations were required to quantify the impact for each Risk Reduction Measure when only portions of operations within each building or breezeway are being modified. For purposes of estimating potential emissions reductions for this measure, the lamella and final pH adjustment tanks are assumed to contribute 10% of the potential fugitive Cr(VI) emissions between Buildings 2 and 3 as estimated for current operations in the Baseline HRA. As discussed in Risk Reduction Measure #5, since the Patio and Waste Treatment area accounts for almost all Cr(VI) activity between Buildings 2 and 3, the assumption that these operations account for 10% of the current emissions from between Buildings 2 and 3 is designed to be conservative. The installation of tank covers on these tanks is estimated to reduce such potential fugitive Cr(VI) emissions by 90%, based on engineering judgment.

<u>Estimated Cost:</u> Installation cost is estimated at $10,000 and annual operational and maintenance costs are estimated at $1,000.

<u>Estimated Completion Date:</u> September 2015

Risk Reduction Measure #9: The demasking operation in Building 3 will be moved to Building 4 and will be equipped with two downdraft tables, each venting to High-efficiency particulate air (HEPA) filters. Please refer to the drawings provided in Attachment 1 for details on the proposed design.

Estimated Emissions Reduction: Since potential fugitive Cr(VI) emissions were estimated on a building-wide or area-wide level, engineering judgments based on Facility operations were required to quantify the modeled impact for each Risk Reduction Measure when only portions of operations within each building or breezeway are being modified. For purposes of estimating a corresponding emissions reduction, 25% of the potential fugitive Cr(VI) emissions estimated to originate from Building 3 per current operations (in the Baseline HRA) are assumed to be from the demasking operations. Since the General Plate and Precious Metals Departments account for a significant portion of the Cr(VI) activity in Building 3, the assumption that the demasking operations account for 25% of the current modeled emissions from Building 3 is designed to be conservative. Such emissions are estimated to have a 90% capture efficiency, based on engineering judgment, with 99.97% control efficiency due to the presence of HEPA filters.

The remaining 25% of the potential fugitive Cr(VI) emissions estimated to originate from Building 3 per current operations (50% allocated to the General Plate and Precious Metals Departments and 25% allocated to the demasking operation above), are assumed to be transferred to Building 4 along with the relocation of Paint Booth 1, Oven 6, Oven 7, and all preparation and packaging operations. Such potential fugitive emissions will then see estimated reductions due to the proposed PTE and subsequent filtration on Building 4, discussed in Risk Reduction Measure #10 below. Further, Facility-wide improved cleaning procedures are expected to help reduce the generation of any potential fugitive Cr(VI) emissions. As discussed above, since the General Plate and Precious Metals Departments account for a significant portion of the Cr(VI) activity in Building 3, the assumption that 25% of the current emissions from Building 3 is from the painting, curing, preparation, and packaging, operations is designed to be conservative.

Estimated Cost: The costs associated with this risk reduction measure are included under Risk Reduction Measure #14.

Estimated Completion Date: September 2016.

Risk Reduction Measure #10: Storage of paint racks have been moved from in-between Buildings 3 and 4 to inside Building 4. The racks are stored in the open section of the southeast corner of Building 4 and are of two general types. The first is a flat panel rack that is approximately 3 feet in height that has a flat top to lay parts on to be coated. The other type of rack is a vertical hanging rack that is approximately 6 feet in height that is used to hang parts from that are to be coated. Both types of racks have solid casters that allow for the movement of the racks into and out of the paint booths and the ovens for curing.

Storage of supersacks that contain any chromic waste (filters, paint booth debris, etc.) has also been moved to Building 4, in the open section of the southeast corner.

To control any potential fugitive Cr(VI) emissions from the storage of paint racks or supersacks, or from uncaptured emissions from painting, scuffing, or demasking operations, Building 4 will be enclosed to create a PTE in accordance with USEPA Method 204, and vented to a building-wide ULPA unit. A solid wall will be constructed on the central western section of the building, enclosing the paint, demasking, and final inspection area. Additionally, the roll-up door located at the southeast corner of the building will remain closed during normal operations. Should the door need to be opened for the transfer of any parts and/or materials, in additional to the building wide ventilation unit equipped with ULPA filters, a curtain of plastic strips will also be installed at the roll-up door to prevent any potential Cr(VI) emissions from escaping the building. The only remaining openings will be two entry doors (each 3' x 7').

The criteria to satisfy the definition of PTE under USEPA Method 204 in Building 4 will be met as follows:

- With the building-wide fan designed to pull approximately 15,000 cfm, and the total NDOs in the Building 4 at 42 square feet (two doors, each 3 feet by 7 feet), the resulting inward facial velocity would then be 15,000/42 = 357 feet/minute. This meets the minimum average facial velocity of 200 feet/minute through all NDOs, as required by USEPA Method 204.
- The total area of the NDOs does not exceed 5% of the surface area of the enclosure's walls, floor, and ceiling (42 square feet/16,800 total square feet = 0.25%); and
- All Cr(VI) emissions will be captured and contained for discharge through either the individual demasking, paint booth, and scuffing booth controls, or through the proposed building-wide ULPA filter unit.
- Due to space restrictions within Building 4, the closest emission point will be within four equivalent opening diameters (i.e. 17.5 feet) from the NDOs. Therefore, Hixson requests the SCAQMD approve this exception as allowed in USEPA Method 204.

  Estimated Emissions Reduction: Any potential Cr(VI) emissions from the storage of paint racks and supersacks, or not captured through the individual enclosures and ULPA filtration units in the demasking area, paint booths, or scuffing booth operations, will be captured through the building-wide ventilation unit, and will be reduced by 99.999% due to the presence of ULPA filters.

  Since the movement of rack storage and supersacks into Building 4 was completed prior to the Baseline HRA period, the potential fugitive Cr(VI) emissions from between Buildings 3 and 4, as estimated for current operations, is assumed to be from both Building 3 and Building 4 Cr(VI) operations and potential transfer between buildings. Since any Cr(VI) containing operations in each building will now be enclosed within a PTE, such potential fugitive Cr(VI) emissions will now be captured and controlled. For purposes of estimating post-implementation risk, these emissions were assumed to be split evenly between Building 3 and Building 4 contributions and, correspondingly, will be routed to either the proposed dry scrubber on Building 3 or the proposed building-wide fan and ULPA unit on Building 4. In either location, the emissions will be fully captured and will have control efficiencies of 99.999% due to ULPA filters.

  Estimated Cost: The costs associated with this risk reduction measure are included under Risk Reduction Measure #14.

  Estimated Completion Date: July, 2016. Rack storage has already been moved to Building 4.

Risk Reduction Measure #11: A High-efficiency particulate air (HEPA) filtration system will be installed at the exhaust of the vacuum metalizing chamber.

Estimated Emissions Reduction: While the vacuum metalizing chamber is not a source of Cr(VI) emissions, the Facility is proposing the installation of a HEPA filtration system to reduce any potential cadmium emissions from the unit. Since there are no Cr(VI) emissions from this unit and potential fugitive Cr(VI) emissions are the risk driver from the Facility, we do not expect any potential cadmium emissions from this unit to significantly affect the overall risk.

Estimated Cost: Installation cost is estimated at $15,000 and annual operational and maintenance costs are estimated at $2,000.

Estimated Completion Date: January 2016.

Risk Reduction Measure #12: Unused ductwork on Building 2 will be inspected and sealed or removed to the extent practical.

Estimated Emissions Reduction: Since Building 2 will become a PTE as discussed in Risk Reduction Measure #1, emissions reductions associated with the inspection and sealing of vents on Building 2 will not be quantified here.

Estimated Cost: The associated cost for removing such system/ventilation ducts and repairing and the Building 2 and 3 roof is estimated to cost $130,000.

Estimated Completion Date: December 31, 2016.

Risk Reduction Measure #13: In addition to policies and procedures already implemented, Hixson will implement other policies and procedures to further reduce the potential for fugitive emissions including:

a. Regularly, at least daily, HEPA vacuuming of the paint rack and supersack storage area in Building 4, along with many other areas of the Facility.
b. Continuing to evaluate its operations to further identify and alleviate or minimize the potential for fugitive emissions.

Estimated Emissions Reduction: As discussed in Risk Reduction Measure #14 below, all curing ovens and paint booth operations will be moved to Building 4. Consolidating such operations is expected to reduce the potential for fugitive emissions due to the reduction of material movement in between buildings. Since the associated cleaning policies and procedures discussed above are focused on Building 4, it is estimated that a significant portion of potential fugitive Cr(VI) emissions in Building 4 will be substantially reduced. Additionally, the enclosures and ULPA units on each of the paint booths, scuffing booth, and demasking area, along with the proposed building-wide enclosure and filtration unit, will prevent any potential fugitive Cr(VI) emissions from escaping the building prior to control through ULPA filters.

Since Building 4 is proposed to become a PTE, the corresponding reduction in pre-controlled emissions due to enhanced cleaning procedures has not been estimated here and will not be accounted for in the evaluation of post-implementation risk. This reflects a conservative approach to the analysis.

Estimated Cost: The associated costs from policies and procedures are estimated to cost $60,000 annually.

Estimated Completion Date: Additional housekeeping processes are currently in place and are ongoing.

To accommodate all potential changes proposed above, the Facility is also proposing the following changes in source location and configuration:

Risk Reduction Measure #14: Paint Booth 1, Oven 6, Oven 7, and all demasking, preparation, and packaging operations will be moved from Building 3 to Building 4. In order to maintain the production levels, the addition of a paint booth (Paint Booth 3) and oven (Oven 14) will be required in Building 4. Masking, Masking supermarket, Maintenance, DI Water Supply, and the Steico cell will subsequently be moved to 861 Production Place (new Building 5).

Estimated Emissions Reduction: Consolidating all curing ovens and paint booth operations in one building is expected to reduce the potential for fugitive emissions due to the reduction of material movement in between buildings. Reductions associated with such consolidation and associated cleaning activities are estimated under Risk Reduction Measure #13 above. The addition of Paint Booth 3 will not increase overall emissions from the paint booths, as production levels are expected to remain the same. The addition of Oven 14 will increase potential emissions due to natural gas combustion, however, such additional oven emissions are not expected to significantly impact risk. For purposes of estimating the post-implementation risk, emissions from Paint Booth 1 and 2 (SB1 and SB2) in the Baseline HRA will be evenly split between Paint Booths 1, 2, and 3. Emissions from Ovens 12 (already permitted) and Oven 14 will be assumed to be equal to the emissions from Ovens 6 and 7. Further, the operations moved to Building 5 do not include fugitive Cr(VI) emissions sources or other Toxic Air Contaminant (TAC)-emitting operations.

Estimated Cost: Installation cost is estimated at $1,365,000 and annual operational and maintenance costs are estimated at $215,000.

Estimated Completion Date: September 2016.

Risk Reduction Measure #15: The new anodize line in Building 2 is currently being constructed, as indicated in previous PTCs submitted to SCAQMD.

Estimated Emissions Reduction: The configuration and design of the new anodize line is expected to reduce potential fugitive emissions from Building 2 as the tanks will be aligned such that material movement between tanks is minimized, therefore reducing associated dragout. However, since Building 2 is proposed to become a PTE, the corresponding reduction in pre-controlled emissions due to the new anodize line has not been estimated here and, to be conservative, will not be accounted for in the evaluation of post-implementation risk.

Estimated Cost: Installation cost is estimated at $4,335,000 and annual operational and maintenance costs is estimated at $250,000.

Estimated Completion Date: December 31, 2016.

Risk Reduction Measure #16: The sanding and scuffing booth in Building 4 will be equipped with an HEPA filtration unit and exhausted through the roof of Building 4 to two stacks, rather than within Building 4.

Estimated Emissions Reduction: The increased dispersion due to the routing of any potential scuffing booth emissions has been accounted for in the modeling of post-implementation risk.

Since potential fugitive Cr(VI) emissions were estimated on a building-wide or area-wide level, engineering judgments based on Facility operations were required to quantify the impact for each Risk Reduction Measure when only portions of operations within each building or breezeway are being modified. For purposes of estimating potential changes in offsite concentrations for this measure, the scuffing booth operations are assumed to contribute 50% of the potential fugitive Cr(VI) emissions in Building 4 as estimated for current operations in the Baseline HRA. For purposes of post-implementation risk, these emissions are assumed to be split evenly between the two stacks, and controlled at 99.97% efficiency.

The remaining 50% of the potential fugitive Cr(VI) emissions in Building 4 are assumed to originate from miscellaneous painting, drying, material movement and storage activities, and will be captured in the building-wide PTE discussed in Risk Reduction Measure #10 above.

Estimated Cost: $25,000

Estimated Completion Date: September 2016.

Further, as mentioned above, the Facility has already made changes and modifications to existing equipment and operations to reduce both fugitive and point source emissions including, but not limited to, the following. As these changes were completed prior to May 2014, the corresponding risk reduction has already been accounted for in the modeling-monitoring reconciliation performed over the baseline period of May 2014 through April 2015 (representative of current operations), which is the baseline for this RRP. As such, no further reduction is considered in this RRP. The corresponding installation costs associated with these changes (all of which were voluntary measures undertaken by Hixson) totals $546,500 and the annual operational and maintenance costs are estimated at $70,000 (including the $60,000 listed under Risk Reduction Measure #13).

1. The exhaust stack on Paint Booth 2 was replaced due to the buildup of paint on the interior of the stack.
2. Hixson voluntarily upgraded the HEPA filters on Paint Booth 1, Paint Booth 2, and the Anodize Scrubber to 99.999% ULPA filters.

3. Hixson purchased and installed a sanding/scuffing booth to eliminate possible fugitive emissions from the process of sanding/scuffing possible chrome containing primers prior to applying a topcoat.
4. All six of the abrasive blasting cabinets at the Facility are now enclosed. Four of the cabinets are located at the backside of Building 1 in an enclosed room and the other two cabinets are located in Building 3 in the preparation area of the General Plate line. Each of the cabinets is equipped with a filtration system that will provide adequate capture of particulate matter that is produced during the abrasive blasting process.
5. Hixson has implemented many new policies and procedures to reduce potential fugitive emissions, which have added hundreds of hours annually to the tasks performed by the production and maintenance personnel. These procedures have modified and/or augmented the processes dealing with cleanup activities (i.e. HEPA vacuuming as opposed to sweeping), changes in filter removal and changes outs, the addition of chemical constituents to processing tanks and the handling of waste that may contain chromium compounds.
6. Over the past several years, Hixson has revised and submitted new permit applications due to changes recommended by SCAQMD staff.

6 Estimation of Post-Implementation Risk [(f)(3)(H)]

Based on the estimated emissions reductions associated with the proposed or equivalent Risk Reduction Measures currently proposed and discussed in Section 5 above, the Facility has projected the facility-wide risk that would remain after the implementation of all the above-described measures. This assessment is presented in Appendix A. A summary of the key results metrics are as follows:

Risk/Hazard Index	**Post-Implementation HRA**
Maximally Exposed Individual Resident cancer risk	0.8 in one million
Maximally Exposed Individual Resident cancer risk, without the home grown produce pathway	0.6 in one million
Maximally Exposed Individual Worker cancer risk	0.4 in one million
Cancer Burden	0
Maximum Chronic Hazard Index, Resident	0.002
Maximum Chronic Hazard Index, Worker	0.006
Maximum 8-hour Chronic Hazard Index	0.0002
Maximum Acute Hazard Index, Point of Maximum Impact (PMI)	0.04

As shown above, should Hixson implement the proposed or equivalent risk reduction measures, modeled cancer risks at the MEIR are reduced to 0.8 in a million (with the home grown produce pathway), and modeled cancer risks at the MEIW are reduced to 0.4 in a million, both of which are below the SCAQMD Rule 1402 Action Risk Level of 25 in a million. The modeled cancer burden, maximum chronic hazard indices (HIs), and maximum acute HIs all remain below the SCAQMD public notification thresholds. In summary, the Facility's future operations and risk profile satisfy Rule 1402 standards, based on implementation of the measures proposed (or equivalent measures).

7 References

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Appendix A

Projected Health Risks after Implementing all Measures Currently Proposed

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Appendix A
Projected Health Risks After Implementing All Measures Currently Proposed

Ramboll Environ conducted this updated health risk assessment (HRA) to project future health risks after the Facility implements the risk reduction measures currently being evaluated and discussed in Section 5 of the revised Risk Reduction Plan (RRP). Ramboll Environ performed revised air modeling and used updated risk assessment methodologies as described below. Emissions data used in the updated HRA has been updated to account for the risk reduction measures discussed above.

A.1 Projected TAC Emissions

To evaluate the current conditions at the Facility, a modeling-monitoring reconciliation was performed over the baseline period of May 2014 through April 2015. The resulting estimates of potential fugitive Hexavalent chromium [Cr(VI)] emissions serve as the baseline of this RRP. Details of this reconciliation process are included in Appendix B.

Tables summarizing annual and maximum hourly toxic air contaminant (TAC) emissions by source for the Baseline HRA are presented in Tables A-a and A-b. Modeled emissions here represent those presented in the Supplemental HRA submitted on November 14, 2015, with the exception of the potential fugitive Cr(VI) emissions, which are detailed in Appendix B of this report.

Section 5 of the RRP discussed the risk reduction measures currently being evaluated, along with estimated emissions reductions and specifications of relevant control equipment (e.g. Ultra-low efficiency particulate air (ULPA) filters of control efficiency 99.999%). Tables A-1 and A-2 summarize the annual and maximum hourly TAC emissions by source, respectively, after accounting for all estimated emissions reductions relative to the baseline period of May 2014 through April 2015. Emissions reduction due to Facility changes made before May, 2014 were not accounted for in this RRP as they are already taken into account in the estimated baseline emissions. Supporting calculations for the reallocation and reduction of emissions are provided in Appendix C.

A.2 Modeling and Risk Assessment Methods

This HRA updated both the modeling and risk calculations, as compared to the HRA submitted on November 14, 2014. Emission sources modeled included all existing, relocated, and new point sources (16 total) and the only remaining fugitive emission source (located between Building 2 and 3).[3] The updated emissions data is presented in Tables A-1 and A-2. Point source modeling parameters are listed in Table A-3 and area source modeling parameters (for the corresponding potential fugitive sources) are listed in Table A-4. The locations of potential future onsite sources and nearby buildings are included as Figure A-1. Routine sources were modeled according to their operating schedule, while potential fugitive Cr(VI) sources were

[3] All prior potential fugitive emissions sources are still included in the model, but are not assigned any associated emissions.

modeled assuming continuous operation. The operating schedule for each source is shown in Table A-5.[4]

In addition to the sources included in the post-implementation model, Hixson operates a soil vapor extraction (SVE) unit that uses a carbon adsorption unit to control potential gaseous emissions. The AQMD completed a very conservative, screening level HRA for this unit when permitted, which shows that potential risks and hazards are minimal, with a maximum residential cancer risk of 0.4 in one million, a maximum worker risk of 0.06 in one million, and acute and chronic hazard indices far below thresholds. For completeness, this HRA has been included as Attachment 3.

Ramboll Environ performed revised modeling to account for the modified Facility boundary and new and/or relocated point sources. The regulatory default options were used to generate the X/Q ("chi over q") values using the most recent version of American Meteorological Society/Environmental Protection Agency regulatory air dispersion model (AERMOD) (version 14134). The source parameters were provided by the Facility or were derived from source test reports.

The receptor grid covers a 1 kilometer radius surrounding the facility, and census block receptors were extracted from Hotspots Analysis and Reporting Program (HARP), version 2. As discussed in some of the risk reduction measures currently proposed, the Facility is proposing to move some operations to a new building at 861 Production Place (Building 5). Additionally, beginning in 2011, the Facility moved some operations from Building 1 (front office, training room, non-destructive testing) into a building across the way at 816 Production Place (Building 6). Operations in both Building 5 and Building 6 do not conduct TAC-emitting operations and have therefore not been included in the models. However, for purposes of evaluating offsite receptors, receptors previously evaluated in Buildings 5 and 6 have been removed and are no longer evaluated for offsite worker risks or for acute HI impacts. Figure A-1 shows the Facility layout as proposed through the risk reduction measures discussed in this RRP.

As discussed in the HRA submitted on November 14, 2014, John Wayne Airport meteorological station ([Weather Bureau Army Navy] WBAN #93184, KSNA) was selected (and approved by SCAQMD staff) as the most representative surface station for the Facility. Five years of meteorological data, 2009-2013, were processed for use in AERMOD using surface meteorological data from John Wayne Airport and upper-air meteorological data from San Diego Miramar (WBAN # 03190, KNKX). Terrain data were obtained from the United States Geological Survey (USGS), with 1/3 arcsec (~10 meter) National Elevation Dataset (NED) data downloaded, from which elevations and hill heights for the sources, buildings, and receptors were extracted.

Ramboll Environ used HARP2 (version 15076) to calculate the health risks, consistent with the Draft Supplemental Guidelines for Preparing Risk Assessments for the Air Toxics "Hot Spots" Information and Assessment Act ("Draft SCAQMD Supplemental Guidelines") South Coast Air Quality Management District (SCAQMD 2015a). As this is an updated model compared with what was used for the HRA submitted on November 14, 2014, corresponding risk results should not be compared between the two models.

[4] Note that while some scrubber and control units may operate 24 hours a day, 7 days a week, the modeling was conducted to follow the schedule of primary emissions generation.

As the majority of post-implementation emissions are routed through point sources with discrete operating schedules, instead of through continuous fugitive emission sources, the HARP2 model for worker risks has been run to incorporate a model adjustment factor (MAF), per Table 12 of the Draft SCAQMD Supplemental Guidelines stacks. As the various point sources at Hixson follow different operating schedules, a conservative MAF of 4.2 was used, which covers the shortest potential period of operation of 8 hours/day, 5 days/week.[5]

As incorporated in the HARP2 model, Ramboll Environ used risk calculation parameters consistent with the updated (February, 2015) Office of Environmental Health Hazard Assessment (OEHHA) Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessment ("OEHHA Guidance") and the Draft SCAQMD Supplemental Guidelines.

A.3 Risk Estimates

When the risk reduction measures discussed in Section 5 of the RRP are considered, the modeled cancer risk at the Maximally Exposed Individual Resident (MEIR) is estimated to be 0.8 in a million (vs. 211 in a million in the Baseline HRA). The modeled MEIR is at Receptor 760[6] (413425, 3721575) and is located at a residential unit south of the Facility. The modeled cancer risk at the Maximally Exposed Individual Worker (MEIW) is estimated to be 0.4 in a million (vs. 13.1 in a million in the Baseline HRA). The modeled MEIW is at Receptor 936[7] (413550, 3721675) and is located north of the Facility on Production Place, at a complex of industrial buildings. Both maximum cancer risks are below the SCAQMD Rule 1402 Action Risk Level of 25 in a million and the public notification threshold of 10.0.

The cancer burden is estimated to be 0, as the modeled cancer risk at the MEIR is below one in a million. The cancer burden in the Baseline HRA was 0.11.

The maximum modeled chronic Hazard Index (HI) for the residential scenario is estimated to be 0.0002 (vs. 0.05 in the Baseline HRA). It is located at Receptor 760[8] (413425, 3721575), a residential unit south of the Facility. The maximum modeled chronic HI for the worker scenario is estimated to be 0.006 (vs. 0.07 in the Baseline HRA). The maximum modeled chronic HI MEIW is at Receptor 936[9] (413550, 3721675), which is north of the Facility on Production Place, at a complex of industrial buildings. Both maximum chronic HIs are well below the SCAQMD Rule 1402 Action Risk Level of 3.0 and the public notification threshold of 1.0.

The maximum acute HI [i.e. Point of Maximum Impact (PMI)] is estimated to be 0.04 (vs. 0.25 in the Baseline HRA). It is at Receptor 25 (413359.2, 3721639.5) and is located on the northern boundary of the Facility. The maximum acute HI is well below the SCAQMD Rule 1402 Action Risk Level of 3.0 and the public notification threshold of 1.0.

The maximum locations for the residential cancer risk, chronic HI, and acute HI are presented on Figure A-2. The maximum locations for the worker cancer risk, chronic HI, and acute HI are shown in Figure A-3.

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5 The shortest operating period included in the model is 16 hours/day, 5 days/week; therefore the application of a 4.2 MAF this is a very conservative approach.
6 The cancer risk MEIR was previously numbered as Receptor 750 in the 2013 HRA.
7 The cancer risk MEIW was previously numbered as Receptor 929 in the 2013 HRA.
8 The chronic HI MEIR was previously numbered as Receptor 750 in the 2013 HRA.
9 The chronic HI MEIW was previously numbered as Receptor 929 in the 2013 HRA.

All electronic files, including modeling and emissions files, are included in the CD-ROM in Appendices C and D of the RRP.

Appendix A Tables

Table A-a
Baseline HRA, Modeled Annual Emissions by Source and Substance, in Pounds per Year
Hixson Metal Finishing
Newport Beach, CA

			Compound and CAS Number																				
			Acetaldehyde	Acrolein	Ammonia	Benzene	Cadmium	Crystalline Silica[1]	Ethyl Benzene	Formaldehyde	Glycol Ethers and Acetates[2]	Hexane	Hexavalent Chromium[3]	Lead	Methanol	Methyl Ethyl Ketone	Methyl Isobutyl Ketone	Nickel	PAHs	Naphthalene	Phosphoric Acid	Toluene	Xylenes
Source Number	**Source**	**Source Description**	**75-07-0**	**107-02-8**	**7664-41-7**	**71-43-2**	**7440-43-9**	**7631-86-9**	**100-41-4**	**50-00-0**	**1115**	**110-54-3**	**18540-29-9**	**7439-92-1**	**67-56-1**	**78-93-3**	**108-10-1**	**7440-02-0**	**1151**	**91-20-3**	**7664-38-2**	**108-88-3**	**1330-20-7**
1	FS1	Building 4	-	-	-	-	-	-	-	-	-	-	8.97E-03	-	-	-	-	-	-	-	-	-	-
2	FS2	Building 3	-	-	-	-	-	-	-	-	-	-	1.15E-02	-	-	-	-	-	-	-	-	-	-
3	FS3	Building 2	-	-	-	-	-	-	-	-	-	-	4.17E-02	-	-	-	-	-	-	-	-	-	-
5	FS5	Between Building 3&4	-	-	-	-	-	-	-	-	-	-	4.11E-02	-	-	-	-	-	-	-	-	-	-
6	FS6	Between Building 2&3	-	-	-	-	-	-	-	-	-	-	1.37E-02	-	-	-	-	-	-	-	-	-	-
8	FS8	Building 3 Plating	-	-	-	-	2.52E-01	-	-	-	-	-	-	-	-	-	-	8.20E-03	-	-	-	-	-
9	PS1	SB #1	-	-	4.14E-01	-	-	4.45E-06	4.53E+00	4.48E-02	4.20E+01	-	3.27E-04	1.84E-07	2.50E-01	1.36E+02	6.72E+01	1.69E-07	-	-	1.68E-02	1.79E+01	2.55E+01
10	PS2	SB #2	-	-	3.22E-02	-	-	-	4.65E+00	6.60E-04	1.12E+01	-	3.03E-04	7.51E-07	1.29E+01	1.74E+02	4.36E+01	2.62E-09	-	-	8.56E-01	4.40E+01	2.15E+01
11	PS3	Scrubber (Anodize Line, Tank 70)	-	-	-	-	-	-	-	-	-	-	4.00E-04	-	-	-	-	-	-	-	-	-	-
12	PS4	Oven #3	4.30E-03	2.70E-03	1.80E+01	8.00E-03	-	-	9.50E-03	1.70E-02	-	6.30E-03	-	-	-	-	-	-	1.00E-04	3.00E-04	-	3.66E-02	2.72E-02
13	PS5	Oven #6	5.91E-03	3.71E-03	2.48E+01	1.10E-02	-	-	1.31E-02	2.34E-02	-	8.66E-03	-	-	-	-	-	-	1.38E-04	4.13E-04	-	5.03E-02	3.74E-02
14	PS6	Oven #7	5.91E-03	3.71E-03	2.48E+01	1.10E-02	-	-	1.31E-02	2.34E-02	-	8.66E-03	-	-	-	-	-	-	1.38E-04	4.13E-04	-	5.03E-02	3.74E-02
		Total Facility Emissions	**1.61E-02**	**1.01E-02**	**6.79E+01**	**3.00E-02**	**2.52E-01**	**4.45E-06**	**9.22E+00**	**1.09E-01**	**5.32E+01**	**2.36E-02**	**1.18E-01**	**9.34E-07**	**1.31E+01**	**3.10E+02**	**1.11E+02**	**8.20E-03**	**3.75E-04**	**1.13E-03**	**8.73E-01**	**6.20E+01**	**4.70E+01**

Notes:
1. The CAS # for crystalline silica in the HARP software is 1175.
2. To conservatively estimate the risk from glycol ethers and acetates, the CAS # representing the most conservative toxicity values was used (109-86-4, ethylene glycol monomethyl ether).
3. Hexavalent chromium emissions from potential fugitive sources FS1 through FS6 were estimated per May 2014 - April 2015 modeling-monitoring reconciliation discussed in detail in Appendix B. Potential fugitive emissions estimated here are subject to uncertainty associated with air dispersion modeling.

Abbreviations:
CAS = Chemical Abstract Service
HARP = Hotspots Analysis Reporting Program

Table A-b
Baseline HRA, Modeled Maximum Hourly Emissions by Source and Substance, in Pounds per Hour
Hixson Metal Finishing
Newport Beach, CA

			Compound and CAS Number																			
			Acetaldehyde	Acrolein	Ammonia	Benzene	Cadmium	Crystalline Silica[1]	Ethyl Benzene	Formaldehyde	Glycol Ethers and Acetates[2]	Hexane	Hexavalent Chromium[3]	Lead	Methanol	Methyl Ethyl Ketone	Methyl Isobutyl Ketone	Nickel	PAHs	Naphthalene	Phosphoric Acid	Toluene	Xylenes
Source Number	**Source**	**Source Description**	**75-07-0**	**107-02-8**	**7664-41-7**	**71-43-2**	**7440-43-9**	**7631-86-9**	**100-41-4**	**50-00-0**	**1115**	**110-54-3**	**18540-29-9**	**7439-92-1**	**67-56-1**	**78-93-3**	**108-10-1**	**7440-02-0**	**1151**	**91-20-3**	**7664-38-2**	**108-88-3**	**1330-20-7**
1	FS1	Building 4	-	-	-	-	-	-	-	-	-	-	1.02E-06	-	-	-	-	-	-	-	-	-	-
2	FS2	Building 3	-	-	-	-	-	-	-	-	-	-	1.31E-06	-	-	-	-	-	-	-	-	-	-
3	FS3	Building 2	-	-	-	-	-	-	-	-	-	-	4.76E-06	-	-	-	-	-	-	-	-	-	-
5	FS5	Between Building 3&4	-	-	-	-	-	-	-	-	-	-	4.70E-06	-	-	-	-	-	-	-	-	-	-
6	FS6	Between Building 2&3	-	-	-	-	-	-	-	-	-	-	1.56E-06	-	-	-	-	-	-	-	-	-	-
8	FS8	Building 3 Plating	-	-	-	-	6.04E-05	-	-	-	-	-	-	-	-	-	-	2.55E-05	-	-	-	-	-
9	PS1	SB #1	-	-	1.99E-04	-	-	2.14E-09	2.18E-03	2.15E-05	2.02E-02	-	1.57E-07	8.83E-11	1.20E-04	6.54E-02	3.23E-02	8.11E-11	-	-	8.08E-06	8.61E-03	1.22E-02
10	PS2	SB #2	-	-	1.55E-05	-	-	-	2.23E-03	3.17E-07	5.39E-03	-	1.46E-07	3.61E-10	6.18E-03	8.37E-02	2.09E-02	1.26E-12	-	-	4.12E-04	2.11E-02	1.03E-02
11	PS3	Scrubber (Anodize Line, Tank 70)	-	-	-	-	-	-	-	-	-	-	9.59E-08	-	-	-	-	-	-	-	-	-	-
12	PS4	Oven #3	8.19E-06	5.14E-06	3.43E-02	1.52E-05	-	-	1.81E-05	3.24E-05	-	1.20E-05	-	-	-	-	-	-	1.90E-07	5.71E-07	-	6.97E-05	5.18E-05
13	PS5	Oven #6	1.64E-06	1.03E-06	6.85E-03	3.05E-06	-	-	3.62E-06	6.47E-06	-	2.40E-06	-	-	-	-	-	-	3.81E-08	1.14E-07	-	1.39E-05	1.04E-05
14	PS6	Oven #7	1.64E-06	1.03E-06	6.85E-03	3.05E-06	-	-	3.62E-06	6.47E-06	-	2.40E-06	-	-	-	-	-	-	3.81E-08	1.14E-07	-	1.39E-05	1.04E-05
		Total Facility Emissions	**1.15E-05**	**7.20E-06**	**4.82E-02**	**2.13E-05**	**6.04E-05**	**2.14E-09**	**4.44E-03**	**6.72E-05**	**2.56E-02**	**1.68E-05**	**1.38E-05**	**4.49E-10**	**6.30E-03**	**1.49E-01**	**5.33E-02**	**2.55E-05**	**2.67E-07**	**8.00E-07**	**4.20E-04**	**2.98E-02**	**2.26E-02**

Notes:
1. The CAS # for crystalline silica in the HARP software is 1175.
2. To conservatively estimate the risk from glycol ethers and acetates, the CAS # representing the most conservative toxicity values was used (109-86-4, ethylene glycol monomethyl ether).
3. Hexavalent chromium emissions from potential fugitive sources FS1 through FS6 were estimated per May 2014 - April 2015 modeling-monitoring reconciliation discussed in detail in Appendix B. Potential fugitive emissions estimated here are subject to uncertainty associated with air dispersion modeling.

Abbreviations:
CAS = Chemical Abstract Service
HARP = Hotspots Analysis Reporting Program

Table A-1
Post-Implementation, Annual Emissions by Source and Substance, in Pounds per Year
Hixson Metal Finishing
Newport Beach, CA

				Compound and CAS Number																					
				Acetaldehyde	Acrolein	Ammonia	Benzene	Cadmium	Crystalline Silica[1]	Ethyl Benzene	Formaldehyde	Glycol Ethers and Acetates[2]	Hexane	Hexavalent Chromium[3]	Lead	Methanol	Methyl Ethyl Ketone	Methyl Isobutyl Ketone	Nickel	PAHs	Naphthalene	Phosphoric Acid	Toluene	Xylenes
Source Number	**Source**	**HRA Source Description**	**RRP Source Description**	**75-07-0**	**107-02-8**	**7664-41-7**	**71-43-2**	**7440-43-9**	**1175**	**100-41-4**	**50-00-0**	**109-86-4**	**110-54-3**	**18540-29-9**	**7439-92-1**	**67-56-1**	**78-93-3**	**108-10-1**	**7440-02-0**	**1151**	**91-20-3**	**7664-38-2**	**108-88-3**	**1330-20-7**
6	FS6	Between Building 2&3	Between Building 2&3	-	-	-	-	-	-	-	-	-	-	1.37E-04	-	-	-	-	-	-	-	-	-	-
9	PS1	SB #1	SB #1	-	-	1.49E-01	-	-	1.48E-06	3.06E+00	1.52E-02	1.77E+01	-	2.10E-04	3.11E-07	4.37E+00	1.03E+02	3.69E+01	5.71E-08	-	-	2.91E-01	2.06E+01	1.56E+01
10	PS2	SB #2	SB #2	-	-	1.49E-01	-	-	1.48E-06	3.06E+00	1.52E-02	1.77E+01	-	2.10E-04	3.11E-07	4.37E+00	1.03E+02	3.69E+01	5.71E-08	-	-	2.91E-01	2.06E+01	1.56E+01
11	PS3	Scrubber (Anodize Line, Tank 70)	Building 2/3 Acid Scrubber (Wet)	-	-	-	-	2.52E-01	-	-	-	-	-	-	-	-	-	-	8.15E-03	-	-	-	-	-
12	PS4	Oven #3	Oven #3	4.30E-03	2.70E-03	1.80E+01	8.00E-03	-	-	9.50E-03	1.70E-02	-	6.30E-03	-	-	-	-	-	-	1.00E-04	3.00E-04	-	3.66E-02	2.72E-02
13	PS5	Oven #6	Oven #6	5.91E-03	3.71E-03	2.48E+01	1.10E-02	-	-	1.31E-02	2.34E-02	-	8.66E-03	-	-	-	-	-	-	1.38E-04	4.13E-04	-	5.03E-02	3.74E-02
14	PS6	Oven #7	Oven #7	5.91E-03	3.71E-03	2.48E+01	1.10E-02	-	-	1.31E-02	2.34E-02	-	8.66E-03	-	-	-	-	-	-	1.38E-04	4.13E-04	-	5.03E-02	3.74E-02
15	PS7	-	Oven #12	5.91E-03	3.71E-03	2.48E+01	1.10E-02	-	-	1.31E-02	2.34E-02	-	8.66E-03	-	-	-	-	-	-	1.38E-04	4.13E-04	-	5.03E-02	3.74E-02
16	PS8	-	Oven #14	5.91E-03	3.71E-03	2.48E+01	1.10E-02	-	-	1.31E-02	2.34E-02	-	8.66E-03	-	-	-	-	-	-	1.38E-04	4.13E-04	-	5.03E-02	3.74E-02
17	PS9	-	SB #3	-	-	1.49E-01	-	-	1.48E-06	3.06E+00	1.52E-02	1.77E+01	-	2.10E-04	3.11E-07	4.37E+00	1.03E+02	3.69E+01	5.71E-08	-	-	2.91E-01	2.06E+01	1.56E+01
18	PS10	-	Building 2/WT Chromic Scrubber (Dry)	-	-	-	-	-	-	-	-	-	-	3.57E-04	-	-	-	-	-	-	-	-	-	-
19	PS11	-	Building 3 Chromic Scrubber (Dry)	-	-	-	-	-	-	-	-	-	-	2.63E-07	-	-	-	-	-	-	-	-	-	-
20	PS12	-	Demasking, Downdraft Table 1	-	-	-	-	-	-	-	-	-	-	3.88E-07	-	-	-	-	-	-	-	-	-	-
21	PS13	-	Demasking, Downdraft Table 2	-	-	-	-	-	-	-	-	-	-	3.88E-07	-	-	-	-	-	-	-	-	-	-
23	PS15	-	Scuffing Booth, Stack 1	-	-	-	-	-	-	-	-	-	-	1.21E-06	-	-	-	-	-	-	-	-	-	-
24	PS16	-	Scuffing Booth, Stack 2	-	-	-	-	-	-	-	-	-	-	1.21E-06	-	-	-	-	-	-	-	-	-	-
25	PS17	-	Building 4 HEPA Chamber and Fan	-	-	-	-	-	-	-	-	-	-	2.87E-07	-	-	-	-	-	-	-	-	-	-
			Total Facility Emissions	**2.80E-02**	**1.76E-02**	**1.17E+02**	**5.20E-02**	**2.52E-01**	**4.45E-06**	**9.24E+00**	**1.56E-01**	**5.32E+01**	**4.10E-02**	**1.13E-03**	**9.34E-07**	**1.31E+01**	**3.10E+02**	**1.11E+02**	**8.16E-03**	**6.50E-04**	**1.95E-03**	**8.73E-01**	**6.21E+01**	**4.71E+01**

Notes:
1. The CAS # for crystalline silica is 7631-86-9 but in the HARP software it is 1175.
2. To conservatively estimate the risk from glycol ethers and acetates (CAS # 1115), the CAS # representing the most conservative toxicity values was used (109-86-4, ethylene glycol monomethyl ether).
3. Hexavalent chromium emissions from potential fugitive sources were estimated per May 2014 - April 2015 modeling-monitoring reconciliation discussed in detail in Appendix B, then adjusted for the risk reduction measures currently under evaluation, as discussed in Section 5 of the Risk Reduction Plan. Potential fugitive emissions estimated here are subject to uncertainty associated with air dispersion modeling.

Abbreviations:
CAS = Chemical Abstract Service
HARP = Hotspots Analysis Reporting Program
HRA = Health Risk Assessment
RRP = Risk Reduction Plan

Table A-2
Post-Implementation, Hourly Emissions by Source and Substance, in Pounds per Hour
Hixson Metal Finishing
Newport Beach, CA

				Compound and CAS Number																				
				Acetaldehyde	Acrolein	Ammonia	Benzene	Cadmium	Crystalline Silica[1]	Ethyl Benzene	Formaldehyde	Glycol Ethers and Acetates[2]	Hexane	Hexavalent Chromium[3]	Lead	Methanol	Methyl Ethyl Ketone	Methyl Isobutyl Ketone	Nickel	PAHs	Naphthalene	Phosphoric Acid	Toluene	Xylenes
Source Number	Source	HRA Source Description	RRP Source Description	75-07-0	107-02-8	7664-41-7	71-43-2	7440-43-9	1175	100-41-4	50-00-0	109-86-4	110-54-3	18540-29-9	7439-92-1	67-56-1	78-93-3	108-10-1	7440-02-0	1151	91-20-3	7664-38-2	108-88-3	1330-20-7
6	FS6	Between Building 2&3	Between Building 2&3	-	-	-	-	-	-	-	-	-	-	1.56E-08	-	-	-	-	-	-	-	-	-	-
9	PS1	SB #1	SB #1	-	-	7.15E-05	-	-	7.14E-10	1.47E-03	7.29E-06	8.53E-03	-	1.01E-07	1.50E-10	2.10E-03	4.97E-02	1.78E-02	2.75E-11	-	-	1.40E-04	9.92E-03	7.52E-03
10	PS2	SB #2	SB #2	-	-	7.15E-05	-	-	7.14E-10	1.47E-03	7.29E-06	8.53E-03	-	1.01E-07	1.50E-10	2.10E-03	4.97E-02	1.78E-02	2.75E-11	-	-	1.40E-04	9.92E-03	7.52E-03
11	PS3	Scrubber (Anodize Line, Tank 70)	Building 2/3 Acid Scrubber (Wet)	-	-	-	-	6.04E-05	-	-	-	-	-	-	-	-	-	-	2.55E-05	-	-	-	-	-
12	PS4	Oven #3	Oven #3	8.19E-06	5.14E-06	3.43E-02	1.52E-05	-	-	1.81E-05	3.24E-05	-	1.20E-05	-	-	-	-	-	-	1.90E-07	5.71E-07	-	6.97E-05	5.18E-05
13	PS5	Oven #6	Oven #6	1.64E-06	1.03E-06	6.85E-03	3.05E-06	-	-	3.62E-06	6.47E-06	-	2.40E-06	-	-	-	-	-	-	3.81E-08	1.14E-07	-	1.39E-05	1.04E-05
14	PS6	Oven #7	Oven #7	1.64E-06	1.03E-06	6.85E-03	3.05E-06	-	-	3.62E-06	6.47E-06	-	2.40E-06	-	-	-	-	-	-	3.81E-08	1.14E-07	-	1.39E-05	1.04E-05
15	PS7	-	Oven #12	1.64E-06	1.03E-06	6.85E-03	3.05E-06	-	-	3.62E-06	6.47E-06	-	2.40E-06	-	-	-	-	-	-	3.81E-08	1.14E-07	-	1.39E-05	1.04E-05
16	PS8	-	Oven #14	1.64E-06	1.03E-06	6.85E-03	3.05E-06	-	-	3.62E-06	6.47E-06	-	2.40E-06	-	-	-	-	-	-	3.81E-08	1.14E-07	-	1.39E-05	1.04E-05
17	PS9	-	SB #3	-	-	7.15E-05	-	-	7.14E-10	1.47E-03	7.29E-06	8.53E-03	-	1.01E-07	1.50E-10	2.10E-03	4.97E-02	1.78E-02	2.75E-11	-	-	1.40E-04	9.92E-03	7.52E-03
18	PS10	-	Building 2/WT Chromic Scrubber (Dry)	-	-	-	-	-	-	-	-	-	-	7.79E-08	-	-	-	-	-	-	-	-	-	-
19	PS11	-	Building 3 Chromic Scrubber (Dry)	-	-	-	-	-	-	-	-	-	-	6.31E-11	-	-	-	-	-	-	-	-	-	-
20	PS12	-	Demasking, Downdraft Table 1	-	-	-	-	-	-	-	-	-	-	8.46E-11	-	-	-	-	-	-	-	-	-	-
21	PS13	-	Demasking, Downdraft Table 2	-	-	-	-	-	-	-	-	-	-	8.46E-11	-	-	-	-	-	-	-	-	-	-
23	PS15	-	Scuffing Booth, Stack 1	-	-	-	-	-	-	-	-	-	-	1.71E-10	-	-	-	-	-	-	-	-	-	-
24	PS16	-	Scuffing Booth, Stack 2	-	-	-	-	-	-	-	-	-	-	1.71E-10	-	-	-	-	-	-	-	-	-	-
25	PS17	-	Building 4 HEPA Chamber and Fan	-	-	-	-	-	-	-	-	-	-	4.04E-11	-	-	-	-	-	-	-	-	-	-
			Total Facility Emissions	**1.47E-05**	**9.25E-06**	**6.19E-02**	**2.74E-05**	**6.04E-05**	**2.14E-09**	**4.45E-03**	**8.01E-05**	**2.56E-02**	**2.16E-05**	**3.97E-07**	**4.49E-10**	**6.30E-03**	**1.49E-01**	**5.33E-02**	**2.55E-05**	**3.43E-07**	**1.03E-06**	**4.20E-04**	**2.99E-02**	**2.27E-02**

Notes:
1. The CAS # for crystalline silica is 7631-86-9 but in the HARP software it is 1175.
2. To conservatively estimate the risk from glycol ethers and acetates (CAS # 1115), the CAS # representing the most conservative toxicity values was used (109-86-4, ethylene glycol monomethyl ether).
3. Hexavalent chromium emissions from potential fugitive sources were estimated per May 2014 - April 2015 modeling-monitoring reconciliation discussed in detail in Appendix B, then adjusted for the risk reduction measures currently under evaluation, as discussed in Section 5 of the Risk Reduction Plan. Potential fugitive emissions estimated here are subject to uncertainty associated with air dispersion modeling.

Abbreviations:
CAS = Chemical Abstract Service
HARP = Hotspots Analysis Reporting Program
HRA = Health Risk Assessment
RRP = Risk Reduction Plan

Table A-3
Post-Implementation, Point Source Modeling Parameters
Hixson Metal Finishing
Newport Beach, California

Source Number	Source	UTM East (m)	UTM North (m)	Base Elevation (m)	Modeled Emission Rate (g/s)	Stack Height (m)	Stack Diameter (m)	Stack Temperature (K)	Exhaust Flow Rate (acfm)	Exhaust Velocity (m/s)
PS1	SB #1	413,380.94	3,721,605.30	32.83	1	6.8	0.61	304.8	10,649	18.5
PS2	SB #2	413,369.49	3,721,597.43	32.68	1	6.8	0.76	300.5	11,374	12.4
PS3	Building 2/3 Acid Scrubber (Wet)	413,465.78	3,721,609.67	32.74	1	7.6	0.61	300.0	9,000	14.6
PS4	Oven #3	413,380.93	3,721,625.18	32.81	1	6.1	0.25	390.9	2,224	20.7
PS5	Oven #6	413,358.74	3,721,605.73	32.82	1	6.2	0.20	400.4	2,087	43.9
PS6	Oven #7	413,358.85	3,721,602.84	32.8	1	6.3	0.20	381.5	2,361	47.2
PS7	Oven #12	413,358.84	3,721,598.39	32.74	1	6.2	0.20	400.0	2,200	45.0
PS8	Oven #14	413,358.30	3,721,614.50	32.85	1	6.2	0.20	400.0	2,200	45.0
PS9	SB #3	413,362.79	3,721,614.40	32.87	1	6.8	0.75	300.0	10,000	15.0
PS10	Building 2/WT Chromic Scrubber (Dry)	413,463.08	3,721,602.21	32.7	1	7.6	0.76	300.0	14,300	14.8
PS11	Building 3 Chromic Scrubber (Dry)	413,424.61	3,721,597.68	32.74	1	7.6	0.71	300.0	13,250	15.7
PS12	Demasking, Downdraft Table 1	413,351.76	3,721,607.36	32.78	1	7.6	0.46	300.0	5,000	14.4
PS13	Demasking, Downdraft Table 2	413,351.81	3,721,604.42	32.76	1	7.6	0.46	300.0	5,000	14.4
PS15	Scuffing Booth, Stack 1	413,372.13	3,721,597.36	32.67	1	7.6	0.61	300.0	9,000	14.6
PS16	Scuffing Booth, Stack 2	413,373.41	3,721,597.36	32.68	1	7.6	0.61	300.0	9,000	14.6
PS17	Building 4 HEPA Chamber and Fan	413,378.62	3,721,597.43	32.72	1	7.6	0.76	300.0	15,000	15.5

Notes
1. Source parameters for new sources (PS7-PS17) are based on the current information available, and in some cases may be approximate.

Abbreviations:
acfm = actual cubic feet per minute
g/s = grams per second
K = Kelvin
m = meter
m/s = meters per second
SB = Spray Booth
UTM = Universal Transverse Mercator

Table A-4
Post-Implementation, Area Source Modeling Parameters
Hixson Metal Finishing
Newport Beach, California

Source Number	Source	UTM East[1] (m)	UTM North[1] (m)	Base Elevation (m)	Area (m^2)	Modeled Emission Rate[2] (g/ (s-m^2))	Release Height[3] (m)	Initial Vertical Dimension[4] (m)
FS1	Building 4	413,382.1	3,721,628.0	32.77	969.2	0.00103	2.3	2.13
FS2	Building 3	413,396.5	3,721,627.4	32.67	969.2	0.00103	2.3	2.13
FS3	Building 2	413,442.0	3,721,628.0	32.52	998.9	0.00100	4.6	2.13
FS5	Between Buildings 3 and 4	413,382.1	3,721,596.7	32.67	457.5	0.00219	0	0.00
FS6	Between Buildings 2 and 3	413,427.4	3,721,628.0	32.63	463.5	0.00216	0	0.00
FS8	Building 3 Plating	413,396.5	3,721,627.4	32.67	969.2	0.00103	2.3	2.13

Notes:

1. Represents the coordinates of the first vertex as it appears in the modeling files.
2. Modeled emission rates were derived using unit emission rates of 1 g/s and corresponding areas.
3. Due to the strong pull from the roof vents/fans on Building 2, the release height for this fugitive source has been set to the building height. The release height for Buildings 3 and 4 have been set to 1/2 of the building height.
4. The initial vertical dimension for Building sources represents the building height divided by 2.15, per model guidance.

Abbreviations:

g/s-m^2 = grams per second per meter squared

K = Kelvin

m = meter

UTM = Universal Transverse Mercator

Table A-5
Operating Schedules
Hixson Metal Finishing
Newport Beach, California

Source Number	Source	Weekday Hours of Operation	Weekday Shift Hours	Weekend Hours of Operation[1]	Weekend Shift Hours	Hours/Week[2]	Hours/Year
PS1	SB #1	24	all	8	6am - 2pm	136	7091
PS2	SB #2	24	all	0	-	120	6257
PS3	Building 2/3 Acid Scrubber (Wet)	16	6am - 10pm	0	-	80	4171
PS4	Oven #3	24	all	24	all	168	8760
PS5	Oven #6	24	all	8	6am - 2pm	136	7091
PS6	Oven #7	24	all	8	6am - 2pm	136	7091
PS7	Oven #12	24	all	8	6am - 2pm	136	7091
PS8	Oven #14	24	all	8	6am - 2pm	136	7091
PS9	SB #3	24	all	8	6am - 2pm	136	7091
PS10	Building 2/WT Chromic Scrubber (Dry)	16	6am - 10pm	8	6am - 2pm	88	4589
PS11	Building 3 Chromic Scrubber (Dry)	16	6am - 10pm	0	-	80	4171
PS12	Demasking, Downdraft Table 1	16	6am - 10pm	8	6am - 2pm	88	4589
PS13	Demasking, Downdraft Table 2	16	6am - 10pm	8	6am - 2pm	88	4589
PS15	Scuffing Booth, Stack 1	24	all	8	6am - 2pm	136	7091
PS16	Scuffing Booth, Stack 2	24	all	8	6am - 2pm	136	7091
PS17	Building 4 HEPA Chamber and Fan	24	all	8	6am - 2pm	136	7091
FS1	Building 4	24	all	24	all	168	8760
FS2	Building 3	24	all	24	all	168	8760
FS3	Building 2	24	all	24	all	168	8760
FS4	Building 1	24	all	24	all	168	8760
FS5	Between Buildings 3 and 4	24	all	24	all	168	8760
FS6	Between Buildings 2 and 3	24	all	24	all	168	8760
FS7	Between Buildings 1 and 2	24	all	24	all	168	8760
FS8	-	16	6am - 10pm	0	-	80	4171

Notes:

1. Building 2/WT Chromic Scrubber (Dry) and Demasking operates only on Saturdays in addition to its weekday schedule. All other sources that operate on the weekends operate on both Saturdays and Sundays.
2. Note that while some scrubber and control units may operate 24 hours a day, 7 days a week, the modeling was conducted to follow the schedule of primary emissions generation.

Abbreviations:

SB = Spray Booth

Appendix A Figures

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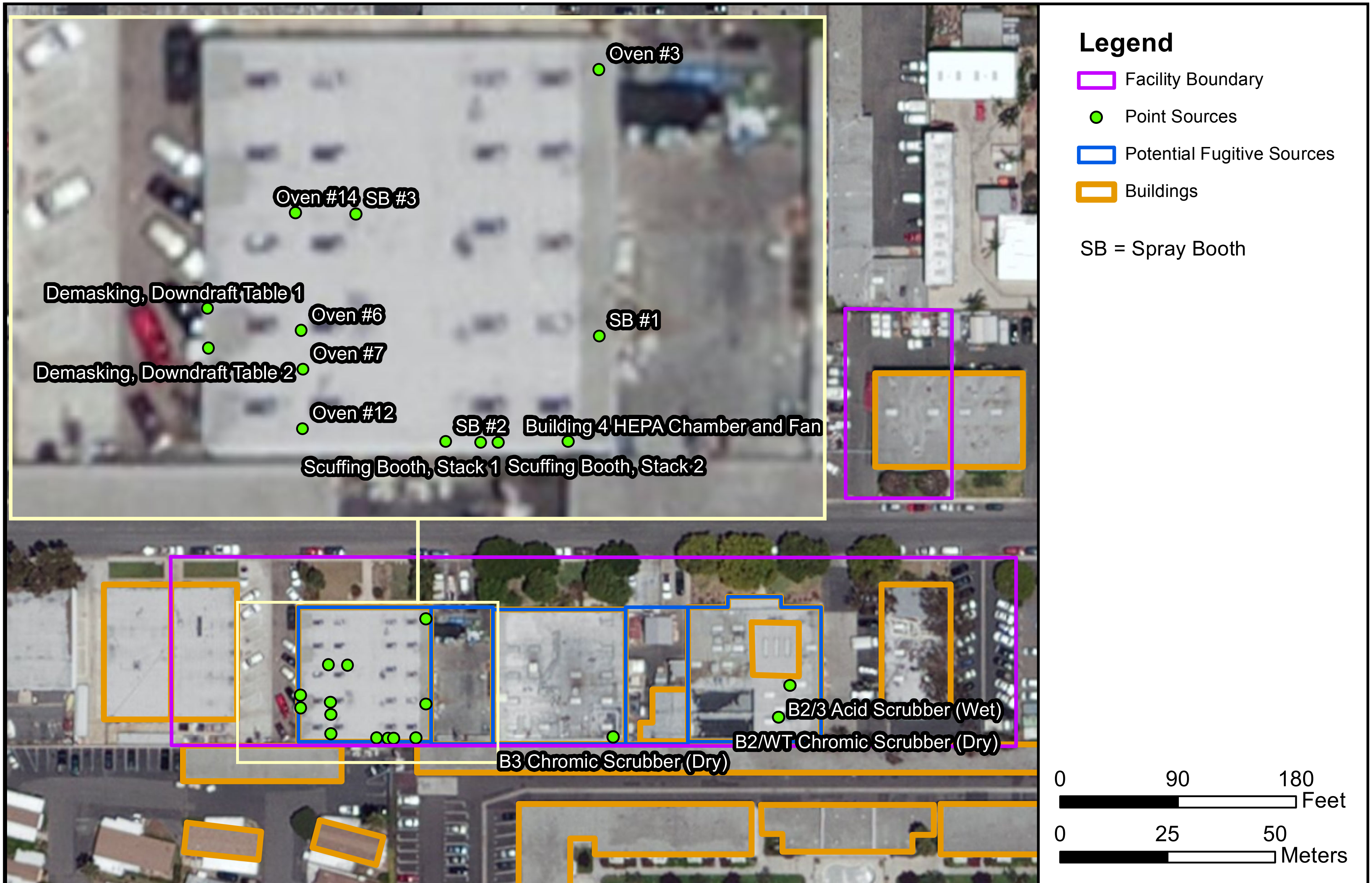
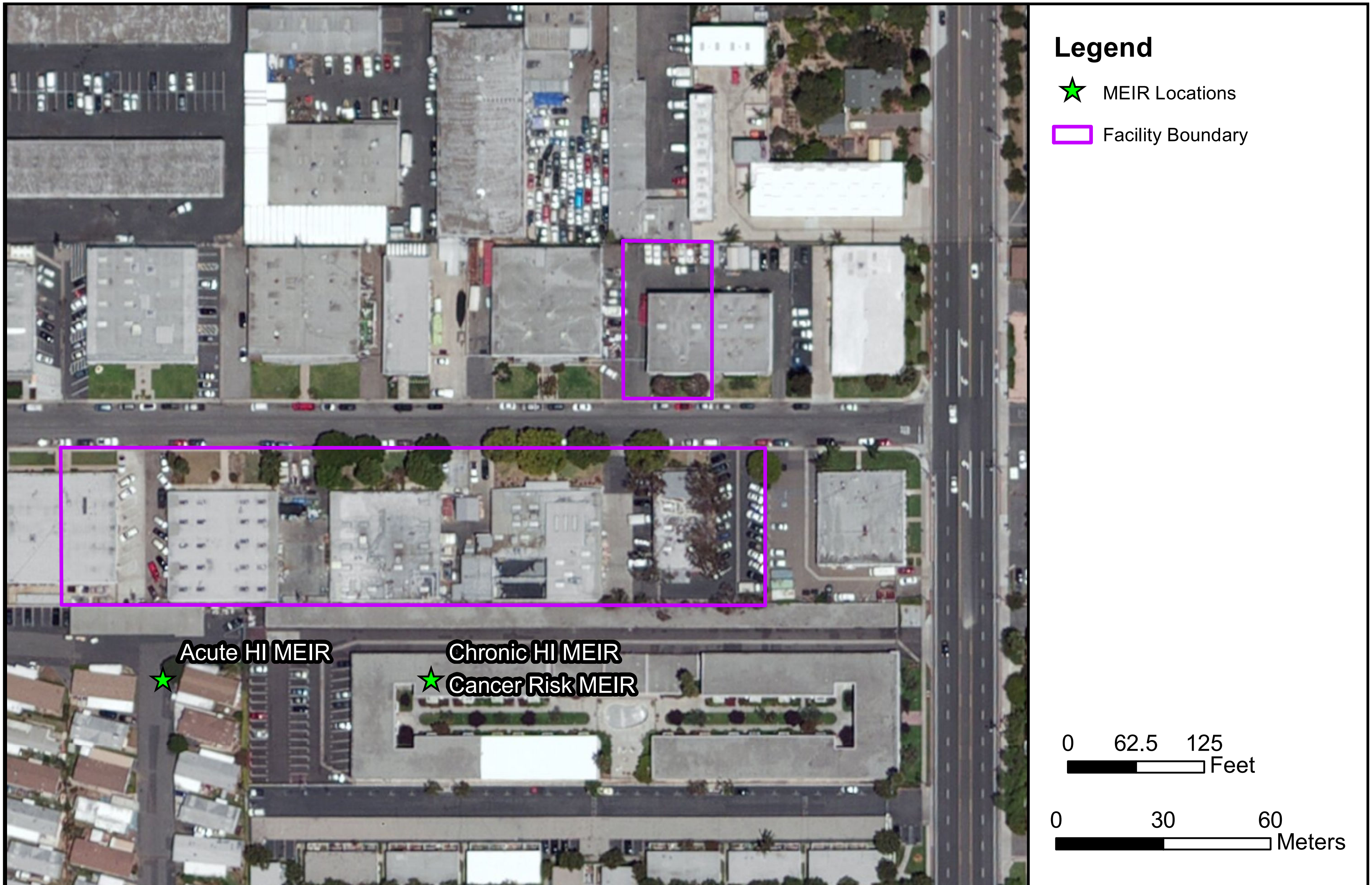


RAMBOLL ENVIRON

Post-Implementation, Property Layout
Hixson Metal Finishing
Newport Beach, California

Figure

A-1



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Post-Implementation, MEIR Locations
Hixson Metal Finishing
Newport Beach, California

Figure
A-2

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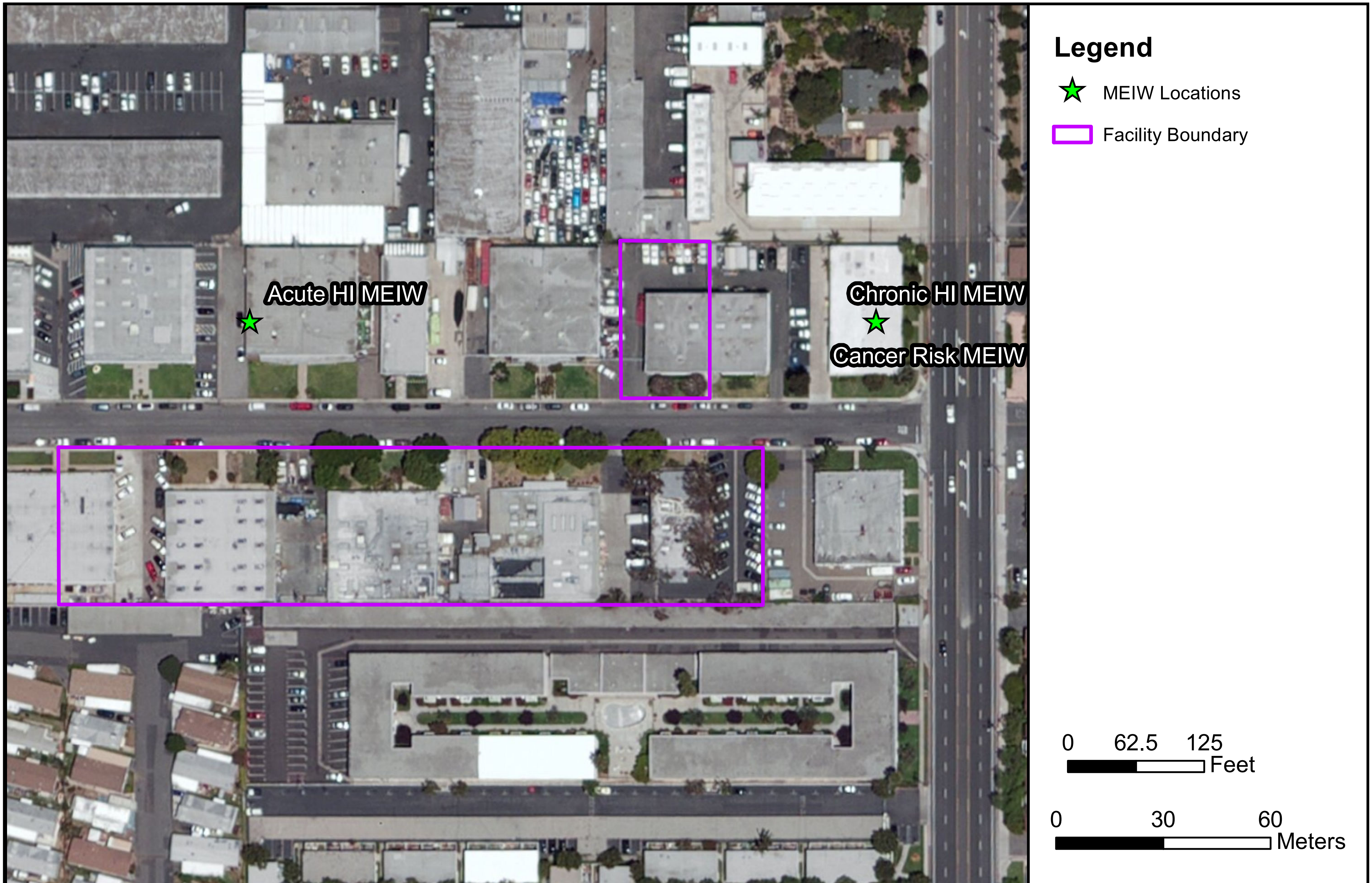

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Post-Implementation, MEIW Locations
Hixson Metal Finishing
Newport Beach, California

Figure

A-3

Appendix B

Potential Fugitive Cr(VI) Emissions Determination - Baseline Conditions

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Appendix B
Potential Fugitive Cr(VI) Emissions Determination – Baseline Conditions

To determine the potential fugitive Cr(VI) emissions over the 12 month period from May 2014 through April 2015, Ramboll Environ performed modeling-monitoring reconciliation, as discussed below. The resulting potential fugitive Cr(VI) emission rates as estimated here, serve as the baseline for the RRP.

Ramboll Environ performed an hourly air dispersion model using 2014-2015 John Wayne Airport meteorological data to reconcile with daily Cr(VI) offsite monitoring results. Ramboll Environ used AERMOD with X/Q emissions to model Cr(VI) emissions during the May 2014 through April 2015 period. The model included five potential fugitive sources representing Buildings 2, 3, and 4 and the breezeways between Buildings 2/3 and 3/4, as well as three point sources: the current paint spray booths and the anodize line. Due to the low activity and handling of Cr(VI)-containing materials in Building 1 and in between Building 1 and 2, these areas are not expected to be potential fugitive Cr(VI) emission sources. Source parameters for the point and potential fugitive area sources are in Tables B-1 and B-2.

The model set-up for the reconciliation analysis paralleled that discussed in the HRA submitted on November 14, 2014, with the following differences:

- 2014-2015 John Wayne Airport meteorological data was used, to match the reconciliation period. A wind rose for the 2014-2015 reconciliation period is provided in Figure B-1;
- Only Cr(VI) sources were modeled, including the five potential fugitive sources and three point sources;
- 1-hr average post files were generated, so that appropriate 24-hr averages could be calculated to match actual sample run times during the reconciliation period; and
- Only two receptors were included to represent the Millet and Apartments monitors, as discussed below.

The two modeled receptors included in the model represented the two offsite monitors, Apartments (UTM coordinates 413,390.1 m East and 3,721,595.3 m North) and Millet (UTM coordinates 413,428.2 m East and 3,721,666.3 m North). Locations of these monitors are shown in Figure B-2. Flagpole heights were used to represent the locations of the monitor air intakes (2.7 meters for the Millet monitor, and 4.0 meters for the Apartments monitor).

During this period, the monitors collected continuous 24-hr samples of Cr(VI) on filters at a daily frequency. 351 days within the reconciliation period had valid Cr(VI) samples from both the Millet and Apartments monitors. An additional 6 days had valid Cr(VI) samples from either the Millet or Apartments monitors. Once daily sampling began on April 17, 2014, samples were collected from 8 am to 8 am. To accurately compare model results with the 24-hr samples, 1-hr average dispersion factors were computed for every hour from May 1, 2014 to May 1, 2015,[10] and 24-hr averages were calculated to match the daily sampling schedule described. Samples that were flagged as irregular (e.g. “shorter” or “longer” sample elapsed time) were excluded

[10] Note that the model was run through May 1, 2015 since the April 30, 2015 sample duration extends until 8 am on May 1, 2015.

from this analysis. When calculating 24-hr averages, AERMOD regulatory default methods were employed, including the treatment of calms and missing meteorological data.

Using the 357 days of valid sampling data, of which 351 days have data at both monitors, a least squares optimization approach was used to determine the reconciled emission rates of each potential fugitive source (5 independent emission rates). The minimization was done using the Generalized Reduced Gradient (GRG) algorithm in the Solver package in Microsoft Excel (2013 package), assuming default Solver settings with the exception of turning off the automatic scaling function. The automatic scaling function forces Solver to internally rescale the values of the variables, constraints, and objectives to similar magnitudes. However, there is no reason to believe that each potential fugitive source contributes in an equal manner to the monitor results; therefore, this function was not used. Before running Solver, the calculated point source contribution at each monitor was subtracted from the monitoring results. Point source contributions were determined based on the appropriate dispersion factors and emission rates. Point source Cr(VI) emissions were estimated using the same methods as presented in the 2013 AER, with the following update:

- To account for the installation of the ULPA filtration system on both spray booths, a 99.999% control efficiency was applied to Cr(VI) emissions[11] instead of the 99.997% control efficiency of the prior filters used in 2013.

Point source emission rates used in this reconciliation are summarized in Table B-3.

Due to the significant reductions seen in Cr(VI) monitored concentrations, several sample days within this period see results that are at the same magnitude or lower than background Cr(VI) concentrations, as reported in the SCAQMD MATES IV study (SCAQMD 2015b). The MATES IV study measured ambient Cr(VI) at ten sites in the South Coast Air Basin from 2012 to 2013 and found background annual average Cr(VI) concentrations ranging from 0.03 ng/m^3 to 0.11 ng/m^3. The closest MATES IV monitors to the Facility are to the north, in Long Beach. In North Long Beach the sampled annual average Cr(VI) concentration was 0.04 ng/m^3 and in West Long Beach the sampled annual average Cr(VI) concentration was 0.03 ng/m^3. These coastal sites might reasonably be expected to represent the background Cr(VI) concentration in Newport Beach, and at the Facility. To account for background concentrations, in addition to subtracting the point source contributions, 0.03 ng/m^3 was subtracted from each monitor concentration. If this resulted in a negative concentration, the concentration was then set to zero before running Solver. Subtracting a background concentration of 0.03 ng/m^3 is a conservative approach as the North Long Beach and West Long Beach monitors saw maximum background concentrations of 0.20 ng/m^3 and 0.14 ng/m^3, respectively, with standard deviations of 0.04 ng/m^3 and 0.03 ng/m^3, respectively.

For sample days with valid samples at both monitors, Solver was used to minimize the difference between the modeled concentrations and the monitored concentrations (minus point source and background contribution) at both monitors simultaneously. For the sample days with valid samples at only one monitor, Solver was used to minimize the difference between the modeled concentration and the monitored concentration (minus point source and background contribution) at the given monitor. To account for onsite monitoring data,[12] reconciled emissions

[11] The upgraded filter control efficiency was still applied after the 65% spray gun transfer efficiency.

[12] Onsite monitors are set-up on Buildings 2, 3, and 4 and in between Buildings 2/3 and 3/4.

rates were then totaled over all potential fugitive Cr(VI) sources and reallocated to each individual source based on the relative contribution of each corresponding onsite monitor to total daily monitored concentrations. The location of onsite monitors are shown in Figure B-3. This reallocation was done on a daily basis. On days with any missing or invalid onsite monitoring data (for any of the five monitors), emissions were not reallocated and were kept as determined through the reconciliation with offsite monitors. Using this method, 357 individual sets of solutions were computed, for each day with valid sampling data in the May 2014 through April 2015 period.

To account for curtailment periods during May 2014 through April 2015, emission rates estimated for any day when the facility was shut down were excluded from the analysis. This ensures that the baseline emission rates used for the RRP represent normal and enforceable operations that will continue in the future. Hixson was shut down for a total of 152 days during the May 2014 through April 2015 period, of which 147 corresponding with valid monitoring data. [13]

Resulting emission rates for each valid operating day (a total of 210 days) were then averaged to determine the current reconciled and reallocated potential fugitive Cr(VI) emission rates used as a baseline to this RRP. Table B-4 presents the reconciled and reallocated Cr(VI) emission rates for each of the five potential fugitive sources modeled, averaged over each valid sample day. These emission rates were applied in the Baseline HRA. To demonstrate the fit of the reconciled and reallocation Cr(VI) emission rates to the monitored Cr(VI) concentrations, results of each daily reconciliation and reallocation performed are plotted against the monitored concentration (minus point source and background contributions) in Figures B-4 and B-5 for the Millet and Apartments monitors, respectively. The Millet monitor sees a better overall fit, with an R-squared value of 0.81, as compared to 0.26 at the Apartments monitor.

Air dispersion models introduce a source of uncertainty in the estimation of exposure concentrations; therefore the resulting reconciled emissions are also subject to the uncertainty introduced through the model.

Supporting calculations for the modeling-monitoring reconciliation and reallocation of potential fugitive Cr(VI) emissions are provided in Appendix C.

[13] The days when Hixson was shut down within the May 2014 through April 2015 period are flagged in the supporting calculation files included in Appendix C.

Appendix B Tables

Table B-1
Reconciliation, Point Source Modeling Parameters
Hixson Metal Finishing
Newport Beach, California

Source Number	Source	UTM East (m)	UTM North (m)	Base Elevation (m)	Modeled Emission Rate (g/s)	Stack Height (m)	Stack Diameter (m)	Stack Temperature (K)	Exhaust Flow Rate (acfm)	Exhaust Velocity (m/s)
PS1	SB #1	413,411.30	3,721,600.93	33.02	1	6.8	0.61	304.8	10,649	18.5
PS2	SB #2	413,371.50	3,721,612.79	32.83	1	6.8	0.76	300.5	11,374	12.4
PS3	Scrubber (Anodize Line, Tank 70)	413,465.76	3,721,610.29	32.74	1	7.6	0.46	304.8	3,564	10.8

Abbreviations:
acfm = actual cubic feet per minute
g/s = grams per second
K = Kelvin
m = meter
m/s = meters per second
SB = Spray Booth
UTM = Universal Transverse Mercator

Table B-2
Reconciliation, Area Source Modeling Parameters
Hixson Metal Finishing
Newport Beach, California

Source Number	Source	UTM East[1] (m)	UTM North[1] (m)	Base Elevation (m)	Area (m^2)	Modeled Emission Rate[2] (g/ (s-m^2))	Release Height[3] (m)	Initial Vertical Dimension[4] (m)
FS1	Building 4	413,382.1	3,721,628.0	32.77	969.2	0.00103	2.3	2.13
FS2	Building 3	413,396.5	3,721,627.4	32.67	969.2	0.00103	2.3	2.13
FS3	Building 2	413,442.0	3,721,628.0	32.52	998.9	0.00100	4.6	2.13
FS5	Between Buildings 3 and 4	413,382.1	3,721,596.7	32.67	457.5	0.00219	0	0.00
FS6	Between Buildings 2 and 3	413,427.4	3,721,628.0	32.63	463.5	0.00216	0	0.00

Notes:

1. Represents the coordinates of the first vertex as it appears in the modeling files.
2. Modeled emission rates were derived using unit emission rates of 1 g/s and corresponding areas.
3. Due to the strong pull from the roof vents/fans on Building 2, the release height for this fugitive source has been set to the building height. The release height for Buildings 3 and 4 have been set to 1/2 of the building height.
4. The initial vertical dimension for Building sources represents the building height divided by 2.15, per model guidance.

Abbreviations:

g/s-m^2 = grams per second per meter squared

K = Kelvin

m = meter

UTM = Universal Transverse Mercator

Table B-3
Reconciliation, Point Source Emission Rates
Hixson Metal Finishing
Newport Beach, California

Source Number	Source	5/1/14 - 4/30/15 Emissions (lbs)[1]	5/1/14 - 4/30/15 Emissions (g/s)[2]	Weekday Operating Hours (hrs)	Weekend Operating Hours (hrs)	Operating Hours/Period in Consideration (hrs)
PS1	SB #1	3.27E-04	5.81E-09	24	8	7091
PS2	SB #2	3.03E-04	6.10E-09	24	0	6257
PS3	Scrubber (Anodize Line, Tank 70)	3.57E-04	1.08E-08	16	0	4171

Notes:

1. Emissions are based on 2013 Annual Emission Report (AER) data and updated control efficiencies.
2. Since variable emission rates were modeled with '0' in periods of no operation and '1' in periods of operation, corresponding g/s emission rates were derived by dividing the total emissions from 5/1/14-4/30/15 by the operating hours within that period.

Abbreviations:

g = gram
hrs = hours
lbs = pounds
SB = Spray Booth
s = second

Table B-4
Reconciled Cr(VI) Potential Fugitive Source Emission Rates
Hixson Metal Finishing
Newport Beach, CA

Estimated Emission Rates by Potential Fugitive Source (g/s)				
B4	**B3**	**B2**	**Btwn 3&4**	**Btwn 2&3**
FS1	**FS2**	**FS3**	**FS5**	**FS6**
1.3E-07	1.7E-07	6.0E-07	5.9E-07	2.0E-07

Abbreviations:
Cr(VI) = hexavalent chromium
g/s = gram per second

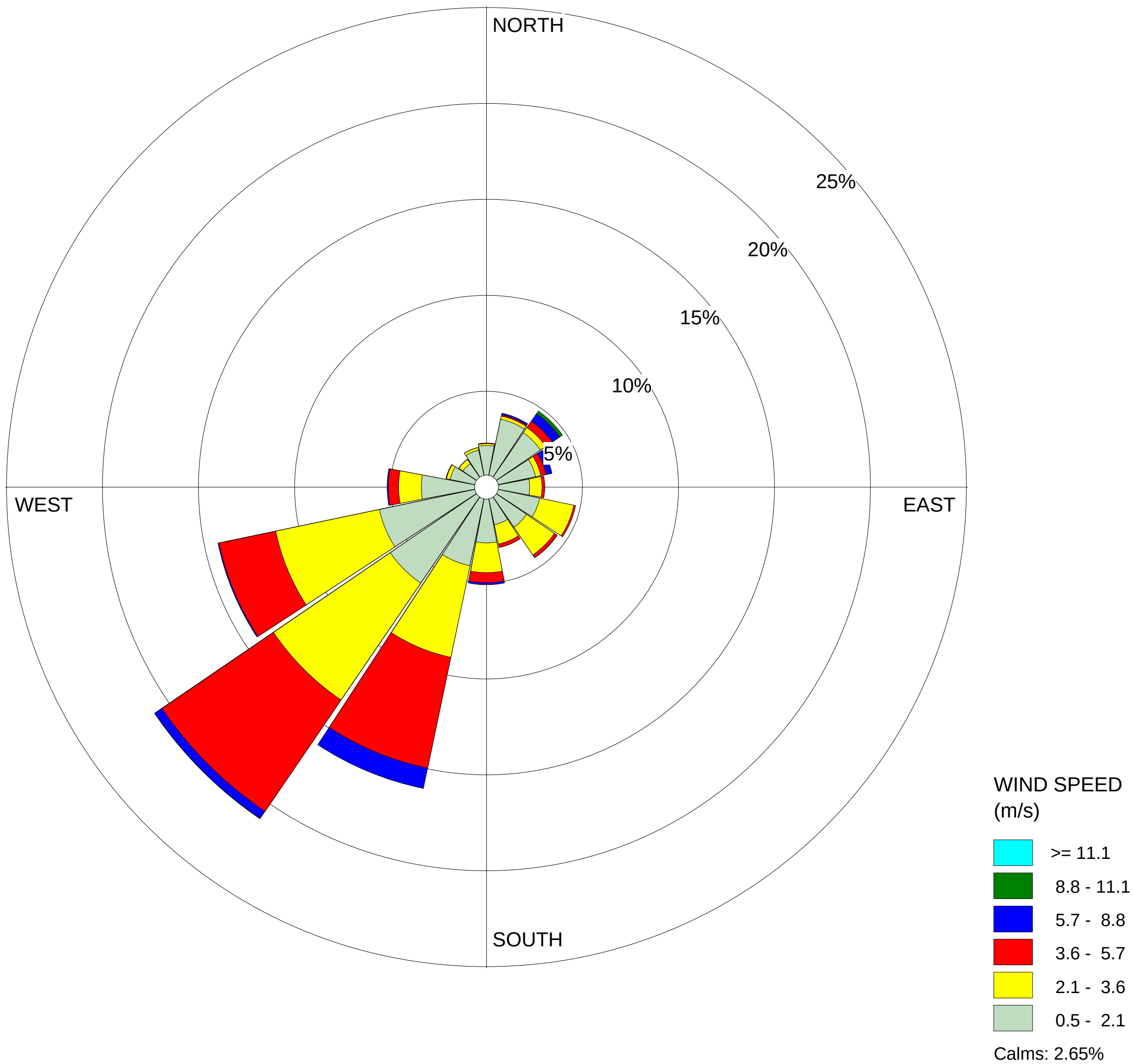
Appendix B Figures

WIND ROSE PLOT:

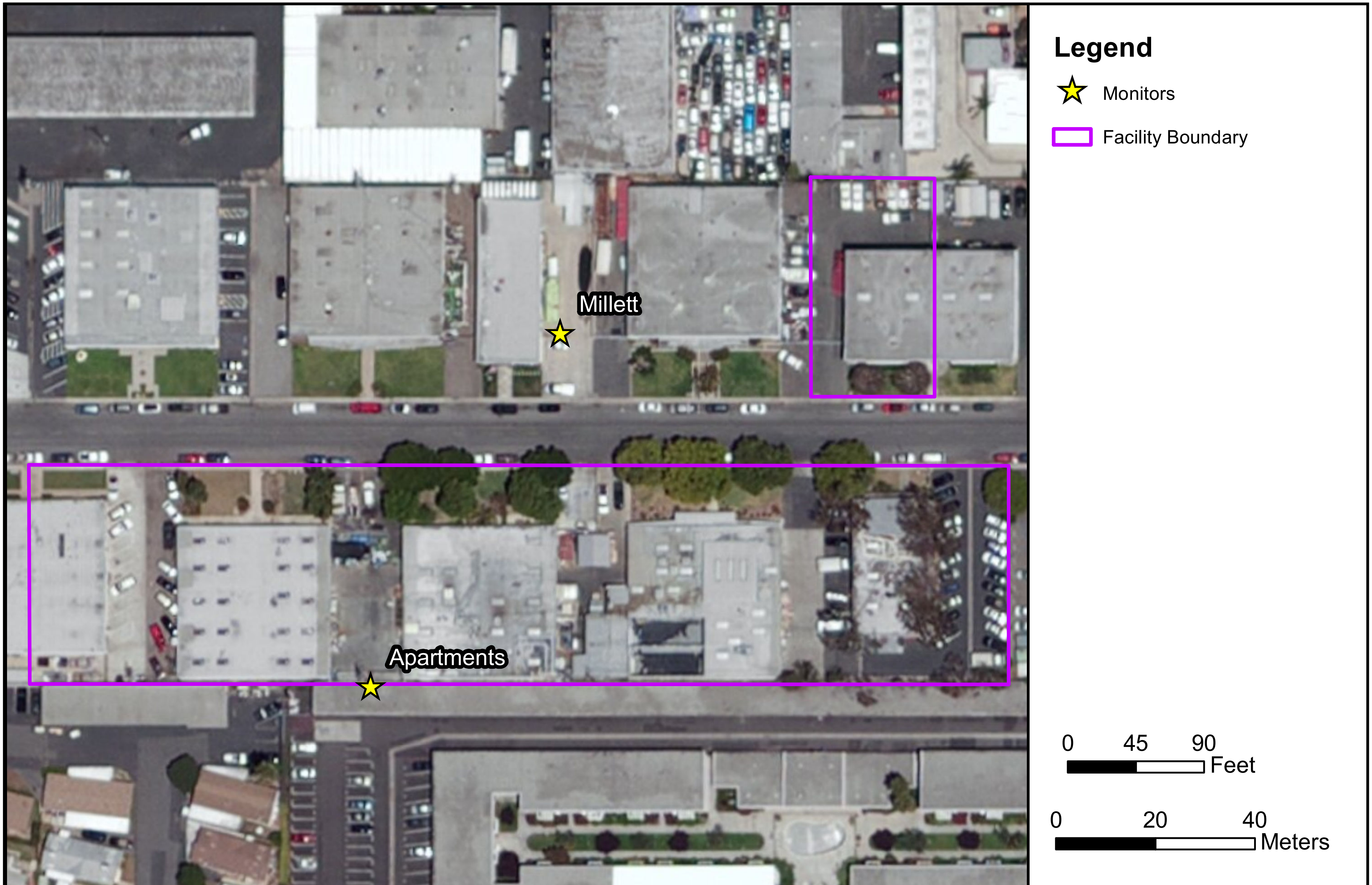
Figure B-1: Wind Rose for John Wayne Airport
May 2014 - April 2015

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
	Start Date: 5/1/2014 - 00:00 **End Date: 5/1/2015 - 08:00**	MODELER:	
	CALM WINDS: **2.65%**	TOTAL COUNT: **8735 hrs.**	
	AVG. WIND SPEED: **2.39 m/s**	DATE: **6/1/2015**	PROJECT NO.:



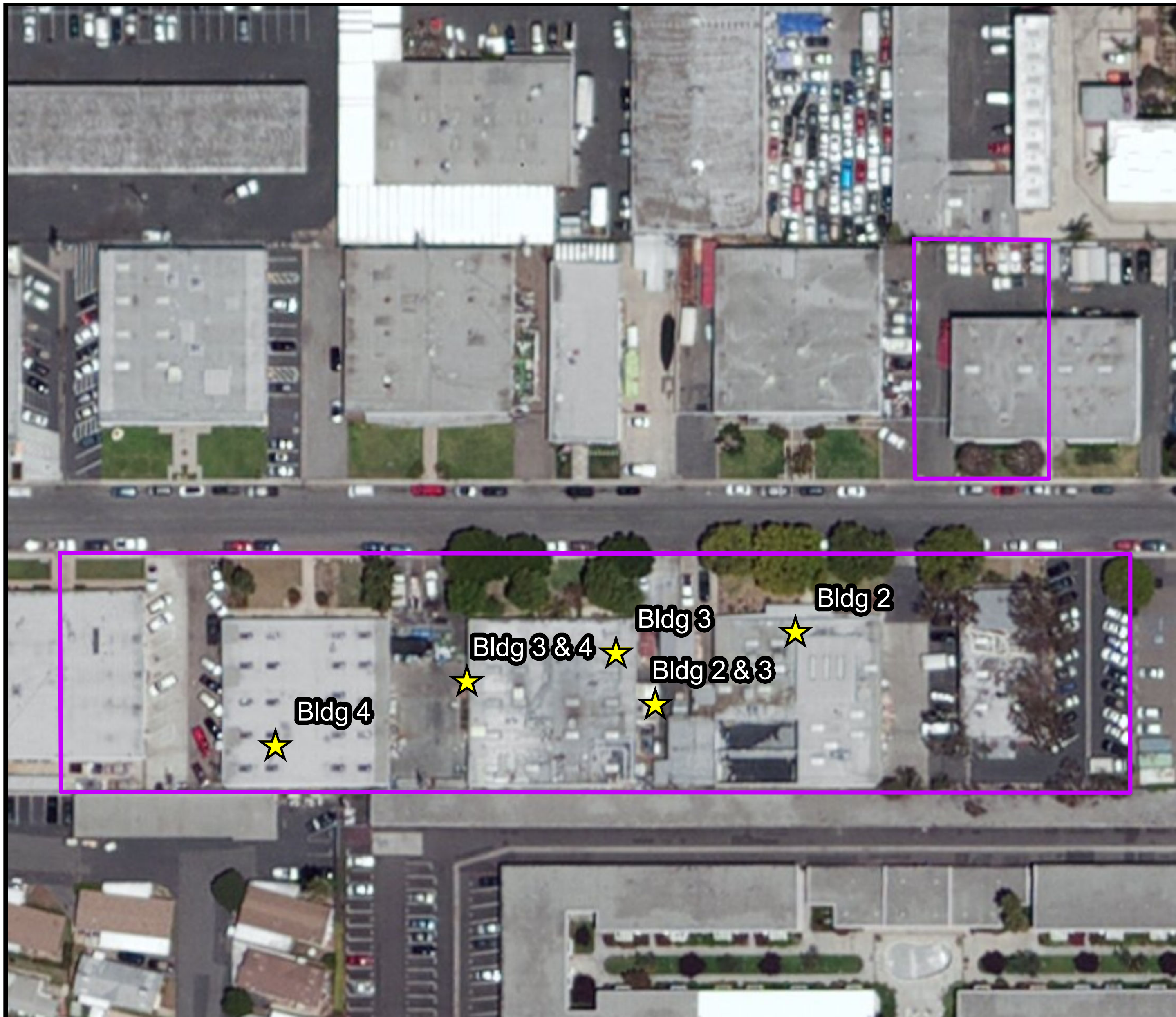
RAMBOLL ENVIRON

Locations of Offsite Monitors
Hixson Metal Finishing
Newport Beach, California

N

Figure
B-2

CONFIDENTIAL



Legend

- ★ Monitors
- Facility Boundary

0 45 90 Feet

0 20 40 Meters

RAMBØLL ENVIRON

Locations of Onsite Monitors
Hixson Metal Finishing
Newport Beach, California

N

Figure

B-3

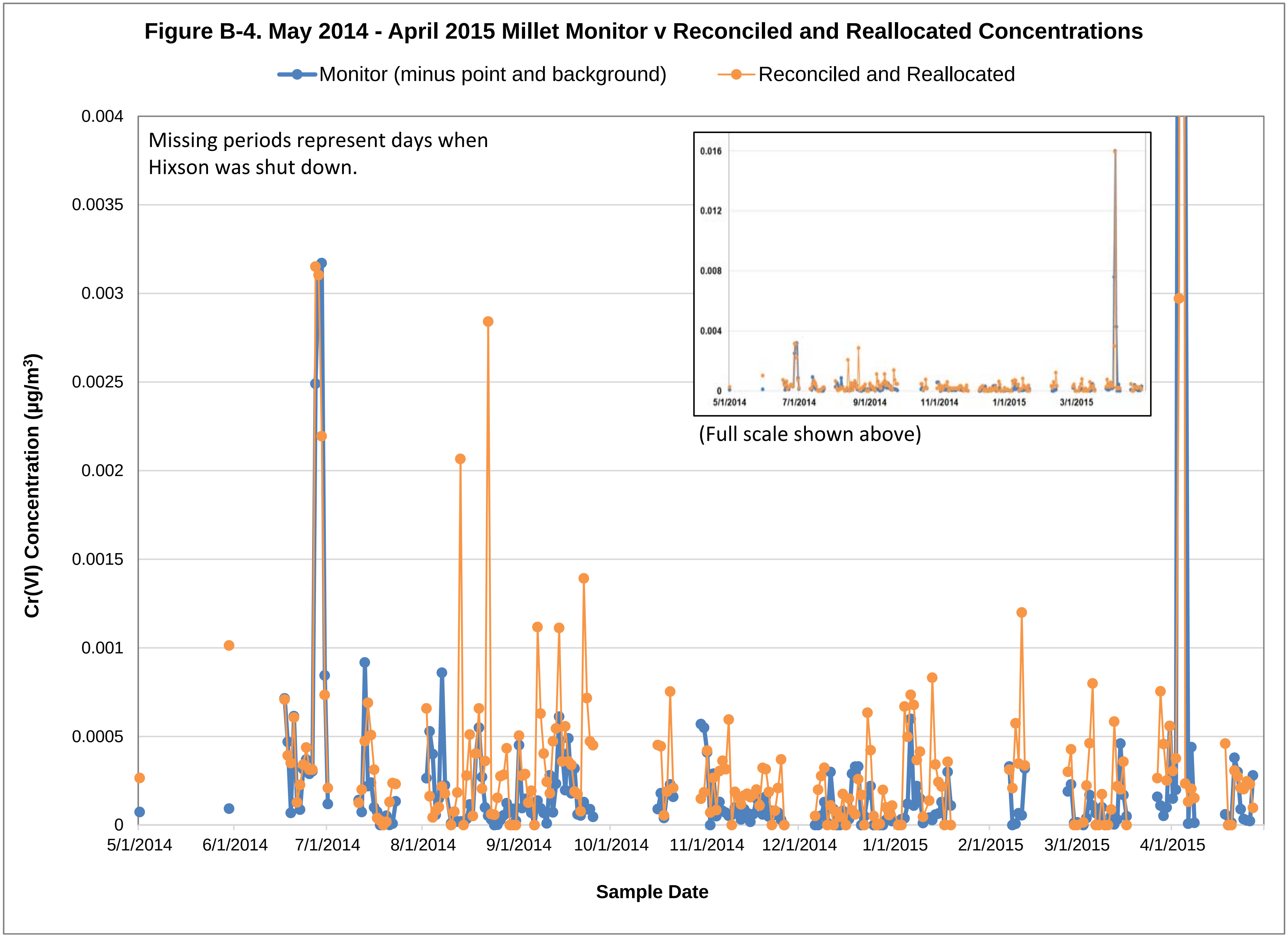
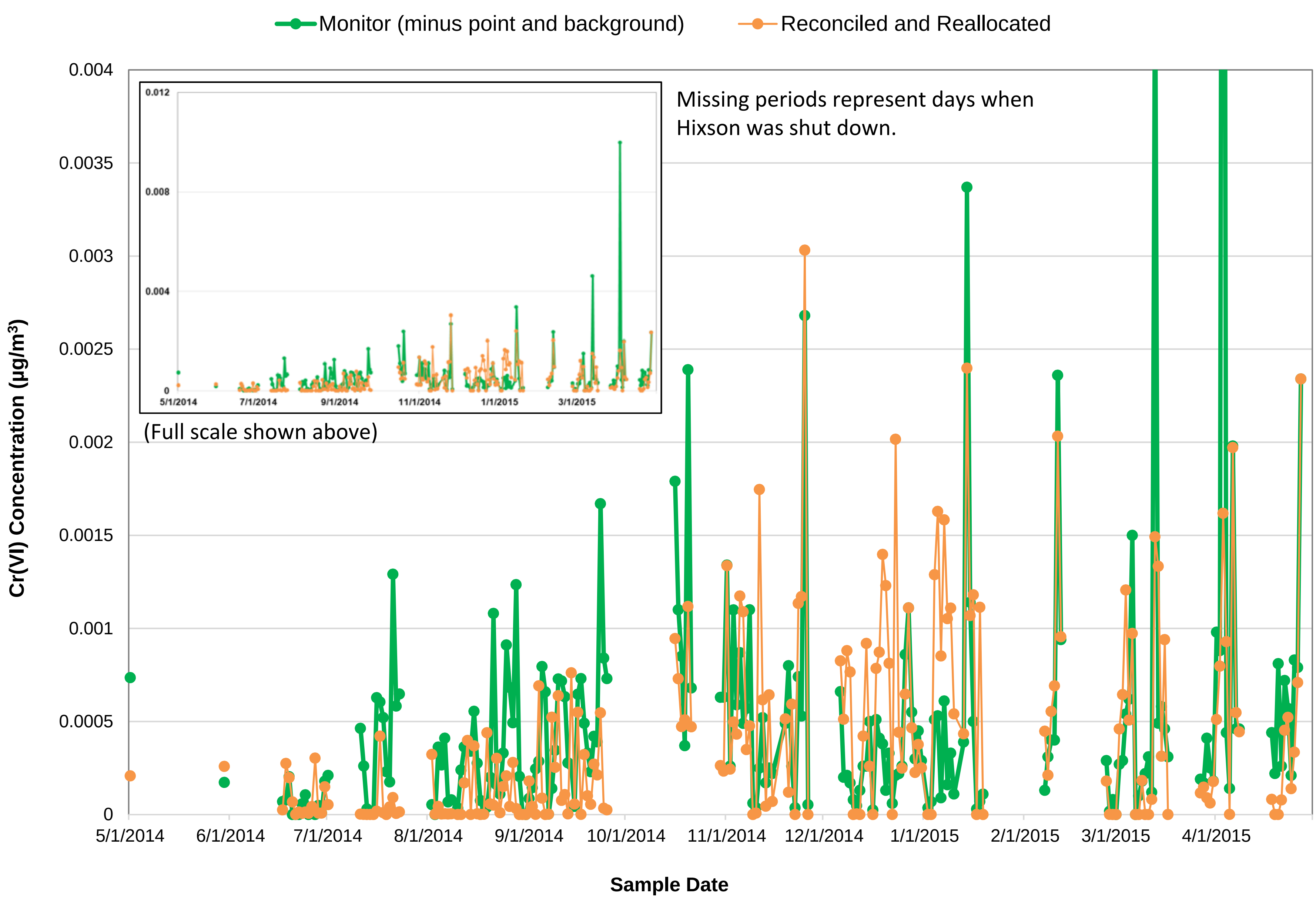


Figure B-4. May 2014 - April 2015 Millet Monitor v Reconciled and Reallocated Concentrations
Monitor (minus point and background)
Reconciled and Reallocated
Missing periods represent days when Hixson was shut down.
(Full scale shown above)
Cr(VI) Concentration (µg/m³)
Sample Date
0.004
0.0035
0.003
0.0025
0.002
0.0015
0.001
0.0005
0
5/1/2014
6/1/2014
7/1/2014
8/1/2014
9/1/2014
10/1/2014
11/1/2014
12/1/2014
1/1/2015
2/1/2015
3/1/2015
4/1/2015
0.016
0.012
0.008
0.004
0
5/1/2014
7/1/2014
9/1/2014
11/1/2014
1/1/2015
3/1/2015

Figure B-5. May 2014 - April 2015 Apartments Monitor v Reconciled and Reallocated Concentrations



Appendix C

Supporting Calculations

[Provided Electronically]

1 Supporting Calculations Files

File Name	File Description
Cancer Burden.xlsx	Calculations performed to determine cancer burden for the Baseline HRA and Post-Implementation scenarios
May2014-Apr2015_Reconciliation.xlsx	Calculations performed to determine fugitive emission rates used for the Baseline HRA by reconciling monitor concentrations with AERMOD modeling results
RRP Emissions.xlsx	Calculations performed to determine air toxics emissions to be used in HARP2 for the Post-Implementation scenario

Appendix D

Air Dispersion Modeling Files and HARP Files

[Provided Electronically]

1 Meteorological Data Files

1.1 Reconciliation Meteorological Data

1.1.1 AERMINUTE

File Name	File Description
*.INP	AERMINUTE Input Files, Years 2014-2015 (2 total)
*.DAT	AERMINUTE Output Files, Years 2014-2015 (2 total)

1.1.2 AERSURFACE

File Name	File Description
AERSURFACE.INP	AERSURFACE Input File
SURF_PARAMS.OUT	AERSURFACE Output File

1.1.3 AERMET

File Name	File Description
*in1	AERMET Stage 1 Input Files, Years 2014-2015 (2 total)
*in2	AERMET Stage 2 Input Files, Years 2014-2015 (2 total)
*in3	AERMET Stage 3 Input Files, Years 2014-2015 (2 total)
*OU1	AERMET Stage 1 Output Files, Years 2014-2015 (2 total)
*OU2	AERMET Stage 2 Output Files, Years 2014-2015 (2 total)
*OU3	AERMET Stage 3 Output Files, Years 2014-2015 (2 total)

1.1.4 Final Meteorological Files

File Name	File Description
KSNA.2014-2015.PFL	John Wayne Airport Profile File, Years 2014-2015
KSNA.2014-2015.SFC	John Wayne Airport Surface File, Years 2014-2015

1.2 Baseline HRA and RRP Meteorological Data[14]

File Name	File Description
KSNA.5Y.PFL	John Wayne Airport Profile File, Years 2009-2013
KSNA.5Y.SFC	John Wayne Airport Surface File, Years 2009-2013

[14] The same meteorological files were also used for the 2013 reconciliation effort.

2 AERMOD Modeling Files

2.1 Reconciliation

File Name	File Description
Reconciliation_Model_052014to042015.inp	AERMOD Input File, Reconciliation run
Reconciliation_Model_052014to042015.out	AERMOD Output File, Reconciliation run
ERRORS.LST	AERMOD Error File, Reconciliation run
SUMMARYFILE.SUM	AERMOD Summary File, Reconciliation run
*.PST	1-hr post files for three Cr(VI) point sources and five potential Cr(VI) fugitive sources (8 total)

2.2 Baseline HRA

2.2.1 Baseline HRA Model, Cancer, Chronic Run[15]

File Name	File Description
HRA_Baseline_Chronic.inp	AERMOD Input File, Cancer and Chronic HI run
HRA_Baseline_Chronic.out	AERMOD Output File, Cancer and Chronic HI run
ERRORS.LST	AERMOD Error File, Cancer and Chronic HI run
SUMMARYFILE.SUM	AERMOD Summary File, Cancer and Chronic HI run
*.PLT	Period average and 1st high, 1-hr plot files for six point sources and eight fugitive sources (28 total), Cancer and Chronic HI run[16]

2.2.2 Baseline HRA Model, Acute Run[17]

File Name	File Description

[15] Since variable emission rates were used, separate runs were performed for cancer risks/chronic HI and acute HI analyses. In the cancer risks/chronic HI run, which depends on annual emissions, variable emission rate scalars were adjusted such that the annual emissions sum to 31,536 kg/yr (i.e. the variable emission rate scalars sum to 8760 hours per year). In the acute HI run, which depends on maximum hourly emissions, variable emission rates were entered such that a 1 g/s emission rate was applied when emissions are on and a 0 g/s emission rate was applied when emissions are off (i.e. the variable emission rate scalars sum to the actual hours of operation per year).

[16] Note that both period average and 1st high, 1-hr plot files are required to be imported into HARP2 for the program to perform any analysis, but only the period average plot files are utilized for any cancer risk and chronic HI analyses.

[17] Since variable emission rates were used, separate runs were performed for cancer risks/chronic HI and acute HI analyses. In the cancer risks/chronic HI run, which depends on annual emissions, variable emission rate scalars

HRA_Model_Baseline_Acute.inp	AERMOD Input File, Acute HI run
HRA_Model_Baseline_Acute.out	AERMOD Output File, Acute HI run
ERRORS.LST	AERMOD Error File, Acute HI run
SUMMARYFILE.SUM	AERMOD Summary File, Acute HI run
*.PLT	Period average and 1st high, 1-hr plot files for six point sources and eight fugitive sources (28 total), Acute HI run[18]

2.2.3 AERMAP Files

File Name	File Description
Aermap input file.txt	AERMAP Input File, for Baseline HRA model (all sources, buildings, and receptors)[19]
Aermap output file.txt	AERMAP Output File, for Baseline HRA model (all sources, buildings, and receptors)
Aermap receptor file.txt	AERMAP Receptor File, elevations and hill heights for all receptors
Aermap source file.txt	AERMAP Source File, elevations for all sources and buildings

2.2.4 BPIP PRIME Files

File Name	File Description
Bpip input file.txt	BPIP PRIME Input File
Bpip output file.txt	BPIP PRIME Output File
Bpip summary file.txt	BPIP PRIME Summary File

were adjusted such that the annual emissions sum to 31,536 kg/yr (i.e. the variable emission rate scalars sum to 8760 hours per year). In the acute HI run, which depends on maximum hourly emissions, variable emission rates were entered such that a 1 g/s emission rate was applied when emissions are on and a 0 g/s emission rate was applied when emissions are off (i.e. the variable emission rate scalars sum to the actual hours of operation per year).

[18] Note that both period average and 1st high, 1-hr plot files are required to be imported into HARP2 for the program to perform any analysis, but only the 1st high, 1-hr plot files are utilized for any acute HI analyses.

[19] The sources and buildings required for the reconciliation model are included in this AERMAP run. The receptors for the reconciliation model are in the AERMAP run submitted with the HRA on November 14, 2014.

2.3 RRP

2.3.1 RRP Model, Cancer, Chronic Run[20]

File Name	File Description
RRP_Model_Chronic.inp	AERMOD Input File, Cancer and Chronic HI run
RRP_Model_Chronic.out	AERMOD Output File, Cancer and Chronic HI run
ERRORS.LST	AERMOD Error File, Cancer and Chronic HI run
SUMMARYFILE.SUM	AERMOD Summary File, Cancer and Chronic HI run
*.PLT	Period average and 1st high, 1-hr plot files for seventeen point sources and eight fugitive sources (50 total), Cancer and Chronic HI run[21]

2.3.2 RRP Model, Acute Run[22]

File Name	File Description
RRP_Model_Acute.inp	AERMOD Input File, Acute HI run
RRP_Model_Acute.out	AERMOD Output File, Acute HI run
ERRORS.LST	AERMOD Error File, Acute HI run
SUMMARYFILE.SUM	AERMOD Summary File, Acute HI run

[20] Since variable emission rates were used, separate runs were performed for cancer risks/chronic HI and acute HI analyses. In the cancer risks/chronic HI run, which depends on annual emissions, variable emission rate scalars were adjusted such that the annual emissions sum to 31,536 kg/yr (i.e. the variable emission rate scalars sum to 8760 hours per year). In the acute HI run, which depends on maximum hourly emissions, variable emission rates were entered such that a 1 g/s emission rate was applied when emissions are on and a 0 g/s emission rate was applied when emissions are off (i.e. the variable emission rate scalars sum to the actual hours of operation per year).

[21] Note that both period average and 1st high, 1-hr plot files are required to be imported into HARP2 for the program to perform any analysis, but only the period average plot files are utilized for any cancer risk and chronic HI analyses.

[22] Since variable emission rates were used, separate runs were performed for cancer risks/chronic HI and acute HI analyses. In the cancer risks/chronic HI run, which depends on annual emissions, variable emission rate scalars were adjusted such that the annual emissions sum to 31,536 kg/yr (i.e. the variable emission rate scalars sum to 8760 hours per year). In the acute HI run, which depends on maximum hourly emissions, variable emission rates were entered such that a 1 g/s emission rate was applied when emissions are on and a 0 g/s emission rate was applied when emissions are off (i.e. the variable emission rate scalars sum to the actual hours of operation per year).

*.PLT	Period average and 1st high, 1-hr plot files for seventeen point sources and eight fugitive sources (50 total), Acute HI run[23]

2.3.3 AERMAP Files

File Name	File Description
Aermap input file.txt	AERMAP Input File, for RRP model (all sources, buildings, and receptors)
Aermap output file.txt	AERMAP Output File, for RRP model (all sources, buildings, and receptors)
Aermap receptor file.txt	AERMAP Receptor File, elevations and hill heights for all receptors
Aermap source file.txt	AERMAP Source File, elevations for all sources and buildings

2.3.4 BPIP PRIME Files

File Name	File Description
Bpip input file.txt	BPIP PRIME Input File
Bpip output file.txt	BPIP PRIME Output File
Bpip summary file.txt	BPIP PRIME Summary File

3 HARP2 Files

3.1 Baseline HRA Emissions

File Name	File Description
Baseline_Emissions.CSV	Baseline HRA Emissions Input File for HARP2

3.2 RRP Emissions

File Name	File Description
RRP_Emissions.CSV	RRP Emissions Input File for HARP2 (for Post-Implementation Scenario)

[23] Note that both period average and 1st high, 1-hr plot files are required to be imported into HARP2 for the program to perform any analysis, but only the 1st high, 1-hr plot files are utilized for any acute HI analyses.

Attachment 1

Proposed Scrubber Systems and Facility Drawings

Proposed Scrubber Systems

Anodize

This will require 2 separate scrubbers. One scrubber would be used to directly vent the hexavalent chromium containing tanks. This would be a horizontal dry type scrubber with the addition of HEPA (ULPA) filters rated at 99.999% at 0.3 micron. The tanks vented to this scrubber would be:

60A – Clear Chemfilm
101 – Tri Acid Etch
70 – Chromic Acid Anodize
75 – Sodium Dichromate Seal
75C – Dilute Chromic Seal
150 – Dow 7

Note. We have contacted the manufacture of the constituents contained in all of our anodize dye tanks and all the constituents used do NOT contain any hex chrome.

All of the above tanks would be directly vented using hoods and push air. The total surface area of all the above tanks is 133 sq ft. In order to meet the requirements of the ventilation handbook of 100 CFM/sq ft of tank surface area (with push air) the scrubber system will be 13,300 CFM. In addition, this scrubber will be used to vent the Waste Treatment area at 1,000 CFM in order to maintain a PTE for that area. Total scrubber size will be 14,300 CFM.

In addition to the dry scrubber as indicated above, a separate wet acid scrubber that will be equipped with a mesh pad will be used to vent the entire building that houses the anodize line and will also be used to vent the Precious Metals and General Plate areas (in order to provide acid fume capture and meet PTE requirements). This scrubber will be sized, in conjunction with the chromic scrubbers, to provide a PTE of the entire building housing the anodize line and will provide the additional ventilation to the Precious Metals and General Plate areas in order to also provide a PTE in those areas. With the addition of the automatic doors (fast opening and closing to be installed at the southeast and northwest roll up doors) the approximate size of the mesh pad equipped wet acid scrubber will be 9,000 CFM with 7,000 CFM being used for the Anodize line. An additional 1,000 CFM will be provided to each of the Precious Metals and General Plate areas.

The ducting for all the areas noted above will be strategically equipped with dampers in order to balance the system in order to provide the required ventilation in all area. The design criteria of the ducting system that runs from building two (acid scrubber for anodize line) to building three (general plate and precious metals) has been taken into consideration as it pertains to these CFM calculations. In the anodize area this will provide a total of 20,300 CFM of ventilation therefore meeting the requirements in order to maintain the PTE (203 fps/sq ft)

Waste Treatment

The Waste Treatment area will be entirely sealed with curtains with no openings. The chromic scrubber that is located above the anodize line will provide 1,000 CFM of ventilation to this area.

The F006 filter cake also resides in this area. The filter cake container will be located inside the PTE. General procedures for the removal of the filter cake will be to line the container with a thick layer of plastic (vesqueen) prior to removing the cake from the filter press. Once complete the filter cake will be wrapped with the plastic and then securely sealed. The wrapped filter cake will then be transported to the roll off storage bin to await final removal from the site.

General Plate and Precious Metals Areas - Cyanide

The General Plate and Precious Metals areas will share a Cyanide Mist Eliminator. The tanks served are as follows:

General Plate

82 – Cadmium Plate
CD3 – Cadmium Dragout III
54 – Douglas LHE Cadmium
56 – Cadmium Plate
810 – 810 Strip
52 – Cadmium Plate
79 – Dull Cadmium Plate

Precious Metals

167 – Cyanide Activator
168 – Matte Silver
7 – Silver Plate, Type III
6 – Silver Plate, Type II
5 – Silver Plate, Type I
4 – Silver Strike
46 – Copper Cyanide Strike
1 – Gold Strike
3 – Gold Plate Type II
24 – Copper Cyanide Strike
820 – Reverse Silver Strip

Each of the above tanks will be hooded and directly vented to the cyanide mist eliminator. The ventilation will exit to the atmosphere after the mist eliminator. The mist eliminator will have a wash down cycle of approximately 1 minute every 8 hours. This wash down water will be plumbed to the waste treatment system for treatment and disposal. The total surface area of all above tanks is 158 sq ft. Therefore the mist eliminator will be sized to provide 15,800 CFM. This will provide 100 ft/min per square ft of tank surface area. This will be augmented with push air at each tank.

Note: A single hood will be placed along the east and south walls of the Precious Metals department and the east and north wall of the General Plate department. These hoods will be equipped with openings and adjustment vents/dampers/baffles that can be dialed in during installation in order to provide the ventilation to each of the tanks as required.

General Plate and Precious Metals Areas – Cr VI

The 2 chromic tanks that are now located in the Precious Metals area will be moved to the General Plate line and therefore a PTE in this area will not be required. In addition, tank 100, Cadmium Chromate, will be moved from the Vacuum cadmium area (Building 1) to the General Plate line. Therefore no chromic tanks will be located in the Precious Metals department so no chromic scrubber will be required in that area.

The General Plate line will have a chromic scrubber system. This would be a dry type vertical scrubber that will be located where the existing acid and cyanide scrubbers are located now. This scrubber will be equipped with the addition of HEPA (ULPA) filters rated at 99.999% at 0.3 micron. The tank vented to this scrubber would be:

43 – Passivation Type II
57 – Cad Chromate, Gold

59A – FPL Etch
58 – Cad Chromate, Clear
126 – Chromate Seal
118 – Chromate Rinse
119A – Cad Chromate, Olive Drab
160 – Sodium Dichromate
1101 – Tri Acid Etch (Moved from P/M)
138 – Douglas Cadmium Chrome (Moved from P/M)
100 – Cadmium Chromate (Moved from VacCad)

Each of the above tanks will be hooded and directly vented to the chromic scrubber system. The total surface area of all above tanks is 132.5 cu ft. Therefore the scrubber will be sized to provide for 13,250 CFM providing the 100 CFM per square ft of tank surface area. This will be augmented with push air.

Note: A single hood would be placed along the west wall of the General Plate department. This hood will be equipped with openings and adjustment vents/dampers/baffles that can be dialed in during installation in order to provide the ventilation to each of the tanks as required.

General Plate and Precious Metals Areas – Acid

In addition to the cyanide mist eliminator and the dry chromic scrubber, these areas will be provided with additional ventilation from the mesh pad equipped wet acid scrubber located on the mezzanine above the anodize line. Each area will be ventilated at 1,000 CFM (2,000 CFM total). This will provide the ventilation required to maintain a PTE in the General Plate area. Since no chromic containing tanks will be located in the precious Metals area, a PTE is not required.

The ducting will be strategically equipped with dampers in order to balance the system in order to provide the required ventilation in all areas

Building 4 (Paint Area)

Building 4 will be enclosed with the addition of a solid wall to be constructed on the central western section of the building. This will enclose the entire paint area, the demasking area, and the final inspection area.

The demasking operations will be provided with the addition of downdraft tables. There will be a total of 2 tables at 5,050 CFM per table.

The entire enclosed PTE will also be vented to a fan and HEPA chamber equipped with HEPA filters rated at 99.999% (ULPA) pulling 15,000 CFM.

All super sacks that contain any chromic waste (filters, paint booth debris, etc.) will be stored inside the PTE area in building 4. A curtain wall will be installed at the southeast roll up door that will maintain the PTE during operations that may require the roll up door to be opened periodically.

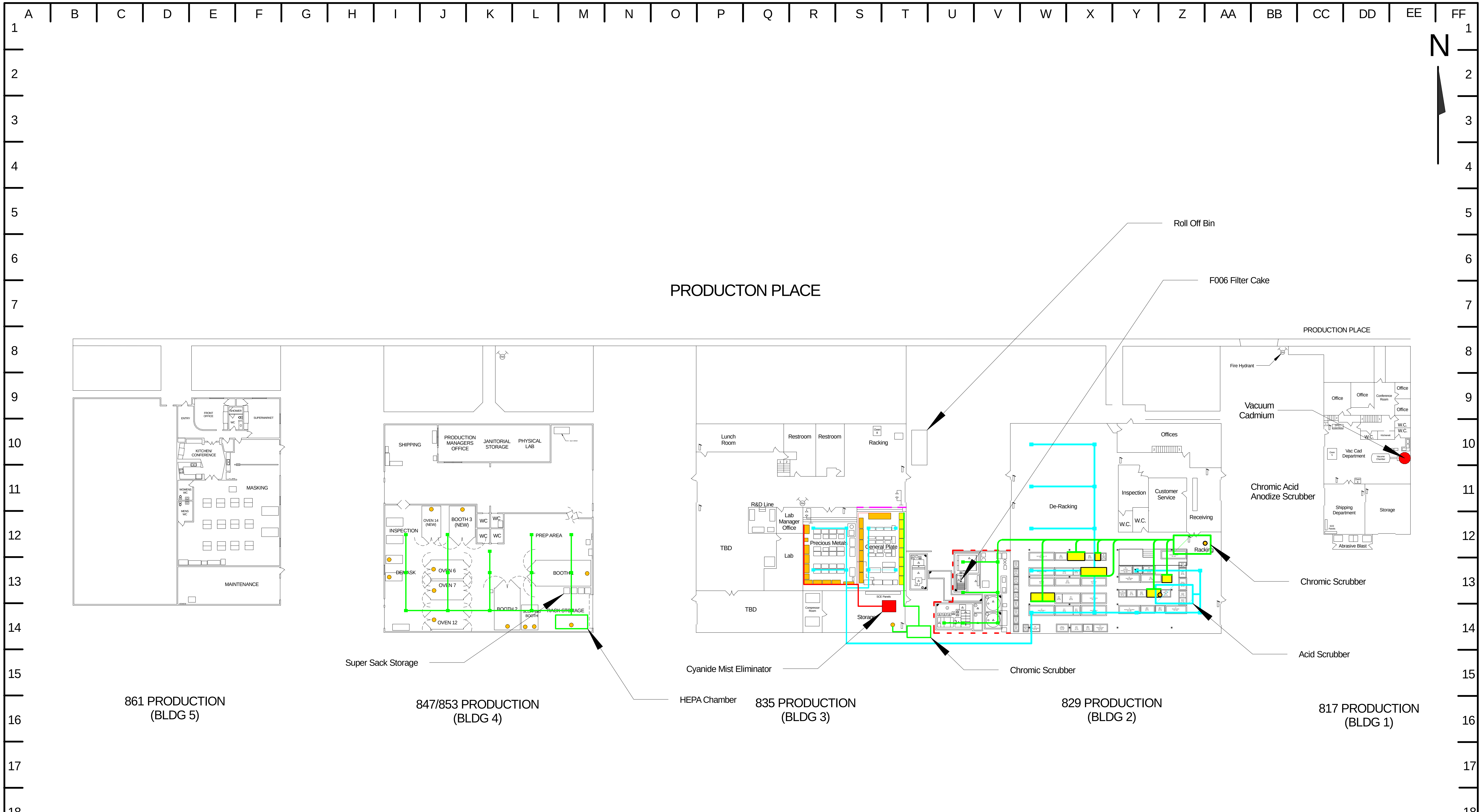
Ventilation is as follows:

Area	PTE Opening	CFM
Anodize	100’ Sq	13,300 (Chromic Scrubber), 7,000 (Acid Scrubber) – Total 20,300 CFM
Waste Treatment	0’ Sq (Fully Curtained)	1,000 (Chromic Scrubber)
General Plate	42’ Sq	1,000 (Acid Scrubber), 13,250 (Cr VI Scrubber), 10,200 CFM (Cyanide

		Mist Eliminator) – Total 24,450 CFM
Precious Metals	42' Sq	1,000 (Acid Scrubber), 5,600 (Cyanide Mist Eliminator) – Total 6,600 CMF
Building 4	42' Sq	15,000 (Fan and HEPA Chamber)

Stack Information

Building	Stack Name	CFM	Diameter	Surface Area (ft2)	Velocity (ft/min)	Height
1	VacCad	55	4	0.09	630	25
2	Chromic (Ano/ WT)	14,300	30	4.91	2,913	25
2	Acid	9,000	24	3.14	2,865	25
3	Cyanide	15800	32	5.59	2,829	25
3	Chromic (GP/PM)	13,250	28	4.28	3,099	25
4	Oven 3	2,224	10	0.55	4,078	20
4	Oven 6	2,087	8	0.35	5,979	20.5
4	Oven 7	2,361	8	0.35	6,764	20.8
4	Oven 12	2,200	7.9	0.34	6,506	20.3
4	Oven 14	2,200	7.9	0.34	6,506	20.3
4	Paint Booth 1	10,649	24	3.14	3,390	22.3
4	Paint Booth 2	11,374	30	4.91	2,317	22.3
4	Paint Booth 3	10,000	30	4.76	2,103	22.31
4	Down Draft Table 1	5,000	18	1.77	2,829	25
4	Down Draft Table 2	5,000	18	1.77	2,829	25
4	Scuffing Booth (Stack 1)	9,000	24	3.14	2,865	25
4	Scuffing Booth (Stack 1)	9,000	24	3.14	2,865	25
4	Building 4 ULPA Unit	15,000	30	4.91	3,056	25
4	Scuffing Booth (Stack 1)	9,000	24	3.14	2,865	25
4	Building 4 ULPA Unit	15,000	30	4.91	3,056	25

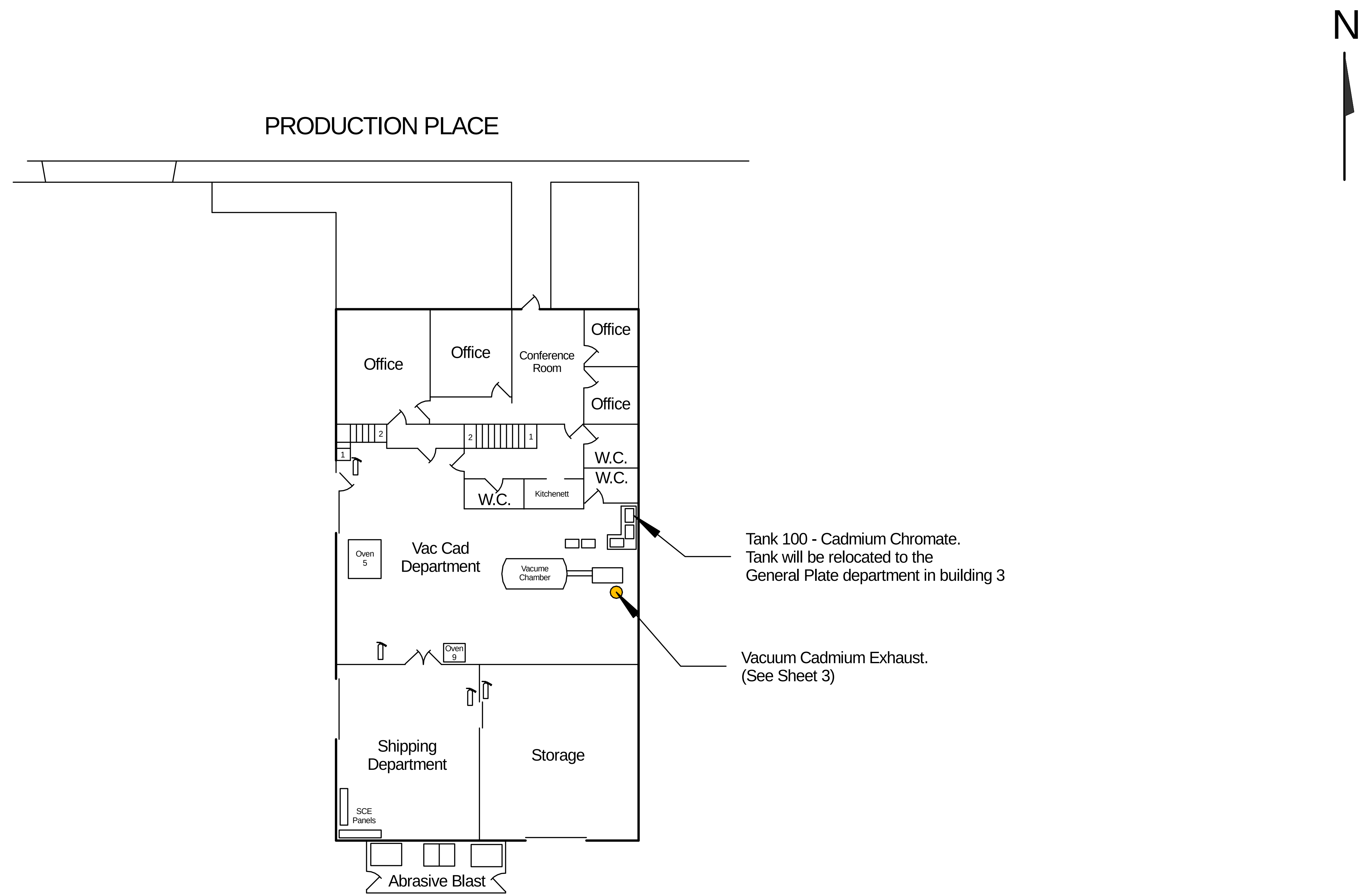


HIXSON METAL FINISHING

DATE	REV
06/29/15	E
BY	PAGE 1 OF 12
BGreene	

Title
Hixson Plot Plan

Business Name and Address
Hixson Metal Finishing
829 Production Place, Newport Beach, CA 92663



BUILDING 1 - 817 PRODUCTION PLACE
No Scale

HIXSON METAL FINISHING	DATE 06/26/15	REV B
	BY BGreene	PAGE 2 OF 12
Title: RRP - Building 1		
Business Name and Address: Hixson Metal Finishing, 829 Production Place, Newport Beach, CA 92663		

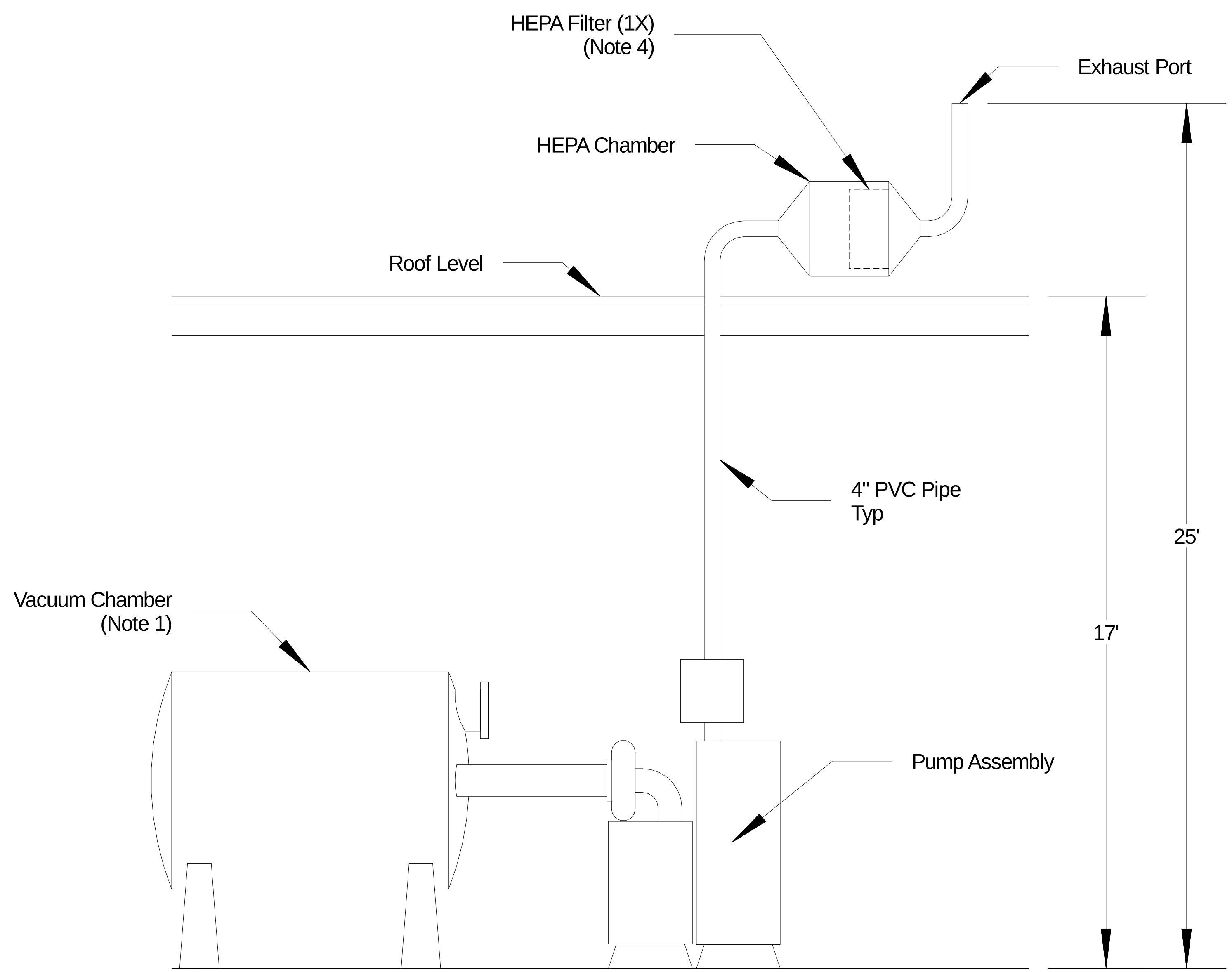
Notes:

1. The vacuum cadmium chamber is 156.11 cubic feet.

2. The vacuum pump can exhaust the complete chamber in approx 3 min.

3. Estimated air flow is 52.1 CFM

4. A single HEPA filter rated at 99.99% or above will be used prior to venting to atmosphere. See specification sheet provided for Flanders model: 0-011-C-08-SU-12-00-23 G23GF

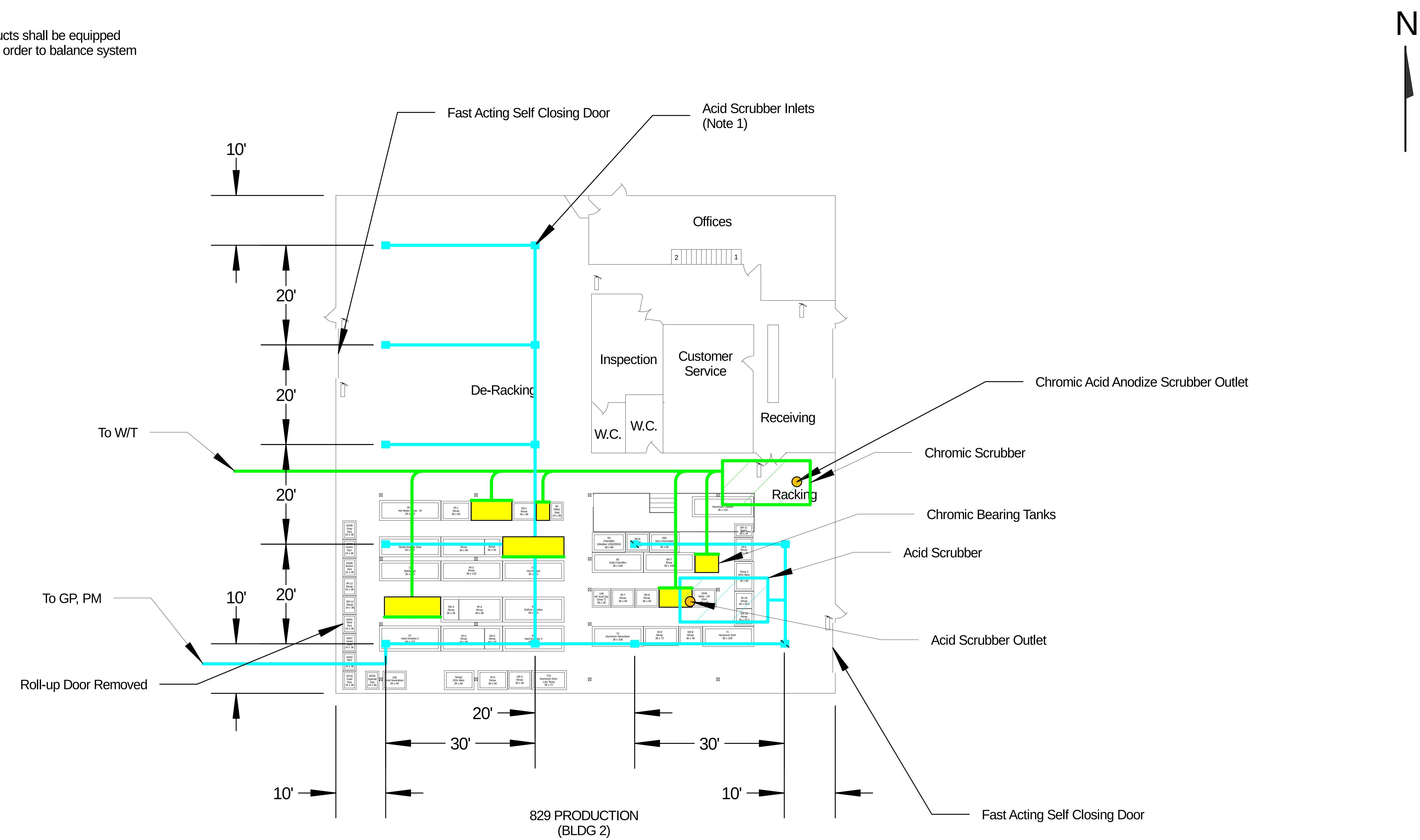


BUILDING 1 - 817 PRODUCTION PLACE
VACUUM CADMIUM CHAMBER
No Scale

HIXSON METAL FINISHING	DATE 06/26/15	REV B
	BY BGreene	PAGE 3 OF 12
Title RRP - Vac Cad Details		
Business Name and Address Hixson Metal Finishing 829 Production Place, Newport Beach, CA 92663		

Notes:

1. All intakes/ducts shall be equipped with dampers in order to balance system



	DATE 06/29/15	REV G
HIXSON METAL FINISHING	BY BGreene	PAGE 4 OF 12

Title
RRP - Building 2

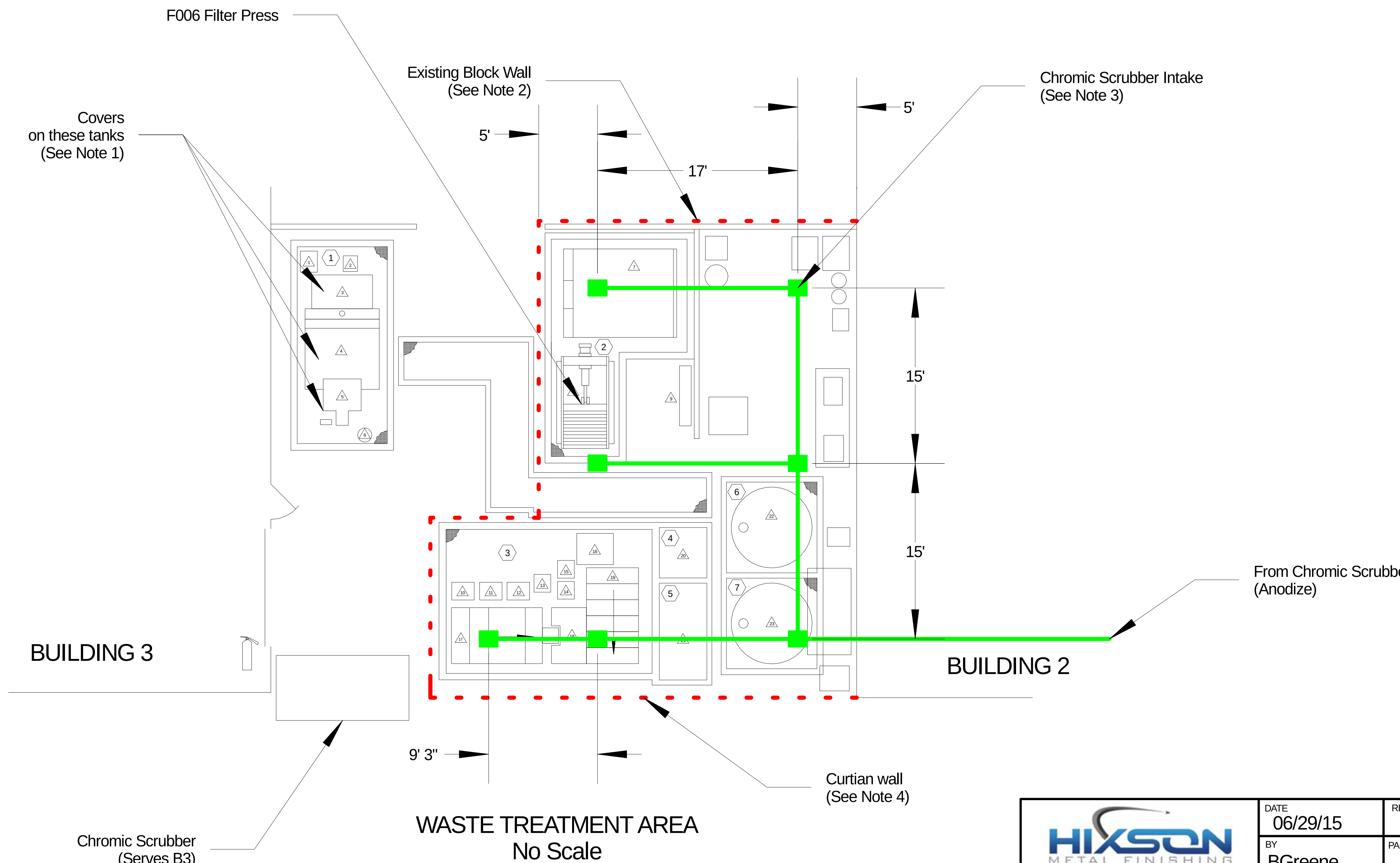
Business Name and Address
Hixson Metal Finishing
829 Production Place, Newport Beach, CA 92663

Notes:
1. See sheet 6 for detail of cover design.

2. There is an existing block wall that is approx 7' in hieght along the north side of the waste treatment area. This wall will be augmented with a cutain wall that will hang down below the top of the block wall. Please see sheet 6 typical curtain wall elevation detail.

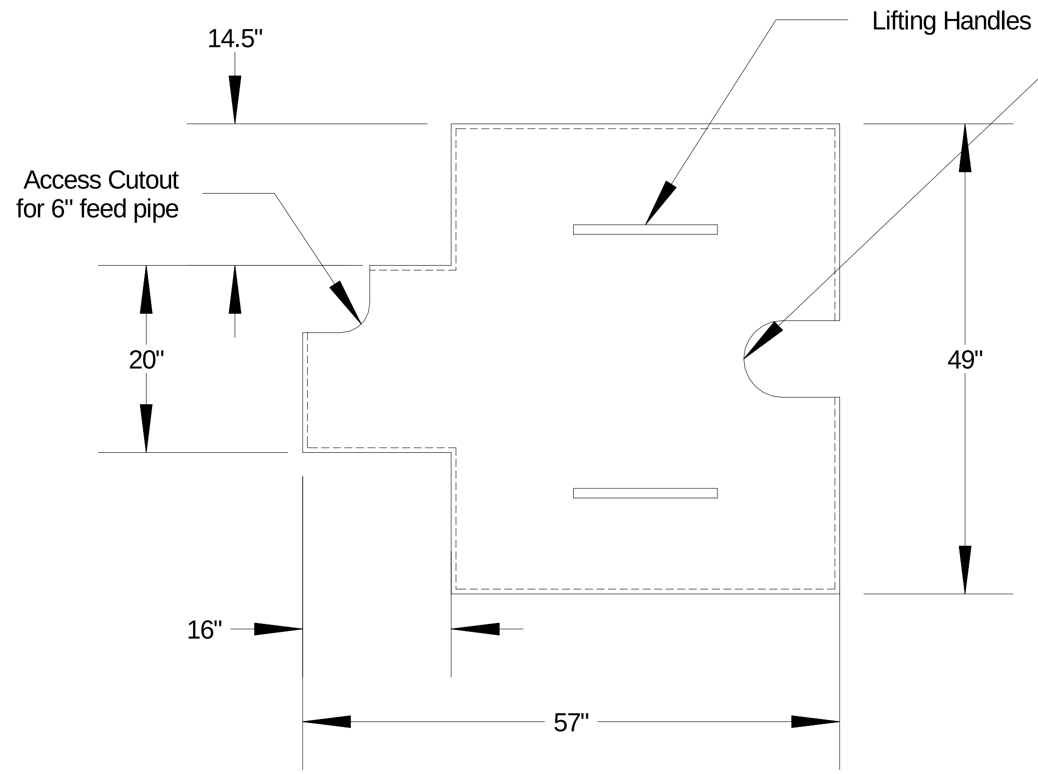
3. All intakes/ducts shall be equipped with dampers in order to balance system.

4. A curtain wall will extend around the entire waste treatment area. This wall will be attached to the overhead portion and extend down to ground level. Please see sheet 6 for typical curtain wall elevation.

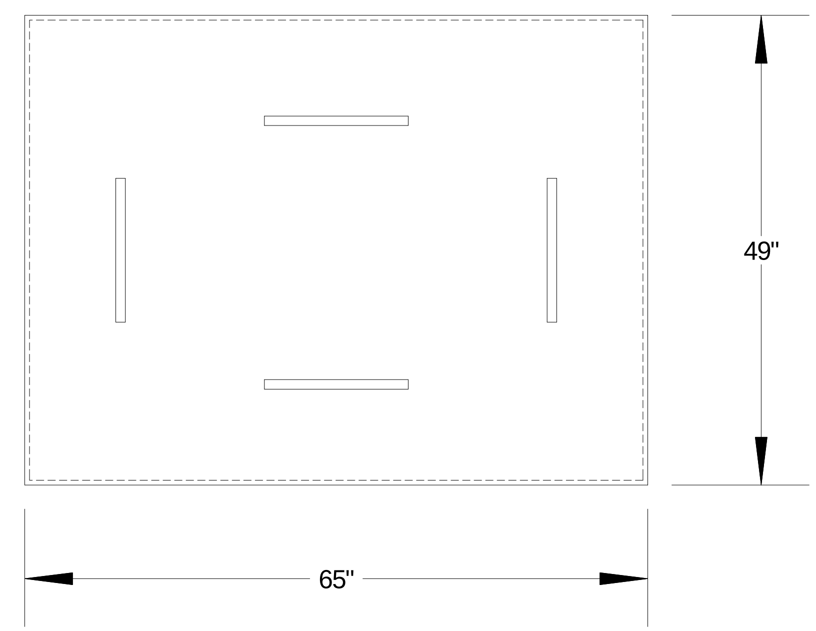


WASTE TREATMENT AREA
No Scale

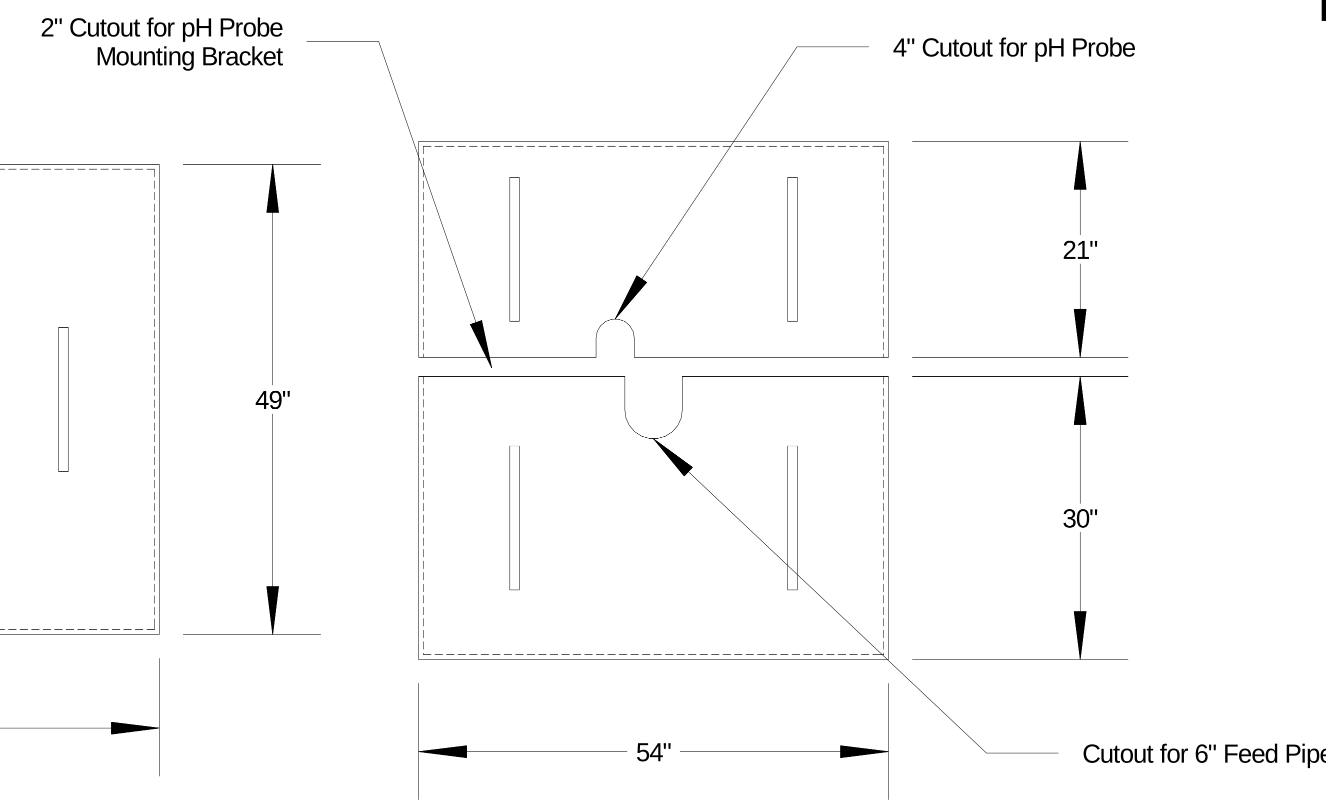
HIXSON METAL FINISHING	DATE 06/29/15	REV G
	BY BGreene	PAGE 5 OF 12
Title: RRP - Waste Treatment		
Business Name and Address: Hixson Metal Finishing, 829 Production Place, Newport Beach, CA 92663		



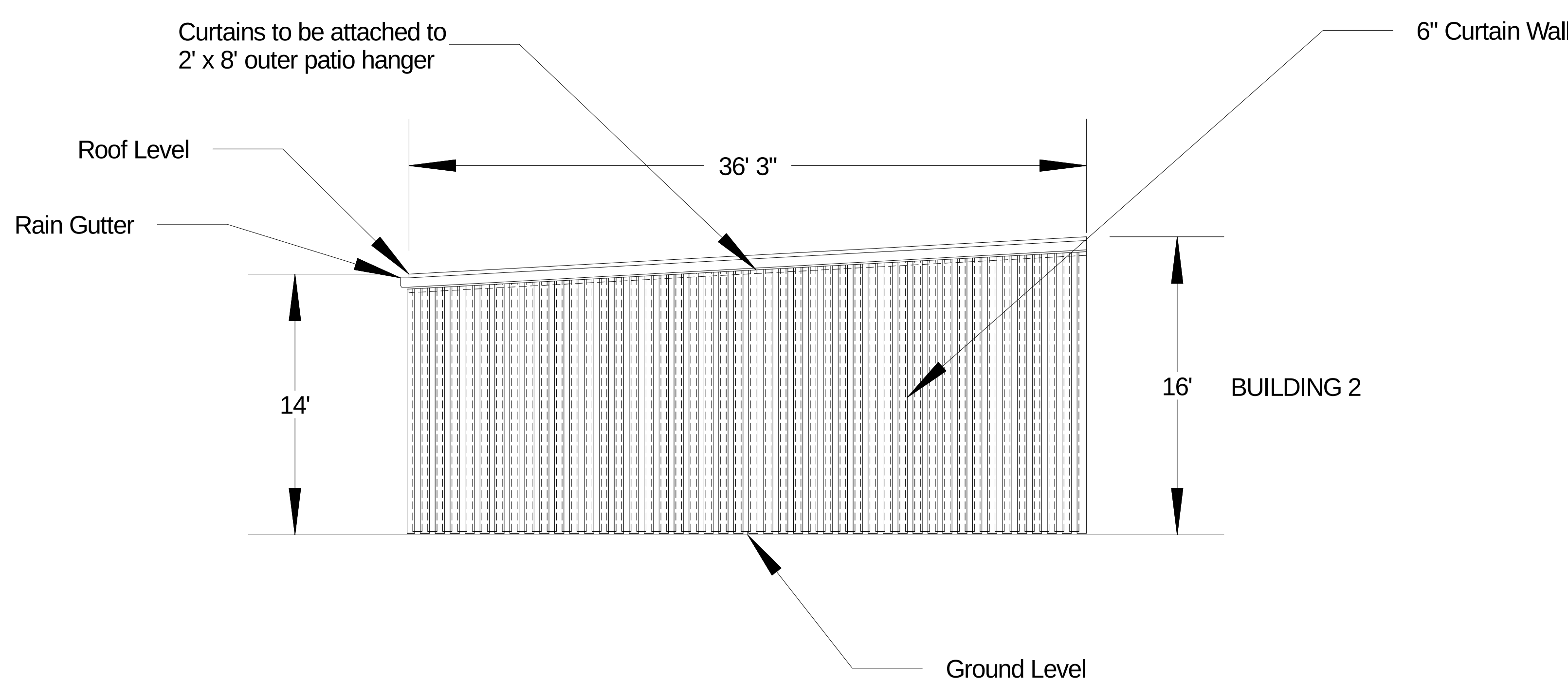
FLOCCULENT COVER
No Scale



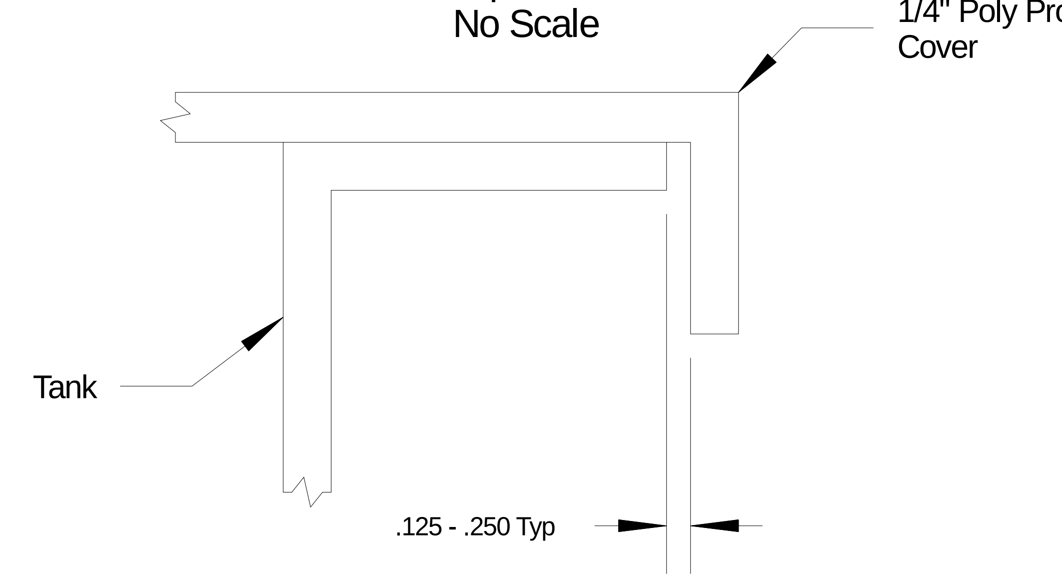
SETTELER COVER
No Scale



FINAL pH COVER
No Scale



WASTE TREATMENT (TYPICAL)
Norh Elevation
No Scale



TYPICAL COVER CROSSSECTION
No Scale

HIXSON METAL FINISHING	DATE 06/29/15	REV C
	BY BGreene	PAGE 6 OF 12
Title RRP - Waste Treatment		
Business Name and Address Hixson Metal Finishing 829 Production Place, Newport Beach, CA 92663		

Notes:

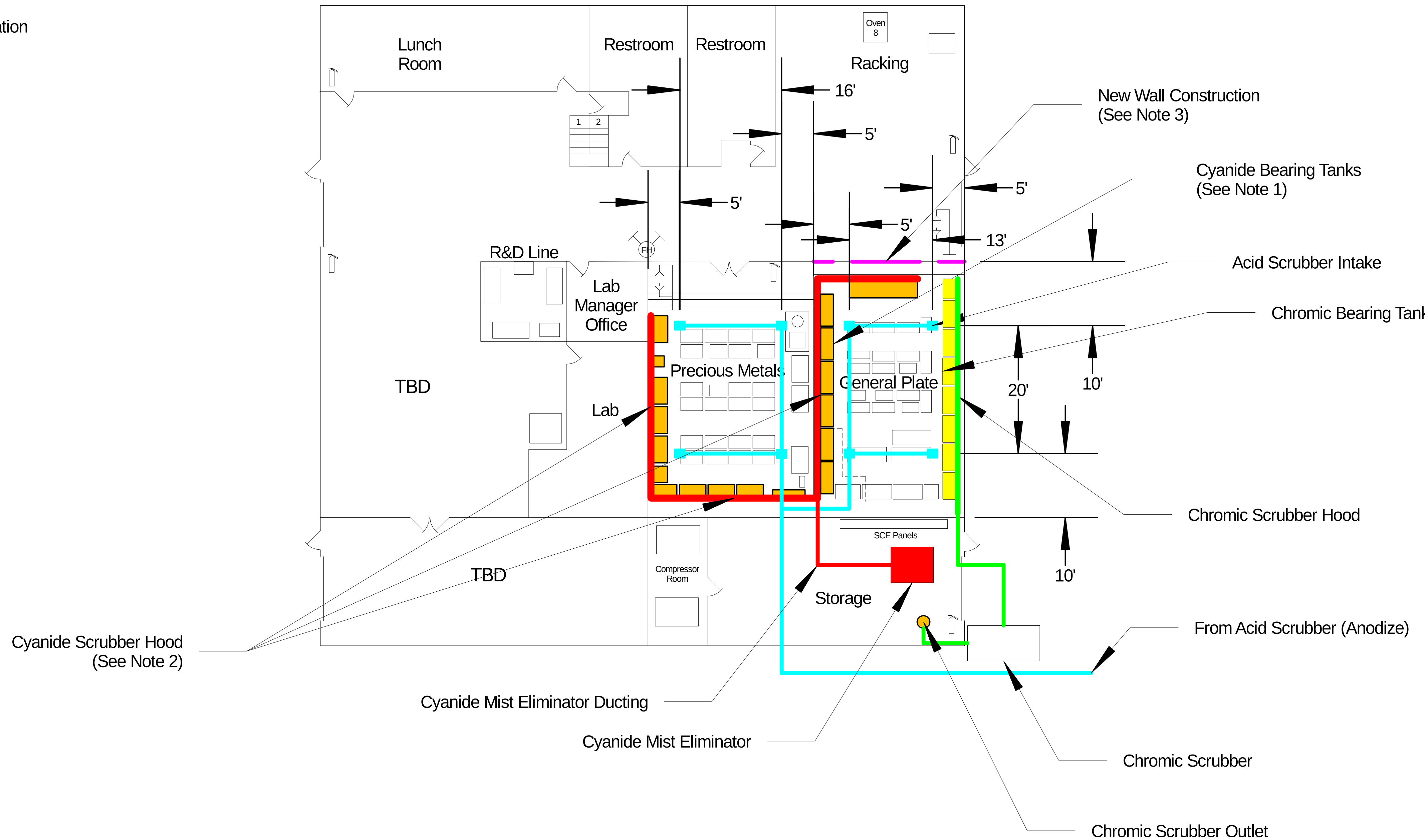
1. Tanks CD3, 54, 56, 810, 52 and 79 will be relocated within the department in order to align along the west wall. This will facilitate better placement of the cyanide ducting and hoods.

2. See Detail on Sheet 9 for typical cyanide/chromium hood design

3. See detail on sheet 8 for elevation view of new wall construction.

Cyanide Tanks

Chromic Tanks



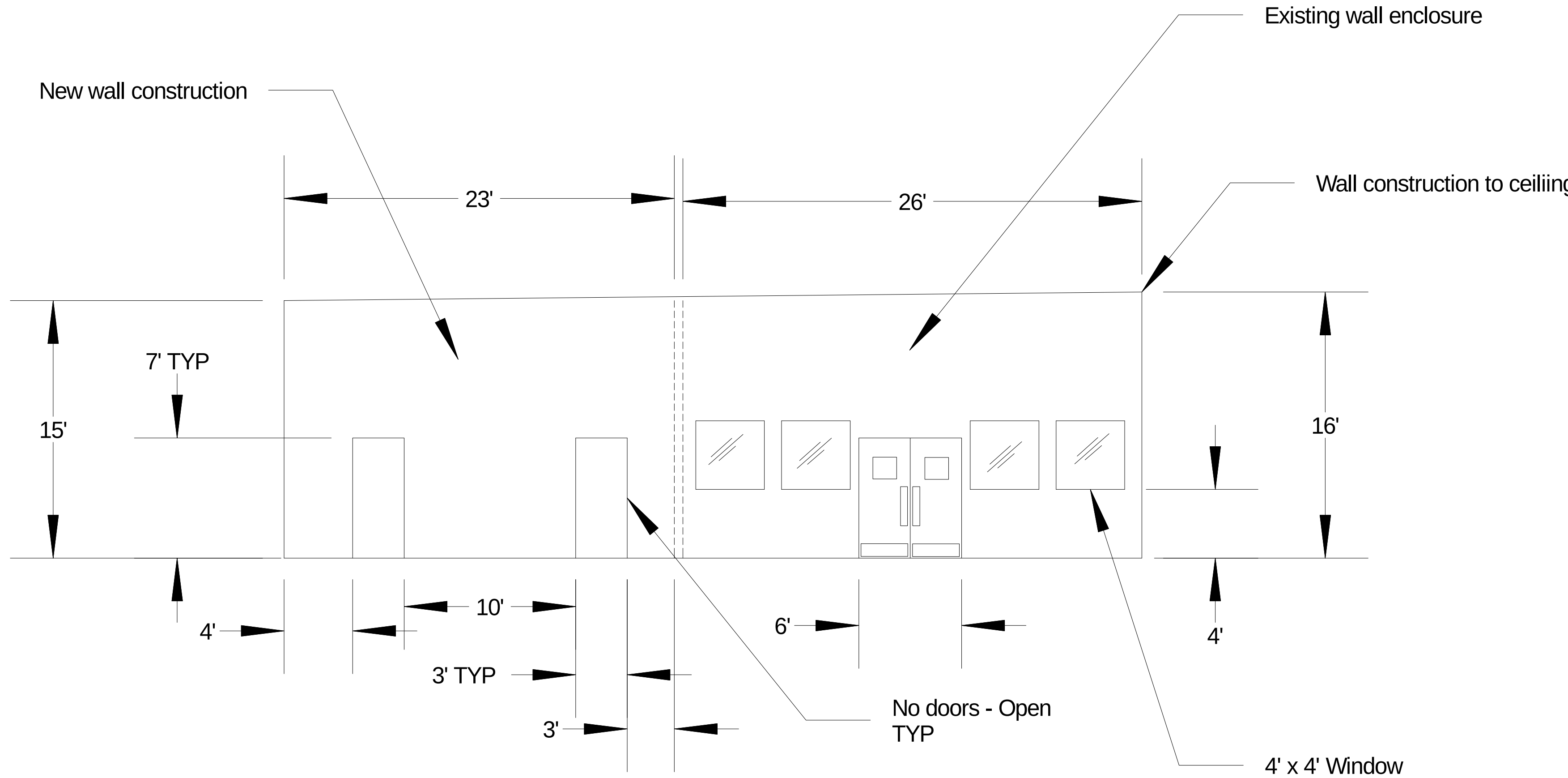
BUILDING 3 - 835 PRODUCTION PLACE
No Scale

N

HIXSON METAL FINISHING	DATE 06/29/15	REV G
	BY BGreene	PAGE 7 OF 12

Title
RRP - Building 3

Business Name and Address
Hixson Metal Finishing
829 Production Place, Newport Beach, CA 92663

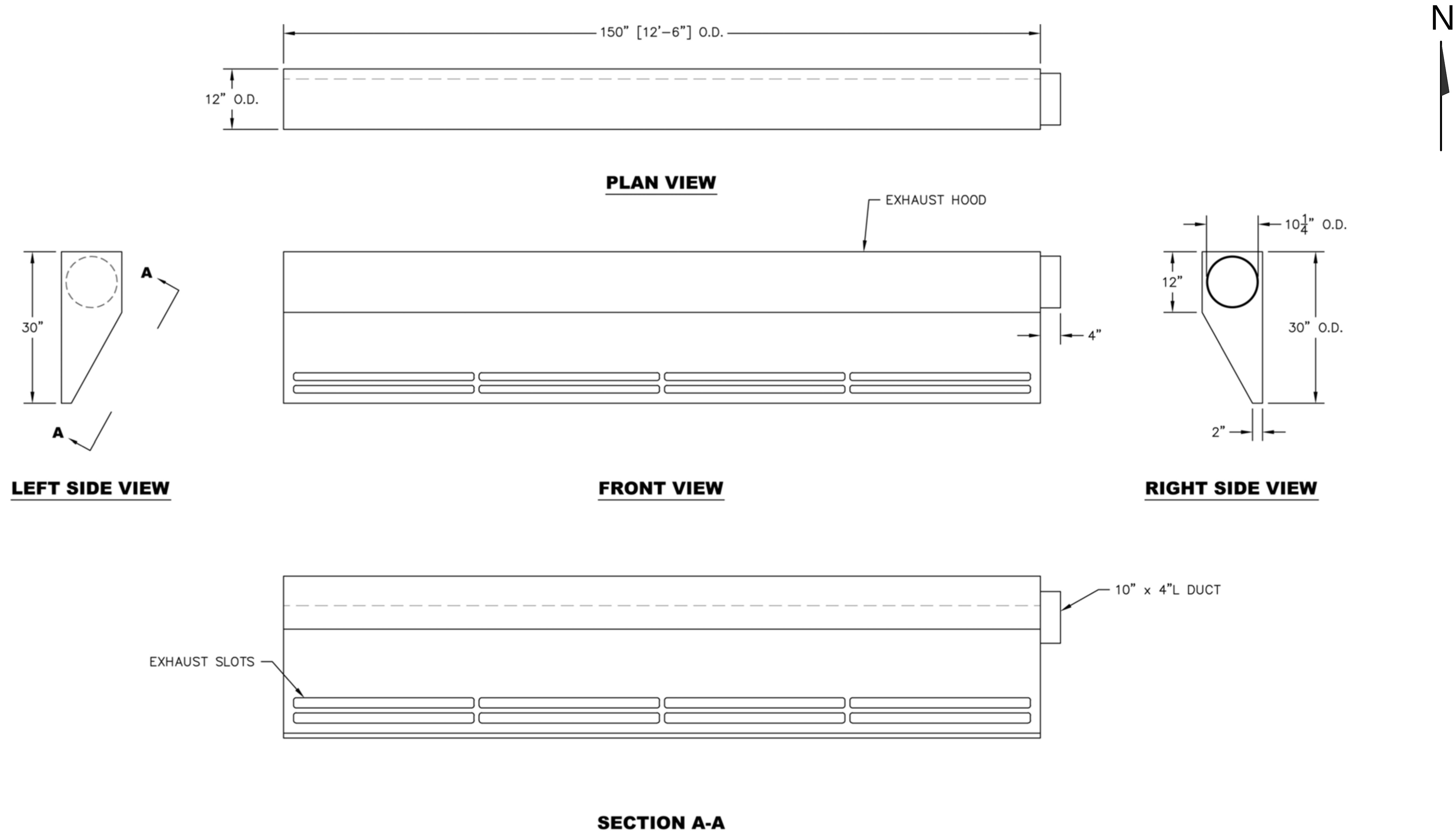


DETAIL
SOUTH ELEVATION OF GENERAL PLATE/PRECIUOS METALS WALL
(BUILDING 3
No Scale

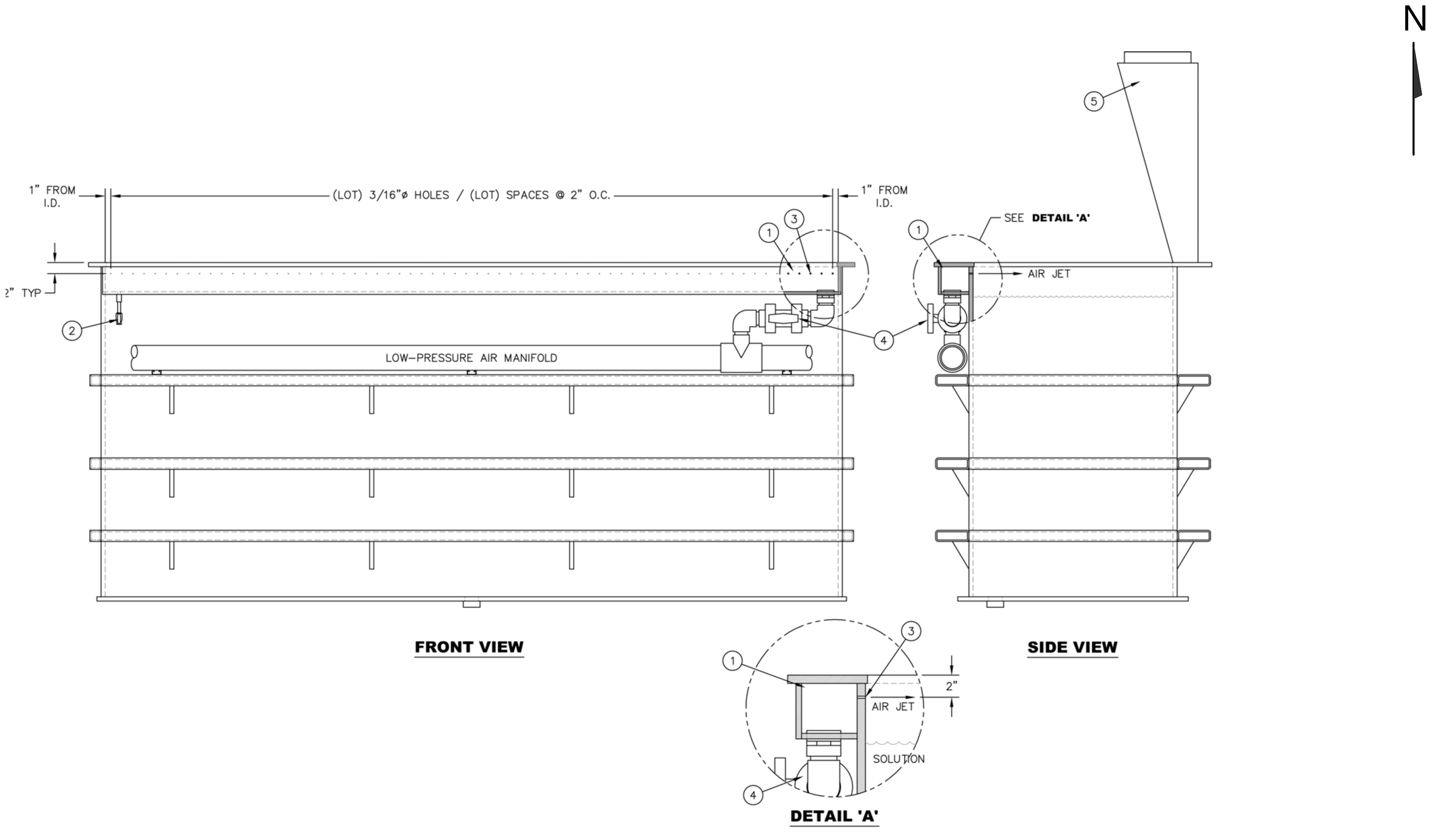
DATE 06/29/15	REV C
BY BGreene	PAGE 8 OF 12

Title
RRP - B3 Elevation

Business Name and Address
Hixson Metal Finishing
829 Production Place, Newport Beach, CA 92663



HIXSON METAL FINISHING	DATE 06/26/15	REV B
	BY BGreene	PAGE 9 OF 12
Title RRP - B3 Hoods		
Business Name and Address Hixson Metal Finishing 829 Production Place, Newport Beach, CA 92663		



HIXSON METAL FINISHING

DATE 06/26/15	REV B	
BY BGreene	PAGE 10	OF 12

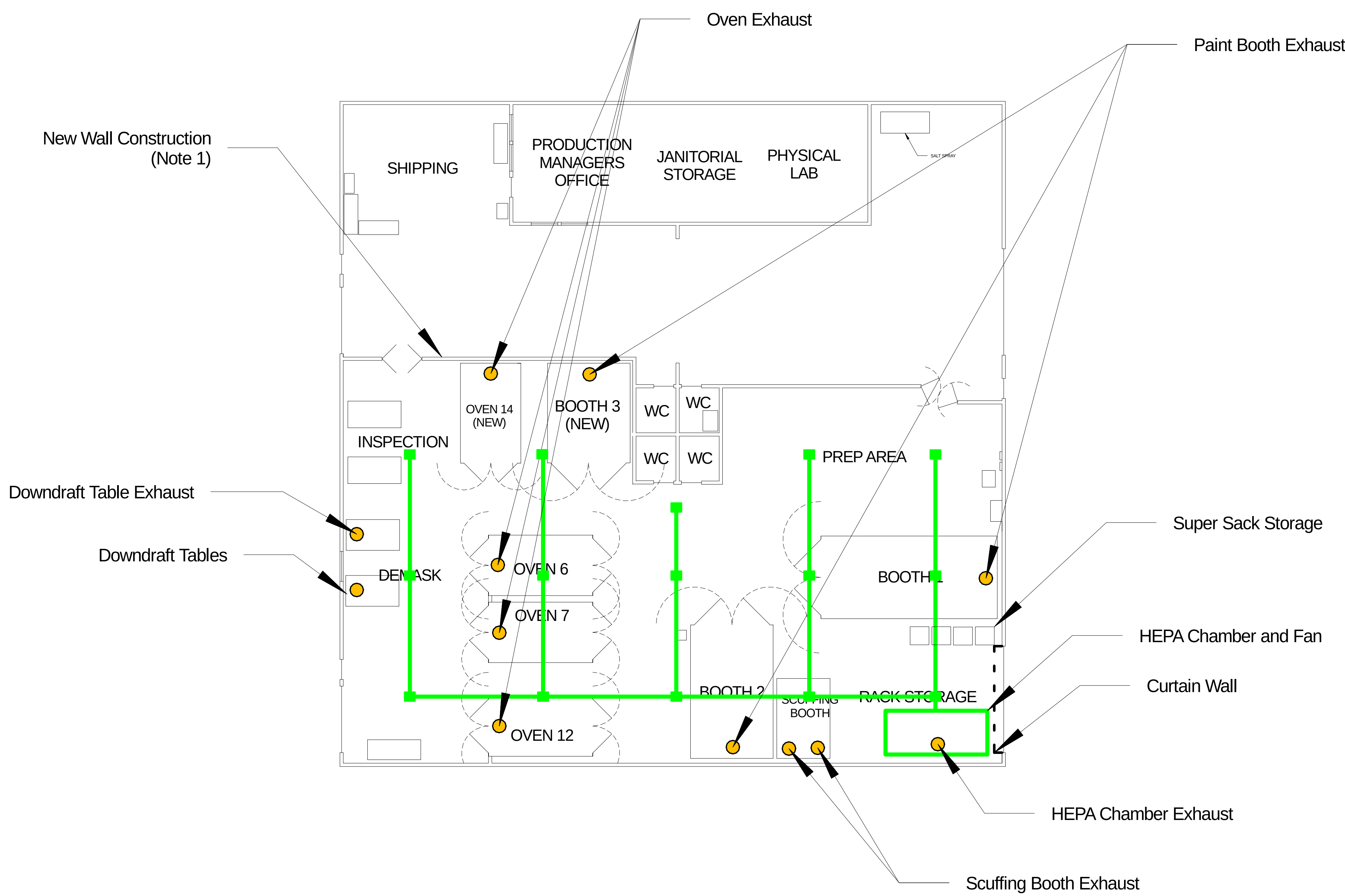
Title
RRP - Tank Details

Business Name and Address
Hixson Metal Finishing
829 Production Place, Newport Beach, CA 92663

Notes:

1. See sheet 12 for detail.
2. See sheet 12 for detail.

N



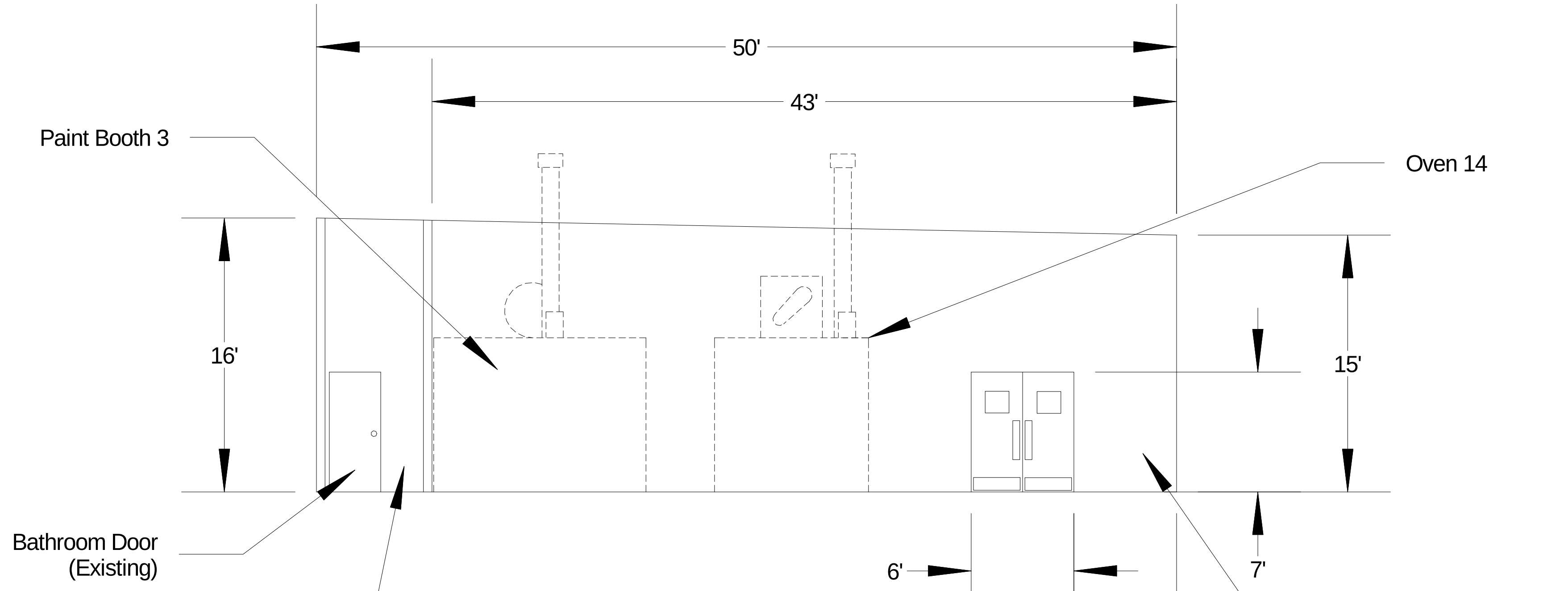
BUILDING 4 - 847/853 PRODUCTION PLACE
No Scale

HIXSON METAL FINISHING

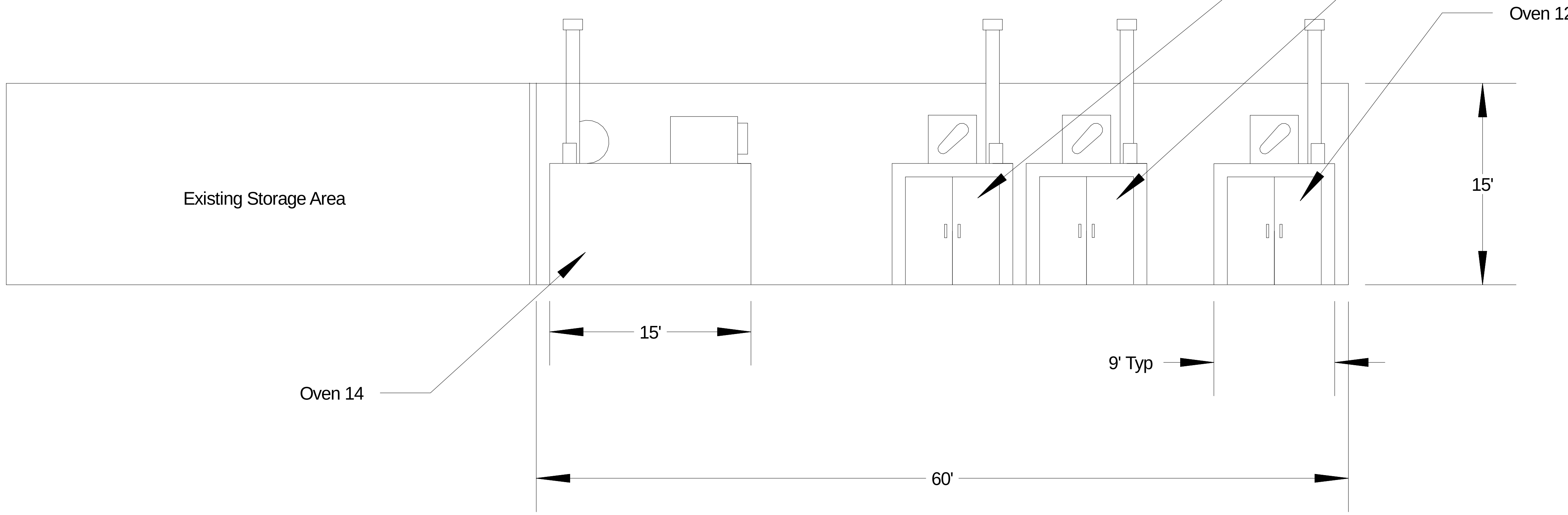
DATE 06/29/15	REV G	
BY BGreene	PAGE 11	OF 12

Title
RRP - Building 4

Business Name and Address
Hixson Metal Finishing
829 Production Place, Newport Beach, CA 92663



DETAIL
SOUTH ELEVATION OF PAIT/DEMASKING AREA
(BUILDING 4)
No Scale



DETAIL
EAST ELEVATION OF PAIT/DEMASKING AREA
(BUILDING 4)
No Scale

N

HIXSON METAL FINISHING

DATE 06/26/15	REV B	
BY BGreene	PAGE 12	OF 12

Title
RRP - B4 Elevations

Business Name and Address
Hixson Metal Finishing
829 Production Place, Newport Beach, CA 92663

Attachment 2

Mist Elimination Design for Packed Bed Scrubbers

MIST ELIMINATION DESIGN FOR PACKED BED SCRUBBERS

I. Introduction

Scrubbers require mist eliminators to prevent liquid droplets entrained in the gas stream from being ejected with the treated gas to the atmosphere. Liquid droplets become entrained in the gas stream from a variety of sources. These are:

A. Scrubber liquid entrained as mist by the gas stream
B. Mist generated directly from the process
C. Mist created as condensation from gas stream cooling
D. Mist created as gas phase constituents chemically react

II. Specific Applications

A. Scrubber Liquid Entrainment

Scrubber liquid becomes entrained in the gas stream as it flows through irrigated packing and shears liquid from the packing surfaces. Scrubber liquid also becomes entrained as the gas flows countercurrently to the liquid distributor flow, especially when liquid distribution is accomplished with spray nozzles.

The attached graph from Hesketh, Air Pollution Control, 1991, shows that mist droplets generated in this fashion are in the range of 50-100 microns in diameter.

B. Direct Generation Of Process Mist

Processes that directly generate mist include many metal finishing operations. Lead-acid battery charging, aluminum anodizing and hard chrome plating all produce mist by formation of hydrogen which out-gasses from a liquid solution. Mist droplets become airborne as escaping bubbles burst through liquid surface films. Reaction of nitric acid (HNO_3) with metals such as stainless steel, gold, copper, aluminum, brass or magnesium produce NO_x gases which, like hydrogen, entrain mist as they escape from the process liquid.

Air agitation of liquids, mechanical disturbance of liquids from parts dipping, or nitrogen blow-off at the end of a storage tank filling cycle are additional ways of mechanically creating mists from liquids.

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1550 Industrial Drive, Owosso, MI 48867
Tel: 989-725-8184 • Fax: 989-725-8188
info@dualldiv.com • www.dualldiv.com

Mists generated by out-gassing tend to be smaller than those generated by other mechanical means due to the somewhat uniform distribution of gas formation in solution. Number, size and geometry of parts processed at a given time all affect the mist size created by out-gassing. A population mean diameter estimate for these mists based on hard chrome plating studies is 10 microns. An estimate of population mean diameter for mists generated by the other mechanical means described above is 40 microns.

C. Condensation

Mist generated as condensate represents an important and challenging class of scrubbing applications. Only the most common will be discussed. These are hydrochloric and nitric acid "fogs". Oil "hazes" and particle fumes from molten salts also result from the process of condensation.

Hydrochloric acid fog is produced when a sufficient concentration of HCl gas
is brought into contact with humid air. The attached graph (Figure 2, Schaber) represents a phase diagram which can be used to determine whether
aerosol or "fog" formation will occur under humid scrubber conditions. As an example, take 50 deg. C (122 deg. F) air at 100% saturation containing 1000 ppmv HCl.

Mole Fraction HCl = 1 x 10^-3
PH2O = 0.122 atm = 124 mbar
PHCl = 1 x 10^-3 atm = 1.0 mbar

Using the graph, this condition lies above the 50 deg. C dewpoint curve and will therefore result in HCl "fog" formation. Specific conditions of droplet nucleation and growth affect the mist size of HCl "fog". Based on the attached Figure 3 from Schaber, the droplets are expected to range from 2-6 microns. Process Engineers at Duall determine if HCl "fog" will occur for a specific application and design scrubbing equipment accordingly.

A similar phenomenon occurs with nitric acid (HNO3) when tanks are heated and/or contain high acid concentrations. Because HNO3 is less volatile than HCl, HNO3 "fog" occurs more readily, i.e., at lower temperatures and concentrations. In addition, because most processes that emit HNO3 produce lower vapor concentrations than those emitting HCl, nucleation and growth tend to result in smaller droplet sizes. Duall's standard practice is to design
high efficiency mist eliminators into all scrubber systems treating emissions from processes using heated HNO3.

Duall
1550 Industrial Drive, Owosso, MI 48867
Tel: 989-725-8184 • Fax: 989-725-8188
info@dualldiv.com • www.dualldiv.com

D. Chemical Reaction Aerosols

The two most common “reaction aerosols” are sulfuric acid (H2SO4) formed by reaction of sulfur trioxide gas (SO3) with water vapor and ammonium chloride formed by reaction of ammonia gas (NH3) with HCl gas.

Because these aerosols form by molecular interactions they tend to be extremely fine, i.e., in the range of 0.01-0.1 microns. The H2SO4 aerosol commonly occurs from fuming sulfuric acid or “oleum”, which is concentrated H2SO4 containing dissolved SO3 gas. Ammonium chloride aerosol formation can be avoided by keeping separate the streams containing NH3 and HCl, if they arise from different sources. To separate such fine aerosols from a gas stream a special type of mist eliminator is required, known as a fiberbed, diffusion or Brinks mist eliminator. This type of mist eliminator contains densely packed or wound glass fibers and operates at low face velocities for capitalizing on the Brownian movement of submicronic aerosols.

III. Equipment Selection/Design

A. Scrubber Entrainment

All Duall scrubbers are equipped with a mist eliminator designed as a minimum to separate scrubber liquor entrained in the gas stream. Standard design is 99% removal of droplets 20 micron and larger.

In vertical counterflow towers, a bed of random-dumped 2 in. packing is used. In horizontal crossflow scrubbers, 4-bend chevron baffles are used. A performance curve for a 12 in. deep bed of packing media is attached. The chevron baffles perform very similarly, when operated at a gas face velocity of 800-1000 fpm.

B. Direct Generation Of Process Mist

This type of mist is typically handled with the above standard mist eliminator design. Two exceptions are lead-acid battery in-tank plate charging and hard chrome plating. To handle the first application, Duall utilizes a 12 in. bed of random-dumped 1 in. packing. Hard chrome plating mist is treated with a high efficiency composite mesh pad (CMP). Because U.S. EPA emission limits on chromium are strict, the CMP must be designed for removal of 2 micron and larger droplets.

Duall
1550 Industrial Drive, Owosso, MI 48867
Tel: 989-725-8184 • Fax: 989-725-8188
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In many applications involving direct generation of process mist, gaseous contaminants are not present. Required control is therefore limited to separation of airborne mist. In these instances, the main mist eliminator is often followed by a secondary mist eliminator to allow periodic or continuous washing of the primary media. The secondary mist eliminator is designed as described above for “scrubber entrainment.”

C. Condensation

For HCl applications where “fog” formation is expected, a high efficiency CMP is used in Duall scrubbers. A performance curve is attached. When high aerosol loadings are anticipated based on process conditions, a secondary mist eliminator is provided to collect re-entrainment from the overloaded, or “flooded”, primary CMP. The secondary mist eliminator is designed as described above for “scrubber entrainment.” Also, a minimum packed bed depth of 5 ft. is recommended, providing high HCl gas absorption efficiency as well as significant aerosol growth. An overall collection efficiency of 99% can be readily achieved with this design.

Applications involving HNO3 “fog” are handled similarly, with two notable differences. The secondary mist eliminator is best placed downstream of the exhaust fan, and only 85% overall collection efficiency is achievable using packed bed scrubbers with CMPs.

The secondary mist eliminator is located after the fan because the pressure increase across the fan forces condensation of water vapor in the saturated gas stream. The water vapor condenses on extremely fine acid aerosol nuclei which has passed through the CMP. The fan thus acts as a droplet growth device.

For greater overall HNO3 collection efficiencies > 85%, a fiberbed mist eliminator is required. However, higher efficiencies are rarely specified due to most processes generating a relatively light HNO3 loading, and the 85% design is typically adequate.

In either case of HCl or HNO3 “fog”, stack design is important. Stacks with breech entries and drains should be used. In addition, stacks should be sized for < 2000 fpm gas velocity and should be at least 7 diameters tall above the gas entry. Even low levels of residual acid will cause stack condensation to be acidic. Adequate stack design facilitates drainage of such condensation.

Duall
1550 Industrial Drive, Owosso, MI 48867
Tel: 989-725-8184 • Fax: 989-725-8188
info@dualldiv.com • www.dualldiv.com

D. Chemical Reaction Aerosols

As mentioned above, these aerosols require fiberbed mist eliminators. Duall incorporates these devices usually as the last step in a wet scrubbing system, placing the fan just upstream of the fiberbed mist eliminator. The fiberbed vessel then becomes the base of the stack. The gas enters the vessel at the bottom and flows up through a tube sheet into the centers of each element, and then radially outward through the packed or wound glass fibers. A continuous high pressure, low volume atomized water spray is applied at the entry to each element for washing out foreign solid particulate or dissolving collected salt particulate.

Fiberbed mist eliminators have >99% removal for droplets < 0.3 micron, >99% removal for droplets > 0.3 micron, and 99% removal for droplets = 0.3 micron. The reason for this performance is that very small droplets have Brownian motion facilitating diffusion as a collection mechanism, whereas the larger droplets are collected by interception and inertial impaction. Droplets = 0.3 micron have no prevailing mechanism for capture and are therefore collected at the minimum efficiency of 99%. The attached diagram shows the three mechanisms of collection.

Duall
1550 Industrial Drive, Owosso, MI 48867
Tel: 989-725-8184 • Fax: 989-725-8188
info@dualldiv.com • www.dualldiv.com

Attachment 3

Soil Vapor Extraction Unit HRA

TIER 1 / TIER 2 SCREENING RISK ASSESSMENT DATA INPUT

Application deemed complete date: 08/02/13

A/N: 554447
Fac: HIXSON METAL FINISHING

Stack Data

		Units
Hour/Day	24	hr/day
Day/Week	7	day/wk
Week/Year	52	wk/yr
Emission Units	PPMv	
* To convert emission units to lbs/hr, enter Exhaust Flow Rate here -->	200	scfm
Control Efficiency	0.00	fraction range 0-1
Does source have TBACT?	YES	
Point or Volume Source ?	P	P or V
Stack Height or Building Height	17	feet
Area (For Volume Source Only)		ft^2
Distance-Residential	15.4	meters
Distance-Commercial	33.8	meters
Meteorological Station	Long Beach	

Source Type:	O - Other
Screening Mode (NO = Tier 1 or Tier 2; YES = Tier 3)	NO

Emission Units	PPMv	
Source output capacity	n/a	n/a

FOR USER-DEFINED CHEMICALS AND EMISSIONS, FILL IN THE TABLE BELOW

USER DEFINED CHEMICALS AND EMISSIONS				R1 - Uncontrolled	Efficiency Factor	R2 - Controlled
Cmpound Code	Compound	PPMv	Molecular Weight	lbs/hr	Fraction range 0-1	lbs/hr
P2	Perchloroethylene (or tetrachloroethylene)	1.40E-02	165.83	7.35078E-05		7.35078E-05
T8	Trichloroethylene	1.00E-02	130.4	4.12876E-05		4.12876E-05
B1	Benzene (including benzene from gasoline)	1.60E-02	78.11	3.95702E-05		3.95702E-05
E4	Ethyl benzene	1.60E-02	106.16	5.37803E-05		5.37803E-05
X1	Xylenes (isomers and mixtures)	1.80E-02	106.2	6.05256E-05		6.05256E-05
T3	Toluene (methyl benzene)	2.80E-02	92.13	8.16773E-05		8.16773E-05

TIER 1 SCREENING RISK ASSESSMENT REPORT

Receptor Distance (actual) (m)	15.4
Receptor Distance (for X/Q LOOKUP) (m)	25

Tier 1 Results	
Cancer/Chronic ASI	Acute ASI
4.79E-01 PASSED	7.08E-05 PASSED

APPLICATION SCREENING INDEX CALCULATION

Compound	Average Annual Emission Rate	Max Hourly Emission Rate (lbs/hr)	Cancer / Chronic Pollutant Screening Level (lbs/yr)	Acute Pollutant Screening Level (lbs/hr)	Cancer / Chronic Pollutant Screening Index	Acute Pollutant Screening Index (PSI)
Perchloroethylene (or tetrachloroethylene)	6.42E-01	7.35E-05	5.44E+00	1.00E+01	1.18E-01	7.35E-06
Trichloroethylene	3.61E-01	4.13E-05	1.63E+01		2.21E-02	
Benzene (including benzene from gasoline)	3.46E-01	3.96E-05	1.14E+00	7.39E-01	3.03E-01	5.36E-05
Ethyl benzene	4.70E-01	5.38E-05	1.31E+01		3.59E-02	
Xylenes (isomers and mixtures)	5.29E-01	6.05E-05	2.31E+04	1.10E+01	2.28E-05	5.50E-06
Toluene (methyl benzene)	7.14E-01	8.17E-05	9.92E+03	1.85E+01	7.19E-05	4.41E-06
TOTAL (APPLICATION SCREENING INDEX)					**4.79E-01**	**7.08E-05**

TIER 2 SCREENING RISK ASSESSMENT REPORT

A/N: 554447
Fac: HIXSON METAL FINISHING

Application deemed complete date: 08/02/13

2. Tier 2 Data

MET Factor	1.00
4 hr	0.89
6 or 7 hrs	0.73

Dispersion Factors tables

3	For Chronic X/Q
6	For Acute X/Q

Dilution Factors (ug/m3)/(tons/yr)

Receptor	X/Q	X/Qmax
Residential	49.68	2000
Commercial	40.31328	1648.2112

Adjustment and Intake Factors

	AFann	DBR	EVF
Residential	1	302	0.96
Worker	1	149	0.38

3. Rule 1401 Compound Data

Compound	R1 - uncontrolled (lbs/hr)	R2 - controlled (lbs/hr)	CP	MP MICR Resident	MP MICR Worker	MP Chronic Resident	MP Chronic Worker	REL Chronic	REL Acute
Perchloroethylene (or tetrachloroethylene)	7.35E-05	7.35E-05	2.10E-02	1.0000	1.0000	1.0000	1.0000	35	20000
Trichloroethylene	4.13E-05	4.13E-05	7.00E-03	1	1	1	1	600	
Benzene (including benzene from gasoline)	3.96E-05	3.96E-05	1.00E-01	1	1	1	1.0000	60	1300
Ethyl benzene	5.38E-05	5.38E-05	8.70E-03	1	1	1	1	2000	
Xylenes (isomers and mixtures)	6.05E-05	6.05E-05		1.0000	1.0000	1	1	700	22000
Toluene (methyl benzene)	8.17E-05	8.17E-05		1.0000	1.0000	1	1	300	37000

4. Emission Calculations

Compound	uncontrolled R1 (lb/hr)	controlled R2 (lb/hr)	R2 (lb/yr)	R2 (ton/yr)
Perchloroethylene (or tetrachloroethylene)	7.35E-05	7.35E-05	0.64216377	0.000321082
Trichloroethylene	4.13E-05	4.13E-05	0.36068846	0.000180344
Benzene (including benzene from gasoline)	3.96E-05	3.96E-05	0.34568559	0.000172843
Ethyl benzene	5.38E-05	5.38E-05	0.46982439	0.000234912
Xylenes (isomers and mixtures)	6.05E-05	6.05E-05	0.52875159	0.000264376
Toluene (methyl benzene)	8.17E-05	8.17E-05	0.71353251	0.000356766
Total	3.50E-04	3.50E-04	3.06E+00	1.53E-03

A/N: 554447 Application deemed complete date: 08/02/13

TIER 2 RESULTS

5a. MICR

MICR = CP (mg/(kg-day))^-1 * Q (ton/yr) * (X/Q) * AFann * MET * DBR * EVF * 1E-6* MP

Compound	Residential	Commercial
Perchloroethylene (or tetrachloroethylene)	9.71E-08	1.54E-08
Trichloroethylene	1.82E-08	2.88E-09
Benzene (including benzene from gasoline)	2.49E-07	3.95E-08
Ethyl benzene	2.94E-08	4.66E-09
Xylenes (isomers and mixtures)		
Toluene (methyl benzene)		
Total	**3.94E-07**	**6.24E-08**
	PASS	**PASS**

No Cancer Burden, MICR<1.0E-6

5b. Cancer Burden	**NO**
X/Q for one-in-a-million:	
Distance (meter)	
Area (km2):	
Population:	-
Cancer Burden:	

6. Hazard Index

HIA = [Q(lb/hr) * (X/Q)max] * AF / Acute REL

HIC = [Q(ton/yr) * (X/Q) * MET * MP] / Chronic REL

Target Organs	Acute	Chronic	Acute Pass/Fail	Chronic Pass/Fail
Alimentary system (liver) - AL		4.62E-04	Pass	Pass
Bones and teeth - BN			Pass	Pass
Cardiovascular system - CV			Pass	Pass
Developmental - DEV	6.53E-05	2.08E-04	Pass	Pass
Endocrine system - END		5.84E-06	Pass	Pass
Eye	1.73E-05	1.49E-05	Pass	Pass
Hematopoietic system - HEM	6.09E-05	1.43E-04	Pass	Pass
Immune system - IMM	6.09E-05		Pass	Pass
Kidney - KID		4.62E-04	Pass	Pass
Nervous system - NS	1.18E-05	2.36E-04	Pass	Pass
Reproductive system - REP	6.53E-05		Pass	Pass
Respiratory system - RES	1.73E-05	7.78E-05	Pass	Pass
Skin			Pass	Pass

A/N: 554447 **Application deemed complete date:** 08/02/13

6a. Hazard Index Acute

HIA = [Q(lb/hr) * (X/Q)max] *AF/ Acute REL

	HIA - Residential									
Compound	AL	CV	DEV	EYE	HEM	IMM	NS	REP	RESP	SKIN
Perchloroethylene (or tetrachloroethylene)				7.35E-06			7.35E-06		7.35E-06	
Trichloroethylene										
Benzene (including benzene from gasoline)			6.09E-05		6.09E-05	6.09E-05		6.09E-05		
Ethyl benzene										
Xylenes (isomers and mixtures)				5.50E-06					5.50E-06	
Toluene (methyl benzene)			4.41E-06	4.41E-06			4.41E-06	4.41E-06	4.41E-06	
Total			6.53E-05	1.73E-05	6.09E-05	6.09E-05	1.18E-05	6.53E-05	1.73E-05	

	HIA - Commercial								
Compound	AL	CV	DEV	EYE	HEM	IMM	NS	REP	RESP	SKIN
Perchloroethylene (or tetrachloroethylene)				6.06E-06			6.06E-06		6.06E-06	
Trichloroethylene										
Benzene (including benzene from gasoline)			5.02E-05		5.02E-05	5.02E-05		5.02E-05		
Ethyl benzene										
Xylenes (isomers and mixtures)				4.53E-06					4.53E-06	
Toluene (methyl benzene)			3.64E-06	3.64E-06			3.64E-06	3.64E-06	3.64E-06	
Total			5.38E-05	1.42E-05	5.02E-05	5.02E-05	9.70E-06	5.38E-05	1.42E-05	

6b. Hazard Index Chronic

HIC = [Q(ton/yr) * (X/Q) * MET * MP] / Chronic REL

	HIC - Residential												
Compound	AL	BN	CV	DEV	END	EYE	HEM	IMM	KID	NS	REP	RESP	SKIN
Perchloroethylene (or tetrachloroethylene)	4.56E-04								4.56E-04				
Trichloroethylene						1.49E-05				1.49E-05			
Benzene (including benzene from gasoline)				1.43E-04			1.43E-04			1.43E-04			
Ethyl benzene	5.84E-06			5.84E-06	5.84E-06				5.84E-06				
Xylenes (isomers and mixtures)										1.88E-05		1.88E-05	
Toluene (methyl benzene)				5.91E-05						5.91E-05		5.91E-05	
Total	4.62E-04			2.08E-04	5.84E-06	1.49E-05	1.43E-04		4.62E-04	2.36E-04		7.78E-05	

A/N: 554447

Application deemed complete date: 08/02/13

6b. Hazard Index Chronic (cont.)

	HIC - Commercial												
Compound	AL	BN	CV	DEV	END	EYE	HEM	IMM	KID	NS	REP	RESP	SKIN
Perchloroethylene (or tetrachloroethylene)	3.70E-04								3.70E-04				
Trichloroethylene						1.21E-05				1.21E-05			
Benzene (including benzene from gasoline)				1.16E-04			1.16E-04			1.16E-04			
Ethyl benzene	4.74E-06			4.74E-06	4.74E-06				4.74E-06				
Xylenes (isomers and mixtures)										1.52E-05		1.52E-05	
Toluene (methyl benzene)				4.79E-05						4.79E-05		4.79E-05	
Total	3.75E-04			1.69E-04	4.74E-06	1.21E-05	1.16E-04		3.75E-04	1.91E-04		6.32E-05	