Charter Township of Garfield
Planning Department Report No. 2018-70

Prepared:	July 3, 2018	Pages:	Page 1 of 2
Meeting:	July 11, 2018 Planning Commission	Attachments:	☒
Subject:	Serra Noise Study and Automobile Laundry-Introduction		
File No.		Parcel No. 05-014-005-00	
Applicant/Owner:	Serra Works of Traverse City, LLC		
Agent:	Karrie A. Zeits		

BACKGROUND:

The request is to consider the conversion of the wash bay that the Planning Commission approved for construction at 940 Boon Street (Z-2017-03) to an automobile laundry in accordance with the process set forth in the First Amendment to and Restatement of Conditional Rezoning Agreement dated March 30, 2018 (the "CRA").

As called for in the CRA, "[a]ny modification to the wash bay to include noise generating mechanicals shall first be reviewed and approved, following a public hearing, by the Planning Commission" (*see* Paragraph 2.f.i).

In addition, the CRA states that "[a] noise study shall be performed prior to approval and following installation of the mechanicals, if approved, demonstrating that noise will not be detrimental to the surrounding neighborhoods" (*see* Paragraph 2.f.ii).

In accordance with the conditions of the CRA stated above, the applicant's noise consultant has completed a noise study. At tonight's meeting, the noise consultant will be in attendance (likely electronically) to present his findings and answer any questions. In short, the consultant finds that:

- The noise levels produced by a mechanized car wash are in line with the ambient sound level currently experienced by adjacent neighborhoods.
- At the Garfield Township property line, the sound level will be 56-58 dBA, whereas steady traffic is at 55-65 dBA. Individual events, such a noise generated by airport operations, often exceed this level.
- In light of the above findings, it is the consultant's opinion that "there will be no detrimental acoustical impact to the adjacent residential neighborhoods of either Garfield Township or Traverse City from the operation of the proposed car wash, as the blowers will only be operated with the exit door closed."

STAFF COMMENT:

For context, the Section 712.A(4) of the Zoning Ordinance states the following with regard to noise generated by automobile laundries: "Noise generated on site from any source shall not exceed 40 decibels measured at any property line." Therefore, with 56-58 decibels at the

property line, the proposed car wash would violate the Ordinance, even with the exit doors closed.

The question, then, is should Section 712 of the Ordinance be amended to allow a higher sound level generated by automobile laundries than the current 40 decibels? The applicant and their consultant will present their case that it should.

It is Staff's opinion that the applicant's study needs some form of verification, as we cannot simply agree to amend the Ordinance based on a private consultant's opinion of no detrimental impact, even though it appears to be grounded in significant analysis and expertise. One possibility might be that the applicant provides money in an escrow so that the Township can have the findings reviewed by a different consultant selected by the Township. It appears that this would have to take place prior to scheduling a public hearing.

ACTION REQUESTED:
Direct Staff to continue to work with the applicant and seek verification of the noise study.

Attachments:
1. Packet provided by applicant dated June 6, 2018 containing preliminary noise study findings
2. Packet provide by the applicant dated June 28, 2018 containing full noise study findings

SONDEE RACINE & DOREN PLC
ATTORNEYS

MAURICE A. BORDEN
JEFFREY L. JOCKS
KARRIE A. ZEITS

RONALD W. SONDEE, OF COUNSEL
JOHN P. RACINE, JR., OF COUNSEL
W. PETER DOREN, OF COUNSEL

310 WEST FRONT STREET
SUITE 300
TRAVERSE CITY, MICHIGAN 49684
TEL (231) 947-0400
FAX (231) 947-0748
www.sondeeracine.com

June 6, 2018

HAND DELIVERED
Roberto Larrea
Planning Director
Charter Township of Garfield
3848 Veterans Drive
Traverse City, MI 49684

RE: Serra Works of Traverse City, LLC
940 Boon Street – Wash Bay to Automobile Laundry Request

Dear Mr. Larrea:

This correspondence is submitted on behalf of Serra Works of Traverse City, LLC. The purpose of this correspondence is to request to be on the Planning Commission's agenda for its regular meeting on July 11, 2018, for the Planning Commission to consider modification of the wash bay currently approved for construction at 940 Boon Street to an automobile laundry/car wash pursuant to the process set forth in the First Amendment to and Restatement of Conditional Rezoning Agreement dated March 30, 2018, for 940 Boon Street (the CRA). I have attached to this correspondence as **Attachment 1** the CRA for your reference.

The proposal is to convert the wash bay, as depicted on the site plan attached as **Attachment 2,** to be operated as an automobile laundry. As indicated in the CRA, any modification to the wash bay to include noise generating mechanicals shall first be reviewed and approved, following a public hearing, by the Planning Commission. Paragraph 2.f.i.

The automobile laundry is proposed to be operated during the hours of operation for the new Toyota dealership, which are as follows:

Monday through Thursday	-	7:30 am to 8:00 pm
Friday	-	7:30 am to 6:00 pm
Saturday	-	8:00 am to 4:00 pm

The automobile laundry will not be open to the public. It will be operated only by Serra employees in connection with the operation of the Toyota dealership. The traffic will flow into the automobile laundry at the east end and will exit out of the west end. **Attachment 3** highlights the automobile laundry and depicts the flow of traffic. The doors will remain closed

at all times while the automobile laundry is in use. Once a car enters the automobile laundry from the east end, the east door will close, the car will go through, and the west end door will remain closed until after the dryers are finished.

Per the CRA, prior to conversion of the wash bay to an automobile laundry, "[a] noise study shall be performed prior to approval and following installation of the mechanicals, if approved, demonstrating that noise will not be detrimental to the surrounding neighborhoods." Paragraph 2.f.ii. As indicated in Attachment 5, which is a summary of the findings of Serra's noise consultant, Mr. Eric M. Zwerling, M.S., INCE, ASA, of The Noise Consultancy, LLC, operation of the automobile laundry in this fashion will have no acoustical impact on the neighborhood and will not be detrimental to the surrounding neighborhoods. I have attached as **Attachment 4** and **Attachment 5**, Mr. Zwerling's credentials and his June 6, 2018, correspondence providing an overview of his findings and conclusions based upon the acoustical study and impact analysis on the 940 Boon Street site from Thursday, May 31, through Saturday, June 2, 2018.

Mr. Zwerling will be in attendance at the July 11, 2018, Planning Commission to answer any questions that the Planning Commission, the public, or staff may have. As indicated, Mr. Zwerling's attendance may be via Skype or similar technology, which will be set up by Serra for the meeting.

Thank you, and please let me know if you have any questions or need any additional information prior to the meeting.

Sincerely,

SONDEE RACINE & DOREN, PLC

Karrie A. Zeits

KAZ:alr
cc Client
Mr. Eric M. Zwerling, MS, INCE, ASA

ATTACHMENT 1

FIRST AMENDMENT TO AND RESTATEMENT OF CONDITIONAL REZONING AGREEMENT

APPLICATION # Z 2017-03

Received:

This First Amendment to and Restatement of a Conditional Rezoning Agreement entered into in 2008 and recorded at 2008R-03914 Grand Traverse, County Register of Deeds ("Amendment") is entered into on the 30 day of March, 2018, between Serra Works of Traverse City, LLC, a Michigan limited liability company, of 3118 E. Hill Road, Grand Blanc, Michigan ("Applicant") and the Charter Township of Garfield, 3848 Veterans Drive, Traverse City, Michigan 49684 ("Township"), and provides as follows:

Recitals

A. Applicant is the owner in fee of the following property located at 940 Boon Street in the Township of Garfield, County of Grand Traverse, State of Michigan and more fully described as follows ("Property"):

A part of Lots 15 and 16 of the recorded Plat of Hannah Lay & Co's Fifteenth Addition to the City of Traverse City, more specifically described as: The North 385 feet of the East one-half of the Northeast one-quarter of the Northeast one-quarter, Section 14, Town 27 North, Range 11 West; except the West 100 feet of the North 189 feet thereof; also except the East 251.01 feet of said East one-half of the northeast one-quarter; EXCEPT the North 33 feet of the East 660.37 feet of the Northeast quarter of the Northeast quarter of Section 14, Town 27 North, Range 11 West. Together with an easement over the East 20 feet of land in the township of Garfield, Grand Traverse County, Michigan, described as: part of Lot 16, Hannah, Lay and Company's 15th Addition to the City of Traverse City, a part of Section 14, Town 27 North, Range 11 West, described as commencing at the Northeast corner of said Section 14; thence North 89 6' 30" West along the Section line 660.37 feet; thence South 0 2' 50" West, 33.00 feet to the Point of Beginning; thence continuing 0 2' 50" West, 156.00; thence south 89 6' 30" East parallel to the Section line 100.00 feet; thence North 0 2' 50" East, 156.00 feet; thence North 89 6' 30" West 100.00 feet to the Point of Beginning, for a private drive the exclusive use of the Grantor, his

hears and assigns which is the same easement described in the deed at Liber 316, page 341, Grand Traverse County Register of Deeds, Parcel Identification Number 28-05-014-005-00.

B. The Property is subject to a Conditional Zoning Agreement (the "Agreement") entered into in 2008 and recorded at 2008R-03914 Grand Traverse, County Register of Deeds whereby the Property was rezoned from R-1B, Single Family Residential, to C-2, General Business now C-G, General Commercial.

C. MCL 125.3405 of the Zoning Enabling Act, as amended, provides that a landowner may offer use limitations related to the rezoning of land within a township pursuant to a Conditional Rezoning Agreement ("CRA") and Section 422(G)(2) of the Charter Township of Garfield Zoning Ordinance (the "Zoning Ordinance") provides that any amendment to a statement of conditions must be processed in the same manner as a CRA under MCL 124.3405.

D. The Applicant has requested to amend certain conditions of the Statement of Conditions set forth in the Agreement.

E. By entering into this Amendment, the Applicant and the Township desire to set forth the parties' obligations with respect to the Property and the conditions under which the Township has granted this Amendment to the Agreement.

NOW THEREFORE, the Applicant and the Township hereby declare and agree that the Property shall be held, transferred, sold, conveyed and occupied subject to the covenants, conditions, restrictions, grants and reservations set forth herein; all of which are for the benefit of the Township and shall run with and bind the Property and all parties having any right, title or interest in all or any portion of the Property, as well as its heirs, successors and assigns.

Agreement and Statement of Conditions

1. Rezoned Limited Uses. The Property shall remain rezoned to C-G, Commercial General. With respect to the Township Zoning Ordinance in effect on the date of this Amendment, the Applicant voluntarily offers and agrees that the Applicant may be permitted to conduct all existing permitted, conditional and special land uses in the C-G District, which includes by reference the same uses in the C-L District, Local Commercial, except for the following:

    a. The property shall not be used for any of the following permitted uses in the C-G and C-L Districts:

        i. Restaurant and tavern
        ii. Public assembly buildings
        iii. Bus passenger terminals and stations
        iv. Gasoline Service Stations
        v. Commercial Recreational Facilities
        vi. Miniature golf, trampoline, or similar public amusement
        vii. Drive-In Business or Drive-Through Business
        viii. Sexually Oriented Business

ix. Indoor Entertainment Center
x. Mortuaries / Funeral Homes
xi. Restaurant
xii. Retail convenience / Retail Food

2. Site Development Conditions. The following site development conditions shall apply:

a. The healthy vegetation located on the property shall not be removed from a twenty-five (25) foot strip of land south of the Boon Street right of way except as depicted on the Landscape Plan submitted and dated August 10, 2017, to allow construction of a drive and a sidewalk as shown on the site plan submitted on August 10, 2017, and the removal of trees that are obstructions to the approach and departure surfaces for Runway 10 at the Cherry Capital Airport (the "Boon Street Buffer").

b. The Applicant shall install and maintain in healthy condition a coniferous tree buffer along the Property's north property line which does not abut Boon Street as well as the west property line of the Property adjacent to the residential property to the west. Such buffer shall be installed prior to any occupancy of the property.

c. There shall be only one curb cut for a drive along Boon Street and the curb cut shall be aligned with the alley to the north as shown on the August 10, 2017, Site Plan, made a part hereof, (the "August 10 Site Plan").

d. The drive off/on Garfield shall be posted for "No Left Turn" as shown on the August 10 Site Plan.

e. The planting size of the conifers in the Boon Street Buffer shall be increased from six (6) feet to between eight (8) to ten (10) feet to create a tiered vegetative buffer.

f. The Automobile Laundry will be labeled a "wash bay" and may be permitted without noise generating mechanicals customarily associated with an automated car wash, such as automatic dryers, brushes, conveyors, and mitter curtains, and shall be subject to the following:

i. Any modification to the "wash bay" to include noise generating mechanicals shall first be reviewed and approved, following a public hearing, by the Planning Commission.

ii. A noise study shall be performed prior to approval and following installation of the mechanicals, if approved, demonstrating that noise will not be detrimental to the surrounding neighborhoods.

iii. The automobile laundry shall not be open to the public.

3. Right to Record. This Conditional Rezoning Agreement may be recorded by the Township with the Grand Traverse County Register of Deeds.

4. Township Right to Rezone. Nothing in this Agreement shall be deemed to prohibit the Township from revising its Zoning Ordinance or rezoning all or any portion of the Rezoned Property to another zoning classification. Any rezoning shall be conducted in compliance with the Township Zoning Ordinance and the Zoning Enabling Act. Upon any such rezoning taking effect, the use of the land so rezoned shall conform as much as possible thereafter to all of the requirements regulating use and development within the new zoning district and ordinance as modified by any more restrictive provisions contained in this Agreement. In the event of a rezoning, the Applicant's use of the property in conformity with this Agreement shall be a legal nonconforming use.

5. Compliance with Conditions. The Applicant shall continuously operate and maintain the development or use in compliance with all of the conditions set forth in the Statement of Conditions. Any failure to comply with a condition contained within the Statement of Conditions shall constitute a violation of the Zoning Ordinance and the be punishable accordingly. Additionally, any such violation shall be deemed a nuisance per se and subject to judicial abatement as provided by law.

6. Commencement Time Period. Substantial construction of the development as set forth in August 10 Site Plan as allowed and permitted under federal or state law, rule or regulation or the Township Zoning Ordinance must be commenced within 18 months from the date of this Agreement, and thereafter proceed diligently to completion. This time limitation may upon written request be extended by the Township Board if (1) it is demonstrated to the Township Board's reasonable satisfaction that there is a strong likelihood that the development and/or use will commence within the period of extension and proceed diligently thereafter to completion and (2) the Township Board finds that there has not been a change in circumstances that would render the zoning changes of statement of conditions made pursuant to this Agreement incompatible with other zones and uses in the surrounding area or otherwise inconsistent with sound zoning policy.

7. Reversion to Prior Zoning for Failure to Commence. If the approved development and/or use of the Property does not occur within the time frame specified under paragraph 6 above, the land shall revert to its former zoning classification as set forth in MCL 125.3405. The reversion process shall be initiated by the Township Board requesting that the Township Planning Commission proceed with consideration of rezoning of the land to its former zoning classification.

8. Subsequent Rezoning of Land. If the Property is thereafter rezoned to a different zoning classification or to the same zoning classification but with a different or no statement of conditions, whether as a result of a reversion of zoning pursuant to Section 6 above or otherwise, the statement of conditions imposed under this Agreement shall cease to be in effect. Upon the Applicant's written request, the Township Clerk shall record with the Register of Deeds of Grand Traverse County a notice that the statement of conditions in the Agreement is no longer in effect.

9. Termination. This Agreement may be terminated by written mutual agreement of the parties. If so terminated, the Township Clerk shall sign a document recordable with the Grand Traverse County Register of Deeds that the statement of conditions in the Agreement is no longer in

effect.

Applicant, Serra of Traverse City, LLC, a Michigan limited liability company, hereby attests that the conditions imposed by this Amendment to the Agreement were offered voluntarily and are consented to willingly.

Schedule of Documents

DOCUMENT NAME	SHEET #	DATE	SUBMITTED BY:
Site Plan Cover	C00-00-000	N/A	Gosling/Czubak
Existing Site Plan	CD 1-00-01	8-10-17	Gosling/Czubak
Proposed Demolition Plan	CD 1-00-02	8-10-17	Gosling/Czubak
Site Plan	CS 1 -00-01	8-10-17	Gosling/Czubak
Grading Plan	CG 1-00-01	8-10-17	Gosling/Czubak
SESC Plan	CS 1-00-02	8-10-17	Gosling/Czubak
Storm Sewer Plan	CU 1-00-01	8-10-17	Gosling/Czubak
Water & Sewer Service Plan	CU 1-00-02	8-10-17	Gosling/Czubak
Site Details	CN 1-00-01	8-10-17	Gosling/Czubak
Utility Details	CN 1-00-02	8-10-17	Gosling/Czubak
Storm Sewer Details	CN 1 -00-03	8-10-17	Gosling/Czubak
Landscape Plan	LS 1-00-01	12-13-17	Gosling/Czubak
Photometric Plan	PAGE - M OF 1	8-9-17	Keen Technical Solutions LLC
Architectural Plan Cover	Cover	8-10-17	Ghafari Assoc. LLC
Architecture Floor Plan	AE 1- 01-00	Not Dated	Ghafari Assoc. LLC
Architectural Building Elevations	AE 2-00-02	Not Dated	Ghafari Assoc. LLC
Architectural Sign Details	AE2-00-03	SIGNS NOT APPROVED	Ghafari Assoc. LLC
Architectural Concept Rendering	AE 2-00-04	SIGNS NOT APPROVED	Ghafari Assoc. LLC
FAA - Kevin Klein Correspondence	Cherry Capital Airport	10-27-17	Cherry Capital Airport

SERRA OF ~~TRAVERSE CITY, LLC~~

By: Joseph O. Serra
Its: President

STATE OF MICHIGAN)
)SS.
COUNTY OF Genesee)

Sworn to before me, a Notary Public in and for said State and County, personally appeared Joseph Serra on behalf of Serra of Traverse City, LLC, a Michigan limited liability company, known to me to be the above described person, who executed the foregoing and acknowledged the same to be his/her free act and deed on this 30 day of March, ~~2017~~. 2018

LYNN WOLVERTON
Notary Public, State of Michigan
County of Saginaw
My Commission Expires 12-26-2018
Acting in the County of Genesee

Lynn Wolverton, Notary Public
County of Saginaw, MI
Acting in Genesee County, MI
My Commission Expires: 12/26/2018

CHARTER TOWNSHIP OF GARFIELD

By: Charles S. Korn
Its: Supervisor

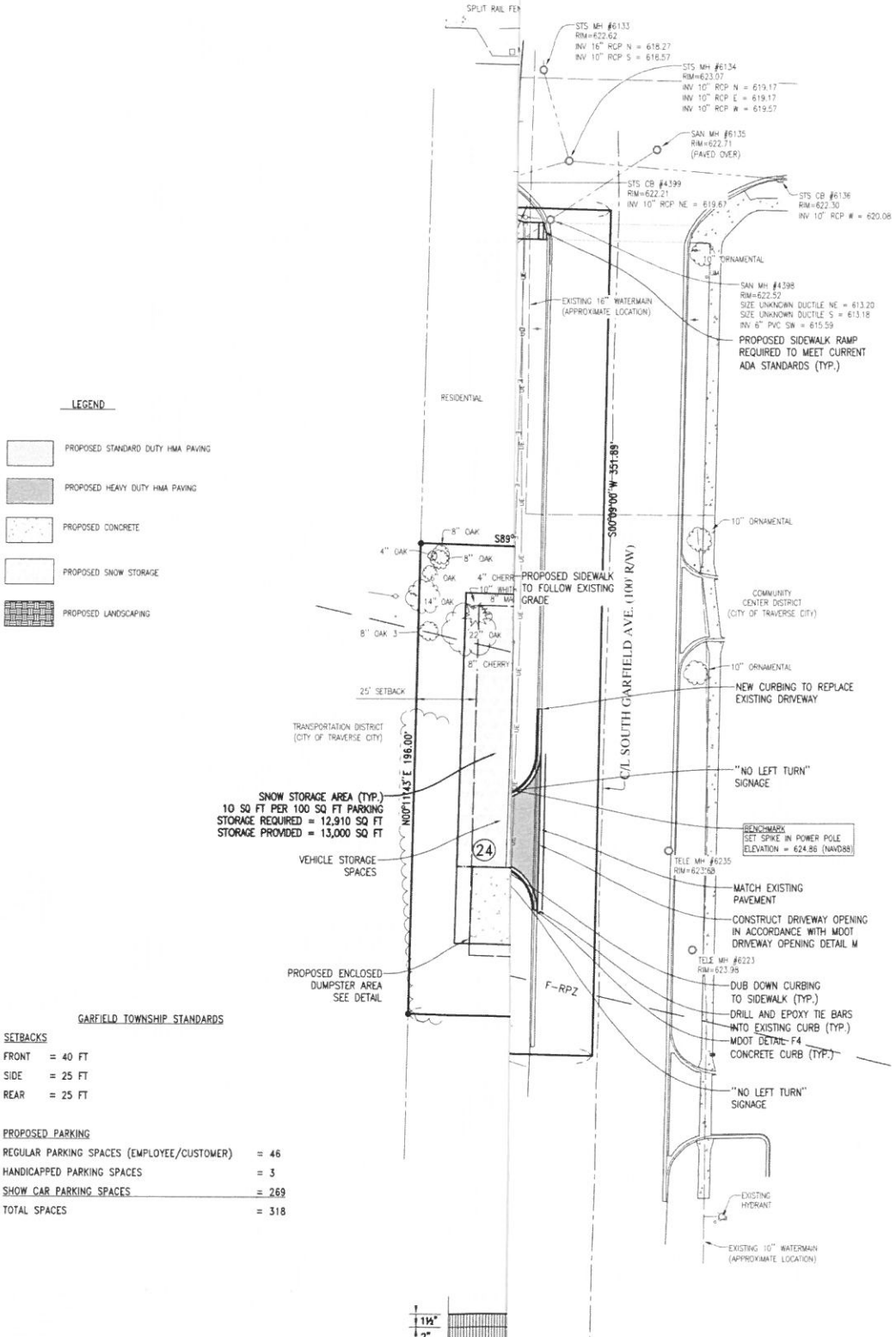
STATE OF MICHIGAN)
)SS.
COUNTY OF GRAND TRAVERSE)

Sworn to before me, a Notary Public in and for said State and County, personally appeared Charles S. Korn, on behalf of the Charter Township of Garfield, known to me to be the above described person, who executed the foregoing and acknowledged the same to be his/her free act and deed on this _____day of_____, 2017.

, Notary Public
County of Grand Traverse, MI
Acting in Grand Traverse County, MI
My Commission Expires: _____

Prepared By: Karrie A. Zeits, Sondee, Racine & Doren, PLC, 310 W. Front Street, Suite 300, Traverse City, MI 49694 (231)947-0400

ATTACHMENT 2



LEGEND

- PROPOSED STANDARD DUTY HMA PAVING
- PROPOSED HEAVY DUTY HMA PAVING
- PROPOSED CONCRETE
- PROPOSED SNOW STORAGE
- PROPOSED LANDSCAPING

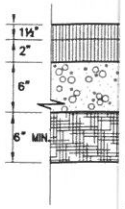
GARFIELD TOWNSHIP STANDARDS

SETBACKS

FRONT	= 40 FT
SIDE	= 25 FT
REAR	= 25 FT

PROPOSED PARKING

REGULAR PARKING SPACES (EMPLOYEE/CUSTOMER)	= 46
HANDICAPPED PARKING SPACES	= 3
SHOW CAR PARKING SPACES	= 269
TOTAL SPACES	= 318



STANDARD DU

SITE PLAN NOTES

1. FOR BENCHMARK INFORMATION, SEE EXISTING SITE PLAN.
2. PLEASE REFER TO THE GEOTECHNICAL REPORT FOR SOIL BORING LOCATION AND INFORMATION.
3. SEE ARCHITECTURAL PLANS FOR THE CONSTRUCTION OF THE BUILDING.
4. ALL DIMENSIONS MEASURED FROM CURB ARE FROM THE CENTER OF CURB, 8" FROM THE EDGE OF PAVEMENT

811 Know what's below. Call before you dig.

THE LOCATION OF THE EXISTING UTILITIES, AS SHOWN ON THIS PLAN, ARE APPROXIMATE ONLY. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY ACTUAL LOCATION AND DEPTH OF ALL EXISTING UTILITIES. THE OWNER AND THE SURVEYOR SHALL NOT BE RESPONSIBLE FOR ANY OMISSION OR VARIATION FROM THE LOCATION SHOWN. THE CONTRACTOR SHALL NOTIFY "MISS DIG" AT 1 (800) 482-7171 OR 811 THREE (3) WORKING DAYS PRIOR TO THE START OF CONSTRUCTION.

Gosling Czubak engineering sciences, inc.
• Engineers • Surveyors • Environmental Services • Landscape Architecture
1280 Business Park Drive
Traverse City, MI 49686
231-946-9191 800-968-1002
Fax 231-941-4603

No.	Date:	Revision	By:
1	06/05/2018	FOR CAR HAUS USE	DPG

Date: 6/08/2017
Scale: 1" = 30'
Drawn By: ZCA
Checked By: DPG

Location: E 1/2 OF THE NE 1/4 OF THE NE 1/4 OF SECTION 14, T27N, R11W GARFIELD TOWNSHIP GRAND TRAVERSE COUNTY, MICHIGAN

PROPOSED SITE PLAN

SERRA AUTOMOTIVE - TOYOTA PROJECT

TRAVERSE CITY, MICHIGAN

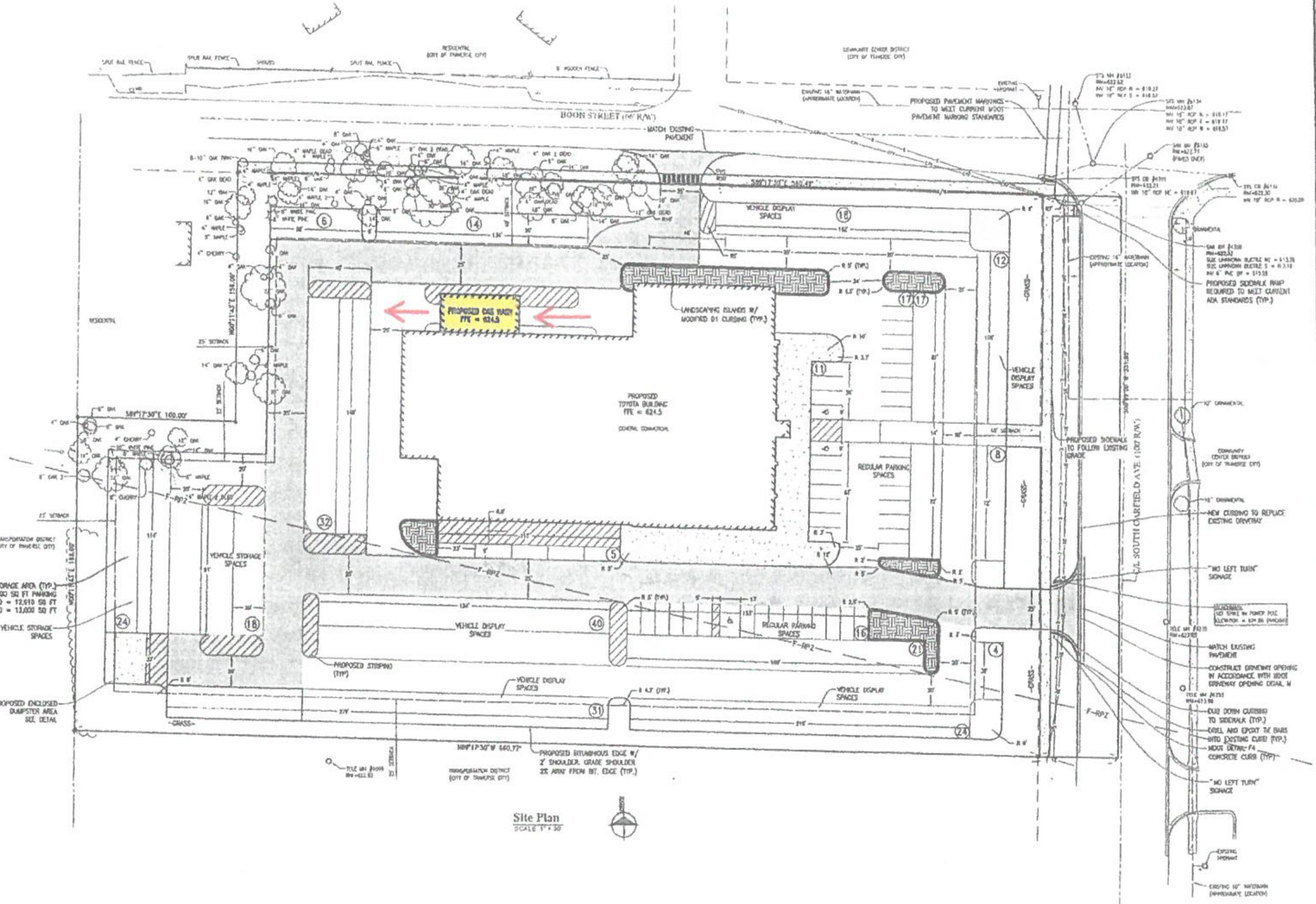
Project No. 2017064001.03

Sheet CS1-00-01

ATTACHMENT 3

LEGEND

- PROPOSED STANDARD DUTY HMA PAVING
- PROPOSED HEAVY DUTY HMA PAVING
- PROPOSED CONCRETE
- PROPOSED SNOW STORAGE
- PROPOSED LANDSCAPING



Site Plan
SCALE 1" = 30'

GARFIELD TOWNSHIP STANDARDS

SETBACKS

FRONT	= 40 FT
SIDE	= 25 FT
REAR	= 25 FT

PROPOSED PARKING

REGULAR PARKING SPACES (EMPLOYEE/CUSTOMER)	= 46
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TOTAL SPACES	= 318

STANDARD DUTY HMA PAVING
NO SCALE

HEAVY DUTY HMA PAVING
NO SCALE

811 Know what's below. Call before you dig.

SITE PLAN NOTES

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3. SEE ARCHITECTURAL PLANS FOR THE CONSTRUCTION OF THE BUILDING.
4. ALL DIMENSIONS MEASURED FROM CURB ARE FROM THE CENTER OF CURB, 8" FROM THE EDGE OF PAVEMENT

PROPOSED SITE PLAN

SERRA AUTOMOTIVE - TOYOTA PROJECT
TRAVERSE CITY, MICHIGAN

Location: E 1/2 OF THE NE 1/4 OF THE NE 1/4 OF SECTION 14, T27N, R11W GARFIELD TOWNSHIP GRAND TRAVERSE COUNTY, MICHIGAN

Date: 8/08/2017 Drawn By: ZCA Scale: 1" = 30' Checked By: DPO

Gosling Czubak Engineering Sciences, Inc. — Engineers • Surveyors • Environmental Services • Landscape Architecture

Sheet CS1-00-01

ATTACHMENT 4

ERIC M. ZWERLING, M.S., INCE, ASA

Rutgers University Noise Technical Assistance Center
14 College Farm Road
New Brunswick, NJ 08901

The Noise Consultancy, LLC
309 Van Neste Rd
Flemington, NJ 08822

CURRENT POSITIONS

1991-Present *Director* - Noise Technical Assistance Center
Department of Environmental Sciences
Rutgers - The State University of New Jersey

1999-Present *President* - The Noise Consultancy, LLC
Noise Consultant/ Expert Witness (Since 1992)
[Expert for the Defendants, City of New York Law Department
-in- Robert Turley, *et al.*, - against- Rudolph Guiliani, *et al.*,]

1993-Present *Noise Enforcement Expert* - New Jersey Department of Environmental Protection. Contracted (as Director of the RNTAC) to provide technical expertise on noise related issues to the NJDEP and the State of New Jersey

1998-Present *Instructor* - "Noise Hazards" in 'Fundamentals of Industrial Hygiene'. University of Medicine and Dentistry of New Jersey , School of Public Health, Office of Public Health Practice

1998-Present Committee Member - S12 Working Group 41, Model Community Noise Ordinances. Acoustical Society of America

2001-Present Committee Member - Technical Study Group on Community Noise
Institute of Noise Control Engineering

1994-Present *Instructor* - "Community Noise" in 'Environment and Public Health Course," Rutgers Continuing Education Program, Cook College Office of Continuing Professional Education.

1992-2005 *Adjunct Professor*- Rutgers University Department of Environmental Sciences. Course: 375:336 'Community and Occupational Noise'

1998-2000 Commissioner - Franklin Township (NJ) Environmental Commission

2010-Present Board of Education, Chair – Green Committee
Readington Township, New Jersey

2017-Present Chair – Subcommittee
New Jersey State Noise Code NJAC 7:29 - Amendments
New Jersey Noise Control Council
New Jersey Department of Environmental Protection

PROFESSIONAL AFFILIATIONS

Member - Acoustical Society of America
Member – Institute of Noise Control Engineering

EDUCATION

ABD Ph.D. Candidate
Rutgers - the State University of New Jersey
Department of Environmental Sciences

Occupational Hearing Conservationist
Council for Accreditation in Occupational Hearing Conservation.

Graduate Certificate in Environmental Ethics -
Department of Philosophy, University of Georgia.

B.S., M.S. University of Georgia.

JURISDICTIONAL CERTIFICATIONS

Approved Noise Control Investigator
New Jersey Department of Environmental Protection
Pursuant to N.J.A.C. 7:29 -2.11(a)3

Approved Noise Consultant
New York City Department of Environmental Protection
Pursuant to N.Y.C.A.C. Section 24-231

Approved Instructor
State of Michigan
Department of Licensing and Regulatory Affairs
Bureau of Construction Codes

AWARDS

1997 *Advisor of the Year Award*
Rutgers College Student Activities Advisory Council
Faculty Advisor - Students for Environmental Awareness

2016 *Sustainable Raritan Award*
Outstanding Achievement in Public Education
Sustainable Raritan River Collaborative and Rutgers' Sustainable Raritan River Initiative

PUBLICATIONS

Zwerling, E.M. 2015. Proposed Noise Standard for Wind Turbine Generators on Farms. State Agriculture Development Committee, New Jersey Department of Agriculture.

Zwerling, E.M, A. Myers, C. Shamoon. 2012. Analysis of the "Plainly Audible" Standard for Noise Ordinances. Proceedings of Inter- Noise 2012. Institute of Noise Control Engineering.

Zwerling, E.M., C. Shamoon. 2010. Proactive Regulation Engenders Creative Innovation - Quieting the Jackhammer. Proceedings of Noise-Con 2010. Institute of Noise Control Engineering.

Szulecki, S., E. Zwerling, C. Anderson, B. Turpin. 2010. Modeling with CadnaA to estimate the probability of awakening associated with train horns. Proceedings of Noise-Con 2010. Institute of Noise Control Engineering.

Zwerling, E.M., C. Anderson, S. Szulecki, F. Maimone, B. Turpin. 2009. Study of Train Noise in Teaneck, NJ. USEPA Agreement Number: X-83245701-0

Zwerling, E.M. 2005. Regulatory Scheme For Noise Enforcement In New Jersey . *Invited paper.* Journal of the Acoustical Society of America.V.118, No. 3, Pt 2 of 2, Sept. 2005, p. 1849.

Zwerling, E.M. 2004. Training as a Critical Component of Successful Noise Enforcement Programs. *Invited paper.* Journal of the Acoustical Society of America.V.115, No. 5, Pt 2 of 2, May 2004, p. 2568.

Zwerling, E.M. 2004. Noise Enforcement in Cities. *Invited paper.* Journal of the Acoustical Society of America.V.115, No. 5, Pt 2 of 2, May 2004, p. 2593.

Zwerling, E.M. 2002. Characteristics of Successful Local Noise Enforcement Programs. *Invited paper.* Journal of the Acoustical Society of America.V.112, No. 5, Pt 2 of 2, Nov. 2002, p. 2375.

Zwerling, E.M. 2002. Boom Car and Boom Box Code Drafting. The Quiet Zone. Spring 2002.

Zwerling, E.M. 2002. Hearing Protection. In *Encyclopedia of Public Health,* ed. Lester Breslow. Macmillan Reference USA.

Zwerling, E.M. 2001. Vehicle Enforcement. Rutgers Noise Technical Assistance Center. Developed for North Salem, NY

Zwerling, E.M. 2000. Regulation of Amplified Sound Sources. Proceedings of Noise-Con 2000. Acoustical Society of America / Institute of Noise Control Engineering. Newport Beach , CA. December 3-5, 2000 .

Zwerling, E.M. 2000. State of Michigan Model Noise Ordinance. Proceedings of Michigan Municipal League Annual Convention/ Michigan Association of Municipal Attorneys Annual Meeting. September 28-30, 2000 , Macinac Island , MI .

Zwerling, E. M. Contributing Editor. 1991-Present. Community Noise Enforcement. Rutgers Noise Technical Assistance Center.

Zwerling, E. M. Contributing Editor. 1998. Vehicle Sound Reproduction Enforcement. Rutgers Noise Technical Assistance Center. Developed for the City of Rochester, New York

Zwerling, E.M. 1997. Community Noise Enforcement: A Mature Technology. Hearing Rehabilitation Quarterly. 22:4, 4-8+.

Zwerling, E.M., D. Pinto, P. Hanna, J. Lepis, B. Turpin. 1997. Local Noise Enforcement Options and Model Noise Ordinance *With Pre-Approved Language for the State of New Jersey* . Rutgers Cooperative Extension Publication #E215.

Zwerling, E.M. 1997. Community Noise Infosheet. Environmental and Occupational Health Sciences Institute. Public Education and Risk Communication Division.

Zwerling, E.M. 1996. Turning Down the Volume: Effective Strategies for Community Noise Enforcement. The Police Chief. V. 63, Dec. 53-59.

Zwerling, E. M. & B. J. Turpin. 1996. Community Noise Enforcement: Reviving a Moribund Program or Developing One Anew. Proceedings of Noise-Con 96, The 1996 National Conference on Noise Control Engineering. 955-960.

Zwerling, E.M. 1996. Community Noise Pollution Certification and Assistance. Home page for Rutgers Noise Technical Assistance Center. http://www.envsci.rutgers.edu/org/rntac/

RESEARCH PROJECTS (at Rutgers University, as P.I. or Co-P.I.)

"Assistance Regarding Noise Standards for Wind Turbines on Farms," Granting Agency: New Jersey State Agricultural Development Commission (SADC), 2011 - 2015.

"Assistance Regarding Noise Standards for Photovoltaic Installations on Farms," for New Jersey State Agricultural Development Commission (SADC), 2010.

"Railroad Noise in Teaneck, New Jersey" Granting Agency: United States Environmental Protection Agency, 2005 - 2009.

"Road Noise Educational Outreach Program," Granting Agency: New Jersey Department of Transportation, 2002.

CONFERENCE PRESENTATIONS

Community Noise Control: Reviving a Moribund Program or Creating One Anew. International Code Council 2013 Conference. Atlantic City, NJ. September 30, 2013.

Emerging Noise Issues: Emergency Generators and Beach Bars. *Invited Presentation.* New Jersey Environmental Health Association Annual Public Health Conference. Atlantic City , NJ March 5, 2013.

Must we regulate civility? Yes, unfortunately. But, is it effective? *Invited lecture.* stillspotting ( ) nyc . Guggenheim Museum. New York City. October 9, 2012.

Analysis of the "Plainly Audible" Standard for Noise Ordinances. Proceedings of Inter- Noise 2012. Institute of Noise Control Engineering. August 22, 2012.

Proactive Regulation Engenders Creative Innovation - Quieting the Jackhammer. *Invited Paper.* Proceedings of Noise-Con 2010. Institute of Noise Control Engineering. Baltimore, MD, April 20, 2010.

Environmental Health and Noise: Issues and Answers. *Invited Presentation.* New Jersey Environmental Health Association Annual Public Health Conference. Atlantic City , NJ March 3, 2008.

Noise Primer For Legal Professionals. *Invited Presentation.* New York State Bar Association Environmental Law Section Fall Meeting. Saratoga Springs , New York . October 13, 2007.

How to Control Noise Pollution in Your Community. *Invited Presentation.* 90th Annual Conference - New Jersey State League of Municipalities. Atlantic City , NJ November 15, 2005.

Regulatory Scheme for Noise Enforcement in New Jersey . *Invited Paper.* 150th Meeting - Acoustical Society of America . Minneapolis , MN October 17-21, 2005.

Noise Enforcement in Cities. *Invited Paper.* 147th Meeting - Acoustical Society of America . New York , New York May 24-28, 2004.

Training as a Critical Component of Successful Noise Enforcement Programs. *Invited Paper.* 147th Meeting - Acoustical Society of America . New York , New York May 24-28, 2004.

Community Noise Impacts. *Invited Presentation.* Topics in Public Health. New Jersey Department of Health and Senior Services. April 16, 2003.

Characteristics of Successful Local Noise Enforcement Programs. *Invited Paper.* First Pan-American/Iberian Meeting on Acoustics. Jointly Sponsored: Acoustical Society of America , the Iberoamerican Federation of Acoustics and the Mexican Institute of Acoustics. Cancun , Mexico .Dec 2-6, 2002.

Community-Based Environmental Noise Management, *Invited Panelist;* The Role of State and Local Governmental Agencies in Noise Abatement and Control, *Invited Panelist.* Inter-Noise 2002, The 2002 International Congress and Exposition on Noise Control Engineering. Dearborn , MI Aug. 19-21, 2002.

Community Noise Regulation and Enforcement: Theory and Practice. American Association of Code Enforcement. 4th Semi-Annual Education Conference. Bowie , MD. May 1-3, 2002.

Regulation of Amplified Sound Sources. Noise-Con 2000. Acoustical Society of America/Institute of Noise Control Engineering. Newport Beach , CA. December 3-5, 2000.

Writing and Enforcing a Noise Ordinance. Michigan Municipal League Annual Convention.
Nuts and Bolts of Writing a Noise Ordinance. Michigan Association of Municipal Attorneys Annual Conference. Macinac Island , MI , September 28-30, 2000.

Municipal Noise Regulation - Theory and Practice. International Municipal Lawyers Association, Mid-Year Seminar. Washington , D.C. April 9-11, 2000.

Effective Strategies for Community Noise Enforcement:
Michigan Municipal League 9th Annual Education Conference. Mt. Pleasant, MI. March 11, 1998.
The Association of Towns of the State of New York , Annual Meeting, Educational Training Courses. New York City , February 16, 1998 .

American Association of Code Enforcement 8th Annual Business and Educational Conference. Hagerstown , MD , October 20-25, 1997.

Community Noise Enforcement: Reviving a Moribund Program or Developing One Anew. Noise-Con '96, The 1996 National Conference on Noise Control Engineering, Seattle, WA, September 29-October 2, 1996.

NOISE ENFORCEMENT CERTIFICATION COURSES TAUGHT

Community Noise Enforcement
Vehicular Noise Enforcement
Vehicle Sound Reproduction Enforcement
Motor Sports Ordinance Enforcement
Octave Band Analysis for Enforcement Purposes

New Jersey :
Certification and recertification - every three months, 1991 to present.

On-Site:
New Rochelle, NY; Jacksonville, FL (four times); Long Beach, NY (three times); Everett, WA; St. Augustine, FL (three times), Seattle, WA (twice); Neptune Beach, FL; Gainesville, FL; Anchorage, AK (twice); Binghamton, NY (twice); Washington State Association of Code Enforcement (three times); Ft. Collins, CO; Shelter Island, NY (four times); New York City, NY [NYC DEP, NYPD, NYC Parks, NYC DDOC] (eight times); Rochester, NY; Newport, RI; Platekill, NY; Traverse City, MI; DeKalb County, GA (four times); Twinsburg, OH; Sandusky, OH; North Salem, NY; Honolulu, HI; Lafayette, LA (twice); Philadelphia, PA (twice); Barbados, West Indies (twice); Collier County, FL (three times); Walton County, FL (three times); Greenville County (SC); Vancouver B.C. (three times); Panama City Beach, FL (twice); Matanuska-Susitna Borough, AK; Union, OH; Ithaca, NY

ON-SITE ORDINANCE DEVELOPMENT WORKSHOPS

Lafayette, LA; Traverse City, MI; Plattekill, NY; St. Augustine, FL; Charleston County, SC; Lansing, MI; DeKalb County, GA; Walton County, FL, Overland Park, KS; Greenville County, SC, Decatur, AL; Yonkers, NY; Ossining, NY; Newport RI; Monroe County, FL; Fort Lauderdale, FL; Panama City Beach, FL

PARTIAL LIST OF CLIENTS

City of New York Law Department; City of Philadelphia Law Department, Environmental & Regulatory Compliance Division; U. S. State Department; City of New York Police Department; Bergen County (NJ) Utilities Authority; New York City Department of Environmental Protection; New York State Office of Attorney General; McDonald's Corporation, Lafayette (LA) Consolidated Government; McGlinchey Stafford (New Orleans); Gaeta Recycling, Inc.; National Ecology; Browning Ferris Industries; Township of Manalapan (NJ); Kansas State Legislature; Readington Township (NJ); City of Lansing (MI); City of Tacoma (WA); City of St. Augustine (FL); Atlantic Development and Management Corp.; CareMatrix Corporation; County of Charleston (SC); DeKalb County (GA); Greenville County (SC); Ethicon, Inc.; City of Yonkers (NY); Walton County (FL); City of Overland Park (KS); City of Newport (RI); City of Ossining (NY); Franklin Township (NJ); Alliance to Save Southern Ulster's Rural Environment; Roche Molecular Systems; Wheelabrator,

Inc.; Monroe County (FL); City of Juneau (AK); Township of Branchburg (NJ); City of Eugene (OR); Union County United (PA); City of Fort Lauderdale (FL); City of Panama City Beach (FL); Stop & Shop Supermarket Company; Track Racket (Millville, NJ); Green Lawn Cemetery (Columbus, OH); Nissan Motor Company, Ltd.; City of Union (OH); City of Ithaca (NY); SA Engineering; Upper Deerfield Township (NJ)

Stephen M. Szulecki, M.S., INCE

116 Highland Avenue ◆ Highlands ◆ New Jersey 07732
(732) 872-7688
steve_noiseconsultancy@comcast.net ◆ www.noiseconsultancy.com

Education

1990	Rutgers, the State University of New Jersey **B.S. Environmental Sciences** Minor: Science Teaching Certification
1996	Rutgers, the State University of New Jersey **M.S. Environmental Sciences**

Employment History

2000 - Present	**Vice President** - The Noise Consultancy, LLC, 309 Van Neste Road, Flemington, NJ.
2012 - Present (1991-2000)	**Director** - Rutgers Air Pollution Training Program. Department of Environmental Sciences. Rutgers, the State University of New Jersey, New Brunswick, NJ.
2000 - 2012	**Visiting Lecturer** - Rutgers, the State University of New Jersey - Department of Environmental Sciences, New Brunswick, NJ.
1996 - 2000	**Assistant Instructor** (Faculty Position) - Department of Environmental Sciences. Rutgers, the State University of New Jersey, New Brunswick, NJ

Professional Experiences

Member - New Jersey Noise Control Council. Appointed by the Governor for the State of New Jersey. October, 2008 - present. Vice Chair 1/2016 – present.

Member – Institute of Noise Control Engineers. 2007 – present.

Acoustical Consultant to the Township of Lawrence, Lawrenceville, New Jersey, 2000 - present.

Presented Acoustical Expert Testimony at Zoning Board Hearing, Wayne Township, NJ, representing the applicant, CarMax, January 2016.

Presented Acoustical Expert Testimony at Zoning Board Hearing, Ocean Township, NJ, representing the applicant, Yeshiva Gedola Na'Os Yaakov, Inc., October & December 2015.

Presented Acoustical Expert Testimony at Planning Board Hearing, Forestburgh, NY, representing the applicant, ASTI, LLC (Gun Range & Motorcoss Track), May & June 2015.

Acoustical Consultant to the Borough of Tinton Falls Zoning Board of Adjustment, Tinton Falls, New Jersey, December 2013 – January 2015.

Conducted a comprehensive acoustical study and prepared a noise mitigation assessment report for the National Shipbuilders Research Program (NSRP) of the sound emission levels of portable ventilation blowers used in the construction and renovation of aircraft carriers and submarines, including detailed noise abatement recommendations. January 2014 – January 2015.

Conducted a comprehensive acoustical study for Toyota Motors, Blue Spring, MS. January 2014.

Consultant (Research Scientist) to Rutgers University on the research project, "Development of a Wind Turbine Regulation." Granting Agency: New Jersey State Agricultural Development Commission (SADC), October 2011 – November 2014. Providing expertise in the areas of environmental acoustical measurement and acoustical modeling.

Presented Acoustical Expert Testimony at Alcohol Beverage Control Board Hearing, City of Hoboken, NJ, representing the establishment owner, Lounge 11 (West 5). February 2014.

Presented a lecture at the International Code Council, 2013 Annual Conference in Atlantic City, NJ, titled, *Community Noise Control: Reviving a Moribund Program or Creating One Anew*, September 30, 2013.

Presented Acoustical Expert Testimony at Zoning Board Hearing, Town of Westfield, NJ, representing the applicant, Stop & Shop Supermarket, proposed expansion, May and June 2013.

Conducted an acoustical study to quantify sound emission levels of portable ventilation blowers used on aircraft carriers under construction/renovation at a shipyard in Newport News, VA, including detailed noise abatement recommendations. October 2012.

Presented Acoustical Expert Testimony at New York City Department of Environmental Protection Administrative Law Hearing, NY, NY representing the defendant, Z-Best Carwash, October 2012.

Presented Acoustical Expert Testimony at Zoning Board Hearing, Franklin Township, NJ, representing the applicant, Moncada Solar, proposed solar farm, July 2012.

Presented Acoustical Expert Testimony at Zoning Board Hearing, Franklin Township, NJ, representing the applicant, Althea Cleantech, proposed solar farm, February 2012.

Presented Acoustical Expert Testimony at Zoning Board Hearing, South Brunswick Township, NJ, representing the applicant, Raritan Valley Tree Service, December 2011.

Presented Acoustical Expert Testimony at Zoning Board Hearing, Greenwich Township, NJ, representing the applicant, Warren Solar I, Inc., proposed solar farm, August 2010.

Presented Acoustical Expert Testimony at Zoning Board Hearing, Upper Pittsgrove Township, NJ, representing the applicant, Atlantic Green Power, Inc. (proposed solar farm), May 2010.

Presented a research paper at NoiseCon2010 (Institute of Noise Control Engineers and Acoustical Society of America Joint Conference) in Baltimore, MD, *Modeling with CadnaA to estimate the probability of awakening associated with train horns*, April 2010.

Presented Acoustical Expert Testimony in New York Dept. of Environmental Conservation, Administrative Law Hearing – Issues Conference, Elmira, NY, representing the Intervener, RPLC Inc., in the matter of Chemung County Landfill Expansion Application – April 28, 2010.

Consultant (Research Scientist) to Rutgers University on the research project, "Railroad Noise in Teaneck, NJ." Granting Agency: US Environmental Protection Agency, September 2005 - December 2009. Providing expertise in the areas of environmental acoustical measurement and modeling.

Presented Acoustical Expert Testimony at Zoning Board Hearing, City of Union, NJ, representing the applicant, VJB Realty Associates, Inc. (proposed sound recording studio), February 2009.

Presented Acoustical Expert Testimony at Planning Board Hearing, Borough of Eatontown, NJ, representing the applicant, Best Buy, Inc. (proposed retail store), January 2009.

Prepared Occupational Noise Exposure Assessment for US State Dept., Embassy Security Division (subjects: Security Agent Trainees & Driving Course Instructors and Trainees), Summit Point, WV, December 2008.

Prepared Occupational Noise Exposure Assessment for US State Dept., Embassy Security Division (subjects: Agent Trainees & Firing Range Instructors), Summit Point, WV, July 2008.

Subject Matter Expert and Author/Editor to US Environmental Protection Agency for the Revision of *EPA 435, Atmospheric Sampling*, Student Manual and Laboratory Workbook, June 2007 - June 2008.

Subject Matter Expert and Author/Editor to Rutgers University, Department of Environmental Sciences - Air Pollution Training Center, for the Revision of *EPA 464, Analytical Methods for Air Quality Standards*, Student Manual and Laboratory Workbook, March 2007 - June 2008.

Presented Acoustical Expert Testimony in New York Dept. of Environmental Conservation, Administrative Law Hearing, Monticello, NY, representing the intervener, Mountain Lodge Estates, in the matter of Sullivan County Landfill Expansion Application - May 2007, July 2007, September 2007, and July 2008.

Presented Acoustical Expert Testimony at Planning Board Hearing, City of Clifton, NJ, representing the applicant, Glaxo-Smith-Kline, Inc., April 2008, May 2008, & January 2009.

Acoustical Consultant to the Township of Bridgewater, Bridgewater, New Jersey, Turtle & Hughes Application, January 2007 - September 2007.

Presented Acoustical Expert Testimony at Planning Board Hearing, Borough of Hasbrouck Heights, NJ, representing the applicant, Terrace Properties, Inc. (proposed townhouse subdivision), March 2007.

Presented Acoustical Expert Testimony at Zoning Board Hearing, Borough of Tinton Falls, NJ, representing the applicant, Clayton Companies, Inc. (proposed concrete production facility), March 2007.

Presented Acoustical Expert Testimony at Zoning Board Hearing, Borough of Sea Bright, NJ, representing the applicant, Surf Rider Beach Club (proposed banquet facility expansion), October 2006.

Presented Acoustical Expert Testimony at Planning Board Hearing, Union Township, PA, representing the objectors, Union Township United (proposed racetrack), April & May 2006.

Presented Acoustical Expert Testimony at Zoning Board Hearing, Borough of Shrewsbury, NJ, representing the applicant, JPMorgan Chase Bank, Inc. (proposed new branch office), March 2006.

Presented Acoustical Expert Testimony at Planning Board Hearing, Borough of Old Tappan, NJ, representing the applicant, Colonial Manor (banquet hall expansion), January 2005, February 2005, March 2005, & July 2005.

Presented Acoustical Expert Testimony at Planning Board Hearing, Hopewell Township, NJ, representing an objector in the Lexicon, Inc. Application (expansion of research facility), July 2004.

Presented Acoustical Expert Testimony in Superior Court, Jasper County, Missouri, regarding: William C. Beall vs. James A.Wilbert, Mo-Kan Dragway, Inc., et al., March 2004.

Occupational Noise Exposure Assessment for US State Dept., Embassy Security Division (Firing Range Instructors), Virginia, May 2003.

Consultant (Research Scientist) to Rutgers University on a research project entitled: "Road Noise Educational Outreach Program," for the New Jersey Department of Transportation, January 2002-September 2002. Provided expertise in the areas of residential acoustical construction, the efficacy of low cost sound attenuation measures, and the development of training/outreach materials for professionals and the public at large.

Presented Acoustical Expert Testimony on Acoustical Study for City of Long Branch, NJ vs. Koplitz, November 2001, finding for Client.

Acoustical Studies/Modeling: **City of New York**; NYC, NY, **New York City Police Department;** NYC, NY; **Newport News Shipyard,** Newport News, VA; **Nissan Corporation,** Canton, MS; **Toyota Motors,** Blue Springs, MS**; Roche Inc.,** Branchburg, NJ; **BFI, Inc.** Tremley Point Marine Transfer Station, Linden, NJ; **McDonald's Inc.**, East Brunswick and Somerset, NJ; **Ethicon, Inc.**, Bridgewater, NJ; **Pewter Village Apartments**, Collingswood, NJ; **Air Management Services**, City of Philadelphia, PA; **Manalapan Township vs. Raceway Park, Inc.**, Manalapan, NJ; **Recycling Specialists Inc.**, Jersey City, NJ; **Sullivan County (NY) Landfill**, (partial listing).

Technical Content Reviewer: *EPA Course 452: Principles and Practices of Air Pollution Control* (Student Manual and Instructors Guide for a classroom/lecture based training course). Produced by

Ices, LTD., under contract from USEPA, Air Pollution Training Institute, September 2002-February 2003.

Technical Content Reviewer: *EPA Course 413: Control of Particulate Emissions* (Student Manual and Instructors Guide for a classroom/lecture based training course). Produced by Ices, LTD., under contract from USEPA, Air Pollution Training Institute, May-October 1999.

Technical Content Reviewer: *OL2000: Basic Concepts in Environmental Sciences-Module 1* (computer based training course). Produced by North Carolina State University, under contract from USEPA, Air Pollution Training Institute, January 1998.

Provided Technical Assistance to NJDEP/NJDOT/NJDMV to establish training for DMV personnel to audit privatized vehicle inspection facilities and existing inspection & repair facilities under the new I/M program, 1998.

Consultant to Liberty Lakes (Burlington, NJ) regarding odor impact at their facility from a local landfill, 1998.

Consultant to Township of Roxbury, New Jersey. Provided advice regarding the air pollution implications of the decommissioning of 150-year-old explosive facility in their jurisdiction, 1997.

Provided technical assistance to NJDEP/NJDOT on the use of exhaust carbon monoxide as a surrogate for the evaluation of smoke output from heavy-duty diesel vehicles, 1996.

Relevant Skills, Professional Education Courses and Certifications

Attended the Professional Training Course, *CandaA - Basic and Advanced Training,* April 22-23, 2010 in Baltimore, MD. Sponsored by DataKusiks, Inc, Greifenberg, Germany. Awarded Certificate of Achievement.

Proficient in the use and application of *CadnaA*, 3-dimensional, graphical, noise modeling software.

Certified in Community Noise Investigations in the State of New Jersey at Rutgers University, New Brunswick, NJ, 1999 - present (recertified biannually).

Approved Noise Consultant
New York City Department of Environmental Protection
Pursuant to N.Y.C.A.C. Section 24-231

Attended the Professional Training Course, *Noise Control for Buildings, Manufacturing Plants, Equipment and Products,* November 10-14, 2003 in Orlando, FL. Sponsored by Hoover & Keith, Inc, Houston, TX. Awarded Certificate of Achievement.

Attended the Professional Training Course, *FHWA Traffic Noise Model (TNM),* November 4-7, 2003 in Franklin, TN. Sponsored by Bowlby & Associates, Inc., Franklin, TN. Awarded Certificate of Achievement.

Attended the Professional Training Course, *Noise Control and Low-noise Product Design*, October 25-26, 2001 in Portland, ME at Noise-Con 2001. Sponsored by The Institute of Noise Control Engineering of the USA. Awarded Certificate of Achievement.

Proficient in the Use and Application of Federal Highway Administration sanctioned *Traffic Noise Model* (TNM).

Certified as an Instructor in Visible Emissions Evaluation by Successful Completion of *Visible Emissions Evaluation Instructor's Course,* sponsored by USEPA, Research Triangle Park, NC, December 1990.

Developed and administered a professional education program at Rutgers University, Department of Environmental Sciences, New Brunswick, NJ.

Prepared grant proposals and contracts.

Developed professional education courses and associated teaching materials.

Operated air quality and acoustical field/laboratory analytical instrumentation and equipment.

Evaluated and designed emission capture, transport, and measurement/monitoring systems.

Supervised technical and non-technical personnel.

Teaching Experience

Professional Education Courses:

- Source Sampling for Pollutants (EPA 450)
- Odor Field Enforcement
- Visible Emissions Evaluation Certification/Recertification
- Analytical Methods for Air Quality Standards (EPA 464)
- Atmospheric Sampling (EPA 435)
- Control of Particulate Emissions (EPA 413)
- Control of Gaseous Emissions (EPA 415)
- Industrial Ventilation
- Continuous Emissions Monitoring (EPA 474)
- Principles and Practice of Air Pollution Control (EPA452)
- Air Sampling for Air Toxics

Undergraduate Courses:

- Air Sampling and Analysis (Rutgers University)
- Environmental Science I (Middlesex County College)

Associations, Awards, and Other Activities

Member, Institute of Noise Control Engineering, 2007-Present.

Air and Waste Management Association-member, Noise & Vibration Committee, 1992-1998. Certificate of Appreciation from American Industrial Hygiene Association, New Jersey Section, June 2000.

Faculty Advisor, Environmental Sciences Club, Rutgers University, 1997-2000.

Mid-Atlantic States Section of Air & Waste Association 42nd Annual Conference, Pre-conference workshop Co-Chairman, October 1996.

American Industrial Hygiene Student Chapter, Faculty Advisor, 1992-93, 1997-2000.

Conference Presentations and Lectures

Community Noise Control: Reviving a Moribund Program or Creating One Anew. Presented at International Code Council, 2013 Annual Conference in Atlantic City, NJ, September 30, 2013.

Modeling with CadnaA to estimate the probability of awakening associated with train horns. Presented at NoiseCon2010 (Institute of Noise Control Engineers and Acoustical Society of America Joint Conference) in Baltimore, MD, April 2010.

Status of Training at the Rutgers Area Training Center. Presented at the 5th Annual Air Pollution Training Contracts' Conference, December 2-5, 1997, Raleigh, NC, Invited.

Fundamentals of Air Sampling. Presented at the 42nd Mid-Atlantic States Section of the Air & Waste Management Association Pre-Conference Workshop, *Environmental Testing Issues Impacting Industries*, October 28, 1996, Invited.

Classroom Courses vs. Distant Learning Courses, Training Curriculum Development and the Status of Training at the Rutgers Area Training Center. Presented at the 4th Annual Air Pollution Training Contracts' Conference, September 25-27, 1996, in Raleigh, NC, Invited.

Publications

Szulecki, S., E. Zwerling, C. Anderson, B. Turpin, 2010. *Modeling with CadnaA to estimate the probability of awakening associated with train horns*. Proceedings of Noise-Con 2010. Institute of Noise Control Engineering.

Zwerling, E., C. Shamoon, S. Szulecki, 2010. *Proactive regulation engenders creative innovation: Quieting the Jackhammer*. Proceedings of Noise-Con 2010. Institute of Noise Control Engineering.

Evaluation of Visible Emissions - Professional Education Training Course, (Student Manual), 119 pages, Revised 2004, Robert Hague and Stephen Szulecki.

Odor Enforcement - Professional Education Training Course, (Student Manual), 47 pages, Revised 2008, Stephen Szulecki.

The Clean Air Act (CAA) and New Jersey, (Fact Sheet). B.Turpin, M. Achtau, S. Szulecki, L. Zussman and B. Motherwell. 1996. Rutgers Cooperative Extension Publication, Rutgers University, New Brunswick, NJ.

Critical Assessment of Methodologies for the Detection and Measurement of Odors in Ambient Air, 1995, 49 pages, Stephen Szulecki.

Air Sampling and Analysis Laboratory Manual, Manganelli, R.M., Szulecki, S.M., 1999.

ATTACHMENT 5

THE NOISE CONSULTANCY, LLC
309 VAN NESTE ROAD
FLEMINGTON, NEW JERSEY 08822

THENOISECONSULTANCY

(908)237-0298 ☛ noiseconsultancy@aol.com ☛ www.noiseconsultancy.com

SENT VIA EMAIL

June 6, 2018

Karrie A. Zeits
Sondee, Racine & Doren, PLC
310 W. Front Street, Suite 300
Traverse City, Michigan 49684

Re: Acoustical Study and Impact Analysis
Proposed Car Wash
Serra Automotive – Toyota Project
Traverse City, MI

Dear Ms. Zeits:

This letter is prepared as a summary of my preliminary findings from the field study completed, June 2, 2018, in connection with the above referenced matter. The letter is prepared for submission in connection with Serra's request to be on the Charter Township of Garfield Planning Commission's agenda for July 11, 2018. A full report will supplement these preliminary findings if requested, and I will be in attendance at the July 11, 2018, Planning Commission meeting to present my findings to the Township and answer any questions that the Planning Commission, the public, or Township staff may have.

As you know, I conducted an extensive acoustical study and impact analysis on-site in Garfield Township from Thursday May 31 through Saturday June 2.

I conducted ambient sound level measurements on Thursday, Friday and Saturday in both Garfield Township and Traverse City on either side of Boon Street, at locations that represent the closest residences in both jurisdictions to the proposed car wash.

Ambient sound level measurements in Garfield Township were conducted at a distance of 60.5 feet from the edge of the pavement of Boon Street, which is the approximately the same distance from the street as the adjacent residence in Garfield Township. This location accurately represents the sound level of vehicles on Boon Street and Garfield Avenue as received at that residence (see attached photos and satellite image)

I also conducted extensive sound level measurements of an existing car wash that utilizes the same equipment as will the proposed car wash. All measurements were conducted with a precision acoustical analyzer that is laboratory certified and field calibration checks were

performed throughout the measurement sessions with a laboratory-certified acoustical calibrator (see attached certificates).

I have appended to this letter data from two of the ambient measurement sessions I conducted on Friday and Saturday mornings, both as a time-history graph as well as the summary data sheet. These ambient sound level measurement sessions were each 10 minutes in duration.

Also appended is the data from measurements conducted at a distance of 129 feet from the exit of the car wash, which represents distance of the exit of the proposed car wash to the western property line of site abutting the closest residential property in Garfield Township. The duration of that logged measurement was 23 seconds.

Summary Findings

It was determined that if the car wash were operated with the exit door open while the blowers were operated the acoustical impact would be unacceptable. It was thereupon agreed that the blowers would not be operated with the exit door open.

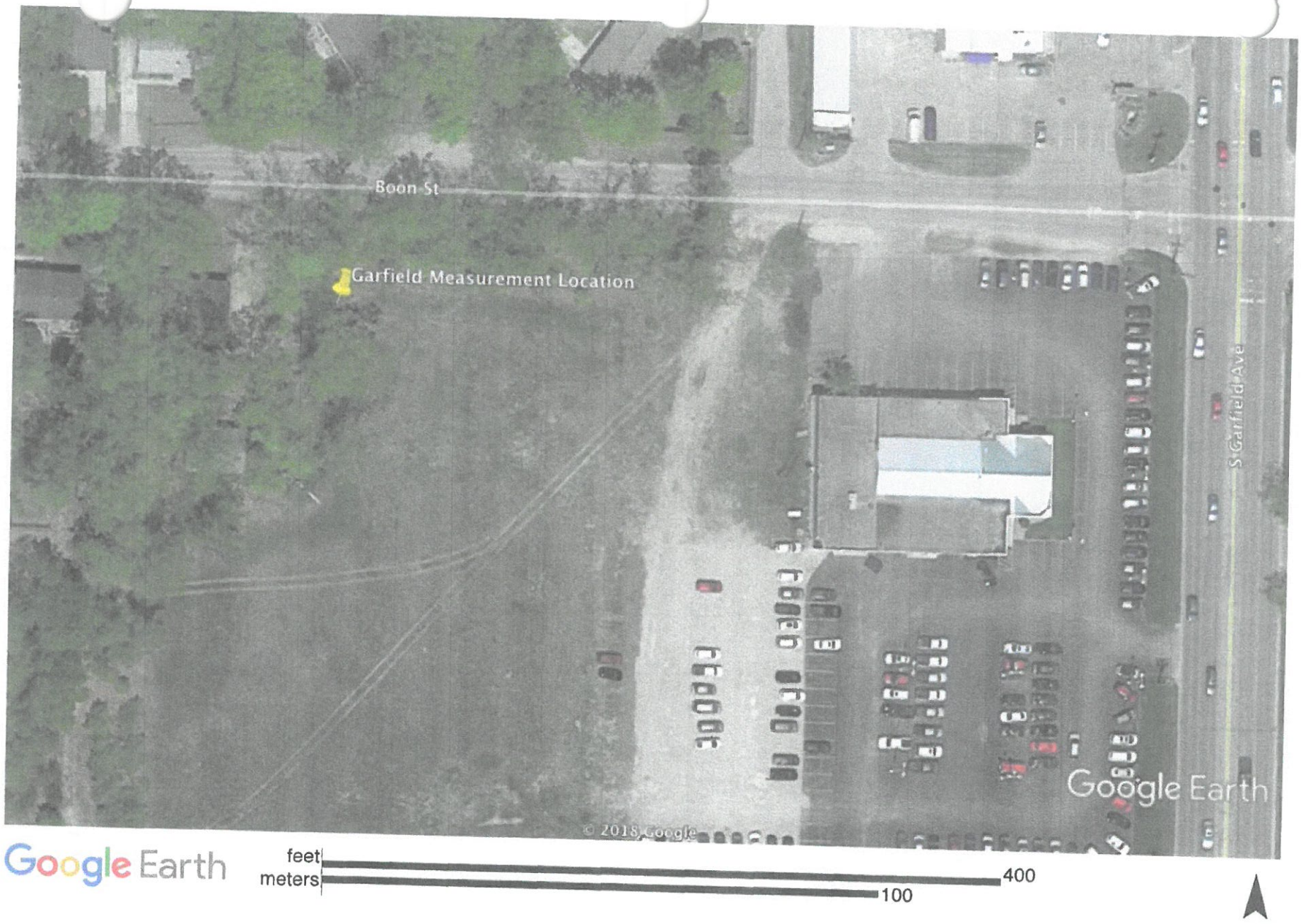
The sound level of the car wash, with the exit door closed and blowers operating, ranged from 56-58 dBA, measured at 129 feet. Vehicles on Boon Street and Garfield routinely equal or exceed these sound levels, and do so often several times per minute (see appended time history graphs). Boon and Garfield are both busy streets. Aircraft operations from the airport (not reported herein) significantly exceed the sound level of the proposed car wash.

While the sound emissions from the proposed car wash may occasionally be audible, when there are no other concurrent masking noise sources, the sound from the car wash will be less intense (sometimes significantly) than other common pre-existing noise sources at that location and they will occur significantly less frequently.

There will be no acoustical impact from the operation of the proposed car wash, if the blowers are not operated when the exit door is open.

Sincerely,

Eric M. Zwerling, M.S., INCE, ASA
President

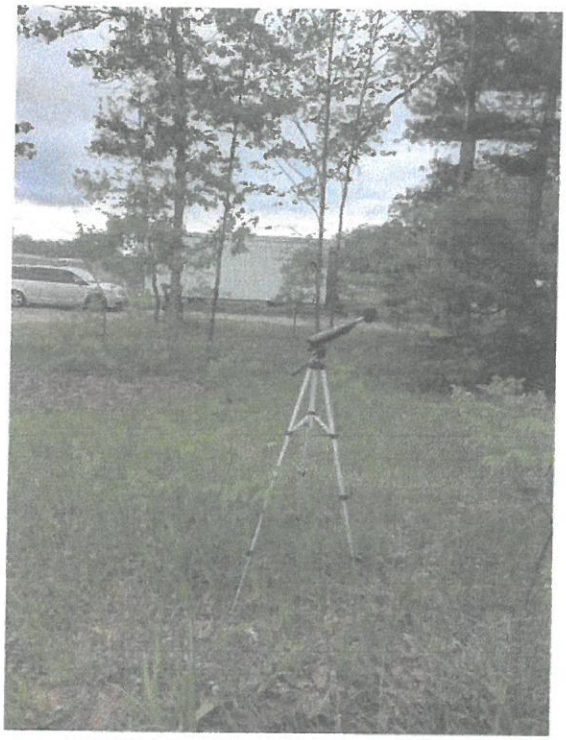


Google Earth

feet 400

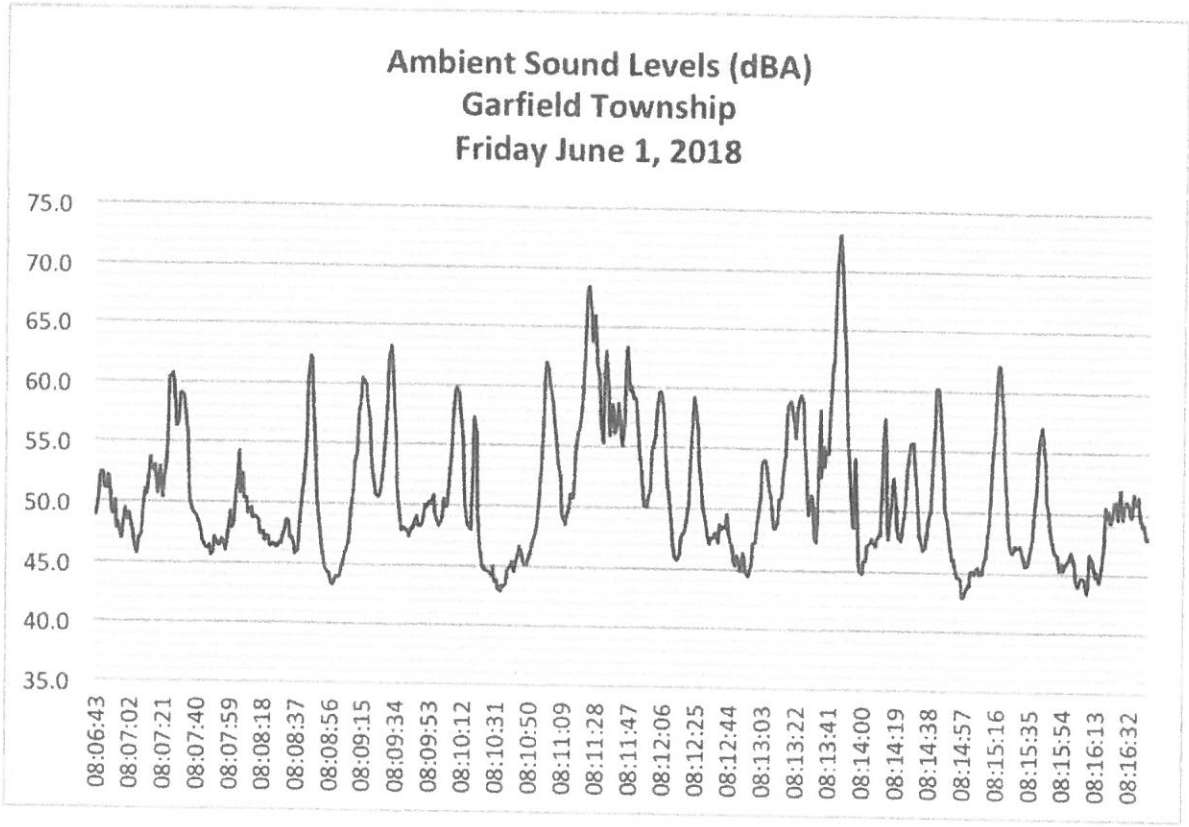
meters 100

GARFIELD TOWNSHIP AMBIENT SOUND LEVEL MEASUREMENT LOCATION



View of meter, looking west. Note that it is located approximately in the plane of the front of the adjacent residence in Garfield Township, 60.5 feet south of Boon Street.

View of meter looking east towards Garfield Ave.


Ambient Sound Levels (dBA)
Garfield Township
Friday June 1, 2018
75.0
70.0
65.0
60.0
55.0
50.0
45.0
40.0
35.0
08:06:43
08:07:02
08:07:21
08:07:40
08:07:59
08:08:18
08:08:37
08:08:56
08:09:15
08:09:34
08:09:53
08:10:12
08:10:31
08:10:50
08:11:09
08:11:28
08:11:47
08:12:06
08:12:25
08:12:44
08:13:03
08:13:22
08:13:41
08:14:00
08:14:19
08:14:38
08:14:57
08:15:16
08:15:35
08:15:54
08:16:13
08:16:32

General Information

Serial Number	02504
Model	Model 831
Firmware Version	2.314
Filename	831_Data.490
User	
Job Description	
Location	
Measurement Description	
Start Time	Friday, 2018 June 01 08:06:43
Stop Time	Friday, 2018 June 01 08:16:44
Duration	00:10:01.6
Run Time	00:10:00.5
Pause	00:00:01.1
Pre Calibration	Friday, 2018 June 01 07:43:58
Post Calibration	None
Calibration Deviation	---

Note

Overall Data

LAeq		55.8	dB
LASmax	2018 Jun 01 08:13:48	72.5	dB
LZpeak (max)	2018 Jun 01 08:11:49	91.4	dB
LASmin	2018 Jun 01 08:10:35	42.9	dB
LCeq		64.5	dB
LAeq		55.8	dB
LCeq - LAeq		8.7	dB
LAIeq		57.2	dB
LAeq		55.8	dB
LAIeq - LAeq		1.4	dB
Ldn		55.8	dB
LDay 07:00-22:00		55.8	dB
LNight 22:00-07:00		---	dB
Lden		55.8	dB
LDay 07:00-19:00		55.8	dB
Evening 19:00-22:00		---	dB
Night 22:00-07:00		---	dB
Overloads		83.6	dB
Overload Duration		0	
# OBA Overloads		0.0	s
OBA Overload Duration		0	
		0.0	s

Statistics

LAS1.00	67.4	dBA
LAS10.00	59.0	dBA
LAS33.30	52.2	dBA
LAS50.00	49.8	dBA
LAS66.60	47.9	dBA
LAS90.00	45.3	dBA
LAS > 65.0 dB (Exceedence Counts / Duration)	2 / 13.0	s
LAS > 85.0 dB (Exceedence Counts / Duration)	0 / 0.0	s
LZpeak > 135.0 dB (Exceedence Counts / Duration)	0 / 0.0	s
LZpeak > 137.0 dB (Exceedence Counts / Duration)	0 / 0.0	s
LZpeak > 140.0 dB (Exceedence Counts / Duration)	0 / 0.0	s

Settings

RMS Weight	A Weighting	
Peak Weight	Z Weighting	
Detector	Slow	
Preamp	PRM831	
Microphone Correction	Off	
Integration Method	Linear	
OBA Range	Low	
OBA Bandwidth	1/1 and 1/3	
OBA Freq. Weighting	Z Weighting	
OBA Max Spectrum	Bin Max	
Gain	+0	dB
Under Range Limit	25.8	dB
Under Range Peak	76.8	dB
Noise Floor	16.7	dB
Overload	142.4	dB

1/1 Spectra

Freq. (Hz):	8.0	16.0	31.5	63.0	125	250	500	1k	2k	4k	8k	16k
LZeq	59.4	58.8	59.0	59.6	60.6	49.3	50.1	52.3	49.3	40.5	31.4	18.5
LZSmax	75.8	73.1	76.2	71.0	75.5	61.9	64.4	68.0	68.1	59.7	50.4	36.1
LZSmin	44.4	48.5	50.7	51.9	49.5	38.3	38.7	37.8	32.3	28.7	16.5	11.7

1/3 Spectra

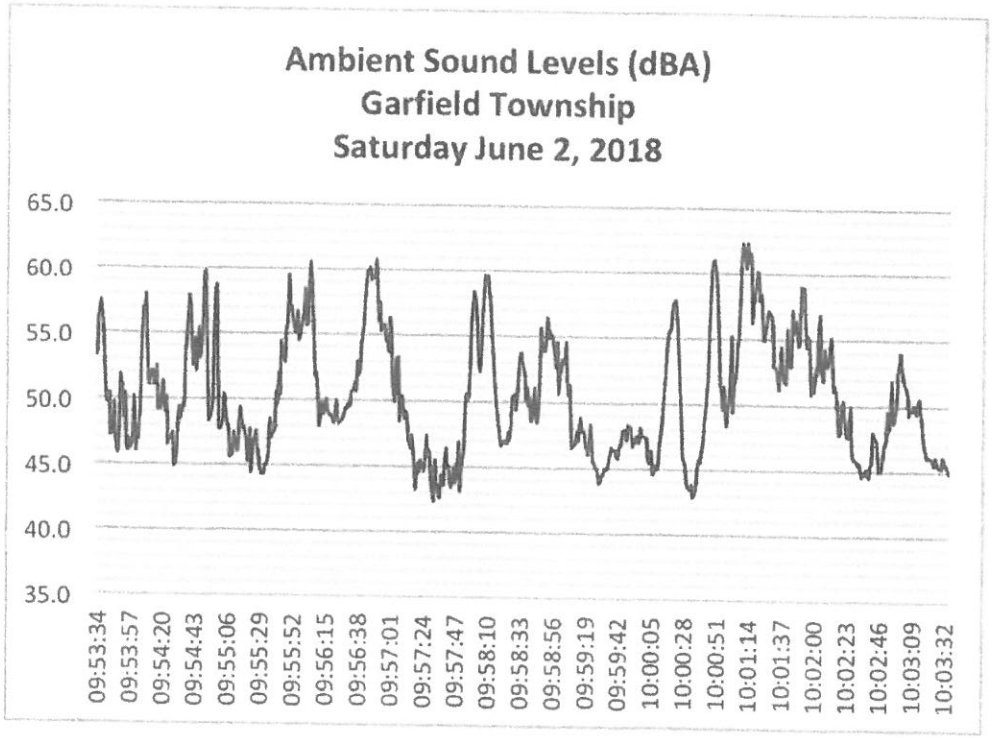
Freq. (Hz):	6.3	8.0	10.0	12.5	16.0	20.0	25.0	31.5	40.0	50.0	63.0	80.0
LZeq	55.9	53.3	54.2	55.0	54.0	52.7	56.1	53.7	52.4	53.6	53.7	56.5
LZSmax	72.8	69.9	69.1	68.4	69.2	67.2	75.8	65.6	62.7	69.5	64.6	70.8
LZSmin	35.3	37.5	39.0	41.9	42.1	42.2	46.1	45.4	45.5	44.7	45.9	45.7

Freq. (Hz):	100	125	160	200	250	315	400	500	630	800	1k	1.25k
LZeq	56.4	57.9	49.7	45.6	44.2	43.4	45.3	44.5	46.1	47.9	47.8	46.6
LZSmax	70.4	75.1	62.4	59.6	58.3	57.9	61.6	59.5	62.8	63.9	63.1	64.5
LZSmin	44.3	43.1	38.1	33.4	31.6	32.5	33.5	33.9	33.6	33.6	33.3	31.0

Freq. (Hz):	1.6k	2k	2.5k	3.15k	4k	5k	6.3k	8k	10k	12.5k	16k	20k
LZeq	46.0	44.3	42.7	38.1	34.3	31.9	29.6	25.7	19.9	16.5	12.4	9.0
LZSmax	63.9	62.9	63.3	57.6	52.7	51.1	48.1	45.6	38.6	34.8	29.2	21.8
LZSmin	29.0	26.9	24.4	24.3	24.5	21.7	13.8	10.8	8.0	7.0	6.8	7.1

Calibration History

Preamp	Date	dB re. 1V/Pa
PRM831	01 Jun 2018 07:43:58	-24.8
PRM831	31 May 2018 19:09:57	-24.9
PRM831	31 May 2018 18:11:11	-24.9
PRM831	30 May 2018 18:29:55	-24.9
PRM831	30 May 2018 18:29:35	-25.0
PRM831	05 May 2018 10:58:30	-25.4
PRM831	05 May 2018 09:44:38	-25.4
PRM831	05 May 2018 05:09:08	-25.5
PRM831	05 May 2018 05:08:52	-25.5
PRM831	24 Apr 2018 09:52:56	-25.1
PRM831	24 Apr 2018 09:04:38	-25.0


Ambient Sound Levels (dBA)
Garfield Township
Saturday June 2, 2018
65.0
60.0
55.0
50.0
45.0
40.0
35.0
09:53:34
09:53:57
09:54:20
09:54:43
09:55:06
09:55:29
09:55:52
09:56:15
09:56:38
09:57:01
09:57:24
09:57:47
09:58:10
09:58:33
09:58:56
09:59:19
09:59:42
10:00:05
10:00:28
10:00:51
10:01:14
10:01:37
10:02:00
10:02:23
10:02:46
10:03:09
10:03:32

General Information

rial Number	02504
el	Model 831
mware Version	2.314
ilename	831_Data.515
User	
Job Description	
Location	
Measurement Description	
Start Time	Saturday, 2018 June 02 09:53:34
Stop Time	Saturday, 2018 June 02 10:03:38
Duration	00:10:03.2
Run Time	00:10:01.5
Pause	00:00:01.7
Pre Calibration	Saturday, 2018 June 02 09:51:38
Post Calibration	None
Calibration Deviation	---

Note

Overall Data

LAeq		53.1	dB
LASmax	2018 Jun 02 10:01:12	62.5	dB
LZpeak (max)	2018 Jun 02 09:54:48	88.7	dB
LASmin	2018 Jun 02 09:57:38	42.6	dB
LCeq		67.4	dB
LAeq		53.1	dB
LCeq - LAeq		14.3	dB
LAIeq		54.5	dB
LAeq		53.1	dB
LAIeq - LAeq		1.4	dB
Ldn		53.1	dB
LDay 07:00-22:00		53.1	dB
LNight 22:00-07:00		---	dB
Lden		53.1	dB
LDay 07:00-19:00		53.1	dB
ening 19:00-22:00		---	dB
ht 22:00-07:00		---	dB
# Overloads		80.9	dB
Overload Duration		0	
# OBA Overloads		0.0	s
OBA Overload Duration		0	
		0.0	s

Statistics

LAS1.00	60.9	dBA
LAS10.00	57.0	dBA
LAS33.30	52.6	dBA
LAS50.00	49.8	dBA
LAS66.60	47.7	dBA
LAS90.00	45.3	dBA
LAS > 65.0 dB (Exceedence Counts / Duration)	0 / 0.0	s
LAS > 85.0 dB (Exceedence Counts / Duration)	0 / 0.0	s
LZpeak > 135.0 dB (Exceedence Counts / Duration)	0 / 0.0	s
LZpeak > 137.0 dB (Exceedence Counts / Duration)	0 / 0.0	s
LZpeak > 140.0 dB (Exceedence Counts / Duration)	0 / 0.0	s

Settings

RMS Weight	A Weighting	
Peak Weight	Z Weighting	
Detector	Slow	
Preamp	PRM831	
Microphone Correction	Off	
Integration Method	Linear	
OBA Range	Low	
OBA Bandwidth	1/1 and 1/3	
OBA Freq. Weighting	Z Weighting	
OBA Max Spectrum	Bin Max	
Gain	+0	dB
Under Range Limit	25.8	dB
Under Range Peak	76.9	dB
ise Floor	16.7	dB
load	142.5	dB

1/1 Spectra

Freq. (Hz):	8.0	16.0	31.5	63.0	125	250	500	1k	2k	4k	8k	16k
Leq	55.0	54.5	56.6	66.8	59.3	50.7	50.2	47.8	43.1	39.5	30.6	21.0
LZSmax	72.0	66.8	66.4	77.7	70.2	63.2	63.8	58.6	54.2	47.5	41.2	39.5
LZSmin	42.1	47.8	50.3	51.1	46.9	36.7	37.1	37.2	30.9	31.0	20.5	12.5

1/3 Spectra

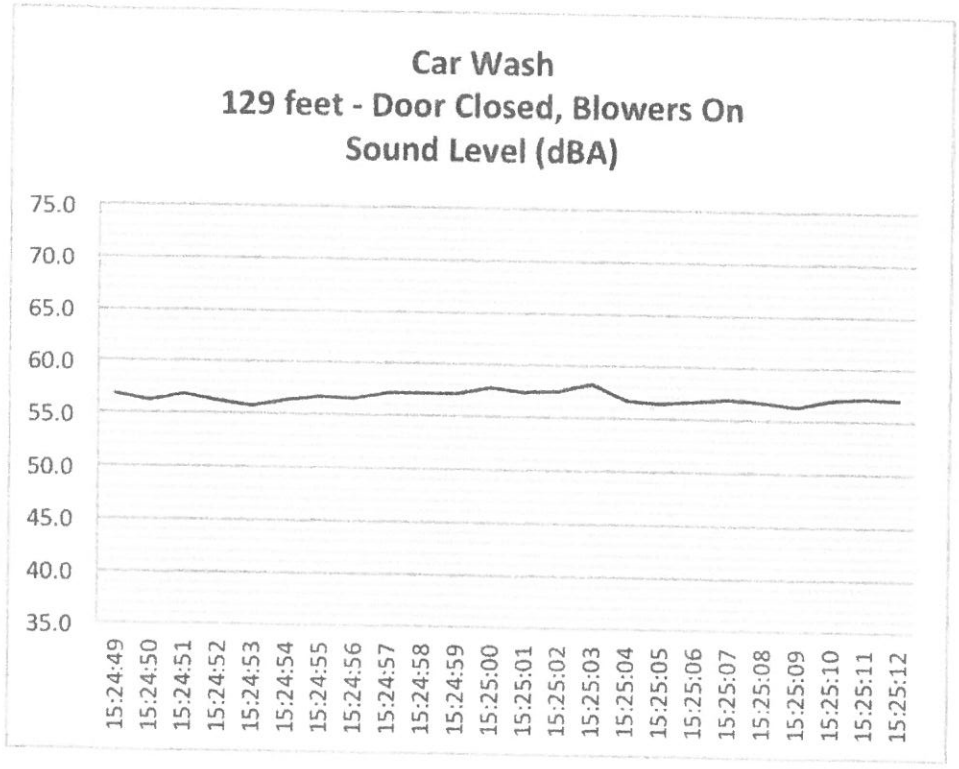
Freq. (Hz):	6.3	8.0	10.0	12.5	16.0	20.0	25.0	31.5	40.0	50.0	63.0	80.0
LZeq	51.6	49.7	49.2	50.6	49.9	48.4	51.2	52.1	52.4	52.1	55.5	66.3
LZSmax	68.9	66.7	65.9	61.8	64.1	58.6	58.6	65.6	62.0	63.7	70.0	77.6
LZSmin	32.9	32.6	38.6	40.4	41.1	40.7	44.3	43.2	44.4	43.8	45.6	44.3

Freq. (Hz):	100	125	160	200	250	315	400	500	630	800	1k	1.25k
LZeq	55.6	51.9	53.2	44.5	46.0	46.2	46.2	45.6	43.9	43.8	43.5	41.4
LZSmax	69.4	66.3	65.1	61.6	58.3	61.0	61.3	59.3	54.9	54.4	54.9	52.3
LZSmin	43.9	41.4	36.5	31.5	29.5	30.3	31.2	32.3	32.7	33.1	32.7	29.7

Freq. (Hz):	1.6k	2k	2.5k	3.15k	4k	5k	6.3k	8k	10k	12.5k	16k	20k
LZeq	40.4	38.2	34.9	32.1	29.6	38.0	25.7	21.2	20.1	18.0	16.8	11.0
LZSmax	52.1	49.2	46.1	45.7	42.3	47.3	36.7	36.3	36.2	36.8	35.0	26.9
LZSmin	28.0	25.4	22.8	21.9	20.0	27.5	15.5	9.3	9.2	7.1	8.4	7.5

Calibration History

Preamp	Date	dB re. 1V/Pa
PRM831	02 Jun 2018 09:51:38	-24.9
PRM831	02 Jun 2018 08:56:34	-25.0
PRM831	02 Jun 2018 08:10:44	-24.9
PRM831	01 Jun 2018 16:25:03	-25.0
PRM831	01 Jun 2018 15:55:27	-25.1
PRM831	01 Jun 2018 14:31:29	-25.2
PRM831	01 Jun 2018 13:19:52	-24.9
PRM831	01 Jun 2018 11:14:14	-25.0
PRM831	01 Jun 2018 10:35:34	-24.9
PRM831	01 Jun 2018 08:34:37	-25.0
PRM831	01 Jun 2018 07:43:58	-24.8


Car Wash
129 feet - Door Closed, Blowers On
Sound Level (dBA)
75.0
70.0
65.0
60.0
55.0
50.0
45.0
40.0
35.0
15:24:49
15:24:50
15:24:51
15:24:52
15:24:53
15:24:54
15:24:55
15:24:56
15:24:57
15:24:58
15:24:59
15:25:00
15:25:01
15:25:02
15:25:03
15:25:04
15:25:05
15:25:06
15:25:07
15:25:08
15:25:09
15:25:10
15:25:11
15:25:12

General Information

Serial Number	02504
Model	Model 831
Firmware Version	2.314
Filename	831_Data.508
User	
Job Description	
Location	
Measurement Description	
Start Time	Friday, 2018 June 01 15:24:49
Stop Time	Friday, 2018 June 01 15:25:14
Duration	00:00:24.7
Run Time	00:00:23.1
Pause	00:00:01.6
Pre Calibration	Friday, 2018 June 01 14:31:29
Post Calibration	None
Calibration Deviation	---

Note

Overall Data

LAeq		56.9	dB
LASmax	2018 Jun 01 15:25:04	58.4	dB
LZpeak (max)	2018 Jun 01 15:24:57	101.8	dB
LASmin	2018 Jun 01 15:24:54	55.9	dB
LCeq		68.9	dB
LAeq		56.9	dB
LCeq - LAeq		12.0	dB
LAIeq		58.3	dB
LAeq		56.9	dB
LAIeq - LAeq		1.4	dB
Ldn		56.9	dB
LDay 07:00-22:00		56.9	dB
LNight 22:00-07:00		---	dB
Lden		56.9	dB
LDay 07:00-19:00		56.9	dB
Evening 19:00-22:00		---	dB
Night 22:00-07:00		---	dB
Overloads		70.5	dB
Overload Duration		0	
# OBA Overloads		0.0	s
OBA Overload Duration		0	
		0.0	s

Statistics

LAS1.00	58.1	dBA
LAS10.00	57.5	dBA
LAS33.30	57.1	dBA
LAS50.00	56.8	dBA
LAS66.60	56.7	dBA
LAS90.00	56.3	dBA

LAS > 65.0 dB (Exceedence Counts / Duration)	0 / 0.0	s
LAS > 85.0 dB (Exceedence Counts / Duration)	0 / 0.0	s
LZpeak > 135.0 dB (Exceedence Counts / Duration)	0 / 0.0	s
LZpeak > 137.0 dB (Exceedence Counts / Duration)	0 / 0.0	s
LZpeak > 140.0 dB (Exceedence Counts / Duration)	0 / 0.0	s

Settings

RMS Weight	A Weighting	
Peak Weight	Z Weighting	
Detector	Slow	
Preamp	PRM831	
Microphone Correction	Off	
Integration Method	Linear	
OBA Range	Low	
OBA Bandwidth	1/1 and 1/3	
OBA Freq. Weighting	Z Weighting	
OBA Max Spectrum	Bin Max	
Gain	+0	dB
Under Range Limit	25.9	dB
Under Range Peak	77.2	dB
Noise Floor	16.8	dB
Overload	142.7	dB

1/1 Spectra

Freq. (Hz):	8.0	16.0	31.5	63.0	125	250	500	1k	2k	4k	8k	16k
LZeq	75.5	69.1	66.1	62.3	60.9	59.7	56.8	48.9	43.8	36.6	26.9	15.8
LZSmax	81.9	77.1	70.0	63.8	62.6	60.7	59.4	51.0	46.5	41.7	31.2	18.9
LZSmin	64.8	57.0	63.3	60.7	59.2	58.8	55.4	47.9	42.4	35.1	25.0	14.2

1/3 Spectra

Freq. (Hz):	6.3	8.0	10.0	12.5	16.0	20.0	25.0	31.5	40.0	50.0	63.0	80.0
LZeq	72.2	69.5	68.8	66.1	65.5	61.2	62.4	61.7	58.7	58.0	58.4	55.8
LZSmax	78.1	75.8	75.8	73.3	74.0	67.5	67.4	64.3	62.8	61.4	60.2	59.2
LZSmin	62.7	60.1	54.7	52.5	51.8	51.4	57.8	58.9	55.8	55.5	56.4	53.8

Freq. (Hz):	100	125	160	200	250	315	400	500	630	800	1k	1.25k
LZeq	54.7	56.0	57.2	55.9	55.5	53.7	52.8	52.6	49.8	46.5	43.1	40.3
LZSmax	56.7	59.0	58.5	57.5	57.5	55.5	54.9	53.8	51.9	48.8	44.5	43.2
LZSmin	53.1	52.8	55.9	54.4	54.0	52.2	51.2	50.6	47.6	45.1	42.2	38.8

Freq. (Hz):	1.6k	2k	2.5k	3.15k	4k	5k	6.3k	8k	10k	12.5k	16k	20k
LZeq	39.7	39.5	37.5	33.9	31.5	28.2	24.5	21.8	16.8	12.9	10.0	9.2
LZSmax	41.5	42.6	40.7	37.9	37.8	31.9	29.0	25.0	19.5	16.8	12.9	12.7
LZSmin	38.7	37.6	35.8	32.4	29.5	26.7	22.6	19.7	14.7	10.5	8.5	7.9

Calibration History

Preamp	Date	dB re. 1V/Pa
PRM831	01 Jun 2018 14:31:29	-25.2
PRM831	01 Jun 2018 13:19:52	-24.9
PRM831	01 Jun 2018 11:14:14	-25.0
PRM831	01 Jun 2018 10:35:34	-24.9
PRM831	01 Jun 2018 08:34:37	-25.0
PRM831	01 Jun 2018 07:43:58	-24.8
PRM831	31 May 2018 19:09:57	-24.9
PRM831	31 May 2018 18:11:11	-24.9
PRM831	30 May 2018 18:29:55	-24.9
PRM831	30 May 2018 18:29:35	-25.0
PRM831	05 May 2018 10:58:30	-25.4

Calibration Certificate

Certificate Number 2018002601
Customer:
The Noise Consultancy LLC
309 Van Nest Road
Flemmington, NJ 08822, United States

Model Number	831
Serial Number	0002504
Test Results	**Pass**
Initial Condition	AS RECEIVED same as shipped
Description	Larson Davis Model 831 Class 1 Sound Level Meter Firmware Revision: 2.314

Procedure Number	D0001.8384		
Technician	Ron Harris		
Calibration Date	12 Mar 2018		
Calibration Due	12 Mar 2019		
Temperature	23.53	°C	± 0.25 °C
Humidity	50.1	%RH	± 2.0 %RH
Static Pressure	86.74	kPa	± 0.13 kPa

Evaluation Method ***Tested with:***

Larson Davis PRM831, S/N 019078
PCB 377B02, S/N 115996
Larson Davis CAL200, S/N 9079
Larson Davis CAL291, S/N 0203

Data reported in dB re 20 µPa.

Compliance Standards Compliant to Manufacturer Specifications and the following standards when combined with Calibration Certificate from procedure D0001.8378:

IEC 60651:2001 Type 1	ANSI S1.4-2014 Class 1
IEC 60804:2000 Type 1	ANSI S1.4 (R2006) Type 1
IEC 61252:2002	ANSI S1.11 (R2009) Class 1
IEC 61260:2001 Class 1	ANSI S1.25 (R2007)
IEC 61672:2013 Class 1	ANSI S1.43 (R2007) Type 1

Issuing lab certifies that the instrument described above meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). It has been calibrated using measurement standards traceable to the International System of Units (SI) through the National Institute of Standards and Technology (NIST), or other national measurement institutes, and meets the requirements of ISO/IEC 17025:2005.
Test points marked with a ‡ in the uncertainties column do not fall within this laboratory's scope of accreditation.

The quality system is registered to ISO 9001:2008

This calibration is a direct comparison of the unit under test to the listed reference standards and did not involve any sampling plans to complete. No allowance has been made for the instability of the test device due to use, time, etc. Such allowances would be made by the customer as needed

The uncertainties were computed in accordance with the ISO Guide to the Expression of Uncertainty in Measurement (GUM). A coverage factor of approximately 2 sigma (k=2) has been applied to the standard uncertainty to express the expanded uncertainty at approximately 95% confidence level.

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Correction data from Larson Davis Model 831 Sound Level Meter Manual, I831.01 Rev O, 2016-09-19

For 1/4" microphones, the Larson Davis ADP024 1/4" to 1/2" adaptor is used with the calibrators and the Larson Davis ADP043 1/4" to

CASELLA CEL

Certificate of Conformity and Calibration

Instrument Model: CEL-120/2 Acoustic Calibrator **Certificate #:** 68279
Serial Number: 2651663

Calibration References:

Casella CEL hereby certifies that the above listed sound measuring instrument has been tested according to the manufacturer's specifications and meets the requirements of the relevant American National Standards Institute (ANSI) Standard for Sound Calibrators S1.40 - 1983 (R1997). This instrument was calibrated against standards which are either traceable to the National Institute of Standards and Technology (NIST) or they have been derived by approved ratio techniques.

Test Conditions:

22.5 °C		Date of Issue:-	October 25, 2017
71.9 %RH		Due Date:-	October 25, 2018
1006.1 mBar		Service Engineer:-	Ken Umbeer

Declaration of conformity:-

This test certificate confirms that the instrument specified above has been successfully tested to comply with the manufacturer's published specifications. Tests are performed using equipment traceable to national standards. This product is certified as being compliant to the requirements of the CE Directive. Test accuracy ratio (TAR) ≥1.

Summary:

The data represents the response of the sound level meter calibrator to the reference source corrected for atmospheric conditions at the time of calibration.

	Nominal Value	Tolerance	As Received	As Adjusted
Frequency (Hz)	1000.0	±5.0	1000.0	1000.0
Level (dB)	114.0	±0.3	114.0	114.0

Standards Used in Calibration:		Serial Number	Calibration Due Date	Certificate Number
Sound Level Meter:	CEL-620.A1	5130002	1/30/2018	27299-2
Multimeter:	Fluke 45	4995184	1/27/2018	1447789

Casella CEL
415 Lawrence Bell Dr.
Unit #4
Buffalo, NY 14221
U.S.A.
Toll Free: +1 (800) 366 2966
Fax +1 (716) 276 3043
E-mail: info@casellaUSA.com
Web: www.casellaUSA.com

Casella CEL (U.K.)
Regent House
Wolseley Road
Kempston
Bedford
MK42 7JY
Phone: +44 (0) 1234 844100
Fax:- +44(0) 1234 841490
E-mail: info@casellacel.com
Web: www.casellacel.com

Casella España S.A.
Polígono Európolis
Calle C, nº4B
28230 Las Rozas - Madrid
Phone: + 34 91 640 75 19
Fax:- + 34 91 636 01 96
E-mail: online@casella-es.com
Web: www.casella-es.com

Casella China (中国)
地址
北京[illegible]广场W1座911室
邮编: 100738
电话: 0086 10 85183141
传真: 0086 10 85183143
电子邮件:
info@casellameasurement.cn
网址: www.casellachina.cn

ERIC M. ZWERLING, M.S., INCE, ASA

Rutgers University Noise Technical Assistance Center
14 College Farm Road
New Brunswick, NJ 08901

The Noise Consultancy, LLC
309 Van Neste Rd
Flemington, NJ 08822

CURRENT POSITIONS

1991-Present *Director* - Noise Technical Assistance Center
Department of Environmental Sciences
Rutgers - The State University of New Jersey

1999-Present *President* - The Noise Consultancy, LLC
Noise Consultant/ Expert Witness (Since 1992)
[Expert for the Defendants, City of New York Law Department
-in- Robert Turley, *et al.*, - against- Rudolph Guiliani, *et al.*,]

1993-Present *Noise Enforcement Expert* - New Jersey Department of Environmental Protection. Contracted (as Director of the RNTAC) to provide technical expertise on noise related issues to the NJDEP and the State of New Jersey

1998-Present *Instructor* - "Noise Hazards" in 'Fundamentals of Industrial Hygiene'. University of Medicine and Dentistry of New Jersey , School of Public Health, Office of Public Health Practice

1998-Present Committee Member - S12 Working Group 41, Model Community Noise Ordinances. Acoustical Society of America

2001-Present Committee Member - Technical Study Group on Community Noise
Institute of Noise Control Engineering

1994-Present *Instructor* - "Community Noise" in 'Environment and Public Health Course," Rutgers Continuing Education Program, Cook College Office of Continuing Professional Education.

1992-2005 *Adjunct Professor*- Rutgers University Department of Environmental Sciences. Course: 375:336 'Community and Occupational Noise'

1998-2000 Commissioner - Franklin Township (NJ) Environmental Commission

2010-Present Board of Education, Chair – Green Committee
Readington Township, New Jersey

2017-Present Chair – Subcommittee
New Jersey State Noise Code NJAC 7:29 - Amendments
New Jersey Noise Control Council
New Jersey Department of Environmental Protection

PROFESSIONAL AFFILIATIONS

Member - Acoustical Society of America
Member – Institute of Noise Control Engineering

EDUCATION

ABD Ph.D. Candidate
Rutgers - the State University of New Jersey
Department of Environmental Sciences

Occupational Hearing Conservationist
Council for Accreditation in Occupational Hearing Conservation.

Graduate Certificate in Environmental Ethics -
Department of Philosophy, University of Georgia.

B.S., M.S. University of Georgia.

JURISDICTIONAL CERTIFICATIONS

Approved Noise Control Investigator
New Jersey Department of Environmental Protection
Pursuant to N.J.A.C. 7:29 -2.11(a)3

Approved Noise Consultant
New York City Department of Environmental Protection
Pursuant to N.Y.C.A.C. Section 24-231

Approved Instructor
State of Michigan
Department of Licensing and Regulatory Affairs
Bureau of Construction Codes

AWARDS

1997 *Advisor of the Year Award*
Rutgers College Student Activities Advisory Council
Faculty Advisor - Students for Environmental Awareness

2016 *Sustainable Raritan Award*
Outstanding Achievement in Public Education
Sustainable Raritan River Collaborative and Rutgers' Sustainable Raritan River Initiative

PUBLICATIONS

Zwerling, E.M. 2015. Proposed Noise Standard for Wind Turbine Generators on Farms. State Agriculture Development Committee, New Jersey Department of Agriculture.

Zwerling, E.M, A. Myers, C. Shamoon. 2012. Analysis of the "Plainly Audible" Standard for Noise Ordinances. Proceedings of Inter- Noise 2012. Institute of Noise Control Engineering.

Zwerling, E.M., C. Shamoon. 2010. Proactive Regulation Engenders Creative Innovation - Quieting the Jackhammer. Proceedings of Noise-Con 2010. Institute of Noise Control Engineering.

Szulecki, S., E. Zwerling, C. Anderson, B. Turpin. 2010. Modeling with CadnaA to estimate the probability of awakening associated with train horns. Proceedings of Noise-Con 2010. Institute of Noise Control Engineering.

Zwerling, E.M., C. Anderson, S. Szulecki, F. Maimone, B. Turpin. 2009. Study of Train Noise in Teaneck, NJ. USEPA Agreement Number: X-83245701-0

Zwerling, E.M. 2005. Regulatory Scheme For Noise Enforcement In New Jersey . *Invited paper.* Journal of the Acoustical Society of America.V.118, No. 3, Pt 2 of 2, Sept. 2005, p. 1849.

Zwerling, E.M. 2004. Training as a Critical Component of Successful Noise Enforcement Programs. *Invited paper.* Journal of the Acoustical Society of America.V.115, No. 5, Pt 2 of 2, May 2004, p. 2568.

Zwerling, E.M. 2004. Noise Enforcement in Cities. *Invited paper.* Journal of the Acoustical Society of America.V.115, No. 5, Pt 2 of 2, May 2004, p. 2593.

Zwerling, E.M. 2002. Characteristics of Successful Local Noise Enforcement Programs. *Invited paper.* Journal of the Acoustical Society of America.V.112, No. 5, Pt 2 of 2, Nov. 2002, p. 2375.

Zwerling, E.M. 2002. Boom Car and Boom Box Code Drafting. The Quiet Zone. Spring 2002.

Zwerling, E.M. 2002. Hearing Protection. In *Encyclopedia of Public Health,* ed. Lester Breslow. Macmillan Reference USA.

Zwerling, E.M. 2001. Vehicle Enforcement. Rutgers Noise Technical Assistance Center. Developed for North Salem, NY

Zwerling, E.M. 2000. Regulation of Amplified Sound Sources. Proceedings of Noise-Con 2000. Acoustical Society of America / Institute of Noise Control Engineering. Newport Beach , CA. December 3-5, 2000 .

Zwerling, E.M. 2000. State of Michigan Model Noise Ordinance. Proceedings of Michigan Municipal League Annual Convention/ Michigan Association of Municipal Attorneys Annual Meeting. September 28-30, 2000 , Macinac Island , MI .

Zwerling, E. M. Contributing Editor. 1991-Present. Community Noise Enforcement. Rutgers Noise Technical Assistance Center.

Zwerling, E. M. Contributing Editor. 1998. Vehicle Sound Reproduction Enforcement. Rutgers Noise Technical Assistance Center. Developed for the City of Rochester, New York

Zwerling, E.M. 1997. Community Noise Enforcement: A Mature Technology. Hearing Rehabilitation Quarterly. 22:4, 4-8+.

Zwerling, E.M., D. Pinto, P. Hanna, J. Lepis, B. Turpin. 1997. Local Noise Enforcement Options and Model Noise Ordinance *With Pre-Approved Language for the State of New Jersey* . Rutgers Cooperative Extension Publication #E215.

Zwerling, E.M. 1997. Community Noise Infosheet. Environmental and Occupational Health Sciences Institute. Public Education and Risk Communication Division.

Zwerling, E.M. 1996. Turning Down the Volume: Effective Strategies for Community Noise Enforcement. The Police Chief. V. 63, Dec. 53-59.

Zwerling, E. M. & B. J. Turpin. 1996. Community Noise Enforcement: Reviving a Moribund Program or Developing One Anew. Proceedings of Noise-Con 96, The 1996 National Conference on Noise Control Engineering. 955-960.

Zwerling, E.M. 1996. Community Noise Pollution Certification and Assistance. Home page for Rutgers Noise Technical Assistance Center. http://www.envsci.rutgers.edu/org/rntac/

RESEARCH PROJECTS (at Rutgers University, as P.I. or Co-P.I.)

"Assistance Regarding Noise Standards for Wind Turbines on Farms," Granting Agency: New Jersey State Agricultural Development Commission (SADC), 2011 - 2015.

"Assistance Regarding Noise Standards for Photovoltaic Installations on Farms," for New Jersey State Agricultural Development Commission (SADC), 2010.

"Railroad Noise in Teaneck, New Jersey" Granting Agency: United States Environmental Protection Agency, 2005 - 2009.

"Road Noise Educational Outreach Program," Granting Agency: New Jersey Department of Transportation, 2002.

CONFERENCE PRESENTATIONS

Community Noise Control: Reviving a Moribund Program or Creating One Anew. International Code Council 2013 Conference. Atlantic City, NJ. September 30, 2013.

Emerging Noise Issues: Emergency Generators and Beach Bars. *Invited Presentation.* New Jersey Environmental Health Association Annual Public Health Conference. Atlantic City , NJ March 5, 2013.

Must we regulate civility? Yes, unfortunately. But, is it effective? *Invited lecture.* stillspotting ( ) nyc . Guggenheim Museum. New York City. October 9, 2012.

Analysis of the "Plainly Audible" Standard for Noise Ordinances. Proceedings of Inter- Noise 2012. Institute of Noise Control Engineering. August 22, 2012.

Proactive Regulation Engenders Creative Innovation - Quieting the Jackhammer. *Invited Paper.* Proceedings of Noise-Con 2010. Institute of Noise Control Engineering. Baltimore, MD, April 20, 2010.

Environmental Health and Noise: Issues and Answers. *Invited Presentation.* New Jersey Environmental Health Association Annual Public Health Conference. Atlantic City , NJ March 3, 2008.

Noise Primer For Legal Professionals. *Invited Presentation.* New York State Bar Association Environmental Law Section Fall Meeting. Saratoga Springs , New York . October 13, 2007.

How to Control Noise Pollution in Your Community. *Invited Presentation.* 90th Annual Conference - New Jersey State League of Municipalities. Atlantic City , NJ November 15, 2005.

Regulatory Scheme for Noise Enforcement in New Jersey . *Invited Paper.* 150th Meeting - Acoustical Society of America . Minneapolis , MN October 17-21, 2005.

Noise Enforcement in Cities. *Invited Paper.* 147th Meeting - Acoustical Society of America . New York , New York May 24-28, 2004.

Training as a Critical Component of Successful Noise Enforcement Programs. *Invited Paper.* 147th Meeting - Acoustical Society of America . New York , New York May 24-28, 2004.

Community Noise Impacts. *Invited Presentation.* Topics in Public Health. New Jersey Department of Health and Senior Services. April 16, 2003.

Characteristics of Successful Local Noise Enforcement Programs. *Invited Paper.* First Pan-American/Iberian Meeting on Acoustics. Jointly Sponsored: Acoustical Society of America , the Iberoamerican Federation of Acoustics and the Mexican Institute of Acoustics. Cancun , Mexico .Dec 2-6, 2002.

Community-Based Environmental Noise Management, *Invited Panelist;* The Role of State and Local Governmental Agencies in Noise Abatement and Control, *Invited Panelist.* Inter-Noise 2002, The 2002 International Congress and Exposition on Noise Control Engineering. Dearborn , MI Aug. 19-21, 2002.

Community Noise Regulation and Enforcement: Theory and Practice. American Association of Code Enforcement. 4th Semi-Annual Education Conference. Bowie , MD. May 1-3, 2002.

Regulation of Amplified Sound Sources. Noise-Con 2000. Acoustical Society of America/Institute of Noise Control Engineering. Newport Beach , CA. December 3-5, 2000.

Writing and Enforcing a Noise Ordinance. Michigan Municipal League Annual Convention.
Nuts and Bolts of Writing a Noise Ordinance. Michigan Association of Municipal Attorneys Annual Conference. Macinac Island , MI , September 28-30, 2000.

Municipal Noise Regulation - Theory and Practice. International Municipal Lawyers Association, Mid-Year Seminar. Washington , D.C. April 9-11, 2000.

Effective Strategies for Community Noise Enforcement:
Michigan Municipal League 9th Annual Education Conference. Mt. Pleasant, MI. March 11, 1998.
The Association of Towns of the State of New York , Annual Meeting, Educational Training Courses. New York City , February 16, 1998 .

American Association of Code Enforcement 8th Annual Business and Educational Conference. Hagerstown , MD , October 20-25, 1997.

Community Noise Enforcement: Reviving a Moribund Program or Developing One Anew. Noise-Con '96, The 1996 National Conference on Noise Control Engineering, Seattle, WA, September 29-October 2, 1996.

NOISE ENFORCEMENT CERTIFICATION COURSES TAUGHT

Community Noise Enforcement
Vehicular Noise Enforcement
Vehicle Sound Reproduction Enforcement
Motor Sports Ordinance Enforcement
Octave Band Analysis for Enforcement Purposes

New Jersey :
Certification and recertification - every three months, 1991 to present.

On-Site:
New Rochelle, NY; Jacksonville, FL (four times); Long Beach, NY (three times); Everett, WA; St. Augustine, FL (three times), Seattle, WA (twice); Neptune Beach, FL; Gainesville, FL; Anchorage, AK (twice); Binghamton, NY (twice); Washington State Association of Code Enforcement (three times); Ft. Collins, CO; Shelter Island, NY (four times); New York City, NY [NYC DEP, NYPD, NYC Parks, NYC DDOC] (eight times); Rochester, NY; Newport, RI; Platekill, NY; Traverse City, MI; DeKalb County, GA (four times); Twinsburg, OH; Sandusky, OH; North Salem, NY; Honolulu, HI; Lafayette, LA (twice); Philadelphia, PA (twice); Barbados, West Indies (twice); Collier County, FL (three times); Walton County, FL (three times); Greenville County (SC); Vancouver B.C. (three times); Panama City Beach, FL (twice); Matanuska-Susitna Borough, AK; Union, OH; Ithaca, NY

ON-SITE ORDINANCE DEVELOPMENT WORKSHOPS

Lafayette, LA; Traverse City, MI; Plattekill, NY; St. Augustine, FL; Charleston County, SC; Lansing, MI; DeKalb County, GA; Walton County, FL, Overland Park, KS; Greenville County, SC, Decatur, AL; Yonkers, NY; Ossining, NY; Newport RI; Monroe County, FL; Fort Lauderdale, FL; Panama City Beach, FL

PARTIAL LIST OF CLIENTS

City of New York Law Department; City of Philadelphia Law Department, Environmental & Regulatory Compliance Division; U. S. State Department; City of New York Police Department; Bergen County (NJ) Utilities Authority; New York City Department of Environmental Protection; New York State Office of Attorney General; McDonald's Corporation, Lafayette (LA) Consolidated Government; McGlinchey Stafford (New Orleans); Gaeta Recycling, Inc.; National Ecology; Browning Ferris Industries; Township of Manalapan (NJ); Kansas State Legislature; Readington Township (NJ); City of Lansing (MI); City of Tacoma (WA); City of St. Augustine (FL); Atlantic Development and Management Corp.; CareMatrix Corporation; County of Charleston (SC); DeKalb County (GA); Greenville County (SC); Ethicon, Inc.; City of Yonkers (NY); Walton County (FL); City of Overland Park (KS); City of Newport (RI); City of Ossining (NY); Franklin Township (NJ); Alliance to Save Southern Ulster's Rural Environment; Roche Molecular Systems; Wheelabrator,

Inc.; Monroe County (FL); City of Juneau (AK); Township of Branchburg (NJ); City of Eugene (OR); Union County United (PA); City of Fort Lauderdale (FL); City of Panama City Beach (FL); Stop & Shop Supermarket Company; Track Racket (Millville, NJ); Green Lawn Cemetery (Columbus, OH); Nissan Motor Company, Ltd.; City of Union (OH); City of Ithaca (NY); SA Engineering; Upper Deerfield Township (NJ)

THE NOISE CONSULTANCY, LLC
309 VAN NESTE ROAD
FLEMINGTON, NEW JERSEY 08822

THENOISECONSULTANCY

(908)237-0298 ☛ noiseconsultancy@aol.com ☛ www.noiseconsultancy.com

SENT VIA EMAIL

June 28, 2018

Karrie A. Zeits
Sondee, Racine & Doren, PLC
310 W. Front Street, Suite 300
Traverse City, Michigan 49684

Re: Acoustical Study and Impact Analysis
Proposed Car Wash
Serra Automotive – Toyota Project
940 Boon Street
Charter Township of Garfield, MI

Dear Ms. Zeits:

Background

Serra Works of Traverse City, LLC, is proposing to construct an automotive car wash as part of Serra Toyota Traverse City in Garfield Township, Grand Traverse County, Michigan. The car wash will serve only those vehicles being sold and serviced by the Toyota dealership. The Noise Consultancy, LLC (see resume, Appendix F) has been engaged in this matter, and I have conducted an extensive acoustical study and impact analysis on-site in Garfield Township and Traverse City from Thursday May 31 through Saturday June 2.

Executive Summary

Source sound level measurements were conducted of a car wash equipped with the same blowers and rollup door as will be installed at the proposed facility. Those measurements were conducted both in close proximity to the car wash as well at the same distance and orientation to the car wash as are the nearest residences in Garfield Township and Traverse City. As a result of this analysis, a modification has been made to the proposed operations/configuration of the proposed car wash, which will allow the blower cycle to complete prior to opening the exit door. Operated with the exit door closed, the sound level of the car wash will be 56-58 dBA (decibels, measured on the A-scale) at the closest residential property line in Garfield Township, and 45-46 dBA at the closest residential property line in Traverse City.

Ambient sound level measurements were conducted Thursday May 31 through Saturday June 2 in both Garfield Township and Traverse City on either side of Boon Street, at locations that represent the closest residences in both jurisdictions to the proposed car wash. These ambient sound level measurements demonstrated that Boon Street and Garfield Avenues are very active roads, and Traverse City's Cherry Capital Airport is the source of intermittent but intense (loud) noise events.

At the Garfield Township property line there are between 10-25 noise events every 10 minutes that range from 55-65 + dBA. At the Traverse City property line there are 10-25 noise events every 10 minutes that range from 65-75 + dBA, as that property line is closer to Boon Street, where vehicles pass often and fast. Other noise sources in the environment such as aircraft and sirens range from 70-90 dBA.

Executive Conclusion

Serra Toyota is proposing to construct a relatively quiet car wash in a relatively noisy location, adjacent to two busy roads and an airport. The noise levels of the car wash with the proposed modification are well within the ambient sound level currently experienced by the surrounding neighborhoods.

At the Garfield Township property line, the sound level of the car wash will be 56-58 dBA, while steady traffic is in the range of 55-65 dBA, with individual events well above that level. At the Traverse City property line the sound level of the car wash will be 45-46 dBA, while steady traffic is in the range of 65-75 dBA.

It is my opinion that there will be no detrimental acoustical impact to the adjacent residential neighborhoods of either Garfield Township or Traverse City from the operation of the proposed car wash, as the blowers will only be operated with the exit door closed.

Applicable Standards

In Garfield Township, the Conditional Rezoning Agreement (CRA) establishes the standard by which the noise emissions from the proposed automobile laundry's "wash bay" is to be evaluated. The CRA provides in relevant part as follows:

*** 2.f.

i. Any modification to the "wash bay" to include noise generating mechanicals shall first be reviewed and approved, following a public hearing, by the Planning Commission.

ii. A noise study shall be performed prior to approval and following installation of the mechanicals, if approved, **demonstrating that noise will not be detrimental to the surrounding neighborhoods**.

iii. The automobile laundry shall not be open to the public. (Emphasis supplied).

It should be noted that Garfield Township Article 7 Supplemental Use Regulations establishes standards for certain uses. Section 712 Automobile Laundries states that "Noise generated on site from any source [associated with the car laundry] shall not exceed 40 decibels measured at any property line." This limit is significantly over-restrictive, and without proper regulatory basis and background. It is well below the limit established by most jurisdictions for nighttime noise, much less daytime noise.

In fact, just across Boon Street, in Traverse City, the permissible limits in a residential area are 65 dBA from 7:00 AM to 10:00 PM and 60 dBA from 10:00 PM to 7:00 AM. (§652.04(h)). Garfield Township's limit on Automobile Laundries is also unique, as in the entirety of Garfield Township's Zoning Ordinance the only other potential sound source for which decibel limits are established are wind turbines (and the limit is 60 dBA (Section 780)), and they operate at night, when the car wash will not.

This study also demonstrates that the standard set forth in Section 712 is well below the pre-existing ambient sound level in the surrounding neighborhood.

Study Goals

The goal of this acoustical study and impact analysis was to determine the current ambient sound levels across a range of weekday and weekend hours and evaluate whether the sound emissions of the proposed car wash would have detrimental impact on the surrounding residential neighborhoods. If it were determined that there would be impact, to develop and test mitigation measures that would remediate the acoustical impact.

Receptor Locations

The closest residence in Garfield Township is directly to the west of the proposed car wash on Boon Street (see Measurement Location Map and Photos, Appendix B). The property line is approximately 129 feet from the exit of the car wash as detailed on the site plan dated 6/08/2017.

The closest residences in Traverse City are to the north and northwest of the proposed car wash across Boon Street. The property line is approximately 138 feet (to the "split rail fence") from the exit of the car wash as detailed on the site plan dated 6/08/2017.

Measurement Quality Control

Larson Davis Precision Acoustics Analyzer

Sound Level Meter - Model 831 (ANSI Type I)	Serial# 0002504
Preamplifier - Model PRM831	Serial# 019078
Microphone - Model 377B02	Serial# 115996

Laboratory Certified: PCB Piezotronics, March 12, 2018
(see Calibration Certificates, Appendix E)

Casella CEL-120/2 Acoustic Calibrator — Serial# 2661883
Laboratory Certified: Casella CEL, October 25, 2017

Kestrel 3000 Wind Meter — Serial# 2180869

Field Calibration Checks:		
	May 31, 2018	6:12 PM, 7:10
	June 1, 2018	7:44 AM, 8:34, 10:35, 11:15, 1:20 PM, 2:32, 3:54, 4:25
	June 2, 2018	8:10 AM, 8:56, 9:51, 10:18

Weather:
May 31 6:12 PM 3.2 -7.4 MPH, 75.7°F, 69.8% RH
June 1 8:33 AM 1.2 - 3.9 MPH, 56.2°F, 78.4% RH
June 1 10:53 AM 0.0 - 3.3 MPH, 59.2°F, 72.7% RH
June 1 1:20 PM 2.9 - 6.3 MPH, 62.6°F, 58.7% RH
June 1 2:32 PM 4.8 – 8.5 MPH, 62.2°F, 57.4% RH
June 2 8:57 AM 0.0 – 1.8 MPH, 59.4°F, 58.8% RH
June 2 10:18 AM 1.6 - 3.9 MPH, 66.6°F, 41.2% RH

Ambient Sound Level Measurement Locations

The primary sources of ambient sound for the residences adjacent to the proposed car wash are: Boon Street, Garfield Avenue and the operations of Traverse City's Cherry Capital Airport. While flight operations from the airport are the source of the most intense sound events in the environment, those operations are significantly less frequent than the traffic on Boon Street, which is a busy street and cars pass the houses frequently, going fast. Thus, distance from Boon Street was a primary consideration in choosing ambient sampling locations. Vehicles on Garfield Avenue can occasionally be as loud as those on Boon Street, as can be General Aviation aircraft in and out of the airport which were very numerous on Saturday morning.

Ambient sound level measurements in Garfield Township (see Appendix B - Garfield Township Ambient Sound Level Time History Graphs) were conducted at a measured distance of 60.5 feet from the edge of the pavement of Boon Street, which was visually estimated in the field to be the approximate distance from the pavement to the front wall of the adjacent residence in Garfield Township. The goal was to conduct ambient sound level measurements at a location that accurately represents the sound level of vehicles on Boon Street and Garfield Avenue as received at that residence. Further analysis via Google Earth demonstrates that the adjacent house actually sits 50 feet from the pavement on Boon Street (see attached photos and satellite image). Thus, the reported ambient sound levels that were measured at 60.5 feet from Boon Street slightly understate the actual exposure levels for the residence that sits at 50 feet from the road. In other words, the noise experienced at the residence is actually louder than was measured.

Ambient sound level measurements in Traverse City (see Appendix C – Traverse City Ambient Sound Level Time History Graphs) were conducted across Boon Street at a split rail fence approximately 19 feet from the edge of the pavement. This location accurately represents the sound levels at the rear property lines (backyards) of the Traverse City properties at the end of the Arbutus Court cul-de-sac. The southern corner of the residences are approximately another 10 feet to the north. This location is closer to Boon Street than is the Garfield Township measurement location so the sound levels measured at that location are higher, as traffic on Boon Street is the predominant source of ambient sound for these residences.

It should be noted that the Traverse City ambient sound levels, as reported, also represent the ambient sound levels for the middle of the front yard of the Garfield Township residence, 19 feet from Boon Street.

Comparable Source Sound Level Measurements

Extensive sound level measurements were conducted of an existing car wash that utilizes the same equipment as will the proposed car wash (see Appendix D – Source Sound Level Measurements).

Garfield Township receptor - sound level measurements were conducted directly on the axis of the exit of the car wash at 0° (zero degrees) at a distance of 129 feet.

Traverse City receptor - sound level measurements were conducted at an angle 80° (eighty degrees) to the axis of the exit of the car wash at a distance of 138 feet.

Results

Ambient Sound Levels of the Surrounding Neighborhood

In Appendix B is presented a series of time history graphs of the ambient sound levels measured in the Garfield Township residential neighborhood adjacent to the proposed car wash. A review of those graphs demonstrates that there are between 10-25 separate noise events during each 10-minute sampling period that are between 55-65 dBA. In addition, there are a number of noise events above those levels such as on 6/1, vehicles at 69 dBA 8:11 AM and 73 dBA at 8:14 AM, and a helicopter at 85 dBA.

For ease of comparison in one place, those time history graphs are also labeled with the sound levels of the car wash at the nearest Garfield Township property line (56-58 dBA, see below).

In Appendix C are time history graphs of the ambient sound levels in the adjacent Traverse City residential neighborhood. A review of those graphs demonstrates a similar number of noise events, but there the maximum levels range between 65-75 dBA because of the closer proximity of the property line to Boon Street. There was an ambulance at 90 dBA at 8:42 AM Saturday morning.

Again, for ease of comparison in one place, those time history graphs are also labeled with the sound levels of the car wash (45-46 dBA in the case of the Traverse City neighborhood, see below).

Source Sound Levels

The most intense sound sources in the car wash are the blowers at the exit. Sound emissions from the entrance are much less intense. The primary source on the entrance side is the garage door opening, and it is 17 dBA less than the blowers at a comparable distance (67 dBA @ 25 ft v 84 dBA @ 25 ft).

Garfield Township Receptor

Blower sound levels, **exit door open** - when measured at a distance of 129 feet, directly on axis to the exit at 0° (zero degrees) the maximum sound levels ranged from **71-73 dBA** (see Appendix D).

Blower sound levels, **exit door closed** - when measured at a distance of 129 feet, directly on axis to the exit at 0° (zero degrees) the maximum sound levels ranged from **56-58 dBA**. This is the sound level for the closest residential property line in Garfield

Township. Those levels will drop with additional distance into the surrounding neighborhood.

Closing the exit door provides an attenuation of 15 dBA. This was also confirmed by paired readings at 25 feet (84 dBA open v 69 dBA closed).

As stated above, for ease of comparison in one place, the sound level of the car wash (56-58 dBA, Garfield receptor) was also labeled onto the ambient sound level time history graphs in Appendix B.

Traverse City Receptor

Blower sound levels, **exit door open** - when measured at a distance of 138 feet, at an angle 80° (eighty degrees) to the axis of the exit of the car wash the maximum sound levels ranged from **60-61 dBA**.

With the **exit door closed**, the level will drop to **45-46 dBA** at that location. The closed-door study was not conducted as the ambient sound level was 50-52 dBA at the time of the testing. You can't measure a sound which is below the ambient sound level.

The sound level of 45-46 dBA is at the closest residential property line in Traverse City. Those levels will drop with additional distance into the surrounding neighborhood.

As stated above, for ease of comparison in one place, the sound level of the car wash (45-46 dBA, Traverse City receptor) was also labeled onto the ambient sound level time history graphs in Appendix C.

Discussion

Garfield Township Receptor

Sound level measurements conducted at a comparable car wash at a distance and orientation representing the closest residential property line in Garfield Township revealed that operation of the proposed car wash with an open exit door would result in an unacceptable impact of sound levels ranging from 71-73 dBA.

It was thereupon agreed that the blowers would not be operated with the exit door open. Upon retesting the car wash with the exit door closed and blowers operating, the sound level ranged from 56-58 dBA, measured at the same location (see Appendix D).

The car wash will likely be extended so that vehicles can complete the blower cycle prior to the exit doors opening. In this study, the testing was conducted with the blowers

immediately inside the exit doors. In the newly proposed configuration, the blowers will be approximately 14 feet inside the exit door, further reducing the sound levels exiting the building while the blowers are in operation.

Extensive ambient sound level measurements conducted over the course of three days demonstrates that traffic and other noise sources in the environment routinely result in between 10-25 events during each 10 minute period which range between 55-65+ dBA at the Garfield residence (see Appendix B). Some are much higher, such as flight operations from the Traverse City Airport, with the end of the main runway at a distance of approximately 2,000 feet, oriented essentially parallel to Boon Street.

In addition, the ambient sound level measurements representing the Garfield Township residence were conducted at a distance of 60 feet from Boon Street, while the distance to the residence is actually 50 feet. Thus, the ambient sound levels in this report understate the sound levels of the Boon Street traffic at the residence.

The noise levels of the car wash with the proposed modification are well within the ambient sound level currently experienced by the Garfield Township Residence.

Traverse City Receptor

Sound level measurements conducted at a comparable car wash at a distance and orientation representing the closest residential property line in Traverse City revealed that operation of the proposed car wash with an open exit door would result in sound levels of approximately 60-61 dBA. The acoustical remediation measures undertaken to address the Garfield Township receptor will reduce the sound levels for the Traverse City receptors to 45-46 dBA. The permissible limit for such sound under Traverse City's Noise Code is 65 dBA.

Extensive ambient sound level measurements conducted over the course of three days demonstrates that traffic and other noise sources in the environment routinely result in between 10-25 events during each 10 minute period which range between 65-75 dBA at the Traverse City residential property lines (See Appendix C). Some are much higher, such as flight operations from the Traverse City Airport, and an ambulance siren.

Again, the noise levels of the car wash with the proposed modification are well within the ambient sound level currently experienced by the Traverse City residences.

Conclusions

Serra Toyota is proposing to build a relatively quiet car wash in a relatively noisy environment, adjacent to two busy roads and an airport. They have agreed to an extensive

modification of the proposed facility for the sole purpose of reducing sound emissions from their property. The use of the car wash is intermittent and the blowers only operate in the final stage of the washing cycle.

Most of the time sound from the car wash will be masked by the sound from traffic on the two immediately adjacent busy roads, noise from which is both much more frequent and also more intense (louder) than from the car wash. In addition, the proximity to the Airport results in intermittent noise sources that are much louder than the car wash, and in the case of Saturday morning, the buzz of general aviation aircraft was pervasive.

There may be times when the car wash is audible, if someone is listening carefully when there is no masking sound occurring at the same time, however, it will be well below other sound levels common and frequent in the environment and thus will neither be unusual nor intrusive. It will also be at levels approximately 20 decibels below the applicable regulatory standard, across Boon Street in Traverse City.

Therefore, it is my conclusion that there will be no detrimental acoustical impact to the adjacent residential neighborhoods of either Garfield Township or Traverse City from the operation of the proposed car wash, as reconfigured, and as a result will not be disturbing to those neighborhoods.

Sincerely,

Eric M. Zwerling, M.S., INCE, ASA
President

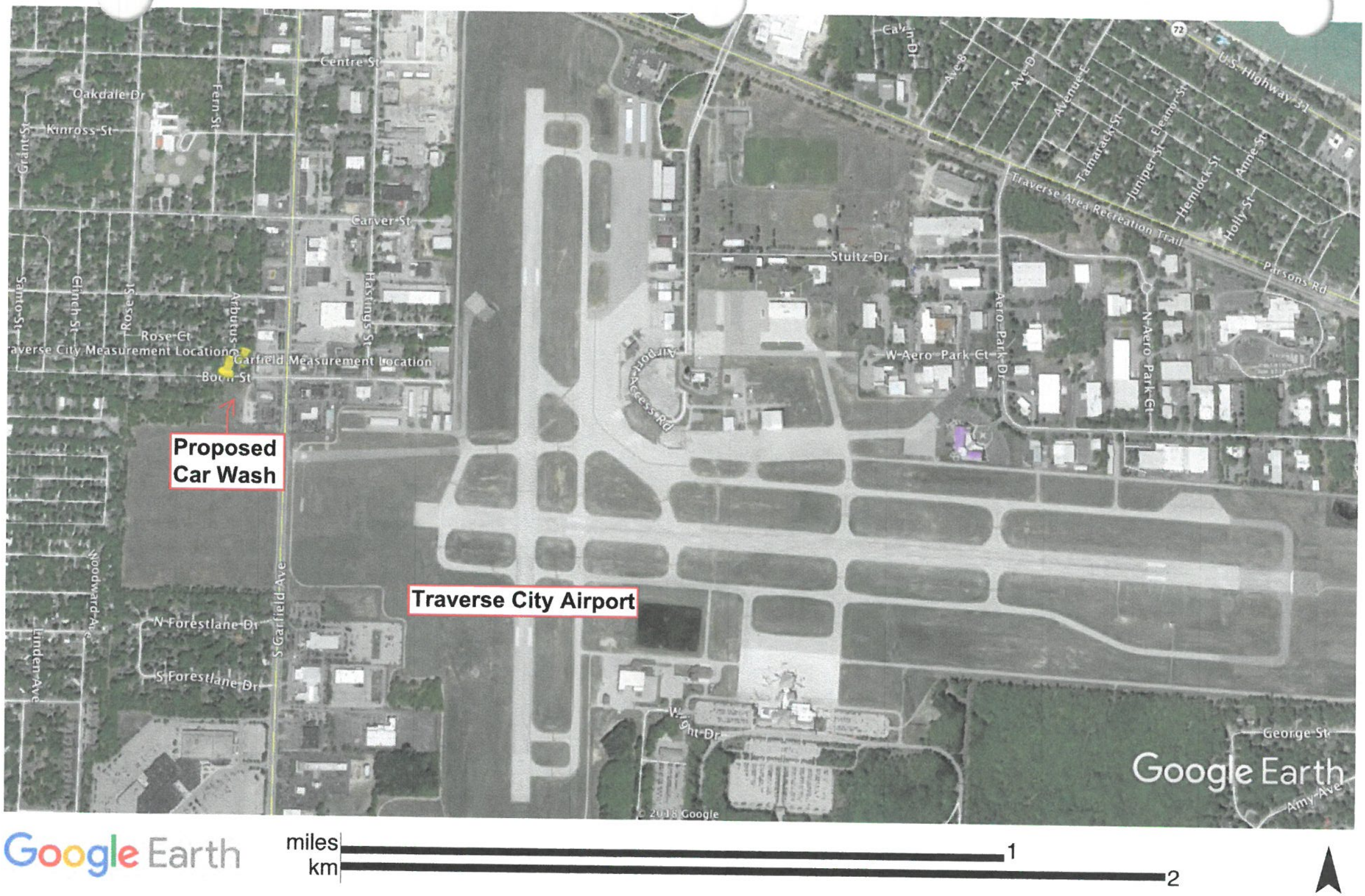
Appendix A

Measurement Locations and Photos

Google Earth

feet 400
meters 100

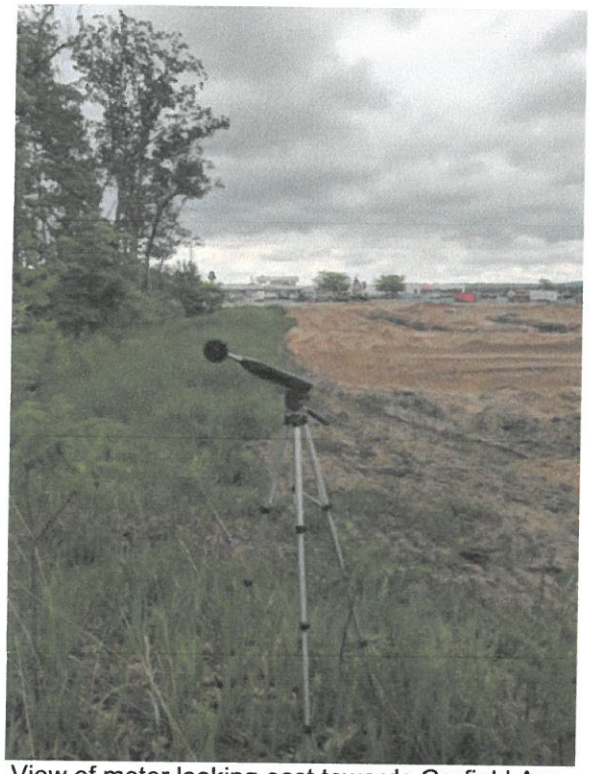
* Location and dimensions approximate.
For illustration purposes only.
Refer to site plan.


Proposed
Car Wash
Traverse City Airport
Garfield Measurement Location
Traverse City Measurement Location
Oakdale Dr
Kinross St
Grant St
Fern St
Centre St
Carver St
Hastings St
Santo St
Clinch St
Rose St
Rose Ct
Arbutus
Boon St
S Garfield Ave
Woodward Ave
Linden Ave
N Forestlane Dr
S Forestlane Dr
Airport Access Rd
Stultz Dr
W Aero Park Ct
Aero Park Dr
N Aero Park Ct
Traverse Area Recreation Trail
Parsons Rd
U.S. Highway 31
72
Calvin Dr
Ave B
Ave D
Avenue E
Tamarack St
Juniper St
Eleanor St
Hemlock St
Anne St
Holly St
George St
Amy Ave
© 2018 Google
Google Earth
Google Earth
miles
1
km
2

AMBIENT SOUND LEVEL MEASUREMENT LOCATIONS

View of the meter at the Garfield Township location - looking west, towards the residence.
It was estimated that this location was approximately in the plane of the front wall of the residence.
It was measured to be 60.5 feet from the pavement of Boon Street.
Further analysis showed that the house is actually 50 feet from the pavement.

View of meter looking North towards Boon Street

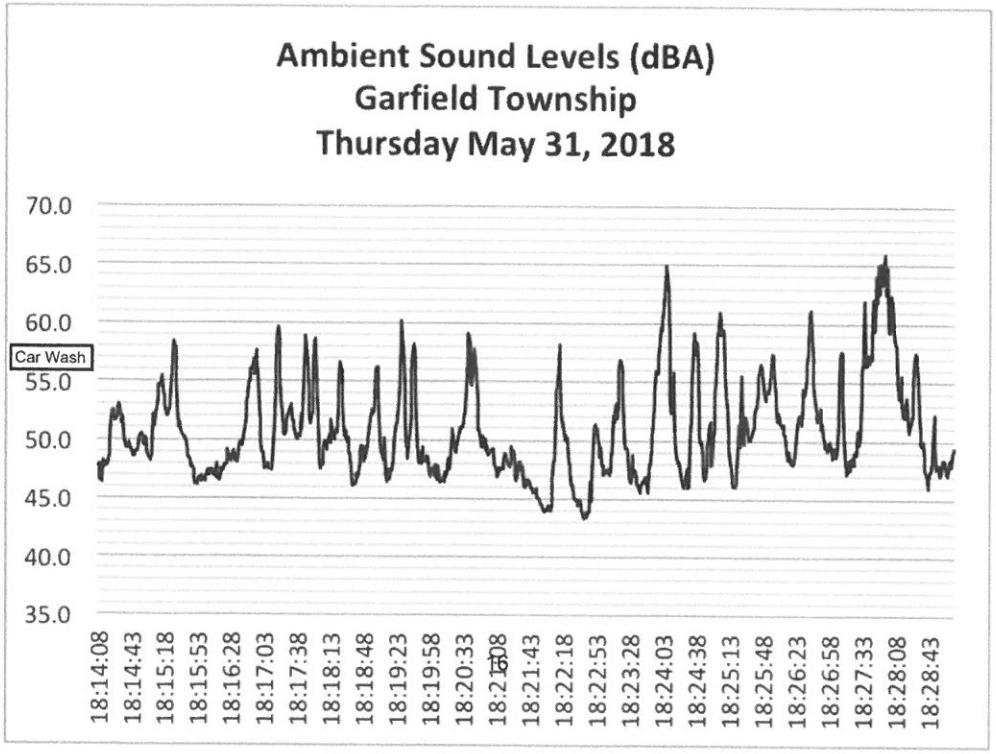


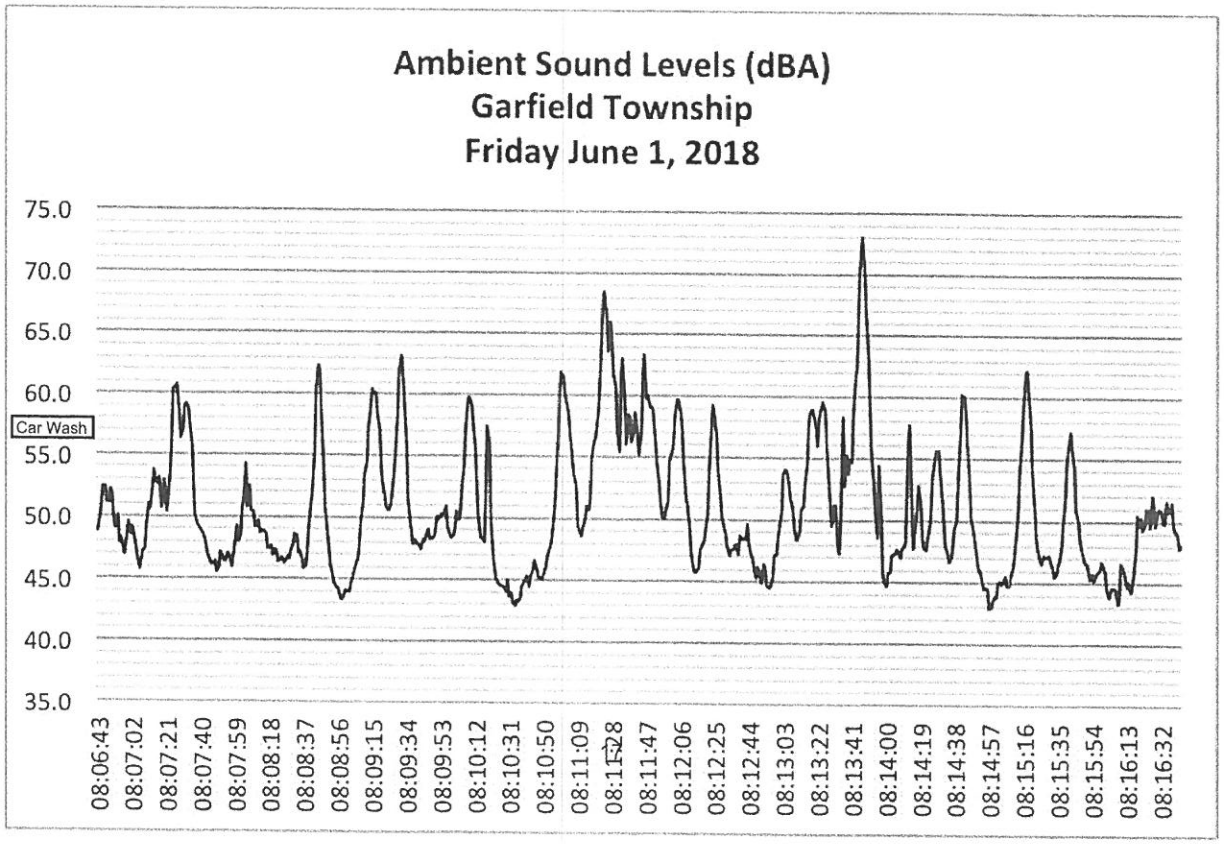
View of meter looking east towards Garfield Ave.

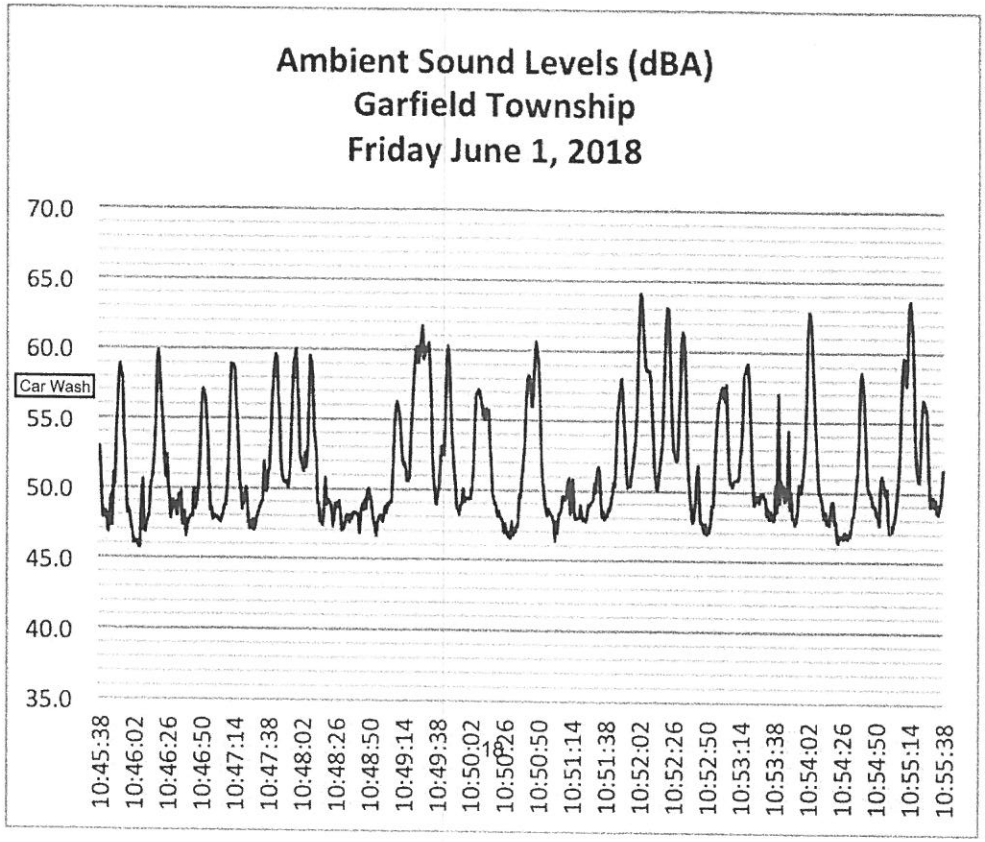
View of the meter at the Traverse City location - split rail fence.

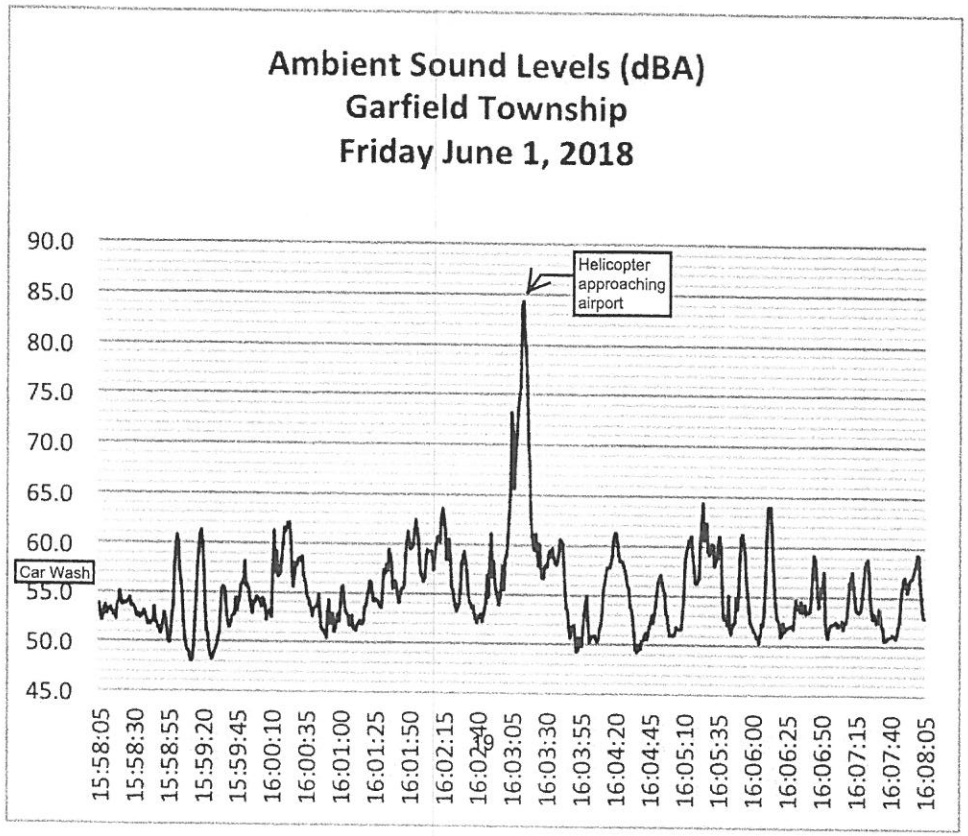
Appendix B

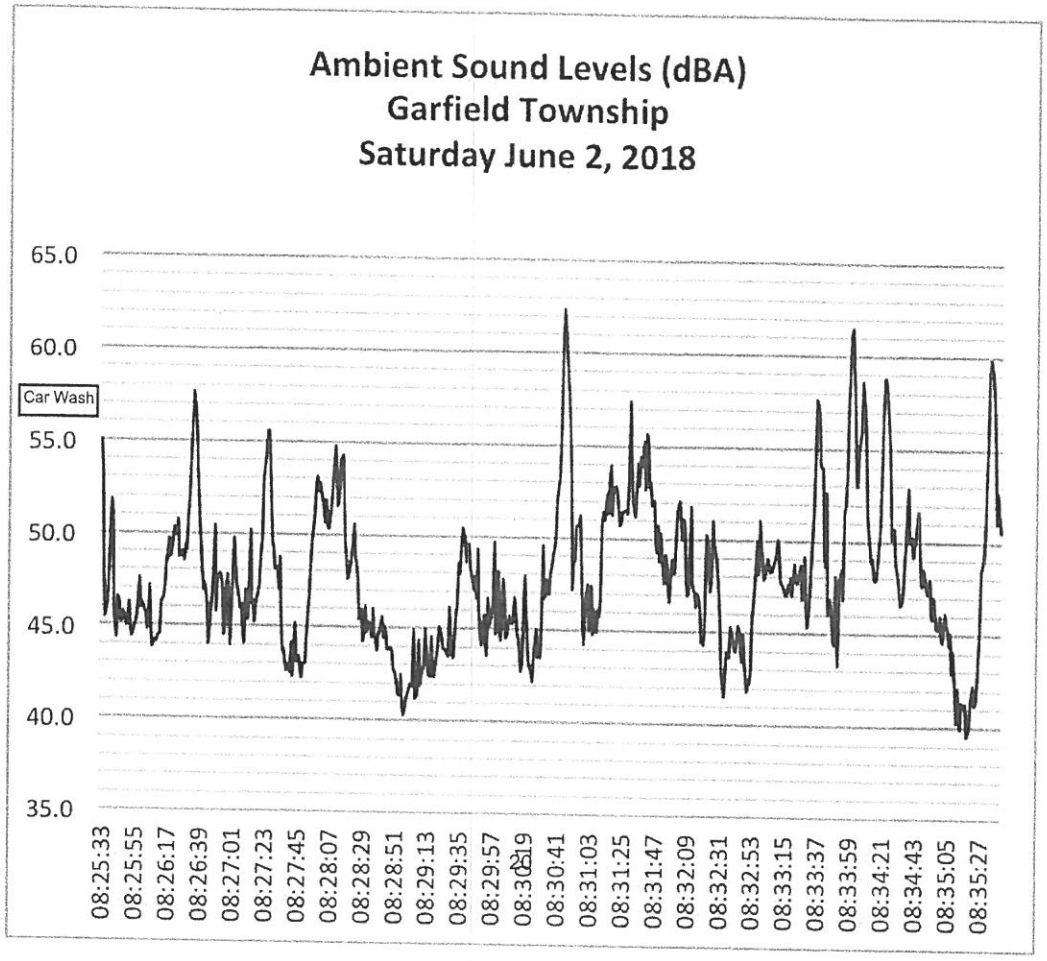
Ambient
Sound Level Measurements
Garfield Township

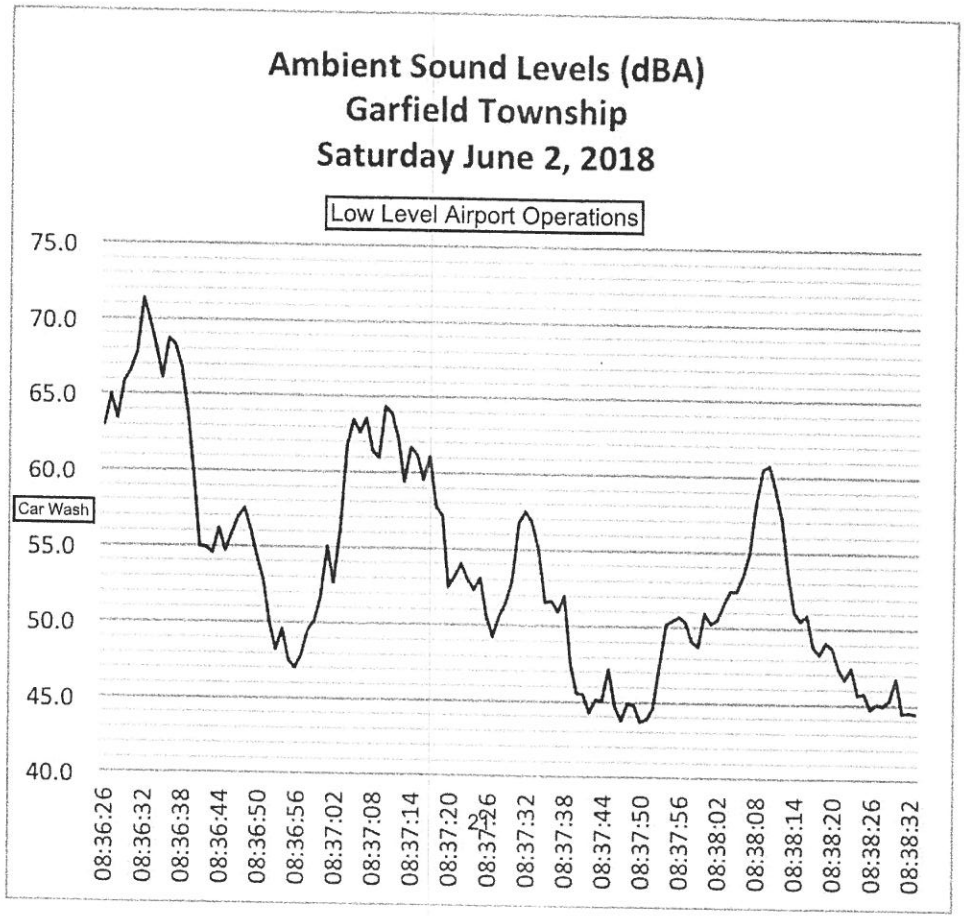

Ambient Sound Levels (dBA)
Garfield Township
Thursday May 31, 2018
70.0
65.0
60.0
Car Wash
55.0
50.0
45.0
40.0
35.0
18:14:08
18:14:43
18:15:18
18:15:53
18:16:28
18:17:03
18:17:38
18:18:13
18:18:48
18:19:23
18:19:58
18:20:33
18:21:43
18:22:18
18:22:53
18:23:28
18:24:03
18:24:38
18:25:13
18:25:48
18:26:23
18:26:58
18:27:33
18:28:08
18:28:43

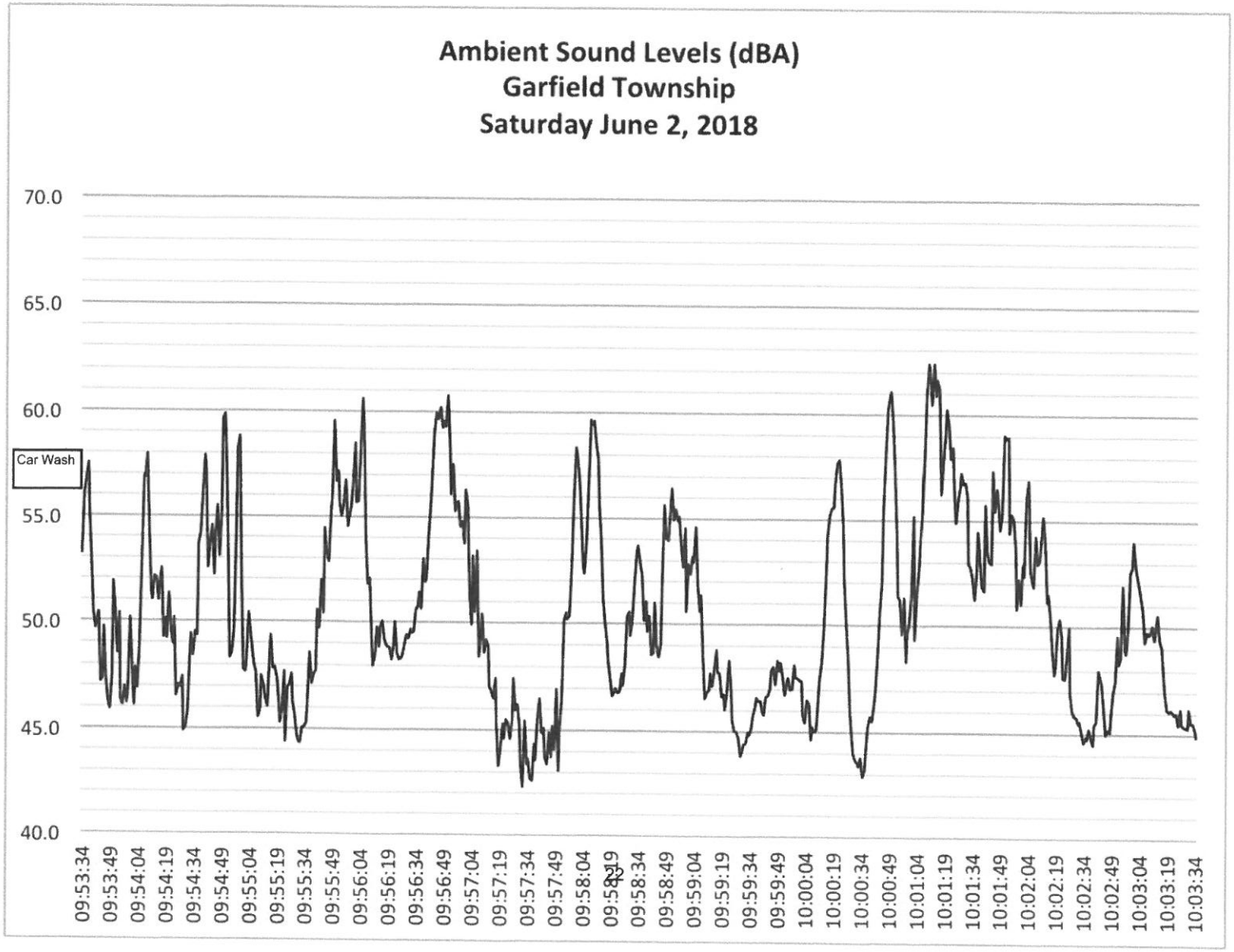

Ambient Sound Levels (dBA)
Garfield Township
Friday June 1, 2018
75.0
70.0
65.0
60.0
Car Wash
55.0
50.0
45.0
40.0
35.0
08:06:43
08:07:02
08:07:21
08:07:40
08:07:59
08:08:18
08:08:37
08:08:56
08:09:15
08:09:34
08:09:53
08:10:12
08:10:31
08:10:50
08:11:09
08:11:28
08:11:47
08:12:06
08:12:25
08:12:44
08:13:03
08:13:22
08:13:41
08:14:00
08:14:19
08:14:38
08:14:57
08:15:16
08:15:35
08:15:54
08:16:13
08:16:32


Ambient Sound Levels (dBA)
Garfield Township
Friday June 1, 2018
70.0
65.0
60.0
Car Wash
55.0
50.0
45.0
40.0
35.0
10:45:38
10:46:02
10:46:26
10:46:50
10:47:14
10:47:38
10:48:02
10:48:26
10:48:50
10:49:14
10:49:38
10:50:02
10:50:26
10:50:50
10:51:14
10:51:38
10:52:02
10:52:26
10:52:50
10:53:14
10:53:38
10:54:02
10:54:26
10:54:50
10:55:14
10:55:38


Ambient Sound Levels (dBA)
Garfield Township
Friday June 1, 2018
90.0
85.0
80.0
75.0
70.0
65.0
60.0
55.0
50.0
45.0
Car Wash
Helicopter approaching airport
15:58:05
15:58:30
15:58:55
15:59:20
15:59:45
16:00:10
16:00:35
16:01:00
16:01:25
16:01:50
16:02:15
16:02:40
16:03:05
16:03:30
16:03:55
16:04:20
16:04:45
16:05:10
16:05:35
16:06:00
16:06:25
16:06:50
16:07:15
16:07:40
16:08:05

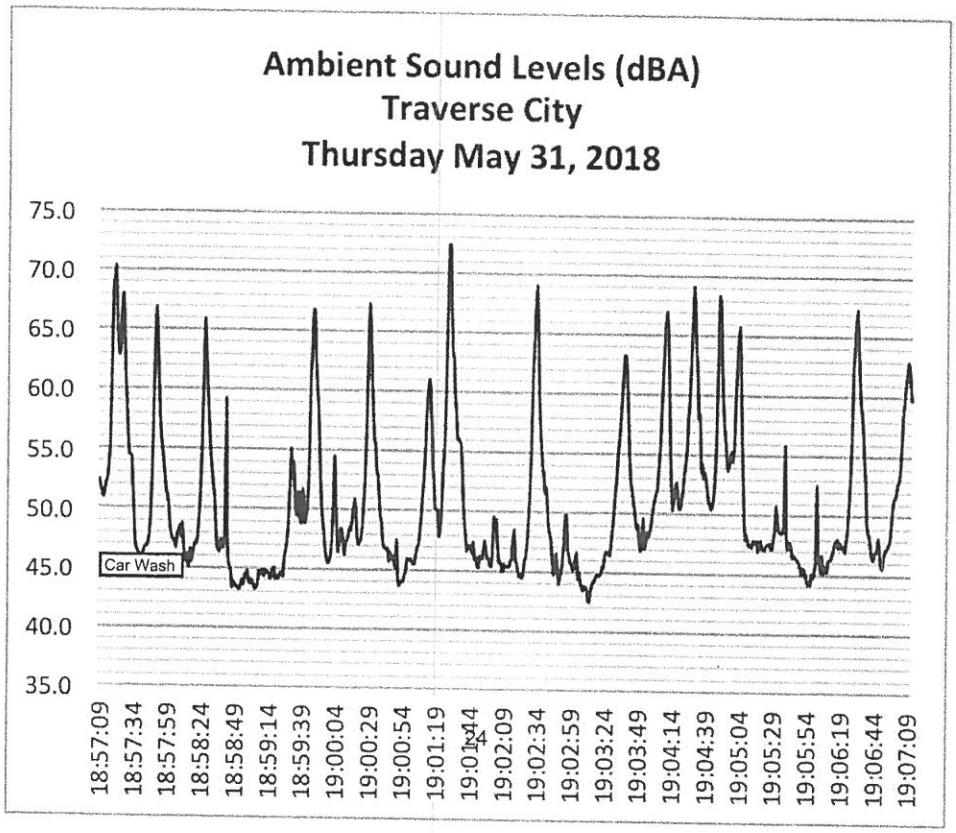

Ambient Sound Levels (dBA)
Garfield Township
Saturday June 2, 2018
65.0
60.0
Car Wash
55.0
50.0
45.0
40.0
35.0
08:25:33
08:25:55
08:26:17
08:26:39
08:27:01
08:27:23
08:27:45
08:28:07
08:28:29
08:28:51
08:29:13
08:29:35
08:29:57
08:30:19
08:30:41
08:31:03
08:31:25
08:31:47
08:32:09
08:32:31
08:32:53
08:33:15
08:33:37
08:33:59
08:34:21
08:34:43
08:35:05
08:35:27

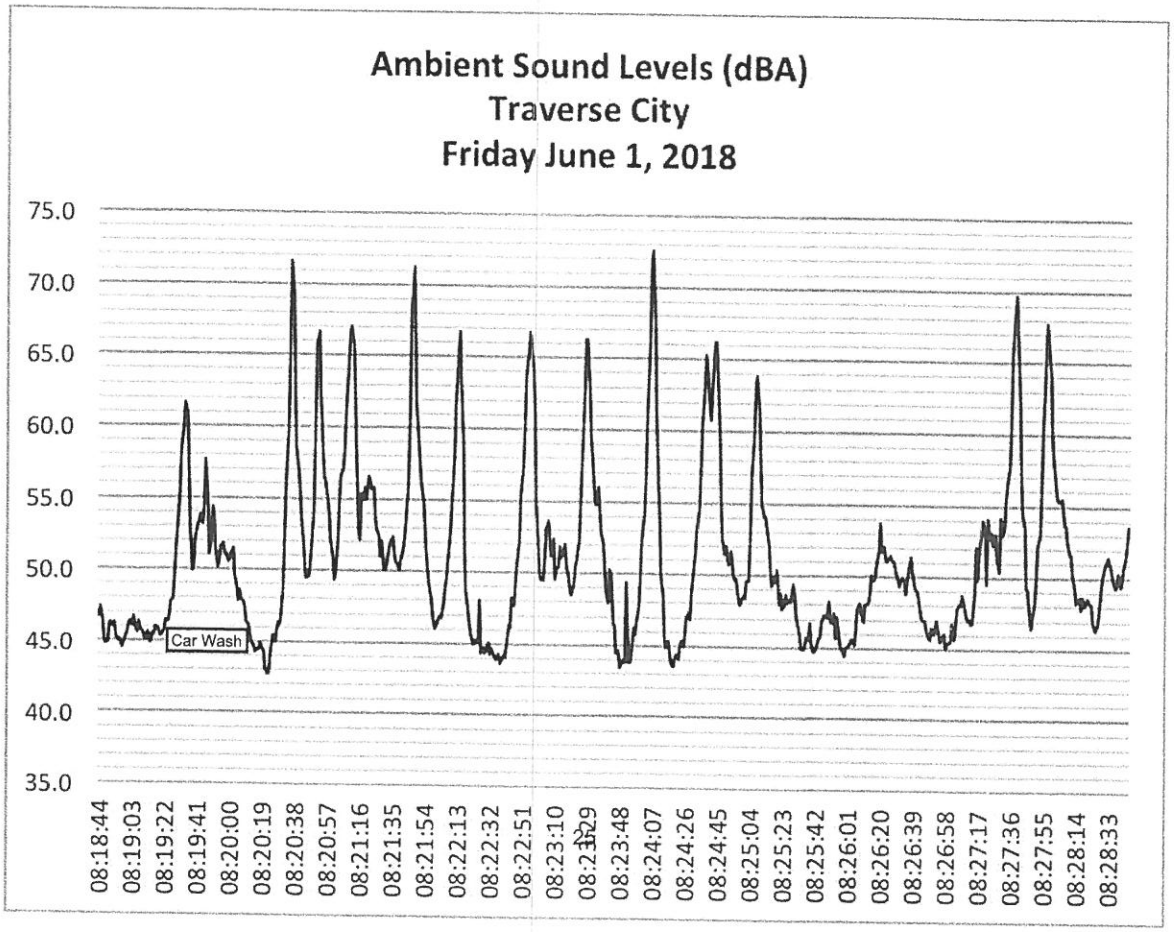

Ambient Sound Levels (dBA)
Garfield Township
Saturday June 2, 2018
Low Level Airport Operations
Car Wash
75.0
70.0
65.0
60.0
55.0
50.0
45.0
40.0
08:36:26
08:36:32
08:36:38
08:36:44
08:36:50
08:36:56
08:37:02
08:37:08
08:37:14
08:37:20
08:37:26
08:37:32
08:37:38
08:37:44
08:37:50
08:37:56
08:38:02
08:38:08
08:38:14
08:38:20
08:38:26
08:38:32

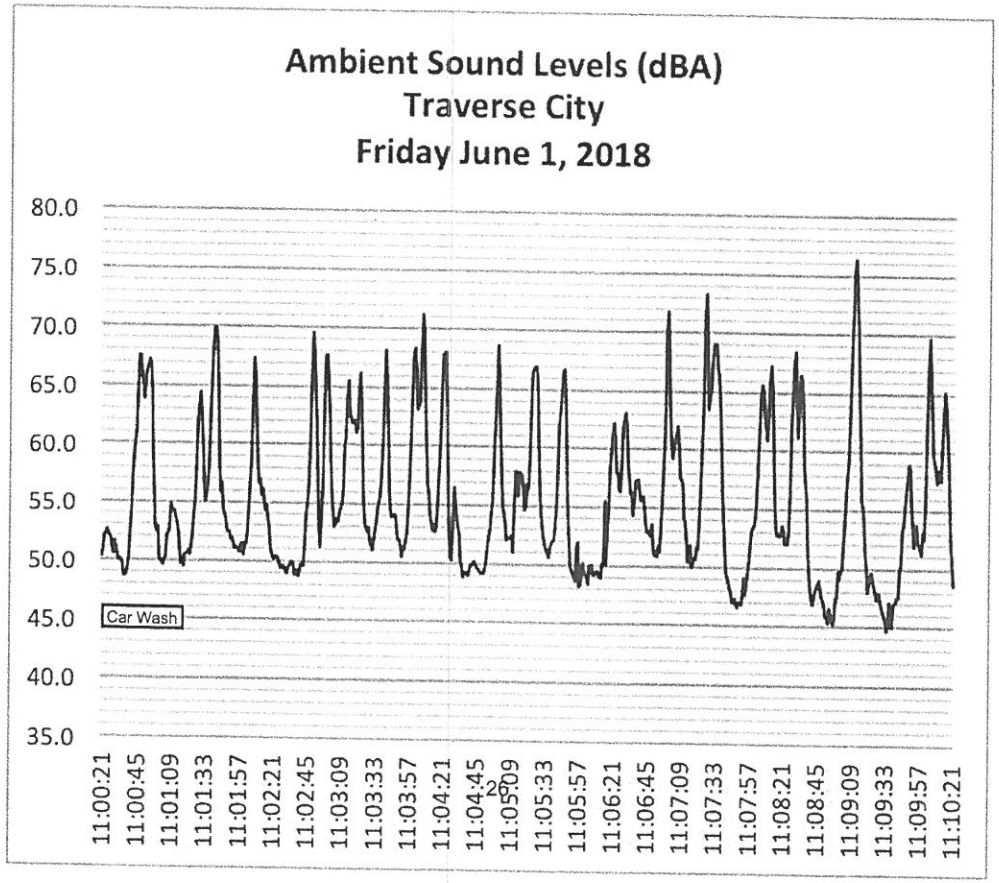

Ambient Sound Levels (dBA)
Garfield Township
Saturday June 2, 2018
70.0
65.0
60.0
55.0
50.0
45.0
40.0
Car Wash
09:53:34
09:53:49
09:54:04
09:54:19
09:54:34
09:54:49
09:55:04
09:55:19
09:55:34
09:55:49
09:56:04
09:56:19
09:56:34
09:56:49
09:57:04
09:57:19
09:57:34
09:57:49
09:58:04
09:58:19
09:58:34
09:58:49
09:59:04
09:59:19
09:59:34
09:59:49
10:00:04
10:00:19
10:00:34
10:00:49
10:01:04
10:01:19
10:01:34
10:01:49
10:02:04
10:02:19
10:02:34
10:02:49
10:03:04
10:03:19
10:03:34

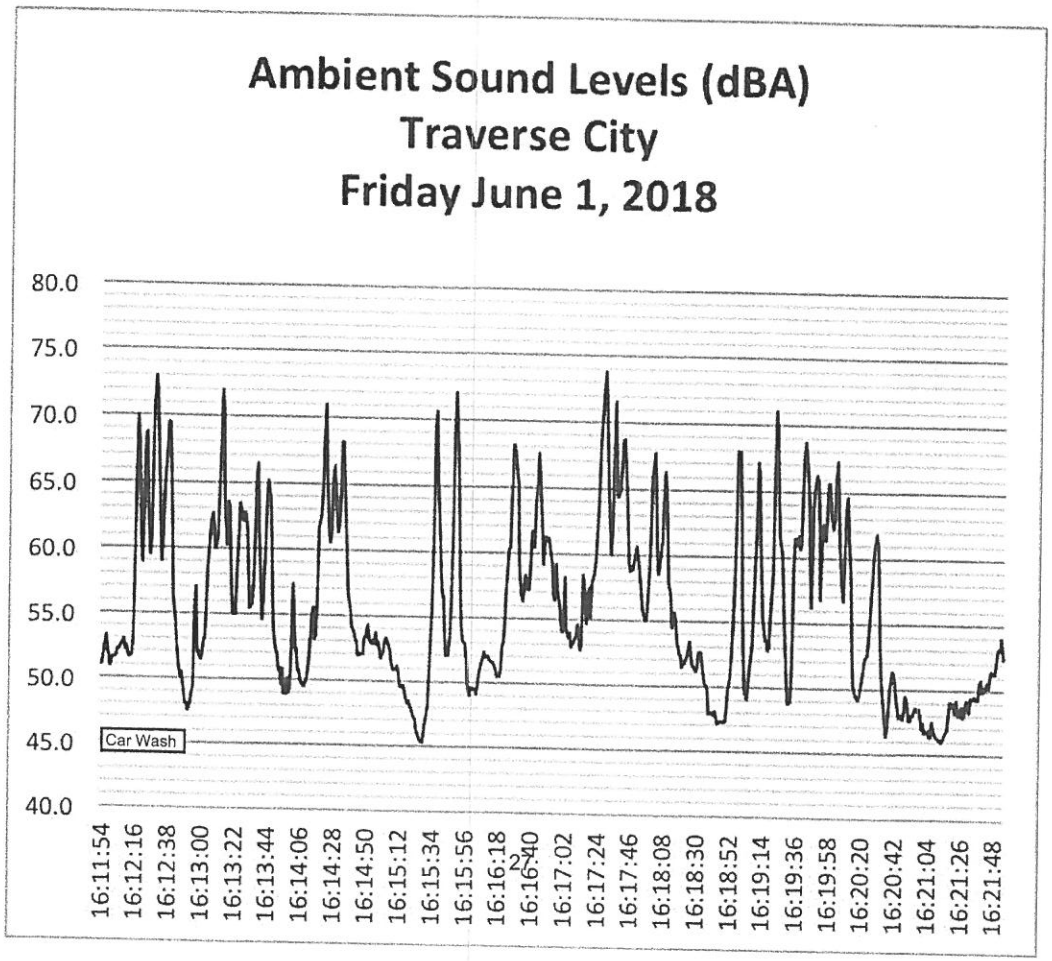
Appendix B

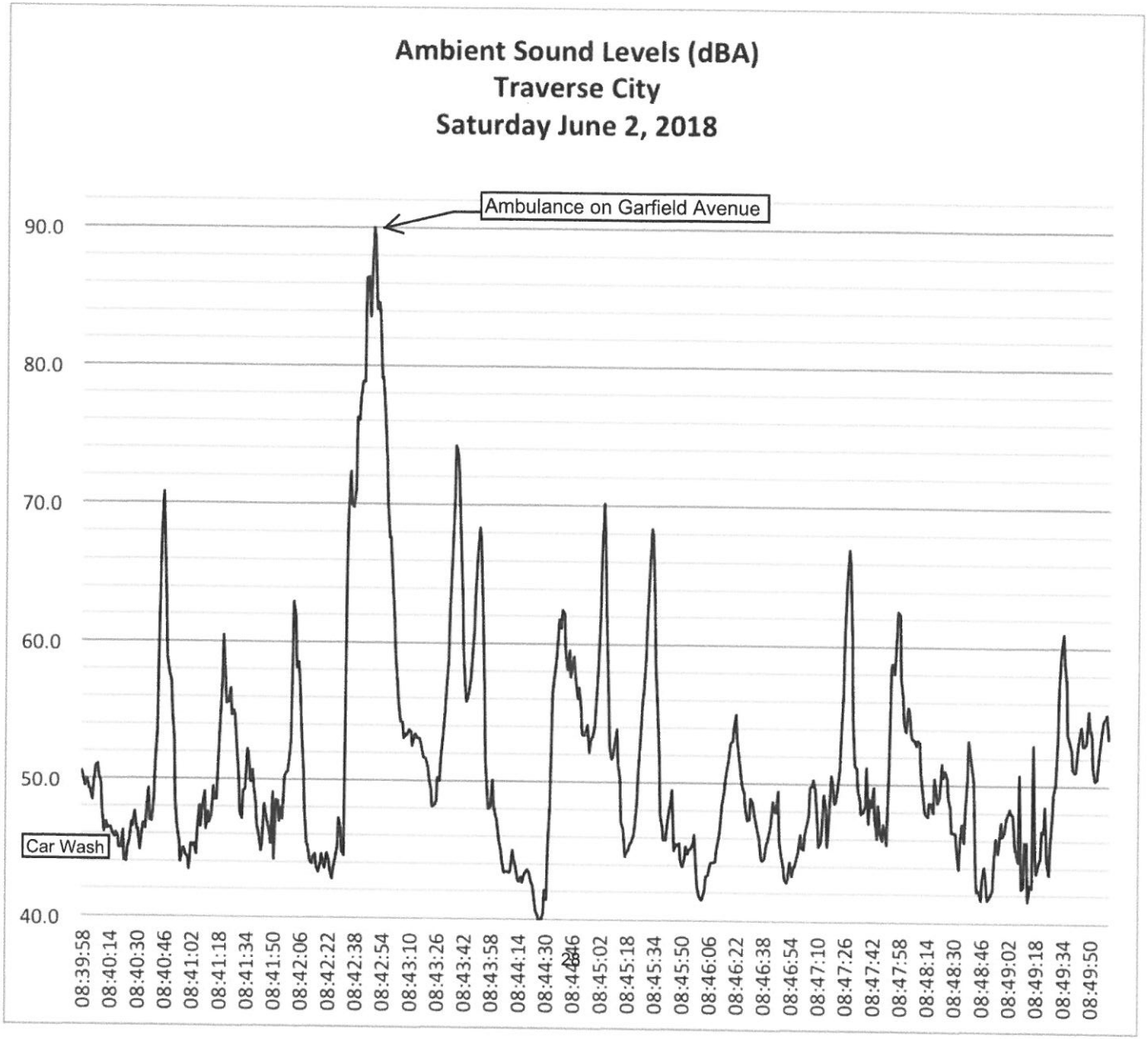
Ambient
Sound Level Measurements
Traverse City

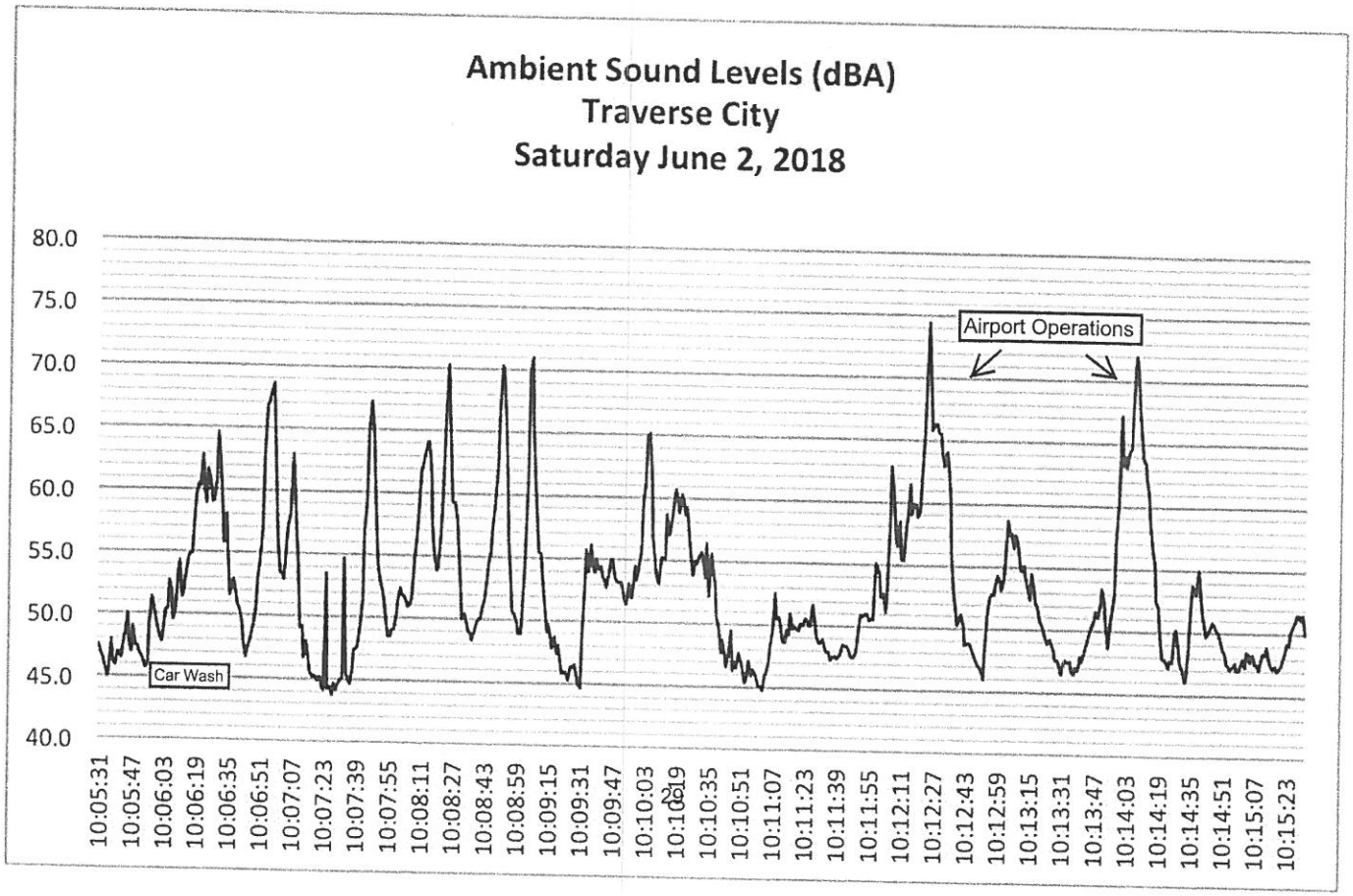

Ambient Sound Levels (dBA)
Traverse City
Thursday May 31, 2018
75.0
70.0
65.0
60.0
55.0
50.0
45.0
40.0
35.0
Car Wash
18:57:09
18:57:34
18:57:59
18:58:24
18:58:49
18:59:14
18:59:39
19:00:04
19:00:29
19:00:54
19:01:19
19:02:09
19:02:34
19:02:59
19:03:24
19:03:49
19:04:14
19:04:39
19:05:04
19:05:29
19:05:54
19:06:19
19:06:44
19:07:09


Ambient Sound Levels (dBA)
Traverse City
Friday June 1, 2018
75.0
70.0
65.0
60.0
55.0
50.0
45.0
40.0
35.0
Car Wash
08:18:44
08:19:03
08:19:22
08:19:41
08:20:00
08:20:19
08:20:38
08:20:57
08:21:16
08:21:35
08:21:54
08:22:13
08:22:32
08:22:51
08:23:10
08:23:29
08:23:48
08:24:07
08:24:26
08:24:45
08:25:04
08:25:23
08:25:42
08:26:01
08:26:20
08:26:39
08:26:58
08:27:17
08:27:36
08:27:55
08:28:14
08:28:33


Ambient Sound Levels (dBA)
Traverse City
Friday June 1, 2018
80.0
75.0
70.0
65.0
60.0
55.0
50.0
45.0
40.0
35.0
Car Wash
11:00:21
11:00:45
11:01:09
11:01:33
11:01:57
11:02:21
11:02:45
11:03:09
11:03:33
11:03:57
11:04:21
11:04:45
11:05:09
11:05:33
11:05:57
11:06:21
11:06:45
11:07:09
11:07:33
11:07:57
11:08:21
11:08:45
11:09:09
11:09:33
11:09:57
11:10:21

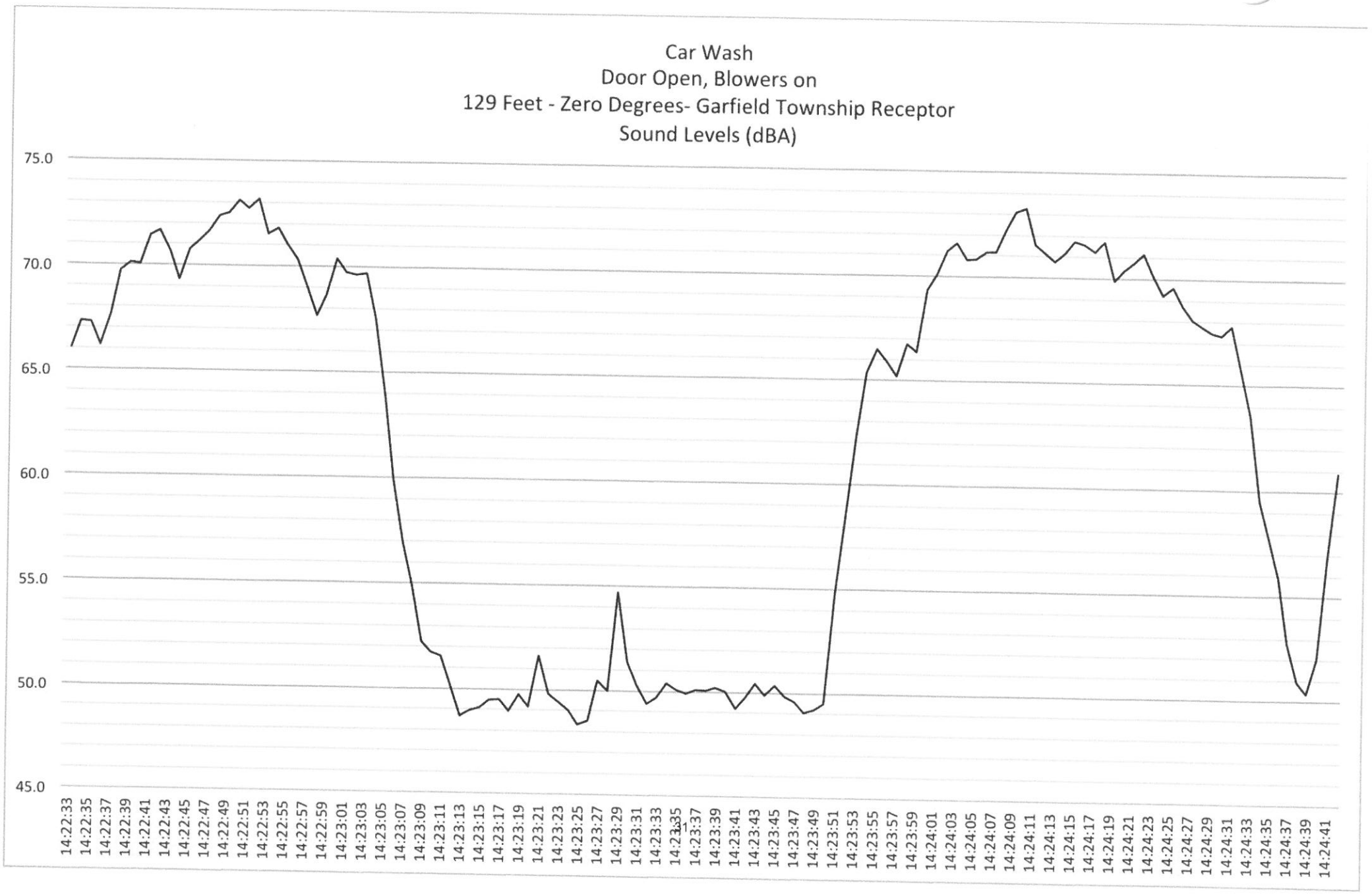

Ambient Sound Levels (dBA)
Traverse City
Friday June 1, 2018
80.0
75.0
70.0
65.0
60.0
55.0
50.0
45.0
40.0
Car Wash
16:11:54
16:12:16
16:12:38
16:13:00
16:13:22
16:13:44
16:14:06
16:14:28
16:14:50
16:15:12
16:15:34
16:15:56
16:16:18
16:16:40
16:17:02
16:17:24
16:17:46
16:18:08
16:18:30
16:18:52
16:19:14
16:19:36
16:19:58
16:20:20
16:20:42
16:21:04
16:21:26
16:21:48

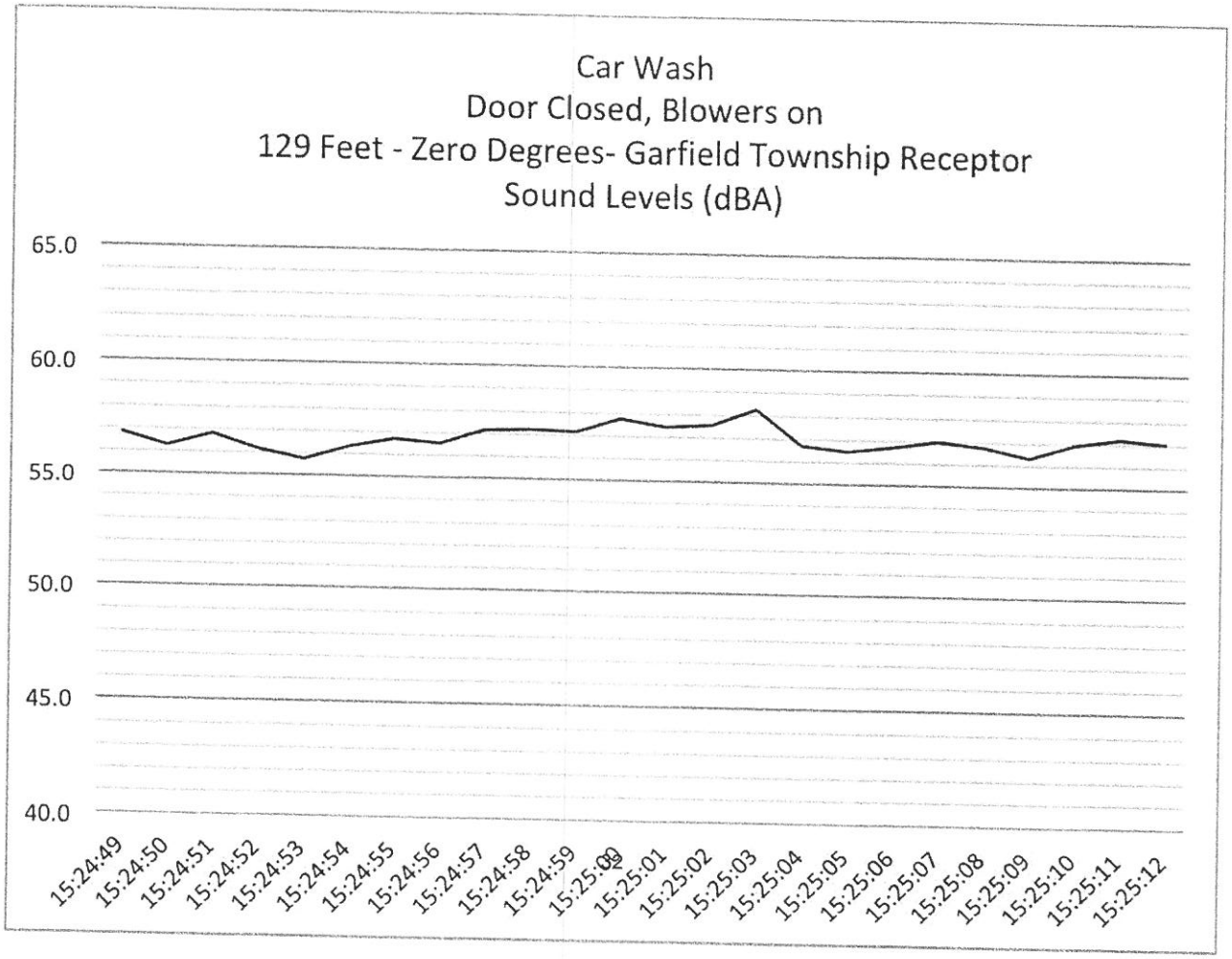

Ambient Sound Levels (dBA)
Traverse City
Saturday June 2, 2018
Ambulance on Garfield Avenue
Car Wash
90.0
80.0
70.0
60.0
50.0
40.0
08:39:58
08:40:14
08:40:30
08:40:46
08:41:02
08:41:18
08:41:34
08:41:50
08:42:06
08:42:22
08:42:38
08:42:54
08:43:10
08:43:26
08:43:42
08:43:58
08:44:14
08:44:30
08:44:46
08:45:02
08:45:18
08:45:34
08:45:50
08:46:06
08:46:22
08:46:38
08:46:54
08:47:10
08:47:26
08:47:42
08:47:58
08:48:14
08:48:30
08:48:46
08:49:02
08:49:18
08:49:34
08:49:50


Ambient Sound Levels (dBA)
Traverse City
Saturday June 2, 2018
80.0
75.0
70.0
65.0
60.0
55.0
50.0
45.0
40.0
Car Wash
Airport Operations
10:05:31
10:05:47
10:06:03
10:06:19
10:06:35
10:06:51
10:07:07
10:07:23
10:07:39
10:07:55
10:08:11
10:08:27
10:08:43
10:08:59
10:09:15
10:09:31
10:09:47
10:10:03
10:10:19
10:10:35
10:10:51
10:11:07
10:11:23
10:11:39
10:11:55
10:12:11
10:12:27
10:12:43
10:12:59
10:13:15
10:13:31
10:13:47
10:14:03
10:14:19
10:14:35
10:14:51
10:15:07
10:15:23

Appendix D

Source
Sound Level Measurements


Car Wash
Door Open, Blowers on
129 Feet - Zero Degrees- Garfield Township Receptor
Sound Levels (dBA)
75.0
70.0
65.0
60.0
55.0
50.0
45.0
14:22:33
14:22:35
14:22:37
14:22:39
14:22:41
14:22:43
14:22:45
14:22:47
14:22:49
14:22:51
14:22:53
14:22:55
14:22:57
14:22:59
14:23:01
14:23:03
14:23:05
14:23:07
14:23:09
14:23:11
14:23:13
14:23:15
14:23:17
14:23:19
14:23:21
14:23:23
14:23:25
14:23:27
14:23:29
14:23:31
14:23:33
14:23:35
14:23:37
14:23:39
14:23:41
14:23:43
14:23:45
14:23:47
14:23:49
14:23:51
14:23:53
14:23:55
14:23:57
14:23:59
14:24:01
14:24:03
14:24:05
14:24:07
14:24:09
14:24:11
14:24:13
14:24:15
14:24:17
14:24:19
14:24:21
14:24:23
14:24:25
14:24:27
14:24:29
14:24:31
14:24:33
14:24:35
14:24:37
14:24:39
14:24:41


Car Wash
Door Closed, Blowers on
129 Feet - Zero Degrees- Garfield Township Receptor
Sound Levels (dBA)
65.0
60.0
55.0
50.0
45.0
40.0
15:24:49
15:24:50
15:24:51
15:24:52
15:24:53
15:24:54
15:24:55
15:24:56
15:24:57
15:24:58
15:24:59
15:25:00
15:25:01
15:25:02
15:25:03
15:25:04
15:25:05
15:25:06
15:25:07
15:25:08
15:25:09
15:25:10
15:25:11
15:25:12

Car Wash
Door Open, Blowers on
138 Feet - Eighty Degrees- Traverse City Receptor
Sound Levels (dBA)
65.0
60.0
55.0
50.0
45.0
40.0
14:26:56
14:26:58
14:27:00
14:27:02
14:27:04
14:27:06
14:27:08
14:27:10
14:27:12
14:27:14
14:27:16
14:27:18
14:27:20
14:27:22
14:27:24
14:27:26
14:27:28
14:27:30
14:27:32
14:27:34
14:27:36
14:27:38
14:27:40
14:27:42
14:27:44
14:27:46
14:27:48
14:27:50
14:27:52
14:27:54
14:27:56
14:27:58
14:28:00
14:28:02

Appendix E

Calibration Certificates

Calibration Certificate

Certificate Number 2018002601

Customer:

The Noise Consultancy LLC
309 Van Nest Road
Flemmington, NJ 08822, United States

Model Number	831
Serial Number	0002504
Test Results	**Pass**
Initial Condition	AS RECEIVED same as shipped
Description	Larson Davis Model 831 Class 1 Sound Level Meter Firmware Revision: 2.314

Procedure Number	D0001.8384	
Technician	Ron Harris	
Calibration Date	12 Mar 2018	
Calibration Due	12 Mar 2019	
Temperature	23.53 °C	± 0.25 °C
Humidity	50.1 %RH	± 2.0 %RH
Static Pressure	86.74 kPa	± 0.13 kPa

Evaluation Method ***Tested with:***

Larson Davis PRM831, S/N 019078
PCB 377B02, S/N 115996
Larson Davis CAL200, S/N 9079
Larson Davis CAL291, S/N 0203

Data reported in dB re 20 µPa.

Compliance Standards Compliant to Manufacturer Specifications and the following standards when combined with Calibration Certificate from procedure D0001.8378:

IEC 60651:2001 Type 1	ANSI S1.4-2014 Class 1
IEC 60804:2000 Type 1	ANSI S1.4 (R2006) Type 1
IEC 61252:2002	ANSI S1.11 (R2009) Class 1
IEC 61260:2001 Class 1	ANSI S1.25 (R2007)
IEC 61672:2013 Class 1	ANSI S1.43 (R2007) Type 1

Issuing lab certifies that the instrument described above meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). It has been calibrated using measurement standards traceable to the International System of Units (SI) through the National Institute of Standards and Technology (NIST), or other national measurement institutes, and meets the requirements of ISO/IEC 17025:2005.
Test points marked with a ‡ in the uncertainties column do not fall within this laboratory's scope of accreditation.

The quality system is registered to ISO 9001:2008.

This calibration is a direct comparison of the unit under test to the listed reference standards and did not involve any sampling plans to complete. No allowance has been made for the instability of the test device due to use, time, etc. Such allowances would be made by the customer as needed.

The uncertainties were computed in accordance with the ISO Guide to the Expression of Uncertainty in Measurement (GUM). A coverage factor of approximately 2 sigma (k=2) has been applied to the standard uncertainty to express the expanded uncertainty at approximately 95% confidence level.

This report may not be reproduced, except in full, unless permission for the publication of an approved abstract is obtained in writing from the organization issuing this report.

Correction data from Larson Davis Model 831 Sound Level Meter Manual, I831.01 Rev O, 2016-09-19

For 1/4" microphones, the Larson Davis ADP024 1/4" to 1/2" adaptor is used with the calibrators and the Larson Davis ADP043 1/4" to

Certificate of Conformity and Calibration

CASELLA CEL

Instrument Model: CEL-120/2 Acoustic Calibrator **Certificate #:** 68279
Serial Number: 2651883

Calibration References:

Casella CEL hereby certifies that the above listed sound measuring instrument has been tested according to the manufacturer's specifications and meets the requirements of the relevant American National Standards Institute (ANSI) Standard for Sound Calibrators S1.40 - 1983 (R1997). This instrument was calibrated against standards which are either traceable to the National Institute of Standards and Technology (NIST) or they have been derived by approved ratio techniques.

Test Conditions:

22.5 °C		Date of Issue:-	October 25, 2017
71.9 %RH		Due Date:-	October 25, 2018
1006.1 mBar		Service Engineer:-	Ken Umbeer

Declaration of conformity:-

This test certificate confirms that the instrument specified above has been successfully tested to comply with the manufacturer's published specifications. Tests are performed using equipment traceable to national standards. This product is certified as being compliant to the requirements of the CE Directive. Test accuracy ratio (TAR) ≥1.

Summary:

The data represents the response of the sound level meter calibrator to the reference source corrected for atmospheric conditions at the time of calibration.

	Nominal Value	Tolerance	As Received	As Adjusted
Frequency (Hz)	1000.0	±5.0	1000.0	1000.0
Level (dB)	114.0	±0.3	114.0	114.0

Standards Used in Calibration:		**Serial Number**	**Calibration Due Date**	**Certificate Number**
Sound Level Meter:	CEL-620.A1	5130002	1/30/2018	27299-2
Multimeter:	Fluke 45	4995184	1/27/2018	1447789

Casella CEL
415 Lawrence Bell Dr.
Unit #4
Buffalo, NY 14221
U.S.A.

Toll Free: +1 (800) 366 2966
Fax +1 (716) 276 3043
E-mail: info@casellaUSA.com
Web: www.casellaUSA.com

Casella CEL (U.K.)
Regent House
Wolsely Road
Kempston
Bedford
MK42 7JY

Phone: +44 (0) 1234 844100
Fax:- +44(0) 1234 841490
E-mail: info@casellacel.com
Web: www.casellacel.com

Casella España S.A.
Polígono Europolis
Calle C, nº48
28230 Las Rozas - Madrid

Phone: + 34 91 640 75 19
Fax:- + 34 91 636 01 96
E-mail: online@casella-es.com
Web: www.casella-es.com

Casella China（中国）
地址
北京东城区东方广场W1座911室
邮编: 100738

电话: 0086 10 85183141
传真: 0086 10 85183143
电子邮件:
info@casellameasurement.cn
网址: www.casellachina.cn

Appendix F

Qualifications
Of
Firm

ERIC M. ZWERLING, M.S., INCE, ASA

Rutgers University Noise Technical Assistance Center
14 College Farm Road
New Brunswick, NJ 08901

The Noise Consultancy, LLC
309 Van Neste Rd
Flemington, NJ 08822

CURRENT POSITIONS

1991-Present *Director* – Rutgers Noise Technical Assistance Center
Department of Environmental Sciences
Rutgers - The State University of New Jersey

1999-Present *President* - The Noise Consultancy, LLC
Noise Consultant/ Expert Witness (Since 1992)
[Expert for the Defendants, City of New York Law Department -
United States District Court for the Southern District of New York]

1993-Present *Noise Enforcement Expert* - New Jersey Department of Environmental Protection. Contracted (as Director of the RNTAC) to provide technical expertise on noise related issues to the NJDEP and the State of New Jersey

1998-Present Committee Member - S12 Working Group 41, Model Community Noise Ordinances. Acoustical Society of America

2001-Present Committee Member - Technical Study Group on Community Noise
Institute of Noise Control Engineering

1994-Present *Instructor* - "Community Noise" in 'Environment and Public Health Course,"
Rutgers Continuing Education Program, Cook College Office of Continuing Professional Education.

1998-2011 *Instructor* - "Noise Hazards" in 'Fundamentals of Industrial Hygiene'.
University of Medicine and Dentistry of New Jersey, School of Public Health, Office of Public Health Practice

1992-2005 *Adjunct Professor*- Rutgers University Department of Environmental Sciences. Course: 375:336 'Community and Occupational Noise'

1998-2000 Commissioner - Franklin Township (NJ) Environmental Commission

2010-Present Board of Education, Chair – Green Committee
Readington Township, New Jersey

2017-Present Chair – Subcommittee
New Jersey State Noise Code NJAC 7:29 - Amendments
New Jersey Noise Control Council
New Jersey Department of Environmental Protection

PROFESSIONAL AFFILIATIONS

Member - Acoustical Society of America
Member – Institute of Noise Control Engineering

EDUCATION

ABD Ph.D. Candidate
Rutgers - the State University of New Jersey
Department of Environmental Sciences

Occupational Hearing Conservationist
Council for Accreditation in Occupational Hearing Conservation.

Graduate Certificate in Environmental Ethics -
Department of Philosophy, University of Georgia.

B.S., M.S. University of Georgia.

JURISDICTIONAL CERTIFICATIONS

Approved Noise Control Investigator
New Jersey Department of Environmental Protection
Pursuant to N.J.A.C. 7:29 -2.11(a)3

Approved Noise Consultant
New York City Department of Environmental Protection
Pursuant to N.Y.C.A.C. Section 24-231

Approved Instructor
State of Michigan
Department of Licensing and Regulatory Affairs
Bureau of Construction Codes

AWARDS

1997 *Advisor of the Year Award*
Rutgers College Student Activities Advisory Council
Faculty Advisor - Students for Environmental Awareness

2016 *Sustainable Raritan Award*
Outstanding Achievement in Public Education
Sustainable Raritan River Collaborative and Rutgers' Sustainable Raritan River Initiative

PUBLICATIONS

Zwerling, E.M. 2015. Proposed Noise Standard for Wind Turbine Generators on Farms. State Agriculture Development Committee, New Jersey Department of Agriculture.

Zwerling, E.M, A. Myers, C. Shamoon. 2012. Analysis of the "Plainly Audible" Standard for Noise Ordinances. Proceedings of Inter- Noise 2012. Institute of Noise Control Engineering.

Zwerling, E.M., C. Shamoon. 2010. Proactive Regulation Engenders Creative Innovation - Quieting the Jackhammer. Proceedings of Noise-Con 2010. Institute of Noise Control Engineering.

Szulecki, S., E. Zwerling, C. Anderson, B. Turpin. 2010. Modeling with CadnaA to estimate the probability of awakening associated with train horns. Proceedings of Noise-Con 2010. Institute of Noise Control Engineering.

Zwerling, E.M., C. Anderson, S. Szulecki, F. Maimone, B. Turpin. 2009. Study of Train Noise in Teaneck, NJ. USEPA Agreement Number: X-83245701-0

Zwerling, E.M. 2005. Regulatory Scheme For Noise Enforcement In New Jersey . *Invited paper.* Journal of the Acoustical Society of America.V.118, No. 3, Pt 2 of 2, Sept. 2005, p. 1849.

Zwerling, E.M. 2004. Training as a Critical Component of Successful Noise Enforcement Programs. *Invited paper.* Journal of the Acoustical Society of America.V.115, No. 5, Pt 2 of 2, May 2004, p. 2568.

Zwerling, E.M. 2004. Noise Enforcement in Cities. *Invited paper.* Journal of the Acoustical Society of America.V.115, No. 5, Pt 2 of 2, May 2004, p. 2593.

Zwerling, E.M. 2002. Characteristics of Successful Local Noise Enforcement Programs. *Invited paper.* Journal of the Acoustical Society of America.V.112, No. 5, Pt 2 of 2, Nov. 2002, p. 2375.

Zwerling, E.M. 2002. Boom Car and Boom Box Code Drafting. The Quiet Zone. Spring 2002.

Zwerling, E.M. 2002. Hearing Protection. In *Encyclopedia of Public Health,* ed. Lester Breslow. Macmillan Reference USA.

Zwerling, E.M. 2001. Vehicle Enforcement. Rutgers Noise Technical Assistance Center. Developed for North Salem, NY

Zwerling, E.M. 2000. Regulation of Amplified Sound Sources. Proceedings of Noise-Con 2000. Acoustical Society of America / Institute of Noise Control Engineering. Newport Beach , CA. December 3-5, 2000 .

Zwerling, E.M. 2000. State of Michigan Model Noise Ordinance. Proceedings of Michigan Municipal League Annual Convention/ Michigan Association of Municipal Attorneys Annual Meeting. September 28-30, 2000 , Macinac Island , MI .

Zwerling, E. M. Contributing Editor. 1991-Present. Community Noise Enforcement. Rutgers Noise Technical Assistance Center.

Zwerling, E. M. Contributing Editor. 1998. Vehicle Sound Reproduction Enforcement. Rutgers Noise Technical Assistance Center. Developed for the City of Rochester, New York

Zwerling, E.M. 1997. Community Noise Enforcement: A Mature Technology. Hearing Rehabilitation Quarterly. 22:4, 4-8+.

Zwerling, E.M., D. Pinto, P. Hanna, J. Lepis, B. Turpin. 1997. Local Noise Enforcement Options and Model Noise Ordinance *With Pre-Approved Language for the State of New Jersey* . Rutgers Cooperative Extension Publication #E215.

Zwerling, E.M. 1997. Community Noise Infosheet. Environmental and Occupational Health Sciences Institute. Public Education and Risk Communication Division.

Zwerling, E.M. 1996. Turning Down the Volume: Effective Strategies for Community Noise Enforcement. The Police Chief. V. 63, Dec. 53-59.

Zwerling, E. M. & B. J. Turpin. 1996. Community Noise Enforcement: Reviving a Moribund Program or Developing One Anew. Proceedings of Noise-Con 96, The 1996 National Conference on Noise Control Engineering. 955-960.

Zwerling, E.M. 1996. Community Noise Pollution Certification and Assistance. Home page for Rutgers Noise Technical Assistance Center. http://www.envsci.rutgers.edu/org/rntac/

RESEARCH PROJECTS (at Rutgers University, as P.I. or Co-P.I.)

"Assistance Regarding Noise Standards for Wind Turbines on Farms," Granting Agency: New Jersey State Agricultural Development Commission (SADC), 2011 - 2015.

"Assistance Regarding Noise Standards for Photovoltaic Installations on Farms," for New Jersey State Agricultural Development Commission (SADC), 2010.

"Railroad Noise in Teaneck, New Jersey" Granting Agency: United States Environmental Protection Agency, 2005 - 2009.

"Road Noise Educational Outreach Program," Granting Agency: New Jersey Department of Transportation, 2002.

CONFERENCE PRESENTATIONS

Community Noise Control: Reviving a Moribund Program or Creating One Anew. International Code Council 2013 Conference. Atlantic City, NJ. September 30, 2013.

Emerging Noise Issues: Emergency Generators and Beach Bars. *Invited Presentation.* New Jersey Environmental Health Association Annual Public Health Conference. Atlantic City , NJ March 5, 2013.

Must we regulate civility? Yes, unfortunately. But, is it effective? *Invited lecture.* stillspotting ( ) nyc . Guggenheim Museum. New York City. October 9, 2012.

Analysis of the "Plainly Audible" Standard for Noise Ordinances. Proceedings of Inter- Noise 2012. Institute of Noise Control Engineering. August 22, 2012.

Proactive Regulation Engenders Creative Innovation - Quieting the Jackhammer. *Invited Paper.* Proceedings of Noise-Con 2010. Institute of Noise Control Engineering. Baltimore, MD, April 20, 2010.

Environmental Health and Noise: Issues and Answers. *Invited Presentation.* New Jersey Environmental Health Association Annual Public Health Conference. Atlantic City , NJ March 3, 2008.

Noise Primer For Legal Professionals. *Invited Presentation.* New York State Bar Association Environmental Law Section Fall Meeting. Saratoga Springs , New York . October 13, 2007.

How to Control Noise Pollution in Your Community. *Invited Presentation.* 90th Annual Conference - New Jersey State League of Municipalities. Atlantic City , NJ November 15, 2005.

Regulatory Scheme for Noise Enforcement in New Jersey . *Invited Paper.* 150th Meeting - Acoustical Society of America . Minneapolis , MN October 17-21, 2005.

Noise Enforcement in Cities. *Invited Paper.* 147th Meeting - Acoustical Society of America . New York , New York May 24-28, 2004.

Training as a Critical Component of Successful Noise Enforcement Programs. *Invited Paper.* 147th Meeting - Acoustical Society of America . New York , New York May 24-28, 2004.

Community Noise Impacts. *Invited Presentation.* Topics in Public Health. New Jersey Department of Health and Senior Services. April 16, 2003.

Characteristics of Successful Local Noise Enforcement Programs. *Invited Paper.* First Pan-American/Iberian Meeting on Acoustics. Jointly Sponsored: Acoustical Society of America , the Iberoamerican Federation of Acoustics and the Mexican Institute of Acoustics. Cancun , Mexico .Dec 2-6, 2002.

Community-Based Environmental Noise Management, *Invited Panelist;* The Role of State and Local Governmental Agencies in Noise Abatement and Control, *Invited Panelist.* Inter-Noise 2002, The 2002 International Congress and Exposition on Noise Control Engineering. Dearborn , MI Aug. 19-21, 2002.

Community Noise Regulation and Enforcement: Theory and Practice. American Association of Code Enforcement. 4th Semi-Annual Education Conference. Bowie , MD. May 1-3, 2002.

Regulation of Amplified Sound Sources. Noise-Con 2000. Acoustical Society of America/Institute of Noise Control Engineering. Newport Beach , CA. December 3-5, 2000.

Writing and Enforcing a Noise Ordinance. Michigan Municipal League Annual Convention. Nuts and Bolts of Writing a Noise Ordinance. Michigan Association of Municipal Attorneys Annual Conference. Macinac Island , MI , September 28-30, 2000.

Municipal Noise Regulation - Theory and Practice. International Municipal Lawyers Association, Mid-Year Seminar. Washington , D.C. April 9-11, 2000.

Effective Strategies for Community Noise Enforcement:
Michigan Municipal League 9th Annual Education Conference. Mt. Pleasant, MI. March 11, 1998.
The Association of Towns of the State of New York , Annual Meeting, Educational Training Courses. New York City , February 16, 1998 .

American Association of Code Enforcement 8th Annual Business and Educational Conference. Hagerstown , MD , October 20-25, 1997.

Community Noise Enforcement: Reviving a Moribund Program or Developing One Anew. Noise-Con '96, The 1996 National Conference on Noise Control Engineering, Seattle, WA, September 29-October 2, 1996.

NOISE ENFORCEMENT CERTIFICATION COURSES TAUGHT

Community Noise Enforcement
Vehicular Noise Enforcement
Vehicle Sound Reproduction Enforcement
Motor Sports Ordinance Enforcement
Octave Band Analysis for Enforcement Purposes

New Jersey :
Certification and recertification - every three months, 1991 to present.

On-Site:
New Rochelle, NY; Jacksonville, FL (five times); Long Beach, NY (three times); Everett, WA; St. Augustine, FL (three times), Seattle, WA (three times); Fairfax County, VA (twice); Neptune Beach, FL; Gainesville, FL; Anchorage, AK (twice); Binghamton, NY (twice); Washington State Association of Code Enforcement (three times); Ft. Collins, CO; Shelter Island, NY (four times); New York City, NY [NYC DEP, NYPD, NYC Parks, NYC DDOC] (eight times); Rochester, NY; Newport, RI; Platekill, NY; Traverse City, MI (three times); Prince George's County, MD; East Hampton, NY (twice); College Park, MD (twice); DeKalb County, GA (four times); Twinsburg, OH; Sandusky, OH; North Salem, NY; Honolulu, HI; Lafayette, LA (twice); Philadelphia, PA (twice); Barbados, West Indies (twice); Freeport, NY (twice); Collier County, FL (three times); MASS DEP; Walton County, FL (three times); Montgomery County, MD (twice); Greenville County (SC); Vancouver B.C. (three times); Panama City Beach, FL (twice); Matanuska-Susitna Borough, AK; Union, OH; Ithaca, NY (three times); Rehoboth Beach, DE; Southampton, NY (twice); Union, OH; Mercer County (NJ) Parks Department

ON-SITE ORDINANCE DEVELOPMENT WORKSHOPS

Lafayette, LA; Traverse City, MI; Plattekill, NY; St. Augustine, FL; Charleston County, SC; Lansing, MI; DeKalb County, GA; Walton County, FL, Overland Park, KS; Greenville County, SC, Decatur, AL; Yonkers, NY; Ossining, NY; Newport RI; Monroe County, FL; Fort Lauderdale, FL; Panama City Beach, FL

PARTIAL LIST OF CLIENTS

City of New York Law Department; City of Philadelphia Law Department, Environmental & Regulatory Compliance Division; U. S. State Department; City of New York Police Department; Bergen County (NJ) Utilities Authority; New York City Department of Environmental Protection; New York State Office of Attorney General; McDonald's Corporation, Lafayette (LA) Consolidated Government; McGlinchey Stafford (New Orleans); Gaeta Recycling, Inc.; National Ecology; Browning Ferris Industries; Township of Manalapan (NJ); Kansas State Legislature; Readington

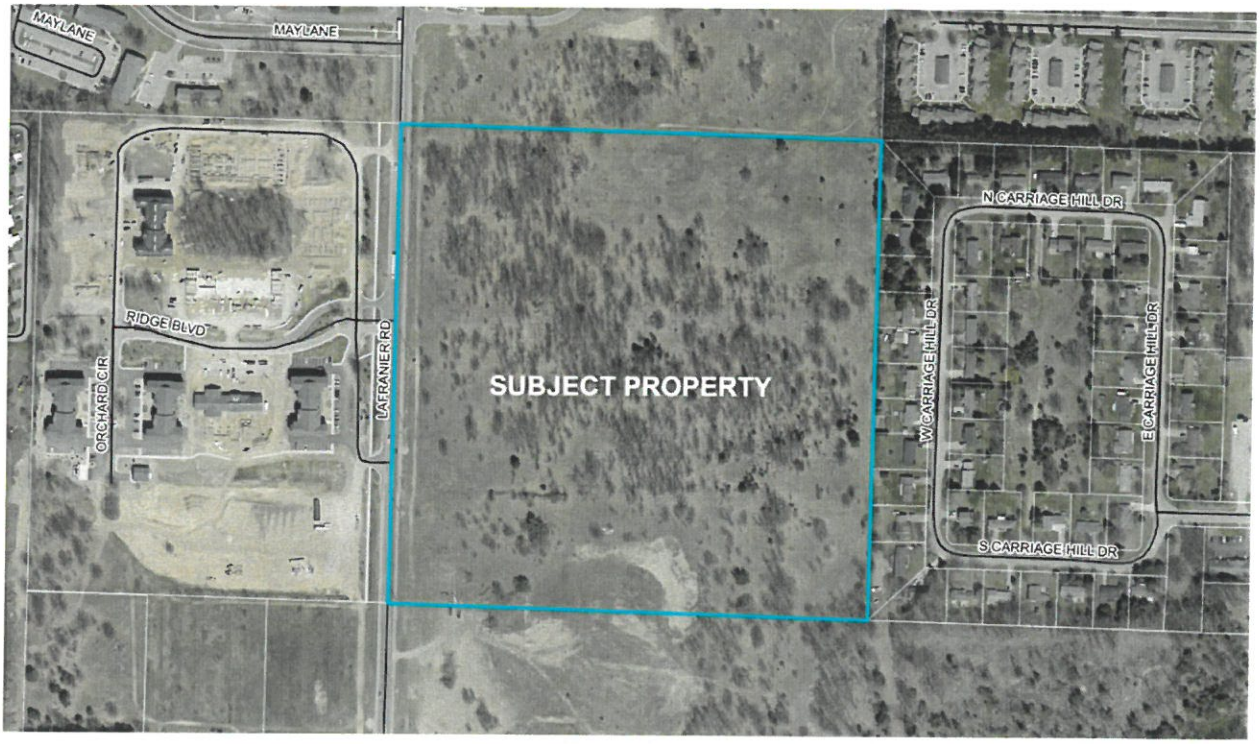
Township (NJ); City of Lansing (MI); City of Tacoma (WA); City of St. Augustine (FL); Atlantic Development and Management Corp.; CareMatrix Corporation; County of Charleston (SC); DeKalb County (GA); Greenville County (SC); Ethicon, Inc.; City of Yonkers (NY); Walton County (FL); City of Overland Park (KS); City of Newport (RI); City of Ossining (NY); Franklin Township (NJ); Alliance to Save Southern Ulster's Rural Environment; Roche Molecular Systems; Wheelabrator, Inc.; Monroe County (FL); City of Juneau (AK); Township of Branchburg (NJ); City of Eugene (OR); Union County United (PA); City of Fort Lauderdale (FL); City of Panama City Beach (FL); Stop & Shop Supermarket Company; Track Racket (Millville, NJ); Green Lawn Cemetery (Columbus, OH); Nissan Motor Company, Ltd.; City of Union (OH); City of Ithaca (NY); SA Engineering; Upper Deerfield Township (NJ); Serra Toyota (Traverse City, MI); City of Norwalk (CT), Coronet Inc.

Charter Township of Garfield
Planning Department Report No. 2018-72

Prepared:	June 26, 2018	Pages:	1 of 2
Meeting:	July 11, 2018 Planning Commission	Attachments:	☐
Subject:	LaFranier Trust Property Proposed Service Drive		
Applicant:	Dixie Roethlisberger		
Owner:	Louis G and Marvel R LaFranier Trusts		
File No.	SPR-2018-01		
Parcel No.	05-023-041-00		

PURPOSE OF APPLICATION:
The application requests site plan review of a service drive which, if approved, would allow for the division of vacant property.

SUBJECT PROPERTY:
The approximately 40-acre subject property is located along LaFranier Road. The applicant has requested to divide the property via land division and is required to submit a service drive for review and approval. The service drive would limit access to the parcel's 1,300 feet of road frontage, as required by Section 512 of the Zoning Ordinance.



BACKGROUND:
The owner of this parent parcel is currently considering dividing out smaller parcels of land for individual sale and development along LaFranier Road. However, prior to approval of any land division, the Zoning Ordinance requires that a service drive be constructed to provide shared

access to the resulting individual development sites. This is an access management approach intended to limit an overabundance of individual curb cuts, which applies to development along Federal and State Highways, as well as County Primary Roads.

STAFF COMMENT:
The service drive will be designed to current Township specifications and constructed as the property develops. The proposed service drive is limited to one access point and only designed for the parcel being subdivided. Staff is of the opinion that this accomplishes the intent of the Ordinance and allows flexibility in design as the applicants move forward with the sale of property. In essence, we would be allowing the design of future projects to dictate the location of the internal roadway system and location of connectivity to adjacent properties.

The application proposes one curb cut to be located directly across from an entrance to the Ridge 45 apartments. The location of the curb cut is logical, and supported by Staff.

RECOMMENDATION:
A service drive must be reviewed and approved by the Planning Commission. Since this is an administrative process, no public hearing is required for this approval.

If the Planning Commission is comfortable with the service drive plan, the following motion would be appropriate:

> THAT application SPR-2018-01, submitted by Dixie Roethlisberger to construct a service drive on portions of parcel no. 05-023-041-00, BE APPROVED, subject to the following conditions:
>
> 1. That the service drive be designed in accordance with the construction standards of the Garfield Township Zoning Ordinance.
> 2. That all future development sites in the project area shall be accessed via the approved curb cut and appropriate extensions shall be made to provide interconnectivity within the properties and between adjacent properties.
> 3. That all agency reviews and final engineering review by the Township Engineer are received prior to the construction of the drive.
> 4. That a landscape plan be provided as a condition of future land divisions or condominium development.
> 5. That any and all Grand Traverse County Road Commission requirements be approved as a part of this approval unless specifically conflicting with the Garfield Township Zoning Ordinance. In the case of conflict, Staff or the Planning Commission shall review the issues for compliance.
> 6. That a letter by an engineer, signed and sealed, be provided to the Zoning Administrator certifying the construction of the service drive to Township specifications be provided prior to the construction of any structures on the property.