



Agenda
City of Charlevoix Planning Commission Regular Meeting
Monday, September 14, 2026 - 6:00 PM
Council Chambers, 210 State Street, Charlevoix, MI

- A. Call to Order/Pledge of Allegiance**
- B. Roll Call**
- C. Inquiry into Potential Conflicts of Interest**
- D. Approval of Agenda**
- E. Approval of the Minutes**
 - 1. Planning Commission Regular Minutes of August 10, 2026
- F. Public Hearings**
 - 1. Public Hearing for changes to Section 153.187 Parking
- G. New Business**
 - 1. Section 153.187 Parking
- H. Old Business**
 - 1. Data Centers
- I. Staff Updates**
 - 1. Zoning Administrators Report
- J. Call for Public Comment Not Related to Agenda Items**
- K. Requests For Next Month's Agenda, Commissioner Comments or Research Items**
- L. Adjournment by 8:00 p.m. unless extended by a motion**

Persons with disabilities who need an accommodation to fully participate in these meetings should contact the City Clerk's Office at 231-547-3250 or by email clerk@charlevoixmi.gov. A 24-hour notice may be needed for certain accommodations. An attempt will be made to grant all reasonable accommodations requests.

City of Charlevoix
Planning Commission Regular Meeting Minutes
Monday, August 10, 2026 - 6:00 PM
Council Chambers, 210 State Street, Charlevoix, MI

A. Call to Order/Pledge of Allegiance

The meeting was called to order at 6:00 p.m. by Chair Muladore. The Commission, staff and members of the public rose and recited the Pledge of Allegiance.

B. Roll Call

Chair: Jennifer Muladore

Members Present: Scott Beatty, Shelley Boehmer, Christine Galbreath, Kristin Jones, Maureen Radke

Members Absent: None

Staff Present: Jonathan Scheel, Director of Planning and Zoning

C. Inquiry into Potential Conflicts of Interest

None.

D. Approval of Agenda

Motion by Member Beatty, seconded by Member Boehmer to approve the agenda as presented.

Motion carried by unanimous voice vote.

E. Approval of the Minutes

1. Minutes of July 13, 2026 Planning Commission Meeting

Member Jones stated a correction was needed on the June 8th meeting minutes to complete a public comment by "Bill" to add his last name, which is Truvilowicz. Chair Muladore stated that she could correct the hard copy of the minutes by writing in the last name.

Motion by Member Boehmer, seconded by Member Radke to approve the minutes of July 13, 2026, as presented.

Motion carried by unanimous voice vote.

F. Call for Public Comment Not Related to Agenda Items

None.

G. New Business

None.

H. Old Business

1. Data Center Ordinance

Director Scheel informed the Commission that the proposed ordinance was last reviewed in June, and the latest draft incorporates public feedback from that meeting. He acknowledged Andrew Paige's detailed notes, which informed some of his revisions. However, he did not revise the noise section due to its complexity and ongoing research. He has received a technical report from Nelson Acoustics regarding noise issues relevant to the William County Board of

Supervisors and will simplify that information for the next Commission meeting.

Discussion followed regarding vibration and noise decibel issues related to this type of use. Director Scheel reviewed the red-lined changes he had made to the ordinance since the last meeting. Under Non-operational, the Commission asked to change from one year to 12 months. Mr. Scheel stated under equipment it was recommended to use semiconductor-based flash storage instead of mechanical hard drives. Discussion followed regarding language related to equipment replacement, changes to facility operations or decommissioning the facility.

Chair Muladore stated she had to visualize the up to 10 MW size for a facility which would equate to a 30,000 to 60,000 sq. ft. facility which is the equivalent of a football field or two Trader Joe stores, and she stated that was too big. The Commission concurred to recommend 3 MW as the maximum size for such a facility and Director Scheel would bring back more research on the facility size.

The Commission concurred that the facility has to meet dark sky lighting principles.

The Commission reviewed the remaining staff recommended changes to the ordinance and no further changes were added by the Commission. The Commission agreed to review the ordinance one more time at the September meeting before scheduling a public hearing.

I. Staff Updates

1. Zoning Administrator Report

Director Scheel reviewed the report and described a couple of situations with neighbor complaints about different issues.

J. Requests For Next Month's Agenda, Commissioner Comments or Research Items

Chair Muladore stated that next month's agenda would include the changes to the Parking Ordinance and the Master Plan discussion. Director Scheel reminded Members to bring any recommended changes to the Master Plan to his attention for further review and discussion at the September meeting.

There was discussion regarding a property for sale on Stover Road and related zoning issues.

K. Adjournment by 8:00 p.m. unless extended by a motion

Chair Owens adjourned the meeting at 7:14 p.m.

Sarah J. Dvoracek/fgm

City Clerk

Jennifer Muladore

Chair

Charlevoix Planning Commission

Public Hearings

Title: Public Hearing for changes to Section 153.187 Parking

Date: September 14, 2026

Presented By: Jonathan Scheel, Director of Planning & Zoning

Background:

Hear public comment and discuss changes to 153.187 PARKING of the City of Charlevoix Zoning Ordinance. The Planning Commission may approve, deny or table any action on the ordinance changes. If approved, the Planning Commission then recommends their action to the City Council.

Recommendation:

The Planning Commission may approve, deny or table any action on the ordinance changes

Attachments:

1. Parking changes final version
2. Public Notice Parking

OFF-STREET PARKING, LOADING, ACCESS AND CIRCULATION Proposed changes

§ 153.187 PARKING REQUIREMENTS AND LIMITATIONS.

(C) For a use not specifically included in Table 153.187, off-street parking requirements shall be in accordance with a use determined by the Zoning Administrator to have comparable parking characteristics. For any use determined as not having a comparable parking requirement, it shall be determined by the Planning Commission based on recent and published parking research, or by accepting the findings of a parking study provided by the applicant in accordance with § 153.188(B)(6) of this chapter. Where the applicant has provided a parking study, it shall demonstrate that a standard other than that required by this subchapter would be more appropriate based on the number of employees, expected level of customer traffic, or actual counts at a similar establishment. Parking studies shall be prepared by a qualified expert, such as a professional transportation engineer or professional transportation planner, based upon standards, manuals and research published by professional organizations, such as the Institute of Transportation Engineers, the Transportation Research Board or Urban Land Institute. The Planning Commission may require parking studies of comparable uses in the general area as part of the study.

(H) Off-street parking exemptions, reductions, and allowances.

Credit for on-street parking. Within the Mixed Use Overlay Areas, any on-street parking space adjacent to the use, each such space consisting of not less than 23 feet of contiguous linear permissible on-street parking that is immediately adjacent to the use, may be counted as one space against applicable off-street parking requirements for such use

I) The minimum required number of off-street parking spaces shall be determined based on the requirements listed in Table 153.187.

Table 153.187: Parking and Access Requirements by Use	
Use	Number of Parking Spaces
Table 153.187: Parking and Access Requirements by Use	
Use	Number of Parking Spaces
RESIDENTIAL USES	
ADU	1 space per dwelling unit
Bed and breakfast	See § 153.116(D)(7)
Boarding or rooming house	1 space per 2 beds, plus 1 additional space for owner or employee use
Dwellings above first floor businesses	1 space per dwelling unit
Multiple-family residential dwellings	1 space per dwelling unit

§ 153.188 PARKING ALTERNATIVES.

(A) *Shared/common parking.* Shared parking, or an arrangement in which two or more nonresidential uses with different peak parking demands (hours of operation) uses the same off-street parking spaces to meet their off-street parking requirements, may be allowed.

(3) Shared parking must be within 300 feet walking distance, measured from the entrance of the use to the nearest parking space in the shared lot.

(B) *Modification of parking requirements.* The Planning Commission may reduce the parking space requirements of this section for any use, based upon one or more of the following.

(2) Convenient municipal off-street parking facilities are located no further than 600 feet from the subject properties.

§ 153.189 OFF-STREET PARKING FACILITY DESIGN.

(A) *Off-street parking location and setbacks.*

(3) *Proximity.* Required off-street parking facilities for all uses, other than residential dwellings, shall be located on the same lot as the use, or within 300 feet of the building(s) or use they are intended to serve. Distance shall be measured from the nearest point of the building to the nearest point of the off-street parking lot.

(B) (5) A parking study to document that the above divisions (B)(1)(a) through (B)(1)(d) have been addressed

(C) *Pavement.* Unless alternative materials are specifically permitted as provided in this division (C), all parking lots and vehicle and equipment storage areas shall be hard surfaced using asphalt, concrete or concrete or brick pavers and shall be appropriately graded and drained. The Planning Commission may approve permeable surfaces for all or part of a parking lot. For storage areas, a substitute for hard surface paving may be allowed if the Planning Commission finds adjoining properties will not be adversely affected.

(E) *Dimensions.* Table 153.189 specifies applicable parking space and aisle dimension requirements.

(2) The length of a parking stall may be reduced by up to two feet if the parked vehicle can overhang an unobstructed landscaped area or sidewalk by not more than two feet. In such instances a sidewalk shall be at least seven feet wide.

(L) Lighting. All lighting must meet **153.172 LIGHTING.**



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NOTICE OF PUBLIC MEETINGS

Charlevoix City Hall – Council Chambers 2nd
Floor
210 State Street
Charlevoix, MI 49720

August 21, 2026

City Planning Commission

September 14, 2026, 6:00PM

The City of Charlevoix Planning Commission will hold a public meeting on **Monday September 14, 2026, at 6:00 p.m.** in the Charlevoix City Hall Council Chambers to hear public comment and discuss changes to 153.187 PARKING of the City of Charlevoix Zoning Ordinance. The Planning Commission may approve, deny or table any action on the ordinance changes. If approved, the Planning Commission then recommends their action to the City Council.

Written and oral comments from the public are welcome. Oral comments may be presented at the hearing. Written comments may be mailed, emailed, faxed or hand delivered to the City Planning Department no later than 4:00 PM on the evening of the hearings at the above address. The case file and plans may be viewed at the City Planning Office at City Hall or see the agenda at **charlevoixmi.gov** after September 9, 2026. Please call or email me with any questions or concerns you may have.

Jonathan D. Scheel
Director of Planning and Zoning

Charlevoix Planning Commission

New Business

Title: Section 153.187 Parking

Date: September 14, 2026

Presented By: Jonathan Scheel, Director of Planning & Zoning

Background:

Minor changes to the parking section of the zoning ordinance including one required space for ADUs, limited credit for street parking, and removing contradictory language for downtown parking.

Recommendation:

Motion to approve sending for legal review and then to City Council

Attachments:

1. current
2. Parking changes
3. Parking changes final version

OFF-STREET PARKING, LOADING, ACCESS AND CIRCULATION

§ 153.185 DESCRIPTION AND PURPOSE.

(A) The purpose of this subchapter is to prescribe regulations for off-street parking of motor vehicles in residential and non-residential zoning districts, to ensure that adequate parking and access are provided in a safe and convenient manner and to afford reasonable protection for adjacent land uses from light, glare, noise, air pollution and other effects of parking concentrations.

(B) It is the further intent of these regulations to:

- (1) Implement the goals and policies of the city's Master Plan;
- (2) Reduce the impacts associated with parking lots through minimum and maximum parking requirements; and
- (3) Accommodate shared parking to limit the extent of paved and impervious surfaces.

(Prior Code, § 5.90)

§ 153.186 APPLICABILITY.

(A) For all buildings and uses established after the effective date of this chapter, off-street parking shall be provided as required by this section, except in the CBD Central Business District. Parking spaces provided in this manner shall be unreserved and generally available to the public.

(B) If the intensity of the use of any building or site is increased by adding floor area, increasing seating capacity or employees, or by any other means, additional off-street parking shall be provided to the extent required by this subchapter.

(C) For off-street parking facilities that exist on the effective date of this chapter, their capacity shall not be reduced below the requirements of this subchapter, nor shall the capacity of non-conforming parking facilities be further reduced or made more non-conforming.

(D) Required off-street parking shall not be changed to another use unless equal facilities are provided elsewhere, in accordance with the provisions of this subchapter.

(E) Changes in use or new uses of existing buildings or floor area shall require parking in accordance with this subchapter, except in the CBD Central Business District the requirement for additional parking due to a legal commercial use change shall be waived.

(Prior Code, § 5.91) (Ord. 807, passed 9-3-2019)

§ 153.187 PARKING REQUIREMENTS AND LIMITATIONS.

(A) Off-street parking shall only be used for temporary vehicle parking related to the activities on the premise. The storage of merchandise, motor vehicles for sale, recreational vehicles, limousines, trucks and trailers is prohibited, except under the conditions of § 153.153 of this chapter. Use of off-street parking to store or park wrecked or junked cars, or to repair vehicles is prohibited.

(B) When calculations for required parking spaces result in a fraction over one-half, one full parking space shall be required.

(C) For a use not specifically included in Table 153.187, off-street parking requirements shall be in accordance with a use determined by the Zoning Administrator to have comparable parking characteristics. For any use determined as not having a comparable parking requirement, it shall be determined by the Planning Commission based on recent and published parking research, or by accepting the findings of a parking study provided by the applicant in accordance with § 153.188(B)(6) of this chapter.

(D) For benches, pews or similar seating, each 24 inches shall be counted as one seat unless plans filed with the city specify a maximum seating capacity, which shall then be used to determine parking requirements.

(E) Unless otherwise indicated, floor area shall refer to usable floor area (UFA).

(F) Where parking requirements are established by maximum building seating or occupancy, capacity shall be based on the building and/or fire code, whichever is more restrictive.

(G) Minimum parking space requirements shall not be exceeded unless approved by the Planning Commission based on documented evidence that additional spaces are required to accommodate parking demand on a typical day. The

Planning Commission may require any additional spaces to be constructed using alternate paving materials, such as pervious pavers or concrete. A required or requested use of alternative paving materials shall include a maintenance plan and agreement from the property owner deemed satisfactory to the Planning Commission.

(H) The minimum required number of off-street parking spaces shall be determined based on the requirements listed in Table 153.187.

Table 153.187: Parking and Access Requirements by Use	
Use	Number of Parking Spaces
Table 153.187: Parking and Access Requirements by Use	
Use	Number of Parking Spaces
RESIDENTIAL USES	
Bed and breakfast	See § 153.116(D)(7) <i>Can use off street parking in front of parcel</i>
Boarding or rooming house	1 space per 2 beds, plus 1 additional space for owner or employee use
Dwellings above first floor businesses	1 space per dwelling unit
Multiple-family residential dwellings	1.5 spaces per dwelling unit <i>why less? why more?</i>
Senior apartments and senior independent living	0.5 space per unit, and 1 space per employee. Should units revert to general occupancy, the requirements for multiple-family residential dwellings shall apply
Single-family and two-family dwellings	2 spaces per dwelling unit <i>base on sq ft?</i>
INSTITUTIONAL USES	
Auditoriums, assembly halls, meeting rooms, theaters and similar places of assembly	1 space per 4 seats, based on maximum seating capacity in the main place of assembly, as established by the city's Fire and Building Codes
Day care facility, nursery school, child care center, family day care home, group day care home	1 per 700 sq. ft. of UFA, plus 1 per employee. Sufficient area shall be designated for drop-off of children or adults in a safe manner that will not result in traffic disruptions
Elementary and middle schools	1 per teacher, employee and administrator
Convalescent or nursing home	1 per 6 beds or occupants and 1 space per staff member or employee on the largest shift
Hospitals and similar facilities for human care	1 per 5 beds, plus 1 per employee on the largest shift
Churches and customary related uses	1 for every 5 seats in the main place of assembly
High schools; colleges and universities; business, trade, technical, vocational or industrial schools; performing and fine arts schools	1 per teacher, employee and administrator, and 1 for every 10 students
RETAIL USES	
Retail stores, except as otherwise specified	1 per employee on the largest shift, plus 1 for every 500 sq. ft. of UFA
Multi-tenant shopping centers	

With 60,000 sq. ft. or less of retail	1 per employee on the largest shift, plus 1 for every 350 sq. ft. of retail UFA
With over 60,000 sq. ft. of retail	1 per employee on the largest shift, plus 1 for every 300 sq. ft. of retail UFA
With restaurants	If more than 20% of the shopping center's floor area is occupied by restaurants or entertainment uses, parking requirements for these uses shall be calculated separately. Where the amount of restaurant space is unknown, it shall be calculated at 20%
Agricultural sales, greenhouses and nurseries or roadside stands	1 per employee on the largest shift, plus 1 per 350 sq. ft. of permanent or temporary area devoted primarily to sales
Animal grooming, training, day care and boarding	1 per employee on the largest shift, plus 1 for every 1,000 sq. ft. of UFA
Furniture and appliance, household equipment, show-room of a plumber, decorator, electrician, hardware, wholesale and repair shop or other similar uses	1 per employee on the largest shift, plus 1 for every 1,000 sq. ft. of net UFA, plus 1 additional space per employee
Grocery store/supermarket	1 per employee on the largest shift, plus 1 for every 500 sq. ft. of UFA
Home improvement centers	1 per employee on the largest shift, plus 1 for every 1,000 sq. ft. of UFA
Open air businesses, except as otherwise specified	1 per employee on the largest shift, plus 1 for every 500 sq. ft. of lot area for retail sales, uses and services
Vehicle dealerships, including automobiles, RVs, motorcycles, snowmobiles, ATVs and boats	1 per employee on the largest shift, plus 1 for every 1,000 sq. ft. of floor space of sales room
SERVICE USES	
Banks and other financial institutions	1 per employee on the largest shift, plus 1 per 500 sq. ft. of UFA for the public. Drive-up windows/drive-up ATMs shall be provided with 2 stacking spaces per window or drive-up ATM
Beauty parlor or barber shop	1 per employee on the largest shift, plus 1 parking space per chair/station
Dry cleaners	1 per employee on the largest shift, plus 1 per 500 sq. ft. of UFA
Laundromats	1 per employee on the largest shift, plus 1 per 4 combinations of washer-dryer machines, plus 1 space per employee
Mortuary, funeral home	1 per employee on the largest shift, plus 1 per 3 patron seats at largest capacity
Motel, hotel or other commercial lodging establishment	1 per employee on the largest shift, plus 0.5 space per unit. In addition, spaces required for ancillary uses such as lounges, restaurants or places of assembly shall be provided and determined on the basis of the individual requirements for that use

Motor vehicle service stations (gas stations and truck stops)	1 per employee on the largest shift, plus additional parking required for other uses within an automobile service station, such as the retail floor area, restaurants or vehicle repair stalls
Vehicle repair establishment, major or minor	1 per employee on the largest shift, plus 1 per service stall
Vehicle wash	
Self-service (coin operated)	4 spaces, plus 2 stacking spaces for every washing stall
Full-service	1 per employee on the largest shift, plus 4 spaces and 3 stacking spaces for every washing stall or line
Restaurants, bars and clubs	
Standard sit-down restaurants with liquor license	1 per employee on the largest shift, plus 1 per 300 sq. ft. of UFA
Carry-out restaurant (with limited or no seating for eating on premises)	1 per employee on the largest shift, plus 4 per service or counter station
Open front restaurant/ice cream stand	1 per employee on the largest shift, plus 5 spaces and 1 per 6 seats
Drive-through restaurant	1 for every 2 employees, plus 1 for every 6 seats intended for patrons within the building, plus 4 stacking spaces per food pickup window
Bars, lounges, taverns, nightclubs (majority of sales consist of alcoholic beverages)	1 per employee on the largest shift, plus 1 per 200 sq. ft. of UFA
Private clubs, lodge halls or banquet halls	1 per employee on the largest shift, plus 1 for every 6 persons allowed within the maximum occupancy load as established by the city's Fire and Building Codes
RECREATION	
Athletic clubs, exercise establishments, health studios, sauna baths, martial art schools and other similar uses	1 per employee on the largest shift, plus 1 per 4 persons allowed within the maximum occupancy load as established by city's Fire and Building Codes
Billiard parlors	1 per 3 persons allowed within the maximum occupancy load as established by city's Building and Fire Codes, or 1 per 500 sq. ft. of gross floor area, whichever is greater
Bowling alleys	4 per bowling lane plus additional for accessory uses such as bars
Indoor recreation establishments including gymnasiums, tennis courts and handball, roller or ice-skating rinks, exhibition halls, dance halls and banquet halls	1 space for every 6 persons allowed within the maximum occupancy load as established by the city's Fire and Building Codes
Miniature or "par-3" courses	1 per employee on the largest shift, plus 1 per 2 holes
Commercial marinas	0.25 space for every boat slip based on the permitted slips by the state's Department of

Natural Resources

OFFICES

Business offices, post offices or professional offices of lawyers, architects or similar professionals	1 per employee on the largest shift, plus 1 for every 300 sq. ft. of UFA, but no less than 5 parking spaces
Medical offices of doctors, dentists, veterinarians or similar professions	1 per employee on the largest shift, plus 1 for every 300 sq. ft. of UFA

INDUSTRIAL USES

Industrial establishments, including manufacturing, research and testing laboratories, creameries, bottling works, printing, plumbing or electrical workshops	1 for every 2 employees or 700 sq. ft. of UFA, whichever is greater
Warehouses and storage buildings	1 per employee on the largest shift
Mini warehouses/self-storage	Unobstructed parking area equal to 1 for every 10 door openings, plus parking for other uses on site such as truck rental
Truck terminal	1 per employee on the largest shift, plus 2 truck spaces of 10 x 70 ft. per truck berth or docking space
Air freight forwarders/distribution facilities	1 per employee on the largest shift

(Prior Code, § 5.92) (Ord. 802, passed 4-15-2019; Ord. 807, passed 9-3-2019; Ord. 839, passed 6-19-2023)

§ 153.188 PARKING ALTERNATIVES.

(A) *Shared/common parking.* Shared parking, or an arrangement in which two or more nonresidential uses with different peak parking demands (hours of operation) uses the same off-street parking spaces to meet their off-street parking requirements, may be allowed.

(1) The Zoning Administrator may approve an adjustment to the parking requirements allowing shared parking arrangements for nonresidential uses with different hours of operation.

(2) Applicant must provide that there is no substantial conflict in the principle operating hours of the uses for which the shared parking is proposed.

(3) Shared parking must be within 50 feet walking distance, measured from the entrance of the use to the nearest parking space in the shared lot. *7. means adjacent property only. B1C below is 300'*

(4) An agreement providing for the shared use of the parking, executed by the parties involved, must be filed with the Zoning Administrator, in a form approved by the Zoning Administrator upon consultation with the city attorney.

(B) *Modification of parking requirements.* The Planning Commission may reduce the parking space requirements of this section for any use, based upon one or more of the following.

(1) Shared parking by multiple uses is expected due to the likelihood of numerous multipurpose visits, or if uses have peak parking demands during different times of the day or days of the week; subject to the following.

(a) Sidewalks shall be maintained or established between the uses.

(b) Pedestrian connections, both within and to the site, shall provide safe and convenient access to building entrances.

(c) For separate properties, shared parking lots shall be within 300 feet to one another with vehicular and pedestrian access.

(d) Unless the multiple uses are all under single ownership and within a unified business or shopping center, office park or industrial park, shared parking agreements shall be filed with the City Clerk after approval by the Zoning Administrator.

(2) Convenient municipal off-street parking facilities or on-street spaces are located no further than 600 feet from the subject properties. *what does this mean?*

(3) An expectation of walk-in trade is reasonable due to the proximity of residential neighborhoods, downtown or employment areas that are interconnected with sidewalks.

(4) Other forms of travel such as bicycle or transit are available and are reasonable alternatives.

(5) The Planning Commission may require a parking study to document that the above divisions (B)(1)(a) through (B)(1)(d) have been addressed. *Doesn't fit under (B) heading*

(6) Where the applicant has provided a parking study, it shall demonstrate that a standard other than that required by this subchapter would be more appropriate based on the number of employees, expected level of customer traffic, or actual counts at a similar establishment. Parking studies shall be prepared by a qualified expert, such as a professional transportation engineer or professional transportation planner, based upon standards, manuals and research published by professional organizations, such as the Institute of Transportation Engineers, the Transportation Research Board or Urban Land Institute. The Planning Commission may require parking studies of comparable uses in the general area as part of the study.

(C) *Deferred parking.*

(1) Where a reduction in parking spaces is not warranted, but an applicant can demonstrate the parking requirements for a proposed use may be excessive given the particular circumstances of the use and property, the Planning Commission may defer some of the required parking. The site plan shall designate an area to accommodate its future construction, if and when it is needed, meeting the design standards and dimensional requirements of this subchapter. In the interim, the deferred parking area shall be landscaped and maintained and shall not occupy required setbacks, buffers or landscaped areas or be used for any other purpose.

(2) Construction of the deferred parking spaces may be initiated by the owner or required by the city based on conditions affecting on-site parking needs or observations, and shall require administrative approval of an amended site plan.

Contradicts 186(A)&(E)
 (D) *Downtown parking.* The minimum number of off-street parking spaces required by this section shall be waived for all buildings fronting Bridge Street between the Pine River Channel and Antrim Street.

(E) *Proposed developments.* The Planning Commission may require parking in the side or rear of a building where possible, if a proposed development fronts a public street. In these instances the Planning Commission may waive or reduce landscaping or screening requirements in § 153.171 of this chapter.

(Prior Code, § 5.93) (Ord. 794, passed 9-17-2018; Ord. 807, passed 9-3-2019)

§ 153.189 OFF-STREET PARKING FACILITY DESIGN.

(A) *Off-street parking location and setbacks.*

(1) *Side and rear yard limitation.* Off-street parking lots shall meet the side setback requirements as specified in the zoning district and shall not be closer than 15 feet from the rear property line. *change with Alley?*

(2) *Front yard limitation.* In the CBD, GC, PO and CM Districts and single multi-family buildings in the R1 or R2 Districts, the required front yard setback shall not be used for off-street parking, loading, or unloading and shall remain open, unoccupied and unobstructed, except for landscaping or vehicle access drives.

(3) *Proximity.* Required off-street parking facilities for all uses, other than residential dwellings, shall be located on the same lot as the use, or within 300 feet of the building(s) or use they are intended to serve. Distance shall be measured from the nearest point of the building to the nearest point of the off-street parking lot. *contradicts 153.08(A)&(B)*

(a) Required off-street parking facilities for residential dwellings shall be located on the same property as the premises they are intended to serve and shall consist of a driveway, a parking apron and/or a garage. Parking for single multifamily structures shall be located at the rear or on the side of the building. *contradicts 153.08(A)&(E)*

(b) In the CBD District, parking facilities shall be located within 600 feet of the building or use to be served. Distance shall be measured from the nearest point of the building to the nearest point of the off-street parking lot. *contradicts 186(A)&(E)*

(c) Parking access shall be from the alley or front side where available, otherwise access may be from the front lot line.

(B) *Parking construction and development.* The construction of a parking lot shall require an approved site plan, in accordance with §§ 153.230 through 153.243 of this chapter. Construction shall be completed and approved by the Zoning Administrator.

(C) *Pavement.* Unless alternative materials are specifically permitted as provided in this division (C), all parking lots and vehicle and equipment storage areas shall be hard-surfaced using asphalt, concrete or concrete or brick pavers and shall be appropriately graded and drained. The Planning Commission may approve permeable paving for all or part of a parking lot. For storage areas, a substitute for hard surface paving may be allowed if the Planning Commission finds adjoining properties will not be adversely affected.

other choices? pavers permeable

(D) *Curbs.* A parking lot shall be surrounded by a six-inch concrete curb, except for driveway openings, sidewalk cut-ins and approved drainage systems, to protect landscaped or pedestrian areas, buildings or adjacent property from potential vehicle encroachment. The Planning Commission may approve an alternative to a fully curbed parking facility as long as the intent of this division (D) is achieved. To avoid conflicts with swinging car doors and overhanging bumpers, in such circumstances all plants shall be set back at least two feet from the edge of pavement.

(E) *Dimensions.* Table 153.189 specifies applicable parking space and aisle dimension requirements.

(1) Angled parking between the specified ranges shall be to the nearest degree.

(2) The length of a parking stall may be reduced by up to two feet if the parked vehicle can overhang an unobstructed landscaped area or sidewalk by not less than two feet. In such instances a sidewalk shall be at least seven feet wide.

(3) At least seven feet shall be maintained between a parking lot and building.

(4) All parking lots shall be striped and maintained showing individual parking bays in accordance with the following dimensions:

Table 153.189: Dimensional Requirements (Feet)

Parking Pattern (Degree)	Parking Space		Maneuvering Lane Width	Total 1 Row of Parking and Maneuvering Lane	Total Bay (2 Rows of Parking and Maneuvering Lane)
	Width	Length			
0 degree (parallel)	8	23	12	20	28
30 to 53	9	20	12	32	52
54 to 74	9	20	15	36.5	58
75 to 90	9	18	24	42	60

(F) *Stacking spaces.* Waiting/stacking spaces for a drive-through use (such as a bank, restaurant, car wash, pharmacy, dry cleaner or oil change establishment) shall be at least 24 feet long and ten feet wide and shall not block off-street parking spaces. Where the waiting/stacking lane is a single lane accommodating five or more vehicles, an escape lane shall be provided for vehicles wishing to by-pass the drive-up window.

(G) *Ingress and egress.* Clearly defined and limited driveways shall provide adequate vehicular access to a parking lot. Interior access and circulation aisles for all parking spaces shall be provided. A public street shall not be used as a maneuvering space for a vehicle to get into or out of an off-street parking space. Access drives serving a parking lot in a non-residential zoning district shall not cross a residential district, except when access is provided by means of an alley that forms a boundary between a residential and non-residential district.

(H) *Landscaping.* Off-street parking areas shall be landscaped in accordance with the requirements of § 153.171(H) of this chapter.

(I) *Fire lanes.* All fire lanes shall be designated on a site and posted with signs prior to occupancy.

(J) *Barrier free parking.* Signed and marked barrier free parking spaces shall be provided at convenient locations in a parking lot in accordance with the state barrier free parking requirements. Barrier free spaces shall be located as close as possible to building entrances.

(K) *Maintenance.* All parking lots and structures shall be maintained free of trash and debris and all surfaces, curbs, light fixtures and signs shall be maintained in good condition.

(L) *Lighting.* (Reference lighting ordinance)

(Prior Code, § 5.94) (Ord. 807, passed 9-3-2019; Ord. 848, passed 4-1-2024) Penalty, see § 153.999

§ 153.190 OFF-STREET LOADING REQUIREMENTS.

(A) *Uses requiring loading area.* To avoid interference with the use of public streets, alleys and parking spaces, adequate space for standing, loading and unloading shall be provided and maintained on the same lot as the premises.

(B) *Loading area requirements.* A loading and unloading space shall be paved, and unless otherwise provided, shall be ten feet by 40 feet, with a 15-foot height clearance, according to Table 153.190:

Table 153.190: Minimum Off-Street Loading Requirements	
Building Net GFA	Minimum Truck Loading Spaces
0 - 1,400 sq. ft.	None
1,401 - 20,000 sq. ft.	1 space
20,001 - 100,000 sq. ft.	1 space, plus 1 space for each 40,000 sq. ft. in excess of 20,000 sq. ft.
100,001 - 500,000 sq. ft.	5 spaces, plus 1 space for each 40,000 sq. ft. in excess of 100,000 sq. ft.

(C) *Orientation of overhead doors.* Overhead doors for a truck loading area shall not face a public right-of-way and shall be screened so they are not visible from a public street or an adjacent residential district.

(Prior Code, § 5.95) Penalty, see § 153.999

OFF-STREET PARKING, LOADING, ACCESS AND CIRCULATION Proposed changes

§ 153.187 PARKING REQUIREMENTS AND LIMITATIONS.

(C) For a use not specifically included in Table 153.187, off-street parking requirements shall be in accordance with a use determined by the Zoning Administrator to have comparable parking characteristics. For any use determined as not having a comparable parking requirement, it shall be determined by the Planning Commission based on recent and published parking research, or by accepting the findings of a parking study provided by the applicant in accordance with § 153.188(B)(6) of this chapter. Where the applicant has provided a parking study, it shall demonstrate that a standard other than that required by this subchapter would be more appropriate based on the number of employees, expected level of customer traffic, or actual counts at a similar establishment. Parking studies shall be prepared by a qualified expert, such as a professional transportation engineer or professional transportation planner, based upon standards, manuals and research published by professional organizations, such as the Institute of Transportation Engineers, the Transportation Research Board or Urban Land Institute. The Planning Commission may require parking studies of comparable uses in the general area as part of the study.

(H) Off-street parking exemptions, reductions, and allowances.

Credit for on-street parking. Within the Mixed Use Overlay Areas, any on-street parking space adjacent to the use, each such space consisting of not less than 23 feet of contiguous linear permissible on-street parking that is immediately adjacent to the use, may be counted as one space against applicable off-street parking requirements for such use

(H) I The minimum required number of off-street parking spaces shall be determined based on the requirements listed in Table 153.187.

Table 153.187: Parking and Access Requirements by Use	
Use	Number of Parking Spaces
Table 153.187: Parking and Access Requirements by Use	
Use	Number of Parking Spaces
RESIDENTIAL USES	
ADU	1 space per dwelling unit
Bed and breakfast	See § 153.116(D)(7)
Boarding or rooming house	1 space per 2 beds, plus 1 additional space for owner or employee use
Dwellings above first floor businesses	1 space per dwelling unit
Multiple-family residential dwellings	1.5 spaces per dwelling unit

§ 153.188 PARKING ALTERNATIVES.

(A) *Shared/common parking.* Shared parking, or an arrangement in which two or more nonresidential uses with different peak parking demands (hours of operation) uses the same off-street parking spaces to meet their off-street parking requirements, may be allowed.

(3) Shared parking must be within ~~50-~~ 300-foot walking distance, measured from the entrance of the use to the nearest parking space in the shared lot.

(B) *Modification of parking requirements.* The Planning Commission may reduce the parking space requirements of this section for any use, based upon one or more of the following.

(2) Convenient municipal off-street parking facilities ~~or on-street spaces~~ are located no further than 600 feet from the subject properties.

~~—(5)—The Planning Commission may require a parking study to document that the above divisions (B)(1)(a) through (B)(1)(d) have been addressed.~~

~~—(6)—Where the applicant has provided a parking study, it shall demonstrate that a standard other than that required by this subchapter would be more appropriate based on the number of employees, expected level of customer traffic, or actual counts at a similar establishment. Parking studies shall be prepared by a qualified expert, such as a professional transportation engineer or professional transportation planner, based upon standards, manuals and research published by professional organizations, such as the Institute of Transportation Engineers, the Transportation Research Board or Urban Land Institute. The Planning Commission may require parking studies of comparable uses in the general area as part of the study.~~

~~(D) *Downtown parking.* The minimum number of off-street parking spaces required by this section shall be waived for all buildings fronting Bridge Street between the Pine River Channel and Antrim Street.~~

§ 153.189 OFF-STREET PARKING FACILITY DESIGN.

(A) *Off-street parking location and setbacks.*

(3) *Proximity.* Required off-street parking facilities for all uses, other than residential dwellings, shall be located on the same lot as the use, or within 300 feet of the building(s) or use they are intended to serve. Distance shall be measured from the nearest point of the building to the nearest point of the off-street parking lot.

~~—(b)—In the CBD District, parking facilities shall be located within 600 feet of the building or use to be served. Distance shall be measured from the nearest point of the building to the nearest point of the off-street parking lot.~~

(B) (5) ~~The Planning Commission may require a~~ A parking study ~~to~~ documents that the above divisions (B)(1)(a) through (B)(1)(d) have been addressed

(C) *Pavement.* Unless alternative materials are specifically permitted as provided in this division (C), all parking lots and vehicle and equipment storage areas shall be hard-surfaced using asphalt, concrete or concrete or brick pavers and shall be appropriately graded and drained. The Planning Commission may approve permeable ~~paving surfaces~~ for all or part of a parking lot. For storage areas, a substitute for hard surface paving may be allowed if the Planning Commission finds adjoining properties will not be adversely affected.

(E) *Dimensions.* [Table 153.189](#) specifies applicable parking space and aisle dimension requirements.

(2) The length of a parking stall may be reduced by up to two feet if the parked vehicle can overhang an unobstructed landscaped area or sidewalk by not ~~less~~ **more** than two feet. In such instances a sidewalk shall be at least seven feet wide.

(L) *Lighting* All lighting must meet **153.172 LIGHTING**.

OFF-STREET PARKING, LOADING, ACCESS AND CIRCULATION Proposed changes

§ 153.187 PARKING REQUIREMENTS AND LIMITATIONS.

(C) For a use not specifically included in Table 153.187, off-street parking requirements shall be in accordance with a use determined by the Zoning Administrator to have comparable parking characteristics. For any use determined as not having a comparable parking requirement, it shall be determined by the Planning Commission based on recent and published parking research, or by accepting the findings of a parking study provided by the applicant in accordance with § 153.188(B)(6) of this chapter. Where the applicant has provided a parking study, it shall demonstrate that a standard other than that required by this subchapter would be more appropriate based on the number of employees, expected level of customer traffic, or actual counts at a similar establishment. Parking studies shall be prepared by a qualified expert, such as a professional transportation engineer or professional transportation planner, based upon standards, manuals and research published by professional organizations, such as the Institute of Transportation Engineers, the Transportation Research Board or Urban Land Institute. The Planning Commission may require parking studies of comparable uses in the general area as part of the study.

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Credit for on-street parking. Within the Mixed Use Overlay Areas, any on-street parking space adjacent to the use, each such space consisting of not less than 23 feet of contiguous linear permissible on-street parking that is immediately adjacent to the use, may be counted as one space against applicable off-street parking requirements for such use

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(3) Shared parking must be within 300 feet walking distance, measured from the entrance of the use to the nearest parking space in the shared lot.

(B) *Modification of parking requirements.* The Planning Commission may reduce the parking space requirements of this section for any use, based upon one or more of the following.

(2) Convenient municipal off-street parking facilities are located no further than 600 feet from the subject properties.

§ 153.189 OFF-STREET PARKING FACILITY DESIGN.

(A) *Off-street parking location and setbacks.*

(3) *Proximity.* Required off-street parking facilities for all uses, other than residential dwellings, shall be located on the same lot as the use, or within 300 feet of the building(s) or use they are intended to serve. Distance shall be measured from the nearest point of the building to the nearest point of the off-street parking lot.

(B) (5) A parking study to document that the above divisions (B)(1)(a) through (B)(1)(d) have been addressed

(C) *Pavement.* Unless alternative materials are specifically permitted as provided in this division (C), all parking lots and vehicle and equipment storage areas shall be hard surfaced using asphalt, concrete or concrete or brick pavers and shall be appropriately graded and drained. The Planning Commission may approve permeable surfaces for all or part of a parking lot. For storage areas, a substitute for hard surface paving may be allowed if the Planning Commission finds adjoining properties will not be adversely affected.

(E) *Dimensions.* Table 153.189 specifies applicable parking space and aisle dimension requirements.

(2) The length of a parking stall may be reduced by up to two feet if the parked vehicle can overhang an unobstructed landscaped area or sidewalk by not more than two feet. In such instances a sidewalk shall be at least seven feet wide.

(L) Lighting. All lighting must meet **153.172 LIGHTING.**

Charlevoix Planning Commission

Old Business

Title: Data Centers

Date: September 14, 2026

Presented By: Jonathan Scheel, Director of Planning & Zoning

Background:

This is a continuing discussion of the regulation of data centers in the City of Charlevoix. The current attached draft is redlined, showing the changes from last month. Also included is a noise ordinance memorandum report for Prince William County, Virginia. This report references noise generated by data centers and like industries. This report doesn't translate directly to Charlevoix but could be considered very similar. I lean toward generating a new noise ordinance for the city with major input from this report. If the planning commission agrees, I will be communicating with experts in helping me write ordinance language that is understandable and enforceable.

Recommendation:

Review discuss and make comments.

Attachments:

1. Data Center ordinance 9-9-26
2. Data Center noise planning

CITY OF CHARLEVOIX

ORDINANCE NO. ____

**AN ORDINANCE TO REGULATE CRYPTOCURRENCY DATA MINING FACILITIES
AND DATA CENTERS**

The City of Charlevoix ordains:

**Addition of New Sections 153.200 and 153.201 to Title XV Land Usage, Chapter 153 Planning
and Zoning.**

A new section 153.200 entitled “Supplemental Regulations” is hereby added to the City’s Zoning Ordinance.

A new Section 153.201 entitled “Cryptocurrency Data Mining Facilities and Data Centers” is hereby added to the City’s Zoning Ordinance, to read, in its entirety, as follows:

153.201 CRYPTOCURRENCY DATA MINING FACILITIES AND DATA CENTERS.

1. Definitions.

Cryptocurrency Data Mining Facility. A facility dedicated to operating data processing equipment for commercial cryptocurrency mining and the process by which cryptocurrency transactions are verified and added to digital ledgers.

Data Center. A structure that houses information technology infrastructure and equipment for building, running, and delivering applications, and the storage of digital data. This includes Artificial Intelligence (“AI”) Data Centers.

Electrical Substation. A facility used for the transformation or distribution of electrical power necessary to serve a Cryptocurrency Data Mining Facility or Data Center site, excluding any energy generation facility designed to serve as the primary or continuous power source for the Cryptocurrency Data Mining Facility or Data Center.

Non-operational. When the facility has not been used as designed for a period of one year.

2. General Provisions.

1. Cryptocurrency Data Mining Facilities and Data Centers of up to ~~5~~40MW are permitted in the City as a special land use in the Industrial Zoning District.
2. Data Centers that are ancillary to another primary use are permitted in a non-residential district if they a) occupy no more than ten percent of the building footprint, b) are used to serve the enterprise functions of the on-site property owner and are not used to lease data storage and processing services to third parties, and c) are not housed in a separate stand-alone structure on the parcel.

3. The City may enforce any remedy or enforcement, including but not limited to, the removal of any Cryptocurrency Data Mining Facilities and Data Centers pursuant to the Zoning Ordinance or as otherwise authorized by law if the Cryptocurrency Data Mining Facility or Data Center does not comply with this Section.
3. Special Land Use Application Requirements. In addition to the requirements of Article 153.231 Site Plan Approval an applicant for special land use approval of a Cryptocurrency Data Mining Facility or Data Center must provide the City with all of the following:
 1. An application fee in an amount set by resolution of the City Council.
 2. A list of all parcel numbers that the Cryptocurrency Data Mining Facility or Data Center will use; documentation establishing ownership of each parcel; and any lease agreements, easements, or purchase agreements for the subject parcels.
 3. An operations agreement setting forth the parameters of the operation, the name and contact information of the operator, the applicant's inspection protocol, emergency procedures, and general safety documentation.
 4. Current photographs of the subject property.
 5. A site plan that meets 153.235 Required Site Plan Content of the city's zoning ordinance. The site plan must indicate how the Cryptocurrency Data Mining Facility or Data Center will be connected to the power grid.
 6. A written plan for maintaining the subject property, including a plan for maintaining and inspecting drainage systems and addressing stormwater management, and identifying anticipated water usage and wastewater discharge methods, including any required state or county permits, which are subject to the City's review and approval.
 7. A decommissioning and land reclamation plan describing the actions to be taken following the abandonment or discontinuation of the Cryptocurrency Data Mining Facility or Data Center, including evidence of proposed commitments with property owners to ensure proper final reclamation, repairs to roads, and other steps necessary to fully remove the Cryptocurrency Data Mining Facility or Data Center and restore the subject parcels, which is subject to the City's review and approval.
 8. A deposit for an escrow account in an amount set by resolution or fee schedule approved by the City Council. The escrow account is used to cover all costs and expenses associated with the special land use review and/or approval process, which costs can include, but are not limited to, review fees of the City Attorney, City Planner, and engineering, as well as any reports or studies which the City anticipates will be required during the review and/or approval process for the application. At any point during the review process, the City may require that the applicant place additional monies into escrow with the City if the existing escrowed funds on account with the City will be insufficient, in the determination of the City, to cover any remaining costs or expenses with the review and/or approval process. If

additional funds are required by the City to be placed in escrow and the applicant refuses to do so within 14 days after receiving notice, the City will cease the zoning review and/or approval process until and unless the applicant makes the required escrow deposit. Any escrow amounts in excess of actual cost will be returned to the applicant. An itemized billing of all expenses will be provided to the applicant upon request.

9. A plan for resolving complaints from the public or other property owners concerning the construction and operation of the Cryptocurrency Data Mining Facility or Data Center, which is subject to the City's review and approval.

10. A plan for infrastructure impact considerations including;

(1) Power demand thresholds

(a) Utility capacity review

- I. Dedicated electrical substation
- II. Electric nameplate capacity
- III. Power usage effectiveness (PUE) Federal guidelines 1.3 or lower
- IV. Power with clean energy sources (same or better than City)
- V. Self-generation of power (power backup)

(b) Water usage limits

- I. Require usage and disposal amounts
- II. Require disposal ingredients
- III. Water, city capacity review and approval from water department
- IV. Sewer, city capacity review and approval from public works department
- V. Cooling/climate control methods and specifications.

11. A plan for managing any hazardous waste, which is subject to the City's review and approval.

12. A plan addressing response to power outages, which is subject to the City's review and approval.

13. A security plan for providing 24-hour on-site or remote monitored security, including security fencing as described in Section 4.D.

14. A fire protection plan, which identifies the fire risks associated with the Cryptocurrency Data Mining Facility or Data Center; describes the fire suppression system that will be implemented; describes what measures will be used to reduce the risk of fires re-igniting (i.e., implementing a "fire watch"); identifies the equipment needed by the city to effectively fight a potential fire, identifies the water sources that will be available for the local fire department to protect adjacent properties; identifies a system for continuous monitoring, early detection sensors, and appropriate venting; and explains all other

measures that will be implemented to prevent, detect, control, and suppress fires and explosions.

15. A transportation plan for construction and operation phases, including any applicable agreements with the County Road Commission and Michigan Department of Transportation, which is subject to the City's review and approval.

16. An attestation that the applicant will indemnify and hold the City harmless from any costs or liability arising from the approval, installation, construction, maintenance, use, repair, or removal of the Cryptocurrency Data Mining Facility or Data Center, which is subject to the City's review and approval.

17. Proof of environmental compliance, including compliance with Part 31, Water Resources Protection, of the Natural Resources and Environmental Protection Act; (MCL 324.3101 et. seq.; Part 91, Soil Erosion and Sedimentation Control (MCL 324.9101 et. seq.) and any corresponding County ordinances; Part 301, Inland Lakes and Streams, (MCL 324.30101 et. seq.); Part 303, Wetlands (MCL 324.30301 et. seq.); Part 365, Endangered Species Protection (MCL 324.36501 et. seq.); and any other applicable laws and rules in force at the time the City considers the application.

18. An attestation that all stationary and backup energy systems will comply with applicable EPA and EGLE air emission standards, that any diesel generators shall meet the EPA's current Tier 4 emission standards, and that any battery energy storage system (BESS) shall comply with NFPA 855 fire safety standards.

19. A noise and sound study demonstrating compliance with the noise standards, as provided in Section 4.F, at all property lines.

20. A traffic impact study prepared by a professional engineer knowledgeable in the traffic study field identifying trip generation, road capacity needs, and any required improvements.

21. Documentation prepared in coordination with the serving utility demonstrating the availability of sufficient electrical, water, and wastewater capacity to serve the facility without compromising existing needs or causing rate hikes for existing customers.

22. An analysis describing existing environmental site conditions, natural features, and any anticipated impacts to wetlands, streams, woodlands, wildlife habitat, air quality, and groundwater.

23. A community and environmental impact statement evaluating the expected operational characteristics of the Cryptocurrency Data Mining facilities or Data Center and its potential impacts, describing measures to avoid, minimize, or mitigate any adverse impacts identified, including, but not limited to:

1. Emergency Services: Fire, police, and medical response needs and coordination measures.
 2. Road Network: Effects on city street infrastructure and access points.
 3. Water Resources: Effects on wells, aquifers, and surface waters.
 4. Noise, Vibration and Air Emissions: Including generators and cooling equipment.
 5. Land Use Compatibility and Visual Impacts: Especially in relation to nearby residential or agricultural properties.
 6. Any additional relevant information or documentation requested by the Planning Commission, City Council, or other City representatives.
4. System and Location Requirements. In addition to the requirements of Section 153.231 for a site plan, the site plan must include all of the following:
1. Equipment. All equipment used in any Cryptocurrency Data Mining Facility or Data Center must be housed in a metered, electrically grounded, and pre-engineered or prefabricated structure with a fire rating designed to resist an internal electrical fire for at least one hour.
 2. Equipment. Semiconductor-based flash storage will be used for all data storage.
 3. Structures. All principal and accessory structures used for cryptocurrency mining operations and/or data centers, shall be arranged, designed, and constructed to be harmonious and compatible with the site and with the surrounding properties, and comply with zoning district regulations. If prefabricated, pre-engineered, or modular structures are installed, the following standards are required:
 - (a) All structures shall have concrete foundations.
 - (b) All exterior facades shall have muted earth tone colors that will blend the facility into the natural setting and existing environment, and shall not be defective, decayed or corroded.
 - (c) If intermodal shipping containers are utilized such installation shall comply with current National Electrical Code standards.
 3. Lighting. The lighting of the Cryptocurrency Data Mining Facility or Data Center is limited to the minimum light necessary for safe operation. Illumination from any lighting must not extend beyond the perimeter of the lot(s) used for the Cryptocurrency Data Mining Facility or Data Center and must be fully shielded and directed downward. The Cryptocurrency Data Mining Facility or Data Center must not produce any glare that is visible to neighboring lots or persons traveling on public or private roads. Security lighting may be motion-activated or reduced during nighttime or off-peak hours. All exterior lighting will meet Dark Sky lighting principles

Security Fencing. Security fencing must be installed around all electrical equipment related to the Cryptocurrency Data Mining Facility or Data Center. Such fencing must be a minimum six (6) feet tall, maximum of eight (8) feet tall and must use materials, colors, textures, screening and landscaping, that will blend the facility into the natural setting and existing environment. **Substation screening should be of a material and nature so as not to cause organic debris or animal infestation in the substation or adjacent areas.**

5. Substations. Any on-site electrical substation shall be located to minimize visual impact and screened to provide year-round opacity when viewed from public roads or adjacent residential properties.

5 Noise. The Data Center must be designed and built to incorporate sound mitigation methods sufficient to prevent the sound levels emanating from the Data Center including any generator noise (as determined by a third-party acoustic engineer **of the city's choosing at developer's cost**) from exceeding the ambient noise levels that were observed in a baseline study. Design specifications for such sound mitigation must be provided to the City before zoning permit approval.

1. The noise generated by the Cryptocurrency Data Mining Facility or Data Center must not exceed 45 dBA, as measured at the property line of any adjacent parcel.
2. Testing of generators shall be permitted only Monday through Friday between 9:00 a.m. and 5:00 p.m.
3. Where necessary to meet noise limits, audible screening such as sound walls, enclosures, or other mitigation measures shall be required.
4. The Data Center operator must also conduct **an additional** third party **(agreeable between parties)** noise study, as measured at the property line of the nearest property to the Data Center property that is planned or zoned for residential land uses, or other noise sensitive use as reasonably determined by the Zoning Administrator, annually during peak operation of the Data Center mechanical equipment for five years after completion of the initial post-construction noise study. The Data Center operator must provide the results of the noise study to the City within thirty days of the anniversary of the date on which the certificate of occupancy or certificate of completion was issued by the City.

6. Vibration. No use shall generate any ground-transmitted vibration in excess of the limits set forth below. Vibration shall be measured at the nearest adjacent lot line. The vibration maximums set forth below are stated in terms of particle velocity, which may be measured with suitable instrumentation or computed on the basis of displacement and frequency. When computed, the following standards shall apply:

Frequency (Hz)	Particle Velocity (in/sec)
0 to 9.99	0.0010
10 to 19.99	0.0008
20 to 29.99	0.0006
30 to 39.99	0.0004

If requested by the enforcement official, the petitioner shall provide evidence of compliance through a third-party professional specializing in vibration monitoring. The cost and arrangement of testing shall be the petitioner's obligation. Vibrations from temporary construction activities are exempt from these requirements.

7. **Signage.** The Cryptocurrency Data Mining Facility or Data Center shall provide a 24-hour emergency contact signage visible at the access entrance. Signs shall include company name if applicable, owner/representative name, telephone number, and corresponding local power company and telephone number.

8. **Traffic and Access.** Vehicle access shall be directed to County or State-designated primary roadways where feasible. The City may require roadway improvements, turn lanes, or other traffic management measures after considering the recommendations of the Traffic Impact Study required under Section 3.S.

9. **Underground Transmission.** All power transmission or other lines, wires, or conduits from a Cryptocurrency Data Mining Facility or Data Center to any building or other structure must be located underground at a depth that complies with current National Electrical Code standards, except for power switchyards or the area within a substation.

10. **Drainage System Inspections.** The Cryptocurrency Data Mining Facility or Data Center must be maintained in working condition at all times while in operation. The applicant or operator must inspect all drain piping at least once every three years using a robotic camera, with the first inspection occurring before the Cryptocurrency Data Mining Facility or Data Center is in operation. The applicant or operator notify the City of the date of inspection and must submit results of the inspection to the City. The owner or operator must repair any damage or failure of the drainage system within sixty (60) days after discovery and submit proof of the repair to the City. The City is entitled, but not required, to have a representative present at each inspection or to conduct an independent inspection.

11. **Stormwater Management.** Stormwater management facilities shall comply with City and Charlevoix County standards. The use of green infrastructure and low-impact design practices is required where feasible.

12. **Fire Protection.**

1. Before any construction of the Cryptocurrency Data Mining Facility or Data Center begins, the City's fire department (or the fire department with which the City contracts for fire service) will review the fire protection plan submitted with the application. The fire chief will determine whether the fire protection plan adequately protects the City's residents and property and whether there is sufficient water supply to comply with the fire protection plan and to respond to fire or explosion incidents. If the fire chief determines that the plan is adequate, then the fire chief will notify the City or his or her designee of that determination. If the fire chief determines that the plan is inadequate, then the fire chief may

propose modifications to the plan, which the applicant or operator of the Cryptocurrency Data Mining Facility or Data Center must implement. The fire chief's decision may be appealed to the ~~Zoning Board of Appeals City Planning Commission~~, will hear the appeal at an open meeting. The ~~Zoning Board of Appeals Planning Commission~~ may engage experts to review the fire protection plan at the applicants' cost when deemed necessary. The City Planning Commission may affirm, reverse, or modify the fire chief's determination. The City Planning Commission's decision is final, subject to any appellate rights available under applicable law. The Cryptocurrency Data Mining Facility or Data Center must comply with the fire protection plan as approved by the fire chief (or as approved by the City Planning Commission in the event of an appeal).

2. The Cryptocurrency Data Mining Facility or Data Center must contain an internal fire suppression system that shall be reviewed and tested once every twelve (12) months by a third-party contractor approved by the fire chief and **paid for by the applicant**. The applicant or operator may amend the fire protection plan from time-to-time in light of changing technology or other factors. Any proposed amendment must be submitted to the fire department for review and approval under subsection (1).

3. The fire plan will include a fire suppression plan that shows how runoff from fire suppression and firefighting run off will be contained onsite.

13. Applicant must provide all City Fire Department staff or contractors with the appropriate equipment and training to address fires in the Cryptocurrency Data Mining Facility or Data Center.

14. Insurance. The applicant or operator will maintain property/casualty insurance and general commercial liability insurance in an amount that is approved during the site plan approval process based on the size and scope of the development. The City shall be listed as an additional insured on the policy at all times.

15. Permits. All required county, state, and federal permits must be obtained before the Cryptocurrency Data Mining Facility or Data Center begins operating. A building permit is required for construction of a Cryptocurrency Data Mining Facility or Data Center regardless of whether the applicant or operator is otherwise exempt under state law.

16. Before a Data Center is constructed within the Industrial zoning district, the property owner proposing to build a Data Center must comply with the following:

1. The Data Center operator must schedule and attend two neighborhood meetings with residents to describe the project and the proposed sound-mitigation aspects of the project design. Notice of the neighborhood meetings must be mailed **thirty days in advance** to all residents and homeowners associations within a 2,000-foot radius of the parcel. A representative of the developer or owner with decision-making authority on the design of the Data Center must attend the neighborhood meetings. The Data Center operator or property owner must also post a minimum size of 16 sq ft sign on the subject property, at least fifteen days before each neighborhood meeting. The sign must be located along an

arterial street or other high-visibility location as reasonably determined by the Zoning Administrator. The content of the sign shall (i) be consistent with the City's generally applicable sign guidelines to include the applicants name and contact information, a brief description of the Data Center project, and the date, time, and location of the neighborhood meeting, and (ii) must be reviewed and approved by the Zoning Administrator before installation. The applicant must remove the sign at the conclusion of the citizen review process.

2. Before the first neighborhood meeting is held, the property owner proposing to build a Data Center must conduct a sound study performed by a third-party acoustic engineer to document baseline sound levels in the area of the proposed Data Center, including noise levels measured at the property line of the nearest property to the Data Center property that is planned or zoned for residential land uses, or other noise sensitive use as reasonably determined by the Zoning Administrator. The property owner must provide a copy of the results of the study to the City thirty days before the first neighborhood meeting.

18. Decommissioning. If a Cryptocurrency Data Mining Facility or Data Center is abandoned or otherwise nonoperational for a period of one year, the property owner or the operator must notify the City and must remove the system within six (6) months after the date of abandonment. Removal requires receipt of a demolition permit from the Charlevoix County Building Official and full restoration of the site to the satisfaction of the Zoning Administrator. **All structures and equipment are to be removed including foundations.** The site must be filled and covered with top soil and restored to a state compatible with the surrounding vegetation. The requirements of this subsection also apply to a Cryptocurrency Data Mining Facility or Data Center that is never fully completed or operational if construction has been halted for a period of one (1) year.

19. Financial Security. To ensure proper decommissioning of a Cryptocurrency Data Mining Facility or Data Center upon abandonment, the applicant must post financial security in the form of a security bond or escrow payment in an amount equal to 125% of the total estimated cost of decommissioning, code enforcement, and reclamation, which cost estimate must be approved by the City. The operator and the City will review the amount of the financial security every two (2) years to ensure that the amount remains adequate. This financial security must be posted within fifteen (15) business days after approval of the special use application.

20. Extraordinary Events. If the Cryptocurrency Data Mining Facility or Data Center experiences a failure, fire, leakage of hazardous materials, personal injury, or other extraordinary or catastrophic event, the applicant or operator must notify the City within 24 hours **or sooner as may be required by law.** The owner will reimburse the City for all costs related to the City's response to an extraordinary event **or a false alarm.**

21. Annual Report. The applicant or operator must submit a report on or before January 1 of each year that includes all of the following:

1. Current proof of insurance;
2. Verification of financial security; and

3. A summary of all complaints, complaint resolutions, and extraordinary events.
22. Inspections. The City may inspect a Cryptocurrency Data Mining Facility or Data Center at any time by providing 24-hour advance notice to the applicant or operator.
23. Transferability. A conditional land use permit for a Cryptocurrency Data Mining Facility or Data Center is transferable to a new owner. The new owner must register their name and business address 30 days prior to the transfer date with the City and must comply with this Ordinance and all approvals and conditions issued by the City. In the event of a sale or transfer of ownership and/or operation of the Cryptocurrency Data Mining Facility or Data Center, the original security bond or escrow must be maintained throughout the entirety of the process and must not be altered.
24. Remedies. If an applicant or operator fails to comply with this Ordinance, the City, may pursue any remedy or enforcement, including but not limited to the removal of any Cryptocurrency Data Mining Facility or Data Center pursuant to the Zoning Ordinance or as otherwise authorized by law. Additionally, the City may pursue any legal or equitable action to abate a violation and recover any and all costs, including the City's actual attorney fees and costs.

1.

Table 153.086: Allowed Uses, Non-Residential and Mixed Use Zones

Table of Permitted Uses, is hereby amended to add Cryptocurrency Data Mining Facilities and Data Centers as a special land use in the Industrial zoning districts:

	PO	GC	CBD	CH	MC	SR	I	P	CM	Specific Requirements
INDUSTRIAL AND STORAGE										
Cryptocurrency Data Mining Facilities and Data Centers							S			Sec. 153.095

Section x. Validity and Severability.

If any portion of this Ordinance is found invalid for any reason, such holding will not affect the validity of the remaining portions of this Ordinance.

Section x. Repealer.

All other ordinances inconsistent with the provisions of this Ordinance are hereby repealed to the extent necessary to give this Ordinance full force and effect.

Section x. Effective Date.

This Ordinance takes effect upon the expiration of 7 days after publication as required by MCL 125.3401(7).

I, Sarah Dvoracek, do hereby certify that I am the duly elected and acting clerk of the City of Charlevoix, and I do hereby certify that this Ordinance was adopted by the City Council of the City of Charlevoix, County of Charlevoix, State of Michigan, at a regular meeting of the City Council held at the Charlevoix City Hall, on the ____ day of _____, 20 ____.

Vote: ____ Aye ____ Nay

THE CITY COUNCIL OF THE
CITY OF CHARLEVOIX, COUNTY
OF CHARLEVOIX, STATE OF MICHIGAN

By: _____
Sarah Dvoracek
Charlevoix City Clerk

AUTHENTICATED:

By: _____
Lyle Gennett
Charlevoix City Mayor

August 03, 2025

To: Prince William County, VA, Board of Supervisors

Memorandum Report 1618-01: Prince William County Noise Ordinance Update - Basis and Background

EXECUTIVE SUMMARY

Nelson Acoustics was engaged in September 2024 to assist Prince William County (PWC) in updating its Noise Ordinance by providing insight from extensive experience and references to the noise control engineering literature. The goal of the update is to set limits for steady noises that persist with little change for extended periods of time, a common feature of electro-mechanical and industrial equipment. The purpose of this Memorandum is to educate the PWC Board regarding the technical basis for the Ordinance update under consideration.

The current noise Ordinance effectively addresses intermittent noise sources commonly experienced in suburban communities. However, new industrial installations are increasingly being located near residential areas in PWC. The current Noise Ordinance limits may not be able to address this “steady tonal sound” because of round-the-clock operation with near-constant sound levels and the potential for excessive low-frequency noise.

The proposed Ordinance update characterizes this noise type as “steady tonal sound” and defines it as:

Steady tonal sound means a sound characterized by a droning nature and which may be referred to as a whine, hum, rumble or buzz, which may either be broadband or include a single frequency or a narrow cluster of frequencies, Such sound sources include, but are not limited to, heating, ventilating or air-conditioning units, refrigeration units, transformers and backup generators. The sound level from the source must remain essentially constant for the duration of any given measurement.

The experience of noise annoyance depends on both objective (measurable) and subjective (perceptual) factors including sound level, sound spectrum, sound characteristics, accustomed background noise levels and degree of

change from those levels, time of day, neighborhood type, the history of how the noise came to be, it's perceived significance for the future, and interactions with the person or organization creating the noise.

“Compatible”, “Marginally Compatible”, and “Incompatible” noise levels are well established in engineering standards and the noise control engineering literature for transportation noise and “typical” community noise sources. The relationship between sound levels and community response in various neighborhood types has also been studied in detail. These concepts are adapted for constant-level noise.

Because the new limits are part of an enforceable regulation for criminal conduct, they are set at the edge of Incompatibility with suburban residential living. As such it should be clear that compliance does not equate to silence, nor will it necessarily eliminate annoyance or complaints, and should not be confused with a “good neighbor” prescription.

The new limits consist of not-to-exceed octave band sound pressure levels applied to steady noise. They are based on currently observed sound levels in unaffected PWC residential areas combined with compatibility-based guideline spectra. The levels are low enough that residents who have not been previously overexposed should find the situation manageable, and high enough to avoid classifying currently unaffected suburban neighborhoods as “out of compliance”.

(External references are denoted by square brackets [Ref. x] and are listed at the end of the document. Internal footnotes are denoted by superscript^x which appear in most cases at the bottom of the page where they are indicated.)

1. SOUND LEVELS COMPATIBLE WITH RESIDENTIAL LIVING

Environmental noise has historically been evaluated in terms of the “equivalent average A-weighted sound level”, $L_{pA,eq}$. The A-weighting filter approximates the perceived sensitivity of human hearing to low- and moderate-level pure tones¹. The equivalent average sound level has the same energy as the average energy observed during the measurement period. This approach is used for both brief and longer-term noise measurements.

¹ Speaking broadly in musical terms, A-weighting emphasizes “treble clef” sounds (above middle-C) and de-emphasizes “bass clef” sounds (below middle-C). A-weighted measurements regularly underestimate the impact of low-frequency noise which can be problematic because it is more easily transmitted into residences.

Long-term community response to noise has historically been evaluated using the weighted² “equivalent average day-night sound level”, L_{dn} [Ref. 1]. The L_{dn} approach successfully tracks community response to transportation noise in urban areas. Additional modifiers (“adjustments”) account for heightened community response in other contexts and when objectionable noise characteristics are present.

The American National Standard ANSI S12.9 Part 5 defines an adjusted sound level above 60 L_{dn} as incompatible with urban residential living [Ref. 2]. Suburban and rural communities are more sensitive by 5 and 10 dB respectively [Ref. 1,2,3], so the unadjusted compatibility limits for those neighborhood types are 55 and 50 L_{dn} , respectively³.

Table 1: Day-Night Sound Levels compatible with residential living

	Compatible	Marginally Compatible	Incompatible
Urban	≤ 55	55 – 60	> 60
Suburban	≤ 50	50 – 55	> 55
Rural	≤ 45	45 – 50	> 50

Prince William County comprises all three neighborhood types. With an approximate overall population density of 1,400/square mile, PWC can be categorized between “quiet urban/normal suburban residential” and “quiet suburban residential”. The expected pre-existing L_{dn} for that population density is 50 L_{dn} [Ref. 4]. Incompatibility, for the purposes of this project, is therefore based on the limit for suburban residential living: 55 L_{dn} .

2. CURRENT LIMITS APPLIED TO STEADY NOISE

The day-night sound level associated with a round-the-clock steady sound meeting the current nighttime limit (55 dBA) would be 62 L_{dn} , clearly incompatible with all three neighborhood types. The strongest contribution to annoyance for a constant-level noise occurs during nighttime hours. Table 2 gives some insight into how this weighted average is calculated⁴.

² where 10 dB is added to $L_{pA,eq}$ measured at night (10 pm to 7 am), 5 dB is added to $L_{pA,eq}$ levels measured on weekend days (7 am Saturday to 10 pm Sunday); and $L_{pA,eq}$ levels measured during weekdays remain unchanged.

³ Further references in this document will be to unadjusted L_{dn} .

⁴ The time-of-day weightings reflect heightened sensitivity to noise, and the hours-per-week weightings are related to the fraction of a week each sensitivity factor is in effect. The contribution for each period is the arithmetic sum of $L_{pA,eq}$ and the corresponding weighting factors. The contributions are then combined by decibel addition [1]. The L_{dn} for a constant-level sound can be estimated by adding 7 dB to the A-weighted sound level. Values in Table 2 are rounded to the nearest whole decibel.

Table 2: Median Percent Highly Annoyed at 65 L_{dn}

Period	$L_{pA,eq}$	Weighting Time of Day (dB)	Weighting Hours/Week (dB)	Contribution
Weekday	55	+ 0	-4	51
Weekend		+ 5	-7	53
Night		+ 10	-4	61
L_{dn}				62

Large mechanical equipment tends to include a significant amount of low-frequency noise (LFN). Even a moderate amount of LFN would raise the effective L_{dn} from 62 to an adjusted 65 L_{dn} ⁵ [Ref. 1]. Thus, the current nighttime regulation could allow a constant mechanical equipment noise with impact equivalent to 65 L_{dn} or greater.

The long-term response of communities to 65 L_{dn} can be forecast [Ref. 1] as the percentage of persons “highly annoyed”⁶. The initial response to a new intrusive noise, especially if public relations are poor, is equivalent to increasing the L_{dn} by an additional 5 dB [Ref. 1,3].

Table 3: Median Percent Highly Annoyed at 65 L_{dn}

	Long-term	New
Urban	15 %	25 %
Suburban	25 %	40 %
Rural	40 %	55 %

Some communities may be more sensitive than the median values tabulated above.

From the foregoing it should be clear that a constant 55 dBA industrial noise introduced into a suburban environment would elicit numerous, strong complaints despite being acceptable under the current Ordinance.

⁵ Using methods described in Annex D of the 2005 version of [1], a moderate low-frequency sound level L_{LF} of 65, which might often occur in conjunction with L_{pA} 55, is equivalent to adding 62 L_{dn} to the previous total: in decibel math, $62 + 62 = 65 L_{dn}$.

⁶ Broadly speaking, “highly annoyed” suggests persons willing to go beyond making sporadic individual complaints. This may take the form of sustained opposition to current or future similar noise sources through group social, political or legal action.

3. DEVELOPING THE OCTAVE-BAND CRITERIA

The increasing size and power of modern mechanical equipment brings with it increasing low-frequency noise (LFN) emission. Complaints about LFN typically arise indoors where the building structure filters out the higher frequencies. What remains is a disproportionately bass-heavy sound spectrum sometimes characterized as “rumble”. If in addition the noise does not abate at nighttime the experience of intrusive noise is heightened. Listeners may associate it with something large, powerful, unrelenting, and unwelcome just outside while trying to sleep.

The recommended criteria are expressed in terms of a octave-band outdoor limit spectrum for daytime and for nighttime. Octave band analysis is necessary to account for the frequency-dependent sensitivity of human hearing.

The limit spectra represent the convergence of two complementary approaches to defining Incompatibility:

- Identify octave-band levels likely to cause significant complaints in unaffected residential areas, based on a 5 dB departure from measurements made around PWC.
- Identify octave-band spectra at the edge of Incompatibility based on guidance from the engineering literature.

In the first approach, community reaction to intrusive noise is due in part to the increase from accustomed background sound levels. A 5 dB increase is associated with “widespread complaints” [Ref. 3]. Thus, a spectrum 5 dB greater than the observed median sound levels⁷ provides a reference point for Incompatibility over a representative portion of the County.

The second approach makes use of two guideline documents:

- The Composite Noise Rating [Ref. 5] was introduced in the 1950s and was applied successfully to a wide variety of noise sources, including industrial sources. It was updated and promoted by Laymon Miller of BBN in the “Noise Course” notes [Ref. 6]. It defines a family of “balanced” environmental noise spectra and a method for forecasting community response.
- Research into the effects of LFN over the ensuing years have led to more stringent recommendations. A recent German (DIN) standard [Ref. 7] defines a method for evaluating LFN relative to recommended levels for residential living.

⁷ 16 locations during daytime and 8 locations during nighttime, selected by County staff.

The DIN evaluation is used in the 31.5, 63 and 125 Hz bands⁸. The CNR evaluation is used in the bands centered at 250 Hz and above. Their values are spliced into a single row in Tables that follow.

The resulting recommended limits are such that higher levels would be incompatible with residential living, and lower levels would cause an increasing number of “false positives” and more difficult enforcement measurements.

3.1 Nighttime Limit Spectrum

The nighttime limit spectrum (Table 4) roughly equals the higher of the values arrived at using the two approaches. In other words, the limit spectrum is based on the DIN and CNR guidelines unless higher levels could be justified based on pre-existing levels.

Table 4: Nighttime Limit Spectrum

	Octave Band Center Frequency [Hz]								
	31.5	63	125	250	500	1000	2000	4000	8000
Recommended	60	55	50	45	40	36	33	31	30
Median + 5 dB	53	55	50	42	39	37	33	31	25
DIN/CNR	61	53	47	45	41	36	33	30	28

The LFN limits (31.5, 63 and 125 Hz) based on the DIN standard are collectively 3 dB above the nighttime “reference level” below which significant residential LFN problems are avoided. The contribution to each of the octave bands to annoyance is roughly equal.

The CNR limits (250 Hz and above) are the arithmetic average of the “b” and “c” source curves. “Sporadic complaints” are forecast for a spectrum equal to these levels in any octave band, with “widespread” complaints possible if LFN is perceived as annoying.

The difference is split at 500 Hz and a more permissive value is included at 8000 Hz to better handle biogenic sounds (e.g., insects, etc.). The limit is

⁸ Low frequency noise as evaluated in one-third octave bands according to the DIN standard covering the range 8 Hz to 100 Hz. Because significant mechanical equipment noise has not been observed below the 31.5 Hz band, the 8 Hz and 16 Hz octave bands have not been included in the recommended limits.

reduced slightly at 31.5 Hz to reduce below 50% the number of indoor listeners able to detect sound in that band⁹ [Ref. 8].

3.2 Daytime Limit Spectrum

The daytime limit spectrum (Table 5) roughly equals the higher of the values arrived at using the two approaches. In other words, the limit spectrum is based on the guidelines unless higher levels could be justified based on pre-existing levels.

Table 5: Daytime Limit Spectrum

	Octave Band Center Frequency [Hz]								
	31.5	63	125	250	500	1000	2000	4000	8000
Recommended	65	60	55	50	45	41	38	36	35
Median + 5 dB	61	60	54	48	43	41	38	33	23
DIN/CNR	66	59	52	50	46	41	38	35	33

The LFN limits (31.5, 63 and 125 Hz) are set 5 dB above the nighttime spectrum. The contribution to each of the octave bands to annoyance is roughly equal. This is 2 dB *below* the “reference level” for daytime, in consideration of the needs of day sleepers (e.g., firefighters, police, medical personnel).

The CNR limits (250 Hz and above) are the arithmetic average of the “c” and “d” source curves. “Sporadic complaints” are forecast for a spectrum equal to these levels in any octave band if LFN is perceived as annoying.

Modifications of 1 dB are made at 125 Hz, 500 Hz, and 4000 Hz to parallel the nighttime spectrum, exactly 5 dB higher. A more permissive value is included at 8000 Hz to better handle biogenic sounds (e.g., insects, etc.). The limit is reduced slightly at 31.5 Hz to avoid perceptible vibration [Ref. 9], particularly in windows¹⁰.

3.3 Comparing Outdoor Sound Levels to $L_{pA,eq}$ and L_{dn}

A sound spectrum exactly equal to the recommended criterion in each octave band would result in the following overall sound levels:

⁹ An outdoor sound level 60 dB in the 31.5 Hz octave band corresponds to approximately 49 dB indoors. If concentrated in the 40 Hz 1/3-octave band (the most sensitive within the 31.5 Hz octave band) approximately 40% of the population would be able to detect the sound.

¹⁰ 66 dB is reported as the threshold for feelable window vibration in the 25 Hz 1/3-octave band (the most sensitive within the 31.5 Hz octave band) [9].

- 43 dBA during nighttime, and
- 48 dBA during the daytime

This is 12 dBA more stringent than the current regulation of 55 dBA night, 60 dBA day.

A round-the-clock constant-level sound conforming to each of the nighttime octave band limits (43 dBA) would correspond to 50 L_{dn} . However, the A-weighted outdoor level formulation does not address LFN. The low-frequency portion of the same spectrum has an equivalent effect as 55 L_{dn} . Decibel addition of 50 L_{dn} and 55 L_{dn} gives a total of 56 L_{dn} .

The 56 L_{dn} overall result is compared to the 65 L_{dn} calculated above as possible for the current Ordinance, revealing that the new regulation is the equivalent of 9 L_{dn} points more restrictive. Significantly lower rates of annoyance are forecast.

Table 6: Median Percent Highly Annoyed at 56 L_{dn}

	Long-term	New
Urban	5 %	10 %
Suburban	10 %	15 %
Rural	15 %	25 %

As a practical matter, noise control designers typically observe an engineering safety factor of at least 3 dB. Furthermore, it's uncommon to exactly "fit the curve" – surplus noise control (i.e., lower sound levels) is usually unavoidable in some bands to achieve the desired result in one particularly difficult frequency range. Thus, a facility designed to comply with this Ordinance can be expected to have an overall sound level several decibels below those given above.

3.4 Comparison to indoor noise guidelines L_{pA} and NC

The Ordinance regulates outdoor noise levels. Indoor noise levels are inferred by subtracting the typical outdoor-indoor level difference (Noise Reduction or NR) for wood frame residential structures (with windows open roughly 2 inches) [Ref. 1]:

Table 7: Attenuation of Typical Residence

	Octave Band Center Frequency [Hz]								
	31.5	63	125	250	500	1000	2000	4000	8000
NR (dB)	11	15	19	21	23	25	25	25	30

Estimated overall indoor sound levels can then be calculated and compared to two indoor noise guidelines, L_{pA} and NC rating.

The World Health Organization (WHO) recommends indoor sound levels less than 30 dBA to facilitate sleep [Ref. 10].

Recommended indoor noise levels due to operation of HVAC and other building systems are given in ANSI Standard S12.2 [Ref. 11]. The guideline for residential bedrooms is NC-25. For comparison, NC-15 is the guideline for broadcast facilities such as TV studios.

The highest possible indoor L_{pA} and NC ratings are calculated by subtracting the attenuation of a typical residence from an outdoor sound spectrum exactly equal to the recommended outdoor criterion in all octave bands:

Table 8: Highest Possible Indoor Overall Sound Levels

Period	L_{pA}	NC
Day	27	16
Night	22	10

The quantity of noise is therefore expected to be typical for air-conditioned residences and compatible with sleep. If the character of the intruding noise is deemed objectionable, it's possible that masking noise could be employed and effective without becoming itself objectionable.

Noise just complying with the criterion spectrum has the potential to be audible in an otherwise quiet home and external environment. While audibility does not necessarily mean a noise is unacceptable, listeners form their individual opinions based on a variety of factors including the human brain's reflexive ability to focus attention on sounds.

3.6 Comparison to other regulations

The new limit spectra are compared to other octave-band regulations in Tables 9 and 10. A variety of measurement and averaging schemes are used in evaluating them, so the comparisons are not strictly "apples to apples".

Table 9: Comparison to other octave band limits, Nighttime

NIGHT	31.5	63	125	250	500	1000	2000	4000	8000
Proposed	60	55	50	45	40	36	33	31	30
Warrenton	---	59	55	49	43	37	33	29	25
Illinois*	63	61	55	47	40	35	30	25	25
Oregon	65	62	56	50	46	43	40	37	34
New Jersey	86	71	61	53	48	45	42	40	38

* based on the most restrictive Illinois property designation

Table 10: Comparison to other octave band limits, Daytime

DAY	31.5	63	125	250	500	1000	2000	4000	8000
Proposed	65	60	55	50	45	41	38	36	35
Warrenton	---	64	60	54	48	42	39	34	30
Illinois*	72	71	65	57	51	45	39	34	32
Oregon	68	65	61	55	52	49	46	43	40
New Jersey	96	82	74	67	63	60	57	55	53

* based on the most restrictive Illinois property designation

4. Related Topics

4.1 Extracting the Source Contribution from the Total Sound

The Ordinance governs the *contribution* of noise from a particular source. This prevents a facility from being penalized for noise generated by others or already present in the environment.

In most cases the source contribution will be established by subtracting the ambient sound levels¹¹ without the source operating (either by turning off the source or by measuring at a suitable proxy location) from the total sound level¹² with the source included. If the difference between the total sound (*TS*) level and ambient sound (*AS*) level is greater than 3 dB, the source contribution (*SC*) can be computed as [Ref. 4]:

$$SC = 10 \log_{10}(10^{0.1TS} - 10^{0.1AS})$$

¹¹ Ambient sound refers to pre-existing sounds generally present in the area, excluding the sound source under investigation and intermittent extraneous sounds.

¹² Total sound comprises both the ambient sound and the sound source under investigation, excluding extraneous sounds.

If the 3 dB differential is not achieved in a particular band or for overall sound level, the source contribution cannot be accurately determined, and the situation is deemed unenforceable.

The minimum 3 dB differential occurs when the source and ambient levels are numerically equivalent¹³. In other words, the ambient level is the *de facto* criterion when it is higher than the Ordinance criterion. It's possible for residents to be able to perceive the noise source separately from the ambient even when the overall source sound level is less than the ambient. This is an unfortunate consequence of the fact that the human brain is far more sophisticated than a sound level meter.

4.2 Lower criterion levels

Some members of the community expressed a desire to mandate even lower sound levels. Criterion levels would have to be reduced by about 5 dB to produce a significant shift in community reaction. Rural residents would be the primary beneficiaries of this approach, but diminishing returns are apparent in other areas.

The lowered criterion would approximate the median measured spectra, which means (by definition) that in any given band the ambient would equal or exceed the lowered criterion at half of the evaluated locations. In these areas the ambient would be the *de facto* criterion (see discussion above); the lowered criterion values would not be fully enforceable. Residents might find it frustrating that enforcement is not possible against a noise that they may be able to perceive.

Measurements supporting enforcement would also become more complex. The number of potential ambient sources whose contributions need to be accounted for and avoided or subtracted out increases exponentially, and more exotic windscreens or lower maximum windspeeds would also be required to support low-frequency measurements.

Finally, existing facilities not currently generating complaints would be more likely to be categorized as non-compliant ("false positives"). Concern was expressed that such businesses would find themselves in an uncertain state and that businesses typical in suburban areas would have more difficulty complying with the Ordinance in quiet areas, inhibiting natural growth. In addition, a larger proportion of new and/or expanding facilities would require

¹³ The addition of two equal sound levels yields 3 dB greater than the original level. This happens because decibels are logarithmic expressions of sound energy - doubling the energy corresponds to a 3 dB increase.

noise control plans, each of which would involve more complexity and higher cost that might be difficult to justify.

4.3 Higher criterion levels

Objections may arise that the criterion is too stringent and that criterion levels should be higher. This objection would suggest that a greater degree of Incompatibility should be accommodated before enforcement takes place. In such a scenario a rapidly increasing number of people would be highly annoyed for each decibel increase, especially in quiet areas. Indoor daytime sound levels could rise above 30 dBA, affecting day sleepers like firefighters, police, and medical personnel. In other words, $L_{dn} > 55$ serves as an inflection point for additional negative community reaction.

5. CONCLUSION

Recommended criteria for constant-level industrial and electro-mechanical equipment noise (“steady tonal sound”) have been developed specifically for PWC during this project. They have been derived with extensive reference to well-known guidelines and engineering standards as well as samples of existing sound levels believed to be common within Prince William County. The criterion levels fall into a narrow range where higher levels would be incompatible with residential living and lower levels would cause an increasing number of “false positives” and more difficult enforcement measurements. Particularly in lower frequency bands the criterion values are notably more stringent than other regulations due to the inclusion of recent research on low-frequency noise annoyance.

Effective noise control planning should be required *in advance* to avoid situations in which a facility causes excessive noise as it initially comes online. Residents thus over-exposed may develop enhanced sensitivity to noise, requiring *even more* noise control to achieve a satisfactory result after the fact.

It is hoped that these recommendations will provide Prince William County with a robust, enforceable criterion that balances the needs of residents with future growth. In addition, it is hoped that these criteria will provide clarity for facility designers seeking to identify noise control needs well in advance of construction and operation.

The recommendations described in this memorandum have been specifically tailored to the needs and conditions of Prince William County, VA. While it is believed the methods described herein might be generally applicable, the limit spectra are not portable: detailed study would be needed to adapt them for other municipalities on a case-by-case basis.

NELSON ACOUSTICS (Member NCAC)

www.nelsonacoustical.com

Electronically Reproduced Signature


David A. Nelson, INCE Fellow, INCE Board Certified
Principal Consultant



REFERENCES

1. American National Standards Institute/Acoustical Society of America (ANSI/ASA), Quantities and Procedures for Description and Measurement of Environmental Sound – Part 4: Noise Assessment and Prediction of Long-Term Community Response, ANSI/ASA S12.9-1996/Part 4, and -2005/Part 4.
2. American National Standards Institute/Acoustical Society of America (ANSI/ASA), *Quantities and Procedures for Description and Measurement of Environmental Sound – Part 5: Sound Level Descriptors for Determination of Compatible Land Use*, ANSI/ASA S12.9-2007/Part 5.
3. US EPA and Office of Noise Abatement and Control, Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety, aka “EPA Levels Document”, Publication 550/9-74-004, 1974.
4. American National Standards Institute/Acoustical Society of America (ANSI/ASA), Quantities and Procedures for Description and Measurement of Environmental Sound – Part 3: Short-term Measurements with an Observer Present, ANSI/ASA S12.9-2013/Part 3_R2023.
5. Stevens, K. N., Rosenblith, W. A., & Bolt, R. H., A Community’s Reaction to Noise: Can it be Forecast? Noise Control, January 1955, 63-71 (1955).
6. “Noise Control for Building and Manufacturing Plants”, Hoover and Keith Noise Source, Chapter 2, not publicly available, personal copy, 1993.
7. Deutsche Institut für Normen, *Messung und Beurteilung tieffrequenter Geräuschimmissionen*, DIN 45680 (2020).
8. Kurakata, K., Mizunami, T., Matsushita, K., Percentiles of normal hearing-threshold distribution under free-field listening conditions in numerical form, *Acoustic. Sci. & Tech.* **26**, 5 (2005), pp. 447-449.
9. Shephard, K. P. & Hubbard, H. H., Physical Characteristics and Perception of Low Frequency Noise from Wind Turbines. Noise Control Eng. Journal 36 (1), 5-15 (1991).
10. *Environmental Noise Guidelines for the European Region*, World Health Organization, 2018
11. American National Standards Institute/Acoustical Society of America (ANSI/ASA), Criteria for Evaluating Room Noise, ANSI S12.2-2019.



To: The City of Charlevoix Planning Commission
 From: Jonathan Scheel, Zoning Administrator
 Subject: Zoning Administrator's Report re: thru August 31, 2026

Permits Issued in 2026

Following are two types of breakdowns for all permits issued by the zoning office in 2026:

<u>By month</u>	<u>By type</u>		
January5		<u>Month</u>	<u>Year</u>
February6	Banner permits	3	21
March3	Fence permits	5	9
April.....28	Sidewalk café/use	0	11
May17	Sign	1	11
June.....13	Zoning	6	15
July.....11	Use	0	5
August.....21	<u>Parcel Division</u>	0	2
September	Single-family	0	
October.....	ADU	0	
November	Multi-family	0	1
December	ROW	3	8

The fence, sign & zoning permits break down into the following zoning districts:

	M	Y
Central Business District (CBD)	1	5
Commercial Mixed (CM)	0	5
General Commercial (GC)		1
Industrial		
Marine Commercial (MC)		
Residential Private Club (PC)		1
Public Facilities		
Office	0	2
R-1	5	12
R-2	6	11
Other (LD, Café, Use, ROW)	3	21

Other activities

Level A Site Plan Administrative Review

None

Variances to Zoning Board of Appeals

317 Antrim, Accessory structure (garage)

1' rear variance and 6' 3" side yard variance September 23, 2026

